



# CHAPTER 19

## Managing Modules

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This chapter describes how to manage switching and services modules (also known as line cards) and provides information on monitoring module states.

This chapter includes the following sections:

- [About Modules, page 19-1](#)
- [Verifying the Status of a Module, page 19-3](#)
- [Obtaining Supervisor Module Statistics, page 19-4](#)
- [Checking the State of a Module, page 19-4](#)
- [Reloading Modules, page 19-5](#)
- [Preserving Module Configuration, page 19-7](#)
- [Powering Off Switching Modules, page 19-8](#)
- [Identifying Module LEDs, page 19-9](#)
- [Default Settings, page 19-12](#)

## About Modules

Table 19-1 describes the supervisor module options for switches in the Cisco MDS 9000 Family.

**Table 19-1** Supervisor Module Options

Product	Number of Supervisor Modules	Supervisor Module Slot Number	Switching and Services Module Features
Cisco MDS 9513	Two modules	7 and 8	13-slot chassis allows any switching or services module in the other eleven slots.
Cisco MDS 9509	Two modules	5 and 6	9-slot chassis allows any switching or services module in the other seven slots.
Cisco MDS 9506	Two modules	5 and 6	6-slot chassis allows any switching or services module in the other four slots.

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**Table 19-1 Supervisor Module Options (continued)**

Product	Number of Supervisor Modules	Supervisor Module Slot Number	Switching and Services Module Features
Cisco MDS 9216	One module	1	2-slot chassis allows one optional switching or services module in the other slot.
Cisco MDS 9216A	One module	1	2-slot chassis allows one optional switching or services module in the other slot.
Cisco MDS 9216i	One module	1	2-slot chassis allows one optional switching or services module in the other slot.

## Supervisor Modules

Supervisor modules are automatically powered up and started with the switch.

- Cisco MDS 9513 Directors have two supervisor modules—one in slot 7 (sup-1) and one in slot 8 (sup-2). See [Table 19-2](#). When the switch powers up and both supervisor modules come up together, the active module is the one that comes up first. The standby module constantly monitors the active module. If the active module fails, the standby module takes over without any impact to user traffic.
- Cisco MDS 9506 and Cisco MDS 9509 switches have two supervisor modules—one in slot 5 (sup-1) and one in slot 6 (sup-2). See [Table 19-2](#). When the switch powers up and both supervisor modules come up together, the active module is the one that comes up first. The standby module constantly monitors the active module. If the active module fails, the standby module takes over without any impact to user traffic.
- Cisco MDS 9216i switches have one supervisor module that includes an integrated switching module with 14 Fibre Channel ports and two Gigabit Ethernet ports.
- Cisco MDS 9200 Series switches have one supervisor module that includes an integrated 16-port switching module.

**Table 19-2 Supervisor Module Terms and Usage**

Module Terms	Fixed or Relative	Usage
module-7 and module-8	Fixed usage for MDS 9513	module-7 always refers to the supervisor module in slot 7 and module-8 always refers to the supervisor module in slot 8.
module-5 and module-6	Fixed usage for MDS 9509 and MDS 9506	module-5 always refers to the supervisor module in slot 5 and module-6 always refers to the supervisor module in slot 6.
module-1	Fixed usage for MDS 9200 series	module-1 always refers to the supervisor module in slot 1.

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**Table 19-2 Supervisor Module Terms and Usage**

Module Terms	Fixed or Relative	Usage
sup-1 and sup-2	Fixed usage	On the MDS 9506 and MDS 9509 switches, sup-1 always refers to the supervisor module in slot 5 and sup-2 always refers to the supervisor module in slot 6.  On the MDS 9513 Directors, sup-1 always refers to the supervisor module in slot 7 and sup-2 always refers to the supervisor module in slot 8.
sup-active and sup-standby	Relative usage	sup-active refers to the active supervisor module—relative to the slot that contains the active supervisor module.  sup-standby refers to the standby supervisor module—relative to the slot that contains the standby supervisor module.
sup-local and sup-remote	Relative usage	If you are logged into the active supervisor, sup-local refers to the active supervisor module and sup-remote refers to the standby supervisor module.  If you are logged into the standby supervisor, sup-local refers to the standby supervisor module (the one you are logged into.) There is no sup-remote available from the standby supervisor module (you cannot access a file system on the active sup).

## Switching Modules

Cisco MDS 9000 Family switches support any switching module in any non-supervisor slot. These modules obtain their image from the supervisor module.

## Services Modules

Cisco MDS 9000 Family switches support any services module in any non-supervisor slot.

Refer to the *Cisco MDS 9000 Family SAN Volume Controller Configuration Guide* for more information on CSMs.

## Verifying the Status of a Module

Before you begin configuring the switch, you need to ensure that the modules in the chassis are functioning as designed. To verify the status of a module at any time expand **Switches** and then select **Hardware** in the Physical Attributes pane in Fabric Manager and select **Card Module Status** tab in the Information pane (see the “[Fibre Channel Interfaces](#)” section on page 20-2). The interfaces in each module are ready to be configured when the `ok` status is displayed. A sample screenshot follows:

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Figure 19-1 Card Module Status Display

Switch	Slot	Name	Model	Reset	Oper Status	Reset Reason	Last Change	Power Admin	Power Oper	Power Current
sw-47-24	2	1/2 Gbps FC Module	D5-X9016	<input type="checkbox"/>	ok	Unknown	2007/04/18-10:28:23	on	ok	210.0W / 5.0A
sw-47-24	1	2x1GE IPS, 14x1/2Gbps FC/Supervisor(active)	D5-X9216-K9-SUP	<input type="checkbox"/>	ok	Reset Requested by CLI command reload	2007/04/18-10:26:17	on	ok	209.16W / 4.98A
sw-47-152	2	1/2 Gbps FC Module	D5-X9016	<input type="checkbox"/>	ok	Unknown	2007/04/18-11:09:13	on	ok	210.0W / 5.0A
sw-47-152	4	2x1GE IPS, 14x1/2Gbps FC Module	D5-X9302-14K9	<input type="checkbox"/>	ok	Unknown	2007/04/18-11:10:01	on	ok	200.34W / 4.77A
sw-47-152	9	1/2/4 Gbps FC Module	D5-X9112	<input type="checkbox"/>	ok	Unknown	2007/04/18-11:11:13	on	ok	132.3W / 3.15A
sw-47-152	8	2x1GE IPS, 14x1/2Gbps FC Module	D5-X9302-14K9	<input type="checkbox"/>	ok	Unknown	2007/04/18-11:10:20	on	ok	200.34W / 4.77A
sw-47-152	6	Supervisor/Fabric-1	D5-X9530-SF1-K9	<input type="checkbox"/>	ok	Unknown	2007/04/18-11:08:24	on	ok	209.16W / 4.98A
sw-47-152	1	1/2/4 Gbps FC Module	D5-X9148	<input type="checkbox"/>	ok	Unknown	2007/04/18-11:10:10	on	ok	184.8W / 4.4A
sw-47-152	3	1/2 Gbps FC Module	D5-X9016	<input type="checkbox"/>	ok	Unknown	2007/04/18-11:09:28	on	ok	210.0W / 5.0A
sw-47-152	7	1/2 Gbps FC Module	D5-X9002	<input type="checkbox"/>	ok	Unknown	2007/04/18-11:09:46	on	ok	190.68W / 4.54A
sw-47-152	5	Supervisor/Fabric-1(active)	D5-X9530-SF1-K9	<input type="checkbox"/>	ok	Reset Requested by CLI command reload	2007/04/18-11:07:10	on	ok	209.16W / 4.98A
sw-47-17	1	1/2/4 Gbps FC/Supervisor-2(active)	D5-C9124-K9-SUP	<input type="checkbox"/>	ok	Reset Requested by CLI command reload	2007/04/18-10:25:32	on	ok	209.16W / 4.98A
sw-47-151	2	JP Storage Services Module	D5-X9304-SMP	<input type="checkbox"/>	ok	Unknown	2007/04/18-10:28:06	on	ok	160.02W / 3.61A
sw-47-151	4	JP Storage Services Module	D5-X9304-SMP	<input type="checkbox"/>	ok	Unknown	2007/04/18-10:28:33	on	ok	200.34W / 4.77A

The Status column in the output should display an `ok` status for switching modules and an active or standby (or HA-standby) status for supervisor modules. If the status is either `ok` or active, you can continue with your configuration..



#### Note

A standby supervisor module reflects the HA-standby status if the HA switchover mechanism is enabled (see the “[HA Switchover Characteristics](#)” section on page 17-2). If the warm switchover mechanism is enabled, the standby supervisor module reflects the standby status.

The states through which a switching module progresses is discussed in the “[Checking the State of a Module](#)” section on page 19-4.

## Obtaining Supervisor Module Statistics

You can view statistics for the supervisor module, such as CPU utilization and NVRAM size, using Fabric Manager. To view supervisor module statistics using Fabric Manager, follow these steps:

- Step 1** Do one of the following in the Logical Domains pane:
- Expand **SAN** to display a list of all switches in the SAN.
  - Click one of the fabrics to display a list of switches for that fabric.
  - Click a VSAN to display a list of switches for that VSAN.
- Step 2** Expand **Switches** and select **Supervisor Statistics** in the Physical Attributes pane.
- You see the supervisor statistics for each switch in the Information pane.

## Checking the State of a Module

The switching module goes through a testing and an initializing stage before displaying an `ok` status. [Table 19-3](#) describes the possible states in which a module can exist.

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**Table 19-3**      **Module States**

<b>Module Status Output</b>	<b>Description</b>
powered up	The hardware has electrical power. When the hardware is powered up, the software begins booting.
testing	The switching module has established connection with the supervisor module and the switching module is performing bootup diagnostics.
initializing	The diagnostics have completed successfully and the configuration is being downloaded.
failure	The switch detects a switching module failure upon initialization and automatically attempts to power-cycle the module three times. After the third attempt it continues to display a failed state.
ok	The switch is ready to be configured.
power-denied	The switch detects insufficient power for a switching module to power up.
active	This module is the active supervisor module and the switch is ready to be configured.
HA-standby	The HA switchover mechanism is enabled on the standby supervisor module (see the “ <a href="#">HA Switchover Characteristics</a> ” section on page 17-2).
standby	The warm switchover mechanism is enabled on the standby supervisor module (see the “ <a href="#">HA Switchover Characteristics</a> ” section on page 17-2).

To view the state of a module from Device Manager, choose **Physical > Modules**. The dialog box displays the status of every module.

## Reloading Modules

You can reload the entire switch, reset specific modules in the switch, or reload the image on specific modules in the switch.

This section includes the following topics:

- [Reloading a Switch, page 19-5](#)
- [Power Cycling Modules, page 19-6](#)

## Reloading a Switch

To reload a switch using Fabric Manager, follow these steps:

- 
- Step 1** Do one of the following in the Logical Domains pane:
- Click **SAN** to display a list of all switches in the SAN.
  - Click one of the fabrics to display a list of switches for that fabric.
  - Click a VSAN to display a list of switches for that VSAN.
- Step 2** Expand **Switches** and select **Hardware** in the Physical Attributes pane.

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You see a list of modules contained in the selected switches.

**Step 3** Click the **Card Module Status** tab.

You see the information shown in [Figure 19-2](#).

**Figure 19-2 Card Module Status Tab**

Switch	Slot	Name	Model	Reset	Oper Status	Reset Reason	Last Change	Power Admin	Power Oper	Power Current
47-24	2	1/2 Gbps FC Module	D5-X9016	<input type="checkbox"/>	ok	Unknown	2007/04/18-10:28:23	on	ok	210.0W / 5.0A
47-24	1	2x1GE IPS, 14x1/2Gbps FC/Supervisor(active)	D5-X9216-K9-SUP	<input type="checkbox"/>	ok	Reset Requested by CLI command reload	2007/04/18-10:26:17	on	ok	209.16W / 4.98A
47-152	2	1/2 Gbps FC Module	D5-X9016	<input type="checkbox"/>	ok	Unknown	2007/04/18-11:09:13	on	ok	210.0W / 5.0A
47-152	4	2x1GE IPS, 14x1/2Gbps FC Module	D5-X9302-14K9	<input type="checkbox"/>	ok	Unknown	2007/04/18-11:10:01	on	ok	200.34W / 4.77A
47-152	9	1/2/4 Gbps FC Module	D5-X9112	<input type="checkbox"/>	ok	Unknown	2007/04/18-11:11:13	on	ok	132.34W / 3.15A
47-152	8	2x1GE IPS, 14x1/2Gbps FC Module	D5-X9302-14K9	<input type="checkbox"/>	ok	Unknown	2007/04/18-11:10:20	on	ok	200.34W / 4.77A
47-152	6	Supervisor/Fabric-1	D5-X9530-SF1-K9	<input type="checkbox"/>	ok	Unknown	2007/04/18-11:08:24	on	ok	209.16W / 4.98A
47-152	1	1/2/4 Gbps FC Module	D5-X9148	<input type="checkbox"/>	ok	Unknown	2007/04/18-11:10:10	on	ok	184.8W / 4.4A
47-152	3	1/2 Gbps FC Module	D5-X9016	<input type="checkbox"/>	ok	Unknown	2007/04/18-11:09:28	on	ok	210.0W / 5.0A
47-152	7	1/2 Gbps FC Module	D5-X9032	<input type="checkbox"/>	ok	Unknown	2007/04/18-11:09:46	on	ok	190.68W / 4.54A
47-152	5	Supervisor/Fabric-1(active)	D5-X9530-SF1-K9	<input type="checkbox"/>	ok	Reset Requested by CLI command reload	2007/04/18-11:07:10	on	ok	209.16W / 4.98A
47-17	1	1/2/4 Gbps FC/Supervisor-2(active)	D5-C9124-K9-SUP	<input type="checkbox"/>	ok	Reset Requested by CLI command reload	2007/04/18-10:25:32	on	ok	209.16W / 4.98A
47-151	2	IP Storage Services Module	D5-X9304-SMIP	<input type="checkbox"/>	ok	Unknown	2007/04/18-10:28:06	on	ok	160.02W / 3.81A
47-151	4	IP Storage Services Module	D5-X9308-SMIP	<input type="checkbox"/>	ok	Unknown	2007/04/18-10:28:33	on	ok	200.34W / 4.77A

**Step 4** Check the **Reset** check box in the row of the switch to reload.

**Step 5** Click the **Apply Changes** icon.

## Power Cycling Modules

To power cycle any module using Fabric Manager, follow these steps:

**Step 1** Do one of the following in the Logical Domains pane:

- Click **SAN** to display a list of all switches in the SAN.
- Click one of the fabrics to display a list of switches for that fabric.
- Click a VSAN to display a list of switches for that VSAN.

**Step 2** Expand **Switches** and select **Hardware** from the Physical Attributes pane.

**Step 3** Click the **Card Module Status** tab.

**Step 4** Check the **Reset** check box in the row for the module(s) you want to reset.

**Step 5** Click the **Apply Changes** icon.



**Caution** Resetting a module disrupts traffic through the module.

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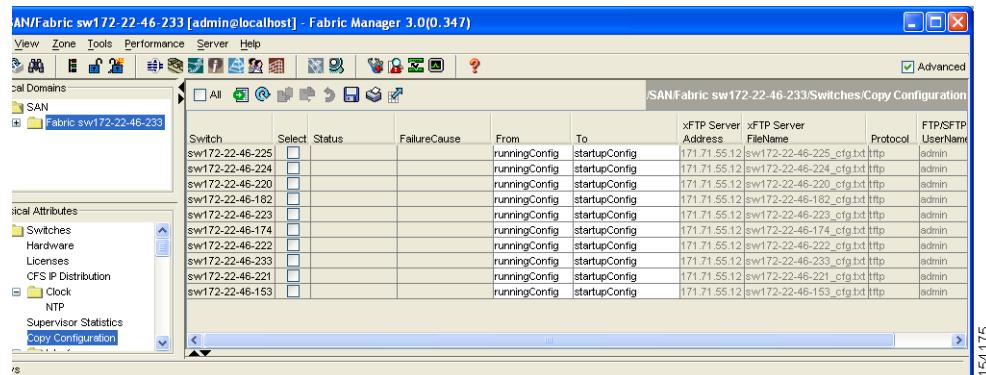
## Preserving Module Configuration

Use the “copy running-config to startup-config” procedure to save the new configuration into nonvolatile storage. Once this procedure is complete, the running and the startup copies of the configuration are identical.

To preserve the module configuration using Fabric Manager, follow these steps:

- Step 1** Do one of the following in the Logical Domains pane:
- Click **SAN** to display a list of all switches in the SAN.
  - Click one of the fabrics to display a list of switches for that fabric.
  - Click a VSAN to display a list of switches for that VSAN.
- Step 2** Expand **Switches** and select **Copy Configuration** in the Physical Attributes pane. You see a list of switches (see [Figure 19-3](#)).

**Figure 19-3** List of Switches Available to Copy



- Step 3** Click individual **Select** check boxes for switch configurations to copy.
- Step 4** In the From column, ensure that **runningConfig** is selected.
- Step 5** In the To column, ensure that **startupConfig** is selected.
- Step 6** Click the **Apply Changes** icon.

[Table 19-4](#) displays various scenarios when module configurations are preserved or lost.

**Table 19-4** Switching Module Configuration Status

Scenario	Consequence
A particular switching module is removed and the <b>copy running-config startup-config</b> command is issued again.	The configured module information is lost.
A particular switching module is removed and the same switching module is replaced before the <b>copy running-config startup-config</b> command is issued again.	The configured module information is preserved.

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**Table 19-4 Switching Module Configuration Status (continued)**

Scenario	Consequence
A particular switching module is removed and replaced with the same type switching module, and a <b>reload module number</b> command is issued.	The configured module information is preserved.
A particular switching module is reloaded when a <b>reload module number</b> command is issued.	The configured module information is preserved.
A particular switching module is removed and replaced with a different type of switching module. For example, a 16-port switching module is replaced with a 32-port switching module.	The configured module information is lost from the running configuration. The default configuration is applied.  The configured module information remains in startup configuration until a <b>copy running-config startup-config</b> command is issued again.
<p>Sample scenario:</p> <ol style="list-style-type: none"> <li>1. The switch currently has a 16-port switching module and the startup and running configuration files are the same.</li> <li>2. You replace the 16-port switching module in the switch with a 32-port switching module.</li> <li>3. Next, you remove the 32-port switching module and replace it with the same 16-port switching module referred to in Step 1.</li> <li>4. You <b>reload</b> the switch.</li> </ol>	<p>Sample response:</p> <ol style="list-style-type: none"> <li>1. The switch uses the 16-port switching module and the present configuration is saved in nonvolatile storage.</li> <li>2. The factory default configuration is applied.</li> <li>3. The factory default configuration is applied.</li> <li>4. The configuration saved in nonvolatile storage referred to in Step 1 is applied.</li> </ol>

## Powering Off Switching Modules

By default, all switching modules are in the power up state.

To power off a module using Fabric Manager, follow these steps:

- 
- Step 1** Do one of the following in the Logical Domains pane:
- Click **SAN** to display a list of all switches in the SAN.
  - Click one of the fabrics to display a list of switches for that fabric.
- Step 2** Expand **Switches** and select **Hardware** in the Physical Attributes pane.  
You see a list of modules contained in the selected switches.
- Step 3** Select **off** from the drop-down list in the row for the module(s) you want to power off.
- Step 4** Click the **Apply Changes** icon.



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**Note** To power on a module, repeat Steps 1-4 but select **on** in Step 3.

## Identifying Module LEDs

Table 19-5 describes the LEDs for the Cisco MDS 9200 Series integrated supervisor modules.

**Table 19-5 LEDs for the Cisco MDS 9200 Series Supervisor Modules**

LED	Status	Description
Status	Green	All diagnostics pass. The module is operational (normal initialization sequence).
	Orange	One of the following applies: The module is booting or running diagnostics (normal initialization sequence). The inlet air temperature of the system has exceeded the maximum system operating temperature limit (a minor environmental warning). To ensure maximum product life, you should immediately correct the environmental temperature and restore the system to normal operation.
	Red	One of the following applies: The diagnostic test failed. The module is not operational because a fault occurred during the initialization sequence. The inlet air temperature of the system has exceeded the safe operating temperature limits of the card (a major environmental warning). The card has been shut down to prevent permanent damage. The system will be shut down after two minutes if this condition is not cleared.
Speed	On	2-Gbps mode and beacon mode disabled.
	Off	1-Gbps mode and beacon mode disabled.
	Flashing	Beacon mode enabled. See the <a href="#">“Identifying the Beacon LEDs” section on page 20-14</a> .
Link	Solid green	Link is up.
	Solid yellow	Link is disabled by software.
	Flashing yellow	A fault condition exists.
	Off	No link.

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Table 19-6 describes the LEDs for the Cisco MDS 9200 Series interface module.

**Table 19-6 LEDs on the Cisco MDS 9200 Series Interface Module**

LED	Status	Description
Status	Green	All diagnostics pass. The module is operational (normal initialization sequence).
	Orange	One of the following applies: The module is booting or running diagnostics (normal initialization sequence). The inlet air temperature of the system has exceeded the maximum system operating temperature limit (a minor environmental warning). To ensure maximum product life, you should immediately correct the environmental temperature and restore the system to normal operation.
	Red	One of the following applies: The diagnostic test failed. The module is not operational because a fault occurred during the initialization sequence. The inlet air temperature of the system has exceeded the safe operating temperature limits of the card (a major environmental warning). The card has been shut down to prevent permanent damage.
System	Green	All chassis environmental monitors are reporting OK.
	Orange	One of the following applies: The power supply failed or the power supply fan failed. Incompatible power supplies are installed. The redundant clock failed.
	Red	The temperature of the supervisor module exceeded the major threshold.
MGMT 10/100 Ethernet Link LED	Green	Link is up.
	Off	No link.
MGMT 10/100 Ethernet Activity LED	Green	Traffic is flowing through port.
	Off	No link or no traffic.

Table 19-7 describes the LEDs for the 16-port and 32-port switching modules, and the 4-port, 12-port, 24-port, and 48-port Generation 2 switching modules.

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**Table 19-7 LEDs for the Cisco MDS 9000 Family Fibre Channel Switching Modules**

LED	Status	Description
Status	Green	All diagnostics pass. The module is operational (normal initialization sequence).
	Orange	One of the following applies: The module is booting or running diagnostics (normal initialization sequence). The inlet air temperature of the system has exceeded the maximum system operating temperature limit (a minor environmental warning). To ensure maximum product life, you should immediately correct the environmental temperature and restore the system to normal operation.
	Red	One of the following applies: The diagnostic test failed. The module is not operational because a fault occurred during the initialization sequence. The inlet air temperature of the system has exceeded the safe operating temperature limits of the card (a major environmental warning). The card has been shut down to prevent permanent damage.
Speed	On	2-Gbps mode.
	Off	1-Gbps mode.
Link	Solid green	Link is up.
	Steady flashing green	Link is up (beacon used to identify port).
	Intermittent flashing green	Link is up (traffic on port).
	Solid yellow	Link is disabled by software.
	Flashing yellow	A fault condition exists.
	Off	No link.

The LEDs on the supervisor module indicate the status of the supervisor module, power supplies, and the fan module. [Table 19-8](#) provides more information about these LEDs.

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**Table 19-8 LEDs for the Cisco MDS 9500 Series Supervisor Modules**

LED	Status	Description
Status	Green	All diagnostics pass. The module is operational (normal initialization sequence).
	Orange	One of the following applies: The module is booting or running diagnostics (normal initialization sequence). An over temperature condition has occurred (a minor threshold has been exceeded during environmental monitoring).
	Red	One of the following applies: The diagnostic test failed. The module is not operational because a fault occurred during the initialization sequence. An over temperature condition occurred (a major threshold was exceeded during environmental monitoring).
System <sup>1</sup>	Green	All chassis environmental monitors are reporting OK.
	Orange	One of the following applies: The power supply has failed or the power supply fan has failed. Incompatible power supplies are installed. The redundant clock has failed.
	Red	The temperature of the supervisor module major threshold has been exceeded.
Active	Green	The supervisor module is operational and active.
	Orange	The supervisor module is in standby mode.
Pwr Mgmt <sup>1</sup>	Green	Sufficient power is available for all modules.
	Orange	Sufficient power is not available for all modules.
MGMT 10/100 Ethernet Link LED	Green	Link is up.
	Off	No link.
MGMT 10/100 Ethernet Activity LED	Green	Traffic is flowing through port.
	Off	No link or no traffic.
CompactFlash	Green	The external CompactFlash card is being accessed.
	Off	No activity.

1. The System and Pwr Mgmt LEDs on a redundant supervisor module are synchronized to the active supervisor module.

## Default Settings

Table 19-9 lists the default settings for the supervisor module.

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**Table 19-9**      **Default Supervisor Module Settings**

Parameters	Default
Administrative connection	Serial connection.
Global switch information	<ul style="list-style-type: none"> <li>• No value for system name.</li> <li>• No value for system contact.</li> <li>• No value for location.</li> </ul>
System clock	No value for system clock time.
In-band (VSAN 1) interface	IP address, subnet mask, and broadcast address assigned to the VSAN are set to 0.0.0.0.

Table 19-10 lists the default settings for the SSM.

**Table 19-10**      **Default SSM Settings**

Parameters	Default
Initial state when installed	<ul style="list-style-type: none"> <li>• Power-down state on switches with Cisco MDS SAN-OS Release 2.1(1a) and earlier installed.</li> <li>• Fibre Channel switching mode on switches with Cisco MDS SAN-OS Release 2.1(2) and later installed and SSMs with EPLD version 2.0(2) and later installed.</li> </ul>

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