Aruba 2400-E Access Multiplexer
Installation Guide
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This product complies with EN55022 Class A and EN55024 standards.

Safety

Lithium Battery Notice
This product contains a lithium battery which is replaceable only by a trained technician.

CAUTION: The lithium battery may explode if it is incorrectly replaced. A trained technician should replace the battery with only the same or equivalent type battery recommended by the manufacturer. Dispose of used batteries according to the manufacturer’s instructions.

Laser Notice
This product uses replaceable laser transceiver modules on some ports.

CAUTION: Use of controls or adjustments of performance or procedures other than those specified in this manual may result in hazardous radiation exposure.


For continued compliance with the above laser safety standards, only approved Class 1 modules from our approved vendors should be installed in the product. See “Approved GBICs” on page 26 for a list of approved modules and vendors.
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This preface includes the following information:

- An overview of the sections in this manual
- A list of related documentation for further reading
- A key to the various text conventions used throughout this manual
- Aruba Networks support and service information

Overview of this Manual

This manual is for trained technicians responsible for installing the Aruba 2400-E WLAN Switch. This manual is organized as follows:

Chapter 1, “Overview”—Describes the main features of this product, including physical diagrams.

Chapter 2, “Installing the Chassis”—Instructions for mounting the chassis and attaching power.

Chapter 3, “Initializing the 2400-E”—Instructions for completing the setup dialog when the Access Multiplexer is first booted.

Appendix A, “Ports.”—Describes interface, cable, and adapter specifications for system ports.

Appendix B, “Specifications.”—Describes the system’s size, weight, storage and operating environment, and certifications for electromagnetic compliance and safety.

Related Documents

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

- Aruba 2400-E Access Point Installation Guide (this manual)
- ArubaOS User Guide
## Text Conventions

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

<table>
<thead>
<tr>
<th>Type Style</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Italics</em></td>
<td>This style is used to emphasize important terms and to mark the titles of books.</td>
</tr>
<tr>
<td><strong>System items</strong></td>
<td>This fixed-width font depicts the following:</td>
</tr>
<tr>
<td></td>
<td>- Sample screen output</td>
</tr>
<tr>
<td></td>
<td>- System prompts</td>
</tr>
<tr>
<td></td>
<td>- Filenames, software devices, and certain commands when mentioned in the text</td>
</tr>
<tr>
<td><strong>Commands</strong></td>
<td>In the command examples, this bold font depicts text that the user must type exactly as shown.</td>
</tr>
<tr>
<td><code>&lt;Arguments&gt;</code></td>
<td>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:</td>
</tr>
<tr>
<td></td>
<td># send &lt;text message&gt;</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>[ Optional ]</td>
<td>In the command examples, items enclosed in brackets are optional. Do not type the brackets.</td>
</tr>
<tr>
<td>{ Item A</td>
<td>Item B }</td>
</tr>
<tr>
<td><strong>Button</strong></td>
<td>Indicates the name of the keyboard key that should be pressed.</td>
</tr>
</tbody>
</table>
This chapter introduces you to the 2400-E Access Multiplexer. It describes the general features of the system and illustrates key physical elements. Once you are familiar with the system, you can begin the installation process covered in the next chapters.

The Aruba 2400-E Access Multiplexer is a wired concentrator deployed in the closet distribution switch to secure network ports located either in common areas, conference rooms or cubes, and in office ports. All traffic traversing an 2400-E will be tunneled over the network to an Aruba Mobility Controller, where security services will be applied.

Features

This section outlines the general features of the 2400-E Access Multiplexer:

- 2 Gigabit Ethernet (GE) uplink ports.
- 24 Fast Ethernet (FE) ports with Serial and Power Over Ethernet (SPOE) capability.
- Each Access Multiplexer counts as one AP against the AP limit on the Mobility Controller (regardless of the number of ports connected).

Upon discovery of an Aruba Mobility Controller, the 2400-E will register with the Mobility Controller. When the multiplexer ports have been configured, the 2400-E will then establish a secure GRE tunnel from each of these ports to the Mobility Controller.
Physical Description

**FIGURE 1-1** Aruba 2400-E WLAN Switch System

1 **System Indicator LEDs**

<table>
<thead>
<tr>
<th>LED</th>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>Green</td>
<td>Switch is receiving proper power.</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>Switch is powered off.</td>
</tr>
<tr>
<td>Status</td>
<td>Green</td>
<td>Switch has booted and is functioning properly.</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>Switch is booting, loading software, or has failed.</td>
</tr>
</tbody>
</table>

2 **24 FE ports**

These network ports are used for connecting wireless APs, such as the Aruba Wireless Access Point, as well as wired LAN segments. The ports provide 10/100 Mbps Fast Ethernet connectivity, and in some cases, power and serial connectivity as well. See “FE Network Ports” on page 21 for port, LED, and cable specifications.

3 **2 GE uplink ports**

The GE ports can provide high-bandwidth uplinks between the 2400-E Access Multiplexer and the wired LAN. These ports provide a1000 Mbps Gigabit Ethernet connection. Depending on the option selected at time of purchase, one of the following interfaces is available:

- 1000BASE-T copper connector (standard model HW-800-CHAS-SPOE-T)
1000BASE-SX fiber-optic connector (optional model HW-800-CHAS-SPOE-SX)

**CAUTION:** This model uses a laser transceiver on the fiber-optic uplink port. Use of controls or adjustments of performance or procedures other than those specified herein may result in hazardous radiation exposure.

See “GE Uplink Ports” on page 25, for port, LED, and cable specifications.

4 **Serial Console port**

This port is for connecting a local management console. It is required to access the text-based Command-Line Interface (CLI) for initial configuration of the 2400-E Access Multiplexer. It can also be used for switch management and troubleshooting.

The port accepts an RS-232 serial cable an RJ-45 male connector. See “Serial Console Port” on page 29 for more port and cable specifications.

See the *Aruba ArubaOS User Guide* for details on using the features available through this port.

5 **Fans/heat exhaust (on side)**

Four independent fans promote proper air circulation for cooling the 2400-E Access Multiplexer.

During operation, the air vents on the left and right sides of the chassis must remain unobstructed by cables or mounting equipment. For proper air circulation, leave at least 10 cm (4 inches) of clearance on the left and right of the chassis.

6 **Holes for attaching rack mounting brackets (on side)**

7 **Power Input Socket (on back)**

The power input socket on the back of the switch accepts a power cord with a standard IEC320 connector. For proper safety and performance, the power cord must be rated to 10 A and conform to grounded electrical standards in the country where the product is operated.
Installing the Chassis

This chapter covers the following installation topics:

- Precautions to be observed during installation
- Requirements for 2400-E Access Multiplexer components and rack mounting gear
- Selecting a proper environment for the 2400-E Access Multiplexer
- Mounting the 2400-E Access Multiplexer in a rack
- Connecting power to the 2400-E Access Multiplexer

**NOTE:** Service to all Aruba Networks equipment must be performed by trained service personnel only.

### Pre-Installation Checklist

During installation, you will need the following:

- Aruba 2400-E WLAN Switch chassis
- Two mounting brackets (included)
- Six 6-32 flat head screws (included)
- Four 12-24 screws (included) or screws appropriate for your rack
- Aruba power cord rated to at least 10 A with IEC320 connector (included)
- Phillips or cross-head screwdriver
- 19-inch equipment rack, or equivalent
- 1U rack space with 10 cm (4 inches) clearance to the left and right of the rack
- Electrical power: 90-135/180-264 VAC, 50 to 60 Hz, 4.0/2.0 A
- Cool, non-condensing air 0 to 40 °C (32 to 104 °F)
- Another person to help position the switch
- Console terminal (or computer running emulation software) with RJ-45 or DB-9 serial port
- RS-232 serial cable with RJ-45 male connectors (straight-through Ethernet patch cable)
- Aruba serial adapter (included) if connecting to the console with DB-9
Precautions

**CAUTION:** Hazardous energy is always present while the Aruba 2400-E WLAN Switch is plugged into an electrical outlet. Remove all rings, jewelry, and other potentially conductive material before working with this product.

Never insert foreign objects into the chassis or any other component, even when the 2400-E Access Multiplexer is unplugged.

Main power is fully disconnected from the 2400-E Access Multiplexer by unplugging the power cord from the power outlet. For safety reasons, verify the power outlet and plug are within easy reach of the operator.

Do not handle electrical cables which are not insulated. This includes any network cables.

To minimize electrical hazard, keep water and other fluids away from the product.

Comply with electrical grounding standards during all phases of installation and operation of the product. Do not allow the 2400-E Access Multiplexer chassis, network ports, power source, or mounting brackets to contact any device, cable, object, or person attached to a different electrical ground. Also, never connect the device to external storm grounding sources.

Installation or removal of the chassis must be performed in a static-free environment. The proper use of anti-static body straps and mats is strongly recommended.

Do not ship or store this product near strong electromagnetic, electrostatic, magnetic, or radioactive fields.

Do not disassemble the chassis. This product has no internal user-serviceable parts. When service or repair is needed, see “Contacting Aruba Networks” on page 33.

Requirements
Rack Mounting Kit

Using the included rack mounting kit, you can mount the 2400-E Access Multiplexer in a standard 19-inch network equipment rack. The rack mounting kit contains the following parts:

![Rack Mounting Kit Diagram]

**NOTE:** The four 12-24 screws are intended for securing the switch to the rack. Some racks require different screws which are not included. Verify that you have the correct screws or fasteners for your rack system before attempting to mount the switch.

Selecting a Location

The 2400-E Access Multiplexer, like other network and computing devices, requires an “electronics friendly” environment.

**Reliable power**

Verify that your electrical outlet is compatible with the 2400-E Access Multiplexer. The switch power input is auto-ranging and accepts 90-132/180-264 VAC, 50 to 60 Hz, 4.0/2.0 A.

The power cords must be rated to 10 A and conform to grounded electrical standards in the country where the product is operated.

Use of a power line conditioner or Uninterruptible Power Supply (UPS) can decrease or mitigate problems caused by power service fluctuations. Verify that the output of any power shaping device is compatible with the 2400-E Access Multiplexer power supply.

**Cool, non-condensing ventilation**

For proper operation, the 2400-E Access Multiplexer requires an environment with an ambient air temperature between 0 and 40 °C (32 to 104 °F). Humidity must be kept at non-condensing levels between 5 and 95%.
Where a large number of electrical devices are working in the same area, additional air conditioning or air circulation equipment may be required.

**Ample space**

For proper air circulation, leave at least 10 cm (4 inches) clearance for the vents on the left and right of the chassis. Leave additional space in front and back of the chassis to access power cords, network cables, and indicator LEDs.

**Limited electromagnetic interference**

For best operation, keep the 2400-E Access Multiplexer and all cords and cables at least 0.7 meters (2 feet) from fluorescent lighting fixtures, and 2 meters (6 feet) from photocopiers, radio transmitters, electric generators, and other sources of strong electromagnetic interference.

### Mounting the Chassis

1. Verify that your rack environment meets requirements (see “Selecting a Location” on page 7).

2. Attach the rack mounting brackets to the switch chassis as shown in Figure 2-2.

![Attaching the Rack Mounting Brackets](image-url)
Orient both brackets so that the narrow flange faces the front. When placed properly, the brackets’ screw holes will match the holes on the side of the chassis.

Use a Phillips or cross-head screwdriver to attach each bracket securely with three 6-32 flat head screws (included).

3. Attach the 2400-E Access Multiplexer to the rack.

**CAUTION:** To avoid personal injury or damage to equipment, get help for lifting and positioning the 2400-E Access Multiplexer. Also, do not install the 2400-E Access Multiplexer in any fashion where instability or uneven mechanical loading may occur.

**NOTE:** For proper operation, the 2400-E Access Multiplexer requires an ambient air temperature between 0 to 40 °C (32 to 104 °F). Verify that your rack environment is in compliance.
Position the switch chassis in the equipment rack and align the brackets’ mounting holes with the corresponding holes in your rack frame.

**FIGURE 2-3** Mounting the 2400-E Access Multiplexer

Use a Phillips or cross-head screwdriver to secure the switch to the rack with two 12-24 screws (included) for each mounting bracket.

**NOTE:** Some cabinets require different screws which are not included. Verify that you use the correct screws or fasteners for your rack system.
4. Adhere to clearance requirements.

**FIGURE 2-4** “Keep Clear” Zones

For proper air circulation, leave at least 10 cm (4 inches) clearance for the vents on the left and right of the chassis.

Leave additional space in front and back of the chassis to access power cords, network cables, and indicator LEDs.

---

**Connecting Power**

---

**CAUTION:** This procedure should be performed by a trained technician.

1. Verify you understand the procedure and all precautions.
Before beginning, read the entire procedure. Verify you understand all the precautions in these steps as well as those on page 6.

2. Verify that your site’s electrical system is compatible with the switch.
   The switch power input is auto-ranging and accepts 90-132/180-264 VAC, 50 to 60 Hz, 4.0/2.0 A.

   **NOTE:** Use of a power line conditioner or Uninterruptible Power Supply (UPS) can decrease or mitigate problems caused by power service fluctuations. Verify that the output of any power shaping device is compatible with the 2400-E Access Multiplexer power supplies.

3. Verify that the switch power supply can handle the POE devices.
   The total power drawn by all connected Power Over Ethernet (POE) devices must not exceed 200 W total.

4. Attach the power cord to the power input socket at the back of the switch.
   Plug an appropriate power cord into the power input socket. Use the included power cord if it is compatible with your electrical outlet. Otherwise, replace the power cord with the type appropriate for your country. The power input socket accepts a power cord with a standard IEC320 connector.

   **CAUTION:** For proper safety and performance, the power cord must be rated to 10 A and conform to grounded electrical standards in the country where the product is operated.

5. Attach the power cord to a proper electrical outlet.
   Once power is connected, the switch will automatically turn on and you can perform the power-on test.

---

**Verifying the Installation**

Once the 2400-E Access Multiplexer is physically installed, run the following power-on test:

1. Check for the proper power indicators.
   Immediately upon power up, you should observe the following:
   - The system Power LED lights solid green
   - The system Status LED is initially off while booting

2. Check the fans to verify they are working.
You should be able to feel significant airflow blowing from the chassis vents at each of the three fan positions.

**CAUTION:** If *one or more* fans do not work, immediately shut down and replace the 2400-E Access Multiplexer.

3. Check for the appropriate operation indicators.
   Once the system has successfully booted, you should observe the following:
   - The system Power LED is still lit solid green.
   - The system Status LED is solid green.

   **NOTE:** For more information on LED behavior, see “Physical Description & LEDs” on page 22.

4. Once the system has passed the initial power-up test:
   - Connect appropriate network cables (see Chapter A, “Cables” on page 24 for port and cable information).

5. You are now ready to perform the initial setup as described in the *Aruba Quick Start Guide* (which is included in the Accessory Kit).
Before you can access the Web-based WebUI tools, which is the primary configuration interface for Aruba Access Multiplexers, the switch must be configured with basic system information through the CLI.

Generally, this basic system configuration is performed the first time an administrator logs in to the switch, when the factory-installed setup dialog is automatically launched and prompts the administrator for this basic system information.

## Serial Console Port

The serial console port is located on the front panel of the 2400-E Access Multiplexer. This port is for connecting a local management console and can be used to access the text-based Command-Line Interface (CLI) to configure, manage, and troubleshoot the 2400-E Access Multiplexer.

Connect the required RS-232 serial cable to a terminal with a DB-9 male port. (All switch accessory kits contain a flat RJ-45 to RJ-45 cable and DB-9 to RJ-45 adapter for this purpose). Use the following communications settings for connecting to a terminal emulation session on the terminal

**TABLE 3-1** Console Terminal Settings

<table>
<thead>
<tr>
<th>Baud Rate</th>
<th>Data Bits</th>
<th>Parity</th>
<th>Stop Bits</th>
<th>Flow Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>9600</td>
<td>8</td>
<td>None</td>
<td>1</td>
<td>None</td>
</tr>
</tbody>
</table>
### Prerequisite Information

Before you start configuring the switch, collect the following network-related information:

**TABLE 3-2 Required Information**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VLAN IP address</td>
<td>This VLAN IP address is the address that the Access Multiplexer uses to communicate with the Master Switch or Mobility Controller where the GRE tunnel terminates.</td>
</tr>
<tr>
<td>Interface IP address/subnet mask</td>
<td>This is the IP address and subnet mask of the VLAN interface that is connected to the network.</td>
</tr>
<tr>
<td>Default gateway</td>
<td>This is the default gateway on the subnet that the switch is connected to. If the host managing the switch is on the same subnet, skip this step.</td>
</tr>
<tr>
<td>Master switch IP address</td>
<td>The IP address of the Master Switch that terminates the GRE tunnel.</td>
</tr>
<tr>
<td>Mobility Controller IP address</td>
<td>The IP address of the mobility controller that terminates the GRE tunnel and can be the same as the master switch.</td>
</tr>
</tbody>
</table>

*Figure 3-1 illustrates the possible GRE connections.*
**FIGURE 3-1** Connecting the 2400-E Access Multiplexer

**NOTE:** The 2400-E can connect to a Master Switch or to a Mobility Controller configured as a local to a Master Switch. In either configuration, the 2400-E is considered a local switch. In the case of the 2400-E being connected to a local Mobility Controller, the Master Switch to this Mobility Controller will provide Master Switch services to the 2400-E such as heartbeat.

You can also configure the 2400-E as its own master. Though Aruba recommends configuring the 2400-E as its own master, there are advantages to either configuration. For details, see the *Aruba Wired Multiplexer (MUX) Validated Reference Design Guide*. 
Initial Switch Setup

The following procedure outlines the minimum, basic switch setup dialog configuration required to enable access to the WebUI. If initial setup has already been performed on your Access Multiplexer, you can use the CLI to change any of the default or previously set parameters.

The setup dialog will prompt you for all necessary information. Defaults are available for some prompts, and are shown in parenthesis. To accept a default value shown in parenthesis, press <Enter>. If you make a mistake, you can either power off, then power on the switch to restart the setup dialog, or you can proceed to the end of the script where you will have the option to repeat the script (by entering r).

In cases where complex options are available, this guide recommends the default.

Once your switch is operational, you can modify it with information contained in the ArubaOS User Guide.

<table>
<thead>
<tr>
<th>Setup Dialog Prompt</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enter System name [Aruba2400-E]:</td>
<td>Assign a name to your switch. The example shows the default name for an Aruba 2400-E Access Multiplexer.</td>
</tr>
<tr>
<td>Enter VLAN 1 interface IP address [172.16.0.254]:</td>
<td>Enter the appropriate IP address for your VLAN 1.</td>
</tr>
<tr>
<td>Enter VLAN 1 interface subnet mask [255.255.255.0]:</td>
<td>Enter the subnet mask for VLAN 1 interface, or press Return to accept the default.</td>
</tr>
<tr>
<td>Enter IP Default gateway [none]:</td>
<td>Enter the appropriate IP address for your default gateway or press Return to accept the default (none).</td>
</tr>
<tr>
<td>Enter Master switch IP address:</td>
<td>You must define which switch will act as master for this local switch by telling this local switch the address of the master Access Multiplexer. Enter the loopback IP address of the master if a loopback IP address is configured. If not, then enter the master switch VLAN 1 IP address. Proceed with the password for admin login.</td>
</tr>
</tbody>
</table>
Initializing the 2400-E

Enter Mobility Controller IP address: The IP address of the mobility controller that terminates the GRE tunnel and which can be the same as the Master switch. The 2400-E will be recognized by this switch’s Master Switch as another local switch.

Enter password for admin login (up to 32 chars): Enter the switch administrator’s password. The default password is admin.

Re-type Password for admin login: Confirm the password entry. If you re-type the password differently from the initial entry, the system will prompt you:

Passwords were not the same! Please re-enter

Enter password for enable mode Create the Enable mode password. The administrator must be able to access this mode to access the configuration commands.

Re-type password for enable mode Confirm the Enable mode password. If the two entries do not match, the system will prompt you:

Passwords were not the same! Please re-enter

Do you wish to shutdown all the ports (yes|no)? [no]: Typically, you should answer no to enable all ports, set them to trusted mode, and assign them to VLAN 1. If you select yes, all the ports will be disabled.

Current choices are: Set up Dialog will confirm your settings.

Do you wish to accept the changes (yes|no) If you select yes, the system will reboot to this new configuration. If you select no, the Setup Dialog will restart from the beginning. If you need to just change a selection, press ctrl-P to step back through the Setup Dialog prompts until you come to the prompt answer you wish to change.
You can now access the Aruba Access Multiplexer WebUI by using the configured Switch IP from a Web browser.

To use the WebUI, the following client is required:

- A PC with network access to the Aruba Access Multiplexer IP address
- Microsoft Internet Explorer version 5.5 (or higher)

### Logging Into the Web User Interface

1. Use your Web browser to access the Access Multiplexer.

To start the WebUI software, enter the following URL in your Web browser:

   http://<Access Multiplexer IP address or hostname>

Upon successful login, the WebUI appears.
The Aruba 2400-E Access Multiplexer has a number of ports, each with their own purpose:

- **24 Fast Ethernet (FE) ports**
  Used for connecting to Access Points (APs) and wired LAN segments. These 10/100 Mbps FE ports aggregate and route traffic under the direction of the switch’s internal software. These ports can also provide power and serial connectivity to compatible devices.

- **2 Gigabit Ethernet (GE) ports**
  Used for high-bandwidth 1000 Mbps GE uplink between the 2400-E Access Multiplexer and the wired LAN. Each port socket accepts a variety of Gigabit Interface Converters (GBICs) for versatility in selecting optical and electrical interfaces.

- **One Serial Console port**
  Used for connecting a local configuration and management console.

This chapter describes the general features and physical characteristics of the various ports and details their compatible cables and connectors.

### FE Network Ports

The 2400-E Access Multiplexer has 24 Fast Ethernet (FE) network ports.

The FE ports are used for connecting the switch to wireless Access Points (APs) and wired LAN segments. These ports can also provide power and serial connectivity to compatible devices. All FE ports automatically sense and negotiate speed, duplex, and MDI/MDX settings.

### Serial & Power Over Ethernet

Each FE port supports RS-232 Serial communications and IEEE 802.3af Power Over Ethernet (SPOE).

When a compatible Power Over Ethernet (POE) device (such as the Aruba AP) is connected to a network port, the port can provide operating power to that device through the connected Ethernet cable. This allows APs to be installed in areas
where electrical outlets are unavailable, undesirable, or not permitted, such as in the plenum and air handling spaces. The switch network ports automatically detect when compatible POE devices are connected and require power.

The network ports also provide serial connectivity over the same Ethernet cable, allowing convenient access to device console interfaces.

Special cables and adapters may be necessary to use SPOE features with some equipment. See material starting on page 24 for port and cable specifications.

### Physical Description & LEDs

![Aruba 2400-E FE Network Ports](image)

**FIGURE A-1**  Aruba 2400-E FE Network Ports

#### FE Network Ports

Ports are grouped in banks of 8 (as shown in Figure A-1 on page 22). There are 3 banks, for a total of 24 ports. These ports provide 10/100 Mbps Fast Ethernet connectivity, and in some cases, power and serial connectivity as well. See material starting on page 24 for port and cable specifications.

#### LNK/ACT LED

Each FE port has its own LNK/ACT LED, located at the left side of the port. During operation, these LEDs provide the following status information:

<table>
<thead>
<tr>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>No Ethernet link on the port.</td>
</tr>
<tr>
<td>Green</td>
<td>An Ethernet link has been established on the port, but no data is currently being transmitted or received.</td>
</tr>
<tr>
<td>Flashing Green</td>
<td>The port is transmitting or receiving data. The flashing rate is proportional to your network activity.</td>
</tr>
</tbody>
</table>

#### POE LED
Each FE port has its own POE LED, located at the right side of the port. This LED provides the following POE status information:

### TABLE A-2  FE POE LED

<table>
<thead>
<tr>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>The port is disabled or the attached device has not requested power. POE is not being provided by the port.</td>
</tr>
<tr>
<td>Green</td>
<td>POE is being provided to the attached device.</td>
</tr>
<tr>
<td>Amber</td>
<td>The attached device has requested power, but POE is not being provided by the port.</td>
</tr>
</tbody>
</table>

### Access Point Status LEDs

Each LED represents the status of APs connected to a specific port on the switch. During operation, the LEDs provide the following information:

### TABLE A-3  AP Status LED

<table>
<thead>
<tr>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red (solid)</td>
<td>An AP on this port has failed (highest precedence).</td>
</tr>
<tr>
<td>Red (flashing)</td>
<td>An air monitor on this port has detected an unsecured AP. The AP is attached to your network but is not listed in the switch security policies. If security policies are enabled, clients are not granted access to your network through the unsecured AP.</td>
</tr>
<tr>
<td>Green (flashing)</td>
<td>An air monitor on this port has detected interference. The interfering device (AP or other radio source) has been detected by your valid APs, but has no wired presence on your network.</td>
</tr>
<tr>
<td>Amber (solid)</td>
<td>Load balancing is enabled on this port or an AP has reached the maximum number of clients it is configured to support.</td>
</tr>
<tr>
<td>Green (solid)</td>
<td>All detected APs on this port are operating as expected.</td>
</tr>
<tr>
<td>Off</td>
<td>No AP is detected on the port (lowest precedence).</td>
</tr>
</tbody>
</table>

The LED states in Table A-3 are listed in order of precedence (highest to lowest). If more than one AP is connected to the port, the state with the highest precedence is displayed.
Pin Outs

The RJ-45 female connector pin-outs are shown in Figure A-2:

![Figure A-2 FE Network Port Pin-outs](image)

Cables

The type of cable required for each port depends on the device being connected:

- **Direct connection to a SPOE compatible device.**
  
  This requires an 8-conductor Category 5 UTP Ethernet cable with an RJ-45 male connector. A straight-through cable is required to preserve POE voltage polarity.

  The port should be connected to the intended device either directly or using a SPOE adapter with no intervening hubs, routers, switches, or other network equipment.

  Aruba SPOE adapters separate the serial and FE portions of the cable and route them to their individual ports on the connected device. There are two adapter models:

  - **CA-SPOE-ADAPT-1** adapts the Ethernet cable for DB-9 serial and RJ-45 FE devices.
  - **CA-SPOE-ADAPT-2** adapts the Ethernet cable for RJ-45 serial and RJ-45 FE devices.

  The Aruba SPOE adapters are compatible with the following APs:

<table>
<thead>
<tr>
<th>AP Make and Model</th>
<th>POE</th>
<th>Serial</th>
<th>Aruba SPOE Adapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aruba APs</td>
<td>Yes</td>
<td>Yes</td>
<td>CA-SPOE-ADAPT-1</td>
</tr>
<tr>
<td>Cisco 340</td>
<td>No</td>
<td>Yes</td>
<td>CA-SPOE-ADAPT-1</td>
</tr>
<tr>
<td>Cisco 350</td>
<td>Yes</td>
<td>Yes</td>
<td>CA-SPOE-ADAPT-1</td>
</tr>
</tbody>
</table>
**Direct connection to a POE compatible device.**

This requires a 4- or 8-conductor Category 5 UTP Ethernet cable with an RJ-45 male connector. A straight-through cable is required to preserve POE voltage polarity.

For POE, the port should be connected directly to the intended device with no intervening hubs, routers, switches, or other network equipment.

**Connection to a regular 10/100 Mbps Ethernet segment**

This requires a 4- or 8-conductor Category 5 UTP Ethernet cable with an RJ-45 male connector. 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).

For cables that run through plenums or air-handling spaces as described in NEC (2002) Article 300.22(C), the 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.

Be sure to install cables in accordance with all applicable local regulations and practices.

### GE Uplink Ports

The switch has two Gigabit Ethernet (GE) uplink ports. These ports provide high-bandwidth 10/100/1000 Mbps Gigabit Ethernet uplinks between the 2400-E Access Multiplexer and the wired LAN. The port automatically senses and negotiates speed, duplex, and MDI/MDX settings.

### TABLE A-4 Aruba SPOE Adapter Compatibility

<table>
<thead>
<tr>
<th>AP Make and Model</th>
<th>POE</th>
<th>Serial</th>
<th>Aruba SPOE Adapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco 1100</td>
<td>Yes</td>
<td>No</td>
<td>CA-SPOE-ADAPT-1</td>
</tr>
<tr>
<td>Cisco 1200</td>
<td>Yes</td>
<td>Yes</td>
<td>CA-SPOE-ADAPT-2</td>
</tr>
<tr>
<td>SMC EZ Connect 2755W</td>
<td>No</td>
<td>Yes</td>
<td>CA-SPOE-ADAPT-1</td>
</tr>
</tbody>
</table>
Physical Description and LEDs

There are two GE ports. Each port socket accepts a variety of Gigabit Interface Converters (GBICs) for versatility in selecting optical and electrical interfaces. See page 26 for GBIC specifications.

Each GE port has its own LNK/ACT LED located to the right of that port. During operation, these LEDs provide the following status information:

<table>
<thead>
<tr>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>No Ethernet link on the port.</td>
</tr>
<tr>
<td>Green</td>
<td>An Ethernet link has been established on the port, but no data is currently being transmitted or received.</td>
</tr>
<tr>
<td>Flashing Green</td>
<td>The port is transmitting or receiving data. The flashing rate is proportional to your network activity.</td>
</tr>
</tbody>
</table>

GBICs

Approved GBICs

Approved GBICs are typically selected when the line card is purchased. Although the modules are user-replaceable, for continued safety and reliability only approved modules from approved vendors should be used.

**LC-GBIC-T (1000BASE-T copper)**

<table>
<thead>
<tr>
<th>Vendor</th>
<th>Part Number</th>
<th>Cable Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aruba</td>
<td>LC-GBIC-T</td>
<td>Cable: Category 5 UTP</td>
</tr>
<tr>
<td>Molex</td>
<td>74740-0001</td>
<td>Connector: RJ-45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Range: Up to 100 m (325 feet)</td>
</tr>
</tbody>
</table>
**LC-GBIC-SX (1000BASE-SX optical)**

<table>
<thead>
<tr>
<th>Vendor</th>
<th>Part Number</th>
<th>Cable Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aruba</td>
<td>LC-GBIC-SX</td>
<td>62.5 µm multimode fiber</td>
</tr>
<tr>
<td>Delta</td>
<td>GBIC-1250A3FS</td>
<td>50 µm multimode fiber</td>
</tr>
<tr>
<td>OCP</td>
<td>DTR-1250-MM-GB</td>
<td></td>
</tr>
<tr>
<td>Agilent</td>
<td>HFBR-5601</td>
<td></td>
</tr>
</tbody>
</table>

**Connector:** SC-type fiber optic

**Range:** Up to 260 m (850 feet)

---

**LC-GBIC-LX (1000BASE-LX optical)**

<table>
<thead>
<tr>
<th>Vendor</th>
<th>Part Number</th>
<th>Cable Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aruba</td>
<td>LC-GBIC-LX</td>
<td>62.5 µm single mode fiber</td>
</tr>
<tr>
<td>OCP</td>
<td>DTR-1250-SM-GB-L1</td>
<td>50 µm single mode fiber</td>
</tr>
</tbody>
</table>

**Connector:** SC-type fiber optic

**Range:** 10km (6.21 miles)

---

For more current information on modules of other types and from other vendors, visit our Web site or contact customer support (see page 33).

**Replacing a GBIC**

1. Squeeze Release Tabs and Remove GBIC
2. Insert GBIC With Label Up

---

**Figure A-4** GBIC Removal and Insertion
## Cables

The following table lists the cable characteristics for approved GBICs:

**TABLE A-6  GE Cable Characteristics**

<table>
<thead>
<tr>
<th>GBIC Type</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000BASE-T (copper)</td>
<td>Cable: Category 5 UTP</td>
</tr>
<tr>
<td></td>
<td>Connector: RJ-45</td>
</tr>
<tr>
<td></td>
<td>Range: Up to 100 m (325 feet)</td>
</tr>
<tr>
<td>1000BASE-SX (optical)</td>
<td>Cable: 62.5 µm multimode fiber</td>
</tr>
<tr>
<td>Shortwave 850 nm</td>
<td>Connector: SC-type fiber optic</td>
</tr>
<tr>
<td></td>
<td>Range: Up to 260 m (850 feet)</td>
</tr>
<tr>
<td></td>
<td>Cable: 50 µm multimode fiber</td>
</tr>
<tr>
<td></td>
<td>Connector: SC-type fiber optic</td>
</tr>
<tr>
<td></td>
<td>Range: Up to 550 m (1800 feet)</td>
</tr>
<tr>
<td>1000BASE-LX (optical)</td>
<td>Cable: 62.5 µm multimode fiber</td>
</tr>
<tr>
<td></td>
<td>Connector: SC-type fiber optic</td>
</tr>
<tr>
<td></td>
<td>Range: 10km (6.21 miles)</td>
</tr>
<tr>
<td></td>
<td>Cable: 50 µm multimode fiber</td>
</tr>
<tr>
<td></td>
<td>Connector: SC-type fiber optic</td>
</tr>
<tr>
<td></td>
<td>Range: 10km (6.21 miles)</td>
</tr>
</tbody>
</table>

**CAUTION:** Fiber-optic interfaces use a laser transceiver. Use of controls or adjustments of performance or procedures other than those specified herein may result in hazardous radiation exposure.
Serial Console Port

The serial console port is located on the front panel of the 2400-E Access Multiplexer. This port is for connecting a local management console and can be used to access the text-based Command-Line Interface (CLI) to configure, manage, and troubleshoot the 2400-E Access Multiplexer.

**CAUTION:** Do not connect Access Points to the serial console port. The serial port is designed to connect to RS-232-only devices. Non-RS-232 devices such as Access Points will cause the Switch to fail and can cause damage.

See the *Aruba ArubaOS User Guide* for using the features available through this port.

**Port & Adapter Pin Outs**

The serial console port’s RJ-45 female connector accepts an RS-232 serial cable with a male connector. Pin-outs are shown in Figure A-5:

![Serial Console Port](image)

**Figure A-5**  Serial Port
To connect the required RS-232 serial cable to a terminal with a DB-9 male port, use the included adapter. Pin-outs are shown in Figure A-6:

**Figure A-6  Serial Port Adapter**

**Communications Settings**

**Table A-7  Console Terminal Settings**

<table>
<thead>
<tr>
<th>Baud Rate</th>
<th>Data Bits</th>
<th>Parity</th>
<th>Stop Bits</th>
<th>Flow Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>9600</td>
<td>8</td>
<td>None</td>
<td>1</td>
<td>None</td>
</tr>
</tbody>
</table>
## Physical

### TABLE B-1  Physical Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>Height 4.45 cm (1.75 inches)</td>
</tr>
<tr>
<td></td>
<td>Width 44.2 cm (17.4 inches)</td>
</tr>
<tr>
<td></td>
<td>Depth 40.9 cm (16.1 inches)</td>
</tr>
<tr>
<td>Weight</td>
<td>5.7 KG (12 lbs.)</td>
</tr>
</tbody>
</table>

## Environment

### TABLE B-2  Environmental Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>Operating: 0 to 40 ºC (32 to 104 ºF)</td>
</tr>
<tr>
<td></td>
<td>Storage: 0 to 50 ºC (32 to 122 ºF)</td>
</tr>
<tr>
<td>Humidity</td>
<td>5% to 95% (non-condensing)</td>
</tr>
</tbody>
</table>

## Operation

### TABLE B-3  Operational Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>90-132/180-264 VAC, 50-60 Hz, 4.0/2.0 A</td>
</tr>
<tr>
<td>Network Management</td>
<td>Command-Line Interface and HTML Web-browser Interface</td>
</tr>
<tr>
<td>Standards</td>
<td>IEEE 802.1x, IEEE 802.3 10BASE-T, IEEE 802.3u 100BASE-TX, IEEE 802.3ab 1000BASE-T, IEEE 802.3z 1000BASE-SX</td>
</tr>
</tbody>
</table>
## Certifications

### TABLE B-4  Certifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electromagnetic</td>
<td></td>
</tr>
<tr>
<td>Compatibility</td>
<td>FCC Part 15 Class A</td>
</tr>
<tr>
<td></td>
<td>ICES-003 Class A</td>
</tr>
<tr>
<td></td>
<td>VCCI Class A (Japan)</td>
</tr>
<tr>
<td></td>
<td>The CE approval mark on back of the product indicates that it meets</td>
</tr>
<tr>
<td></td>
<td>European Directive 89/336/EEC</td>
</tr>
<tr>
<td></td>
<td>EN55022 Class A (CISPR 22 Class A),</td>
</tr>
<tr>
<td></td>
<td>EN55024, EN 61000-3-2, EN 61000-3-3</td>
</tr>
<tr>
<td></td>
<td>AS/NZS CISPR 22:2004 Class A</td>
</tr>
<tr>
<td>Safety</td>
<td>UL60950,</td>
</tr>
<tr>
<td></td>
<td>CAN/CSA C22.2 No 60950,</td>
</tr>
<tr>
<td></td>
<td>IEC/EN60950</td>
</tr>
<tr>
<td></td>
<td>Low Voltage Directive (LVD) 73/23/EEC</td>
</tr>
<tr>
<td></td>
<td>21 CFR Chapter 1, Subchapter J, Part 1040.10 (Laser Safety),</td>
</tr>
<tr>
<td></td>
<td>IEC/EN 60825-1, EN 60825-2 (Laser Safety)</td>
</tr>
</tbody>
</table>

Aruba Networks provides a multi-language document containing country specific restrictions, additional safety and regulatory information for the enclosed product. You may find this reference on our website at:

Contacting Aruba Networks

Web Site

- **Main Site**  
  http://www.arubanetworks.com
- **Support Site**  
  http://www.arubanetworks.com/support
- **Software Licensing Site**  
  https://licensing.arubanetworks.com
- **Wireless Security Incident Response Team (WSIRT)**  
  http://www.arubanetworks.com/support/wsirt
- **Support Email**  
  support@arubanetworks.com
- **WSIRT Email**  
  wsirt@arubanetworks.com

Please email details of any security problem found in an Aruba product.

Telephone Numbers

- **Aruba Corporate**  
  +1 (408) 227-4500
- **FAX**  
  +1 (408) 227-4550
- **Support**
  - United States  
    800-WI-FI-LAN (800-943-4526)
  - France  
    +33 (0) 1 70 72 55 59
  - United Kingdom  
    +44 (0) 20 7127 5989
  - Germany  
    +49 (0) 69 38 09 77 22 8
  - All other countries  
    +1 (408) 754-1200

Proper Disposal of Aruba Equipment

This product at end of life is subject to separate collection and treatment in the EU Member States, Norway, and Switzerland and therefore is marked with the symbol shown at the left. Treatment applied at end of life of these products in these countries shall comply with the applicable national laws implementing Directive 2002/96EC on Waste of Electrical and Electronic Equipment (WEEE).

The Restriction on Hazardous Substances Directive (RoHS) (2002/95/EC), which accompanies the WEEE Directive, bans the use of heavy metals and brominated flame-retardants in the manufacture of electrical and electronic equipment. Specifically, restricted materials under the RoHS Directive are Lead (including Solder used in PCB’s), Cadmium, Mercury, Hexavalent Chromium, and Bromine.

Aruba declares compliance with the European Union (EU) WEEE Directive (2002/96/EC). For more information on WEEE, refer to:

http://www.dti.gov.uk/sustainability/weee/

China RoHS

Aruba products also comply with China environmental declaration requirements and are labeled with the “EFUP 50” label shown at the left.

### Hazardous Materials Declaration

<table>
<thead>
<tr>
<th>部件名称 (Parts)</th>
<th>有害有害物质或元素 (Hazardous Substances)</th>
</tr>
</thead>
<tbody>
<tr>
<td>铅 (Pb)</td>
<td>汞 (Hg)</td>
</tr>
<tr>
<td>电路板 PCA Board</td>
<td>X</td>
</tr>
<tr>
<td>机械组件 Mechanical Subassembly</td>
<td>O</td>
</tr>
</tbody>
</table>

O: 表示该有害有害物质在该部件所有均匀材料中的含量均在SJ/T11363-2006标准规定的限量要求以下。This component does not contain this hazardous substance above the maximum concentration values in homogeneous materials specified in the SJ/T11363-2006 Industry Standard.

X: 表示该有害有害物质至少在该部件的某一均匀材料中的含量超过SJ/T11363-2006标准规定的限量要求。This component does contain this hazardous substance above the maximum concentration values in homogeneous materials specified in the SJ/T11363-2006 Industry Standard.

对销售之日新售产品，本表显示该部分电子信息产品可能包含这些物质。This table shows where these substances may be found in the supply chain of electronic information products, as of the date of sale of the enclosed product.

对销售之日新售产品，本表显示该部分电子信息产品可能包含这些物质。This table shows where these substances may be found in the supply chain of electronic information products, as of the date of sale of the enclosed product.

The Environment- Friendly Use Period (EFUP) for all enclosed products and their parts are per the symbol shown here. The Environment- Friendly Use Period is valid only when the product is operated under the conditions defined in the product manual.