



# Power Management and Environmental Monitoring

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This chapter describes the power management and environmental monitoring features in Cisco IOS Release 12.2SX.



**Note**

For complete syntax and usage information for the commands used in this chapter, see the Cisco IOS Master Command List, at this URL:

[http://www.cisco.com/en/US/docs/ios/mcl/allreleasemcl/all\\_book.html](http://www.cisco.com/en/US/docs/ios/mcl/allreleasemcl/all_book.html)

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**Tip**

For additional information about Cisco Catalyst 6500 Series Switches (including configuration examples and troubleshooting information), see the documents listed on this page:

[http://www.cisco.com/en/US/products/hw/switches/ps708/tsd\\_products\\_support\\_series\\_home.html](http://www.cisco.com/en/US/products/hw/switches/ps708/tsd_products_support_series_home.html)

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This chapter consists of these sections:

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

## Understanding Power Management

These sections describe power management:

- [Enabling or Disabling Power Redundancy, page 10-2](#)
- [Powering Modules Off and On, page 10-4](#)
- [Viewing System Power Status, page 10-4](#)
- [Power Cycling Modules, page 10-5](#)
- [Determining System Power Requirements, page 10-5](#)
- [Determining System Hardware Capacity, page 10-5](#)
- [Determining Sensor Temperature Threshold, page 10-9](#)

**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, see 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 10-5.

## 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 10-4).

[Table 10-1](#) describes how the system responds to changes in the power supply configuration.

**Table 10-1** Effects of Power Supply Configuration Changes

Configuration Change	Effect
Redundant to nonredundant	<ul style="list-style-type: none"> <li>System log and syslog messages are generated.</li> <li>System power is increased to the combined power capability of both power supplies.</li> <li>Modules marked <i>power-deny</i> in the <b>show power</b> oper state field are brought up if there is sufficient power.</li> </ul>
Nonredundant to redundant (both power supplies must be of equal wattage)	<ul style="list-style-type: none"> <li>System log and syslog messages are generated.</li> <li>System power is decreased to the power capability of one supply.</li> <li>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 <b>show power</b> oper state field.</li> </ul>

Table 10-1 Effects of Power Supply Configuration Changes (continued)

Configuration Change	Effect
Equal wattage power supply is inserted with redundancy enabled	<ul style="list-style-type: none"> <li>• System log and syslog messages are generated.</li> <li>• System power equals the power capability of one supply.</li> <li>• No change in module status because the power capability is unchanged.</li> </ul>
Equal wattage power supply is inserted with redundancy disabled	<ul style="list-style-type: none"> <li>• System log and syslog messages are generated.</li> <li>• System power is increased to the combined power capability of both power supplies.</li> <li>• Modules marked <i>power-deny</i> in the <b>show power</b> oper state field are brought up if there is sufficient power.</li> </ul>
Higher or lower wattage power supply is inserted with redundancy enabled	<ul style="list-style-type: none"> <li>• System log and syslog messages are generated.</li> <li>• If the system power used is more than 83% of the higher wattage power supply capacity, the lower wattage power supply shuts down. The system will operate in redundant mode, with only the higher wattage power supply.</li> <li>• If the system power used is less than 83% of the higher wattage power supply capacity, the lower wattage power supply comes online. The system will operate in non-redundant combined mode, with both the power supplies.</li> </ul>
Higher or lower wattage power supply is inserted with redundancy disabled	<ul style="list-style-type: none"> <li>• System log and syslog messages are generated.</li> <li>• System power is increased to the combined power capability of both power supplies.</li> <li>• Modules marked <i>power-deny</i> in the <b>show power</b> oper state field are brought up if there is sufficient power.</li> </ul>
Power supply is removed with redundancy enabled	<ul style="list-style-type: none"> <li>• System log and syslog messages are generated.</li> <li>• No change in module status because the power capability is unchanged.</li> </ul>
Power supply is removed with redundancy disabled	<ul style="list-style-type: none"> <li>• System log and syslog messages are generated.</li> <li>• System power is decreased to the power capability of one supply.</li> <li>• 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 <b>show power</b> oper state field.</li> </ul>
System is booted with power supplies of different wattage installed and redundancy enabled	<ul style="list-style-type: none"> <li>• System log and syslog messages are generated.</li> <li>• If the system power used is more than 83% of the higher wattage power supply capacity, the lower wattage power supply shuts down. The system will operate in redundant mode, with only the higher wattage power supply.</li> <li>• If the system power used is less than 83% of the higher wattage power supply capacity, the lower wattage power supply comes online. The system will operate in non-redundant combined mode, with both the power supplies.</li> </ul>
System is booted with power supplies of equal or different wattage installed and redundancy disabled	<ul style="list-style-type: none"> <li>• System log and syslog messages are generated.</li> <li>• System power equals the combined power capability of both power supplies.</li> <li>• The system powers up as many modules as the combined capacity allows.</li> </ul>

## Powering Modules Off and On

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

	Command	Purpose
Step 1	Router# <b>configure terminal</b>	Enters global configuration mode.
Step 2	Router(config)# <b>power enable module</b> <i>slot_number</i>	Powers a module on.
Step 3	Router(config)# <b>no power enable module</b> <i>slot_number</i>	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.

## Determining System Power Requirements

For information about power consumption, see the *Release Notes for Cisco IOS Release 12.2SX* publication at this URL:

[http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/release/notes/ol\\_14271.html](http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/release/notes/ol_14271.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 a switching module:

```
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%

```

Router#

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

```

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

```

Router#

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

```

Router#

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%

```

Router#

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%

```

Router#

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

Router#

```

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
Router#
```

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%
Router#
```

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
Router#
```

This example shows how to display the capacity and utilization of QoS policer resources for each PFC and DFC:

```
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%
Router#
```

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
```

```
Router#
```

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 Environmental Monitoring

These sections describe environmental monitoring:

- [Overview, page 10-10](#)
- [Monitoring System Environmental Status, page 10-10](#)
- [Understanding LED Environmental Indications, page 10-12](#)

### Overview

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

All modules have an LED labeled STATUS. There are LEDs on power supplies and fan trays that indicate problems. A nongreen LED indicates a problem.

Supervisor engines have an LED labeled SYSTEM that indicates alarms. The alarm can be on a supervisor engine, module, power supply, fan tray, or backplane.

In non-VSS mode, the SYSTEM LED indicates the following:

- With one supervisor engine, the SYSTEM LED on the active supervisor engine indicates the alarm status for the chassis.
- With two supervisor engines, the SYSTEM LED on the standby supervisor engine indicates the alarm status of the standby supervisor engine.

In VSS mode, the SYSTEM LED indicates the following:

- With one supervisor engine in each chassis, the SYSTEM LED on the active chassis supervisor engine indicates the alarm status for both chassis. The SYSTEM LED on the standby chassis supervisor engine indicates the alarm status of the standby chassis.
- With two supervisor engines in each chassis, the SYSTEM LED on the active-chassis, in-chassis active supervisor engine indicates system status for both chassis.
- With two supervisor engines in each chassis, the SYSTEM LED on the standby-chassis in-chassis active supervisor engine indicates the alarm status of the standby chassis.
- With two supervisor engines in each chassis, the SYSTEM LEDs on in-chassis standby supervisor engines are turned off.

The SYSTEM LED 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, alerting you to a problem that could turn critical if corrective action is not taken.

Temperature sensors monitor key components. The temperature sensors are polled every 30 seconds. If the sensed temperature falls below the alarm threshold, the alarm is immediately cancelled.

For major alarms, there is a delay before any automatic actions occur to protect the switch. The delay is 5 minutes for a major alarm from a board sensor, and a 1 minute for a major alarm from an ASIC sensor.

[Table 10-2](#) lists the environmental indicators for the supervisor engine and switching modules.

**Note**

See the *Catalyst 6500 Series Switch Supervisor Engine Guide* for additional information on LEDs, including the supervisor engine STATUS LED.

**Table 10-2 Environmental Monitoring for Supervisor Engine and Switching Modules**

Component	Alarm Type	SYSTEM LED Color	Action
VSS mode supervisor engine temperature sensor exceeds major threshold	Major	Red	<p>Generates syslog message and an SNMP trap. After the time delay, these actions happen:</p> <ul style="list-style-type: none"> <li>With a redundant supervisor engine in the same chassis, the peer chassis becomes active and the previously active supervisor engine drops to ROMMON. With Release 12.2(33)SX14 and later releases, if the fan tray is faulty or absent, the chassis with fault shuts down. The peer chassis continues operating.</li> <li>With a single supervisor engine in the chassis, the supervisor engine drops to ROMMON and the peer chassis becomes active. With Release 12.2(33)SX14 and later releases, if the fan tray is faulty or absent, the faulty chassis shuts down.</li> </ul>
Non-VSS mode supervisor engine temperature sensor exceeds major threshold	Major	Red	<p>Generates syslog message and an SNMP trap. After the time delay, these actions happen:</p> <ul style="list-style-type: none"> <li>With a redundant supervisor engine in the same chassis, the redundant supervisor engine becomes active and the previously active supervisor engine drops to ROMMON. With Release 12.2(33)SX14 and later releases, if the fan tray is faulty or absent, the chassis shuts down.</li> <li>With a single supervisor engine, the supervisor engine drops to ROMMON. With Release 12.2(33)SX14 and later releases, if the fan tray is faulty or absent, the chassis shuts down.</li> </ul>
Supervisor engine temperature sensor exceeds minor threshold	Minor	Orange	<p>Generates syslog message and an SNMP trap.</p> <p>Monitors the condition.</p>
Redundant supervisor engine temperature sensor exceeds major or minor threshold	Major	Red	<p>Generates syslog message and an SNMP trap.</p> <p>If a major alarm is generated and the overtemperature condition is not corrected, the system shuts down after 5 minutes.</p>
	Minor	Orange	<p>Monitors the condition if a minor alarm is generated.</p>
Switching module temperature sensor exceeds major threshold	Major	Red	<p>Generates syslog message and SNMP.</p> <p>Powers down the module (see the <a href="#">“Understanding Power Management” section on page 10-1</a>).</p>
Switching module temperature sensor exceeds minor threshold	Minor	Orange	<p>Generates syslog message and an SNMP trap.</p> <p>Monitors the condition.</p>

**Tip**

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For additional information about Cisco Catalyst 6500 Series Switches (including configuration examples and troubleshooting information), see the documents listed on this page:

[http://www.cisco.com/en/US/products/hw/switches/ps708/tsd\\_products\\_support\\_series\\_home.html](http://www.cisco.com/en/US/products/hw/switches/ps708/tsd_products_support_series_home.html)

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