

SPARC T5-4 Server Service Manual



Part No: E29663-14
February 2019

Part No: E29663-14

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Using This Documentation

- **Overview** – Describes how to troubleshoot and maintain the server
- **Audience** – Technicians, system administrators, and authorized service providers
- **Required knowledge** – Advanced experience troubleshooting and replacing hardware

Product Documentation Library

Documentation and resources for this product and related products are available at <http://www.oracle.com/goto/t5-4/docs>.

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Identifying Components

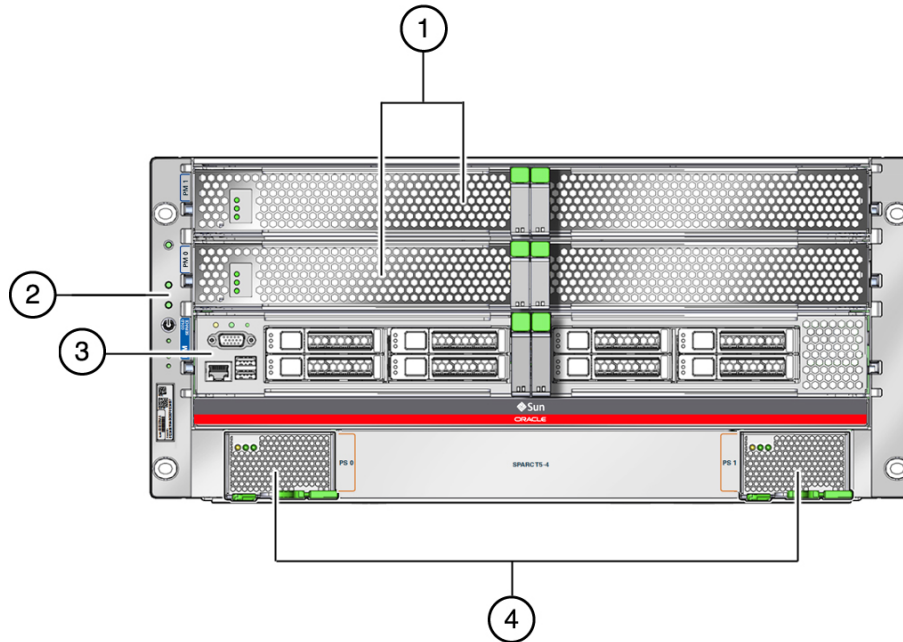
These topics identify key components of the server, including major boards and internal system cables, as well as front and rear panel features.

- [“Front Panel Components” on page 14](#)
- [“Rear Panel Components” on page 15](#)
- [“Chassis Subassembly Components” on page 17](#)
- [“Processor Module Components” on page 18](#)
- [“Main Module Components” on page 19](#)
- [“Supported Storage and Backup Devices” on page 20](#)
- [“Component Service Task Reference” on page 20](#)

Related Information

- [“Detecting and Managing Faults” on page 23](#)
- [“Preparing for Service” on page 47](#)
- [“Returning the Server to Operation” on page 199](#)

Front Panel Components

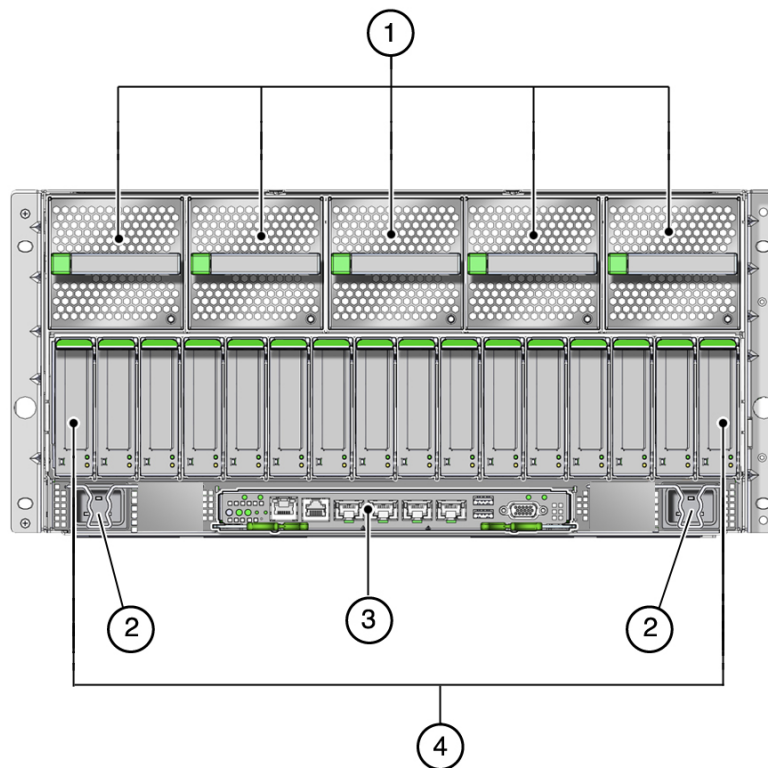


No.	Description	Links
1	Processor modules (slots 0 and 1) or processor filler module (slot 1 only)	“Processor Module Components” on page 18 “Servicing Processor Modules” on page 59
2	Control panel	“Detecting and Managing Faults” on page 23 “Preparing for Service” on page 47 “Returning the Server to Operation” on page 199
3	Main module	“Main Module Components” on page 19 “Servicing the Main Module” on page 101
4	Power supplies (2)	“Servicing Power Supplies” on page 141

Related Information

- [“Rear Panel Components” on page 15](#)
- [“Servicing Processor Modules” on page 59](#)
- [“Servicing Power Supplies” on page 141](#)

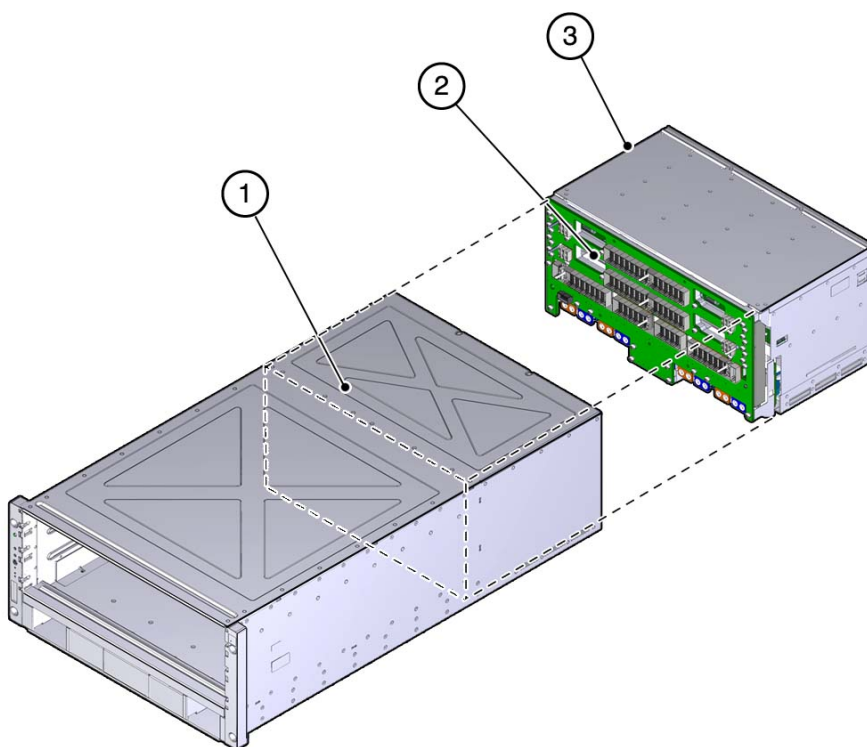
Rear Panel Components



No.	Description	Links
1	Fan modules (5)	“Servicing Fan Modules” on page 151
2	AC power connectors (2)	“Preparing for Service” on page 47
3	Rear I/O module	“Servicing the Rear I/O Module” on page 181

No.	Description	Links
4	PCIe carriers (16)	“Servicing PCIe Cards” on page 159

These components are accessible within the rear chassis subassembly, which you can access after you have removed all the components from the rear of the server.



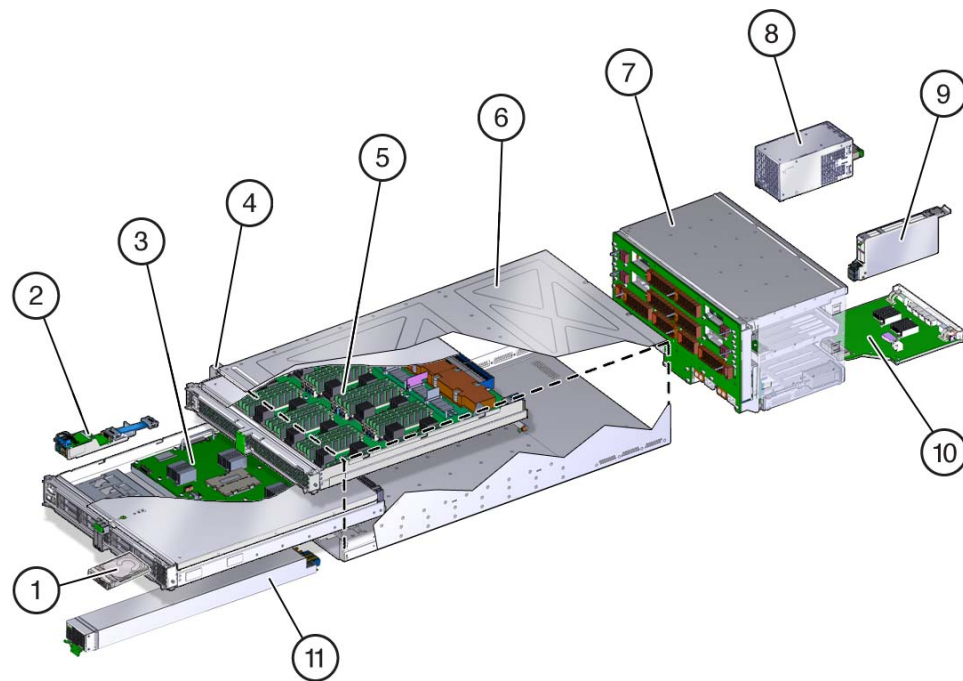
No.	Description	Links
1	Server chassis	
2	Midplane assembly	“Servicing the Rear Chassis Subassembly” on page 191
3	Rear chassis subassembly	“Servicing the Rear Chassis Subassembly” on page 191

Related Information

- [“Servicing Fan Modules” on page 151](#)
- [“Servicing Power Supplies” on page 141](#)

- [“Servicing the Rear I/O Module” on page 181](#)
- [“Servicing PCIe Cards” on page 159](#)
- [“Servicing the Rear Chassis Subassembly” on page 191](#)

Chassis Subassembly Components



No.	Description	Links
1	Hard drives (8)	“Servicing Hard Drives” on page 91
2	Front I/O assembly	“Servicing the Front I/O Assembly” on page 137
3	Main module	“Servicing the Main Module” on page 101
4	System controls and indicators	“Front Panel Controls and LEDs” on page 30
5	Processor modules (2)	“Servicing Processor Modules” on page 59
6	System chassis	
7	Rear chassis subassembly (RCSA)	“Servicing the Rear Chassis Subassembly” on page 191

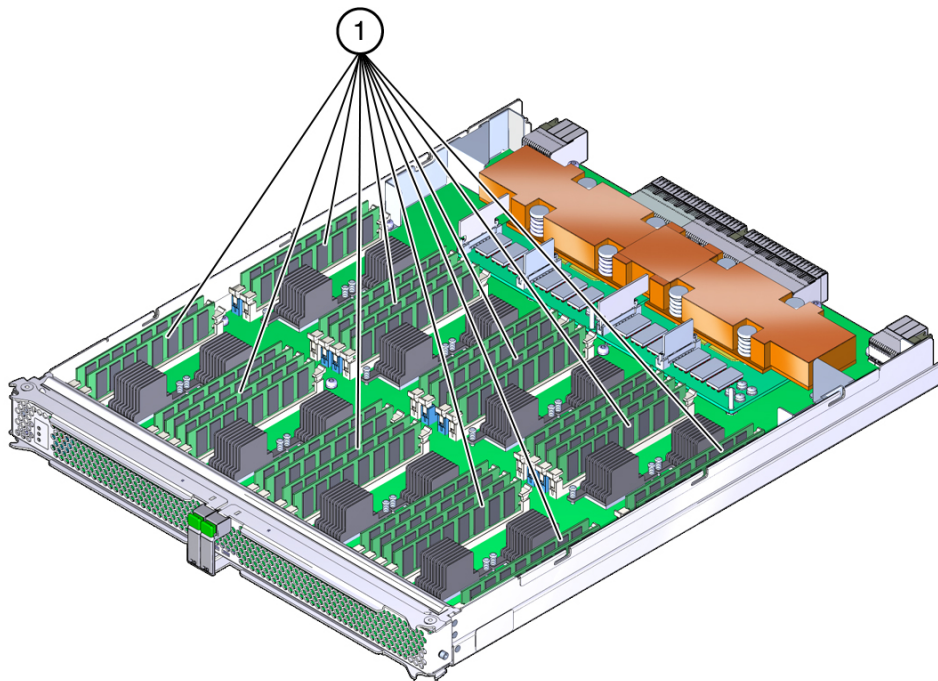
No.	Description	Links
8	Fan modules (5)	“Servicing Fan Modules” on page 151
9	PCIe carriers (16)	“Servicing PCIe Cards” on page 159
10	Rear I/O module	“Servicing the Rear I/O Module” on page 181
11	Power supplies (2)	“Servicing Power Supplies” on page 141

Related Information

- [“Rear Panel Components” on page 15](#)
- [“Component Service Task Reference” on page 20](#)

Processor Module Components

These components are accessible within the processor module when you remove the processor module from the front of the server.



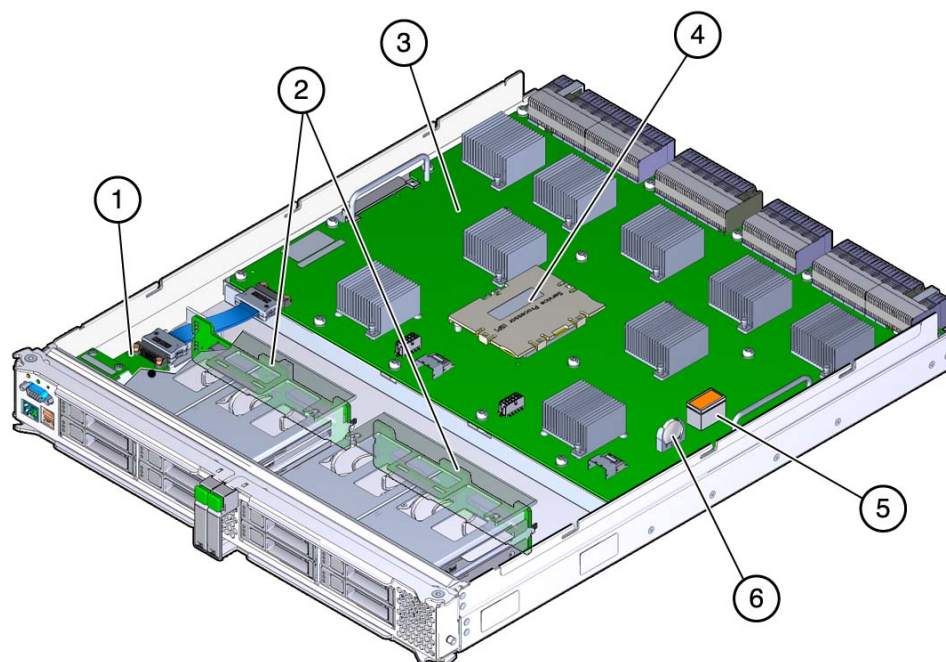
No.	Description	Link
1	DIMMs	“Servicing DIMMs” on page 73

Related Information

- [“Servicing Processor Modules” on page 59](#)
- [“Servicing DIMMs” on page 73](#)

Main Module Components

These components are accessible after you remove the main module from the front of the server.



No.	Description	Links
1	Front I/O assembly and cables	“Servicing the Front I/O Assembly” on page 137
2	Storage backplanes	“Servicing the Storage Backplanes” on page 111
3	Main module motherboard	
4	Service processor card	“Servicing the Service Processor Card” on page 119
5	System configuration PROM	“Servicing the System Configuration PROM” on page 127
6	System battery	“Servicing the System Battery” on page 131

Related Information

- [“Front Panel Components” on page 14](#)
- [“Component Service Task Reference” on page 20](#)
- [“Servicing the Main Module” on page 101](#)

Supported Storage and Backup Devices

The server supports the following storage devices:

- Fibre channel arrays (SATA, FC, flash, and SAS-2)
- SAS arrays (SAS-2)
- ZFS appliances (SAS-2)

The server also supports these types of tape backup and restore devices:

- TCP/IP
- Fibre channel
- SAS
- LVD SCSI

Related Information

- [“Servicing Hard Drives” on page 91](#)

Component Service Task Reference

This table lists the names of serviceable components. It also lists the system names and task locations for the components.

Component	Max.	NAC Name	SDM Name	Link to Service Procedure
Processor module	2	/SYS/PMx	/System/CPU_Modules/ CPU_Module_x	“Servicing Processor Modules” on page 59
Processor filler module	1	/SYS/PFMx		“Servicing Processor Modules” on page 59
DIMM	64	/SYS/PMx/CMx/CMP/ BOBx/CHx/Dx	/System/Memory/DIMMs/DIMM_x	“Servicing DIMMs” on page 73
Hard drive	8	/SYS/SASBPx/HDDx	/System/Storage/Disks/ Disks_x	“Servicing Hard Drives” on page 91
Main module	1	/SYS/MB	None	“Servicing the Main Module” on page 101
Storage backplane	2	/SYS/SASBPx	None	“Servicing the Storage Backplanes” on page 111
SP card	1	/SYS/MB/SP	/SP	“Servicing the Service Processor Card” on page 119
System PROM	1	/SYS/MB/SCC	None	“Servicing the System Configuration PROM” on page 127
System battery	1	/SYS/MB/BAT	None	“Servicing the System Battery” on page 131
Front I/O assembly	1	/SYS/FIO	None	“Servicing the Front I/O Assembly” on page 137
Power supply	2	/SYS/PSx	/System/Power/ Power_Supplies/ Power_Supply_x	“Servicing Power Supplies” on page 141
Fan module	5	/SYS/RCSA/FBD0/FMx	/System/Cooling/Fans/Fan_x	“Servicing Fan Modules” on page 151
PCIe card	16	/SYS/RCSA/PCIEx/CAR/ CAR/CARD	/System/PCI_Devices/Add-on/ Device_x	“Servicing PCIe Cards” on page 159
Rear IO module	1	/SYS/RIO	/System/Networking/ Ethernet_NICs	“Servicing the Rear I/O Module” on page 181
Rear chassis subassembly (RCSA)	1	/SYS/RCSA	None	“Servicing the Rear Chassis Subassembly” on page 191

Related Information

- [“Detecting and Managing Faults” on page 23](#)
- [“Preparing for Service” on page 47](#)
- [“Returning the Server to Operation” on page 199](#)
- [“Matching Devices to Device Names” in SPARC and Netra SPARC T5 Series Servers Administration Guide](#)

Detecting and Managing Faults

These topics explain how to use various diagnostic tools to monitor server status and troubleshoot faults in the server. The examples use the PSH `fmadm faulty` command.

- [“Understanding Diagnostics” on page 23](#)
- [“Interpreting LEDs” on page 29](#)
- [“Configuring POST” on page 34](#)
- [“Managing Faults” on page 40](#)
- [“Interpreting Log Files and System Messages” on page 44](#)

Related Information

- [“Identifying Components” on page 13](#)
- [“Preparing for Service” on page 47](#)
- [“Component Service Task Reference” on page 20](#)
- [“Returning the Server to Operation” on page 199](#)
- [Oracle ILOM Documentation](#)

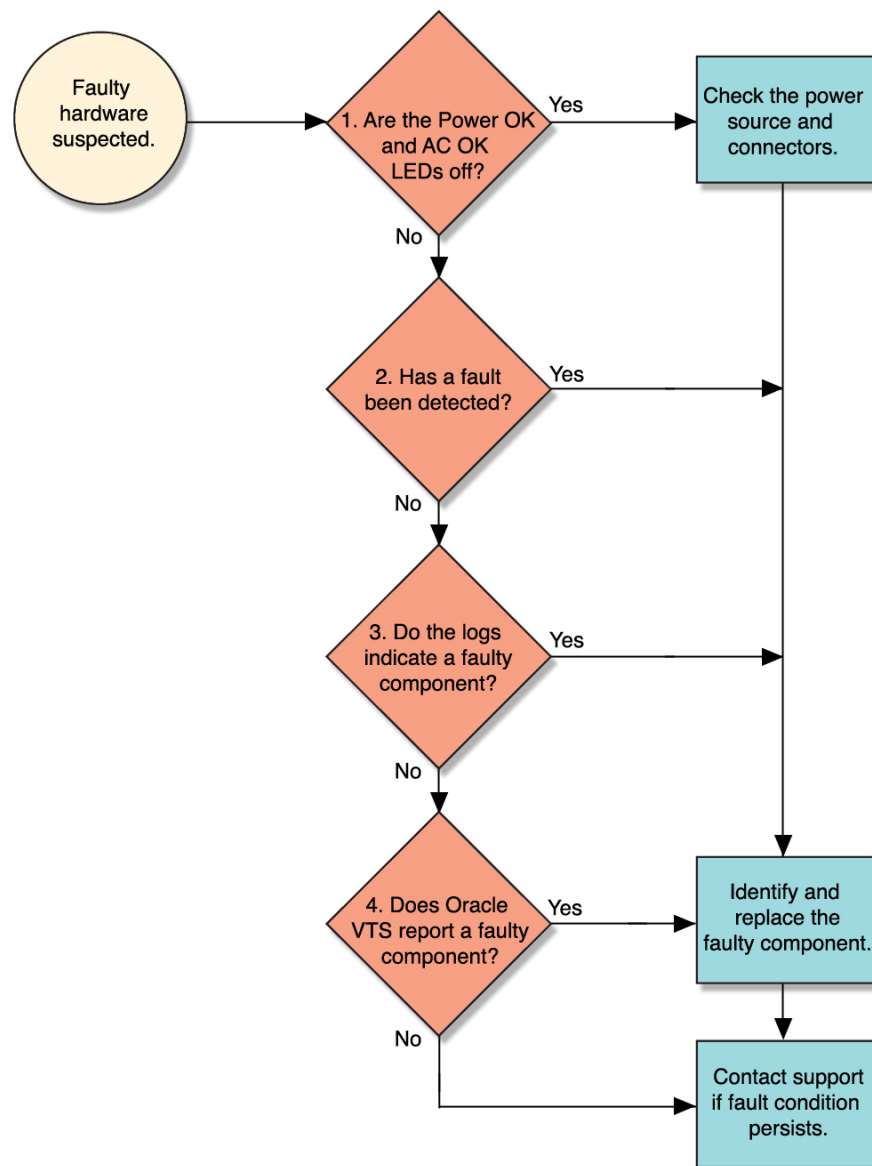
Understanding Diagnostics

These topics explain the diagnostic process and tools.

- [“Diagnostics Process” on page 24](#)
- [“Tool Availability” on page 26](#)
- [“Log In to Oracle ILOM \(Service\)” on page 27](#)
- [“Oracle ILOM Service-Related Tools” on page 28](#)

Diagnostics Process

Depending on the fault, you might need to perform all of the steps or just some of them. You also might have to run diagnostic software that needs to be installed or enabled.



Note - The diagnostic tools you use, and the order in which you use them, depend on the nature of the problem you are troubleshooting. However, for descriptive purposes, this table follows the steps given in the illustration.

Step	Diagnostic Action	Possible Outcome	Links
1.	Confirm that the Power OK and AC OK LEDs are lit.	If these LEDs are not lit, check the power source and power connections to the server.	■ “Interpreting LEDs” on page 29
2.	Check the server for detected faults.	Use these tools to check for faults: <ul style="list-style-type: none"> ■ System LEDs on the front and rear panels. ■ <code>fmadm faulty</code> from the Oracle Solaris prompt or through the Oracle ILOM fault management shell. ■ <code>show faulty</code> from the Oracle ILOM. prompt or through the Open Problems BUI ■ Datacenter management tools, such as Oracle Enterprise Manager Ops Center. 	“Check for Faults” on page 40
3.	Check the log files for fault information.	If system messages indicate a faulty component, replace it.	“Interpreting Log Files and System Messages” on page 44
4.	Run Oracle VTS software.	To run Oracle VTS, the server must be running the Oracle Solaris OS. <ul style="list-style-type: none"> ■ If Oracle VTS reports a faulty component, replace it. ■ If Oracle VTS does not report a faulty component, run POST. 	<ul style="list-style-type: none"> ■ Refer to the Oracle VTS software documentation. ■ Contact technical support if the problem persists.

Related Information

- [“Tool Availability” on page 26](#)
- [“Log In to Oracle ILOM \(Service\)” on page 27](#)
- [“Oracle ILOM Service-Related Tools” on page 28](#)
- [Oracle ILOM Documentation](#)

Tool Availability

This table describes what tools are available at the different states in which the server operates.

Tool	Standby Power	OpenBoot Prompt	Oracle Solaris Prompt
Status LEDs	Yes	Yes	Yes
PSH commands	Yes	No	Yes
Oracle ILOM logs and commands	Yes	No	No
OpenBoot commands	No	Yes	No
Oracle Solaris logs and commands	No	No	Yes
Oracle VTS	No	No	Yes (if installed)
Third-party software	No	No	Yes (if installed)

Related Information

- [“Diagnostics Process” on page 24](#)
- [“Log In to Oracle ILOM \(Service\)” on page 27](#)
- [“Oracle ILOM Service-Related Tools” on page 28](#)
- [Oracle ILOM Documentation](#)

▼ Log In to Oracle ILOM (Service)

1. **At the terminal prompt, type:**

```
ssh root@IP-address  
Password: password
```

```
Oracle (R) Integrated Lights Out Manager
```

```
Version 3.2.1.2 rXXXXX
```

```
Copyright (c) 2013, Oracle and/or its affiliates. All rights  
reserved.
```

```
->
```

Note - To enable first-time login and access to Oracle ILOM, a default Administrator account and its password are provided with the system. To build a secure environment, you must change the default password (changeme) for the default Administrator account (root) after your initial login to Oracle ILOM. If this default Administrator account has since been changed, contact your system administrator for an Oracle ILOM user account with Administrator privileges.

2. **Enable the Oracle ILOM 3.0 legacy name spaces.**

```
-> set /SP/cli legacy_targets=enabled
```

Note - In Oracle ILOM 3.1, the name spaces for /SYS and /STORAGE were replaced with /System. You can still use the 3.0 legacy names in commands at any time, but to expose the legacy names in the output, you must enable them. This manual uses the legacy names in the command examples and shows the names in the output examples. For more information about the new name spaces, see the Oracle ILOM documentation.

Related Information

- [“Diagnostics Process” on page 24](#)
- [“Tool Availability” on page 26](#)
- [“Oracle ILOM Service-Related Tools” on page 28](#)
- [“Matching Devices to Device Names” in *SPARC and Netra SPARC T5 Series Servers Administration Guide*](#)
- [Oracle ILOM Documentation](#)

Oracle ILOM Service-Related Tools

You can use these Oracle ILOM shell commands when performing service-related tasks.

Oracle ILOM Command	Description
<code>help [command]</code>	Displays a list of all available commands with syntax and descriptions. Specifying a command name as an option displays help for that command.
<code>set /HOST send_break_action=break</code>	Takes the host server from the OS to either kmdb or OpenBoot prompt (equivalent to a Stop-A), depending on the mode in which the Oracle Solaris OS was booted.
<code>start /HOST/console</code>	Connects to the host.
<code>show /HOST/console/history</code>	Displays the contents of the host's console buffer.
<code>set /HOST/bootmode property=value</code>	Controls the method of booting for the host server's firmware. The value of property can be state, config, or script.
<code>stop /System</code> or <code>stop /SYS</code>	Powers off the host server.
<code>start /System</code> or <code>start /SYS</code>	Powers on the host server.
<code>reset /System</code> or <code>reset /SYS</code>	Generates a hardware reset on the host server.
<code>reset /SP</code>	Reboots the SP.

Related Information

- [“Diagnostics Process” on page 24](#)
- [“Tool Availability” on page 26](#)

- [“Log In to Oracle ILOM \(Service\)” on page 27](#)
- [Oracle ILOM Documentation](#)

Interpreting LEDs

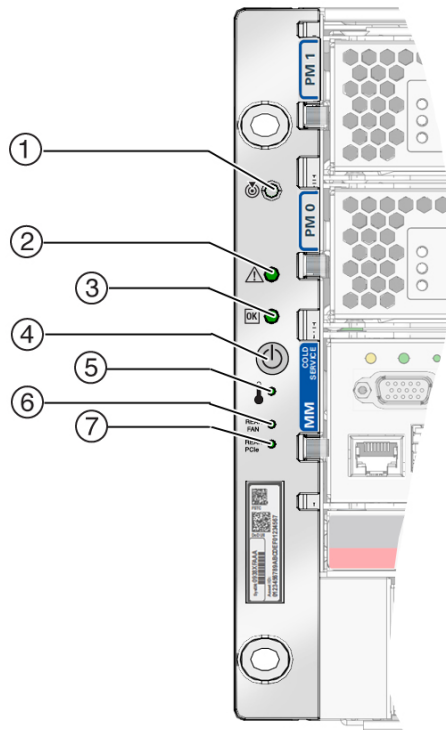
Use these steps to determine if an LED indicates that a component has failed in the server.




Steps	Description	Links
1.	Check the LEDs on the front and rear of the server.	<ul style="list-style-type: none"> ■ “Front Panel Controls and LEDs” on page 30 ■ “Rear Panel Controls and LEDs” on page 32
2.	Check the LEDs on the individual components. Note - Component LEDs might not be lit even though the component is faulty. Use the instructions in these links to determine if the component has been diagnosed as being faulty.	<ul style="list-style-type: none"> ■ “Determine if the Main Module Is Faulty” on page 103 ■ “Determine Which Processor Module Is Faulty” on page 63 ■ “Determine Which DIMM Is Faulty (DIMM Fault Remind Button)” on page 79 ■ “Determine Which Hard Drive Is Faulty” on page 94 ■ “Determine Which Power Supply Is Faulty” on page 144 ■ “Determine Which Fan Module Is Faulty” on page 152 ■ “Determine Which PCIe Card Is Faulty” on page 166 ■ “Determine if the Rear I/O Module Is Faulty” on page 184



Related Information

- [“Understanding Diagnostics” on page 23](#)
- [“Managing Faults” on page 40](#)

Front Panel Controls and LEDs



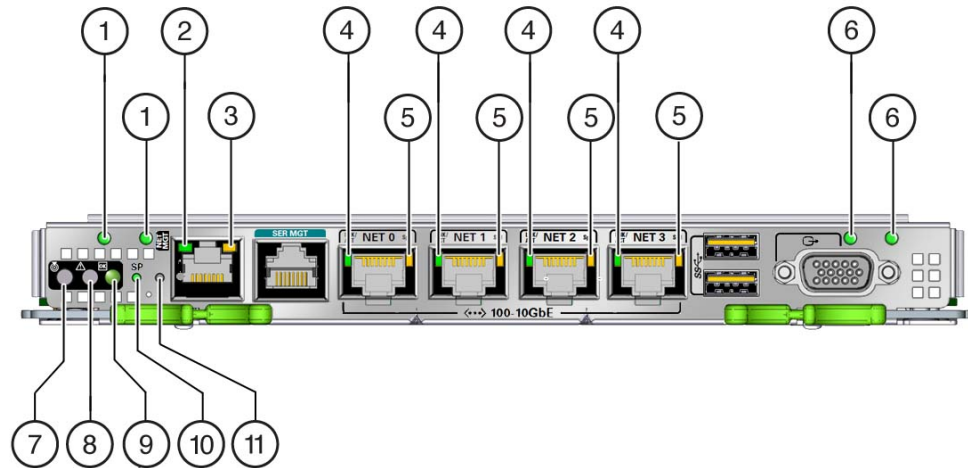
No.	LED	Icon or Label	Description
1	Locator LED and button(white)		You can turn on the Locator LED to identify a particular server. When lit, the LED blinks rapidly. Turn on the Locator LED by pressing the Locator button, or see “Locate the Server” on page 52.
2	Service Required LED(amber)		The <code>fmadm faulty</code> command provides details about any faults that cause this indicator to light. See “Check for Faults” on page 40. Under some fault conditions, individual component fault LEDs are lit in addition to the Service Required LED.
3	Power OK LED (green)		Indicates these conditions:

No.	LED	Icon or Label	Description
			<ul style="list-style-type: none"> ■ Off – Server is not running in its normal state. Server power might be off. The SP might be running. ■ Steady on – Server is powered on and is running in its normal operating state. No service actions are required. ■ Fast blink – Server is running in standby mode and can be quickly returned to full function. ■ Slow blink – A normal but transitory activity is taking place. Slow blinking might indicate that server diagnostics are running or that the server is booting.
4	Power button		<p>The recessed Power button toggles the server on or off. See “Power Off the Server (Power Button – Graceful Shutdown)” on page 55.</p>
5	System Overtemp LED(amber)		<p>Indicates these conditions:</p> <ul style="list-style-type: none"> ■ Off – Indicates a steady state, no service action is required. ■ Steady on – Indicates that a temperature failure event has been acknowledged and a service action is required.
6	Fan Module Fault LED(amber)	Rear FM	<p>Indicates these conditions:</p> <ul style="list-style-type: none"> ■ Off – Indicates a steady state, no service action is required. ■ Steady on – Indicates that a fan module failure event has been acknowledged and a service action is required on at least one of the fan modules.
7	PCIe Card Fault LED(amber)	Rear PCIe	<p>Indicates these conditions:</p> <ul style="list-style-type: none"> ■ Off – Indicates a steady state, no service action is required. ■ Steady on – Indicates that a failure event has been acknowledged and a service action is required on at least one of the PCIe cards.





Related Information

- [“Rear Panel Controls and LEDs”](#) on page 32
- [“Understanding Diagnostics”](#) on page 23

Rear Panel Controls and LEDs



No.	LED	Icon or Label	Description
1	AC 0 (left) and AC 1 (right) power LED		Indicates these conditions: <ul style="list-style-type: none"> ■ Off – No power is applied to the server. ■ Green – Power is applied to the server.
2	Net MGT port link LED		Indicates these conditions: <ul style="list-style-type: none"> ■ Off – No link is established. ■ On or blinking – A link is established.
3	Net MGT port speed LED		Indicates these conditions: <ul style="list-style-type: none"> ■ Off – The link is operating as a 10-Mbps connection. ■ On or blinking – The link is operating as a 100-Mbps connection.
4	Network port link LED		Indicates these conditions: <ul style="list-style-type: none"> ■ Off – No link is established. ■ Blinking – A link is established.
5	Network port speed LED		Indicates these conditions: <ul style="list-style-type: none"> ■ Off – The link is operating as a 10-Mbps connection or there is no link. ■ Amber on – The link is operating as a 100-Mbps connection. ■ Green on – The link is operating as a Gigabit connection (1000 Mbps).

No.	LED	Icon or Label	Description
6	AC 2 (left) and AC 3 (right) power LEDs		Indicates these conditions: <ul style="list-style-type: none"> ■ Off – No power is applied to the server. ■ Green – Power is applied to the server.
7	Locator LED and button (white)		Turn on the Locator LED by pressing the Locator button, or see “Locate the Server” on page 52 . When lit, the LED blinks rapidly.
8	Service Required LED (amber)		The <code>fmadm faulty</code> command provides details about any faults that cause this indicator to light. See “Check for Faults” on page 40 . Under some fault conditions, individual component fault LEDs are lit in addition to the Service Required LED.
9	Power OK LED(green)		Indicates these conditions: <ul style="list-style-type: none"> ■ Off – Server is not running in its normal state. System power might be off. The SP might be running. ■ Steady on – Server is powered on and is running in its normal operating state. No service actions are required. ■ Fast blink – Server is running in standby mode and can be quickly returned to full function. ■ Slow blink – A normal but transitory activity is taking place. Slow blinking might indicate that system diagnostics are running or that the system is booting.
10	SP LED	SP	Indicates these conditions: <ul style="list-style-type: none"> ■ Off – AC power might have been connected to the power supplies. ■ Steady on, green – SP is running in its normal operating state. No service actions are required. ■ Blink, green – SP is initializing the Oracle ILOM firmware. ■ Steady on, amber – An SP error has occurred and service is required.
11	Overtemp LED(amber)		Indicates these conditions: <ul style="list-style-type: none"> ■ Off – Indicates a steady state, no service action is required. ■ Steady on – Indicates that a temperature failure event has been acknowledged and a service action is required.

Related Information

- [“Front Panel Controls and LEDs” on page 30](#)
- [“Understanding Diagnostics” on page 23](#)

Configuring POST

These topics explain how to configure POST as a diagnostic tool.

- [“POST Overview” on page 34](#)
- [“Oracle ILOM Properties That Affect POST Behavior” on page 34](#)
- [“Configure POST” on page 37](#)
- [“Run POST With Maximum Testing” on page 39](#)

POST Overview

POST is a group of PROM-based tests that run when the server is powered on or when it is reset. POST checks the basic integrity of the critical hardware components in the server.

You can also set other Oracle ILOM properties to control various other aspects of POST operations. For example, you can specify the events that cause POST to run, the level of testing POST performs, and the amount of diagnostic information POST displays. These properties are described in [“Oracle ILOM Properties That Affect POST Behavior” on page 34](#).

If POST detects a faulty component, the component is disabled automatically. If the server is able to run without the disabled component, the server boots when POST completes its tests. For example, if POST detects a faulty processor core, the core is disabled, POST completes its test sequence, and the server boots using the remaining cores.

Related Information

- [“Oracle ILOM Properties That Affect POST Behavior” on page 34](#)
- [“Configure POST” on page 37](#)
- [“Run POST With Maximum Testing” on page 39](#)

Oracle ILOM Properties That Affect POST Behavior

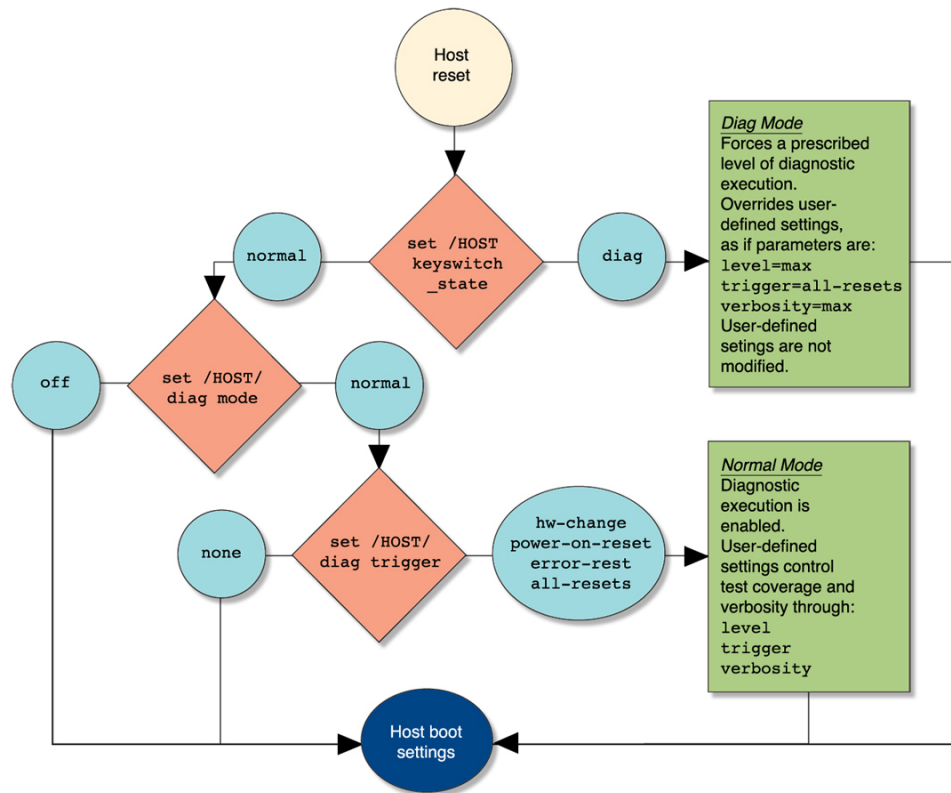
Note - The value of `keyswitch_state` must be `normal` when individual POST parameters are changed.

Properties	Values	Description
/HOST keyswitch_state	normal	The server can power on and run POST (based on the other parameter settings). This parameter overrides all other commands.
	diag	The server runs POST based on predetermined settings.
	standby	The server cannot power on.
	locked	The server can power on and run POST, but no flash updates can be made.
/HOST/diag mode	off	POST does not run.
	normal	POST runs according to diag level value.
/HOST/diag level	max	If diag mode=normal, runs all the minimum tests plus extensive processor and memory tests.
	min	If diag mode=normal, runs minimum set of tests.
/HOST/diag trigger	hw-change	(Default) Runs POST following a FRU replacement or an AC power cycle.
	all-resets	Runs POST on all resets.
	error-reset	Runs POST on all error resets.
	power-on-reset	Runs POST on every power on.
	none	Does not run POST on reset.
/HOST/diag hw_change_level	max	Runs the maximum set of tests.
	min	Runs the minimum set of tests.
/HOST/diag hw_change_verbosity	min	(Default) Displays the minimum level of output.
	max	Displays information for each step.
	normal	Displays a moderate amount of information, including component names and test results.
	debug	Displays extensive debugging information.
	none	Disables the output.
/HOST/diag power_on_level	max	(Default) Runs the maximum set of tests.
	min	Runs the minimum set of tests.
/HOST/diag power_on_verbosity	min	(Default) Displays the minimum level of output.
	max	Displays information for each step.
	normal	Displays a moderate amount of information, including component names and test results.
	debug	Displays extensive debugging information.
	none	Disables the output.
/HOST/diag error_reset_level	max	(Default) Runs the maximum set of tests.
	min	Runs a minimum set of tests.

Configuring POST

Properties	Values	Description
/HOST/diag error_reset_verbosity	min	(Default) Displays the minimum level of output.
	max	Displays information for each step.
	normal	Displays a moderate amount of information, including component names and test results.
	debug	Displays extensive debugging information.
	none	Disables the output.
/HOST/diag verbosity	normal	Displays all test and informational messages in POST output.
	min	Displays functional tests with a banner and pinwheel in POST output.
	max	Displays all test, informational, and some debugging messages in POST output.
	debug	Displays extensive debugging information.
	none	Does not display POST output.

This flowchart illustrates the same set of Oracle ILOM set command variables.



Related Information

- [“POST Overview” on page 34](#)
- [“Configure POST” on page 37](#)
- [“Run POST With Maximum Testing” on page 39](#)

▼ Configure POST

1. **Log in to Oracle ILOM.**
See [“Log In to Oracle ILOM \(Service\)” on page 27](#).
2. **Set the virtual keyswitch to the value that corresponds to the POST configuration you want to run.**

This example sets the virtual keyswitch to normal, which configures POST to run according to other parameter values.

```
-> set /HOST keyswitch_state=normal
Set ???keyswitch_state' to ???Normal'
```

For possible values for the keyswitch_state parameter, see [“Oracle ILOM Properties That Affect POST Behavior” on page 34](#).

3. If the virtual keyswitch is set to normal, and you want to define the mode, level, verbosity, or trigger, set the respective parameters.

Syntax:

```
set /HOST/diag property=value
```

See [“Oracle ILOM Properties That Affect POST Behavior” on page 34](#) for a list of parameters and values.

Examples:

```
-> set /HOST/diag mode=normal
-> set /HOST/diag verbosity=max
```

4. View the current values for settings.

Example:

```
-> show /HOST/diag

/HOST/diag
  Targets:

  Properties:
    error_reset_level = max
    error_reset_verbosity = normal
    hw_change_level = max
    hw_change_verbosity = normal
    level = min
    mode = normal
    power_on_level = max
    power_on_verbosity = normal
    trigger = hw_change error-reset
    verbosity = normal
```

Commands:

```
cd
set
show
->
```

Related Information

- [“POST Overview” on page 34](#)
- [“Oracle ILOM Properties That Affect POST Behavior” on page 34](#)
- [“Run POST With Maximum Testing” on page 39](#)
- [Oracle ILOM Documentation](#)

▼ Run POST With Maximum Testing

This procedure describes how to configure the server to run the maximum level of POST.

1. Log in to Oracle ILOM.

See [“Log In to Oracle ILOM \(Service\)” on page 27](#).

2. Set the virtual keyswitch to **diag** so that POST runs in service mode.

Alternatively, you can use the `/System` target.

```
-> set /HOST keyswitch_state=diag
Set ???keyswitch_state' to ???Diag'
```

3. Run POST.

Alternatively, you can use the `/System` target.

```
-> start /System
Are you sure you want to start /System (y/n)? y
Starting /System
```

Related Information

- [“POST Overview” on page 34](#)
- [“Oracle ILOM Properties That Affect POST Behavior” on page 34](#)
- [“Configure POST” on page 37](#)
- [Oracle ILOM Documentation](#)

Managing Faults

These topics describe the Predictive Self-Healing feature.

- [“PSH Overview” on page 40](#)
- [“Check for Faults” on page 40](#)
- [“Clear a Fault” on page 43](#)

PSH Overview

PSH provides problem diagnosis on the SP and the host. Regardless of where a fault occurs, you can view and manage the fault diagnosis from the SP or the host.

When possible, PSH initiates steps to take the component offline. PSH also logs the fault to the `syslogd` daemon and provides a fault notification with a message ID. You can use the message ID to get additional information about the problem from the Knowledge Base article database.

A PSH console message provides this information about each detected fault:

- Type
- Severity
- Description
- Automated response
- Impact
- Suggested action for system administrator

If PSH detects a faulty component, use the `fmadm faulty` command to display information about the fault. See [“Check for Faults” on page 40](#).

Related Information

- [“Check for Faults” on page 40](#)
- [“Clear a Fault” on page 43](#)

▼ Check for Faults

The `fmadm faulty` command displays the list of faults detected by PSH. You can run this command from either the host or through the Oracle ILOM fault management shell.

1. Log in to Oracle ILOM.

See [“Log In to Oracle ILOM \(Service\)”](#) on page 27.

2. Check for PSH-diagnosed faults.

This example shows how to check for faults through the Oracle ILOM fault management shell.

```
-> start /SP/faultmgmt/shell
Are you sure you want to start /SP/faultmgmt/shell (y/n)? y

faultmgmtsp> fmadm faulty
-----
Time                UUID                msgid                Severity
-----
2012-08-27/19:46:26 4ec16c8d-5cdb-c6ca-c949-e24d3637ef27 PCIEX-8000-8R Major

Problem Status      : solved
Diag Engine         : [unknown]
System
  Manufacturer      : Oracle Corporation
  Name              : SPARC T5-8
  Part_Number       : 12345678+11+1
  Serial_Number     : 1238BDC0DF
-----

Suspect 1 of 1
  Fault class       : fault.io.pciex.device-interr-corr
  Certainty         : 100%
  Affects           : hc:///chassis=0/motherboard=0/cpuboard=0/chip=0/hostbridge=0/pciexrc=0
  Status            : faulted but still in service
  FRU
    Status          : faulty
    Location         : /SYS/PM0
    Manufacturer     : Oracle Corporation
    Name             : TLA,PN,NRM,T5 1.2
    Part_Number      : 7061001
    Revision         : 01
    Serial_Number    : 465769T+12445102WR
  Chassis
    Manufacturer     : Oracle Corporation
    Name             : SPARC T5-8
    Part_Number      : 12345678+13+2
    Serial_Number    : 1248DC140
```

Description : A fault has been diagnosed by the Host Operation System.

Response : The service required LED on the chassis and on the affected FRU may be illuminated.

Impact : No SP impact

Action : Refer to the associated reference document at <https://support.oracle.com/msg/PCIEX-8000-8R> for the latest service procedures and policies regarding this diagnosis.

faultmgmtsp>

In this example, a fault is displayed that includes these details:

- **Date and time of the fault (2012-08-27/19:46:26).**
 - **UUID (4e16c8d-5cdb-c6ca-c949-e24d3637ef27), which is unique to each fault.**
 - **Message identifier (PCIEX-8000-8R), which can be used to obtain additional fault information from Knowledge Base articles.**
3. **Consider your next step:**
 - **If you are checking for faults while adding a second processor module, and no faults were detected, return to “[Server Upgrade Process](#)” on page 59.**
 - **If a fault is detected, proceed to [Step 4](#).**
 4. **Use the message ID to obtain more information about this type of fault.**
 - a. **Obtain the message ID from console output.**
 - b. **Go to <https://support.oracle.com>, and search on the message ID in the Knowledge tab.**
 5. **Follow the suggested actions to repair the fault.**
 6. **If necessary, clear the fault manually.**

See “[Clear a Fault](#)” on page 43.

Related Information

- “[PSH Overview](#)” on page 40
- “[Clear a Fault](#)” on page 43

▼ Clear a Fault

When PSH detects faults, the faults are logged and displayed on the console. In most cases, after the fault is repaired, the corrected state is detected by the server, and the fault condition is repaired automatically. However, this repair should be verified. In cases where the fault condition is not automatically cleared, you must clear the fault manually.

1. After replacing a faulty FRU, power on the server.

See [“Returning the Server to Operation” on page 199](#).

2. At the host prompt, determine whether the replaced FRU still shows a faulty state.

See [“Check for Faults” on page 40](#).

- If no fault is reported, you do not need to do anything else. Do not perform the subsequent steps.

- If a fault is reported, continue to [Step 3](#).

3. Clear the fault from all persistent fault records.

In some cases, even though the fault is cleared, some persistent fault information remains and results in erroneous fault messages at boot time. To ensure that these messages are not displayed, type this PSH command:

```
faultmgmtsp> fmadm acquit UUID
```

4. If required, reset the server.

In some cases, the output of the fmadm faulty command might include this message for the faulty component:

```
faulted and taken out of service
```

If this message appears in the output, you must reset the server after you manually repair the fault.

```
faultmgmtsp> exit
-> reset /System
Are you sure you want to reset /System? y
Resetting /System ...
```

Related Information

- [“PSH Overview” on page 40](#)
- [“Check for Faults” on page 40](#)

Interpreting Log Files and System Messages

With the OS running on the server, you have the full complement of Oracle Solaris OS files and commands available for collecting information and for troubleshooting.

If PSH does not indicate the source of a fault, check the message buffer and log files for notifications for faults. Drive faults are usually captured by the Oracle Solaris message files.

These topics explain how to view the log files and system messages.

- [“Check the Message Buffer” on page 44](#)
- [“Understanding Diagnostics” on page 23](#)
- [“Managing Faults” on page 40](#)

▼ Check the Message Buffer

The `dmesg` command checks the system buffer for recent diagnostic messages and displays them.

1. **Log in as superuser.**
2. **Type:**

```
# dmesg
```

Related Information

- [“View Log Files \(Oracle Solaris\)” on page 45](#)
- [“View Log Files \(Oracle ILOM\)” on page 45](#)

▼ View Log Files (Oracle Solaris)

The error logging daemon, `syslogd`, automatically records various system warnings, errors, and faults in message files. These messages can alert you to system problems such as a device that is about to fail.

The `/var/adm` directory contains several message files. The most recent messages are in the `/var/adm/messages` file. After a period of time (usually every week), a new messages file is automatically created. The original contents of the messages file are rotated to a file named `messages.1`. Over a period of time, the messages are further rotated to `messages.2` and `messages.3`, and then deleted.

1. **Log in as superuser.**

2. **Type:**

```
# more /var/adm/messages
```

3. **To view all logged messages, type:**

```
# more /var/adm/messages*
```

Related Information

- [“Check the Message Buffer” on page 44](#)
- [“View Log Files \(Oracle Solaris\)” on page 45](#)

▼ View Log Files (Oracle ILOM)

1. **View the event log.**

```
-> show /SP/logs/event/list
```

2. **View the audit log.**

```
-> show /SP/logs/audit/list
```

Related Information

- [“Check the Message Buffer” on page 44](#)
- [“View Log Files \(Oracle Solaris\)” on page 45](#)

Preparing for Service

These topics describe how to prepare the server for servicing.

Step	Description	Link
1	Review safety and handling information.	“Safety Information” on page 47
2	Gather the tools needed for service.	“Tools Needed for Service” on page 49
3	Consider filler panel options.	“Filler Panels” on page 50
4	Find the server serial number.	“Find the Server Serial Number” on page 51
5	Identify the server to be serviced.	“Locate the Server” on page 52
6	Locate the component service information.	“Component Service Task Reference” on page 20
7	For cold-service operations, shut down the OS.	“Removing Power From the Server” on page 53
8	Gain access to service components.	“Chassis Subassembly Components” on page 17

Safety Information

For your protection, observe the following safety precautions when setting up your equipment:

- Follow all cautions and instructions marked on the equipment and described in the documentation shipped with your server.
- Follow all cautions and instructions marked on the equipment and described in the *SPARC T5-4 Server Safety and Compliance Guide*.
- Ensure that the voltage and frequency of your power source match the voltage and frequency inscribed on the equipment's electrical rating label.
- Follow the ESD safety practices as described in this section.

This topic includes the following sections:

- [“Safety Symbols ” on page 48](#)
- [“ESD Precautions” on page 48](#)
- [“Antistatic Wrist Strap” on page 49](#)

- [“Antistatic Mat” on page 49](#)

Safety Symbols

Note the meanings of the following symbols that might appear in this document:



Caution - There is a risk of personal injury or equipment damage. To avoid personal injury and equipment damage, follow the instructions.



Caution - Hot surface. Avoid contact. Surfaces are hot and might cause personal injury if touched.



Caution - Hazardous voltages are present. To reduce the risk of electric shock and danger to personal health, follow the instructions.

Related Information

- [“Safety Information” on page 47](#)
- [“ESD Precautions” on page 48](#)
- [“Antistatic Wrist Strap” on page 49](#)
- [“Antistatic Mat” on page 49](#)

ESD Precautions

ESD-sensitive devices, such as the PCIe cards, hard drives, and DIMMs require special handling.



Caution - Circuit boards and hard drives contain electronic components that are extremely sensitive to static electricity. Ordinary amounts of static electricity from clothing or the work environment can destroy the components located on these boards. Do not touch the components along their connector edges.



Caution - You must disconnect all power supplies before servicing any of the components that are inside the chassis.

Related Information

- [“Safety Symbols ” on page 48](#)
- [“Antistatic Wrist Strap” on page 49](#)
- [“Antistatic Mat” on page 49](#)

Antistatic Wrist Strap

Wear an antistatic wrist strap and use an antistatic mat when handling components such as hard drive assemblies, circuit boards, or PCIe cards. When servicing or removing server components, attach an antistatic strap to your wrist and then to a metal area on the chassis. Following this practice equalizes the electrical potentials between you and the server.

Related Information

- [“Safety Symbols ” on page 48](#)
- [“ESD Precautions” on page 48](#)
- [“Antistatic Mat” on page 49](#)

Antistatic Mat

Place ESD-sensitive components such as motherboards, memory, and other PCBs on an antistatic mat.

Related Information

- [“Safety Symbols ” on page 48](#)
- [“ESD Precautions” on page 48](#)
- [“Antistatic Wrist Strap” on page 49](#)

Tools Needed for Service

You will need the following tools for most service operations:

- Antistatic wrist strap
- Antistatic mat
- No. 1 Phillips screwdriver
- No. 2 Phillips screwdriver
- No. 1 flat-blade screwdriver (battery removal)

Related Information

- [“Component Service Categories” on page 50](#)
- [“Filler Panels” on page 50](#)

Filler Panels

Each server is shipped with replacement filler panels for hard drives and processor modules. A filler panel is an empty metal or plastic enclosure that does not contain any functioning system hardware or cable connectors.

The filler panels are installed at the factory and must remain in the server until you replace them with a functional component to ensure proper airflow through the system. If you remove a filler panel and continue to operate your system with an empty slot, the server might overheat due to improper airflow. For instructions on removing or installing a filler panel for a server component, refer to the topic in this document about servicing that component.

Related Information

- [“Safety Information” on page 47](#)
- [“Component Service Categories” on page 50](#)

Component Service Categories

Replaceable components fall into these categories:

- **Hot-serviceable by the customer** – Hot-serviceable components can be removed while the server is running. Hot-swappable components do not require any preparation prior to servicing. Hot-pluggable components do require preparation prior to servicing.
- **Cold-serviceable by the customer or exclusively by authorized service personnel** – Cold-serviceable components require that the server is shut down. In addition, some service

procedures require that the power cables be disconnected between the power supplies and the power source.

The following table identifies the server components that are replaceable.

Component	Power Status for Removal	Authorized Service Personnel Only	Remove and Replace Instructions
Processor module	Off	X	“Servicing Processor Modules” on page 59
DIMM	Off		“Servicing DIMMs” on page 73
Hard drive	Off or On		“Servicing Hard Drives” on page 91
Main module [†]	Off		“Servicing the Main Module” on page 101
Storage backplane*	Off	X	“Servicing the Storage Backplanes” on page 111
Service processor card*	Off		“Servicing the Service Processor Card” on page 119
System configuration PROM*	Off	X	“Servicing the System Configuration PROM” on page 127
System battery*	Off		“Servicing the System Battery” on page 131
Front I/O assembly*	Off		“Servicing the Front I/O Assembly” on page 137
Power supply	Off or On		“Servicing Power Supplies” on page 141
Fan module	Off or On		“Servicing Fan Modules” on page 151
PCIe card	Off or On		“Servicing PCIe Cards” on page 159
Rear I/O module*	Off	X	“Servicing the Rear I/O Module” on page 181
Rear chassis subassembly*	Off	X	“Servicing the Rear Chassis Subassembly” on page 191

[†]You must disconnect the power cords before accessing this component..

Related Information

- [“Removing Power From the Server” on page 53](#)
- [“Returning the Server to Operation” on page 199](#)

▼ Find the Server Serial Number

If you require technical support for your server, you will be asked to provide the server's serial number.

- **Use one of the following options to find the serial number:**
 - **Locate the manufacturing sticker on the front of the server or on the sticker on the side of the server.**

- **At the Oracle ILOM prompt, type:**

```
-> show /System

/SYS
Targets:
  MB
  MB_ENV
  RIO
  PM0
  PM1
  FM0
...
Properties:
  type = Host System
  ipmi_name = /System
  keyswitch_state = Normal
  product_name = T5-4
  product_part_number = 602-1234-01
  product_serial_number = 0723BBC006
  fault_state = OK
  clear_fault_action = (none)
  power_state = On

Commands:
  cd
  reset
  set
  show
  start
  stop
```

Related Information

- [“Locate the Server” on page 52](#)

▼ Locate the Server

You can use the Locator LEDs to identify a particular server.

1. **At the Oracle ILOM prompt, type:**


```
-> set /System/Locator_indicator=on
```

The white Locator LEDs (one on the front panel and one on the rear panel) blink.

2. **After locating the server with the blinking Locator LED, turn it off using one of the following methods:**

- **Press the Locator button.**
- **At the Oracle ILOM prompt, type:**

```
-> set /System/Locator_indicator=off
```

Related Information

- [“Find the Server Serial Number” on page 51](#)

Removing Power From the Server

These topics describe different methods for removing power from the chassis.

- [“Prepare to Power Off the Server” on page 53](#)
- [“Power Off the Server \(Oracle ILOM\)” on page 54](#)
- [“Power Off the Server \(Power Button – Graceful Shutdown\)” on page 55](#)
- [“Power Off the Server \(Power Button – Emergency Shutdown\)” on page 55](#)
- [“Disconnect Power Cords” on page 56](#)
- [“Prevent ESD Damage” on page 57](#)

Related Information

- [“Configuring Boot and Restart Behavior” in *SPARC and Netra SPARC T5 Series Servers Administration Guide*](#)

▼ Prepare to Power Off the Server

1. **Notify affected users that the server will be shut down.**

Refer to the Oracle Solaris system administration documentation for additional information.

2. Save any open files and quit all running programs.

Refer to your application documentation for specific information for these processes.

3. Shut down all logical domains.

Refer to the Oracle Solaris system administration documentation for additional information.

4. Shut down the Oracle Solaris OS.

Refer to the Oracle Solaris system administration documentation for additional information.

5. Power off the server.

See:

- [“Power Off the Server \(Oracle ILOM\)” on page 54](#)
- [“Power Off the Server \(Power Button – Graceful Shutdown\)” on page 55](#)
- [“Power Off the Server \(Power Button – Emergency Shutdown\)” on page 55](#)

Related Information

- [“Disconnect Power Cords” on page 56](#)

▼ Power Off the Server (Oracle ILOM)

You can use the SP to perform a graceful shutdown of the server. This type of shutdown ensures that all of your data is saved and that the server is ready for restart.

1. Log in as superuser or equivalent.

Depending on the type of problem, you might want to view server status or log files. You also might want to run diagnostics before you shut down the server.

2. Switch from the system console to the Oracle ILOM prompt by typing the #. (Hash-Period) key sequence.

3. At the Oracle ILOM prompt, type:

```
-> stop /System
Stopping /System
```

4. If you are powering off the server in order to add a second processor module, return to [“Server Upgrade Process” on page 59](#).

Related Information

- [“Prepare to Power Off the Server” on page 53](#)
- [“Power Off the Server \(Power Button – Graceful Shutdown\)” on page 55](#)
- [“Power Off the Server \(Power Button – Emergency Shutdown\)” on page 55](#)

▼ Power Off the Server (Power Button – Graceful Shutdown)

This procedure places the server in the power standby mode.

1. **Press and release the recessed Power button.**
The Power OK LED blinks rapidly.
2. If you are powering off the server in order to add a second processor module, return to [“Server Upgrade Process” on page 59](#).

Related Information

- [“Power Off the Server \(Oracle ILOM\)” on page 54](#)
- [“Power Off the Server \(Power Button – Emergency Shutdown\)” on page 55](#)

▼ Power Off the Server (Power Button – Emergency Shutdown)



Caution - All applications and files are closed abruptly without saving changes. File system corruption might occur.

- **Press and hold the Power button for four seconds.**

Related Information

- [“Power Off the Server \(Oracle ILOM\)” on page 54](#)

- [“Power Off the Server \(Power Button – Graceful Shutdown\)” on page 55](#)

▼ Disconnect Power Cords

You must disconnect the power cords before accessing the following components:

- Main module
- Storage backplanes
- Service processor card
- System configuration PROM
- System battery
- Front I/O assembly
- Rear I/O module
- Rear chassis subassembly

1. Power off the server.

See:

- [“Power Off the Server \(Oracle ILOM\)” on page 54](#)
- [“Power Off the Server \(Power Button – Graceful Shutdown\)” on page 55](#)
- [“Power Off the Server \(Power Button – Emergency Shutdown\)” on page 55](#)

2. Disconnect all power cords from the server.



Caution - Because standby power is always present in the system, you must unplug the power cords before accessing certain components.

Related Information

- [“Safety Information” on page 47](#)
- [“Servicing the Main Module” on page 101](#)
- [“Servicing the Storage Backplanes” on page 111](#)
- [“Servicing the Service Processor Card” on page 119](#)
- [“Servicing the System Configuration PROM” on page 127](#)
- [“Servicing the System Battery” on page 131](#)
- [“Servicing the Front I/O Assembly” on page 137](#)
- [“Servicing the Rear I/O Module” on page 181](#)

- [“Servicing the Rear Chassis Subassembly” on page 191](#)

▼ Prevent ESD Damage

Many components contained in the processor modules and main module can be damaged by ESD. To protect these components from damage, perform the following steps before opening these modules for service.

1. **Prepare an antistatic surface to set parts on during the removal, installation, or replacement process.**

Place ESD-sensitive components, such as the printed circuit boards, on an antistatic mat. The following items can be used as an antistatic mat:

- Antistatic bag used to wrap a replacement part
- ESD mat
- A disposable ESD mat (shipped with some replacement parts or optional server components)

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

When servicing or removing server components, attach an antistatic strap to your wrist and then to a metal area on the chassis.

Related Information

- [“Safety Information” on page 47](#)
- [“Servicing Processor Modules” on page 59](#)
- [“Servicing DIMMs” on page 73](#)
- [“Servicing the Main Module” on page 101](#)
- [“Servicing the Storage Backplanes” on page 111](#)
- [“Servicing the Service Processor Card” on page 119](#)
- [“Servicing the System Configuration PROM” on page 127](#)
- [“Servicing the System Battery” on page 131](#)
- [“Servicing the Front I/O Assembly” on page 137](#)
- [“Servicing PCIe Cards” on page 159](#)
- [“Servicing the Rear I/O Module” on page 181](#)
- [“Servicing the Rear Chassis Subassembly” on page 191](#)

Servicing Processor Modules

Description	Links
Replace a processor module.	<ul style="list-style-type: none">■ “Determine Which Processor Module Is Faulty” on page 63■ “Preparing for Service” on page 47■ “Remove a Processor Module or Processor Filler Module” on page 64■ “Install a Processor Module or Processor Filler Module” on page 67■ “Verify the Processor Module” on page 70
Learn the process for upgrading the server from a single processor module configuration to a two processor module configuration.	“Server Upgrade Process” on page 59
Remove the processor module as part of another component's service operation.	“Remove a Processor Module or Processor Filler Module” on page 64
Install the processor module as part of another component's service operation.	“Install a Processor Module or Processor Filler Module” on page 67

Related Information

- [“Identifying Components” on page 13](#)
- [“Processor Module Components” on page 18](#)
- [“Detecting and Managing Faults” on page 23](#)
- [“Preparing for Service” on page 47](#)
- [“Component Service Categories” on page 50](#)
- [“Servicing DIMMs” on page 73](#)
- [“Returning the Server to Operation” on page 199](#)

Server Upgrade Process

The SPARC T5-4 server supports two processor module configurations:

- Fully-populated — two processor modules
- Half-populated — one processor module and one processor filler module

Processor modules are cold-service components that can be replaced only by qualified service personnel. For the location of the processor modules, see “[Front Panel Components](#)” on page 14.



Caution - These service procedures require that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

This table contains the steps for upgrading the server to a fully-populated configuration. You can also view an animated demonstration of the upgrade process at:

http://download.oracle.com/SPARC/T5-4-Server/SPARC_T5-4-Server-Upgrade.mp4

or:

http://download.oracle.com/SPARC/T5-4-Server/T5-4_Demo.html

Step	Description	Link
1	Remove the upgrade components from their packaging, and place them on an antistatic mat.	
2	Remove the covers from the new processor module.	“Remove a Processor Module or Processor Filler Module” on page 64
3	Remove all of the DIMM filler panels in the processor module. The steps to remove the DIMM filler panels are the same as the steps for removing DIMMs.	“Remove a DIMM or DIMM Filler Panel” on page 81
4	Verify that you have the correct DIMMs for your server. All of the DIMMs must be either 16 or 32 GB, and they must match the size and capacity of the DIMMs already installed in the server.	“DIMM Population Rules” on page 73
5	Install the DIMMs.	“Install a DIMM” on page 83
6	Check the server for faults. If any fault is present, you must correct the fault and clear it from the server before you can continue with the upgrade.	“Check for Faults” on page 40
7	Shut down the server.	“Removing Power From the Server” on page 53
8	Remove the processor filler module from Slot 1.	“Remove a Processor Module or Processor Filler Module” on page 64
9	Install the new processor module in Slot 1.	“Install a Processor Module or Processor Filler Module” on page 67
10	Return the server to operation.	“Returning the Server to Operation” on page 199
11	Verify the installation. If any fault is present, you must correct the fault and clear it from the server.	“Verify the Processor Module” on page 70

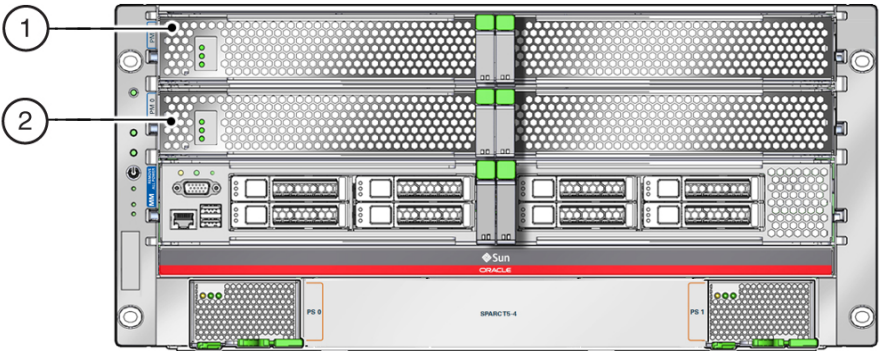
Step	Description	Link
12	Review the root complex changes.	“PCIe Root Complex Connections (Dual-Processor Configurations)” on page 161
13	Review the PCIe card load balancing changes. Even though the load balancing guidelines change with the upgrade, you do not need to move any existing PCIe cards.	“PCIe Card Installation Order” on page 163

Related Information

- [“Processor Module Components” on page 18](#)
- [“Managing Faults” on page 40](#)
- [“Removing Power From the Server” on page 53](#)
- [“Servicing DIMMs” on page 73](#)
- [“Processor Module Locations” on page 61](#)
- [“Remove a Processor Module or Processor Filler Module” on page 64](#)
- [“Install a Processor Module or Processor Filler Module” on page 67](#)
- [“Verify the Processor Module” on page 70](#)
- [“Understanding PCIe Root Complex Connections” on page 159](#)
- [“PCIe Card Installation Order” on page 163](#)
- [“Returning the Server to Operation” on page 199](#)

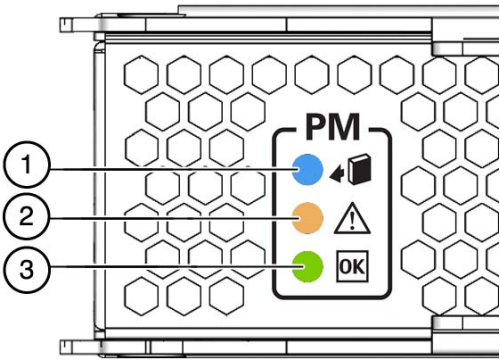
Processor Module Locations

Processor modules are accessed from the front of the server. In Oracle ILOM, the processor modules are numbered PM0 and PM1, starting with the lower slot.





No.	Description
1	Processor Module 1 (PM1) or processor filler module
2	Processor Module 0 (PM0)

Processor Module LEDs



No.	LED	Icon	Description
1	(No function.)		Not supported.

No.	LED	Icon	Description
2	Service Required (amber)		Indicates that the processor module has experienced a fault condition.
3	OK (green)		Indicates if the processor module is available for use. <ul style="list-style-type: none"> ■ On – The server is running and the processor module is functioning correctly. ■ Off – The server is powered down and the processor module is in standby mode.

Related Information

- [“Processor Module Components” on page 18](#)
- [“Server Upgrade Process” on page 59](#)
- [“Determine Which Processor Module Is Faulty” on page 63](#)
- [“Remove a Processor Module or Processor Filler Module” on page 64](#)
- [“Install a Processor Module or Processor Filler Module” on page 67](#)
- [“Verify the Processor Module” on page 70](#)

▼ Determine Which Processor Module Is Faulty

The following LEDs are lit when a processor module fault is detected:

- Front and rear System Fault (Service Required) LEDs
- Service Required LED on the faulty processor module

1. **Determine if the Service Required LEDs are illuminated on the front panel or the rear I/O module.**

See [“Interpreting LEDs” on page 29](#).

2. **From the front of the server, check the processor module LEDs to identify which processor module needs to be replaced.**

See [“Processor Module LEDs” on page 62](#). The amber Service Required LED is lit on the processor module that needs to be replaced.

3. **Remove the faulty processor module.**

See [“Remove a Processor Module or Processor Filler Module” on page 64](#).

Related Information

- [“Processor Module Components” on page 18](#)
- [“Processor Module LEDs” on page 62](#)
- [“Remove a Processor Module or Processor Filler Module” on page 64](#)
- [“Install a Processor Module or Processor Filler Module” on page 67](#)
- [“Verify the Processor Module” on page 70](#)

▼ Remove a Processor Module or Processor Filler Module

Processor modules and processor filler modules are cold-service components that can be replaced only after you power off the system. For the location of the modules, see [“Processor Module Locations” on page 61](#).



Caution - The server can overheat if you leave the server running with the empty processor module slot open for longer than one minute. To ensure proper airflow, leave the faulty processor module installed if a replacement processor module or processor filler module is currently unavailable.

Processor modules are cold-service components that can be replaced only by qualified service personnel.



Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

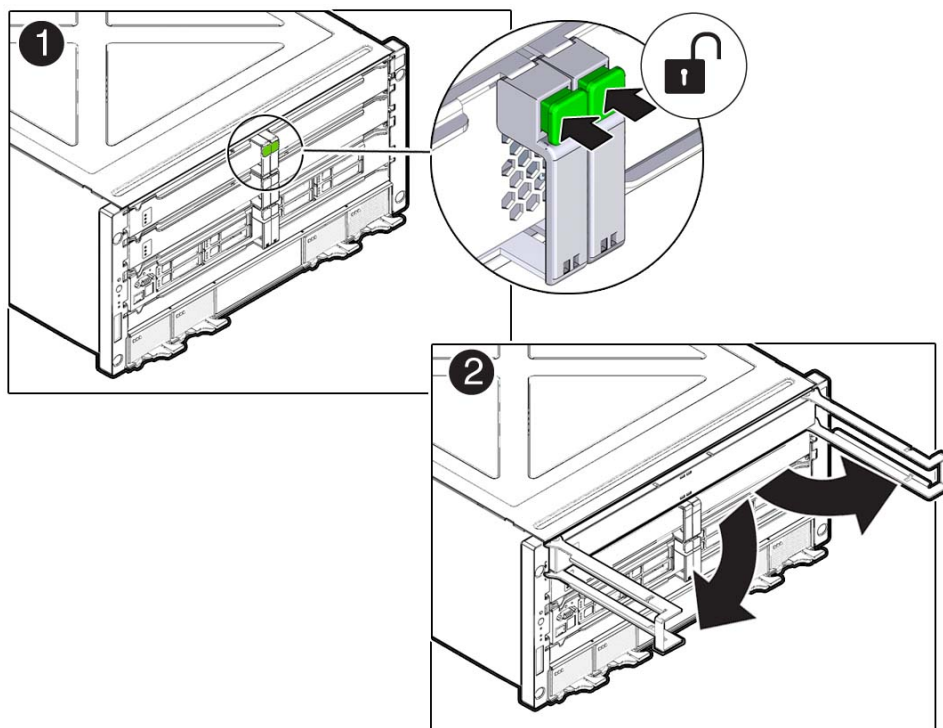
1. **Prepare the server for service.**

See [“Preparing for Service” on page 47](#).

2. **Locate the processor module in the server that you want to remove.**

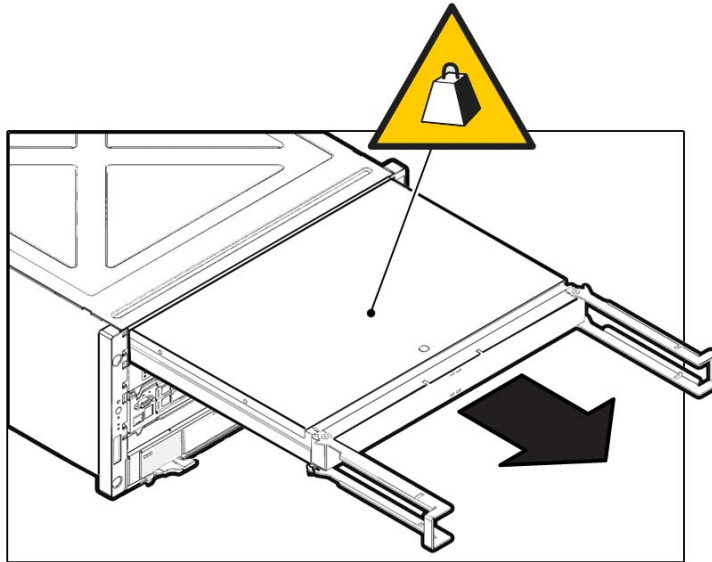
- If you are replacing a faulty processor module, see [“Determine Which Processor Module Is Faulty” on page 63](#) to locate a faulty processor module.
- If you are adding a processor module, remove the processor filler module in slot 1.

3. Squeeze the release latches together on the two extraction levers and pull the extraction levers out to disengage the processor module or processor filler module from the server.



4. Pull the processor module or processor filler module halfway out of the server, and close the levers.

This protects the levers from damage while the module is outside the server.



5. Using two hands, completely remove the processor module or processor filler module and place the module on an antistatic mat.



Caution - Do not touch the connectors at the rear of the module.

6. Determine your next step:
 - If you are replacing or installing DIMMs within the processor module, see [“Servicing DIMMs” on page 73](#).
 - If you are replacing a faulty processor module, populate and install the replacement processor module:
 - a. Remove all of the DIMMs from the faulty processor module, and set them in a safe place.

See [“Remove a DIMM or DIMM Filler Panel” on page 81](#).

b. Install the DIMMs into the new processor module.

See [“Install a DIMM” on page 83](#).

c. Install the processor module.

See [“Install a Processor Module or Processor Filler Module” on page 67](#).

- If you are adding a second processor module to the server, return to [“Server Upgrade Process” on page 59](#).

Related Information

- [“Processor Module Components” on page 18](#)
- [“Processor Module LEDs” on page 62](#)
- [“Server Upgrade Process” on page 59](#)
- [“Determine Which Processor Module Is Faulty” on page 63](#)
- [“Servicing DIMMs” on page 73](#)
- [“Install a Processor Module or Processor Filler Module” on page 67](#)
- [“Verify the Processor Module” on page 70](#)

▼ Install a Processor Module or Processor Filler Module

Processor modules are cold-service components that can be replaced only by qualified service personnel. For the location of the processor modules, see [“Front Panel Components” on page 14](#).



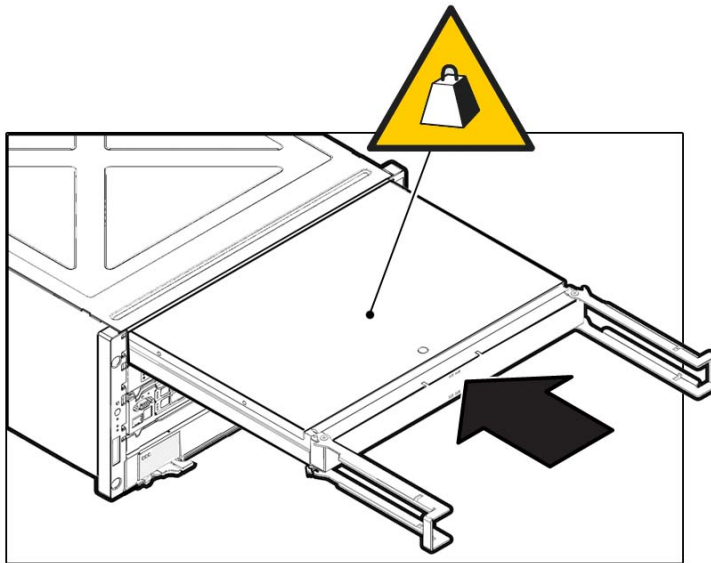
Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

1. Determine your first step:

- If you are installing a processor module after replacing or installing DIMMs, go to [Step 2](#).
- If you are installing a new processor module to replace a faulty one, install all of the DIMMs that you removed from the faulty processor module into the replacement module. See [“Install a DIMM” on page 83](#).

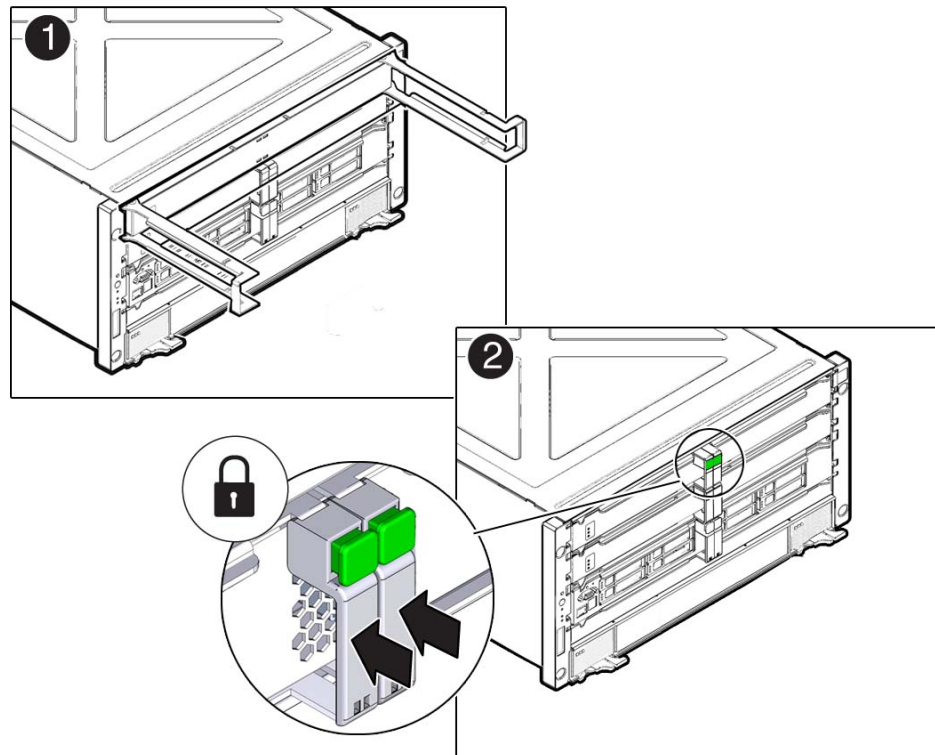
2. **Open the latches on the processor module or processor filler module, and insert the module into the empty processor module slot in the server.**

Note - A processor filler module can only be installed in slot 1.



3. **Bring the levers together toward the center of the module and press the levers firmly against the module to fully seat the module back into the server.**

The levers should click into place when the module is fully seated in the server.



4. **Power on the server.**
See [“Returning the Server to Operation”](#) on page 199.
5. **Verify the processor module functionality.**
See [“Verify the Processor Module”](#) on page 70.
6. **If you are adding a second processor module to the server, return to [“Server Upgrade Process”](#) on page 59**

Related Information

- [“Processor Module Components”](#) on page 18
- [“Server Upgrade Process”](#) on page 59

- [“Processor Module LEDs” on page 62](#)
- [“Determine Which Processor Module Is Faulty” on page 63](#)
- [“Remove a Processor Module or Processor Filler Module” on page 64](#)
- [“Servicing DIMMs” on page 73](#)
- [“Verify the Processor Module” on page 70](#)

▼ Verify the Processor Module

1. Use the Oracle ILOM fault management shell to determine if the new processor module is shown as enabled or disabled:

```
-> start /SP/faultmgmt/shell
Are you sure you want to start /SP/faultmgmt/shell (y/n)? y

faultmgmtsp> fmadm faulty
```

- a. If the output from the `fmadm faulty` command shows the replacement processor module as enabled, go to [Step 2](#).
 - b. If the output from the `fmadm faulty` command shows the replacement processor as disabled, go to [“Detecting and Managing Faults” on page 23](#) to clear the PSH-detected fault from the server.
2. Verify that the OK LED is lit on the processor module and that the Fault LED is not lit.
See [“Processor Module LEDs” on page 62](#).
 3. Verify that the front and rear Service Required LEDs are not lit.
See [“Front Panel Controls and LEDs” on page 30](#) and [“Rear Panel Controls and LEDs” on page 32](#).
 4. Perform one of the following tasks based on your verification results:
 - If the previous steps did not clear the fault, see [“Diagnostics Process” on page 24](#).
 - If [Step 2](#) and [Step 3](#) indicate that no faults have been detected, then the processor module has been replaced successfully. No further action is required.

- If you are verifying the server after adding a second processor module, return to [“Server Upgrade Process” on page 59](#).

Related Information

- [“Processor Module Components” on page 18](#)
- [“Processor Module LEDs” on page 62](#)
- [“Determine Which Processor Module Is Faulty” on page 63](#)
- [“Remove a Processor Module or Processor Filler Module” on page 64](#)
- [“Install a Processor Module or Processor Filler Module” on page 67](#)

Servicing DIMMs

DIMMs are cold-service components that can be replaced by customers. For the location of the DIMMs, see [“Processor Module Components” on page 18](#).



Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

Description	Links
Understand how to replace DIMMs	<ul style="list-style-type: none">■ “DIMM Population Rules” on page 73■ “DIMM Addresses” on page 74■ “DIMM Rank Classification” on page 76
Locate a faulty DIMM	<ul style="list-style-type: none">■ “DIMM Fault Handling” on page 77■ “Determine Which DIMM is Faulty (PSH)” on page 78■ “Determine Which DIMM Is Faulty (DIMM Fault Remind Button)” on page 79■ “DIMM Configuration Errors” on page 88
Replace a DIMM	<ul style="list-style-type: none">■ “Remove a DIMM or DIMM Filler Panel” on page 81■ “Install a DIMM” on page 83■ “Verify a DIMM” on page 86

DIMM Population Rules

Consider the following population rules when installing, upgrading, or replacing DIMMs in a processor module:

- Two DIMM capacities are supported: 16 Gbyte and 32 Gbyte.
- All DIMMs installed in the server must have identical capacities (all 16 Gbyte or all 32 Gbyte DDR3 DIMMs).
- All DIMMs installed in each processor module must be identical (identical Oracle part number).

To identify DIMM architecture, see [“DIMM Rank Classification” on page 76](#).

- The following memory configurations are supported:
 - 512 Gbytes (all 16-Gbyte DIMMs in one processor module)
 - 1024 Gbytes (all 16-Gbyte DIMMs in two processor modules)
 - 1024 Gbytes (all 32-Gbyte DIMMs in one processor module)
 - 2048 Gbytes (all 32-Gbyte DIMMs in two processor modules)

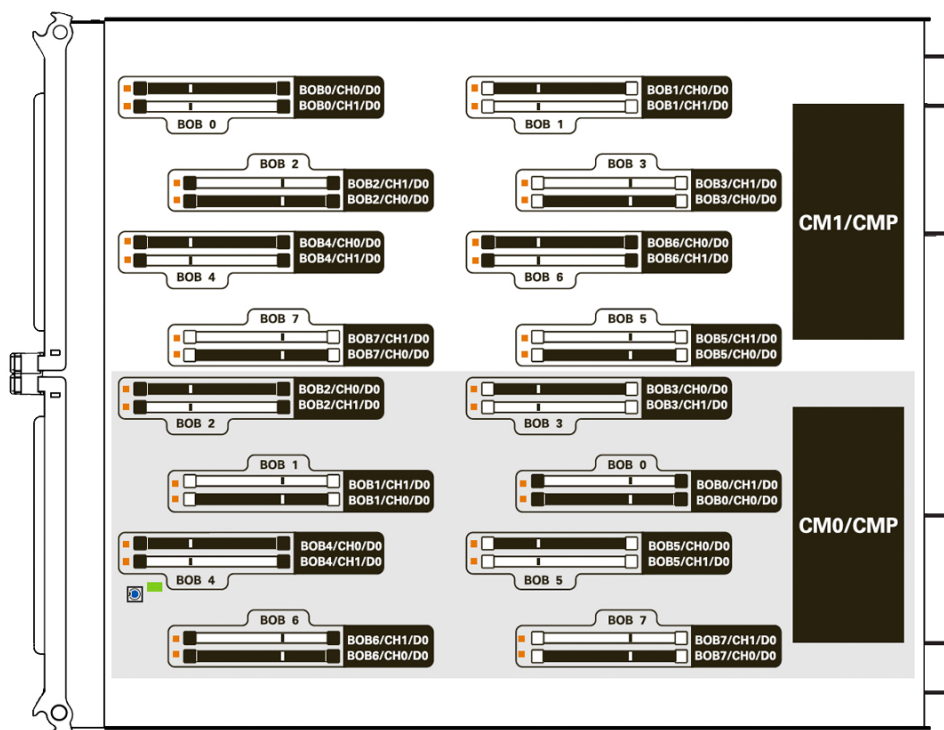
Note - If you are adding a second processor module to the server, you must install DIMMs of the same type and capacity that are already in the existing processor modules. See [“Server Upgrade Process” on page 59](#).

Related Information

- [“DIMM Addresses” on page 74](#)
- [“DIMM Rank Classification” on page 76](#)
- [“Remove a DIMM or DIMM Filler Panel” on page 81](#)
- [“Install a DIMM” on page 83](#)
- [“Verify a DIMM” on page 86](#)

DIMM Addresses

The following figure illustrates the DIMM addresses on a processor module:



DIMM NAC names are based on the location of the DIMM slot on the processor module, as well as in which slot the processor module is installed. For example, the full NAC name for the DIMM installed in the front-left corner on a processor module installed at PM0 is:

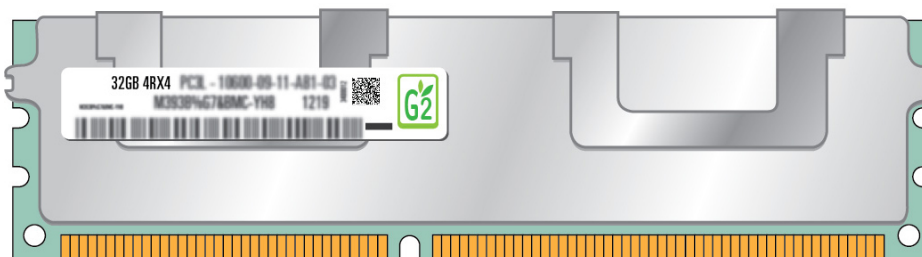
/SYS/PM0/CM1/CMP/BOB0/CH0/D0

Related Information

- [“Servicing Processor Modules” on page 59](#)
- [“DIMM Population Rules” on page 73](#)
- [“DIMM Rank Classification” on page 76](#)
- [“DIMM Fault Handling” on page 77](#)
- [“DIMM Configuration Errors” on page 88](#)

DIMM Rank Classification

Each DIMM includes a printed label identifying its rank classification (examples below). Use these rank classification labels to identify the architecture of the DIMMs installed in the server, or to verify the architecture of any replacement or upgrade DIMMs you intend to install.



The following table identifies the corresponding rank classification label shipped with each DIMM.

Rank Type	Bank Classifications	Label
Dual-rank x4 DIMMs	16 Gbyte	2Rx4
Quad-rank x4 DIMMs	32 Gbyte	4Rx4

Note - All DIMMs related to each CMP must have identical rank classifications. For more information, see [“DIMM Population Rules” on page 73](#).

Related Information

- [“DIMM Population Rules” on page 73](#)
- [“DIMM Addresses” on page 74](#)
- [“DIMM Configuration Errors” on page 88](#)

DIMM Fault Handling

A variety of features play a role in how the memory subsystem is configured and how memory faults are handled. Understanding the underlying features helps you identify and repair memory problems.

The following server features manage memory faults:

- **POST** – By default, POST runs when the server is powered on. For CEs, POST forwards the error to the PSH daemon for error handling. If an uncorrectable memory fault is detected, POST displays the fault with the device name of the faulty DIMMs, and logs the fault. POST then disables the faulty DIMMs. Depending on the memory configuration and the location of the faulty DIMM, POST disables half of physical memory in the server, or half the physical memory and half the processor threads. When this offlining process occurs in normal operation, you must replace the faulty DIMMs based on the fault message and enable the disabled DIMMs with the Oracle ILOM command `set device requested_config_state=Enabled` where *device* is the name of the DIMM being enabled.
- **PSH technology** – The Oracle PSH feature uses the Fault Manager daemon (`fmd`) to watch for various kinds of faults. When a fault occurs, the fault is assigned a UUID and logged. PSH reports the fault and suggests a replacement for the DIMMs associated with the fault.

If you suspect the server has a memory problem, run the Oracle ILOM `show faulty` command. This command lists memory faults and identifies the DIMM modules associated with the fault.

Related Information

- [“POST Overview” on page 34](#)
- [“DIMM Population Rules” on page 73](#)
- [“DIMM Addresses” on page 74](#)
- [“DIMM Configuration Errors” on page 88](#)

▼ Determine Which DIMM is Faulty (PSH)

The Oracle Fault Management tool `fmadm faulty` displays current server faults, including DIMM failures.

1. Start the Fault Management Shell:

```
-> start /SP/faultmgmt/shell
Are you sure you want to start /SP/faultmgmt/shell (y/n)? y
```

2. Type:

```
faultmgmtsp> fmadm faulty
```

```
-----
Time                UUID                msgid                Severity
-----
2013-01-18/21:04:40 7040d859-5b03-4a58-8dfd-e3a80875d62f SPSUN4V-8000-EJ Critical
Problem Status      : solved
Diag Engine         : fdd 1.0
System
  Manufacturer      : Oracle Corporation
  Name              : SPARC T5-4
  Part_Number       : 7021179
  Serial_Number     : 1201CTHC01
System Component
  Manufacturer      : Oracle Corporation
  Name              : SPARC T5-4
  Part_Number       : 7021179
  Serial_Number     : 1201CTHC01
-----
Suspect 1 of 1
  Fault class       : fault.memory.dimm-ue
  Certainty         : 100%
  Affects           : /SYS/PM0/CM1/CMP/BOB0/CH0/D0
  Status            : faulted but still in service
FRU
  Status            : faulty
  Location           : /SYS/PM0/CM1/CMP/BOB0/CH0/D0
  Manufacturer       : Samsung
  Name              : 8192MB DDR3 SDRAM DIMM
  Part_Number       : 07042208,M393B1K70DH0-YK0
  Revision           : 04
  Serial_Number     : 00CE0212153367DD4B
Chassis
```

Manufacturer : Oracle Corporation
Name : SPARC T5-4
Part_Number : 7021179
Serial_Number : 1201CTHC01
Description : Uncorrectable errors have occurred while accessing memory.
Response : An attempt will be made to remove the affected memory from service. Host HW may restart.
Impact : Total system memory capacity has been reduced and some applications may have been terminated.
Action : Use 'fmadm faulty' to provide a more detailed view of this event. Please refer to the associated reference document at <http://support.oracle.com/msg/SPSUN4V-8000-EJ> for the latest service procedures and policies regarding this diagnosis.

Related Information

- [“Determine Which DIMM Is Faulty \(DIMM Fault Remind Button\)” on page 79](#)
- [“DIMM Configuration Errors” on page 88](#)

▼ Determine Which DIMM Is Faulty (DIMM Fault Remind Button)

DIMMs are cold-service components that can be replaced by customers. For the location of the DIMMs, see [“Processor Module Components” on page 18](#).

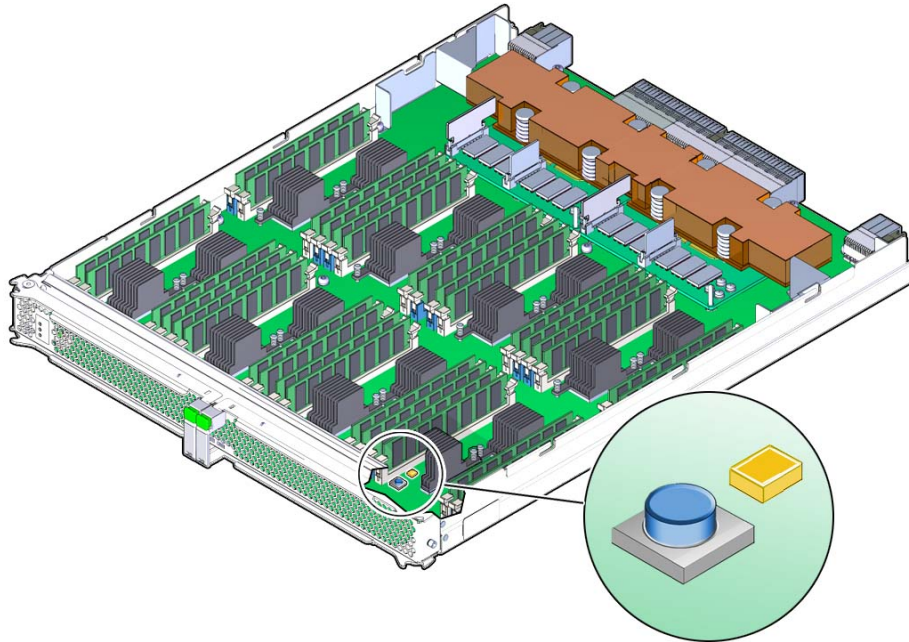


Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

1. Consider your first steps:

- Familiarize yourself with DIMM configuration rules.
See [“DIMM Population Rules” on page 73](#)
- Prepare the system for service.
See [“Preparing for Service” on page 47](#).
- Remove the processor module containing the faulty DIMM. Place the processor module on an ESD-protect work surface. Remove the processor module cover.
See [“Remove a Processor Module or Processor Filler Module” on page 64](#).

2. **Locate the DIMM Fault Remind button on the processor module.**



3. **Verify that the DIMM Fault Remind Power LED next to the button is illuminated.**

An illuminated DIMM Fault Remind Power LED indicates that there is power available to illuminate the faulty DIMM LED once you have pressed the DIMM Fault Remind button.

4. **Press the DIMM Fault Remind button on the processor module.**

This will cause DIMM Fault LED associated with the faulty DIMM to illuminate for a few minutes.

5. **Note the DIMM next to the illuminated DIMM Fault LED.**
6. **Ensure that all other DIMMs are seated correctly in their slots.**

Related Information

- [“Determine Which DIMM is Faulty \(PSH\)” on page 78](#)
- [“DIMM Configuration Errors” on page 88](#)

▼ Remove a DIMM or DIMM Filler Panel

DIMMs and DIMM filler panels are cold-service components that can be replaced by customers. For the location of the DIMMs, see [“Processor Module Components” on page 18](#).



Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.



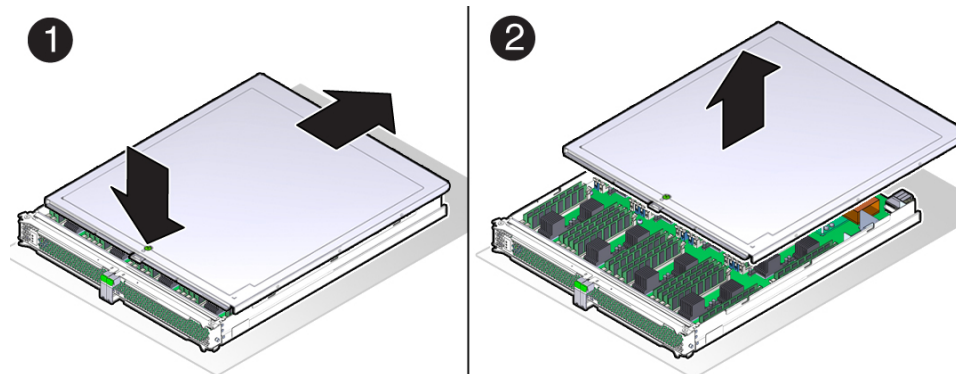
Caution - Do not leave DIMM slots empty. You must install filler panels in all empty DIMM slots.

1. Consider your first steps:

- Familiarize yourself with DIMM configuration rules.
See [“DIMM Population Rules” on page 73](#)
- Prepare the system for service.
See [“Preparing for Service” on page 47](#).
- Remove the processor module. Place the processor module on an ESD-protect work surface.
See [“Remove a Processor Module or Processor Filler Module” on page 64](#).

2. Remove the cover from the processor module.

Press the green button near the front edge of the cover and slide the cover back and up off the main module.



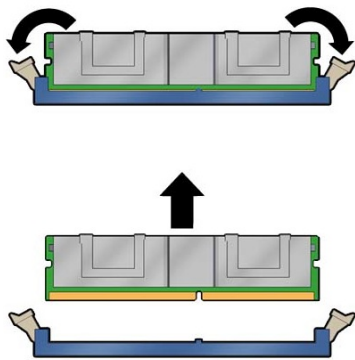
3. Locate the DIMMs that need to be replaced.

See [“Determine Which DIMM Is Faulty \(DIMM Fault Remind Button\)”](#) on page 79.

4. **Push down on the ejector tabs on each side of the DIMM until the DIMM is released.**



Caution - DIMMs and heat sinks on the motherboard might be hot.



5. **Grasp the top corners of the faulty DIMM and lift it out of its slot.**
6. **Place the DIMM on an antistatic mat.**
7. **Repeat [Step 4](#) through [Step 6](#) for any other DIMMs or DIMM filler panels you intend to remove.**
8. **Determine your next step:**
 - **If you are installing replacement DIMMs at this time, go to [“Install a DIMM”](#) on page 83.**
 - **If you are not installing replacement DIMMs at this time, go to [Step 9](#).**
9. **Finish the installation procedure.**

See:

 - **Install the processor module.**

See [“Install a Processor Module or Processor Filler Module”](#) on page 67.

- Return the server to operation.
See [“Returning the Server to Operation” on page 199](#).
- Verify DIMM functionality.
See [“Verify a DIMM” on page 86](#).

Related Information

- [“DIMM Population Rules” on page 73](#)
- [“DIMM Addresses” on page 74](#)
- [“Determine Which DIMM Is Faulty \(DIMM Fault Remind Button\)” on page 79](#)
- [“Determine Which DIMM is Faulty \(PSH\)” on page 78](#)
- [“Install a DIMM” on page 83](#)
- [“Verify a DIMM” on page 86](#)

▼ Install a DIMM

DIMMs are cold-service components that can be replaced by customers. For the location of the DIMMs, see [“Processor Module Components” on page 18](#).



Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

1. Consider your first steps:

- Familiarize yourself with DIMM configuration rules.
See [“DIMM Population Rules” on page 73](#)
- Prepare the system for service.
See [“Preparing for Service” on page 47](#).
- Remove the processor module. Place the processor module on an ESD-protected work surface.
See [“Remove a Processor Module or Processor Filler Module” on page 64](#).

2. Consider your next steps:

- **If you are replacing a faulty DIMM, ensure that you have removed the faulty DIMM.**
See [“Remove a DIMM or DIMM Filler Panel” on page 81](#).

- **If you are populating a new processor module, ensure you have the correct DIMMs for your server.**

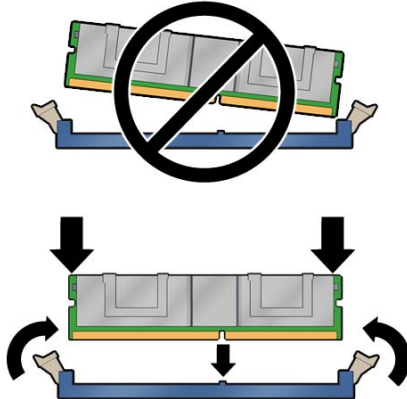
See [“DIMM Population Rules” on page 73](#)

Note - If you ordered processor modules without memory to upgrade the server from a single-module configuration to a dual-module configuration, you must install DIMMs of the same type and capacity that are already in the existing processor modules.

3. **Unpack the replacement DIMMs and place them on an antistatic mat.**
4. **Ensure that the ejector tabs on the connector that will receive the DIMM are in the open position.**
5. **Align the DIMM notch with the key in the connector.**

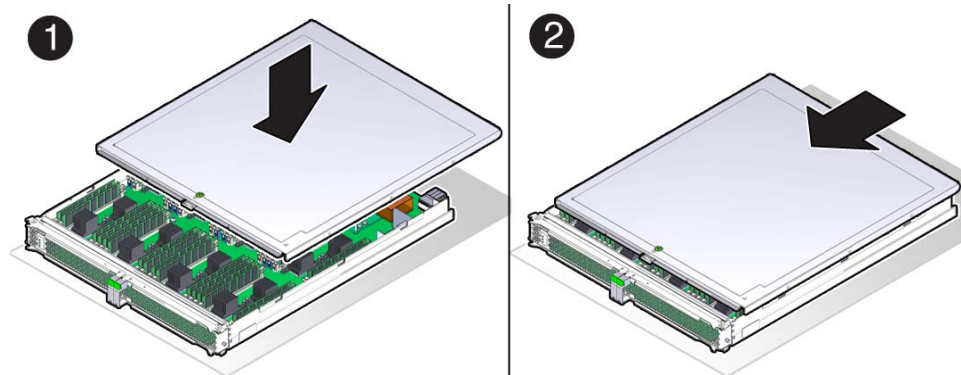


Caution - Ensure that the orientation is correct. The DIMM might be damaged if the orientation is reversed.



6. **Push the DIMM into the connector until the ejector tabs lock the DIMM in place.**
If the DIMM does not easily seat into the connector, check the DIMM's orientation.
7. **Repeat [Step 4](#) through [Step 6](#) until all new DIMMs are installed.**

8. Place the cover onto the processor module and slide the cover forward until the latch clicks into place.



9. Consider your next steps.
 - If you are adding a second processor module to the server, return to [“Server Upgrade Process” on page 59](#).
 - If you are replacing a processor module after installing replacement DIMMs, proceed to [Step 10](#).
10. Finish the installation procedure.

See:

 - Install the processor module.

See [“Install a Processor Module or Processor Filler Module” on page 67](#).
 - Return the server to operation.

See [“Returning the Server to Operation” on page 199](#).
 - Verify DIMM functionality.

See [“Verify a DIMM” on page 86](#).

Related Information

- [“DIMM Population Rules” on page 73](#)
- [“DIMM Addresses” on page 74](#)
- [“DIMM Rank Classification” on page 76](#)
- [“Remove a DIMM or DIMM Filler Panel” on page 81](#)

- [“Verify a DIMM” on page 86](#)
- [“DIMM Fault Handling” on page 77](#)
- [“DIMM Configuration Errors” on page 88](#)

▼ Verify a DIMM

1. Access the Oracle ILOM prompt.

Refer to the SPARC T5 Series Servers Administration Guide for instructions.

2. Use the `show faulty` command to determine how to clear the fault.

- If `show faulty` indicates a POST-detected fault, go to [Step 3](#).
- If `show faulty` output displays a UUID, which indicates a host-detected fault, skip [Step 3](#) and go directly to [Step 4](#).

3. Use the `set` command to enable the DIMM that was disabled by POST.

In most cases, replacement of a faulty DIMM is detected when the service processor is power cycled. In those cases, the fault is automatically cleared from the server. If `show faulty` still displays the fault, the `set` command will clear it.

```
-> set /SYS/MB/CM1/CMP/MR3/BOB0/CH0/D0 requested_config_state=Enabled
Set 'requested_config_state' to 'Enabled'
```

4. For a host-detected fault, perform the following steps to verify the new DIMM:

a. Set the virtual keyswitch to `diag` so that POST will run in Service mode.

```
-> set /System/keyswitch_state=diag
Set 'keyswitch_state' to 'diag'
```

b. Power cycle the server.

```
-> stop /System
Are you sure you want to stop /System (y/n)? y
Stopping /System
-> start /System
Are you sure you want to start /System (y/n)? y
Starting /System
```

Note - Use the `show /HOST` command to determine when the host has been powered off. The console will display `status=Powered Off`. Allow approximately one minute before running this command.

c. Switch to the system console to view POST output.

Watch the POST output for possible fault messages. The following output indicates that POST did not detect any faults:

```
-> start /HOST/console
...
0:0:0>INFO:
0:0:0> POST Passed all devices.
0:0:0>POST: Return to VBSC.
0:0:0>Master set ACK for vbsc runpost command and spin...
```

Note - The server might boot automatically at this point. If so, go directly to [Step 4e](#). If it remains at the ok prompt go to [Step 4d](#).

d. If the server remains at the ok prompt, type boot.

e. Return the virtual keyswitch to normal mode.

```
-> set /System/keyswitch_state=normal
Set 'keyswitch_state' to 'normal'
```

f. Switch to the system console and type the Oracle Solaris OS `fmadm faulty` command.

```
# fmadm faulty
```

If any faults are reported, refer to the diagnostics instructions described in [“Check for Faults” on page 40](#).

5. Switch to the Oracle ILOM command shell.

6. Run the `show faulty` command.

```
-> show faulty
```

Target	Property	Value
--------	----------	-------

```

-----+-----+-----
/SP/faultmgmt/0 | fru | /SYS/PM0/CMP0/BOB0/CH1/D0
/SP/faultmgmt/0 | timestamp | Dec 14 22:43:59
/SP/faultmgmt/0/ | sunw-msg-id | SUN4V-8000-DX
faults/0 | |
/SP/faultmgmt/0/ | uuid | 3aa7c854-9667-e176-efe5-e487e520
faults/0 | | 7a8a
/SP/faultmgmt/0/ | timestamp | Dec 14 22:43:59
faults/0 | |

```

If the `show faulty` command reports a fault with a UUID, go on to [Step 7](#). If `show faulty` does *not* report a fault with a UUID, you are done with the verification process.

7. Switch to the system console and type the `fmadm repaired` command with the UUID.

Use the same UUID that was displayed from the output of the Oracle ILOM `show faulty` command.

```
# fmadm repaired /SYS/PM0/CMP0/BOB0/CH1/D0
```

Related Information

- [“DIMM Population Rules” on page 73](#)
- [“DIMM Addresses” on page 74](#)
- [“Determine Which DIMM Is Faulty \(DIMM Fault Remind Button\)” on page 79](#)
- [“Determine Which DIMM is Faulty \(PSH\)” on page 78](#)
- [“Remove a DIMM or DIMM Filler Panel” on page 81](#)
- [“Install a DIMM” on page 83](#)
- [“DIMM Fault Handling” on page 77](#)
- [“DIMM Configuration Errors” on page 88](#)

DIMM Configuration Errors

When the system boots, system firmware checks the memory configuration against the rules described in [“DIMM Population Rules” on page 73](#). If any violations of these rules are detected, the following general error message is displayed.

Please refer to the service documentation for supported memory configurations.

In some cases, the server boots in a degraded state, and a message such as the following is displayed:

```
NOTICE: /SYS/PM0/CM0/CMP/CORE8/P0 is degraded
```

In other cases, the configuration error is fatal, and the following message is displayed:

```
Fatal configuration error - forcing power-down
```

In addition to these general memory configuration errors, one or more rule-specific messages is displayed, indicating the type of configuration error detected. To identify the DIMMs affected, use the `fmadm faulty` command as described in [“Check for Faults” on page 40](#).

Related Information

- [“Check for Faults” on page 40](#)
- [“Clear a Fault” on page 43](#)
- [“DIMM Population Rules” on page 73](#)
- [“DIMM Addresses” on page 74](#)
- [“DIMM Rank Classification” on page 76](#)
- [“DIMM Fault Handling” on page 77](#)

Servicing Hard Drives

Hard drives are hot-service components that can be replaced by customers. For the location of the hard drives, see [“Hard Drive Locations” on page 91](#).



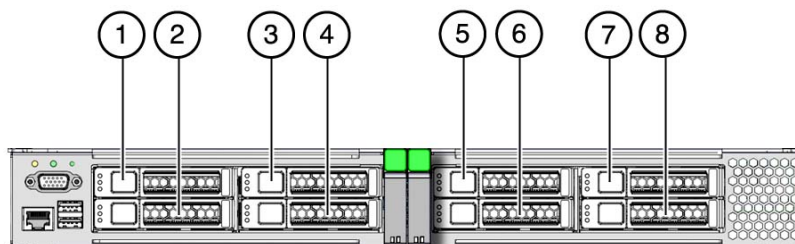
Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

These topics describe service procedures for the hard drives in the server.

- [“Hard Drive Locations” on page 91](#)
- [“Hard Drive Hot-Service Capabilities” on page 92](#)
- [“Hard Drive LEDs” on page 93](#)
- [“Determine Which Hard Drive Is Faulty” on page 94](#)
- [“Remove a Hard Drive” on page 95](#)
- [“Install a Hard Drive” on page 97](#)
- [“Verify the Hard Drive” on page 98](#)

Hard Drive Locations

You can install a mix of hard disk drives and solid state drives. The server requires at least one hard drive to be installed and operational.



No.	Description	No.	Description
1	Drive 1	5	Drive 5
2	Drive 0	6	Drive 4
3	Drive 3	7	Drive 7
4	Drive 2	8	Drive 6

Related Information

- [“Supported Storage and Backup Devices” on page 20](#)
- [“Component Service Task Reference” on page 20](#)
- [“Hard Drive Hot-Service Capabilities” on page 92](#)
- [“Hard Drive LEDs” on page 93](#)
- [“Determine Which Hard Drive Is Faulty” on page 94](#)
- [“Remove a Hard Drive” on page 95](#)
- [“Install a Hard Drive” on page 97](#)
- [“Verify the Hard Drive” on page 98](#)

Hard Drive Hot-Service Capabilities

The hard drives in the server are hot-serviceable, meaning that the drives can be removed and inserted while the server is powered on.

Depending on the configuration of the data on a particular drive, the drive might also be removable while the server is online. However, to hot-service a drive while the server is online you must take the drive offline before you can safely remove it. Taking a drive offline prevents any applications from accessing it, and removes logical software links to it.

You *cannot* hot-service a drive in the following situations:

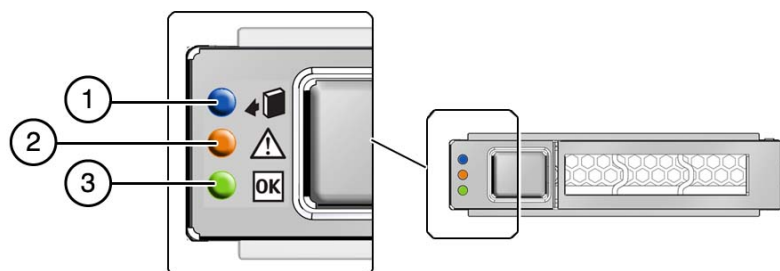
- If the drive contains the operating system and the operating system is not mirrored on another drive.
- If the drive cannot be logically isolated from the online operations of the server.

If either of these conditions apply to the drive being serviced, you must take the server offline (shut down the operating system) before you replace the drive.


Related Information

- [“Hard Drive Locations” on page 91](#)
- [“Hard Drive LEDs” on page 93](#)
- [“Determine Which Hard Drive Is Faulty” on page 94](#)
- [“Remove a Hard Drive” on page 95](#)
- [“Install a Hard Drive” on page 97](#)
- [“Verify the Hard Drive” on page 98](#)

Hard Drive LEDs



No.	LED	Icon	Description
1	Ready to Remove (blue)		Indicates that a drive can be removed during a hot-service operation.
2	Service Required (amber)		Indicates that the drive has experienced a fault condition.

No.	LED	Icon	Description
3	OK/Activity (green)		Indicates the drive's availability for use. <ul style="list-style-type: none">■ On – Read or write activity is in progress.■ Off – Drive is idle and available for use.

Related Information

- [“Hard Drive Hot-Service Capabilities” on page 92](#)
- [“Hard Drive Locations” on page 91](#)
- [“Determine Which Hard Drive Is Faulty” on page 94](#)
- [“Remove a Hard Drive” on page 95](#)
- [“Install a Hard Drive” on page 97](#)
- [“Verify the Hard Drive” on page 98](#)

▼ Determine Which Hard Drive Is Faulty

The following LEDs are lit when a hard drive fault is detected:

- System Service Required LEDs on the front panel and rear I/O module
- Service Required LED on the faulty drive

1. **Determine if the System Service Required LEDs are lit on the front panel or the rear I/O module.**

See [“Interpreting LEDs” on page 29](#).

2. **From the front of the server, check the drive LEDs to identify which drive needs to be replaced.**

See [“Hard Drive LEDs” on page 93](#). The amber Service Required LED is lit on the drive that needs to be replaced.

3. **Remove the faulty drive.**

See [“Remove a Hard Drive” on page 95](#).

Related Information

- [“Hard Drive Locations” on page 91](#)
- [“Hard Drive Hot-Service Capabilities” on page 92](#)
- [“Hard Drive LEDs” on page 93](#)

- [“Remove a Hard Drive” on page 95](#)
- [“Install a Hard Drive” on page 97](#)
- [“Verify the Hard Drive” on page 98](#)

▼ Remove a Hard Drive

Hard drives are hot-service components that can be replaced by customers. For the location of the hard drives, see [“Hard Drive Locations” on page 91](#).



Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

1. **Locate the drive in the server that you want to remove.**
 - See [“Hard Drive Locations” on page 91](#) for the locations of the drives in the server.
 - See [“Determine Which Hard Drive Is Faulty” on page 94](#) to locate a faulty drive.
2. **Determine if you need to shut down the OS to replace the drive, and perform one of the following actions:**
 - If the drive cannot be taken offline without shutting down the OS, follow instructions in [“Power Off the Server \(Oracle ILOM\)” on page 54](#), and go to [Step 4](#).
 - If the drive can be taken offline without shutting down the OS, go to [Step 3](#).
3. **Take the drive offline:**
 - a. **At the Oracle Solaris prompt, type the `cfgadm -al` command to list all drives in the device tree, including drives that are not configured:**

```
# cfgadm -al
```

This command lists dynamically reconfigurable hardware resources and shows their operational status. In this case, look for the status of the drive you plan to remove. This information is listed in the Occupant column.

Example:

Ap_id	Type	Receptacle	Occupant	Condition
...				
c2	scsi-sas	connected	configured	unknown
c2::w5000cca00a76d1f5,0	disk-path	connected	configured	unknown
c3	scsi-sas	connected	configured	unknown
c3::w5000cca00a772bd1,0	disk-path	connected	configured	unknown
c4	scsi-sas	connected	configured	unknown
c4::w5000cca00a59b0a9,0	disk-path	connected	configured	unknown
...				

You must unconfigure any drive whose status is listed as configured, as described in [Step 3b](#).

- b. **Unconfigure the drive using the `cfgadm -c unconfigure` command.**

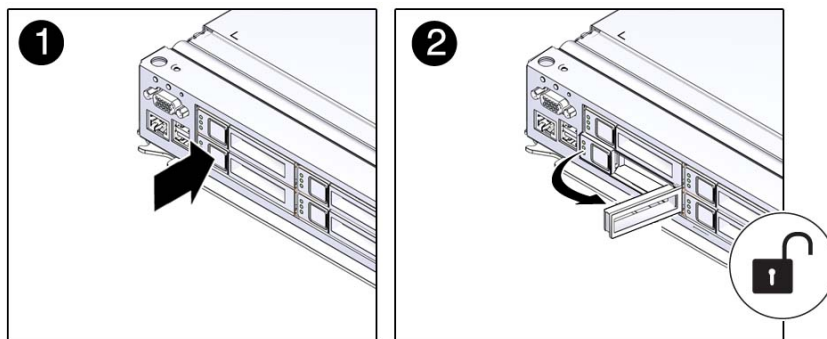
Example:

```
# cfgadm -c unconfigure c2::w5000cca00a76d1f5,0
```

Replace `c2::w5000cca00a76d1f5,0` with the drive name that applies to your situation.

- c. **Verify that the blue Ready-to-Remove LED on the drive is lit.**

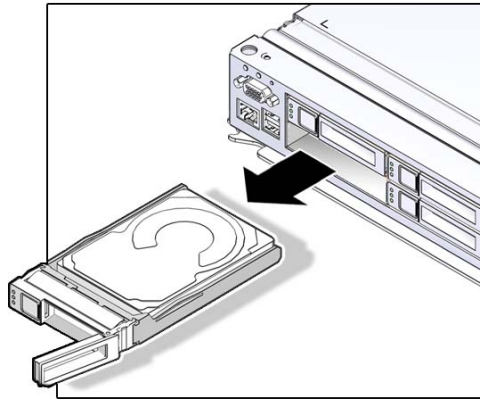
4. **Press the drive release button to unlock the drive.**



5. **Pull on the latch to remove the drive from the server.**



Caution - The latch is not an ejector. Do not force the latch too far to the right. Doing so can damage the latch.



6. Install the replacement drive or a filler tray.

See [“Install a Hard Drive” on page 97](#).

Related Information

- [“Determine Which Hard Drive Is Faulty” on page 94](#)
- [“Install a Hard Drive” on page 97](#)
- [“Verify the Hard Drive” on page 98](#)

▼ Install a Hard Drive

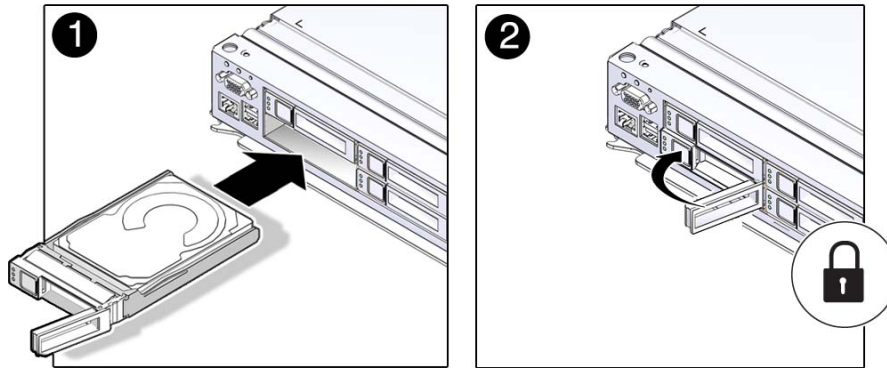
Hard drives are hot-service components that can be replaced by customers. For the location of the hard drives, see [“Hard Drive Locations” on page 91](#).



Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

- 1. Align the replacement drive to the drive slot, and slide the drive in until it is seated.**

Drives are physically addressed according to the slot in which they are installed. If you are replacing a drive, install the replacement drive in the same slot as the drive that was removed. See [“Hard Drive Locations” on page 91](#) for drive slot information.



2. Close the latch to lock the drive in place.

3. Verify the installation.

See [“Verify the Hard Drive” on page 98](#).

Related Information

- [“Determine Which Hard Drive Is Faulty” on page 94](#)
- [“Remove a Hard Drive” on page 95](#)
- [“Verify the Hard Drive” on page 98](#)

▼ Verify the Hard Drive

1. Determine if you replaced or installed a hard drive in a running server or not.

- If you replaced or installed a hard drive in a server that is running (if you hot-serviced the hard drive), then no further action is necessary. The Oracle Solaris OS auto-configures the hard drive.
- If you replaced or installed a hard drive in a powered-down server, then continue with these procedures to configure the hard drive.

2. **If the OS is shut down, and the drive you replaced was not the boot device, boot the OS.**

Depending on the nature of the replaced drive, you might need to perform administrative tasks to reinstall software before the server can boot. Refer to the Oracle Solaris OS administration documentation for more information.

3. **At the Oracle Solaris prompt, type the `cfgadm -al` command to list all drives in the device tree, including any drives that are not configured:**

```
# cfgadm -al
```

This command helps you identify the drive you installed. Example:

Ap_id	Type	Receptacle	Occupant	Condition
...				
c2	scsi-sas	connected	configured	unknown
c2::w5000cca00a76d1f5,0	disk-path	connected	configured	unknown
c3	scsi-sas	connected	configured	unknown
c3::sd2	disk-path	connected	unconfigured	unknown
c4	scsi-sas	connected	configured	unknown
c4::w5000cca00a59b0a9,0	disk-path	connected	configured	unknown
...				

4. **Configure the drive using the `cfgadm -c` configure command.**

Example:

```
# cfgadm -c configure c2::w5000cca00a76d1f5,0
```

Replace `c2::w5000cca00a76d1f5,0` with the drive name for your configuration.

5. **Verify that the blue Ready-to-Remove LED is no longer lit on the drive that you installed.**

See [“Hard Drive LEDs” on page 93](#).

6. **At the Oracle Solaris prompt, type the `cfgadm -al` command to list all drives in the device tree, including any drives that are not configured:**

```
# cfgadm -al
```

The replacement drive is now listed as configured. Example:

Ap_id	Type	Receptacle	Occupant	Condition
...				
c2	scsi-sas	connected	configured	unknown
c2: :w5000cca00a76d1f5,0	disk-path	connected	configured	unknown
c3	scsi-sas	connected	configured	unknown
c3: :w5000cca00a772bd1,0	disk-path	connected	configured	unknown
c4	scsi-sas	connected	configured	unknown
c4: :w5000cca00a59b0a9,0	disk-path	connected	configured	unknown
...				

7. Perform one of the following tasks based on your verification results:

- If the previous steps did not verify the drive, see [“Diagnostics Process” on page 24](#).
- If the previous steps indicate that the drive is functioning properly, perform the tasks required to configure the drive. These tasks are covered in the **Oracle Solaris OS administration documentation**.

For additional drive verification, you can run the Oracle VTS software. Refer to the Oracle VTS documentation for details.

Related Information

- [“Determine Which Hard Drive Is Faulty” on page 94](#)
- [“Remove a Hard Drive” on page 95](#)
- [“Install a Hard Drive” on page 97](#)

Servicing the Main Module

For the location of the main module, see [“Front Panel Components” on page 14](#).



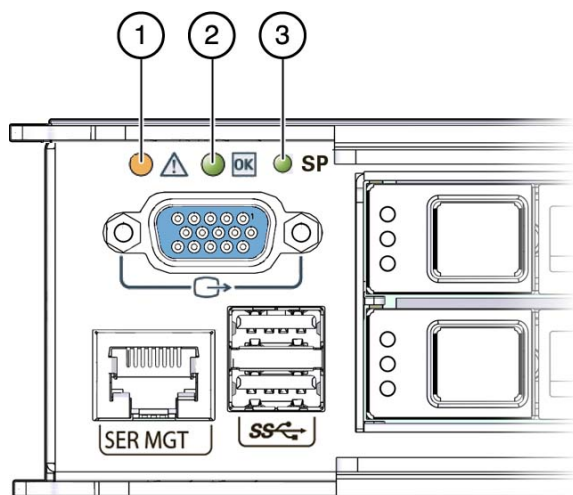
Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.





Caution - You must disconnect the power cords before servicing this component. See [“Disconnect Power Cords” on page 56](#).

Step	Description	Link
1	Determine if the main module is faulty.	“Main Module LEDs” on page 102
2	Prepare the server for service.	“Preparing for Service” on page 47
3	Remove the main module.	“Remove the Main Module” on page 103
4	Service main module components.	<ul style="list-style-type: none">■ “Servicing the Storage Backplanes” on page 111■ “Servicing the Service Processor Card” on page 119■ “Servicing the System Configuration PROM” on page 127■ “Servicing the System Battery” on page 131■ “Servicing the Front I/O Assembly” on page 137
5	Install the main module.	<ul style="list-style-type: none">■ “Install the Main Module” on page 107■ “Verify the Main Module” on page 109
6	Return the server to operation.	“Returning the Server to Operation” on page 199

Main Module LEDs



No.	LED	Icon	Description
1	Service Required LED (amber)		<p>Indicates that service is required. POST and Oracle ILOM are two diagnostic tools that can detect a fault or failure resulting in this indication.</p> <p>The Oracle ILOM show faulty command provides details about any faults that cause this indicator to illuminate.</p> <p>Under some fault conditions, individual component fault LEDs are lit in addition to the Service Required LED.</p>
2	Power OK LED (green)		<p>Indicates these conditions:</p> <ul style="list-style-type: none"> ■ Off – System is not running in its normal state. System power might be off. The SP might be running. ■ Steady on – System is powered on and is running in its normal operating state. No service actions are required. ■ Fast blink – System is running in standby mode and can be quickly returned to full function. ■ Slow blink – A normal but transitory activity is taking place. Slow blinking might indicate that system diagnostics are running or that the system is booting.
3	SP LED (green)	SP	<p>Indicates these conditions:</p> <ul style="list-style-type: none"> ■ Off – AC power might have been connected to the power supplies.

No.	LED	Icon	Description
			<ul style="list-style-type: none"> ■ Steady on, green – SP is running in its normal operating state. No service actions are required. ■ Blink, green – SP is initializing the Oracle ILOM firmware. ■ Steady on, amber – A SP error has occurred and service is required.

Related Information

- [“Determine if the Main Module Is Faulty” on page 103](#)
- [“Remove the Main Module” on page 103](#)
- [“Install the Main Module” on page 107](#)

▼ Determine if the Main Module Is Faulty

- **Check the Service Required LED on the main module.**

The Service Required LED is lit when the server detects a main module fault.

Related Information

- [“Main Module LEDs” on page 102](#)
- [“Remove the Main Module” on page 103](#)
- [“Install the Main Module” on page 107](#)

▼ Remove the Main Module

1. **(Optional) If you are replacing a faulty main module, you must back up ILOM configuration settings.**
 - a. **Configure the SER MGT port to enable the configuration parameters to be uploaded.**
Refer to the ILOM documentation for network configuration instructions.
 - b. **Back up the ILOM configuration parameters.**
See [Oracle ILOM documentation](#).
2. **Shut down the server.**

See [“Removing Power From the Server”](#) on page 53.

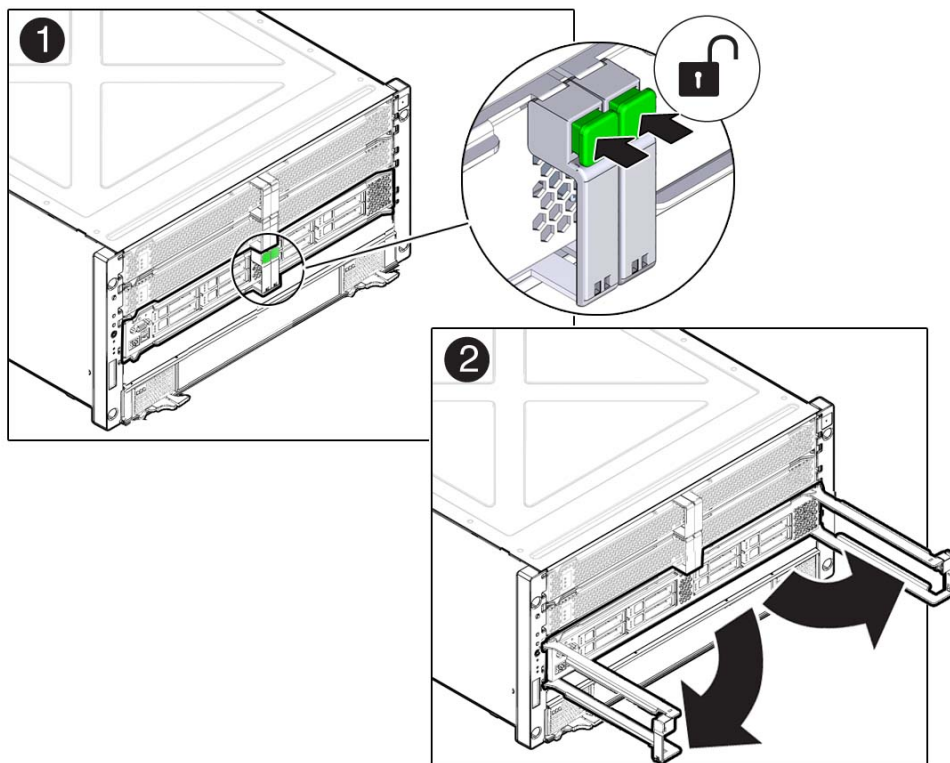
3. Disconnect the power cords.

See [“Disconnect Power Cords”](#) on page 56.

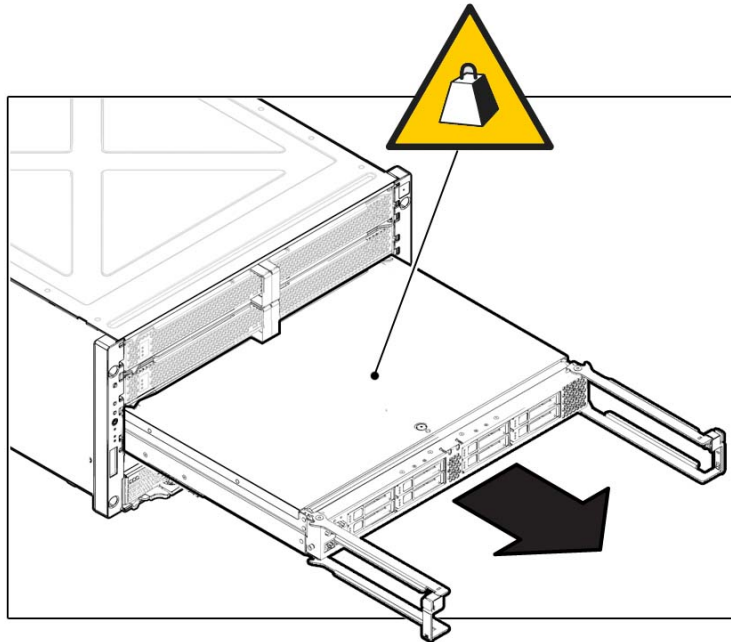
4. Locate the main module in the server.

See [“Front Panel Components”](#) on page 14.

5. Squeeze the release latches together on the two extraction levers, and pull the extraction levers out to disengage the main module from the server.



6. Pull the main module halfway out of the server.



7. Press the levers back toward the center of the main module.

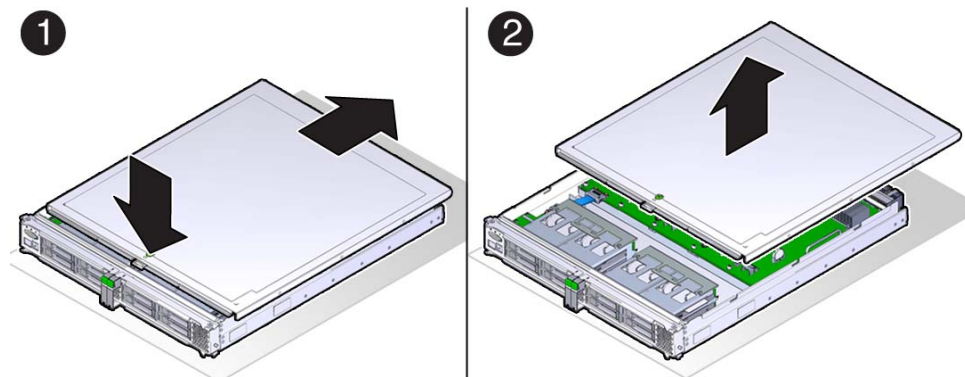
This will keep the levers from being damaged when the main module is outside the server.



Caution - Due to the weight of the main module, the following step requires two people to perform. Do not attempt to lift the main module alone.

8. Remove the main module completely from the server.
9. Remove the cover from the main module.

Press the green button near the front edge of the cover and slide the cover back and up off the main module.



10. Determine your next step.

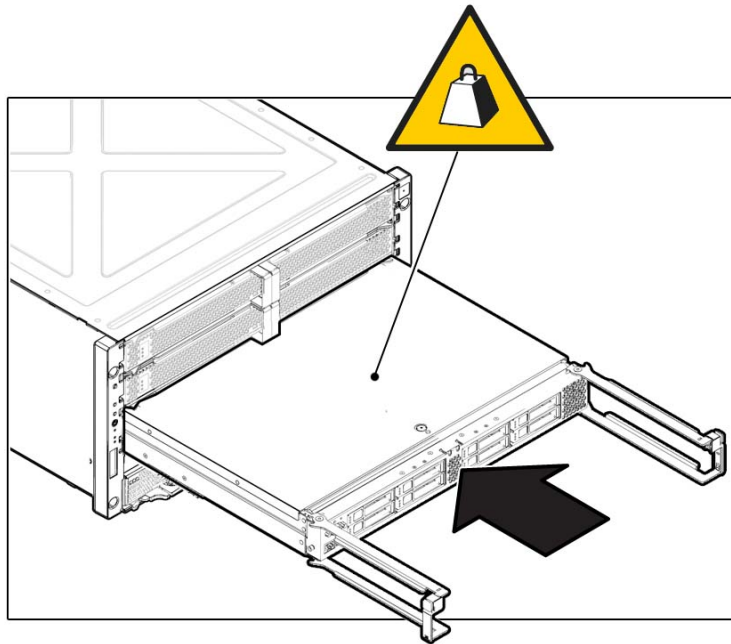
- **If you are replacing a main module due to a faulty motherboard, remove all of the internal components, and transfer them to the new main module.**
- **If you are replacing a component inside the main module, use one of the following links:**
 - [“Servicing the Service Processor Card” on page 119](#)
 - [“Servicing the System Battery” on page 131](#)
 - [“Servicing the System Configuration PROM” on page 127](#)
 - [“Servicing the Front I/O Assembly” on page 137](#)
 - [“Servicing the Storage Backplanes” on page 111](#)

Related Information

- [“Main Module Components” on page 19](#)
- [“Main Module LEDs” on page 102](#)
- [“Install the Main Module” on page 107](#)

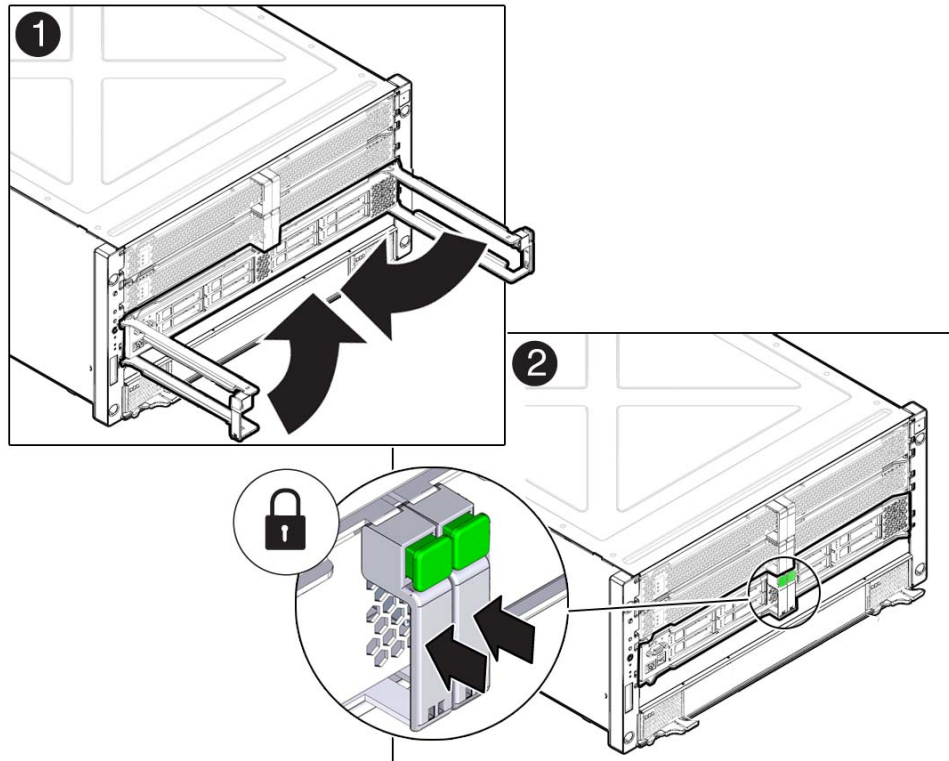
▼ Install the Main Module

1. Place the cover back onto the main module and slide the cover forward until the latch clicks into place.
2. Open the levers so that they are fully open.
3. Insert the main module into its slot in the server until the levers begin to engage.



4. Press the levers back together, toward the center of the module, then press the levers firmly against the module to fully seat the module back into the server.

The levers should click into place when the module is fully seated in the server.



5. Connect the power cords.

See [“Connect Power Cords” on page 199](#).

6. If the you are replacing the main module with a new one, connect a terminal or a terminal emulator (PC or workstation) to the SER MGT port.

The following message is delivered over the serial management port.

Unrecognized Chassis: This module is installed in an unknown or unsupported chassis. You must upgrade the firmware to a newer version that supports this chassis.

7. Download the system firmware.

- a. **Configure the SER MGT port to enable the firmware image to be downloaded.**

Refer to the Oracle ILOM documentation for network configuration instructions.

- b. **Download the system firmware.**

Follow the firmware download instructions in the Oracle ILOM documentation.

Note - You can load any supported system firmware version, including the firmware revision that had been installed prior to the replacement of the main module. However, Oracle strongly recommends installing the newest version of the system firmware.

8. **Power on the server.**

See [“Returning the Server to Operation” on page 199](#).

Related Information

- [“Main Module Components” on page 19](#)
- [“Main Module LEDs” on page 102](#)
- [“Remove the Main Module” on page 103](#)

▼ **Verify the Main Module**

1. **Verify that the main module Service Required LED is not lit.**

See [“Main Module LEDs” on page 102](#).

2. **Verify that the front and rear system Service Required LEDs are not lit.**

See [“Front Panel Controls and LEDs” on page 30](#) and [“Rear Panel Controls and LEDs” on page 32](#).

3. **Perform one of the following tasks based on your verification results:**

- If the previous steps did not clear the fault, see [“Diagnostics Process” on page 24](#).
- If the previous steps indicate that no faults have been detected, then the main module has been replaced successfully. No further action is required.

Related Information

- [“Main Module LEDs” on page 102](#)

- [“Determine if the Main Module Is Faulty” on page 103](#)
- [“Remove the Main Module” on page 103](#)
- [“Install the Main Module” on page 107](#)

Servicing the Storage Backplanes

For the location of the storage backplanes, see [“Processor Module Components” on page 18](#).



Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

- [“Remove a Storage Backplane” on page 111](#)
- [“Install a Storage Backplane” on page 115](#)

▼ Remove a Storage Backplane

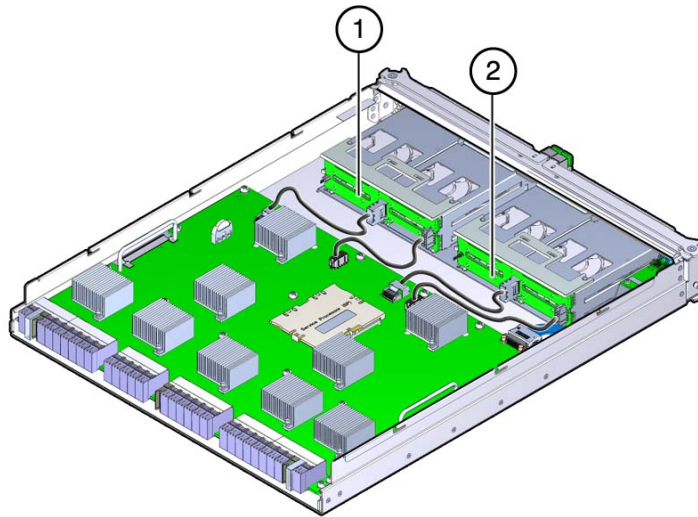
A storage backplane is a cold-service component that can be replaced only by authorized service personnel.



Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

1. **Power off the server.**
See [“Removing Power From the Server” on page 53](#).
2. **Remove all the hard drives from the front of the server for the storage backplane that you want to replace.**
Note the locations of the drives before removing them so that you can install them later in their original slots. You have to remove only hard drives 0–3 or drives 4–7, depending on which storage backplane you want to replace. See [“Remove a Hard Drive” on page 95](#).
3. **Remove the main module from the server.**
See [“Remove the Main Module” on page 103](#).
4. **Take the necessary ESD precautions.**
See [“Prevent ESD Damage” on page 57](#).

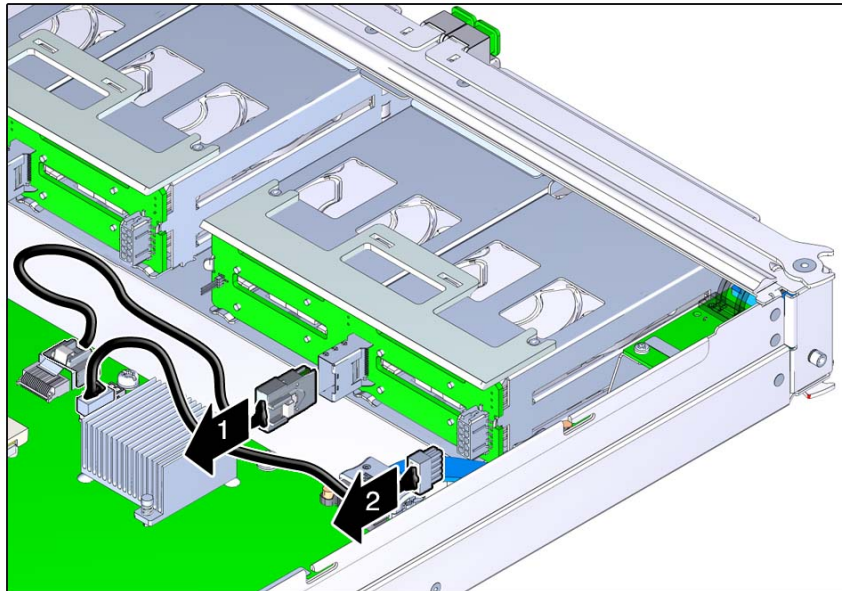
5. **Locate the storage backplane that you want to remove.**



1	Storage backplane for drives 4–7 (SAS_BP1)	2	Storage backplane for drives 0–3 (SAS_BP0)
---	--	---	--

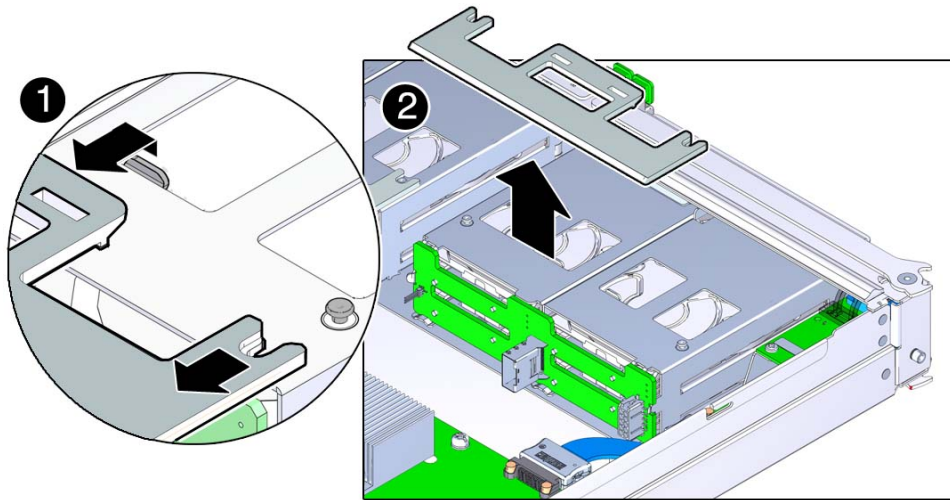
6. **Disconnect the two storage backplane cables from the storage backplane that you want to replace.**
 - a. **Lift up on the connectors that secure the data cable to the storage backplane and the motherboard, and remove the data cable from the main module.**

- b. Lift up on the connectors that secure the power cable to the storage backplane and the motherboard, and remove the power cable from the main module.



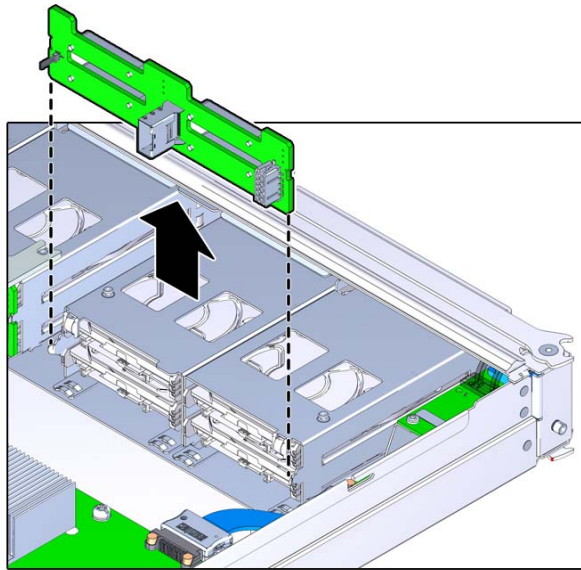
-
- | | |
|---|---|
| 1 | Data cable, storage backplane connection |
| 2 | Power cable, storage backplane connection |
-

7. Lift up on the plastic retaining panel for the storage backplane that you want to remove to disengage the plastic panel from the top of the hard drive assembly.



8. Push the plastic panel toward the rear of the main module, and remove the plastic panel from the main module.

9. Push the top edge of the storage backplane slightly toward the rear of the main module, then lift the storage backplane up and remove it from the main module.



Related Information

- [“Install a Storage Backplane” on page 115](#)

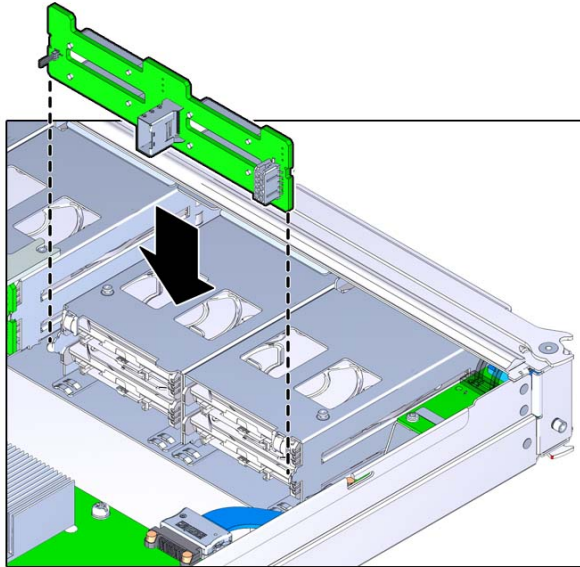
▼ Install a Storage Backplane



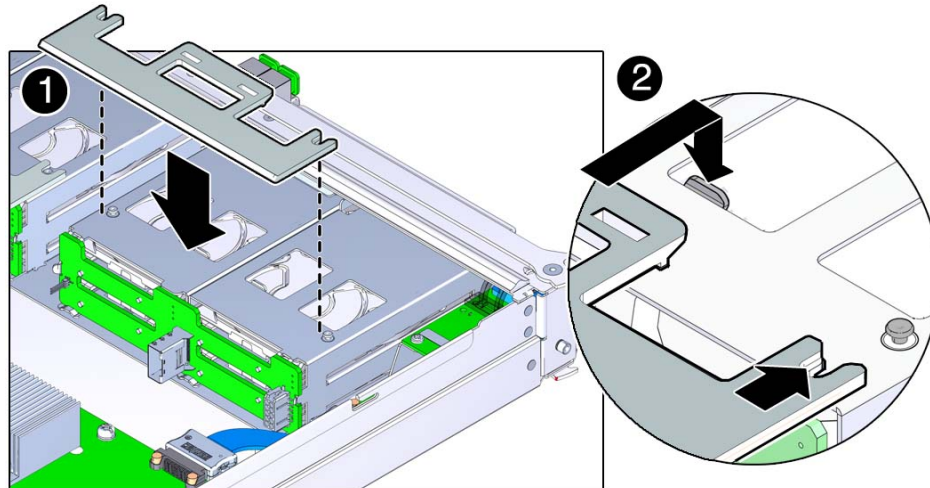
Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

1. **Take the necessary ESD precautions.**
See [“Prevent ESD Damage” on page 57](#).
2. **Position the storage backplane in the main module.**

3. Lower the storage backplane into place.

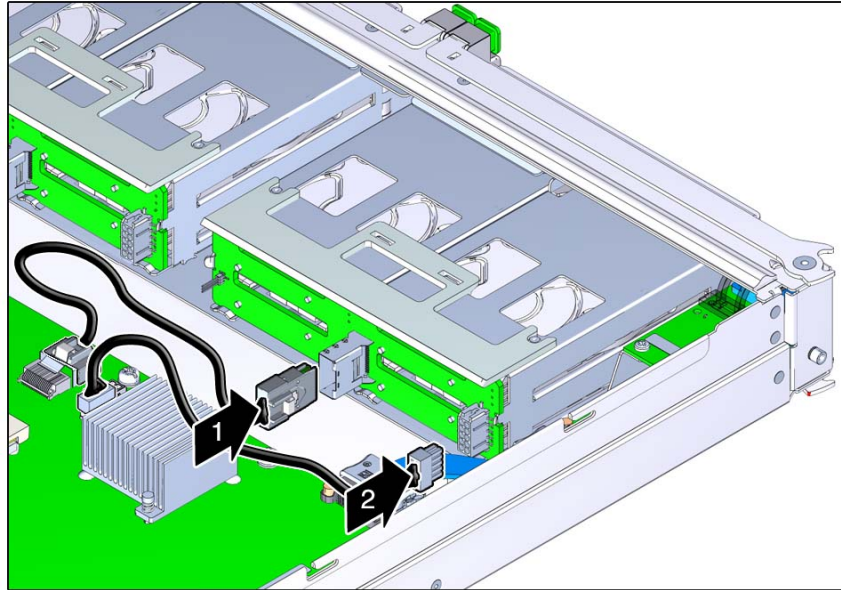


4. Slide the plastic retaining panel into place over the storage backplane so that the two notches in the panel slide underneath the two metal mounting studs on the hard drive assembly.



5. Press on the press point on the retaining panel to secure it to the top of the hard drive assembly.
6. Connect the two storage backplane cables to the storage backplane and the motherboard.
 - a. Connect the data cable to the storage backplane and the motherboard.

- b. **Connect the power cable to the storage backplane and the motherboard.**



-
- | | |
|---|---|
| 1 | Data cable, storage backplane connection |
| 2 | Power cable, storage backplane connection |
-

7. **Insert the main module back into the server.**
See [“Install the Main Module” on page 107](#).
8. **Install the hard drives that you removed back into the main module.**
Refer to the notes that you took when removing the hard drives to install them back into their original slots. See [“Install a Hard Drive” on page 97](#).
9. **Power on the server.**
See [“Returning the Server to Operation” on page 199](#).

Related Information

- [“Remove a Storage Backplane” on page 111](#)

Servicing the Service Processor Card

These topics describe service procedures for the service processor in the server.



Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

Steps	Description	Links
1.	Determine if the service processor card is faulty.	“Determine if the Service Processor Card Is Faulty” on page 119
2.	Remove the main module.	“Remove the Main Module” on page 103
3.	Replace the service processor card.	<ul style="list-style-type: none">■ “Remove the Service Processor Card” on page 120■ “Install the Service Processor Card” on page 122
4.	Install the main module.	“Install the Main Module” on page 107
5.	Verify the replacement service processor card.	“Verify the Service Processor Card” on page 125

▼ Determine if the Service Processor Card Is Faulty

The following LEDs are illuminated when a SP fault is detected:

- System Service Required LEDs on the front panel and rear I/O module
- Server SP LED on the main module or rear I/O module

1. **Determine if the System Service Required LEDs are illuminated on the front panel or the rear I/O module.**

See [“Interpreting LEDs” on page 29](#).

2. **Check the SP LED on the main module or the rear I/O module to determine if the service processor card needs to be replaced.**

See [“Main Module LEDs” on page 102](#) or [“Rear Panel Controls and LEDs” on page 32](#). The SP LED is illuminated amber if the service processor card needs to be replaced.

3. Remove the faulty service processor card.

See [“Remove the Service Processor Card” on page 120](#).

Related Information

- [“Remove the Service Processor Card” on page 120](#)
- [“Install the Service Processor Card” on page 122](#)
- [“Verify the Service Processor Card” on page 125](#)

▼ Remove the Service Processor Card

The service processor card is a cold-service component that can be replaced by a customer.



Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

1. Back up the SP configuration information before removing the service processor card.

At the Oracle ILOM prompt, type:

```
-> cd /SP/config  
-> dump -destination uri target
```

where:

■ **The acceptable values for *uri* are:**

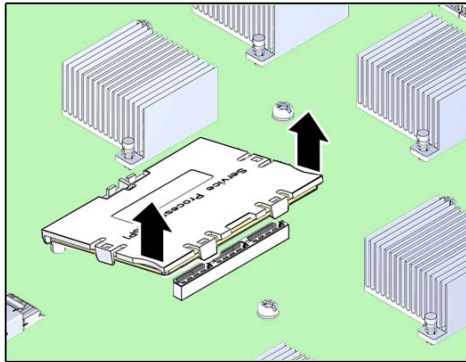
- **tftp**
- **ftp**
- **sftp**
- **scp**
- **http**
- **https**

- *target* is the remote location where you want to store the configuration information.

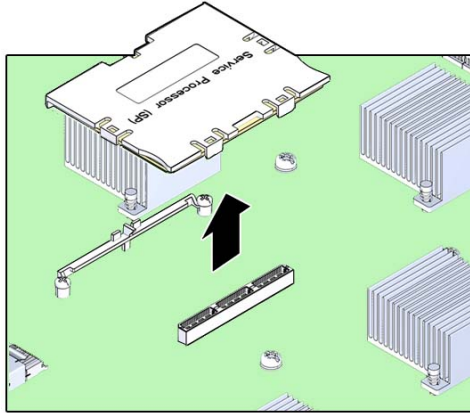
For example:

```
-> dump -destination tftp://129.99.99.99/pathname
```

2. **Take the necessary ESD precautions.**
See [“Prevent ESD Damage” on page 57](#).
3. **Remove the main module from the server.**
See [“Remove the Main Module” on page 103](#).
4. **Locate the service processor card on the main module.**
See [“Main Module Components” on page 19](#).
5. **Grasp the service processor card by the two grasp points, and lift up to disengage the service processor card from the connectors on the motherboard.**



6. Lift the service processor card up and away from the motherboard.



Related Information

- [“Determine if the Service Processor Card Is Faulty” on page 119](#)
- [“Install the Service Processor Card” on page 122](#)

▼ Install the Service Processor Card

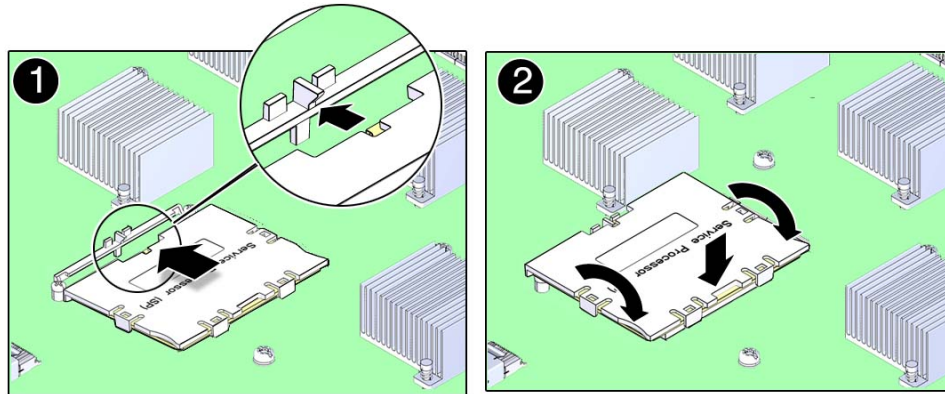


Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

1. **Take the necessary ESD precautions.**

See [“Prevent ESD Damage” on page 57](#).

2. Lower the side of the service processor card with the Align Tab sticker down on the service processor tab on the motherboard.



3. Lower the other side of the service processor card down and press down on the service processor card to seat it into the connectors on the motherboard.
4. Install the main module back into the server.
See [“Install the Main Module”](#) on page 107.
5. Connect a terminal or a terminal emulator (PC or workstation) to the SER MGT port.

If the replacement service processor card detects that the SP firmware is not compatible with the existing host firmware, further action is suspended and the following message is delivered over the SER MGT port.

Unrecognized Chassis: This module is installed in an unknown or unsupported chassis. You must upgrade the firmware to a newer version that supports this chassis.

If you see this message, go on to [Step 6](#).

If you do not see this message, go to [Step 7](#).

6. Download the system firmware.
 - a. Configure the SER MGT port to enable the firmware image to be downloaded.

Refer to the Oracle ILOM documentation for network configuration instructions.

b. Download the system firmware.

Follow the firmware download instructions in the Oracle ILOM documentation.

Note - You can load any supported system firmware version, including the firmware revision that had been installed prior to the replacement of the service processor card. However, Oracle strongly recommends installing the newest version of the system firmware.

7. Restore the service processor configuration information that you backed up earlier.

At the Oracle ILOM prompt, type:

```
-> cd /SP/config  
-> load -source uri target
```

where:

■ **The acceptable values for *uri* are:**

- **tftp**
- **ftp**
- **sftp**
- **scp**
- **http**
- **https**

■ ***target* is the remote location where you stored the configuration information.**

For example:

```
-> load -source tftp://129.99.99.99/pathname
```

8. Verify the installation of the service processor card.

See [“Verify the Service Processor Card” on page 125](#).

Related Information

- [“Determine if the Service Processor Card Is Faulty” on page 119](#)
- [“Remove the Service Processor Card” on page 120](#)
- [“Verify the Service Processor Card” on page 125](#)

▼ Verify the Service Processor Card

1. **Verify that the SP LED on the main module or rear I/O module is lit green.**
See [“Main Module LEDs” on page 102](#) or [“Rear I/O Module LEDs” on page 181](#).
2. **Verify that the front and rear Service Required LEDs are not lit.**
See [“Interpreting LEDs” on page 29](#).
3. **Perform one of the following tasks based on your verification results:**
 - If the previous steps did not clear the fault, see [“Diagnostics Process” on page 24](#).
 - If the previous steps indicate that no faults have been detected, then the service processor card has been replaced successfully. No further action is required.

Related Information

- [“Determine if the Service Processor Card Is Faulty” on page 119](#)
- [“Remove the Service Processor Card” on page 120](#)
- [“Install the Service Processor Card” on page 122](#)

Servicing the System Configuration PROM

These topics describe service procedures for the system configuration PROM in the server.

The system configuration PROM stores the host ID and MAC address. If you have to replace the motherboard, be sure to move the System configuration PROM from the old motherboard to the new motherboard. This step will ensure that the server will retain its original host ID and MAC address.



Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

Steps	Description	Links
1.	Remove the main module.	“Remove the Main Module” on page 103
2.	Replace the system configuration PROM.	“Remove the System Configuration PROM” on page 127 “Install the System Configuration PROM” on page 128
3.	Install the main module.	“Install the Main Module” on page 107
4.	Verify the system configuration PROM.	“Verify the System Configuration PROM” on page 129

▼ Remove the System Configuration PROM

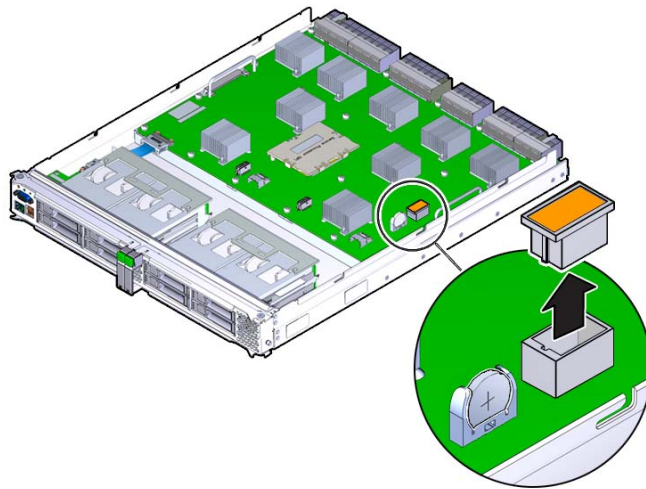
The system configuration PROM is a cold-service component that can be replaced only by authorized service personnel. To identify and locate the system configuration PROM, see [“Processor Module Components” on page 18](#).

Before beginning this procedure, ensure that you are familiar with the cautions and safety instructions described in [“Safety Information” on page 47](#).



Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

1. **Remove the main module from the server.**
See [“Remove the Main Module” on page 103.](#)
2. **Take the necessary ESD precautions.**
See [“Prevent ESD Damage” on page 57.](#)
3. **Locate the system configuration PROM on the main module.**
See [“Main Module Components” on page 19.](#)
4. **Grasp the system configuration PROM and lift it up to remove it from the main module.**



Related Information

- [“Install the System Configuration PROM” on page 128](#)

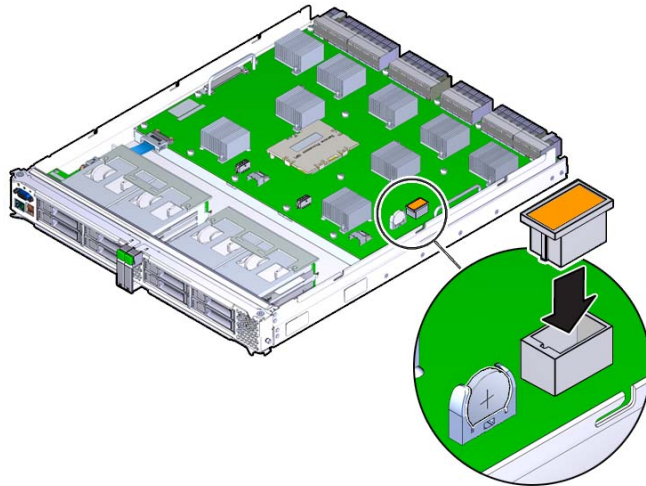
▼ Install the System Configuration PROM

Before beginning this procedure, ensure that you are familiar with the cautions and safety instructions described in [“Safety Information” on page 47.](#)



Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

1. **Orient the system configuration PROM properly onto the main module.**



2. **Press down on the system configuration PROM until it is completely seated on the main module.**
3. **Insert the main module back into the server.**
See [“Install the Main Module” on page 107.](#)
4. **Return the server to operation.** See [“Returning the Server to Operation” on page 199.](#)

Related Information

- [“Remove the System Configuration PROM” on page 127](#)
- [“Verify the System Configuration PROM” on page 129](#)

▼ Verify the System Configuration PROM

1. **Verify that the banner display includes an Ethernet address and a Host ID value.**

The Ethernet address and Host ID values are read from the system configuration PROM. Their presence in the banner verifies that the SP and the host can read the system configuration PROM.

```
.
.
.
SPARC T5-4, No Keyboard
.
OpenBoot X.XX, 16256 MB memory available, Serial
#87304604.Ethernet address *:*:*:*:*:*, Host ID: *****
.
.
.
```

2. For additional verification, run specific commands to display data stored in the system configuration PROM.

- Use the Oracle ILOM show command to display the MAC address:

```
-> show /HOST macaddress
/HOST
Properties:
macaddress = **:*:*:*:*:*
```

- Use Oracle Solaris OS commands to display the hostid and Ethernet address:

```
# hostid
8534299c

# ifconfig -a
lo0: flags=2001000849<UP,LOOPBACK,RUNNING,MULTICAST,IPv4,VIRTUAL> mtu 8232
index 1
    inet 127.0.0.1 netmask ff000000
igb0: flags=201004843<UP,BROADCAST,RUNNING,MULTICAST,IPv4> mtu 1500 index 2
    inet 10.6.88.150 netmask fffffe00 broadcast 10.6.89.255
    ether *:*:*:*:*:*
```

Servicing the System Battery

The system battery is a cold-service component that can be replaced by a customer. For the location of the system battery, see [“Processor Module Components” on page 18](#).



Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

- [“Remove the System Battery” on page 131](#)
- [“Install the System Battery” on page 132](#)
- [“Verify the System Battery” on page 134](#)

▼ Remove the System Battery

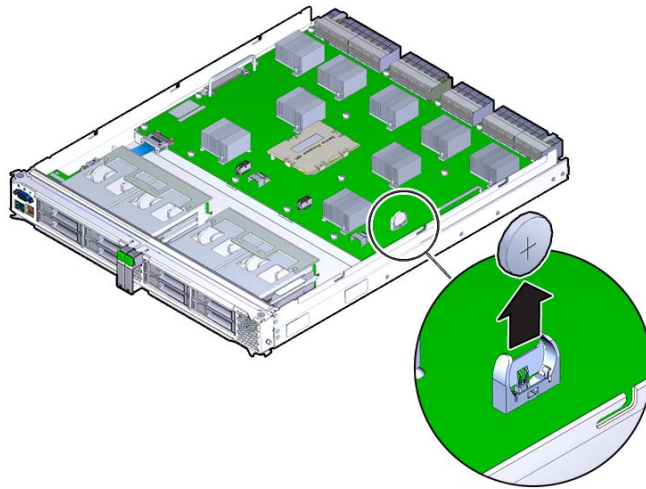
The system battery is a cold-service component that can be replaced by a customer.



Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

1. **Take the necessary ESD precautions.**
See [“Prevent ESD Damage” on page 57](#).
2. **Remove the main module from the server.**
See [“Remove the Main Module” on page 103](#).
3. **Locate the system battery in the main module.**
See [“Main Module Components” on page 19](#).

4. Gently push the battery toward the side of the server to release it from the retention clip.



Related Information

- [“Install the System Battery” on page 132](#)
- [“Verify the System Battery” on page 134](#)

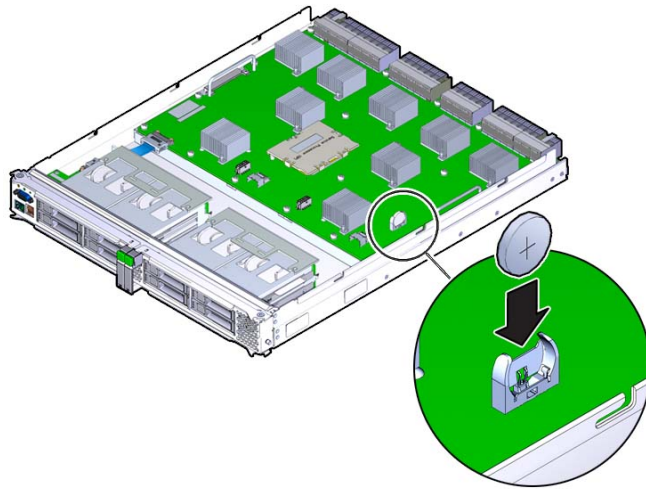
▼ Install the System Battery



Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

1. Take the necessary ESD precautions.
See [“Prevent ESD Damage” on page 57](#).

2. Insert the new system battery in the main module, with the positive side (+) facing out.



3. Install the main module back into the server.
See [“Install the Main Module” on page 107](#).
4. If the service processor is configured to synchronize with a network time server using the Network Time Protocol (NTP), the Oracle ILOM clock will be reset as soon as the server is powered on and connected to the network. Otherwise, proceed to the next step.
5. If the service processor is not configured to use NTP, you must reset the Oracle ILOM clock using the Oracle ILOM CLI or the web interface. For instructions, see the Oracle Integrated Lights Out Manager (ILOM) 3.2.1 Documentation Collection.
6. If the service processor is not configured to use NTP, use the Oracle ILOM `clock` command to set the day and time.

The following example sets the date to November 17, 2012, and the timezone to PDT.

```
-> set /SP/clock datetime=111716192012 timezone=PDT
Set 'datetime' to '111716192012'
Set 'timezone' to 'PDT'
-> show -d properties /SP/clock
```

```
/SP/clock
Properties:
    datetime = Fri NOV 17 16:19:56 2012
    timezone = PDT (PDT)
    usentpserver = (none)
Commands:
    cd
    set
    show
```

Note - For additional details about setting the Oracle ILOM clock, refer to the CLI Procedures Guide for Oracle ILOM.

7. **Verify that the new system battery is functioning properly.**

See [“Verify the System Battery” on page 134](#).

Related Information

- [“Remove the System Battery” on page 131](#)
- [“Verify the System Battery” on page 134](#)

▼ Verify the System Battery

1. **Run `show /SYS/MB/V_BAT` to check the status of the system battery.**

In the output, the `/SYS/MB/V_BAT` status should be OK, as in the following example.

```
-> show /SYS/MB/V_BAT
Targets:
Properties:
    type = Voltage
    ipmi_name = MB/V_VBAT
    class = Threshold Sensor
    value = 3.140 Volts
    upper_nonrecov_threshold = N/A
    upper_critical_threshold = N/A
    upper_noncritical_threshold = N/A
    lower_noncritical_threshold = 2.704 Volts
    lower_critical_threshold = N/A
    lower_nonrecov_threshold = N/A
    alarm_status = cleared
Commands:
    cd
```

show

2. **Verify that the value in the Voltage column shows a voltage of approximately 2.8 V.**

Related Information

- [“Remove the System Battery” on page 131](#)
- [“Install the System Battery” on page 132](#)

Servicing the Front I/O Assembly

These topics describe service procedures for the front I/O assembly in the server.



Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

- [“Front I/O Assembly Reference” on page 137](#)
- [“Remove the Front I/O Assembly” on page 137](#)
- [“Install the Front I/O Assembly” on page 139](#)

Front I/O Assembly Reference

The front I/O assembly consists of the following components:

- Two circuit boards (FIO and VGA boards)
- A ribbon cable connecting the front I/O assembly to the motherboard

Related Information

- [“Remove the Front I/O Assembly” on page 137](#)
- [“Install the Front I/O Assembly” on page 139](#)

▼ Remove the Front I/O Assembly

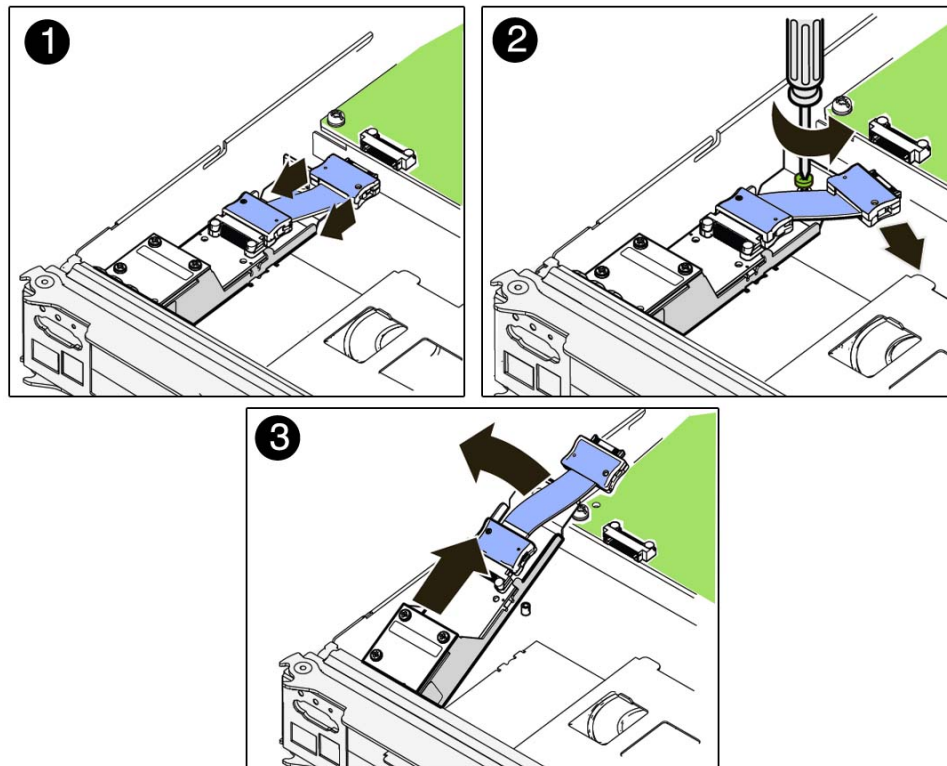
The front I/O assembly is a cold-service component that can be replaced only by authorized service personnel. For the location of this component, see [“Main Module Components” on page 19](#).



Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause electronic components to fail.

1. **Remove the main module from the server.**
See [“Remove the Main Module” on page 103](#).
2. **Take the necessary ESD precautions.**
See [“Prevent ESD Damage” on page 57](#).
3. **Locate the front I/O assembly on the main module.**
See [“Main Module Components” on page 19](#).
4. **Disconnect the ribbon cable that connects the assembly to the motherboard and remove the front I/O assembly.**
 - a. **Pull the cable free of the connector on the motherboard (panel 1).**
 - b. **Push the cable connector aside to access the captive screw that secures the assembly to the motherboard (panel 2).**
Loosen the screw to release the lower end of the assembly.

- c. Gently pull the front I/O assembly toward the back of the main module until the ports at the front of the assembly clear the front of the main module, and then remove the front I/O assembly from the main module (panel 3).



Related Information

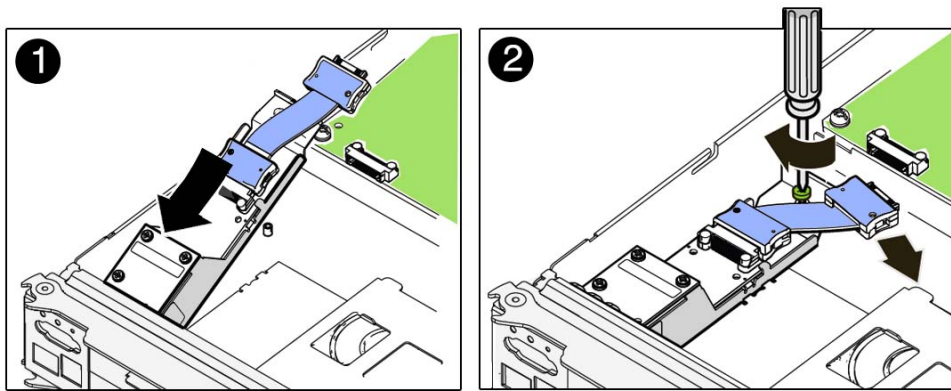
- [“Front I/O Assembly Reference” on page 137](#)
- [“Install the Front I/O Assembly” on page 139](#)

▼ Install the Front I/O Assembly



Caution - This procedure requires that you handle components that are sensitive to static discharge. Static discharges can cause the components to fail.

1. **Take the necessary ESD precautions.**
See [“Prevent ESD Damage”](#) on page 57.
2. **Insert the front I/O assembly into position in the main module.**
 - a. **Gently slide the front I/O assembly into position with the ports inserted into the port holes in the front of the main module (panel 1).**
 - b. **Lower the rear of the front I/O assembly so that the captive screw is aligned with the screw hole on the motherboard and tighten the screw (panel 2).**
 - c. **Connect the assembly's ribbon cable to the connector on the motherboard (panel 3).**



Related Information

- [“Front I/O Assembly Reference”](#) on page 137
- [“Remove the Front I/O Assembly”](#) on page 137

Servicing Power Supplies

The server contains two power supplies, which provide 1 + 1 power redundancy. If you need to replace a power supply, you can do so while the server is operating.

Note - To take full advantage of the server's power redundancy, plug the two power supplies into separate power sources wired to two separate circuits.



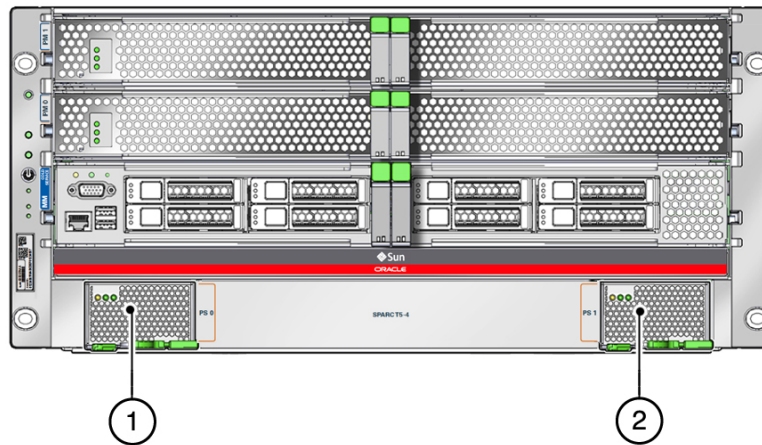
Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

These topics describe service procedures for the power supplies in the server.

- [“Power Supply and AC Power Connectors” on page 141](#)
- [“Power Supply and AC Power Connector LEDs” on page 143](#)
- [“Determine Which Power Supply Is Faulty” on page 144](#)
- [“Remove a Power Supply” on page 144](#)
- [“Install a Power Supply” on page 147](#)
- [“Verify a Power Supply” on page 150](#)

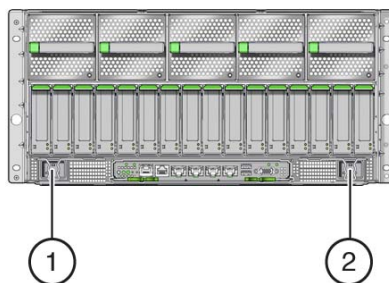
Power Supply and AC Power Connectors

Power supply units are accessed from the front of the server.



-
- | | |
|---|----------------------|
| 1 | Power Supply 0 (PS0) |
| 2 | Power Supply 1 (PS1) |
-

Power cords are accessed from the rear of the server.



-
- | | |
|---|------------------------------------|
| 1 | Connector for Power Supply 1 (PS1) |
| 2 | Connector for Power Supply 0 (PS0) |
-

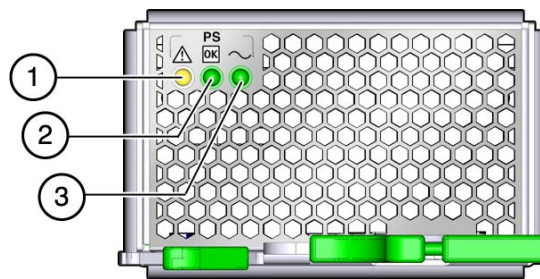
Related Information

- [“Power Supply and AC Power Connector LEDs” on page 143](#)
- [“Determine Which Power Supply Is Faulty” on page 144](#)

- [“Remove a Power Supply” on page 144](#)
- [“Install a Power Supply” on page 147](#)
- [“Verify a Power Supply” on page 150](#)

Power Supply and AC Power Connector LEDs

Each power supply is provided with a set of three LEDs, which are located at the front of the server.



No.	LED	Icon	Description
1	Fault (amber)		illuminates when the power supply is faulty. Note - The front and rear panel Service Required LEDs are also illuminated if the server detects a power supply fault.
2	OK (green)		Lights when the power supply DC voltage from the PSU to the server is within tolerance.
3	AC Present (green)	~AC	Lights when AC voltage is applied to the power supply.

Each AC power connector has a single LED that is located on the rear I/O module (See [“Interpreting LEDs” on page 29](#)).

Related Information

- [“Power Supply and AC Power Connectors” on page 141](#)

- [“Determine Which Power Supply Is Faulty” on page 144](#)
- [“Remove a Power Supply” on page 144](#)
- [“Install a Power Supply” on page 147](#)
- [“Verify a Power Supply” on page 150](#)

▼ Determine Which Power Supply Is Faulty

The following LEDs are lit when a power supply fault is detected:

- System Service Required LEDs on the front panel and rear I/O module
- Fault LED on the faulty power supply

1. **Determine if the System Service Required LEDs are lit on the front panel or the rear I/O module.**

See [“Interpreting LEDs” on page 29](#).

2. **From the front of the server, check the power supply Fault LEDs to identify which power supply needs to be replaced.**

See [“Power Supply and AC Power Connector LEDs” on page 143](#). The amber Service Required LED is lit on the power supply that needs to be replaced.

3. **Remove the faulty power supply.**

See [“Remove a Power Supply” on page 144](#).

Related Information

- [“Power Supply and AC Power Connectors” on page 141](#)
- [“Power Supply and AC Power Connector LEDs” on page 143](#)
- [“Remove a Power Supply” on page 144](#)
- [“Install a Power Supply” on page 147](#)
- [“Verify a Power Supply” on page 150](#)

▼ Remove a Power Supply

The power supply is a hot-service component that can be replaced by a customer.

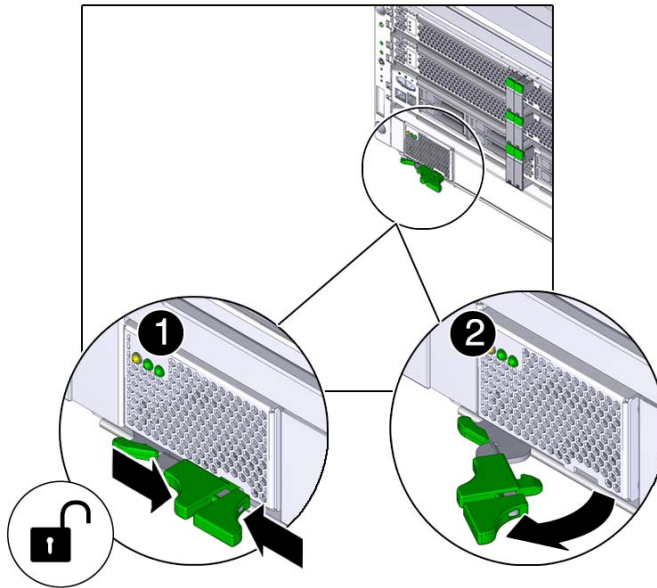


Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

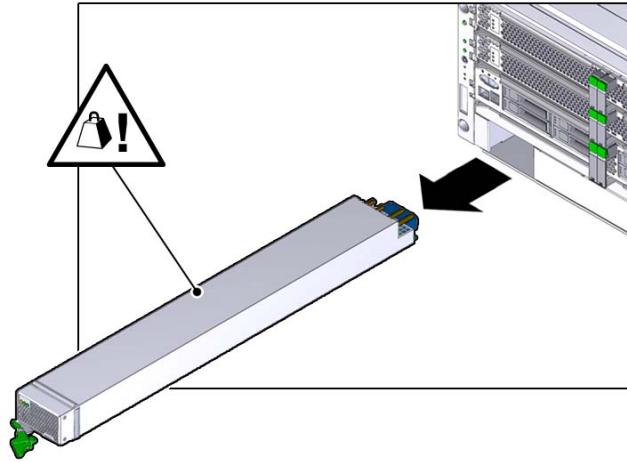
1. **Locate the power supply that you want to remove.**
 - See **“Front Panel Components” on page 14** for the locations of the power supplies in the server.
 - See **“Determine Which Power Supply Is Faulty” on page 144** to locate a faulty power supply.
2. **Go to the rear of the server and locate the AC power connector at the rear of the server that supplies power to the faulty power supply.**

See **“Power Supply and AC Power Connectors” on page 141**.
3. **Disconnect that power cord.**

4. Go to the front of the server and, on the power supply to be removed, squeeze the release latches together, then pull the extraction lever toward you to disengage the power supply from the server.



5. Pull the power supply out of the server.



6. Install the replacement power supply.

See [“Install a Power Supply” on page 147](#).

Related Information

- [“Power Supply and AC Power Connectors” on page 141](#)
- [“Power Supply and AC Power Connector LEDs” on page 143](#)
- [“Determine Which Power Supply Is Faulty” on page 144](#)
- [“Install a Power Supply” on page 147](#)
- [“Verify a Power Supply” on page 150](#)

▼ Install a Power Supply

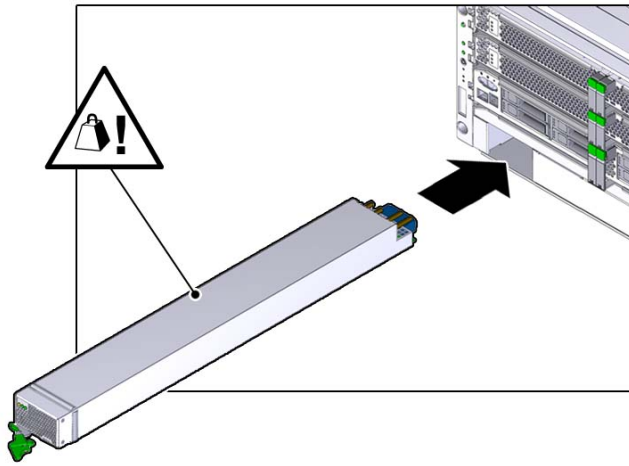
The power supply is a hot-service component that can be replaced by a customer.



Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

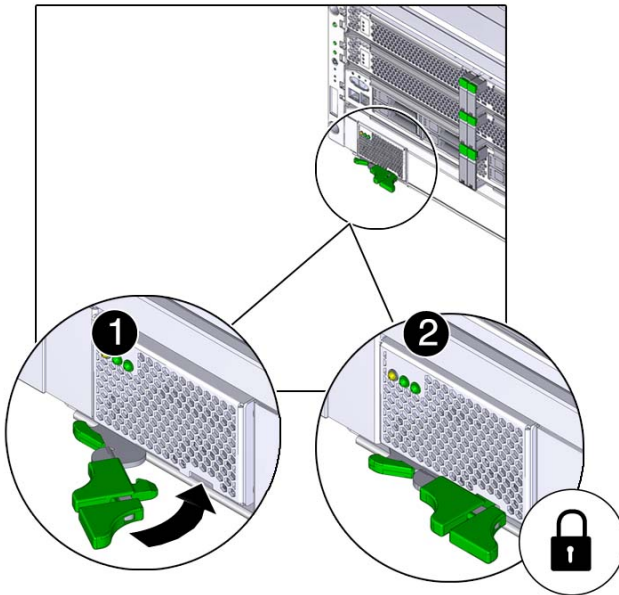
1. Open the latch on the replacement power supply, and align the power supply with the empty bay.

Verify that the power supply is oriented as shown in the following figure.



2. Slide the power supply into the chassis.

3. **Press the lever against the power supply to fully seat the power supply in the server.**



4. **Insert the power cord into the AC connector for the power supply that you just installed.**

As soon as power is applied to the server, standby power initializes the service processor. Depending on the server's OpenBoot PROM settings, the host server might automatically boot, or you might need to boot it manually.

5. **Verify the power supply.**

See [“Verify a Power Supply” on page 150](#).

Related Information

- [“Power Supply and AC Power Connectors” on page 141](#)
- [“Power Supply and AC Power Connector LEDs” on page 143](#)
- [“Determine Which Power Supply Is Faulty” on page 144](#)
- [“Remove a Power Supply” on page 144](#)
- [“Verify a Power Supply” on page 150](#)

▼ Verify a Power Supply

1. **Verify that the power supply Power OK and AC Present LEDs are lit, and that the Fault LED is not lit.**

See [“Power Supply and AC Power Connector LEDs” on page 143.](#)

2. **Verify that the front and rear Service Required LEDs are not lit.**

See [“Interpreting LEDs” on page 29.](#)

3. **Perform one of the following tasks based on your verification results:**

- **If the previous steps did not clear the fault, see [“Diagnostics Process” on page 24.](#)**
- **If [Step 1](#) and [Step 2](#) indicate that no faults have been detected, then the power supply has been replaced successfully. No further action is required.**

Related Information

- [“Power Supply and AC Power Connectors” on page 141](#)
- [“Power Supply and AC Power Connector LEDs” on page 143](#)
- [“Determine Which Power Supply Is Faulty” on page 144](#)
- [“Remove a Power Supply” on page 144](#)
- [“Install a Power Supply” on page 147](#)

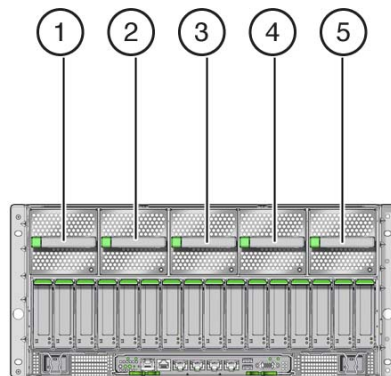
Servicing Fan Modules

The server continues to operate at full capacity if one fan module is not operational. If the server is operating with four fan modules installed and one or more of those four fan modules fails, the server will power down to keep from overheating. You can perform a hot-service on a fan module only when four or five fan modules are operational.

These topics describe service procedures for the fan modules in the server.

- [“Fan Module Locations” on page 151](#)
- [“Determine Which Fan Module Is Faulty” on page 152](#)
- [“Remove a Fan Module” on page 153](#)
- [“Install a Fan Module” on page 155](#)
- [“Verify a Fan Module” on page 156](#)

Fan Module Locations



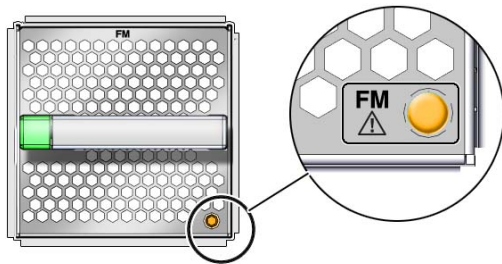
Part	Description
1	Fan module 0
2	Fan module 1
3	Fan module 2
4	Fan module 3
5	Fan module 4

Related Information

- [“Determine Which Fan Module Is Faulty” on page 152](#)
- [“Remove a Fan Module” on page 153](#)
- [“Install a Fan Module” on page 155](#)
- [“Verify a Fan Module” on page 156](#)

Fan Module LED

Each fan module has a single Service Required LED.



▼ Determine Which Fan Module Is Faulty

The following LEDs are illuminated when a fan module fault is detected:

- System Service Required LEDs on the front panel and rear I/O module
- Server Fan Fail LED on the front panel
- Service Required LED on the faulty fan module

1. **Determine if the System Service Required LEDs are illuminated on the front panel or the rear I/O module.**
See [“Interpreting LEDs” on page 29](#).
2. **Determine if the Server Fan Fail LED on the front panel is illuminated.**
See [“Front Panel Controls and LEDs” on page 30](#).
3. **From the rear of the server, check the fan module LEDs to identify which fan module needs to be replaced.**
The fan module Service Required LED is illuminated on the fan module that needs to be replaced.
4. **Remove the faulty fan module.**
See [“Remove a Fan Module” on page 153](#).

Related Information

- [“Remove a Fan Module” on page 153](#)
- [“Install a Fan Module” on page 155](#)
- [“Verify a Fan Module” on page 156](#)

▼ Remove a Fan Module

The fan module is a hot-service component that can be replaced by a customer.

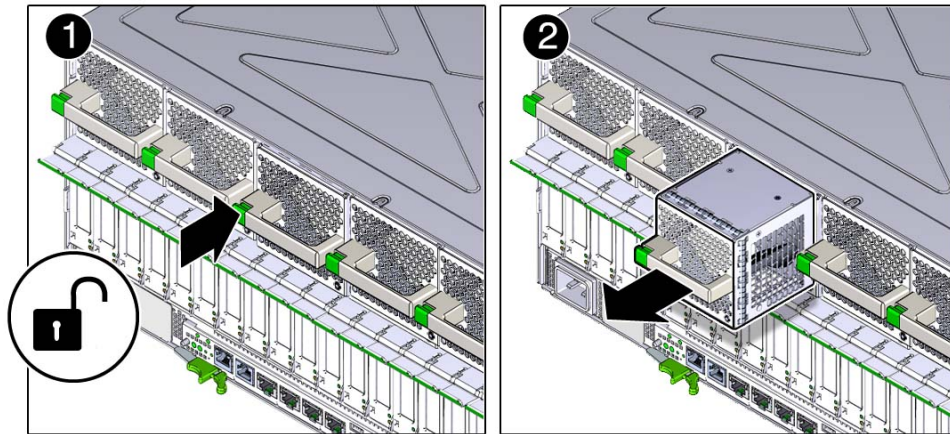


Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

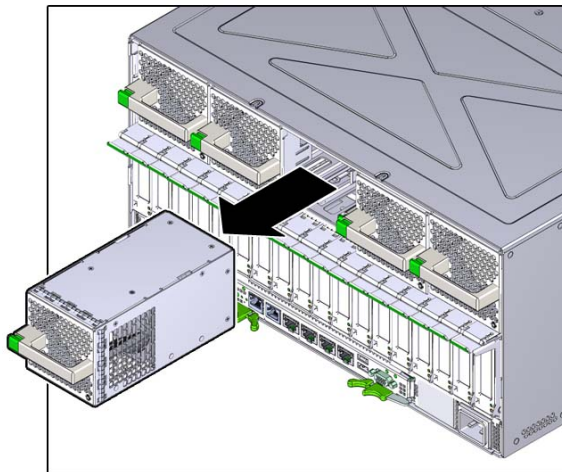
1. **Locate the faulty fan module that you want to remove from the server.**
 - See [“Rear Panel Components” on page 15](#) for the locations of the fan modules in the server.
 - See [“Determine Which Fan Module Is Faulty” on page 152](#) to locate a faulty fan module.
2. **Determine if you can remove the fan module with the server running or not.**
See [“Fan Module Locations” on page 151](#) to determine if you can remove a fan module with the server running or if you must shut down the server before removing a fan module.

- If you can remove a fan module with the server running, go to [Step 3](#).
- If you cannot remove a fan module with the server running, see [“Removing Power From the Server” on page 53](#) to power down the server before continuing.

3. Press the green button to disengage the fan module from the chassis.



4. Pull the fan module out of the server.



Related Information

- [“Fan Module Locations” on page 151](#)
- [“Determine Which Fan Module Is Faulty” on page 152](#)
- [“Install a Fan Module” on page 155](#)
- [“Verify a Fan Module” on page 156](#)

▼ Install a Fan Module

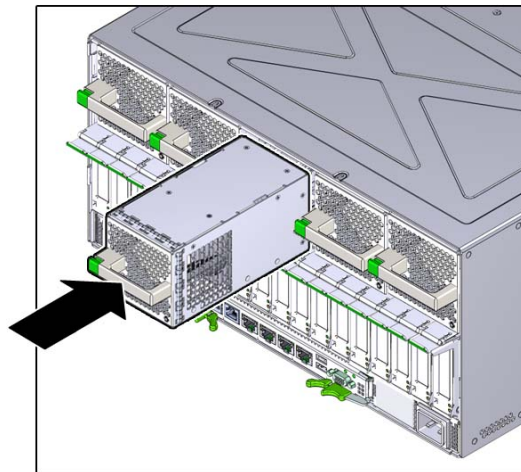
The fan module is a hot-service component that can be replaced by a customer.



Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

1. **Insert the fan module into the empty fan module slot.**

The fan snaps into position with an audible click.



2. **Power on the server, if necessary.**

If you had to power off the server before removing and installing a new fan module, see [“Returning the Server to Operation” on page 199](#) to power on the server again.

3. **Verify the fan module functionality.**

See [“Verify a Fan Module” on page 156](#).

Related Information

- [“Determine Which Fan Module Is Faulty” on page 152](#)
- [“Remove a Fan Module” on page 153](#)
- [“Verify a Fan Module” on page 156](#)

▼ Verify a Fan Module

1. Ensure that you have completed the following:

- Applied power to the server.
See [“Connect Power Cords” on page 199](#).
- Powered on the server.
See [“Power On the Server \(Oracle ILOM\)” on page 200](#).

2. Check the front or rear panel LEDs for the following:

- Green System OK LED – lit
- Amber System Fault LED – not lit
- Amber System Fan Fault LED – not lit

See [“Front Panel Controls and LEDs” on page 30](#) and [“Rear Panel Controls and LEDs” on page 32](#).

If these conditions are met, continue to [Step 5](#).

If these conditions are not met, perform the actions described in [“Diagnostics Process” on page 24](#).

3. Log in to Oracle ILOM.

See [“Log In to Oracle ILOM \(Service\)” on page 27](#).

4. Start the `faultmgmt` shell.

```
-> start SP/faultmgmt/shell
Are you sure you want to start the faultmgmt shell (y/n)? y

faultmgmtsp>
```

5. Use the `fmadm faulty` command to check for faults.

- If faults are reported, see [“Diagnostics Process” on page 24](#).
- If no faults are reported, then the fan module has been replaced successfully.

Related Information

- [“Determine Which Fan Module Is Faulty” on page 152](#)
- [“Remove a Fan Module” on page 153](#)
- [“Install a Fan Module” on page 155](#)

Servicing PCIe Cards

These topics describe service procedures for the PCIe cards that are installed in the PCIe card carriers in the server.

- [“Understanding PCIe Root Complex Connections” on page 159](#)
- [“PCIe Card Installation Order” on page 163](#)
- [“PCIe Carrier Handle and LEDs” on page 165](#)
- [“Determine Which PCIe Card Is Faulty” on page 166](#)
- [“Remove a PCIe Card Carrier” on page 167](#)
- [“Remove a PCIe Card” on page 170](#)
- [“Install a PCIe Card” on page 171](#)
- [“Remove a PCIe Carrier Extension” on page 174](#)
- [“Install a PCIe Carrier Extension” on page 175](#)
- [“Install a PCIe Card Carrier” on page 176](#)
- [“Verify the PCIe Card” on page 178](#)

Understanding PCIe Root Complex Connections

All 16 PCIe slots support PCIe cards with the following characteristics:

- Hot-plug low-profile adapters
- x8 Gen1, x8 Gen2, and x8 Gen3 cards

Note - If you install a 16-lane card in any slot, electrical support is provided to the card's lowest 8 lanes.

A root complex is the CMP circuitry that provides the base to a PCIe I/O fabric. Each PCIe I/O fabric consists of the PCIe switches, PCIe slots, and leaf devices associated with the root complex. Understanding the relationship of the PCIe root complexes to the PCIe I/O fabrics

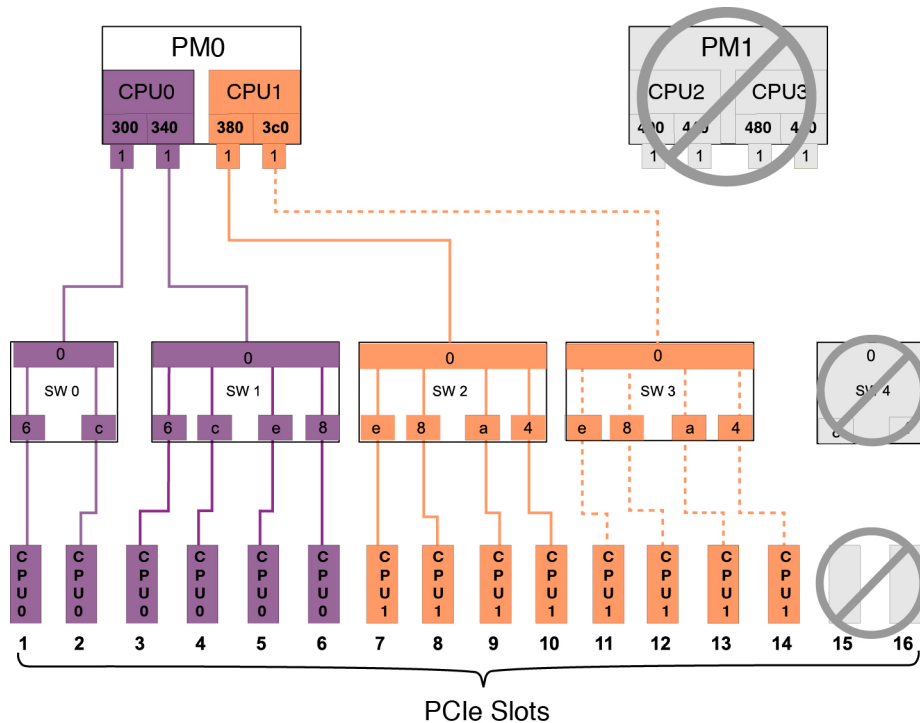
will help you properly assign devices when configuring Oracle VM Server for SPARC logical domains.

These topics explain the root complex configurations:

- [“PCIe Root Complex Connections \(Single-Processor Configurations\)” on page 160](#)
- [“PCIe Root Complex Connections \(Dual-Processor Configurations\)” on page 161](#)

PCIe Root Complex Connections (Single-Processor Configurations)

In single-processor configurations, the server configures the PCIe root complex paths to this topology.



This diagram illustrates the root complex connections between the two CPUs in PM0 and 14 PCIe I/O slots.

Note - I/O slots 15 and 16 cannot be used in single-processor configurations.

CPUs 0 and 1 support four root complex fabrics, which connect to the 12 usable I/O slots through switches 0 through 3.

This table shows the root complex topology that is in effect in single-processor configurations:

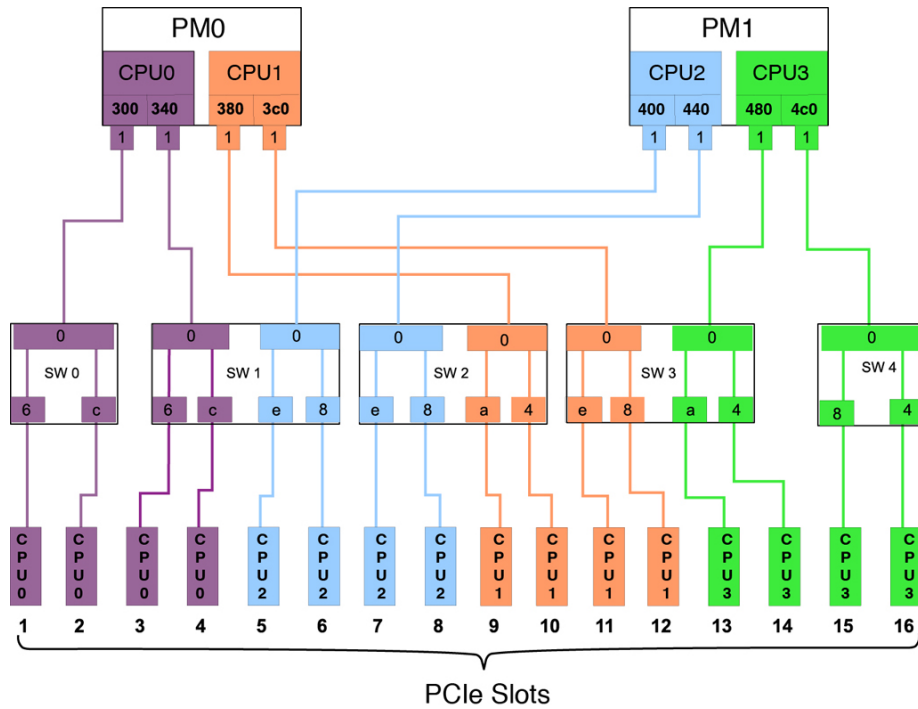
PM	CPU	Switch	I/O Slot	Root Complex Path
0	0	0	1	/pci@300/pci@1/pci@0/pci@6
0	0	0	2	/pci@300/pci@1/pci@0/pci@c
0	0	1	3	/pci@340/pci@1/pci@0/pci@6
0	0	1	4	/pci@340/pci@1/pci@0/pci@c
0	0	1	5	/pci@340/pci@1/pci@0/pci@e
0	0	1	6	/pci@340/pci@1/pci@0/pci@8
0	1	2	7	/pci@380/pci@1/pci@0/pci@e
0	1	2	8	/pci@380/pci@1/pci@0/pci@8
0	1	2	9	/pci@380/pci@1/pci@0/pci@a
0	1	2	10	/pci@380/pci@1/pci@0/pci@4
0	1	3	11	/pci@3c0/pci@1/pci@0/pci@e
0	1	3	12	/pci@3c0/pci@1/pci@0/pci@8
0	1	3	13	/pci@3c0/pci@1/pci@0/pci@a
0	1	3	14	/pci@3c0/pci@1/pci@0/pci@4
N/A	N/A	N/A	15	No root complex for this slot
N/A	N/A	N/A	16	No root complex for this slot

Related Information

- [“Understanding PCIe Root Complex Connections” on page 159](#)
- [“PCIe Root Complex Connections \(Dual-Processor Configurations\)” on page 161](#)
- [“PCIe Card Installation Order” on page 163](#)

PCIe Root Complex Connections (Dual-Processor Configurations)

This topic describes the PCIe root complex topology in servers with two processor modules installed and operational.



This diagram illustrates the root complex connections between the four CPUs and the 16 PCIe I/O slots. Each CPU supports two I/O root complex fabrics. Each root complex connects to two I/O slots through one of five multiplexing switches.

The port ID values shown in the diagram correspond to the pci@ values reported in the showdevs command output. For example:

PM	CPU	Switch	I/O Slot	Root Complex Path
0	0	0	1	/pci@300/pci@1/pci@0/pci@6
0	0	0	2	/pci@300/pci@1/pci@0/pci@c
0	0	1	3	/pci@340/pci@1/pci@0/pci@6
0	0	1	4	/pci@340/pci@1/pci@0/pci@c
1	2	1	5	/pci@400/pci@1/pci@0/pci@e
1	2	1	6	/pci@400/pci@1/pci@0/pci@8
1	2	2	7	/pci@440/pci@1/pci@0/pci@e
1	2	2	8	/pci@440/pci@1/pci@0/pci@8
0	1	2	9	/pci@380/pci@1/pci@0/pci@a
0	1	2	10	/pci@380/pci@1/pci@0/pci@4

PM	CPU	Switch	I/O Slot	Root Complex Path
0	1	3	11	/pci@3c0/pci@1/pci@0/pci@e
0	1	3	12	/pci@3c0/pci@1/pci@0/pci@8
1	3	3	13	/pci@480/pci@1/pci@0/pci@a
1	3	3	14	/pci@480/pci@1/pci@0/pci@4
1	3	4	15	/pci@4c0/pci@1/pci@0/pci@8
1	3	4	16	/pci@4c0/pci@1/pci@0/pci@4

If you are reviewing root complex changes after adding a second processor module, return to [“Server Upgrade Process” on page 59](#).

Related Information

- [“Server Upgrade Process” on page 59](#)
- [“Understanding PCIe Root Complex Connections” on page 159](#)
- [“PCIe Root Complex Connections \(Single-Processor Configurations\)” on page 160](#)
- [“PCIe Card Installation Order” on page 163](#)

PCIe Card Installation Order

Note - Some PCIe cards are restricted to specific I/O slots to meet system cooling requirements. Other I/O cards provide better performance when installed in particular slots. For more information about PCIe slot restrictions for specific devices, see [“I/O Slot Restrictions” in SPARC T5-4 Server Product Notes](#).

For optimal load balancing, install the PCIe cards in this order:

- For single-processor configurations:

Install PCIe cards in this PCIe slot order (single-processor configurations)													
3	7	11	4	8	12	5	9	13	1	6	10	14	2

Note - In single-processor configurations, PCIe slots 15 and 16 are unavailable.

- For dual-processor configurations:

Install PCIe cards in this PCIe slot order (dual-processor configurations)															
5	9	7	11	3	13	4	14	6	10	8	12	1	15	2	16

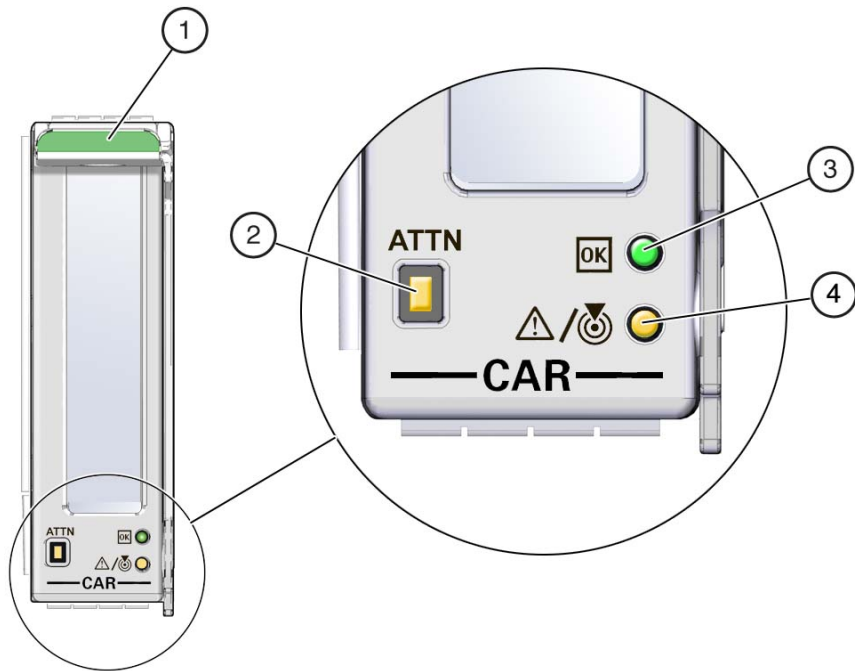
You may populate the PCIe slots in a different order to satisfy LDom or redundant failover considerations, but load balancing might not be as efficient. For example, you may distribute PCIe cards evenly across available root complexes.

If you are reviewing PCIe installation order after adding a second processor module, return to [“Server Upgrade Process” on page 59](#).


Related Information

- [“Server Upgrade Process” on page 59](#)
- [“Understanding PCIe Root Complex Connections” on page 159](#)
- [“Determine Which PCIe Card Is Faulty” on page 166](#)
- [“Remove a PCIe Card” on page 170](#)
- [“Install a PCIe Card” on page 171](#)
- [“Verify the PCIe Card” on page 178](#)

PCIe Carrier Handle and LEDs



No.	Button/LED	Icon	Description
1			Card carrier handle
2	Attention Required button	ATTN	Press this button to bring the PCIe card offline. Press this button again to bring the PCIe card online.
3	OK (green)	OK	Indicates the following conditions: <ul style="list-style-type: none"> ■ Off – The server is powered off, or the PCIe card is not operating. You can remove the PCIe card, or install a new card. ■ On – The PCIe card is connected and online. Do not insert or remove the card. ■ Blinking – The PCIe card is powering up or powering down. Do not insert or remove the card.

No.	Button/LED	Icon	Description
4	Service Required (amber)		<p>The Service Required LED indicates the following conditions:</p> <ul style="list-style-type: none"> ■ Off – No fault is detected. ■ On – A fault has been detected.

Note - If a PCIe card fails and you do not have a replacement available, leave the failed PCIe card and carrier installed to ensure proper airflow in the server.

Related Information

- [“Understanding PCIe Root Complex Connections” on page 159](#)
- [“PCIe Card Installation Order” on page 163](#)
- [“Determine Which PCIe Card Is Faulty” on page 166](#)
- [“Remove a PCIe Card Carrier” on page 167](#)
- [“Install a PCIe Card Carrier” on page 176](#)
- [“Verify the PCIe Card” on page 178](#)

▼ Determine Which PCIe Card Is Faulty

The following LEDs are illuminated when a fault is detected:

- System Service Required LEDs on the front panel and rear I/O module
- System PCIe Fault LED on the front panel
- Service Required LED on card carrier containing the faulty PCIe card

1. **Determine if the System Service Required LEDs are illuminated on the front panel or the rear I/O module.**

See [“Interpreting LEDs” on page 29](#).

2. **Determine if the PCIe Fault LED is illuminated on the front panel.**

See [“Front Panel Controls and LEDs” on page 30](#).

3. **From the rear of the server, find the PCIe carrier that has an amber Service Required LED lit.**

4. **Remove the faulty PCIe card.**

See [“Remove a PCIe Card Carrier” on page 167](#).

Related Information

- [“Understanding PCIe Root Complex Connections” on page 159](#)
- [“Remove a PCIe Card” on page 170](#)
- [“Install a PCIe Card” on page 171](#)
- [“Verify the PCIe Card” on page 178](#)

▼ Remove a PCIe Card Carrier

The SPARC T5-4 server supports single-wide and double-wide card carriers. The removal steps are the same for both carrier types. This topic includes illustrations only for the single-wide carrier.

Note - If you are installing a PCIe card that requires a double-wide carrier, you must remove two adjacent PCIe card carriers.



Caution - To remove a PCIe card that is assigned to an I/O domain, first remove the device from the I/O domain. Then, add the device to the root domain before you physically remove the device from the system. These steps enable you to avoid a configuration that is unsupported by the Direct I/O or SR-IOV feature. For more information about making hardware changes to an I/O domain, refer to the Oracle VM for SPARC documentation.



Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

1. **Take the necessary ESD precautions.**

See [“Prevent ESD Damage” on page 57](#).

2. **Start this procedure with the primary domain at the Oracle Solaris prompt.**

Note - Removing PCIe card carriers while the server is at the OpenBoot prompt is not supported. The server must be either powered off, or booted into the Oracle Solaris OS.

3. **Locate the PCIe card carrier at the rear of the server.**

- See [“Determine Which PCIe Card Is Faulty” on page 166](#) to locate a faulty PCIe card.
- For the location of the PCIe card carriers, see [“Rear Panel Components” on page 15](#).

4. Determine if you are removing a PCIe card carrier from a running server.

- If you are removing a PCIe card carrier from a server that is running (that is, if you are hot-swapping the PCIe card), go to [Step 5](#).
- If you are removing a PCIe card carrier from a powered-down server, go to [Step 7](#).

5. Take the PCIe card offline. Do one of the following:

- **Press the ATTN button to take the card offline.**

The Power OK LED should go off, indicating that the card is ready to be removed. Go to [Step 7](#).

- **Use the `hotplug` command to bring the card offline:**

- At the Oracle Solaris prompt, list all of the PCIe devices in the device tree:**

```
# hotplug list -l | grep PCIE
```

This command lists dynamically reconfigurable PCIe resources and shows their operational status. In this case, look for the status of the card you plan to remove.

For example:

```
/pci@300/pci@1/pci@0/pci@6 [PCIE1] EMPTY
/pci@340/pci@1/pci@0/pci@6 [PCIE3] ENABLED
/pci@380/pci@1/pci@0/pci@a [PCIE9] EMPTY
/pci@3c0/pci@1/pci@0/pci@e [PCIE11] EMPTY
/pci@400/pci@1/pci@0/pci@c [PCIE2] EMPTY
/pci@440/pci@1/pci@0/pci@c [PCIE4] EMPTY
/pci@480/pci@1/pci@0/pci@4 [PCIE10] EMPTY
/pci@4c0/pci@1/pci@0/pci@8 [PCIE12] EMPTY
/pci@500/pci@1/pci@0/pci@e [PCIE5] EMPTY
/pci@540/pci@1/pci@0/pci@e [PCIE7] ENABLED
/pci@580/pci@1/pci@0/pci@a [PCIE13] EMPTY
/pci@5c0/pci@1/pci@0/pci@8 [PCIE15] EMPTY
/pci@600/pci@1/pci@0/pci@8 [PCIE6] EMPTY
/pci@640/pci@1/pci@0/pci@8 [PCIE8] EMPTY
/pci@680/pci@1/pci@0/pci@4 [PCIE14] EMPTY
/pci@6c0/pci@1/pci@0/pci@4 [PCIE16] EMPTY
```

- Disable the PCIe card.**

For example:

```
# hotplug disable /pci@340/pci@1/pci@0/pci@6 PCIE3
```

6. Power off the PCIe card:

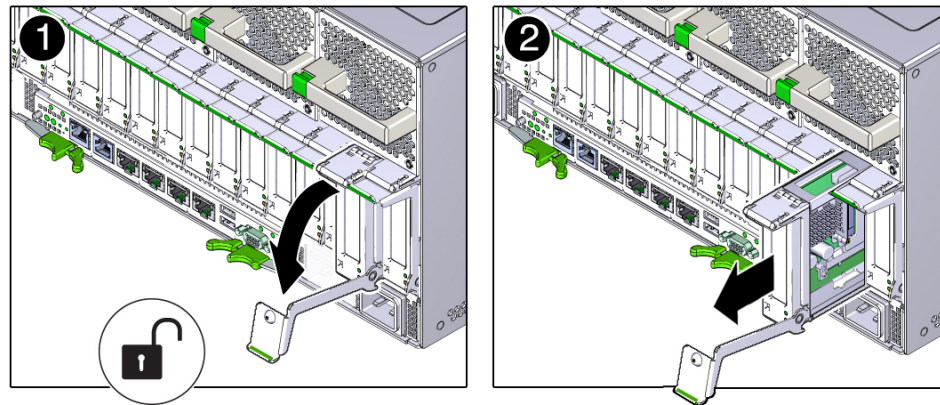
For example:

```
# hotplug poweroff /pci@340/pci@1/pci@0/pci@6 PCIE3
```

7. Disconnect any transceivers, if applicable, and all of the cables connected to the PCIe card.

Tip - Label the cables to ensure proper connection to the replacement PCIe card.

8. Pull the PCIe card carrier handle down to disengage the carrier from the card cage.



9. Remove the PCIe card carrier from the server.

Related Information

- [“Determine Which PCIe Card Is Faulty” on page 166](#)
- [“Remove a PCIe Card” on page 170](#)
- [“Remove a PCIe Carrier Extension” on page 174](#)
- [“Install a PCIe Carrier Extension” on page 175](#)
- [“Install a PCIe Card Carrier” on page 176](#)

▼ Remove a PCIe Card

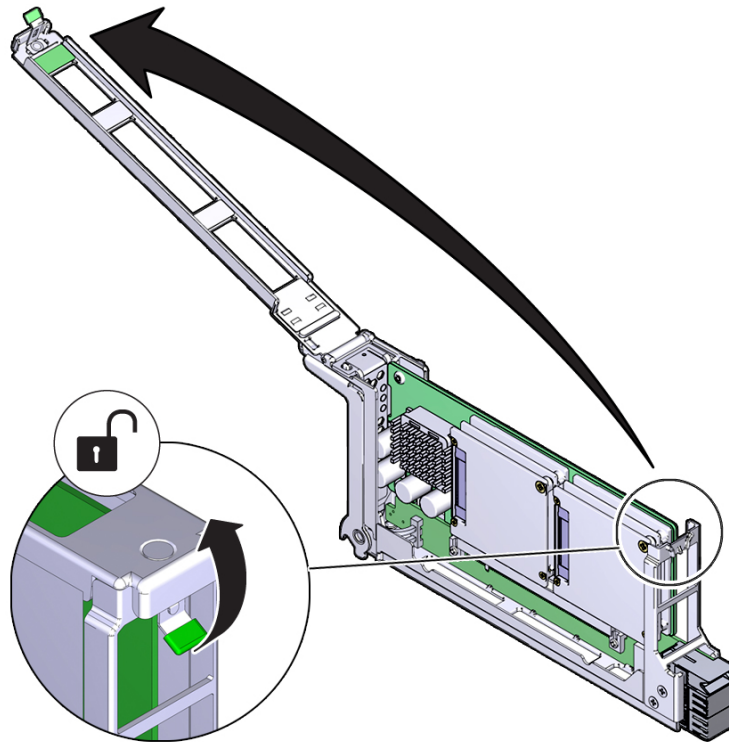


Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

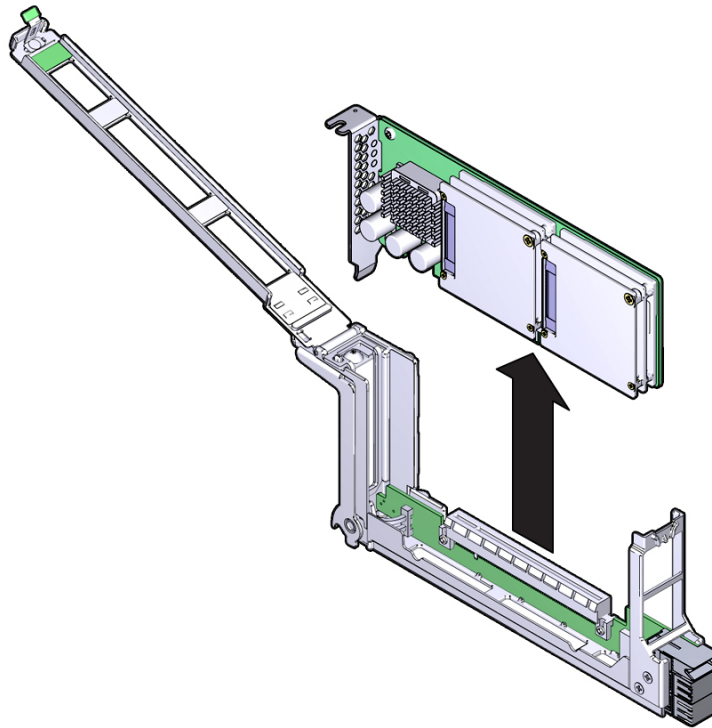
1. **Ensure that you have already taken antistatic measures.**

See [“Prevent ESD Damage” on page 57](#).

2. **Unlatch and open the PCIe card carrier top cover.**



3. Carefully remove the PCIe card from the PCIe card carrier.



4. Place the PCIe card on an antistatic mat or into its antistatic packaging.

Related Information

- [“Install a PCIe Card” on page 171](#)

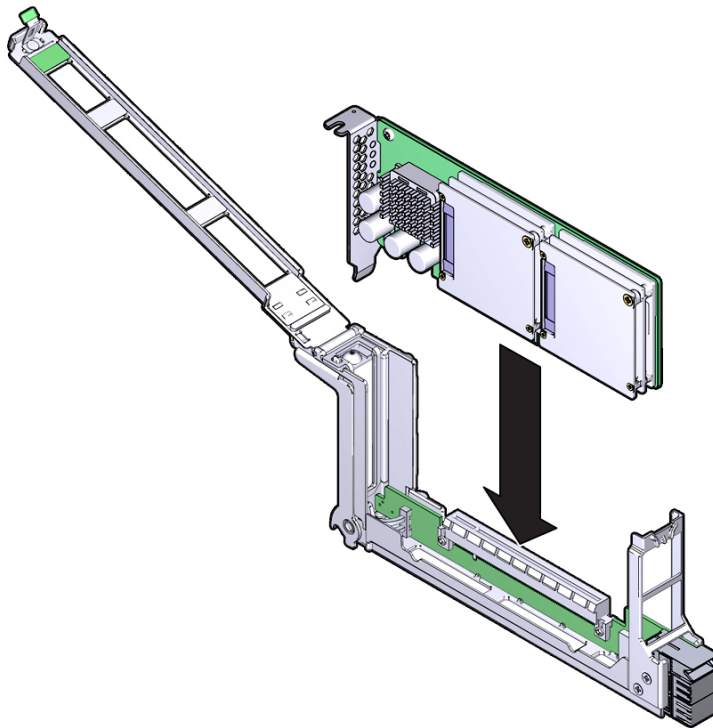
▼ Install a PCIe Card



Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.

1. Determine your first step:

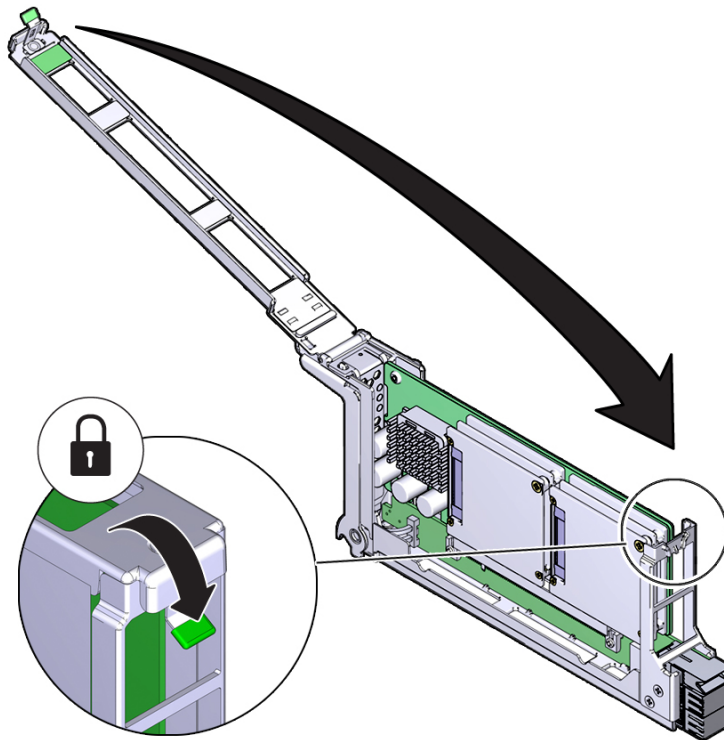
- a. If you are installing a new PCIe card and need an empty PCIe card carrier, see [“Remove a PCIe Card Carrier” on page 167](#).
 - b. If you are replacing a faulty PCIe card and have already removed its carrier from the server, go to [Step 2](#).
 - c. If you are installing a PCIe card that requires a PCIe carrier extension, see [“Install a PCIe Carrier Extension” on page 175](#).
2. Remove the PCIe card from its packaging.
 3. Insert the PCIe card into the PCIe card carrier until the bottom connector is firmly seated in the PCIe card carrier's connector.





Caution - Do not twist or turn the PCIe card as you insert it into the PCIe card carrier. Ensure that the PCIe card's connector is fully seated in the PCIe card carrier's slot, and that the notch in the PCIe card's rear bulkhead is seated around the PCIe carrier's alignment tab.

4. Close and latch the PCIe card carrier's top cover.



Related Information

- [“Determine Which PCIe Card Is Faulty” on page 166](#)
- [“Remove a PCIe Card” on page 170](#)
- [“Install a PCIe Carrier Extension” on page 175](#)
- [“Install a PCIe Card Carrier” on page 176](#)
- [“Verify the PCIe Card” on page 178](#)

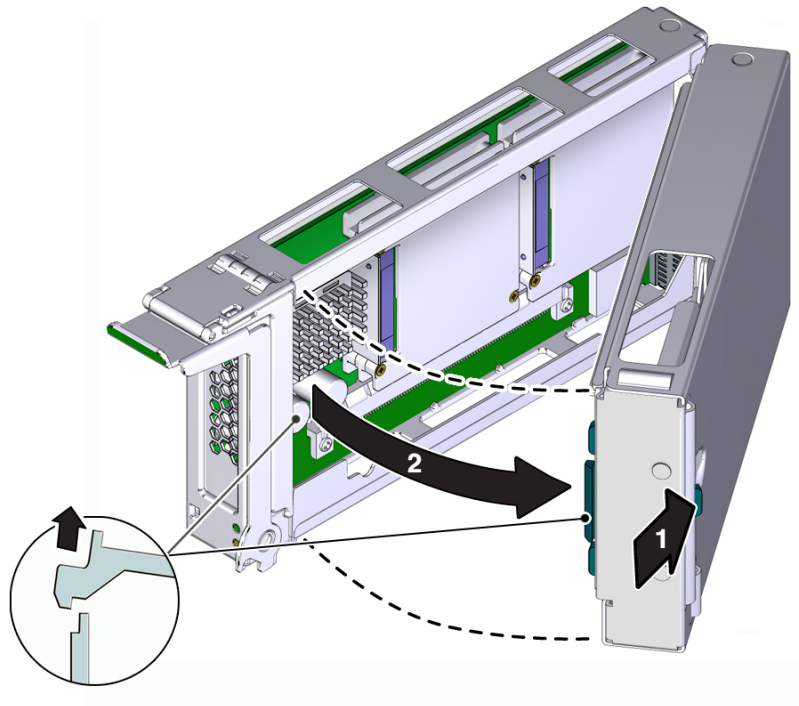
▼ Remove a PCIe Carrier Extension

Normally, it is not necessary to remove a carrier extension when you are replacing the PCIe card. However, if you are reconfiguring the server to remove a double-wide carrier, use the steps in this procedure.

1. **Remove the PCIe carrier and carrier extension from the server.**

The PCIe carrier and extension are removed as a single unit. See [“Remove a PCIe Card Carrier” on page 167](#).

2. **Unlock the carrier extension at the front panel.**



3. **Hold the latch open, and swing the carrier extension away from the main carrier.**
4. **Remove the PCIe card from the main carrier.**

See [“Remove a PCIe Card” on page 170](#).

5. Determine your next step:

- If you are installing a new PCIe card, see [“Install a PCIe Card” on page 171](#).
- If you are not installing a PCIe card, proceed to [Step 6](#).

6. Set the carrier extension aside, and install two PCIe card carriers in the slots that were occupied by the PCIe card carrier and the carrier extension.

See [“Install a PCIe Card Carrier” on page 176](#).

Related Information

- [“Install a PCIe Card” on page 171](#)
- [“Install a PCIe Carrier Extension” on page 175](#)
- [“Install a PCIe Card Carrier” on page 176](#)

▼ Install a PCIe Carrier Extension

Some PCIe cards must be installed with PCIe card carrier extension. The carrier extension provides the additional airflow that is required for proper cooling.

1. Ensure that you have removed two adjacent PCIe card carriers from the server.

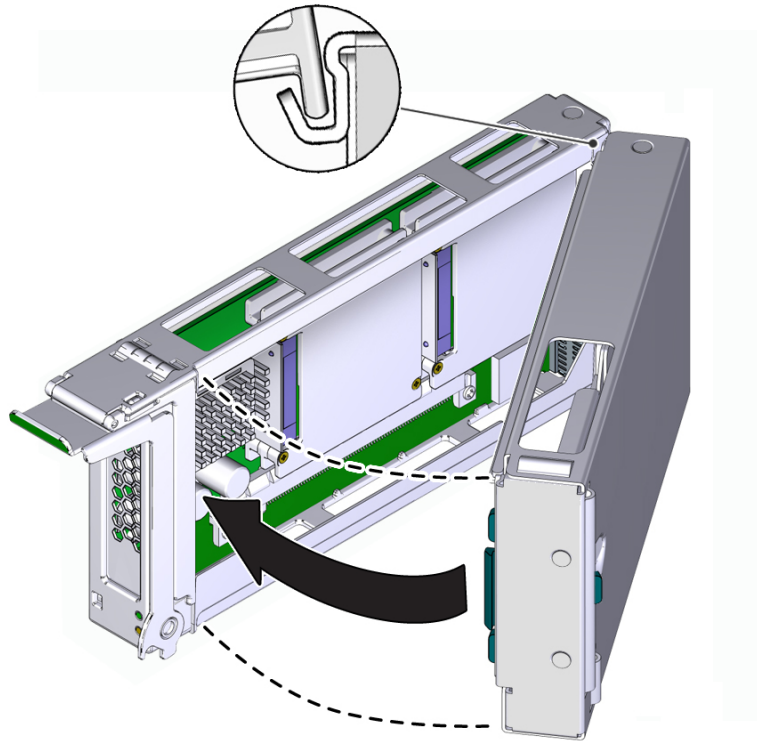
See [“Remove a PCIe Card Carrier” on page 167](#). Retain the extra card carrier in a suitable storage space in case you want to remove the carrier extension later.

Note - To ensure proper system cooling, all PCIe slots must be occupied with a PCIe card carrier or carrier extension.

2. Install the PCIe card.

See [“Install a PCIe Card” on page 171](#).

3. **Align the rear flange on the carrier extension with the rear wall of the main carrier, and swing the two components together until they latch into place.**



Related Information

- [“Install a PCIe Card” on page 171](#)
- [“Install a PCIe Card Carrier” on page 176](#)

▼ Install a PCIe Card Carrier

The SPARC T5-4 server supports single-wide and double-wide card carriers. The installation steps are the same for both carrier widths. This topic includes illustrations only for the single-wide carrier.



Caution - This procedure involves handling circuit boards that are extremely sensitive to static electricity. Ensure that you follow ESD preventative practices to avoid damaging the circuit boards. See [“ESD Precautions” on page 48](#).

Note - Some PCIe cards require a PCIe card carrier extension to ensure proper system cooling. If your PCIe card requires a PCIe carrier extension, see [“Install a PCIe Carrier Extension” on page 175](#).

1. **Ensure that the primary domain is at the Oracle Solaris prompt.**

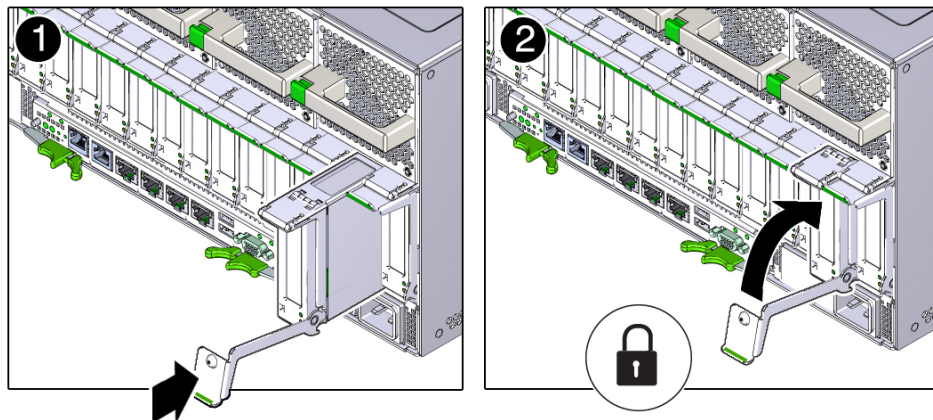
Note - Installing PCIe card carriers while the server is at the OpenBoot prompt is not supported. The server must either be powered off, or booted into the Oracle Solaris OS.

2. **Insert the PCIe card carrier into the card cage until it stops.**



Caution - Do not press on the PCIe back panel, or force the PCIe card carrier into the card cage.

3. **Close the latch to lock the carrier.**
Rotate the handle up until it latches into place.



4. **Reconnect all of the cables and any transceivers, if applicable, to the PCIe card.**
5. **Determine your next step:**

- If you replaced or installed a PCIe card in a server that is running (that is, if you hot-swapped the PCIe card), go to [Step 6](#).
 - If you replaced or installed a PCIe card in a powered-down server, power on the server using the instructions provided in [“Returning the Server to Operation” on page 199](#), then go to [Step 7](#).
6. Take the PCIe card online. Do one of the following:
- Press the ATTN button. The card's Power OK LED should light, indicating that the card is online. Go to [Step 7](#).
 - At the Oracle Solaris prompt, power on and enable the PCIe card.
For example:

```
# hotplug poweron /pci@340/pci@1/pci@0/pci@6 PCIE3  
# hotplug enable /pci@340/pci@1/pci@0/pci@6 PCIE3
```
7. Verify the PCIe card's installation.
See [“Verify the PCIe Card” on page 178](#).

Related Information

- [“Determine Which PCIe Card Is Faulty” on page 166](#)
- [“Remove a PCIe Card Carrier” on page 167](#)
- [“Install a PCIe Carrier Extension” on page 175](#)
- [“Verify the PCIe Card” on page 178](#)

▼ Verify the PCIe Card

1. Verify that the PCIe card carrier Fault LED is not illuminated.
2. Verify that the System Service Required LEDs on the front panel and rear I/O module are not illuminated.
See [“Interpreting LEDs” on page 29](#).
3. Verify that the System PCIe Fault LED on the front panel is not illuminated.
See [“Front Panel Controls and LEDs” on page 30](#).

4. **Perform one of the following tasks based on your verification results:**
 - If any of the LEDs are illuminated, see [“Diagnostics Process” on page 24](#).
 - If none of the LEDs are illuminated, go to [Step 6](#).
5. **Verify that the green Power LED is lit on the PCIe card carrier that you installed.**
6. **At the Oracle Solaris prompt, ensure that the PCIe card is connected and online:**

```
# hotplug list -cv
```

Connection	State	Description
PCIE1	EMPTY	PCie-Native
...		
PCIE7	ENABLED	PCie-Native
Device	Usage	
SUNW,qlc@0	-	
fp	-	
disk	-	
fp@0,0	-	
SUNW,qlc@0,1	-	
fp	-	
disk	-	
fp@0,0	-	
PCIE13	EMPTY	PCie-Native
PCIE15	EMPTY	PCie-Native

Related Information

- [“Determine Which PCIe Card Is Faulty” on page 166](#)
- [“Remove a PCIe Card” on page 170](#)
- [“Install a PCIe Card” on page 171](#)

Servicing the Rear I/O Module



Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.



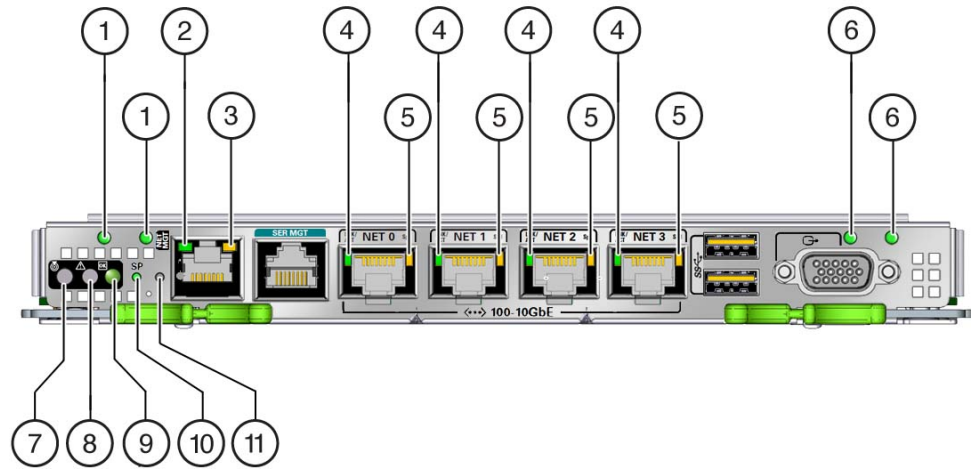
Caution - You must disconnect the power cords before servicing this component. See [“Disconnect Power Cords” on page 56](#).

These topics describe service procedures for the rear I/O module in the server.




- [“Rear I/O Module LEDs” on page 181](#)
- [“Determine if the Rear I/O Module Is Faulty” on page 184](#)
- [“Remove the Rear I/O Module” on page 184](#)
- [“Install the Rear I/O Module” on page 186](#)
- [“Verify the Rear I/O Module” on page 188](#)

Rear I/O Module LEDs

The LEDs on the rear I/O module give server status information and link information on the NET ports.



No.	LED	Icon	Description
1	AC1 connector LED		Indicates the state of the AC connector. Green indicates that the AC connector is functioning correctly. Amber indicates a fault with PSU1.
1	(Unused)		This LED has no function.
2	NET MGT link and activity LED (green)		Indicates the following conditions: <ul style="list-style-type: none"> ■ On or blinking – A link is established. ■ Off – No link is established.
3	NET MGT speed (green)		Indicates the following conditions: <ul style="list-style-type: none"> ■ Blinking – A link is established. ■ Off – No link is established.
4	NET link and activity (green)		Indicates the following conditions: <ul style="list-style-type: none"> ■ On – A link is established. ■ Blinking – Transfer activity is present on the link. ■ Off – No link is established.
5	NET speed (amber/green)		Indicates the following conditions: <ul style="list-style-type: none"> ■ Green on – The link is operating as a 100-Mbps connection. ■ Off – There is no link.
6	(Unused)		This LED has no function.
6	AC0 connector LED		Indicates the state of the AC connector. Green indicates that the AC connector is functioning correctly. Amber indicates a fault with PSU 0.
7	System Locator LED and button(white)		The Locator LED can be turned on to identify a particular server. When on, it blinks rapidly. There are two methods for turning a Locator LED on:

No.	LED	Icon	Description
8	System Service Required LED(amber)		<ul style="list-style-type: none"> ■ Issuing the Oracle ILOM command set <code>/System/Locator_indicator=on</code> ■ Pressing the Locator button <p>Indicates that service is required. POST and Oracle ILOM are two diagnostic tools that can detect a fault or failure resulting in this indication.</p> <p>The Oracle ILOM <code>show faulty</code> command provides details about any faults that cause this indicator to illuminate.</p> <p>The System Service Required LED also illuminates on the rear I/O module if the rear I/O module has failed.</p>
9	System Power OK LED (green)		<p>Indicates the following conditions:</p> <ul style="list-style-type: none"> ■ Off – Server is not running in its normal state. Server power might be off. The SP might be running. ■ Steady on – Server is powered on and is running in its normal operating state. No service actions are required. ■ Fast blink – Server is running in standby mode and can be quickly returned to full function. ■ Slow blink – A normal but transitory activity is taking place. Slow blinking might indicate that server diagnostics are running or the server is booting.
10	Service Processor LED	SP	<p>Indicates the following conditions:</p> <ul style="list-style-type: none"> ■ Off – The AC power might have been connected to the power supplies. ■ Steady on, green – The SP is running in its normal operating state. No service actions are required. ■ Blink, green – The SP is initializing the Oracle ILOM firmware. ■ Steady on, amber – A SP error has occurred and service is required.
11	System Overtemp LED (amber)		<p>Provides the following operational temperature indications:</p> <ul style="list-style-type: none"> ■ Off – Indicates a steady state, no service action is required. ■ Steady on – Indicates that a temperature event has been detected and a service action is required.

Related Information

- [“Determine if the Rear I/O Module Is Faulty” on page 184](#)
- [“Remove the Rear I/O Module” on page 184](#)
- [“Install the Rear I/O Module” on page 186](#)
- [“Verify the Rear I/O Module” on page 188](#)

▼ Determine if the Rear I/O Module Is Faulty

The System Service Required LED on the rear I/O module illuminates when a rear I/O module fault is detected.

1. **Determine if the System Service Required LED is illuminated on the rear I/O module.**

See [“Rear I/O Module LEDs” on page 181](#).

2. **Remove the faulty rear I/O module.**

See [“Remove the Rear I/O Module” on page 184](#).

Related Information

- [“Rear I/O Module LEDs” on page 181](#)
- [“Remove the Rear I/O Module” on page 184](#)
- [“Install the Rear I/O Module” on page 186](#)
- [“Verify the Rear I/O Module” on page 188](#)

▼ Remove the Rear I/O Module

The rear I/O module is a cold-service component that can be replaced by a customer.

1. **Take the necessary ESD precautions.**

See [“Prevent ESD Damage” on page 57](#).

2. **Locate the failed rear I/O module.**

- See [“Rear Panel Components” on page 15](#) for the location of the rear I/O module in the server.
- See [“Determine if the Rear I/O Module Is Faulty” on page 184](#) to verify that the rear I/O module has failed.

3. **Power off the server.**

See [“Removing Power From the Server” on page 53](#).

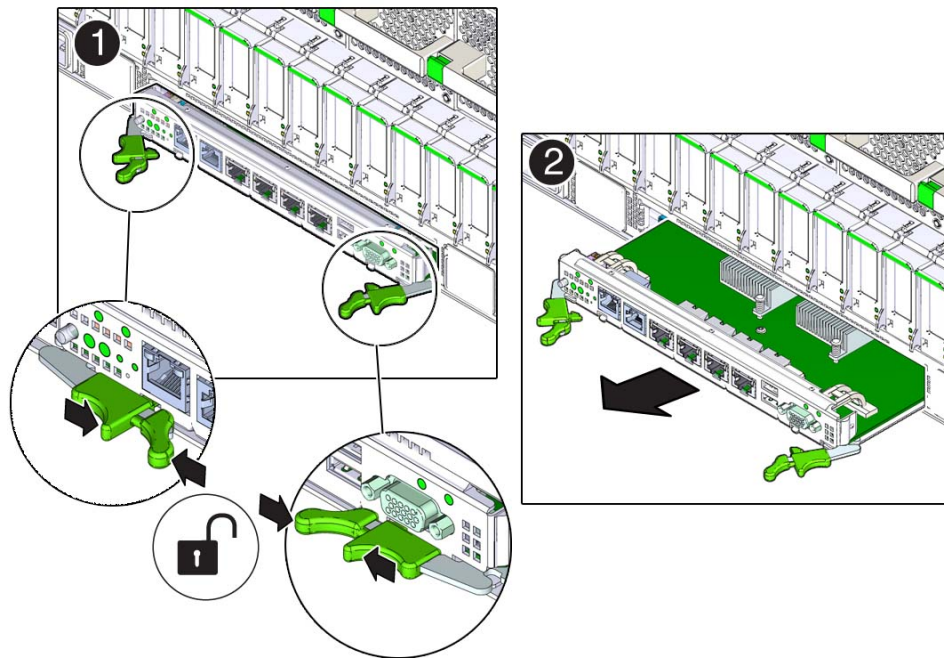
4. **Disconnect the power cords.**

See [“Disconnect Power Cords” on page 56](#).

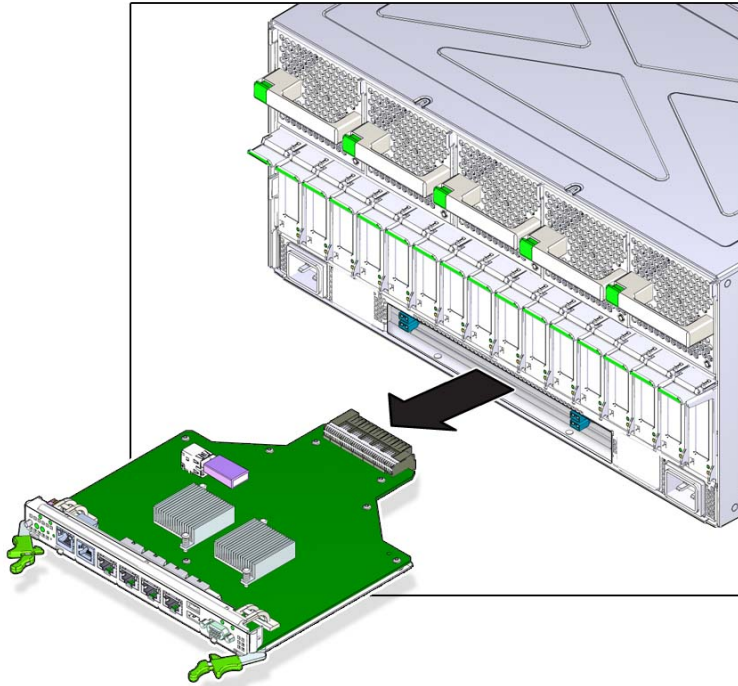
5. **Label the cables connected to the ports on the rear I/O module, and then disconnect the cables from the ports.**

You will reconnect the cables to the same ports on the replacement rear I/O module.

6. **Press the green buttons on the rear I/O module ejection levers, and spread the levers open to eject the rear I/O module.**



7. **Pull the module away from the server to remove it.**



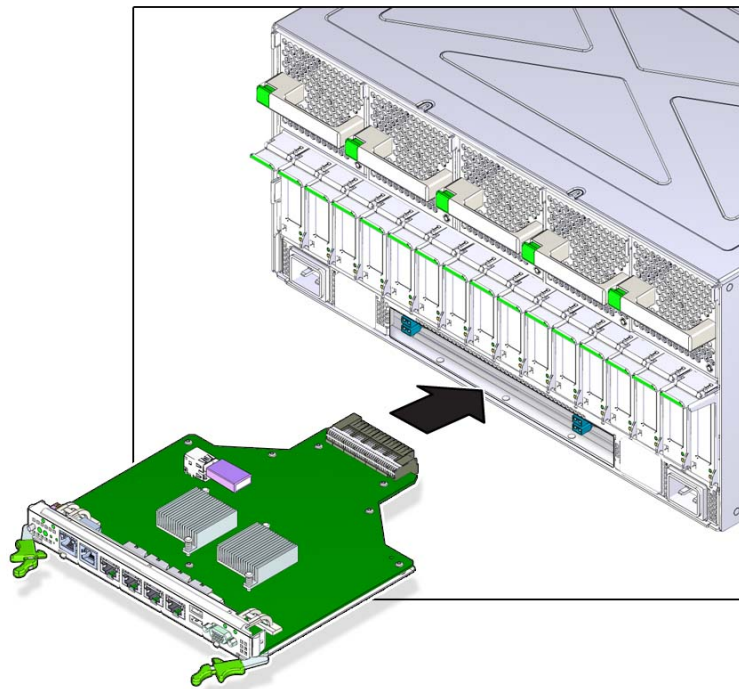
Related Information

- [“Preparing for Service” on page 47](#)
- [“Rear I/O Module LEDs” on page 181](#)
- [“Determine if the Rear I/O Module Is Faulty” on page 184](#)
- [“Install the Rear I/O Module” on page 186](#)
- [“Verify the Rear I/O Module” on page 188](#)

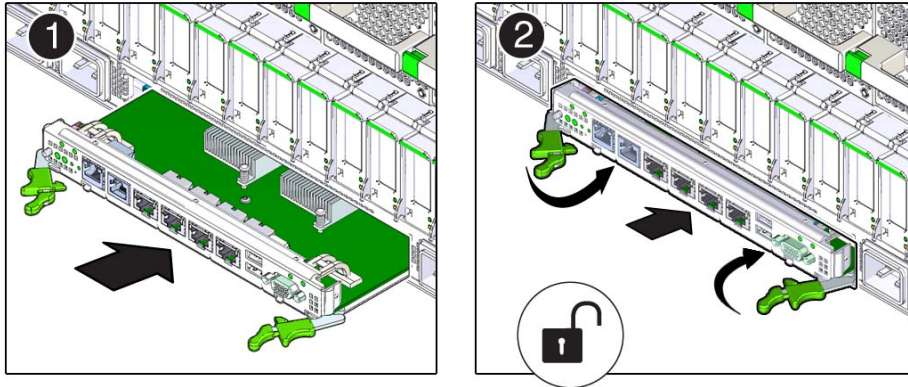
▼ Install the Rear I/O Module

1. **Take the necessary ESD precautions.**
See [“Prevent ESD Damage” on page 57](#).

2. With the levers in the extended position, insert the rear I/O module into the slot at the rear of the server.



3. **Close the extraction levers until they click into place to fully seat the rear I/O module into the server.**



4. **Connect the cables to the appropriate ports on the rear I/O module.**
5. **Connect the power cords.**
See [“Connect Power Cords” on page 199](#).
6. **Power on the server.**
See [“Returning the Server to Operation” on page 199](#).
7. **Verify the rear I/O installation.**
See [“Verify the Rear I/O Module” on page 188](#).

Related Information

- [“Rear I/O Module LEDs” on page 181](#)
- [“Determine if the Rear I/O Module Is Faulty” on page 184](#)
- [“Remove the Rear I/O Module” on page 184](#)
- [“Verify the Rear I/O Module” on page 188](#)
- [“Returning the Server to Operation” on page 199](#)

▼ **Verify the Rear I/O Module**

1. **Ensure that you have completed the following:**

- Applied power to the server.
See [“Connect Power Cords” on page 199](#).
 - Started the system.
See [“Power On the Server \(Oracle ILOM\)” on page 200](#).
2. **Verify that the System Service Required LED on the rear I/O module is not lit.**
See [“Rear I/O Module LEDs” on page 181](#).
 3. **Log in to Oracle ILOM.**
See [“Log In to Oracle ILOM \(Service\)” on page 27](#).
 4. **Start the faultmgmt shell.**

```
-> start SP/faultmgmt/shell
Are you sure you want to start the faultmgmt shell (y/n)? y

faultmgmtsp>
```

5. **Use the `fmadm faulty` command to determine if the server is operating normally.**
 - If a fault was detected, see [“Diagnostics Process” on page 24](#).
 - If no faults were detected, then the rear I/O module has been replaced successfully. No further action is required.

Related Information

- [“Detecting and Managing Faults” on page 23](#)
- [“Rear I/O Module LEDs” on page 181](#)
- [“Determine if the Rear I/O Module Is Faulty” on page 184](#)
- [“Remove the Rear I/O Module” on page 184](#)
- [“Install the Rear I/O Module” on page 186](#)

Servicing the Rear Chassis Subassembly

For the location of the rear chassis subassembly, see [“Rear Panel Components” on page 15](#).



Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause failure of server components.



Caution - You must disconnect the power cords before servicing this component. See [“Disconnect Power Cords” on page 56](#).

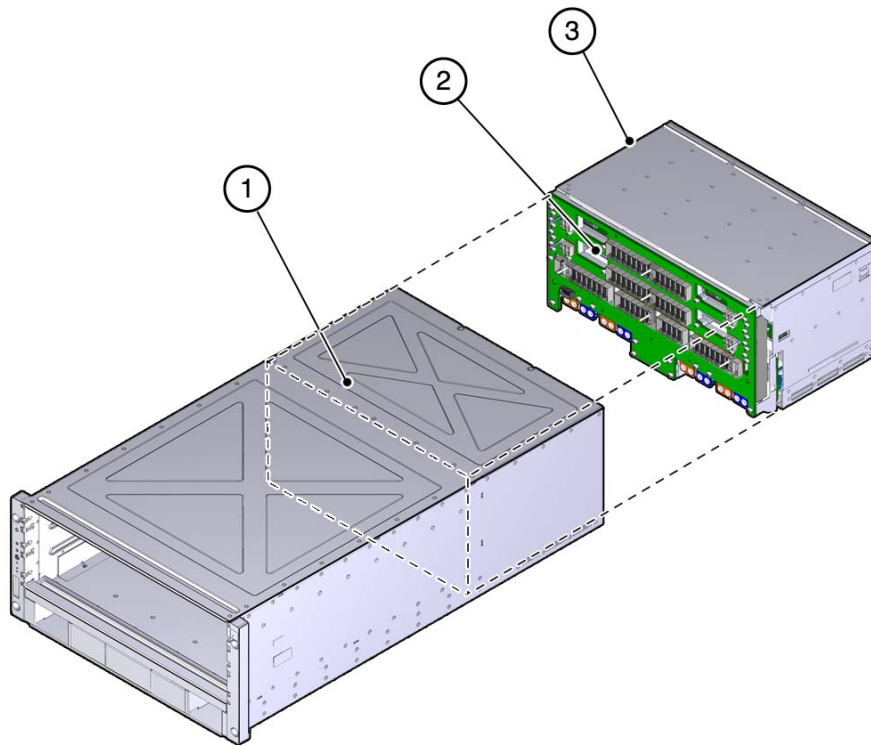
- [“Rear Chassis Subassembly Components” on page 191](#)
- [“Remove the Rear Chassis Subassembly” on page 192](#)
- [“Install the Rear Chassis Subassembly” on page 195](#)
- [“Verify the Rear Chassis Subassembly” on page 196](#)

Related Information

- [“Identifying Components” on page 13](#)
- [“Detecting and Managing Faults” on page 23](#)
- [“Preparing for Service” on page 47](#)
- [“Returning the Server to Operation” on page 199](#)

Rear Chassis Subassembly Components

You remove and install the rear chassis subassembly as a single unit.



No.	Description
1	Server chassis
2	Midplane subassembly
3	Rear chassis subassembly chassis

Related Information

- [“Remove the Rear Chassis Subassembly” on page 192](#)
- [“Install the Rear Chassis Subassembly” on page 195](#)

▼ Remove the Rear Chassis Subassembly

1. Verify that the rear chassis subassembly needs to be replaced.

Use the server software to determine if the rear chassis subassembly needs to be replaced. See [“Detecting and Managing Faults” on page 23](#) for more information.

2. Power off the server.

See [“Removing Power From the Server” on page 53](#).

3. Disconnect the power cords.

See [“Disconnect Power Cords” on page 56](#).

4. From the front of the server, remove the following components:

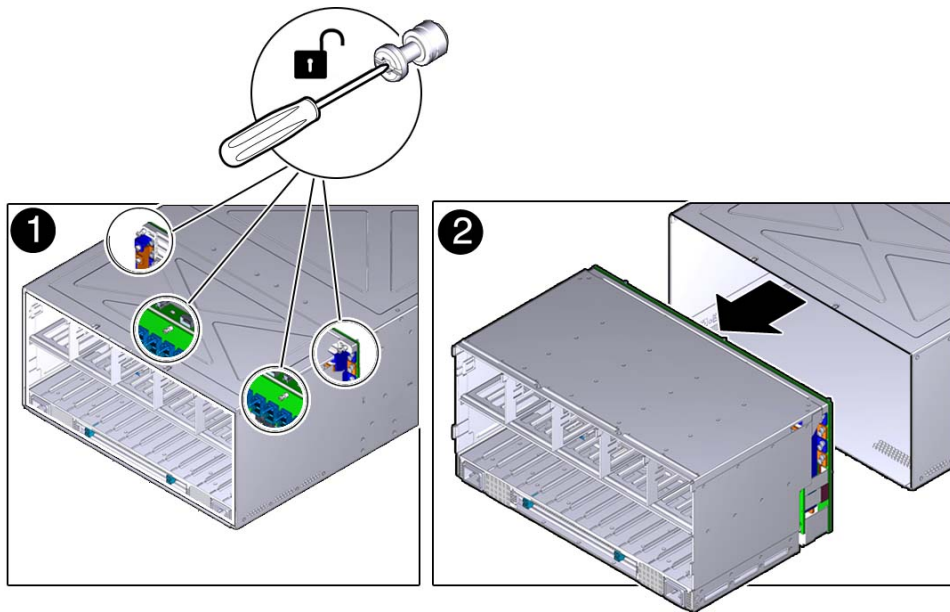
- Both processor modules – see [“Remove a Processor Module or Processor Filler Module” on page 64](#).
- Main module – see [“Remove the Main Module” on page 103](#).
- Both power supplies – see [“Remove a Power Supply” on page 144](#).

5. Go to the rear of the server and remove the following components:

- All five fan modules – see [“Remove a Fan Module” on page 153](#).
- All PCIe carriers or PCIe filler panels – see [“Remove a PCIe Card Carrier” on page 167](#). Make note of the slots for each carrier or filler panel so that you can install them into the same slots.
- Rear I/O module – see [“Remove the Rear I/O Module” on page 184](#).

You will install these components into the replacement rear chassis subassembly once you have replaced the faulty subassembly.

6. Locate the four green mounting screws for the rear chassis subassembly.



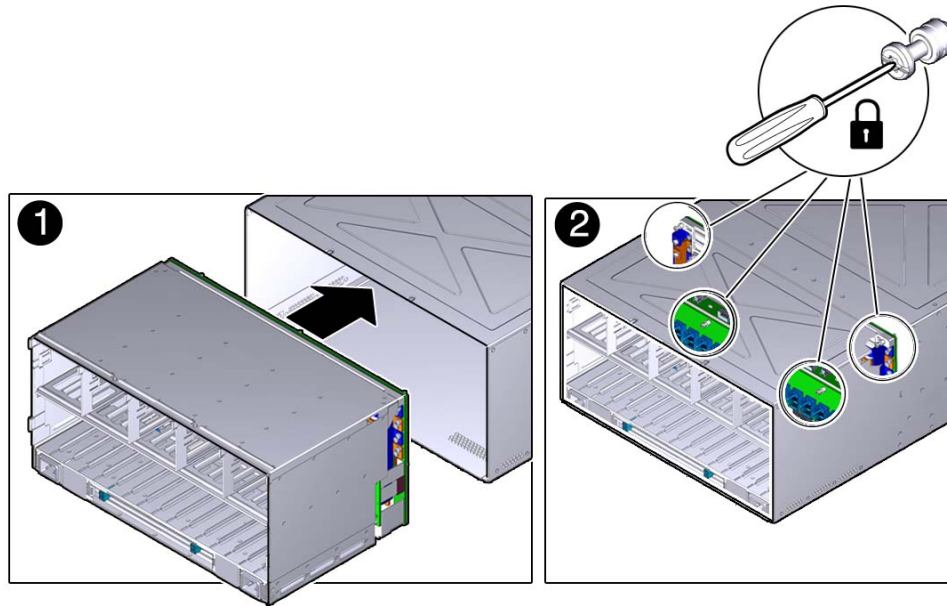
7. Using a Phillips screwdriver, loosen the five screws that secure the rear chassis subassembly to the system.
8. Slide the rear chassis subassembly out and away from the server.

Related Information

- [“Install the Rear Chassis Subassembly” on page 195](#)

▼ Install the Rear Chassis Subassembly

1. Slide the rear chassis subassembly into the server.



2. Using a Phillips screwdriver, tighten the four green screws to secure the rear chassis subassembly in the server.
Tighten the screws in the following order:
 - a. Lower right screw.
 - b. Upper left screw.
 - c. Upper right screw.
 - d. Lower left screw.
3. Remove the connector covers from the replacement rear chassis subassembly.
4. Install the following components back into the rear of the server:

- All five fan modules – see [“Install a Fan Module” on page 155](#).
 - All PCIe carriers or filler panels – see [“Install a PCIe Card Carrier” on page 176](#). Verify that you are installing the PCIe cards back in their original slots using the notes that you took when removing the cards from the slots earlier.
 - Rear I/O module – see [“Install the Rear I/O Module” on page 186](#).
- 5. Go to the front of the server and install the following components:**
- Both processor modules – see [“Install a Processor Module or Processor Filler Module” on page 67](#).
 - Main module – see [“Install the Main Module” on page 107](#).
 - Both power supplies – see [“Install a Power Supply” on page 147](#).
- 6. Connect the power cords.**
See [“Connect Power Cords” on page 199](#)
- 7. Power on the server.**
See [“Returning the Server to Operation” on page 199](#).
- 8. Verify the rear chassis subassembly.**
See [“Verify the Rear Chassis Subassembly” on page 196](#).

Related Information

- [“Remove the Rear Chassis Subassembly” on page 192](#)
- [“Returning the Server to Operation” on page 199](#)

▼ Verify the Rear Chassis Subassembly

- 1. Ensure that you have completed the following:**
 - Applied power to the server.
See [“Connect Power Cords” on page 199](#).
 - Started the system.
See [“Power On the Server \(Oracle ILOM\)” on page 200](#).
- 2. Log in to Oracle ILOM.**
See [“Log In to Oracle ILOM \(Service\)” on page 27](#).

3. Start the faultmgmt shell.

```
-> start SP/faultmgmt/shell
Are you sure you want to start the faultmgmt shell (y/n)? y

faultmgmtsp>
```

4. Use the `fmadm faulty` command to determine if the server is operating normally.

- If a fault was detected, see [“Diagnostics Process” on page 24](#).
- If no faults were detected, then the rear chassis subassembly has been replaced successfully. No further action is required.

Related Information

- [“Detecting and Managing Faults” on page 23](#)
- [“Rear I/O Module LEDs” on page 181](#)
- [“Remove the Rear Chassis Subassembly” on page 192](#)
- [“Install the Rear Chassis Subassembly” on page 195](#)

Returning the Server to Operation

These topics explain how to return the Oracle SPARC T5-4 server to operation after you have performed service procedures.

Steps	Description	Links
1.	Connect the power cords.	“Connect Power Cords” on page 199
2.	Power on the server.	“Power On the Server (Oracle ILOM)” on page 200
3.	Continue the service operation you were performing (if applicable).	“Component Service Categories” on page 50

Related Information

- [“Identifying Components” on page 13](#)
- [“Detecting and Managing Faults” on page 23](#)
- [“Preparing for Service” on page 47](#)
- [“Configuring Boot and Restart Behavior” in *SPARC and Netra SPARC T5 Series Servers Administration Guide*](#)
- [Oracle ILOM Documentation Library \(http://www.oracle.com/goto/ilom/docs\)](http://www.oracle.com/goto/ilom/docs)

▼ Connect Power Cords

Note - Standby power is applied as soon as the power cords are connected. Depending on how the firmware is configured, the server might boot automatically.

1. **Locate the AC connectors on the rear of the server.**
See [“Rear Panel Components” on page 15](#).
2. **Connect the power cords to the AC connectors.**

Related Information

- [“Power On the Server \(Oracle ILOM\)” on page 200](#)

▼ Power On the Server (Oracle ILOM)

Note - The boot process depends on the most recent power state of the server and on Oracle ILOM policy settings. You must determine if the server is running before you issue the `start /System` command.

1. Check the server power state. Type:

```
-> show /System power_state
/System
  Properties:
    power_state = Off
```

2. If the server is powered off, power on the server. Type:

```
-> start /System
Starting /System
```

3. (Optional.) To view server boot output, start a host console stream. Type:

```
-> start /HOST/console
```

4. If you are adding a second processor module, return to [“Server Upgrade Process” on page 59](#).

Related Information

- [“Connect Power Cords” on page 199](#)

Glossary

A

ANSI SIS	American National Standards Institute Status Indicator Standard.
ASF	Alert standard format (Netra products only).
AWG	American wire gauge.

B

blade	Generic term for server modules and storage modules. <i>See</i> server module <i>and</i> storage module .
blade server	Server module. <i>See</i> server module .
BMC	Baseboard management controller.
BOB	Memory buffer on board.

C

chassis	For servers, refers to the server enclosure. For server modules, refers to the modular system enclosure.
CMA	Cable management assembly.
CMM	Chassis monitoring module (server modules only). The CMM is the service processor in the modular system that contains server modules. Oracle ILOM runs on the CMM, providing lights out management of the components in the modular system chassis. <i>See</i> modular system <i>and</i> Oracle ILOM .
CMP	Chip multiprocessor.

D

DHCP Dynamic Host Configuration Protocol.

disk module or disk blade Interchangeable terms for storage module. See [storage module](#).

DTE Data terminal equipment.

E

EIA Electronics Industries Alliance.

ESD Electrostatic discharge.

F

FEM Fabric expansion module (server modules only). FEMs enable server modules to use the 10GbE connections provided by certain NEMs. See [NEM](#).

FRU Field-replaceable unit.

H

HBA Host bus adapter.

host The part of the server or server module with the CPU and other hardware that runs the Oracle Solaris OS and other applications. The term *host* is used to distinguish the primary computer from the SP. See [SP](#).

hot-pluggable Describes a component that can be replaced with power applied, but the component must be prepared for removal.

hot-swappable Describes a component that can be replaced with power applied, and no preparation is required.

I

ID PROM Chip that contains system information for the server or server module.

IP Internet Protocol.

K

KVM Keyboard, video, mouse. Refers to using a switch to enable sharing of one keyboard, one display, and one mouse with more than one computer.

L

LwA Sound power level.

M

MAC Machine access code.

MAC address Media access controller address.

modular system The rackmountable chassis that holds server modules, storage modules, NEMs, and PCI EMs (server modules only). The modular system provides Oracle ILOM through its CMM.

MSGID Message identifier.

N

name space Top-level Oracle ILOM target.

NEBS Network Equipment-Building System (Netra products only).

NEM Network express module (server modules only). NEMs provide Ethernet and SAS connectivity to storage modules.

NET MGT Network management port. An Ethernet port on the server SP, the server module SP, and the CMM.

NIC Network interface card or controller.

NMI Nonmaskable interrupt.

O

OBP	OpenBoot PROM. Sometimes OBP is used in file names and messages to indicate a relationship to OpenBoot.
Oracle ILOM	Oracle Integrated Lights Out Manager. Oracle ILOM firmware is preinstalled on a variety of Oracle systems. Oracle ILOM enables you to remotely manage your Oracle servers regardless of the state of the host system.
Oracle ILOM CMM	Oracle ILOM that runs on the CMM (server modules only). See Oracle ILOM .
Oracle Solaris OS	Oracle Solaris operating system.

P

PCI	Peripheral component interconnect.
PEM	PCIe ExpressModule (server modules only). Modular components that are based on the PCI Express industry-standard form factor and offer I/O features such as Gigabit Ethernet and Fibre Channel.
POST	Power-on self-test.
PROM	Programmable read-only memory.
PSH	Predictive self healing.

R

REM	RAID expansion module (server modules only). Sometimes referred to as an HBA See HBA . Supports the creation of RAID volumes on drives.
------------	---

S

SAS	Serial attached SCSI.
SCC	System configuration chip.

SER MGT Serial management port. A serial port on the server SP, the server module SP, and the CMM.

server module Modular component that provides the main compute resources (CPU and memory) in a modular system. Server modules also might have on-board storage and connectors that hold FEMs.

SP Service processor. In the server or server module, the SP is a card with its own OS. The SP processes Oracle ILOM commands providing lights out management control of the host. *See* [host](#).

SSD Solid-state drive.

SSH Secure shell.

storage module Modular component that provides computing storage to the server modules.

T

TIA Telecommunications Industry Association (Netra products only).

Tma Maximum ambient temperature.

U

U.S. NEC United States National Electrical Code.

UCP Universal connector port.

UI User interface.

UL Underwriters Laboratory Inc.

UTC Coordinated Universal Time.

UUID Universal unique identifier.

W

WWN World wide name. A unique number that identifies a SAS target.

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