



Avaya Solution & Interoperability Test Lab

Using Cisco Catalyst Express 500-24LC Switch and 500-24PC Switch with an IEEE 802.3af Compliant Power over Ethernet card for Avaya 4600 and 5600 Series IP Telephones and Avaya Wireless Access Points - Issue 1.0

Abstract

These Application Notes describe how to configure the Cisco Catalyst Express 500-24LC switch and 500-24PC switch to provide inline power for Avaya 4600 and 5600 Series IP Telephones and Avaya Wireless Access Points. The various powering arrangements and the administration commands for displaying and controlling the powering status of the switch ports are covered.

1. Introduction

Power over Ethernet (PoE) allows a switch to supply power to a network device within the same cable that carries the Ethernet traffic. This simplifies network installation and powering design, removing the need for separate power supplies for network devices. IEEE 802.3af defines a standard protocol to be used by power sourcing equipment (PSE) and powered devices (PD). The Cisco Catalyst Express 500-24LC and 500-24PC Switches are IEEE 802.3af compliant PSEs and can provide inline power to the Avaya 4600 and 5600 series IP Telephones and Avaya Wireless Access Points, which are IEEE 802.3af compliant PDs.

Only the first four ports of the Cisco Catalyst Express 500-24LC switch are capable of providing Power over Ethernet. However, the Cisco Express 500-24PC is able to provide PoE for all 24 ports.

The Avaya product configurations addressed by these Application Notes are shown in **Figure 1**. The following Avaya Powered Devices are directly connected to the switch:

- Avaya 4601 IP Telephone
- Avaya 4602 IP Telephone
- Avaya 4602SW IP Telephone
- Avaya 4610SW IP Telephone
- Avaya 4620 IP Telephone
- Avaya 4620SW IP Telephone
- Avaya 4621SW IP Telephone
- Avaya 4622SW IP Telephone
- Avaya 4625SW IP Telephone
- Avaya 5601 IP Telephone
- Avaya 5602SW IP Telephone
- Avaya 5610SW IP Telephone
- Avaya Gen-2 4606, 4612, and 4624 IP Telephones
- Avaya Wireless AP-4/5/6 802.11a/b/g Access Point

The Avaya 4612 and 4624 IP Telephones can be identified as Gen-2 by inspecting the model number. “2A” in the model number indicates Gen-2. The model number can be found by:

- Inspecting the label attached to the bottom of the Telephone.

OR

- Pressing **Mute, V, I, E, W, #** on the keypad and then pressing * until the model number appears. Press # to exit.

An example of a model number is 4612D02A-003 (Gen-2).

The Avaya 4620SW Class 2 and Class 3 IP Telephones can be differentiated by the microphone at the bottom right side of the Telephone. If the microphone has one hole, it is Class 2, and if it has two holes, it is Class 3.

The powering tests included verification of the following:

- Successful boot operation
- For Avaya IP Telephones, successful registration with Avaya Communication Manager or Avaya IP Office and completion of a test call.
- For the Wireless LAN Access Point, successful registration for an Avaya IP Softphone with Avaya Communication Manager and completion of a test call.



Figure 1: Avaya 4600 Series IP Telephones and a Wireless Access Point with the Cisco Catalyst Express 500-24LC and 500-24PC Switches.

2. Equipment and Software Validated

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

Network Component	Software Version
Avaya 4601 IP Telephone	1.8.2
Avaya 4602/4602SW IP Telephone	1.8.2
Avaya 4606 IP Telephone	1.8.3
Avaya 4610SW IP Telephone	2.3
Avaya 4612/4624 Gen-2 IP Telephone	1.8.3
Avaya 4620/4620SW IP Telephone	2.3
Avaya 4621SW IP Telephone	2.3
Avaya 4622SW IP Telephone	2.3
Avaya 4625SW IP Telephone	2.5
Avaya 5601 IP Telephone	1.8.6
Avaya 5602SW IP Telephone	1.8.6
Avaya 5610SW IP Telephone	2.1
Avaya 5620SW IP Telephone	2.1
Avaya IP Softphone	5.1.4.6
Avaya AP-4/5/6	2.4.5
Avaya IP Office 403	3.0
Avaya Communication Manager (Avaya S8700 Media Server)	3.0
Cisco Catalyst Express 500-24LC and 500-24PC IOS Software	12.2(25)FY

Table 1 – Network Component Software Versions

3. IEEE 802.3af PoE Implementation on the Avaya PDs and Cisco Catalyst Express 500-24LC and 500-24PC Switches

In June 2003, the IEEE approved a standard for Power over Ethernet. The maximum power is 15.4W per PSE port and the maximum power delivered to a powered device, accounting for cable loss, is 12.95W. Optionally, powered devices may also be classified based on the maximum power the device will draw. The Cisco Catalyst Express 500-24LC, 500-24PC, and Avaya PDs support this optional classification. The Cisco Catalyst Express 500-24LC and 500-24PC Switches can detect the Avaya PDs with the correct classification and deliver the appropriate power.

The IEEE 802.3af classifications are given in **Table 2**. Class 0 is a legacy class for devices built before the standard evolved to power classification levels.

Class	PSE Output Max. Power
0	15.4W
1	4.0W
2	7.0W
3	15.4W
4	Treat as Class 0

Table 2 – IEEE 802.3af PSE and Powered-Device Power Classifications

Table 3 shows the detected class and power allocated from the Cisco Catalyst Express 500-24LC and 500-24PC Switches to the Avaya IP Telephones and the Wireless Access Point. The Cisco Catalyst 500-24LC and 500-24PC Switches do not show the actual power used.

Avaya IP Telephones	Class	Power Allocated (Watts)
4601	2	7
4602	1	4
4602SW	2	7
4610SW	2	7
4620	3	15.4
4620SW (Pre 11/2004)	3	15.4
4620SW (Post 11/2004)	2	7
4621SW	2	7
4622SW	2	7
4625SW	3	15.4
5601	2	7
5602SW	1	4
5610SW	2	7
5620SW	2	7
Gen-2 4606	0	15.4
Gen-2 4612	0	15.4
Gen-2 4624	0	15.4
Avaya AP-4/5/6	0	15.4

Table 3 – Class and Power Allocation for Avaya IP Telephones and a Wireless Access Point

4. Configuring Inline Power on the Cisco Catalyst 500-24LC and 500-24PC Switches

The following describes how the Cisco Catalyst 500-24LC and 500-24PC Switches interact with powered devices.

1. PoE-capable ports are configured by default to auto mode. This means that Powered Device discovery is enabled. If insufficient inline power is available from the power supplies for all the powered devices in auto mode, there is no guarantee which device will receive power.
2. Power over Ethernet ports may be configured to never provide inline power.

The ports connected to the Avaya 4600 and 5600 IP Telephones and Avaya Wireless Access Points must use the default auto mode in order to be powered by the Cisco switches.

4.1. Configuring and Verifying Inline Power on the Cisco Catalyst 500-24LC and 500-24PC Switches

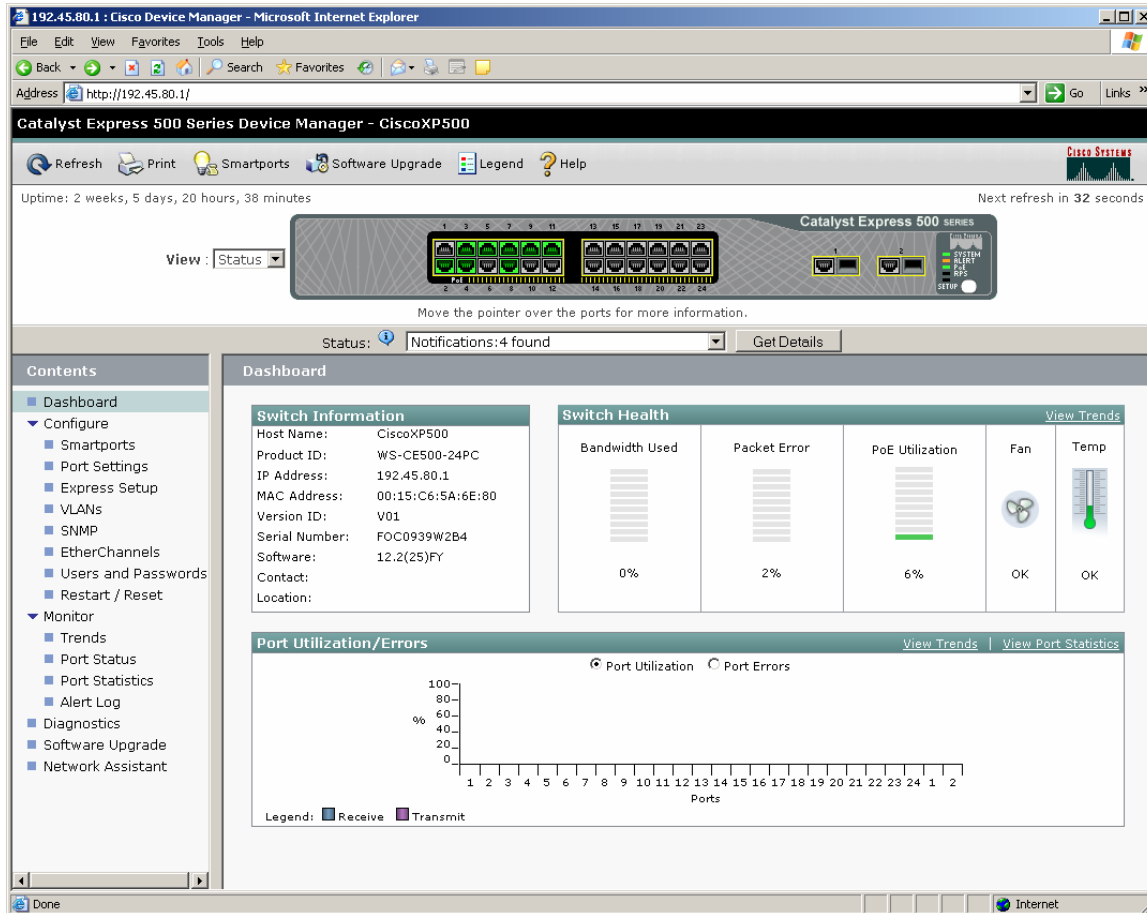
The Cisco Catalyst Express 500-24LC and 500-24PC Switches can both be accessed using a web-based interface. Launch an Internet browser and type the switch's IP address in the address field. The following screenshots are taken from the Cisco Catalyst Express 500-24PC Switch.

To enable or disable PoE on a certain port of the switch, the user can select the **Configure**→**Port Settings** and then, under **PoE** column, select auto or never.

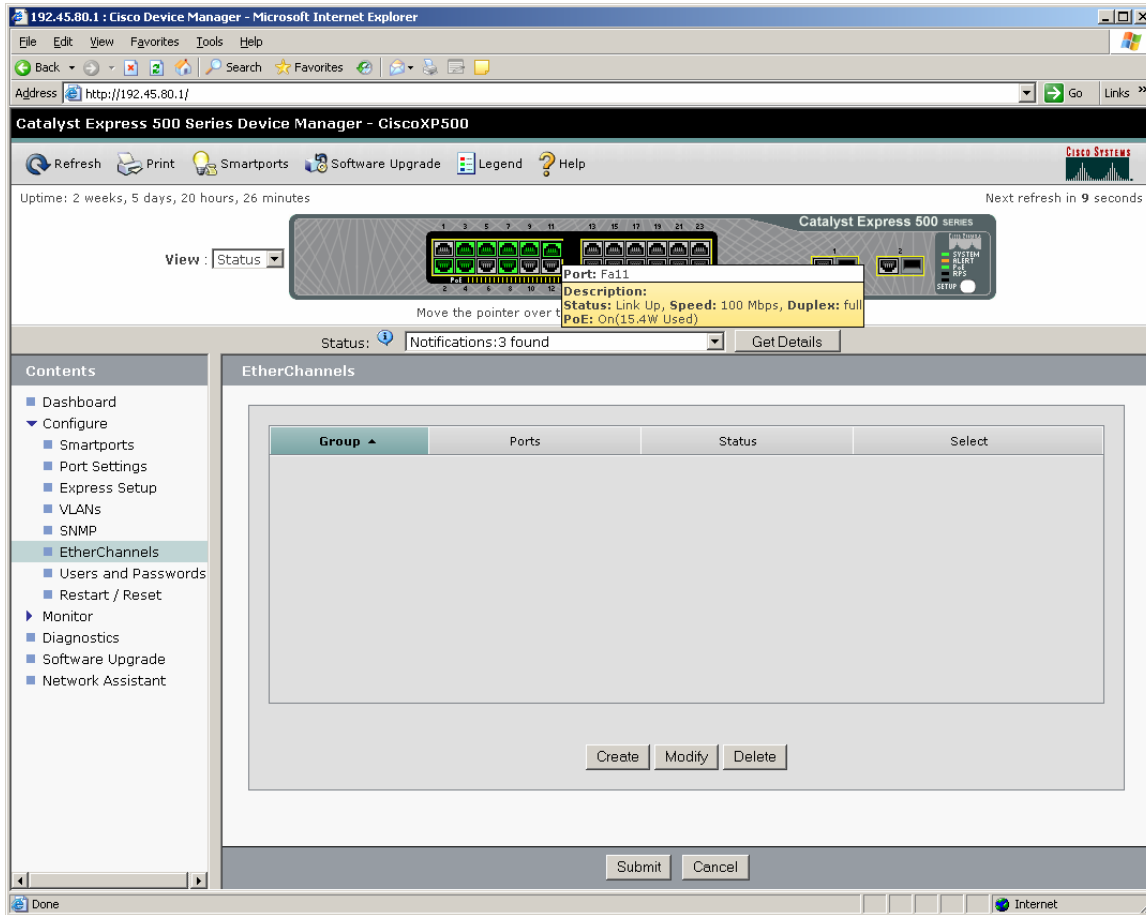
The screenshot shows the Cisco Catalyst Express 500 Series Device Manager web interface. The main content area displays the 'Port Settings' configuration page. The interface includes a navigation menu on the left, a main content area with a port settings table, and a status bar at the bottom. The table lists ports Fa1 through Fa12 with columns for Port, Description, Enable, Speed, Duplex, PoE, and Auto-MDIX. The PoE column for Fa1-Fa10 is set to 'Auto', Fa11 is 'Full', and Fa12 is 'Auto'.

Port	Description	Enable	Speed	Duplex	PoE	Auto-MDIX
Fa1		<input checked="" type="checkbox"/>	Auto	Auto	Auto	<input checked="" type="checkbox"/>
Fa2		<input checked="" type="checkbox"/>	Auto	Auto	Auto	<input checked="" type="checkbox"/>
Fa3		<input checked="" type="checkbox"/>	Auto	Auto	Auto	<input checked="" type="checkbox"/>
Fa4		<input checked="" type="checkbox"/>	Auto	Auto	Auto	<input checked="" type="checkbox"/>
Fa5		<input checked="" type="checkbox"/>	Auto	Auto	Auto	<input checked="" type="checkbox"/>
Fa6		<input checked="" type="checkbox"/>	Auto	Auto	Auto	<input checked="" type="checkbox"/>
Fa7		<input checked="" type="checkbox"/>	Auto	Auto	Auto	<input checked="" type="checkbox"/>
Fa8		<input checked="" type="checkbox"/>	Auto	Auto	Auto	<input checked="" type="checkbox"/>
Fa9		<input checked="" type="checkbox"/>	Auto	Auto	Auto	<input checked="" type="checkbox"/>
Fa10		<input checked="" type="checkbox"/>	Auto	Auto	Auto	<input checked="" type="checkbox"/>
Fa11		<input checked="" type="checkbox"/>	Auto	Full	Auto	<input type="checkbox"/>
Fa12		<input checked="" type="checkbox"/>	Auto	Auto	Auto	<input checked="" type="checkbox"/>

To view the percentage of power being used up by the PDs, the user can access **Dashboard** and view how much of the power is being allocated under the **Switch Health** area.



To view the information on a certain port on the switch, the user can move the mouse over to the corresponding port in the picture and view the status, speed, duplex, and PoE of the port.



5. Verification Steps

- Connect Avaya IP Telephones to Cisco Catalyst 500-24LC and 500-24PC Switches. Verify that the Avaya IP Telephones can be powered properly.
- Verify that the Avaya IP Telephones can register with Avaya Communication Manager and IP Office and calls can be made successfully.
- Use the web-based interface on the Cisco switch to check the power status.
- Reset the switch. Verify that all the IP Telephones can be powered up properly.

6. Conclusion

The Cisco Catalyst 500-24LC and 500-24PC Switches can both provide inline power to the Avaya 4600 and 5600 series IP Telephones and the Avaya AP 4/5/6 Wireless Access Point.

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