Sun Blade™ 6048 Modular System Service Manual

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Contents

Preface

This *Sun Blade™ 6048 Modular System Service Manual* contains information and procedures for maintaining and upgrading the modular system.

Before You Read This Document

It is important that you review the safety guidelines in the *Sun Blade 6048 Modular System Safety and Compliance Guide.*

Product Updates

For product updates that you can download for the Sun Blade 6048modular system, go to:

http://www.sun.com/downloads

This site contains updates for firmware and drivers, as well as CD-ROM .iso images.

Related Documentation

For a description of the document set for the Sun Blade 6048 modular system, see the *Where to Find Documentation* sheet that is packed with your system and also posted at the product's documentation site. See the following web site:.

http://docs.sun.com/app/docs/prod/blade.6048mod

Translated versions of some of these documents are available at the documentation web site in French, Simplified Chinese, Traditional Chinese, Korean, and Japanese. English documentation is revised more frequently and might be more up-to-date than the translated documentation.

Using UNIX Commands

This document might not contain information about basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices. Refer to the following for this information:

- Software documentation that you received with your system
- Solaris™ Operating System documentation, which is at:

  http://docs.sun.com

Typographic Conventions

Typeface[*]	Meaning	Examples
AaBbCc123	The names of commands, files, and directories; onscreen computer output	Edit your .login file. Use ls -a to list all files. % You have mail.
AaBbCc123	What you type, when contrasted with onscreen computer output	% **su** Password:
AaBbCc123	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	Read Chapter 6 in the *User's Guide*. These are called *class* options. You *must* be superuser to do this. To delete a file, type rm *filename*.

* The settings on your browser might differ from these settings.

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Please include the title and part number of your document with your feedback:

Sun Blade 6048 Modular System Service Manual, part number 820-2863-13.

Introduction to the Sun Blade 6048 Modular System

This chapter contains an overview of the Sun Blade 6048 modular system.

The Sun Blade 6048 modular system is a blade server system optimized for high-performance applications that place great demands on CPU performance, memory capacity, and I/O bandwidth. The system supports up to 48 server modules (also known as blades) per chassis. The system design provides a power and cooling infrastructure to support current and future CPU and memory configurations, ensuring that the chassis lifecycle will span multiple generations of server module upgrades. The system provides a unified yet flexible architecture that enables you to consolidate multiple operating environments and applications.

This chapter includes the following sections:

1.1 System Components

The Sun Blade 6048 modular system includes four chassis shelves. Each shelf contains slots for 12 server modules accessible from the front of the chassis, along with two power supplies and two front fan modules (located inside the power supplies). At the rear of the each chassis shelf are up to 24 PCI ExpressModules (PCI EMs), two network express modules (NEMs), one chassis management module (CMM), and six fan modules. All active chassis components that are critical to system operation are configured for redundancy.

The Sun Blade 6048 modular system is designed for ease of service by either the customer for user-upgradeable components or by authorized service personnel.

FIGURE 1-1 shows the front and rear views of the chassis.

FIGURE 1-1   Front and Rear Views of Sun Blade Modular System Chassis
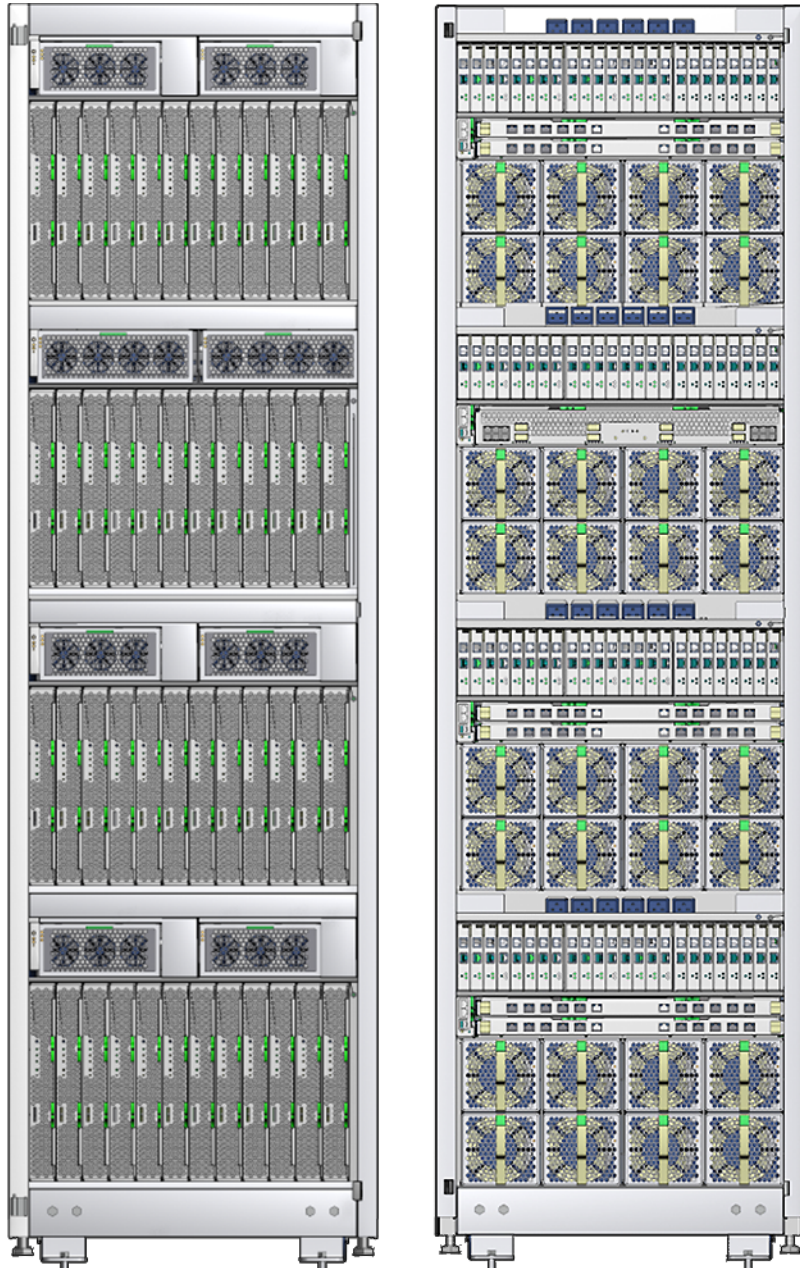
FIGURE 1-2 shows the locations of components for each chassis shelf.

FIGURE 1-2 Single Shelf Component View

Power supplies

Front indicator
module (FIM)

Server or storage modules (blades)

PCI ExpressModules (PCI EMs)

Chassis
management
module (CMM)

Network express
modules (NEMs)

Rear fans
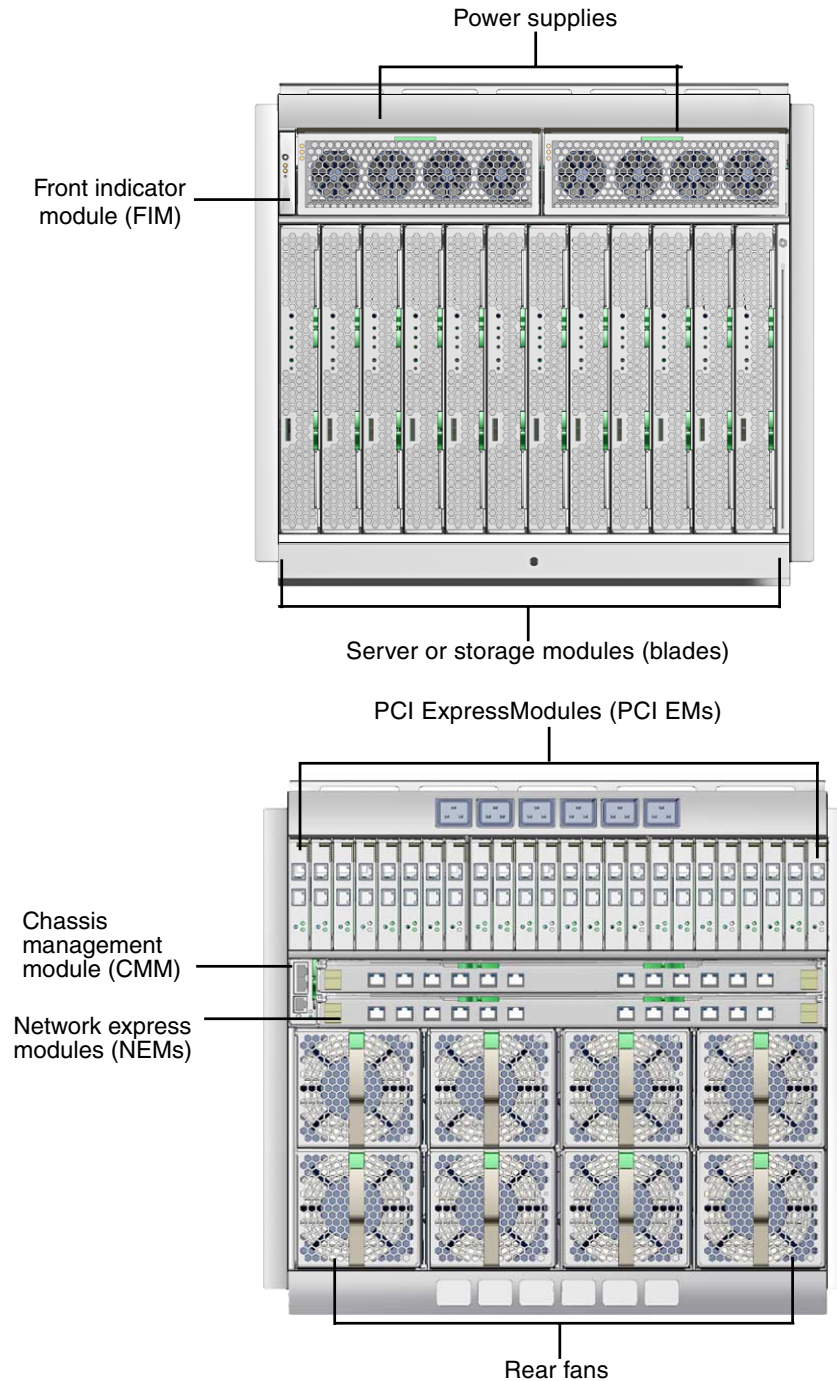
1.2   Server Modules

The Sun Blade 6048 modular system architecture includes capacity for up to 48
hot-pluggable server modules.

Refer to the documentation that comes with the server module for specific
information about each server module.

1.3   I/O Connectivity

All I/O is PCI Express based on customer-replaceable units (CRUs) called PCI
ExpressModules (PCI EMs) and network express modules (NEMs).

The PCI ExpressModules (PCI EMs) are based on the PCI Express industry-standard
form factor for PCI EMs. The PCI EMs provide dedicated I/O functions on a per-
server module basis. There are two PCI EMs for each server module, for up to 24
PCI EMs per chassis shelf.

You can customize the server module and PCI EM configurations in the chassis. For
example, one server module can be configured with redundant Fibre Channel PCI
EMs, while another server module can have a single Fibre Channel PCI EM and a
single InfiniBand PCI EM. The PCI EMs provide a maximum of 4 Gbytes per second
of I/O per module.

Up to two NEMs per system shelf offer pass-through Gigabit Ethernet connections to
the server modules. Designed within a Sun proprietary form factor, these switchless
networking devices provide a dual Gigabit NIC for each server module. There are
up to two RJ-45 Ethernet interfaces per server module providing
10/100/1000BASE-T ports at the chassis rear.

1.4 CMM System Management

The Sun Blade 6048 modular system chassis management module (CMM) manages a portion of the Sun Blade 6048 chassis. This section provides an overview of the CMM functionality. For specific information about system management using the CMM Integrated Lights Out Manager (ILOM), see the *Sun Integrated Lights Out Manager 2.0 User's Guide.*

The CMM provides an RJ-45 serial interface and two RJ-45 Ethernet connectors. The CMM is also compatible with Sun N1 System Manager (SM) software and some third-party management software.

The CMM provides the following:

- Automatic control of chassis fan speed
- A command-line interface (CLI) and web interface that provides the ability to control and view the status of components present in the chassis. The CLI and web interface enable the following:
  - Display component presence
  - Display component FRU SEEPROM data
  - Display component status
  - Display and configure CMM network parameters
  - Display and configure server module service processor (SP) network parameters
  - Connect to server module SP CLIs through SSH (CLI only)
- Support for IPMItool: IMPItool is an open-source, simple command-line interface (CLI) utility for managing and configuring IPMI-enabled devices. IPMItool can manage the IPMI functions of either the local system or a remote system. You can use the IPMItool utility to perform IPMI functions with a kernel device driver or over a LAN. You can download IPMItool from this site: http://ipmitool.sourceforge.net/

1.4.1 CMM Integrated Lights Out Manager (ILOM) Features

The CMM ILOM provides the following features:

- Is accessed through the CMM serial and network ports.
- Detects the presence of replaceable components in the chassis. This is limited to components that are not managed by the server module SP.

- Provides inventory information and status of components inside the chassis. This does not include components managed by the server module SP.
- Provides an interface to view FRU SEEPROM data and for the following components: power supplies, fan modules, chassis, NEMs, CMM, and server module motherboards.

The CLI provides an interface to view the status of the components shown in TABLE 1-1.

TABLE 1-1   CLI Component Status

Component	Status
Power supply	• Presence • Power state • Voltage and current • Fan speed • Temperature • Failure state • Fault state • Warning state
Fan module	• Presence • Fan speed • Failure state
Chassis	Power state
NEMs	Presence
Server module (blade)	Presence

1.4.2   Sun Integrated Lights Out Manager

The Sun Integrated Lights Out Manager (ILOM) firmware is preinstalled on the CMM, and it initializes as soon as power is applied to the chassis. ILOM provides a command-line interface (CLI) and a web interface that you can use to administer and diagnose local or remote systems.

Out-of-band communication is provided through the serial port for CLI console access and through a dedicated Ethernet for CLI via SSH or the web interface. In-band communication is provided via the host operating system. ILOM runs on the CMM independently of the rest of the system, using the system's standby power. Therefore, ILOM continues to function when the system's operating system goes offline or when the system is powered off.

See the *Sun Integrated Lights Out Manager 2.0 User's Guide* for more information about the CMM ILOM.

1.4.3 System Nomenclature

The figures and tables in this section describe the paths in the CMM ILOM CLI that you can use to locate component information. You can also use the ILOM web interface to access this information. Refer to the *Sun Integrated Lights Out Manager 2.0 User's Guide* for more information.

Use the **show** command with the component location shown in this section to view information about the component.

For example, **show /CH/PS0** gives you the following information about power supply module 0:

```
-> show /CH/PS0

/CH/PS0
    Targets:
        STATUS
        S0
        S1
        S2
        T_AMB
        FAN0
        FAN1
        FAN2
        FAN3
        FAN_FAIL
        V+12V
        V+3_3V
        I+3_3V
        V+3_3V_FAULT
        T_AMB_FAULT
        T_AMB_WARN

    Properties:
        type = Power Supply
    Commands:
        cd
        show
```

The information available for each component varies, depending on the component sensor type. See Appendix A for ILOM sensor information.

FIGURE 1-3 and TABLE 1-2 show the nomenclature used in the CMM ILOM to access information for front chassis components.

FIGURE 1-3 Front Panel
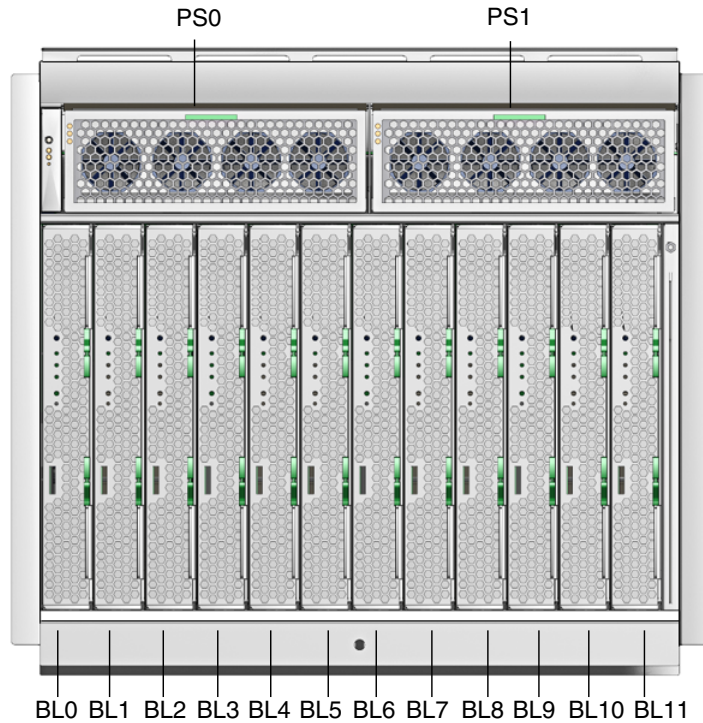
TABLE 1-2 Front Panel Nomenclature

FRU Description	Location	$n =$
Blade Module (n = 0–11)	/CH/BLn	0....11
Power Supply Unit (n = 0–1)	/CH/PSn	0, 1

FIGURE 1-4 and TABLE 1-3 show the nomenclature used in the CMM ILOM to access information for rear chassis components.

FIGURE 1-4   Rear Panel
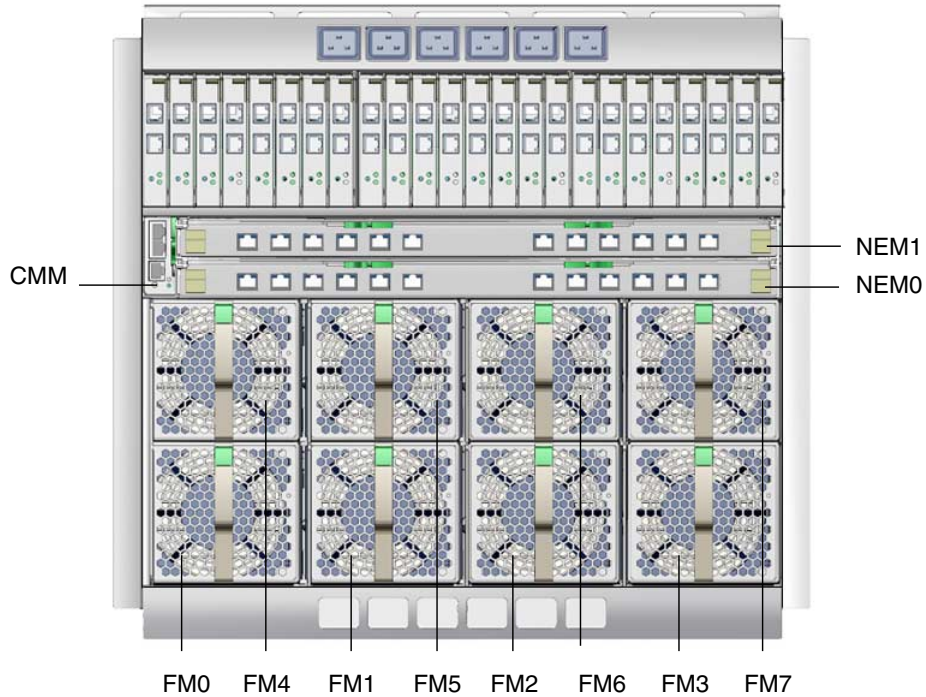
TABLE 1-3   Rear Panel Nomenclature

FRU Description	Location	$n =$
Fan module (n = 0–7)	/CH/FMn	0...7
Chassis management module	/CMM	n/a
Gigabit Ethernet NEM (n = 0–1)	/CH/NEMn	0, 1
NEM (n = 0) [*]	/CH/NEMn	0, 1

[*] If you have a NEM installed that occupies both NEM slots, the ILOM identification for that NEM is NEM0.

FIGURE 1-5 and TABLE 1-4 show the nomenclature used in the CMM ILOM to access information for rear chassis components.

FIGURE 1-5 Chassis LEDs
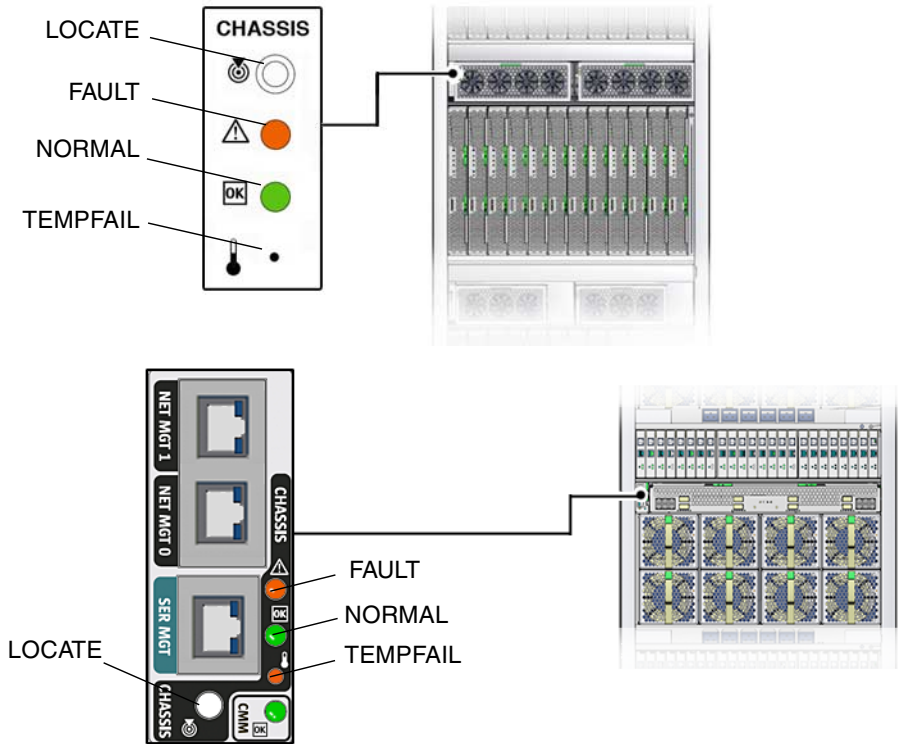
TABLE 1-4 LED Nomenclature

LED Description	Location
Locate button/LED	/CH/LOCATE
Fault LED (Service action required)	/CH/SERVICE
Power/OK LED	/CH/NORMAL
Temperature Fail LED	/CH/TEMPFAIL

1.5 Feature Summary

The Sun Blade 6048 modular system is designed with hardware and software features that surpass those of conventional servers. These features are summarized in TABLE 1-5. Additional system specifications can be found in the *Sun Blade 6048 Modular System Site Planning Guide*.

TABLE 1-5   Sun Blade 6048 Modular System Features

Feature	Description
Chassis dimensions	• Chassis height: 81.7 inches (2075 mm) • Chassis depth: 40.35 inches (1025 mm) • Chassis width: 23.78 inches (604 mm)
Front modules	• Up to 12 server modules (blades) per shelf • Two power supply modules per shelf • One front indicator LED module (FIM) per shelf • Two front fan modules located in power supply per shelf
Rear modules	• Up to 24 PCI ExpressModules (2 per server module) per shelf • Up to two NEMs per shelf • One chassis management module (CMM) per shelf • Eight high-performance fan modules to cool the server modules per shelf
System Management	Chassis management module (CMM) provides: • Connection to the system-wide management network • 10/100/1000BASE-T external connections • Serial port access to CMM • Sun Integrated Lights Out Manager (ILOM) firmware

1.6 Reliability, Availability, and Serviceability Features

The Sun Blade 6048 modular system includes many server module-centric and chassis-wide features that increase reliability, availability, and serviceability (RAS). These RAS features are aspects of a system's design that affect its ability to operate continuously and to minimize the time necessary to service the system. Reliability

refers to the system's ability to operate continuously without failures and to maintain data integrity. Availability refers to the ability of the system to recover to an operational state after a failure, with minimal impact.

Serviceability relates to the time it takes to restore a system to service following a component failure. Together, the RAS features of the Sun Blade 6048 modular system provide for near continuous operation.

This section includes the following topics:

- Section 1.6.1, "Hot-Pluggable Components" on page 1-13
- Section 1.6.2, "Hot-Swappable Components" on page 1-13
- Section 1.6.3, "Redundant Components" on page 1-14
- Section 1.6.4, "Environmental Monitoring" on page 1-14
- Section 1.6.5, "RAS Features Summary" on page 1-15
- Section 1.6.6, "LED Indicators and Buttons" on page 1-16

1.6.1 Hot-Pluggable Components

Sun Blade 6048 modular system hardware supports hot-plugging of the chassis-mounted server modules (blades). Using the proper software commands, you can install or remove these components while the system is running. Hot-plug technology significantly increases the system's serviceability and availability by providing the ability to replace these components without service disruption.

Refer your server module documentation for information about software commands for hot-pluggable components.

1.6.2 Hot-Swappable Components

Sun Blade 6048 modular system hardware supports hot-swapping of the network express modules (NEMs), PCI ExpressModules (PCI EMs), chassis management module (CMM), both front and rear fan modules, and power supply modules. You can install or remove these components while the system is running, without using any software commands.

1.6.3 Redundant Components

The Sun Blade 6048 modular system provides redundant components that enable the system to continue operations if one of the associated components fails. This separation of functions minimizes the impact of component problems and servicing.

The redundant components include the following:

- Power supply units
- System fans (front and rear)

The following modules might be redundant, depending on the system configuration:

- Server modules
- PCI ExpressModules
- Network express modules

1.6.4 Environmental Monitoring

The Sun Blade 6048 modular system features an environmental monitoring subsystem designed to protect components against the following:

- Extreme temperatures
- Lack of adequate airflow throughout the system
- Power supply failures
- Hardware faults

Temperature sensors located throughout the system monitor the ambient temperature of the chassis and internal components. The software and hardware ensure that the temperatures within the chassis do not exceed predetermined safe operating ranges. If the temperature observed by a sensor falls below or rises above a set threshold, the monitoring software subsystem lights the amber Service Required indicators on the front and back of the system. If the temperature condition persists and reaches a critical threshold, the system might initiate a graceful system shutdown. See Section 1.6.6, "LED Indicators and Buttons" on page 1-16 for more information about the system LEDs.

All error and warning messages are sent to the chassis management module (CMM), and are logged in the Sun ILOM log file. Additionally, some customer-replaceable units (CRUs), such as power supplies and fans, provide LEDs that indicate a failure within the CRU. See Section 2.3.1, "Chassis Shelf Faults" on page 2-11 for more information about chassis fault LEDs.

1.6.5 RAS Features Summary

TABLE 1-6 RAS Features Summary

Feature	Description
Power supplies	Hot-swappable; redundant; integrated into the chassis, making the server modules more reliable.
Airflow and cooling	Fans are integrated into the chassis: • Two hot-swappable front fan modules (located within the power supply) cool the PCI-EMs, NEMs, and power supplies. • Eight hot-swappable rear fan modules cool the server modules.
Server modules (blades)	Hot-pluggable; servicing can be done without affecting cabling or I/O configuration.
I/O modules	Hot-swappable network express modules and PCI ExpressModules.
Chassis management module	Hot-swappable; standby operation.
CMM ILOM and system management	Intelligent per-blade and chassis-wide management functions; CMM ILOM continues to function when the operating system goes offline or the system is powered off.
Hardware upgrades	No tools required to access user-upgradeable modules.
Power-on and restart	Automatic server restart; network-based booting capability.
Troubleshooting	Troubleshooting includes: • Environmental monitoring • Rapid response lighting • Service LED indicators • System error logging, including logging to the system event log (SEL)

1.6.6 LED Indicators and Buttons

The Sun Blade 6048 chassis system indicators follow the ANSI Vita 40-2003 Status Indicator Standard as well as Sun Microsystems Service Indicator Application Guidelines.

There are three types of indicators for chassis components: Normal (green), Fault (amber), and Locate (white), although not every customer-replaceable unit (CRU) will have all indicator types. The subset of indicators and functionality chosen for each component depends on what is appropriate for a given CRU.

See the documentation for the server modules for information about server module LEDs.

TABLE 1-7 summarizes all service indicators and their modes in the Sun Blade 6048 system. The indicators on the CMM are the same as the chassis service indicators. The slow-blink amber function for the PCI Express Modules is a Locate function that is specified by the PCI ExpressModule standard.

The LED states are displayed as follows:

- Steady on
- Off
- Slow blink: Blinks once per second
- Fast blink: Blinks four times per second
- Standby: Turns on for 100 ms and off for 2900 ms

TABLE 1-7 LED Indicators

Indicator	Color	State	CMM	PCI EM	Rear Fan	Front Fan	Power Supply
OK (Normal)	Green	Off	X	X			X
		Standby	X				
		On	X	X		X	X
Fault	Amber	Off	X	X	X	X	X
		Slow Blink	X	X			
		On		X	X	X	X
Locate	White	Off	X				
		Fast blink	X				

TABLE 1-8 shows the functions of the system LEDs and buttons.

TABLE 1-8 LED and Button Descriptions

Button or Indicator	Color	Description
Locator indicator (chassis)	White	This LED provides the following indications: • **Fast Blink**: Helps you locate a specific system in a data center. • **Off**: Normal operating state. You can illuminate the Locator indicator either by executing a software command on the CMM, or by momentarily pressing the associated Locator button that is integrated with the LED.
Locator button (chassis)	n/a	This button provides the following function: • **Quick press**: Lights the Locator indicator.
Fault (Service Action Required) indicator (chassis, rear fans, power supplies, front fans, and PCI EMs)	Amber	This LED provides the following indications: • **Steady on or slow blink:** indicates that the component, or a component that a module contains, is broken and needs to be replaced. On the FIM or CMM, this LED provides a summary of all other Service Action Required FRU and CRU indicators in the chassis. It remains steady on as long as any Service Action Required indicator on any FRU or CRU in the chassis is lit in either a slow blink or steady on state. • **Off:** Service is not required.

TABLE 1-8   LED and Button Descriptions *(Continued)*

Button or Indicator	Color	Description
OK indicator (chassis, power supplies, CMM, and PCI EMs)	Green	This LED provides the following indications: • **Standby blink** – Indicates that the unit is being managed. The unit is not operational, but it is ready to be activated. On the FIM or CMM, this LED indicates that the CMM has begun initialization. When the CMM has completed its initialization and has begun to actively manage the chassis, the OK indicator changes to the standby blink state. At this state, only the chassis summary indicators and CMM indicators are active. • **Steady on** – Indicates that the unit is operating normally. • **Off** – Remains off before the chassis has powered on and before the chassis has reached the standby blink state.
Locator indicator (chassis)	White	This LED provides the following indications: • **Fast blink** – Helps you locate a specific system in a data center. • **Off** – Normal operating state. You can illuminate the Locator indicator either by executing a software command on the CMM, or by momentarily pressing the associated Locator button that is integrated with the LED.
DC-OK (power supply module)	Green	Located on the power supply module, this LED indicates whether the current and voltage for the power supply module is within accepted. • **Steady** – Voltage, temperature, and current for the power supply module are within the accepted range. • **Off** – Indicates that there is a fault with the power supply module.
Ethernet link activity (CMM)	Green	Located on the CMM, this LED provides these indications: • **Steady on** – Lights when external Ethernet connection is active. • **Off** – Indicates that there is no external Ethernet connection.

1.7 Upgraded Chassis

An updated chassis is now available for the Sun Blade 6048 modular system. This chassis enables installation of the Sun Blade cooling doors and contains a PCIe 2.0 compatible midplane.

You can identify the updated chassis in two ways:

■ The updated chassis has air baffles installed on the top and bottom of the chassis. FIGURE 1-6 shows the location of the top and bottom air baffles.

FIGURE 1-6   Air Baffles on Updated Chassis

Chassis air baffles
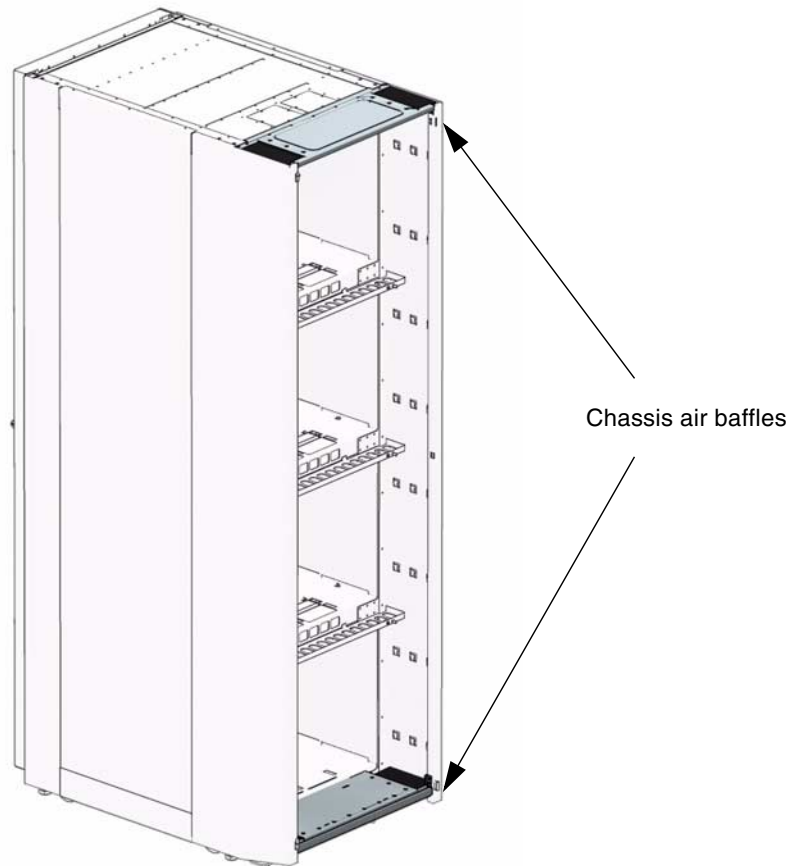
■ You can use the chassis CMM to identify the chassis part number with one of the following methods:

▼ View Component Information Using the CLI

1. Log in to the ILOM CLI as an Administrator or Operator.

2. At the command prompt, type:

```
-> show /CH
```

The chassis manufacturing part number will be displayed in the product_part_number field.

- If the part number is 594-5971, you have the upgraded chassis.
- If the part number is 594-5110, you have the previous version of the chassis.

▼ View Component Information Using the Web Interface

1. Log in to the ILOM web interface as an Administrator or Operator.

2. Select System Information --> Components.

The Component Management page appears.

3. Click on /CH in the Component Management Status table.

A dialog box appears with information about the chassis.

The chassis manufacturing part number will be displayed in the product_part_number field.

- If the part number is 594-5971, you have the upgraded chassis.
- If the part number is 594-5110, you have the previous version of the chassis.

Fault Management

This chapter contains information about the following topics related to fault management on the Sun Blade 6048 modular system.

2.1 About Fault Management

The fault management software of the Sun Blade 6048 modular system monitors hardware health and diagnoses and reports hardware failures on system components. Fault management also monitors environmental conditions and reports when the systems environment is outside acceptable parameters. Various sensors on the system chassis shelf, the power supplies (PSUs), server modules, and fans are continuously monitored. When a sensor registers a problem, the fault management software, which runs on the chassis management module (CMM), is notified.

Fault management then diagnoses the problem. If it determines that a hardware or environmental failure has occurred, fault management lights the Service Action Required LED on the affected component. The ILOM management interfaces are updated to reflect the failure (the fault), and the failure is recorded as a fault in the event log.

Note – The Sun Blade 6048 modular system's fault management software is entirely unrelated to Solaris Fault Management Architecture (FMA). Fault management is part of the system management software and does not interact with the server module hosts or their operating systems.

2.1.1 External Compared With Internal Faults

When a system component experiences a hardware failure, it is called an internal fault; that is, the fault is the result of a problem with the hardware of the Sun Blade 6048 modular system itself. Internal faults are cleared when a repair action takes place, most likely the replacement of the failed component.

There are some faults, however, that are external faults. In these cases, the system hardware has not failed, but a condition external to the system is causing a potential problem. If, for example, the ambient air temperature (external to the chassis) exceeds a certain threshold, it is a fault because it can adversely affect the operation of the system if not corrected. External faults are autoclearing; they are cleared when the external condition no longer exists. Nonetheless, an external fault can, if not attended to, cause components or the system as a whole to shut down.

2.1.2 Components Monitored by Fault Management

Fault management monitors the following system component.

TABLE 2-1 Component Fault Management

System Component	Refer to This Section
System chassis shelf	Section 2.3.1, "Chassis Shelf Faults" on page 2-11
Power supply units (PSUs)	Section 2.3.2, "Power Supply Module Faults" on page 2-13
Front fans (within power supply modules)	Section 2.3.2, "Power Supply Module Faults" on page 2-13
Rear Fans	Section 2.3.3, "Rear Fan Faults" on page 2-18

Note – For information about faults for other system components such as NEMs, PCI EMs, and blades, refer to the documentation for that component.

2.2 Monitoring Faults

There are three ways to tell when a fault has occurred somewhere in the system:

- The amber Service Action Required LEDs on the failed component and on the system chassis shelf are illuminated (see Section 2.2.1, "Monitoring the Service Action Required LEDs" on page 2-3).

- Component status information, available through the ILOM web interface and CLI, registers that the component is in a faulted state (see Section 2.2.2, "Monitoring Faults From the Management Interfaces" on page 2-4).

- The fault is recorded in the system event log (see Section 2.2.3, "Monitoring the Event Log" on page 2-7).

2.2.1 Monitoring the Service Action Required LEDs

When a component experiences a hardware failure (enters a fault state), fault management illuminates the Service Action Required (amber) LED on that component. In addition, fault management illuminates the Service Action Required LEDs on the system chassis shelf (both front and back) when any system component is in a faulted state.

2.2.1.1 When Service Action Required LEDs Are Turned Off

Since a Service Action Required LED indicates a hardware failure, it remains illuminated until fault management detects that the failed hardware has been replaced or repaired. The chassis shelf Service Action Required LEDs, which serve as summary indicators for all component faults, remain illuminated as long as any system component remains in a faulted state.

2.2.1.2 When Only the Chassis Shelf LEDs Are Lit

If the chassis Service Action Required LEDs are illuminated but no other system component has a lit Service Action Required LED, then fault management has diagnosed an external fault: a problem outside the system that potentially affects the system as a whole. For example, if the external ambient air temperature exceeds 45º C, a fault is declared and the system shuts down although there is nothing physically wrong with any system hardware.

Refer to Section 2.3.1, "Chassis Shelf Faults" on page 2-11 for information about the external conditions that can cause these chassis faults.

2.2.1.3 About Power Supply Faults

The power supply units (PSUs) are a special case; they monitor their own fault status and control their own Service Action Required LEDs. The fault management software cannot turn the PSU LEDs on or off. However, because fault management is monitoring sensors on the PSUs, it is notified when a PSU fault occurs. Fault management illuminates the chassis shelf Service Action Required LEDs and notes the fault occurrence in the ILOM management interfaces and in the event log.

Note that it is possible for a PSU to extinguish its Service Action Required LED (declare that the fault is cleared), but for fault management to continue to assert that the PSU is still in a faulted state. If this happens, the ILOM management interfaces, the chassis shelf Service Action Required LEDs, and the event log reflect that the faulted state is ongoing.

Refer to Section 2.3.2, "Power Supply Module Faults" on page 2-13 for more information.

2.2.2 Monitoring Faults From the Management Interfaces

You can monitor chassis shelf and component faults from the ILOM CLI or the web interface.

Note – Refer to the *Sun Integrated Lights Out Manager 2.0 User's Guide* for information about the object namespace and how to identify the targets and properties that might pertain to faults.

- Section 2.2.2.1, "Obtaining Sensor Readings Using the CLI" on page 2-4
- Section 2.2.2.2, "Obtaining Sensor Readings Using the Web Interface" on page 2-5

2.2.2.1 Obtaining Sensor Readings Using the CLI

To obtain sensor readings using the CLI:

1. **Establish a local serial console connection or SSH connection to the CMM, and log in to the ILOM.**

2. **Issue the appropriate** show **command to display information about system components.**

For example, if a power-supply AC-1 light is lit, you would issue the following command:

```
> show /CH/PS0/S1/AC_FAIL

 /CH/PS0/S1/AC_FAIL
    Targets:

    Properties:
        type = Voltage
        class = Discrete Sensor
        value = Predictive Failure Asserted

    Commands:
        cd
        show
```

The `value = Predictive Failure Asserted` shows the faulted power supply. Since one of the power supplies in power supply module 0 has failed, the entire power supply module will need to be replaced.

2.2.2.2 Obtaining Sensor Readings Using the Web Interface

In the ILOM web interface, you can obtain instantaneous sensor readings about system FRUs (field-replaceable units) or other system inventory on the System Monitoring -> Sensor Readings page.

To obtain sensor readings from the ILOM web interface:

1. **Open a web browser, and type the IP address of the server SP or CMM.**

   The Login page for the ILOM web interface appears.

2. **In the ILOM Login page, enter a user name and password, and then click OK.**

   The ILOM web interface appears.

3. **In the web interface page, click System Monitoring -> Sensors Readings.**

   The Sensor Readings page appears.

FIGURE 2-1   Sensor Readings Page

Note – If the server is powered off, many components will appear as "no reading."

4. **In the Sensor Readings page, do the following:**

   a. **Locate the name of the sensor you want to view.**

   b. **Click the name of the sensor to view the property values associated with that sensor.**

For specific details about the type of discrete sensor targets you can access, as well as the paths to access them, consult the user documentation provided with the Sun server platform.

2.2.3 Monitoring the Event Log

Faults are recorded in the system event log, which can be viewed from the ILOM CLI or web interface.

- "Viewing or Clearing the ILOM Event Log Using the CLI" on page 2-7
- "Viewing or Clearing the ILOM Event Log Using the Web Interface" on page 2-9

2.2.3.1 Viewing or Clearing the ILOM Event Log Using the CLI

To view or clear events in the system event log using the ILOM CLI:

1. **Establish a local serial console connection or SSH connection to the CMM, and log in to the ILOM.**

2. **Type the following command paths to set the working directory:**

```
cd /CMM/logs/event
```

3. **Type the following command path to display the event log list.**

```
show list
```

The contents of the event log appears. An example follows.

```
ID      Date/Time                  Class      Type      Severity
-----   ------------------------   --------   --------   --------
50611   Wed Aug 15 16:55:56 2007   Audit      Log        minor
        root : Open Session : object = /session/type : value = shell
: success
50610   Wed Aug 15 16:44:44 2007   Audit      Log        minor
        root : Open Session : object = /session/type : value = shell
: success
50609   Tue Aug 14 18:03:45 2007   Audit      Log        minor
```

4. **In the event log, perform any of the following tasks:**

   - **Scroll down the list to view entries.** Press any key except q. The following table provides descriptions of the columns that appear in the log.

Column Label	Description
Event ID	The number of the event, in sequence from number 1.
Date/Time	The day and time the event occurred. If the Network Time Protocol (NTP) server is enabled to set the ILOM time, the ILOM clock will use Universal Coordinated Time (UTC).
Class/Type	• Audit/ Log: Commands that result in a configuration change. Description includes user, command, command parameters, and success or fail. • IPMI/Log: Any event that is placed in the IPMI SEL is also put in the management log. • Chassis/State: For changes to the inventory and general system state. • Chassis/Action: Category for shutdown events for server module or chassis, hot insert or removal of a FRU, and Reset Parameters button pushed. • FMA/Fault: For Fault Management Architecture (FMA) faults. Description gives time of fault as detected by FMA and suspect component. • FMA/Repair: For FMA repairs. Description gives component.
Severity	Critical, Major, or Minor
Description	A description of the event.

- **Dismiss the event log (stop displaying the log).** Press the q key.
- **Clear entries in the event log.** Perform these steps:

a. **Type set clear=true**

   A confirmation message appears.

b. **Type one of the following:**

   - To clear the entries, type **y**.
   - To cancel clearing the log, type **n**.

Note – The ILOM event log accumulates many types of events, including copies of IPMI entries. Clearing the ILOM event log clears all entries in the log, including the IPMI entries. However, clearing the ILOM event log entries does not clear the actual entries posted directly to an IPMI log.

2.2.3.2 Viewing or Clearing the ILOM Event Log Using the Web Interface

To view or clear events in the ILOM event log using the ILOM web interface:

1. **Open a web browser, and type the IP address of the server CMM.**

   The Login page for the ILOM web interface appears.

2. **In the ILOM Login page, enter a user name and password, and then click OK.**

   The ILOM web interface appears.

3. **In the web interface page, select System Monitoring -> Event Logs.**

   The Event Log page appears.

FIGURE 2-2 ILOM Web Interface Event Log
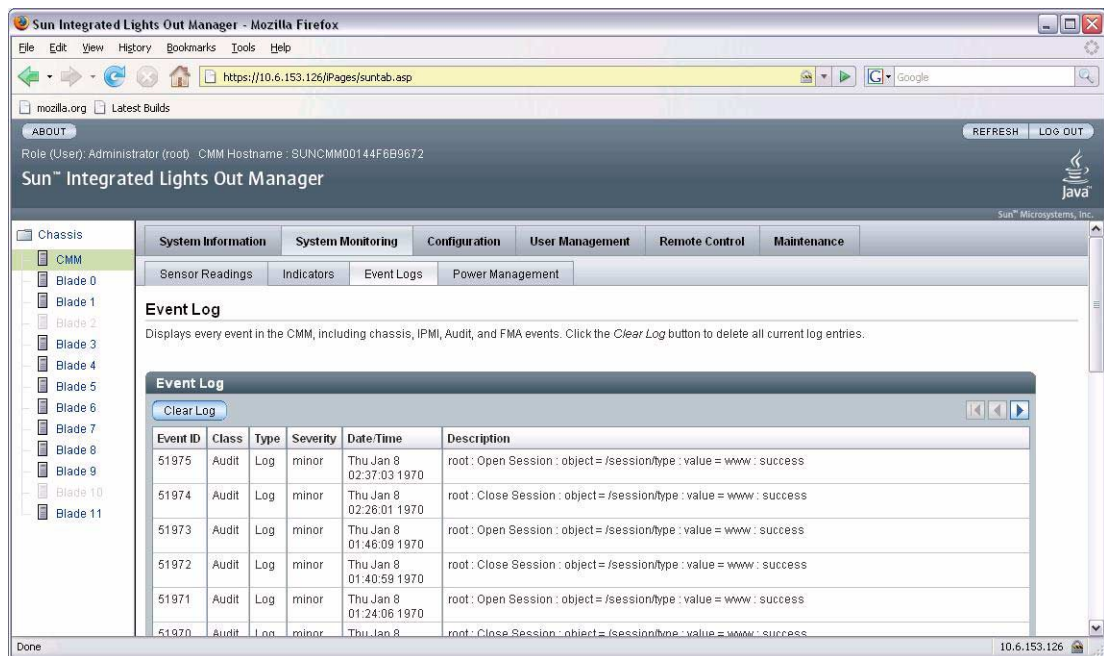
4. **In the Event Log page, perform any of the following:**
   - **Page through entries:** Use the page navigation controls at the top and the bottom of the table to navigate forward and backward through the available data in the table.

     Note that selecting a larger number of entries might cause the web interface to respond more slowly than selecting a smaller number of entries.

■ **View the entries in the display by scrolling through the list**: The following
table provides descriptions of the columns that appear in the log.

Column Label	Description
Event ID	The number of the event, in sequence from number 1.
Date/Time	The day and time the event occurred. If the Network Time Protocol (NTP) server is enabled to set the ILOM time, the ILOM clock will use Universal Coordinated Time (UTC).
Class/Type	• Audit/ Log: Commands that result in a configuration change. Description includes user, command, command parameters, and success or fail. • IPMI/Log: Any event that is placed in the IPMI SEL is also put in the management log. • Chassis/State: For changes to the inventory and general system state. • Chassis/Action: Category for shutdown events for server module or chassis, hot insert or removal of a FRU, and Reset Parameters button pushed. • FMA/Fault: For Fault Management Architecture (FMA) faults. Description gives time of fault as detected by FMA and suspect component. • FMA/Repair: For FMA repairs. Description gives component.
Severity	Critical, Major, or Minor
Description	A description of the event.

■ **Clear the event log** – To clear the event log, click the Clear Event Log button.
A confirmation dialog box appears. In the confirmation dialog box, click OK to
clear the entries.

Note – The ILOM event log accumulates many types of events, including copies of
IPMI entries. Clearing the ILOM event log clears all entries in the log, including the
IPMI entries. However, clearing the ILOM event log entries does not clear the actual
entries posted directly to an IPMI log.

2.3 Determining That Hardware Has Failed

When a hardware failure occurs, the following actions take place:

- One of the following fault LEDs are illuminated:
  - The amber Service Action Required LED is illuminated on the failed component, and the chassis shelf Service Action Required LEDs (both front and back) are illuminated.
  - The Temperature Fail LED is illuminated on the chassis shelf, showing that the ambient temperature for the chassis shelf has moved above an acceptable range.

    The chassis shelf Service Action Required LEDs serve as summary indicators, notifying you that a hardware failure has occurred on one (or more) of the components in the chassis shelf.

- The sensor information in the CMM ILOM identifies which component has experienced a hardware failure. The following topics in this section describe the fault sensors that are activated with component faults.

- The fault associated with the hardware failure is recorded in the system event log.

  See Section 2.2.3, "Monitoring the Event Log" on page 2-7 or the *Sun Integrated Lights Out Manager 2.0 User's Guide* for more information about reading component sensors and the event log.

The following sections contain further details on identifying faults in the system or specific components:

- Section 2.3.1, "Chassis Shelf Faults" on page 2-11
- Section 2.3.2, "Power Supply Module Faults" on page 2-13
- Section 2.3.3, "Rear Fan Faults" on page 2-18

2.3.1 Chassis Shelf Faults

Chassis shelf faults are external faults: There is no hardware failure, but an external condition exists that can adversely affect the operation of the system. Because they are external, chassis shelf faults are auto-clearing; when fault management detects that the external condition has returned to within normal parameters, it clears the fault.

A fault is declared, and the chassis shelf Temperature Fail LEDs are illuminated when the external condition represents a potential hazard to the system. It is possible for an external fault to force a shutdown of the entire system.

The Chassis Shelf Service Action Required LED also lights when there is a fault on a chassis shelf component.

2.3.1.1 Chassis Shelf LED Locations

FIGURE 2-3 and FIGURE 2-4 show the location of the LEDs on the front and rear of the chassis.

FIGURE 2-3 Front Chassis Shelf Fault Indicators
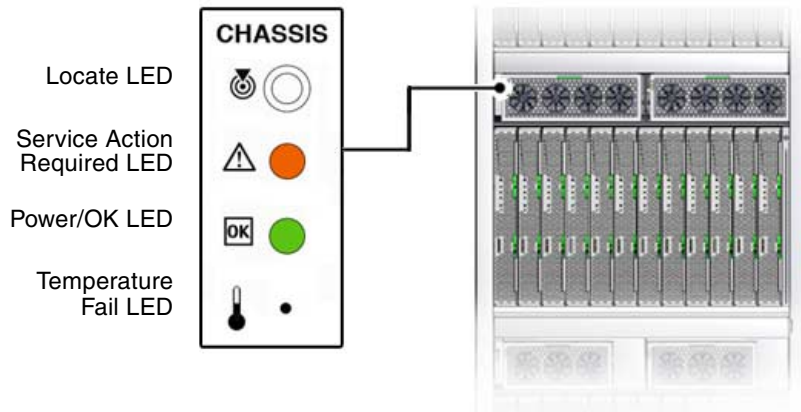
FIGURE 2-4 Rear Chassis Shelf Fault Indicators
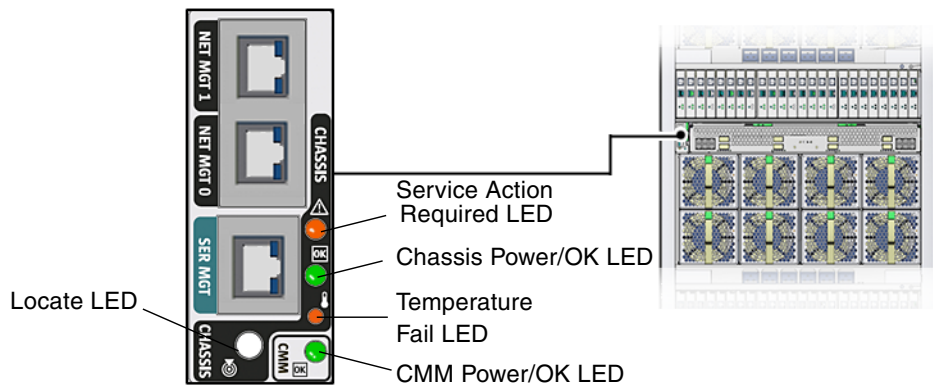
2.3.1.2 Checking Other LEDs

If the Service Action Required LED is lit on the FIM or CMM, check the indicators on the power supplies and fan modules to see if one of these is also lit. Refer to the following sections for more information.

- Section 2.3.2, "Power Supply Module Faults" on page 2-13
- Section 2.3.3, "Rear Fan Faults" on page 2-18

If a blade Service Action Required LED is lit, refer to the blade documentation for servicing the blade.

2.3.1.3 Viewing Chassis Shelf Faults in ILOM

The chassis shelf Temperature Fail LED light turns on when at least one of the ambient temperature sensors in the power supply modules reaches 40° C, and shuts down the chassis shelf when the temperature reaches 45° C. See TABLE 2-3 for information about viewing this sensor information.

See the *Sun Integrated Lights Out Manager 2.0 User's Guide* for more information about reading this and other chassis shelf sensors.

2.3.2 Power Supply Module Faults

There are three power supplies located within each power supply module. The AC-0 LED corresponds to power supply 0 within the power supply module, AC-1 corresponds to power supply 1, and AC-2 corresponds to power supply 2.

If you do not need the full 8400W of power from the power supplies, you can connect only two of the total three plugs to the AC0 and AC1 connectors for each power supply. Do not connect AC2.

When only two of the available three plugs is connected to the power supplies, 5600 W of power will be supplied to the chassis. The LEDs and ILOM will show different readings than for the three power cord connections. See the notes in the following sections for the differences in configurations.

2.3.2.1 Power Supply LED Locations

9000W Power Supply LED Location

PSU Service LED

DC LED

AC-2 LED

AC-1 LED

AC-0 LED

Front Fan Service LED
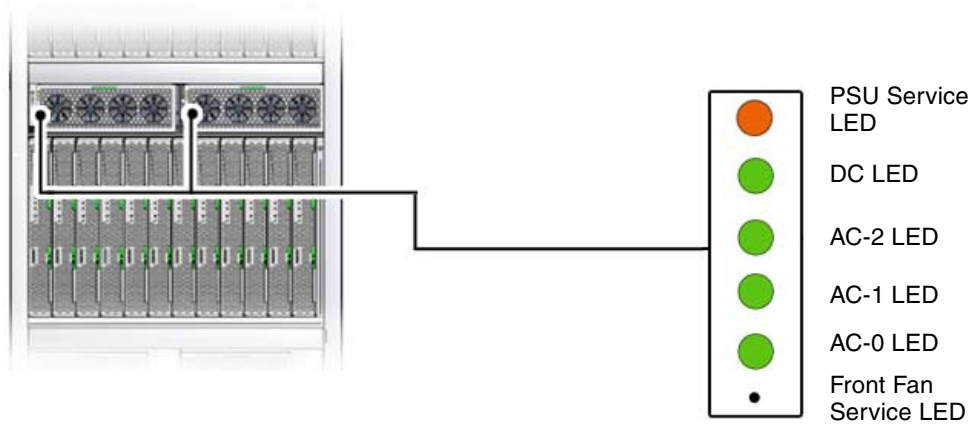
2.3.2.2 Power Supply Fault LED Functions

TABLE 2-2 shows the operation of the LEDs during normal operation or when a fault has occurred. Refer to the appropriate sensor table to find the location of the fault in the ILOM CLI.

TABLE 2-2 Power Supply Fault LED Functions

Condition	AC-0 LED (Green)	AC-1 LED (Green)	AC-2 LED (Green)	DC LED (Green)	PSU Service LED (Amber)	Fan Service LED (Amber)	Sensor Table
Normal operation (3 cord configuration)	On	On	On	On	Off	Off	n/a
Normal operation (2 cord configuration)	On	On	Off	Off	On	Off	See Appendix A
Over current, over voltage, or over temperature warning fault	On	On	On	Off	On	Off	TABLE 2-4
AC 0 failed	Off	On	On	Off	Off	Off	TABLE 2-4
AC 1 failed	On	Off	On	Off	Off	Off	TABLE 2-4
AC 2 failed	On	On	Off	Off	Off	Off	TABLE 2-4
Front fan failed	On	On	On	On	Off	On	TABLE 2-5

2.3.2.3 Viewing Power Supply Faults in ILOM

If the power supply module LEDs indicate that a power supply or front fan failure has occurred, you can verify the fault by viewing the appropriate sensor through the ILOM CLI. See the *Sun Integrated Lights Out 2.0 Manager User's Guide* and Appendix A for details on locating and reading the sensors in the ILOM.

Note – In the tables below, the variable *n* represents one of the following values: power supply module 0 (PS0), power supply module 1 (PS1), 12V output 0 (S0), 12V output 1 (S1), or 12V output 1 (S2). For example, /CH/PS0/S1 represents 12 V output 1 located within power supply module 0.

Unless noted otherwise, the sensors shown in the following tables will display the following value if a fault has occurred:

```
value = Predictive Failure Asserted
```

Note – If you are using two power cords per power supply, the ILOM readings will be different. Refer to Section A.2, "ILOM Behavior With Two Power Cord Configuration" on page A-5 for more information.

TABLE 2-3   Power Supply Module Warnings

Fault Type	CLI Path to Sensor
Power supply input lost or out of range. Possible values are: • Presence detected • Power supply failure detected • Predictive failure • Power supply input lost (AC/DC) • Power supply input lost or out of range • Power supply input out of range, but present	/CH/PS*n*/STATUS
This sensor shows the ambient temperature of the power supply. The CMM LED turns on when ambient reaches 40º C, and the chassis shelf shuts down when the temperature reaches 45º C.	/CH/PS*n*/T_AMB
12V_*n* output current exceeds 240A for 100 msec.	/CH/PS*n*/S*n*/I+12V_WARN
Ambient temperature reaches the following range: 50º–60º C.	/CH/PS*n*/T_AMB_WARN

TABLE 2-4   Power Supply Module Faults

Fault Type	CLI Path to Sensor
Power supply has failed.	/CH/PS*n*/S*n*/AcFAIL
Ambient temperature reaches the following range: 65º–75ºC. This sensor causes the power supply to shut down.	/CH/PS*n*/T_AMB_FAULT
12V power output has exceeded 14V for more than 400 milliseconds.	/CH/PS*n*/S*n*/V+12V_FAULT

TABLE 2-4 Power Supply Module Faults

Fault Type	CLI Path to Sensor
3V power output reaches the following range: 3.7–4.3V.	/CH/PS*n*/V+3_3V_FAULT
12V_*n* output current exceeds 240 amps for more than 60 seconds, or 12V_*n* output current exceeds 275A for 20 msec.	/CH/PS*n*/S*n*/I+12V_FAULT
3.3V output current exceeds 13A for more than 20 msec.	/CH/PS*n*/I+3_3V_Fault

TABLE 2-5 Front Fan Faults

Fault Type	CLI Path to Sensor
Front fan has failed.	/CH/PS*n*/FAN_FAIL

2.3.3 Rear Fan Faults

The Sun Blade 6048 chassis shelf contains six rear fans.

2.3.3.1 Rear Fan LED Location

FIGURE 2-6 Rear Fan LED Location

Fan
Service
Action
Required
LED
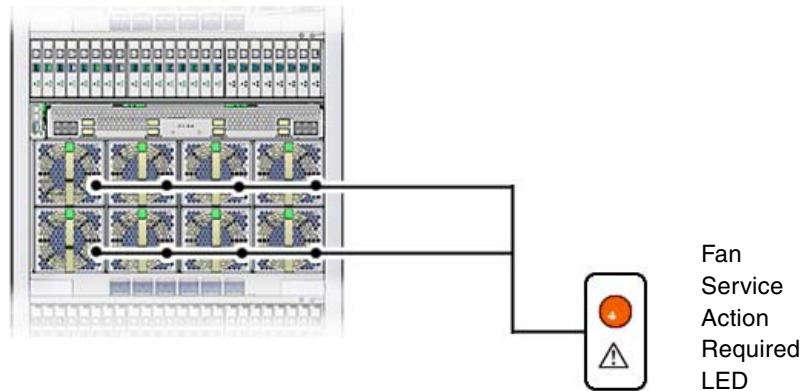
2.3.3.2 Rear Fan Fault LED Functions

The rear fan fault LEDs indicate when a failure has occurred on a fan module. The source of the failure could be mechanical, electrical, or the result of a midplane controller failure.

2.3.3.3 Viewing Rear Fan Faults in ILOM

Use the following command to view the sensor for a rear fan fault:

```
show /CH/FMn/FAIL
```

The variable *n* represents the fan module number. For example, /CH/FM1/FAIL indicates a fan failure in fan module 1.

See the *Sun Integrated Lights Out Manager 2.0 User's Guide* and Appendix A for more information about reading this and other rear fan sensors.

2.4 Replacing a Faulted Component

When a fault indicates a hardware failure, the recommended method for clearing the fault is to replace the failed component.

To replace a failed component:

1. **Determine which system component has experienced a hardware failure.**

   Look at the Service Action Required LEDs and the event log to get information about the component failure.

   See Section 2.3, "Determining That Hardware Has Failed" on page 2-11.

2. **Remove and replace the failed component.**

   Refer to the instructions in Chapter 4.

3. **Monitor the component LEDs to confirm that the fault is cleared.**

Preparing for Service

This chapter contains information on preparing to service the Sun Blade 6048 modular system.

The following sections are in this chapter:

3.1 About Replaceable Components

The Sun Blade 6048 modular system is designed for ease of use by both customers and authorized service personnel. All components in the Sun Blade 6048 modular system are removable and serviceable by a single person. Most components are customer-replaceable units (CRUs); however, some components are field-replaceable units (FRUs), which must be removed and installed only by authorized Sun service personnel. See Section 3.1.4, "CRU Features" on page 3-3 and Section 3.1.5, "FRU Features" on page 3-4 to determine which components are CRUs and which components are FRUs.

When a component fails, its associated amber Service Action Required LED indicator lights. See Section 3.1.2, "Diagnosing and Detecting Component Faults" on page 3-2.

The Sun Blade 6048 modular system is designed with a midplane to which various replaceable units are installed from the front and rear of the chassis.

Components that are hot-pluggable and hot-swappable do not require tools for removal or replacement. When you replace a component, an indicator light goes on or an audible click sounds so that you know the component is properly installed. For

a list of hot-pluggable and hot-swappable components and those components that require the system or associated module to be powered off, see Section 3.1.3, "Hot-Swappable and Hot-Pluggable Components" on page 3-3.

3.1.1 Accessing Component Information

You can use the CMM ILOM CLI interface or web interface to access information about some components installed in the chassis. In general, this applies to any component with a FRU ID, or present or not-present indicators. For more information about accessing component information, see the *Sun Integrated Lights Out Manager 2.0 User's Guide*.

You can view the following component information:

- Part number
- Revision level
- Serial number
- Any fault data associated with the component

Component information is accessible even when the component itself is powered off. When you remove or replace a component, the management interfaces report and log the change in the component inventory within 10 seconds.

3.1.2 Diagnosing and Detecting Component Faults

The Sun Blade 6048 modular system uses fault-management software to monitor hardware health and to diagnose and report hardware failures on system components. When a sensor on the system chassis, power supplies, or fans registers a problem, the fault management software diagnoses the problem, and if it determines that a hardware failure has occurred, the software lights the component's Service Action Required LED. The ILOM management interfaces are also updated to reflect the hardware failure, and the failure is recorded as a fault in the event log. For further information about the fault management software and how to monitor faults, see Chapter 2.

3.1.3 Hot-Swappable and Hot-Pluggable Components

Within the Sun Blade 6048 modular system, most customer-replaceable units (CRUs) and field-replaceable units (FRUs) are hot-swappable, and some components are hot-pluggable. Both hot-swappable and hot-pluggable components can be removed and installed while the system is running, without affecting the rest of the system's operations. However, for hot-pluggable components, you must prepare the operating system prior to the hot-plug procedure by performing certain system administration tasks.

The system continues to operate normally during a hot-swap or hot-plug operation of redundant components. However there are constraints as to the period of time you can perform removal and replacement of certain components. Refer to specific service procedures for that information.

3.1.4 CRU Features

CRUs are components that customers can replace on-site, without the assistance of authorized service personnel. The following table describes the components, and indicates whether they are hot-swappable or hot-pluggable.

TABLE 3-1 CRU Features

CRU	Description	Hot-swap or Hot-plug?
Server modules (blades)	Installed from the front, the server modules contain the core CPU and memory subsystem. The server modules also contain the PCI Express I/O connectivity to the NEMs and PCI EMs.	Hot-plug
Power supply modules	Installed from the front, the chassis supports two power supply modules. Each power supply module provides approximately 2800W at 12V to power the server modules, NEMs, and PCI EMs. The power supply modules also provide 3.3V standby power to power the system controller.	Hot-swap
Front fan modules	Installed from the front, the front fan modules are located within the power supply modules. These fans cool the power supplies, NEMs, and PCI EMs.	Hot-swap
Front indicator module (FIM)	Installed from the front, this module provides LEDs to indicate chassis activity.	Hot-swap
Chassis management module (CMM)	Installed from the rear, the chassis accommodates a CMM in a standby configuration. The CMM provides partial chassis-management functions.	Hot-swap

TABLE 3-1   CRU Features *(Continued)*

CRU	Description	Hot-swap or Hot-plug?
Network express modules (NEMs)	Installed from the rear, the chassis supports up to two NEMs. The initial NEMs installed in the Sun Blade 6048 are switchless NEMs that provide a dual Gigabit NIC for each server module, with up to 20 RJ-45 interfaces at the chassis rear.	Hot-swap
PCI ExpressModules (PCI EMs)	Installed from the rear, the chassis holds up to 20 PCI EMs. The PCI EMs provide dedicated I/O on a per-server module basis. Each server module connects through PCI Express to two PCI EMs. The PCI EMs are hot-pluggable under direct control of the server module hardware and software.	Hot-plug
Rear fan modules	Installed from the rear, the chassis provides six fan modules that cool the server modules.	Hot-swap
Rear fan boards	Installed from the rear, the rear fan boards connect the fans to the midplane. There is one fan board for every two rear fan modules.	N/A

3.1.5   FRU Features

FRUs are components that must be removed and replaced only by authorized Sun service personnel. These components are neither hot-swappable or hot-pluggable. The system must be powered off before you replace the components.

TABLE 3-2   FRU Features

FRU	Description	Hot-swap or Hot-plug?
Midplane	Installed from the front. You must remove all system modules, fan connector boards, and the midplane air baffle before you remove or install the midplane.	N/A

3.2 Locating Front and Rear Components

FIGURE 3-1 shows the front components and FIGURE 3-2 shows the rear components on the Sun Blade 6048 chassis. Internal components that are not visible in the illustrations are in the following locations:

- Front fan modules (x2): Within the power supplies
- Rear fan boards (x3): Behind the fan modules (one per every two fan modules)
- Midplane: In the center of the chassis
- Internal power cables: Run from the power supplies in the front of the chassis to the power connections in the rear of the chassis

FIGURE 3-1 Front View of Sun Blade Modular System Chassis
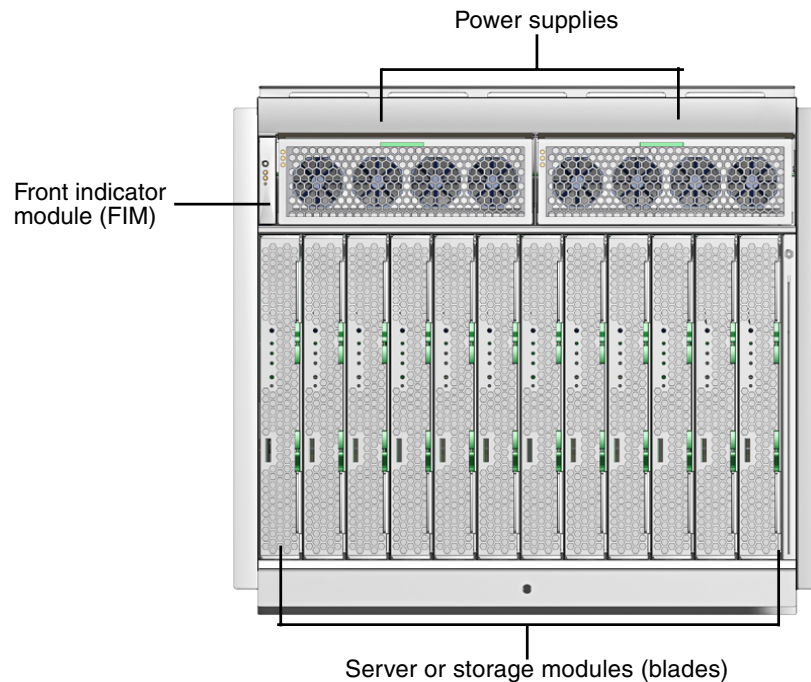
FIGURE 3-2   Rear View of Sun Blade Modular System Chassis

PCI ExpressModules (PCI EMs)

Chassis
management
module (CMM)

Network express
module (NEM)

Rear fans
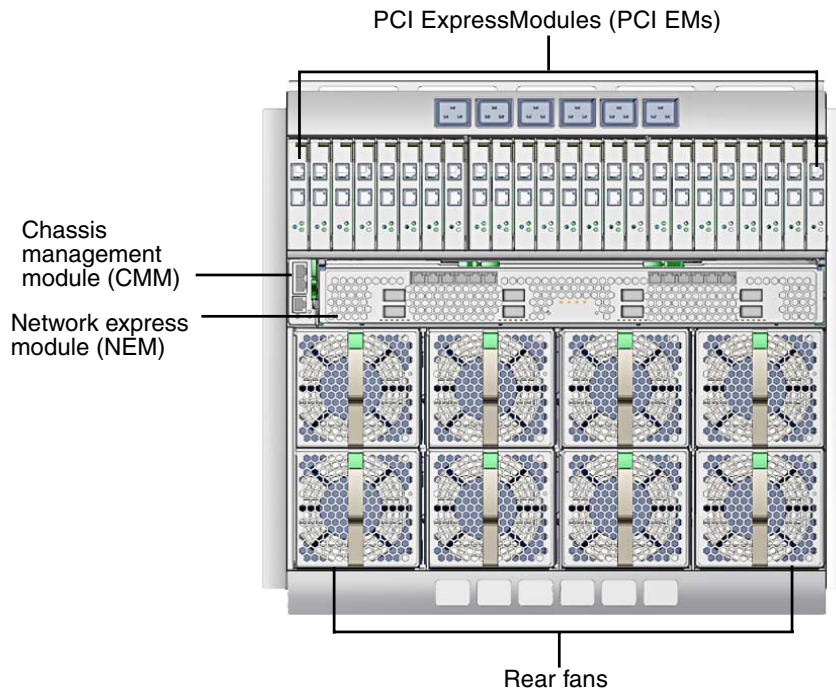
3.3   Powering Off the System Before Service

Although most components of the Sun Blade 6048 modular system can be removed while the system is powered on, you must remove power from the system to service the following components:

■ Midplane

■ Internal power cables

You can power off the system in one of two ways, as described in the following sections:

■ Section 3.3.1, "Powering Off the System Using the CLI" on page 3-7

■ Section 3.3.2, "Powering Off the System Using the Web Interface" on page 3-7

3.3.1 Powering Off the System Using the CLI

You can use the command-line interface to power off the system.

1. Log in to the ILOM CLI on the CMM.

2. Type the following command:

```
stop -f /CH
```

This command powers off the server without a graceful shutdown of the host operating systems.

⚠ **Caution –** Using the -f option could result in data loss unless the host operating systems have already been shut down at the server module level.

For instructions on powering on the system after service is complete, see Section 4.4, "Powering On the System After Service" on page 4-28.

3.3.2 Powering Off the System Using the Web Interface

To powering off the system using the web interface:

1. Log in to the ILOM web interface on the chassis management module (CMM).

2. Select the CMM view from the left panel.

3. From the Remote Control tab, click the Remote Power Control tab.

4. Select the radio button next to /CH (chassis).

5. Use the drop-down list to select a new power state for the chassis.

The chassis current power state appears in the Current State column.

a. Select one of the following values:

Immediate Power Off: Select to power off the server without a graceful shutdown of the host operating systems. Using this option could result in data loss as the host operating systems are not powered off gracefully.

Graceful Shutdown and Power Off: Select to gracefully shut down the operating system before the host is powered off.

b. In the confirmation dialog box, click OK to confirm the change.

3.4   Required Installation Tools and ESD

You will need the following tools and supplies to install the initial hardware into the Sun Blade 6048 modular system:

- No. 2 Phillips screwdriver for removing the midplane or fan connector boards
- M5 hex nut driver for removing internal power cables
- Antistatic wrist strap
- Antistatic mat

3.4.0.1   Attaching the Antistatic Wrist Strap

Use the following procedure to prevent static damage when you are accessing the server modules and server module options.

⚠ **Caution –** Printed circuit boards and hard drives contain electronic components that are extremely sensitive to static electricity. Ordinary amounts of static from your clothes or the work environment can destroy components. Do not touch the components themselves or any metal parts without taking proper antistatic precautions.

1. **Use an antistatic mat or similar surface.**

   When installing an option onto the server module, such as a DIMM or disk drive, place those static-sensitive parts on an antistatic surface. You can use the following items as an antistatic surface:

   - The bag used to wrap a Sun part
   - The shipping container used to package a Sun part
   - Sun electrostatic discharge (ESD) mat (part number 250-1088, available through your Sun sales representative)
   - Disposable ESD mat (shipped with some Sun parts and options)

2. **Attach an antistatic wrist strap.**

   Attach one end of the wrist strap to the chassis sheet metal, and the other end to your wrist. Refer to the instructions that come with the strap.

3. **Detach both ends of the strap when you are finished installing the parts.**

Replacing System Components

This chapter contains information and procedures for servicing the Sun Blade 6048 server module hardware, including component removal and replacement procedures.

The following topics are covered in this chapter:

4.1 Customer-Replaceable Units

The following procedures describe how to replace customer-replaceable unit (CRU) components:

4.1.1 Replacing Power Supplies and Front Fan Modules

You will need to replace a front fan module or power supply module if the module fails. A front fan module is located within each of the power supply modules, so you will need to remove the power supply associated with the fan module before replacing the module.

Do not leave a power supply slot vacant. Power supplies have integrated fans that will continue to supply cooling air even when the power supply is off. You can remove and replace a power supply from a powered-off system or from a powered-on system using a hot-swap procedure.

Note – When removing a power supply from the system, wait for all LED indicators on the power supply to turn off before reinstalling the power supply. If you do not follow this procedure, the system might log a false power supply fault condition.

Use the following procedures to install a power supply into the corresponding vacant slot.

4.1.1.1 Removing the Power Supply Modules and Front Fan Modules

FIGURE 4-1 shows how to remove the power supplies and front fan modules.

Note – Remove only one power supply at a time. One power supply must be in the system at all times to supply power to the system.

FIGURE 4-1   Removing a Power Supply and Front Fan Module
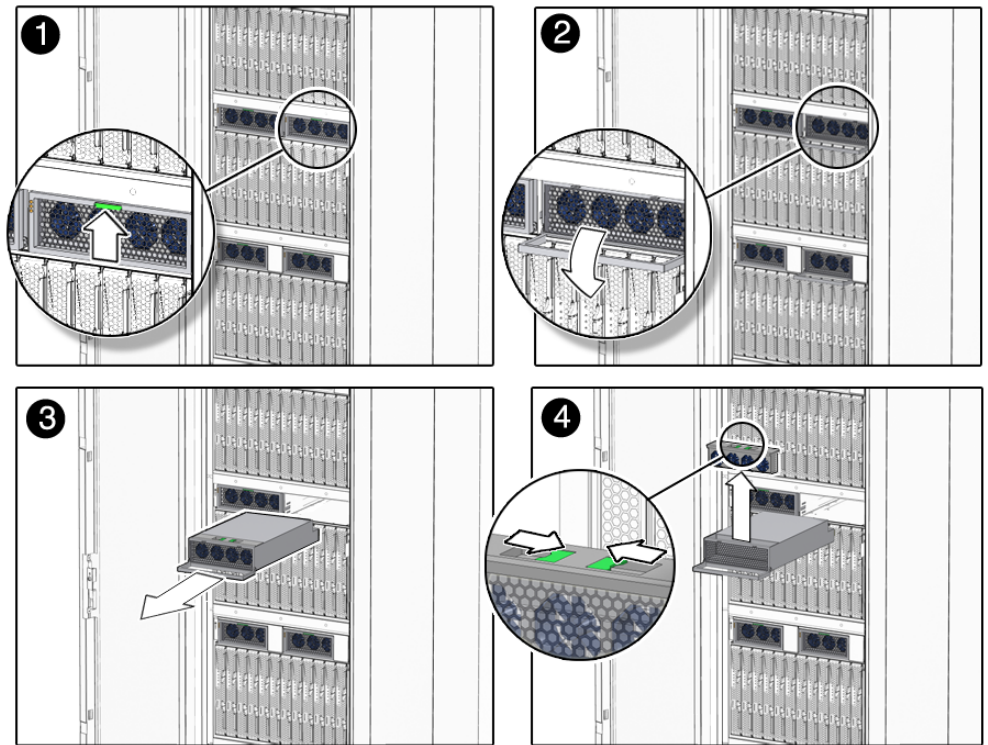
Note – You will need to replace the power supply that you removed within one minute to ensure proper system operation.

1. **In the front of the chassis, locate the power supply to be removed or the power supply that contains the front fan module that you plan to replace.**

2. **Press and hold the green button on top of the power supply handle frame.**

3. **Rotate the power supply handle away from the power supply and down.**

4. **Pull the power supply out of the chassis approximately 100 cm.**

5. **Choose the instructions below that correspond to the module that you want to replace:**
   - If you are replacing the whole power supply: **While supporting the bottom of the power supply module with both your hands, pull the power supply all the way out of the chassis.**

- If you are planning to replace the fan module only:

a. **You do not need to remove the power supply from the system any further.**

⚠ **Caution –** The fan will continue spinning for a moment after the power supply is disconnected. Be careful not to insert a finger or other object into the fan while it is still spinning.

---

b. **With one hand, press together the two latches on top of the fan module and pull the module upward.**

c. **Grasp the module with the other hand as soon as possible and remove the module from the power supply.**

4.1.1.2 Installing the Power Supply Modules and Front Fan Modules

FIGURE 4-2 shows how to install the power supplies.

FIGURE 4-2   Installing a Power Supply Module and Front Fan Module
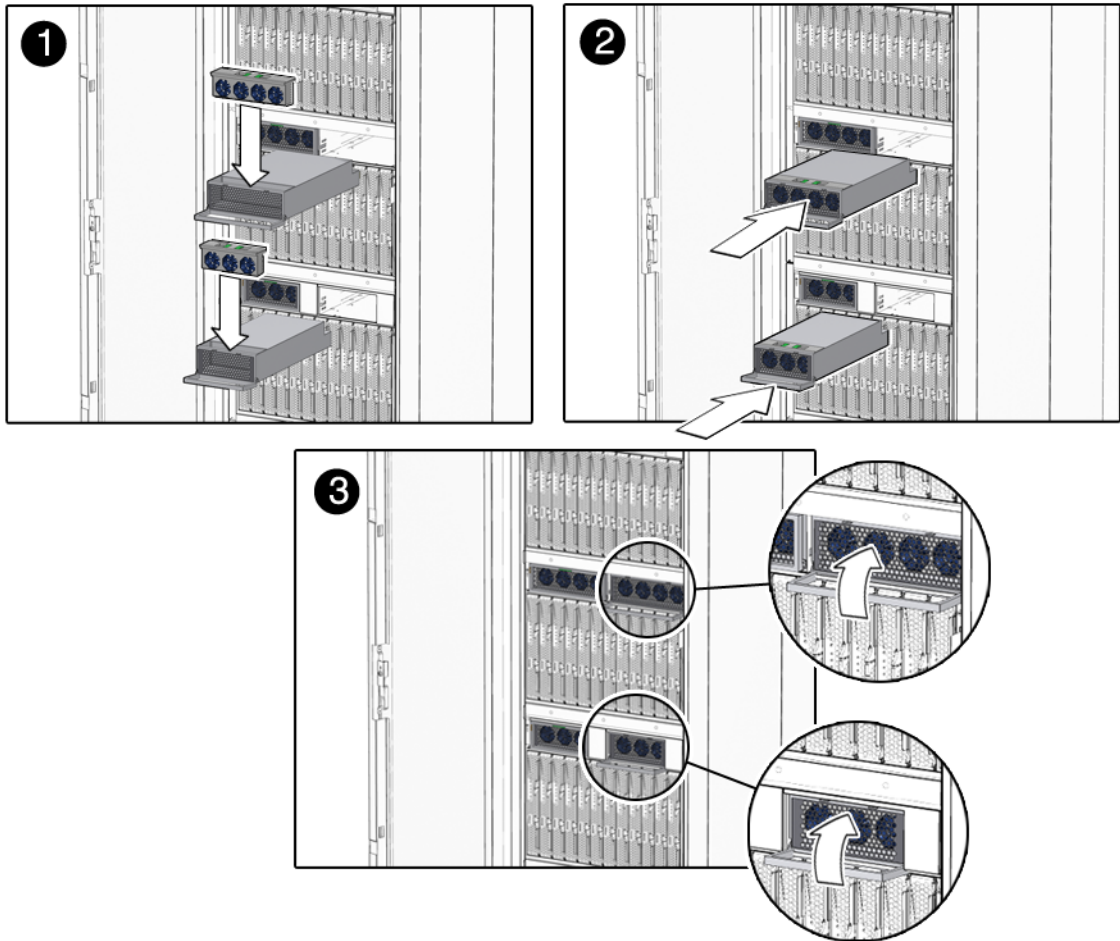
1. **If you are replacing a front fan module, insert the fan module into the power supply.**

2. **If necessary, pull the power supply handle out and away from the power supply.**

3. **Align the power supply unit with the power supply slot.**

   Ensure that the power supply unit is facing up and that the five LED holes appear on the left when you are installing the power supply module.

4. **In a smooth motion, slide the power supply into the power supply slot until the unit engages with the internal connectors.**

4.1.2 Replacing Server Modules

You can remove and replace a server module (blade) from a powered-off system or from a powered-on system using hot-plug procedures.

⚠ **Caution –** Do not operate system with empty slots. Always insert a filler into an empty slot to reduce the possibility of module shutdown.

4.1.2.1 Removing Server Modules

1. Initiate an orderly shutdown of the operating system.

See the documentation for your server module for information about how to do this.

2. Power down the server module to standby power.

See the documentation associated with the server module for detailed instructions.

FIGURE 4-3 Removing a Server Module
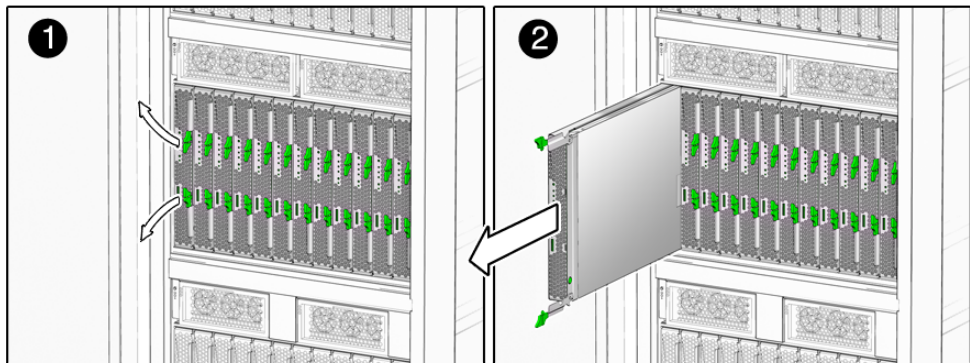
3. Press the latches on the ejectors at the top and bottom of the server module.

4. Swing out both ejector latches simultaneously (raise the top ejector and lower the bottom ejector).

5. Use the ejector latches to start pulling the server module out of its slot in the chassis.

⚠ **Caution –** Do not use the ejector latches to carry the server module. The ejector latches should be only used to unseat the server module from the chassis. The latches are not designed to support the weight of the server module.

6. Use your hands to finish pulling the server module out of the chassis, supporting the weight of the server module from the bottom.

7. Install a filler panel into the server module slot if the server module will be out of the chassis for longer than one minute.

4.1.2.2 Installing Server Modules

To install server module:

1. Remove the filler panel, if necessary.

FIGURE 4-4 Removing a Filler Panel
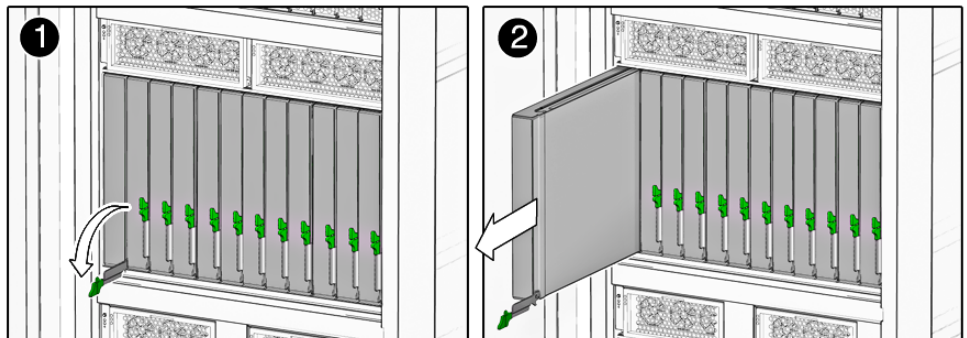
2. Rotate the lower ejector lever on the filler panel downward, and pull the filler panel out of the chassis.

Note – Do not discard the filler panel. You will need to reinstall the filler panel if the server module needs to be serviced or removed at a later time.

FIGURE 4-5 shows how to install a server module.

FIGURE 4-5   Installing a Server Module
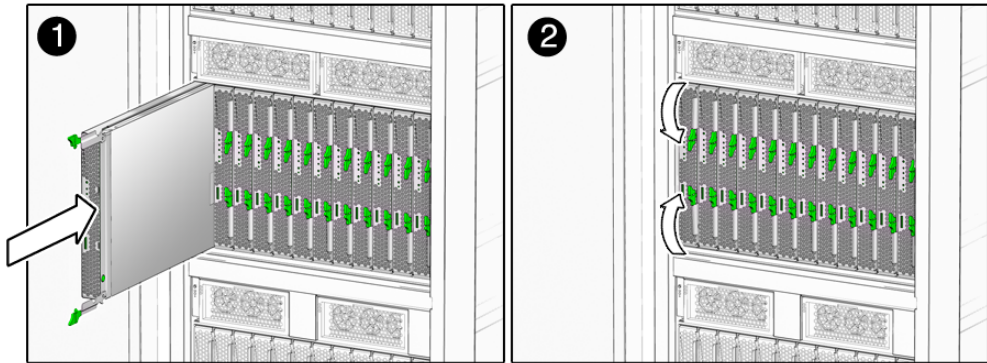
3. **Align the server module with the vacant server module slot. Ensure the following:**

   - Server module indicator lights on the front panel are facing toward you.
   - Server module ejector levers are fully opened.
   - Server module ejectors are on the right side of the module.

4. **Slide the server module into the vacant server module chassis slot.**

   As the ejectors make contact with the chassis, the bottom lever will start to rise, and the top lever will start to lower.

5. **Simultaneously close the ejector levers at the top and bottom of the server module (lower the top ejector and raise the bottom ejector) until the levers clamp in place against the front of the server module.**

   As the ejector levers are closed, the server module moves back to engage with the chassis.

6. **Verify that the server module is powered on and operational.**

   After you insert a server module into a powered-on system, the server module's internal service processor (SP) is brought online automatically, and the server module is powered on by default.

7. **For each remaining server module to be installed, repeat** Step 1 **through** Step 6**.**

4.1.3 Replacing the Front Indicator Module

The front indicator module (FIM) is located in the front of the chassis. You can remove and replace a FIM from a powered-off system or from a powered-on system using hot-plug procedures.

4.1.3.1 Removing the Front Indicator Module

To remove the front indicator module:

1. **Remove power supply 0 from the chassis. See** Section 4.1.1, "Replacing Power Supplies and Front Fan Modules" on page 4-2**.**

   FIGURE 4-6 shows how to remove the FIM.

FIGURE 4-6   Removing the FIM
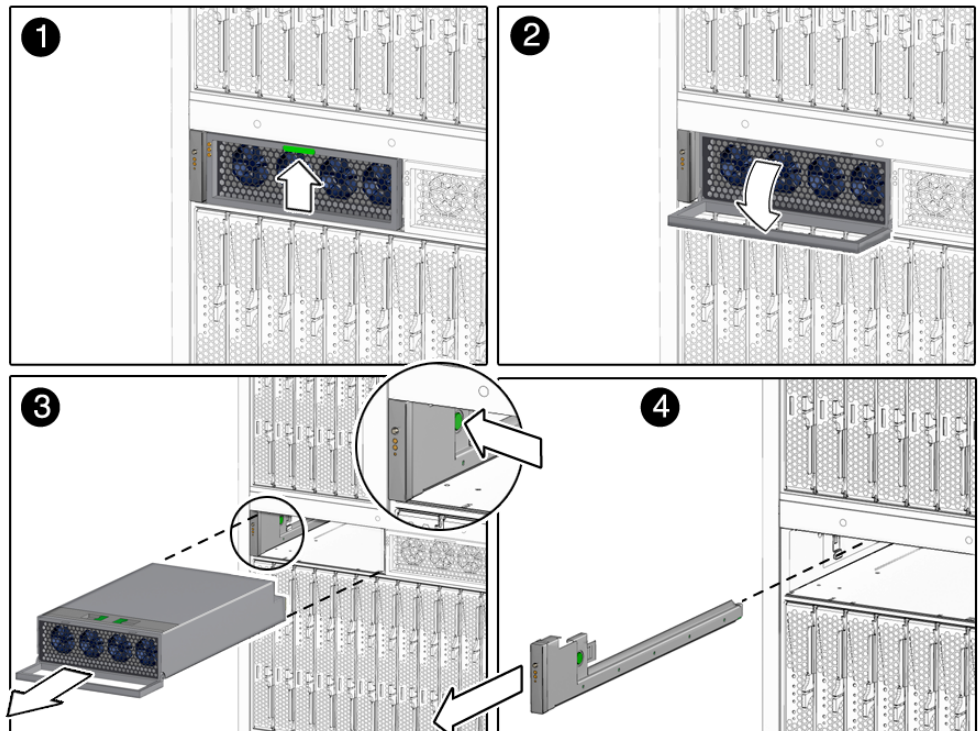
2. **Push back the power supply air baffle.**

3. **Press the button on the right side of the front indicator module (FIM).**

4. Remove the FIM from the chassis.

4.1.3.2 Installing the Front Indicator Module

To install the front indicator module:

1. Align the FIM with the FIM slot.

Make sure that the release button is on the right side of the module.

FIGURE 4-7 shows how to install the FIM.

FIGURE 4-7 Installing the FIM
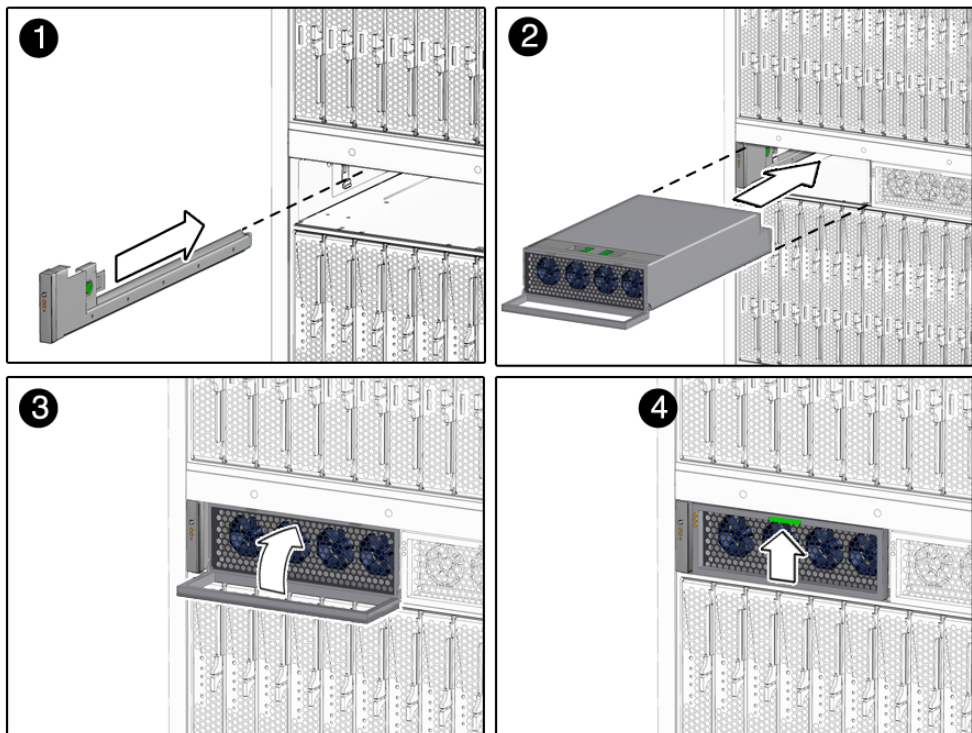
2. Slide the FIM into the FIM slot.

3. Reinstall power supply 0 into the chassis.

See Section 4.1.1, "Replacing Power Supplies and Front Fan Modules" on page 4-2.

4.1.4 Replacing NEMs

If a network express module (NEM) fails, you will need to replace the NEM. You can remove and replace a NEM from a powered-on system using a hot-swap operation, as well as from a powered-off system.

Caution – If you are not immediately replacing the NEM, install an NEM filler panel to ensure proper system operation.

4.1.4.1 Removing the NEMs

FIGURE 4-8 shows how to remove the NEMs. Panel 3a shows removal of a dual-slot NEM, and Panel 3b shows removal of a single-slot NEM.

FIGURE 4-8   Removing a NEM
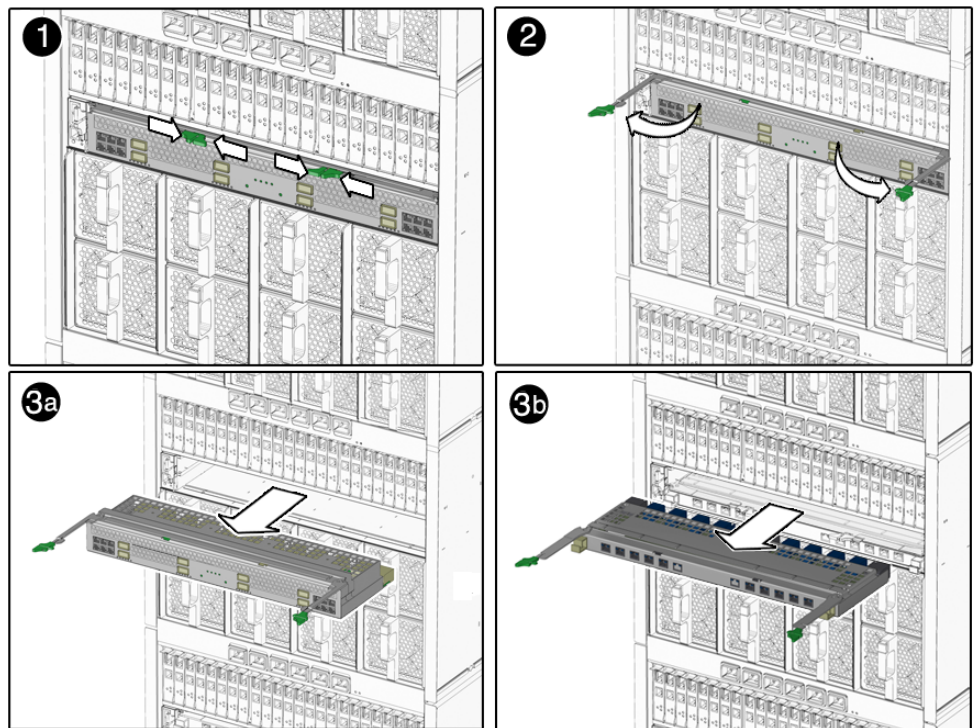
1. **In the rear of the chassis, locate the NEM that you want to remove.**

2. **Remove all cables from the NEM.**

3. **Press together and hold the ejector buttons on both the right and left ejector levers.**

4. **To unlatch the NEM from the chassis, open the ejector levers by extending them outward.**

5. **Holding the opened ejector levers, pull the NEM toward you until you can pull the rest of the module out by hand.**

4.1.4.2 Installing the NEMs

FIGURE 4-9 shows how to install the NEMs. Panel 1a shows installation of a dual-slot NEM, and Panel 1b shows installation of a single-slot NEM.

FIGURE 4-9   Installing a NEM
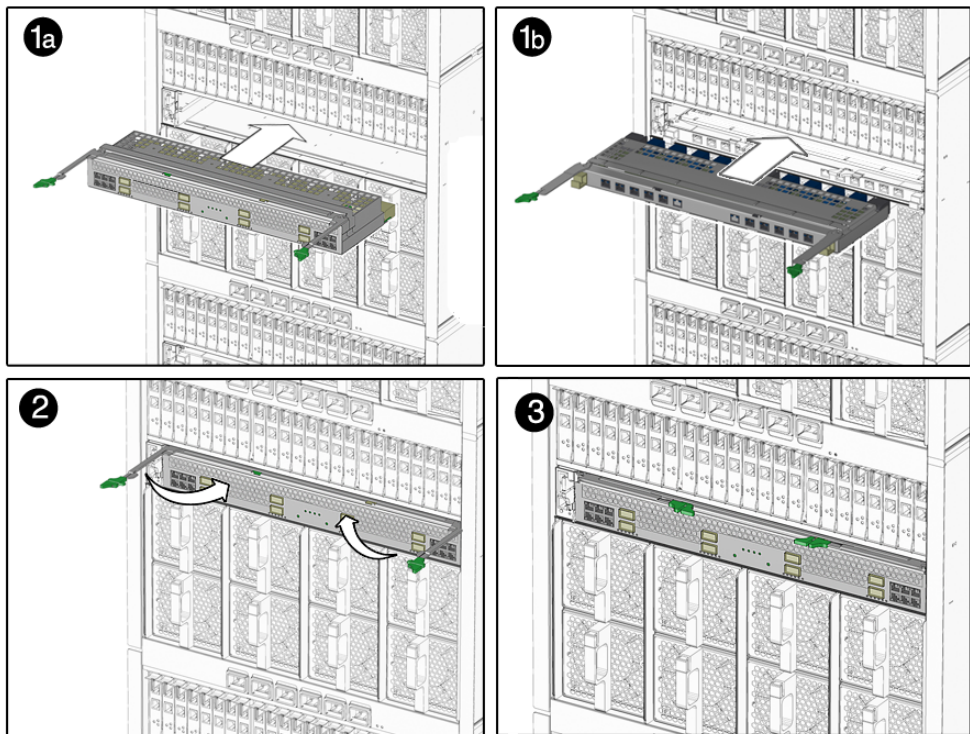
1. **Align the NEM with the vacant NEM slot.**

   Ensure that:

   - The RJ-45 port connectors of the NEM are facing you.

   - The NEM ejector levers are fully opened.

2. **Slide the NEM into the vacant NEM chassis slot until you feel it stop.**

3. **Complete the installation by closing the ejector levers to secure the NEM in the chassis.**

4.1.5 Replacing PCI EMs

A pair of PCI EMs is assigned to each server module in the chassis. All PCI EMs connect to a chassis midplane. The midplane provides an interconnect between the server modules and the PCI EMs installed in the chassis. The midplane connections between the server module and the PCI EM are logically defined by the midplane as shown in FIGURE 4-10.

FIGURE 4-10 PCI EM to Server Module Correspondence
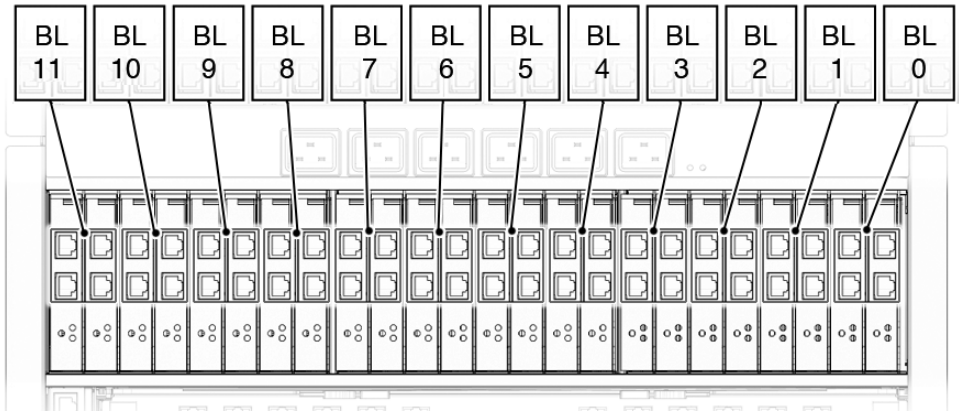
If the PCI Express Module (PCI EM) fails or if you choose to change the I/O configuration, you will need to replace a PCI EM. You can remove and replace a PCI EM from a powered-on system using a hot-swap procedure, as well as from a powered-off system.

> ⚠ **Caution –** If you are not immediately replacing the PCI EM, install an PCI EM filler panel to ensure proper system operation.

4.1.5.1 Removing the PCI EMs

> **Note –** Check your server module operating system documentation to determine if software commands are needed for the system to recognize PCI EM removal or installation.

FIGURE 4-11 shows how to remove the PCI EMs.

FIGURE 4-11 Removing a PCI EM
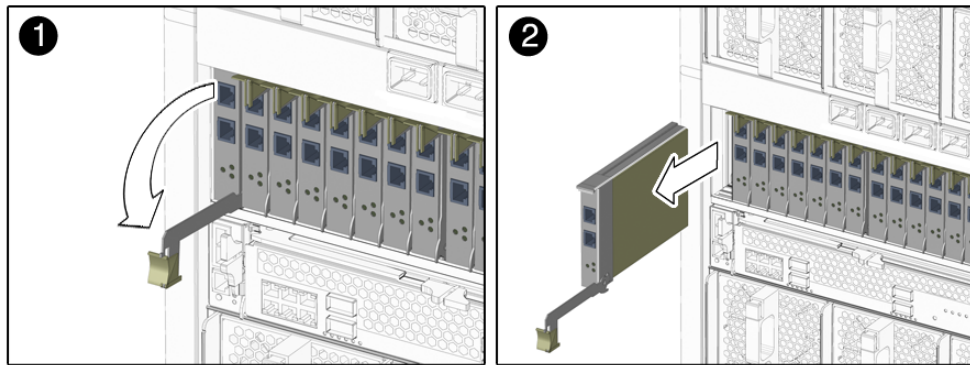
1. **In the rear of the chassis, locate the PCI EM that you want to remove.**

   If the amber Attention indicator on a PCI EM is lit, this indicates a problem with the PCI EM, and you might choose to replace it. Otherwise, if you want to change the I/O configuration, you can choose any PCI EM to replace.

2. **If you are hot-plugging the PCI EM, prepare the operating system.**

   You will need to prepare for PCI EM removal through the associated server module operating system. See the server module (blade) or operating system documentation for more information.

3. **Verify that the PCI EM Power indicator is off.**

   If you have successfully prepared the PCI EM for a hot-removal, the Power indicator turns off.

4. **Place one finger on top of ejector-lever handle.**

5. Pull the ejector lever toward you to pull the PCI EM forward until you can pull the rest of the module out by hand.

4.1.5.2 Installing PCI EMs

FIGURE 4-12 shows how to install the PCI EMs.

FIGURE 4-12 Installing a PCI EM
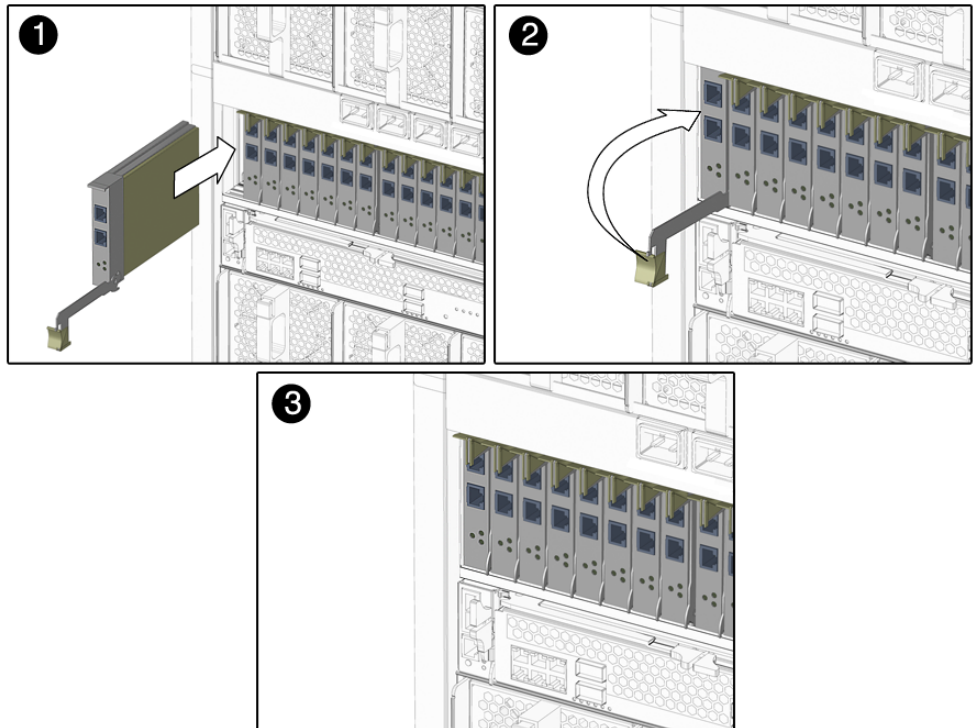
1. **Do one of the following, depending on the type of PCI EM that you are installing:**

   - If you are not installing a Gigabit Ethernet PCI EM, go to Step 2.

   - If you are installing a Gigabit Ethernet PCI EM, continue this step:

   a. **Press the Release button on the side of the GbE PCI EM to release its cover, then remove the cover.**

   b. **Locate the PCI EM MAC address, which is visible on the PCI EM with its cover removed.**

   c. **Record the MAC address and the slot number into which you are about to install the GbE PCI EM. Keep the data for future reference.**

   d. **Replace the GbE PCI EM cover by sliding the cover into place.**

2. **Align the PCI EM with the vacant PCI EM slot.**

   Ensure that the indicator lights on the front panel of the PCI EM are facing toward you and that the PCI EM ejector lever on the bottom is fully opened.

3. **Slide the PCI EM into the vacant PCI EM chassis slot.**

   The ejector lever starts to pop up as the module engages with the system slot.

4. **Complete the installation by closing the ejector lever to secure the PCI EM in the chassis.**

5. **Notify the operating system that a new PCI EM is installed.**

   See the server module (blade) documentation for more information.

6. **Verify that the PCI EM Power indicator is On.**

   If the hot-insertion procedure was successful, the green Power indicator will light.

7. **For each remaining PCI EM to be installed, repeat** Step 1 **through** Step 6.

4.1.6 Replacing the Rear Fan Modules

You will need to replace a rear fan module if the module fails. You can remove and replace a rear fan from a powered-off system or from a powered-on system using a hot-swap procedure.

4.1.6.1 Removing the Rear Fan Modules

FIGURE 4-13 shows how to remove rear fan modules.

FIGURE 4-13 Removing a Fan Module
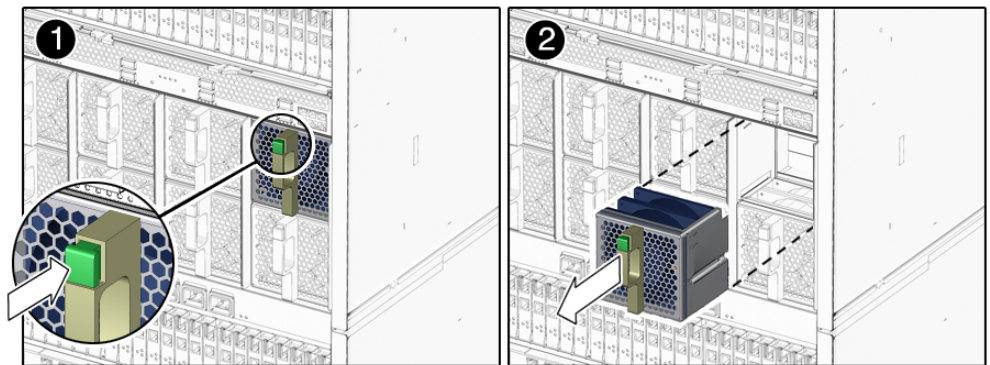
1. In the rear of the chassis, locate the fan module that you want to remove.

2. Press and hold the green button on the fan handle.

3. Pull out the rear fan module in a smooth motion until it is free from the chassis.

4.1.6.2 Installing Rear Fan Modules

FIGURE 4-14 shows how to install rear fan modules.

FIGURE 4-14 Installing a Fan Module
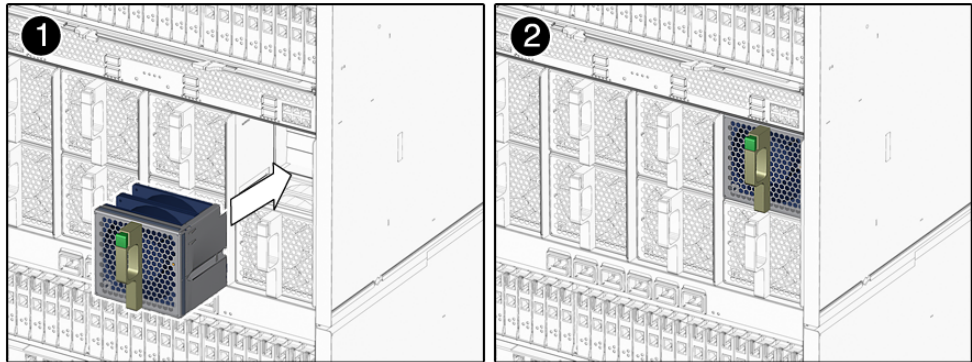
1. **In the back of the system chassis, locate a vacant fan module slot.**

2. **Using both hands, align the fan module with the vacant slot.**

   Make sure that the green button on the handle of the fan module is at the top of the fan.

3. **Slide the fan module into the vacant slot until the front panel meets the chassis.**

   After you install the rear fan module, the chassis management module (CMM) will automatically detect the new module.

4.1.7 Replacing the Fan Board

You will need to replace a fan if the board fails. You can remove and replace a fan board from a powered-off system.

4.1.7.1 Removing the Fan Board

FIGURE 4-15 shows how to remove the fan boards.

FIGURE 4-15 Removing a Fan Board
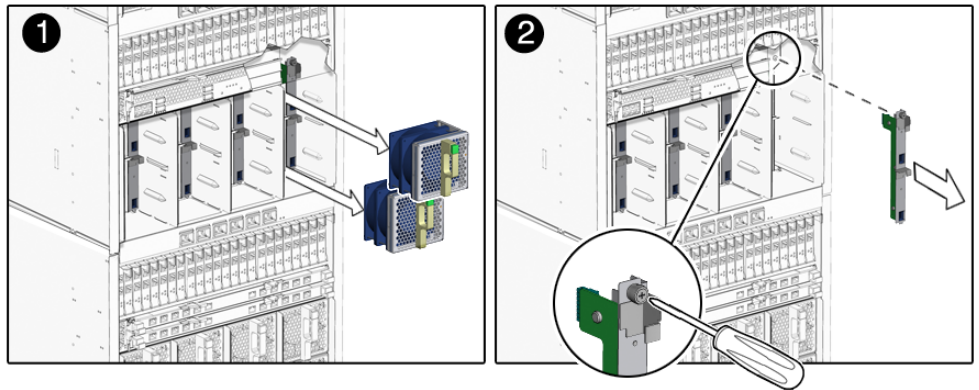
1. **Power off the chassis.**

   See Section 3.3, "Powering Off the System Before Service" on page 3-6.

2. **Remove the two rear fan modules that are in front of the fan indicator module that you want to remove. See** Section 4.1.6, "Replacing the Rear Fan Modules" on page 4-17**.**

3. **Loosen the captive screw on the fan indicator module until you can pull the top of the controller forward. Then lift the controller up and off the chassis.**

   This screw needs to be fully unscrewed because the screw disengages the fan controller connector from the midplane.

4.1.7.2 Installing a Fan Board

FIGURE 4-16 shows how to install the fan boards.

FIGURE 4-16 Installing a Fan Board
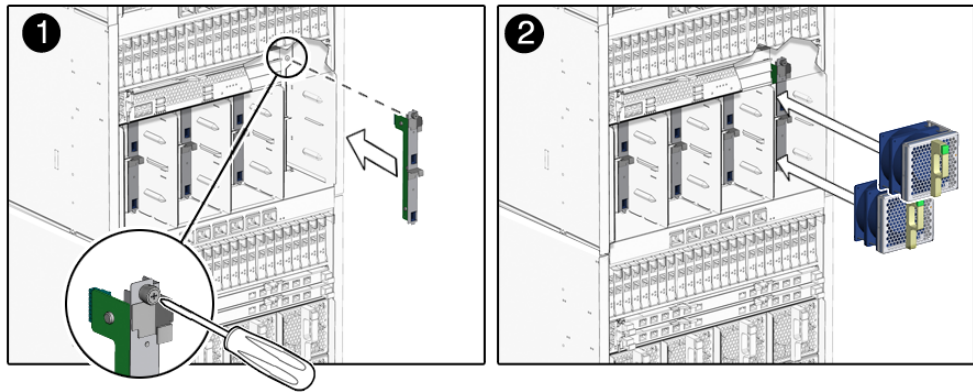
1. **Place the bottom notch on the fan board into the hole in the chassis.**

2. **Push the top captive screw into place and tighten it.**

3. **Replace the two rear fan modules that you removed.**

   See Section 4.1.6, "Replacing the Rear Fan Modules" on page 4-17.

4. **Power on the chassis.**

   See Section 4.4, "Powering On the System After Service" on page 4-28

4.1.8   Replacing the CMM

You will need to replace a chassis management module (CMM) if the module fails. You can remove and replace a CMM from a powered-off system or from a powered-on system using a hot-swap procedure. The chassis will be unmanageable while you replace the CMM hardware.

Note – The system fans will run at 100 per cent speed when the CMM is removed from the system, as there will be no fan management while the CMM is out of the system.

4.1.8.1   Removing the CMM

FIGURE 4-17 shows how to remove the CMM.

FIGURE 4-17 Removing the CMM
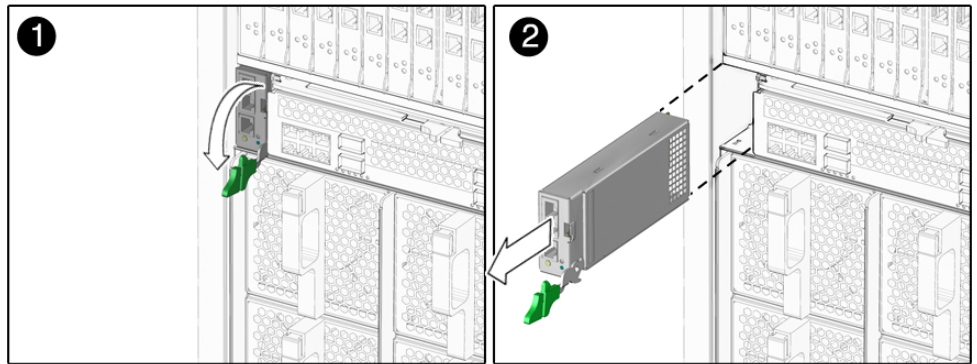
1. **In the rear of the chassis, locate the CMM.**

2. **Remove any cables on the CMM.**

3. **Press together and hold the ejector button on the module ejector lever.**

4. **To unlatch the module from the chassis, pull the ejector lever away from the module and up.**

5. **Pull the ejector lever toward you until you are able to pull the rest of the module out by hand.**

4.1.8.2 Installing the CMM

FIGURE 4-18 shows how to install the CMM.

FIGURE 4-18 Installing the CMM
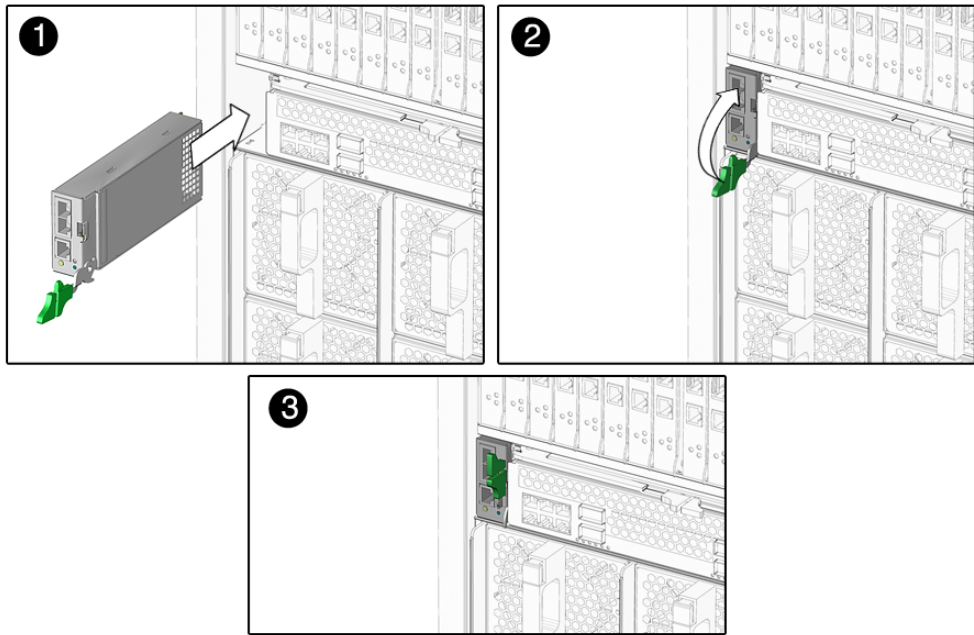
1. **Align the CMM with the CMM slot.**

   Ensure that the CMM indicator lights of the CMM on the front panel are on the top of the module and facing you.

2. **Slide the CMM into the vacant CMM chassis slot.**

   Ensure that the CMM engages with the system chassis guidance system.

3. **Complete the installation by closing the ejector lever to secure the CMM in the chassis.**

   After you physically install a CMM in a powered-on system, the CMM automatically begins its initialization. If you have installed the CMM in a powered-off system, the CMM goes through the following sequence of operations:

   - CMM receives 3-volt auxiliary standby power and comes out of reset.
   - While the CMM boots up, the green OK indicator on the CMM is set to the Slow Blink state.
   - When the CMM has booted, the CMM sets the green OK indicator on the front indicator (FIM) and chassis management module (CMM) to the Standby Blink state, indicating that the chassis is now ready for full power-on.

4.1.9 Installing the Cooling Doors

There are now two cooling doors available for the Sun Blade 6048 modular system. The cooling doors can only be installed on a Sun Blade 6048 upgraded chassis.

To install a rear door, you will need the upgraded Sun Blade 6048 module system. See Section 1.7, "Upgraded Chassis" on page 1-19 for information on how to identify the new chassis.

Refer to the *Sun Cooling Door 5200 Installation and User's Guide* or the *Sun Cooling Door 5600 Installation Guide* for detailed information on installing the cooling doors.

4.2 Field-Replaceable Units

The following procedures should be performed only by Sun Service personnel.

4.2.1 Replacing the Midplane

The midplane is not a hot-swappable or hot-pluggable component. You will need to power off the chassis before replacing this component.

4.2.1.1 Removing the Midplane

To remove the midplane:

1. **Power off the chassis.**

   See Section 3.3, "Powering Off the System Before Service" on page 3-6.

   FIGURE 4-19 shows how to remove the midplane.

FIGURE 4-19 Removing the Midplane
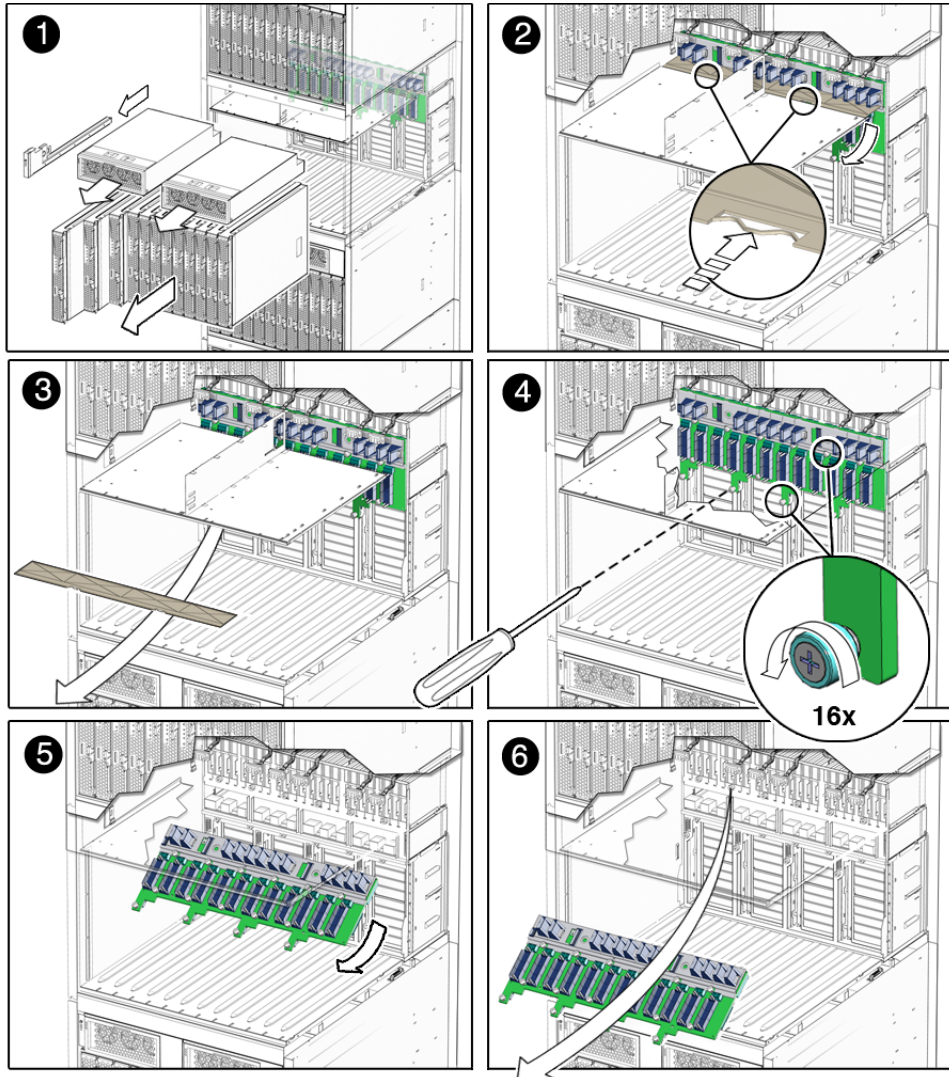
2. **Remove all the modules or filler panels that are installed in the chassis.**

   See the procedures in Section 4.1, "Customer-Replaceable Units" on page 4-1.

3. **Remove the air baffle by pressing the snaps from underneath the power supply cage and tilting the front of the air duct downward to free it from the chassis.**

4. **Loosen the 16 captive screws attaching the midplane to the back of the chassis.**

Caution – Do not touch the connectors on the midplane. Doing so could result in damaged or bent connector pins.

5. **Pull the midplane away from the chassis guidepins, then down to clear the power supply cage.**

6. **Tilt the midplane slightly to the side to and remove it from the chassis.**

7. **If present, pull off the gasketing material located on the left and right side of the chassis in the midplane area. See** FIGURE 4-20**.**

FIGURE 4-20 Removing the Midplane Gasketing Material
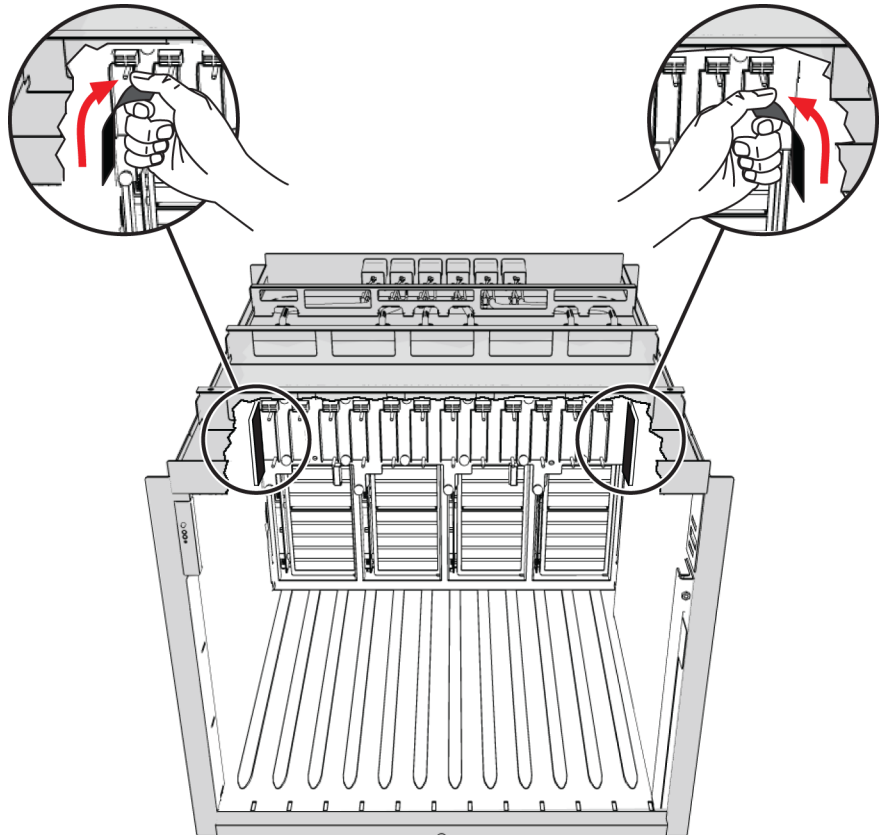
4.2.1.2　Installing the Midplane

⚠

Caution – Thermal damage to the chassis can occur. Failure to remove the gasketing material prior to installing the midplane might result in damage to chassis.

FIGURE 4-21 shows how to install the midplane.

FIGURE 4-21　Installing the Midplane
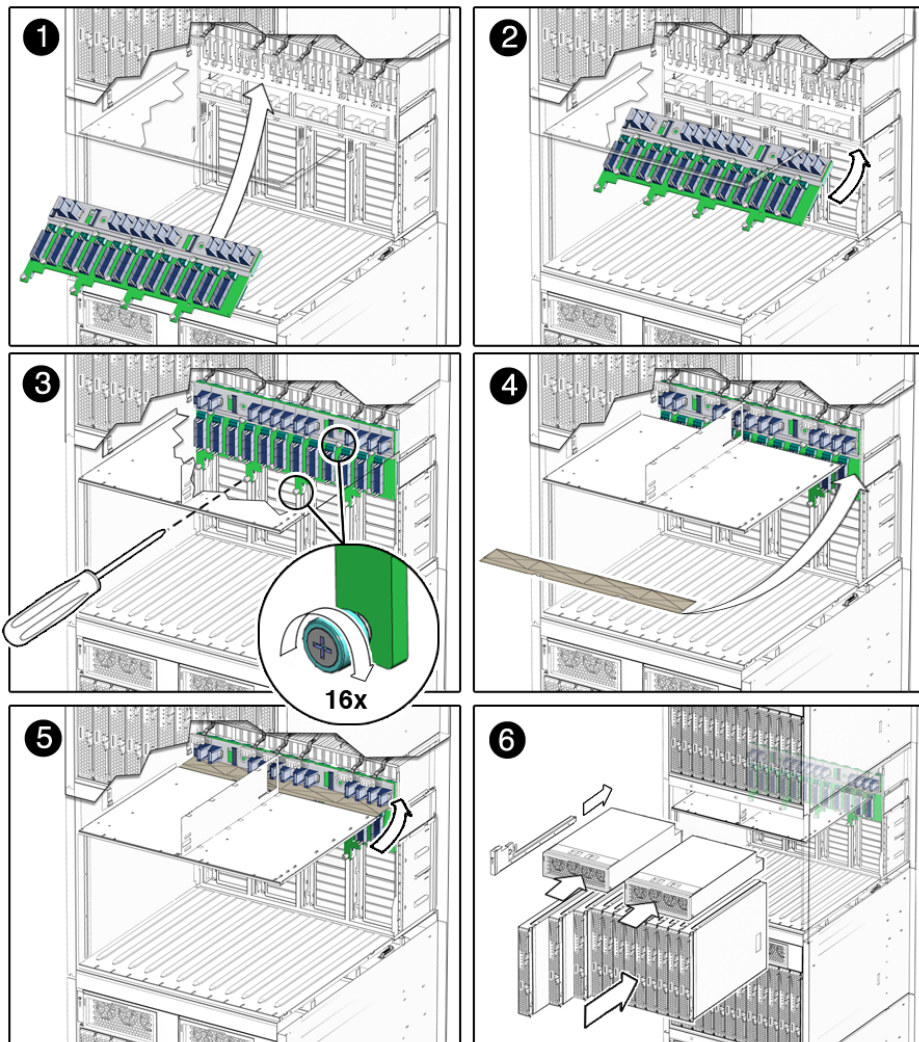
1. Before installing the midplane, remove any gasketing material from the chassis that is present in the midplane area. See Step 7 in the "Removing the Midplane" section for more information.

2. Tilt the midplane to the side slightly to fit it into the chassis.

3. When you reach the back wall of the chassis, straighten the midplane so that it is flush with the back of the chassis, and lift it so that the guidepin holes are aligned with the chassis guidepins.

4. Push the midplane backward slightly to engage the chassis guidepins.

5. Fasten the 16 screws to secure the midplane to the chassis.

6. Replace the air baffle.

   a. Align the air baffle so that the fastening snaps are facing away from the inside of the chassis.

   a. Place the back edge of the air baffle in the slot on the back of the chassis.

   b. Rotate the air baffle upward until the snaps fasten into place at the back of the power supply cage.

7. Replace all of the components that were removed from the chassis before you install the midplane, except for the gasketing material the you removed.

   See the procedures in Section 4.1, "Customer-Replaceable Units" on page 4-1.

8. Power on the chassis.

   See Section 4.4, "Powering On the System After Service" on page 4-28.

4.3 Servicetool FRU Update Procedure

Caution – The SunService account is for the use of Sun service representatives only. Do not use the SunService account unless you are instructed to do so in a procedure developed by Sun Microsystems.

---

1. Use SSH to log in to the SunService account. The default password is changeme.

```
# ssh <SP IP address> -l sunservice
# <SP IP Address>'s password: changeme
```

2. **At the prompt, enter the** `servicetool` **command with options. The options are defined in the table below.**

```
# servicetool --fru_update=serviceprocessor <OtherOptions>=<value>
```

Other Options	Value
`--fru_product_part_number`	Write a new part number to the FRU.
`--fru_product_serial_number`	Write a new serial number to the FRU.
`--fru_chassis_serial_number`	Write a new chassis serial number to the FRU.
`--fru_asset_tag`	Write a new asset tag to the FRU.

3. **Watch the output from the command, and respond to the confirmation prompts for continuing the update and rebooting the server:**

```
Servicetool is going to collect system information for the service
processor for future part swaps.
The following preconditions must be true for this to work:
    * The new service processor must be installed.
Do you want to continue (y|n)? y
Service processor FRU information ready to be collected.
You MUST reboot the service processor for to complete
this process. Allow the service processor to fully boot.
DO NOT UNPLUG THE SYSTEM WHILE THE SERVICE PROCESSOR IS BOOTING!
Would you like to reboot the service processor now (y|n)?y
The system is going down NOW!!
Sending SIGTERM to all processes.
```

4.4 Powering On the System After Service

Follow the procedures in this section after you have serviced the following components:

- Midplane
- Internal power cables

The chassis is set by default to power on automatically when AC power is connected to the chassis. However, if you have changed this default setting so that the chassis does not power on automatically, you can power on the system by issuing software commands through the CMM command-line interface (CLI).

This section includes the following topics:

4.4.1 Power Cord Connections

Ensure that the power cords are connected to the AC power inlets on the rear of the chassis. These power cords must be rated at 16A or 20A (depending on geographic location) and must have a plug that meets the requirements of the data center installation. The connection to the AC inlet on the system is location specific:

- AMER–L6-20P to IEC 320 C19 (2.4m); Sun part number 180-2005-02
- EMEA–IEC 309 to IEC 320 C19; (2.4m); Sun part number 180-2004-02

4.4.2 Powering On the System Automatically

1. **Verify that the power cords are properly connected to the AC inlets on the chassis and to the cabinet power distribution unit (PDU) or other power source.**

   When the chassis is first connected to AC power, the following sequence of events occurs:

   - The power supplies produce 3V auxiliary standby power.
   - The CMM receives 3V auxiliary standby power and comes out of reset.
   - The CMM starts to boot and sets the OK indicator on the CMM to a slow blink state.
   - When the CMM has booted, the CMM sets the OK indicator on the front indicator module (FIM) and CMM to the standby blink state, indicating that the chassis is now ready for full power-on.
   - The chassis then automatically powers on by default.

   Note – The chassis powers on only when at least one power supply module is energized and at least one AC input is receiving power.

2. **Verify that the green OK indicator on the FIM or CMM is in the Steady On state.**

   When the chassis has been fully powered on, the OK indicator remains illuminated. The steady on OK LED indicates that the power supplies are energized and the 12V power is supplied to the fan array, server modules, and the network express modules (NEMs).

4.4.3 Powering On the System Using the CLI

1. Log in to the ILOM CLI:

```
ssh root@ipaddress
```

2. Type:

```
start /CH.
```

This command powers on the chassis and is available only to administrators.

4.4.4 Powering On the System Using the Web Interface

1. Open a web browser, and type the IP address of the server SP or CMM.
The Login page for the ILOM web interface appears.

2. In the ILOM Login page, enter a user name and password, then click OK.
The ILOM web interface appears.

3. Select the CMM view from the left panel.

4. From the Remote Control tab, click the Remote Power Control tab.

FIGURE 4-22 Remote Control Tab
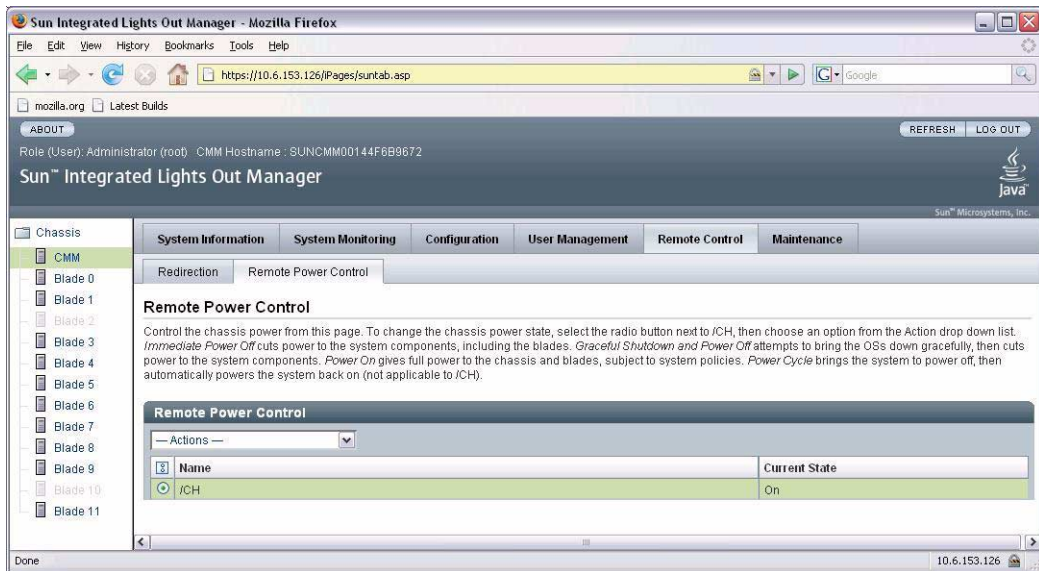
5. **Select the radio button next to /CH (chassis).**

6. **Use the drop-down list to select a new power state for the chassis.**

   The chassis current power state appears in the Current State column.

   a. **Select the Power On value to power on the host.**

   b. **In the confirmation dialog box, click OK to confirm the change.**

4.5   Expansion Module Installation

This section describes installation of a 2U expansion module for the Sun Blade 6048 cabinet. This expansion module is offered as a separate orderable option. The module will enable you to mount a 2 RU system on top of the Sun Blade 6048 system.

The following illustrations shows the procedure for installing the top cap on a Sun Blade 6048 cabinet.
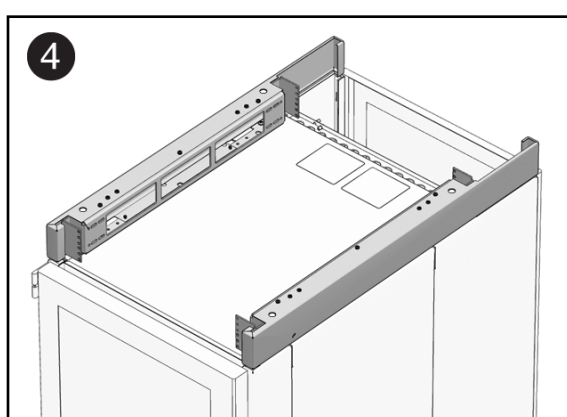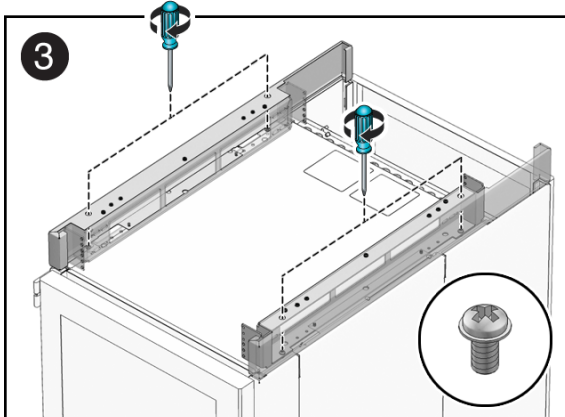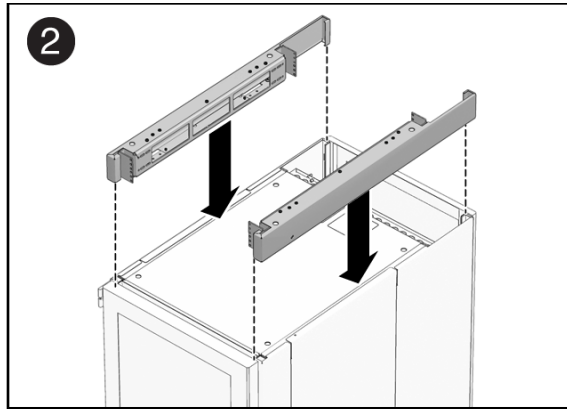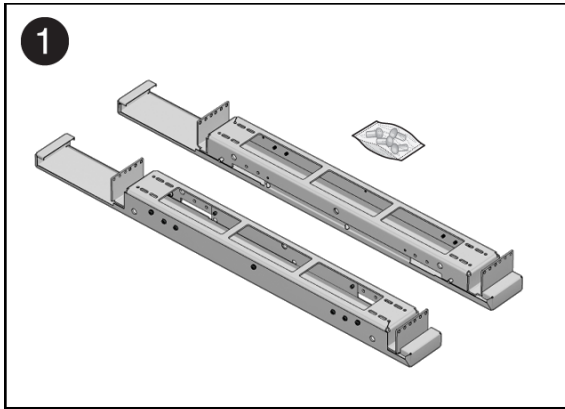
1. **Unpack the contents of the expansion module kit (see panel 1).**

   The **expansion module** kit contains two expansion module mounting brackets and four M6 screws.

2. **Place the brackets on the top of the Sun Blade 6048 cabinet (see panel 2).**

   The open part of the bracket should correspond with the opening in the back of the cabinet.

3. **Use two of the M6 screws for each bracket to fasten the expansion module brackets (see panel 3).**

   a. **Place two M6 screws in the two outermost screw holes of the right bracket.**

   b. **Insert a screwdriver into the hole on top of the bracket that is directly above the screw, and tighten the screw.**

   c. **Repeat steps a and b for the left bracket.**

   You can now mount a 2 rack unit (RU) system onto the expansion module, using the rack rails included with the system.

4.6   Floor Tie Down Installation

This section describes how to install floor tie downs onto the Sun Blade 6048 chassis.

Note – This procedure describes a generic procedure for installing floor tie downs that are supplied by the customer.

Refer to FIGURE 4-23 for the reference on the installation procedure.

FIGURE 4-23 Floor Tie Down Locations and Installation
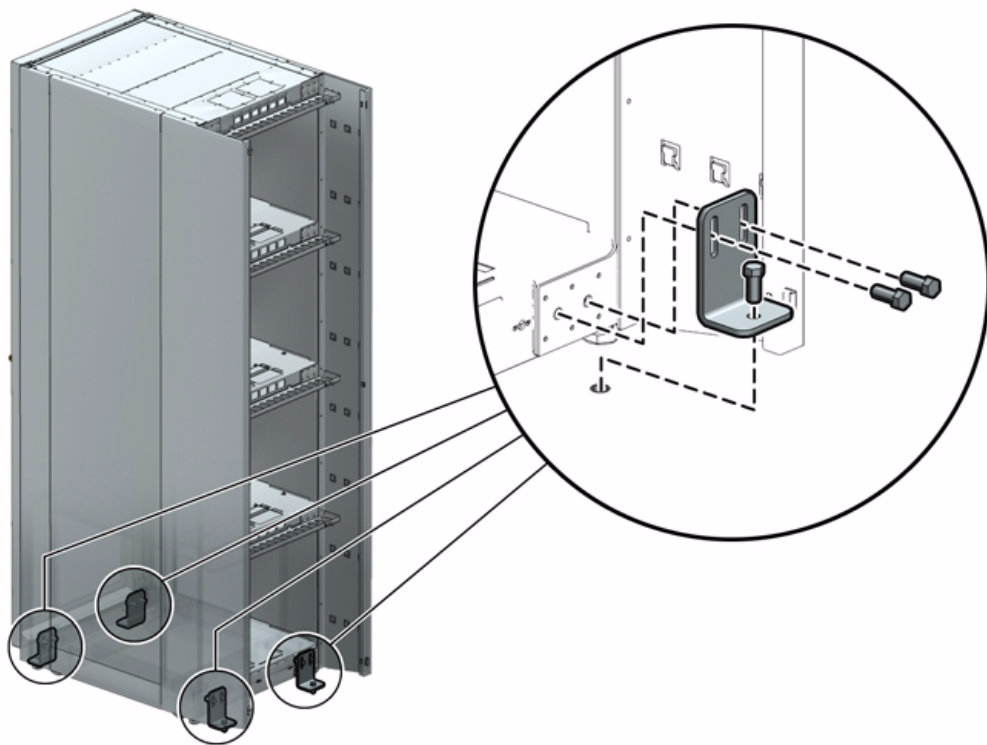
1. **Remove the metal plates from the bottom shelf on the front and back of the system.**

   The brackets are installed in four places: two on the front, two on the back.

2. Install the four brackets in the in two outer holes on each side of the chassis front and back.

Refer to FIGURE 4-23 for locations where the brackets should be installed on the chassis.

3. Secure the bottom of the each bracket to the hole in the platform underneath the chassis

Sun Blade 6048 ILOM 2.0 Information

This appendix contains ILOM 2.0 information that is specific to the Sun Blade 6048 modular system.

For additional information on using ILOM with the Sun Blade modular system, see the Sun Integrated Lights Out Manager 2.0 User's Guide, 820-1188.

The following topics are covered in this appendix:

A.1 Activating CMM Ethernet Ports

By default, Ethernet Port 0 is enabled on the CMM. You can enable Port 1 or enable both ports through the CLI or the web interface.

Caution – You can cause Ethernet networking problem and bring down the external network if you activate both Ethernet ports on the CMM. Before you activate both ports, make sure the external switch supports trunk mode. The upstream Ethernet switch needs to be configured correctly, so that no Ethernet traffic loop is created. This is done usually by the spanning tree algorithm.

A.1.1 To Enable Ethernet Ports Through the CLI

To enable port 1 via the CLI:

1. **Log in to the ILOM CLI:**

```
ssh root@ipaddress
```

2. **Type:**

```
cd /CMM/network.
```

3. **Type show to view the** `switchconf` **variable setting.**

   For example:

```
show
/CMM/network
    Targets:

    Properties:
        commitpending = (Cannot show property)
        ipaddress = 10.6.153.71
        ipdiscovery = dhcp
        ipgateway = 10.6.152.1
        ipnetmask = 255.255.252.0
        macaddress = 00:14:4F:6B:6F:C1
        pendingipaddress = 10.6.153.71
        pendingipdiscovery = dhcp
        pendingipgateway = 10.6.152.1
        pendingipnetmask = 255.255.252.0
        switchconf = port0

    Commands:
        cd
        set
        show

 switchconf = port1
```

In this example, the `switchconf` variable is set to `port0`

- To activate port 1 and disable port 0, type: **switchconf=port1**
- To activate port 1 and keep port 0 active, type **switchconf=trunk**

4. **Remove the CMM and reinstall it into the chassis.**

   The active port is now NET MGT port 1 or both NET MGT ports.

A.1.2 To Enable Ethernet Ports Through the Web Interface

To enable an Ethernet port via the web interface:

1. **Open a web browser and type the IP address of the server SP or CMM.**

   The Login page for the ILOM web interface appears.

2. **In the ILOM Login page, enter a user name and password then click OK.**

   The ILOM web interface appears.

3. **Click on CMM in the left panel.**

4. **Click the Configuration tab, then the Network tab.**

FIGURE A-1 ILOM Web Interface Network Screen
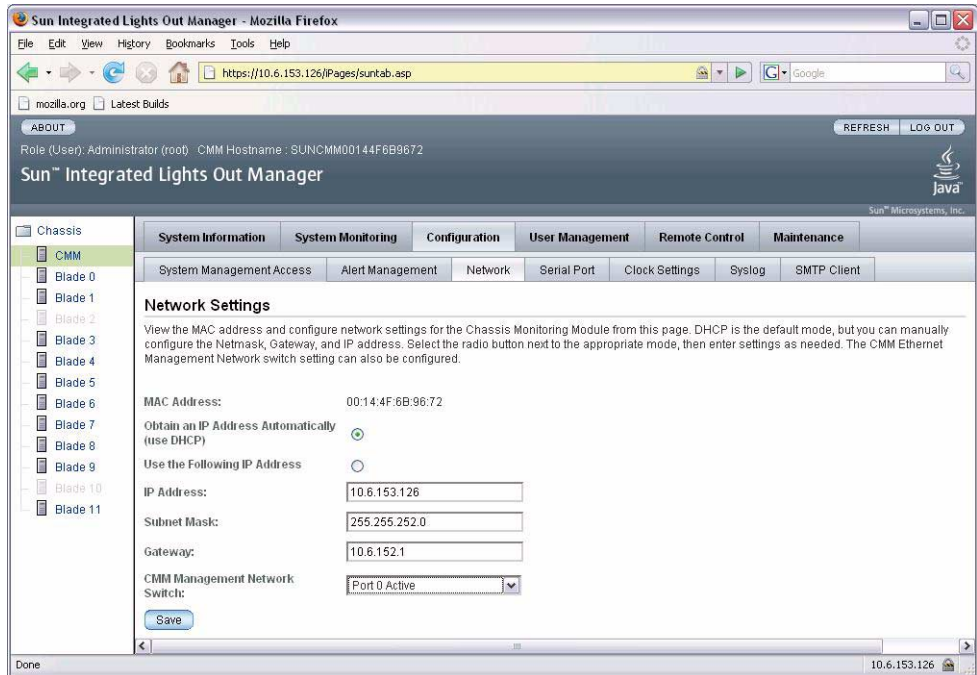
In the CMM Management Network Switch drop down list, select the port that you want to activate or Trunking (Link Aggregation) to activate both ports.

5. **Remove the CMM and reinstall it into the chassis.**

The active port is now NET MGT port 1 or both NET MGT ports.

A.2   ILOM Behavior With Two Power Cord Configuration

This section specifies how CMM and server module firmware behave when only two of the three power plugs are connected to an A231 power supply module.

There are three plugs on the back of each A231 PSU. These plugs are named AC0, AC1, and AC2. Each allow connection of a 220V power cord.When only two of the available three plugs is connected to the A231 PSUs, this will provide 5600 watts to the entire chassis.

If you connect only two of the total three plugs, connect them to AC0 and AC1. AC2 should not be connected.

For details on ILOM, refer to the *Sun Integrated Lights Out Manager 2.0 User's Guide*.

A.2.1   CMM Behavior

The following topics describe the CMM behavior when two power cords are connected to the power supply module.

You can use the following interfaces to view the power supply information:

- Section A.2.1.1, "IPMItool" on page A-6
- Section A.2.1.2, "CLI" on page A-6
- Section A.2.1.3, "Web Inferface" on page A-6

Note – The command samples in this section use the variable X to represent power supply 0 or power supply 1.

A.2.1.1   IPMItool

You can use the following ipmitool commands to view power supply information:

- **`ipmitool -H SPIPaddress -U root -P changeme sdr`**

  This command should display the following output:

  ```
  psX.status        | 0x08       | ok
  psX.pstate_0      | 0x01       | ok
  psX.pstate_1      | 0x01       | ok
  psX.pstate_2      | 0x02       | ok
  psX.I12V_2        | 0.00 Amps  | ok
  psX.ac0_fail      | 0x01       | ok
  psX.ac1_fail      | 0x01       | ok
  psX.ac2_fail      | 0x02       | ok
  ```

- **`ipmitool -H SPIPaddress -U root -P changeme sel elist`**

  This command should display output similar to the following:

  ```
  1100 | Pre-Init Time-stamp   | Power Supply psX.status | Presence detected
  | Deasserted
  1200 | Pre-Init Time-stamp   | Power Supply psX.status | Power Supply AC
  lost | Asserted
  1300 | Pre-Init Time-stamp   | Voltage psX.ac2_fail | Predictive Failure
  Asserted
  ```

A.2.1.2   CLI

`show /CMM/logs` command should produce output similar to the following:

```
8665    Thu Mar 19 03:15:44 1970   IPMI      Log       critical
ID =   1d : pre-init timestamp : Power Supply : psX.status : Power Supply
AC lost
8667    Thu Mar 19 03:15:44 1970   IPMI      Log       critical
ID =   1f : pre-init timestamp : Voltage : psX.ac2_fail : Predictive Failure
Asserted
```

A.2.1.3   Web Inferface

1. **Log into the ILOM web interface, using the SP IP address for the CMM.**

2. **Click on CMM.**

3. Click on System Monitoring tab, then Sensor Readings tab.

The following readings will be displayed:

```
/CH/PSX/STATUS = [Power Supply input lost (AC/DC)]
/CH/PSX/S2/PSTATE = State Deasserted
/CH/PSX/S2/AC_FAIL = Predictive Failure Asserted
```

A.2.2 Server Module Behavior

The following topics describe the CMM behavior when two power cords are connected to the power supply module.

You can use the following interfaces to view the power supply information:

This information applies for server modules running ILOM 2.0.

Note – The command samples in this section use the variable X to represent power supply 0 or power supply 1.

A.2.2.1 IPMItool

You can use the following ipmitool commands to view power supply information:

- **`ipmitool -H SPIPaddress -U root -P changeme sdr`**

This command should display the following output:

```
psX.vinok2        | 0x01           | ok
psX.pwrok2        | 0x01           | ok
```

- **`ipmitool -H SPIPaddress -U root -P changeme sel elist`**

This command should display output similar to the following:

```
a503 | 12/27/2005 | 14:55:45 | Power Supply psX.vinok2 | State
Deasserted
a603 | 12/27/2005 | 14:55:45 | Power Supply psX.pwrok2 | State
Deasserted
```

A.2.2.2   CLI

`show /SP/logs` command should produce output similar to the following:

```
8665    Thu Mar 19 03:15:44 1970  IPMI      Log        critical
ID =   1d : pre-init timestamp : Power Supply : psX.vinok2 : State
Deasserted
8667    Thu Mar 19 03:15:44 1970  IPMI      Log        critical
ID =   1f : pre-init timestamp : Voltage : psX.pwrok2 : State
Deasserted
```

A.2.2.3   Web Interface

1. Log into the ILOM web interface using the SP IP of the server module.

2. Click on System Monitoring tab, then Sensor Readings tab.

The following readings will be displayed:

```
/SYS/PS1/VINOK2 = State Deasserted
/SYS/PS1/PWROK2 = State Deasserted
/SYS/PS0/VINOK2 = State Deasserted
/SYS/PS0/PWROK2 = State Deasserted
```

A.3 ILOM Sensor Information

The chassis includes a number of sensors that generate entries in the system event log (SEL) when the sensor crosses a threshold. Many of these readings are used to adjust the fan speeds and perform other actions, such as illuminating LEDs and powering off the chassis.

These sensors can also be configured to generate IPMI PET traps as, described in the *Integrated Lights Out Manager (ILOM) Administration Guide* 820-0280.

> **Caution –** Do not use any interface other than the ILOM CLI or web GUI to alter the state or configuration of any sensor or LED. Doing so could void your warranty.

A.3.1 Basic Status Sensors

nem*n*.prsnt

These sensors report whether the network express modules (NEMs) are present. NEMs are numbered from 0.

TABLE 1   nem*n*.prsnt Readings

Reading	State	Event	Description	Action
0x0001	Device Absent	Yes	NEM is absent.	none
0x0002	Device Present	Yes	NEM is present.	none

A.3.2 Power Supply Sensors

There are two power supplies in the chassis. Each power supply has two AC input lines and two DC output lines. All are numbered from 0.

`psn.prsnt`

Reports the presence of the power supply.

TABLE 2   `psn.prsnt Readings`

Reading	State	Event	Description	Action
0x0001	Device Absent	Yes	Power Supply is absent.	none
0x0002	Device Present	Yes	Power Supply is present.	none

`psn.vinokn`

Reports the status of the AC input lines for each power supply.

TABLE 3   `psn.vinokn Readings`

Reading	State	Event	Description	Action
0x0001	State Deasserted	Yes	Power Supply is disconnected from AC power.	System Alert LED is SLOW
0x0002	State Asserted	Yes	Power Supply is connected to AC power.	System Alert LED is OFF

`psn.pwrokn`

Reports status of DC output lines for each power supply.

TABLE 4   `psn.pwrokn` Readings

Reading	State	Event	Description	
0x0001	State Deasserted	Yes	DC output is off.	none
0x0002	State Asserted	Yes	DC output is on.	none

A.3.3   Fan Sensors

The chassis contains eight fan modules. Each module contains two fans. Modules and fans are numbered from 0.

fm*n*.f*n*.speed

These sensors report individual fan speeds. All fan speed sensors are configured to generate the same events and all faults are handled in the same way. They are not monitored when the chassis is powered off.

TABLE 5   Fan Speed Events

Threshold	Direction	Event	Description
Lower Non-Recoverable	Assert	Yes	Fan speed has decreased below lower non-recoverable threshold. This indicates that the fan has failed or has been removed.
Lower Non-Recoverable	Deassert	Yes	Fan speed has returned to normal from lower non-recoverable. This indicates that the fan has returned to normal or has been replaced.

fm*n*.fail

These sensors report fan module failure status.

TABLE 6   fm*n*.fail Readings

Reading	State	Event	Description
0x0001	Predictive Failure Deasserted	No	This state indicates that the fan module has not failed.
0x0002	Predictive Failure Asserted	Yes	This state indicates that the fan module has failed.

A.3.4 Server Module Present

bl*n*.prsnt

These sensors report whether server modules are present in the specified slots. Slots are numbered from 0.

TABLE 7 Server Module Present States

Reading	State	Event	Description
0x0001	State Deasserted	No	This state indicates that the server module is not present.
0x0002	State Asserted	No	This state indicates that the server module is present.

A.3.5 Chassis Sensors

ch.t_ovrd

This sensor reports if any blade is requesting full fan speed due to high temperature.

TABLE A-1 Full Fan Speed State

Reading	State	Event	Description
0x0001	State Deasserted	No	This state indicates that no blade is requesting full fan speed
0x0002	State Asserted	No	This state indicates that one ore more blades is requesting full fan speed.

ch.t_amb_*n*

Two sensors, ch.t_am_0 and ch.t_amb_1, report ambient temperature in the chassis midplane. These are for monitoring only; no threshold is defined.

ch.pwrctl.state

Reports power supply oversubscription state.

.

TABLE A-2   Power supply oversubscription state

Reading	State	Event	Description
0x0001	State Deasserted	No	Power supplies are not oversubscribed; blades are allowed to turn on.
0x0002	State Asserted	No	Power supplies are oversubscribed; blades are not allowed to turn on.

A.3.6   Readings for Specific Cases

This section shows some of the sensor readings for the SEL in cases that are specific to the Sun Blade 6048 modular system.

A.3.6.1   CMM Boots

When the CMM boots up, the SEL displays the readings shown in TABLE A-3.

TABLE A-3   CMM Boot SEL Readings

Sensor ID	Device	State	Description
100	Entity Presence nem0.prsnt	Device Present	NEM 0 is present.
200	Entity Presence ps0.prsnt	Device Present	Power supply (PSU) 0 is present.
300	Entity Presence ps1.prsnt	Device Present	PSU 1 is present.
400	Voltage ps0.pstate_0		State Asserted	All the 4 ACs are connected and DC output fine.
500	Voltage ps0.pstate_1	State Asserted	All the 4 ACs are connected and DC output fine.
600	Voltage ps1.pstate_0	State Asserted	All the 4 ACs are connected and DC output fine.
700	Voltage ps1.pstate_1	State Asserted	All the 4 ACs are connected and DC output fine.
800	Entity Presence bl0.prsnt	Device Present	Blade 0 is present.
900	Entity Presence bl1.prsnt	Device Present	Blade 1 is present.
a00	Entity Presence bl2.prsnt	Device Present	Blade 2 is present.
b00	Entity Presence bl3.prsnt	Device Present	Blade 3 is present.

Sensor ID	Device	State	Description
c00	Entity Presence bl4.prsnt	Device Present	Blade 4 is present.
d00	Entity Presence bl5.prsnt	Device Present	Blade 5 is present.
e00	Entity Presence bl6.prsnt	Device Present	Blade 6 is present.
f00	Entity Presence bl7.prsnt	Device Present	Blade 7 is present.
1000	Entity Presence bl8.prsnt	Device Present	Blade 8 is present.
1100	Entity Presence bl9.prsnt	Device Present	Blade 9 is present.
1200	Entity Presence bl10.prsnt	Device Present	Blade 10 is present.
1300	Entity Presence bl11.prsnt	Device Present	Blade 11 is present.

A.3.6.2   AC Cables Are Disconnected

When three of the AC cables get disconnected, the SEL displays the readings shown in .

Note – The order of the events might not the real time event exactly, because that is based on how the sensors are being scanned:

TABLE A-4   AC Cable Disconnect SEL Readings

Sensor ID	Device	State	Description
1400	Voltage ps0.pstate_0	State Deasserted	PSU 0 side 0' DC output is out (because AC is unplugged).
1500	Voltage ps0.ac1_fail	Predictive Failure Asserted	PSU0 side 1 AC is disconnected.
1600	Power Supply ps0.status	Presence detected | Deasserted	Presence of PSU 1 is detected.
1700	Power Supply ps0.status	Power Supply AC lost | Asserted	At least one AC input is lost to power supply 0.
1800	Voltage ps0.ac0_fail	Predictive Failure Asserted	PSU 0 side 0 AC is disconnected.

TABLE A-4   AC Cable Disconnect SEL Readings *(Continued)*

Sensor ID	Device	State	Description
1900	Voltage ps0.pstate_1	State Deasserted	PSU 0 side 1 DC output is out.
1a00	Power Supply ch.pwrctl.state	Predictive Failure Asserted	There is now not enough power for chassis.
1b00	Voltage ps1.pstate_1	State Deasserted	PSU 1 side 1 DC output is out.

A.3.6.3   All the AC Cables Get Disconnected, Then Plugged Back In

When all of the AC cables get disconnected, then plugged back in the SEL displays the readings shown in TABLE A-5.

TABLE A-5   AC Cables Re-inserted SEL Readings

Sensor ID	Device	State	Description
1c00	Entity Presencenem0.prsnt	Device Present	NEM 0 is present.
1d00	Entity Presence ps0.prsnt	Device Present	PSU 0 is present.
1e00	Entity Presence ps1.prsnt	Device Present	PSU 1 is present.
1f00	Voltage ps0.pstate_0	State Asserted	PSU 0 side 0 is connected.
2000	Voltage ps0.pstate_1	State Asserted	PSU 0 side 1 is connected.
2100	Voltage ps1.pstate_0	State Asserted	PSU 1 side 0 is connected.
2200	Voltage ps1.pstate_1	State Asserted	PSU 1 side 1 is connected.
2300	Entity Presence bl0.prsnt	Device Present	Blade 0 is present.
2400	Entity Presence bl1.prsnt	Device Present	Blade 1 is present.
2500	Entity Presence bl2.prsnt	Device Present	Blade 2 is present.
2600	Entity Presence bl3.prsnt	Device Present	Blade 3 is present.
2700	Entity Presence bl4.prsnt	Device Present	Blade 4 is present.
2800	Entity Presence bl5.prsnt	Device Present	Blade 5 is present.
2900	Entity Presence bl6.prsnt	Device Present	Blade 6 is present.
2a00	Entity Presence bl7.prsnt	Device Present	Blade 7 is present.
2b00	Entity Presence bl8.prsnt	Device Present	Blade 8 is present.

Sensor ID	Device	State	Description
2c00	Entity Presence bl9.prsnt	Device Present	Blade 9 is present.
2d00	Entity Presence bl10.prsnt	Device Present	Blade 10 is present.
2e00	Entity Presence bl11.prsnt	Device Present	Blade 11 is present.

A.3.6.4   Stop /CH

When the stop /CH command is applied, the SEL displays the readings shown in TABLE A-6 .

TABLE A-6   Stop /CH SEL Readings

Sensor ID	Device	State	Description
2f00	Power Supply ch.pwrctl.state	Predictive Failure Asserted	Not enough power, since the PSU shuts off.
3000	ps0.pstate_0	State Deasserted	PSU 0 side 0 is out.
3100	ps1.pstate_1	State Deasserted	PSU 1 side 1 is out.
3200	ps1.pstate_0	State Deasserted	PSU 1 side 0 is out.
3400	ps0.pstate_1	State Deasserted	PSU 0 side 1 is out.

A.3.6.5   Start /CH

When the start /CH command is applied, the SEL displays the readings shown in TABLE A-7.

TABLE A-7   Start /CH SEL Readings

Sensor ID	Device	State	Description
3500	Voltage ps1.pstate_0 |	State Asserted	PSU 1 side 0 is on.
3700	ps0.pstate_1	State Asserted	PSU 0 side 1 is on.
3800	Power Supply ch.pwrctl.state	Predictive Failure Deasserted	Now there is enough power for the chassis.
3900	Voltage ps0.pstate_0	State Asserted	PSU 0 side 0 is on.
3a00	Voltage ps1.pstate_1	State Asserted	PSU 1 side 1 is on.

A.3.6.6 One PSU Is Removed

When one PSU is removed, and there is too much power consumption in the chassis to support PSU redundancy, the SEL displays the readings shown in TABLE A-8.

TABLE A-8 PSU Removed SEL Readings

Sensor ID	Device	State	Description
3b00	Power Supply ch.pwrctl.state	Predictive Failure Asserted	Not enough power is available for the chassis.
3c00	Entity Presence ps1.prsnt	Device Absent	PSU 1 is absent from the system.

A.3.6.7 PSU Is Re-inserted

TABLE A-9 shows the SEL readings as a PSU is reinserted into the system and the system recognized that power has been re-applied.

TABLE A-9 PSU Re-inserted SEL Readings

Sensor ID	Device	State	Description
3d00	Entity Presence ps1.prsnt	Device Present	Re-insert PSU 1.
3e00	Voltage ps1.pstate_0	State Deasserted	PSU 1 power was off.
3f00	Voltage ps1.pstate_0	State Asserted	PSU 1 power is on.
4000	Power Supply ch.pwrctl.state	Predictive Failure Deasserted	Now there is enough power for chassis.

Power Management

The amount of power used by the blades and other components cannot exceed the amount of power provided by the power supply units (PSUs). If demand exceeds supply, the PSUs might shut down completely and without warning. There are two things you can do to avoid this situation:

■ When planning the system, calculate the power needs of your blades and other components, and verify that they do not exceed the power available. The power consumption data you need is provided in Section B.1, "Determining Power Requirements" on page B-1.

■ Use the power management system of the chassis ILOM to monitor power usage and to configure backup power supplies. See Section B.2, "ILOM Power Management Features" on page B-6.

B.1   Determining Power Requirements

The power requirement of a blade system is the sum the following:

■ Power requirement of the chassis itself, including the CMM, but not including any blades, modules, or fans.

■ Total power required for the blades, including power for internal options (processors and DIMMs) as well as power for external components attached to each blade.

■ Total power required by Network Express Modules (NEMs).

■ Total power required by fans.

The following sections contain the power consumption values assumed by the CMM ILOM. These are the values you should use for planning your system. The actual power consumption of real-world components may be significantly lower than the ILOM's assumed values. However you must plan using the ILOM's assumed values

in order to avoid triggering the safety features of the ILOM's power management system. See Section B.2, "ILOM Power Management Features" on page B-6 for more information.

B.1.1 Power Required by the Chassis

The chassis requires 20W. This figure includes power used by the CMM, but does not include power used by blades, modules, or fans.

B.1.2 Power Required by Blades

A blade's power requirement is the sum of the following:

■ The base power requirement for the blade. This value includes power required by the blade motherboard and service processor, but does not include power required by any optional components.

■ The power requirements of any processors.

■ The power requirements of any DIMMs.

■ The power requirements of any disks.

■ The power requirements of any attached PCI Express Modules (PCI EMs).

■ The power requirements of any attached Raid Expansion Modules (REMs).

■ The power requirements of any attached Expansion Modules (FEM).

For example, suppose you are estimating the power requirement for a maximally configured Sun Blade X6250, with the highest-powered processors. Its power consumption is given in TABLE B-1.

TABLE B-1   Power Requirements for Maximally Configured Sun Blade X6250.

Component	Requirement Per Component	Number of Components	Subtotal
Blade (Base Requirement)	50W	1	50W
Processors	120W	2	240W
PCI EMs	25W	2	50W
DIMMs	11W	16	176W
		Total	**603W**

TABLE B-1   Power Requirements for Maximally Configured Sun Blade X6250.

Component	Requirement Per Component	Number of Components	Subtotal
Disks	12W	4	48W
REM	14W	1	14W
FEM	25W	1	25W
		Total	603W

Power requirements for blade products and their components are given in the following tables. Note that PCI EMs always require 25W; this value is repeated in each table for ease of reference.

TABLE B-2   Power Requirements for Sun Blade X6220 and Its Components

Component	Requirement Per Component	Possible Number of Components
Blade (Base Requirement)	25W	1
Processor	68W/95W/120W	1-2
PCI EMs	25W	0-2
DIMMs	6W	2-16
Disks	11W	0-4
REM	N/A	0
FEM	N/A	0

TABLE B-3   Power Requirements for Sun Blade X6240 and its Components

Component	Requirement Per Component	Possible Number of Components
Blade (Base Requirement)	25W	1
Processor	68W/95W	1-4
PCI EMs	25W	0-2
DIMMs	6W	2-32

TABLE B-3   Power Requirements for Sun Blade X6240 and its Components

Component	Requirement Per Component	Possible Number of Components
Disks	N/A	0
REM	N/A	0
FEM	N/A	0

TABLE B-4   Power Requirements for Sun Blade X6250 and its Components

Component	Requirement Per Component	Possible Number of Components
Blade (Base Requirement)	50W	1
Processor	50W/80W/120W	1-2
PCI EMs	25W	0-2
DIMMs	11W	2-16
Disks	12W	0-4
REM	14W	0-1
FEM	25W	0-1

TABLE B-5   Power Requirements for Sun Blade T6300 and its Components

Component	Requirement Per Component	Possible Number of Components
Blade (Base Requirement)	250W	1
Processor	N/A	0
PCI EMs	25W	0-2
DIMMs	6W	2-16
Disks	N/A	0
REM	N/A	0
FEM	N/A	0

TABLE B-6   Power Requirements for Sun Blade T6320 and its Components

Component	Requirement Per Component	Possible Number of Components
Blade (Base Requirement)	550W	1
Processor	N/A)	0
PCI EMs	25W	0-2
DIMMs	N/A	0
Disks	N/A	0
REM	N/A	0
FEM	N/A	0

TABLE B-7   Power Requirements for Sun Blade 6000 Storage Module and its Components

Component	Requirement Per Component	Possible Number of Components
Blade (Base Requirement)	50W	1
Processor	N/A	0
PCI EMs	N/A	0
DIMMs	N/A	0
Disks	12W	0-8
REM	N/A	0
FEM	N/A	0

B.1.3 Power Estimates for Network Express Modules (NEMs)

A chassis can contain 1 or 2 NEMs, which must be the same model. Power requirements for each model are specified in TABLE B-8.

TABLE B-8   NEM Power Requirements

NEM Type	Power Requirement for Each NEM
Basic NEM	0
NEM+	24W
IB NEM	173W
Hydra NEM	80W

B.1.4 Power Requirements for Fans

A chassis has two kinds of fans:

- Fans in fan modules. Each module requires 65W.
- Fans in power supplies. Each power supply requires 72W.

B.2 ILOM Power Management Features

The CMM ILOM power management system performs two functions:

- It reports values for power consumption and PSU power efficiency.
- It determines the power requirements of installed components, and only allows a blade to power up if doing so does not increase power requirements past power available. The power requirements assumed by the CMM ILOM are documented in Section B.1, "Determining Power Requirements" on page B-1.

You can access power data and also configure the power management system through the CMM ILOM WebGUI, under the System Monitoring/Power Management tab, as shown in FIGURE B-1.

FIGURE B-1   Power Management Tab in CMM ILOM WebGUI

This information and configuration is also available through the ILOM command line:

TABLE 0-1

```
-> show /CMM/powermgmt
 /CMM/powermgmt
    Targets:
        1 (Chassis DC Consumed Power)
        2 (Chassis AC Consumed Power)
        3 (PSU 0 AC Consumed Power)
        4 (PSU 0 DC Consumed Power)
        5 (PSU 0 Power Efficiency)
        6 (PSU 1 AC Consumed Power)
        7 (PSU 1 DC Consumed Power)
        8 (PSU 1 Power Efficiency)
    Properties:
        reserve_psus = 0
        total_psus = 2
```

For more information, refer to the documentation for your version of the ILOM.

The power management system automatically determines the amount of power available from installed PSUs. You can set aside one PSU as a reserve by setting the "Reserve Power Supplies" field in the WebGUI to "1.". You can also set the reserve_psus property from the command line. Setting aside a reserve PSU reduces available power by 50%.

Caution – Before setting aside a reserve PSU, verify that currently powered-up blades will have their power requirements met by the single remaining PSU.

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