



Avaya Solution & Interoperability Test Lab

Configuring the Enterasys V2H124-24P Switch to provide Power over Ethernet (PoE) for Avaya IP Telephones and Avaya Wireless Access Points - Issue 1.0

Abstract

These Application Notes describe how to configure the Enterasys V2H124-24P Switch to provide in-line power for Avaya IP Telephones and Avaya Wireless Access Points. The various Avaya powering arrangements are shown and the administration commands for displaying and controlling the powering status of the switch ports are shown.

1. Introduction

Power over Ethernet (PoE) allows a switch to supply power to a network device within the same CAT-5 cable that carries the Ethernet signaling. This simplifies network installation and powering design, removing the need for a separate power supply for each IP telephone. IEEE 802.3af defines a standard protocol to be used by powering and powered devices. Avaya 4600 Series IP Telephones and Avaya wireless LAN Access Point products can be powered in this way by 802.3af compliant powering devices.

The Avaya product configurations addressed by these Application Notes are shown in **Figure 1**.

The powering tests included verification of the following after the product was connected to the switch:

- Successful boot operation.
- For IP telephones, successful registration with an Avaya IP Office IP406v2 or Avaya S8300 Media Server with G350 Media Gateway and completion of a test call.
- For wireless LAN access points, successful registration of a wireless laptop and use of the administration web interface for the access point from the laptop.

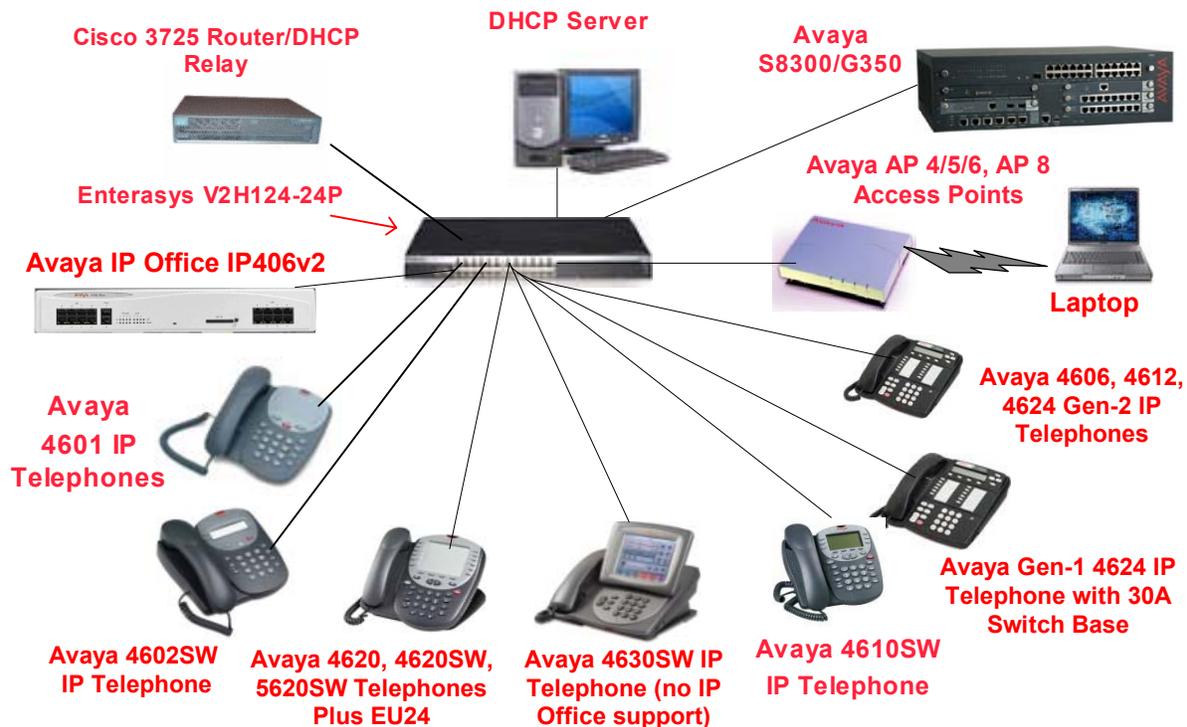


Figure 1: Enterasys Power over Ethernet (PoE) Switch Configuration

2. Equipment and Software Validated

Avaya IP Telephone model numbers and firmware versions can be obtained via the following keypad sequence:

Press **Hold V I E W #**

Press * until the model number appears.

Press * until the “.bin” file name appears, which contains the version.

Press # to exit.

The following equipment and software were used for the sample configuration provided:

Equipment	Firmware
Avaya IP Office IP406v2	3.0(40)
Avaya Communication Manager S8300 Media Server with G350 Media Gateway	2.2 (R012x.02.0.111.4)
Avaya 4601 IP Telephone	2.1
Avaya 4602 IP Telephone	1.8
Avaya 4602SW IP Telephone	1.8
Avaya 4606 IP Telephone (Gen-2)	1.8
Avaya 4610 SW IP Telephone	2.1
Avaya 4612 IP Telephone (Gen-2)	1.8
Avaya 4620 IP Telephone with EU24 Button Expansion Module	2.1
Avaya 4620SW IP Telephone with EU24 Button Expansion Module	2.1
Avaya 5620SW IP Telephone with EU24 Button Expansion Module	2.1
Avaya 4624 IP Telephone (Gen-1) (with Avaya 30A Ethernet Switch Base.	1.8
Avaya 4624 IP Telephone (Gen-2)	1.8
Avaya 4630SW IP Screenphone	2.1
Avaya AP-4/5/6 Access Point	3.0.4
Avaya AP-8 Access Point	2.6.0

3. Configure Inline Power on the Enterasys V2H124-24P

The configuration steps given assume an Avaya IP Office based configuration, but can easily be applied to an Avaya Communication Manager based configuration. These instructions also assume that the Enterasys switch has a management IP address configured and is otherwise at default settings.

Step 1: Open the browser interface to the Enterasys V2H-124-24P.

Step 2: Configure Power Parameters

Step 2(a): Select **POE** → **Power Port Config** from the menu. Since all of the endpoints used here draw much less than the default 15.4 watts, and most draw less than 6 watts, the default Power Port configuration of 15.4 Watts per endpoint was accepted, allowing the most flexibility for how ports are used.

Apply this setting if any changes were made.

The screenshot shows the web interface for the Enterasys V2H-124-24P switch. At the top, there is a navigation bar with the Enterasys logo and a status bar for the Intelligent Switch. The status bar shows a row of 24 ports, with the first few being green (Link Up) and the rest blue (Link Down). There are also dropdown menus for Unit (set to 1) and Mode (set to Active).

On the left side, there is a navigation menu with the following items: Home, System, SNTP, SNMP, Security, Port, Enterasys, PoE, power status, power config, power port status, power port config, Address Table, Spanning Tree, VLAN, Priority, IGMP Snooping, and DNS.

The main content area is titled "Power Port Configuration" and contains a table with the following data:

Port	Admin Status	Priority	Power Allocation (3000-15400 milliwatts)
1	<input checked="" type="checkbox"/> Enabled	low	15400
2	<input checked="" type="checkbox"/> Enabled	low	15400
3	<input checked="" type="checkbox"/> Enabled	low	15400
4	<input checked="" type="checkbox"/> Enabled	low	15400
5	<input checked="" type="checkbox"/> Enabled	low	15400
6	<input checked="" type="checkbox"/> Enabled	low	15400
7	<input checked="" type="checkbox"/> Enabled	low	15400
8	<input checked="" type="checkbox"/> Enabled	low	15400
9	<input checked="" type="checkbox"/> Enabled	low	15400
10	<input checked="" type="checkbox"/> Enabled	low	15400
11	<input checked="" type="checkbox"/> Enabled	low	15400
12	<input checked="" type="checkbox"/> Enabled	low	15400
13	<input checked="" type="checkbox"/> Enabled	low	15400

Step 3: Configure VLANs

The following steps describe the VLAN configuration, assuming the use of separate Voice and Data VLANs and DHCP to provide IP Phone set configuration.

Step 3(a): Select **VLAN** → **802.1Q VLAN** → **Static List** and, for each VLAN to be used configure the **New:** table with a **VLAN ID** and a **VLAN Name** and check the **Enabled** box. Click “<<Add” to enable it on the system. In this configuration, VLAN 1 was the data subnet and VLAN 42 was the voice subnet.

The screenshot shows the configuration page for the 'VLAN Static List'. On the left is a navigation tree with the following structure:

- Home
- System
- SNTP
- SNMP
- Security
- Port
- Enterasys
- PoE
- Address Table
- Spanning Tree
- VLAN
 - 802.1Q VLAN
 - GVRP Status
 - Basic Information
 - Current Table
 - Static List
 - Static Table
 - Static Membership by Port
 - Port Configuration
 - Trunk Configuration
- Priority
- IGMP Snooping
- DNS

The main configuration area is titled 'VLAN Static List' and contains the following elements:

- Current:** A list box containing:
 - 1, DefaultVlan, Enabled
 - 2, acmdfltVlan, Enabled
 - 10, nortel, Disabled
 - 20, vlan20, Enabled
 - 42, vlan42, Enabled
- New:** A form with the following fields:
 - VLAN ID (1-4093): []
 - VLAN Name: []
 - Status: Enabled
- Buttons: '<<Add' and 'Remove'

Step 3(b): Select **VLAN→802.1Q VLAN→Static Table**. Select the IP Phone port default VLAN: **1** in the **VLAN** drop-down box. For each IP Phone port in the table, select **Untagged**. For the IP Office port, select none. Ensure that the port settings are appropriate for the other data devices that will use this VLAN, including the router and the DHCP server, if they are on this VLAN. No more than one untagged VLAN should be assigned to any single port.

Apply this setting.

Select VLAN 42 (this configuration's Voice VLAN). Set the Avaya IP Office port value to **Untagged**. Set all IP Phone ports and the router port value to **Tagged**. The Access Point port was set to **Untagged** in this configuration, but a **Tagged** interface is also supported if the Access Point is also set to use VLAN tagging.

Apply this setting.

Port	Tagged	Untagged	Forbidden	None	Trunk Member
1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	
2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	
3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	
4	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
5	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
6	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
7	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
8	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
9	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
10	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
11	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
12	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	
13	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
14	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
15	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
16	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	

Step 3(c): Select **VLAN→802.1Q VLAN→Port Configuration**. Set the IP Office port **PVID** to **42** (the “voice” VLAN). For other ports, set the **PVID** to **1**. Otherwise, the default settings, including **Acceptable Frame Type: All** and **Mode: Hybrid** are acceptable.

Apply this setting.

The screenshot shows the configuration page for an Intelligent Switch. At the top, there is a status bar with the Enterasys logo, a row of port status indicators (Link Up/Down), and dropdown menus for Unit (1) and Mode (Active). On the left is a navigation tree with categories like System, Security, Port, PoE, and VLAN. The main area is titled 'VLAN Port Configuration' and contains a table with 11 rows, one for each port. Each row has columns for Port, PVID, Acceptable Frame Type, Ingress Filtering, GVRP Status, and three GARP timer settings (Join, Leave, LeaveAll), plus a Mode column. All 'Acceptable Frame Type' and 'Mode' settings are set to 'ALL' and 'Hybrid' respectively. 'Ingress Filtering' is disabled for all ports, while 'GVRP Status' is enabled.

Port	PVID	Acceptable Frame Type	Ingress Filtering	GVRP Status	GARP Join Timer(Centi Seconds)(20-1000)	GARP Leave Timer(Centi Seconds)(60-3000)	GARP LeaveAll Timer(Centi Seconds)(500-18000)	Mode
1	42	ALL	<input type="checkbox"/> Enabled	<input checked="" type="checkbox"/> Enabled	20	60	1000	Hybrid
2	42	ALL	<input type="checkbox"/> Enabled	<input checked="" type="checkbox"/> Enabled	20	60	1000	Hybrid
3	42	ALL	<input type="checkbox"/> Enabled	<input checked="" type="checkbox"/> Enabled	20	60	1000	Hybrid
4	1	ALL	<input type="checkbox"/> Enabled	<input checked="" type="checkbox"/> Enabled	20	60	1000	Hybrid
5	1	ALL	<input type="checkbox"/> Enabled	<input checked="" type="checkbox"/> Enabled	20	60	1000	Hybrid
6	1	ALL	<input type="checkbox"/> Enabled	<input checked="" type="checkbox"/> Enabled	20	60	1000	Hybrid
7	1	ALL	<input type="checkbox"/> Enabled	<input checked="" type="checkbox"/> Enabled	20	60	1000	Hybrid
8	1	ALL	<input type="checkbox"/> Enabled	<input checked="" type="checkbox"/> Enabled	20	60	1000	Hybrid
9	1	ALL	<input type="checkbox"/> Enabled	<input checked="" type="checkbox"/> Enabled	20	60	1000	Hybrid
10	1	ALL	<input type="checkbox"/> Enabled	<input checked="" type="checkbox"/> Enabled	20	60	1000	Hybrid
11	1	ALL	<input type="checkbox"/> Enabled	<input checked="" type="checkbox"/> Enabled	20	60	1000	Hybrid

Step 4: Configure Port Priority.

The intention of this section is to configure the switch such that, if there is congestion for egress bandwidth, the voice traffic will get priority. Data and other untagged traffic is given a default priority of 0. Voice traffic will be marked with a priority 6 tag that is administered in the IP Phones via the DHCP/TFTP process and will override the default port setting.

Configuration screens that are not shown can be assumed to be default. For example, priority traffic was configured to be served from Queue 3, which was set to be served first via strict priority for egress.

Step 4(a): Select **Priority**→**Default Port Priority** and ensure that the IP Office port will be marked with priority **6** and the other ports with a priority of **0**.

Apply this setting.

Port	Default Priority (0-7)	Number of Egress Traffic Classes	Trunk
1	6	4	
2	0	4	
3	0	4	
4	0	4	
5	0	4	
6	0	4	
7	0	4	
8	0	4	
9	0	4	
10	0	4	
11	0	4	
12	0	4	
13	0	4	
14	0	4	

4. Notes on DHCP/TFTP Server and IP Office Configuration

These Application Notes will only provide high level guidance related to configuration beyond the Enterasys switch as this information has been covered in existing Avaya documentation.

In particular, the 4600 Series IP Telephone LAN Administrator's Guide [AV-LANAdmin], listed in the reference section of this document, describes the setup. Some key points are:

- Assuming a separate voice/data VLAN configuration as shown in these Application Notes, the IP Telephones, after a reset will contact the DHCP server on the default VLAN and then, after being assigned to the Voice VLAN by the DHCP response, will reinitiate the DHCP process with the new "Voice" VLAN tag on the new subnet.
- In this configuration, there is one DHCP server serving multiple subnets. This is done by configuring the router to "relay" DHCP requests from different subnets to the DHCP server. An example of a configuration that does this is given in [AV-DHCP].
- The **Auto-create Extn Enable** option in the IP Office **System→Gatekeeper** tab should be disabled. Otherwise, if enabled, the IP Office will automatically create a User and Extension entry for any IP Phone registering with a previously unknown extension. User keypad errors could cause undesirable dial plan entries.

5. Avaya IP Phone configuration

Once the rest of the configuration is complete, most IP Phone configuration is automatic. Set the IP Phone to default values, by pressing:

Hold, R E S E T #

Enter the Extension and Password when prompted.

Alternatively, the IP Phones can be statically assigned VLANs and IP addresses using the Phone keypad by pressing **Hold, A D D R #** and setting the entries to the desired values.

IP Phone settings can be reviewed on the large display sets (e.g., the 4620SW), by pressing **Options**, followed by **View IP Settings**.

The 4610SW settings can be viewed by selecting:

Hold, A D D R # and then pressing # to scroll through each setting.

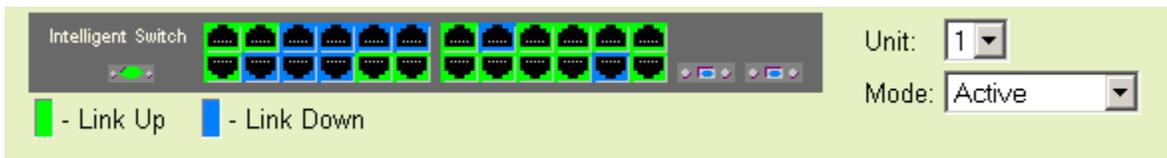
6. Avaya Wireless LAN Access Point Configuration

The Avaya AP-4/5/6 and AP-8 Wireless LAN Access Points accept power over Ethernet with default settings. VLAN operation is enabled via the **Configure**→**SSID/VLAN/Security** tab→**Mgmt VLAN** tab. Select **Enable VLAN protocol** and leave the **VLAN Management** setting as **untagged**. Select **OK**, and then select **Commands** and **Reboot** to reboot the device.

This assumes that the Enterasys port for this device has a PVID value for the VLAN that the Access Point Management IP address is on. Then, using the Wireless-A or Wireless-B tabs, a different VLAN Id can be assigned to each SSID as needed.

7. Verification Steps

- Use the icon on the top of the Enterasys Web page to confirm link up for each active port:



- Select **Port**→**Port Information** to see the **Speed** and **Duplex Status** of a port. As shown, ports 1 and 5 have been plugged into the Hub of an IP403 and so display the correct 100 Mb/s, half duplex state.

Port Information								
Port	Name	Type	Admin Status	Oper Status	Speed Duplex Status	Flow Control Status	Autonegotiation	Trunk Member
1		100Base-TX	Enabled	Up	100half	None	Enabled	
2		100Base-TX	Enabled	Up	100full	None	Enabled	
3		100Base-TX	Enabled	Up	100full	None	Enabled	
4		100Base-TX	Enabled	Down	100full	None	Enabled	
5		100Base-TX	Enabled	Up	100half	None	Enabled	
6		100Base-TX	Enabled	Down	100full	None	Enabled	
7		100Base-TX	Enabled	Down	100half	None	Enabled	

- Select **PoE** → **power port status** to verify a non-zero **Power Consumption** value on ports that should be drawing power. If not, check that the **Admin Status** is on and then that the phone is connected appropriately to the port.

The screenshot shows a web browser window with the address bar displaying 'http://192.16.20.201/'. The browser's menu bar includes 'File', 'Edit', 'View', 'Favorites', 'Tools', and 'Help'. The address bar contains 'http://192.16.20.201/'. The main content area is titled 'Power Port Status' and contains a table with the following data:

Port	Admin Status	Mode	Power Allocation (milliwatts)	Power Consumption (milliwatts)	Priority
1	Enabled	off	15400	0	low
2	Enabled	off	15400	0	low
3	Enabled	off	15400	0	low
4	Enabled	off	15400	0	low
5	Enabled	off	15400	0	low
6	Enabled	off	15400	0	low
7	Enabled	off	15400	0	low
8	Enabled	off	15400	0	low
9	Enabled	off	15400	0	low
10	Enabled	off	15400	0	low
11	Enabled	off	15400	0	low
12	Enabled	off	15400	0	low
13	Enabled	on	15400	5212	low
14	Enabled	on	15400	3123	low
15	Enabled	off	15400	0	low
16	Enabled	on	15400	6987	low
17	Enabled	on	15400	3123	low
18	Enabled	on	15400	3276	low

At the bottom of the page, there are buttons for 'Apply', 'Revert', and 'Help'. The browser's status bar at the bottom right shows 'Local intranet'.

- Spanning Tree is enabled by default and is recommended to prevent accidental network loops that can otherwise wreak havoc on a layer 2 network. The figure below shows the output when ports 1 and 5 have been plugged into the IP406v2 LAN switch interface for redundancy. Via the Spanning Tree protocol, the Enterasys switch sets one of the ports into the Discarding state, thus preventing a loop as shown by selecting **Spanning Tree→STA→Port Configuration**.

Intelligent Switch: [Link Up/Down indicators] Unit: 1 Mode: Active

Navigation Tree: Home, System, SNMP, Security, Enterasys, PoE, Address Table, Spanning Tree, STA, Information, Configuration, Port Information, Trunk Information

STA Port Configuration

Port	Spanning Tree	STA State	Priority (0-240), in steps of 16	Path Cost (1-200000000)	Admin Link Type	Admin Edge Port (Fast Forwarding)	Migration	Trunk
1	<input checked="" type="checkbox"/> Enabled	Forwarding	128	200000	Auto	<input checked="" type="checkbox"/> Enabled	<input type="checkbox"/> Enabled	
2	<input checked="" type="checkbox"/> Enabled	Forwarding	128	200000	Auto	<input checked="" type="checkbox"/> Enabled	<input type="checkbox"/> Enabled	
3	<input checked="" type="checkbox"/> Enabled	Forwarding	128	200000	Auto	<input checked="" type="checkbox"/> Enabled	<input type="checkbox"/> Enabled	
4	<input checked="" type="checkbox"/> Enabled	Discarding	128	200000	Auto	<input checked="" type="checkbox"/> Enabled	<input type="checkbox"/> Enabled	
5	<input checked="" type="checkbox"/> Enabled	Discarding	128	200000	Auto	<input checked="" type="checkbox"/> Enabled	<input type="checkbox"/> Enabled	

- To troubleshoot with a sniffer, select **Port→Mirror** and configure a session to send traffic (received, transmitted, or both) from a port of interest to a destination port that has a protocol analyzer plugged in.

Intelligent Switch: [Link Up/Down indicators] Unit: 1 Mode: Active

Navigation Tree: Home, System, SNMP, Security, Port, Port Information, Trunk Information, Port Configuration, Trunk Configuration, Trunk Membership, LACP, Broadcast Control, Mirror Port Configuration, Rate Limit, Port Statistics

Mirror Port Configuration

Mirror Sessions: Source: 1/19 Both Destination: 1/2

New: Source Unit: 1, Source Port: 1, Type: Rx, Target Unit: 1, Target Port: 1

Buttons: <<Add, Remove

8. Conclusion

The Enterasys V2H124-24P Power Switch can successfully be used to power Avaya IP Telephones and Wireless LAN Access Points.

9. References

From www.enterasys.com:

- [ENT-MAN] “Matrix V-Series V2H124-24, V2H124-24FX, and V2H124-24P Fast Ethernet Switch Configuration Guide”, P/N 9033925-06, 2005.

From www.avaya.com:

- [AV-LANAdmin] “4600 Series IP Telephone Release 2.1 LAN Administrator’s Guide”.
- [AV-DHCP] “Configuring Avaya IP Telephones using DHCP to Facilitate Failover Registration between Avaya IP Office and Avaya Communication Manager”.

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