POE Settings

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Chapter 1   Power Over Ethernet

1.1   POE Overview

PoE is the simplified term of Power Over Ethernet and it means that the power supply can be provided within a reliable power supply distance of up to 100m through the 10BASE-T, 100BASE-TX or 1000BASE-T Ethernet. Through this method, the centralized power supply to terminal the IP telephone, wireless AP, portable charger, POS, camera and data collector can be effectively realized when these terminals access the network without the consideration of the cabling of the power source system. As to the currency, the current PoE power supply has its uniform standard--802.3af, which has already released now, and there exists no incompatible problem as to different equipment from different manufacturers.

1.1.1   PoE Power Supply

According to 802.3af, the PoE power supply system includes two kinds of equipment: PSE and PD. As to Power Sourcing Equipment (PSE), it is mainly used to provide power supply to other devices and it can be further divided into two classes: Midspan (PoE lies out of the switch) and Endpoint (PoE is integrated into the switch).

BDCOM's equipment, supporting PoE power supply, has their power supply system installed in the inside, so the equipment belongs to the Endpoint PSE equipment. PD, shortened term of Powered Device, is the device in the PoE power supply system to receive the power supply. It mainly refers to some wireless APs, some IP phones or some SOHO switches with low power. The typical networking structure of the PoE power supply system is shown in the following figure:
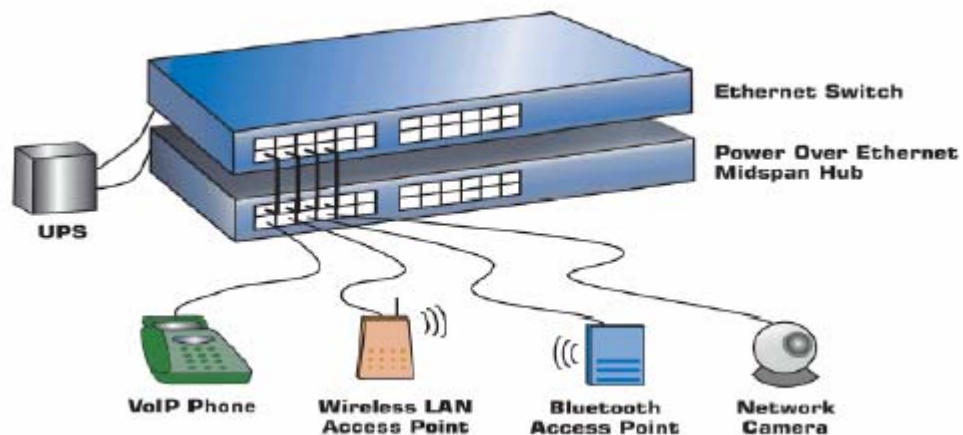
PI (Power Interface), the interface between PSE/PD and the network cable, is also defined in 802.3af. Up to now, there are two power supply modes defined: alternative A (signal lines, 1, 2, 3 and 6) and alternative B (idle lines 4, 5, 7 and 8).

1) Power supply through the idle line pair—alternative B

As shown in the following figure, link 4 and link 5 form the anode, while link 7 and link 8 form the cathode. The power supply is from PSE to PD.
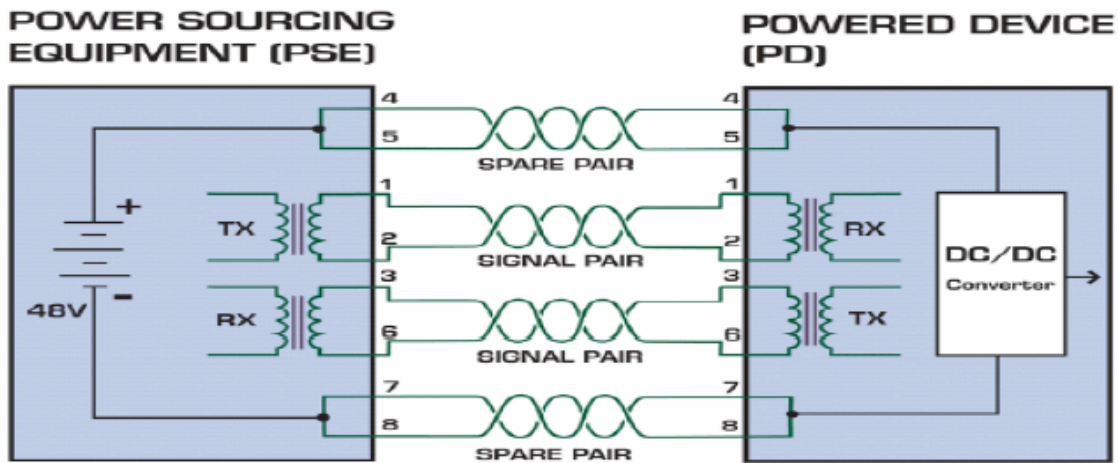
2) Power supply through the data pair—alternative A

As shown in the following figure, PSE can provide the power to PD through the data pair. Because DC and data frequency does not interfere each other, the electric power and data can be transmitted simultaneously at the same pair. In fact, it can be seen as the multiplexing of the cable. Link 1 and link 2 form the anode (or cathode), while link 3 and 6 form the cathode (or anode).
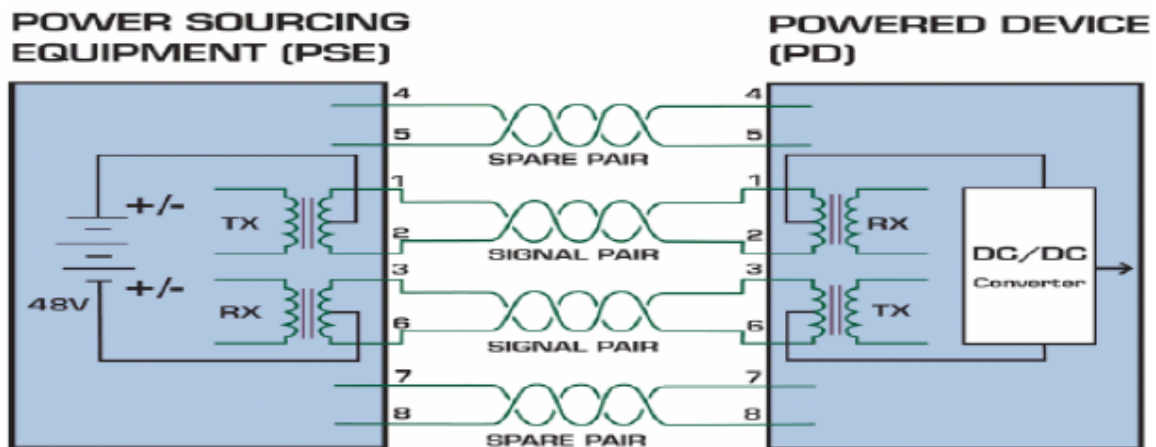
Generally speaking, standard PD has to support two power reception modes, while PSE only needs to support one of the two modes. All BDCOM products, as the PSE switches, only support the signal line power supply—alternative A.

1.1.2   Power-Up Procedure of PoE Equipment

The procedure for PD to obtain the power when PD accesses the PSE system is shown in the following figure:
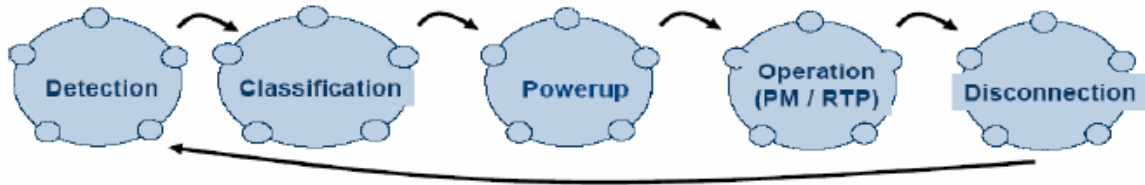
The above-mentioned procedure is described below:

1) Detection: PSE checks whether PD exists.

PSE detects the resistance value between the power-output lines to judge whether PD exists. At the detection phase, the output voltage is between 2.8V and 10V, and the voltage polarity is consistent with the polarity of the minus 48V output voltage. Only when PD is detected can PSE conduct the next operation.

The two traits for PD existence are: a. the DC resistance is between 19Kohm and 26.5Kohm; b. the capacitance is no more than 150nF.

2) Classification (optional): PSE confirms the power of PD.

PSE checks the output current of the power source to confirm the power level of PD. On the Classification phase, the output voltage is between 15.5V and 20.5V. The voltage polarity is consistent with the polarity of the minus 48V output voltage.

3) Powerup: PSE supplies PD with power. When PSE finds that a mounted device belongs to legal PD and completes the classification of PD (optional), PSE starts to provide the power to this device and exports a voltage of -48V. 5) Disconnection: PSE checks whether PD is disconnected through special checkup method, and if PD is found to be disconnected, PSE will shut down the output interface. The interface will return to the Detection phase. The ideal output of PSE is shown in the following figure:
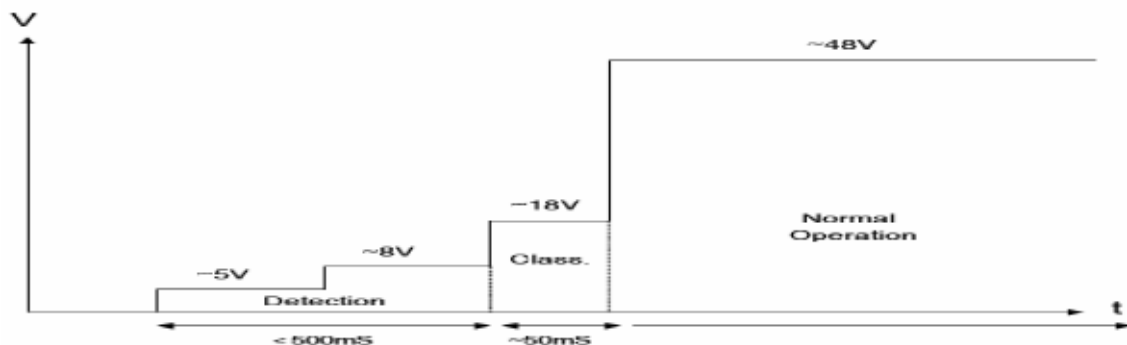
1.2   PoE Configuration Task List

- Displaying the Configuration

- It is used to set the power supply management mode for a switch.

- It is used to set the lasting time of the LED in PoE mode.

- Stopping Sending the Trap Notification to Users When Power Supply Changes Or Power Alarm Occurs

- Sets the percentage between alarm power and the total power.

- Setting Power Supply Protection

- Setting the Power Statistics

- Setting the Standard of PSE Power Supply

- Enabling the Power Supply of a Port

- It is used to set the maximum power of a port.

- Setting the Power Supply Priority for a Port

- It is used to set the port description (usually for PD).

- It is used to set the forced power supply.

1.3   PoE Configuration Tasks

1.3.1   Displaying the Information about POE-Related Systems

You can observe the information about the PoE module and ports by running the following commands in EXEC mode.

The following commands are shown in EXEC or global configuration mode:

Show poe system	It is used to display the information about POE-related systems.
Show poe all	Displays the information description table of the POE port.
Show poe power	It is used to display the information about the power supply of all ports.
Show poe interface *type slot/port*	It is used to display the detailed POE information of a designated port.

1.3.2 Setting the Power Supply Management Mode for a Switch

The default management mode is **auto**. In auto mode, the maximum power limit cannot be set and the default one is the maximum port's power supported by the chip; the power supply priority of a port cannot be set and the default priority is **low**.

But in preemptive or non-preemptive mode, the maximum power limit and the power supply priority of a port can be set.

In preemptive mode, the interface with high power supply priority will continue providing the power to the newly accessed PD even in full load and the interface with low power supply priority is cut off from the power, while in non-preemptive mode, the prompt information will occur on an interface with high power supply priority when PD is accessed this interface in full load.

Run the following commands in global mode to configure the power supply management mode of a switch:

Procedure	Command	Purpose
Step1	**config**	Enters the global configuration mode.
Step2	**poe power-management** {auto | preemptive | non-preemptive}	It is used to set the power supply management mode for a switch.

Run the following commands in global mode to further set the systematic parameters in non-auto mode:

When the total power exceeds **lowDisable**, the port cannot be powered; when the total power is less than **lowDisable**, the power supply can go again.

lowDisable = total power - value

When the total power exceeds **lowNoConnect**, those ports whose priorities are lower than or equal to the priority of the currently powered port, which is lowest priority among the powered ports, will be cut off from the power supply.

lowNoConnect = lowDisable – value

Procedure	Command	Purpose
Step1	**config**	Enters the global configuration mode.
Step2	**poe power-management** {lowDisable | lowNoConnect } *value*	Sets the systematic parameters of a switch in non-auto mode.

1.3.3 Setting the Lasting Time of the LED in PoE Mode

In global mode, run the following commands to set the lasting time of PoE LED:

Procedure	Command	Purpose
Step1	**config**	Enters the global configuration mode.

| Step2 | **poe led-time** *time* | It is used to set the lasting time of the LED in PoE mode. |

Run the following commands to resume the default settings:

Procedure	Command	Purpose
Step1	**config**	Enters the global configuration mode.
Step2	**no poe led-time**	Resumes the default interval, that is, 30 seconds.

1.3.4   Stopping Sending the Trap Notification to Users When Power Supply Changes Or Power Alarm Occurs

Run the following commands in global mode:

Procedure	Command	Purpose
Step1	**config**	Enters the global configuration mode.
Step2	**poe mib notification-stop**	Means that the trap notification will not be sent to users when the power supply of a port changes.

Resume the default settings by running the following commands:

Procedure	Command	Purpose
Step1	**config**	Enters the global configuration mode.
Step2	**no poe mib notification-stop**	Means that the trap notification will be sent to users when the power supply of a port changes.

1.3.5   Setting the Percentage between Alarm Power and Total Power

Run the following commands in global mode:

Procedure	Command	Purpose
Step1	**config**	Enters the global configuration mode.
Step2	**poe threshold** *value*	Sets the percentage between alarm power and the total power.

Resume the default settings by running the following commands:

Procedure	Command	Purpose
Step1	**config**	Enters the global configuration mode.
Step2	**no poe threshold**	The default percentage between alarm power and the total power is 100%.

1.3.6   Setting Power Supply Protection

To set power supply protection for a port, run the following command:

Run the following command in global mode to enable the power statistics:

Procedure	Command	Purpose
Step1	**config**	Enters the global configuration mode.
Step2	**poe pse-unprotect**	Disables the power supply protection of a port.

The port protection is shut down:

Procedure	Command	Purpose
Step1	**config**	Enters the global configuration mode.
Step2	**no poe pse-unprotect**	Enables the power supply protection of a port.

1.3.7   Setting the Power Statistics

Run the following command in global mode to enable the power statistics:

Procedure	Command	Purpose
Step1	**config**	Enters the global configuration mode.
Step2	**poe counter** *value*	Sets the sampling interval of power statistics.

Run the following commands to resume the default settings:

Procedure	Command	Purpose
Step1	**config**	Enters the global configuration mode.
Step2	**no poe counter**	Disables the power statistics.

1.3.8   Setting the Standard of PSE Power Supply

If you select the AF standard, the power supply for a port can reach up to 15.4W.

If you select the AT standard, the power supply for a port can reach up to 30W.

If you select MAX, it means that as to the switch with support of both AF and AT, the AT standard will be selected, and as to the switch only supporting AF, the AF standard will be selected.

Procedure	Command	Purpose
Step1	**config**	Enters the global configuration mode.
Step2	**poe standard** {AT | AF | MAX}	Sets the power supply standard of a switch.

1.3.9 Enabling the Power Supply of a Port

Method 1:

The power supply of a port is enabled by default, but you can run the following commands in port configuration mode to disable this function:

Procedu re	Command	Purpose
Step1	**config**	Enters the global configuration mode.
Step2	**interface** intf-type intf-id	Enters the interface configuration mode.
Step3	**poe disable**	Disables the power supply of a port.

To resume the default settings, you can run the following commands:

Procedu re	Command	Purpose
Step1	**config**	Enters the global configuration mode.
Step2	**interface** intf-type intf-id	Enters the interface configuration mode.
Step3	**no poe disable**	Enables the power supply of a port.

Method 2:

Procedu re	Command	Purpose
Step1	**config**	Enters the global configuration mode.
Step2	**interface** intf-type intf-id	Enters the interface configuration mode.
Step3	**poe disable time-range** *name*	Shuts down the power supply of a port in the **name** time range.

The following procedure shows how to resume the default settings and disable the power supply.

Procedu re	Command	Purpose
Step1	**config**	Enters the global configuration mode.
Step2	**interface** intf-type intf-id	Enters the interface configuration mode.
Step3	**no poe disable time-range**	Loses the control of the power supply of a port in a time range.

1.3.10 Setting the Maximum Power of a Port

The default maximum power of a port is 30000mW and you can set the maximum power of this port by running this command in interface configuration mode:

Procedure	Command	Purpose
Step1	**config**	Enters the global configuration mode.
Step2	**interface** intf-type intf-id	Enters the interface configuration mode.
Step3	**poe max-power** *value*	Sets the maximum power of a port, whose unit is mW.

Resume the default settings by running the following commands:

Procedure	Command	Purpose
Step1	**config**	Enters the global configuration mode.
Step2	**interface** intf-type intf-id	Enters the interface configuration mode.
Step3	**no poe max-power**	The default maximum power of a port is 30000mW.

1.3.11   Setting the Power Supply Priority for a Port

The default power supply priority of a port is low and you can set the maximum power of this port by running this command in interface configuration mode:

Procedure	Command	Purpose
Step1	**config**	Enters the global configuration mode.
Step2	**interface** intf-type intf-id	Enters the interface configuration mode.
Step3	**poe priority** {critical | high | low }	Sets the power supply priority of a port to **critical**, **high** or **low**.

1.3.12   Setting the Port Description (usually for PD)

The port description is null by default and you can set the port description by running this command in interface configuration mode:

Procedure	Command	Purpose
Step1	**config**	Enters the global configuration mode.
Step2	**interface** intf-type intf-id	Enters the interface configuration mode.
Step3	**poe PD-discription** *string*	Sets the port description.

Resume the default settings by running the following commands:

Procedure	Command	Purpose
Step1	**config**	Enters the global configuration mode.

| Step2 | **interface** intf-type intf-id | Enters the interface configuration mode. |
| Step3 | **no poe PD-discription** | Deletes the character string of port's description. |

1.3.13 Setting the Forced Power Supply

The forced power supply is disabled by default and you can enable it by running the following commands in interface configuration mode:

Procedure	Command	Purpose
Step1	**config**	Enters the global configuration mode.
Step2	**interface** intf-type intf-id	Enters the interface configuration mode.
Step3	**poe force-power**	Enables the forced power supply on a port.

To resume the default settings, run the following commands:

Procedure	Command	Purpose
Step1	**config**	Enters the global configuration mode.
Step2	**interface** intf-type intf-id	Enters the interface configuration mode.
Step3	**no poe force-power**	Disables the forced power supply on a port.