# POWER OVER ETHERNET SUPPORT

IN THE DELL<sup>™</sup> POWERCONNECT<sup>™</sup> PC6224P AND PC6248P



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#### INTRODUCTION

This paper describes the Power over Ethernet (PoE) support in the Dell<sup>™</sup> PowerConnect<sup>™</sup> PC6224P and PC6248P Ethernet switches, requirements, and configuration.

Power over Ethernet provides electrical power as well as data to remote devices over standard twisted-pair cable, such as existing LAN cabling, without the need to update or modify the network infrastructure. IEEE 802.3af defines the standard to deliver power over Ethernet cables. When you use PoE, you do not need to locate network devices next to power sources. Some of the devices that can use PoE as a power source include:

- IP Phones
- Wireless Access Points
- IP Gateways
- PDAs
- Remote audio and video monitoring devices

All 48 physical copper interfaces on the PC6248P and the 24 ports on the PC6224P have the capability to provide power. Some of the salient features are as follows:

- 1. Endspan PSE configuration is used.
- 2. Power is supplied over spare ports. Power over data pairs is not supported.
- 3. The total power budgets for the switches are:

SWITCH	TOTAL POWER BUDGET
PC6224P	370 watts
PC6249P (no external power supply)	380 watts
PC6248P (with external power supply)	712 watts

- 4. Legacy as well as 802.3af compliant powered devices are supported.
- 5. When the power budget is exceeded, the next port attempting to power up causes the port with the lowest priority to shut down in order to allow higher priority ports to power up.
- 6. You can configure a trap to be generated when the power budget is exceeded.

#### LEGACY ETHERNET POWERED DEVICE SUPPORT

The system has the ability to disable legacy Ethernet Powered Device support. By default the system is configured to support Standard 802.3af mode. You can enable legacy mode via the power inline legacy command.

#### REQUIREMENTS

The requirements for PoE (spare connections, etc.) are as follows:

- 1. To be able to provide power to connected powered devices over Ethernet.
  - 2. To be able to power legacy powered devices.
  - 3. To be able to modify the firmware on the DP63000 PoE Controller. For more information, see PoE Controller Firmware Upgrade on page 9.

POWER OVER ETHERNET SUPPORT IN DELL POWERCONNECT PC6224P AND PC6248P

#### **POWER OVER ETHERNET CONFIGURATION**

Support for PoE configuration is provided through CLI and Web, as well as SNMP. For SNMP support, the standard POWER-ETHERNET MIB, as well as the LVL7-POWER-ETHERNET MIB, are used.

#### **CLI CONFIGURATION**

The following examples use the switch's Command Line Interface (CLI) for configuring PoE. See the  $Dell^{TM}$  PowerConnect<sup>TM</sup> 6224 Systems CLI Reference Guide for more detailed information about the commands.

#### **POWER INLINE (AUTO|NEVER)**

Use this Interface Configuration (Ethernet) mode CLI command to enable or disable the ability of a port to deliver power. An example is shown below.

```
console>enable
console#configure
console(config)#interface ethernet 1/g1
console(config-if-1/g1)# power inline auto
console(config-if-1/g1)# exit
```

The following table describes the commands used in the previous example.

COMMAND	DESCRIPTION
enable	Sets the CLI mode to enable privilege mode.
configure	Sets the CLI mode to configuration mode.
interface ethernet 1/gl	Sets the CLI mode to configure gigabit ethernet port 1 (referred to in the command as '1/g1'). <b>NOTE:</b> Value '1' in "1/g1" specifies the unit number, this number depends on the Stack unit number and can be between 1 to 12.
power inline auto	Enables the device discovery protocol and, if found, supplies power to the device.
exit	Puts the CLI back into the configuration CLI mode.

#### **POWER INLINE PRIORITY (CRITICAL|HIGH|LOW)**

Use this Interface Configuration (Ethernet) mode CLI command to configure a port priority level for the delivery of power to an attached device. The switch may not be able to supply power to all connected devices, so the port priority is used to determine which ports will supply power if adequate power capacity is not available for all enabled ports. For ports that have the same priority level, the lower-numbered port has higher priority.

For a system delivering peak power to a certain number of devices, if a new device is attached on a high-priority port, power will be shut down to a device on a low-priority port, and the new device will get powered up.

An example of the command is shown below.

```
console>enable
console#configure
console(config)#interface ethernet 1/g1
console(config-if-1/g1)# power inline priority high
console(config-if-1/g1)# exit
```

The following table describes the commands used in the previous example.

COMMAND	DESCRIPTION
enable	Sets the CLI mode to enable privilege mode.
configure	Sets the CLI mode to configuration mode.
interface ethernet 1/g1	Sets the CLI mode to configure gigabit ethernet port 1 (referred to in the command as '1/g1'). <b>NOTE:</b> Value '1' in "1/g1" specifies the unit number, this number depends on the Stack unit number and can be between 1 to 12.
power inline priority high	Configures the port priority level for the delivery of power to an attached device.
exit	Puts the CLI back into the configuration CLI mode.

#### **POWER INLINE USAGE-THRESHOLD (PERCENTAGE)**

Use this Global Configuration mode command to configure the system power usage threshold level at which a trap is generated. The threshold is configured as a percentage of the total system power available. The power limit beyond which lower priority ports are disconnected has the configurable range from 37W to 806W. The maximum available system power for the 6224P and 6248P are 370W and 332W respectively. 37W is approximately 11 percent of these values. Thus, the minimum value of the usage-threshold can be configured as 11. An example of the command is shown below.

console>enable
console#configure
console(config)#power inline usage-threshold 90
console(config)#exit

The following table describes the commands used in the previous example.

COMMAND	DESCRIPTION
enable	Sets the CLI mode to enable privilege mode.
configure	Sets the CLI mode to configuration mode.
power inline usage-threshold 90	Configures the system power usage threshold level at which a trap is generated.
exit	Puts the CLI back into the Privileged EXEC mode.

#### **POWER INLINE POWERED-DEVICE (PD-TYPE)**

Use this Interface Configuration (Ethernet) mode command to add a comment or description of the powered device type to enable you to remember what is attached to the interface. An example of the command is shown below.

console>enable console#configure console(config)#interface ethernet 1/g1 console(config-if-1/g1)# power inline powered-device IP-phone console(config-if-1/g1)# exit

To remove the description, use the no form of the command.

no power inline powered-device

The following table describes the commands used in the previous examples.

COMMAND	DESCRIPTION
enable	Sets the CLI mode to enable privilege mode.
configure	Sets the CLI mode to configuration mode.
interface ethernet 1/gl	Sets the CLI mode to configure gigabit ethernet port 1 (referred to in the command as '1/g1'). <b>NOTE:</b> Value '1' in "1/g1" specifies the unit number, this number depends on the Stack unit number and can be between 1 to 12.
power inline powered-device ip-phone	Adds a comment or description of the powered device type ip-phone.
exit	Puts the CLI back into the configuration CLI mode.

#### **POWER INLINE LEGACY**

Use this Global Configuration mode command to enable or disable the ability of the switch to support legacy Ethernet Powered devices. Legacy support is disabled by default. Examples of the commands are shown below.

```
console>enable
console#configure
console(config)# power inline legacy
console(config)# no power inline legacy
console(config)#exit
```

#### POWER OVER ETHERNET SUPPORT IN DELL POWERCONNECT PC6224P AND PC6248P

The following table describes the commands used in the previous example.

COMMAND	DESCRIPTION
enable	Sets the CLI mode to enable privilege mode.
configure	Sets the CLI mode to configuration mode.
power inline legacy	Enables the ability of the switch to support legacy Ethernet powered devices.
no power inline legacy	Disables the ability of the switch to support legacy Ethernet powered devices.
exit	Puts the CLI back into the Privileged EXEC mode.

#### POWER INLINE TRAPS (ENABLE|DISABLE)

Use this Global Configuration mode command to enable inline power traps when the PoE system's total power budget is exceeded. An example of the command is shown below.

console>enable
console#configure
console(config)# power inline traps enable
console(config)#exit

To disable inline power traps, use the no form of the command.

console(config)# no power inline traps

The following table describes the commands used in the previous examples.

COMMAND	DESCRIPTION
enable	Sets the CLI mode to enable privilege mode.
configure	Sets the CLI mode to configuration mode.
power inline traps enable	Enables inline power traps.
no power inline traps	Disables inline power traps.
exit	Puts the CLI back into the Privileged EXEC mode.

#### SHOW POWER INLINE

Use this Privileged EXEC mode command to display the total power available, the total power consumed in the system, and the globally configured usage threshold. An example of the command is shown below.

console>enable console#show power	r inline				
Unit Status					
Unit Power: Nominal Power: Consumed Power:	150 wat		8)		
Unit Power: Nominal Power: Consumed Power:	150 wat		8)		
Global Configurati Usage Threshold: Traps: Legacy Mode:	95% Enabled				
Port Configuration Port Powered Device	е	State	-		Classification [w]
1/g1 IP Phone Mode 1/g2 Wireless AP M	el A	Auto	High	On	

The following table describes the commands used in the previous example.

COMMAND	DESCRIPTION		
enable	Sets the CLI mode to enable privilege mode.		
show power inline	Displays the total power available, the total power consumed in the system, and the globally configured usage threshold.		

#### SHOW POWER INLINE ETHERNET

Use this Privileged EXEC mode command to display the power inline summary for an interface. An example of the command is shown below.

console>enable console#show power inline Ethernet 1/g1						
Port	Powered Device	State	Priority	Status	Classification [w]	
1/g1	IP Phone Model A	Auto	High	On	0.44 - 12.95	
Overload Counter						

The following table describes the commands used in the previous example.

COMMAND	DESCRIPTION
enable	Sets the CLI mode to enable privilege mode.
show power inline Ethernet 1/g1	Displays the total power available, the total power consumed in the system, and the globally configured usage threshold.

#### POE CONTROLLER FIRMWARE UPGRADE

The PoE firmware is part of the switch operational code. When the switch boots up, the PoE Controller's firmware version is checked. If the version is different from the one present with the switch code, or if the firmware in the PoE Controller is corrupted or is not present, a firmware upgrade (or download, as the case may be) will be done. A progress indicator on the serial console indicates progress to the user.

In case of an error while upgrading, the system displays an error message on the serial console and the error message will also be logged.

#### SHOW POE-FIRMWARE-VERSION

Use this Privileged EXEC mode command to display the version of the PoE controller firmware present on the switch file system. An example of the command is shown below.

```
console>enable
console#show poe-firmware-version
```

image version.....603\_4

The following table describes the commands used in the previous example.

COMMAND	DESCRIPTION
enable	Sets the CLI mode to enable privilege mode.
show poe-firmware-version	Displays the version of the PoE controller firmware present on the PD63000 PoE Controller.

#### **WEB CONFIGURATION**

If desired, any of the example configurations above can be performed on the Dell PowerConnect PC6224P and PC6248P switches by using the Web Based Interface (WBI) as well. See the *Dell<sup>TM</sup> PowerConnect<sup>TM</sup> 6200 Series User's Guide* for a description of the Dell WBI.

#### GLOBAL PARAMETERS PAGE

Use the Global Parameters Page to configure and display Global PoE parameters.

#### Figure 1 PoE Global Configuration

🕘 Dell OpenManage Switch	n Administrator - Microsof	t Internet Explorer				- 7 🛛
File Edit View Favorites	Tools Help 🔇 Bac	k 🝷 🔘 🕤 🖹 📓 🐔 🗍 L	inks 🚞 LVL7 🚯 The World Clo	ick 🛅 BRCM 🍯 IETF	RFC Page	<b>.</b>
Address 🕘 http://10.240.3.11	9/base/web_main.html					💌 🄁 Go
Google C-		🔽 Go 🗄 🍏 🚱 🗸	🔹 😭 Bookmarks 🛪 👰 52 blo	cked 🛛 🦑 Check 👻 🐴	🖌 AutoLink 👻 📔 AutoFill 🔉	🔘 Settings 🗸
Dell OpenManage Swite	ch Administrator			Sup	port Help About	Log Out
D¢LL					Powe	rConnect 6224P
10.240.3.119	System > General > Pov	ver Over Ethernet > Global C	Configuration			
CPU Utilzation Reset	Global Configura	ation			Print	Refresh
Global Confi	Unit	Power	Status Nomin	al Power (Watts)	Consumed Power (V	Natts)
Interface Confi	6	C	)n	351	0	
SNTP     Logs     IP Addressing     Diagnostics     Management Secur     SNMP	System Usage Thres Traps Legacy Support	hold (11-99 Percent)	95 Enable V Disable V			
File Management     Advance Settings     Stacking     Unit Configuration     Stack Summary     Supported Switcl     Stack Port Sumr     Stack Port Diagr     Suitching     Suitching			Apply Changes			
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INTERFACE CONFIGURATION PAGE Use this page for PoE Interface configuration.

#### Figure 2 PoE Interface Configuration

	Dell OpenManage Swit	h Administrator	Support Help About Log Out			
D¢LL						
	172.16.1.2	System > General > Interface Configuration				
e	Home ^					
	System	Interface Configuration	Print Refresh			
	General	interface configuration				
	Asset		Show All			
	Health					
	Versions					
	- CPU Utilzation	Port Settings				
	Reset	Port Unit 1 V Port g1	<b>v</b>			
	Power Over Ethe	PoE Admin Status Auto 💌				
	- Global Config	PoE Operational Status				
	Interface Co	Power Priority Level Low 💌				
	⊕ SNTP	Power Classification				
	⊞-Logs	Powered Device (0-24 Characters)				
		Overload Counter 246				
	Diagnostics	Short Counter 246				
	Hanagement Secur	Denied Counter 168				
	⊕ SNMP	Absent Counter 246				
	File Management	Invalid Signature Counter 233				
	H Advance Settings					
	⊞ Stacking	Apply Change				
ŧ	-Switching	Approximate	<u>°</u>			

INTERFACE CONFIGURATION PAGE (SHOW ALL)

This page is displayed when Show All is clicked on the Interface Configuration page to display all interfaces.

Edit Yew Go Bookm								-	0
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ting Started 🔛 Latest He									
OpenManage Switc	h Admini	trator					Support	Help About	Log
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0.131.12.84	System	> General > Pow	ver Over Ethernet > Power Ove	ar Ethernet Table					_
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Versions	Unit				2 ×				
System Resources									
Time Zone Configura									
Clock Detail		Ö		Copy Parameters From			Unit 2 Y Port g1 Y		_
Reset	-								_
Power Over Etherne	0							Copy Te	
Global Configurat		Port	Admin Status	Operational Status	Priority Level	Power Classification	Powered Device	copyre	E
Interface Config	1	2/g1	Auto +	Test-Fail	Low 4	Class 0			
NTP	2	2/92	Auto Y	On	6.0W Y	Class 3	AccessPoint		[
gs	3	2/93	Auto 🖌	Searching	Low	Class 0			1
Addressing	4	2/94	Autor V	Searching	Low -	Class 0 Class 0			1
agnostics anagement Security	5	2/g5 2/g6	Ada +	Searching Searching	Low 14	Class 0			(
IMP	6	2/97	Auts v	Searching	Low ~	Class 0 Class 0			
le Management	8	2/98	Aute v Aute v	Searching	Low V	Class 0			1
dvanced Settings	9	2/99	Auto	Searching	Low -	Class 0			
tacking	10	2/g10	Auto	Searching	100 -	Class 0		1	1
ching	11	2/g11	Acts C +	Searching	Low ~	Class 0			
stics/RMON	12	2/g12	Auto: v	Searching	604 4	Class 0			Č
ting	13	2/g13		Searching	Low 4	Class 0			
220	14	2/g14		Searching	Low Y	Class 0			(
ity of Service	15	2/g15		Searching		Class 0			E
ulticast	16	2/g16		Searching	Low -	Class 0			0
	17	2/g17	Added 199	Searching	108 *	Class 0			(
	18	2/g18	Auto v	Searching	Low Y	Class 0 Class 0			C.
	19 20	2/g19 2/g20	Auto v	Searching Searching	Los v	Class 0 Class 0			1
	21	2/g21	Autor V	Searching	Low Y	Class 0			1
	22	2/922	Auto	Searching	LOw Y	Class 0			ľ
	23	2/g23	Auto -	Searching	Low -	Class 0			T
	24	2/g24	Auto H	Searching	Low 14	Class 0			1
	-								
					Anoly Cha	nges Back			
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#### Figure 3 PoE Table

#### CONCLUSION

Using the standards-based PoE support in the Dell<sup>™</sup> PowerConnect<sup>™</sup> PC6224P and PC6248P Ethernet switches, System Administrators can transmit electrical power as well as data to remote devices over standard twisted-pair cable without updating or modifying the network infrastructure.

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