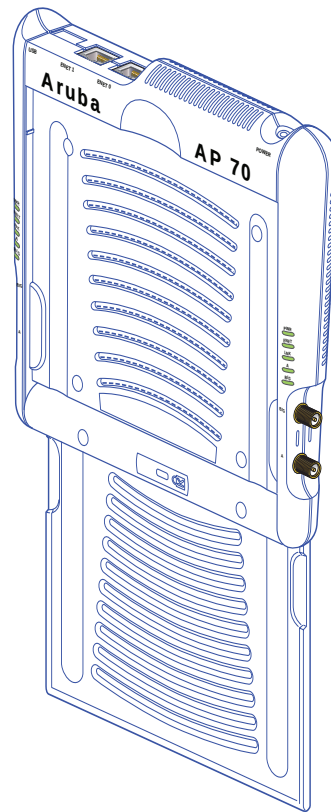


Aruba 70™

Wireless Access Point

Installation Guide



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CHAPTER 1

Introduction

The Aruba 70 is part of a comprehensive wireless network solution. The device works in conjunction with the Aruba WLAN Switch and can act as a wireless access point or air monitor.

As a wireless Access Point (AP), the Aruba 70 provides transparent, secure, high-speed data communications between wireless network devices (fixed, portable, or mobile computers with IEEE 802.11a 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 70 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 AP 70 requires setting the antenna power, which requires professional training. The AP 70 installer must be trained to perform this configuration.

Front View

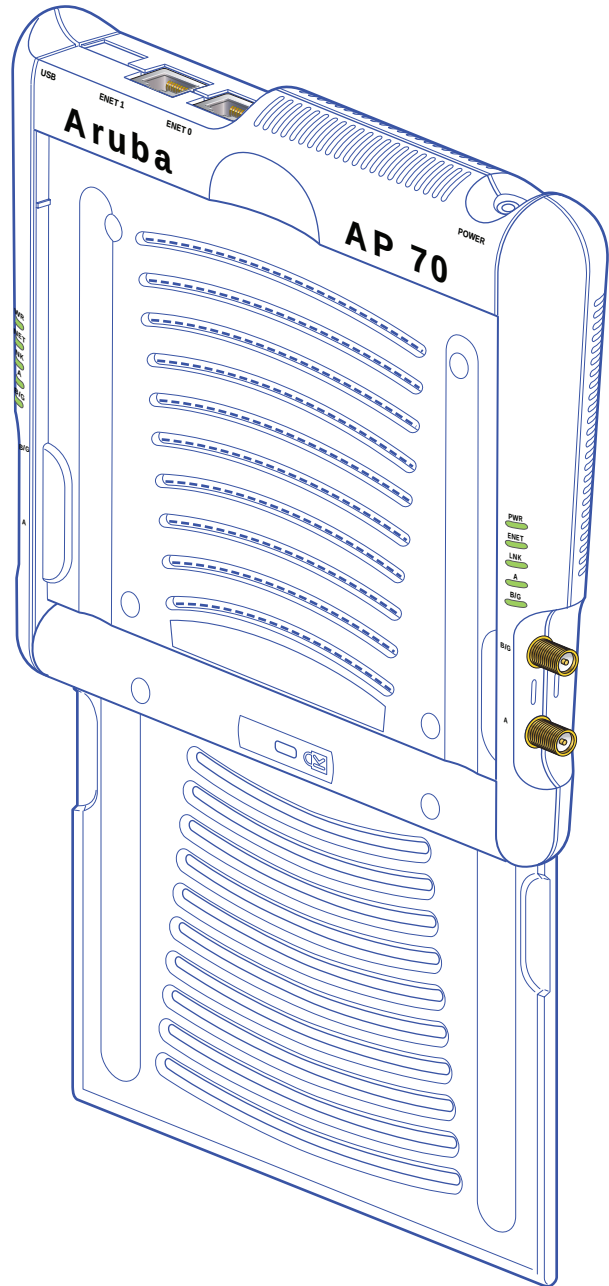


FIGURE 1-1 Aruba 70 Front View

1 Antenna fixtures for Wireless Communications

The AP will have one of the following:

- (A) Aruba AP 70—Two Reverse Polarity SMA (RP-SMA) connectors for attaching separate antennas (not included). For details, see “[Aruba AP 70 Detachable Antennas](#)” on [page 26](#).
- (B) Built-in swivel array with dual, tri-band, omnidirectional antennas

2 Indicator LEDs

During operation, the Aruba 70 LEDs provide the following information:

TABLE 1-1 Aruba 70 LEDs

LED	State	Description
(A) PWR	Off	The device is off - no power.
	Green-Solid	The device is powered and operating.
(B) ENET	Off	No link on the FE port. No connection to the network.
	Green-Solid	Ethernet link detected on the FE port.
	Green-Flashing	Transmitting or receiving data across the FE port. Flashing rate is proportional to network activity.
A	Off	The wireless interface is disabled or down.
	Green-Solid	The wireless interface is enabled and functioning as an Access Point.
	Green-Flashing	The wireless interface is enabled and functioning as an Air Monitor.
B/G	Off	The wireless interface is disabled or down.
	Green-Solid	The wireless interface is enabled and functioning as an Access Point.
	Green-Flashing	The wireless interface is enabled and functioning as an Air Monitor.

Note LEDs on the Aruba WLAN Switch provide additional status and security information about connected APs. See the *Aruba AirOS User Guide* for more information.

3 Air Vents

These vents promote proper air circulation for cooling the device. Do not allow these vents to be obstructed by mounting equipment, network cables, or any other material.

4 FE Ports

The ENET1 and ENET2 ports attach the Aruba 70 to a 10Base-T/100Base-TX (twisted-pair) Ethernet LAN segment. This port also supports Serial and Power Over Ethernet (SPOE).

See [Appendix A](#) for port and cable specifications.

5 USB Ports

>>Terminal support<<.

See [Appendix A](#) for port and cable specifications.

6 DC Power Socket

This socket is used to connect the optional AC power adapter (not included). If POE is being used to supply power to the Aruba 70, the power adapter is not necessary.

7 A Antenna Jack

>><<

See [Appendix A](#) for port and cable specifications.

8 B/G Antenna Jack

>><<

See [Appendix A](#) for port and cable specifications.

Back View

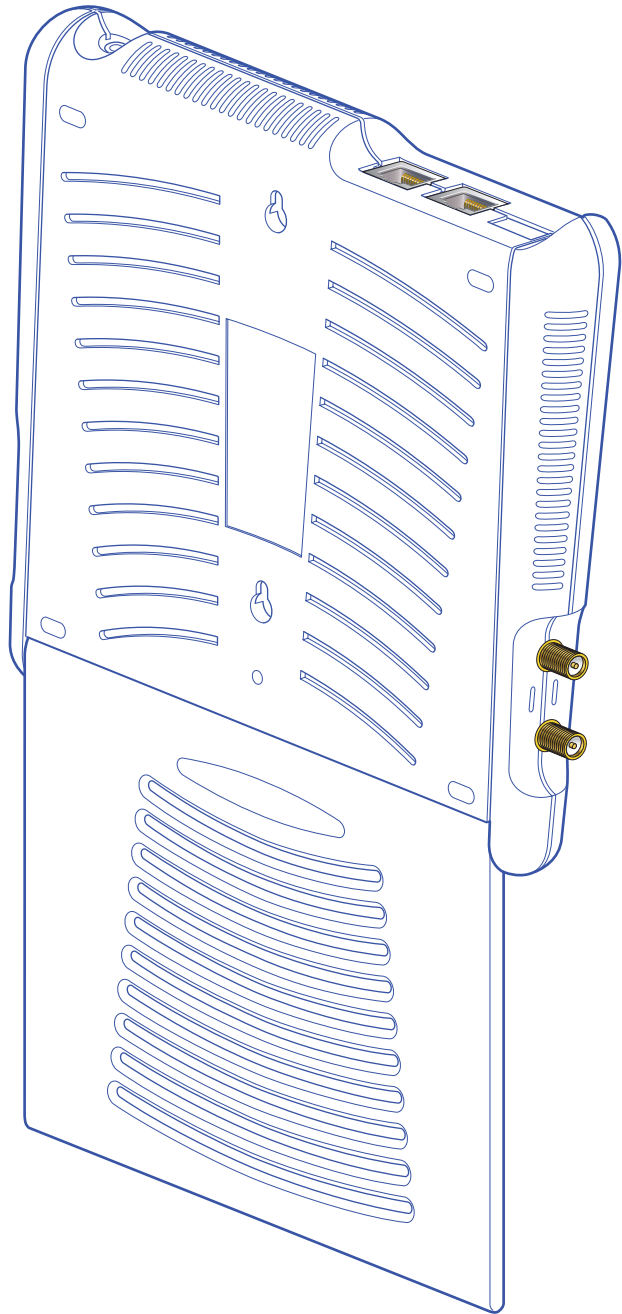


FIGURE 1-2 Aruba 70 Back View

1 Mounting Slots

The keyhole-shaped slots on the back of the chassis are used for mounting the Aruba 70.

2 Air Vents

These vents promote proper air circulation for cooling the device. Do not allow these vents to be obstructed by mounting equipment, network cables, or any other material.

3 Fold-Out Internal Antenna

This fold-out antenna allows the Aruba 70 to be used upright on a table or shelf.

4 Kensington Security Slot

This slot is compatible with a Kensington MicroSaver Security Cable (not included) which can be used to prevent the unauthorized removal of the Aruba 70 from its installed location. To secure the Aruba 70, wrap a security cable around an immovable object, insert the cable's lock into the Kensington Security Slot, and turn the key.

Note The serial number and model number are on the bottom of the unit.>><<

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 WLAN Switch. 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 [Chapter 2](#).

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

AP deployment is covered in [Chapter 3](#).

- 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 *Aruba AirOS User Guide*.

CHAPTER 2

Provisioning Access Points

Access Points are radio broadcast devices and as such are subject to governmental regulation. Network administrators responsible for the configuration and operation of Access Points must comply with local broadcast regulations. Specifically, Access Points must use channel assignment and antenna gain settings (for detachable antennas) appropriate to the location in which the Access Point will be used. Aruba Networks, in compliance with governmental requirements, has designed the AP 70 such that only authorized network administrators can change these settings. Once an administrator changes the antenna gain configuration, the Aruba software automatically adjusts the power level to the appropriate setting. For more information on Access Point configuration, refer to the *User Guide*. For information on setting the antenna gain, see [Figure 2-2](#).

Provisioning provides the AP with initial network settings that allow it to locate the host Aruba WLAN Switch. The following provisioning methods (listed in the order of preference recommended by Aruba Networks) are available:

- **Plug and Play**—Also known as the Aruba Discovery Protocol. This is the easiest method for AP provisioning. With plug and play, Aruba APs can be connected to the network and brought into operation automatically. Although plug and play requires no manual intervention for the APs, this method does require specific services to be configured on your network in advance.
- **AP Provisioning**—Using this AP programming mode, AP configuration parameters are defined on the WLAN switch (using the CLI or Web interface) and then uploaded to the APs.

This method can be used for adding Aruba APs to a highly customized network, or greatly simplified for the most common provisioning.

- Manual Provisioning—APs can be individually provisioned using a serial console terminal connected to the AP. Although this method is complex and requires considerable care, manual provisioning can be used in almost any scenario, with or without access to the WLAN switch.

Note Manual provisioning is intended for use when no Aruba WLAN Switch is available, and is not generally recommended as the primary method of AP provisioning. Plug and play or AP programming mode are the preferred provisioning methods.

Each of these three methods is explained in the following sections. Use these procedures for initial provisioning of APs. To change the configuration for APs that have already been provisioned, go to Maintenance > Program AP > Re-Provision. See the *User Guide* for more information on reprovisioning existing APs.



CAUTION—When an AP 70 powers up for the first time, the WLAN switch will recognize that it is detachable-antennas capable. The network administrator must set the antenna gain manually (in Maintenance > WLAN > Program AP > Provision) before the AP 70 can function as an Access Point. Until the antenna gain is set, the AP 70 with detachable antennas will function as an Air Monitor but will not process wireless packets as an Access Point. Refer to the User Guide for instructions on manually setting antenna gain.

Aruba Discovery Protocol

Aruba Discovery Protocol (ADP) is a plug and play provisioning tool for AP 70 Access Points. ADP performs two tasks:

- Obtains the IP address of the TFTP server from which it downloads the AP boot image
- It discovers the IP address of the master Aruba WLAN switch in the network from which the AP can download its configuration.

The address of the TFTP server that ADP discovers is the equivalent of the BOOTROM environment variable *serverip*. The IP address of the Aruba master switch is the equivalent of the environment variable *master*.

ADP can discover these values using DHCP or by discovery. In the case of DHCP, ADP relies on a DHCP server which is configured to return the IP address of the Master switch using the Vendor Specific Options in DHCP. To facilitate ADP, Aruba APs include this Vendor Specific

Option in the requested Option list, and if the DHCP server is configured to return the IP address of the Master switch, the IP address will be a part of the DHCP response. This is used by the AP to get its image as well as its configuration.

Discovery of the *serverip* and *master* variables is necessary when the DHCP response does not include the Vendor Specific option. The AP attempts to discover an Aruba Master switch by sending multicast packets and broadcast packets on its subnet. To use the ADP discovery method, the ADP discovery mechanism needs to be enabled on the Aruba Master Switch (using the **adp discovery enable** command).

If multicast routing is enabled in the IP network between the AP and the Master switch (which can be any one or more Aruba WLAN switches in the network), the IGMP-Join option should be enabled on the Aruba WLAN switch (using the **adp igmp-join enable** command). If multicast routing is not enabled on the network, the Aruba WLAN switches need to be on the same broadcast domain as the AP or an “IP Helper” must be configured to direct the broadcast ADP packets to the Aruba WLAN switch.

Once these discovery prerequisites are met, the switch will respond to APs with the IP address of the Master Aruba switch. The APs can then obtain their image and configuration.

To enable ADP on an Aruba WLAN switch, enter:

```
(A5000) (config) #adp discovery enable
```

To enable IGMP-Join on an ADP multicast group on an Aruba WLAN switch, enter:

```
(A5000) (config) #adp igmp-join enable
```

Note If you have location-specific configurations for your Access Points, you will need to apply this configuration information using AP Reprovisioning. Refer to the *User Guide* for details on AP Reprovisioning and see the feature description below.

AP Reprovisioning

AP Reprovisioning is the process by which APs are assigned, for example, location codes. Location codes are important for recalibration and triangulation. For details on AP Reprovisioning, see the *User Guide*.

AP Provisioning

AP Provisioning is useful for brand new APs with default configurations. To perform AP Provisioning from the GUI:

- 1 Go to **Maintenance > Program AP**.

On this window, there are two tabs: **Provisioning** and **Reprovisioning**. The Provisioning tab is selected by default.

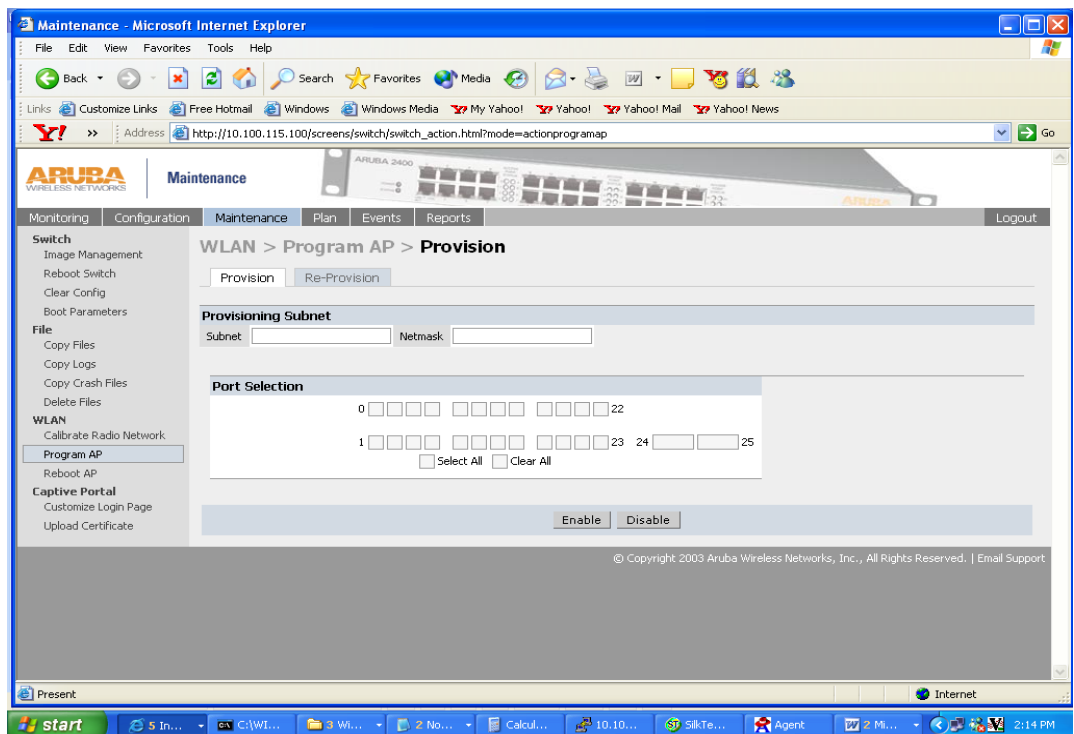


FIGURE 2-1 Provisioning Tab

- 2 Configure the APs Subnet and Netmask.

This is the subnet from which the AP gets an IP during provisioning. (This is not the IP address the AP will use when deployed.)

- 3 Select the **Port** or Port range for provisioning.

To set the Port Range, select the first and the last ports of your range. All the ports in between are automatically selected. (Ports have to be sequentially assigned.)

- 4 Enter the required information and click **Enable**. The Port Range screen displays.

WLAN > Program AP > Provision > Port Range 2/8

AP Parameters

Location:

AP-70 Model-specific Parameters

Antenna Selection

☒ Internal Antenna ☐ External Antenna

Port Configuration

☒ Active/Standby ☐ EtherChannel

AP-60/AP-70 External Antenna Parameters

5 GHz Antenna Gain (dBi): 2 GHz Antenna Gain (dBi):

Master Discovery

☒ Use Aruba Discovery Protocol

☐ Host Switch IP Address: Master Switch IP Address:

☐ Host Switch Name:

IP Settings

☒ Obtain IP Address Using DHCP

☐ Use the following IP Address

IP Address: Subnet Mask:

DNS IP Address: Domain Name:

Gateway IP Address:

AP List

Index	Slot/Port	AP MAC/IP	Location	Master IP	Host IP/Name	IP	GW IP/DNS IP/Domain	5GHz/2GHz Gain	Ext Antenna	Port Cfg	St
No APs are currently connected for provisioning											

P = Provisioned U = Unprovisioned IP = In Progress

Apply Cancel

FIGURE 2-2 Port Range Screen

- 5 Plug the AP into one of the ports configured for provisioning.

If your AP is already plugged into the port, unplug it and plug it in again.

If AP is connected through POE, enter (in interface mode) **no poe** followed by **poe**.

The AP will come up with an IP from the provisioning subnet

After the AP comes up it should be in the provisioning list. Provisioning list shows the list of APs which are plugged into the provisioning ports.

- 6 Click the **Refresh** link (not the browser Refresh option) to see if the AP entry has displayed. (This might take a moment.)

If you cannot see the entry after 1–2 minutes, click **Refresh** again.

The **Clear Table** button appears after an entry in the list appears.

To erase all the table entries, click **Clear Table**. (You cannot clear selected entries.) If a number of APs are provisioned and you click **Clear Table**, only the entries which come up afterwards can be provisioned.

If the entry does not show up in the AP list, check network connectivity. Go to the AP console and verify if the AP has come up with the IP from the provisioning subnet.

- 7 After the entry shows up on the page, configure the **location**, **Host IP/Name**, **Master IP address**.

If AP is going to be assigned a static IP, click **Use the following IP Address** and enter the **IP address**, **Netmask**, **Gateway IP**.

If the AP is going to obtain an IP address using DHCP, click **Use IP Address Using DHCP**.

- 8 After configuring the required parameters, select the entry from the list (AP to which the configuration has to be applied) and click **Apply**.

The State field changes from **U (Unprovisioned)** to **In Progress**.

- 9 After a few seconds, click the **Refresh** link again and the State will have changed to **P (Provisioned)**.

Note Check that the configured parameters are reflected in the AP list entry.

Note Aruba Networks recommends that you provision each AP for a unique location as suggested by site-survey planning. Label each AP with this location information and place the AP in its proper location. Failure to place APs in the location for which they were provisioned will reduce the effectiveness of such RF features as triangulation.

- 10 Click **Back** to go into the previous page

We can see that the Subnet is still configured and Port/s are selected.

- 11 When finished provisioning APs, click **Disable** to disable AP Provisioning.

Note Disable AP Provisioning after all the required APs are provisioned. Ports that are enabled for provisioning do not handle traffic. Therefore plugging an already provisioned AP into a port still set to provisioning mode will prevent that AP from functioning.

Now the AP is configured with the Parameters given

12 Reboot the AP so the AP will come up with the new configured parameters.

Use the Reprovisioning tab for APs which are already deployed but need to be reconfigured. See the *AirOS User Guide* for information on reprovisioning.

Manual Provisioning

Requirements

- A console terminal (or workstation with terminal emulation software) with an available serial communications port using a DB-9 male connector.
- An Aruba serial breakout adapter kit, Part Number CA-SPOE-ADAPT-3, (not included). (See [“Connecting the Console Terminal”](#) on [page 17](#).)
- Access to the Aruba 70 FE port through one of the following:
 - Direct contact with the AP, or
 - If the AP is already deployed, you must have access to the end of the FE cable that leads directly to the AP with no intervening hubs, routers, or other networking equipment.

The cable must be an 8-conductor, Category 5 UTP, straight-through FE cable with RJ-45 connectors.
- A power source for the Aruba 70. Use one of the following:
 - An optional AC power adapter (not included) and an AC power outlet rated at 100~240 V, 50~60 Hz, or
 - The Aruba 70 FE port connected to an Aruba 800, 2400, or 5000 WLAN switch that supports IEEE 802.3af Power Over Ethernet (POE) via a 4- or 8-conductor, Category 5 UTP, straight-through FE cable.¹

Note	Only IEEE 802.3af Power Over Ethernet is supported for manual provisioning. “Inline” or “midspan” POE devices requires Aruba serial breakout adapter, Part Number CA-SPOE-ADAPT-4.
-------------	---

1. IEEE 802.3af-complaint devices like the AP 70 use the same wire pairs for data versus for power. Within the 802.3af standard, there are two sub-specifications on how wire pairs are assigned. Aruba conforms to 802.3af, subparagraph a. If your POE installation uses all-Aruba equipment, you are assured proper operation. However, if you use non-Aruba POE equipment, make sure it conforms to the same standard that Aruba uses. Using POE equipment using IEEE 802.3af subparagraph b wiring assignments, or POE equipment not conforming to the 802.3af standard may result in damaged equipment.

Connecting the Console Terminal

Manual provisioning requires this procedure. You must use the serial console breakout adapter cable to be able to access the serial console interface to the AP 70 while allowing the device to be powered by the AC adapter or POE (from an Aruba WLAN switch).

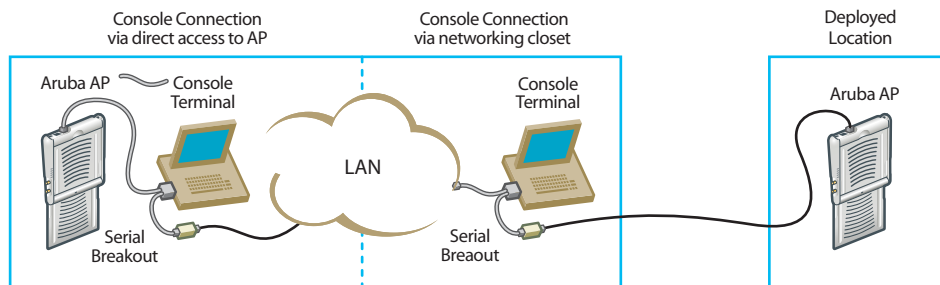


FIGURE 2-3 Aruba 70 Console Topologies

Note The LAN connections are optional unless POE is used to power the AP.

Console Access to the AP

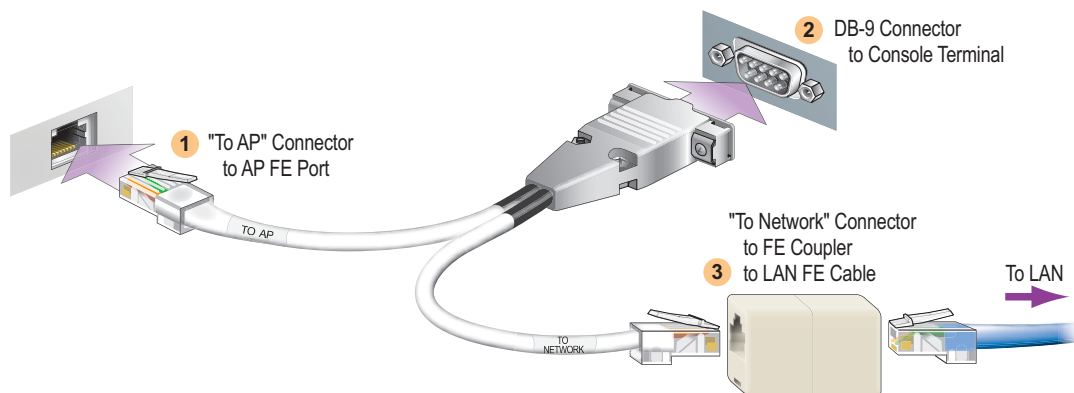


FIGURE 2-4 Connecting Directly to the AP

- 1 Connect the adapter's "To AP" RJ-45 connector to the Aruba 70 FE Port.
- 2 Connect the adapter's DB-9 connector to the serial port on the console terminal.
- 3 Connect the adapter's "To Network" RJ-45 connector to the LAN.

The LAN connection is optional unless POE is being used to power the AP. For convenience, the adapter kit includes an FE coupler to connect RJ-45 cable ends together.

4 Connect power to the Aruba 70.



CAUTION—Be sure to comply with electrical grounding standards during all phases of installation and operation of the AP. Do not allow the Aruba 70 or optional power adapter (if used) to be connected to or make contact with metal or power outlets on a different electrical ground than the device to which it is connected. Also, never connect the AP to external storm grounding sources.

The Aruba 70 can receive electrical power using the following options:

- POE—If connecting the Aruba 70 to a device that supplies IEEE 802.3af compliant POE, no additional power connection is necessary.
- Power Outlet

Note

When the Aruba 70 is installed in an air-handling space, as described in NEC (2002) Article 300.22(C), POE must be used instead of a power outlet.

If local regulations and practices permit, connect the optional AC power adapter (not included) to the DC power socket on the rear panel of the Aruba 70 and plug it into an appropriate power outlet.



CAUTION—To prevent personal injury or damage to equipment, use only the AC power adapter certified for this device in the country where it is used.

Note The indicator LEDs on the Aruba 70 will remain dark during this procedure.

5 Set your local terminal to use the following communications:

TABLE 2-1 Console Terminal Settings

Baud Rate	Data Bits	Parity	Stop Bits	Flow Control
9600	8	None	1	None

6 Establish console communication.

Press <Enter> a few times to establish communication between the Aruba 70 and terminal.

7 From the Aruba 70 console, access the apboot prompt.

Depending on the Aruba 70 status, you will see one of the following on your terminal:

- Autoboot countdown—The countdown prompt allows you to interrupt the normal startup process and access the apboot prompt where provisioning is performed.

```
APBoot 1.2.1 (Apr  7 2004 - 08:54:57)
```

```
CPU:   AR2313 MIPS-32 at 180 MHz: 16 kB I-Cache 16 kB D-Cache
Board: Merlot Local Bus at 90 MHz
DRAM:  32 MB
POST:  passed
FLASH: 4 MB
Net:    en0 lo0
```

```
Hit any key to stop autoboot:  0
```

To access the apboot prompt, press any key (such as <Enter>) before the timer expires. If the countdown expires before you can interrupt it, turn the device off and then back on.

- TFTP time out—If the Aruba 70 cannot locate an Aruba WLAN Switch on its network port, the following type of output is repeatedly displayed:

```
Loading FLASH image...
Verifying checksum... failed!
BOOTP broadcast 1
DHCP IP address:    10.1.2.250
DHCP subnet mask:  255.255.255.0
DHCP def gateway:   10.1.2.1
DHCP DNS server:    10.1.1.2
DHCP DNS domain:    arubanetworks.com
DHCP Aruba server:  10.1.2.11
Loading elf file: 10.1.2.11:mips.ari
Loading: T T T T T T T T
Retry count exceeded; starting again
```

Press <Control-C> to interrupt this process and access the apboot prompt.

Once the apboot prompt is displayed, perform provisioning as described in the next section.

Setting Aruba 70 Parameters

- 1 From the **apboot** prompt, configure the host information, if necessary.

In order to provide centralized management of the APs, each Aruba AP downloads its software image and configuration files from a master Aruba WLAN Switch.

Setting the correct host information depends on the following:

- Does your network use direct IP addresses or DNS with host names?
- If using host names, is **aruba-master** acceptable for the master WLAN switch, or do you need to define a different name?

Depending on your answers, select one of the following steps:

- **My network uses DNS and the **aruba-master** host name is acceptable.**

This is the default. It requires your DNS to be configured to resolve “aruba-master” to the IP address of the master Aruba WLAN Switch. Unless your system has been previously configured for different settings, you can skip to Step 2.

Otherwise, if your system was previously configured for a different setup, manually set the **servername** environment variable to the default host name:

```
apboot> setenv servername aruba-master
```

Note The **master** and **serverip** environment variables also affect how AP source files are selected and should be cleared when using this approach. To clear a variable, enter the **setenv variable** command with no host name or address value:

```
apboot> setenv master
apboot> setenv serverip
```

When finished, proceed to Step 2.

- **My network uses DNS, but I will use a different host name for the WLAN switch.**

This requires that the **servername** variable be configured with your chosen host name for the master Aruba WLAN Switch. It also requires that your DNS be configured to resolve the specified host name to the IP address of the master Aruba WLAN Switch.

To manually set the host name, use the following command:

```
apboot> setenv servername <WLAN switch host name>
```

Note The `master` and `serverip` environment variables also affect how source files are selected and should be cleared when using this approach. To clear a variable, enter the `setenv variable` command with no host or address value.

When finished, proceed to Step 2.

- **My network uses direct IP addresses instead of DNS.**

If using direct IP addresses in your network, use the following commands:

```
apboot> setenv serverip <WLAN switch IP address>
apboot> setenv master <WLAN switch IP address>
```

Note If the `servername` variable is configured in this scenario, it will be ignored.

2 Specify an IP address for a specific AP, if necessary.

If using DHCP, the AP will obtain its IP address automatically and you can skip this step. Otherwise, configure the AP with a static IP address using the following commands:

```
apboot> setenv ipaddr <static IP address for the AP>
apboot> setenv netmask <static IP address mask>
apboot> setenv gatewayip <default gateway IP address>
```

3 Set the location for the specific AP, if necessary.

Location settings depend on how much control you want over configuring logical groups of APs in the future.

- **Default Locations**

If you wish all APs treated as a single entity for configuration and accounting purposes, you can use the default location profile (255.255.65535) and skip to Step 5.

Note If using default locations during initial provisioning, you can later reconfigure the APs to use specific location IDs using the Aruba WLAN Switch management tools.

- **Specific Locations**

By setting specific location IDs for each AP, you can later apply configuration changes or collect statistics and information for specific groups of APs (for example, all APs on a particular floor in a particular building).

To set a specific location for an individual AP, the following command is used:

setenv location *<building number>* . *<floor number>* . *<device number>*

where the following fields are required:

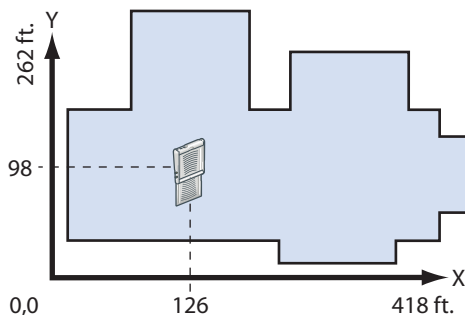
<i>Building Number</i>	A unique number (1-254) is required for each building in your campus.
<i>Floor Number</i>	Within any building, a unique number (1-254) is required for each floor.
<i>Device Number</i>	Within any floor, a unique number (1-65534) is required for each access point or air monitor.

If you performed the recommended site survey using the Aruba RF Plan tool, the location data for all access points and air monitors can be found on the tool's deployment page (see the *Aruba RF Plan User's Guide*).

If you prefer to enter the location data manually, record the location ID you set for each access point and air monitor along with the following:

Device Description Note the intended function of the device (access point or dedicated air monitor) and a brief description of its service location.

X, Y Coordinates For each access point and air monitor, measure its X and Y position (in feet) relative to the bottom-left corner of the building plan as seen from overhead. For example:



Use the same fixed point and orientation for all floors in a building.

4 Save the configuration and reboot the Aruba 70.

```
apboot> save
apboot> boot
```

Once the Aruba 70 boots, disconnect it and mount it in its intended service location (see [Provisioning Access Points](#) on page 25).

CHAPTER 3

AP Deployment

This chapter covers the following topics:

- Physical mounting of the Aruba 70
- Connecting the required cables

Mounting the Aruba 70

When provisioning is complete, mount the Aruba 70 at its intended service location.

The Aruba 70 Access Points with or without external antennas are intended only 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 connections. (When using an external antenna, 5.150 to 5.250 MHz are blocked.)

Select a location as close as possible to the center of the intended coverage area. If necessary, use the Aruba RF Plan site survey tool to determine the optimum locations for your access points and air monitors.

The service location should be free from obstructions or obvious sources of interference. Normally, the higher you place an access point or air monitor, the better its performance.

If external antennas are used, make sure that they and their associated wiring are located entirely indoors. The Aruba 70 and any optional external antennas are not suitable for outside use.

The Aruba 70 can be mounted on a wall or suspended from above (not shown) using one of the optional mounting kits (dimensions vary) in the following ways:

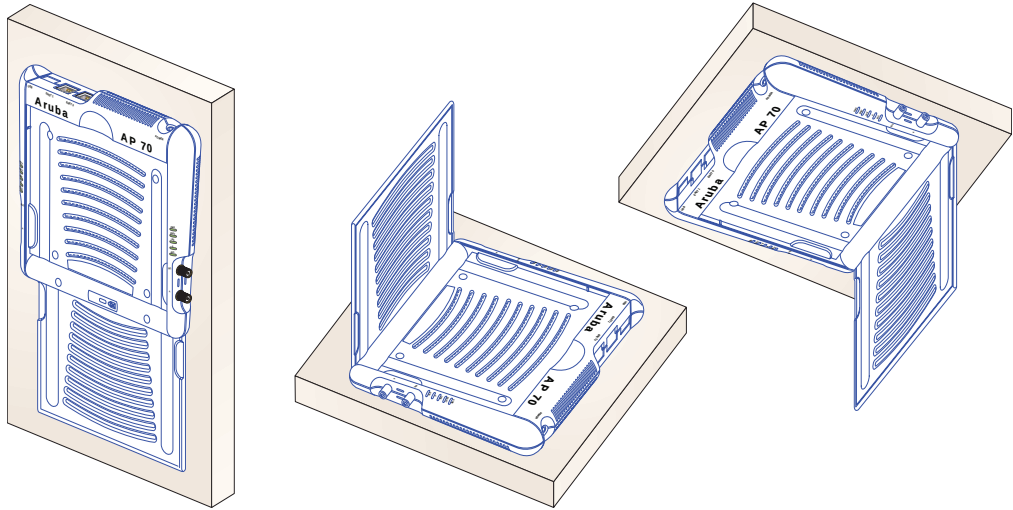


FIGURE 3-1 Aruba 70 Mounting Options

Note For dimensions, see [“Product Specifications”](#). Allow 5 cm (2") additional space on the right-hand side for cables. Measurements for the Aruba AP 70 depend on attached antennas, which vary.

Aruba AP 70 Detachable Antennas

Before deploying the Aruba AP 70, attach the appropriate antennas (not included, see [“FCC-Approved Detachable Antennas”](#)). The antenna connections should be tightened by hand to avoid overtightening.

The Aruba AP 70 has dual Reverse Polarity SMA (RP-SMA) female antenna connectors that accept a variety of high-gain detachable antennas. See [Table 3-1](#) for the list of FCC approved antennas tested for use with the Aruba AP 70.

Make sure that all external antennas and their associated wiring are located entirely indoors. The Aruba AP 70 Access Points and their optional external antennas are not suitable for outside use.

FCC-Approved Detachable Antennas

The following table lists the antennas which are approved for use with the AP 70.

TABLE 3-1 FCC-Approved Detachable Antennas

Aruba Part #	Description	Gain dbi	Manufacturer	Man. Part #
MULTI-BAND ANTENNA				
AP-ANT-1	Tri-Band, High-Gain, Omni-Directional Antenna (Indoor) (Swivel Connector)	5	Nearson	T614AH-2.45/5.X-S
2.4Ghz (802.11B/G)				
AP-ANT-2	High-Gain, Omni-Directional Cylindrical (Indoor) with RP-SMA Connector	6	Centurion	IG2450-RPSM A
AP-ANT-3	High-Gain, Bi-Directional Patch Antenna (Indoor) with RP-SMA Connector	5	Centurion	IB2450-RPSM A
AP-ANT-4	High-Gain, Directional Patch Antenna (Indoor) with RP-SMA Connector	9	Centurion	ID240-RPSM A/CAF94379
AP-ANT-5	Down-Tilt, Omni-Directional Patch Antenna (Indoor) with RP-SMA Connector	3.5	Cushcraft	SQ2403PG36R SM
AP-ANT-7	High-Gain Directional Patch Antenna (Indoor / Outdoor) with RP-SMA Connector	11.5	HD Comms. Corp	PCW24-08012-AFL/HD1965 6

TABLE 3-1 FCC-Approved Detachable Antennas (Continued)

AP-ANT-8	High-Gain, Omni-Directional Cylindrical (Indoor / Outdoor) with RP-SMA Connector	5	Cushcraft	S2403BPX36R SM
5Ghz (802.11A)				
AP-ANT-10	High-Gain, Omni-Directional Cylindrical (Indoor / Outdoor) with RP-SMA Connector	5.5	Cushcraft	S5153WPX3 6RSM
AP-ANT-11	Down-Tilt, Omni-Directional Patch Antenna (Indoor) with RP-SMA Connector	3.5	Cushcraft	SQ5153WP36 RSM
AP-ANT-12	High-Gain, Directional Patch Antenna (Indoor / Outdoor) with RP-SMA Connector	14	Cushcraft	S52514WP36R SM

Free-Standing Placement

To place the Aruba 70 indoors on a flat table or shelf:

- 1 Flip open the Aruba 70 >>panel<<:
- 2 Place the device on a sturdy table or shelf.



CAUTION—Do not place the Aruba 70 in any place where it could fall on people or equipment. For more secure installation, use one of the optional mounting kits.

- 3 Orient the antennas.

For best performance, swivel the individual antennas or antenna array so that they are oriented vertically. Once mounting is complete, connect the required cables (see instructions on [page 31](#)).

Using the Built-In Mounting Slots

The keyhole-shaped slots on the back of the Aruba 70 can be used to attach the device upright to an indoor wall or shelf.



CAUTION—Do not use the mounting slots to hang the Aruba 70 from the ceiling, sideways, or in any place where it could fall on people or equipment. For more secure installation, use one of the optional mounting kits.

To hang the Aruba 70 upright using the mounting slots, perform the following steps.

- 1 Install two screws in the wall or shelf as shown in [Figure 3-2](#):

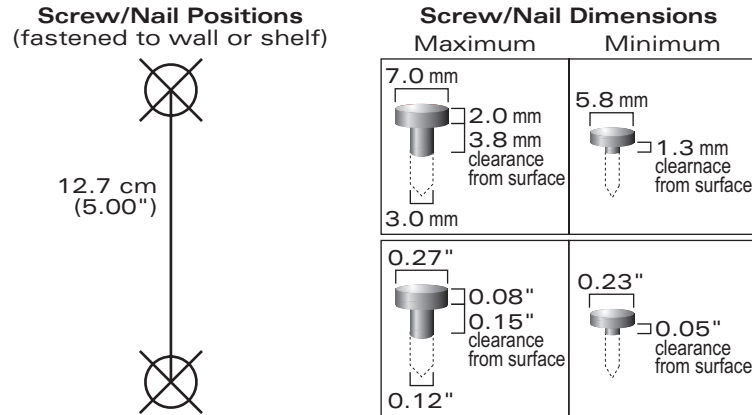


FIGURE 3-2 Mounting Screw Specifications

If attaching the device to drywall, we recommend using appropriate wall anchors (not included) as shown in [Figure 3-3](#) on [page 30](#).

- 2 Align the Aruba 70 mounting slots to capture the surface screws.

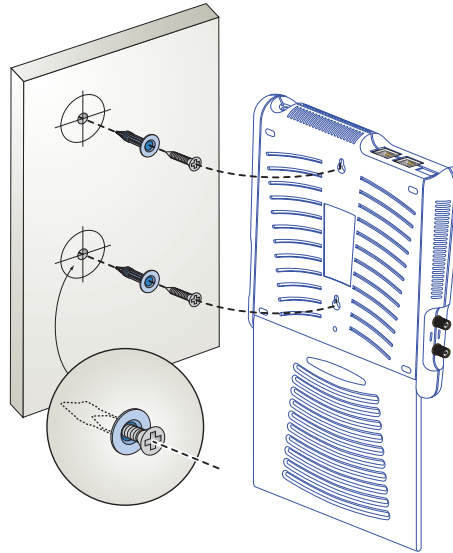


FIGURE 3-3 Hanging the Aruba 70 on Screws

- 3 Secure the Aruba 70, if desired.

To prevent the unauthorized removal of the Aruba 70 from its installed location, use a Kensington MicroSaver Security Cable (not included). Wrap the security cable around an immovable object, insert the cable's lock into the Kensington Security Slot on the back of the Aruba 70, and turn the key.

- 4 Orient the antennas.

For best performance, swivel the individual antennas or antenna array so that they are oriented vertically (see [Figure 3-1](#) on [page 26](#)). Once mounting is complete, connect the required cables (see instructions on [page 31](#)).

Using the Optional Mounting Kits

Use the optional mounting kit to attach the Aruba 70 to a wall, shelf, or ceiling. For installation, see the *Aruba AP 70 Mounting Kit Installation Notes* (P/N 0500037-01) provided with each kit.

Connecting Required Cables

The Aruba 70 Access Points with or without external antennas are intended only 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 connections.

Selecting an FE Cable

The 10/100 Mbps Ethernet (FE) port is used to connect the AP to a 10Base-T/100Base-TX (twisted-pair) Ethernet LAN segment. The appropriate FE cable depends on the features required of the FE port:

- **SPOE**

When connecting the AP to a device that supports Serial and Power Over Ethernet (SPOE), use an 8-conductor, Category 5 UTP, straight-through FE cable.

The Aruba 5000 (with Line Card LC-5000-24FE-2GE-SPOE), the Aruba 2400, and the Aruba 800 support SPOE.

- **POE**

If the connecting device supports only Power Over Ethernet (POE), use a 4- or 8-conductor, Category 5 UTP, straight-through FE cable.

- **Network Only**

If the connecting device does not support POE, use a 4- or 8-conductor, Category 5 UTP, FE cable. The port detects MDI/MDX and automatically adjusts for straight-through or crossover cables.

The maximum length for FE cables is 100 meters (325 feet).

When the Aruba 70 is installed in an air-handling space, such as above suspended ceilings, as described in National Electrical Code (2002) Article 300.22(C), and Canadian Electrical Code, Sections 2-128, 12-010(3) and 12-100, Part 1, CSA C22.1, POE is required. Also, any FE cable installed in such 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, or CMP.

Use the built-in antenna or use Aruba AP-ANT-1. For all other antennas, make sure the antenna cable is UL listed and suitable for use in plenums and air-handling spaces, such as CL2-P, CL3-P, MPP, or CMP, and mount the antenna outside of the air-handling space.

Install cables in accordance with all applicable local and national regulations and practices.

For more port and cable details, see [Appendix A](#).

Connecting Cables & Power



CAUTION—To prevent personal injury or damage to equipment, be sure to comply with electrical grounding standards during all phases of installation and operation of the AP. Do not allow the Aruba 70 or its attachments to be connected to or make contact with metal or power outlets on a different electrical ground than the device to which it is connected. Also, never connect the AP or WLAN Switch to external storm grounding sources.

- 1 Connect one end of the FE cable directly to the Aruba 70 FE port.
- 2 Connect the other end of the FE cable to one of the following:
 - A To a network port on the Aruba WLAN Switch, or
 - B To a network hub, router, or switch that has a routable path to the Aruba WLAN Switch.

Note If the connecting device supplies POE, a straight-through cable must connect the Aruba 70 directly to the powering device without any intervening hubs, routers, or other networking equipment.

- 3 Connect power, if necessary.

The Aruba 70 can receive electrical power using the following options:

- POE

If connecting the Aruba 70 to a device that supplies IEEE 802.3af compliant POE no additional power connection is necessary.

- Power Outlet

Note When the Aruba 70 is installed in an air-handling space, as described in NEC (2002) Article 300.22(C), POE must be used instead of a power outlet.

If local regulations and practices permit, connect the optional AC power adapter (not included) to the DC power socket on the Aruba 70 and plug it into an appropriate power outlet.



CAUTION—To prevent personal injury or damage to equipment, use only the AC power adapter certified for this device in the country where it is used.

APPENDIX A

Port Specifications

FE Port

The 10/100 Mbps Ethernet (FE) port is located on the right-hand side of the Aruba 70 and has an RJ-45 female connector. The port pin-outs are shown in [Figure A-1](#) :

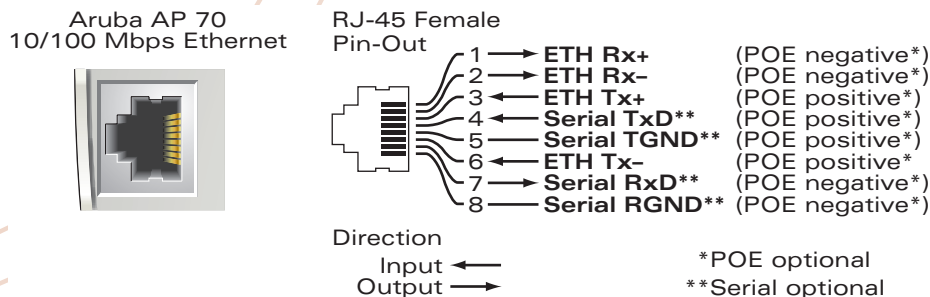


FIGURE A-1 Aruba 70 FE Port>>The AP can be powered over pins 1/2, 3/6, 4/5, and 7/8.)- replace graphic<<

The appropriate cable depends on the level of connectivity required of the FE port:

- If the connecting device supports Serial and Power Over Ethernet (SPOE), use an 8-conductor, Category 5 UTP, straight-through FE cable with a male RJ-45 connector. (The Aruba 5000 (with Line Card LC-5000-24FE-2GE-SPOE), the Aruba 2400, and the Aruba 800 support SPOE.
- If the connecting device supports only Power Over Ethernet (POE, including IEEE 802.3af POE as well as “inline” or “midspan” POE devices), use an 8- or 4-conductor, Category 5 UTP, straight-through FE cable with male RJ-45 connectors.
- If the connecting device does not support Serial or POE, use a 4- or 8-conductor, Category 5 UTP, FE cable with male RJ-45 connectors. The port detects MDI/MDX and automatically adjusts for straight-through or crossover cables.

The maximum length for FE cables is 100 meters (325 feet).

When the Aruba 70 is installed in an air-handling space, as described in NEC (2002) Article 300.22 (C), POE is required. Also, any FE cable installed in such 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 or CMP.

Install cables in accordance with all applicable local regulations and practices.

Serial Breakout Adapter

The optional serial breakout adapter is used to separate the serial communications lines from the Aruba 70 FE+SPOE port. This allows the administrator to connect a local serial console directly to the AP and access the `apboot` prompt for manual provisioning.

The serial breakout adapter pin-outs are shown in [Figure A-2](#) :

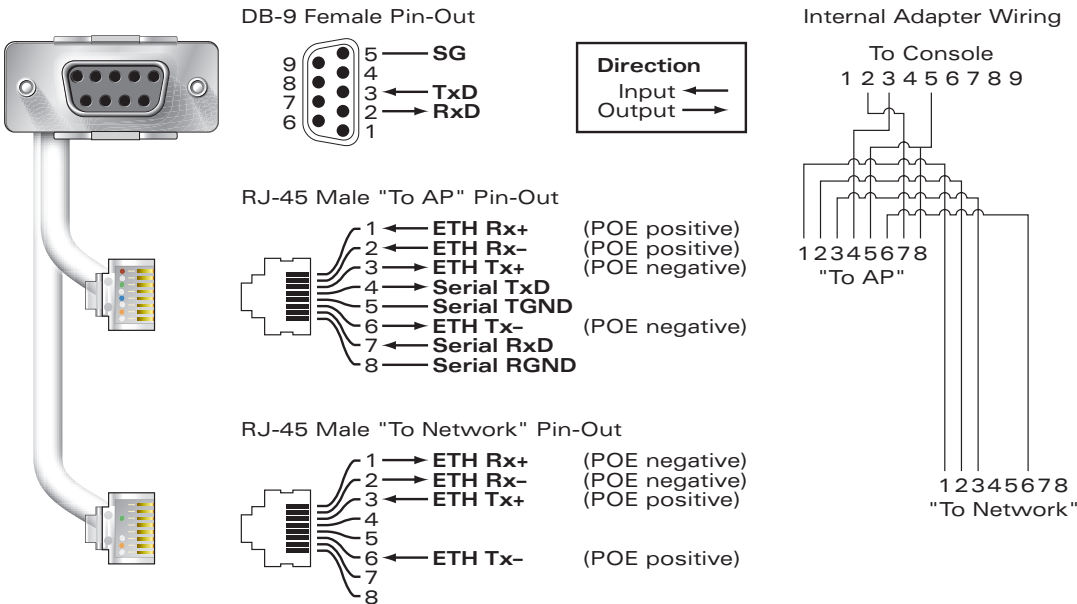


FIGURE A-2 Aruba Serial Breakout Adapter

DB-9 Specification

The DB-9 connector attaches to the serial port of a console terminal. Communication settings for the port are specified in [Table A-1](#) :

TABLE A-1 Console Terminal Settings

Baud Rate	Data Bits	Parity	Stop Bits	Flow Control
9600	8	None	1	None

“To AP” Specifications

The RJ-45 connector labeled “To AP” attaches to the Aruba 70 FE port either directly (if the AP is physically available) or indirectly (if the AP is already deployed).

When connecting indirectly, use a straight-through FE coupler to attach the “To AP” connector to the FE cable leading directly to the AP’s FE port with no intervening hubs, routers, or other network equipment. The cable must be 8-conductor, Category 5 UTP, straight-through FE cable with a maximum length of 100 meters (325 feet).

The Aruba 70 and serial breakout adapter are plenum rated. When is installed in an air-handling space, as described in NEC (2002) Article 300.22(C), any connecting FE cable 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 or CMP.

Install cables in accordance with all applicable local regulations and practices.

“To Network” Specifications

The RJ-45 connector labeled “To Network” attaches to an FE LAN segment. This connection is optional unless IEEE 802.11af Power Over Ethernet (POE) is used to power the AP during manual provisioning.

A straight-through FE coupler may be used to attach the “To Network” connector to a LAN FE cable. The appropriate cable depends on the level of connectivity required of the FE port:

- If the connecting device supports IEEE 802.3af Power Over Ethernet (POE), use a 4- or 8-conductor, Category 5 UTP, straight-through FE cable with male RJ-45 connectors.
The Aruba 5000 (with Line Card LC-5000-24FE-2GE-SPOE), the Aruba 2400, and the Aruba 800 support SPOE.
- Otherwise, use a 4- or 8-conductor, Category 5 UTP, FE cable with male RJ-45 connectors. The port detects MDI/MDX and automatically adjusts for straight-through or crossover cables.

Note Only IEEE 802.3af Power Over Ethernet is supported for manual provisioning. “Inline” or “midspan” POE devices will not work with the Aruba serial breakout adapter.

The maximum length for FE cables is 100 meters (325 feet).

The Aruba 70 and serial breakout adapter are plenum rated. When is installed in an air-handling space, as described in NEC (2002) Article 300.22(C), the connecting FE cable 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 or CMP.

Install cables in accordance with all applicable local regulations and practices.

APPENDIX B

Troubleshooting

After provisioning and deployment, the Aruba 70 can be configured and managed through the Aruba WLAN Switch. However, the Aruba 70 includes built-in troubleshooting features for situations where the switch commands are unable to diagnose AP problems.

This appendix describes using the built-in AP support prompt for troubleshooting.

Accessing the AP Support Prompt

Depending on your network topology, the built-in AP Support prompt can be accessed using the AP serial console port or through the WLAN switch using the Serial Over Ethernet (SOE) interface or using Telnet from a remote management station.

Direct SPOE Connection to WLAN Switch

This method requires that the Aruba 70 is connected directly to an SPOE-compatible network port on the Aruba WLAN Switch (see [“Connecting Required Cables”](#) on [page 31](#)).

- 1 Telnet to the Aruba WLAN Switch Serial-Over-Ethernet (SOE) interface.

Use a Telnet client on your management workstation to connect to the Aruba WLAN Switch IP address using logical port 2300. The connection command may vary depending on the specific software used, but commonly appears as follows:

```
> telnet <WLAN switch IP address> 2300
```

- 2 When prompted, log in to the Aruba WLAN Switch as the administrator:

```
user: admin
password: <administrator password (not displayed)>
```

This will present you with the Aruba WLAN Switch SOE console prompt:

```
Available commands:
  baud [9600|19200|38400|57600|115200]
  connect <slot/port>
  exit (no args)
soe>
```

- 3 Connect to the Aruba WLAN Switch port to which the Aruba 70 is physically attached:

```
soe> connect <slot number>/<port number>
```

where *slot number* is the physical slot of the line card in the WLAN switch, and *port number* is the physical port.

If the AP has not finished booting, allow the Autoboot timer to expire. When the device has booted, the AP support prompt (#) will appear.

Direct Terminal Connection

This method requires that the Aruba 70 is connected to a compatible serial console using the Aruba serial breakout adapter (see “[Connecting the Console Terminal](#)” on [page 17](#)).

- 1 Set up your local terminal.

This procedure requires a terminal or computer running terminal emulation software with the following settings:

Table 3-2 Console Terminal Settings

Baud Rate	Data Bits	Parity	Stop Bits	Flow Control
9600	8	None	1	None

- 2 Establish console communication.

Press <Enter> a few times to establish communication between the Aruba 70 and terminal.

If the AP has not finished booting, allow the Autoboot timer to expire. When the device has booted, the AP Support prompt (#) will appear.

Remote Telnet Connection

If properly set up, the AP support prompt can be accessed remotely using Telnet. By default, this feature is turned off for security purposes and cannot be turned on using the AP interface.

Setting Telnet Access

Telnet access can only be changed from the WLAN switch management interface. Log in to the WLAN switch CLI using the `admin` account, access the configuration (`config`) prompt, and issue the following commands:

```
(Aruba 5000) (config) # ap location <building>.<floor>.<device>  
(Aruba 5000) (sap-config location b.f.d) # telnet {enable|disable}
```

Using Telnet to Connect

Use a Telnet client on your management workstation to connect to the Aruba 70's individual IP address. The connection command may vary depending on the specific software used, but commonly appears as follows:

```
> telnet <Aruba 70 IP address>
```

When the connection is established, the AP support prompt (`#`) will be displayed.

AP Support

Access Levels

- User Access

User access is a low security level, featuring only the most basic commands. It is available without any additional login after the AP has booted.

- Privileged Access

Privileged-level access requires the privileged password (the same privileged password used on the switch) to be entered using the user level `enable` command. The privileged access level is available only after the AP has successfully booted and synchronized with WLAN switch.

User Commands

- **ping** *<host | IP address>*

Verify IP connectivity between the AP and the host address.

- **route**

Display the contents of the AP route table.

- **ifconfig**

Display the AP's IP address settings.

- **enable** *<privileged password>*

Access the AP Support privileged mode.

Privileged Commands

In addition to the user commands, the following commands are available upon successfully entering the privileged mode:

- `ps`
- `show [config|stats|version]`

Note	These commands should be used only as directed by Aruba Customer Support.
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APPENDIX C

Product Specifications

Compliance

FCC - Class A

This equipment has been tested and found to comply with the limits for a Class A 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 indoor 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 5GHz operations. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Radio Frequency Interference Requirements

This device is restricted to indoor use due to its operation in the 5.15 to 5.25 GHz frequency range. 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.

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.

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（V C C I）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 Class A, FCC Part 15 Class C 15.207/15.247, FCC Part 15 Class E 15.407 ICES-003 Class A, RSS 210 (CAN) VCCI Class A EN 61000-3, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11  The CE approval mark on back of the product indicates that it meets European Directives 73/23/EEC and 89/336/EEC EN 55022, EN55024 (89/336/EEC), ETS 300 328 (89/336/EEC), ETS 301 489 (89/336/EEC), ETS 301 893 AS/NZS 3548 Class A, 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

Product Features

- Wireless dual-band transceiver
- Varied antenna options:
 - The Aruba AP 70 has dual Reverse Polarity SMA (RP-SMA) antenna connectors that accept a variety of high-gain detachable antennas (not included).
 - The Aruba AP70 also has a built-in array with dual, tri-band, omnidirectional antennas for reception diversity.
- 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
- Compatible with IEEE 802.3af Power Over Ethernet (POE)
- Seamless connectivity to wired LANs augment existing networks quickly and easily
- Can be centrally managed, configured, and upgraded through the Aruba WLAN Switch to take advantage of network changes and security improvements

Ethernet Compatibility

The Aruba 70 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 70 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 5GHz 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 2.4GHz 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 OFDM and a shared collision domain (CSMA/CA). It operates in the 2.4GHz Industrial/Scientific/Medical (ISM) band. The ISM band is available worldwide for unlicensed use. Data is transmitted at speeds of up to 54 Mbps.

Power Over Ethernet

The Aruba 70 supports the IEEE 802.3af standard for Power Over Ethernet (POE). With this feature, the Aruba 70 can accept electrical power from a compatible POE-capable device (such as the Aruba 5000 (with Line Card LC-5000-24FE-2GE-SPOE), Aruba 2400, or Aruba 800) directly over the FE cable. POE eliminates the need to provide separate power outlets in environments that are difficult or undesirable to wire for electricity.

The Aruba 70 also supports “inline” and “midspan” POE devices for normal operation.

Physical Description

Package Contents

The Aruba 70 package includes:

- One Aruba 70 Wireless Access Point
- Assorted documentation

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 70:

- Detachable antennas (Aruba AP 70 only)
- AC power adapter (5 VDC, 3 A) and power cord
- Serial breakout adapter for direct access to the AP console
- Mounting kit (modular cradle for walls and suspended ceilings)

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

The following specifications apply to the Aruba AP 70 Wireless Access Points.

Aruba AP-70 Access Point

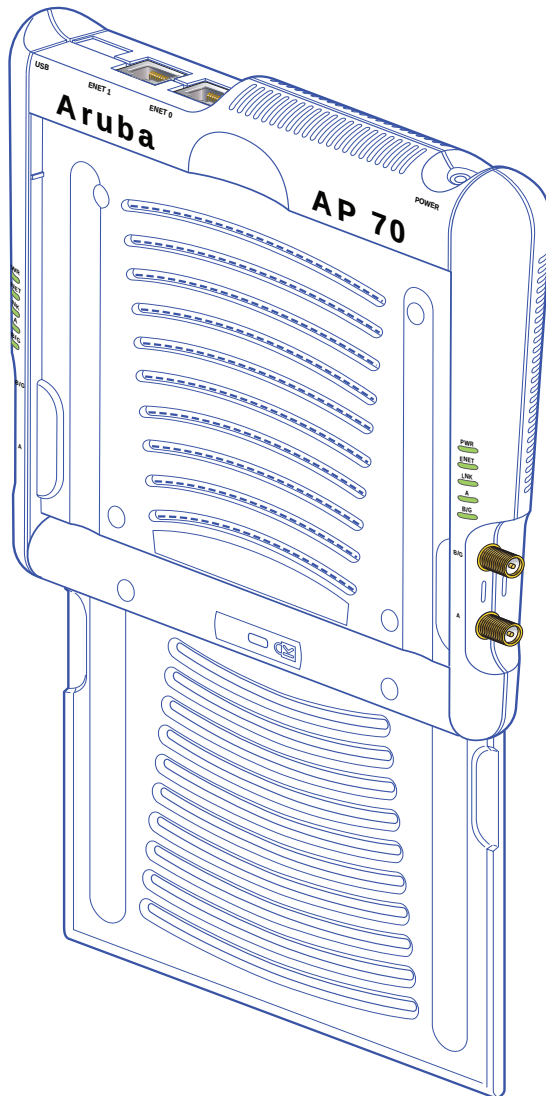


FIGURE C-1 Part Number: AP-70

TABLE C-1 AP-70 802.11 Specifications

Description	802.11a	802.11b	802.11g
Antenna	Dual, diversity supporting Reverse Polarity-SMA (RP-SMA) detachable antenna interfaces suitable for acceptance of single-band or tri-band 802.11a/b/g detachable antennas of various pattern types and gain. For information on third-party antennas, go to the Interoperability section of the Products page at: http://www.arubanetworks.com		
Frequency Band	● 5.250 ~ 5.350Ghz (middle band) 4 channels ● 5.725 ~ 5.825Ghz (higher band) 4 channels	● 2.4 ~ 2.483Ghz (US, Canada & ETSI) ● 2.4 ~ 2.497Ghz (Japan) Complete country list available at http://www.arubanetworks.com/products/aps/certification	● 2.412 ~ 2.462Ghz (US, Canada) ● 2.412 ~ 2.472Ghz (ETSI) ● 2.412 ~ 2.484Ghz (Japan) Complete country list available at http://www.arubanetworks.com/products/aps/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
Media Access Control	CSMA/CA with ACK	CSMA/CA with ACK	CSMA/CA with ACK

TABLE C-1 AP-70 802.11 Specifications (Continued)

Description	802.11a	802.11b	802.11g
Operating Channels	● US & Canada: 8 ● ETSI: 13 ● Japan: 5 Complete country list available at http://www.arubanetworks.com/products/aps/certification	● US & Canada: 11 ● ETSI: 13 ● Japan: 13 Complete country list available at http://www.arubanetworks.com/products/aps/certification	● US & Canada: 11 ● ETSI: 13 ● 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 3-2 AP-70 Characteristics

Description	
Maximum Clients	64
Multi-mode Radio Band	Selectable via software
Manageability:	● Management of all 802.11 parameters ● Network Wide AP Management via: CLI WEB GUI SNMPv3 ● Access Point Profiles, Management by: Geographical Location BSSID Radio Type
Encryption Support (AP and Switch)	40bit / 64bit / 128bit / 152bit WEP, TKIP, AES
Physical (HxWxD):	● 159 x 99 x 31 mm / 6.26 x 3.90 x 1.22 in^a ● Weight 198 grams / 7 oz
Interfaces (Electrical):	● 1 x 10/100 Base-TX auto-sensing Ethernet RJ-45 Interface (Auto-sensing MDI/MDX) ● Serial and Power Over Ethernet – 48V DC / 200mA Power Over Ethernet (802.3af compliant) ● 1 x 5V DC Power Interface
Interfaces (Mechanical):	● Standard Kensington MicroSaver Security Cable Interface (cable not supplied) ● Wall and ceiling mount kit (optional – part number AP-70-MNT) interface

TABLE 3-2 AP-70 Characteristics (Continued)

Description	
Visual Indicators (LEDs)	Ready -- Power Ethernet link status / Activity WLAN Activity
Power	● Optional AC Power Adapter Input— 100-240 AC, 50-60 Hz ● Access Point Input— 5 VDC, 3 A (AC adapter), or 48 VDC, 200 mA (POE)
Power Requirements	● 5V DC / 2A supplied externally via optional AC adapter kit ● 48V DC / 200mA Power Over Ethernet (802.3af compliant) ● Auto-sensing externally supplied AC power or Power Over Ethernet
Output Power	100 mW maximum (or lower as configured on the Aruba WLAN Switch to comply with local regulatory requirements)
Environmental: Humidity	Humidity 5% to 95% (non-condensing)
Standards Compliance	● Ethernet IEEE 802.3 / IEEE 802.3u ● Power Over Ethernet IEEE 802.3af ● Wireless IEEE 802.11a/b/g

TABLE 3-2 AP-70 Characteristics (Continued)

Description	
Electromagnetic Compliance	● FCC Part 15 Class A, FCC Part 15 Class C 15.207/15.247 ● FCC Part 15 Class E 15.407 ● ICES-003 Class A, ● RSS 210 (CAN) ● VCCI Class A ● EN 61000-3, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, ● EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11 ● EN 55022, EN55024 (89/336/EEC), ● ETS 300 328 (89/336/EEC), ETS 301 489 (89/336/EEC) ● ETS 301 893 ● AS/NZS 3548 Class A
Safety Compliance	● CSA/NTRL (CSA 22.2 No. 950 & UL 1950) ● EN60950 (TÜV/GS), IEC60950 (CB)

- a. Measurements indicate only the Access Point chassis. Size and weight do not include other materials (such as detachable antennas, mounting kits, and cables) which may vary

Related Documents

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

- *Aruba AP Starter's Guide*
- *Aruba AP Installation Guide* (this document)
- *Aruba WLAN Switch Installation Guide*
- *Aruba RF Director Starter's Guide*
- *Aruba AirOS User's Guide*
- *Aruba AirOS Command Reference*

For the current versions of these manuals, or to obtain the latest product release notes, visit the support section of our Web site (see [page 56](#)).

Text Conventions

The following conventions are used throughout this manual to emphasize important concepts:

TABLE 3-3 Text Conventions

Type Style	Description
<i>Italics</i>	This style is used to emphasize important terms and to mark the titles of books.
System items	This fixed-width font depicts the following: ● Sample screen output ● System prompts ● Filenames, software devices, and certain commands when mentioned in the text.
Commands	In the command examples, this bold font depicts text that the user must type exactly as shown.
<i><Arguments></i>	In the command examples, italicized text within angle brackets represents items that the user should replace with information appropriate to their specific situation. For example: # send <i><text message></i> In this example, the user would type “send” at the system prompt exactly as shown, followed by the text of the message they wish to send. Do not type the angle brackets.
[Optional]	In the command examples, items enclosed in brackets are optional. Do not type the brackets.
{ Item A Item B }	In the command examples, items within curled braces and separated by a vertical bar represent the available choices. Enter only one choice. Do not type the braces or bars.

Contacting Aruba Wireless Networks

Web Site

- Main Site <http://www.arubanetworks.com>
- Support <http://www.arubanetworks.com/support>

E-mail

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Notes



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