CHAPTER 38

Power Management and Environmental Monitoring

This chapter describes the power management and environmental monitoring features in the Catalyst 6500 series switches.

Note For complete syntax and usage information for the commands used in this chapter, refer to the *Catalyst 6500 Series Switch Cisco IOS Command Reference* publication.

This chapter consists of these sections:

Understanding How Power Management Works

These sections describe power management in the Catalyst 6500 series switches:

Note In systems with redundant power supplies, both power supplies must be of the same wattage. The Catalyst 6500 series switches allow you to mix AC-input and DC-input power supplies in the same chassis. For detailed information on supported power supply configurations, refer to the *Catalyst 6500 Series Switch Installation Guide*.

The modules have different power requirements, and certain configurations require more power than a single power supply can provide. Although the power management feature allows you to power all installed modules with two power supplies, redundancy is not supported in this configuration. Redundant and nonredundant power configurations are discussed in the following sections.

To determine the power requirements for your system, see the "Determining System Power Requirements" section on page 38-4.

Enabling or Disabling Power Redundancy

From global configuration mode, enter the **power redundancy-mode combined | redundant** commands to disable or enable redundancy (redundancy is enabled by default). You can change the configuration of the power supplies to redundant or nonredundant at any time.

Specifying the **combined** keyword disables redundancy. In a nonredundant configuration, the power available to the system is the combined power capability of both power supplies. The system powers up as many modules as the combined capacity allows. However, if one supply should fail and there is not enough power for all previously powered up modules, the system powers down those modules for which there is not enough power.

Specifying the **redundant** keyword enables redundancy. In a redundant configuration, the total power drawn from both supplies is at no time greater than the capability of one supply. If one supply malfunctions, the other supply can take over the entire system load. When you install and turn on two power supplies, each concurrently provides approximately half of the required power to the system. Load sharing and redundancy are enabled automatically; no software configuration is required.

Enter the **show power** command to view the current state of modules and the total power available for modules (see the "Using the CLI to View System Power Status" section on page 38-3).

Table 38-1 describes how the system responds to changes in the power supply configuration.

Table 38-1 Effects of Power Supply Configuration Changes

Configuration Change	Effect
Redundant to nonredundant	• System log and syslog messages are generated. • System power is increased to the combined power capability of both supplies. • Modules marked *power-deny* in the **show power** oper state field are brought up if there is sufficient power.
Nonredundant to redundant (both supplies must be of equal wattage)	• System log and syslog messages are generated. • System power is decreased to the power capability of one supply. • If there is not enough power for all previously powered-up modules, some modules are powered down and marked as *power-deny* in the **show power** oper state field.
Equal wattage power supply is inserted with redundancy enabled	• System log and syslog messages are generated. • System power equals the power capability of one supply. • No change in module status since power capability is unchanged.
Equal wattage power supply is inserted with redundancy disabled	• System log and syslog messages are generated. • System power is increased to the combined power capability of both supplies. • Modules marked *power-deny* in the **show power** oper state field are brought up if there is sufficient power.
Higher or lower wattage power supply is inserted with redundancy enabled	• System log and syslog messages are generated. • The system does not allow you to operate a power supply of different wattage even if the wattage is higher than the installed supply. The inserted supply shuts down.
Higher or lower wattage power supply is inserted with redundancy disabled	• System log and syslog messages are generated. • System power is increased to the combined power capability of both supplies. • Modules marked *power-deny* in the **show power** oper **s**tate field are brought up if there is sufficient power.

Table 38-1 Effects of Power Supply Configuration Changes (continued)

Configuration Change	Effect
Power supply is removed with redundancy enabled	• System log and syslog messages are generated. • No change in module status since power capability is unchanged.
Power supply is removed with redundancy disabled	• System log and syslog messages are generated. • System power is decreased to the power capability of one supply. • If there is not enough power for all previously powered-up modules, some modules are powered down and marked as *power-deny* in the **show power** oper state field.
System is booted with power supplies of different wattage installed and redundancy enabled	• System log and syslog messages are generated. • The system does not allow you to have power supplies of different wattage installed in a redundant configuration. The lower wattage supply shuts down.
System is booted with power supplies of equal or different wattage installed and redundancy disabled	• System log and syslog messages are generated. • System power equals the combined power capability of both supplies. • The system powers up as many modules as the combined capacity allows.

Using the CLI to Power Modules Off and On

You can power down a module from the command-line interface (CLI) by entering the **no power enable module** *slot* command.

Note When you enter the **no power enable module** *slot* command to power down a module, the module's configuration is not saved.

From global configuration mode, enter the **power enable module** *slot* command to turn the power on for a module that was previously powered down.

Using the CLI to View System Power Status

Enter the **show power** command to view the current power status of system components as follows:

```
Router# show power
system power redundancy mode = redundant
system power total =     1153.32 Watts (27.46 Amps @ 42V)
system power used =       397.74 Watts ( 9.47 Amps @ 42V)
system power available =  755.58 Watts (17.99 Amps @ 42V)
                        Power-Capacity PS-Fan Output Oper
PS   Type               Watts   A @42V Status Status State
---- ------------------ ------- ------ ------ ------ -----
1    WS-CAC-2500W       1153.32 27.46  OK     OK     on
2    none
                        Pwr-Requested  Pwr-Allocated  Admin Oper
Slot Card-Type          Watts   A @42V Watts   A @42V State State
---- ------------------ ------- ------ ------- ------ ----- -----
1    WS-X6K-SUP2-2GE     142.38  3.39   142.38  3.39  on    on
2                          -     -      142.38  3.39  -     -
5    WS-X6248-RJ-45      112.98  2.69   112.98  2.69  on    on
Router#
```

Using the CLI to Power Cycle Modules

From global configuration mode, enter the **power cycle module** *slot* command to power cycle (reset) a module; the module powers off for 5 seconds and then powers on.

Determining System Power Requirements

System power requirements are dependent on the size of the power supply. You could have configuration limitations when using the 1000 W and 1300 W power supplies depending on the size of chassis and type of modules installed. For information about power consumption, refer to the *Release Notes for the Catalyst 6000 Family Switches and Cisco 7600 Internet Router for Cisco IOS* publication at this URL:

http://www.cisco.com/en/US/products/hw/switches/ps708/prod_release_notes_list.html

Understanding How Environmental Monitoring Works

Environmental monitoring of chassis components provides early warning indications of possible component failure to ensure safe and reliable system operation and avoid network interruptions. This section describes the monitoring of these critical system components, enabling you to identify and rapidly correct hardware-related problems in your system.

Using CLI Commands to Monitor System Environmental Status

Enter the **show environment** [**alarm** | **status** | **temperature**] command to display system status information. The keywords display the following:

- **alarm**—Displays environmental alarms
  - **status**—Displays alarm status
  - **thresholds**—Displays alarm thresholds
- **status**—Displays field-replaceable unit (FRU) operational status and power and temperature information
- **temperature**—Displays FRU temperature information

Understanding LED Environmental Indications

The LEDs can indicate two alarm types: major and minor. Major alarms indicate a critical problem that could lead to the system being shut down. Minor alarms are for informational purposes only, giving you notice of a problem that could turn critical if corrective action is not taken.

When the system has an alarm (major or minor), indicating an overtemperature condition, the alarm is not canceled or any action taken (such as module reset or shutdown) for 5 minutes. If the temperature falls 5°C (41°F) below the alarm threshold during this period, the alarm is canceled.

Table 38-2 lists the environmental indicators for the supervisor engine and switching modules.

Note Refer to the *Catalyst 6500 Series Switch Module Installation Guide* for additional information on LEDs, including the supervisor engine SYSTEM LED.

Table 38-2 Environmental Monitoring for Supervisor Engine and Switching Modules

Component	Alarm Type	LED Indication	Action
Supervisor engine temperature sensor exceeds major threshold[1]	Major	STATUS[2] LED red[3]	Syslog message and SNMP trap generated. If redundancy, system switches to redundant supervisor engine and the active supervisor engine shuts down. If there is no redundancy and the overtemperature condition is not corrected, the system shuts down after 5 minutes.
Supervisor engine temperature sensor exceeds minor threshold	Minor	STATUS LED orange	Syslog message and SNMP trap generated. Monitor the condition.
Redundant supervisor engine temperature sensor exceeds major or minor threshold	Major	STATUS LED red	Syslog message and SNMP trap generated. If major alarm and the overtemperature condition is not corrected, the system shuts down after 5 minutes.
	Minor	STATUS LED orange	If minor alarm, monitor the condition.
Switching module temperature sensor exceeds major threshold	Major	STATUS LED red	Syslog message and SNMP trap generated. Power down the module[4].
Switching module temperature sensor exceeds minor threshold	Minor	STATUS LED orange	Syslog message and SNMP trap generated. Monitor the condition.

1. Temperature sensors monitor key supervisor engine components including daughter cards.
2. A STATUS LED is located on the supervisor engine front panel and all module front panels.
3. The STATUS LED is red on the failed supervisor engine. If there is no redundant supervisor, the SYSTEM LED is red also.
4. See the "Understanding How Power Management Works" section on page 38-1 for instructions.