



CHAPTER 50

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 Supervisor Engine 32 PISA Cisco IOS Command Reference*, Release 12.2ZY, at this URL:

<http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2ZY/command/reference/cmdref.html>

This chapter consists of these sections:

- [Understanding How Power Management Works](#), page 50-1
- [Understanding How Environmental Monitoring Works](#), page 50-10

Understanding How Power Management Works

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

- [Enabling or Disabling Power Redundancy](#), page 50-2
- [Powering Modules Off and On](#), page 50-3
- [Viewing System Power Status](#), page 50-4
- [Power Cycling Modules](#), page 50-5
- [Power Cycling Power Supplies](#), page 50-5
- [Determining System Power Requirements](#), page 50-5
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Note

In systems with redundant power supplies, both power supplies must be of the same wattage. The Catalyst 6500 series switches allow you to use both 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 some configurations require more power than a single power supply can provide. The power management feature allows you to power all installed modules with two power supplies. However, redundancy is not supported in this configuration because the total power drawn from both power supplies is at no time greater than the capability of one supply. Redundant and nonredundant power configurations are described in the following sections.

To determine the power requirements for your system, see the [“Determining System Power Requirements”](#) section on page 50-5.

Enabling or Disabling Power Redundancy

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

To disable redundancy, use the **combined** keyword. 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 power supply fails and there is not enough power for all of the previously powered-up modules, the system powers down those modules.

To enable redundancy, use the **redundant** keyword. In a redundant configuration, the total power drawn from both power supplies is not greater than the capability of one power supply. If one supply malfunctions, the other supply can take over the entire system load. When you install and power up 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.

To view the current state of modules and the total power available for modules, enter the **show power** command (see the [“Viewing System Power Status”](#) section on page 50-4).

[Table 50-1](#) describes how the system responds to changes in the power supply configuration.

Table 50-1 Effects of Power Supply Configuration Changes

Configuration Change	Effect
Redundant to nonredundant	<ul style="list-style-type: none"> System log and syslog messages are generated. System power is increased to the combined power capability of both power supplies. Modules marked <i>power-deny</i> in the show power oper state field are brought up if there is sufficient power.
Nonredundant to redundant (both power supplies must be of equal wattage)	<ul style="list-style-type: none"> 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 <i>power-deny</i> in the show power oper state field.
Equal wattage power supply is inserted with redundancy enabled	<ul style="list-style-type: none"> System log and syslog messages are generated. System power equals the power capability of one supply. No change in module status because the power capability is unchanged.

Table 50-1 Effects of Power Supply Configuration Changes (continued)

Configuration Change	Effect
Equal wattage power supply is inserted with redundancy disabled	<ul style="list-style-type: none"> System log and syslog messages are generated. System power is increased to the combined power capability of both power supplies. Modules marked <i>power-deny</i> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> System log and syslog messages are generated. System power is increased to the combined power capability of both power supplies. Modules marked <i>power-deny</i> in the show power oper state field are brought up if there is sufficient power.
Power supply is removed with redundancy enabled	<ul style="list-style-type: none"> System log and syslog messages are generated. No change in module status because the power capability is unchanged.
Power supply is removed with redundancy disabled	<ul style="list-style-type: none"> 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 <i>power-deny</i> in the show power oper state field.
System is booted with power supplies of different wattage installed and redundancy enabled	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> System log and syslog messages are generated. System power equals the combined power capability of both power supplies. The system powers up as many modules as the combined capacity allows.

Powering Modules Off and On

To power modules off and on from the CLI, perform this task:

	Command	Purpose
Step 1	Router# configure terminal	Enters global configuration mode.
Step 2	Router(config)# power enable module slot_number	Powers a module on.
	Router(config)# no power enable module slot_number	Powers a module off.



Note

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

This example shows how to power on the module in slot 3:

```
Router# configure terminal
Router(config)# power enable module 3
```

Viewing System Power Status

You can view the current power status of system components by entering the **show power** command 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
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
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#
```

You can view the current power status of a specific power supply by entering the **show power** command as follows:

```
Router# show power status power-supply 2
Power-Capacity PS-Fan Output Oper
Watts  A @42V  Status Status State
-----
1  WS-CAC-6000W      2672.04 63.62 OK      OK      on
2  WS-CAC-9000W-E    2773.68 66.04 OK      OK      on
Router#
```

You can display power supply input fields by specifying the power supply number in the command. A new power-output field with operating mode is displayed for power supplies with more than one output mode. Enter the **show env status power-supply** command as follows:

```
Router# show env status power-supply 1
power-supply 1:
  power-supply 1 fan-fail: OK
  power-supply 1 power-input 1: AC low
  power-supply 1 power-output-fail: OK
Router# show env status power-supply 2
power-supply 2:
  power-supply 2 fan-fail: OK
  power-supply 2 power-input 1: none<<< new
  power-supply 2 power-input 2: AC low<<< new
  power-supply 2 power-input 3: AC high<<< new
  power-supply 2 power-output: low (mode 1)<<< high for highest mode only
  power-supply 2 power-output-fail: OK
```

Power Cycling Modules

You can power cycle (reset) a module from global configuration mode by entering the **power cycle module slot** command. The module powers off for 5 seconds, and then powers on.

Power Cycling Power Supplies

If you have redundant power supplies and you power cycle one of the power supplies, only that power supply is power cycled. If you power cycle both power supplies, the system goes down and comes back up in 10 seconds.

If you only have one power supply and you power cycle that power supply, the system goes down and comes back up in 10 seconds.

This example shows how to power cycle a power supply:

```
Router# hw-module power-supply 2 power-cycle
Power-cycling the power supply may interrupt service.
Proceed with power-cycling? [confirm]
Power-cycling power-supply 1
22:10:23: %C6KPWR-SP-2-PSFAIL: power supply 1 output failed.
22:10:25: %C6KENV-SP-4-PSFANFAILED: the fan in power supply 1 has failed
22:10:33: %C6KPWR-SP-4-PSOK: power supply 1 turned on.
22:10:33: %C6KENV-SP-4-PSFANOK: the fan in power supply 1 is OK
Router#
```

Determining System Power Requirements

The power supply size determines the system power requirements. When you use the 1000 W and 1300 W power supplies, you might have configuration limitations depending on the size of chassis and type of modules installed. For information about power consumption, refer to the *Release Notes for Cisco IOS Release 12.2ZY on the Supervisor Engine 32 PISA* publication at this URL:

http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2ZY/release/notes/ol_13011.html

Determining System Hardware Capacity

You can determine the system hardware capacity by entering the **show platform hardware capacity** command. This command displays the current system utilization of the hardware resources and displays a list of the currently available hardware capacities, including the following:

- Hardware forwarding table utilization
- Switch fabric utilization
- CPU(s) utilization
- Memory device (flash, DRAM, NVRAM) utilization

This example shows how to display CPU capacity and utilization information for the route processor, the switch processor, and the LAN module in the Catalyst 6500 series switch:

```
Router# show platform hardware capacity cpu
CPU Resources
CPU utilization: Module          5 seconds      1 minute      5 minutes
                  1 RP          0% / 0%        1%            1%
                  1 SP          5% / 0%        5%            4%
                  7              69% / 0%      69%           69%
                  8              78% / 0%      74%           74%

Processor memory: Module Bytes:      Total          Used           %Used
                  1 RP          176730048     51774704      29%
                  1 SP          192825092     51978936      27%
                  7              195111584     35769704      18%
                  8              195111584     35798632      18%

I/O memory: Module Bytes:      Total          Used           %Used
                  1 RP          35651584     12226672      34%
                  1 SP          35651584     9747952       27%
                  7              35651584     9616816       27%
                  8              35651584     9616816       27%
```

This example shows how to display EOBC-related statistics for the route processor and the switch processor:

```
Router# show platform hardware capacity eobc EOBC Resources
Module          Packets/sec      Total packets      Dropped packets
1 RP   Rx:         61              108982             0
       Tx:         37              77298             0
1 SP   Rx:         34              101627            0
       Tx:         39              115417            0
7      Rx:         5               10358             0
       Tx:         8               18543             0
8      Rx:         5               12130             0
       Tx:        10              20317             0
```

This example shows how to display the current and peak switching utilization:

```
Router# show platform hardware capacity fabric Switch Fabric Resources
Bus utilization: current is 100%, peak was 100% at 12:34 12mar45
Fabric utilization: ingress egress
Module channel speed current peak current peak
1 0 20G 100% 100% 12:34 12mar45 100% 100% 12:34 12mar45
1 1 20G 12% 80% 12:34 12mar45 12% 80% 12:34 12mar45
4 0 20G 12% 80% 12:34 12mar45 12% 80% 12:34 12mar45
13 0 8G 12% 80% 12:34 12mar45 12% 80% 12:34 12mar45
```

This example shows how to display information about the total capacity, the bytes used, and the percentage that is used for the flash and NVRAM resources present in the system:

```
Router# show platform hardware capacity flash
Flash/NVRAM Resources
Usage: Module Device          Bytes:      Total          Used           %Used
1 RP bootflash:                31981568     15688048      49%
1 SP disk0:                    128577536    105621504     82%
1 SP sup-bootflash:           31981568     29700644      93%
1 SP const_nvram:              129004       856           1%
1 SP nvram:                    391160       22065         6%
7 dfc#7-bootflash:            15204352     616540        4%
8 dfc#8-bootflash:            15204352     0             0%
```

This example shows how to display the capacity and utilization of the EARLs present in the system:

```

Router# show platform hardware capacity forwarding
L2 Forwarding Resources
      MAC Table usage:  Module Collisions Total      Used      %Used
                      6              0  65536      11        1%
      VPN CAM usage:      Total      Used      %Used
                      512          0          0%

L3 Forwarding Resources
      FIB TCAM usage:      Total      Used      %Used
      72 bits (IPv4, MPLS, EoM)  196608      36        1%
      144 bits (IP mcast, IPv6)  32768       7         1%

      detail:      Protocol      Used      %Used
                  IPv4          36        1%
                  MPLS          0         0%
                  EoM           0         0%

                  IPv6           4         1%
                  IPv4 mcast     3         1%
                  IPv6 mcast     0         0%

      Adjacency usage:      Total      Used      %Used
                      1048576      175        1%

Forwarding engine load:
      Module      pps   peak-pps  peak-time
      6              8      1972  02:02:17 UTC Thu Apr 21 2005

Netflow Resources
      TCAM utilization:  Module      Created      Failed      %Used
                      6              1           0           0%
      ICAM utilization:  Module      Created      Failed      %Used
                      6              0           0           0%

      Flowmasks:  Mask#  Type      Features
      IPv4:      0  reserved  none
      IPv4:      1  Intf FulNAT_INGRESS NAT_EGRESS FM_GUARDIAN
      IPv4:      2  unused    none
      IPv4:      3  reserved  none

      IPv6:      0  reserved  none
      IPv6:      1  unused    none
      IPv6:      2  unused    none
      IPv6:      3  reserved  none

CPU Rate Limiters Resources
      Rate limiters:  Total      Used      Reserved      %Used
      Layer 3        9           4           1           44%
      Layer 2        4           2           2           50%

ACL/QoS TCAM Resources
Key: ACLent - ACL TCAM entries, ACLmsk - ACL TCAM masks, AND - ANDOR,
QoSent - QoS TCAM entries, QoSmsk - QoS TCAM masks, OR - ORAND,
Lbl-in - ingress label, Lbl-eg - egress label, LOUsrc - LOU source,
LOUDst - LOU destination, ADJ - ACL adjacency

Module ACLent ACLmsk QoSent QoSmsk Lbl-in Lbl-eg LOUsrc LOUdst AND OR ADJ
6      1%      1%      1%      1%      1%      1%      0%      0%      0% 0% 1%

```

This example shows how to display the interface resources:

```
Router# show platform hardware capacity interface Interface Resources
Interface drops:
  Module      Total drops:   Tx           Rx           Highest drop port: Tx  Rx
  9           0              0            2            0            48

Interface buffer sizes:
  Module      Bytes:         Tx buffer      Rx buffer
  1           12345         12345         12345
  5           12345         12345         12345
```

This example shows how to display SPAN information:

```
Router# show platform hardware capacity monitor SPAN Resources
Source sessions: 2 maximum, 0 used
  Type                               Used
  Local                               0
  RSPAN source                        0
  ERSPAN source                       0
  Service module                      0
Destination sessions: 64 maximum, 0 used
  Type                               Used
  RSPAN destination                   0
  ERSPAN destination (max 24)        0
```

This example shows how to display the capacity and utilization of resources for Layer 3 multicast functionality:

```
Router# show platform hardware capacity multicast
L3 Multicast Resources
IPv4 replication mode: ingress
IPv6 replication mode: ingress
Bi-directional PIM Designated Forwarder Table usage: 4 total, 0 (0%) used
Replication capability: Module          IPv4      IPv6
                               5          egress   egress
                               9          ingress  ingress
MET table Entries: Module          Total    Used    %Used
                               5          65526   6       0%
```

This example shows how to display information about the system power capacities and utilizations:

```
Router# show platform hardware capacity power
Power Resources
Power supply redundancy mode: administratively combined operationally combined
System power: 1922W, 0W (0%) inline, 1289W (67%) total allocated
Powered devices: 0 total
```

This example shows how to display the capacity and utilization of QoS policer resources for each EARL in the Catalyst 6500 series switch.

```
Router# show platform hardware capacity qos
QoS Policer Resources
Aggregate policers: Module          Total      Used      %Used
  1                               1024      102      10%
  5                               1024      1        1%
Microflow policer configurations: Module          Total      Used      %Used
  1                               64        32       50%
  5                               64        1        1%
```


This example shows how to display information about the key system resources:

```
Router# show platform hardware capacity systems System Resources
PFC operating mode: PFC3BXL
Supervisor redundancy mode: administratively rpr-plus, operationally rpr-plus
Switching Resources: Module   Part number           Series           CEF mode
                      5             WS-SUP720-BASE   supervisor       CEF
                      9             WS-X6548-RJ-45   CEF256          CEF
```

This example shows how to display VLAN information:

```
Router# show platform hardware capacity vlan VLAN Resources
VLANs: 4094 total, 10 VTP, 0 extended, 0 internal, 4084 free Router#
```

Determining Sensor Temperature Threshold

The system sensors set off alarms based on different temperature threshold settings. You can determine the allowed temperatures for the sensors by using the **show environment alarm threshold** command.

This example shows how to determine sensor temperature thresholds:

```
Router> show environment alarm threshold
environmental alarm thresholds:

power-supply 1 fan-fail: OK
  threshold #1 for power-supply 1 fan-fail:
    (sensor value != 0) is system minor alarm power-supply 1 power-output-fail: OK
  threshold #1 for power-supply 1 power-output-fail:
    (sensor value != 0) is system minor alarm fantray fan operation sensor: OK
  threshold #1 for fantray fan operation sensor:
    (sensor value != 0) is system minor alarm operating clock count: 2
  threshold #1 for operating clock count:
    (sensor value < 2) is system minor alarm
  threshold #2 for operating clock count:
    (sensor value < 1) is system major alarm operating VTT count: 3
  threshold #1 for operating VTT count:
    (sensor value < 3) is system minor alarm
  threshold #2 for operating VTT count:
    (sensor value < 2) is system major alarm VTT 1 OK: OK
  threshold #1 for VTT 1 OK:
    (sensor value != 0) is system minor alarm VTT 2 OK: OK
  threshold #1 for VTT 2 OK:
    (sensor value != 0) is system minor alarm VTT 3 OK: OK
  threshold #1 for VTT 3 OK:
    (sensor value != 0) is system minor alarm clock 1 OK: OK
  threshold #1 for clock 1 OK:
    (sensor value != 0) is system minor alarm clock 2 OK: OK
  threshold #1 for clock 2 OK:
    (sensor value != 0) is system minor alarm module 1 power-output-fail: OK
  threshold #1 for module 1 power-output-fail:
    (sensor value != 0) is system major alarm module 1 outlet temperature: 21C
  threshold #1 for module 1 outlet temperature:
    (sensor value > 60) is system minor alarm
  threshold #2 for module 1 outlet temperature:
    (sensor value > 70) is system major alarm module 1 inlet temperature: 25C
  threshold #1 for module 1 inlet temperature:
    (sensor value > 60) is system minor alarm
  threshold #2 for module 1 inlet temperature:
    (sensor value > 70) is system major alarm module 1 device-1 temperature: 30C
  threshold #1 for module 1 device-1 temperature:
    (sensor value > 60) is system minor alarm
  threshold #2 for module 1 device-1 temperature:
    (sensor value > 70) is system major alarm module 1 device-2 temperature: 29C
```

```

threshold #1 for module 1 device-2 temperature:
  (sensor value > 60) is system minor alarm
threshold #2 for module 1 device-2 temperature:
  (sensor value > 70) is system major alarm module 5 power-output-fail: OK
threshold #1 for module 5 power-output-fail:
  (sensor value != 0) is system major alarm module 5 outlet temperature: 26C
threshold #1 for module 5 outlet temperature:
  (sensor value > 60) is system minor alarm
threshold #2 for module 5 outlet temperature:
  (sensor value > 75) is system major alarm module 5 inlet temperature: 23C
threshold #1 for module 5 inlet temperature:
  (sensor value > 50) is system minor alarm
threshold #2 for module 5 inlet temperature:
  (sensor value > 65) is system major alarm EARL 1 outlet temperature: N/O
threshold #1 for EARL 1 outlet temperature:
  (sensor value > 60) is system minor alarm
threshold #2 for EARL 1 outlet temperature:
  (sensor value > 75) is system major alarm EARL 1 inlet temperature: N/O
threshold #1 for EARL 1 inlet temperature:
  (sensor value > 50) is system minor alarm
threshold #2 for EARL 1 inlet temperature:
  (sensor value > 65) is system major alarm

```

Understanding How Environmental Monitoring Works

Environmental monitoring of chassis components provides early-warning indications of possible component failures, which ensures a safe and reliable system operation and avoids network interruptions. This section describes the monitoring of these critical system components, which allows you to identify and rapidly correct hardware-related problems in your system.

Monitoring System Environmental Status

To display system status information, enter the **show environment [alarm | cooling | status | temperature]** command. The keywords display the following information:

- **alarm**—Displays environmental alarms.
 - **status**—Displays alarm status.
 - **thresholds**—Displays alarm thresholds.
- **cooling**—Displays fan tray status, chassis cooling capacity, ambient temperature, and per-slot cooling capacity.
- **status**—Displays field-replaceable unit (FRU) operational status and power and temperature information.
- **temperature**—Displays FRU temperature information.

To view the system status information, enter the **show environment** command:

```

Router# show environment
environmental alarms:
  no alarms

Router# show environment alarm
environmental alarms:
  no alarms

```

```
Router# show environment cooling
fan-tray 1:
  fan-tray 1 fan-fail: failed
fan-tray 2:
  fan 2 type: FAN-MOD-9
  fan-tray 2 fan-fail: OK
chassis cooling capacity: 690 cfm
ambient temperature: 55C ["40C (user-specified)" if temp-controlled]
chassis per slot cooling capacity: 75 cfm

  module 1 cooling requirement: 70 cfm
  module 2 cooling requirement: 70 cfm
  module 5 cooling requirement: 30 cfm
  module 6 cooling requirement: 70 cfm
  module 8 cooling requirement: 70 cfm
  module 9 cooling requirement: 30 cfm

Router# show environment status
backplane:
  operating clock count: 2
  operating VTT count: 3
fan-tray 1:
  fan-tray 1 type: WS-9SLOT-FAN
  fan-tray 1 fan-fail: OK
VTT 1:
  VTT 1 OK: OK
  VTT 1 outlet temperature: 33C
VTT 2:
  VTT 2 OK: OK
  VTT 2 outlet temperature: 35C
VTT 3:
  VTT 3 OK: OK
  VTT 3 outlet temperature: 33C
clock 1:
  clock 1 OK: OK, clock 1 clock-inuse: in-use
clock 2:
  clock 2 OK: OK, clock 2 clock-inuse: not-in-use
power-supply 1:
  power-supply 1 fan-fail: OK
  power-supply 1 power-output-fail: OK
module 1:
  module 1 power-output-fail: OK
  module 1 outlet temperature: 30C
  module 1 device-2 temperature: 35C
  RP 1 outlet temperature: 35C
  RP 1 inlet temperature: 36C
  EARL 1 outlet temperature: 33C
  EARL 1 inlet temperature: 31C
module 2:
  module 2 power-output-fail: OK
  module 2 outlet temperature: 31C
  module 2 inlet temperature: 29C
module 3:
  module 3 power-output-fail: OK
  module 3 outlet temperature: 36C
  module 3 inlet temperature: 29C
module 4:
  module 4 power-output-fail: OK
  module 4 outlet temperature: 32C
  module 4 inlet temperature: 32C
module 5:
  module 5 power-output-fail: OK
  module 5 outlet temperature: 39C
  module 5 inlet temperature: 34C
```

```

module 7:
  module 7 power-output-fail: OK
  module 7 outlet temperature: 42C
  module 7 inlet temperature: 29C
  EARL 7 outlet temperature: 45C
  EARL 7 inlet temperature: 32C
module 9:
  module 9 power-output-fail: OK
  module 9 outlet temperature: 41C
  module 9 inlet temperature: 36C
  EARL 9 outlet temperature: 33C
  EARL 9 inlet temperature: N/O

```

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), that indicates an overtemperature condition, the alarm is not canceled nor is 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 50-2 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 50-2 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	Generates syslog message and an SNMP trap. If there is a redundancy situation, the system switches to a redundant supervisor engine and the active supervisor engine shuts down. If there is no redundancy situation 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	Generates syslog message and an SNMP trap. Monitors the condition.
Redundant supervisor engine temperature sensor exceeds major or minor threshold	Major	STATUS LED red	Generates syslog message and an SNMP trap. If a major alarm is generated and the overtemperature condition is not corrected, the system shuts down after 5 minutes.
	Minor	STATUS LED orange	Monitors the condition if a minor alarm is generated.

Table 50-2 Environmental Monitoring for Supervisor Engine and Switching Modules (continued)

Component	Alarm Type	LED Indication	Action
Switching module temperature sensor exceeds major threshold	Major	STATUS LED red	Generates syslog message and SNMP. Powers down the module ⁴ .
Switching module temperature sensor exceeds minor threshold	Minor	STATUS LED orange	Generates syslog message and an SNMP trap. Monitors 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 50-1 for instructions.

