POE

Ethernet Switch

ZyNOS 4.00

Support Notes

Version 4.00 October 2011

ZyXEL
Unleash Networking Power

Overview of Power over Ethernet

Power over Ethernet or **PoE** technology describes a system to pass electrical power safely, along with data, on Ethernet cabling. The IEEE standard for PoE requires category 5 cable or higher for high power levels, but can operate with category 3 cable for low power levels. Power is supplied in common mode over two or more of the differential pairs of wires found in the Ethernet cables and comes from a power supply within a PoE-enabled networking device such as an Ethernet switch or can be *injected* into a cable run with a *midspan* power supply.

The original **IEEE 802.3af-2003** PoE standard provides up to 15.4 W of DC power (minimum 44 V DC and 350 mA) to each device. Only 12.95 W is assured to be available at the powered device as some power is dissipated in the cable.

The updated **IEEE 802.3at-2009** PoE standard also known as **PoE+** or **PoE plus**, provides up to 25.5 W of power. The 2009 standard prohibits a powered device from using all four pairs for power. Some vendors have announced products that claim to be compatible with the 802.3at standard and offer up to 51 W of power over a single cable by utilizing all four pairs in the Cat.5 cable.

The following table shows the IEEE 802.3af power classification of the Powered Devices. This is a number from 0 to 4, where each value represents a range of power (W) that the PD requires to function. The ranges are as follows.

- Class 0 - Default, 0.44 to 12.94 W
- Class 1 - Optional, 0.44 to 3.84 W
- Class 2 - Optional, 3.84 to 6.49 W
- Class 3 - Optional, 6.49 to 12.95 W
- Class 4 - Reserved (PSEs classify as Class 0)

Benefits

- **Lower Cost** – External "wall wart" power supplies can be eliminated.
- **Flexible access point location** –Wireless access points no longer need to be located near AC power source or need power lines and outlets.
- **Remote management** – IP phone, WLAN access points can be powered up or down remotely.

EndSpan & MidSpan

There are two kinds of PoE solutions in the world, Endspan and Midspan. Usually a PoE switch would be an endspan solution, while a PoE Injector would be a midspan solution. (ex. PoE-12, PoE-80)

Alternative A is also called "Endspan", which means that data and power are in the same twisted pairs.   Power is carried over the data pairs (1/2 & 3/6)
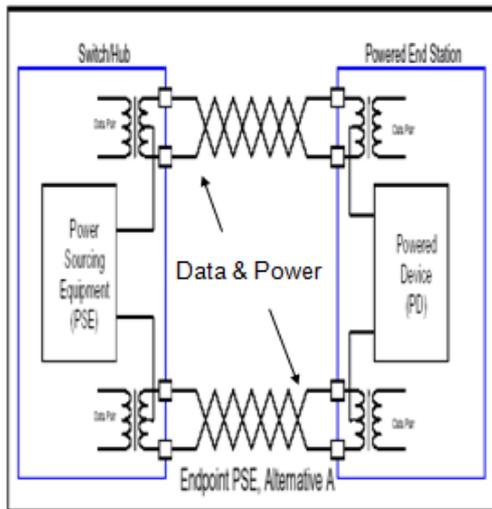
PIN	Alternative A	Alternative B
1	Vport Negative Data	Data
2	Vport Negative Data	Data
3	Vport Positive Data	Data
4		Vport Positive
5		Vport Positive
6	Vport Positive Data	Data
7		Vport Negative
8		Vport Negative

Alternative B is also called "MidSpan" which means that data and power are NOT in the same twisted pairs.   Power is carried over the spare pairs (4/5 & 7/8)
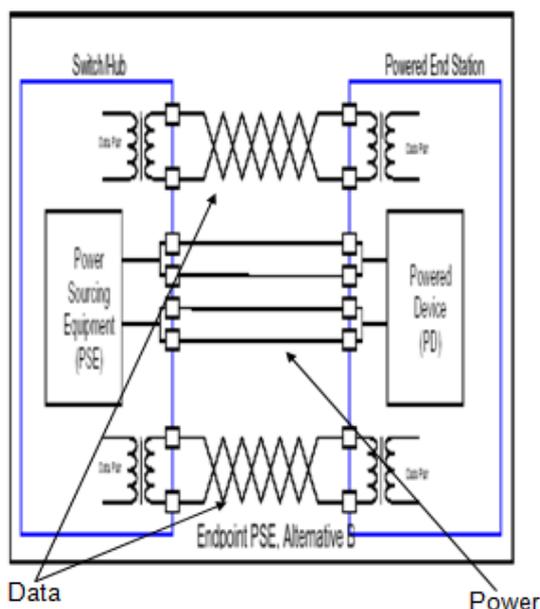
| PIN	Alternative A	Alternative B
1	Vport Negative Data	Data
2	Vport Negative Data	Data
3	Vport Positive Data	Data
4		Vport Positive
5		Vport Positive
6	Vport Positive Data	Data
7		Vport Negative
8		Vport Negative

Our PoE

Our products (switch & injector) which support **IEEE 802.3af-2003:** ES-2024PWR, ES-2108PWR, ES-3124PWR, GS1500-24P, GS2200-24P, PoE-10, PoE-12, PoE-80.
Our products (switch & injector) which support **IEEE 802.3at-2009:**
GS2200-8HP (only port 1~4 have HP), PoE12-HP.

Scenario
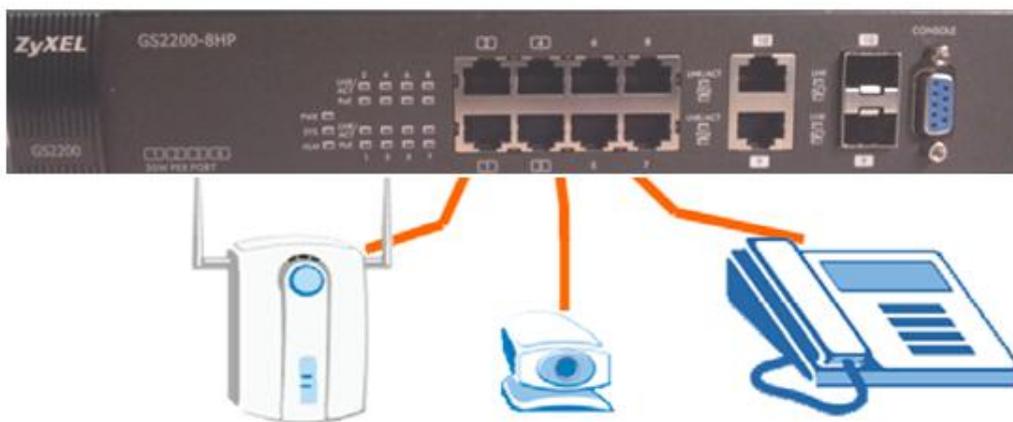
We connect PoE-enabled devices to our switch (GS2200-8HP), and then we proceed to set up PoE on the switch.

How to configure PoE (GS-2200-8HP)

1. Click **Basic Setting** > **PoE Setup** in the navigation panel to display the screen as shown below. Use this screen to configure PoE settings.

2. You can choose the PoE mode (GS2200-8HP only has consumption mode) and enable PD & PD priority.

3. After configuring PoE settings we need to use CLI to enable PoE on the port-interface.

Table 120 pwr Command Summary

COMMAND	DESCRIPTION	M	P
show pwr	Displays information about port power consumption and Power over Ethernet (PoE). Only available on models with the PoE feature.	E	3
show poe-status	This command is available for PoE models only. Displays information about Power over Ethernet (PoE) availability and usage.	E	0
pwr interface <port-list>	Enables PoE (Power over Ethernet) on the specified port(s).	C	13
pwr interface <port-list> priority <critical|high|low>	Sets the PD priority on a port to allow the Switch to allocate power to higher priority ports when the remaining power is less than the consumed power. critical > high > low Note: Available for non-full power models only.	C	13
no pwr interface <port-list>	Disables PoE (Power over Ethernet) on the specified port(s).	C	13
pwr mibtrap	Enables PoE MIB traps on the Switch. Traps are initiated when the usage reaches the limit set by the pwr usagethreshold command.	C	13
no pwr mibtrap	Disables PoE MIB traps on the Switch.	C	13
pwr usagethreshold <1-99>	Sets the percentage of power usage which initiates MIB traps.	C	13
pwr mode <classification|consumption>	Set the power management mode. • Classification - Reserve the maximum power to each PD according to the priority level. • Consumption - Reserve the consuming power to each PD.	C	13

Configuration using the CLI

Command Examples

1. Enable PoE on port interface and set usage threshold and MIB traps.

sysname# configure

sysname(config)# pwr interface 1-4

sysname(config)# pwr usagethreshold 25

sysname(config)# pwr mibtrap

sysname(config)# exit

2. Check the PoE status in CLI

GS2200# sh pwr

```
GS2200# sh pwr

PoE Mode : Classification mode

Total Power:180.0(W)

Consuming Power:   0(W)

Allocated Power:0   (W)

Remaining Power:180.0(W)

Averaged Junction Temperature: 38 (c), 98 (f).

Port State PD Class Priority Consumption (mW) MaxPower(mW)

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1 Enable off 0 Low 0 0

2 Enable off 0 Low 0 0

3 Enable off 0 Low 0 0

4 Enable off 0 Low 0 0

5 Enable off 0 Low 0 0

6 Enable off 0 Low 0 0

7 Enable off 0 Low 0 0

8 Enable off 0 Low 0 0
```