POWER OVER ETHERNET SUPPORT

IN THE DELL™ POWERCONNECT™ PC6224P AND PC6248P

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INTRODUCTION

This paper describes the Power over Ethernet (PoE) support in the Dell™ PowerConnect™ 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 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™ PowerConnect™ 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/g1`	Sets the CLI mode to configure gigabit ethernet port 1 (referred to in the command as '1/g1'). **NOTE:** 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'). **NOTE:** 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/g1`	Sets the CLI mode to configure gigabit ethernet port 1 (referred to in the command as '1/g1'). **NOTE:** 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
```

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 inline

Unit Status

Unit               1
Power:             On
Nominal Power:     150 watt
Consumed Power:    120 watts (80%)

Unit               2
Power:             On
Nominal Power:     150 watt
Consumed Power:    120 watts (80%)

Global Configuration
Usage Threshold:   95%
Traps:             Enabled
Legacy Mode:       Disabled

Port Configuration
Port Powered Device        State  Priority    Status  Classification [w]
---- --------------        -----  --------    ------  ------------------
1/g1 IP Phone Model A      Auto    High       On      0.44 - 12.95
1/g2 Wireless AP Model     Auto    Low        On      0.44 - 3.84
```

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.....1
Short Counter.....0
Denied Counter.....0
Absent Counter.....0
Invalid Signature Counter.....0
```

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.

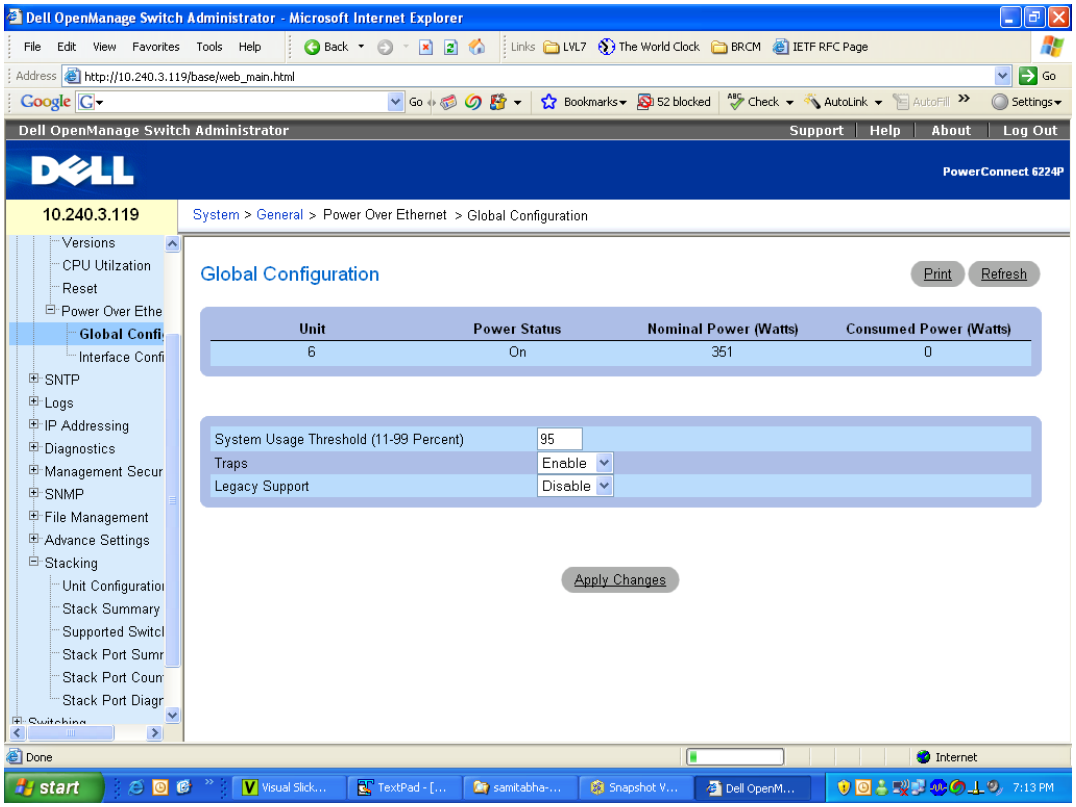
COMMAND	DESCRIPTION
`enable`	Sets the CLI mode to enable privilege mode.
`show poe-firmware-version`	Displays the version of the PoE controller firmware present on the PD63000 PoE Controller.

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™ PowerConnect™ 6200 Series User's Guide* for a description of the Dell WBI.

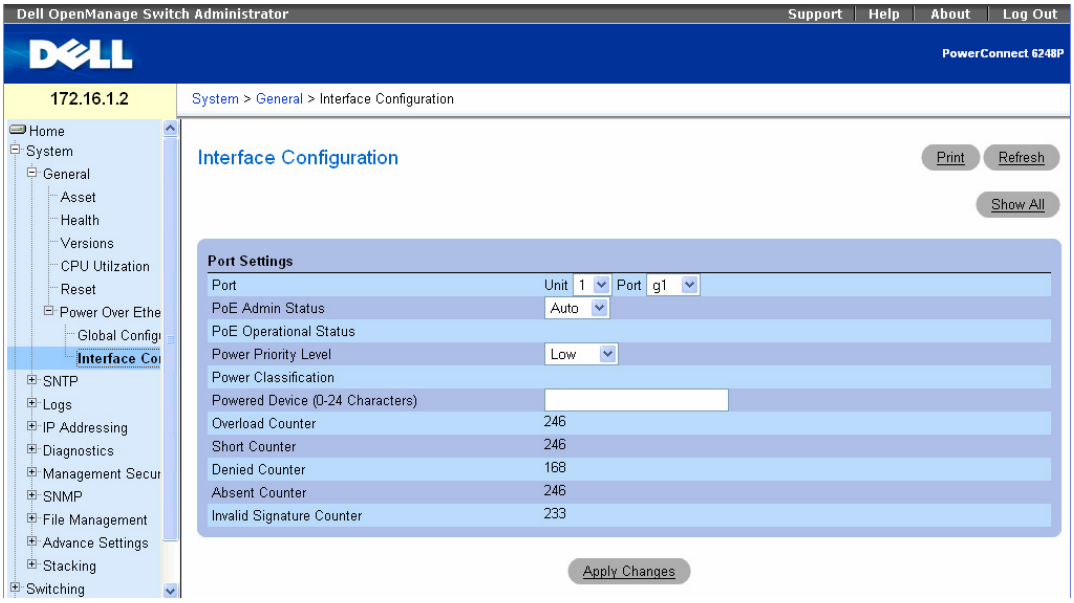
GLOBAL PARAMETERS PAGE
Use the Global Parameters Page to configure and display Global PoE parameters.

Figure 1 PoE Global Configuration



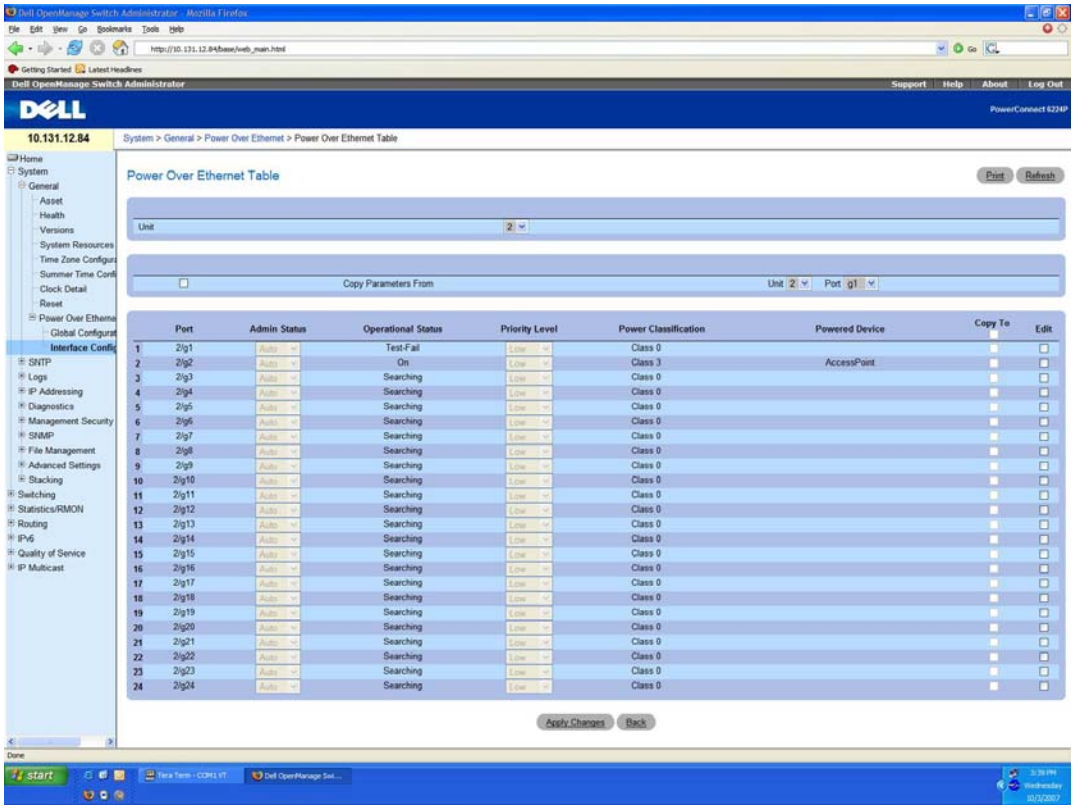
INTERFACE CONFIGURATION PAGE
Use this page for PoE Interface configuration.

Figure 2 PoE Interface Configuration



INTERFACE CONFIGURATION PAGE (SHOW ALL)
This page is displayed when Show All is clicked on the Interface Configuration page to display all interfaces.

Figure 3 PoE Table



CONCLUSION

Using the standards-based PoE support in the Dell™ PowerConnect™ 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.

DISCLAIMER

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