Netra SPARC S7-2 Server Service Manual

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Contents

Using This Documentation

- **Overview** – Describes how to troubleshoot and maintain the Netra SPARC S7-2 server from Oracle
- **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/netra-s7-2/docs.

Feedback

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

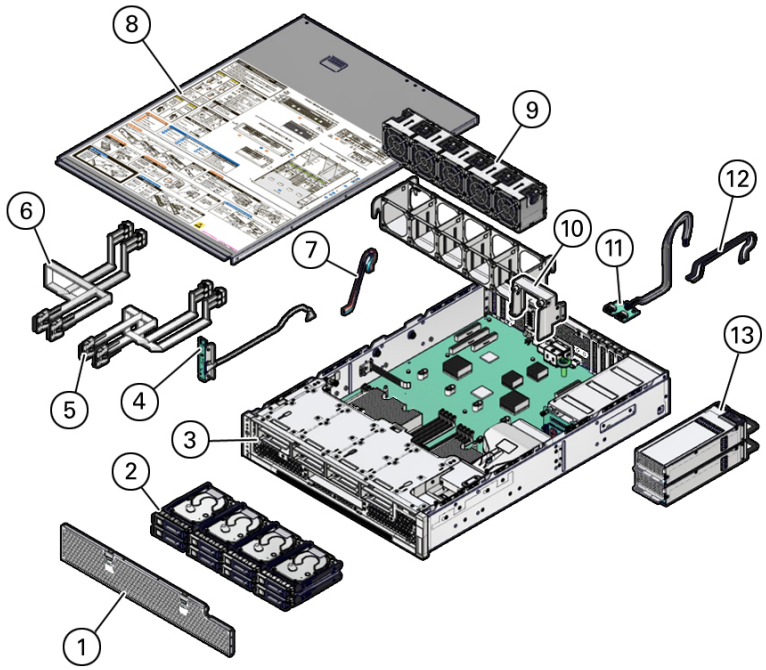
Identifying Components

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

These topics identify key components of the server.

Related Information

Component Locations (Storage, Power, NVMe, and Fan Modules)



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2	Drives	“Servicing SAS Drives” on page 85
3	Chassis	“Accessing Internal Components” on page 55
4	LED board	“Servicing the LED Board” on page 217
5	Drive SAS cables	“Servicing the Cables” on page 193
6	NVMe cables	“Servicing the NVMe Cables” on page 207 “Servicing NVMe Storage Drives” on page 97
7	Drive backplane data cable	“Servicing the Cables” on page 193
8	Top cover with service labels	“Remove the Top Cover” on page 67

No.	Name	Service Links
		“Install the Top Cover” on page 246 “Component Service Task Reference” on page 47
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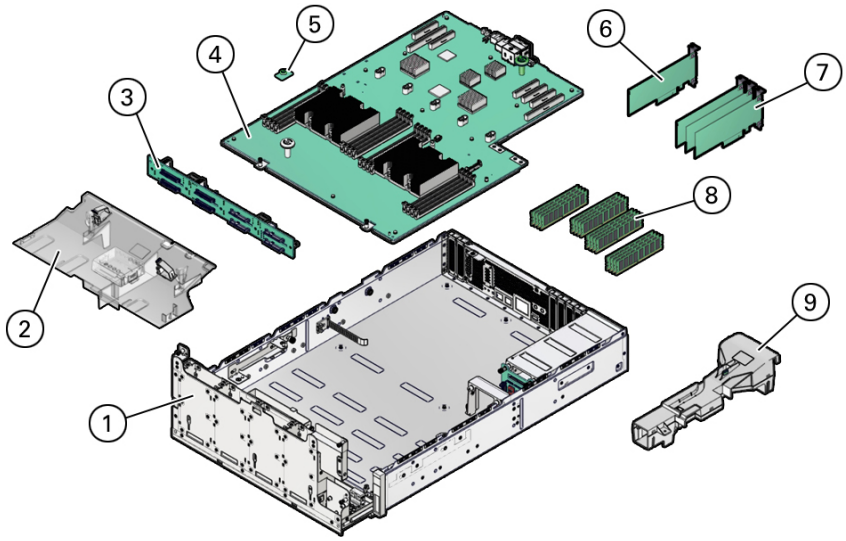
- “Front Panel Components (Service)” on page 17
- “Rear Panel Components (Service)” on page 18
- “Customer-Replaceable Units” on page 19
- “Field-Replaceable Units” on page 20
- “Component Service Task Reference” on page 47

Component Locations (Motherboard, Memory, and PCIe Cards)



No.	Name	Service Links
1	Drive cage	“Rotate the Drive Cage to the Service Position” on page 71 “Secure the Drive Cage” on page 241
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5	eUSB board	“Servicing the eUSB Drive” on page 103
6	HBA PCIe card	“Servicing the Internal HBA PCIe Card” on page 179
7	PCIe cards	“Servicing PCIe Cards” on page 169
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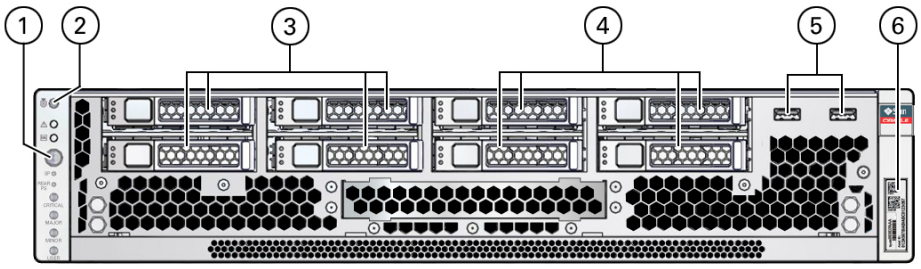
Related Information

- “Component Locations (Storage, Power, NVMe, and Fan Modules)” on page 14
- “Front Panel Components (Service)” on page 17
- “Rear Panel Components (Service)” on page 18
- “Customer-Replaceable Units” on page 19
- “Field-Replaceable Units” on page 20
- “Component Service Task Reference” on page 47

Front Panel Components (Service)



No.	Description	Links
1	Power button	“Power Off the Server (Power Button - Graceful)” on page 51 “Power On the Server (Power Button)” on page 250
2	Locator button	“Front Panel Components (Service)” on page 17
3 and 4	HDD/SSD and NVMe drives HDD/SDD are supported in all slots. NVMe is supported only in slots 0-3. ■ Bottom row – Slots 0, 2, 4, and 6. ■ Top row – Slots 1, 3, 5, and 7.	“Servicing SAS Drives” on page 85 “Servicing NVMe Storage Drives” on page 97

No.	Description	Links
5	USB 2.0 ports	"USB Ports" in *Netra SPARC S7-2 Server Installation Guide*
6	Serial number and manufacturing information	"Find the Server Serial Number" on page 47

Related Information

- "Component Locations (Storage, Power, NVMe, and Fan Modules)" on page 14
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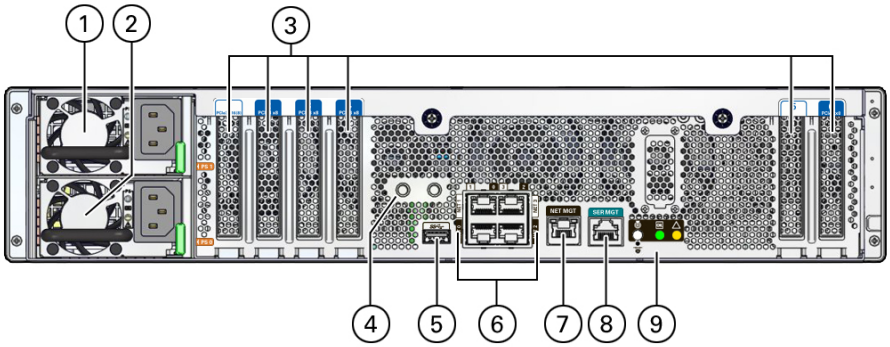
- "Rear Panel Components (Service)" on page 18
- "Customer-Replaceable Units" on page 19
- "Field-Replaceable Units" on page 20

Rear Panel Components (Service)



No.	Description	Links
1, 2	AC or DC power supplies (PS 1 and PS 0)	"Servicing Power Supplies" on page 131
3	PCIe3 slots: ■ Slots 1, 2, 3, and 4 on left ■ Slots 5 and 6 on right	"Servicing PCIe Cards" on page 169
4	Grounding studs	(Optional) for AC servers. See "Connect the Chassis Ground Wire" in *Netra SPARC S7-2 Server Installation Guide*

No.	Description	Links
5	USB port (rear)	"USB Ports" in *Netra SPARC S7-2 Server Installation Guide*
6	Host network 100/1000/10000 ports (NET 0 to 3) for host	"10 Gigabit Ethernet Ports" in *Netra SPARC S7-2 Server Installation Guide*
7	NET MGT RJ-45 network port	"Log In to Oracle ILOM (Service)" on page 26
8	SER MGT RJ-45 serial port	"Log In to Oracle ILOM (Service)" on page 26
9	Status LEDs: ■ Locator LED and button ■ Service Required LED ■ Power OK LED	"Rear Panel LEDs" on page 33 "Rear Panel Components (Service)" on page 18

Related Information

- "Component Locations (Storage, Power, NVMe, and Fan Modules)" on page 14
- "Component Locations (Motherboard, Memory, and PCIe Cards)" on page 16
- "Front Panel Components (Service)" on page 17
- "Customer-Replaceable Units" on page 19
- "Field-Replaceable Units" on page 20

Customer-Replaceable Units

CRUs can be serviced either by the customer or other trained personnel.

Description	Links
Battery	"Servicing the Battery" on page 189
SAS SSD and HDD	"Servicing SAS Drives" on page 85
NVMe SSD	"Servicing NVMe Storage Drives" on page 97
eUSB flash drive	"Servicing the eUSB Drive" on page 103
DIMM	"Servicing DIMMs" on page 159
PCIe cards	"Servicing PCIe Cards" on page 169
Internal SAS HBA PCIe card	"Servicing the Internal HBA PCIe Card" on page 179
Air filter	"Servicing the Air Filter" on page 79
Power cable	"Servicing the Cables" on page 193
Fan module	"Servicing Fan Modules" on page 151
Power supply	"Servicing Power Supplies" on page 131

Related Information

- “Detecting and Managing Faults” on page 25
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Field-Replaceable Units

FRUs can only be serviced by Oracle authorized service personnel. Damage to the components and the server might occur if the FRUs are improperly serviced.

Description	Links
LED board	“Servicing the LED Board” on page 217
Disk drive backplane	“Servicing the Drive Backplane” on page 117
USB board	“Servicing the USB Board” on page 109
PDB	“Servicing the PDB” on page 141
Motherboard	“Servicing the Motherboard” on page 225

Related Information

- “Detecting and Managing Faults” on page 25
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Device Paths

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

Device	Path
PCIe 1	`/pci@300/pci@1/pci@0/pci@a`
PCIe 2	`/pci@300/pci@1/pci@0/pci@11`

Device	Path
PCIe 3	/pci@302/pci@1/pci@0/pci@12
PCIe 4	/pci@302/pci@1/pci@0/pci@13
PCIe 5	/pci@300/pci@2/pci@0/pci@14
PCIe 6	/pci@302/pci@2/pci@0/pci@15
NET 0	/pci@300/pci@1/pci@0/pci@1/network@0
NET 1	/pci@300/pci@1/pci@0/pci@1/network@0,1
NET 2	/pci@300/pci@1/pci@0/pci@1/network@0,2
NET 3	/pci@300/pci@1/pci@0/pci@1/network@0,3
SSD/HDD 0 NVMe 0	/pci@302/pci@2/pci@0/pci@6/LSI,sas@0/disk@p2 /pci@300/pci@2/pci@0/pci@18/nvme@0/disk@1
SSD/HDD 1 NVMe 1	/pci@302/pci@2/pci@0/pci@6/LSI,sas@0/disk@p3 /pci@302/pci@2/pci@0/pci@19/nvme@0/disk@1
SSD/HDD 2 NVMe 2	/pci@302/pci@2/pci@0/pci@6/LSI,sas@0/disk@p1 /pci@302/pci@2/pci@0/pci@17/nvme@0/disk@1
SSD/HDD 3 NVMe 3	/pci@302/pci@2/pci@0/pci@6/LSI,sas@0/disk@p0 /pci@300/pci@2/pci@0/pci@16/nvme@0/disk@1
SSD/HDD 4	/pci@302/pci@2/pci@0/pci@6/LSI,sas@0/disk@p6
SSD/HDD 5	/pci@302/pci@2/pci@0/pci@6/LSI,sas@0/disk@p7
SSD/HDD 6	/pci@302/pci@2/pci@0/pci@6/LSI,sas@0/disk@p5
SSD/HDD 7	/pci@302/pci@2/pci@0/pci@6/LSI,sas@0/disk@p4

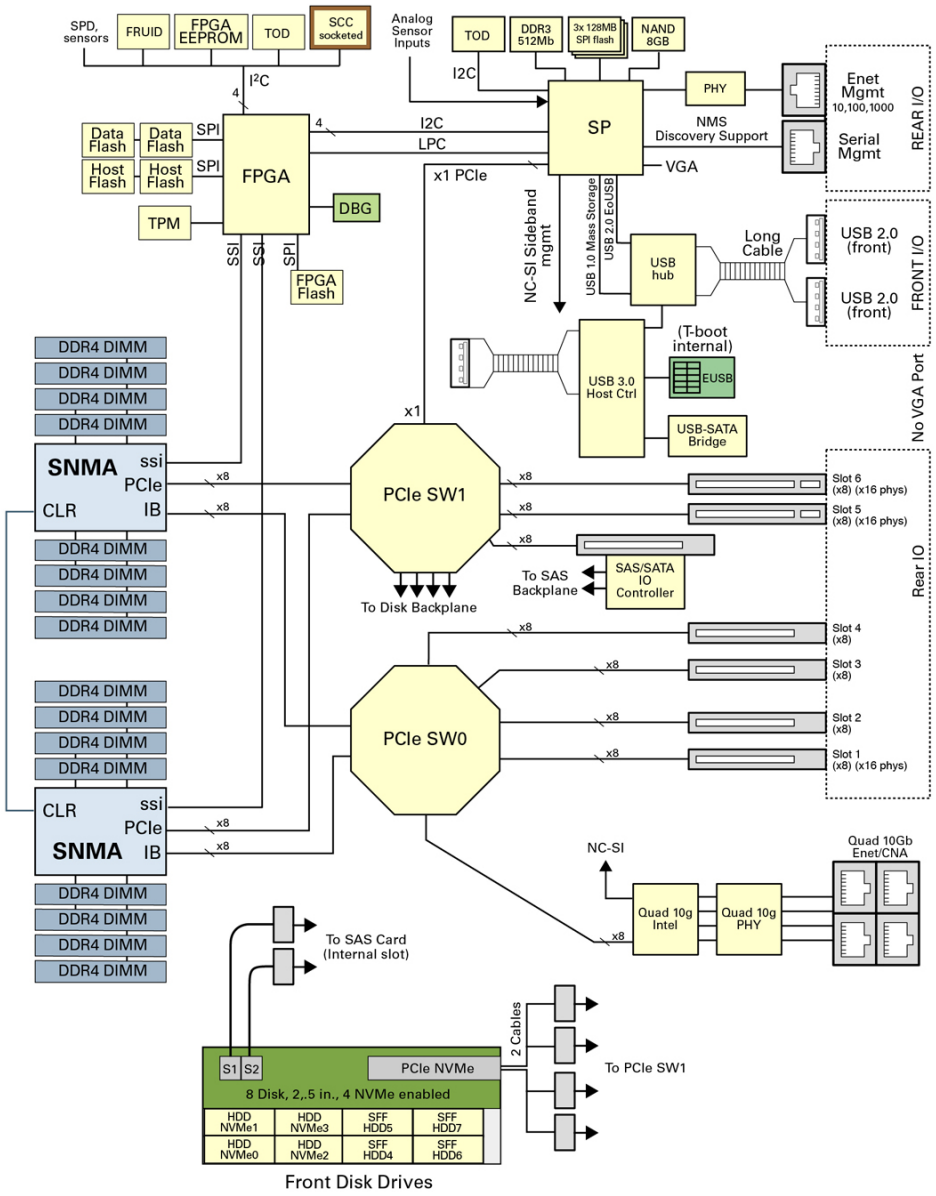
Related Information

- “Rear Panel Components (Service)” on page 18
- “Front Panel Components (Service)” on page 17
- “Server Block Diagram (Dual Processor)” on page 21

Server Block Diagram (Dual Processor)

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

Note - For more detail on root complexes related to the PCIe slots, see "I/O Root Complex Connections" on page 171.



Related Information

- “Rear Panel Components (Service)” on page 18
- “Front Panel Components (Service)” on page 17
- “Customer-Replaceable Units” on page 19
- “Field-Replaceable Units” on page 20
- “Device Paths” on page 20

Detecting and Managing Faults

When problems arise during day-to-day operations of the server, you can use these topics to determine the fault and course of action.

Faults are 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.

Step	Description	Links
1.	Check the server for detected faults and for information about components that might require service.	"Checking for Faults" on page 25 "Interpreting LEDs" on page 30
2.	Perform additional troubleshooting if needed.	"Performing Advanced Troubleshooting" on page 34
3.	Manage faults following a service procedure.	"Clear a Fault Manually" on page 40
4.	Contact technical support if the problem persists.	`https://support.oracle.com`

Related Information

- "Interpreting LEDs" on page 30
- "Identifying Components" on page 13
- "Preparing for Service" on page 43
- "Returning a Server to Operation" on page 235

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 26 "Identify Faulted Components" on page 27

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 29
3.	Identify the names of components that require service as reported by diagnostic software.	"Device Paths" on page 20

Related Information

- "Performing Advanced Troubleshooting" on page 34
- "Clear a Fault Manually" on page 40
- "Interpreting LEDs" on page 30

▼ 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 27
- "Identify Disabled Components" on page 29
- "Device Paths" on page 20
- "Interpreting LEDs" on page 30

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 "Identifying 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 this command 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 previous example).**

   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 40.

Related Information

- “Log In to Oracle ILOM (Service)” on page 26
- “Identify Disabled Components” on page 29
- “Device Paths” on page 20
- “Interpreting LEDs” on page 30

▼ 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  | 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 20.

   For example, type:

```
-> show -t /SYS/MB/CMP0/MCU0/CH1/D0/
Target                              | Property               | Value
------------------------------------+------------------------+------------
...
/SYS/MB/CMP0/MCU0/CH1/D0            | type                   | DIMM
/SYS/MB/CMP0/MCU0/CH1/D0            | ipmi name              | P0/M0/C1/D0
/SYS/MB/CMP0/MCU0/CH1/D0            | requested_config_state | Enabled
/SYS/MB/CMP0/MCU0/CH1/D0            | current_config_state   | Enabled
/SYS/MB/CMP0/MCU0/CH1/D0            | disable_reason         | Configuration Rules
/SYS/MB/CMP0/MCU0/CH1/D0            | fru_name               | 32768MB DDR4 SDRAM DIMM
...
```

   The target system paths here are examples. Your paths will vary.

Related Information

- “Log In to Oracle ILOM (Service)” on page 26
- “Identify Faulted Components” on page 27
- “Device Paths” on page 20
- “Interpreting LEDs” on page 30

Interpreting LEDs

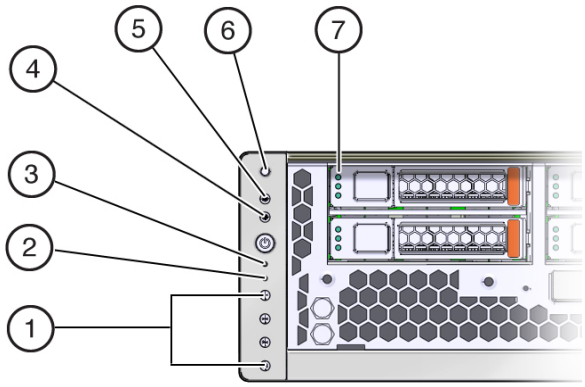
Use these steps to determine if an LED indicates that a component has failed.

Step	Description	Links
1.	Check the LEDs on the front and rear of the server.	■ “Front Panel LEDs” on page 31 ■ “Rear Panel LEDs” on page 33
2.	Check the LEDs on the individual components. Component LEDs might not be lit even though the component is faulty. Rely on software to determine if a component is faulty, see “Identify Faulted Components” on page 27.	■ “Servicing SAS Drives” on page 85 ■ “Servicing NVMe Storage Drives” on page 97 ■ “Servicing Fan Modules” on page 151 ■ “Servicing Power Supplies” on page 131 ■ “Servicing DIMMs” on page 159 ■ “Servicing PCIe Cards” on page 169 ■ “Servicing the Internal HBA PCIe Card” on page 179 ■ “Servicing the Motherboard” on page 225

Related Information

- “Checking for Faults” on page 25
- “Performing Advanced Troubleshooting” on page 34
- “Clear a Fault Manually” on page 40

Front Panel LEDs



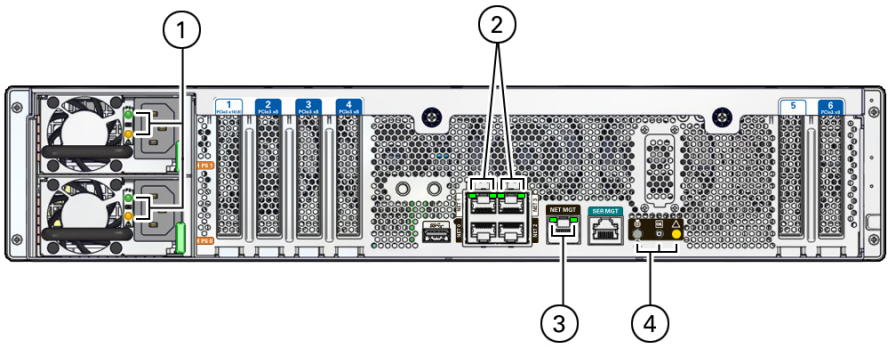
No.	LED	Description
1	Alarm LEDs:	
	■ Critical Alarm LED (red)	Indicates a critical alarm condition.
	■ Major Alarm LED (red)	Indicates a major alarm condition.
	■ Minor Alarm LED (amber)	Indicates a minor alarm condition.
	■ User Alarm LED (amber)	Indicates a user alarm condition.
2	Rear PS Status LED (amber)	Indicates the state of the power supplies: ■ **Off** – Steady state, no service action is required. ■ **On** – Fault with one of the power supplies.
3	SP Status LED	Indicates the state of the SP: ■ **Green flashing** –SP is booting. ■ **Green steady** –SP booted and OK , no service action is required.
4	OK LED (green)	Indicates these conditions: ■ **Off** – Server is not running in its normal state. Server power might be off. The SP might be running. ■ **Steady on** – Server is powered on and is running in its normal operating state. No service actions are required. ■ **Fast blink** – Server is running in Standby mode and can be quickly returned to full function. ■ **Slow blink** – Normal but transitory activity is taking place. Slow blinking might indicate that system diagnostics are running or that the server is booting.

No.	LED	Description
5	Service Required LED (amber)	Indicates that service is required. The Oracle ILOM `show faulty` command provides details about any faults that cause this indicator to light. Under some fault conditions, individual component fault LEDs are turned on in addition to the Service Required LED.
6	Locator LED and button (white)	The Locator LED can be turned on to identify a particular system. When on, the LED blinks rapidly. Pressing and holding the Locator button for 5 seconds initiates a test of all LEDs in the LED assembly.
7	Hard drive status LEDs:	Indicates these conditions: ■ **Off** – Drive is not ready or is faulty. ■ **Steady on** –Drive is on and idle. ■ **Fast blink** – Read or write activity is in progress.
	■ Ready to Remove LED (top, blue)	Indicates that the drive can be removed during a hot-plug operation.
	■ Service Required LED (middle, amber)	Indicates that the drive has experienced a fault condition.
	■ OK/Activity LED (bottom, green)	Indicates the drive's availability for use. ■ **On** – Read or write activity is in progress. ■ **Off** – Drive is idle and available for use.

Related Information

- “Rear Panel LEDs” on page 33
- “Checking for Faults” on page 25
- “Performing Advanced Troubleshooting” on page 34
- “Clear a Fault Manually” on page 40

Rear Panel LEDs



No.	LED	Description
1	Power supply status LEDs (note AC supply shown):	
	■ OK LED (top, green)	Indicates that power supply is functional (on) or with fault (off).
	■ Service Required LED (amber)	On indicates that service for the power supply is required. POST and Oracle ILOM are two diagnostic tools that can detect a fault or failure resulting in this indication. The Oracle ILOM `show faulty` command provides details about any faults that cause this indicator to light.
2	NET 0 to NET 3 Status LEDs Link and Activity LED (green)	Indicates these conditions: ■ **On or blinking** – A link is established. ■ **Off** – No link is established.
3	NET MGT status LEDs:	
	■ Link and Activity LED (green)	Indicates these conditions: ■ **On** – A link is established. ■ **Blinking**– There is activity on the link. ■ **Off** – No link is established.
	■ Speed LED (amber/ green)	Indicates these conditions: ■ **Green** – The link is operating as a 10000-Mbps connection. ■ **Amber** – The link is operating as a Gigabit connection (1000-Mbps). ■ **Off** – The link is operating as a 100-Mbps connection or there is no link.
4	Chassis status LEDs:	

No.	LED	Description
	■ Locator LED and button (left, white)	The Locator LED can be turned on to identify a particular system. When on, the LED blinks rapidly. There are two methods for turning a Locator LED on: ■ Typing the Oracle ILOM command `set /SYS/LOCATE value=Fast_Blink`. ■ Pressing the Locator button.
	■ Service Required LED (center, amber)	Indicates that service is required. POST and Oracle ILOM are two diagnostics tools that can detect a fault or failure resulting in this indication. The Oracle ILOM `show faulty` command provides details about any faults that cause this indicator to light. Under some fault conditions, individual component fault LEDs are turned on in addition to the Service Required LED.
	■ Power OK LED (right, green)	Indicates these conditions: ■ **Off** – Server is not running in its normal state. System power might be off. The SP might be running. ■ **Steady on** – Server is powered on and is running in its normal operating state. No service actions are required. ■ **Fast blink** – Server is running in standby mode and can be quickly returned to full function. ■ **Slow blink** – A normal but transitory activity is taking place. Slow blinking might indicate that system diagnostics are running or that the system is booting.

Related Information

- “Front Panel LEDs” on page 31
- “Checking for Faults” on page 25
- “Performing Advanced Troubleshooting” on page 34
- “Clear a Fault Manually” on page 40

Performing Advanced Troubleshooting

If you are unable to diagnose faults using the methods provided in “Checking for Faults” on page 25, 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 35
Examine log files for additional information about the server.	“View Log Files (Oracle Solaris)” on page 35 “View Log Files (Oracle ILOM)” on page 36

Description	Links
Generate and examine low-level diagnostic information generated by POST.	"POST Overview" on page 37 "Configure POST" on page 37 "Oracle ILOM Properties That Affect POST Behavior" on page 39

Related Information

- "Checking for Faults" on page 25
- "Clear a Fault Manually" on page 40

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 35
- "View Log Files (Oracle ILOM)" on page 36
- "POST Overview" on page 37

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 35
- “View Log Files (Oracle Solaris)” on page 35
- “POST Overview” on page 37

▼ 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 35
- “View Log Files (Oracle Solaris)” on page 35
- “POST Overview” on page 37

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.

Also, you can 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 37
- "Oracle ILOM Properties That Affect POST Behavior" on page 39

▼ Configure POST

1. **Log in to Oracle ILOM.**

   See "Log In to Oracle ILOM (Service)" on page 26.

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/diag/ 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 = (none)
        default_verbosity = normal
        error_level = max
        error_verbosity = normal
        hw_change_level = max
        hw_change_verbosity = normal


   Commands:
        cd
        set
        show
->
```

Related Information

- “POST Overview” on page 37
- “Oracle ILOM Properties That Affect POST Behavior” on page 39

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 37
- “Configure POST” on page 37

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 cleared 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.

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 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 *Oracle Enterprise Manager Ops Center Feature Reference Guide* at:

`http://www.oracle.com/pls/topic/lookup?ctx=oc122`

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

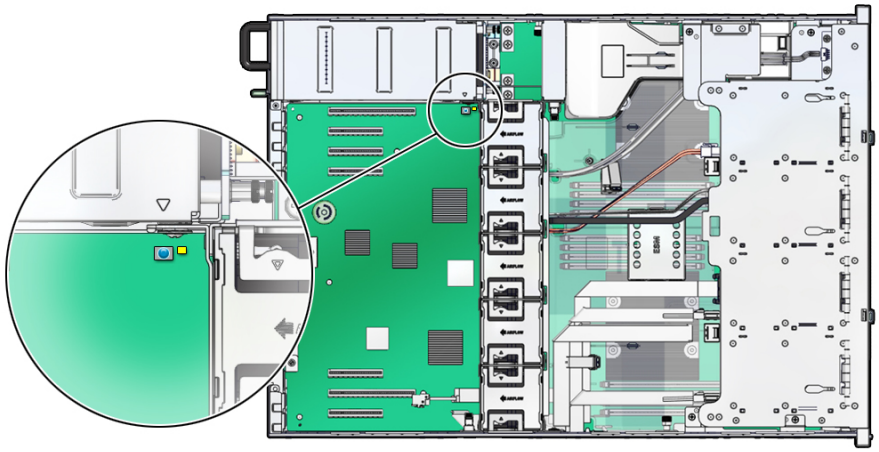
Related Information

- "Checking for Faults" on page 25
- "Performing Advanced Troubleshooting" on page 34

Server Fault Remind Button Operation

When you press the server Fault Remind button, an LED located next to the Fault Remind button lights green to indicate that there is sufficient voltage present in the fault remind circuit to light any fault LEDs that were lit due to a component failure. If this LED does not light when you press the Fault Remind button, it is likely that the capacitor powering the fault remind circuit has lost its charge. This can happen if the Fault Remind button is pressed for several minutes with fault LEDs lit or if power has been removed from the server for more than 15 minutes.

Fault LEDs are provided on the motherboard for DIMMs. The figure shows the location of the Fault Remind button and LED.



Preparing for Service

These topics describe how to prepare the server for servicing.

Step	Description	Link
1.	Review safety and handling information.	“Safety Information” on page 44
2.	Gather the tools for service.	“Service Tools” on page 46
3.	Consider filler options.	“Fillers” on page 46
4.	Find the server serial number.	“Find the Server Serial Number” on page 47
5.	Locate the component service information.	“Component Service Task Reference” on page 47
6.	Identify the server to be serviced.	“Locate the Server” on page 48
	You can now service the air filter, the drives, and the power supplies.	“Servicing the Air Filter” on page 79 “Servicing SAS Drives” on page 85 “Servicing NVMe Storage Drives” on page 97 “Servicing the Internal HBA PCIe Card” on page 179 “Servicing the eUSB Drive” on page 103 “Servicing Power Supplies” on page 131
7.	Shut down the OS and power off the server.	“Removing Power From a Server” on page 49
8.	Move the server out of the rack and open the top cover.	“Accessing Internal Components” on page 55
	You can now service the fan modules, the PCIe cards, and the battery.	“Servicing Fan Modules” on page 151 “Servicing PCIe Cards” on page 169 “Servicing the Battery” on page 189
9.	Remove the fan tray.	“Remove the Fan Tray” on page 69
	You can now service the cables.	“Servicing the Cables” on page 193
10.	Bring the drive cage to service position.	“Rotate the Drive Cage to the Service Position” on page 71
	You can now service the drive backplane.	“Servicing the Drive Backplane” on page 117
11.	Remove the PSU duct.	“Remove the PSU Duct” on page 74
12.	Remove the air duct.	“Remove the Air Duct” on page 75
	You can now service the DIMMs and the LED board.	“Servicing DIMMs” on page 159

Step	Description	Link
	You can now service the USB board, the motherboard, and the PDB.	"Servicing the LED Board" on page 217 "Servicing the USB Board" on page 109 "Servicing the Motherboard" on page 225 "Servicing the PDB" on page 141

Related Information

- "Identifying Components" on page 13
- "Detecting and Managing Faults" on page 25
- "Returning a Server to Operation" on page 235

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 system.
- Follow all cautions and instructions marked on the equipment and described in the *Netra SPARC S7-2 Server Safety and Compliance Guide, Compliance Model No.: 9600*.
- 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 electrostatic discharge safety practices as described.

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.

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.

ESD Measures

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

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

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

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.

Antistatic Wrist Strap Use

Wear an antistatic wrist strap and use an antistatic mat when handling components such as hard drive assemblies, circuit boards, or express modules. 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. These items can be used as an antistatic mat:

- ESD mat
- Antistatic bag used to wrap a replacement part, if turned inside out after removing the part *and* placed on an antistatic surface
- A disposable ESD mat (shipped with some replacement parts or optional system components)

Related Information

- “Service Tools” on page 46
- “Component Service Task Reference” on page 47
- “Removing Power From a Server” on page 49

Service Tools

You need these tools for most service operations:

- Antistatic wrist strap
- Antistatic mat
- Small flat head screwdriver
- No. 1 Phillips screwdriver
- No. 2 Phillips screwdriver

Related Information

- “Safety Information” on page 44
- “Component Service Task Reference” on page 47
- “Accessing Internal Components” on page 55

Fillers

Servers might be shipped with replacement fillers for hard drives and PCI cards. A filler is an empty metal or plastic enclosure that does not contain any functioning system hardware or cable connectors.

The fillers are installed at the factory and must remain in the server until you replace them with a functional component to ensure proper airflow through the system. If you remove a filler and

continue to operate your server with an empty slot, the server might overheat due to improper airflow. For instructions on removing or installing a filler for a server component, refer to the topic in this document about servicing that component.

Related Information

- “Component Service Task Reference” on page 47
- “Servicing SAS Drives” on page 85
- “Servicing PCIe Cards” on page 169

▼ Find the Server Serial Number

If you require technical support for your server, you must provide the chassis serial number. You can find the chassis serial number on a sticker located on the front top of the server.

If it is not convenient to read either sticker, follow this procedure.

1. **Access Oracle ILOM.**
   See “Log In to Oracle ILOM (Service)” on page 26.

2. **Display the serial number.**

```
-> show /System serial_number
 /System
  Properties:
   serial_number = 1150CN2022
->
```

Related Information

- “Safety Information” on page 44
- “Component Service Task Reference” on page 47
- “Accessing Internal Components” on page 55

Component Service Task Reference

This table identifies tasks for servicing components, including those that you must remove as part of a service operation.

Name	Oracle ILOM Target	Service Link
Battery		"Servicing the Battery" on page 189
Cables		"Servicing the Cables" on page 193
DIMMs	/SYS/MB/CMP*w*/MCU*x*/CH*y*/D*z*	"Servicing DIMMs" on page 159
Drives	/SYS/DBP/HDD*x*	"Servicing SAS Drives" on page 85
Drive backplanes	/SYS/DBP	"Servicing the Drive Backplane" on page 117
NVMe drives		"Servicing NVMe Storage Drives" on page 97
Fan modules	/SYS/MB/FM*x*	"Servicing Fan Modules" on page 151
Filter		"Servicing the Air Filter" on page 79
LED board		"Servicing the LED Board" on page 217
Motherboard	/SYS/MB	"Servicing the Motherboard" on page 225
Network interfaces	/SYS/MB/NET*x*	"Servicing the Motherboard" on page 225
PCIe cards	/SYS/MB/PCIE*y*	"Servicing PCIe Cards" on page 169
Internal HBA PCIe card		"Servicing the Internal HBA PCIe Card" on page 179
PDB	/SYS/PDB	"Servicing the PDB" on page 141
Power supplies	/SYS/PS*x*	"Servicing Power Supplies" on page 131
USB board		"Servicing the USB Board" on page 109
eUSB flash drive		"Servicing the eUSB Drive" on page 103

Related Information

- "Removing Power From a Server" on page 49
- "Accessing Internal Components" on page 55

▼ Locate the Server

You can use the Locator LEDs to pinpoint the location of a server. This procedure is helpful when you need to identify one particular server from many others in the same rack.

1. **Access Oracle ILOM.**

   See "Log In to Oracle ILOM (Service)" on page 26.

2. **Turn on the Locator LED.**

```
-> set /SYS/LOCATE value=Fast_Blink
```

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

3. **After locating the server with the blinking Locator LED, turn the LED off by pressing the Locator button.**

Note - Alternatively, you can turn off the Locator LED by running the Oracle ILOM `set /SYS/LOCATE value=off` command.

4. **Consider your next step.**

- **Service other components.**
  See “Component Service Task Reference” on page 47.
- **Remove power from the server.**
  See “Removing Power From a Server” on page 49.

Related Information

- “Safety Information” on page 44
- “Component Service Task Reference” on page 47
- “Accessing Internal Components” on page 55

Removing Power From a Server

These topics describe different procedures for removing power from a server.

Step	Description	Link
1.	Prepare the server for powering off.	“Prepare to Power Off a Server” on page 50
2.	Power off the server by one of three methods.	“Power Off the Server (Oracle ILOM)” on page 50 “Power Off the Server (Power Button - Graceful)” on page 51 “Power Off the Server (Emergency Shutdown)” on page 52
3.	Disconnect the cords and cables.	“Disconnect Power Cords and Data Cables” on page 52

Related Information

- “Accessing Internal Components” on page 55
- “Returning a Server to Operation” on page 235

Prepare to Power Off a Server

Perform this procedure before powering off a server.

1. **Notify affected users that the server will be shut down.**
   Refer to the Oracle Solaris system administration documentation for additional information.
2. **Save any open files and quit all running programs.**
   Refer to your application documentation for specific information for these processes.
3. **Shut down all logical domains.**
   Refer to the Oracle Solaris system administration documentation for additional information.
4. **Shut down the Oracle Solaris OS.**
   Refer to the Oracle Solaris system administration documentation for additional information.
5. **Power off the server.**
   See:

   - **“Power Off the Server (Oracle ILOM)” on page 50**
   - **“Power Off the Server (Power Button - Graceful)” on page 51**
   - **“Power Off the Server (Emergency Shutdown)” on page 52**

Related Information

- “Accessing Internal Components” on page 55
- “Returning a Server to Operation” on page 235

Power Off the Server (Oracle ILOM)

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

Note - Additional information about powering off a server is provided in *Server Administration*.

---

1. **Access Oracle ILOM.**

See “Log In to Oracle ILOM (Service)” on page 26.

Depending on the type of problem, you might want to view server status or log files. Also, you might want to run diagnostics before you shut down the server. See “Detecting and Managing Faults” on page 25.

2. **Power off the server.**

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

Note - You can use the Power button on the front of the server to initiate a graceful server shutdown. See “Power Off the Server (Power Button - Graceful)” on page 51. This button is recessed to prevent accidental server power off.

Related Information

- “Prepare to Power Off a Server” on page 50
- “Disconnect Power Cords and Data Cables” on page 52
- “Power On the Server (Oracle ILOM)” on page 249
- “Power Off the Server (Power Button - Graceful)” on page 51
- “Power Off the Server (Emergency Shutdown)” on page 52

▼ Power Off the Server (Power Button - Graceful)

This procedure places a server in the power standby mode. In this mode, the Power OK LED blinks rapidly.

- **Press and release the recessed Power button.**

See “Front Panel Components (Service)” on page 17.

Related Information

- “Prepare to Power Off a Server” on page 50
- “Disconnect Power Cords and Data Cables” on page 52
- “Power On the Server (Power Button)” on page 250
- “Front Panel Components (Service)” on page 17
- “Power Off the Server (Oracle ILOM)” on page 50

- “Power Off the Server (Emergency Shutdown)” on page 52

Power Off the Server (Emergency Shutdown)

Caution - For this procedure, all applications and files are closed abruptly without saving changes. File system corruption and data loss might occur.

- **Press and hold the Power button for four seconds.**
  See “Front Panel Components (Service)” on page 17.

Related Information

- “Prepare to Power Off a Server” on page 50
- “Disconnect Power Cords and Data Cables” on page 52
- “Power On the Server (Power Button)” on page 250
- “Front Panel Components (Service)” on page 17
- “Power Off the Server (Oracle ILOM)” on page 50
- “Power Off the Server (Power Button - Graceful)” on page 51

Disconnect Power Cords and Data Cables

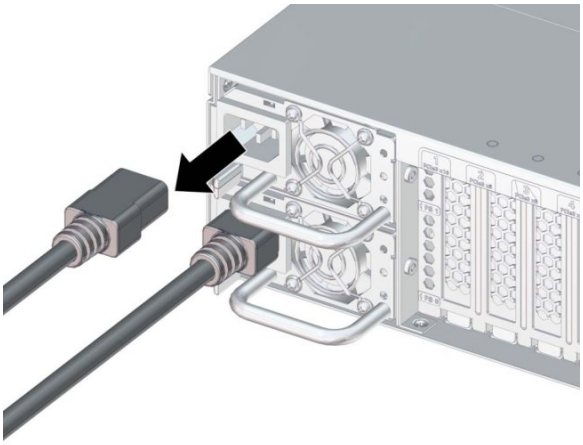
1. **When performing a cold-swap procedure, power off the server.**
   See:

   - **“Power Off the Server (Oracle ILOM)” on page 50**
   - **“Power Off the Server (Power Button - Graceful)” on page 51**
   - **“Power Off the Server (Emergency Shutdown)” on page 52**

2. **Unplug all power cords from the server.**

Caution - Because 12+ VDC standby power is always present in the system, you must unplug the power cords before accessing any cold-serviceable components.

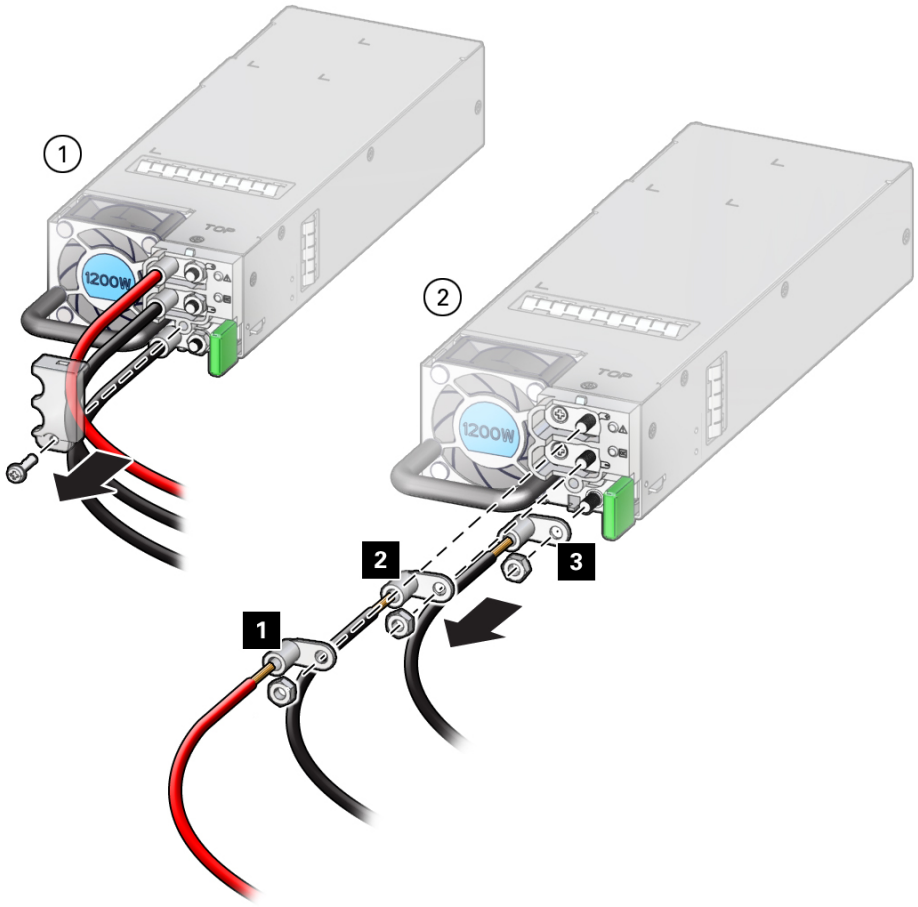
- For AC power cords.



- For DC power supply:
  - Turn off the main power circuit breaker to the server's power supply unit.
  -

Caution - Do not proceed with these instructions until you are sure that there is no voltage present on the DC cords and their power source.

- Remove the terminal housing and the ring nuts, then the power cables followed last by the grounding wire.



3. **Disconnect and remove all of the data cables that are attached to the rear of the server.**

   See “Servicing the Cables” on page 193.

Related Information

- “Power Off the Server (Oracle ILOM)” on page 50

- “Power Off the Server (Power Button - Graceful)” on page 51
- “Power Off the Server (Emergency Shutdown)” on page 52
- “Prevent ESD Damage” on page 55
- “Connect AC Power Cords” on page 249

Accessing Internal Components

These topics provide procedures and guidelines when accessing internal components.

Step	Description	Link
1.	Take antistatic precautions now.	“Prevent ESD Damage” on page 55
2.	If necessary, remove the server from the rack.	“Remove a Server From the 4-Post, 19-inch Rack” on page 56 “Remove a Server From the 2-Post, 19-inch Rack” on page 63
3.	Gain access to the internal components.	“Remove the Top Cover” on page 67

Related Information

- “Safety Information” on page 44
- “Service Tools” on page 46
- “Component Service Task Reference” on page 47
- “Removing Power From a Server” on page 49

▼ Prevent ESD Damage

Many components housed within the chassis can be damaged by electrostatic discharge. To protect these components from damage, perform these steps before opening the chassis for service. See “Safety Information” on page 44.

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

   Place ESD-sensitive components such as the printed circuit boards on an antistatic mat.

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.

3. **Remove the server.**

   See “Removing the Server From the Rack” on page 56.

Related Information

- “Disconnect Power Cords and Data Cables” on page 52
- “Removing the Server From the Rack” on page 56
- “Remove the Top Cover” on page 67
- “Safety Information” on page 44

Removing the Server From the Rack

Before you can remove the top cover to access components inside of the server chassis, you might have to remove the server from the rack.

- “Remove a Server From the 4-Post, 19-inch Rack” on page 56
- “Remove the Cable Management Arm” on page 58
- “Remove a Server From the 2-Post, 19-inch Rack” on page 63

Related Information

- “Disconnect Power Cords and Data Cables” on page 52
- “Prevent ESD Damage” on page 55

▼ Remove a Server From the 4-Post, 19-inch Rack

Caution - The server weighs approximately 21.5 kg (47.3 lbs). Two people are required to dismount and carry the chassis.

The steps to remove the server from a 4-post, 19-inch rack depend on the type of server mounting. Either the server is hard mounted with the hardmount rack kit, or the server is mounted with a sliding rail kit.

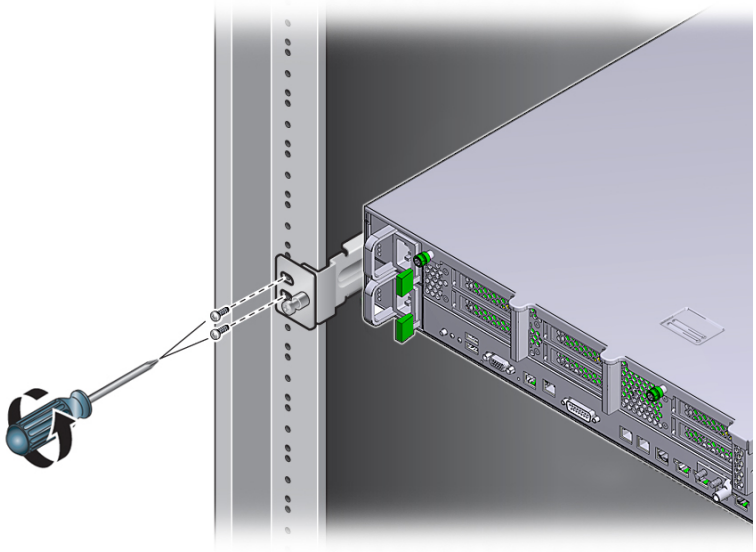
1. **Disconnect all the cables and power cords from the server.**

2. **If the server has a sliding rail kit with a cable management arm (CMA), remove the CMA.**

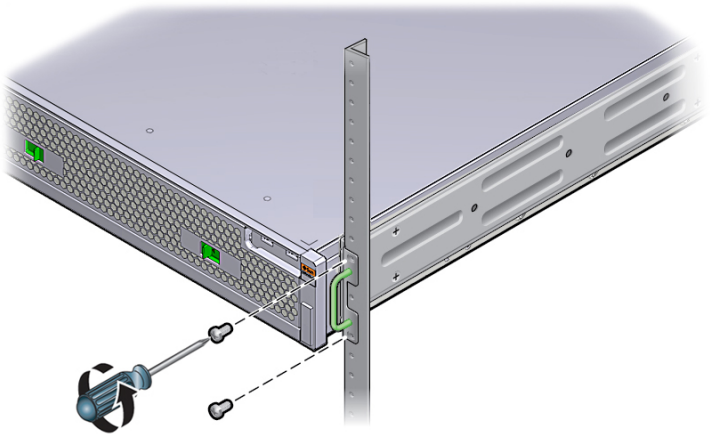
   See “Remove the Cable Management Arm” on page 58.

3. **Support the weight of the server for removal.**

4. **For the hardmount rack kit, remove the two screws securing each rear-mount support bracket.**



5. **For both types of kits, remove the two screws securing each hardmount bracket at the front of the rack.**



6. **For the sliding rail kit, extend the server to the locked position, then press the release buttons on the rails to pull the server out of the rack.**

7. **Lift the server from the rack and set it aside on an antistatic mat.**

8. **Remove the top cover.**
   See “Remove the Top Cover” on page 67.

Related Information

- “Prevent ESD Damage” on page 55
- “Remove the Top Cover” on page 67
- “Install the Top Cover” on page 246
- “Safety Information” on page 44

▼ Remove the Cable Management Arm

Follow this procedure to remove the optional 19-inch sliding rail kit with the CMA. The CMA applies only to the 4-Post, 19-Inch rack with sliding rails for servers.

Before you begin this procedure, refer to “Installing the 19-Inch Sliding Rail Kit With the CMA” in *Netra SPARC S7-2 Server Installation Guide* and identify CMA connectors A, B, C,

and D. You must disconnect the CMA connectors in reverse order, that is, disconnect connector D first, then C, then B, and finally A.

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

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

---

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 rack cabinet and extend all anti-tilt devices before extending the server from the rack.

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

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

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.**

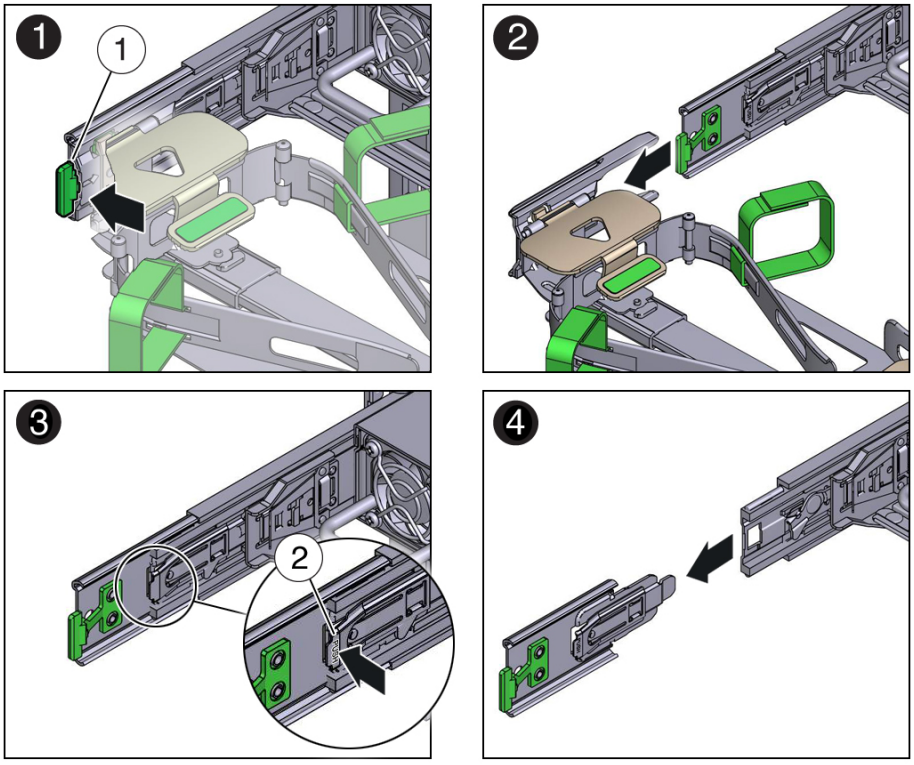
   e. **Remove the cables from the CMA and set them aside.**

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 (frames 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 it 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)

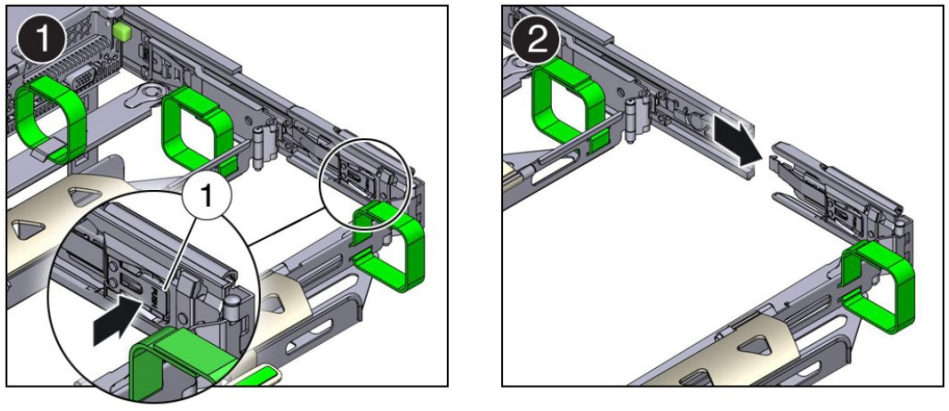
b. Use your right hand to support the CMA and use your left thumb to push in (toward the left) on the slide-rail latching bracket release tab labeled PUSH

(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).**

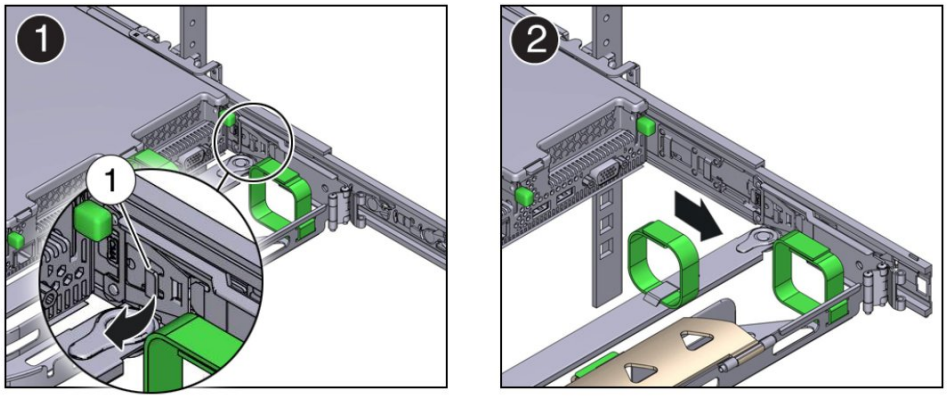


No.	Description
1	Connector C release tab (labeled PUSH)

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 (frames 1 and 2).

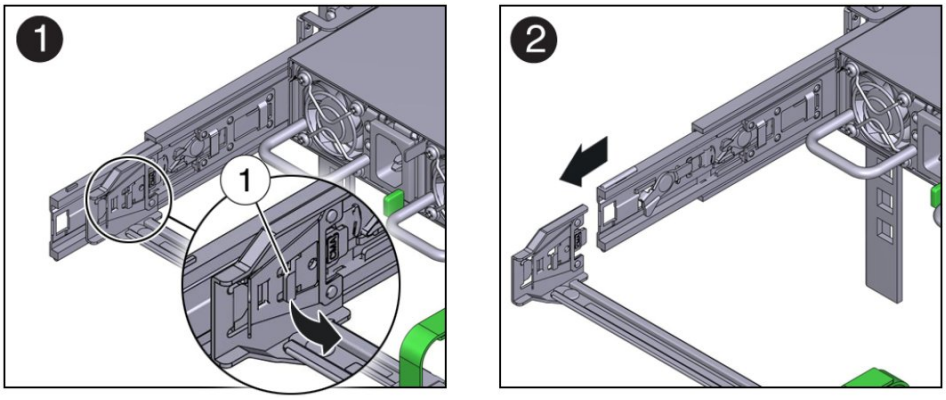


No.	Description
1	Connector B release lever

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.**

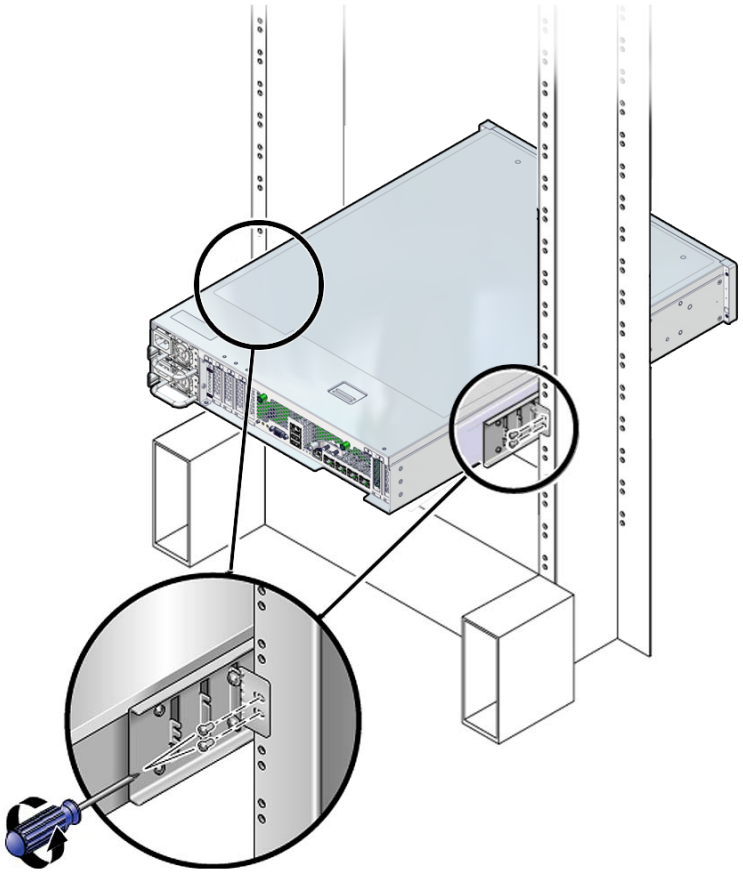
▼ Remove a Server From the 2-Post, 19-inch Rack

Caution - The server weighs approximately 21.5 kg (47.3 lbs). Two people are required to dismount and carry the chassis.

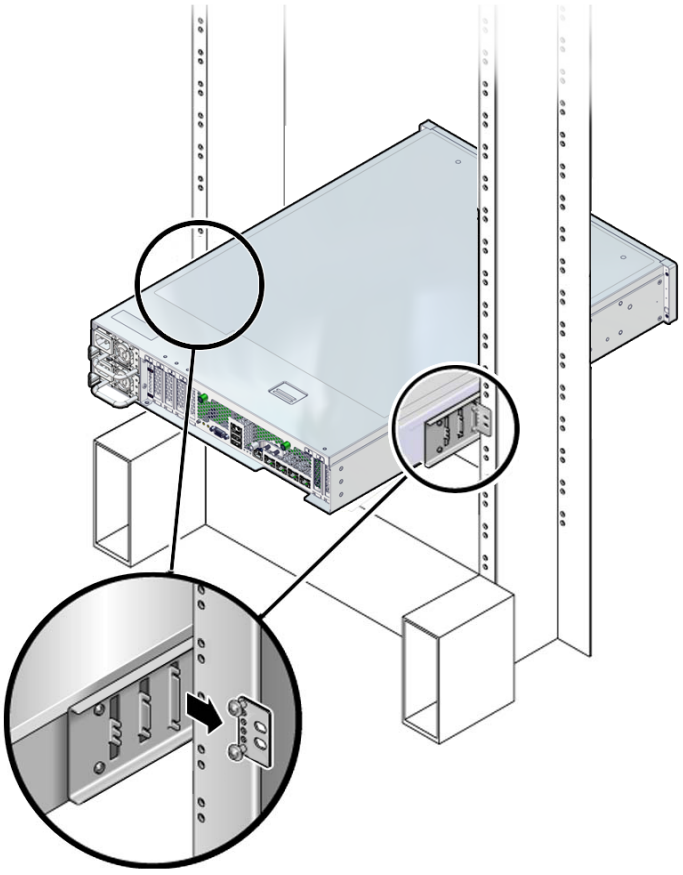
1. **Disconnect all the cables and power cords from the server.**

2. **Support the weight of the server for removal.**

3. **Remove the two screws that secure each rear plate to the back of the post.**

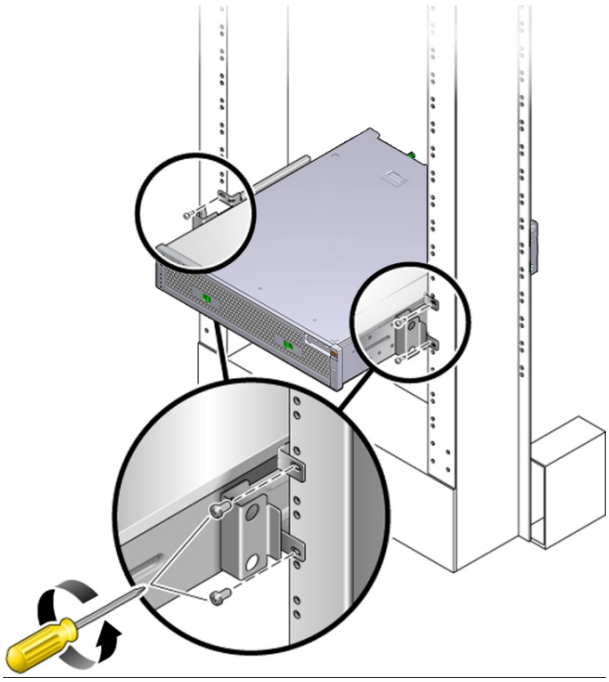


4. **Loosen the two screws that secure each rear plate to the eyelets of the side bracket.**



5. **Slide each rear plate out of the eyelets and set them aside.**

6. **Remove the two screws from each side bracket at the front of the posts.**



7. **Lift the server from the rack and set it aside on an antistatic mat.**

8. **Remove the top cover.**

   See “Remove the Top Cover” on page 67.

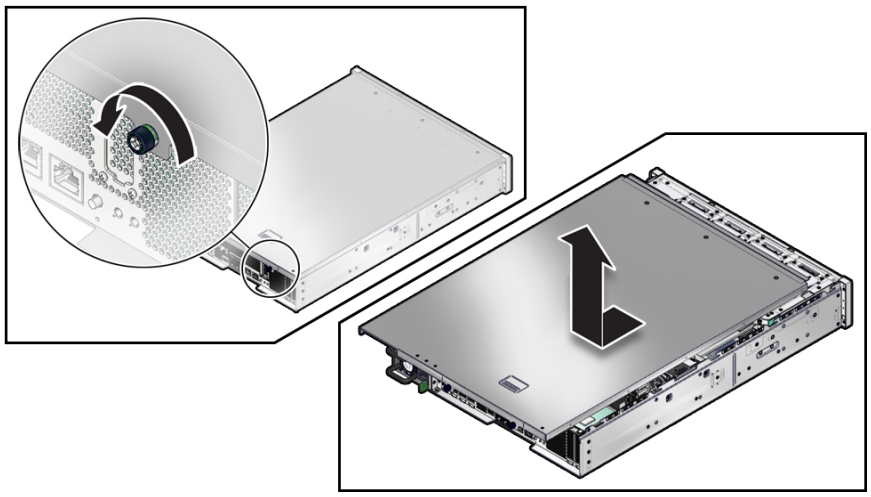
Related Information

- “Prevent ESD Damage” on page 55
- “Remove the Top Cover” on page 67
- “Install the Top Cover” on page 246
- “Safety Information” on page 44

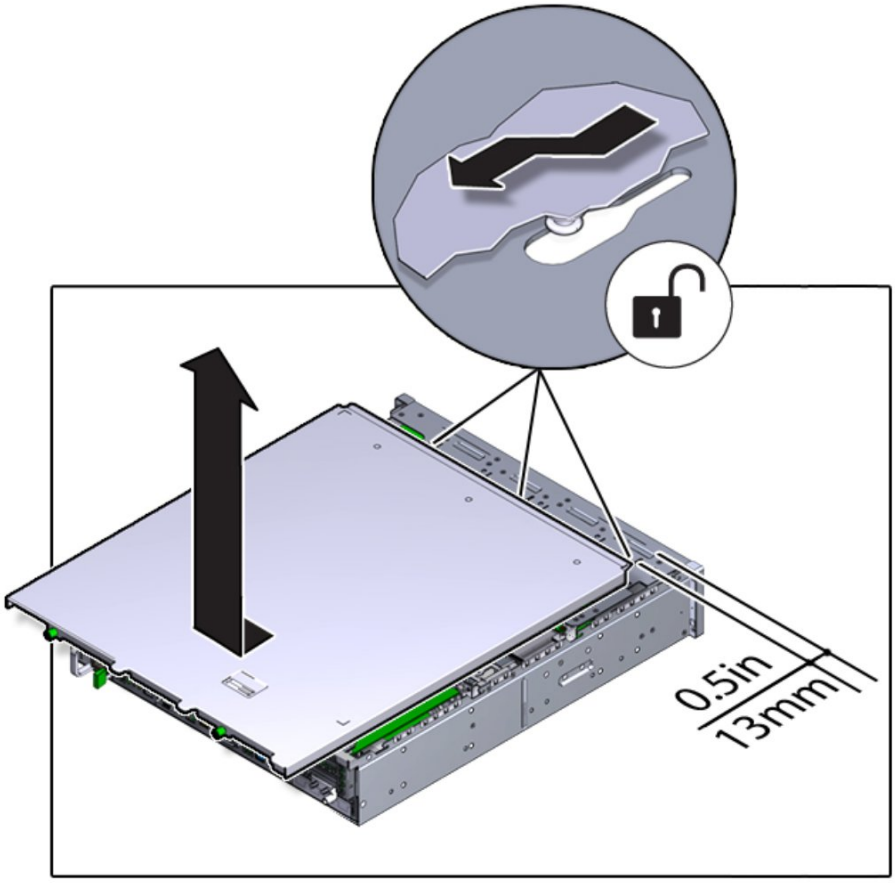
▼ Remove the Top Cover

1. **Remove the server from the rack.**
   See “Removing the Server From the Rack” on page 56.

2. **Fully loosen the two captive screws at the rear of the top cover.**



3. **Slide the top cover back 0.5 in (13 mm), and lift it straight up and off the chassis.**



Set the top cover aside.

4. **Consider your next step.**

Service these components:

- **“Servicing Fan Modules” on page 151**
- **“Servicing PCIe Cards” on page 169**

- **“Servicing the Battery” on page 189**
- **“Remove the Fan Tray” on page 69**

Related Information

- “Prevent ESD Damage” on page 55
- “Removing the Server From the Rack” on page 56
- “Install the Top Cover” on page 246
- “Safety Information” on page 44

▼ Remove the Fan Tray

1. **Complete these prerequisites in this order.**

   See:

   - **“Remove the Top Cover” on page 67**
   - **“Remove a Fan Module” on page 153**

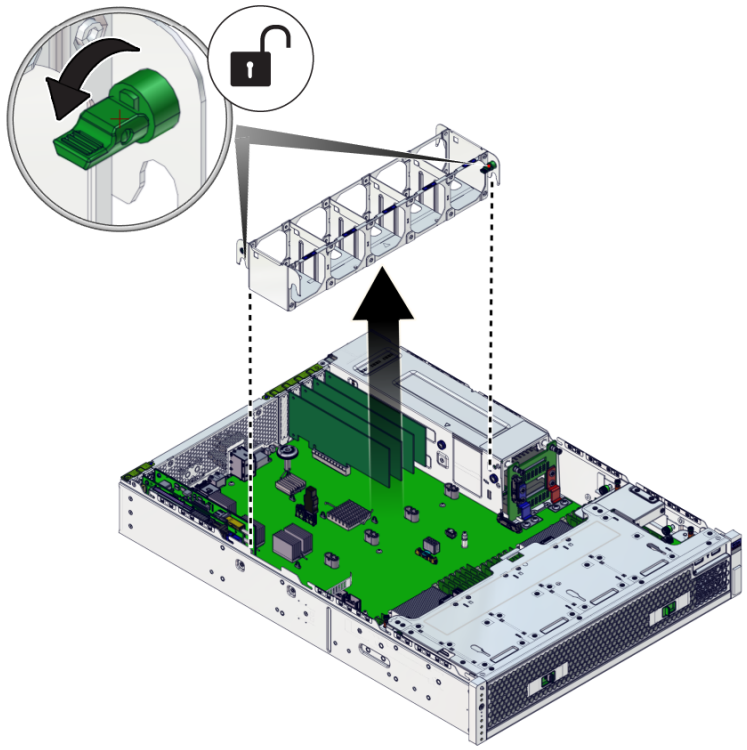
   Remove all fan modules.

2. **Open the two fan tray locks.**

3. **Lift the fan tray straight up and out of the chassis.**

Caution - The fan tray is inside the latch line of the cable pass through. Take care when lifting out the fan tray so that the cable pass through is not damaged or unseated.

Note - Be aware of all cable routing with respect to duct alignment pins.



4. **If servicing the components below the fan tray, such as the motherboard, remove the air ducts.**
   See "Remove the Air Duct" on page 75.
5. **Remove the fan tray bracket that is attached to the chassis.**
6. **Consider your next step.**
   - **Service the hard drive signal, hard drive power, or cables.**
     See "Servicing the Cables" on page 193.
   - **Pivot the drive cage.**

See “Rotate the Drive Cage to the Service Position” on page 71.

Related Information

- “Remove the Top Cover” on page 67
- “Install the Fan Tray” on page 244
- “Rotate the Drive Cage to the Service Position” on page 71

▼ Rotate the Drive Cage to the Service Position

1. **Complete these prerequisites in this order.**

   a. **“Remove the Top Cover” on page 67**

   b. **“Remove a Fan Module” on page 153**

   Note - Remove all fan modules.

   c. **“Remove the Fan Tray” on page 69**

2. **Disconnect the cables attached to the drive backplane, and the cable attached to the USB board.**

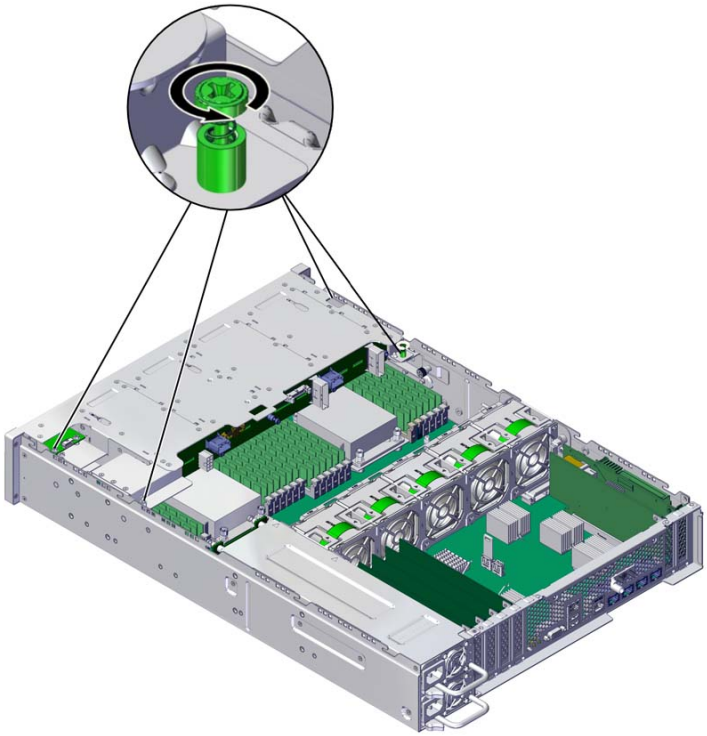
   See “Cable Configurations” on page 194 for location of cables.

   Tip - For easier removal, first press the cables in, then press the release tab, then pull the cables out,

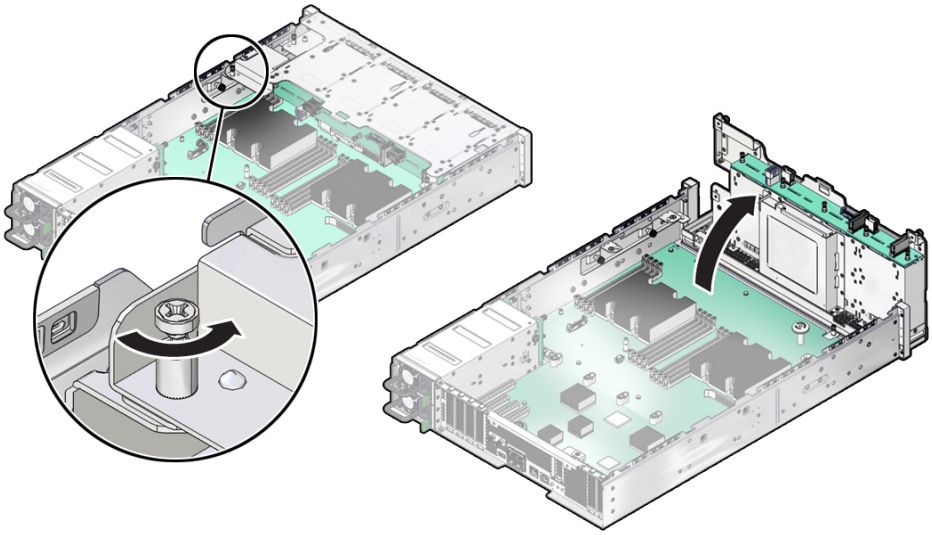
   The cables are shown in the illustration in “Cable Configurations” on page 194.

3. **Fully insert or remove any partially removed drives before continuing.**

4. **Fully loosen the four screws securing the drive cage to the server.**



5. **Rotate the drive cage to the vertical position.**



6. **Consider your next step.**

- **Service the drive backplane.**
  See “Servicing the Drive Backplane” on page 117.
- **Remove the PSU duct.**
  See “Remove the PSU Duct” on page 74.
- **Remove the air duct.**
  See “Remove the Air Duct” on page 75.

Related Information

- “Remove the Fan Tray” on page 69
- “Secure the Drive Cage” on page 241

Remove the PSU Duct

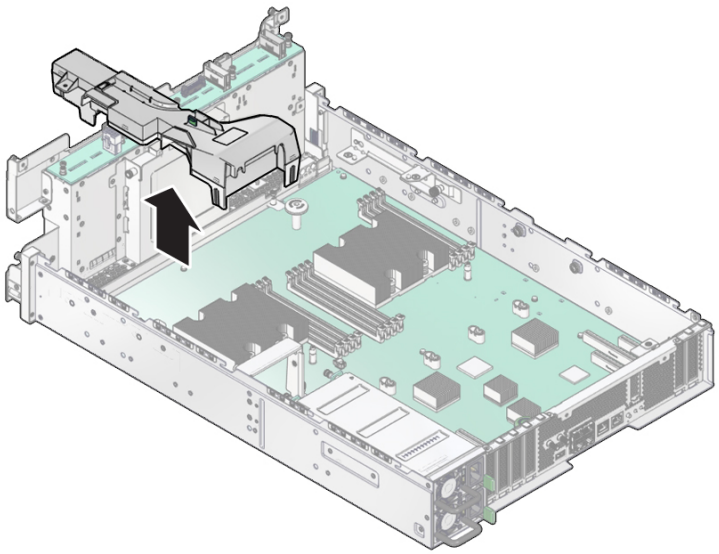
1. **Complete these prerequisites in this order.**

   See:

   - “Remove the Top Cover” on page 67
   - “Rotate the Drive Cage to the Service Position” on page 71

2. **Remove the USB cable from the channel in the PSU duct.**

3. **Lift the PSU duct straight up and off of the alignment pins.**



4. **Set the PSU duct aside.**

5. **Consider your next step.**

   See:

   - “Servicing the eUSB Drive” on page 103
   - “Servicing the USB Board” on page 109
   - “Servicing DIMMs” on page 159

- “Servicing the PDB” on page 141
- “Servicing the Cables” on page 193

Related Information

- “Remove the Air Duct” on page 75
- “Install the PSU Duct” on page 240

▼ Remove the Air Duct

1. **Complete these prerequisites in this order.**

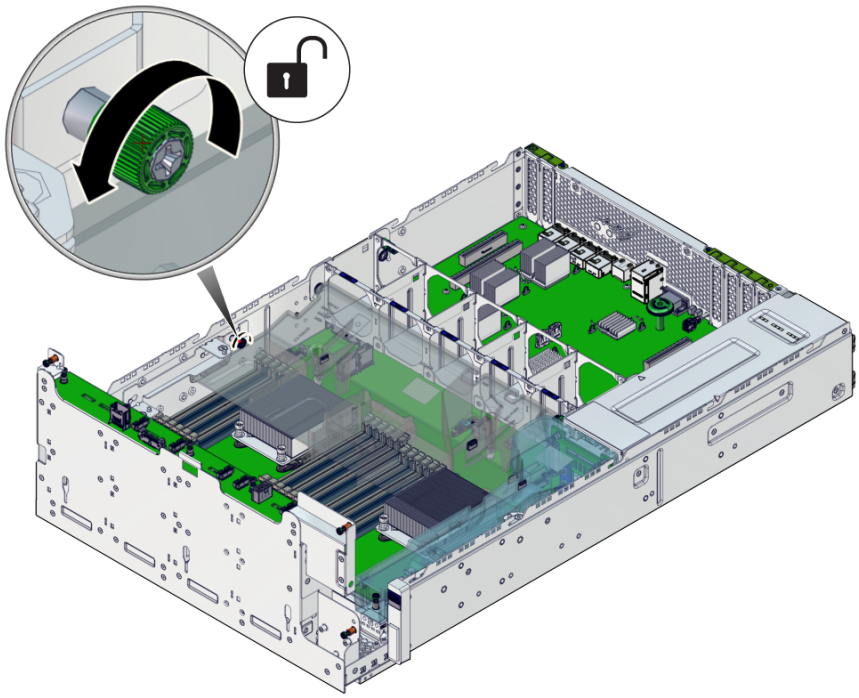
   a. **Remove the top cover.**
   See “Remove the Top Cover” on page 67.

   b. **Rotate the drive cage.**
   See “Rotate the Drive Cage to the Service Position” on page 71.

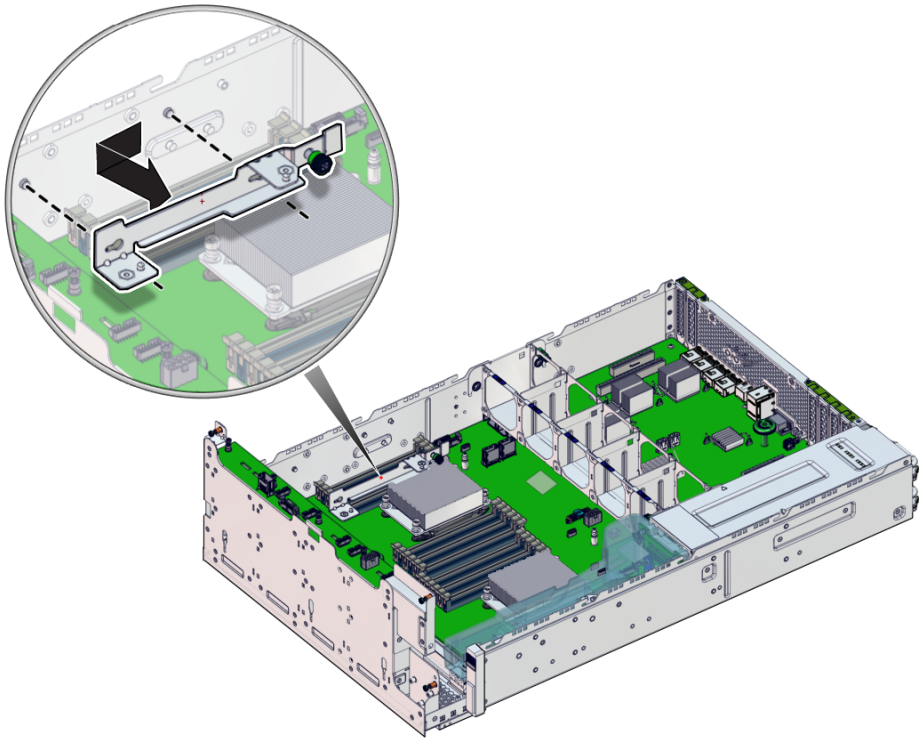
   c. **Remove the PSU duct.**
   See “Remove the PSU Duct” on page 74.

2. **Disconnect the cables, and move them out of the way.**

3. **Fully loosen the thumbscrew on the left bracket.**



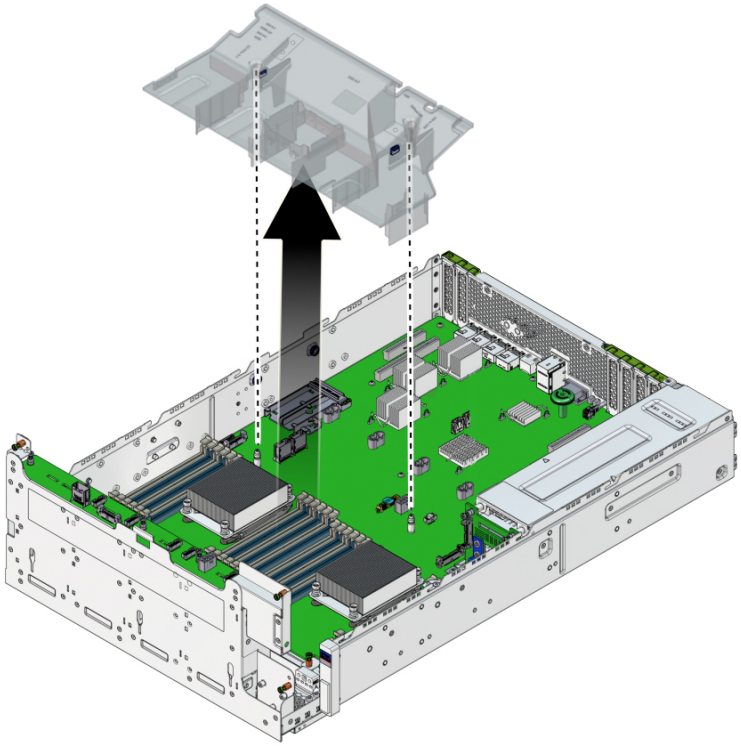
4. **Slide the left thumbscrew bracket forward and off of the mounting pins.**



5. **Set the thumbscrew bracket aside.**

6. **Remove the routed cables from the cable ties on the air duct and from the cutouts in the air duct.**

7. **Lift the air duct straight up and off the alignment pins.**



8. **Set the air duct aside.**

9. **Consider your next step.**

   See:

   - “Servicing DIMMs” on page 159
   - “Servicing the LED Board” on page 217

Related Information

- “Rotate the Drive Cage to the Service Position” on page 71
- “Install the PSU Duct” on page 240
- “Install the Air Duct” on page 236

Servicing the Air Filter

The air filter traps larger dust particles from entering the server. The air filter is located at the air intake end of the server. See “Component Locations (Storage, Power, NVMe, and Fan Modules)” on page 14.

Description	Links
Replace the air filter.	“Remove the Filter” on page 79 “Install the Filter” on page 82
Remove the air filter as part of another component's service operation.	“Remove the Filter” on page 79
Install the air filter as part of another component's service operation.	“Install the Filter” on page 82

Related Information

- “Identifying Components” on page 13
- “Detecting and Managing Faults” on page 25
- “Component Service Task Reference” on page 47
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

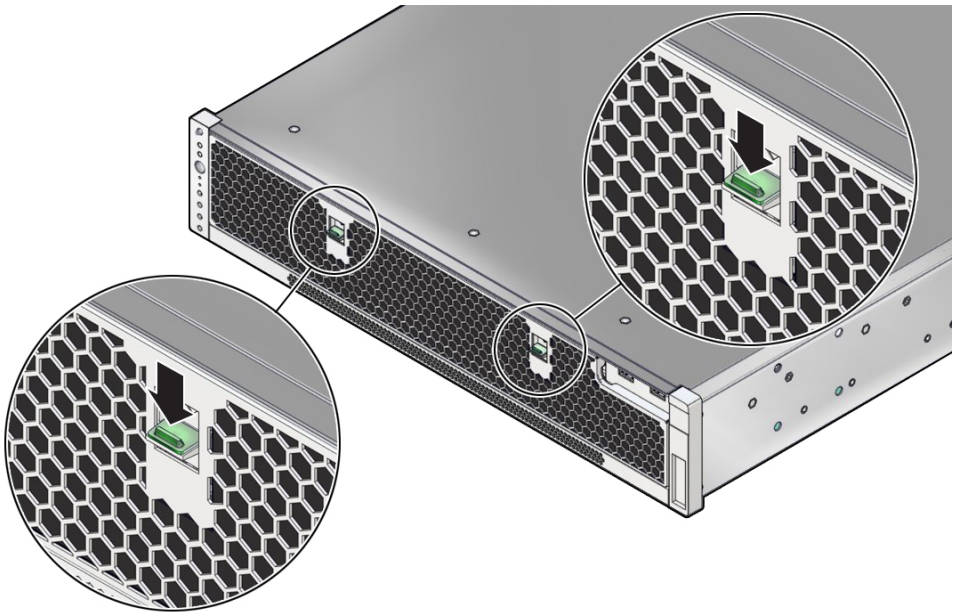
▼ Remove the Filter

Removing the air filter is a hot-swap operation. You do not need to power off the server before you remove the air filter.

1. **Follow safety and ESD precautions.**

   See “Preparing for Service” on page 43.

2. **Press down on the two release latches.**



3. **Tilt and pivot the air filter away from the server.**

4. **Lift the air filter from the server.**
5. **Set the air filter aside.**
6. **Consider your next step.**

   - **If you removed the air filter to replace it, install the new air filter.**

     See “Install the Filter” on page 82.

   - **If you removed the air filter as part of another component's service procedure, return to that procedure.**

     See “Component Service Task Reference” on page 47 for assistance.

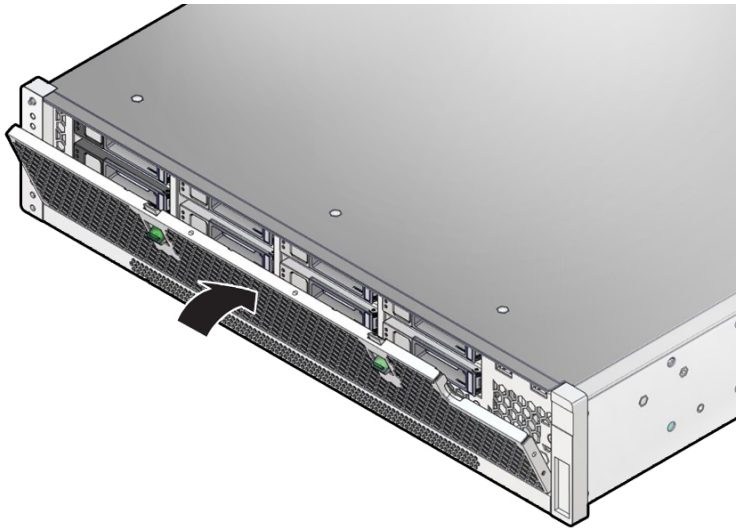
Related Information

- “Install the Filter” on page 82
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Install the Filter

Installing the air filter is a hot-swap operation. You do not need to power off the server before installing the air filter.

1. **If you need to remove an existing air filter, go to "Remove the Filter" on page 79.**
2. **Set the bottom edge of the air filter into the lip at the front of the server.**



The left and right release levers are facing forward.

3. **Tilt and pivot the air filter to vertical position.**
   The release levers snap the air filter into place.
4. **If you installed the air filter as part of another component's removal or installation procedure, return to that procedure.**
   See "Component Service Task Reference" on page 47 for assistance.

Related Information

- "Remove the Filter" on page 79

- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Servicing SAS Drives

SAS drives are used for nonvolatile storage of information. The drives are located across the front of the server, behind the filter. See “Component Locations (Storage, Power, NVMe, and Fan Modules)” on page 14.

Description	Links
Replace a faulty drive.	“SAS Drive Configuration” on page 86 “Locate a Faulty Drive” on page 87 “SAS Drive LEDs” on page 86 “Remove a SAS Drive” on page 89 “Install a SAS Drive” on page 92 “Verify a SAS Drive” on page 95
Remove a drive as part of another component's service operation.	“Remove a SAS Drive” on page 89
Install a drive as part of another component's service operation.	“Install a SAS Drive” on page 92
Add additional drives.	“SAS Drive Configuration” on page 86 “Install a SAS Drive” on page 92 “Verify a SAS Drive” on page 95
Decrease the number of existing drives.	“Remove a SAS Drive” on page 89
Identify a faulty drive.	“SAS Drive LEDs” on page 86 “Locate a Faulty Drive” on page 87 “Detecting and Managing Faults” on page 25

Related Information

- “Identifying Components” on page 13
- “Detecting and Managing Faults” on page 25

- “Component Service Task Reference” on page 47
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

SAS Drive Configuration

The server has eight drive slots. See “Component Locations (Storage, Power, NVMe, and Fan Modules)” on page 14.

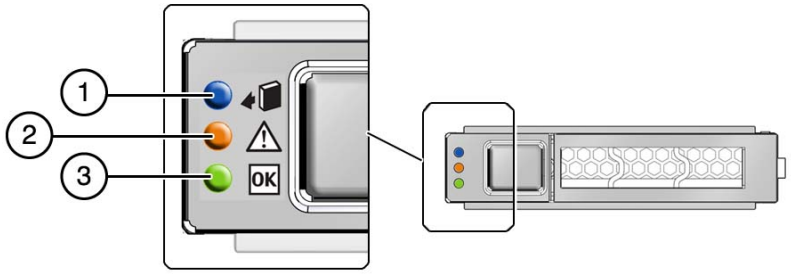
Caution - Overheating hazard. There must be no empty drive slots. Use fillers.

Related Information

- “Install a SAS Drive” on page 92
- “SAS Drive LEDs” on page 86
- “Locate a Faulty Drive” on page 87

SAS Drive LEDs

The status of each SAS drive is represented by the same three LEDs. The LEDs are located above the release button of each drive. See “Front Panel Components (Service)” on page 17. This illustration and table describe the functionality of the drive LEDs.



No.	Icon	Location	Name	Color	State and Meaning
1		Top	Ready to Remove	Blue	**On** – Drive can be removed as a hot-plug operation. **Off** – Do not remove the drive. **On** – Drive is ready to remove.
2		Middle	Attention Service Required	Amber	**On** – Fault detected. **Off** – No faults detected. **Flashing** – No function.
3		Bottom	OK/Activity	Green	**On** – Drive is functional without fault. **Off** – Drive is off or initializing. **Flashing** – Drive read and write activity.

Related Information

- “Locate a Faulty Drive” on page 87
- “SAS Drive Configuration” on page 86
- “Remove a SAS Drive” on page 89
- “Front Panel Components (Service)” on page 17
- “Rear Panel Components (Service)” on page 18

▼ Locate a Faulty Drive

1. **Check to see if any Server Service Required LEDs are lit or flashing.**

   See “Front Panel Components (Service)” on page 17.

2. **Visually inspect the drives to see if any of their status LEDs are lit or flashing.**

   See “SAS Drive LEDs” on page 86.

   If a drive is faulty, replace it. See “Remove a SAS Drive” on page 89.

3. **In Oracle ILOM, check the health of the storage system.**

```
-> show /System/Storage
 /System/Power
  Targets:
   Disks
   Controllers
```

```
   Volumes
   Expanders
  Properties:
   health = OK
   health_details = -
...
->
```

If the `health_details` property identifies a faulty drive, replace it. See "Remove a SAS Drive" on page 89.

4. **Check the health of the individual drives.**

```
-> show /System/Storage/Disks/Disk_x
 /System/Storage/Disks/Disk_0
  Targets:
  Properties:
   health = OK
   health_details = -
...
->
```

where *x* is the number of the drive, from `0` to `7`.

If the `health_details` property identifies the drive as faulty, replace it. See "Remove a SAS Drive" on page 89.

5. **Verify that a drive is faulty.**

If a drive is faulty, you will see `/SYS/DBP/HDD`*x* under the `Value` heading, where *x* is `0` to `7`.

For example, type:

```
-> show faulty
Target              | Property               | Value
--------------------+------------------------+------------------------------
/SP/faultmgmt/0     | fru                    | /SYS/DBP/HDD0
...
->
```

If a drive is faulty, replace it.

See "Remove a SAS Drive" on page 89.

If a FRU value different from `/SYS/DBP/HDD`*x* is displayed, see "Component Service Task Reference" on page 47 to identify which component is faulty.

6. **Use the Oracle ILOM `faultmgmt` shell to identify the faulty component.**

See "Identify Faulted Components" on page 27.

Check the `Fault class` and `Description` fields for more information.

If a drive is faulty, replace it.

See “Remove a SAS Drive” on page 89.

7. **If you are unable to determine if a drive is faulty, seek further information.**

   See “Detecting and Managing Faults” on page 25.

Related Information

- “Remove a SAS Drive” on page 89
- “SAS Drive Configuration” on page 86
- “SAS Drive LEDs” on page 86
- “Verify a SAS Drive” on page 95
- “Detecting and Managing Faults” on page 25

▼ Remove a SAS Drive

Removing a SAS drive is a hot-swap operation. You must run commands on the server before you remove the drive.

1. **Follow safety and ESD precautions.**

   See “Preparing for Service” on page 43.

2. **Determine which drive to remove.**

   See “Locate a Faulty Drive” on page 87.

3. **Tilt and pivot the air filter away from the server.**

   See “Remove the Filter” on page 79.

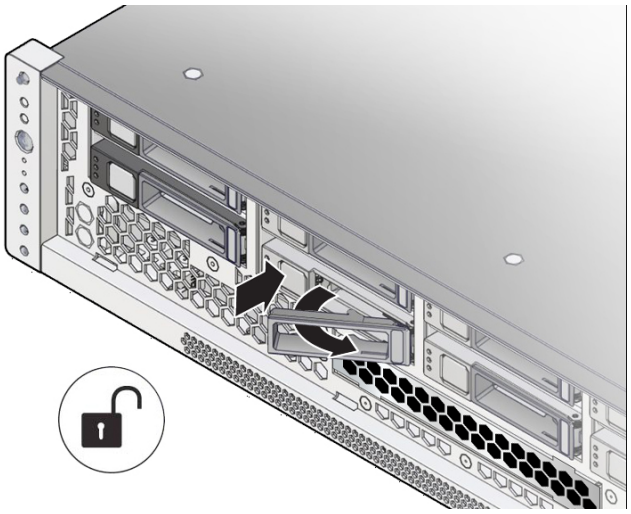
4. **Determine if you need to shut down the OS to remove the drive, then perform one of these actions.**

   - **If the drive cannot be taken offline without shutting down the OS, follow instructions in “Power Off the Server (Power Button - Graceful)” on page 51 then go to Step 7.**
   - **If the drive can be taken offline without shutting down the OS, go to Step 5.**

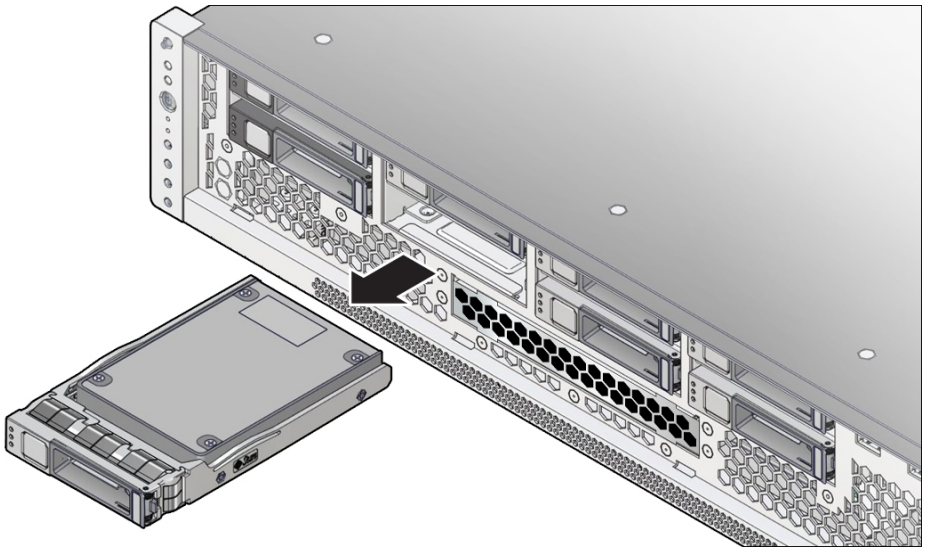
5. **Take the drive offline according to your OS.**
   See the OS documentation.

6. **Verify that the drive's blue Ready-to-Remove LED is lit.**
   See “SAS Drive LEDs” on page 86.

7. **Press the release button and pivot the release lever open to the right.**



8. **Grasp the release lever and pull the drive out of the server.**



9. **Set the drive aside.**

10. **Repeat from Step 5 for any additional drives to be removed.**

11. **Consider your next step.**

- **If you removed a drive as part of a replacement operation, install a new drive.**

  See “Install a SAS Drive” on page 92.

- **If you removed a drive as part of another component's removal or installation procedure, return to that procedure.**

  See “Component Service Task Reference” on page 47.

- **If you are not replacing the drive, install a drive filler in its place.**

  See “Install a SAS Drive” on page 92.

Caution - Overheating hazard. There must be no empty drive slots.

Related Information

- "Locate a Faulty Drive" on page 87
- "Install a SAS Drive" on page 92
- "Preparing for Service" on page 43
- "Returning a Server to Operation" on page 235

Install a SAS Drive

Installing a SAS drive is a hot-plug operation. You do not need to power off the server before installing the drive. This procedure is the same for installing a drive filler.

1. **Consider your first step.**

   - **If you are replacing a drive, remove the faulty or obsolete drive first, then return to this procedure, Step 3.**

     See "Remove a SAS Drive" on page 89.

   - **If you are installing a new or an additional drive, go to Step 2.**

   - **If you are installing a drive as part of another component's service procedure, go to Step 3.**

2. **Review this information and complete these prerequisites in this order.**

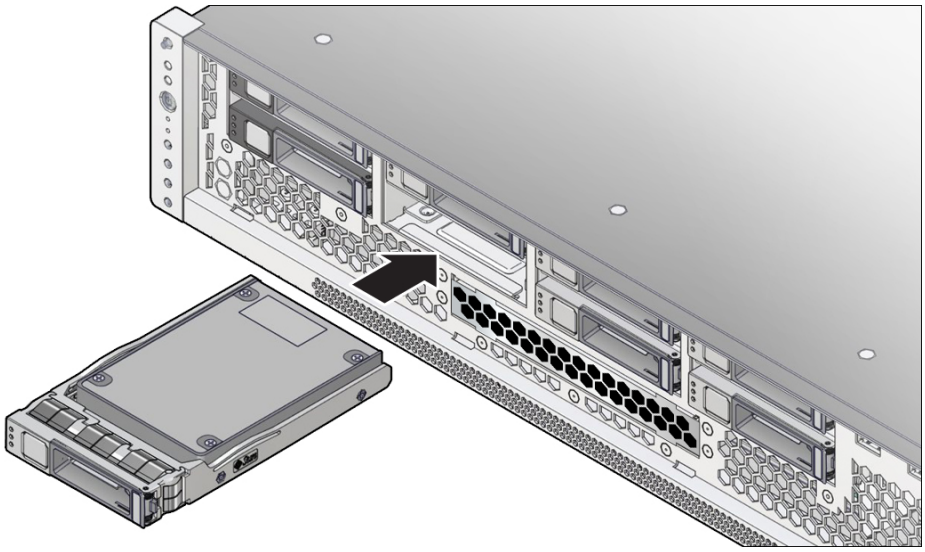
   See:

   - "Preparing for Service" on page 43
   - "SAS Drive Configuration" on page 86
   - "Remove the Filter" on page 79

3. **Push the release button of the drive.**

   The release lever pops out.

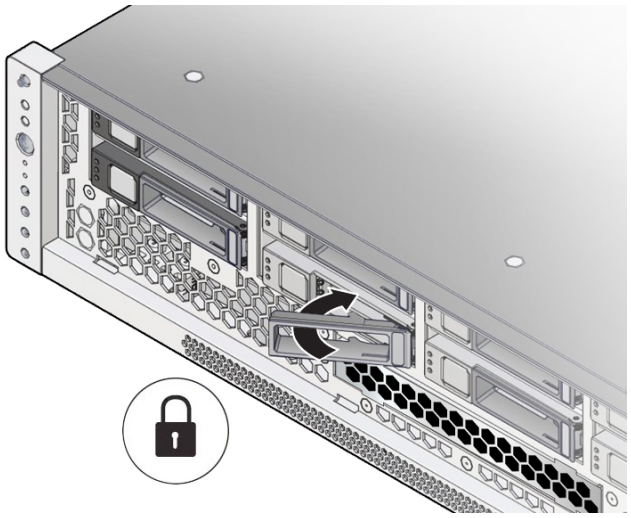
4. **Align the drive with the slot where it installs into the server.**



The connector is at the rear of the drive and the release button is on the left.

5. **Press on the drive to slide the drive into the server until the release lever moves slightly inward.**

6. **Press the release lever fully closed with a click, securing the drive into the server.**



7. **Repeat from Step 3 through Step 6 for any additional drives that you are installing.**

8. **Consider your next step.**

   - **If you installed a new or replacement drive, go to Step 9.**
   - **If you installed a drive as part of another component's removal or installation procedure, return to that procedure.**

     See “Component Service Task Reference” on page 47.

9. **Rotate the air filter up until the latches click.**

   See “Install the Filter” on page 82.

10. **Complete these tasks to finish the service procedure.**

    See:

    - “Returning a Server to Operation” on page 235
    - “Verify a SAS Drive” on page 95

Related Information

- “Remove a SAS Drive” on page 89
- “Verify a SAS Drive” on page 95
- “SAS Drive Configuration” on page 86
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

▼ Verify a SAS Drive

After you install a SAS drive, you can verify its functionality.

1. **Access Oracle ILOM.**

   See “Log In to Oracle ILOM (Service)” on page 26.

2. **Check for the presence of the drive.**

```
-> show /SYS/DBP/HDDx/PRSNT
/SYS/DBP/HDD0/PRSNT
Targets:

    Properties:
        type = Entity Presence
        ipmi_name = HDD0/PRSNT
        class = Discrete Sensor
        value = Present
        alarm_status = cleared

->
```

   where *x* is `0` to `7`.

3. **If you replaced a drive, verify that the drive location is no longer considered faulty, then return to this procedure.**

   See “Locate a Faulty Drive” on page 87.

4. **If the OS was shut down, and the drive you installed was not the boot device, boot the OS.**

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

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

   See “SAS Drive LEDs” on page 86.

6. **When the drive is functioning properly, configure the drive.**

   Refer to the OS documentation.

Related Information

- “Install a SAS Drive” on page 92
- “SAS Drive Configuration” on page 86
- “SAS Drive LEDs” on page 86
- “Locate a Faulty Drive” on page 87

Servicing NVMe Storage Drives

The procedure to install, remove, or replace an NVMe drive depends upon the OS. You can replace the factory-installed NVMe and cables in case either of them become faulty. NVMe support is provided on the motherboard.

Note - NVMe storage drives are supported only on servers that are running Oracle Solaris. Servers that are running Oracle VM, Windows Server, or VMware ESXi do not support NVMe drives. Support for NVMe is on the motherboard.

Caution - Overheating hazard. There must be no empty drive slots. Use fillers.

Description	Links
Replace a faulty NVMe drive.	“Detecting and Managing Faults” on page 25
	“Unmount an NVMe Drive” on page 98
	“Remove an NVMe Drive” on page 99
	“Verify Removal of an NVMe Drive” on page 100
	“Install an NVMe Drive” on page 100
	“Power On an NVMe Drive and Attach a Device Driver” on page 101
	“Verify the Operation of an NVMe Storage Drive” on page 102
Replace a faulty NVMe cable.	“Servicing the NVMe Cables” on page 207
Add an NVMe drive.	“Install an NVMe Drive” on page 100
	“Power On an NVMe Drive and Attach a Device Driver” on page 101
	“Verify the Operation of an NVMe Storage Drive” on page 102
Remove an NVMe drive.	“Unmount an NVMe Drive” on page 98
	“Remove an NVMe Drive” on page 99
	“Verify Removal of an NVMe Drive” on page 100

Description	Links
Remove a cable as part of another component's service operation.	"Remove NVMe Cables" on page 208 "Servicing the Cables" on page 193
Install a cable as part of another component's service operation.	"Install NVMe Cables" on page 209 "Servicing the Cables" on page 193

Related Information

- "Servicing SAS Drives" on page 85
- "Servicing PCIe Cards" on page 169
- "Servicing the Cables" on page 193

▼ Unmount an NVMe Drive

This task uses `pcie13` as an example.

1. **Log in to Oracle Solaris.**

2. **Find the NVMe drive slot number.**

   This output has been edited for clarity.

```
# hotplug list -lc
Connection  State    Description  Path
----------------------------------------------------------------
...
pcie13      ENABLED  PCIe-Native  /pci@7a,0/pci8086,2f08@3/pci111d,80b5@4
...
```

3. **Detach the device driver, and power off the drive slot.**

```
# hotplug poweroff pcie13
```

4. **Verify that the NVMe drive is unmounted.**

   The state of the slot must be `PRESENT`.

```
# hotplug list -lc
Connection  State    Description  Path
----------------------------------------------------------------
pcie13      PRESENT  PCIe-Native  /pci@7a,0/pci8086,2f08@3/pci111d,80b5@4
```

5. **Remove the NVMe drive.**

See “Remove an NVMe Drive” on page 99.

Related Information

- “Remove an NVMe Drive” on page 99
- “Verify Removal of an NVMe Drive” on page 100
- “Install an NVMe Drive” on page 100

▼ Remove an NVMe Drive

After you unmount the NVMe drive, the steps to physically remove the dirve are the same as the steps to remove a SAS storage dirve. For detailed instructions, see “Remove a SAS Drive” on page 89.

1. **Unmount the drive depending on the OS.**
   See “Unmount an NVMe Drive” on page 98.
2. **Follow safety and ESD precautions.**
   See “Prevent ESD Damage” on page 55.
3. **Identify the physical location of the NVMe drive that you want to remove.**
   For drive locations, see “Component Locations (Storage, Power, NVMe, and Fan Modules)” on page 14.
4. **Tilt and pivot the air filter away from the server.**
   See “Remove the Filter” on page 79.
5. **Verify that the OK to Remove LED on the NVMe drive is lit.**
6. **Push the latch release button to open the drive latch.**
7. **Grasp the latch, and pull the drive out of the drive slot.**
8. **Consider your next step.**
   - **If you are replacing the drive, verify the removal.**
     See “Verify Removal of an NVMe Drive” on page 100.
   - **If you are not replacing the drive, install a filler in the empty drive slot to maintain proper airflow, then perform administrative tasks to configure the server to operate without the drive.**

Related Information

- “Install an NVMe Drive” on page 100
- “Power On an NVMe Drive and Attach a Device Driver” on page 101
- “Verify the Operation of an NVMe Storage Drive” on page 102

Verify Removal of an NVMe Drive

This task uses `pcie13` as an example.

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

Note - The state of the slot must be `EMPTY`.

```
# hotplug list -lc
Connection  State    Description  Path
--------------------------------------------------------------------
pcie13      EMPTY    PCIe-Native  /pci@7a,0/pci8086,2f08@3/pci111d,80b5@4
```

Related Information

- “Unmount an NVMe Drive” on page 98
- “Remove an NVMe Drive” on page 99
- “Power On an NVMe Drive and Attach a Device Driver” on page 101
- “Verify the Operation of an NVMe Storage Drive” on page 102

Install an NVMe Drive

The steps to install an NVMe drive are the same as the steps to install a SAS drive. For detailed instructions, see “Install a SAS Drive” on page 92.

Note - After you remove an NVMe drive from the server, wait at least 10 seconds before installing a replacement drive.

1. **Follow safety and ESD precautions.**

   See “Prevent ESD Damage” on page 55.

2. **Remove the new drive from its packaging, and place the drive on an antistatic mat.**

3. **Consider your next step.**

   - **If adding a drive to an empty slot, remove the drive filler.**
   - **If replacing a faulty NVMe drive, remove the drive.**
     See “Remove an NVMe Drive” on page 99.

4. **Align the new drive with the drive slot.**
   The drive is physically addressed according to the slot in which it is installed. You must install a replacement drive in the same slot as the drive that was removed.

5. **Slide the drive into the slot until the drive is fully seated.**

6. **Rotate the air filter up until the latches click.**
   See “Install the Filter” on page 82.

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

8. **Power on the drive and attach a device driver.**
   See “Power On an NVMe Drive and Attach a Device Driver” on page 101.

Related Information

- “Power On an NVMe Drive and Attach a Device Driver” on page 101
- “Verify the Operation of an NVMe Storage Drive” on page 102

▼ Power On an NVMe Drive and Attach a Device Driver

This task uses `pcie13` as an example.

1. **Enable the drive slot.**

```
# hotplug enable pcie x
```

   where *x* is the slot number. See “Device Paths” on page 20.

2. **Display the status of the NVMe drive.**

Note - The state of the slot must be `Enabled`.

```
# hotplug list –lc
```

```
Connection  State    Description     Path
----------------------------------------------------------------------
pcie13      Enabled  PCIe-Native     /pci@300/pci@1/pci@a
```

3. **Check the NVMe drive information.**

   ```
   # nvmeadm list
   ```

4. **Verify the operation of the drive.**

   See “Verify the Operation of an NVMe Storage Drive” on page 102.

Related Information

- “Install an NVMe Drive” on page 100
- “Verify the Operation of an NVMe Storage Drive” on page 102

▼ Verify the Operation of an NVMe Storage Drive

- **Perform one of these steps:**

  - **Check the `/var/log/messages` log file.**
  - **Type the `ls -l /dev/nvme*` command.**

Related Information

- “Verify Removal of an NVMe Drive” on page 100
- “Install an NVMe Drive” on page 100
- “Power On an NVMe Drive and Attach a Device Driver” on page 101

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 55.

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.

The eUSB drive provides USB 3.0 connectivity at the rear of the server. See “Component Locations (Storage, Power, NVMe, and Fan Modules)” on page 14.

Description	Links
Replace a faulty eUSB drive.	“Detecting and Managing Faults” on page 25 “Locate an eUSB Drive” on page 104 “Determine if an eUSB Drive is Faulty” on page 104 “Remove the eUSB Drive” on page 105 “Install the eUSB Drive” on page 106
Remove a eUSB drive.	“Remove the eUSB Drive” on page 105
Install a eUSB drive.	“Install the eUSB Drive” on page 106

Related Information

- “Identifying Components” on page 13
- “Detecting and Managing Faults” on page 25
- “Component Service Task Reference” on page 47
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Locate an eUSB Drive

- **From the OpenBoot PROM, type:**

```
ok probe-scsi-all
.../pci@300/pci@1/pci@0/pci@2/usb@0/storage@1Unit...0...Disk...smiMICRON...eUSB.DISK...
1112
...
```

Related Information

- “Determine if an eUSB Drive is Faulty” on page 104
- “Identifying Components” on page 13
- “Install the eUSB Drive” on page 106
- “Remove the eUSB Drive” on page 105

Determine if an eUSB Drive is Faulty

1. **Check to see if any Server Service Required LEDs are lit or flashing.**

   See “Front Panel Components (Service)” on page 17 and “Interpreting LEDs” on page 30.

2. **In Oracle ILOM, verify that the eUSB drive is recognized and check the fault_state.**

```
->show/SYS/MB/EUSB_DISK/
./SYS/MB/EUSB_DISK
....Targets:
....Properties:
....type.=.Flash.Mini-Disk
....fault_state.=.OK
....clear_fault_action.=.none)
....Commands:
....cd
....set
....show
...
->
```

3. **Use the Oracle ILOM `faultmgmt` shell or the `fmadm faulty` command to identify a faulty component.**

See “Identify Faulted Components” on page 27.

Check the `Fault class` and `Description` fields for more information.

4. **If an eUSB drive is faulty, replace it.**
   See “Remove the eUSB Drive” on page 105.

5. **If you are unable to determine if an eUSB drive is faulty, seek further information.**
   See “Detecting and Managing Faults” on page 25.

Related Information

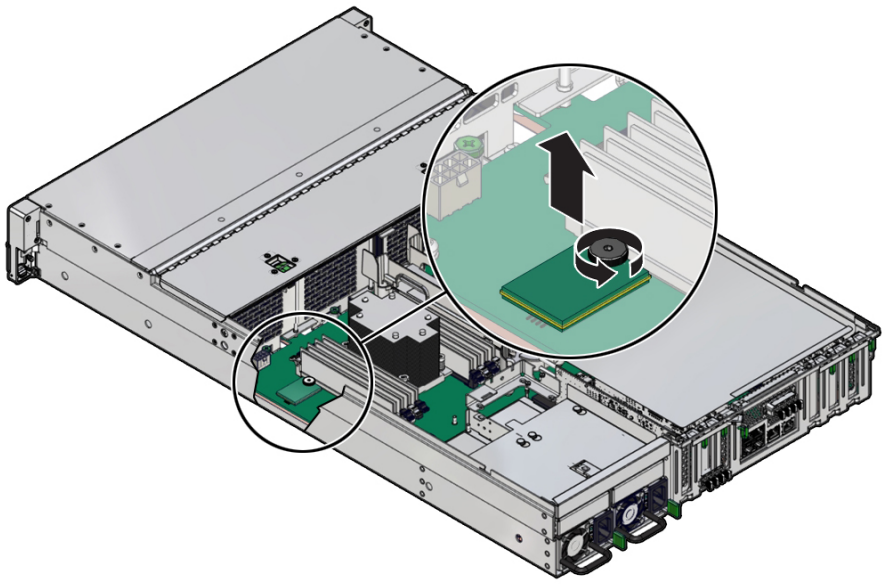
- “Identifying Components” on page 13
- “Detecting and Managing Faults” on page 25
- “Remove the eUSB Drive” on page 105

▼ Remove the eUSB Drive

1. **Prepare for servicing.**
   See “Preparing for Service” on page 43.

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.**



4. **If replacing a faulty eUSB drive, install a new drive.**

   See “Install the eUSB Drive” on page 106.

Related Information

- “Identifying Components” on page 13
- “Install the eUSB Drive” on page 106

▼ Install the eUSB Drive

1. **Prevent ESD damage.**

   See “Preparing for Service” on page 43.

2. **If replacing an eUSB drive, remove the faulty drive.**

   See “Remove the eUSB Drive” on page 105.

3. **Press the new eUSB drive into the socket on the motherboard.**
4. **Tighten the screw to secure the drive to the motherboard.**
5. **Return the server to operation.**

   See “Returning a Server to Operation” on page 235.

Related Information

- “Remove the eUSB Drive” on page 105
- “Detecting and Managing Faults” on page 25

Servicing the USB Board

The USB board provides USB 2.0 connectivity at the front of the chassis. See “Component Locations (Storage, Power, NVMe, and Fan Modules)” on page 14.

Description	Links
Replace the faulty USB board.	“Detecting and Managing Faults” on page 25 “Remove the USB Board” on page 109 “Install the USB Board” on page 113
Remove the USB board as part of another component's service operation.	“Remove the USB Board” on page 109
Install the USB board as part of another component's service operation.	“Install the USB Board” on page 113

Related Information

- “Identifying Components” on page 13
- “Detecting and Managing Faults” on page 25
- “Component Service Task Reference” on page 47
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

▼ Remove the USB Board

Removing the USB board is a cold-service operation. You must power off the server before you remove the USB board.

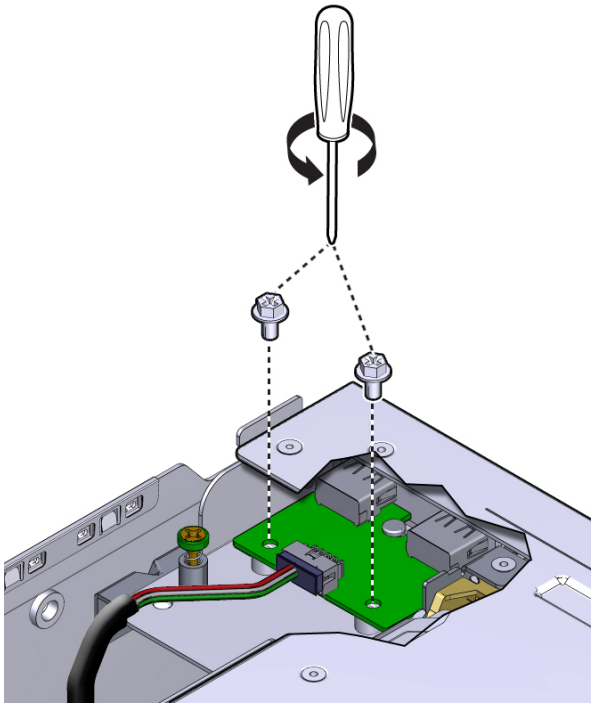
1. **Consider your first step.**

   - **If you have not prepared for service, do so now.**

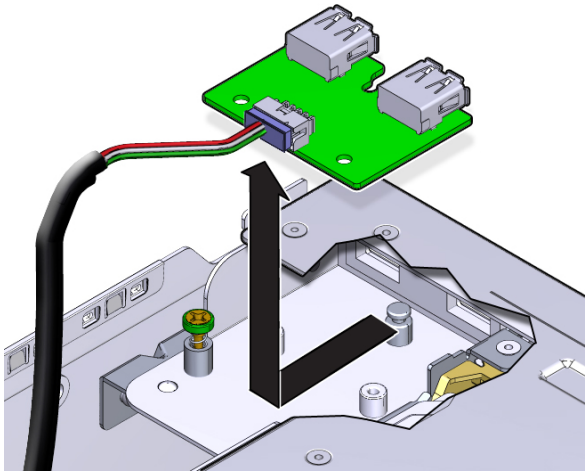
See “Preparing for Service” on page 43.

- **If you are removing the USB board as part of another component's removal or installation procedure, go to Step 5.**

2. **Remove the two screws securing the USB board to the chassis.**



3. **Slide the USB board rearward off of the alignment pin and allow the USB board to float freely.**



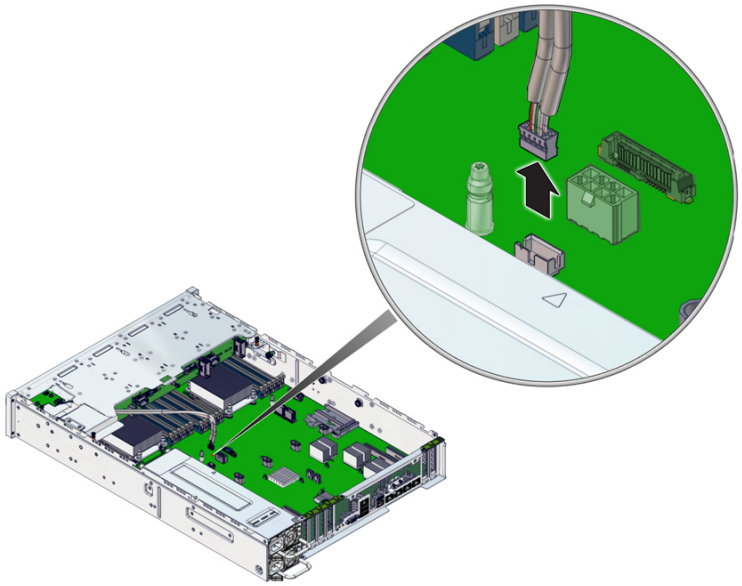
Note - Do not disconnect the cable from the USB board.

4. **Review this information and complete these prerequisites in this order.**

   See:

   - “Remove the Filter” on page 79
   - “Rotate the Drive Cage to the Service Position” on page 71

5. **Disconnect the cable from the motherboard.**



6. **Gently lift the USB board and cable out of the chassis.**
7. **Set the USB board aside.**
8. **Consider your next step.**

   - **If you removed the USB board as part of a replacement operation, install a new USB board.**
     See “Install the USB Board” on page 113.
   - **If you removed the USB board as part of another component's removal or installation procedure, return to that procedure.**
     See “Component Service Task Reference” on page 47.

Related Information

- “Install the USB Board” on page 113
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Install the USB Board

Installing the USB board is a cold-service operation. You must power off the server before installing the USB board.

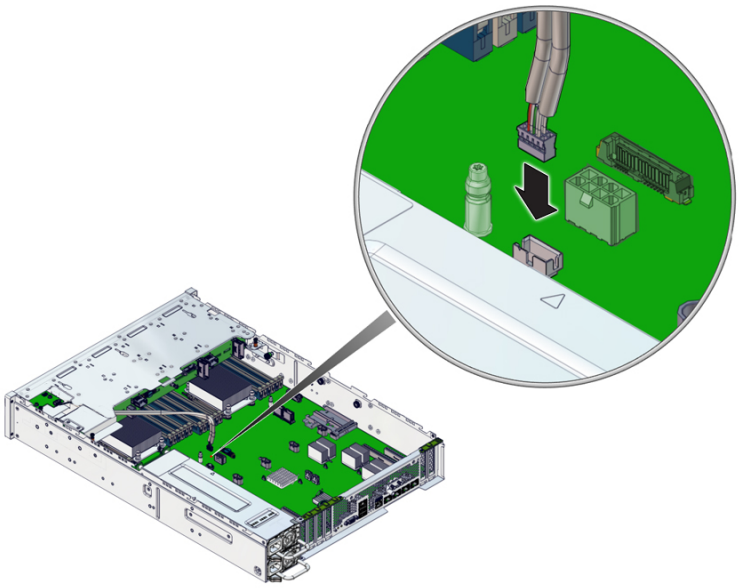
1. **Consider your first step.**

   - **If you are replacing the USB board, remove the faulty or obsolete USB board first, then return to this procedure, Step 4.**

     See “Remove the USB Board” on page 109.

   - **If you are installing the USB board as part of another component's removal or installation procedure, go to Step 4.**

2. **Connect the cable to the motherboard and the USB board.**



3. **Review this information and complete these prerequisites in this order.**

   See:

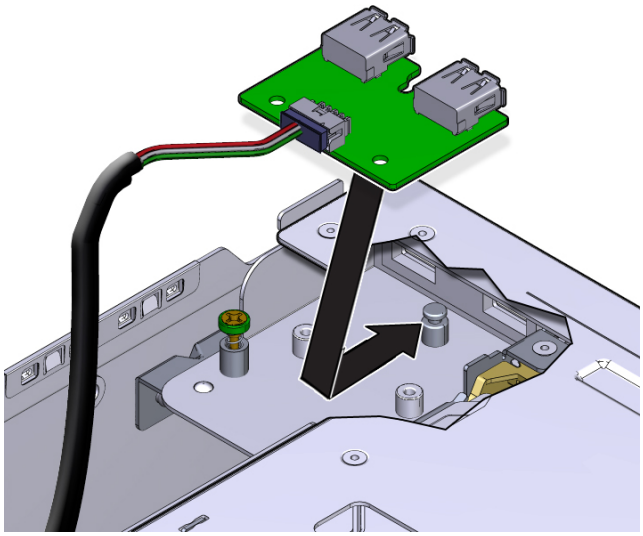
   - “Install the PSU Duct” on page 240

- “Install the Air Duct” on page 236
- “Secure the Drive Cage” on page 241
- “Install the Filter” on page 82

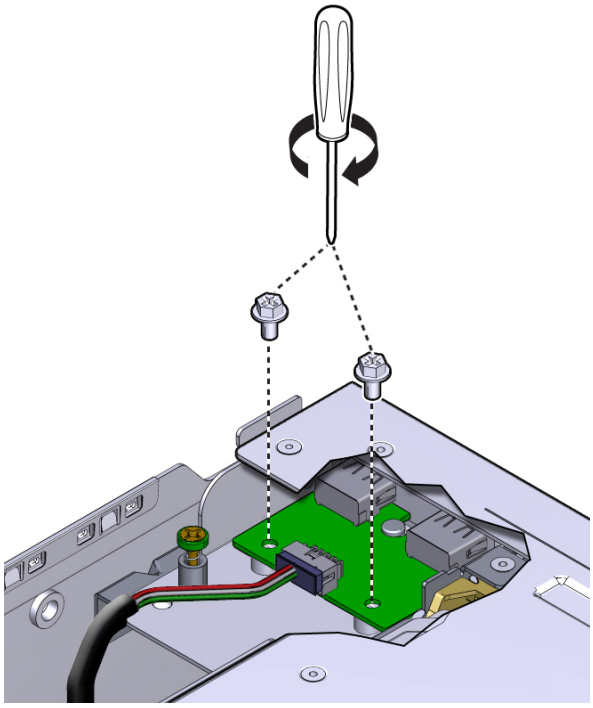
4. **Position the USB board to the location where it installs into the chassis.**

   The USB connectors are forward and upward.

5. **Lower the USB board to the chassis, and slide the board forward over the alignment pin.**



6. **Compress the EMI shielding while you install and tighten the two screws.**



7. **Consider your next step.**

   - **If you installed the USB board as part of a replacement operation, go to Step 8.**
   - **If you installed the USB board as part of another component's removal or installation procedure, return to that procedure.**

     See “Component Service Task Reference” on page 47.

8. **Finish the installation procedure.**

   See “Returning a Server to Operation” on page 235.

Related Information

- “Remove the USB Board” on page 109

- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Servicing the Drive Backplane

The drive backplane provides an interconnect for the drives and their controllers. The drive backplane is located at the rear of the drive cage. See “Identifying Components” on page 13.

Description	Links
Replace a faulty drive backplane.	“Drive Backplane Configuration” on page 117 “Determine if the Drive Backplane Is Faulty” on page 118 “Remove the Drive Backplane” on page 119 “Install the Drive Backplane” on page 122 “Verify the Drive Backplane” on page 124
Remove the drive backplane as part of another component's service operation.	“Remove the Drive Backplane” on page 119
Install the drive backplane as part of another component's service operation.	“Install the Drive Backplane” on page 122
Determine if the drive backplane is faulty.	“Determine if the Drive Backplane Is Faulty” on page 118 “Detecting and Managing Faults” on page 25

Related Information

- “Identifying Components” on page 13
- “Detecting and Managing Faults” on page 25
- “Component Service Task Reference” on page 47
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Drive Backplane Configuration

The server has eight drives. See “Identifying Components” on page 13.

Related Information

- “Determine if the Drive Backplane Is Faulty” on page 118
- “Preparing for Service” on page 43
- “Install the Drive Backplane” on page 122

▼ Determine if the Drive Backplane Is Faulty

You must determine if the drive backplane is faulty before you replace it.

1. **Check to see if any Server Service Required LEDs are lit or flashing.**

   See “Front Panel Components (Service)” on page 17.

2. **In Oracle ILOM, check the health of the storage system.**

```
-> show /System/Storage
 /System/Power
  Targets:
   Disks
   Controllers
   Volumes
   Expanders
  Properties:
   health = OK
   health_details = -
...
->
```

3. **Verify that the drive backplane is faulty.**

   For example, type:

```
-> show faulty
Target              | Property               | Value
--------------------+------------------------+------------------------------
/SP/faultmgmt/0     | fru                    | /SYS/DBP
...
->
```

   - If the drive backplane is faulty, you will see `/SYS/DBP` under the `Value` heading.
   - If a FRU value different from `/SYS/DBP` is displayed, see “Component Service Task Reference” on page 47 to identify which component is faulty.

4. **Use the Oracle ILOM `faultmgmt` shell to identify the faulty component.**

   See “Identify Faulted Components” on page 27.

   Check the `Fault class` and `Description` fields for more information.

5. **If the drive backplane is faulty, replace it.**

   See “Remove the Drive Backplane” on page 119.

6. **If you are unable to determine if the drive backplane is faulty, seek more information.**

   See “Detecting and Managing Faults” on page 25.

Related Information

- “Preparing for Service” on page 43
- “Remove the Drive Backplane” on page 119
- “Detecting and Managing Faults” on page 25

▼ Remove the Drive Backplane

Removing the drive backplane is a cold-service operation. You must power off the server before you remove the drive backplane.

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

1. **Prepare for service.**

   See “Preparing for Service” on page 43.

2. **Tilt and pivot the air filter away from the server.**

   See “Remove the Filter” on page 79.

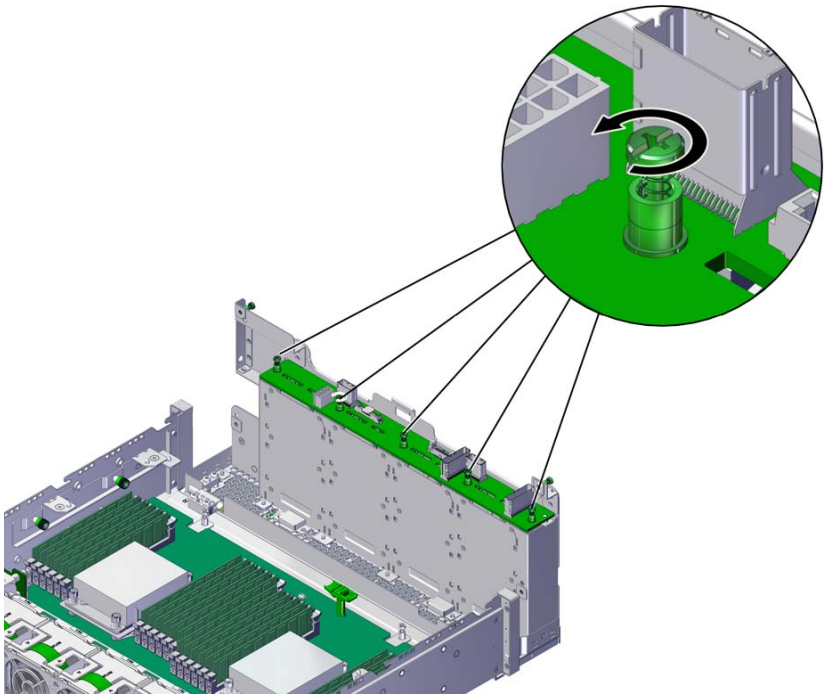
3. **Complete these prerequisites in this order.**

   See:

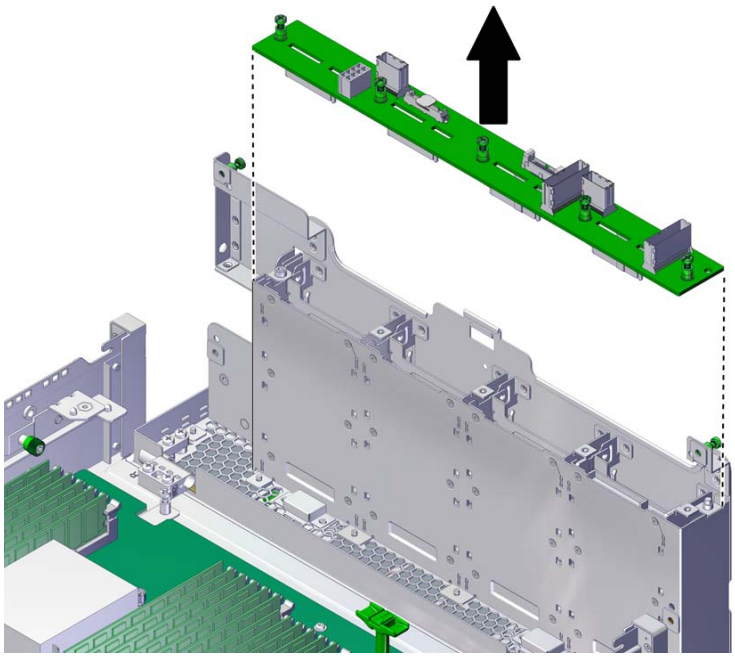
   - “Remove a SAS Drive” on page 89

     Remove all drives.
   - “Rotate the Drive Cage to the Service Position” on page 71

4. **Loosen the five screws from the drive backplane.**



5. **Lift the drive backplane off of the alignment pins and out of the server.**



6. **Set the drive backplane aside.**

7. **Consider your next step.**

   - **If you are replacing the drive backplane, install a new drive backplane.**
     See “Install the Drive Backplane” on page 122.

   - **If you removed the drive backplane as part of another component's removal or installation procedure, return to that procedure.**
     See “Component Service Task Reference” on page 47.

Related Information

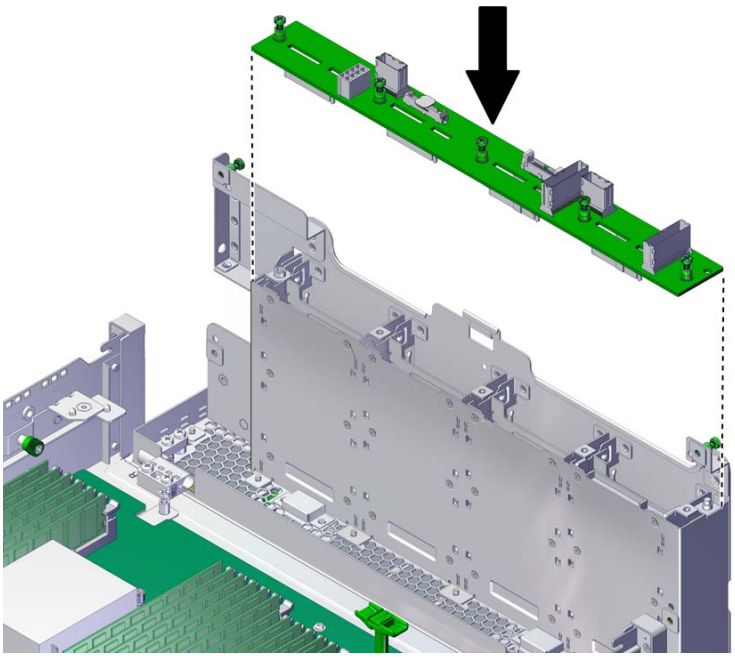
- “Remove the Drive Backplane” on page 119
- “Install the Drive Backplane” on page 122

- “Returning a Server to Operation” on page 235

Install the Drive Backplane

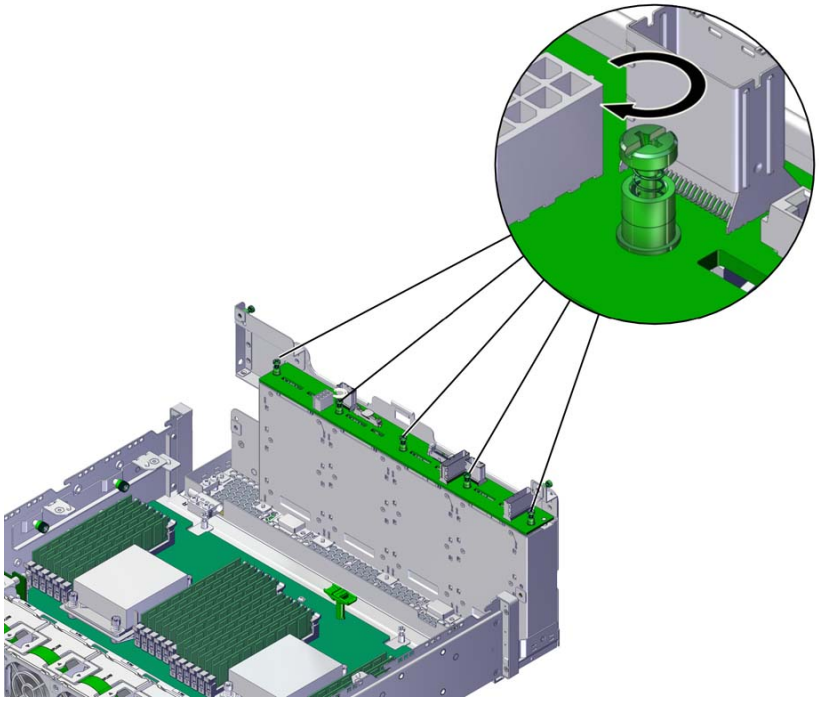
Installing the drive backplane is a cold-service operation. You must power off the server before installing the drive backplane.

1. **Position the drive backplane to where it will install into the server.**



The drive backplane aligns with the drive connectors down. The two alignment holes are on the left, and the single alignment hole is on the right.

2. **Tighten the five screws.**



3. **If you installed the drive backplane as part of another component's service procedure, return to that procedure.**

   See “Component Service Task Reference” on page 47.

4. **Complete these tasks in this order.**

   See:

   - “Secure the Drive Cage” on page 241
   - “Install a SAS Drive” on page 92 and “Install an NVMe Drive” on page 100.

     Install all drives.

5. **Rotate the air filter up until the latches click.**

   See “Install the Filter” on page 82.

6. **Finish the installation procedure.**

See:

- “Returning a Server to Operation” on page 235
- “Verify the Drive Backplane” on page 124

Related Information

- “Detecting and Managing Faults” on page 25
- “Returning a Server to Operation” on page 235

▼ Verify the Drive Backplane

After you install the drive backplane, you can verify its functionality.

1. **Access Oracle ILOM.**
   See “Log In to Oracle ILOM (Service)” on page 26.

2. **Reset the drive backplane.**

```
-> set /SYS/DBP clear_fault_action=true
Are you sure you want to clear /SYS/DBP (y/n)? y
Set 'clear_fault_action' to 'true'

->
```

3. **Verify that the drive backplane is not faulty, then return to this procedure.**
   See “Determine if the Drive Backplane Is Faulty” on page 118.

4. **Verify that the installed drives are recognized.**

```
-> show /SYS/DBP
 /SYS/DBP
  Targets:
   HDD0
   HDD1
   HDD2
...
->
```

Related Information

- “Determine if the Drive Backplane Is Faulty” on page 118
- “Detecting and Managing Faults” on page 25

Servicing the DVD Drive

The internal DVD drive is a SATA optical-storage device with DVD DL-RW capabilities. The DVD drive is located below the disk drives, at the front center of the server. See “Component Locations (Storage, Power, NVMe, and Fan Modules)” on page 14.

Description	Links
Replace the faulty DVD drive.	“Remove the DVD Drive” on page 125 “Install the DVD Drive” on page 128
Remove the DVD drive as part of another component's service operation.	“Remove the DVD Drive” on page 125
Install the DVD drive as part of another component's service operation.	“Install the DVD Drive” on page 128

Related Information

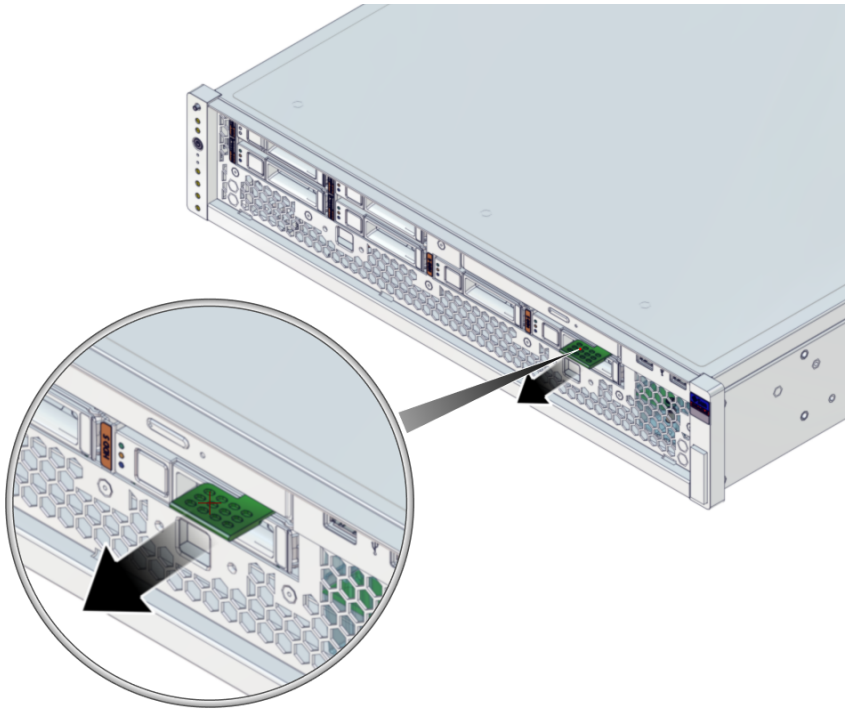
- “Identifying Components” on page 13
- “Detecting and Managing Faults” on page 25
- “Component Service Task Reference” on page 47
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

▼ Remove the DVD Drive

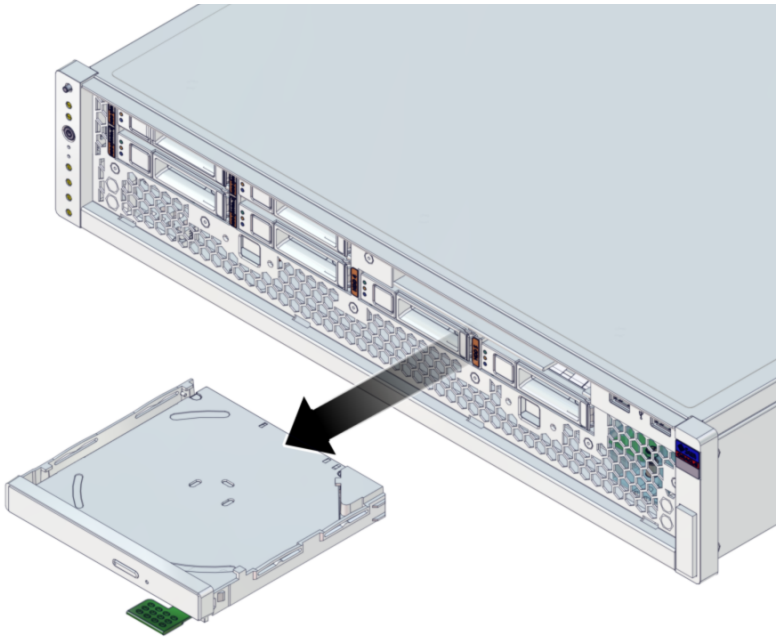
Removing the DVD drive is a cold-plug operation. You must power off the server before you remove the DVD drive.

Caution - Overheating hazard. A DVD drive, even if it does not function, or a filler panel, must be present in the DVD drive slot. Do not perform this procedure until you have a replacement DVD drive or filler panel available.

1. **Prepare for service, including powering down the server.**
   See “Preparing for Service” on page 43.
2. **Remove any media from the DVD drive.**
3. **Follow the steps in “Rotate the Drive Cage to the Service Position” on page 71.**
4. **Remove the filter.**
   See “Remove the Filter” on page 79.
5. **Disconnect the HDD backplane cables.**
6. **Pull the plunger on the DVD component, then remove the DVD component.**



7. **Continue to pull the tab, so that the DVD drive slides out of the server.**



8. **Set the DVD drive aside.**

9. **Consider your next step.**

   - If you are replacing a faulty drive, install the new DVD drive. See “Install the DVD Drive” on page 128.
   - If you removed the DVD drive as part of another component's service procedure, return to that procedure. See “Component Service Task Reference” on page 47 for assistance.

Related Information

- “Install the DVD Drive” on page 128
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Install the DVD Drive

Installing the DVD drive is a cold-plug operation. You must power off the server before installing the DVD drive.

1. **If you are replacing a faulty drive, remove it.**

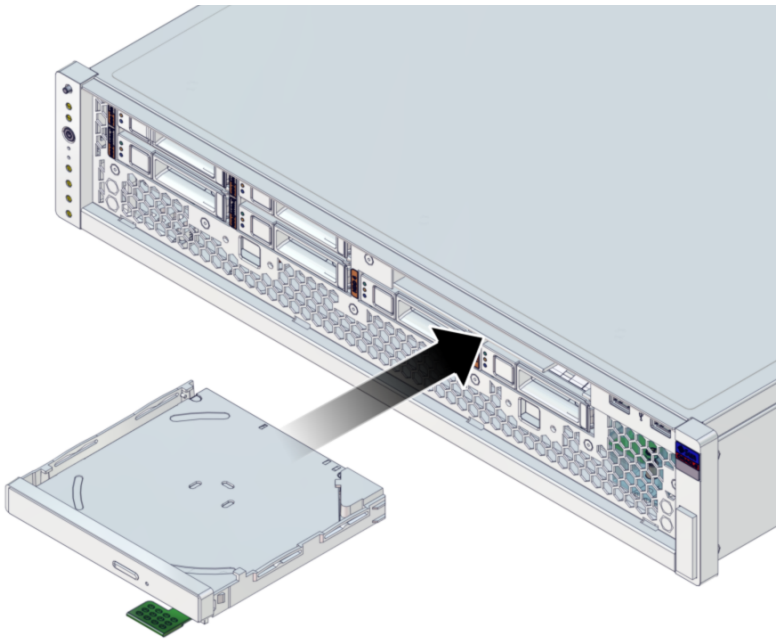
   See “Remove the DVD Drive” on page 125.

2. **Extend the tab out from the underside of the DVD drive.**

3. **Align the DVD drive to the location where it installs into the server.**

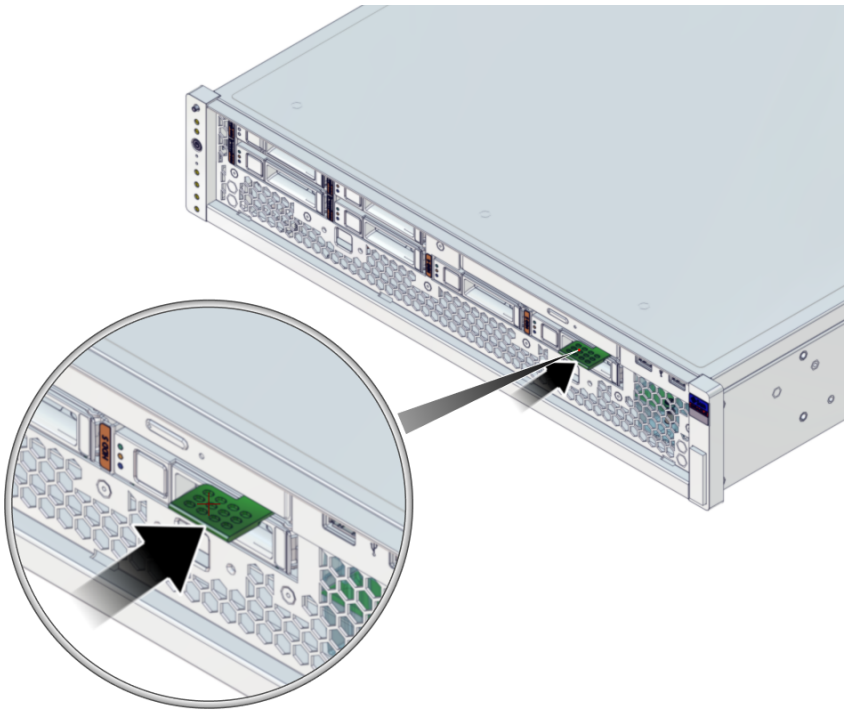
   The DVD drive is oriented with the tab at the right front.

4. **Slide the DVD drive into the server.**



5. **Press on the right side of the DVD drive to firmly seat it into the slot.**

6. **Push the tab in under the DVD drive.**



7. **If you installed the DVD drive as part of another component's removal or installation procedure, return to that procedure.**

   See “Component Service Task Reference” on page 47 for assistance.

8. **Install the filter.**

   See “Install the Filter” on page 82.

9. **Finish the installation procedure.**

   See “Returning a Server to Operation” on page 235.

Related Information

- “Remove the DVD Drive” on page 125
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Servicing Power Supplies

The power supplies apply AC or DC facility power for use in the server chassis. The power supplies are configured for redundancy and are stacked at the rear left of the server. See “Component Locations (Storage, Power, NVMe, and Fan Modules)” on page 14.

Note - Typically servers are ordered and installed specifically for either AC or DC power-based systems. AC and DC servers cannot be mixed into the same system. It is possible to convert a server's power supply from either AC to DC or DC to AC. However, the server's installation must be in a system that matches the power supply. For more information, refer to *Netra SPARC S7-2 Server Installation Guide*.

Description	Links
Replace a faulty power supply.	“Locate a Faulty Power Supply” on page 132 “Power Supply LEDs” on page 132 “Remove a Power Supply” on page 134 “Install a Power Supply” on page 137 “Verify a Power Supply” on page 138
Remove a power supply as part of another component's service operation.	“Remove a Power Supply” on page 134
Install a power supply as part of another component's service operation.	“Install a Power Supply” on page 137
Add additional power supplies.	“Install a Power Supply” on page 137 “Verify a Power Supply” on page 138
Decrease the number of existing power supplies.	“Remove a Power Supply” on page 134
Identify a faulty power supply.	“Power Supply LEDs” on page 132 “Locate a Faulty Power Supply” on page 132 “Detecting and Managing Faults” on page 25

Related Information

- “Identifying Components” on page 13
- “Detecting and Managing Faults” on page 25
- “Component Service Task Reference” on page 47
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Power Supply LEDs

The status of each power supply is represented by two LEDs. These are located to the left of the fan of each power supply. See “Rear Panel LEDs” on page 33 and “Rear Panel Components (Service)” on page 18.

Icon	Location	Name	Color	State and Meaning
~AC	Top	AC or DC	Green	**On** – Input power present and good. **Off** – Input power not present.
⚠	Top	Attention Service Required	Amber	**On** – Normal fault detected. **Off** – No faults detected.

Related Information

- “Locate a Faulty Power Supply” on page 132
- “Remove a Power Supply” on page 134
- “Front Panel Components (Service)” on page 17
- “Rear Panel Components (Service)” on page 18

▼ Locate a Faulty Power Supply

You must determine which power supply is faulty before you replace it.

1. **Check to see if any System Service Required LEDs are lit or flashing.**

   See “Front Panel Components (Service)” on page 17.

2. **Visually inspect the power supplies to see if any of their status LEDs are lit or flashing.**

   See "Power Supply LEDs" on page 132.

3. **In Oracle ILOM, check the health of the power system.**

```
-> show /System/Power
 /System/Power
  Targets:
  Properties:
   health = OK
   health_details = -
...
->
```

   If the `health_details` property identifies a faulty power supply, replace it. See "Remove a Power Supply" on page 134.

4. **Check the health of the individual power supplies.**

```
-> show /System/Power/Power_Supplies/Power_Supply_x
 /System/Power/Power_Supplies/Power_Supply_0
  Targets:
  Properties:
   health = OK
   health_details = -
...
->
```

   where *x* is either `0` (lower power supply) or `1` (upper power supply).

   If the `health_details` property identifies the power supply as faulty, replace it. See "Remove a Power Supply" on page 134.

5. **Determine if a power supply is faulty.**

   For example, type:

```
-> show faulty
Target              | Property               | Value
--------------------+------------------------+-------------------------------
/SP/faultmgmt/0     | fru                    | /SYS/PS0
...
->
```

   - If a FRU value different from `/SYS/PS`*x* is displayed, see "Component Service Task Reference" on page 47 to identify which component is faulty.

- If a power supply is faulty, you will see `/SYS/PS`*x* under the `Value` heading, where *x* is `0` (lower power supply) or `1` (upper power supply).

6. **Use the Oracle ILOM `faultmgmt` shell to identify the faulty component.**

   See “Identify Faulted Components” on page 27.

   Check the `Fault class` and `Description` fields for more information.

7. **Within the Oracle ILOM interface, verify the voltage output.**

```
-> show /SYS/PS0/V_+12V value
 /SYS/PS0/V_+12V
  Properties:
   value = 12.031 Volts
->
```

8. **If a power supply is faulty, replace it.**

   See “Remove a Power Supply” on page 134.

9. **If you are unable to determine if a power supply is faulty, seek further information.**

   See “Detecting and Managing Faults” on page 25.

Related Information

- “Remove a Power Supply” on page 134
- “Power Supply LEDs” on page 132
- “Verify a Power Supply” on page 138
- “Detecting and Managing Faults” on page 25

▼ Remove a Power Supply

Removing a power supply is a hot-swap operation. You do not need to power off the server before you remove the power supply.

1. **Determine which power supply to remove.**

   See “Locate a Faulty Power Supply” on page 132.

2. **Follow safety and ESD precautions.**

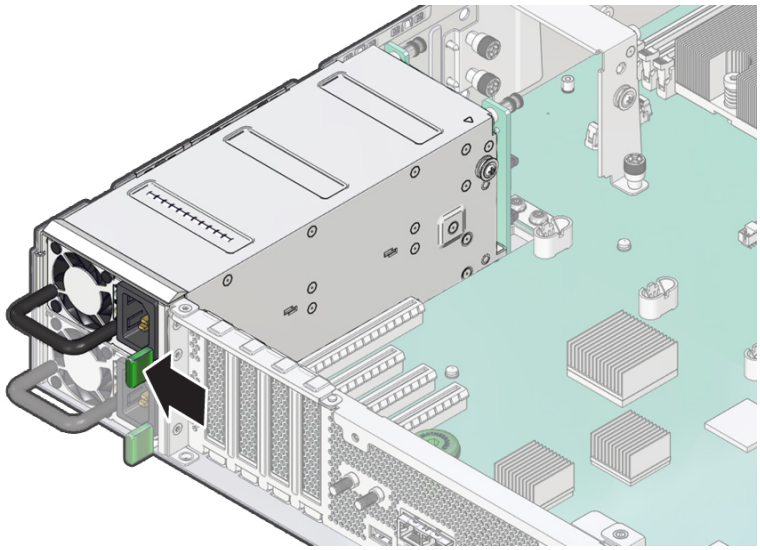
   See “Preparing for Service” on page 43.

3. **Disconnect the power:**

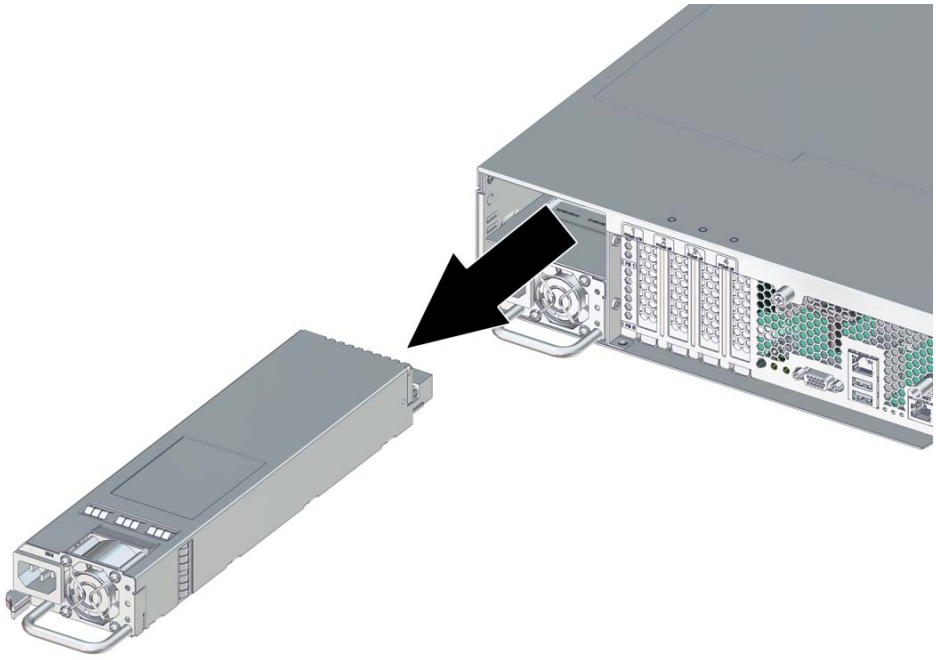
   - For AC power supply, disconnect the power cord from the server's power supply.
   - For DC power supply, turn off the main power circuit breaker to the server's faulty power supply unit.

Caution - Do not proceed with these instructions until you are sure that there is no voltage present on the DC cords and their power source.

4. **Press the release tab to the right, then pull on the handle.**



5. **Continue to pull on the handle to slide the power supply out of the server.**



6. **Set the power supply aside.**

7. **Consider your next step.**

   - **If are replacing a faulty power supply, install the new power supply.**

     See “Install a Power Supply” on page 137.

   - **If you removed a power supply as part of another component's removal or installation procedure, return to that procedure.**

     See “Component Service Task Reference” on page 47.

Related Information

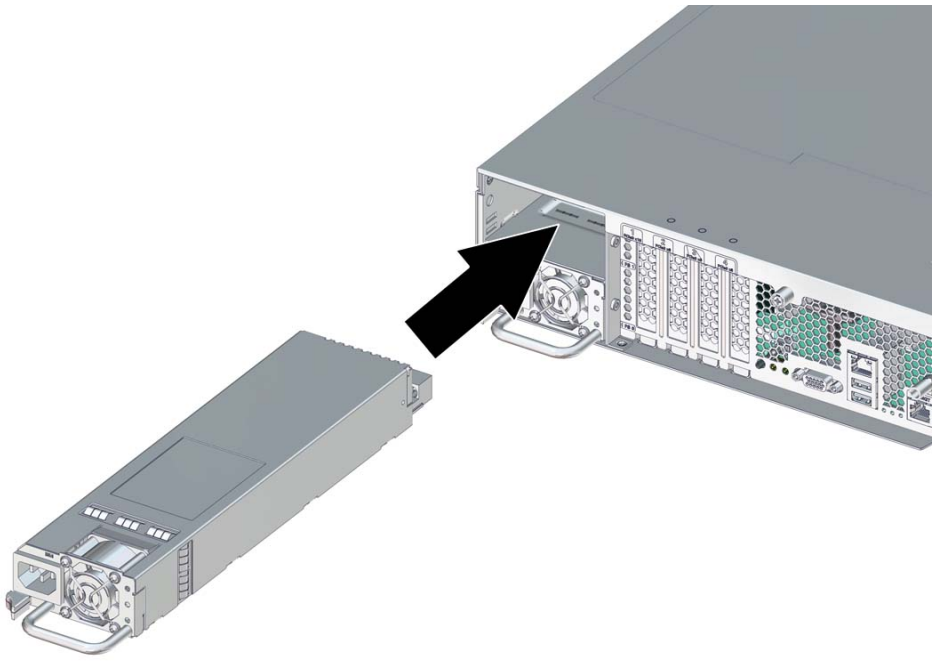
- “Locate a Faulty Power Supply” on page 132
- “Install a Power Supply” on page 137
- “Preparing for Service” on page 43

- “Returning a Server to Operation” on page 235

Install a Power Supply

Installing a power supply is a hot-swap operation. You do not need to power off the server before installing the power supply.

1. **If you are replacing a faulty power supply, remove the faulty component.**
   See “Remove a Power Supply” on page 134.
2. **Align the power supply to the location where it installs into the server.**
   The PDB connector is toward the server, and the release tab is on the right.
3. **Slide the power supply into the server until the power supply seats, and the release tab clicks.**



4. **Connect the power cord.**

   - For AC power supply, see “Connect AC Power Cords” on page 249.
   - For DC power supply, see “Assembling and Connecting DC Power Cords” in *Netra SPARC S7-2 Server Installation Guide*.

   Tip - If the fault is with the server's power supply unit and not with the power cord from the main circuit breaker, you can reuse the already assembled power cord. In this scenario, transfer the existing cords to the replacement power supply. Be sure to follow the safety instructions and guidelines.

5. **If you installed a power supply as part of another component's removal or installation procedure, return to that procedure.**

   See “Component Service Task Reference” on page 47 for assistance.

6. **Complete these tasks in this order to finish the installation.**

   See:

   - “Returning a Server to Operation” on page 235
   - “Verify a Power Supply” on page 138

Related Information

- “Remove a Power Supply” on page 134
- “Verify a Power Supply” on page 138
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

▼ Verify a Power Supply

After you install a power supply, you can verify its functionality.

1. **Access Oracle ILOM.**

   See “Log In to Oracle ILOM (Service)” on page 26.

2. **Reset the power supply.**

```
-> set /SYS/PSx clear_fault_action=true
Are you sure you want to clear /SYS/PS0 (y/n)? y
```

```
Set 'clear_fault_action' to 'true'
->
```

where *x* is `0` (lower power supply) or `1` (upper power supply).

3. **Verify that the power supply is no longer considered faulty, then return to this procedure.**

   See “Locate a Faulty Power Supply” on page 132.

4. **Verify the voltage output.**

```
-> show /SYS/PS0/V_+12V value
 /SYS/PS0/V_+12V
  Properties:
   value = 12.031 Volts
->
```

Related Information

- “Install a Power Supply” on page 137
- “Power Supply LEDs” on page 132
- “Locate a Faulty Power Supply” on page 132

Servicing the PDB

The PDB is an interconnect between the power supplies and the motherboard. The PDB is located forward of the power supplies, under the PSU duct. See “Identifying Components” on page 13.

Description	Links
Replace a faulty PDB.	“Determine if the PDB Is Faulty” on page 141 “Remove the PDB” on page 143 “Install the PDB” on page 146 “Verify the PDB” on page 149
Remove the PDB as part of another component's service operation.	“Remove the PDB” on page 143
Install the PDB as part of another component's service operation.	“Install the PDB” on page 146
Determine if the PDB is faulty.	“Determine if the PDB Is Faulty” on page 141 “Detecting and Managing Faults” on page 25

Related Information

- “Identifying Components” on page 13
- “Detecting and Managing Faults” on page 25
- “Component Service Task Reference” on page 47
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

▼ Determine if the PDB Is Faulty

You must determine if the PDB is faulty before you replace it.

1. **Check to see if any Server Service Required LEDs are lit or flashing.**

   See “Front Panel Components (Service)” on page 17.

2. **In Oracle ILOM, check the health of the power system.**

```
-> show /System/Power
 /System/Power
  Targets:
  Properties:
   health = OK
   health_details = -
...
->
```

3. **Verify that the PDB is faulty.**

   For example, type:

```
-> show faulty
Target              | Property               | Value
--------------------+------------------------+------------------------------
/SP/faultmgmt/0     | fru                    | /SYS/PDB
...
->
```

   - If you see `/SYS/PDB` under the `Value` heading, the PDB is faulty.
   - If a FRU value different from `/SYS/PDB` is displayed, see “Component Service Task Reference” on page 47 to identify which component is faulty.

4. **Use the Oracle ILOM `faultmgmt` shell to identify the faulty component.**

   See “Identify Faulted Components” on page 27.

   Check the `Fault class` and `Description` fields for more information.

5. **If the PDB is faulty, replace it.**

   See “Remove the PDB” on page 143.

6. **If you are unable to determine if the PDB is faulty, seek further information.**

   See “Detecting and Managing Faults” on page 25.

Related Information

- “Remove the PDB” on page 143
- “Verify the PDB” on page 149
- “Detecting and Managing Faults” on page 25

Remove the PDB

Removing the PDB is a cold-service operation. You must power off the server before you remove the PDB.

1. **Prepare for service.**

   See “Preparing for Service” on page 43.

2. **Review this information and complete these prerequisites in this order.**

   See:

   - “Remove a Power Supply” on page 134

     Remove both power supplies.
   - “Remove the Filter” on page 79
   - “Remove a Fan Module” on page 153

     Remove all fan modules.
   - “Remove the Fan Tray” on page 69
   - “Rotate the Drive Cage to the Service Position” on page 71
   - “Remove the Air Duct” on page 75
   - “Remove the PSU Duct” on page 74
   - “Remove a PCIe Card” on page 174
   - “Remove the Internal HBA PCIe Card” on page 179

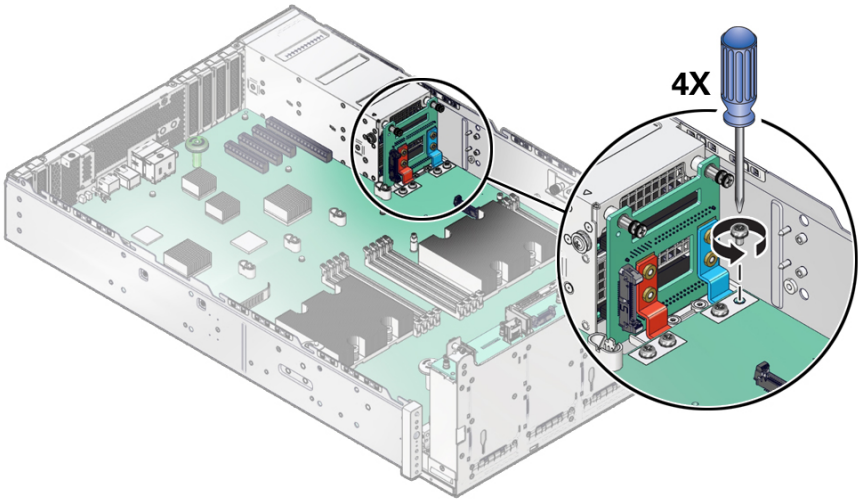
3. **Disconnect the cables from the motherboard.**

4. **Open the cable tie on the right side of the chassis, and disconnect the LED assembly cable.**

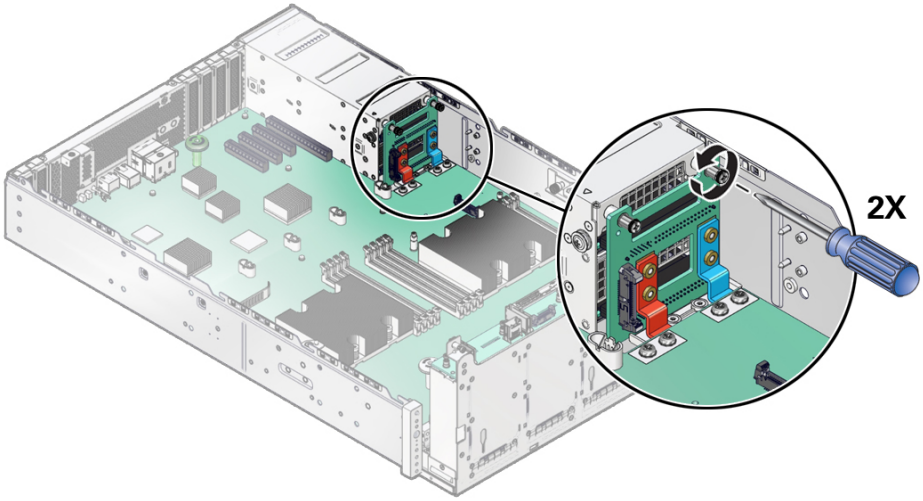
5. **Remove the right thumb screw bracket.**

6. **Disconnect the cable from the PDB.**

7. **Remove the four screws securing the PDB bus bars to the motherboard.**



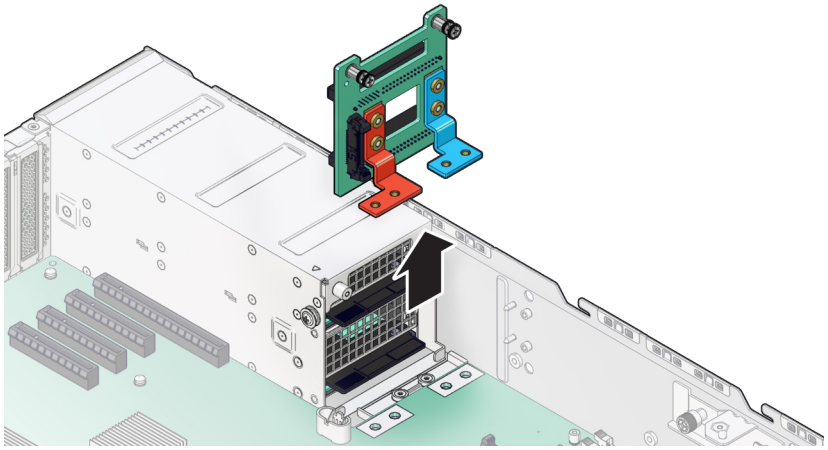
8. **Loosen the two captive screws securing the PDB to the server.**



9. **Grasp the two motherboard handles, and slide the motherboard forward off of the alignment pins.**

   See “Servicing the Motherboard” on page 225 for cautions. For this service procedure, you are not removing the motherboard. You are moving it slightly so that you can remove the PDB.

10. **Lift the PDB bus bars, and remove the PDB from the server.**



11. **Set the PDB aside.**

12. **Consider the next step.**

- **If you are replacing a faulty PDB, install the new PDB.**

  See “Install the PDB” on page 146.

- **If you removed the PDB as part of another component's service procedure, return to that procedure.**

  See “Component Service Task Reference” on page 47.

Related Information

- “Install the PDB” on page 146
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Install the PDB

Installing the PDB is a cold-service operation. You must power off the server before installing the PDB.

1. **Position the PDB to where it installs into the server.**

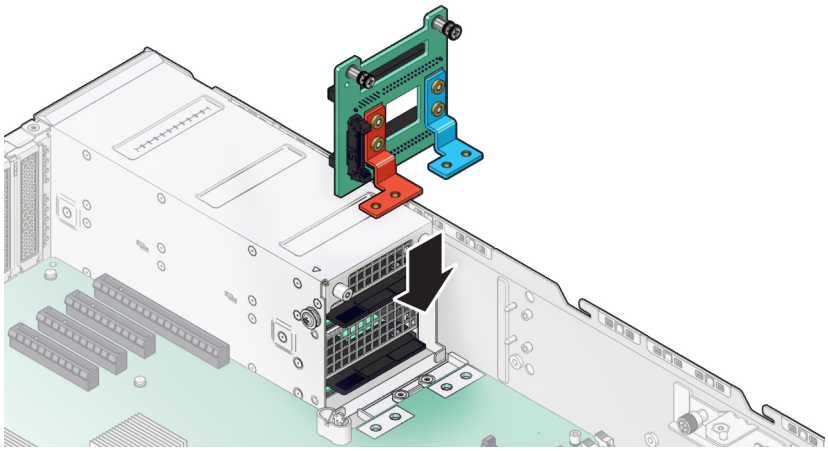
   The bus bars are forward and down.

2. **Grasp the two motherboard handles, and slide the motherboard onto the alignment pins.**

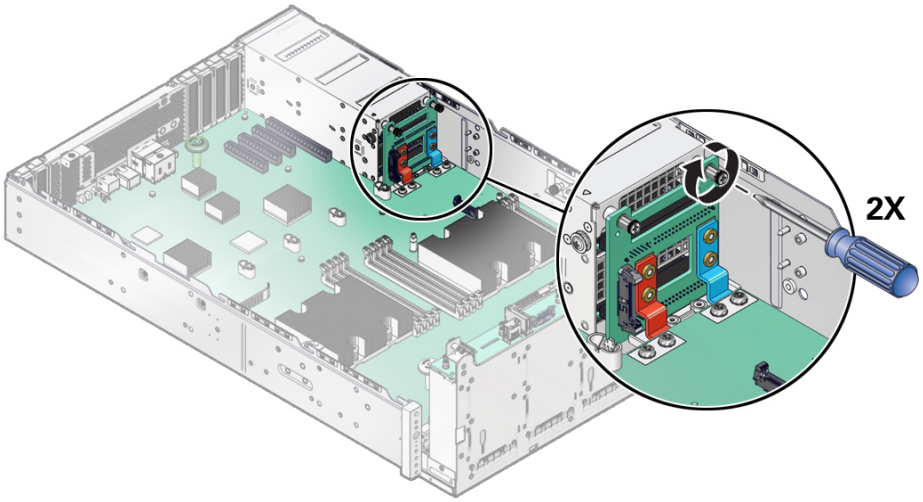
   See “Servicing the Motherboard” on page 225 for cautions. For this service procedure, you are not removing the motherboard. You are moving it slightly so that you can remove the PDB.

3. **Carefully insert the LED into the hole at the rear of the chassis.**

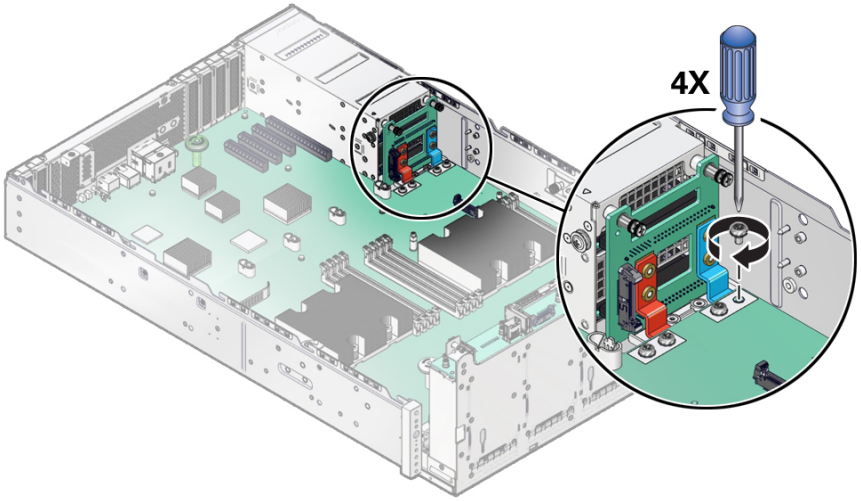
4. **Place the bus bars into the channels, and align the PDB with two posts for the captive screws.**



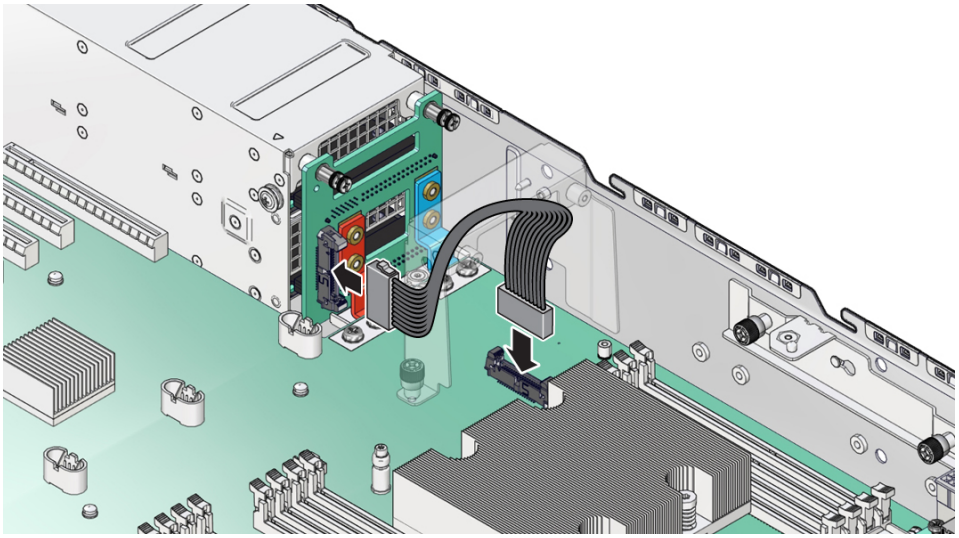
5. **Tighten the two captive screws.**



6. **Install the four screws, securing the PDB bus bars to the motherboard.**



7. **Reconnect the cable to the PDB.**



8. **Install the fan tray bracket and fan tray.**
   See “Install the Fan Tray” on page 244.

9. **Install the right thumb screw bracket.**

10. **Connect the cables from the motherboard.**

11. **Connect the LED assembly cable, and close the cable tie on the right side of the chassis.**

12. **If you installed the PDB as part of another component's removal or installation procedure, return to that procedure.**
    See “Component Service Task Reference” on page 47.

13. **Review this information and complete these prerequisites in this order.**
    See:

    - “Install the Internal HBA PCIe Card” on page 183
    - “Install a PCIe Card” on page 176
    - “Install the Air Duct” on page 236
    - “Install the PSU Duct” on page 240

- "Secure the Drive Cage" on page 241
- "Install the Fan Tray" on page 244
- "Install a Fan Module" on page 155

  Install all fan modules.

14. **Complete these postrequisites in this order to finish the installation procedure.**

    See:

    - "Returning a Server to Operation" on page 235
    - "Verify the PDB" on page 149

Related Information

- "Verify the PDB" on page 149
- "Returning a Server to Operation" on page 235

▼ Verify the PDB

After you install the PDB, you can verify its functionality.

1. **Access Oracle ILOM.**

   See "Log In to Oracle ILOM (Service)" on page 26.

2. **Reset the PDB.**

```
-> set /SYS/PDB clear_fault_action=true
Are you sure you want to clear /SYS/PDB (y/n)? y
Set 'clear_fault_action' to 'true'

->
```

3. **Verify that the PDB is no longer faulty, then return to this procedure.**

   See "Determine if the PDB Is Faulty" on page 141.

Related Information

- "Install the PDB" on page 146
- "Determine if the PDB Is Faulty" on page 141

Servicing Fan Modules

Caution - These procedures require that you handle components that are sensitive to ESD, which can cause server components to fail.

Fan modules are composed of redundant fan elements. This redundancy enables the fan module to continuously supply air flow, even if one fan element fails. The fan modules are located at the midsection of the server, behind the air duct. See “Component Locations (Storage, Power, NVMe, and Fan Modules)” on page 14.

Description	Links
Replace a faulty fan module.	“Locate a Faulty Fan Module” on page 152 “Remove a Fan Module” on page 153 “Install a Fan Module” on page 155 “Verify a Fan Module” on page 157
Remove a fan module as part of another component's service operation.	“Remove a Fan Module” on page 153
Install a fan module as part of another component's service operation.	“Install a Fan Module” on page 155
Add fan modules.	“Install a Fan Module” on page 155 “Verify a Fan Module” on page 157
Decrease the number of fan modules.	“Remove a Fan Module” on page 153
Identify a faulty fan module.	“Locate a Faulty Fan Module” on page 152 “Detecting and Managing Faults” on page 25

Related Information

- “Identifying Components” on page 13
- “Detecting and Managing Faults” on page 25
- “Component Service Task Reference” on page 47

- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

▼ Locate a Faulty Fan Module

You must determine which fan module is faulty before you replace it.

1. **Check to see if any System Service Required LEDs are lit or flashing.**

   See “Front Panel Components (Service)” on page 17.

2. **In Oracle ILOM, check the health of the cooling system.**

```
-> show /System/Cooling
 /System/Cooling
 Targets:
  Properties:
   health = OK
   health_details = -
...
->
```

3. **Verify that a fan module is faulty.**

   For example, type:

```
-> show faulty
Target              | Property               | Value
--------------------+------------------------+-------------------------------
/SP/faultmgmt/0     | fru                    | /SYS/MB/FM0
...
->
```

   If a fan module is faulty, you will see `/SYS/MB/FM`*x* under the `Value` heading where *x* is `0` to `4`.

   If a FRU value different from `/SYS/MB/FM`*x* is displayed, see “Component Service Task Reference” on page 47 to identify which component is faulty.

4. **Use the Oracle ILOM `faultmgmt` shell to identify the faulty component.**

   See “Identify Faulted Components” on page 27.

   Check the `Fault class` and `Description` fields for more information.

5. **Within the Oracle ILOM interface, verify the fan module speeds.**

```
-> show /SYS/MB/FMx/Fy/TACH value
 /SYS/MB/FM0/F0/TACH
 Properties:
 value = 3100.000 RPM
->
```

where:

- *x* is the fan module, `0` (left fan) to `4` (right fan).
- *y* is the fan element, `0` (primary) or `1` (secondary).

6. **If a fan module is faulty, write down which fan module is faulty, then replace it when the new one arrives.**

   See “Remove a Fan Module” on page 153.

7. **If you are unable to determine if a fan module is faulty, seek further information.**

   See “Detecting and Managing Faults” on page 25.

Related Information

- “Remove a Fan Module” on page 153
- “Verify a Fan Module” on page 157
- “Detecting and Managing Faults” on page 25

▼ Remove a Fan Module

Removing a fan module is a cold-service operation. You must power off the server before you remove the fan module.

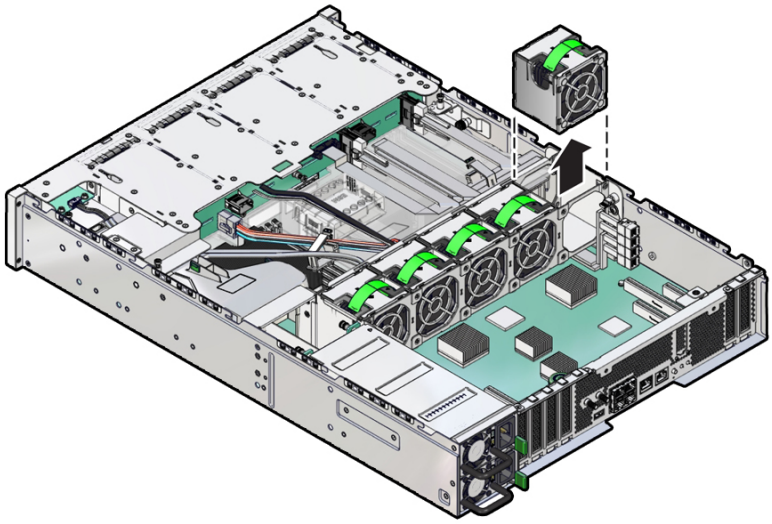
1. **Determine which fan module to remove.**

   See “Locate a Faulty Fan Module” on page 152.

2. **Prepare for service.**

   See “Preparing for Service” on page 43.

3. **On the fan module to be replaced, pull the green band straight up and lift the fan module out of the server.**



4. **Set the fan module aside.**
5. **Repeat from Step 3 for any additional fan modules to be removed.**
6. **Consider your next step.**

   - **If you are replacing a faulty fan module, install the new fan module.**

     See “Install a Fan Module” on page 155.

   - **If you removed a fan module as part of another component's removal or installation procedure, return to that procedure.**

     See “Component Service Task Reference” on page 47 for assistance.

Related Information

- “Locate a Faulty Fan Module” on page 152
- “Install a Fan Module” on page 155
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Install a Fan Module

Installing a fan module is a cold-service operation. You must power off the server before installing the fan module.

1. **If not previously completed, perform the following:**

   a. **Prepare for service.**

   See “Preparing for Service” on page 43.

   b. **Power off the server that contains the fan module.**

   See “Removing Power From a Server” on page 49.

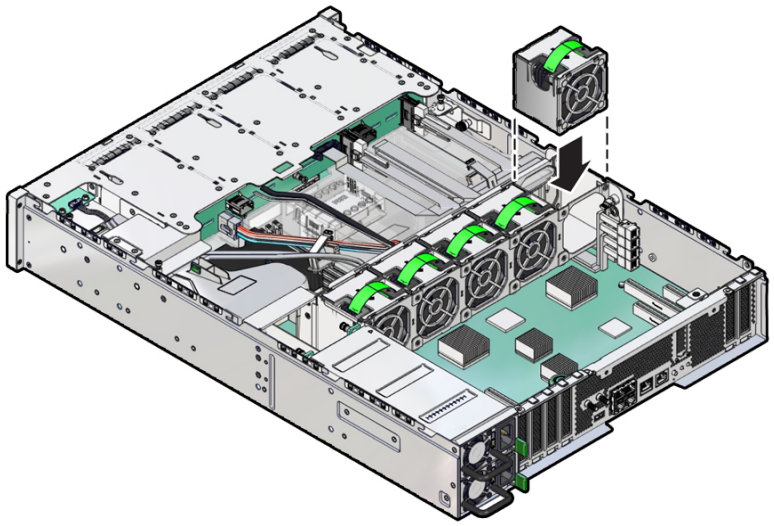
   c. **Remove the server to obtain access to internal components.**

   See “Accessing Internal Components” on page 55.

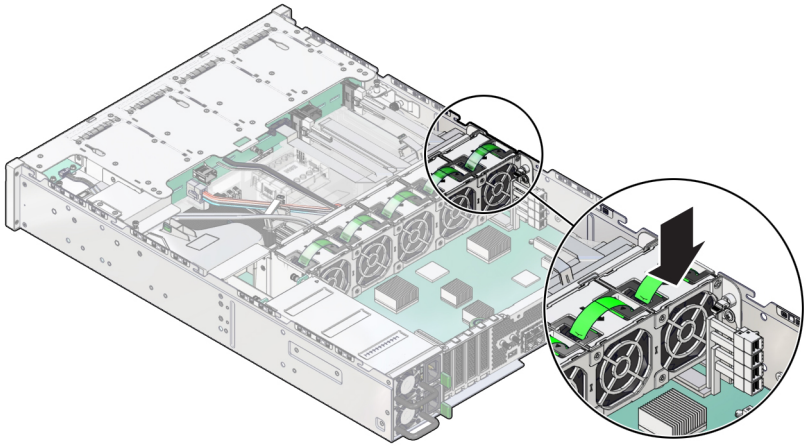
2. **Align the fan module to the location where it installs into the fan tray.**

   The green band is on the top of the fan module, and the arrow points to the rear of the server.

3. **Lower the fan module into the fan tray.**



4. **Press the fan module down until it clicks securely into the fan tray.**



5. **Repeat from Step 2 through Step 4 for any additional fan modules that you are installing.**

6. **If you installed a fan module as part of another component's removal or installation procedure, return to that procedure.**

   See “Component Service Task Reference” on page 47 for assistance.

7. **Complete these postrequisites in this order to finish the installation procedure.**

   See:

   - “Returning a Server to Operation” on page 235
   - “Verify a Fan Module” on page 157

Related Information

- “Remove a Fan Module” on page 153
- “Verify a Fan Module” on page 157
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Verify a Fan Module

After you install a fan module, you can verify its functionality.

1. **Access Oracle ILOM.**

   See “Log In to Oracle ILOM (Service)” on page 26.

2. **Reset the fan module.**

```
-> set /SYS/MB/FMx clear_fault_action=true
Are you sure you want to clear /SYS/MB/FM0 (y/n)? y
Set 'clear_fault_action' to 'true'
->
```

   where *x* is the fan module, `0` (left fan) to `4` (right fan).

3. **Verify that the fan module is no longer considered faulty, then return to this procedure.**

   See “Locate a Faulty Fan Module” on page 152.

4. **Verify the fan module speeds.**

```
-> show /SYS/MB/FMx/Fy/TACH value
 /SYS/MB/FM0/F0/TACH
 Properties:
 value = 3100.000 RPM
->
```

   where:

   - *x* is the fan module, `0` (left fan) to `4` (right fan).
   - *y* is the fan element, `0` (primary) or `1` (secondary).

Related Information

- “Install a Fan Module” on page 155
- “Locate a Faulty Fan Module” on page 152

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.

DIMMs provide RAM for the CPUs configured in the server. The DIMMs are located in slots on either side of the CPUs, at the center of the motherboard. See “Component Locations (Motherboard, Memory, and PCIe Cards)” on page 16.

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

Description	Links
Understand DIMM layout and guidelines.	“Understanding DIMM Layout and Population Rules” on page 160
Replace a faulty DIMM.	“Locate a Faulty DIMM” on page 161 “Remove a DIMM” on page 163 “Install a DIMM” on page 163 “Verify a DIMM” on page 166
Add DIMMs.	“Understanding DIMM Layout and Population Rules” on page 160 “Install a DIMM” on page 163 “Verify a DIMM” on page 166
Locate a faulty DIMM.	“Locate a Faulty DIMM” on page 161

Related Information

- “Identifying Components” on page 13
- “Detecting and Managing Faults” on page 25
- “Preparing for Service” on page 43

- “Returning a Server to Operation” on page 235

Understanding DIMM Layout and Population Rules

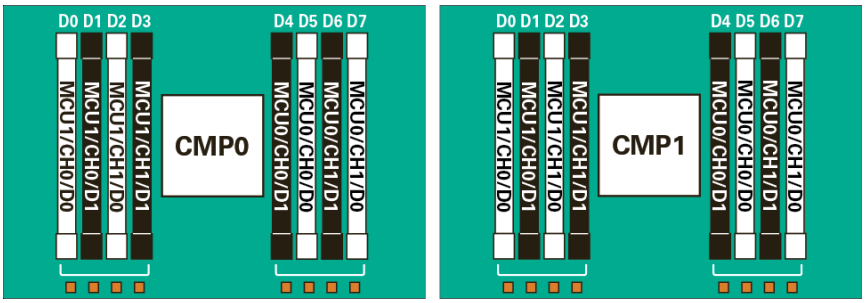
These topics describe DIMM layout and population rules.

Note - In single-processor servers, the DIMM sockets associated with the processor 1 (P 1) are nonfunctional and must 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 P 0 processor socket.

- “DIMM Layout” on page 160
- “DIMM Population Rules” on page 160

DIMM Layout

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.



DIMM Population Rules

The DIMM configurations depend upon the CPU configuration. A single CPU can have a maximum of 8 DIMMS. A dual-CPU configuration can have a maximum of 16 DIMMS.

When you add or remove DIMMs, follow these rules:

- The server supports 64-GB DDR4-2400 DIMMs, 32-GB DDR4-2400 DIMMs, and 16-GB DDR4-2400 DIMMs.
- 4 DIMMs per CPU or 8 DIMMs per CPU.
- Do not mix DIMM sizes.
- When you add DIMMs in pairs, use DIMMs of the same part number.
- If you are mixing DIMM capacities, install the largest capacities first, then consecutively smaller capacities.
- Within a memory channel, DIMMs must be populated in the white sockets first, then in the black sockets.
- If a slot is left empty, install a DIMM filler. With the single-CPU configuration, all DIMM slots on P 1 must be populated with fillers.

Caution - Overheating hazard. There must be no empty DIMM slots. Use fillers for empty slots.

Related Information

- “Install a DIMM” on page 163
- “Locate a Faulty DIMM” on page 161

▼ Locate a Faulty DIMM

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

   See “Preparing for Service” on page 43.

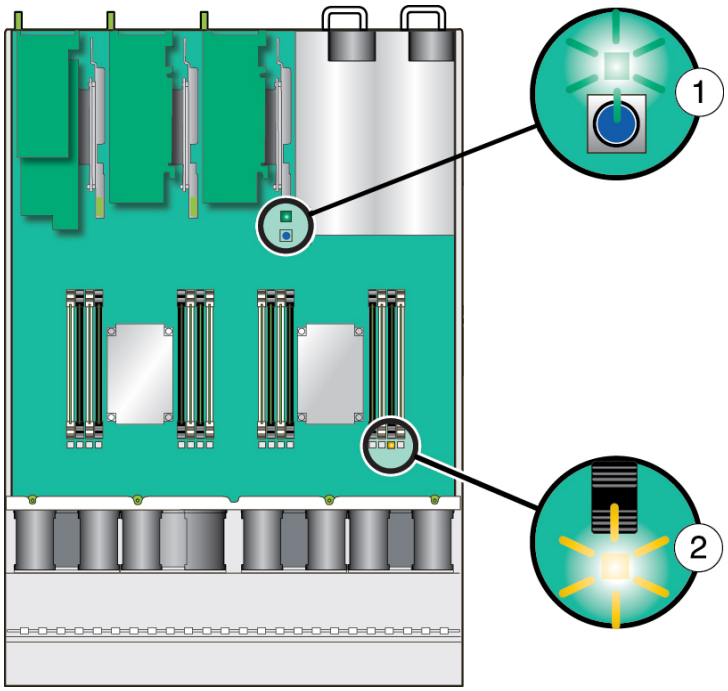
Caution - Follow antistatic practices as described in “Prevent ESD Damage” on page 55 to avoid component damage. These procedures require that you handle components that are sensitive to electrostatic discharge. This sensitivity can cause the components to fail.

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.

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

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

   Failed DDR4 DIMMs display an amber LED on the motherboard.



Number	Description
1	Fault Remind button
2	DIMM fault LEDs

4. **Remove the faulty DIMM.**

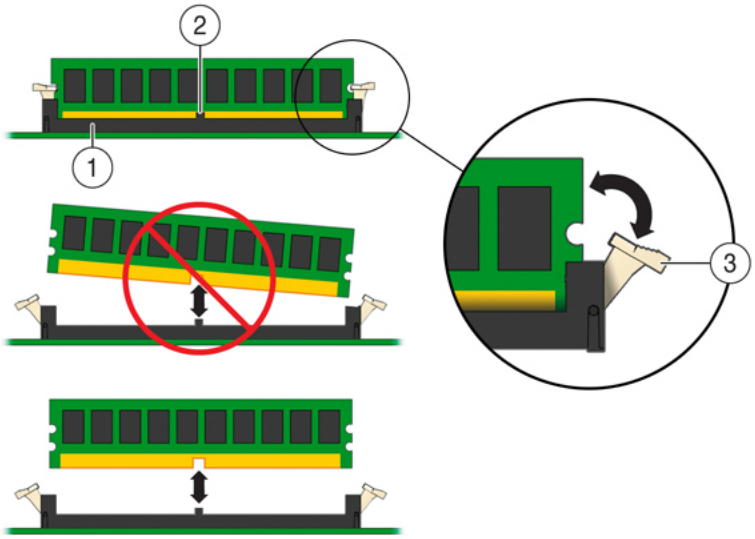
   See “Remove a DIMM” on page 163.

Related Information

- “Understanding DIMM Layout and Population Rules” on page 160
- “Install a DIMM” on page 163

Remove a DIMM

1. **To remove a 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.**



2. **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.**

   See "Install a DIMM" on page 163.

Related Information

- "Understanding DIMM Layout and Population Rules" on page 160
- "Install a DIMM" on page 163

Install a DIMM

1. **If you are replacing a DIMM, perform these tasks.**

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

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

2. Install a DIMM.

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 "Understanding DIMM Layout and Population Rules" on page 160.

Note - For troubleshooting purposes, if you want to move a faulty DDR4 DIMM to a new DIMM socket or reseat a DIMM, 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. See Step 4.

---

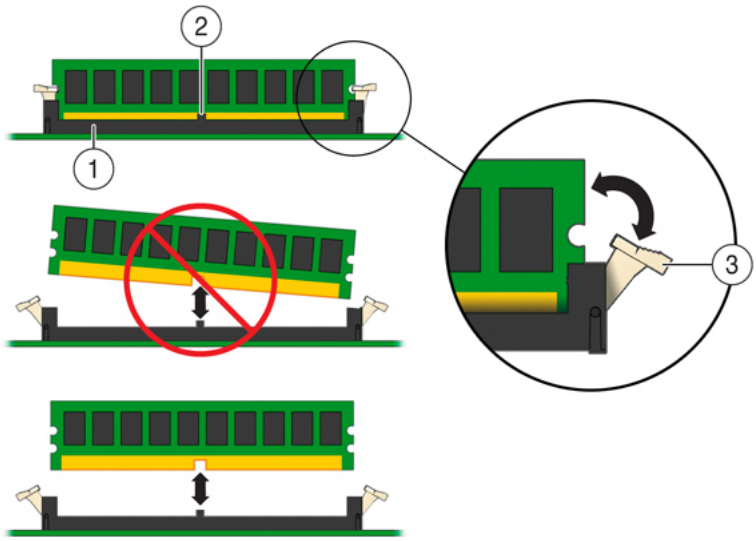
a. On an available DIMM slot, ensure that the ejector tabs are in the open position.

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

The notch ensures that the DIMM is oriented correctly.

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

If the DIMM does not easily seat into the connector 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.



3. **Replace the air baffle.**

4. **(Optional) Use Oracle ILOM to clear server 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`.

5. **Return the server to operation.**
   See “Returning a Server to Operation” on page 235.

6. **Verify the DIMM.**
   See “Verify a DIMM” on page 166.

Related Information

- “Understanding DIMM Layout and Population Rules” on page 160
- “Locate a Faulty DIMM” on page 161
- “Remove a DIMM” on page 163

- “Verify a DIMM” on page 166

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 SP 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 that the new DIMM is working.**

   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 "Detecting and Managing Faults" on page 25.

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

- “Understanding DIMM Layout and Population Rules” on page 160
- “Locate a Faulty DIMM” on page 161
- “Remove a DIMM” on page 163

Servicing PCIe Cards

PCIe cards provide additional I/O and other functionality. The PCIe cards install into the card slots located across the rear of the server. See “Component Locations (Motherboard, Memory, and PCIe Cards)” on page 16. Additionally, there is an internal HBA PCIe card. See “Servicing the Internal HBA PCIe Card” on page 179.

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

Caution - Disconnect any external cabling to a PCIe card prior to removing the card.

Description	Links
Replace a faulty PCIe card.	“Detecting and Managing Faults” on page 25 “PCIe Card Configurations” on page 170 “Locate a Faulty PCIe Card” on page 172 “Remove a PCIe Card” on page 174 “Install a PCIe Card” on page 176 “Verify a PCIe Card” on page 177
Remove a PCIe card as part of another component's service operation.	“Remove a PCIe Card” on page 174
Install a PCIe card as part of another component's service operation.	“Install a PCIe Card” on page 176
Identify I/O connections.	“I/O Root Complex Connections” on page 171
Determine device NAC names.	“PCIe Device NAC Names” on page 172
Add PCIe cards.	“PCIe Card Configurations” on page 170 “Install a PCIe Card” on page 176 “Verify a PCIe Card” on page 177

Description	Links
Decrease the number of PCIe cards.	“Remove a PCIe Card” on page 174
Identify a faulty PCIe card.	“Locate a Faulty PCIe Card” on page 172 “Detecting and Managing Faults” on page 25

Related Information

- “Identifying Components” on page 13
- “Component Service Task Reference” on page 47
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

PCIe Card Configurations

You can install a maximum of six PCIe cards into the server in slots 1 through 6. See “Rear Panel Components (Service)” on page 18 and “Component Locations (Motherboard, Memory, and PCIe Cards)” on page 16.

Additionally, there is an internal HBA PCIe card with SAS3 12 Gbit/sec capability. This internal HBA PCIe is located in slot 7 (next to slot 5). There is no external slot or access for this card. See “Servicing the Internal HBA PCIe Card” on page 179.

Follow these guidelines when configuring PCIe cards:

- The Sun Storage 12 Gb SAS PCIe HBA internal card must be installed in slot 7. This is a configuration requirement.
- Any empty PCIe slot must be populated with a PCIe filler. Use only the PCIe fillers provided with the server, to maintain proper airflow and EMI conformance for empty slots.

Related Information

- “Remove a PCIe Card” on page 174
- “Install a PCIe Card” on page 176
- “Locate a Faulty PCIe Card” on page 172

I/O Root Complex Connections

The single IOH connects to all six of the PCIe slots. The connections are based on single or dual processor configuration.

The `pci@` values reported in the OpenBoot `show-devs` command output are paths in the I/O root complex topology.

TABLE 1 Single CPU I/O Root Complex Connections

Slot	CPU	IOS	RP	Slot Path	Oracle ILOM Target
1	0	0	1	`/pci@300/pci@1/pci@0/pci@a`	`/SYS/MB/PCIE1`
2	0	0	1	`/pci@300/pci@1/pci@0/pci@11`	`/SYS/MB/PCIE2`
3	0	0	1	`/pci@300/pci@1/pci@0/pci@12`	`/SYS/MB/PCIE3`
4	0	0	1	`/pci@300/pci@1/pci@0/pci@13`	`/SYS/MB/PCIE4`
5	0	0	2	`/pci@300/pci@2/pci@0/pci@14`	`/SYS/MB/PCIE5`
6	0	0	2	`/pci@300/pci@2/pci@0/pci@15`	`/SYS/MB/PCIE6`

TABLE 2 Dual CPU I/O Root Complex Connections

PCIe Slot	CPU	IOS	RP	Slot Path	Oracle ILOM Target
1	0	0	1	`/pci@300/pci@1/pci@0/pci@a`	`/SYS/MB/PCIE1`
2	0	0	1	`/pci@300/pci@1/pci@0/pci@11`	`/SYS/MB/PCIE2`
3	1	0	1	`/pci@300/pci@1/pci@0/pci@12`	`/SYS/MB/PCIE3`
4	1	0	1	`/pci@300/pci@1/pci@0/pci@13`	`/SYS/MB/PCIE4`
5	0	0	2	`/pci@300/pci@2/pci@0/pci@14`	`/SYS/MB/PCIE5`
6	1	0	2	`/pci@300/pci@2/pci@0/pci@15`	`/SYS/MB/PCIE6`

Related Information

- “PCIe Device NAC Names” on page 172
- “Device Paths” on page 20
- “Rear Panel Components (Service)” on page 18
- “Server Block Diagram (Dual Processor)” on page 21
- “PCIe Card Configurations” on page 170
- “Remove a PCIe Card” on page 174
- “Install a PCIe Card” on page 176

PCIe Device NAC Names

NAC Name	Switch Number	Port	Device Number	Single CPU	Dual CPU
/SYS/MB/PCIE1	PCIE_SW_0	10	pci@a	0	0
/SYS/MB/PCIE2	PCIE_SW_0	4	pci@11	0	0
/SYS/MB/PCIE3	PCIE_SW_0	6	pci@12	0	1
/SYS/MB/PCIE4	PCIE_SW_0	12	pci@13	0	1
/SYS/MB/PCIE5	PCIE_SW_1	4	pci@14	0	0
/SYS/MB/PCIE6	PCIE_SW_1	6	pci@15	0	1
/SYS/MB/PCIE7	PCIE_SW_1	10	pci@6	0	1

Note - PCIE7 is for the internal HBA card.

Related Information

- “I/O Root Complex Connections” on page 171
- “Device Paths” on page 20
- “Rear Panel Components (Service)” on page 18
- “Server Block Diagram (Dual Processor)” on page 21
- “PCIe Card Configurations” on page 170
- “Remove a PCIe Card” on page 174
- “Install a PCIe Card” on page 176

▼ Locate a Faulty PCIe Card

You must determine which PCIe card is faulty before you replace it.

1. **Check to see if any Server Service Required LEDs are lit or flashing.**

See “Front Panel Components (Service)” on page 17 and “Interpreting LEDs” on page 30.

2. **In Oracle ILOM, verify that each PCIe card is recognized.**

```
-> show /System/PCI_Devices/Add-on
 /System/PCI_Devices/Add-on
  Targets:
   Device_x
   Device_y
...
->
```

where *x*, *y*, etc, are the slot numbers where PCIe cards are installed.

3. **To verify that a single PCIe card is identified, type:**

```
-> show /System/PCI_Devices/Add-on/Device_x
```

where *x* is the slot number where the PCIe card is installed.

If a PCIe card is not recognized, check its installation.

See “Install a PCIe Card” on page 176.

4. **Verify that a PCIe card is faulty.**

For example, type:

```
-> show faulty
Target              | Property               | Value
--------------------+------------------------+-------------------------------
/SP/faultmgmt/0     | fru                    | /SYS/MB/PCIE1
...
->
```

where *y* is `0` to `6`.

- If a PCIe card is faulty, you will see `/SYS/MB/PCIE`*y* under the `Value` heading.
- If a FRU value different from `/SYS/MB/PCIE`*y* is displayed, see “Component Service Task Reference” on page 47 to identify which component is faulty.

5. **Use the Oracle ILOM `faultmgmt` shell to identify the faulty component.**

See “Identify Faulted Components” on page 27.

Check the `Fault class` and `Description` fields for more information.

6. **If a PCIe card is faulty, replace it.**

See “Remove a PCIe Card” on page 174.

7. **If you are unable to determine if a PCIe card is faulty, seek further information.**

   See “Detecting and Managing Faults” on page 25.

Related Information

- “PCIe Card Configurations” on page 170
- “Remove a PCIe Card” on page 174
- “Verify a PCIe Card” on page 177

▼ Remove a PCIe Card

Removing a PCIe card is a cold-service operation. You must power off the server before you remove the PCIe card.

Note - This procedure is the same for removing a filler.

---

1. **Determine which PCIe card to remove.**

   See “Locate a Faulty PCIe Card” on page 172.

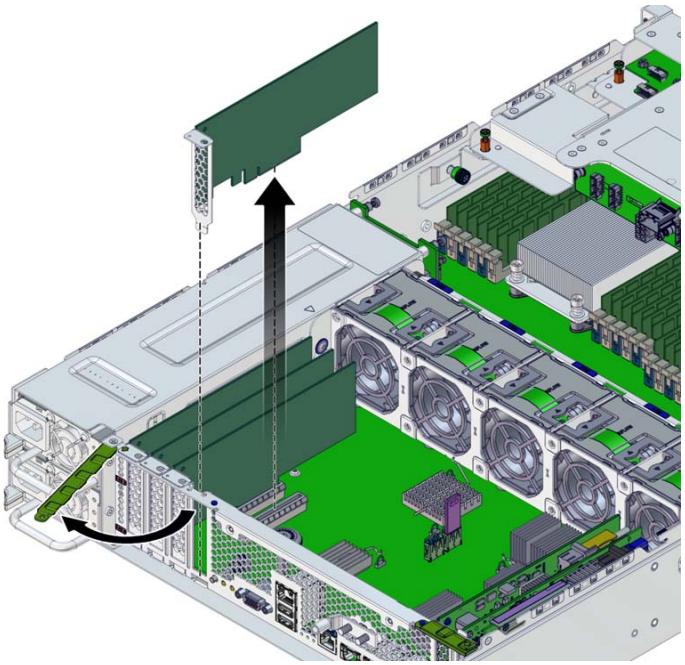
2. **Prepare for service.**

   See “Preparing for Service” on page 43.

3. **Remove the server to obtain access to internal components.**

   See “Accessing Internal Components” on page 55.

4. **Swing the retainer to its fully open position, and lift the PCIe card or filler out of the socket.**



5. **Set the PCIe card or filler aside.**

6. **Repeat from Step 4 for any additional PCIe cards or fillers to be removed.**

7. **Consider your next step.**

   - **If you are replacing a faulty card or installing an additional card, install the new PCIe card.**

     See “Install a PCIe Card” on page 176.

   - **If you removed a PCIe card as part of another component's removal or installation procedure, return to that procedure.**

     See “Component Service Task Reference” on page 47 for assistance.

   - **If you are not replacing the PCIe card, install a filler.**

See “Install a PCIe Card” on page 176.

8. **Power on the server.**

   See “Returning a Server to Operation” on page 235.

Related Information

- “Locate a Faulty PCIe Card” on page 172
- “Install a PCIe Card” on page 176
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

▼ Install a PCIe Card

Installing a PCIe card is a cold-service operation. You must power off the server before installing the PCIe card.

Note - This procedure is the same for installing a PCIe filler.

1. **If you are installing additional cards, review this information and complete these prerequisites in this order.**

   See:

   - “PCIe Card Configurations” on page 170
   - “Preparing for Service” on page 43
   - “Remove a PCIe Card” on page 174

   Remove the filler.

2. **If you are replacing a faulty card and have not removed the faulty card, remove it and return to this procedure.**

   See “Remove a PCIe Card” on page 174.

3. **If not already done, prepare for service.**

   See “Preparing for Service” on page 43.

4. **Position the PCIe card at the slot where it will be installed.**

5. **Press the PCIe card into the socket.**

6. **Swing the retainer to its fully closed position.**

   If there is resistance, check the alignment of the PCIe card bracket and try again.

Caution - Do not force the card into the slot. Damage to the card or the server might occur.

7. **Repeat from Step 4 through Step 6 for additional PCIe cards that you are installing.**

8. **If you installed a PCIe card as part of another component's removal or installation procedure, return to that procedure.**

   See “Component Service Task Reference” on page 47.

9. **Complete these postrequisites in this order to finish the installation procedure.**

   See:

   - “Returning a Server to Operation” on page 235
   - “Verify a PCIe Card” on page 177

Related Information

- “Remove a PCIe Card” on page 174
- “Verify a PCIe Card” on page 177
- “PCIe Card Configurations” on page 170
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

▼ Verify a PCIe Card

After you install a PCIe card, you can verify its functionality.

1. **Access Oracle ILOM.**

   See “Log In to Oracle ILOM (Service)” on page 26.

2. **Reset the PCIe card.**

```
-> set /SYS/MB/PCIEy clear_fault_action=true
Are you sure you want to clear /SYS/MB/PCIE1 (y/n)? y
Set 'clear_fault_action' to 'true'
```

```
->
```

where *y* is `0` to `6` for the slot numbers.

3. **Verify that the PCIe card is recognized.**

```
-> show /System/PCI_Devices/Add-on
 /System/PCI_Devices/Add-on
  Targets:
   Device_x
   Device_y
...
->
```

where *x*, *y*, and so on are the slot numbers where PCIe cards are installed.

If the PCIe card is not recognized, check its installation.

4. **Verify that the PCIe card is identified.**

```
-> show /System/PCI_Devices/Add-on/Device_x
```

where *x* is the slot number where the PCIe card is installed.

5. **If a card is not recognized, try to locate it.**

See "Locate a Faulty PCIe Card" on page 172.

Related Information

- "Install a PCIe Card" on page 176
- "PCIe Card Configurations" on page 170
- "Locate a Faulty PCIe Card" on page 172

Servicing the Internal HBA PCIe Card

The internal HBA PCIe card shows as slot 7 in most firmware, software, and device tree nomenclature.

These topics assist you when servicing the internal HBA card.

Description	Links
Replace a faulty HBA card.	“Detecting and Managing Faults” on page 25 “Locate a Faulty PCIe Card” on page 172 “Remove the Internal HBA PCIe Card” on page 179 “Install the Internal HBA PCIe Card” on page 183 “Verify the Internal HBA PCIe Card” on page 187
Remove an HBA card as part of another component's service operation.	“Remove the Internal HBA PCIe Card” on page 179
Install an HBA card as part of another component's service operation.	“Install the Internal HBA PCIe Card” on page 183
Identify a faulty HBA card.	“Locate a Faulty PCIe Card” on page 172 “Detecting and Managing Faults” on page 25

Related Information

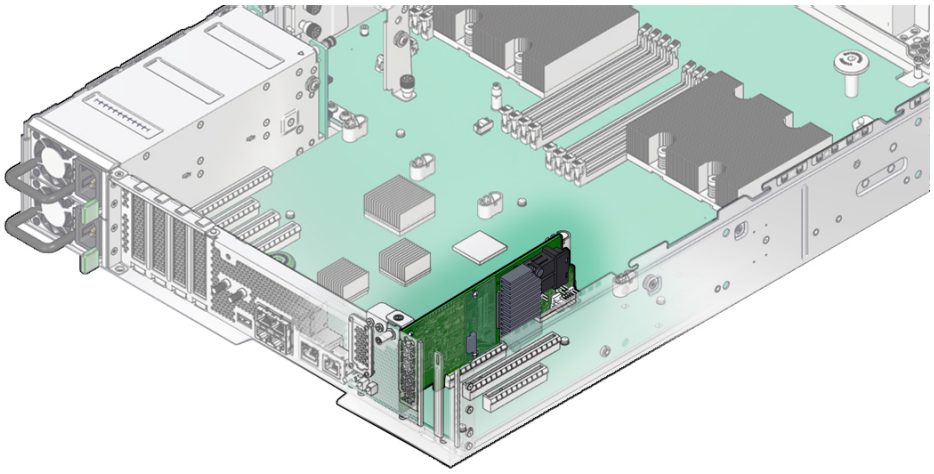
- “Identifying Components” on page 13
- “Preparing for Service” on page 43
- “Prevent ESD Damage” on page 55

▼ Remove the Internal HBA PCIe Card

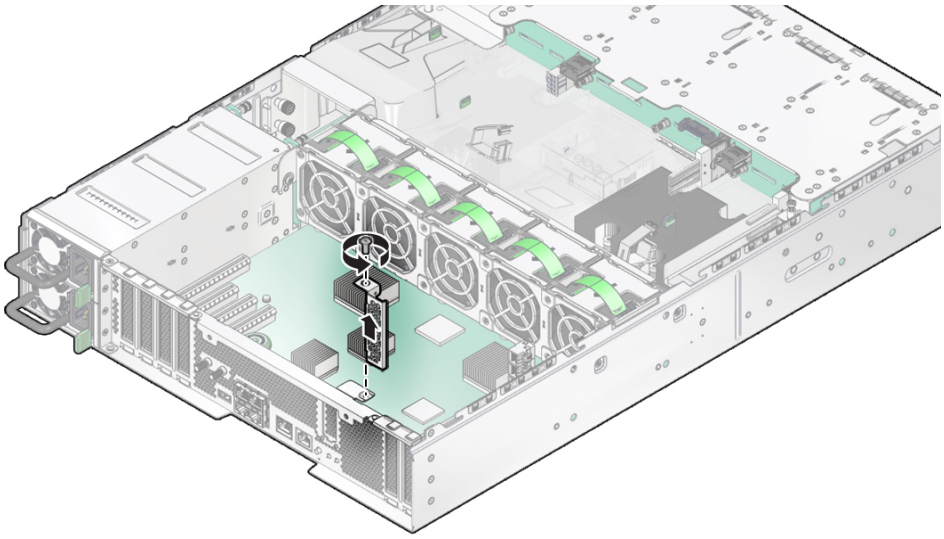
1. **Prepare for servicing.**

See “Preparing for Service” on page 43.

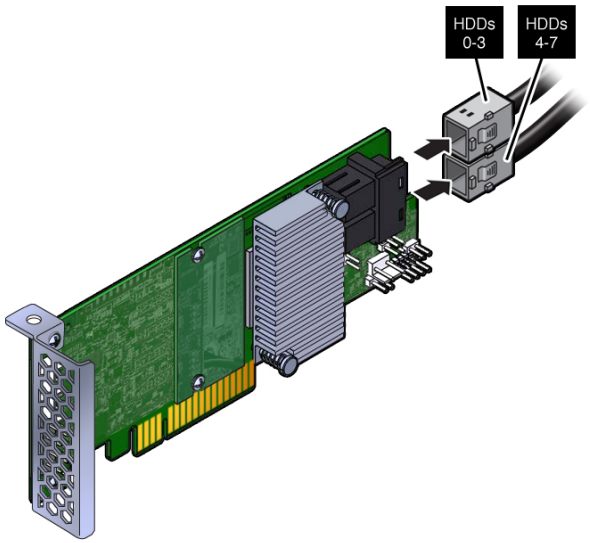
2. **Locate the internal HBA card.**



3. **Using a No. 1 flat-head screwdriver, remove the bracket screw, taking care not to strip it, then carefully lift the card out of its slot.**

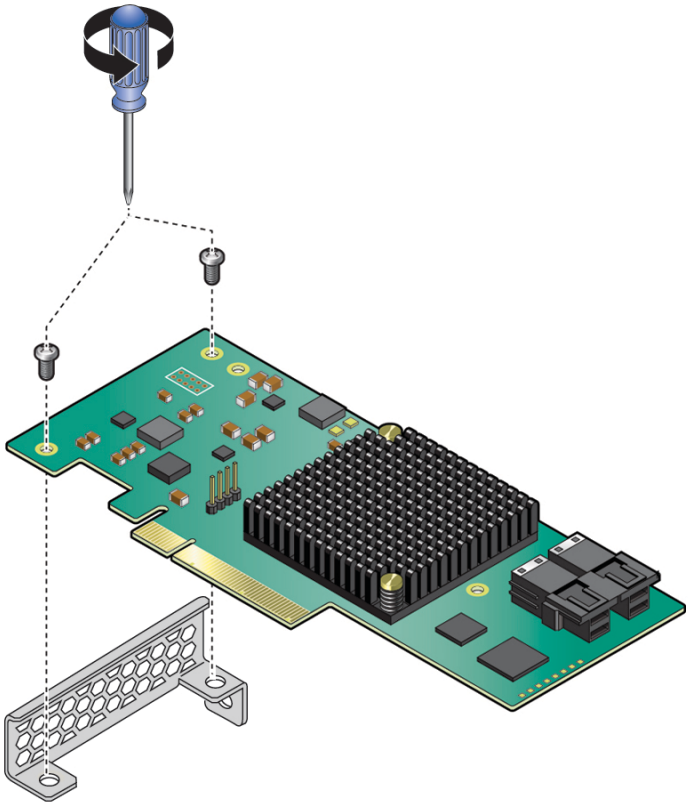


4. **Disconnect the SAS cables from the card, then place the card on an antistatic mat.**



5. **If you are replacing the card, use a No. 2 Philips screwdriver to remove the special fitted bracket from the faulty card.**

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



Related Information

- “Identifying Components” on page 13
- “Preparing for Service” on page 43
- “Prevent ESD Damage” on page 55

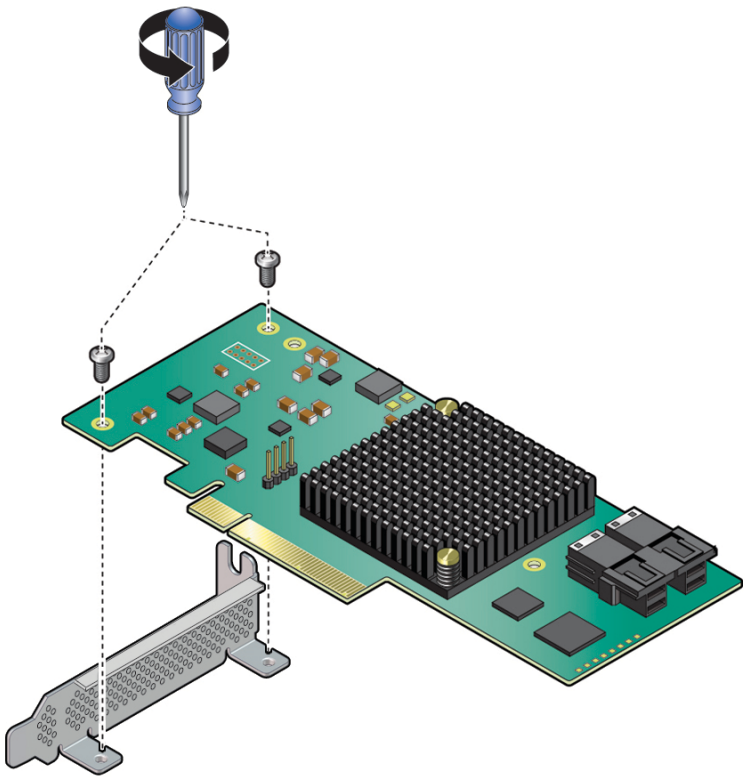
▼ Install the Internal HBA PCIe Card

1. **If you are installng the card as part of another service procedure, skip to Step 3.**

2. **If you are replacing a faulty card, perform the following tasks.**

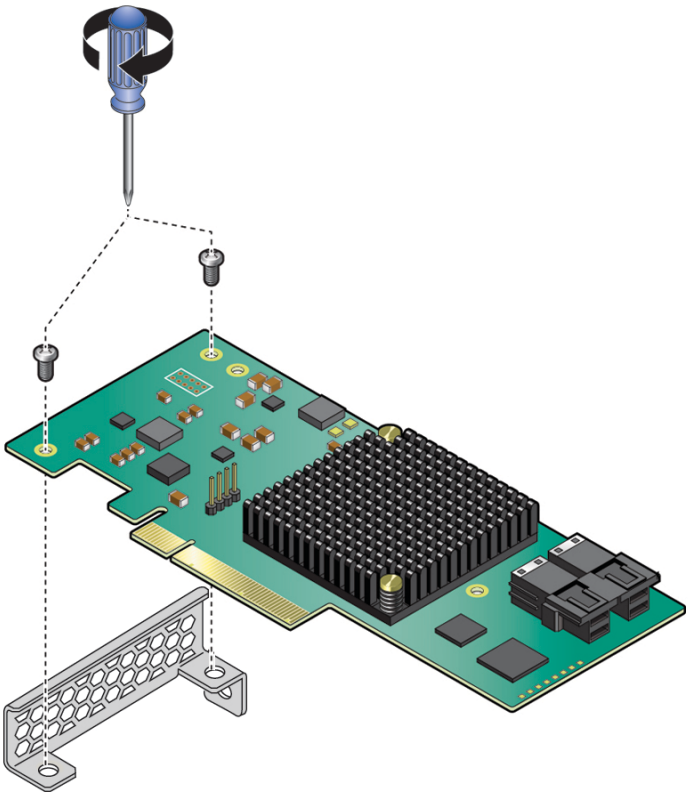
   a. **Unpack the replacement HBA card.**

   b. **Using a No. 2 Philips screwdriver, remove the standard HBA PCIe bracket that shipped with the replacement card.**



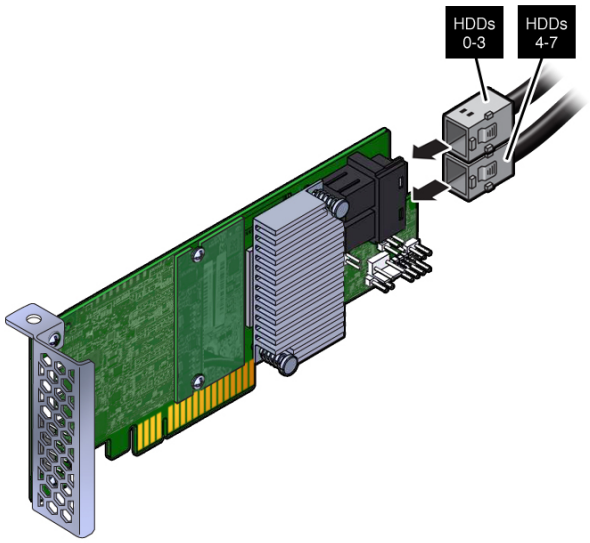
   c. **Install the special fitted bracket that was removed in "Remove the Internal HBA PCIe Card" on page 179.**

Caution - Take care not to overtighten the screws, which could stip or cause the card to crack.



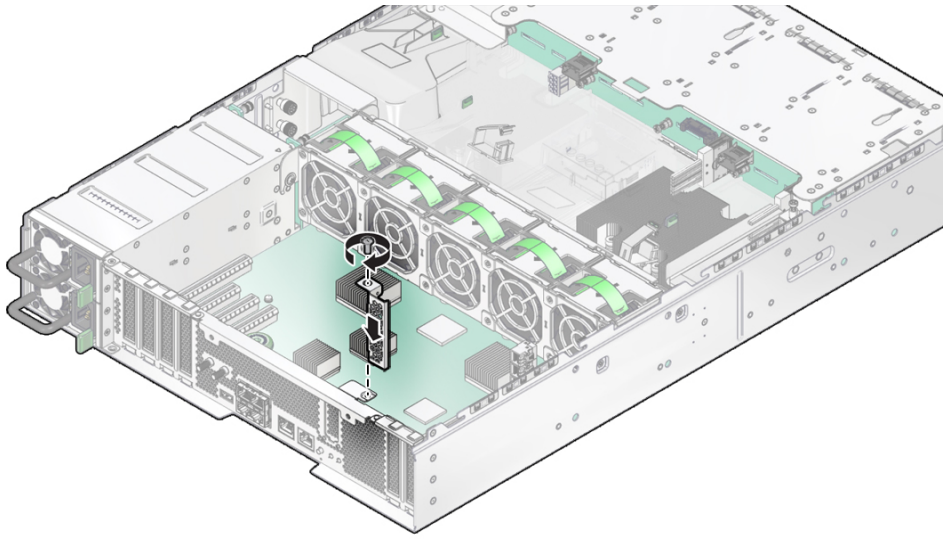
3. **Connect the SAS cables to the HBA card.**

Tip - Cables have designations for top and bottom orientation.



4. **Insert the card connector into the bottom connector.**

5. **Using a No. 1 flat-head screwdriver, secure the card using the bracket screw, being careful not to overtighten the screw.**



6. **Return the server to operation.**
   See “Returning a Server to Operation” on page 235.

Related Information

- “Identifying Components” on page 13
- “Detecting and Managing Faults” on page 25
- “Preparing for Service” on page 43
- “Prevent ESD Damage” on page 55

▼ Verify the Internal HBA PCIe Card

After you install the internal HBA PCIe card, you can verify its functionality.

1. **Access Oracle ILOM.**
   See “Log In to Oracle ILOM (Service)” on page 26.

2. **Reset the card.**

```
-> set /SYS/MB/PCIE7 clear_fault_action=true
Are you sure you want to clear /SYS/MB/PCIE1 (y/n)? y
Set 'clear_fault_action' to 'true'

->
```

3. **Verify that the card is recognized.**

```
-> show /System/PCI_Devices/Add-on
 /System/PCI_Devices/Add-on
  Targets:
   Device_7
...
->
```

If the card is not recognized, check its installation.

4. **Verify that the card is identified.**

```
-> show /System/PCI_Devices/Add-on/Device_7
```

5. **If the card is not recognized, try to locate it.**

See “Locate a Faulty PCIe Card” on page 172.

Related Information

- “Remove the Internal HBA PCIe Card” on page 179
- “Install the Internal HBA PCIe Card” on page 183
- “PCIe Card Configurations” on page 170
- “Locate a Faulty PCIe Card” on page 172

Servicing the Battery

The battery provides continuous backup power for the time-of-day circuits. The battery is located near the PCIe slots 5 and 6. See “Component Locations (Motherboard, Memory, and PCIe Cards)” on page 16.

Description	Links
Replace a battery.	“Remove the Battery” on page 189 “Install the Battery” on page 191
Remove the battery as part of another component's service operation.	“Remove the Battery” on page 189
Install the battery as part of another component's service operation.	“Install the Battery” on page 191

Related Information

- “Identifying Components” on page 13
- “Detecting and Managing Faults” on page 25
- “Component Service Task Reference” on page 47
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

▼ Remove the Battery

Removing the battery is a cold-service operation. You must power off the server before you remove the battery.

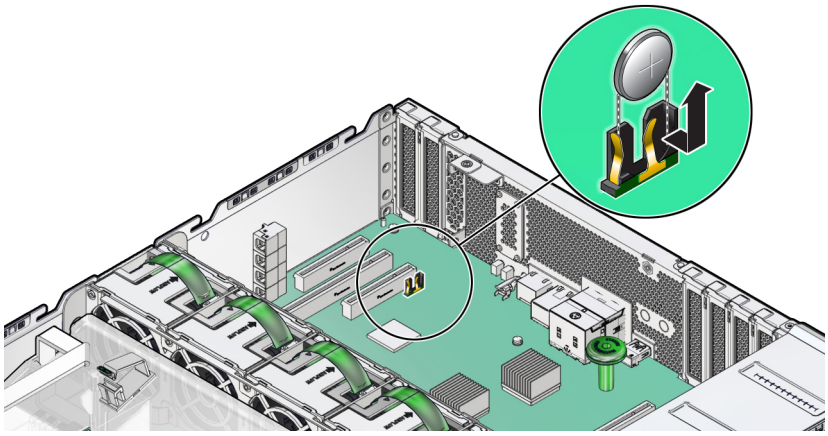
1. **Back up the Oracle ILOM variables.**

   See `http://docs.oracle.com/cd/E19860-01/E21549/z40015841018582.html#scrolltoc`

2. **Prepare for service.**

   See “Preparing for Service” on page 43.

3. **Lift the battery out of the receptacle.**



4. **Set the battery aside.**

5. **Consider your next step.**

   - **If you are replacing the battery, install a new battery.**

     See “Install the Battery” on page 191.

   - **If you removed the battery as part of another component's service procedure, return to that procedure.**

     See “Component Service Task Reference” on page 47 for assistance.

Related Information

- “Install the Battery” on page 191
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Install the Battery

Installing the battery is a cold-service operation. You must power off the server before installing the battery.

1. **If you have not done so already, prepare for service and remove the battery.**

   See:

   - “Preparing for Service” on page 43
   - “Remove the Battery” on page 189

2. **Press the battery into the receptacle until you hear a click.**

   The positive (+) side of the battery faces toward the PCIe card slots 1-4.

3. **If you installed the battery as part of another component's removal or installation procedure, return to that procedure.**

   See “Component Service Task Reference” on page 47 for assistance.

4. **Finish the installation procedure.**

   See “Returning a Server to Operation” on page 235.

5. **Set the date and time on SP and Host OS.**

6. **Restore the Oracle ILOM variables.**

   See `http://docs.oracle.com/cd/E19860-01/E21549/z40015841018582.html#scrolltoc`

Related Information

- “Remove the Battery” on page 189
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Servicing the Cables

The cables deliver power to and conduct signals between hardware components. The cables are routed throughout the server. See “Component Locations (Storage, Power, NVMe, and Fan Modules)” on page 14.

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.

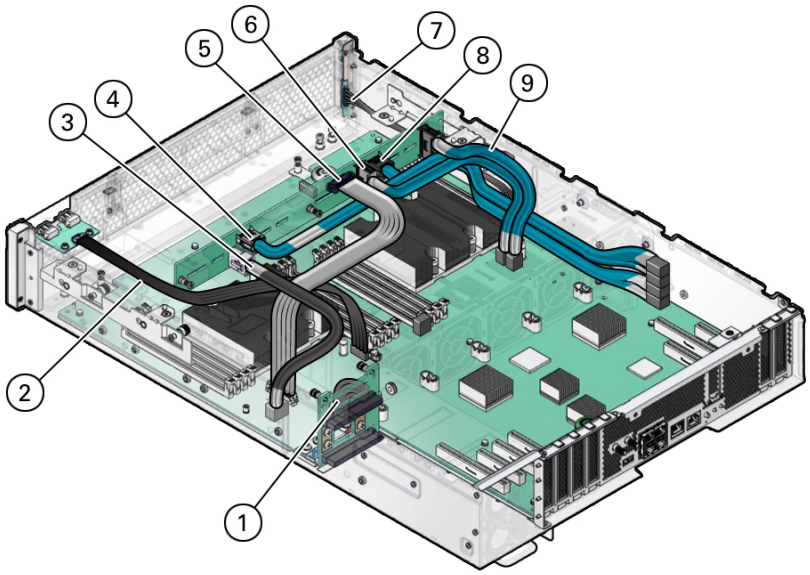
Description	Links
Replace a faulty cable.	“Servicing the SAS Drive Signal Cable” on page 195 “Servicing the Drive Power Cable” on page 199 “Servicing the PDB Signal Cable” on page 203 “Servicing the NVMe Cables” on page 207 “Servicing HBA SAS Cables” on page 211
Remove a system cable as part of another component's service operation.	“Remove the SAS Drive Signal Cable” on page 196 “Remove the Drive Power Cable” on page 200 “Remove the PDB Signal Cable” on page 204 “Remove NVMe Cables” on page 208 “Remove HBA SAS Cables” on page 211
Install a system cable as part of another component's service operation.	“Install the SAS Drive Signal Cable” on page 197 “Install the Drive Power Cable” on page 202 “Install the PDB Signal Cable” on page 206 “Install NVMe Cables” on page 209 “Install HBA SAS Cables” on page 213

Related Information

- “Identifying Components” on page 13
- “Detecting and Managing Faults” on page 25
- “Component Service Task Reference” on page 47
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Cable Configurations

This illustration identifies cables routed throughout the server interior.



No.	Description	Links
1	PDB signal cable	“Servicing the PDB Signal Cable” on page 203
2	USB cable	“Servicing the eUSB Drive” on page 103

No.	Description	Links
3	Drive power cable	“Servicing the Drive Power Cable” on page 199
4	SAS drive signal cable (SAS 0-3)	“Servicing the SAS Drive Signal Cable” on page 195 “Servicing HBA SAS Cables” on page 211
5	Drive backplane data cable	“Servicing the Drive Backplane” on page 117
6	NVMe B drive cable	“Servicing the NVMe Cables” on page 207
7	LED board cable	“Servicing the LED Board” on page 217
8	SAS drive signal cable (SAS 4-7)	“Servicing the SAS Drive Signal Cable” on page 195 “Servicing HBA SAS Cables” on page 211
9	NVMe A drive cable	“Servicing the NVMe Cables” on page 207

Related Information

- “Component Locations (Storage, Power, NVMe, and Fan Modules)” on page 14
- “Component Locations (Motherboard, Memory, and PCIe Cards)” on page 16
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Servicing the SAS Drive Signal Cable

These topics describe how to remove and install SAS drive signal cables.

Description	Links
Replace a faulty cable.	“Detecting and Managing Faults” on page 25 “Remove the SAS Drive Signal Cable” on page 196 “Install the SAS Drive Signal Cable” on page 197
Remove a cable as part of another component's service operation.	“Remove the SAS Drive Signal Cable” on page 196
Install a cable as part of another component's service operation.	“Install the SAS Drive Signal Cable” on page 197

Related Information

- “Identifying Components” on page 13

- "Detecting and Managing Faults" on page 25
- "Component Service Task Reference" on page 47
- "Preparing for Service" on page 43
- "Returning a Server to Operation" on page 235

▼ Remove the SAS Drive Signal Cable

Removing a cable is a cold-service operation. You must power off the server before you remove the cable.

1. **Determine which cable to remove.**
   See "Cable Configurations" on page 194.
2. **Prepare for service.**
   See "Preparing for Service" on page 43.
3. **Remove the fan tray with all fan modules.**
   See "Remove the Fan Tray" on page 69.
4. **Disconnect the SAS drive signal cable connector from the drive backplane.**
   See "Cable Configurations" on page 194.
5. **Remove the air duct.**
   See "Remove the Air Duct" on page 75.
6. **Disconnect the cable connector from the HBA card in slot 7.**

   Tip - Take a photo or note the cable routing and order for use later when installing the cables.
7. **Set the cable aside.**
8. **Consider your next step.**

   - **If you are replacing a cable, install the new cable.**
     See "Install the SAS Drive Signal Cable" on page 197.
   - **If you removed a cable as part of another component's removal or installation procedure, return to that procedure.**

See “Component Service Task Reference” on page 47.

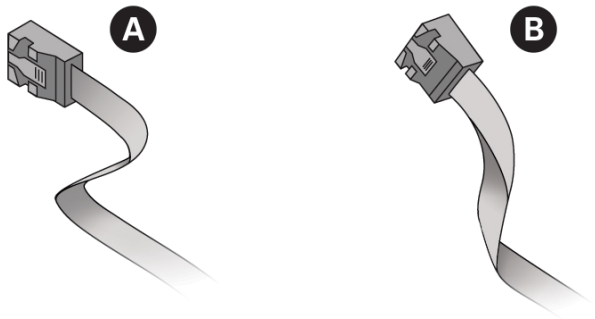
Related Information

- “Install the SAS Drive Signal Cable” on page 197
- “Component Locations (Storage, Power, NVMe, and Fan Modules)” on page 14
- “Component Locations (Motherboard, Memory, and PCIe Cards)” on page 16
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

▼ Install the SAS Drive Signal Cable

Installing a cable is a cold-service operation. You must power off the server before installing the cable.

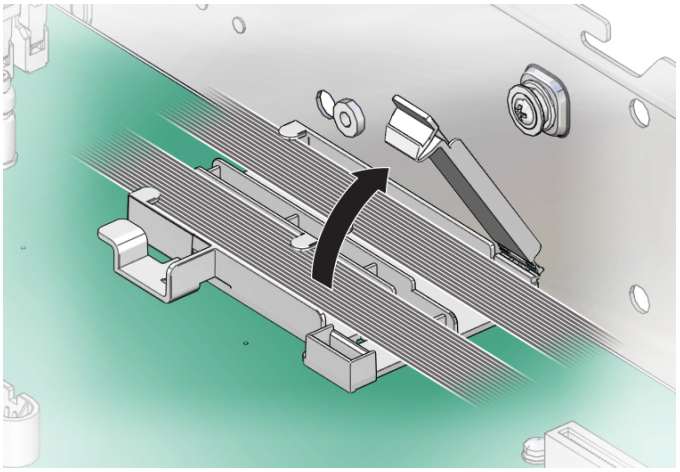
1. **If replacing a faulty cable, fold the new cable with 90-degree bends on each end.**



2. **Route the cable into the cable pass through:**

Caution - The cable pass through is fragile. Take care not to torque or stress it, which could cause damage.

Caution - Avoid hitting and lifting the MAC label nearby. If it is raised while routing the cable, reseat it.



a. **Open the clip, and pass the cable through at a 45-degree angle to get under one tab.**

b. **Angle the cable the opposite direction, then insert it under the other tab.**

c. **Close the clip on the cable pass through.**

d. **Make sure the cables have enough slack so that they are not pulling on HBA card.**

Caution - The HBA card will bend if the cables are too tight.

e. **Ensure that the cable pass through is seated all the way towards the HBA card.**

f. **Make sure that the cable pass through remains seated on all four corners.**

3. **Connect the cable to the HBA card in slot 7.**

4. **Route the cable to the SAS drive signal cable connector on the drive backplane.**

5. **Install the air duct.**

   See “Install the Air Duct” on page 236.

6. **Install the fan tray and all fan modules.**

   See “Install the Fan Tray” on page 244.

7. **Connect the SAS drive signal cable connector to the drive backplane.**

   See “Cable Configurations” on page 194.

8. **If you installed a cable as part of another component's removal or installation procedure, return to that procedure.**

   See “Component Service Task Reference” on page 47 for assistance.

9. **Finish the installation procedure.**

   See “Returning a Server to Operation” on page 235.

Related Information

- “Remove the SAS Drive Signal Cable” on page 196
- “Component Locations (Storage, Power, NVMe, and Fan Modules)” on page 14
- “Component Locations (Motherboard, Memory, and PCIe Cards)” on page 16
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Servicing the Drive Power Cable

These topics describe how to remove and install the drive power cable.

Description	Links
Replace a faulty cable.	“Detecting and Managing Faults” on page 25 “Remove the Drive Power Cable” on page 200 “Install the Drive Power Cable” on page 202
Remove a cable as part of another component's service operation.	“Remove the Drive Power Cable” on page 200

Description	Links
Install a cable as part of another component's service operation.	“Install the Drive Power Cable” on page 202

Related Information

- “Identifying Components” on page 13
- “Detecting and Managing Faults” on page 25
- “Component Service Task Reference” on page 47
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

▼ Remove the Drive Power Cable

Removing a cable is a cold-service operation. You must power off the server before you remove the cable.

1. **Determine which cable to remove.**

   See “Cable Configurations” on page 194.

2. **Prepare for service.**

   See “Preparing for Service” on page 43.

3. **If you are removing the drive power cable from the motherboard, complete these prerequisites in this order.**

   See:

   - “Remove a Fan Module” on page 153

     Remove all fan modules.
   - “Remove the Fan Tray” on page 69

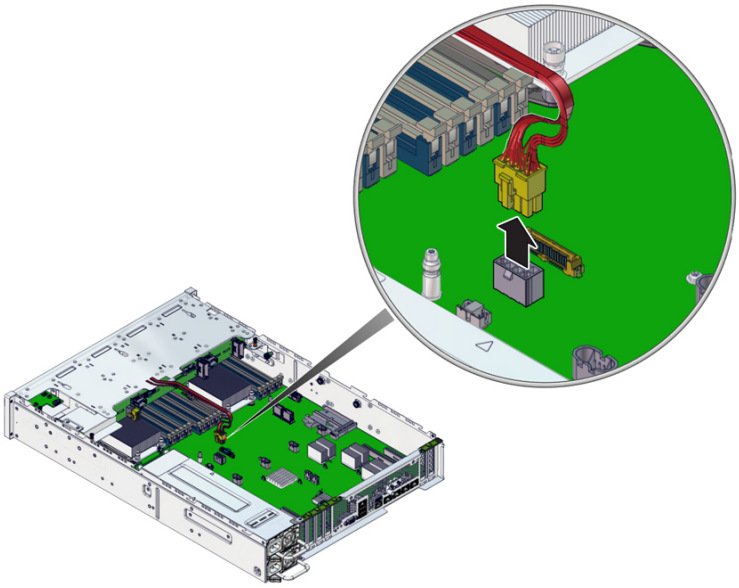
4. **Disconnect the drive power cable from the drive backplane.**

   See “Cable Configurations” on page 194.

5. **Release the cable from the cable clamp.**

6. **If applicable, disconnect the cable from the motherboard.**

If you have not already removed the fan modules and tray, you will need to before disconnecting the cable from the motherboard. See Step 3.



7. **Set the cable aside.**

8. **Consider your next step.**

   - **If you are replacing a cable, install the new cable.**
     See “Install the Drive Power Cable” on page 202.

   - **If you removed a cable as part of another component's removal or installation procedure, return to that procedure.**
     See “Component Service Task Reference” on page 47.

Related Information

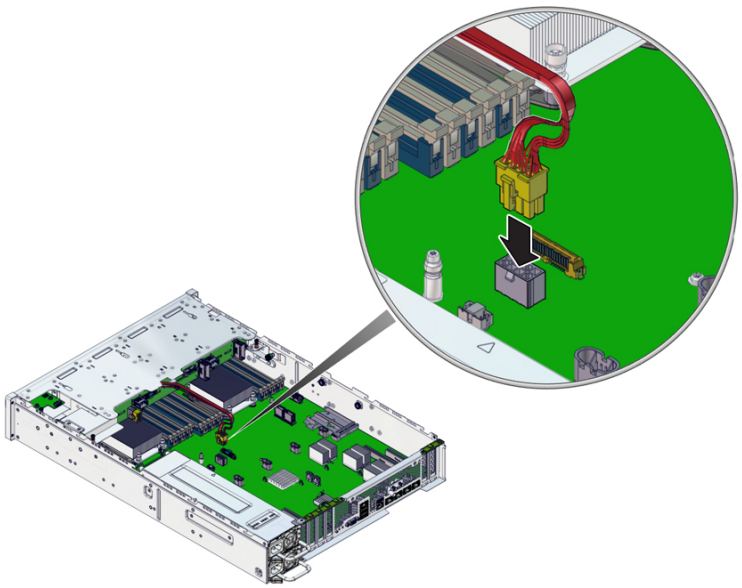
- “Install the Drive Power Cable” on page 202
- “Component Locations (Storage, Power, NVMe, and Fan Modules)” on page 14
- “Component Locations (Motherboard, Memory, and PCIe Cards)” on page 16
- “Preparing for Service” on page 43

- “Returning a Server to Operation” on page 235

Install the Drive Power Cable

Installing a cable is a cold-service operation. You must power off the server before installing the cable.

1. **Connect the cable to the motherboard.**



2. **Route the cable into the cable clamp and against the server wall.**

3. **If you removed the fan modules and tray, complete these prerequisites in this order.**

   See:

   - “Install the Fan Tray” on page 244
   - “Install a Fan Module” on page 155

     Install all fan modules.

4. **Connect the drive power cable to the drive backplane.**

   See “Cable Configurations” on page 194.

5. **If you installed a cable as part of another component's removal or installation procedure, return to that procedure.**

   See “Component Service Task Reference” on page 47.

6. **Finish the installation procedure.**

   See “Returning a Server to Operation” on page 235.

Related Information

- “Remove the Drive Power Cable” on page 200
- “Component Locations (Storage, Power, NVMe, and Fan Modules)” on page 14
- “Component Locations (Motherboard, Memory, and PCIe Cards)” on page 16
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Servicing the PDB Signal Cable

These topics describe how to remove and install the PDB signal cable.

Description	Links
Replace a faulty cable.	“Detecting and Managing Faults” on page 25 “Remove the PDB Signal Cable” on page 204 “Install the PDB Signal Cable” on page 206
Remove a cable as part of another component's service operation.	“Remove the PDB Signal Cable” on page 204
Install a cable as part of another component's service operation.	“Install the PDB Signal Cable” on page 206

Related Information

- “Identifying Components” on page 13
- “Detecting and Managing Faults” on page 25

- "Component Service Task Reference" on page 47
- "Preparing for Service" on page 43
- "Returning a Server to Operation" on page 235

▼ Remove the PDB Signal Cable

Removing a cable is a cold-service operation. You must power off the server before you remove the cable.

1. **Determine which cable to remove.**

   See "Cable Configurations" on page 194.

2. **Prepare for service.**

   See "Preparing for Service" on page 43.

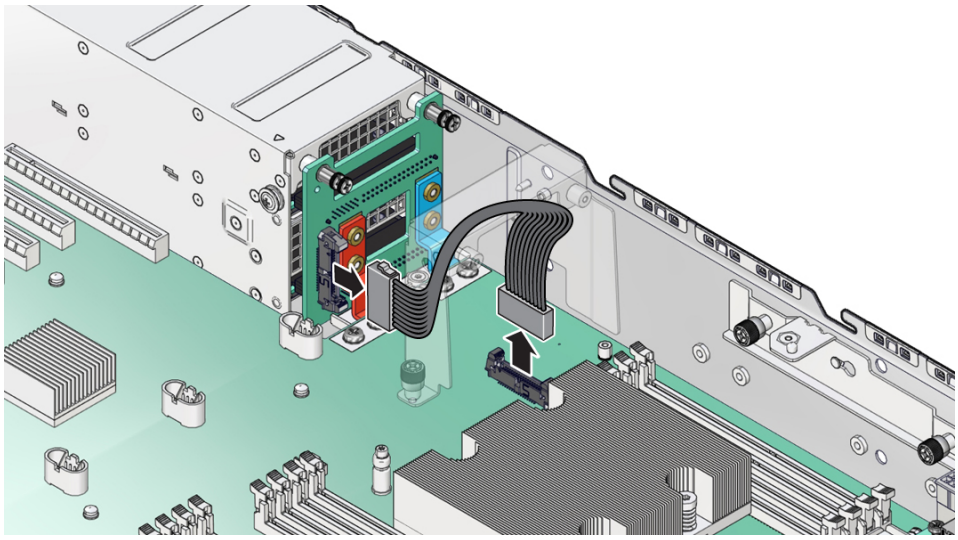
3. **Review this information and complete these prerequisites in this order.**

   See:

   - "Remove a Fan Module" on page 153

     Remove all fan modules.
   - "Remove the Fan Tray" on page 69
   - "Rotate the Drive Cage to the Service Position" on page 71.
   - "Remove the Air Duct" on page 75
   - "Remove the PSU Duct" on page 74

4. **Disconnect the cable from the PDB and the motherboard.**



5. **Set the cable aside.**

6. **Consider your next step.**

   - **If you are replacing a cable, install the new cable.**

     See “Install the PDB Signal Cable” on page 206.

   - **If you removed a cable as part of another component's removal or installation procedure, return to that procedure.**

     See “Component Service Task Reference” on page 47.

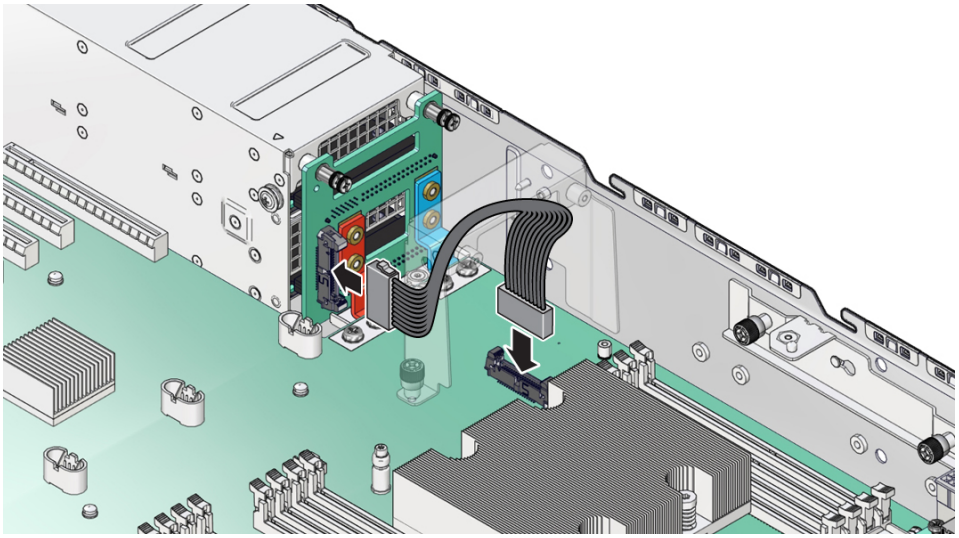
Related Information

- “Install the PDB Signal Cable” on page 206
- “Component Locations (Storage, Power, NVMe, and Fan Modules)” on page 14
- “Component Locations (Motherboard, Memory, and PCIe Cards)” on page 16
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Install the PDB Signal Cable

Installing a cable is a cold-service operation. You must power off the server before installing the cable.

1. **Connect the cable to the motherboard and the PDB.**



2. **Review this information and complete these prerequisites in this order.**
   See:

   - “Install the PSU Duct” on page 240
   - “Install the Air Duct” on page 236
   - “Secure the Drive Cage” on page 241
   - “Install the Fan Tray” on page 244
   - “Install a Fan Module” on page 155

     Install all fan modules.

3. **If you installed a cable as part of another component's removal or installation procedure, return to that procedure.**
   See “Component Service Task Reference” on page 47 for assistance.

4. **Finish the installation procedure.**

See “Returning a Server to Operation” on page 235.

Related Information

- “Remove the PDB Signal Cable” on page 204
- “Component Locations (Storage, Power, NVMe, and Fan Modules)” on page 14
- “Component Locations (Motherboard, Memory, and PCIe Cards)” on page 16
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Servicing the NVMe Cables

These topics describe how to remove and install the NVMe cables.

Description	Links
Replace a faulty cable.	“Detecting and Managing Faults” on page 25 “Remove NVMe Cables” on page 208 “Install NVMe Cables” on page 209
Remove a cable as part of another component's service operation.	“Remove NVMe Cables” on page 208
Install a cable as part of another component's service operation.	“Install NVMe Cables” on page 209

Related Information

- Oracle 1.6TB NVMe SSD Documentation Library
- “Identifying Components” on page 13
- “Detecting and Managing Faults” on page 25
- “Component Service Task Reference” on page 47
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Remove NVMe Cables

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

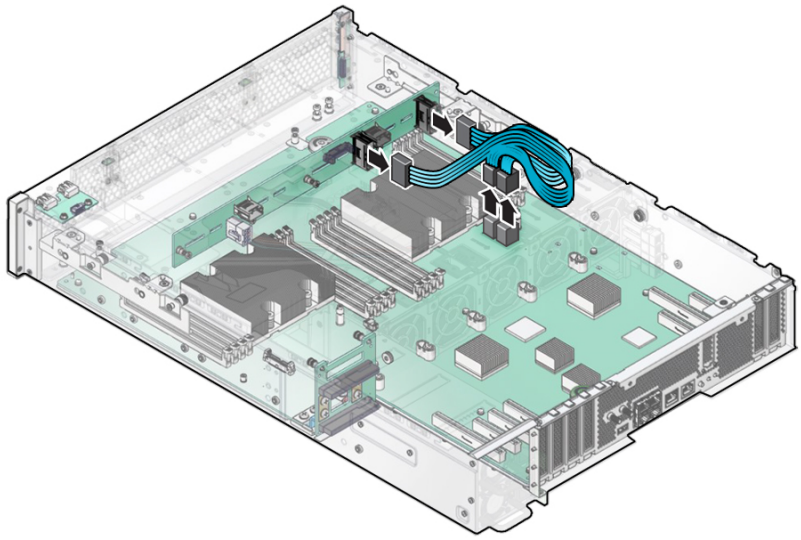
1. **Prepare for service.**

   See “Preparing for Service” on page 43.

2. **Disconnect the NVMe cables from the motherboard and front storage drive backplane.**

   Tip - Take a photograph or note the cable routing and order, for use later when installing the cables.

   Press each latch, then pull out to disengage the cable from each connector.



3. **Remove the SAS cables from the backplane.**

   See “Remove the SAS Drive Signal Cable” on page 196 and “Remove HBA SAS Cables” on page 211.

4. **Remove the air duct.**

   See “Remove the Air Duct” on page 75.

5. **Remove the NVMe cables from the server.**

   Carefully remove the NVMe cable bundle from the server. Be careful not to snag the cables on the server components.

Related Information

- Oracle 1.6TB NVMe SSD Documentation Library
- “Component Locations (Storage, Power, NVMe, and Fan Modules)” on page 14
- “Component Locations (Motherboard, Memory, and PCIe Cards)” on page 16
- “Preparing for Service” on page 43
- “Install NVMe Cables” on page 209
- “Returning a Server to Operation” on page 235

▼ Install NVMe Cables

Replacing the cable assembly 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. **Install the NVMe cables between the front storage drive backplane and the motherboard.**

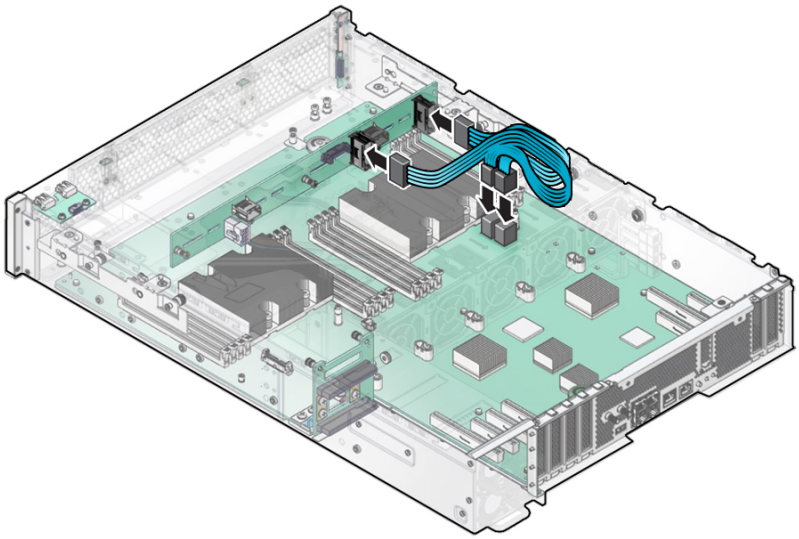
Caution - Be careful not to break any wires or base connectors when bending and folding a cable.

   a. **If installing a new cable, bend it near the white tape banding, at the base connector, to conform with the cable routing.**

Tip - Using the handle of a small screwdriver as a form helps bend the cables while protecting the wires going into the base connectors. If necessary, the white tape banding can be split to maintain the integrity of the cable.

   b. **Plug each cable into its port connector until you hear an audible click.**

The cable labeled 0-1 must be connected to the port labeled 0-1 on the motherboard, and the cable labeled 2-3 must to the port 2-3 on the motherboard.



2. **Install the SAS cables.**

   See “Install the SAS Drive Signal Cable” on page 197 and “Install HBA SAS Cables” on page 213.

3. **Install the air duct.**

   See “Install the Air Duct” on page 236.

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

   See “Returning a Server to Operation” on page 235.

Related Information

- Oracle 1.6TB NVMe SSD Documentation Library
- “Component Locations (Storage, Power, NVMe, and Fan Modules)” on page 14
- “Component Locations (Motherboard, Memory, and PCIe Cards)” on page 16
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Servicing HBA SAS Cables

These topics describe how to remove and install the HBA SAS cables.

Description	Links
Replace a faulty cable.	"Detecting and Managing Faults" on page 25 "Remove HBA SAS Cables" on page 211 "Install HBA SAS Cables" on page 213
Remove a cable as part of another component's service operation.	"Remove HBA SAS Cables" on page 211
Install a cable as part of another component's service operation.	"Install HBA SAS Cables" on page 213

Related Information

- "Identifying Components" on page 13
- "Detecting and Managing Faults" on page 25
- "Component Service Task Reference" on page 47
- "Preparing for Service" on page 43
- "Returning a Server to Operation" on page 235

▼ Remove HBA SAS Cables

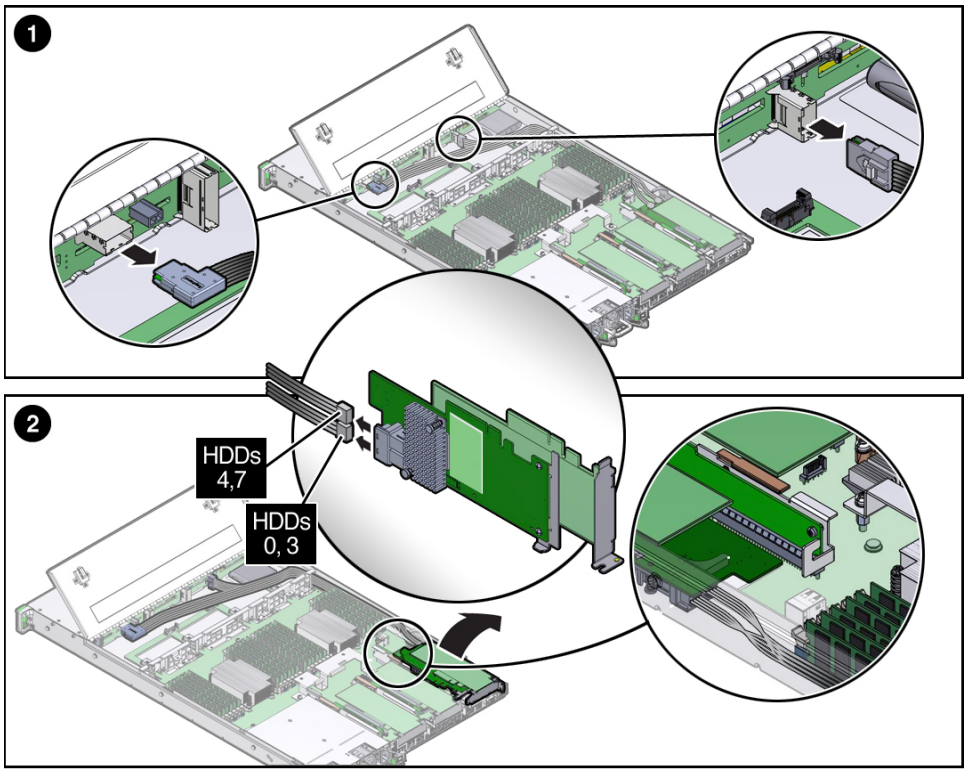
Replacing the cable assembly is a cold-service procedure that must be performed by qualified service personnel. The server must be completely powered down before performing this procedure.

1. **Prepare for servicing.**
   See "Preparing for Service" on page 43.

2. **Remove all of the fan modules and fan tray.**
   See:

   - "Remove a Fan Module" on page 153
     Remove all fan modules.
   - "Remove the Fan Tray" on page 69

3. **To disconnect each SAS cable from the disk backplane, press the latch on the cable connectors and pull the connectors out (panel 1).**



4. **Disconnect the SAS cables from the internal HBA.**

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

5. **Carefully remove the SAS cables and the super capacitor cable from the server.**

Related Information

- “Install HBA SAS Cables” on page 213
- “Component Locations (Storage, Power, NVMe, and Fan Modules)” on page 14
- “Component Locations (Motherboard, Memory, and PCIe Cards)” on page 16
- “Preparing for Service” on page 43

- “Returning a Server to Operation” on page 235

▼ Install HBA SAS Cables

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

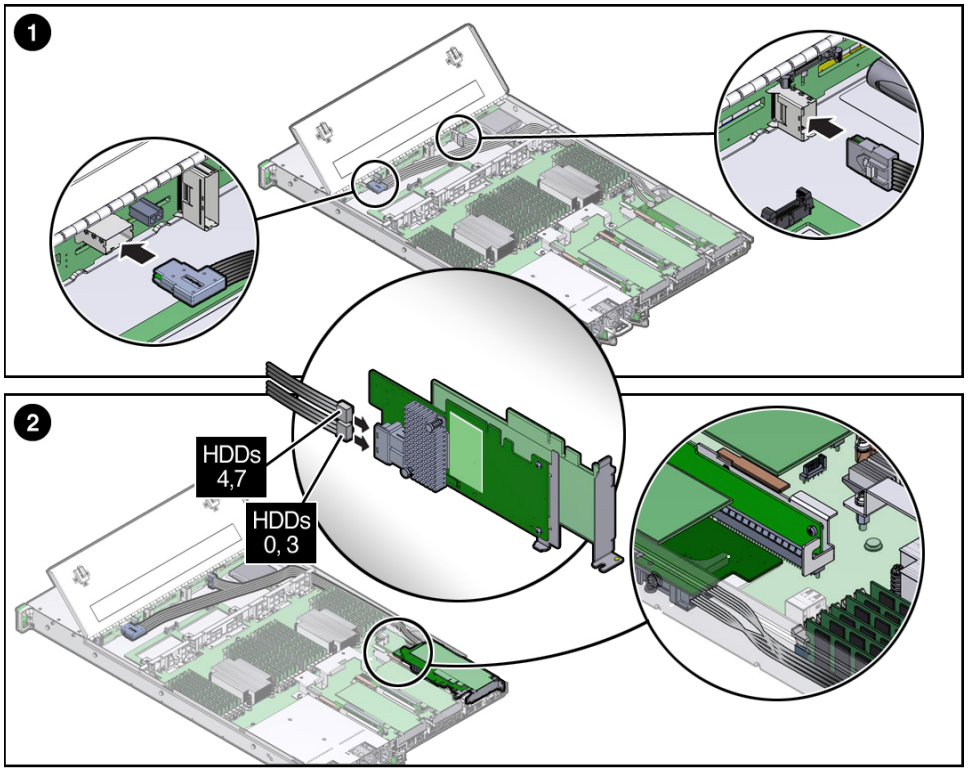
1. **Carefully guide HBA SAS cables through the server.**

2. **If installing replacement cables, fold the new cables 90-degrees at the first bend coming out of the connector.**

Note - This angle positions the cables accurately without placing stress on the connectors and the HBA card. Be careful not to stress or bend the HBA card while routing the cables.

---

3. **Install the SAS cables into the disk backplane (panel 1).**



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

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

   See “Install a Fan Module” on page 155.

6. **Return the server to operation.**

   See “Returning a Server to Operation” on page 235.

Related Information

- “Remove HBA SAS Cables” on page 211
- “Component Locations (Storage, Power, NVMe, and Fan Modules)” on page 14
- “Component Locations (Motherboard, Memory, and PCIe Cards)” on page 16

- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Servicing the LED Board

The LED board is the heart of the LED assembly. The board provides LED status indicators of the server and other components. The LED board is located inside the LED assembly at the left front of the server. See “Component Locations (Storage, Power, NVMe, and Fan Modules)” on page 14.

Description	Links
Replace a faulty LED board.	“Determine if the LED Board Is Faulty” on page 217 “Remove the LED Board and Cable” on page 218 “Install the LED Board and Cable” on page 221 “Verify the LED Board” on page 224
Remove the LED board as part of another component's service operation.	“Remove the LED Board and Cable” on page 218
Install the LED board as part of another component's service operation.	“Install the LED Board and Cable” on page 221
Determine if the LED board is faulty.	“Determine if the LED Board Is Faulty” on page 217 “Detecting and Managing Faults” on page 25

Related Information

- “Identifying Components” on page 13
- “Detecting and Managing Faults” on page 25
- “Component Service Task Reference” on page 47
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

▼ Determine if the LED Board Is Faulty

You must determine if the LED board is faulty before you replace it.

1. **On the server, press and hold the Locator button for more than 5 seconds.**

   See “Front Panel Components (Service)” on page 17.

   If any of the LEDs do not light, the LED board is faulty.

2. **If the LED board is faulty, replace it.**

   See “Remove the LED Board and Cable” on page 218.

3. **If you are unable to determine if the LED board is faulty, seek further information.**

   See “Detecting and Managing Faults” on page 25.

Related Information

- “Remove the LED Board and Cable” on page 218
- “Verify the LED Board” on page 224
- “Detecting and Managing Faults” on page 25
- “Preparing for Service” on page 43

▼ Remove the LED Board and Cable

Removing the LED board is a cold-service operation. You must power off the server before you remove the LED board.

1. **Prepare for service.**

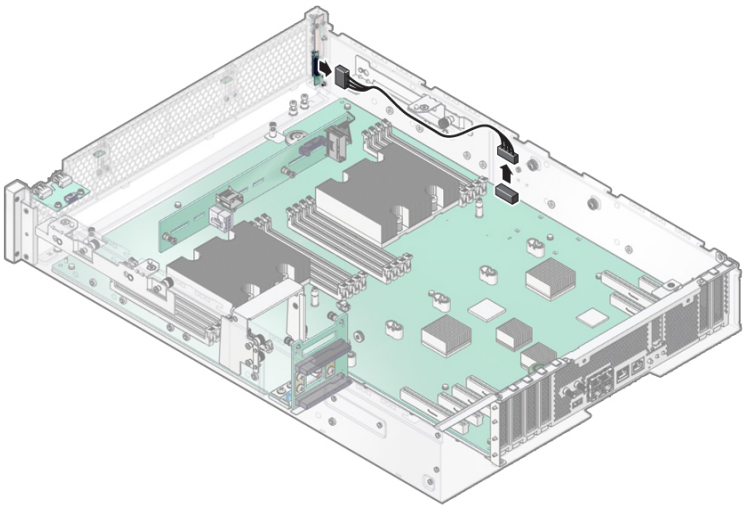
   See “Preparing for Service” on page 43.

2. **Review this information and complete these prerequisites in this order.**

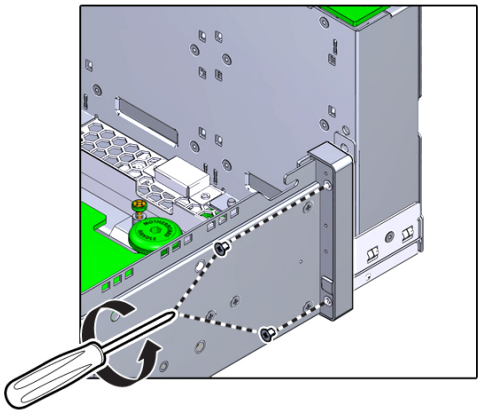
   See:

   - “Removing the Server From the Rack” on page 56
   - “Remove the Filter” on page 79
   - “Rotate the Drive Cage to the Service Position” on page 71
   - “Remove the PSU Duct” on page 74
   - “Remove the Air Duct” on page 75

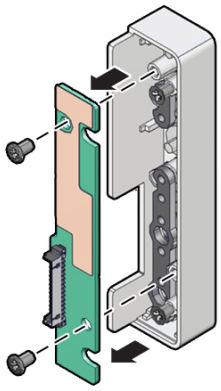
3. **Disconnect the LED cable from the LED assembly.**



4. **Remove the two screws securing the LED assembly to the server (requires a small Phillips screwdriver).**



5. **Lift the LED assembly from the server.**



6. **Remove the two screws securing the LED board to the LED assembly.**
7. **Lift the LED board from the LED assembly, and set it aside.**
8. **Consider your next step.**

   - **If replacing a faulty LED board, install a new LED board.**

     See “Install the LED Board and Cable” on page 221.

   - **If you removed the LED board as part of another component's service procedure, return to that procedure.**

     See “Component Service Task Reference” on page 47.

Related Information

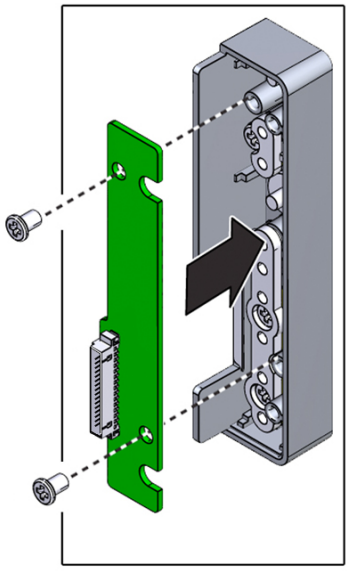
- “Determine if the LED Board Is Faulty” on page 217
- “Install the LED Board and Cable” on page 221
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Install the LED Board and Cable

Installing the LED board is a cold-service operation. You must power off the server before installing the LED board.

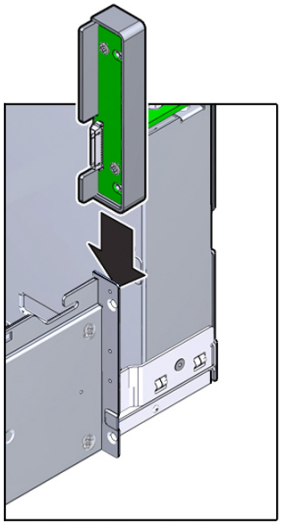
1. **Connect the LED cable to the LED assembly.**

2. **Set the LED board into the LED assembly.**

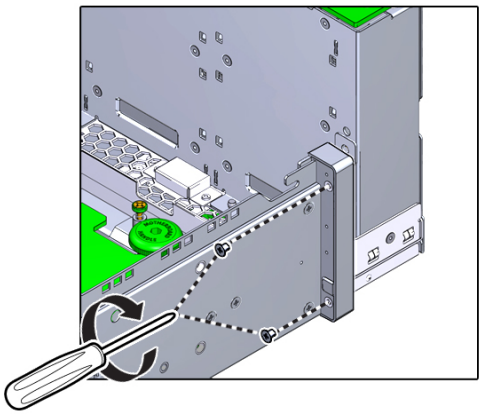


3. **Install and tighten the two screws.**

4. **Position the LED assembly over the flange, on the left of the server.**

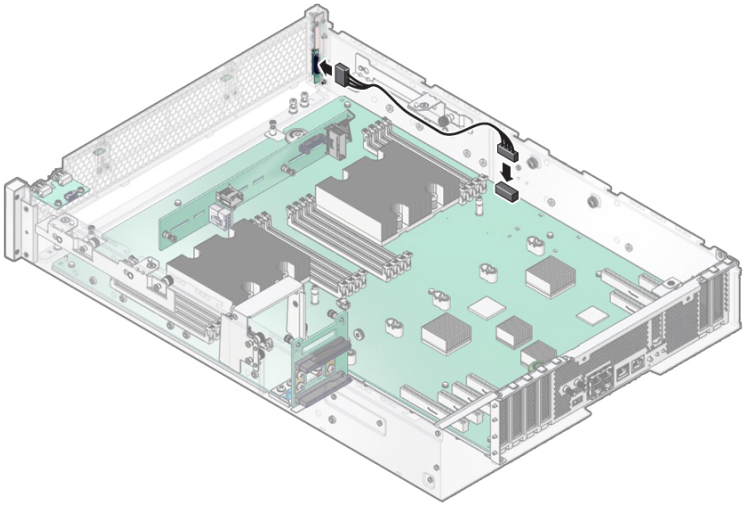


5. **Install and tighten the two screws.**



6. **Route the cable into the cable clamp and against the server wall.**

7. **Connect the LED cable to the LED assembly.**



8. **If you installed the LED board as part of another component's removal or installation procedure, return to that procedure.**
   See “Component Service Task Reference” on page 47 for assistance.

9. **Review this information and complete these prerequisites in this order.**
   See:

   - “Install the Air Duct” on page 236
   - “Install the PSU Duct” on page 240
   - “Secure the Drive Cage” on page 241
   - “Install the Filter” on page 82

10. **Complete these postrequisites in this order to finish the installation procedure.**
    See:

    - “Returning a Server to Operation” on page 235
    - “Verify the LED Board” on page 224

Related Information

- “Remove the LED Board and Cable” on page 218

- “Verify the LED Board” on page 224
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

▼ Verify the LED Board

After you install the LED board, you can verify its functionality.

- **Press and hold the Locator button for more than 5 seconds.**

  All of the LEDs in the LED assembly light. If any of the LEDs do not light, repeat the instructions for installing the LED board.

Related Information

- “Install the LED Board and Cable” on page 221
- “Determine if the LED Board Is Faulty” on page 217
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Servicing the Motherboard

The motherboard is located on a tray at the bottom of the server. See “Component Locations (Motherboard, Memory, and PCIe Cards)” on page 16.

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.

Description	Links
Replace a faulty motherboard.	“Determine if the Motherboard Is Faulty” on page 226 “Remove the Motherboard” on page 228 “Install the Motherboard” on page 231 “Verify the Motherboard” on page 234
Remove the motherboard as part of another component's service operation.	“Remove the Motherboard” on page 228
Install the motherboard as part of another component's service operation.	“Install the Motherboard” on page 231
Determine if the motherboard is faulty.	“Determine if the Motherboard Is Faulty” on page 226 “Detecting and Managing Faults” on page 25

Related Information

- “Identifying Components” on page 13
- “Detecting and Managing Faults” on page 25
- “Component Service Task Reference” on page 47
- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Determine if the Motherboard Is Faulty

You must determine if the motherboard is faulty before you replace it.

1. **Check to see if any Server Service Required LEDs are lit or flashing.**
   See “Front Panel Components (Service)” on page 17.

2. **In Oracle ILOM, check the health of the system processors.**

```
-> show /System/Processors
 /System/Processors
  Targets:
  CPUs
  Properties:
   health = OK
   health_details = -
...
->
```

3. **Check the health of the individual CPUs.**

```
-> show /System/Processors/CPUs/CPU_x
 /System/Processor/CPUs/CPU_0
  Targets:
  Properties:
   health = OK
   health_details = -
...
->
```

   where *x* is the number of the CPU, either `0` or `1`.

4. **Check the health of the networking system.**

```
-> show /System/Networking
 /System/Networking
  Targets:
   Ethernet_NICs
  Properties:
   health = OK
   health_details = -
...
->
```

5. **Check the health of the individual interfaces.**

```
-> show /System/Networking/Ethernet_NICs/Ethernet_NIC_x
 /System/Networking/Ethernet_NICs/Ethernet_NIC_0
  Targets:
  Properties:
   health = OK
   health_details = -
...
->
```

where *x* is the number of the interface, from `0` to `3`.

6. **If any of the previous results indicate that the motherboard is faulty, verify that the motherboard is faulty.**
   For example, type:

```
-> show faulty
Target              | Property               | Value
--------------------+------------------------+-------------------------------
/SP/faultmgmt/0     | fru                    | /SYS/MB
...
->
```

   If the motherboard is faulty, you will see `/SYS/MB`, `/SYS/MB/P0`, or `/SYS/MB/P1` under the `Value` heading.

   - **If the motherboard is faulty, replace it.**
     See "Remove the Motherboard" on page 228.

   - **If a FRU value different from `/SYS/MB`, `/SYS/MB/P0`, or `/SYS/MB/P1` is displayed, see "Component Service Task Reference" on page 47 to identify which component is faulty.**

7. **Use the Oracle ILOM `faultmgmt` shell to identify a faulty component.**
   See "Identify Faulted Components" on page 27.
   Check the `Fault class` and `Description` fields for more information.
   If the motherboard is faulty, replace it.
   See "Remove the Motherboard" on page 228.

8. **Within the Oracle ILOM interface, display the power currently consumed.**

```
-> show /SYS/VPS value
 /SYS/VPS
  Properties:
```

```
   value = 159.175 Watts
->
```

If the power displayed is unreasonable or none at all, replace the motherboard. See “Remove the Motherboard” on page 228.

9. **If you are unable to determine if the motherboard is faulty, seek further information.**

   See “Detecting and Managing Faults” on page 25.

Related Information

- “Remove the Motherboard” on page 228
- “Verify the Motherboard” on page 234
- “Detecting and Managing Faults” on page 25

▼ Remove the Motherboard

Removing the motherboard is a cold-service operation. You must power off the server before you remove the motherboard.

1. **Back up the Oracle ILOM variables.**

   See `http://docs.oracle.com/cd/E19860-01/E21549/z40015841018582.html#scrolltoc`

2. **Prepare for service.**

   See “Preparing for Service” on page 43.

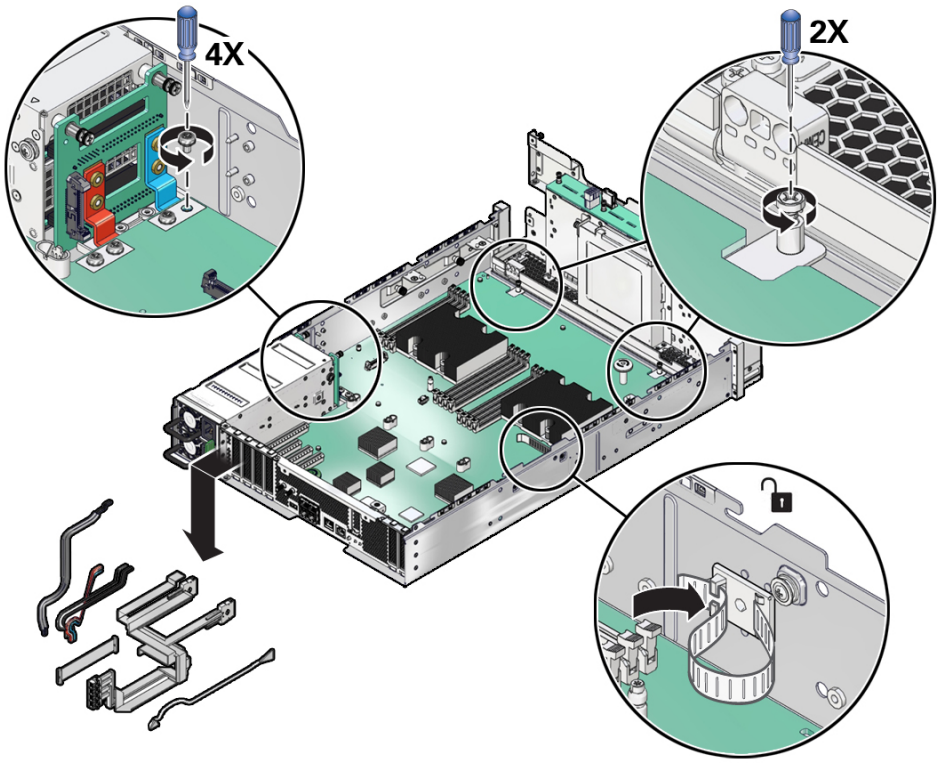
3. **Review this information and complete these prerequisites in this order.**

   See:

   - “Remove the Filter” on page 79
   - “Remove a Fan Module” on page 153

     Remove all fan modules.
   - “Remove the Fan Tray” on page 69
   - “Rotate the Drive Cage to the Service Position” on page 71
   - “Remove the PSU Duct” on page 74
   - “Remove the Air Duct” on page 75
   - “Remove the PDB” on page 143
   - “Remove a PCIe Card” on page 174

4. **Disconnect all remaining cables from the motherboard, and move them out of the way.**



5. **Remove the right thumb screw bracket.**

6. **Remove the four bus bar screws.**

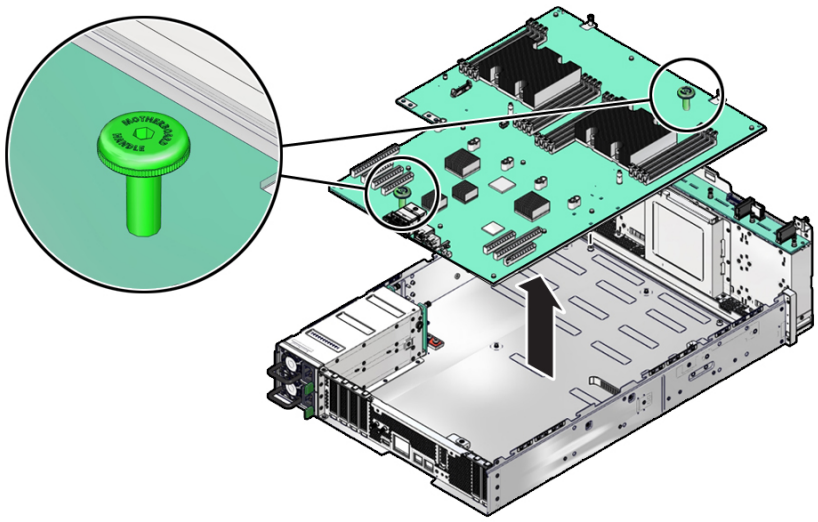
7. **Fully loosen the two captive screws at the front of the motherboard.**

Caution - As you are removing the motherboard, take extra care not to flex or dislodge the DIMMs. Leaving them in place ensures that you can populate the new motherboard with the same configuration.

8. **Grasp the two motherboard handles, slide the motherboard forward off of the alignment pins, then tilt the motherboard to clear the cable tie mounted on the left.**

Caution - Take care when using the handles to remove the motherboard. These handles are not in weight-balanced locations. Avoid flexing the motherboard. Also, if DIMMs are installed, take care not to flex them.

9. **Tilt the motherboard the other direction, and slowly lift the motherboard up and out of the server.**



10. **Set the motherboard aside on an antistatic surface.**

11. **Consider your next step.**

- **If replacing a faulty motherboard, install a new motherboard.**
  See "Install the Motherboard" on page 231.
- **If you removed the motherboard as part of another component's service procedure, return to that procedure.**
  See "Component Service Task Reference" on page 47.

Related Information

- "Install the Motherboard" on page 231

- “Preparing for Service” on page 43
- “Returning a Server to Operation” on page 235

Install the Motherboard

Installing the motherboard is a cold-service operation. You must power off the server before installing the motherboard.

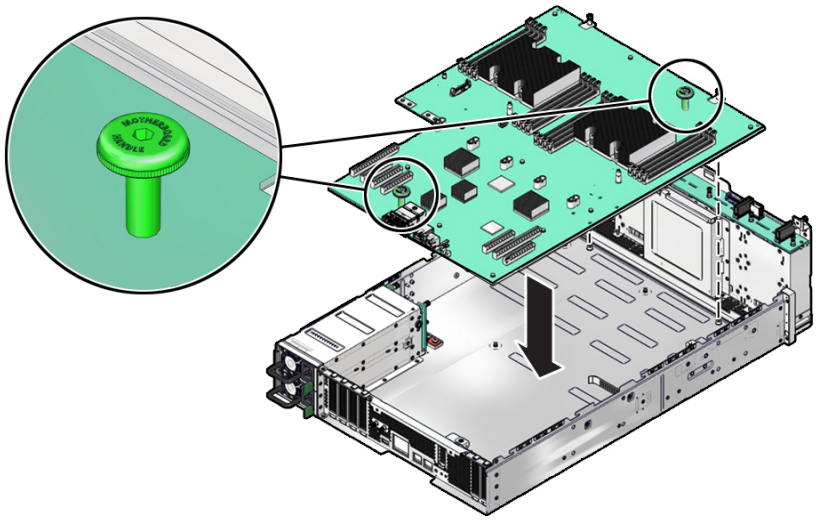
1. **Position the motherboard for installation into the server.**

   The heatsinks are toward the front of the server, and the ports are at the rear.

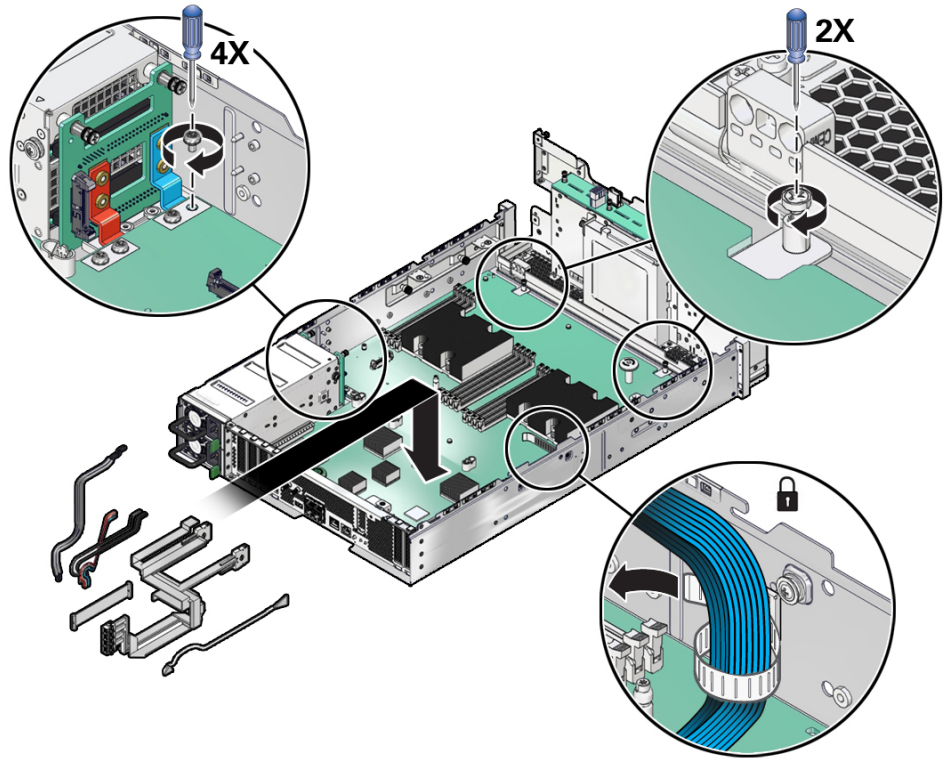
2. **Lift the motherboard by the handles, and slowly lower the motherboard into the chassis.**

Caution - Take care when using the handles to install the motherboard. These handles are not in weight-balanced locations. Avoid flexing the motherboard.

Caution - Take care to clear the four screws at the rear of the chassis. The screws are long and might scratch or damage the motherboard.



3. **Tilt the motherboard to clear the cable tie mounted on the left.**
4. **Lower the motherboard onto the bottom alignment pins.**
5. **Slowly slide the motherboard until it drops, engaging the bottom alignment pins.**
6. **Carefully insert the LED into the hole at the rear of the chassis.**
7. **Continue to slide the motherboard forward until it seats.**
   The rear of the motherboard must be flush with the rear of the server. Additionally, the four holes in the motherboard must align with the four holes in the bus bars.
8. **Tighten the captive screw.**



9. **Install and tighten the four bus bar screws.**
10. **Install the right thumb screw bracket.**

11. **Reconnect the cables you previously disconnected.**

12. **If you installed the motherboard as part of another component's removal or installation procedure, return to that procedure.**

    See “Component Service Task Reference” on page 47.

13. **Review this information and complete these prerequisites in this order.**

    See:

    - “Install a DIMM” on page 163

      Install all DIMMs.

      Tip - With the faulty motherboard aligned to match the orientation of the new motherboard, transfer the DIMMs so that they are installed in the corresponding slots of the new motherboard.

    - “Install a PCIe Card” on page 176
    - “Install the PSU Duct” on page 240
    - “Install the Air Duct” on page 236
    - “Secure the Drive Cage” on page 241
    - “Install the Fan Tray” on page 244
    - “Install a Fan Module” on page 155

      Install all fan modules.
    - “Install the Filter” on page 82

14. **Complete these postrequisites in this order to finish the installation procedure.**

    See:

    - “Returning a Server to Operation” on page 235
    - “Verify the Motherboard” on page 234

15. **Restore the Oracle ILOM variables.**

    See `http://docs.oracle.com/cd/E19860-01/E21549/z40015841018582.html#scrolltoc`

16. **Set the date and time.**

Related Information

- “Verify the Motherboard” on page 234
- “Returning a Server to Operation” on page 235

Verify the Motherboard

After you install the motherboard, you can verify its functionality.

1. **Access Oracle ILOM.**

   See “Log In to Oracle ILOM (Service)” on page 26.

2. **Reset the motherboard.**

```
-> set /SYS/MB clear_fault_action=true
Are you sure you want to clear /SYS/MB (y/n)? y
Set 'clear_fault_action' to 'true'

->
```

3. **Verify that the motherboard is working, then return to this procedure.**

   See “Determine if the Motherboard Is Faulty” on page 226.

4. **Display the power consumtion.**

```
-> show /SYS/VPS value
 /SYS/VPS
  Properties:
   value = 159.175 Watts
->
```

Related Information

- “Determine if the Motherboard Is Faulty” on page 226
- “Returning a Server to Operation” on page 235

Returning a Server to Operation

These topics explain how to return a Netra SPARC S7-2 server from Oracle to operation after you perform service procedures.

Step	Task	Link
1.	Install the air duct if you serviced these components: ■ PSU duct ■ DIMMs ■ LED board	"Install the Air Duct" on page 236
2.	Install the PSU duct if you serviced these components: ■ Air duct ■ USB board ■ Motherboard ■ PDB ■ PDB signal cable	"Install the PSU Duct" on page 240
3.	Secure the drive cage if you serviced the components in Step 1, Step 2, or the drive backplane.	"Secure the Drive Cage" on page 241
4.	Install the fan tray if you serviced the components in Step 1, Step 2, Step 3, or these components: ■ Drive signal cable ■ Drive power cable	"Install the Fan Tray" on page 244
5.	Install the top cover if you serviced the components in Step 1, Step 2, Step 3, Step 4 or these components: ■ Fan modules ■ PCIe cards ■ Battery	"Install the Top Cover" on page 246
6.	Install the server into the rack.	See *Netra SPARC S7-2 Server Installation Guide* to install the server into the rack.
7.	Connect power cords to the server.	"Connect AC Power Cords" on page 249
8.	Power on the server by one of two methods.	"Power On the Server (Oracle ILOM)" on page 249 "Power On the Server (Power Button)" on page 250

Step	Task	Link
9.	Verify the installation of the component, if you serviced the components in Step 1, Step 2, Step 3, Step 5, or these components. ■ Drives ■ Power supplies	"Verify the Motherboard" on page 234 "Verify the PDB" on page 149 "Verify a DIMM" on page 166 "Verify the LED Board" on page 224 "Verify the Drive Backplane" on page 124 "Verify a Fan Module" on page 157 "Verify a PCIe Card" on page 177 "Verify a SAS Drive" on page 95 "Verify the Operation of an NVMe Storage Drive" on page 102 "Verify a Power Supply" on page 138

Related Information

- "Identifying Components" on page 13
- "Detecting and Managing Faults" on page 25
- "Preparing for Service" on page 43

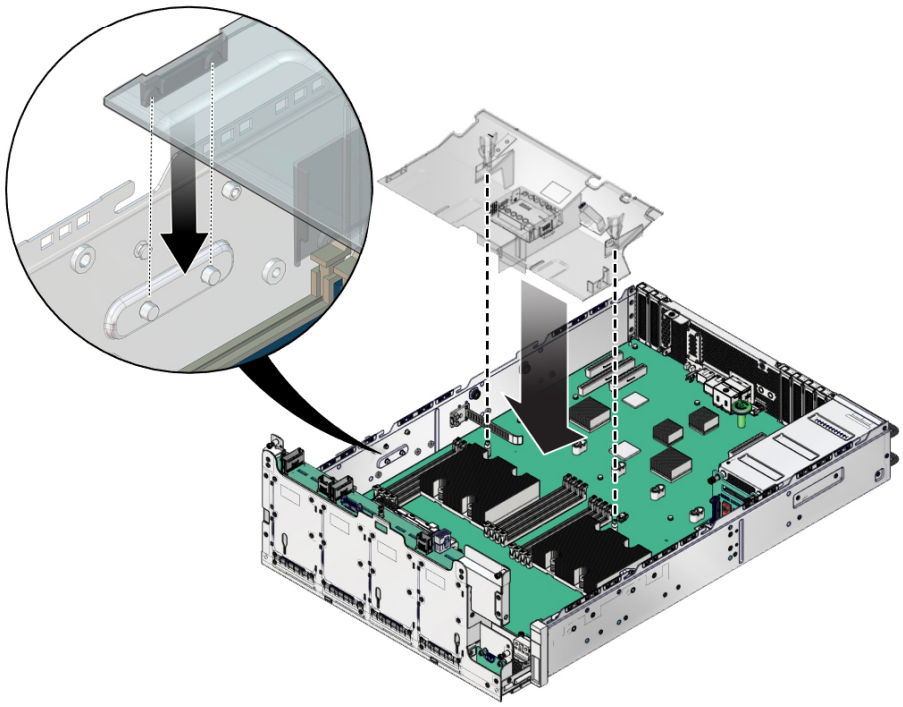
▼ Install the Air Duct

Perform this task when you have previously removed the air duct.

1. **Move any loose cables to the gap between the DIMMs and the server walls.**

Note - Ensure that all cables clear the air duct and other components. The space around the NVMe cables is especially tight.

2. **Align the air duct to where it installs into the server.**

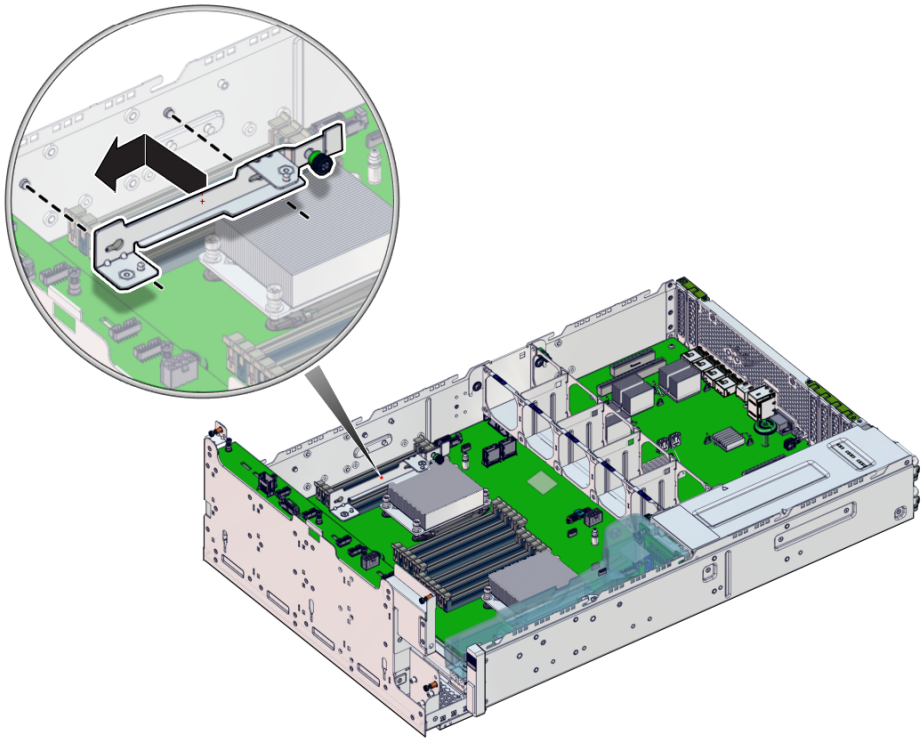


3. **Lower the air duct onto the alignment pins.**

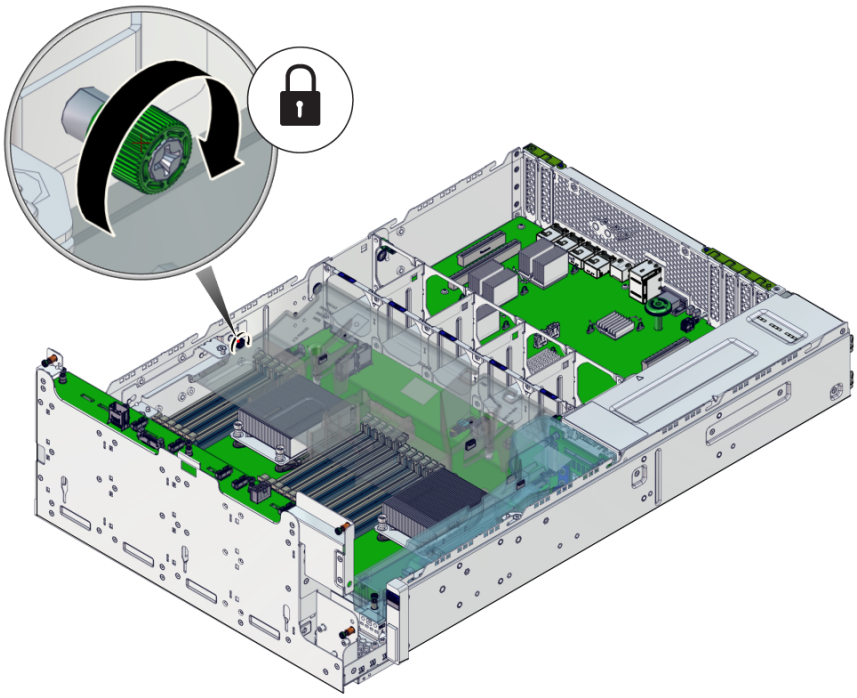
4. **Route the cables through the cable ties on the air duct and cutouts in the air duct.**

5. **Attach the cables to the air duct.**

6. **Set the left (L) thumbscrew bracket over the alignment pins, and slide it backward.**



7. **Tighten the thumbscrew.**



8. **Install the PSU duct.**

   See “Install the PSU Duct” on page 240.

9. **Consider your next step.**

   - **If you installed the air and PSU ducts as part of another component's service procedure, return to that procedure.**

     See “Component Service Task Reference” on page 47 for assistance.

   - **Otherwise, secure the drive cage.**

     See “Secure the Drive Cage” on page 241.

Related Information

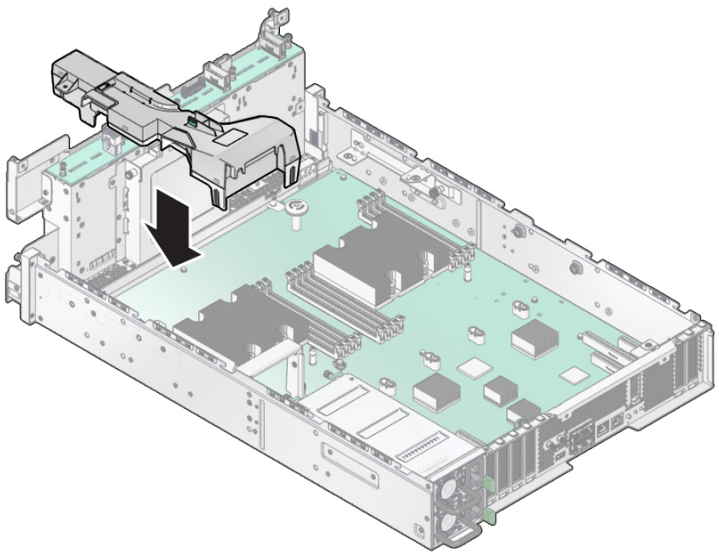
- “Install the PSU Duct” on page 240
- “Remove the Air Duct” on page 75
- “Secure the Drive Cage” on page 241

▼ Install the PSU Duct

Perform this task when you have previously removed the PSU duct.

1. **Install the air duct.**
   See “Install the Air Duct” on page 236.

2. **Lower the PSU duct down over the PDB and the bus bars.**



3. **Route the USB cable over the PSU duct to the USB board.**

4. **Route the USB cable through the cutout in the air duct, and push the cable into the channel in the PSU duct.**

5. **If you installed the PSU duct as part of another component's service procedure, return to that procedure.**

   See “Component Service Task Reference” on page 47 for assistance.

Related Information

- “Remove the PSU Duct” on page 74
- “Install the Air Duct” on page 236

▼ Secure the Drive Cage

Perform this task once you have pivoted the drive cage to the service position.

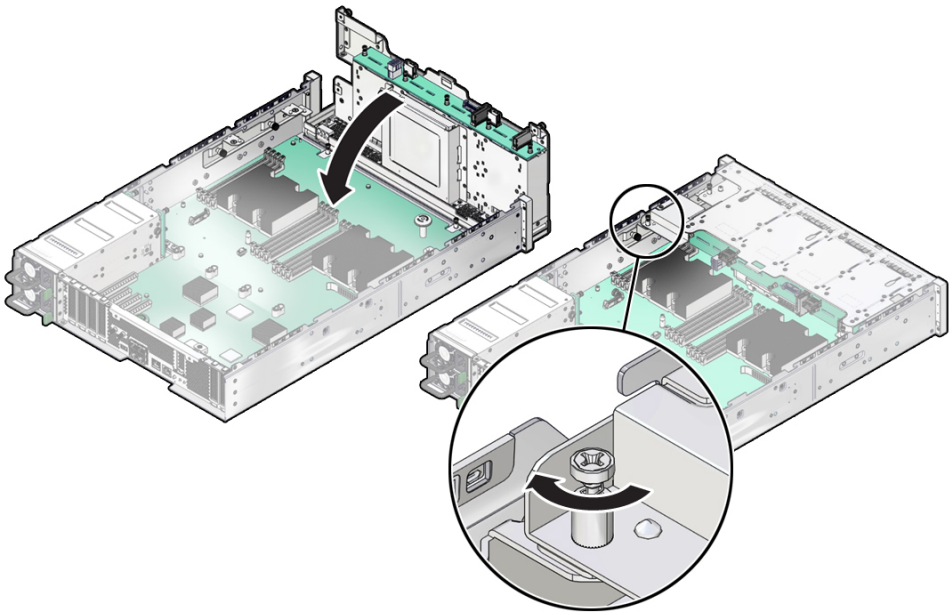
1. **If you previously removed the PSU and air ducts, complete these prerequisites in this order.**

   See:

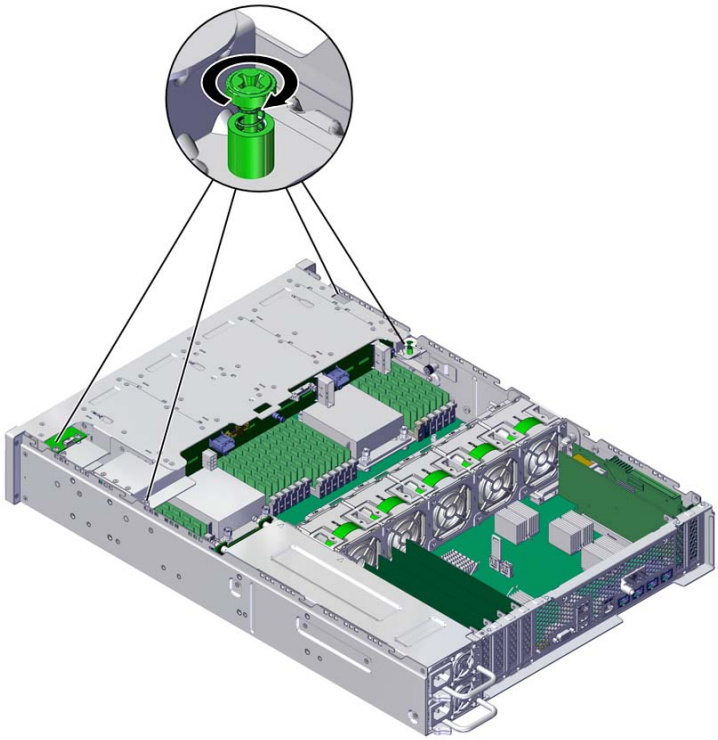
   - “Install the Air Duct” on page 236
   - “Install the PSU Duct” on page 240

2. **Lower the drive cage to the horizontal position.**

Caution - Do not damage the cables as you are closing the drive cage.



3. **Tighten the four screws securing the drive cage to the server.**



4. **Connect the cables to the drive backplane, and connect the cable attached to the USB board.**

   These cables (2, 3, 4, and 6) are visible in “Cable Configurations” on page 194.

5. **Install the filter.**

   See “Install the Filter” on page 82.

6. **Consider your next step.**

   - **If you secured the drive cage as part of another component's service procedure, return to that procedure.**

     See “Component Service Task Reference” on page 47 for assistance.

   - **Otherwise, install the fan tray.**

See “Install the Fan Tray” on page 244.

Related Information

- “Rotate the Drive Cage to the Service Position” on page 71
- “Install the Fan Tray” on page 244

Install the Fan Tray

Perform this task when you have previously removed the fan tray.

1. **If you previously removed the PSU and air ducts or raised the drive cage, complete these prerequisites, as necessary, in this order.**

   See:

   - “Install the Air Duct” on page 236
   - “Install the PSU Duct” on page 240
   - “Secure the Drive Cage” on page 241

2. **Move any loose cables so that they are against the server walls.**

Caution - The fan tray goes inside the latch line of the cable pass through. Take care when installing the fan tray so that the cable pass through is not damaged or unseated.

3. **Install the fan cage bracket, being careful to avoid damage to any mother board components that are near the end of the bracket that gets secured to the motherboard.**

Caution - The fan tray sits on top of the cable pass through. The cable pass through needs to be properly seated when installing the fan tray. If not, damage may occur to the latch.

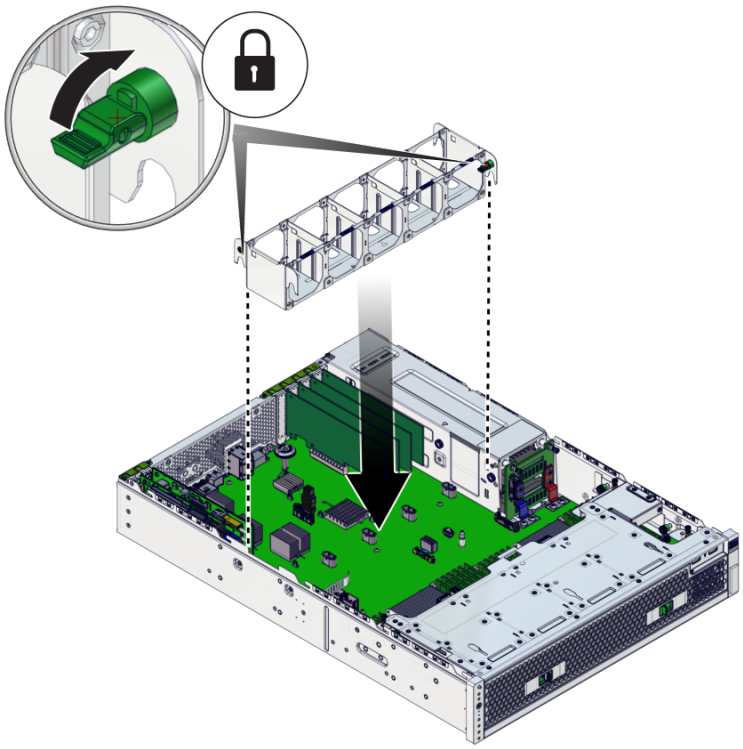
4. **Align the fan tray to where it installs into the server.**

   Two arrows on the top of power supply bay show where the fan tray aligns. Holes in the base of the tray need to match up with fan connectors. If necessary, rotate the tray 180 degrees to align.

5. **Slowly lower the fan tray into the server.**

   Verify that the fan tray is properly seated, and the top surfaces of the fan tray are flush with the server.

6. **Close the two fan tray locks.**



7. **Install the fan modules.**

   See “Install a Fan Module” on page 155.

8. **Consider your next step.**

   - **If you installed the fan tray as part of another component's service procedure, return to that procedure.**

     See “Component Service Task Reference” on page 47 for assistance.

   - **Otherwise, install the top cover.**

     See “Install the Top Cover” on page 246.

Related Information

- “Secure the Drive Cage” on page 241
- “Remove the Fan Tray” on page 69
- “Install the Top Cover” on page 246

▼ Install the Top Cover

Perform this task when you have previously removed the top cover.

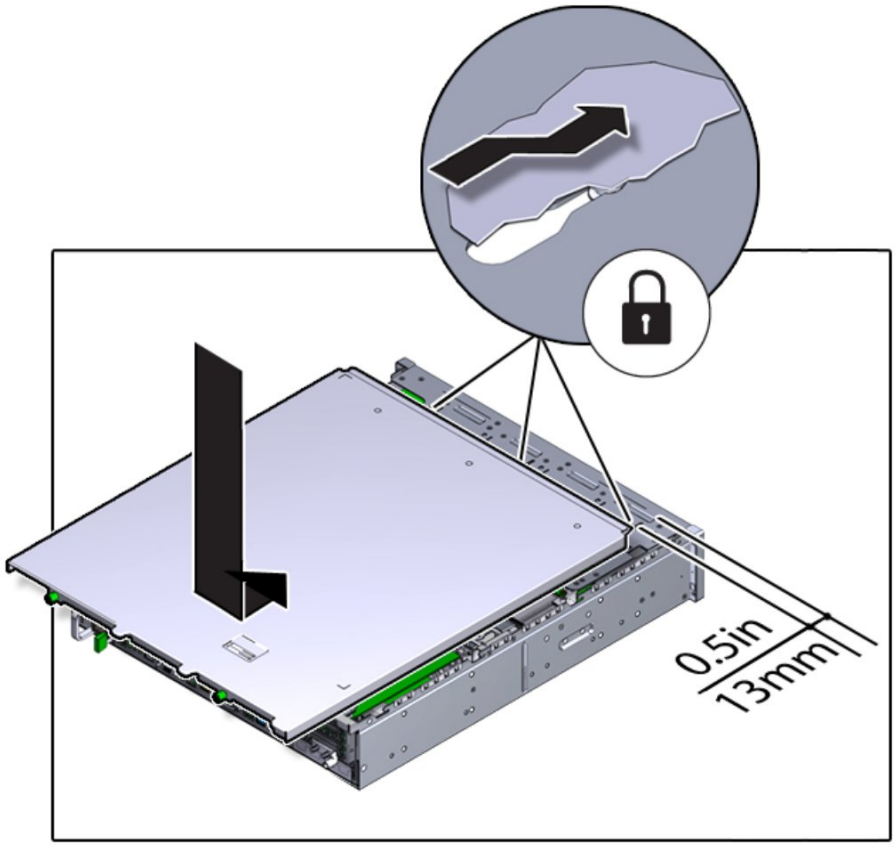
1. **If you previously removed the PSU and air ducts, raised the drive cage, or removed the fan tray, complete these prerequisites in this order.**

   See:

   - “Install the Air Duct” on page 236
   - “Install the PSU Duct” on page 240
   - “Secure the Drive Cage” on page 241
   - “Install the Fan Tray” on page 244
   - “Install a Fan Module” on page 155

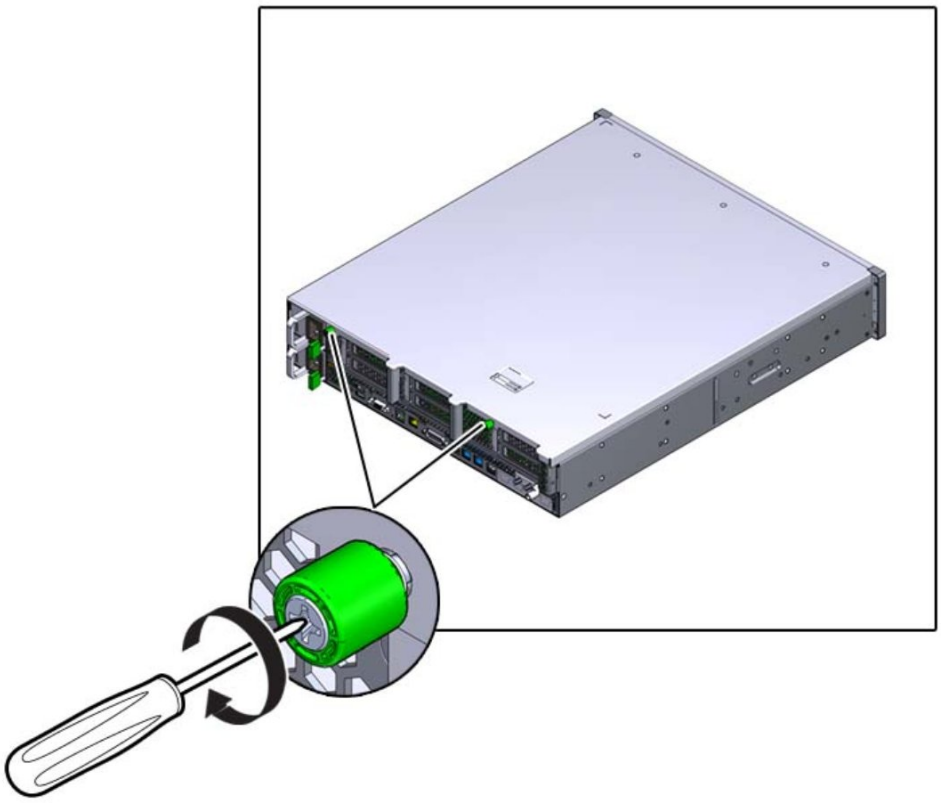
     Install all fan modules.

2. **Position the top cover on the server, with the front edge of the top cover 0.5 in. (13 mm) rearward of the front edge of the server.**



3. **Slide the top cover forward into place.**

4. **Secure the top cover with the two captive screws at the rear.**



5. **Install the server into the rack.**

   Refer to the *Netra SPARC S7-2 Server Installation Guide*, installing the server into the rack.

6. **Connect the power cords.**

   See “Connect AC Power Cords” on page 249.

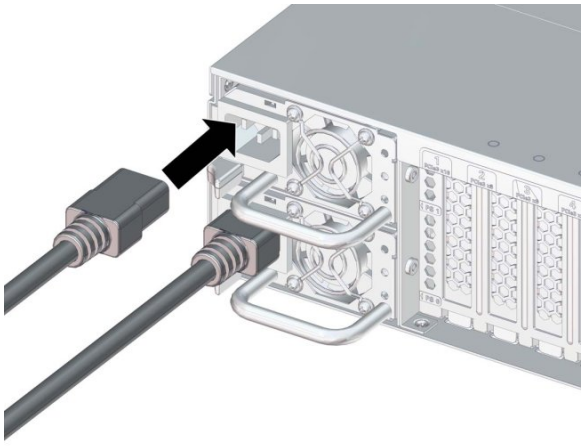
Related Information

- “Install the Fan Tray” on page 244
- “Remove the Top Cover” on page 67
- “Connect AC Power Cords” on page 249

Connect AC Power Cords

1. **Reconnect the power cords to the power supplies.**

   Note - As soon as the power cords are connected, standby power is applied. Depending on how the firmware is configured, the system might boot at this time.



2. **Power on the server.**
   See one of these topics:

   - “Power On the Server (Oracle ILOM)” on page 249
   - “Power On the Server (Power Button)” on page 250

Related Information

- “Install the Top Cover” on page 246
- “Disconnect Power Cords and Data Cables” on page 52
- “Power On the Server (Oracle ILOM)” on page 249
- “Power On the Server (Power Button)” on page 250

Power On the Server (Oracle ILOM)

1. **Access Oracle ILOM.**

See “Log In to Oracle ILOM (Service)” on page 26.

2. **Power on the server.**

```
-> start /System
```

The server powers on and boots.

3. **To verify an installed component, return to that component's verification procedure.**

See “Component Service Task Reference” on page 47 for assistance.

Related Information

- “Connect AC Power Cords” on page 249
- “Power Off the Server (Oracle ILOM)” on page 50
- “Power On the Server (Power Button)” on page 250

▼ Power On the Server (Power Button)

1. **Momentarily press and release the Power button on the front panel.**

See “Front Panel Components (Service)” on page 17 for the location of the Power button.

The server powers on and boots.

2. **To verify an installed component, return to that component's verification procedure.**

See “Component Service Task Reference” on page 47 for assistance.

Related Information

- “Connect AC Power Cords” on page 249
- “Power Off the Server (Power Button - Graceful)” on page 51
- “Power Off the Server (Emergency Shutdown)” on page 52
- “Front Panel Components (Service)” on page 17
- “Power On the Server (Oracle ILOM)” on page 249

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