SPARC S7-2 Server Service Manual

Part No: E72376-04
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Référence: E72376-04

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Contents

Using This Documentation

- **Overview** – Describes how to troubleshoot and maintain the SPARC S7-2 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/S7-2/docs.

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Provide feedback about this documentation at http://www.oracle.com/goto/docfeedback.

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.

For system overview information, see "Understanding the Server" in *SPARC S7-2 Server Installation Guide*.

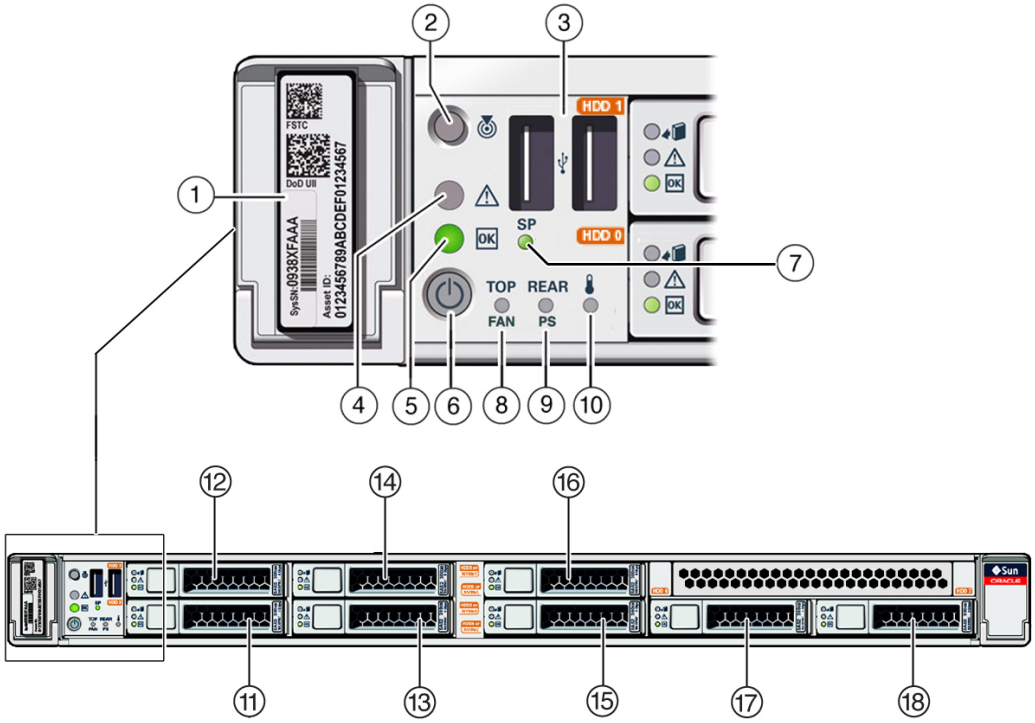
Related Information

- "Detecting and Managing Faults" on page 21
- "Preparing for Service" on page 33

Front Panel Components

This figure shows the layout of the server front panel, including the power and server locator buttons and the various status and fault LEDs.

Note - The front panel also provides access to internal drives and the two front USB ports.



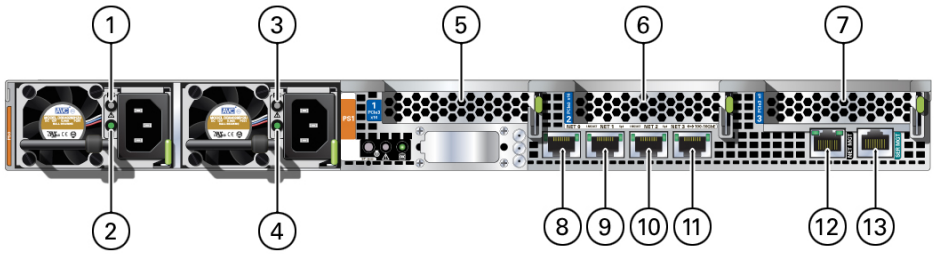
No.	Description	No.	Description
1	Serial number	10	Server Overtemp LED (amber)
2	Locator LED (white)	11	Drive 0 (HDD/SDD)
3	Two USB 2.0 connectors	12	Drive 1 (HDD/SDD)
4	Service Required LED (amber)	13	Drive 2 (HDD/SDD) or NVMe 0
5	Power/OK LED (green)	14	Drive 3 (HDD/SDD) or NVMe 1
6	Power button	15	Drive 4 (HDD/SDD) or NVMe 2
7	SP Fault LED (green or amber)	16	Drive 5 (HDD/SDD) or NVMe 3
8	Fan Service Required LED (amber)	17	Drive 6 (HDD/SDD)
9	PS Service Required LED (amber)	18	Drive 7 (HDD/SDD)

Related Information

- “Rear Panel Components” on page 13
- “Internal Component Locations” on page 14

- “Device Paths” on page 15

Rear Panel Components



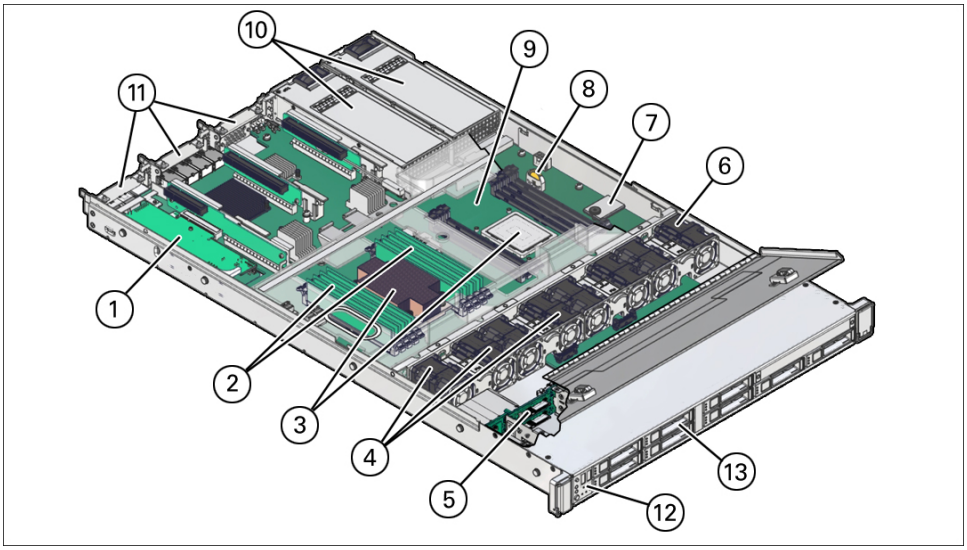
No.	Description	No.	Description
1	PS 0 Fault LED	8	NET 0 100/1000/10000 port
2	PS 0 OK LED	9	NET 1 100/1000/10000 port
3	PS 1 Fault LED	10	NET 2 100/1000/10000 port
4	PS 1 OK LED	11	NET 3 100/1000/10000 port
5	PCIe card slot 1	12	NET MGT port
6	PCIe card slot 2	13	SER MGT/RJ-45 serial port
7	PCIe card slot 3		

Related Information

- “Front Panel Components” on page 11
- “Internal Component Locations” on page 14
- “Server Block Diagram” on page 18
- “Device Paths” on page 15

Internal Component Locations

This figure identifies the replaceable component locations with the top cover removed.



No.	Component	Links
1	Internal HBA card (slot 4)	“Servicing the Internal HBA Card” on page 101
2	DIMMs (for CPU 0)	“Servicing DIMMs” on page 75
3	Processor modules and heat sinks (only CPU 0 shown)	“Servicing the Motherboard” on page 135
4	Fan modules 0,1, and 2	“Servicing Fan Modules” on page 61
5	Drive backplane	“Servicing the Drive Backplane” on page 127
6	Fan module 3 (or fan filler in a single-processor server)	“Servicing Fan Modules” on page 61
7	eUSB drive	“Servicing the eUSB Drive” on page 115
8	Battery	“Servicing the Battery” on page 83
9	Motherboard	“Servicing the Motherboard” on page 135
10	Power supplies	“Servicing Power Supplies” on page 69
11	PCIe slots 1, 2, and 3	“Servicing PCIe Cards” on page 87
12	Front Indicator Module	“Servicing the Front Indicator Module” on page 111
13	Drives	“Servicing Drives” on page 51

Related Information

- “Front Panel Components” on page 11
- “Rear Panel Components” on page 13
- “Server Block Diagram” on page 18
- “Device Paths” on page 15

Device Paths

This table describes the device paths for servers populated with 1 CPU.

Device NAC Name	Description	Device Path	PCIe Switch	Physical Port	Device Number	Owned By	Width
/SYS/MB/USB_CTLR	USB host controller	/pci@300/pci@1/pci@0/pci@2/usb@0	SW 0	Port 12	pci@2	CPU 0	x1
/SYS/MB/XGBE	Ethernet controller	/pci@300/pci@1/pci@0/pci@1	SW 0	Port 4	pci@1	CPU 0	x8
/SYS/MB/NET0	NET 0 interface	/pci@300/pci@1/pci@0/pci@1/network@0	SW 0	Port 4	pci@1	CPU 0	x8
/SYS/MB/NET1	NET 1 interface	/pci@300/pci@1/pci@0/pci@1/network@0,1	SW 0	Port 4	pci@1	CPU 0	x8
/SYS/MB/NET2	NET 2 interface	/pci@300/pci@1/pci@0/pci@1/network@0,2	SW 0	Port 4	pci@1	CPU 0	x8
/SYS/MB/NET3	NET 3 interface	/pci@300/pci@1/pci@0/pci@1/network@0,3	SW 0	Port 4	pci@1	CPU 0	x8
/SYS/MB/RISER1/PCIE1	PCIe slot 1	/pci@300/pci@1/pci@0/pci@11	SW 0	Port 8	pci@11	CPU 0	x8 (physical x16)
/SYS/MB/RISER2/PCIE2	PCIe slot 2	/pci@300/pci@1/pci@0/pci@12	SW 0	Port 6	pci@12	CPU 0	x8 (physical x16)
/SYS/MB/RISER3/PCIE3	PCIe slot 3	/pci@300/pci@2/pci@0/pci@13	SW 1	Port 12	pci@13	CPU 0	x8
/SYS/MB/RISER3/PCIE4	PCIe slot 4	/pci@300/pci@2/pci@0/pci@14	SW 1	Port 8	pci@14	CPU 0	x8
/SYS/DBP/NVME0	NVMe drive in HDD slot 2	/pci@300/pci@2/pci@0/pci@4/nvme@0/disk@1	SW 1	Port 4	pci@4	CPU 0	x4
/SYS/DBP/NVME1	NVMe drive in HDD slot 3	/pci@300/pci@2/pci@0/pci@5/nvme@0/disk@1	SW 1	Port 5	pci@5	CPU 0	x4

Device NAC Name	Description	Device Path	PCIe Switch	Physical Port	Device Number	Owned By	Width
/SYS/DBP/NVME2	NVMe drive in HDD slot 4	/pci@300/pci@2/pci@0/pci@6/nvme@0/disk@1	SW 1	Port 6	pci@6	CPU 0	x4
/SYS/DBP/NVME3	NVMe drive in HDD slot 5	/pci@300/pci@2/pci@0/pci@7/nvme@0/disk@1	SW 1	Port 7	pci@7	CPU 0	x4
/SYS/DBP/HDD0	SAS/SATA drive in slot 0	/pci@300/pci@2/pci@0/pci@14/LSI,sas@0/disk@p2	SW 1	Port 8	pci@14	CPU 0	
/SYS/DBP/HDD1	SAS/SATA drive in slot 1	/pci@300/pci@2/pci@0/pci@14/LSI,sas@0/disk@p3	SW 1	Port 8	pci@14	CPU 0	
/SYS/DBP/HDD2	SAS/SATA drive in slot 2	/pci@300/pci@2/pci@0/pci@14/LSI,sas@0/disk@p1	SW 1	Port 8	pci@14	CPU 0	
/SYS/DBP/HDD3	SAS/SATA drive in slot 3	/pci@300/pci@2/pci@0/pci@14/LSI,sas@0/disk@p0	SW 1	Port 8	pci@14	CPU 0	
/SYS/DBP/HDD4	SAS/SATA drive in slot 4	/pci@300/pci@2/pci@0/pci@14/LSI,sas@0/disk@p6	SW 1	Port 8	pci@14	CPU 0	
/SYS/DBP/HDD5	SAS/SATA drive in slot 5	/pci@300/pci@2/pci@0/pci@14/LSI,sas@0/disk@p7	SW 1	Port 8	pci@14	CPU 0	
/SYS/DBP/HDD6	SAS/SATA drive in slot 6	/pci@300/pci@2/pci@0/pci@14/LSI,sas@0/disk@p5	SW 1	Port 8	pci@14	CPU 0	
/SYS/DBP/HDD7	SAS/SATA drive in slot 7	/pci@300/pci@2/pci@0/pci@14/LSI,sas@0/disk@p4	SW 1	Port 8	pci@14	CPU 0	
/SYS/MB/CMP0/IOS0/RP0	CPU0 PCIe root port 0	/pci@300/pci@1				CPU 0	x8
/SYS/MB/CMP0/IOS0/RP1	CPU0 PCIe root port 1	/pci@300/pci@2				CPU 0	x8

This table describes the device paths for servers populated with 2 CPUs.

Device NAC Name	Description	Device Path	PCIe Switch	Physical Port	Device Number	Owned By	Width
/SYS/MB/USB_CTLR	USB host controller	/pci@300/pci@1/pci@0/pci@2/usb@0	SW 0	Port 12	pci@2	CPU 0	x1
/SYS/MB/XGBE	Ethernet controller	/pci@300/pci@1/pci@0/pci@1	SW 0	Port 4	pci@1	CPU 0	x8
/SYS/MB/NET0	NET 0 interface	/pci@300/pci@1/pci@0/pci@1/network@0	SW 0	Port 4	pci@1	CPU 0	x8
/SYS/MB/NET1	NET 1 interface	/pci@300/pci@1/pci@0/pci@1/network@0,1	SW 0	Port 4	pci@1	CPU 0	x8
/SYS/MB/NET2	NET 2 interface	/pci@300/pci@1/pci@0/pci@1/network@0,2	SW 0	Port 4	pci@1	CPU 0	x8
/SYS/MB/NET3	NET 3 interface	/pci@300/pci@1/pci@0/pci@1/network@0,3	SW 0	Port 4	pci@1	CPU 0	x8
/SYS/MB/RISER1/PCIE1	PCIe slot 1	/pci@302/pci@1/pci@0/pci@11	SW 0	Port 8	pci@11	CPU 1	x8 (physical x16)
/SYS/MB/RISER2/PCIE2	PCIe slot 2	/pci@302/pci@1/pci@0/pci@12	SW 0	Port 6	pci@12	CPU 1	x8 (physical x16)
/SYS/MB/RISER3/PCIE3	PCIe slot 3	/pci@300/pci@2/pci@0/pci@13	SW 1	Port 12	pci@13	CPU 0	x8
/SYS/MB/RISER3/PCIE4	PCIe slot 4	/pci@302/pci@2/pci@0/pci@14	SW 1	Port 8	pci@14	CPU 1	x8
/SYS/DBP/NVME0	NVMe drive in HDD slot 2	/pci@300/pci@2/pci@0/pci@4/nvme@0/disk@1	SW 1	Port 4	pci@4	CPU 0	x4
/SYS/DBP/NVME1	NVMe drive in HDD slot 3	/pci@300/pci@2/pci@0/pci@5/nvme@0/disk@1	SW 1	Port 5	pci@5	CPU 0	x4
/SYS/DBP/NVME2	NVMe drive in HDD slot 4	/pci@302/pci@2/pci@0/pci@6/nvme@0/disk@1	SW 1	Port 6	pci@6	CPU 1	x4
/SYS/DBP/NVME3	NVMe drive in HDD slot 5	/pci@302/pci@2/pci@0/pci@7/nvme@0/disk@1	SW 1	Port 7	pci@7	CPU 1	x4
/SYS/DBP/HDD0	SAS/SATA drive in slot 0	/pci@302/pci@2/pci@0/pci@14/LSI,sas@0/disk@p2	SW 1	Port 8	pci@14	CPU 1	
/SYS/DBP/HDD1	SAS/SATA drive in slot 1	/pci@302/pci@2/pci@0/pci@14/LSI,sas@0/disk@p3	SW 1	Port 8	pci@14	CPU 1	
/SYS/DBP/HDD2	SAS/SATA drive in slot 2	/pci@302/pci@2/pci@0/pci@14/LSI,sas@0/disk@p1	SW 1	Port 8	pci@14	CPU 1	

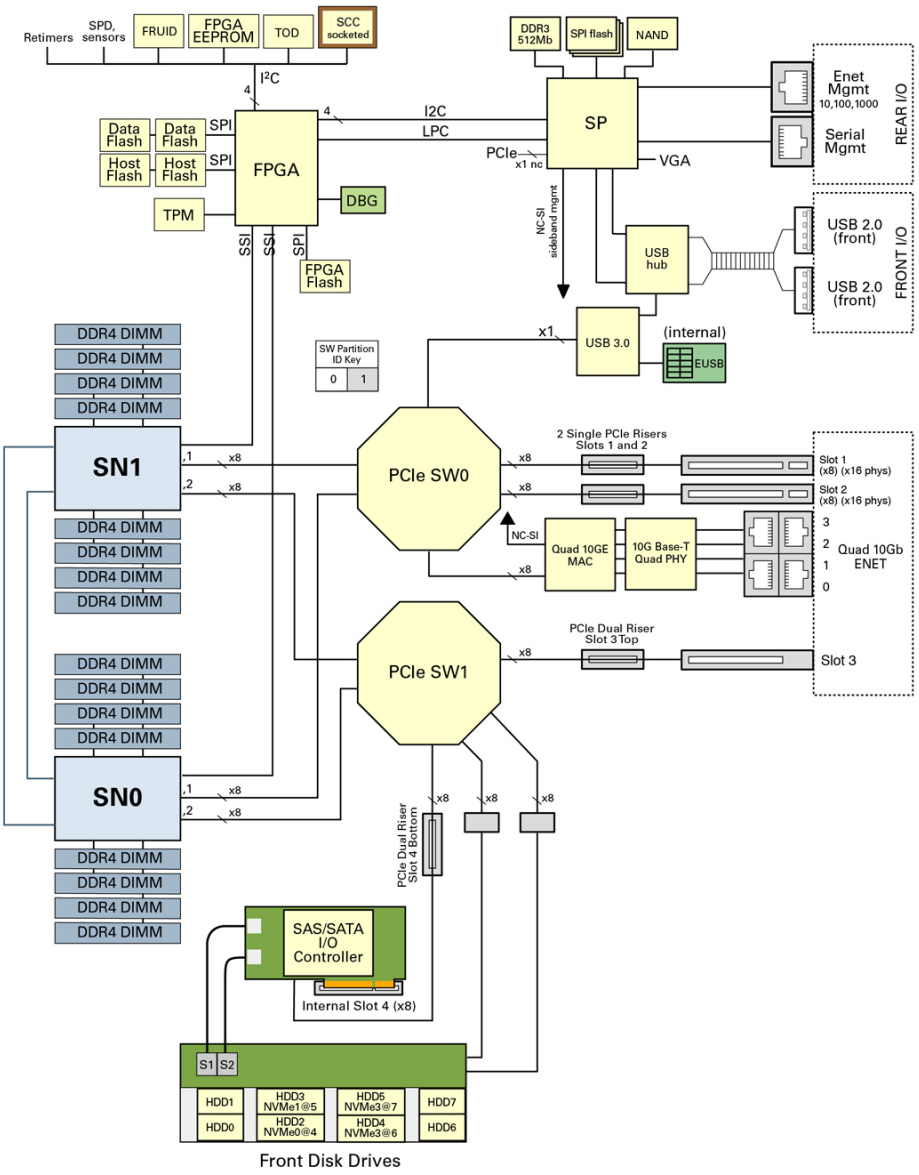
Device NAC Name	Description	Device Path	PCIe Switch	Physical Port	Device Number	Owned By	Width
/SYS/DBP/HDD3	SAS/SATA drive in slot 3	/pci@302/pci@2/pci@0/pci@14/LSI,sas@0/disk@p0	SW 1	Port 8	pci@14	CPU 1	
/SYS/DBP/HDD4	SAS/SATA drive in slot 4	/pci@302/pci@2/pci@0/pci@14/LSI,sas@0/disk@p6	SW 1	Port 8	pci@14	CPU 1	
/SYS/DBP/HDD5	SAS/SATA drive in slot 5	/pci@302/pci@2/pci@0/pci@14/LSI,sas@0/disk@p7	SW 1	Port 8	pci@14	CPU 1	
/SYS/DBP/HDD6	SAS/SATA drive in slot 6	/pci@302/pci@2/pci@0/pci@14/LSI,sas@0/disk@p5	SW 1	Port 8	pci@14	CPU 1	
/SYS/DBP/HDD7	SAS/SATA drive in slot 7	/pci@302/pci@2/pci@0/pci@14/LSI,sas@0/disk@p4	SW 1	Port 8	pci@14	CPU 1	
/SYS/MB/CMP0/IOS0/RP0	CPU0 PCIe root port 0	/pci@300/pci@1				CPU 0	x8
/SYS/MB/CMP0/IOS0/RP1	CPU0 PCIe root port 1	/pci@300/pci@2				CPU 0	x8
/SYS/MB/CMP1/IOS0/RP0	CPU1 PCIe root port 0	/pci@302/pci@1				CPU 1	x8
/SYS/MB/CMP1/IOS0/RP1	CPU1 PCIe root port 1	/pci@302/pci@2				CPU 1	x8

Related Information

- “Internal Component Locations” on page 14
- “Server Block Diagram” on page 18

Server Block Diagram

This block diagram shows the connections between and among components and device slots on a two CPU server. Use this block diagram to determine the optimum locations for optional cards or other peripherals, based on your server's configuration and intended use.



Related Information

- “Rear Panel Components” on page 13

- “Front Panel Components” on page 11
- “Internal Component Locations” on page 14
- “Device Paths” on page 15

Detecting and Managing Faults

When the server encounters a fault, the fault is recorded in a common fault database. The fault is then reported by the server in one of several ways, depending on the type and severity of the fault.

These topics explain how to use various diagnostic tools to monitor server status and troubleshoot faults in the server.

Step	Description	Links
1.	Check the server for detected faults and for information about components that might require service.	“Checking for Faults” on page 21
2.	Perform additional troubleshooting if needed.	“Performing Advanced Troubleshooting” on page 26
3.	Manage faults following a service procedure.	“Clear a Fault Manually” on page 31
4.	Contact technical support if the problem persists.	`https://support.oracle.com`

Related Information

- “Identifying Components” on page 11
- “Preparing for Service” on page 33
- “Returning the Server to Operation” on page 145

Checking for Faults

Use these tools to identify components that require service.

Step	Description	Links
1.	Run the `fmadm faulty` command to display information about components that require service.	“Log In to Oracle ILOM (Service)” on page 22 “Identify Faulted Components” on page 22

Step	Description	Links
2.	Run the `show disabled` command to display information about components that have been disabled either intentionally or because of a failure. Plan to service any components that are degraded or might need service soon to minimize system downtime.	"Identify Disabled Components" on page 25
3.	Identify the names of components that require service as reported by diagnostic software.	"Device Paths" on page 15

Log In to Oracle ILOM (Service)

- **At the terminal prompt, type:**

```
ssh root@SP-IP-address
Password: password
Oracle (R) Integrated Lights Out Manager
Version 3.2.x
Copyright (c) 2016, Oracle and/or its affiliates, Inc. All rights reserved.
->
```

Related Information

- "Identify Faulted Components" on page 22
- "Identify Disabled Components" on page 25
- "Device Paths" on page 15

Identify Faulted Components

You can use LEDs and software to identify faulty components, however, it is best to rely on software to determine if a component is faulty.

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

1. **Identify fault LEDs.**

See “Front Panel Components” on page 11 and “Rear Panel Components” on page 13.

2. **From the Oracle ILOM prompt, start the fault management shell and type `fmadm faulty`.**

   This example shows how to check for faults through the Oracle ILOM fault management shell. You can also check for faults by typing `show faulty` at the Oracle ILOM prompt.

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

faultmgmtsp> fmadm faulty
------------------- ------------------------------------ -------------- -------
Time                UUID                                 msgid          Severity
------------------- ------------------------------------ -------------- -------
2016-05-02/19:54:29 2782ad0c-91cb-c780-9663-807f0bf806df SPSUN4V-8001-0J MAJOR

Problem Status   : open
Diag Engine      : fdd 1.0
System
  Manufacturer   : Oracle Corporation
  Name           : SPARC S7-2
  Part_Number    : 9999991201
  Serial_Number  : 4568BDC0DF

----------------------------------------
Suspect 1 of 1
  Fault class  : fault.io.pciex.bus-linkerr-deg
  Certainty    : 100%
  Affects      : /SYS/MB/PCIE_SWITCH1/PCIE_LINK14
  Status       : faulted
  FRU
     Status      : faulty
     Location    : /SYS/MB
     Manufacturer      : Oracle Corporation
     Name              : TLA,MB,TRAY,S7-2
     Part_Number       : 7329819
     Revision          : 01
     Serial_Number     : 465769T+02xxx03N
     Chassis
        Manufacturer   : Oracle Corporation
        Name           : SPARC S7-2
        Part_Number    : 9999991201
        Serial_Number  : 4568BDC0DF
     Resource Location : /SYS/MB/PCIE_SWITCH1/PCIE_LINK14

Description : An IO interconnect has trained at a slower speed than
```

```
              intended.

Response    : No automated response.

Impact      : System performance may be affected.

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-8001-0J 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 (`2016-05-03/16:01:02`).
- UUID (`2782ad0c-91cb-c780-9663-807f0bf806df`), which is unique to each fault.
- Message ID (`SPSUN4V-8001-0J`), which can be used to obtain additional fault information from Knowledge Base articles.

3. **Use the message ID to obtain more information about this type of fault.**

   a. **Obtain the message ID from console output (`SPT-8000-PX` in the example above).**

   b. **Go to `https://support.oracle.com`, and search on the message ID in the Knowledge tab, or type the URL from the Action field into a browser.**

4. **Follow the suggested actions to repair the fault.**

5. **If necessary, clear the fault manually.**

   See “Clear a Fault Manually” on page 31.

Related Information

- “Log In to Oracle ILOM (Service)” on page 22
- “Identify Disabled Components” on page 25
- “Device Paths” on page 15

Identify Disabled Components

You can run the `show disabled` command from the Oracle ILOM prompt to identify components that have been disabled either intentionally, by a user, or automatically, because of a fault.

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

```
-> show disabled
Target                              | Property       | Value
------------------------------------+----------------+--------------------
...
/SYS/MB/CMP0/MCU0/CH0/D1
    | disable_reason | Configuration Rules
...
```

2. **For additional information about a disabled component, type the `show -t` command and the Oracle ILOM target.**

   See "Device Paths" on page 15.

   For example, type:

```
-> show -t /SYS/MB/CMP0/MCU0/CH0/D1
Target                    | Property                | Value
--------------------------+-------------------------+------------
...
/SYS/MB/CMP0/MCU0/CH0/D1  | type                    | DIMM
/SYS/MB/CMP0/MCU0/CH0/D1  | ipmi name               | P0/M3/B0/C1/D0
/SYS/MB/CMP0/MCU0/CH0/D1  | requested_config_state  | Enabled
/SYS/MB/CMP0/MCU0/CH0/D1  | current_config_state    | Enabled
/SYS/MB/CMP0/MCU0/CH0/D1  | disable_reason          | Configuration Rules
/SYS/MB/CMP0/MCU0/CH0/D1  | fru_name                | 8192MB DDR4 SDRAM DIMM
...
```

Related Information

- "Log In to Oracle ILOM (Service)" on page 22
- "Identify Faulted Components" on page 22
- "Device Paths" on page 15

Performing Advanced Troubleshooting

If you are unable to diagnose faults using the methods provided in "Checking for Faults" on page 21, use any of the following methods to diagnose faults on the server.

Description	Links
Generate and examine diagnostic information.	"Check the Message Buffer" on page 26
Examine log files for additional information about the server.	"View Log Files (Oracle Solaris)" on page 27 "View Log Files (Oracle ILOM)" on page 27
Generate and examine low-level diagnostic information generated by POST.	"POST Overview" on page 28 "Configure POST" on page 28 "Oracle ILOM Properties That Affect POST Behavior" on page 30

Related Information

- "Checking for Faults" on page 21
- "Clear a Fault Manually" on page 31

▼ Check the Message Buffer

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

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

```
# dmesg
```

Related Information

- "View Log Files (Oracle Solaris)" on page 27
- "View Log Files (Oracle ILOM)" on page 27
- "POST Overview" on page 28

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 26
- “View Log Files (Oracle Solaris)” on page 27
- “POST Overview” on page 28

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 26
- “View Log Files (Oracle Solaris)” on page 27
- “POST Overview” on page 28

POST Overview

POST is a group of PROM-based tests that run when the server is powered on or 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. Refer to the section on setting the SPARC host keyswitch state in the *Oracle ILOM Administrator's Guide for Configuration and Maintenance Firmware Release 3.2.x* for a list of parameters and values.

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

- “Configure POST” on page 28
- “Oracle ILOM Properties That Affect POST Behavior” on page 30

▼ Configure POST

1. **Log in to Oracle ILOM.**
   See “Log In to Oracle ILOM (Service)” on page 22.

2. **Set the virtual keyswitch to the value that corresponds to the POST configuration you want to run.**
   This example sets the virtual keyswitch `default_level` to `min`, which configures POST to run according to other parameter values.

```
-> set /HOST default_level=min
```

```
Set default_level to min
```

For possible values for the `default_level` parameter, type:

```
-> help /HOST/diag

/HOST/diag : Manage Host Power On Self Test Diagnostics

Targets:

Properties:
default_level : Diag level in the default cause (no error or hw change)
default_level : Possible values = off, min, max
default_level : User role required for set = r

default_verbosity : Diag verbosity in the default cause (no error or hw
                          change)
default_verbosity : Possible values = none, min, normal, max
default_verbosity : User role required for set = r

error_level : Diag level when running after an error reset
error_level : Possible values = off, min, max
error_level : User role required for set = r

error_verbosity : Diag verbosity when running after an error reset
error_verbosity : Possible values = none, min, normal, max
error_verbosity : User role required for set = r

hw_change_level : Diag level when running after a hw change
hw_change_level : Possible values = off, min, max
hw_change_level : User role required for set = r

hw_change_verbosity : Diag verbosity when running after a hw change
hw_change_verbosity : Possible values = none, min, normal, max
hw_change_verbosity : User role required for set = r

->
```

Note - When the verbosity value is set to *none*, the console may not display any POST test status for extended periods of time on certain configurations.

3. (Optional) Set the virtual keyswitch to determine the diagnostic level after an error reset and after a hardware change.

To set `error_level`, to `max`, and to set `hw_change_level` to `max`, type:

```
-> set /HOST/diag error_level=max
-> set /HOST/diag hw_change_level=max
```

Refer to the section on setting the SPARC host keyswitch state in the *Oracle ILOM Administrator's Guide for Configuration and Maintenance Firmware Release 3.2.x* for a description of parameters and values.

4. **View the current values for settings.**

   For example, type:

```
-> show /HOST/diag

/HOST/diag
   Targets:

   Properties:
        default_level = off
        default_verbosity = max
        error_level = off
        error_verbosity = max
        hw_change_level = off
        hw_change_verbosity = max


   Commands:
        cd
        set
        show
->
```

Related Information

- "POST Overview" on page 28
- "Oracle ILOM Properties That Affect POST Behavior" on page 30

Oracle ILOM Properties That Affect POST Behavior

There are a number of Oracle ILOM commands that you can use to perform host diagnostic tests. For details about using these commands, refer to the chapter that describes configuring host server management actions in the *Oracle ILOM Administrator's Guide for Configuration and Maintenance Firmware Release 3.2.x*.

Related Information

- “POST Overview” on page 28
- “Configure POST” on page 28

▼ Clear a Fault Manually

When the server detects faults, the faults are logged and displayed on the console. In most cases, after the fault is repaired the fault condition is repaired automatically. In cases where the fault condition is not automatically cleared, you must clear the fault manually.

1. **After replacing a faulty component, power on the server and, verify that the fault for that component has cleared.**

   Use the `fmadm faulty` command to confirm that the fault is clear.

   Note - The `fmadm faulty` includes a new fault class called alert. Alerts do not require hardware to be replaced, and will automatically repair when the error condition is no longer present.

2. **Determine your next step.**

   - **If no fault was detected, you do not need to do anything else. Do not perform the subsequent steps.**
   - **If a fault was detected, continue to the next step.**

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:

   ```
   faultmgmtsp> fmadm acquit UUID/NAC-name
   ```

   Fault UUID numbers are displayed in `fmadm faulty` output.

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 ...
```

5. **Clear the fault in the Oracle Enterprise Manager Ops Center software, if applicable.**

   Clearing a fault with the `fmadm aquit` command does not clear that fault in the Oracle Enterprise Manager Ops Center software. You must manually clear the fault or incident. For more information, refer to the section on marking an incident repaired in the *Oracle Enterprise Manager Ops Center Feature Reference Guide* at:

6. **If you are servicing a component, return to the procedure for that component.**

Related Information

- “Checking for Faults” on page 21
- “Performing Advanced Troubleshooting” on page 26

Preparing for Service

Step	Description	Links
1.	Review safety and handling information.	“Safety Information” on page 33
2.	Gather the tools needed for service.	“Service Tools” on page 35
3.	Consider filler options.	“Fillers” on page 35
4.	Find the server serial number.	“Find the Server Serial Number” on page 36
5.	Identify the server to be serviced.	“Locate the Server” on page 37
6.	For cold-service operations, shut down the OS and remove power from the server.	“Removing Power From the Server” on page 37
7.	Move the server out of the rack and gain access to internal components.	“Accessing Server Components” on page 40

Related Information

- “Identifying Components” on page 11
- “Returning the Server to Operation” on page 145

Safety Information

For your protection, observe these 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 S7-2 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.

Safety Symbols

Note the meanings of these 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.

ESD Measures

ESD-sensitive devices, such as the cards, drives, and DIMMS, require special handling.

Caution - Circuit boards and 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.

Antistatic Wrist Strap Use

Wear an antistatic wrist strap and use an antistatic mat when handling components such as 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.

Antistatic Mat

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

Related Information

- “Prevent ESD Damage” on page 41
- “Service Tools” on page 35

Service Tools

You need the following tools for most service operations:

- Antistatic wrist strap
- Antistatic mat
- No. 2 Phillips screwdriver
- T10 Torx screwdriver
- Pen or pencil (to power on server)

Related Information

- “Safety Information” on page 33

Fillers

A filler is an empty metal or plastic enclosure that is installed at the factory or in the field into a server component slot that does not contain a functioning component. The fillers ensure proper airflow through the system. Depending on the component configuration, the server can include the following types of fillers:

- Drive filler
- PCIe card filler (covering back panel, not filling the connector slot)
- Fan filler

Caution - When you remove a component while the server is connected to power, insert a new component or filler within 60 seconds to ensure proper system chassis cooling. After you complete cold-servicing, ensure that all fillers are in place before connecting the server to power.

Related Information

- “Servicing Drives” on page 51
- “Servicing PCIe Cards” on page 87
- “Servicing Fan Modules” on page 61

Find the Server Serial Number

You need the serial number of the server's chassis to obtain technical support for the server.

Note - When a motherboard or drive backplane is replaced, the chassis serial number and part number might need to be programmed into the new component. This action must be done in a special service mode by trained service personnel.

- **Locate the serial number using one of these methods:**
  - **Read the serial number from a sticker located on the front of the server or another sticker on the side of the server.**
  - **At the Oracle ILOM prompt, type:**

```
-> show /System

/System
   Targets:
. . .
```

In the output look for a line under Properties that identifies the product serial number. For example:

```
serial_number = BKL1026F8F
```

Related Information

- “Front Panel Components” on page 11

▼ Locate the Server

You can use the Locator LEDs to identify one particular server from many other servers.

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

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

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

2. **After locating the server with the blinking Server Locator LED, turn it off by pressing the Locator button with a stylus.**

Alternatively, you can type an Oracle ILOM command to turn off the Server Locator LED.

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

Related Information

- “Front Panel Components” on page 11

Removing Power From the Server

Step	Description	Links
1.	Prepare the server for powering off.	“Prepare to Power Off the Server” on page 38
2.	Power off the server by one of three methods.	“Power Off the Server” on page 38
3.	Disconnect the cables from the server.	“Disconnect Cables From the Server” on page 40

Related Information

- “Front Panel Components” on page 11
- *Servers Administration*

▼ Prepare to Power Off the Server

Perform this procedure before powering off the server.

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

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

3. **Save any open files and quit all running programs.**

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

4. **Shut down all logical domains.**

   Refer to Oracle Solaris system administration and Oracle VM Server for SPARC documentation for additional information.

5. **Shut down the Oracle Solaris OS.**

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

Related Information

- “Power Off the Server” on page 38
- “Front Panel Components” on page 11

Power Off the Server

Use one of these methods to power off the server.

▼ Power Off (Oracle ILOM)

Use this procedure to gracefully shut down the OS and power off the server to standby power mode.

1. **Prepare to power off the server.**

See “Prepare to Power Off the Server” on page 38.

2. **Log in to the Oracle ILOM (CLI) using an Administrator account.**

3. **At the Oracle ILOM prompt, shut down the operating system:**

```
-> stop /System
```

▼ Power Off (Server Power Button - Graceful)

Use this procedure to place the server in the power standby mode. In this mode, the Power OK LED blinks rapidly.

1. **Prepare to power off the server.**

   See “Prepare to Power Off the Server” on page 38.

2. **Press and release the recessed Server Power button.**

   You might need to use a pointed object, such as a pen or pencil.

▼ Power Off (Server Power Button - Emergengy)

Use this procedure to force an immediate shut down of the server.

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

1. **Prepare to power off the server.**

   See “Prepare to Power Off the Server” on page 38.

2. **Press and hold the Server Power button for five seconds.**

Related Information

- “Prepare to Power Off the Server” on page 38
- “Disconnect Cables From the Server” on page 40
- “Front Panel Components” on page 11

▼ Disconnect Cables From the Server

Caution - The system supplies standby power to the circuit boards when the power cords are connected even when the system is powered off.

1. **Label all cables connected to the server.**
2. **Power down the server.**
   See “Power Off the Server” on page 38.
3. **Disconnect the power cords from the rear of the server.**
4. **Disconnect all data cables from the rear of the server.**
5. **Gain access to the internal server components.**
   See “Accessing Server Components” on page 40.

Related Information

- “Rear Panel Components” on page 13
- “Extend the Server to the Service Position” on page 41
- “Reconnect Data Cables and Power Cords” on page 149

Accessing Server Components

These topics explain how to access components on the outside and the inside of the server. Perform these tasks in this order, as needed.

- “Prevent ESD Damage” on page 41
- “Extend the Server to the Service Position” on page 41
- “Remove the Cable Management Arm” on page 42
- “Remove the Server From the Rack” on page 47
- “Open the Server Fan Door” on page 48
- “Remove the Top Cover” on page 49

Related Information

- “Safety Information” on page 33

Prevent ESD Damage

Many components housed within the chassis can be damaged by ESD. To protect these components from damage, perform the following steps before opening the chassis for service.

1. **Prepare an antistatic surface to set parts on during the removal or installation 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
   - Disposable ESD mat (shipped with some replacement parts or optional 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.

   See "Safety Information" on page 33.

Related Information

- "Safety Information" on page 33

Extend the Server to the Service Position

If the server is installed in a rack with extendable slide rails, use this procedure to extend the server to the maintenance position.

1. **To prevent the rack from tipping forward when the server is extended, extend all rack anti tilt devices.**

Caution - To reduce the risk of personal injury, stabilize the expansion rack cabinet and extend all anti tilt devices before extending the server from the rack.

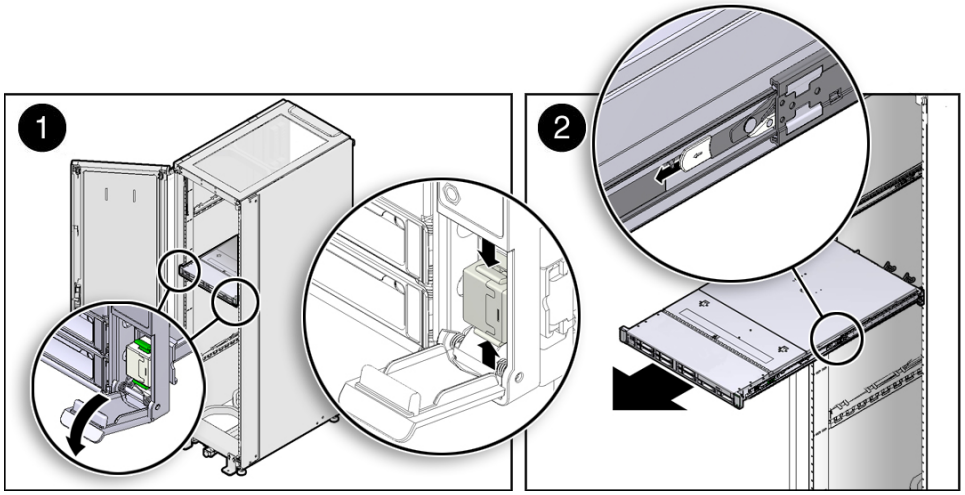
For instructions for stabilizing the rack, see the "Stabilize the Rack" in *SPARC S7-2 Server Installation Guide*.

2. **Verify that no cables will be damaged or will interfere when the server is extended.**

Although the CMA that is supplied with the server is hinged to accommodate extending the server, you should ensure that all cables and cords are capable of extending.

3. **From the front of the server, open and hold the left and right release latch covers in the open position (1).**

   When in an open position, the release latch covers engage the slide rail release latches.



4. **While the release latch covers are in the open position, slowly pull the server forward until the slide rails latch into a locked position (2).**

   The server is now in the extended maintenance position.

Related Information

- “Disconnect Cables From the Server” on page 40
- “Remove the Server From the Rack” on page 47
- “Return the Server to the Normal Operating Position” on page 147

▼ Remove the Cable Management Arm

Before you begin this procedure, refer to “Install the Cable Management Arm” in *SPARC S7-2 Server Installation Guide* and identify CMA connectors A, B, C, and D. You should disconnect

the CMA connectors in the reverse order in which you installed them, that is, disconnect connector D first, then C, then B, and finally A.

Throughout this procedure, once you disconnect any of the CMA's four connectors, do not allow the CMA to hang under its own weight.

Note - References to “left” or “right” in this procedure assume that you are facing the back of the equipment rack.

Caution - To reduce the risk of personal injury, stabilize the rack cabinet and extend all anti tilt devices before extending the server from the rack.

1. **Extend all rack anti tilt devices to prevent the rack from tipping over.**

   For instructions for stabilizing the rack, refer to “Stabilize the Rack” in *SPARC S7-2 Server Installation Guide*.

2. **Extend the server approximately 13 cm (5 inches) out of the front of the rack, to make it easier to remove the CMA.**

3. **Remove the cables from the CMA.**

   a. **Disconnect all cables from the rear of the server.**

   b. **If applicable, remove any additional Velcro straps that were installed to bundle the cables.**

   c. **Unwrap the six Velcro straps that are securing the cables.**

   d. **Open the three cable covers to the fully opened position.**

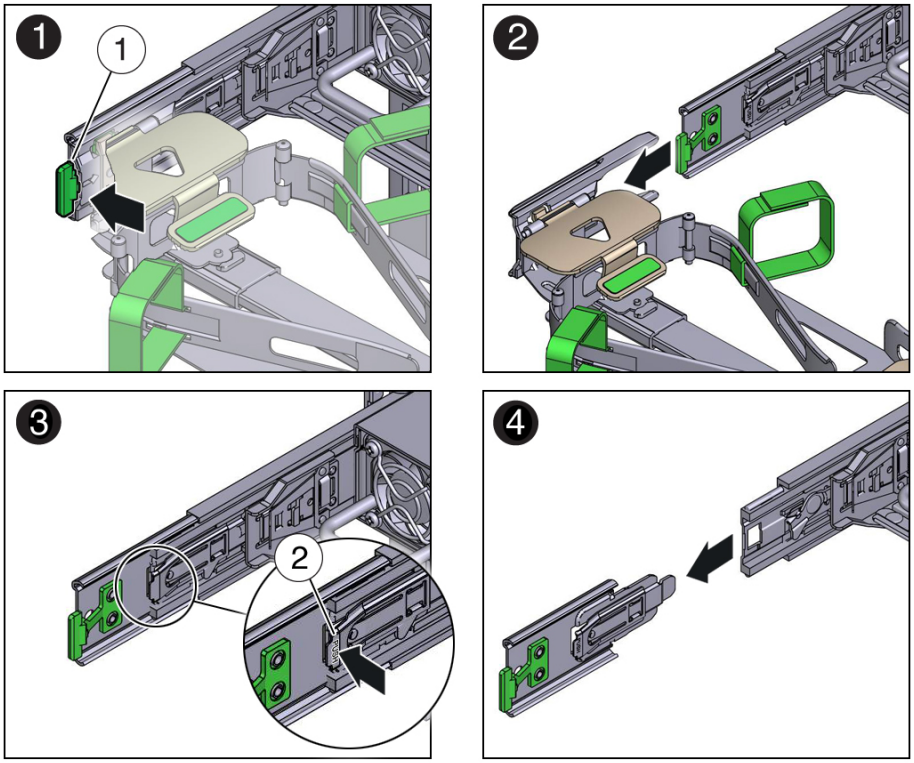
   e. **Remove the cables from the CMA and set them aside.**

4. **Disconnect connector D.**

   a. **Press the green release tab (callout 1) on the slide rail latching bracket toward the left and slide the connector D out of the left slide rail (1 and 2).**

      When you slide connector D out of the left slide rail, the slide rail latching bracket portion of the connector remains in place. You will disconnect the connector in the next step.

Note - Once you have disconnected connector D, you must not allow the CMA to hang under its own weight. Throughout the remainder of this procedure, the CMA must be supported until all the remaining connectors are disconnected and the CMA can be placed on a flat surface.



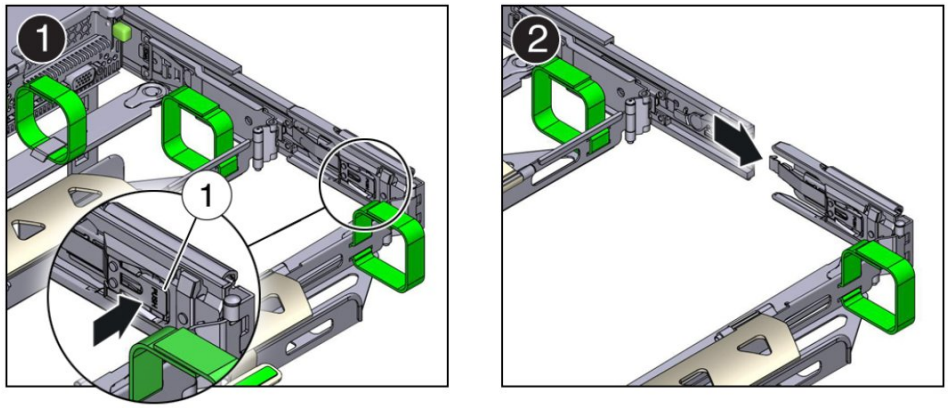
No.	Description
1	Connector D release tab (green)
2	Slide rail latching bracket release tab (labeled PUSH)

b. Use your right hand to support the CMA and use your left thumb to push in (toward the left) on the slide rail latching bracket release tab labeled PUSH (callout 2), and pull the latching bracket out of the left slide rail and put it aside (frames 3 and 4).

5. **Disconnect connector.**

   a. **Place your left arm under the CMA to support it.**

   b. **Use your right thumb to push in (toward the right) on the connector C release tab labeled PUSH (callout 1), and pull connector C out of the right slide rail (frame 1 and 2).**

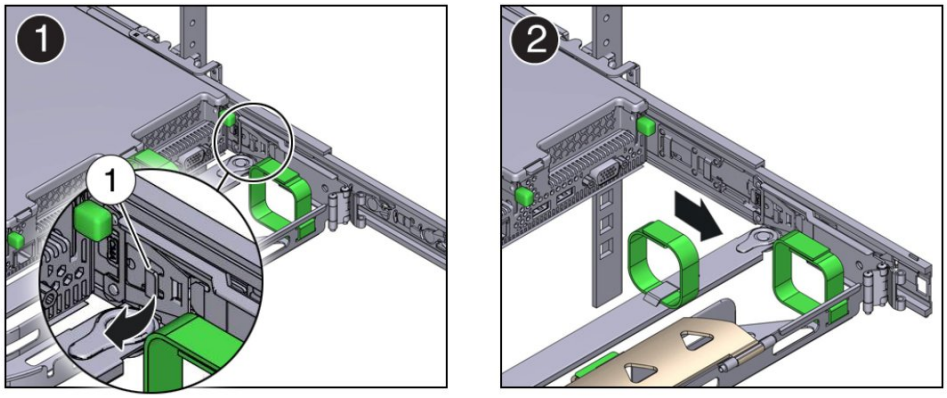


No.	Description
1	Connector C release tab (labeled PUSH)

6. **Disconnect connector B.**

   a. **Place your right arm under the CMA to support it and grasp the rear end of connector B with your right hand.**

b. **Use your left thumb to pull the connector B release lever to the left away from the right slide rail (callout 1) and use your right hand to pull the connector out of the slide rail (panels 1 and 2).**

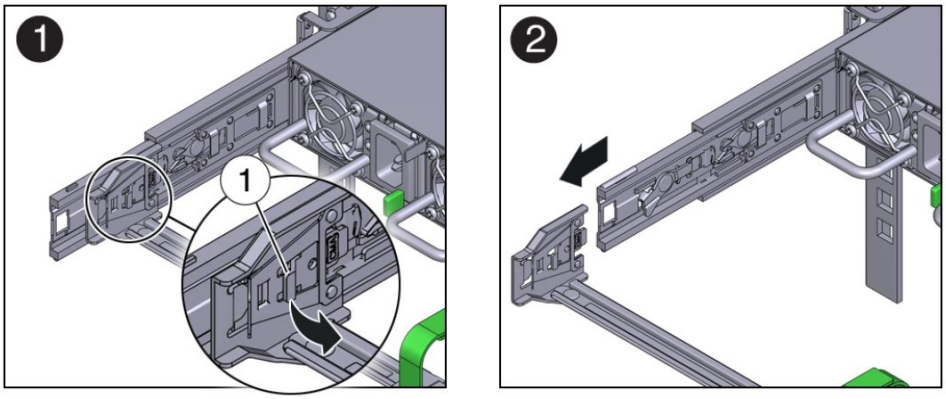


No.	Description
1	Connector B release lever

7. **Disconnect connector A.**

a. **Place your left arm under the CMA to support it and grasp the rear end of connector A with your left hand.**

b. **Use your right thumb to pull the connector A release lever to the right away from the left slide rail (callout 1), and use your left hand to pull the connector out of the slide rail (frames 1 and 2).**



No.	Description
1	Connector A release lever

8. **Remove the CMA from the rack and place it on a flat surface.**

9. **Go to the front of the server and push it back into the rack.**

▼ Remove the Server From the Rack

Caution - The server weighs approximately 18.1 kg (40.0 lbs). Two people are required to dismount and carry the chassis.

1. **Disconnect all the cables and power cords from the server.**

2. **Remove the CMA.**
   See “Remove the Cable Management Arm” on page 42.

3. **Extend the server to the maintenance position.**

For instructions, see “Extend the Server to the Service Position” on page 41.

4. **From the front of the server, pull the green slide rail release tabs toward the front of the server, and pull the server out of the rack until it is free of the rack rails.**

   A slide rail release tab is located on each slide rail (see “Extend the Server to the Service Position” on page 41 (2).

   Note - To pull the green slide rail release tab, place your finger in the center of the tab, not on the end, and apply pressure as you pull the tab toward the front of the server.

5. **Set the server on a sturdy work surface.**

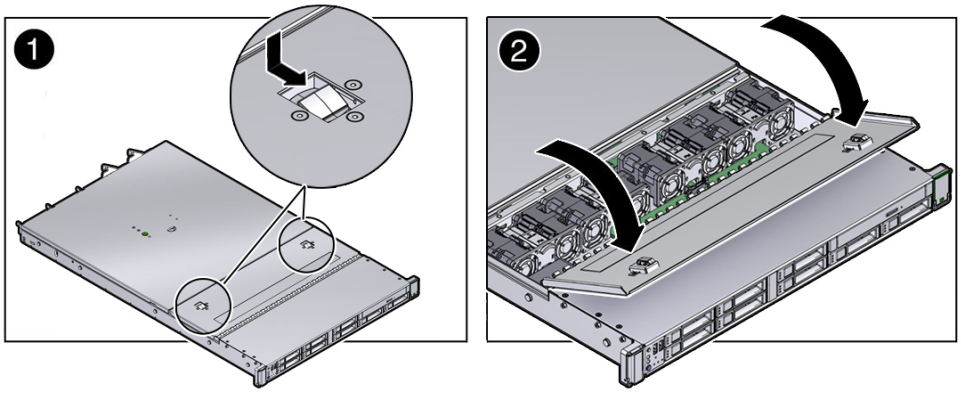
Related Information

- “Disconnect Cables From the Server” on page 40
- “Prevent ESD Damage” on page 41

▼ Open the Server Fan Door

Servicing the server fan modules requires that the fan door be opened. It is also easier to remove the server top cover if you open the fan door first.

- **Open the server fan door by sliding the fan door latches to the front of the server and swinging the door up to the open position.**



Related Information

- “Prevent ESD Damage” on page 41
- “Remove the Top Cover” on page 49

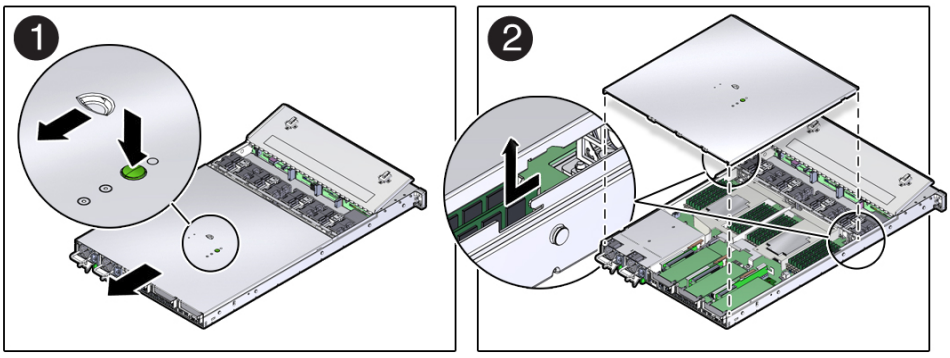
▼ Remove the Top Cover

Servicing most of the server components requires that the top cover be removed.

Caution - If the top cover is removed without first removing the AC power cords, the server host shuts down immediately and an event is logged to indicate that the chassis top cover has been removed.

1. **Ensure that the AC power cords are disconnected from the server power supplies.**
2. **Open the server fan door.**

   See “Open the Server Fan Door” on page 48.
3. **To open the server top cover, press and hold down the top cover release button and use the recessed area to slide the top cover toward the rear of the server about 0.5 inches (12.7 mm) (1).**



4. **Lift the cover off the chassis and set it aside (2).**

Related Information

- “Prevent ESD Damage” on page 41
- “Replace the Top Cover” on page 145

Servicing Drives

The server provides eight 2.5-inch drive bays, accessible through the front panel. See “Front Panel Components” on page 11. Drives can be removed and installed while the server is running. This feature, referred to as being *hot-serviceable*, depends on how the drives are configured.

The server supports traditional, disk-based storage devices, Flash SSDs, which are diskless storage devices based on solid-state memory, and SFF-8639 NVMe PCIe SSDs, which are diskless storage devices based on solid-state memory using the NVMe software interface. NVMe drives are supported in four drive slots, while other drives are supported in any slot. Any of these drives can be a boot device.

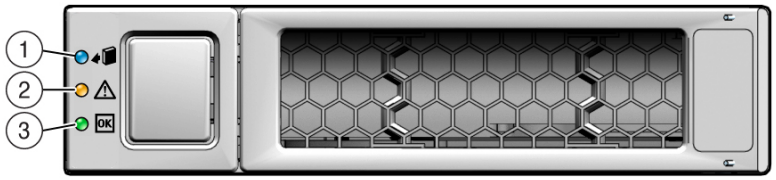
Note - The terms “drive” and “HDD” are used in a generic sense to refer to internal storage devices.

Related Information

- “Identify Faulted Components” on page 22
- “Front Panel Components” on page 11

Drive LEDs

The following figure and table describe the storage drive status indicators (LEDs).



Legend	LED	Color	State and Meaning
1	OK to Remove	Blue	■ Steady on – The storage drive can be removed safely during a hot-plug operation. ■ Off – The storage drive has not been prepared for removal.
2	Service Required	Amber	■ Off – The storage drive is operating normally. ■ Steady on – The system has detected a fault with the storage drive.
3	OK/Activity	Green	■ Off – Power is off or the installed drive is not recognized by the system. ■ Steady on – The drive is engaged and is receiving power. ■ Steady blink – There is disk activity. The LED blinks on and off to show activity.

▼ Remove a Drive

This is a hot-service procedure that can be performed by a customer while the server is running.

Caution - This procedure requires that you handle components that are sensitive to ESD which can cause server components to fail. Follow safety procedures to "Prevent ESD Damage" on page 41.

1. **Determine which drive is faulty by checking the front of the drives for a lit amber fault LED.**

   See "Front Panel Components" on page 11 for the locations of the drives in the server.

2. **If required, shut down the OS to replace the drive.**

   Shut down the OS if the drive:

   - Contains the OS, and the OS is not mirrored on another drive.
   - Cannot be logically isolated from the online operations of the server.

   To shut down the drive, see "Power Off the Server" on page 38 and go to Step 5.

3. **Take the drive offline.**

- **For a standard drive:**

  a. **At the Oracle Solaris prompt, 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.

  ```
  Ap_id                          Type         Receptacle   Occupant       Condition
  c0                             scsi-bus     connected    configured     unknown
  c0::dsk/c1t0d0                 disk         connected    configured     unknown
  c0::dsk/c1t0d0                 disk         connected    configured     unknown
  usb0/1                         unknown      empty        unconfigured   ok
  usb0/2                         unknown      empty        unconfigured   ok
  ...
  ```

  You must unconfigure any drive you plan to remove.

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

  For example, type:

  ```
  # cfgadm -c unconfigure c0::dsk/c1t1d0
  ```

  Replace `c0:dsk/c1t1d0` with the drive name that applies to your situation.

  c. **Verify that the drive's blue Ready to Remove LED is lit.**

- **For an NVMe Drive:**

  a. **Determine the name of the NVMe drive to be removed.**

  ```
  # hotplug list -lc
  ```

  Locate the name of the drive, such as `/SYS/DBP/NVME0` in this example.

  You can use this same command to check the state of the drive at other stages of the removal procedure.

b. Disable the NVMe drive.

```
# hotplug disable /SYS/DBP/NVME0
```

Check that the drive's state has changed from `enabled` to `powered`.

```
# hotplug list -lc
```

c. Power down the NVMe drive.

```
# hotplug poweroff /SYS/DBP/NVME0
```

Check that the drive's state has changed from `powered` to `present`.

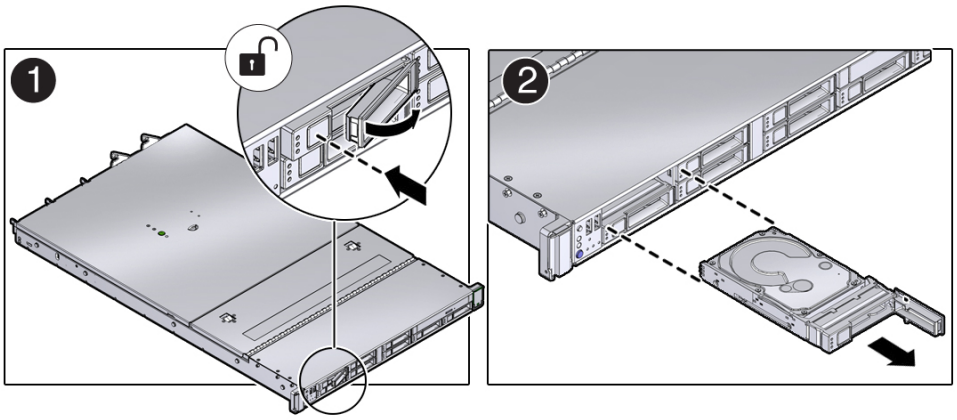
```
# hotplug list -lc
```

In this state, the blue OK to Remove LED on the NVMe drive is lit.

Note - Do not remove the drive unless the blue OK to Remove LED is lit.

4. If you are hot-servicing the drive, locate the drive that displays the amber Fault LED and ensure that the blue Ready to Remove LED is lit.

5. On the drive you want to remove, complete these tasks.



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

a. **Push the release button to open the latch and unlock the drive.**

b. **Grasp the latch and pull the drive out of the slot.**

Caution - When you remove a drive, replace it with a filler or another drive. Otherwise, the server might overheat due to improper airflow.

6. **After you remove an NVMe drive, check that the drive slot's state has changed to `empty`.**

```
# hotplug list -lc
```

7. **Install a replacement drive or a drive filler.**

See “Install a Drive” on page 56 or “Install a Drive Filler” on page 58.

Related Information

- “Install a Drive” on page 56
- “Remove a Drive Filler” on page 55
- “Install a Drive Filler” on page 58
- “Verify a Drive” on page 58

▼ Remove a Drive Filler

This is a hot-service procedure that can be performed by a customer while the server is running.

Drive fillers use the same release and attach mechanism as drives.

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

See “Prevent ESD Damage” on page 41.

2. **On the drive filler you want to remove, complete these tasks.**

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

a. **Push the release button to open the latch and unlock the drive panel by moving the latch to the right.**

b. **Grasp the latch and pull the filler out of the drive slot.**

Caution - When you remove a drive filler, replace it with another filler or a drive. Otherwise, the server might overheat due to improper airflow.

3. **Install a drive or a replacement drive filler.**

   See “Install a Drive Filler” on page 58 or “Install a Drive” on page 56.

Related Information

- “Remove a Drive” on page 52
- “Install a Drive” on page 56
- “Install a Drive Filler” on page 58
- “Verify a Drive” on page 58

▼ Install a Drive

Installing a drive into a server is a two-step process. You must first install the drive into the drive slot and then configure that drive to the server.

Note - If you removed an existing drive from a slot in the server, you must install the replacement drive in the same slot as the drive that was removed. Drives are physically addressed according to the slot in which they are installed.

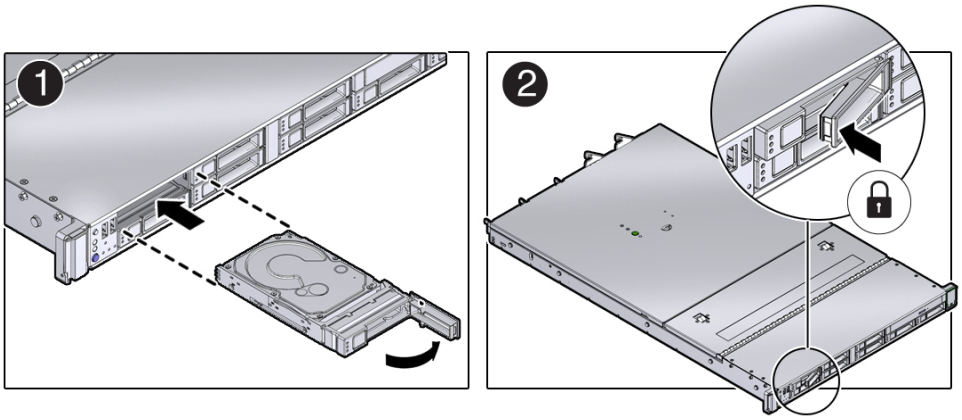
This is a hot-service procedure that can be performed by a customer while the server is running.

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

   See “Prevent ESD Damage” on page 41.

2. **Fully open the release lever on the drive.**

3. **Install the drive by completing the following tasks.**



   a. **Slide the drive into the drive slot until it is fully seated.**

   b. **Close the latch to lock the drive in place.**

4. **Return the drive to operation:**

   - **If you cold-serviced the drive, restore power to the server.**
     See "Power On the Server" on page 151.

   - **If you hot-serviced the drive, configure it.**
     For example, type:

     ```
     # cfgadm -c configure c0::dsk/c1t1d0
     ```

     Replace `c0:dsk/c1t1d0` with the drive name that applies to your situation.

   - **If you hot-serviced an NVMe drive, it should automatically power up and attach. If not, power up and attach the drive manually.**

     ```
     # hotplug enable /SYS/DBP/NVME0
     ```

     Check that the drive's state has changed to `enabled`.

     ```
     # hotplug list –lc
     ```

5. **Verify the drive functionality.**
   See “Verify a Drive” on page 58.

Related Information

- “Remove a Drive” on page 52
- “Remove a Drive Filler” on page 55
- “Install a Drive Filler” on page 58
- “Verify a Drive” on page 58

Install a Drive Filler

Caution - When you remove a drive or filler, replace it with a filler or another drive. Otherwise, the server might overheat due to improper airflow.

This is a hot-service procedure that can be performed by a customer while the server is running.

1. **Fully open the release lever on the drive filler.**
2. **Install the drive.**
   a. **Slide the drive filler into the drive slot until it is fully seated.**
   b. **Close the latch to lock the filler in place.**

Related Information

- “Remove a Drive” on page 52
- “Install a Drive” on page 56
- “Remove a Drive Filler” on page 55
- “Verify a Drive” on page 58

Verify a Drive

1. **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.

2. **At the Oracle Solaris prompt, 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.

```
Ap_id             Type        Receptacle   Occupant       Condition
c0                scsi-bus    connected    configured     unknown
c0::dsk/c1t0d0    disk        connected    configured     unknown
c0::sd1           disk        connected    unconfigured   unknown
usb0/1            unknown     empty        unconfigured   ok
usb0/2            unknown     empty        unconfigured   ok
...
```

3. **Configure the drive.**

For example, to configure the second disk `c0::sd1`, type:

```
# cfgadm -c configure c0::sd1
```

Replace `c0::sd1` with the drive name for your configuration.

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

5. **At the Oracle Solaris prompt, list all drives in the device tree, including any drives that are not configured.**

```
# cfgadm -al
```

The replacement drive is now listed as configured, as shown in the following example.

```
Ap_Id             Type        Receptacle   Occupant      Condition
c0                scsi-bus    connected    configured    unknown
c0::dsk/c1t0d0    disk        connected    configured    unknown
c0::dsk/c1t1d0    disk        connected    configured    unknown
usb0/1            unknown     empty        unconfigured  ok
usb0/2            unknown     empty        unconfigured  ok
...
```

6. **Perform one of these tasks based on your verification results.**

- **If the previous steps did not verify the drive, see “Detecting and Managing Faults” on page 21.**
- **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 Oracle VTS. Refer to the Oracle VTS documentation for details at `http://docs.oracle.com/cd/E19719-01/index.html`.

Related Information

- “Remove a Drive” on page 52
- “Install a Drive” on page 56

Servicing Fan Modules

You need to extend the server from the rack and open the server fan door to access the fan modules.

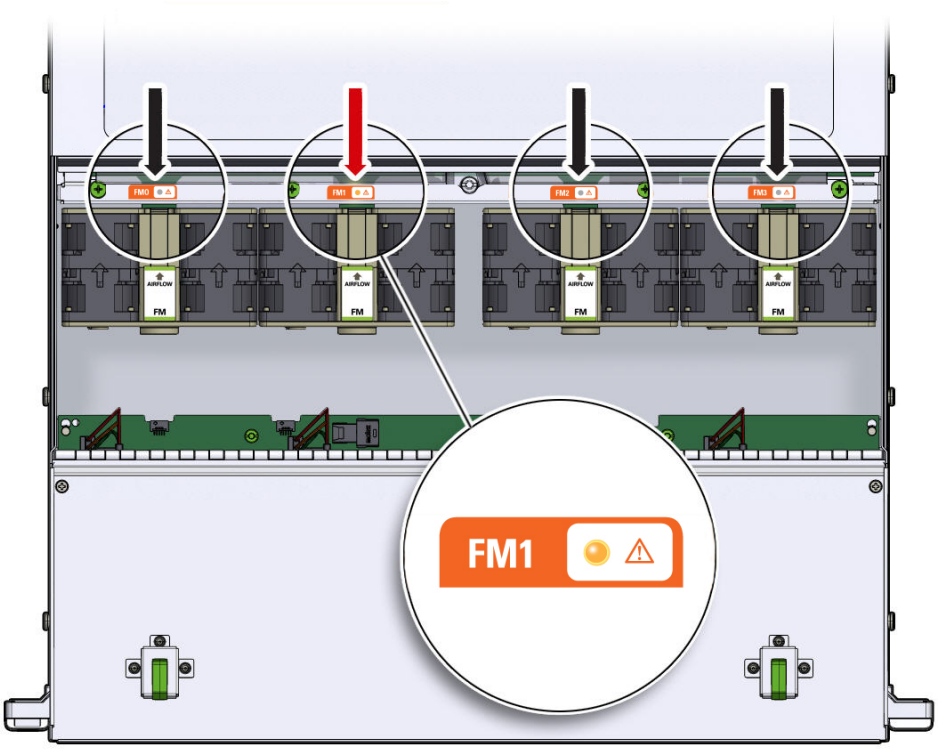
Note - In single-processor servers, only three fans are supported. In this case, slot FM 3 contains a fan filler.

- "Fan Module LEDs" on page 62
- "Remove a Fan Module" on page 63
- "Install a Fan Module" on page 65
- "Verify a Fan Module" on page 66

Related Information

- "Preparing for Service" on page 33

Fan Module LEDs



Status Indicator Name	Color	State Meaning
FM Status	Off/Amber	■ **Off** – The fan module is correctly installed and operating within specification. ■ **Amber** – The fan module is faulty. The front TOP FAN LED and the front and rear panel Service Required LEDs are also lit if the system detects a fan module fault.

Related Information

- “Preparing for Service” on page 33
- “Detecting and Managing Faults” on page 21

Remove a Fan Module

This is a hot-service procedure that can be performed by a customer while the server is running.

Caution - Do not remove a fan without installing a replacement fan to ensure adequate cooling and maintain server availability.

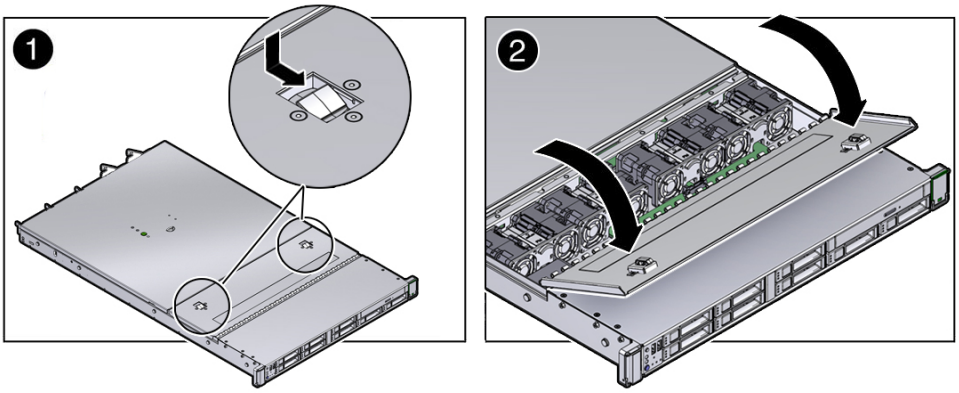
1. **Prepare for servicing.**

   See “Preparing for Service” on page 33.

2. **Extend the server to the maintenance position.**

   See “Extend the Server to the Service Position” on page 41.

3. **To open the server fan door, slide the fan door latches to the front of the server and swing the door up to the open position.**



Caution - Close the server fan door within 60 seconds to maintain adequate airflow to properly cool the server. Leaving the door open for more than 60 seconds, while the server is running, might cause the server to overheat and shut down.

4. **Identify the faulty fan module by locating the fan with the amber fault LED lit.**

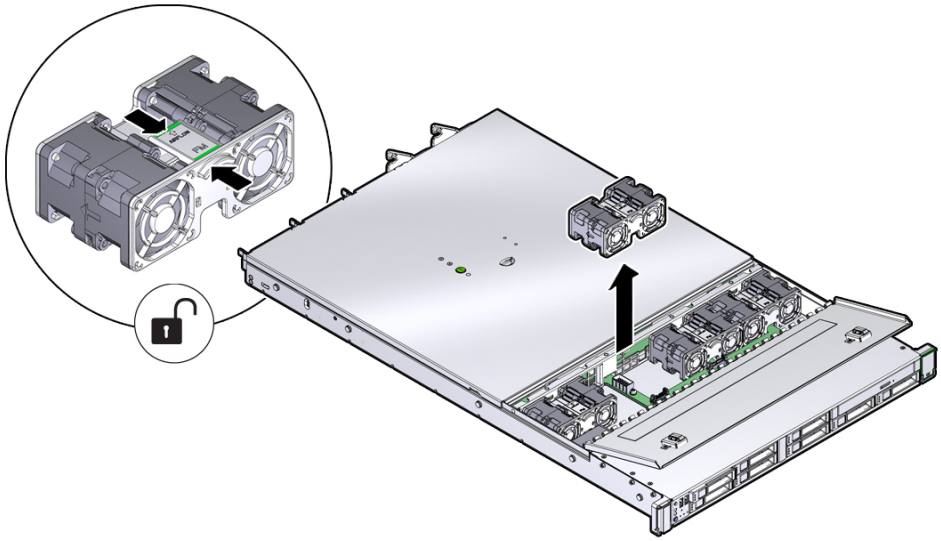
   See “Fan Module LEDs” on page 62.

5. **Remove the faulty fan module.**

a. **Using your thumb and forefinger, grasp the fan module in the finger recesses located in the plastic between the fans.**

b. **Lift the fan module straight up and out of the chassis.**

Caution - When removing a fan module, do not rock it back and forth. Rocking a fan module can cause damage to the motherboard connectors.



6. **Set the fan module aside.**

Caution - Do not service any other components in the fan compartment unless the system is shut down and the power cords are removed.

7. **Consider your next step:**

- If you removed the fan assembly as part of another procedure, return to that procedure.
- Otherwise, continue to "Install a Fan Module" on page 65.

Related Information

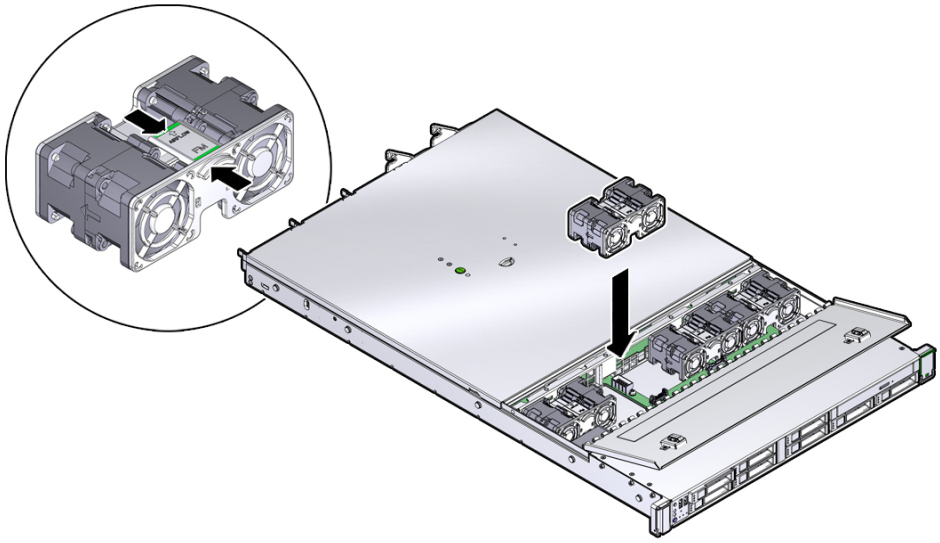
- “Extend the Server to the Service Position” on page 41
- “Install a Fan Module” on page 65

Install a Fan Module

This is a hot-service procedure that can be performed by a customer while the server is running.

1. **Remove the replacement fan module from its packaging and place it on an antistatic mat.**
2. **With the fan door open, position the replacement fan module into the server.**

   The fan modules are keyed to ensure that they are installed correctly.



3. **Press down on the fan module and apply firm pressure to fully seat the fan module.**
4. **Verify that the fan module status indicator (LED) that aligns with the replaced fan module is extinguished.**

5. **Close the fan door.**

6. **Verify that the Top Fan Fault LED on the front of the server and the Service Required LEDs on the front and rear of the server are extinguished.**

7. **Consider your next step:**

   - **If you installed the fan module as part of another procedure, return to that procedure.**
   - **Otherwise, return the server to operation. See "Returning the Server to Operation" on page 145.**

Related Information

- "Returning the Server to Operation" on page 145.
- "Remove a Fan Module" on page 63
- "Verify a Fan Module" on page 66

▼ Verify a Fan Module

1. **Verify that the Service Required LED on the replaced fan module is not lit.**

   See "Fan Module LEDs" on page 62.

2. **At the Oracle ILOM prompt, start the fault management shell.**

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

faultmgmtsp>
```

3. **Type `fmadm faulty` to check for faults.**

   - If faults are reported, see "Detecting and Managing Faults" on page 21.
   - If no faults are reported, then the component has been replaced successfully.

4. **Consider these possibilities:**

   - If any of the LEDs are illuminated, see "Fan Module LEDs" on page 62.
   - If none of the LEDs are illuminated, the fan module has been replaced successfully.

Related Information

- “Front Panel Components” on page 11
- “Rear Panel Components” on page 13

Servicing Power Supplies

The server has redundant hot-serviceable power supplies. You can remove and replace a power supply without shutting the server down, provided that the other power supply is online and working. For information about power configuration policies, refer to the administration guide and the Oracle ILOM documentation.

- "Power Supply LEDs" on page 69
- "Remove a Power Supply" on page 70
- "Install a Power Supply" on page 72

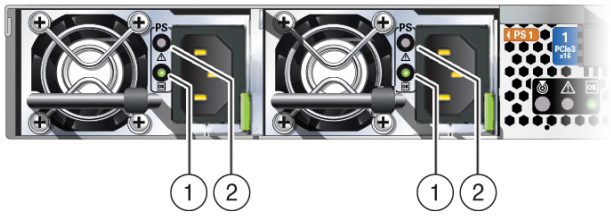
Related Information

- "Remove the Cable Management Arm" on page 42

Power Supply LEDs

Each power supply contains two status indicators (LEDs) on the back panel. This figure and table provide a description of the power supply status indicators.

Note - The front and rear panel Service Required LEDs are also lit when the server detects a power supply fault. See "Front Panel Components" on page 11 and "Rear Panel Components" on page 13.



Legend	Status Indicator Name	Icon	Color	State Meaning
1	AC OK/DC OK		Green	■ **Off** – No AC power is present. ■ **Slow blink** – Normal operating. Input power is within specification. DC output voltage is not enabled. ■ **Steady on** – Normal operation. Input AC power and DC output voltage are within specification.
2	Service Required		Amber	■ **Off** – Normal operation; no service required. ■ **Steady on**– The power supply (PS) has detected a PS fan failure, PS overtemperature, PS over current, or PS over/ under voltage.

Related Information

- “Remove a Power Supply” on page 70
- “Install a Power Supply” on page 72

▼ Remove a Power Supply

This is a hot-service procedure that can be performed by a customer while the server is running.

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

Caution - If a power supply fails and you do not have a replacement available, to ensure proper airflow, leave the failed power supply installed in the server until you replace it with a new power supply.

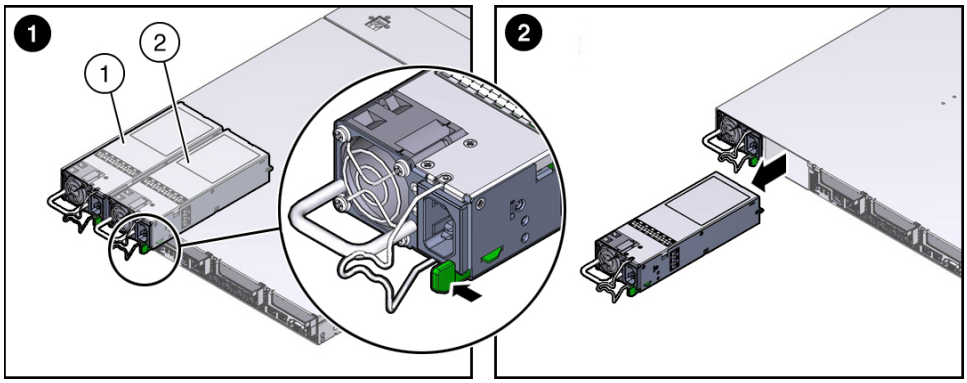
1. **Identify which power supply requires replacement.**
   - **Locate the power supply with the lit amber Service Required LED.**
   - **You can also use the Oracle ILOM `show faulty` command at the Oracle ILOM command line prompt (->) to identify a power supply failure.**
2. **Gain access to the rear of the server where the faulty power supply is located.**
3. **If the CMA is installed, disconnect both CMA left-side connectors and move the CMA out of the way.**

For instructions for disconnecting the CMA left-side connectors, see “Remove the Cable Management Arm” on page 42.

Caution - When disconnecting the CMA left-side connectors, use your arm to support the CMA so that it does not hang down under its own weight and stress the right-side connectors; otherwise, the CMA might be damaged. You must continue to support the CMA until you have reconnected both of the left-side connectors.

4. **Disconnect the power cord from the faulty power supply.**

5. **Grasp the power supply handle and push the power supply latch to the left (1).**



No.	Description
1	Power supply 0
2	Power supply 1

6. **Pull the power supply out of the chassis (2).**

7. **Replace the power supply immediately.**

   See “Install a Power Supply” on page 72.

Caution - Replace the power supply within 5 minutes to ensure proper system cooling.

Related Information

- “Power Supply LEDs” on page 69

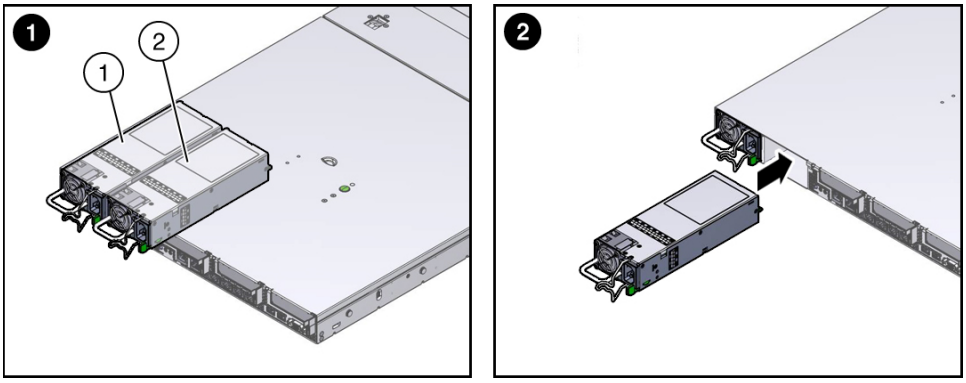
Install a Power Supply

This is a hot-service procedure that can be performed by a customer while the server is running.

Caution - Always replace a faulty power supply with a power supply of the same type (model).

Caution - Replace the power supply within 5 minutes to ensure proper system cooling.

1. **Remove the replacement power supply from its packaging and place it on an antistatic mat.**
2. **Align the replacement power supply with the empty power supply slot (1).**
3. **Slide the power supply into the bay until it is fully seated (2).**
   Ensure you press the power supply in *firmly*, then close the latch. You hear an audible click when the power supply fully seats.



4. **Reconnect the power cord to the power supply.**
5. **Verify that the amber LED on the replaced power supply and the Service Required LEDs on the front and rear panels of the server are not lit.**

6. **If you disconnected the two CMA left-side connectors, reconnect the connectors.**

   For instructions for reconnecting the CMA left-side connectors, refer to "Install the Cable Management Arm" in *SPARC S7-2 Server Installation Guide*.

Related Information

- "Remove a Power Supply" on page 70
- "Power Supply LEDs" on page 69

Servicing DIMMs

The server supports a variety of DDR4 DIMM configurations that can include quad-rank (QR), dual-rank (DR), and single-rank (SR) DDR4 DIMMs.

Caution - Follow antistatic practices as described in “Prevent ESD Damage” on page 41 to avoid component damage. These procedures require that you handle components that are sensitive to electrostatic discharge. This sensitivity can cause the components to fail.

Caution - Ensure that all power is removed from the server before removing or installing DDR4 DIMMs, or damage to the DDR4 DIMMs might occur. You must disconnect all power cables from the system before performing these procedures.

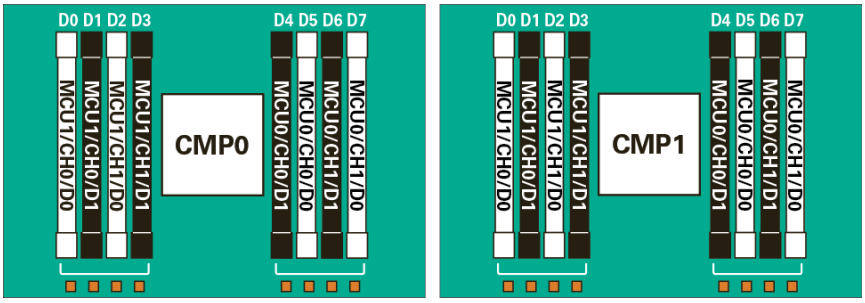
These topics and procedures provide information to assist you when replacing a DIMM or upgrading DIMMs:

Related Information

- “Identify Faulted Components” on page 22
- “Preparing for Service” on page 33

DIMM Layout and Population Rules

The physical layout of the DIMMs and processors is shown in the following figure. When viewing the server from the front, processor 0 (P 0) is on the left.



Note - In single-processor servers, the DIMM sockets associated with the processor 1 (P 1) are nonfunctional and should not be populated with DIMMs. In single-processor servers, a maximum of 8 DIMMs are supported and the DIMMs must be installed in DIMM sockets associated with the P0 processor socket.

The population rules for adding DIMMs to the server are as follows:

- The server supports 64-GB DDR4-2400 DIMMs, 32-GB DDR4-2400 DIMMs, and 16-GB DDR4-2400 DIMMs.
- There are two supported memory configurations: 4 DIMMs per CPU or 8 DIMMs per CPU.
- Do not mix DIMM sizes.
- Within a memory channel, DIMMs must be populated in the white sockets first, then in the black sockets.

Related Information

- “Install a DIMM” on page 78
- “Identify and Remove a Failed DIMM” on page 76

▼ Identify and Remove a Failed DIMM

This is a cold-service procedure that can be performed by a customer. Power down the server completely before performing this procedure.

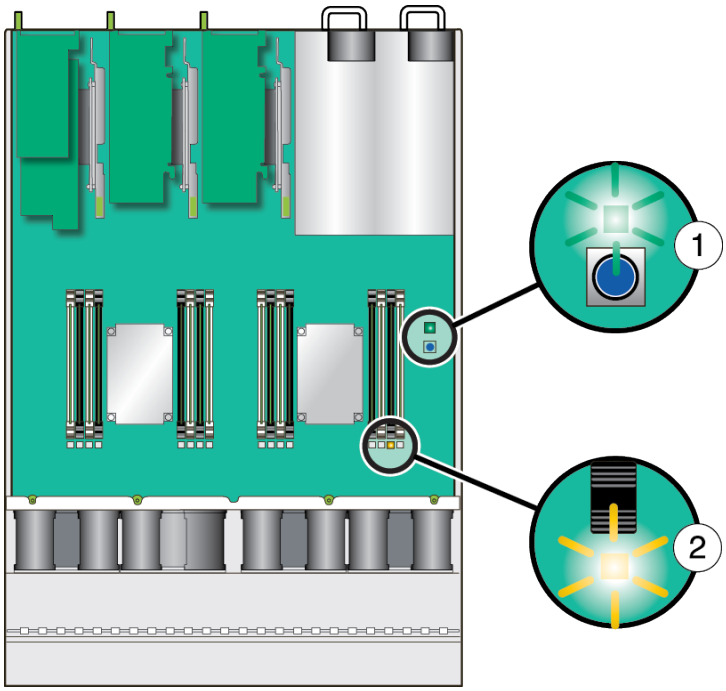
1. **Gain access to the DIMMs by preparing the server for service and removing the top cover.**

   See “Preparing for Service” on page 33.

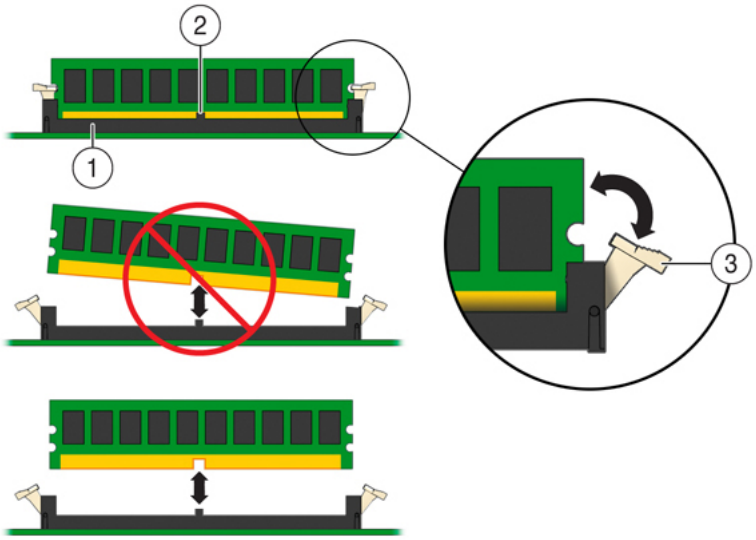
2. **Remove the air baffle by lifting it straight up and out of the system.**

3. **Identify and note the location of the failed DDR4 DIMM by pressing the Fault Remind button on the motherboard.**

   Failed DDR4 DIMMs display an amber LED on the motherboard.



4. **To remove the failed DIMM, rotate both DIMM socket ejectors outward as far as they will go, then carefully lift the DIMM straight up to remove it from the socket.**



5. **Replace each failed DIMM with either another DIMM of the same rank size (quad-rank, dual-rank, or single-rank) or leave the socket empty.**

Related Information

- “DIMM Layout and Population Rules” on page 75
- “Install a DIMM” on page 78

▼ Install a DIMM

This is a cold-service procedure that can be performed by a customer. Power down the server completely before performing this procedure.

1. **Unpack the replacement DDR4 DIMM and place it on an antistatic mat.**

2. **Ensure that the replacement DDR4 DIMM matches the size of the DIMM it is replacing.**

You must not replace a single-rank or dual-rank DIMM with a quad-rank DIMM and vice versa. If you violate this rule, the performance of the server might be adversely affected. For DIMM socket population rules, see “DIMM Layout and Population Rules” on page 75.

3. **Install a DIMM.**

   a. **Ensure that the ejector tabs are in the open position.**

   b. **Align the notch in the replacement DIMM with the connector key in the connector socket.**

      The notch ensures that the DIMM is oriented correctly.

   c. **Push the DDR4 DIMM into the connector until the ejector tabs lock the DIMM in place.**

      If the DIMM does not easily seat into the connector socket, verify that the notch in the DIMM is aligned with the connector key in the connector socket. If the notch is not aligned, damage to the DIMM might occur.

Note - If you want to move a faulty DDR4 DIMM to a new DIMM socket or reseat a DIMM for troubleshooting, you must first manually clear the associated DIMM fault. Otherwise, the DIMM fault might follow the DIMM to the new socket location or reoccur on the current socket location, possibly causing a false DIMM fault condition.

---

4. **Replace the air baffle.**

5. **Return the server to operation.**

   See “Returning the Server to Operation” on page 145.

6. **(Optional) Use Oracle ILOM to clear DDR4 DIMM faults.**

   DDR4 DIMM faults are automatically cleared after a new DIMM has been installed. If you need to manually clear DDR4 DIMM faults, refer to the Oracle Integrated Lights Out Manager (ILOM) 3.2 Documentation Library at `http://www.oracle.com/goto/ILOM/docs`.

Related Information

- “DIMM Layout and Population Rules” on page 75
- “Identify and Remove a Failed DIMM” on page 76
- “Verify a DIMM” on page 80

Verify a DIMM

1. **At the Oracle ILOM prompt type `show faulty`.**

   - **If the output indicates a POST-detected fault, go to Step 4.**
   - **If the output displays a UUID, which indicates a host-detected fault, go to Step 5.**

2. **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 SPM is power cycled. In those cases, the fault is automatically cleared from the server. If `show faulty` still displays the fault, the `set` command clears it.

```
-> set /SYS/MB/CMP0/MCU0/CH0/D0 requested_config_state=Enabled
```

3. **For a host-detected fault, perform these steps to verify the new DIMM.**

   a. **Set the virtual keyswitch to `diag` so that POST runs in Service mode.**

```
-> set /HOST 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
```

   c. **Check if the host has been powered off.**

      Allow approximately one minute before performing this step. Type the `show /HOST` command. When the host is powered off, the console displays `status=Powered Off`.

   d. **Switch to the system console to view POST output.**

      Watch the POST output for possible fault messages. This 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 to Step 3f. If the server remains at the OpenBoot prompt (`ok`) go to the next step.

e. **If the server remains at the OpenBoot prompt, type `boot`.**

f. **Return the virtual keyswitch to Normal mode.**

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

g. **Switch to the system console and type:**

```
# fmadm faulty
```

If any faults are reported, refer to the diagnostics instructions described in "Identify Faulted Components" on page 22.

4. **Switch to the Oracle ILOM command shell.**

5. **Type:**

```
-> show faulty
Target              | Property               | Value
--------------------+------------------------+------------------------------
/SP/faultmgmt/0     | fru                    | /SYS/CMP0/MCU0/CH0/D0
/SP/faultmgmt/0     | timestamp              | Mar 18 16:02:56
/SP/faultmgmt/0/    | sunw-msg-id            | SPSUN4V-8001-OJ
faults/0            |                        |
/SP/faultmgmt/0/    | uuid                   | 2782ad0c-91cb-c780-9663-807f0bf806df
faults/0            |                        |
/SP/faultmgmt/0/    | timestamp              | Mar 18 16:02:56
faults/0            |                        |
```

If this command reports a fault with a UUID go to Step 6. If `show faulty` does *not* report a fault with a UUID, you are done with the verification process.

6. **Switch to the system console and type the `fmadm repair` command with the UUID.**

   Use the same UUID that was displayed from the output of the Oracle ILOM `show faulty` command. For example, type:

```
# fmadm repair 7c7efb20-3333-e2d7-b8ea-986b3e9dbaa9
```

Related Information

- "DIMM Layout and Population Rules" on page 75
- "Identify and Remove a Failed DIMM" on page 76

Servicing the Battery

The battery is located inside the chassis. The battery maintains system time when the server is powered off and disconnected from AC power. If the IPMI logs indicate a battery failure, replace the battery.

Caution - Ensure that all power is removed from the server before removing or installing the battery. You must disconnect the power cables from the system before performing these procedures.

- "Replace the Battery" on page 83

Related Information

- "Preparing for Service" on page 33
- "Disconnect Cables From the Server" on page 40

▼ Replace the Battery

1. **Prepare the host for battery replacement.**

   To correctly reset the date and time after replacing a battery, you must prevent the host from automatically powering on, and also disable any NTP server connections. Before you remove power from the server, perform these steps.

   a. **Check the AUTO_HOST_POWER_ON state. At the Oracle ILOM prompt:**

   ```
   -> show /SP/policy HOST_AUTO_POWER_ON

   /SP/policy
     Properties:
        HOST_AUTO_POWER_ON = enabled
   ```

   b. **Set the property to disabled.**

```
-> set /SP/policy HOST_AUTO_POWER_ON=disabled
```

c. Check the NTP server property for the `/SP/clock`.

```
-> show /SP/clock usentpserver

/SP/clock
  Properties:
     usentpserver = enabled
```

d. Set the property to disabled.

```
-> set /SP/clock usentpserver=disabled
```

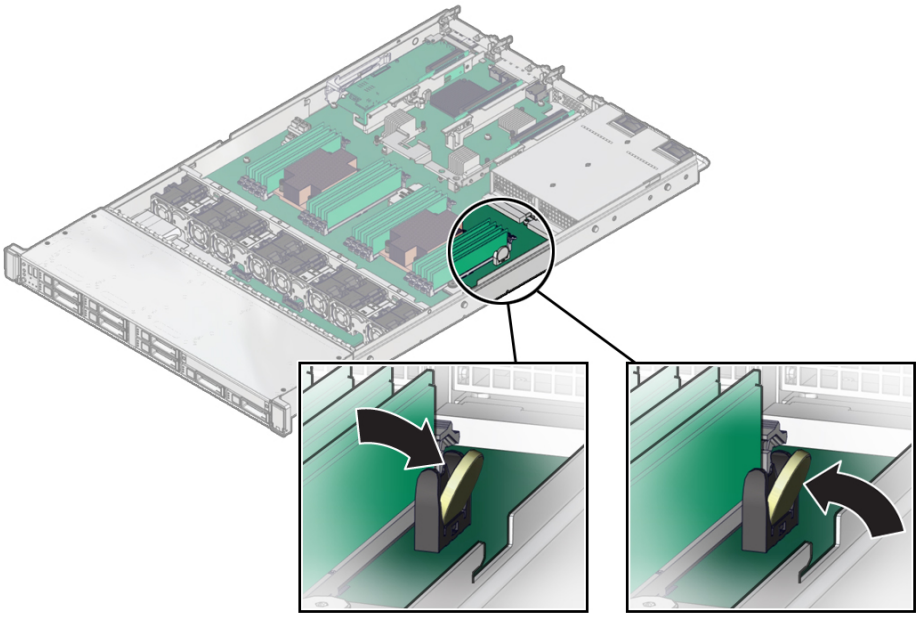
2. Replace the battery.

Replacing the battery is a cold-service procedure. The server must be completely powered down before performing this procedure.

a. Prepare the server for service.

See “Preparing for Service” on page 33.

b. **To dislodge the battery from the retainer, gently push the battery toward the side of the server to release it from the retention clip.**



c. **Unpack the replacement battery.**

d. **Press the new battery into the battery retainer with the positive side (+) facing the side of the server.**

e. **Return the server to operation.**

See “Returning the Server to Operation” on page 145.

3. **Reset the system clock.**

a. **Use the Oracle ILOM clock command to set the day and time.**

The following example sets the date to August 22, 2016, and the timezone to EDT.

```
-> set /SP/clock datetime=0812213202016 timezone=EDT
Set 'datetime' to '0812213202016'
```

```
Set 'timezone' to 'PEDT'

-> show -d properties /SP/clock

/SP/clock
  Properties:
     datetime = Mon Aug 22 13:20:16 2016
     timezone = EDT (EST5EDT)
     uptime = 2 days, 19:56:49
     usentpserver = disabled
```

b. If the SP policy `HOST_AUTO_POWER_ON` was enabled before you replaced the battery, then it must be re-enabled.

```
-> set /SP/policy HOST_AUTO_POWER_ON=enabled
```

c. If the /SP/clock usentpserver property was enabled before you replaced the battery, you must re-enable it.

```
-> set /SP/clock usentpserver=enabled
```

4. Verify the battery.

Check the status of the system battery.

```
-> show /SYS/MB/BAT
```

Related Information

- “Identify Faulted Components” on page 22

Servicing PCIe Cards

These topics describe how to service PCIe risers, PCIe cards, and PCIe card fillers.

Servicing PCIe Risers

PCIe cards in all slots are installed on vertical risers. You must remove the relevant riser to remove and replace a PCIe card. You must remove all three PCIe risers when replacing the motherboard.

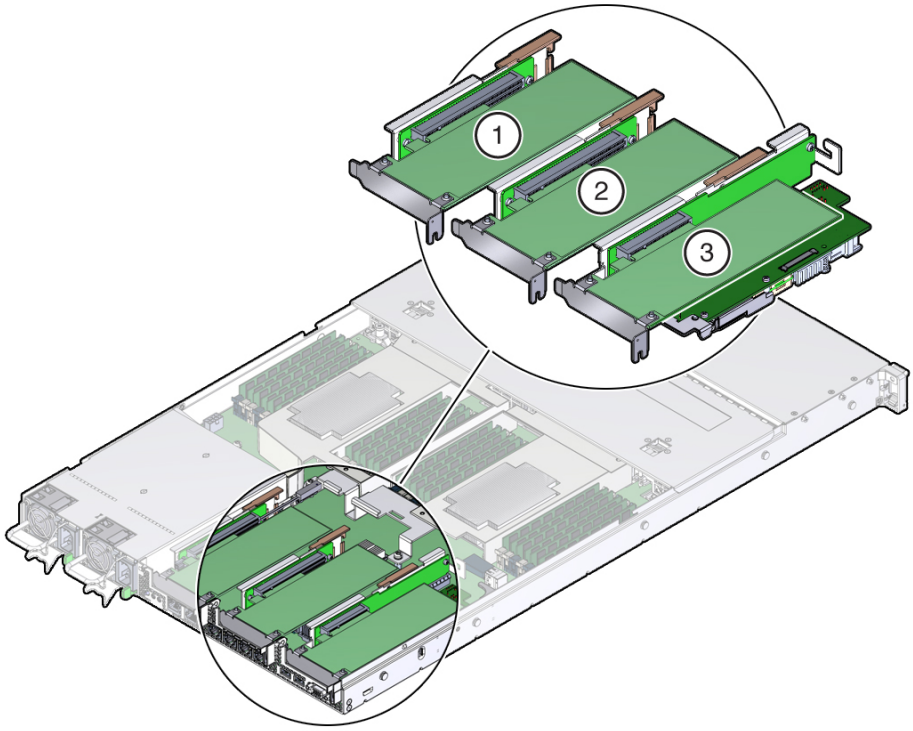
Caution - These procedures require that you handle components that are sensitive to electrostatic discharge. This sensitivity can cause the components to fail. To avoid damage, ensure that you follow antistatic practices to "Prevent ESD Damage" on page 41.

Caution - Ensure that all power is removed from the server before removing or installing PCIe risers, or damage to the PCIe cards installed in the risers might occur. You must disconnect all power cables from the system before performing these procedures.

Related Information

PCIe Riser Location and Differences

The PCIe riser that is installed for PCIe slots 3 and 4 is different than the risers for PCIe slots 1 and 2. The riser for slots 3 and 4 supports two cards, a standard PCIe card and the internal HBA card. Do not attempt to install the PCIe riser for PCIe slots 3 and 4 in slots 1 or 2, and vice versa.



No.	Description
1	PCIe riser and installed PCIe card in slot 1
2	PCIe riser and installed PCIe card in slot 2
3	PCIe riser and installed cards (2) in slots 3 and 4 (the internal HBA card is installed slot 4 of this riser.) **Note:**This riser is different from the risers in slots 1 and 2.

Related Information

- “PCIe Slot Characteristics” on page 97

▼ Remove a PCIe Riser From PCIe Slot 1 or 2

This is a cold-service procedure that can be performed by a customer. Power down the server completely before performing this procedure.

1. **Prepare for servicing.**

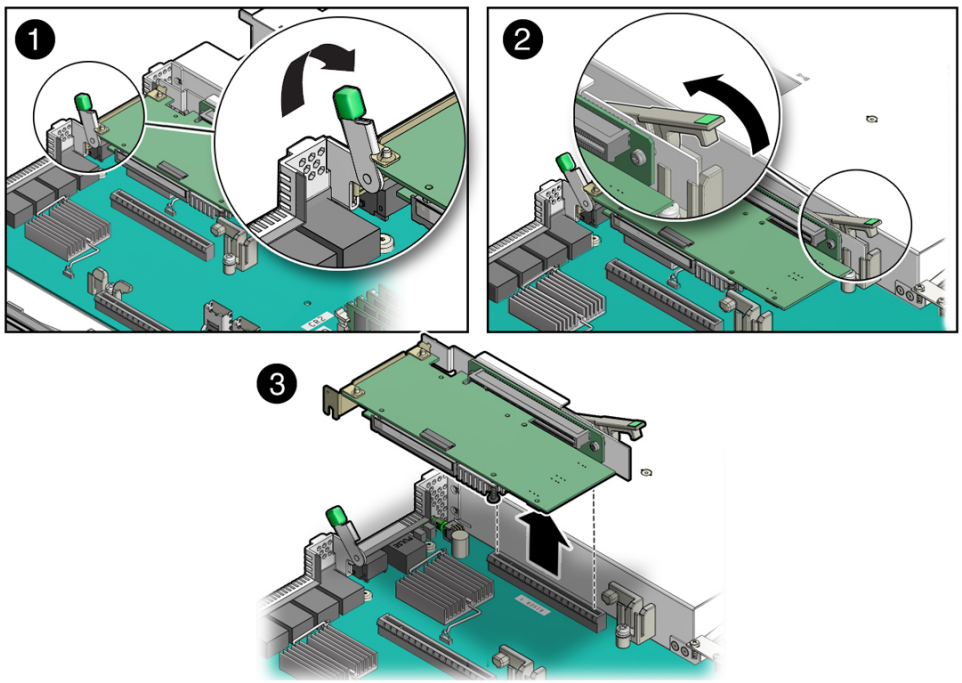
   See “Preparing for Service” on page 33.

2. **Select the PCIe riser that you want to remove.**

   See “PCIe Slot Characteristics” on page 97.

3. **If a PCIe card is installed in the riser, disconnect any external cables from the card.**

4. **Lift the green-tabbed latch on the rear of the server chassis next to the applicable PCIe slot to release the rear bracket on the PCIe card (1).**



Note - If the riser does not have a PCIe card installed, then lift the latch to release the PCIe slot filler panel.

5. **Lift the green-tabbed riser release lever on the PCIe riser with one hand and use your other hand to remove the riser from the motherboard connector (2, 3).**

6. **If there is a PCIe card installed in the riser, place the riser on an antistatic mat and note the slot in which the PCIe riser was originally installed. Otherwise, set the PCIe riser aside.**

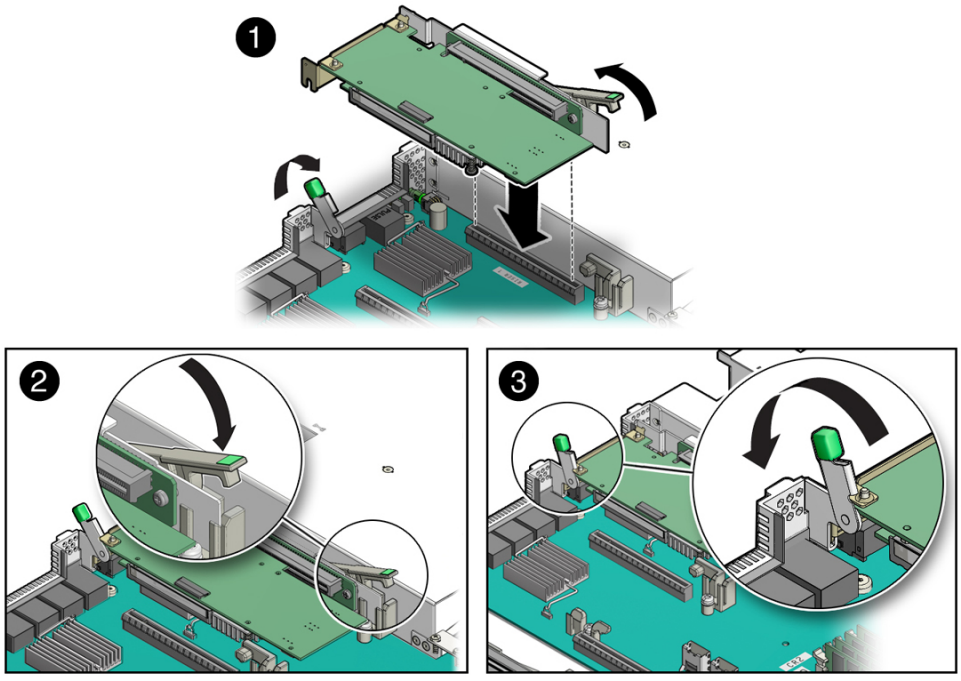
Related Information

- “Install a PCIe Riser Into PCIe Slot 1 or 2” on page 91

▼ Install a PCIe Riser Into PCIe Slot 1 or 2

Note - The PCIe riser that is installed for PCIe slots 3 and 4 is different than the risers for PCIe slots 1 and 2. Do not attempt to install a PCIe riser from slot 1 or 2 into PCIe slots 3 and 4 and vice versa.

1. **Determine into which slot you will install the PCIe riser.**
2. **Retrieve the PCIe riser and any PCIe cards attached to it.**
3. **Raise the green-tabbed release lever on the PCIe riser to the open (up) position (1).**
4. **Gently press the riser into the motherboard connector until it is seated, and then press the green-tabbed release lever on the PCIe riser to the closed (down) position (2).**



5. **Close the green-tabbed latch on the rear of the server chassis next to the applicable PCIe slot to secure the rear bracket on the PCIe card to the server chassis (3).**

   Note - If the riser does not have a PCIe card installed, install a PCIe slot filler panel and close the green-tabbed latch to secure the filler panel.

6. **If there were any external cables connected to the PCIe card, reconnect them.**

7. **Return the server to operation.**

   See “Returning the Server to Operation” on page 145.

8. **Use Oracle ILOM to clear the server PCIe riser fault.**

   If the PCIe riser fault message in Oracle ILOM is not cleared under Open Problems, you must manually clear the fault in Oracle ILOM. For instructions for manually clearing a PCIe riser fault, see the procedure "Clear Faults for Undetected Replaced or Repaired Hardware Components" in the *Oracle ILOM User's Guide for System Monitoring and Diagnostics Firmware Release 3.2.x* in the Oracle Integrated Lights Out Manager (ILOM) 3.2 Documentation Library at `http://www.oracle.com/goto/ILOM/docs`.

Related Information

- “Remove a PCIe Riser From PCIe Slot 1 or 2” on page 89

▼ Remove the PCIe Riser From PCIe Slots 3 and 4

Note - This PCIe riser is actually installed in PCIe slot 3, but it supports up to two PCIe cards. The upper slot, referred to as slot 3, can be used for any supported PCIe card, and, therefore, is optionally populated. The lower slot, referred to as slot 4, is dedicated to the internal HBA card, and, therefore is always populated. The internal HBA card should be serviced only by authorized Oracle Services personnel.

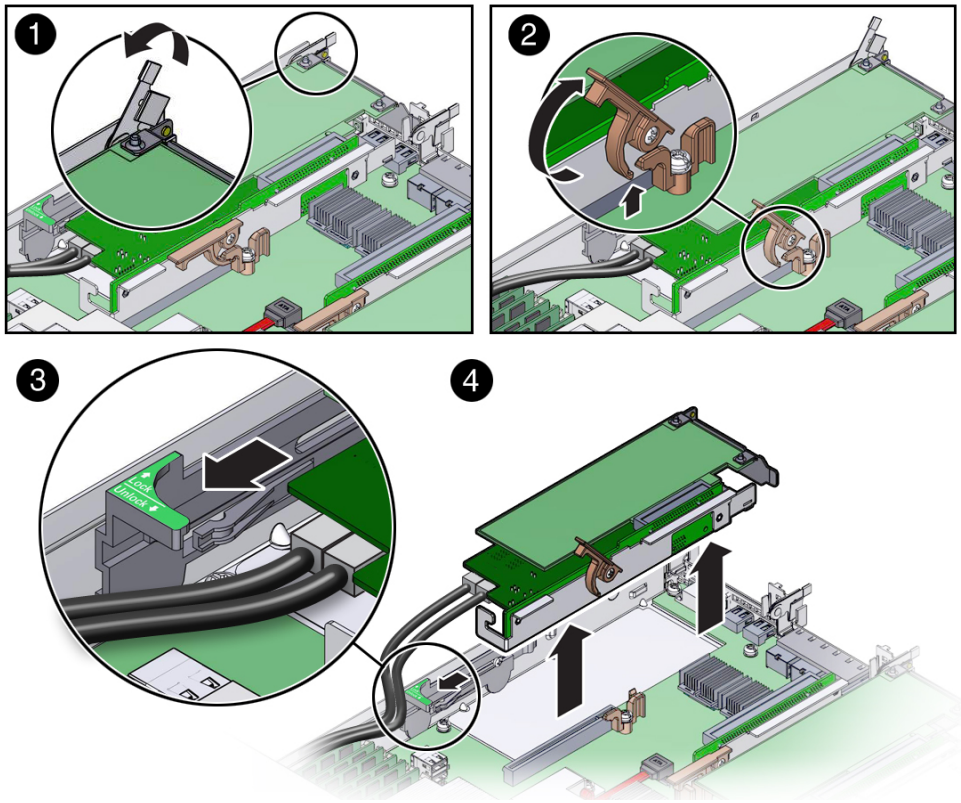
1. **Prepare for servicing.**

   See “Preparing for Service” on page 33.

2. **If there is a PCIe card installed in the riser, disconnect any external or internal cables.**

Note - Do not disconnect the SAS cable from the internal HBA card until after you have removed the riser from the server.

3. **Open the green-tabbed latch located on the rear of the server chassis next to PCIe slot 3 to release the rear bracket on the PCIe card (1).**



Note - If the riser does not have a PCIe card installed in slot 3, then lift the latch to release the PCIe slot 3 filler panel.

4. **To release the riser from the motherboard connector, lift the green-tabbed release lever on the PCIe riser to the open position (2).**

5. **Slide the plastic PCIe card retainer, which is mounted on the side of the chassis, toward the front of the server to release the cards installed in the riser (3).**

6. **Grasp the riser with both hands and remove it from the server (4).**

7. **Disconnect the SAS storage drive (HDD) cables from the internal HBA card installed in PCIe slot 4.**

8. **Place the riser on an antistatic mat.**

Related Information

- “Install the PCIe Riser Into PCIe Slots 3 and 4” on page 94

▼ Install the PCIe Riser Into PCIe Slots 3 and 4

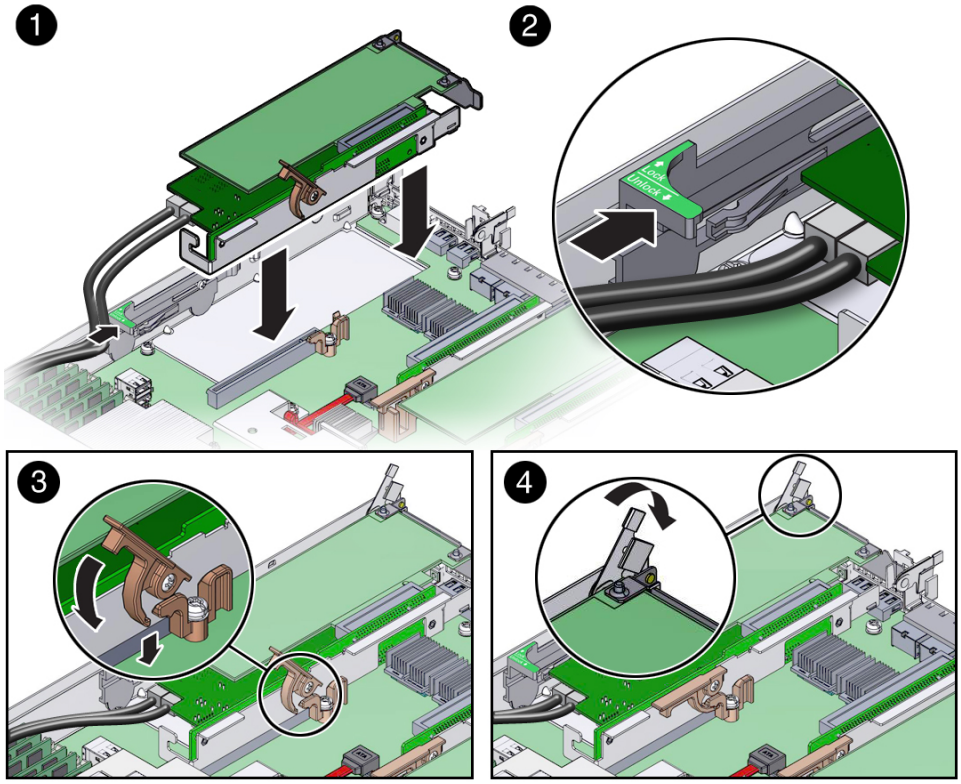
Note - The PCIe riser in slots 3 and 4 is different than the PCIe risers in slots 1 and 2. Do not attempt to install a PCIe riser from slot 1 or 2 into PCIe slots 3 and 4 and vice versa.

This is a cold-service procedure that can be performed by a customer. Power down the server completely before performing this procedure.

1. **Retrieve the PCIe riser and any PCIe cards attached to it.**

2. **Reconnect the SAS cables to the internal host bus adapter card.**

Be sure to connect the SAS cable for storage drives 0 through 3 (HDDs 0-3) to the connector that is farthest from the riser in which the HBA card is installed. Otherwise, the server will incorrectly identify the storage drives when it is powered on.



3. **Raise the green-tabbed release lever on the PCIe riser to the open (up) position, and then gently press the riser into the motherboard connector until it is seated (1).**

4. **Ensure that the rear bracket on the internal HBA card in PCIe slot 4 is connected to the slot in the server chassis side wall.**

   If the bracket is not connected, remove the riser and reposition it so that the rear bracket connects to the side wall, and then gently press the riser into the motherboard connector.

5. **Slide the plastic PCIe card retainer, which is mounted on the side of the chassis, toward the back of the server to secure the cards installed in the riser (2).**

6. **Press the green-tabbed release lever on the PCIe riser to the closed (down) position (3).**

7. **To secure the rear bracket on the PCIe card to the server, close the green-tabbed latch on the rear of the server chassis (4).**

Note - If the riser does not have a PCIe card installed in slot 3, install a PCIe slot filler panel and close the green-tabbed latch to secure the PCIe slot filler panel.

8. **If there is a PCIe card installed in slot 3 of the riser, reconnect any external or internal cables to the card.**

9. **Return the server to operation.**
   See “Returning the Server to Operation” on page 145.

10. **Use Oracle ILOM to clear the server PCIe riser fault.**
    If the PCIe riser fault message in Oracle ILOM is not cleared under Open Problems, you must manually clear the fault in Oracle ILOM. For instructions for manually clearing a PCIe riser fault, see the procedure "Clear Faults for Undetected Replaced or Repaired Hardware Components" in the *Oracle ILOM User's Guide for System Monitoring and Diagnostics Firmware Release 3.2.x* in the Oracle Integrated Lights Out Manager (ILOM) 3.2 Documentation Library at `http://www.oracle.com/goto/ILOM/docs`.

Related Information

- “Remove the PCIe Riser From PCIe Slots 3 and 4” on page 92

Servicing PCIe Cards

These sections describe how to service PCIe cards. Refer to your PCIe card documentation for complete software and cabling information about your card.

Caution - The procedures in this section should not be used to service the internal HBA card that is located in PCIe slot 4. The internal HBA card should be serviced only by qualified Oracle Services personnel.

Caution - These procedures require that you handle components that are sensitive to electrostatic discharge. This sensitivity can cause the components to fail. To avoid damage, ensure that you follow antistatic practices as described in “Prevent ESD Damage” on page 41.

Caution - Ensure that all power is removed from the server before removing or installing PCIe cards. You must disconnect all power cables from the system before performing these procedures.

Note - For a complete list of supported PCIe cards, refer to the *SPARC S7-2 Product Notes* at `http://www.oracle.com/goto/S7-2/docs`.

- "PCIe Slot Characteristics" on page 97
- "Remove a PCIe Card From PCIe Slot 1 or 2" on page 98
- "Install a PCIe Card in PCIe Slot 1 or 2" on page 99
- "Remove a PCIe Card From PCIe Slot 3" on page 100
- "Install a PCIe Card in PCIe Slot 3" on page 101

Related Information

- "Servicing PCIe Risers" on page 87

PCIe Slot Characteristics

There are three external and one internal PCIe slots available in the server. The external slots support optional, standard PCIe cards and are numbered 1, 2, and 3 from left to right when you view the server from the rear. The internal slot, which installs on the riser in PCIe slots 3 and 4, supports a required internal SAS controller HBA card. For a view of the rear panel that shows PCIe slot numbering, see "Rear Panel Components" on page 13.

Note - All of the PCIe slots comply with the PCI Express 3.0 specification and can accommodate 25 watt PCIe cards.

The following table lists the characteristics and requirements of the PCIe slots.

Slot Number	Supported PCIe Card Types	Supported PCIe Specifications	Slot Connector Width/PCI Express Lanes
1	Low-profile cards only	PCIe 1.0, PCIe 2.0, PCIe 3.0	x16 mechanical/x8 electrical
2	Low-profile cards only	PCIe 1.0, PCIe 2.0, PCIe 3.0	x16 mechanical/x8 electrical
3 and 4	Low-profile cards only	PCIe 1.0, PCIe 2.0, PCIe 3.0	x8 mechanical/x8 electrical

Related Information

- “Rear Panel Components” on page 13

▼ Remove a PCIe Card From PCIe Slot 1 or 2

This is a cold-service procedure that can be performed by a customer. Power down the server completely before performing this procedure.

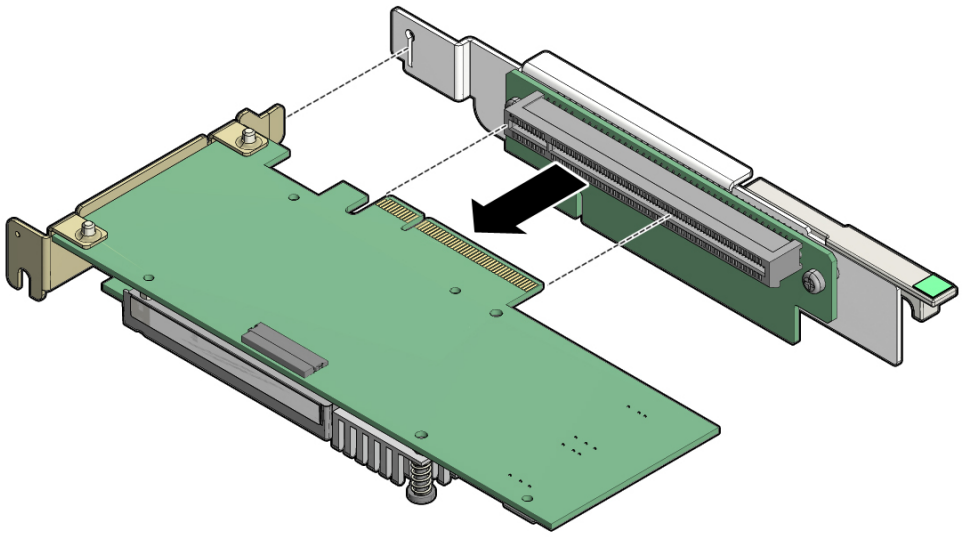
1. **Remove the PCIe riser from the server.**

   See “Remove the PCIe Riser From PCIe Slots 3 and 4” on page 92.

2. **Remove the PCIe card from the PCIe riser.**

   a. **Hold the riser in one hand and use your other hand to carefully pull the PCIe card connector out of the riser.**

   b. **Disconnect the rear bracket that is attached to the PCIe card from the rear of the PCIe riser.**



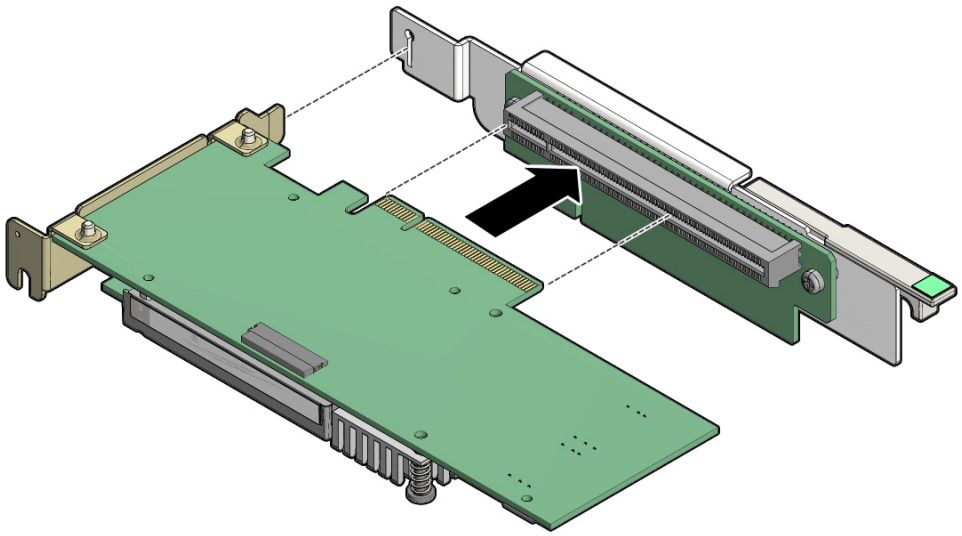
3. **Place the PCIe card on an antistatic mat.**

Caution - Whenever you remove a PCIe card, you should replace it with another PCIe card or a PCIe filler panel. Installing PCIe filler panels in vacant PCIe slots helps reduce the level of electromagnetic interference (EMI) emitted by the server.

▼ Install a PCIe Card in PCIe Slot 1 or 2

This is a cold-service procedure that can be performed by a customer. Power down the server completely before performing this procedure.

1. **Retrieve the PCIe card and riser you want to install.**
2. **Insert the rear bracket that is attached to the PCIe card into the PCIe riser.**
3. **Hold the riser in one hand and use your other hand to carefully insert the PCIe card connector into the Riser.**



4. **Install the PCIe riser into the server.**
See “Install a PCIe Riser Into PCIe Slot 1 or 2” on page 91.

▼ Remove a PCIe Card From PCIe Slot 3

This is a cold-service procedure that can be performed by a customer. Power down the server completely before performing this procedure.

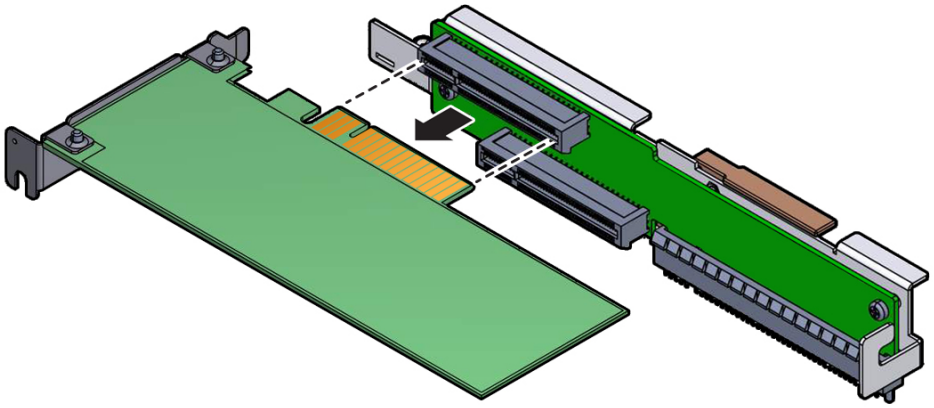
1. **Remove the PCIe riser from the server.**

   See “Remove the PCIe Riser From PCIe Slots 3 and 4” on page 92.

2. **Remove the PCIe card from the riser.**

   a. **Hold the riser in one hand and use your other hand to carefully remove the PCIe card connector from the riser.**

   b. **Disconnect the rear bracket attached to the PCIe card from the rear of the PCIe riser.**



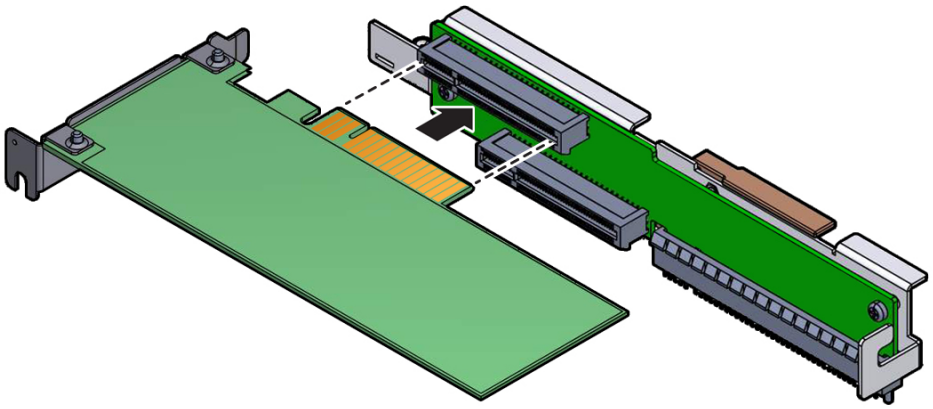
3. **Place the PCIe card on an antistatic mat.**

Caution - Whenever you remove a PCIe card, you should replace it with another PCIe card or a PCIe filler panel. Installing PCIe filler panels in vacant PCIe slots helps reduce the level of electromagnetic interference (EMI) emitted by the server.

▼ Install a PCIe Card in PCIe Slot 3

This is a cold-service procedure that can be performed by a customer. Power down the server completely before performing this procedure.

1. **Retrieve the PCIe card and riser you want to install.**
2. **Insert the rear bracket that is attached to the PCIe card into the PCIe riser.**
3. **Hold the riser in one hand and use your other hand to carefully insert the PCIe card connector into the riser.**



4. **Install the PCIe riser.**
   See “Install the PCIe Riser Into PCIe Slots 3 and 4” on page 94.

Servicing the Internal HBA Card

These topics describe how to service the internal HBA card.

Caution - These procedures require that you handle components that are sensitive to electrostatic discharge. This sensitivity can cause the components to fail. To avoid damage, ensure that you follow antistatic practices as described in “Prevent ESD Damage” on page 41.

Caution - Ensure that all power is removed from the server before removing or installing the internal HBA card. You must disconnect the power cables from the server before performing these procedures.

- "Remove the Internal HBA Card From PCIe Slot 4" on page 102
- "Install the Internal HBA Card in PCIe Slot 4" on page 105

Related Information

- "Preparing for Service" on page 33
- "Prevent ESD Damage" on page 41

Remove the Internal HBA Card From PCIe Slot 4

This is a cold-service procedure that must be performed by qualified service personnel. Power down the server completely before performing this procedure.

1. **Prepare for servicing.**

   See "Preparing for Service" on page 33.

2. **Remove fan module FM 0 (the left-most fan viewing the server from the front).**

   See "Remove a Fan Module" on page 63.

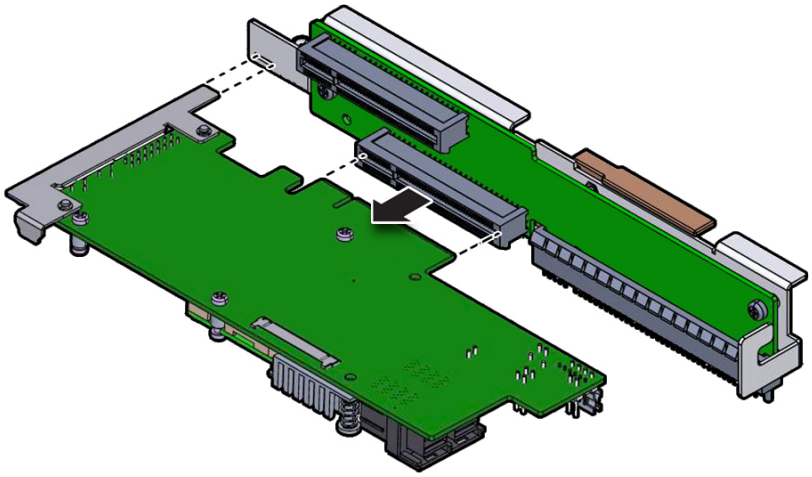
3. **Remove the PCIe riser from slots 3 and 4.**

   See "Remove the PCIe Riser From PCIe Slots 3 and 4" on page 92.

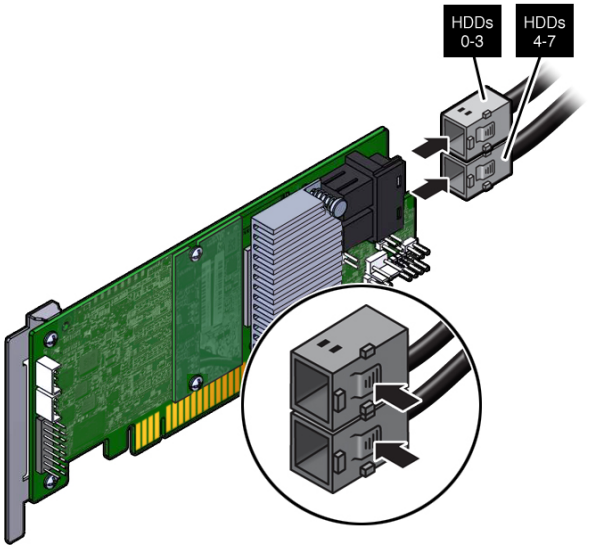
4. **Remove the internal HBA card from the riser.**

   a. **Hold the riser in one hand and use your other hand to carefully remove the card from slot 4 of the riser.**

b. Disconnect the rear bracket attached to the PCIe card from the rear of the PCIe riser.

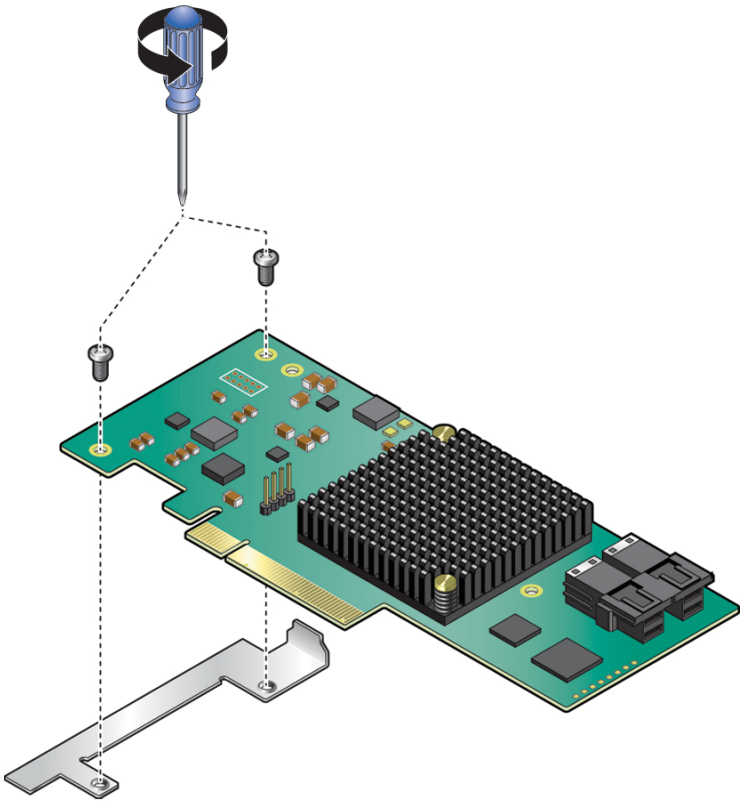


5. **Disconnect the SAS cables from the internal HBA card and place the card on an antistatic mat.**



6. **If you are replacing the internal HBA card, use a T10 Torx screwdriver to remove the special fitted bracket from the HBA card.**

You must install the special fitted bracket on the replacement HBA card. Set aside the bracket until you are ready to install the replacement HBA card.



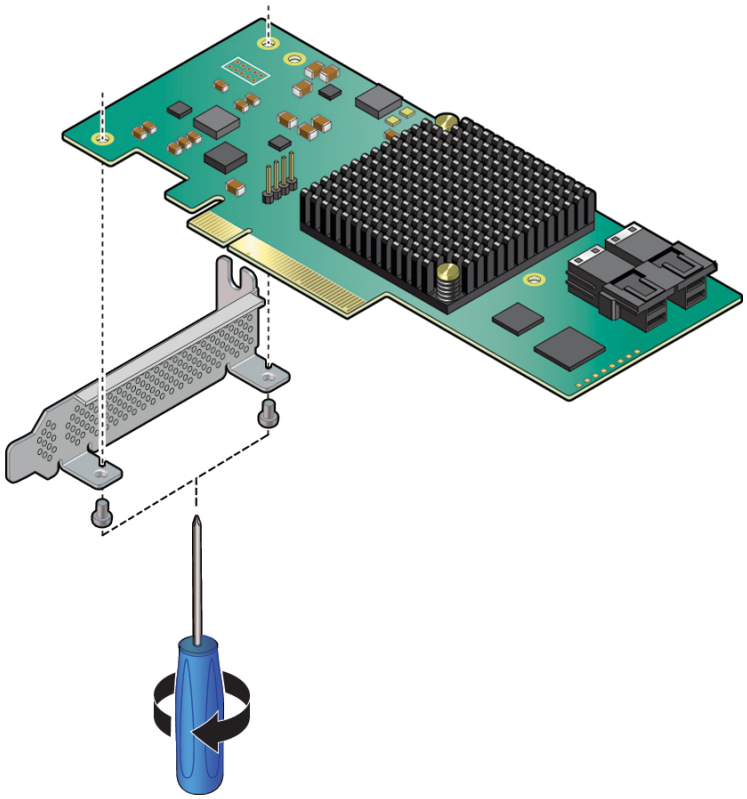
7. **If you need to remove the SAS cables, see “Remove the HBA SAS Cable Assembly” on page 119.**

▼ Install the Internal HBA Card in PCIe Slot 4

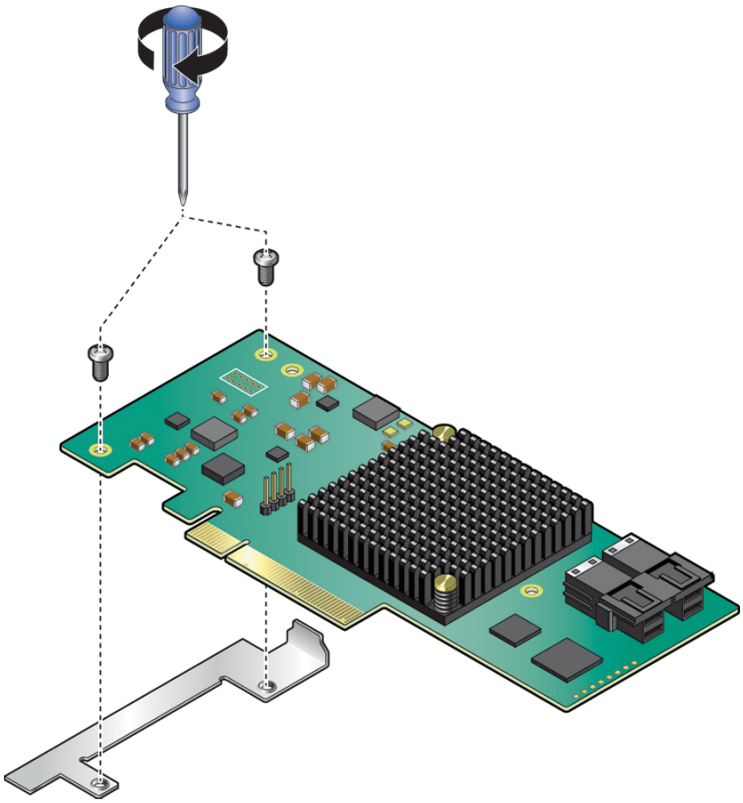
This is a cold-service procedure that must be performed by qualified service personnel. Power down the server completely before performing this procedure.

1. **Unpack the replacement HBA card and the SAS cables, and retrieve the PCIe riser for slot 3.**

2. **Using a T10 Torx screwdriver, remove the standard HBA bracket that shipped with the replacement HBA card.**

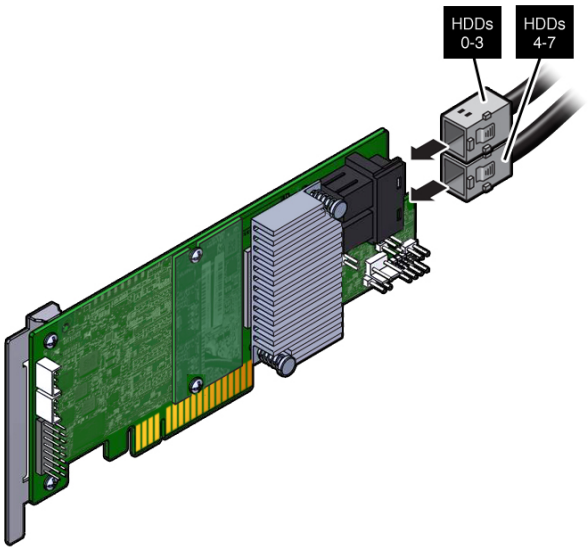


3. **Install the special fitted bracket that was removed in “Remove the Internal HBA Card From PCIe Slot 4” on page 102.**

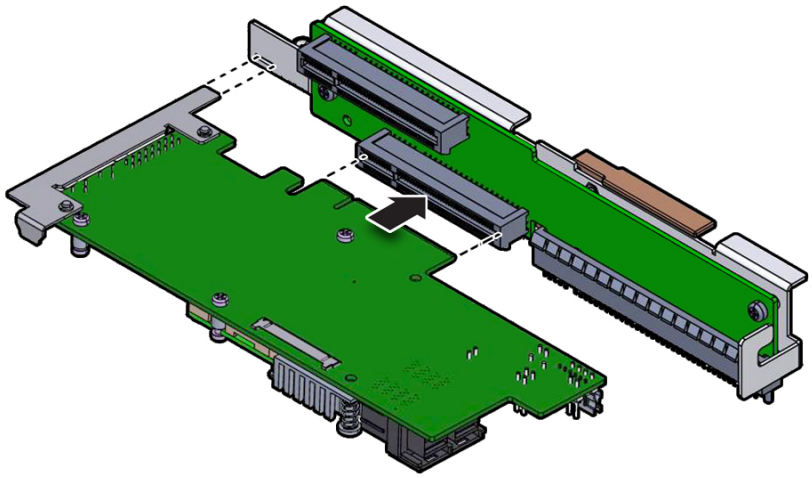


4. **If you are installing new SAS cables, see “Install the HBA SAS Cable Assembly” on page 121.**

5. **Connect the SAS cables to the internal HBA card.**



6. **Insert the rear bracket on the internal HBA card into the rear connector on the PCIe riser.**



7. **Insert the internal HBA card connector into the bottom connector on the riser for PCIe slot 3 and 4.**

8. **Install the PCIe riser.**

   See “Install the PCIe Riser Into PCIe Slots 3 and 4” on page 94.

9. **Install fan module FM 0.**

   See “Install a Fan Module” on page 65.

10. **Return the server to operation.**

    See “Returning the Server to Operation” on page 145.

Servicing the Front Indicator Module

The FIM is mounted on left side of the chassis face next to the drives. See “Front Panel Components” on page 11.

- “Remove the FIM” on page 111
- “Install the FIM” on page 113

Related Information

- “Detecting and Managing Faults” on page 21
- “Preparing for Service” on page 33

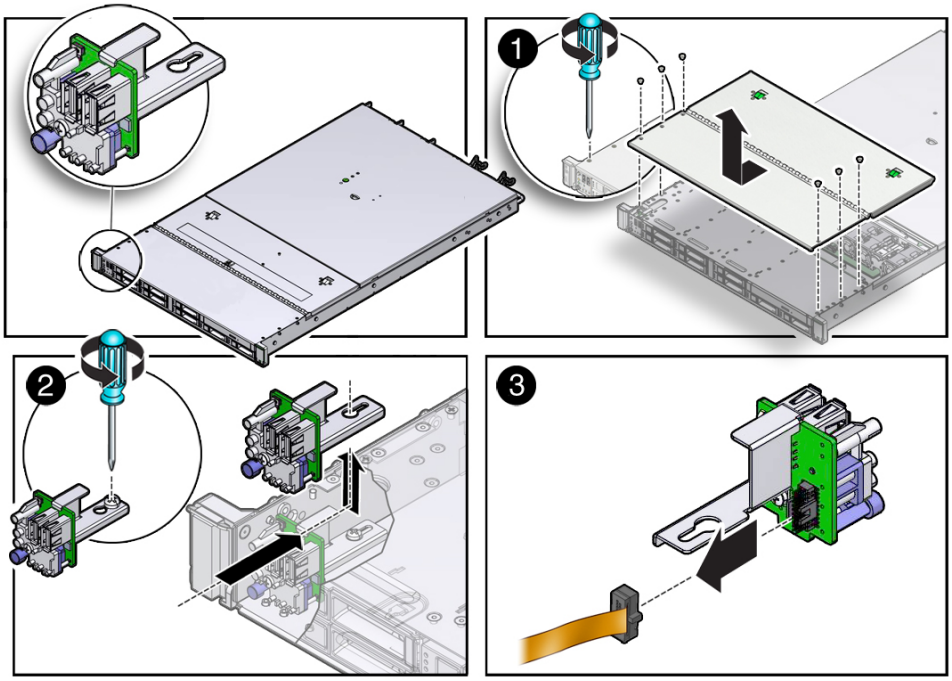
▼ Remove the FIM

This is a cold-service procedure that must be performed by qualified service personnel. Power down the server completely before performing this procedure.

1. **Prepare for servicing.**

   See “Preparing for Service” on page 33.

2. **Remove the top cover from the storage drive cage.**



   a. **Remove the six Phillips screws from the top of the storage drive cage (1).**

      There are three Phillips screws on each side of the storage drive cage.

   b. **Open the server fan door.**

      See "Open the Server Fan Door" on page 48.

   c. **Slide the storage drive cage cover forward (toward the front of the server) and lift it up.**

3. **Loosen the screw that secures the FIM assembly to the server chassis (2).**

4. **Carefully slide the FIM assembly toward the rear of the server enough to lift it over the Phillips screw and out of the server (2).**

5. **Disconnect the FIM cable from the FIM assembly and set the assembly aside (3).**

Related Information

- “Install the FIM” on page 113

Install the FIM

This is a cold-service procedure that must be performed by qualified service personnel. Power down the server completely before performing this procedure.

1. **Attach an antistatic wrist strap to your wrist, and then to a metal area on the chassis.**

   See “Prevent ESD Damage” on page 41.

2. **Unpack the replacement FIM and place it on an antistatic mat.**

3. **Connect the FIM cable to the replacement FIM assembly.**

   See “Remove the FIM” on page 111.

4. **Carefully lower the FIM assembly into the chassis, position it over the Phillips screw in the server chassis, and slide it forward so all the LEDs, USB connectors, and Power On button fit into place on the server front panel.**

5. **Tighten the Phillips screw to secure the FIM assembly to the server chassis.**

6. **Position the storage drive cage cover over the server storage drive cage so that it over hangs the front of the disk drive cage by about 1/4 inch.**

7. **Install the six Phillips screws to secure the cover to the server.**

   There are three Phillips screws on each side of the storage drive cage.

8. **Close the server fan door.**

9. **Return the server to operation.**

   See “Returning the Server to Operation” on page 145.

Related Information

- “Remove the FIM” on page 111

Servicing the eUSB Drive

Caution - These procedures require that you handle components that are sensitive to static discharge. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices to “Prevent ESD Damage” on page 41.

Caution - Ensure that all power is removed from the server before removing or installing an eUSB drive or damage to the drive might occur. You must disconnect all power cables from the system before performing these procedures.

These topics describe how to service the eUSB drive.

Related Information

- “Detecting and Managing Faults” on page 21
- “Preparing for Service” on page 33

▼ Remove the eUSB Drive

This is a cold-service procedure that can be performed by a customer. Power down the server completely before performing this procedure.

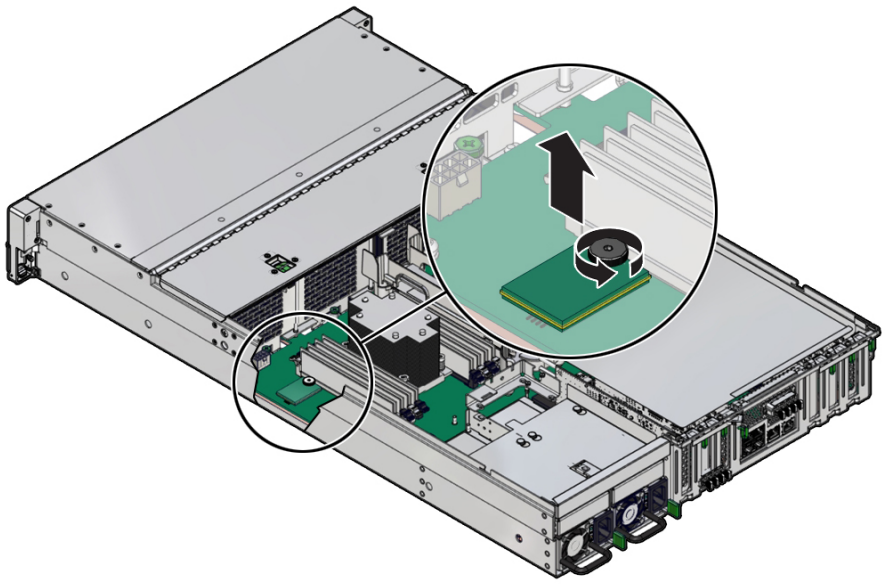
1. **Prepare for servicing.**

   See “Preparing for Service” on page 33.

2. **Loosen the screw that attaches the eUSB drive to the motherboard.**

   Save the screw to use with the new eUSB drive.

3. **Lift the eUSB drive up to disconnect it from the motherboard.**



Related Information

- “Install the eUSB Drive” on page 116

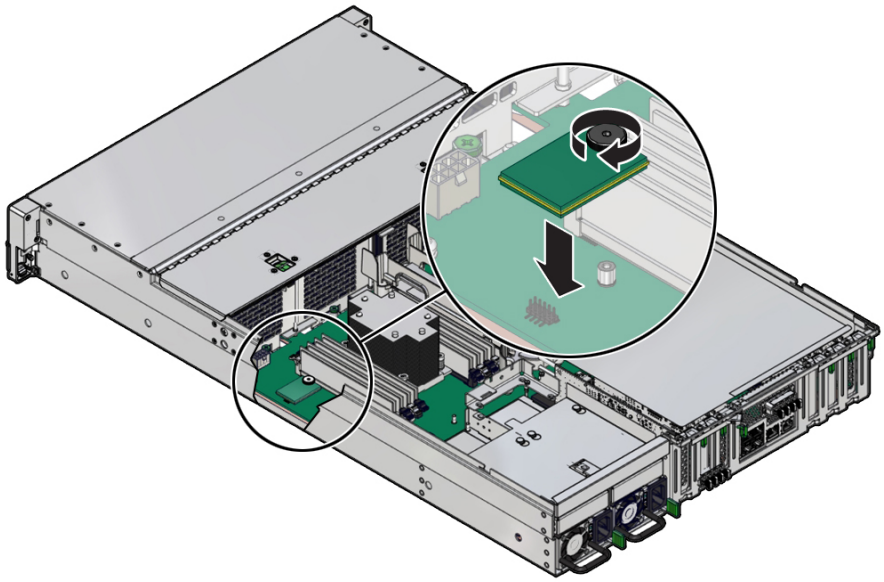
▼ Install the eUSB Drive

This is a cold-service procedure that can be performed by a customer. Power down the server completely before performing this procedure.

1. **Prevent ESD damage.**

   See “Prevent ESD Damage” on page 41.

2. **Press the new eUSB drive into the socket on the motherboard.**



3. **Tighten the screw to secure the drive to the motherboard.**

4. **Return the server to operation.**

   See “Returning the Server to Operation” on page 145.

Related Information

- “Remove the eUSB Drive” on page 115

Servicing Cables

Caution - These procedures require that you handle components that are sensitive to electrostatic discharge. This sensitivity can cause the components to fail. To avoid damage, ensure that you follow antistatic practices as described in “Prevent ESD Damage” on page 41.

Caution - The system supplies power to the cables even when the server is powered off. To avoid personal injury or damage to the server, you must disconnect power cords before servicing the cables.

These topics describe how to service server cables.

Related Information

- “Preparing for Service” on page 33
- “Servicing the Drive Backplane” on page 127

▼ Remove the HBA SAS Cable Assembly

This is a cold-service procedure that must be performed by qualified service personnel. The server must be completely powered down before performing this procedure.

1. **Prepare for servicing.**

   See “Preparing for Service” on page 33.

2. **Remove the air baffle by lifting it straight out of the system.**

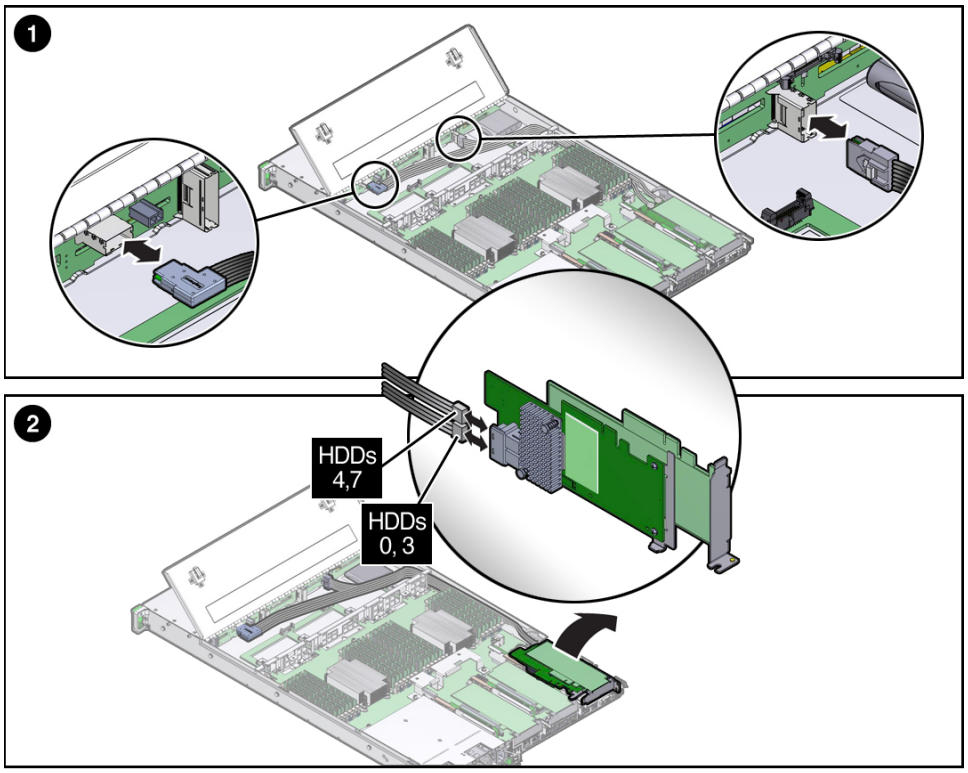
3. **Remove the server fan modules.**
   See “Remove a Fan Module” on page 63.

4. **Remove the server mid-wall.**

   a. **Loosen the four green captive screws that secure the mid-wall to the server chassis, using a No. 2 Phillips screwdriver.**

   b. **Lift up the mid-wall slightly to disengage it, then lift it out of the server and set it aside.**

5. **Disconnect each SAS cables from the drive backplane by pressing the latch on the cable connectors, then pull the connectors. (1).**



6. **Remove the PCIe riser from PCIe slots 3 and 4.**
   See “Remove the PCIe Riser From PCIe Slots 3 and 4” on page 92.

7. **On the under side of the HBA card, press the SAS cable connector latches and then pull out the connectors (2).**

8. **Carefully remove the SAS cables from the server.**

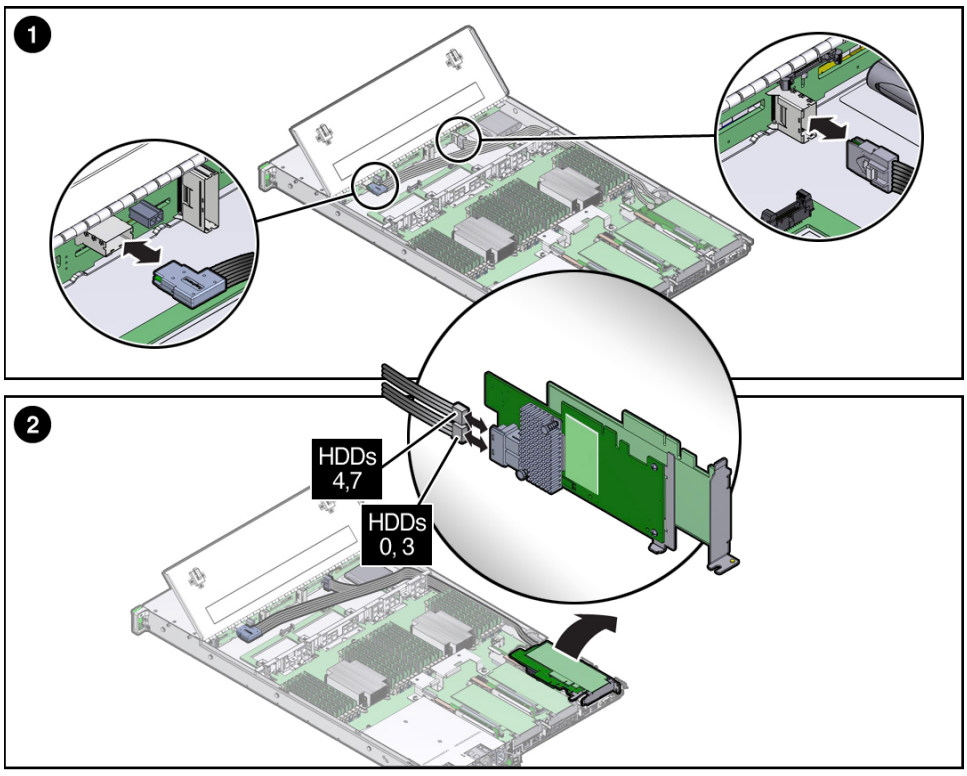
Related Information

- "Install the HBA SAS Cable Assembly" on page 121

▼ Install the HBA SAS Cable Assembly

This is a cold-service procedure that must be performed by qualified service personnel. The server must be completely powered down before performing this procedure.

1. **Carefully guide SAS cables along the side of the chassis.**



2. **Install the SAS cables into the drive backplane (1).**

   The SAS cable ends that connect to the drive backplane are different, one is horizontal and one is vertical. Install each cable end into the appropriate connector.

3. **Connect the SAS cables to the internal HBA card (2).**

4. **Install the PCIe riser with the internal HBA card into PCIe slot 3.**

   See "Install the PCIe Riser Into PCIe Slots 3 and 4" on page 94.

5. **Install all of the server fan modules.**

   See "Install a Fan Module" on page 65.

6. **Install the server mid-wall.**

   a. **Position the mid-wall over the front of the motherboard so that it engages the mushroom-shaped standoffs that are located on the server chassis sidewall (one for each end of the mid-wall).**

   b. **Ensure that SAS cables are not pinched by the mid-wall and that they run beside the mid-wall and not under it.**

   c. **Tighten the four green captive screws to secure the mid-wall to the server chassis, use No. 2 Phillips screwdriver.**

7. **Replace the air baffle.**

8. **Return the server to operation.**

   See "Returning the Server to Operation" on page 145.

Related Information

- "Remove the HBA SAS Cable Assembly" on page 119

▼ Remove the NVMe Cables

This is a cold-service procedure that must be performed by qualified service personnel. The server must be completely powered down before performing this procedure.

1. **Prepare for servicing.**

   See "Preparing for Service" on page 33.

2. **Remove the air baffle by lifting it straight out of the system.**

3. **Remove the server fan modules.**

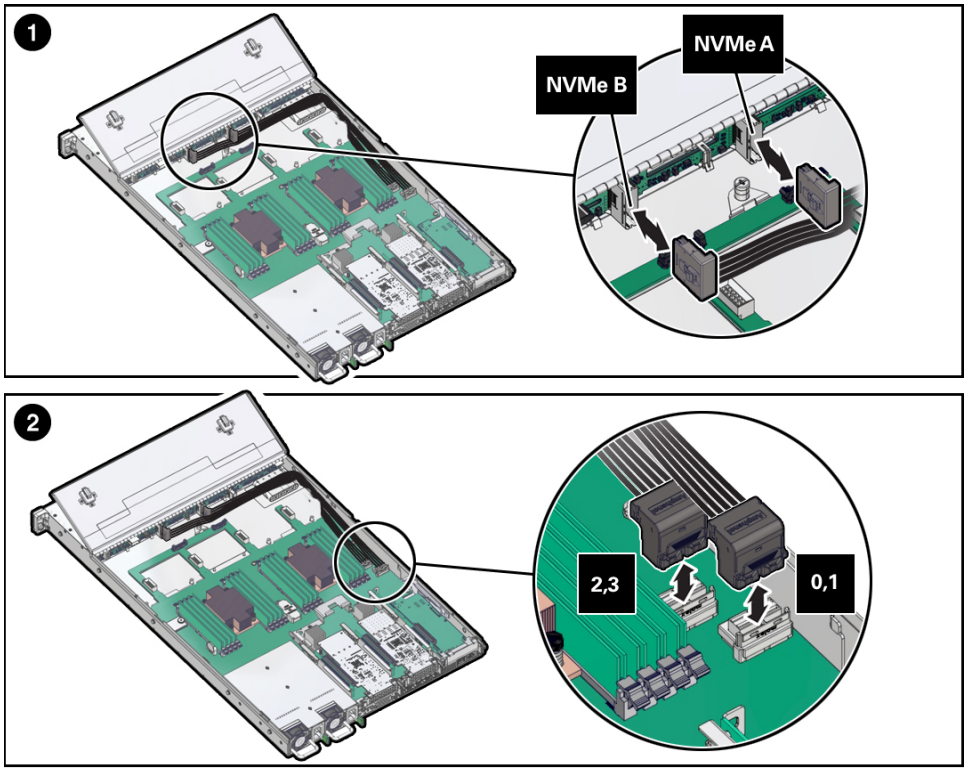
   See “Install a Fan Module” on page 65.

4. **Remove the server mid-wall.**

   a. **Loosen the four green captive screws that secure the mid-wall to the server chassis, using a No. 2 Phillips screwdriver.**

   b. **Lift up the mid-wall slightly to disengage it, then lift it out of the server and set it aside.**

5. **Disconnect the switch card cables from the drive backplane by pressing the latches on the cable connectors and pull the connectors(1).**



6. **Disconnect the cables from the motherboard (2).**

7. **Carefully pull the NVMe card cables from the side of the chassis and remove them from the server.**

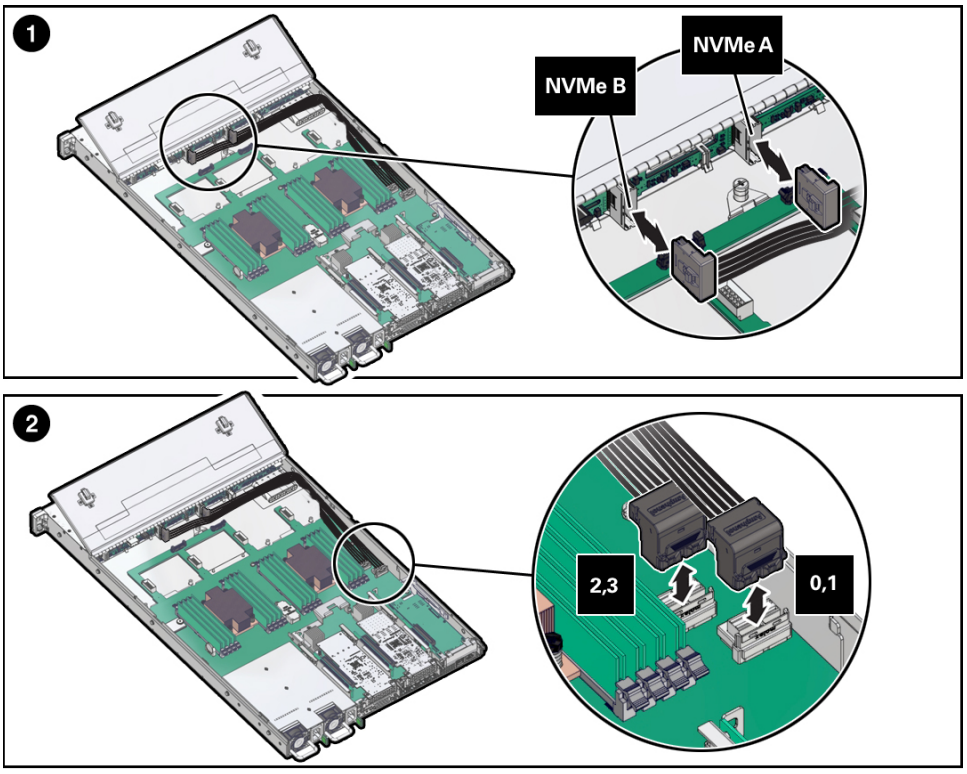
Related Information

- "Install the NVMe Cables" on page 124

Install the NVMe Cables

This is a cold-service procedure that must be performed by qualified service personnel. The server must be completely powered down before performing this procedure.

1. **Guide the NVMe card cables along the side of the chassis.**



2. **Connect the cables to the drive backplane (1).**

   a. **Connect the cable labeled "A" to the connector on the drive backplane labeled "NMVe A".**

   b. **Connect the cable labeled "B" to the connector on the drive backplane labeled "NMVe B".**

3. **Connect the NVMe card cables to the motherboard (2).**

   a. **Connect the cable labeled "2,3" to the connector on the motherboard labeled "2,3".**

      This is the connector closer to the front of the server.

   b. **Connect the cable labeled "0,1" to the connector on the motherboard labeled "0,1".**

      This is the connector closer to the rear of the server.

4. **Install the server fan modules.**

   See "Install a Fan Module" on page 65.

5. **Install the server mid-wall (3).**

   a. **Position the mid-wall over the front of the motherboard so that it engages the mushroom-shaped standoffs that are located on the server chassis sidewall.**

   b. **Ensure that SAS cables are not pinched by the mid-wall and that they run beside the mid-wall and not under it.**

   c. **Tighten the four green captive screws to secure the mid-wall to the server chassis, use No. 2 Phillips screwdriver.**

6. **Replace the air baffle.**

7. **Return the server to operation.**

   See "Returning the Server to Operation" on page 145.

Related Information

- "Remove the NVMe Cables" on page 122

Servicing the Drive Backplane

This board provides connectors for the drive signal cables. This board also serves as the interconnect for the front I/O board, the Power and Locator buttons, and server or component status LEDs.

- "Remove the Drive Backplane" on page 127
- "Install the Drive Backplane" on page 130
- "Verify the Drive Backplane" on page 132

Related Information

- "Preparing for Service" on page 33
- "Servicing the Drive Backplane" on page 127

▼ Remove the Drive Backplane

This is a cold-service procedure that must be performed by qualified service personnel. Power down the server completely before performing this procedure.

Caution - This procedure requires that you handle components that are sensitive to ESD which can cause server components to fail.

1. **Prepare for servicing.**

   See "Preparing for Service" on page 33.

2. **Open the server fan door to gain access to the drive backplanes.**

   See "Open the Server Fan Door" on page 48.

3. **Remove all four fan modules.**

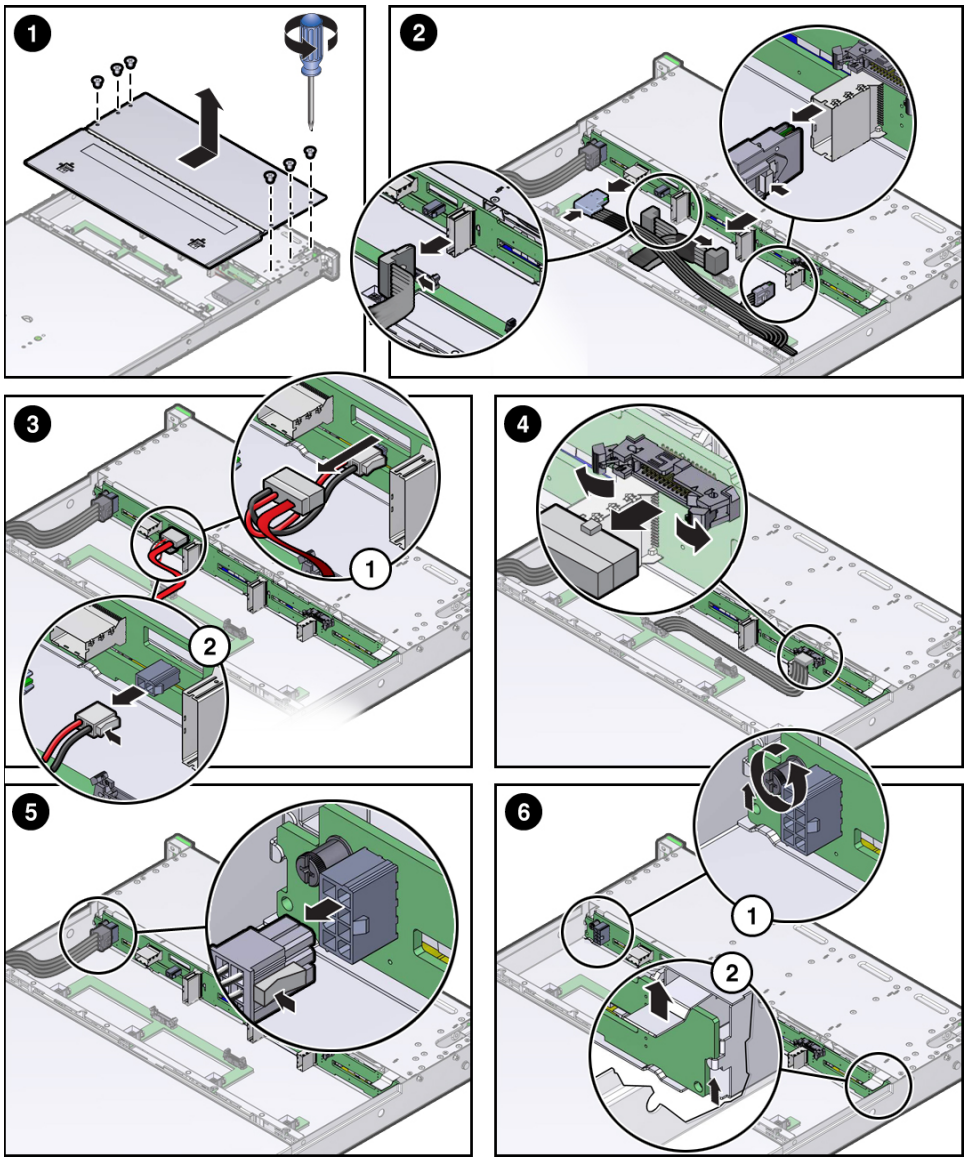
   See "Remove a Fan Module" on page 63.

4. **Pull all storage drives out far enough to disengage them from the drive backplane.**

   See “Remove a Drive” on page 52.

   Note - It is not necessary to completely remove the storage drives from the server. Pull them out far enough to disengage the drives from the drive backplane. If you do remove the storage drives from the server, record their locations so that you can reinstall them in the same locations.

5. **Remove six Philips screws from the disk cage cover and slide toward the front of the server and lift up to remove it (1).**



6. **Disconnect the SAS cables and the NVMe card cables from the drive backplane (2, 4).**

7. **Disconnect the drive backplane auxiliary signal cable from the drive backplane (3).**

8. **Disconnect the drive backplane power cable from the drive backplane (5).**

9. **Loosen the captive screw that secures the drive backplane to the chassis (6.1).**

10. **Lift the metal spring retainer on the right side of the drive backplane, lift the drive backplane up and tilt it toward the rear of the server to free it from the holding brackets, and lift it out of the server (6.2).**

11. **Place the drive backplane on an antistatic mat.**

Related Information

- "Install the Drive Backplane" on page 130

▼ Install the Drive Backplane

This is a cold-service procedure that must be performed by qualified service personnel. Power down the server completely before performing this procedure.

Caution - This procedure requires that you handle components that are sensitive to ESD which can cause server components to fail.

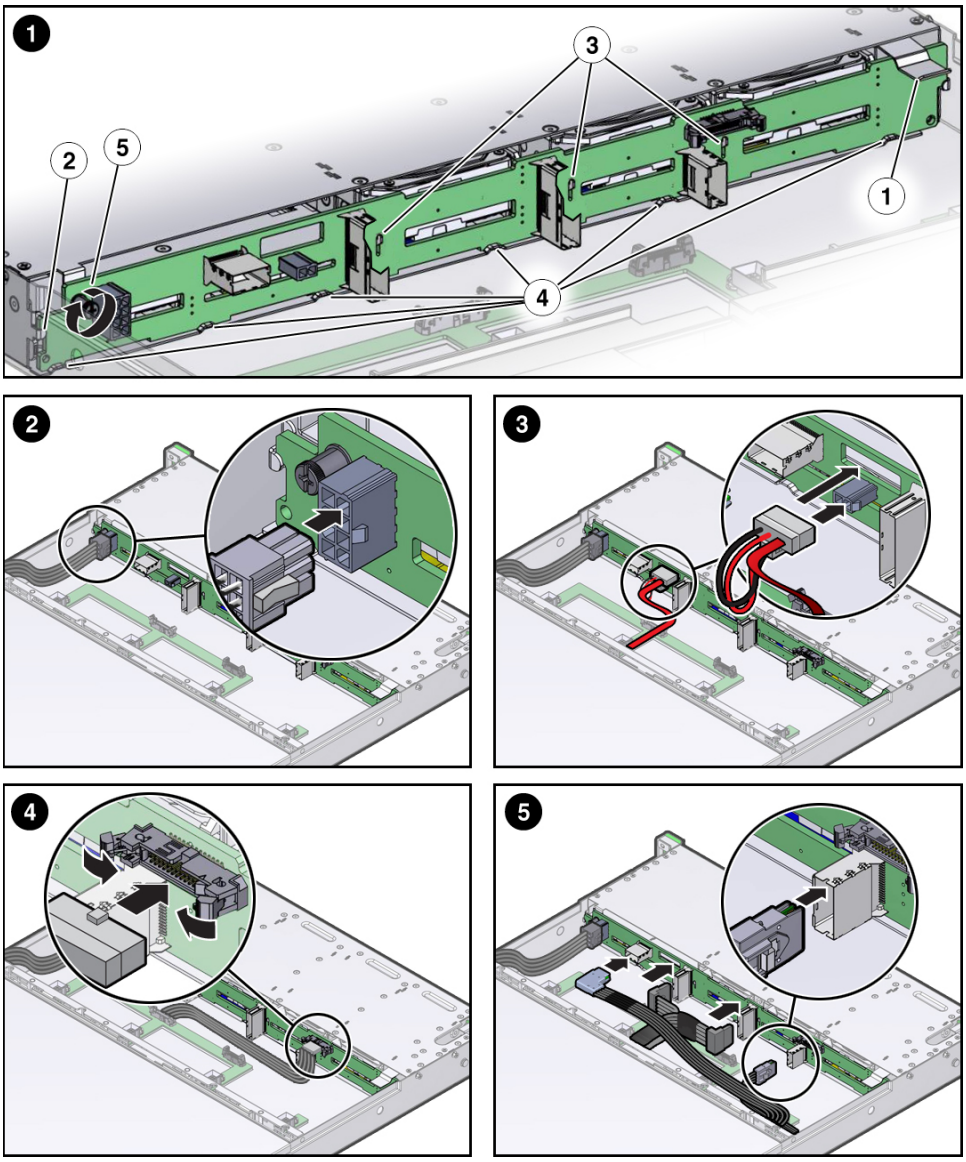
1. **Place the backplane into the disk cage.**

   a. **Lift the metal spring retainer (1.1) and position the backplane so that it fits into the two metal brackets that are located on the chassis side walls (1.2).**

   b. **Lower the drive backplane into the disk cage so that it engages the three metal hooks in the disk cage (1.3)**

   c. **Continue to lower the drive backplane into the disk cage until it is positioned in all six troughs that are located at the bottom of the disk cage (1.4) .**

d. Turn the drive backplane captive screw clockwise until the drive backplane is secure (1.5).



2. **Reconnect the drive backplane power cable to the drive backplane (2).**
3. **Reconnect the drive backplane auxiliary power and signal cable to the drive backplane (4).**
4. **Reconnect the SAS cables and the NVMe card cables to the drive backplane (5).**
5. **Reinstall all of the storage drives into the storage drive cage.**
   See "Install a Drive" on page 56.
6. **Install the disk cage cover.**
7. **Install all four fan modules.**
   See "Install a Fan Module" on page 65.
8. **Return the server to operation.**
   See "Returning the Server to Operation" on page 145.

Related Information

- "Remove the Drive Backplane" on page 127

▼ Verify the Drive Backplane

1. **At the Oracle ILOM prompt, start the fault management shell.**

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

faultmgmtsp>
```

2. **Type `fmadm faulty` to check for faults.**
   - **If faults are reported, see "Detecting and Managing Faults" on page 21 .**
   - **If no faults are reported, then the drive backplane has been replaced successfully.**

Related Information

- "Remove the Drive Backplane" on page 127

- “Install the Drive Backplane” on page 130

Servicing the Motherboard

The motherboard includes two CMPs, NVMe connections, power distribution, memory control subsystems, and all SPM (Oracle ILOM) logic. The motherboard hosts a removable SCC PROM, which contains all MAC addresses, host ID, and Oracle ILOM configuration data.

Follow these procedures to remove and install the motherboard.

Caution - The motherboard should be serviced only by an Oracle qualified service technician.

Caution - Ensure that all power is removed from the server before removing or installing the motherboard. You must disconnect the power cables before performing these procedures.

Caution - These procedures require that you handle components that are sensitive to electrostatic discharge. This sensitivity can cause the components to fail. To avoid damage, ensure that you follow antistatic practices to "Prevent ESD Damage" on page 41.

Related Information

Remove the Motherboard

Caution - Use the Oracle ILOM backup utility prior to removing the motherboard. This utility backs up the Oracle ILOM configuration of the service processor. For more information, see the "Back Up the Oracle ILOM Configuration Settings" section in the Oracle ILOM Documentation Library at https://docs.oracle.com/cd/E37444_01/html/E37446/z400371a1482122.html#scrolltoc.

This is a cold-service procedure that must be performed by qualified service personnel. Power down the server completely before performing this procedure.

1. **Prepare for servicing.**

   See “Preparing for Service” on page 33.

2. **Remove the air baffle from the motherboard and set it aside.**

3. **Remove these reusable components.**

   a. **Fan modules.**

      See “Remove a Fan Module” on page 63.

   b. **Power supplies.**

      See “Remove a Power Supply” on page 70.

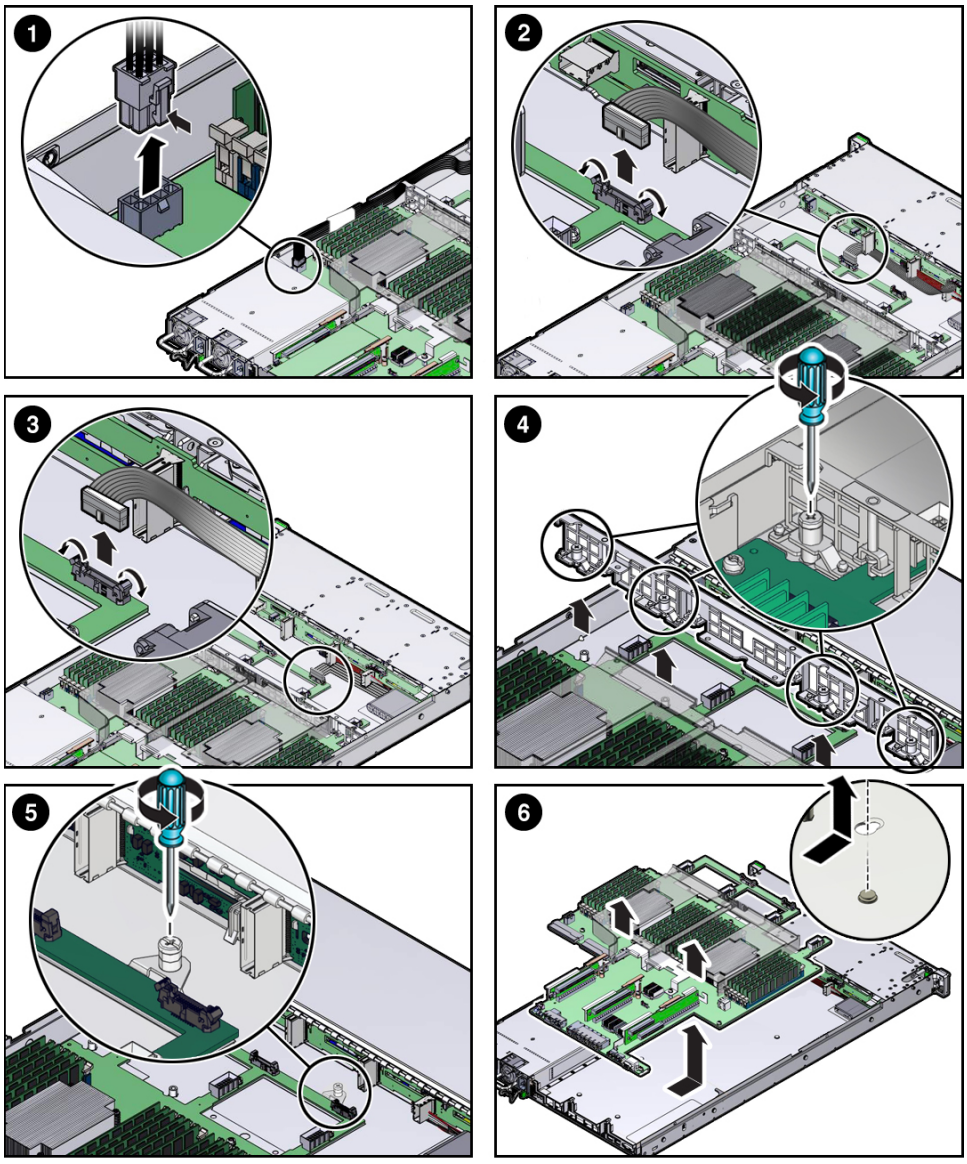
   c. **PCIe risers and attached PCIe cards.**

      See “Servicing PCIe Cards” on page 87.

   d. **NVMe and SAS HBA cables.**

      See “Remove the HBA SAS Cable Assembly” on page 119 and “Remove the NVMe Cables” on page 122.

4. **Disconnect the drive backplane power cable from the motherboard by pressing in on the connector latch and pull the connector (1).**



5. **Eject the drive backplane auxiliary power and front indicator module cable connectors by opening both side latches (2, 3).**

6. **Remove the server mid-wall (4).**

   a. **Using a screwdriver (No. 2 Phillips or flathead), loosen the four green captive screws that secure the mid-wall to the server chassis.**

   b. **Lift up the mid-wall slightly to disengage it, then lift it out of the server and set it aside.**

7. **Loosen the one green captive screw that secures the motherboard to the chassis (5).**

8. **Remove the motherboard from the server chassis (6).**

   a. **Grasp the metal bracket located just to the rear of the DIMM sockets and slide the motherboard toward the front of the server and lift it slightly to disengage it from the standoffs that are located on the server chassis under the motherboard.**

   b. **Lift the motherboard out of the server chassis, and place it on an antistatic mat and next to the replacement motherboard.**

9. **Remove the eUSB drive from the motherboard and install it on the replacement motherboard.**

   See "Remove the eUSB Drive" on page 115.

10. **Remove the SEEPROM from the motherboard and install it on the replacement motherboard.**

11. **Remove the DIMMs from the motherboard and install them in the corresponding DIMM sockets on the replacement motherboard.**

    For instructions, see "Servicing DIMMs" on page 75.

Note - Install the DIMMs only in the sockets (connectors) that correspond to the sockets from which they were removed. Performing a one-to-one replacement of the DIMMs significantly reduces the possibility that the DIMMs will be installed in the wrong slots. If you do not reinstall the DIMMs in the same sockets, server performance might suffer and some DIMMs might not be used by the server.

Related Information

- “Install the Motherboard” on page 139

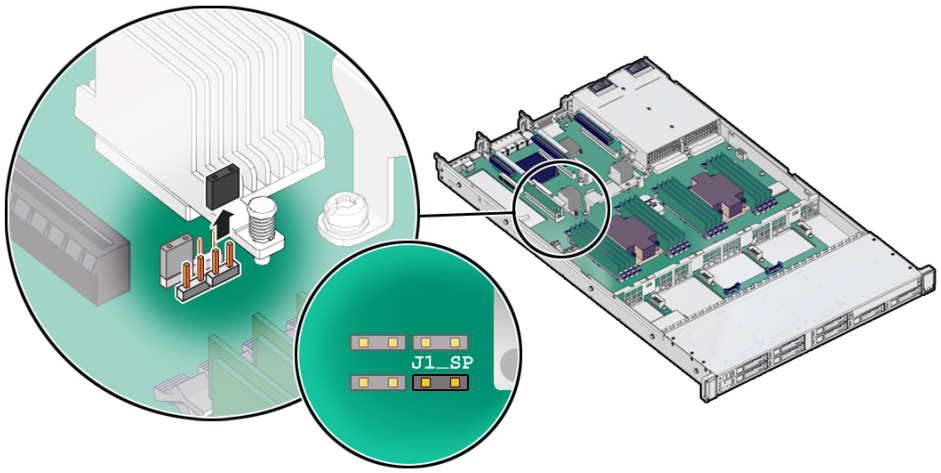
Install the Motherboard

This is a cold-service procedure that must be performed by qualified service personnel. Power down the server completely before performing this procedure.

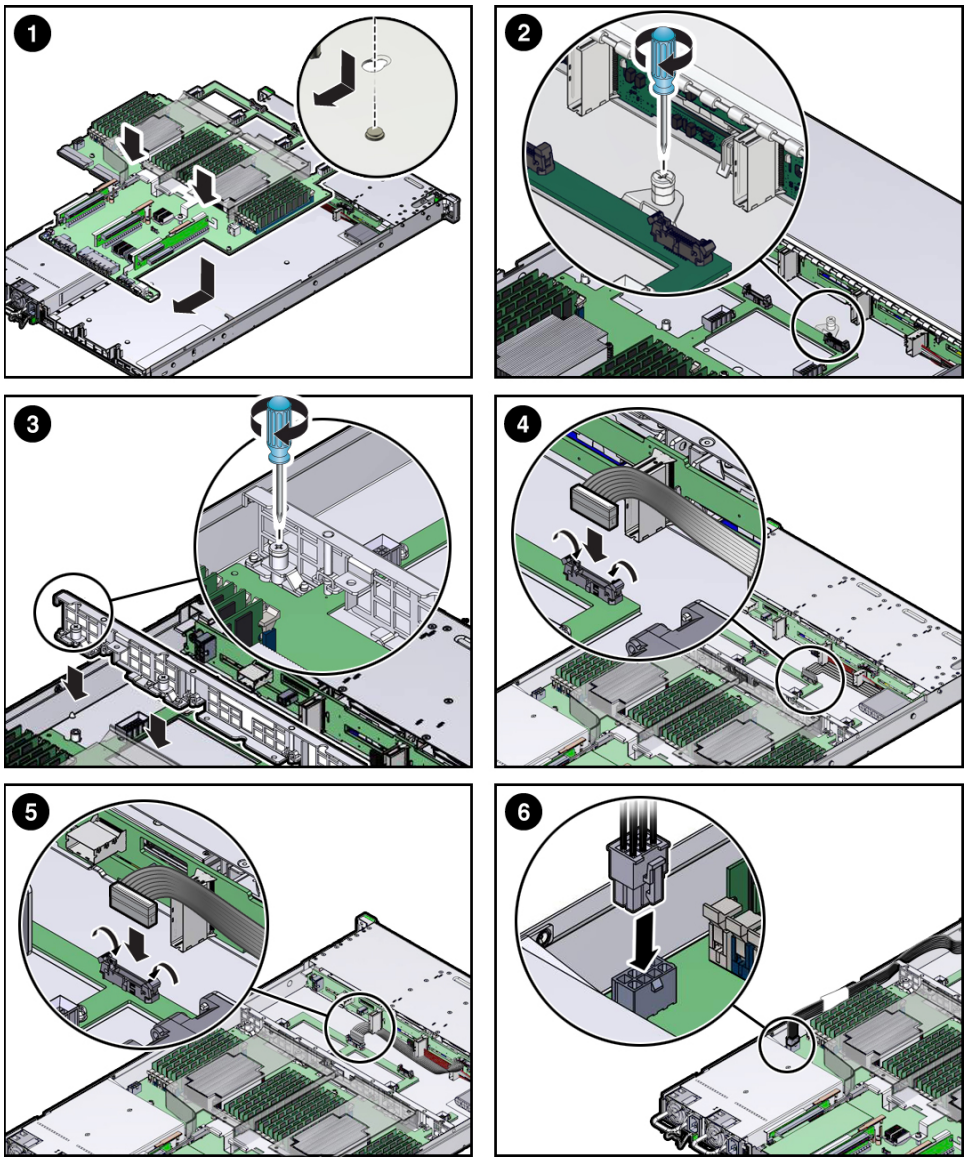
1. **Attach an antistatic wrist strap to your wrist, and then to a metal area on the chassis.**

   See “Prevent ESD Damage” on page 41.

2. **If installed, remove the jumper at location J1_SP on the new motherboard.**



3. **Insert the motherboard into the server chassis (1).**



a. **Grasp the metal bracket located to the rear of the DIMMs and tilt the front of the motherboard up slightly and push it into the opening in the rear of the server chassis.**

b. **Lower the motherboard into the server chassis and slide it to the rear until it engages the seven mushroom-shaped standoffs located on the server chassis under the motherboard.**

c. **Ensure that the indicators, controls, and connectors on the rear of the motherboard fit correctly into the rear of the server chassis.**

4. **Tighten the one green captive screw that secures the motherboard to the chassis (2).**

5. **Install the server mid-wall (3).**

   a. **Place the SAS cables along the left chassis sidewall (viewing the server form the front).**

      You will connect these cables to the internal HBA card later.

   b. **Position the mid-wall over the front of the motherboard so that it engages the mushroom-shaped standoffs that are located on the server chassis sidewall (one for each end of the mid-wall).**

   c. **Ensure that SAS cables are not pinched by the mid-wall and that they run beside the mid-wall and not under it. Otherwise, the cables might be damaged.**

   d. **To secure the mid-wall to the server chassis, use a screwdriver (No. 2 Phillips or flathead) to tighten the four green captive screws.**

6. **If the server has a switch card, carefully guide card cables through the chassis mid-wall.**

   You will connect these cables to the switch card later.

7. **To install the FIM cable, push the side latches on the motherboard connector to the open position and push the FIM cable connector in (4).**

   The side latches close, locking the connector in place.

8. **Reconnect the disk backplane Auxiliary power and signal cable to the motherboard (5).**

9. **Reconnect the disk backplane power cable to the motherboard (6).**
10. **Reinstall the air baffle.**
11. **Reinstall the following reusable components.**
    a. **PCIe risers and attached PCIe cards.**
       See “Servicing PCIe Cards” on page 87.
    b. **Power supplies.**
       See “Install a Power Supply” on page 72.
    c. **Fan modules.**
       See “Install a Fan Module” on page 65.
12. **Return the server to operation.**
    See “Returning the Server to Operation” on page 145.
13. **Update the system firmware.**
    See the *Performing Firmware Updates* section in the *Oracle® ILOM Administrator's Guide for Configuration and Maintenance*.
14. **When you replace a motherboard that contains an SP, download the fallback miniroot image for your hardware and your Oracle Solaris version from My Oracle Support at `https://support.oracle.com`.**
    Then follow the procedure "Uploading a New Solaris Miniroot Package From SP to Host" in the *Oracle ILOM Administrator's Guide for Configuration and Maintenance*.

Related Information

- “Remove the Motherboard” on page 136

▼ Verify the Motherboard

1. **At the Oracle ILOM prompt, start the fault management shell.**

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

```
faultmgmtsp>
```

2. **Type `fmadm faulty` to check for faults.**

   - **If faults are reported, see “Detecting and Managing Faults” on page 21 .**
   - **If no faults are reported, then the motherboard has been replaced successfully.**

Related Information

- “Install the Motherboard” on page 139

Returning the Server to Operation

These topics describe how to return the server to operation after servicing.

Step	Description	Links
1.	Replace the top cover and return the server to its normal operating position	"Remove the Top Cover" on page 49 "Return the Server to the Normal Operating Position" on page 147
2.	Connect the power cords to the server.	"Reconnect Data Cables and Power Cords" on page 149
3.	Power on the server.	"Power On the Server" on page 151

Related Information

- "Preparing for Service" on page 33

▼ Replace the Top Cover

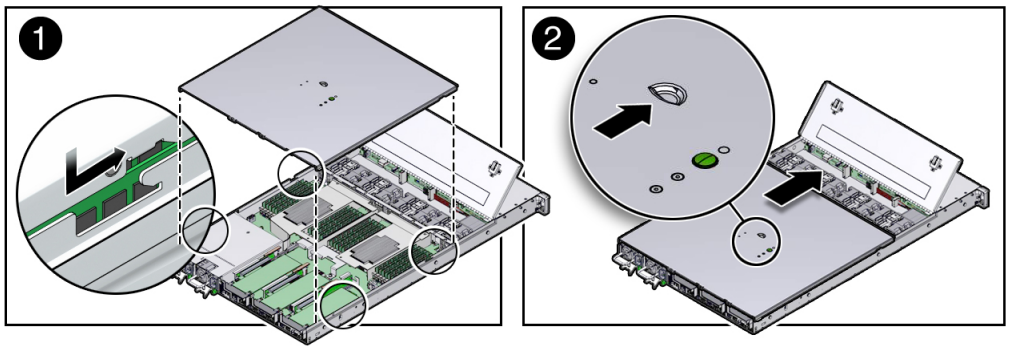
1. **Open the server fan door.**

   See "Open the Server Fan Door" on page 48.

2. **Place the top cover on the chassis (1).**

   Place the cover down so that it hangs over the rear of the server by about 13 mm (0.5 inches) and the side latches align with the slots in the sides of the chassis.

Note - There are three latching tabs on the sides of the cover, two on the right side and one on the left side (viewing the server from the front). There is also a latch on the underside of the cover in the front left corner.



3. **Check both sides of the chassis to ensure that the four corners of the top cover are fully down and flush with the chassis.**

   If the cover corners are not flush with the chassis, slide the cover towards the rear of the chassis until you can position the cover correctly.

Caution - If the top cover is not correctly positioned before you attempt to slide the cover toward the front of the chassis, the internal latch that is located on the underside of the cover might be damaged.

4. **Gently slide the cover toward the front of the chassis until it locks into place (with an audible click) (2).**

   As you slide the cover toward the front of the server, watch the green release button. You will hear an audible click when the green release button pops up, indicating that the cover is locked.

5. **Close the server fan door.**

6. **Remove the antistatic precautions.**

Related Information

- “Remove the Top Cover” on page 49
- “Return the Server to the Normal Operating Position” on page 147

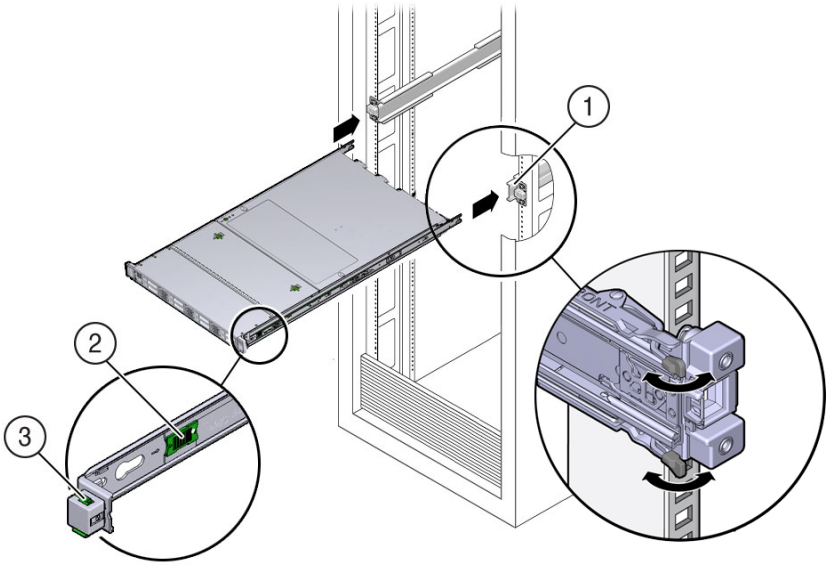
Return the Server to the Normal Operating Position

Caution - Deploy any rack anti tilt mechanisms before installing the server into the rack.

Caution - The server weighs approximately 18.1 kg (40.0 lbs). Two people are required to carry the chassis and install it into the rack.

1. **Push the slide rails into the slide rail assemblies in the rack as far as possible.**
2. **Raise the server so that the rear ends of the mounting brackets are aligned with the slide rail assemblies that are mounted in the rack.**
3. **Insert the mounting brackets into the slide rails, and then push the server into the rack until the mounting brackets encounter the slide rail stops, approximately 30 cm (12 inches).**

   The server is now in the extended maintenance position.



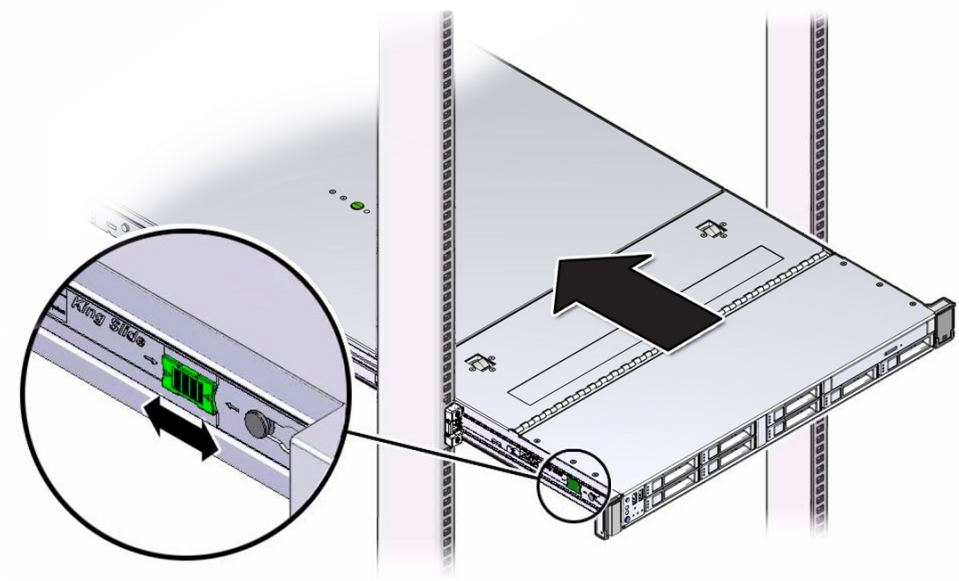
No.	Description
1	Slide rails
2	Slide rail release tab (green)
3	Slide rail lock

4. **Push the server back into the rack.**

   a. **Simultaneously pull and hold the two green release tabs (one on each side of the slide rails on the server) toward the front of the server while you push the server into the rack.**

      As you push the server into the rack, verify that the CMA retracts without binding.

Note - To pull a green release tab, place your finger in the center of the tab, not on the end, and apply pressure as you pull the tab toward the front of the server.



   b. **Continue pushing the server into the rack until the slide rail locks (on the front of the server) engage the slide rail assemblies.**

You will hear an audible click when the server is in the normal rack position.

5. **If the CMA is not installed, that is, you removed it because you removed the server completely out of the rack, install the CMA.**

   For installation instructions for the CMA, refer to "Install the Cable Management Arm" in *SPARC S7-2 Server Installation Guide*.

6. **If the cables are disconnected from the rear of the server, that is, you disconnected the cables because you removed the server completely out of the rack, reconnect the cables.**

   - For instructions on reconnecting cables to the rear of the server, see "Reconnect Data Cables and Power Cords" on page 149.
   - For detailed information on connecting cables to the rear of the server, refer to "Cabling the Server" in *SPARC S7-2 Server Installation Guide*.

Related Information

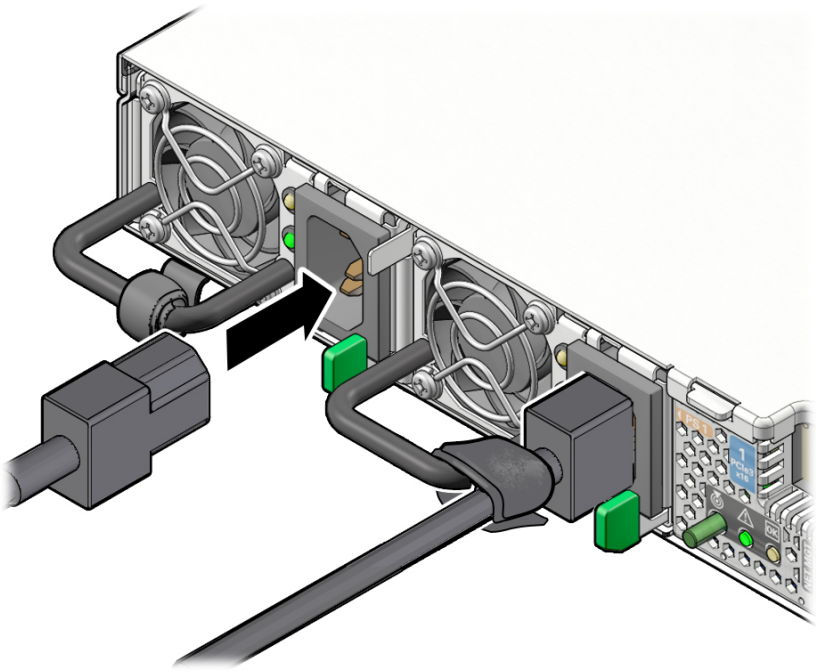
- "Remove the Server From the Rack" on page 47

▼ Reconnect Data Cables and Power Cords

1. **Reconnect the data cables to the rear of the server, as required.**

   If the CMA is in the way, extend the server approximately 13 cm (5 inches) out of the front of the rack.

2. **Reconnect the power cables to the power supplies and secure them with the reclosable straps.**



3. **If necessary, reinstall the cables into the CMA and secure them with the reclosable cable straps.**

4. **If you pulled the server out of the rack to make it easier to connect the cables, push the server into the rack until the slide rail locks (on the front of the server) engage the slide rail assemblies.**

   You will hear an audible click when the server is in the normal rack position.

Related Information

- “Return the Server to the Normal Operating Position” on page 147
- “Power On the Server” on page 151

Power On the Server

As soon as the power cords are connected, standby power is applied and the green Power status indicator on the server front panel blinks. Depending on the configuration of the firmware, the system might boot. If it does not boot, follow this procedure.

- **Power on the server by one of these methods.**
  - Press the Power button on the server front panel.
  - Log in to the Oracle ILOM web interface, click Host Management → Power Control and select Power On from the Select Action list.
  - Log in to the Oracle ILOM CLI, and type this command at the Oracle ILOM prompt:

```
->start /System
```

When the server is powered on and the power-on self-test (POST) code checkpoint tests have completed, the green Power status indicator on the front panel lights and remains lit.

Related Information

- “Power Off the Server” on page 38
- “Reconnect Data Cables and Power Cords” on page 149

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