



## Maintaining the Node

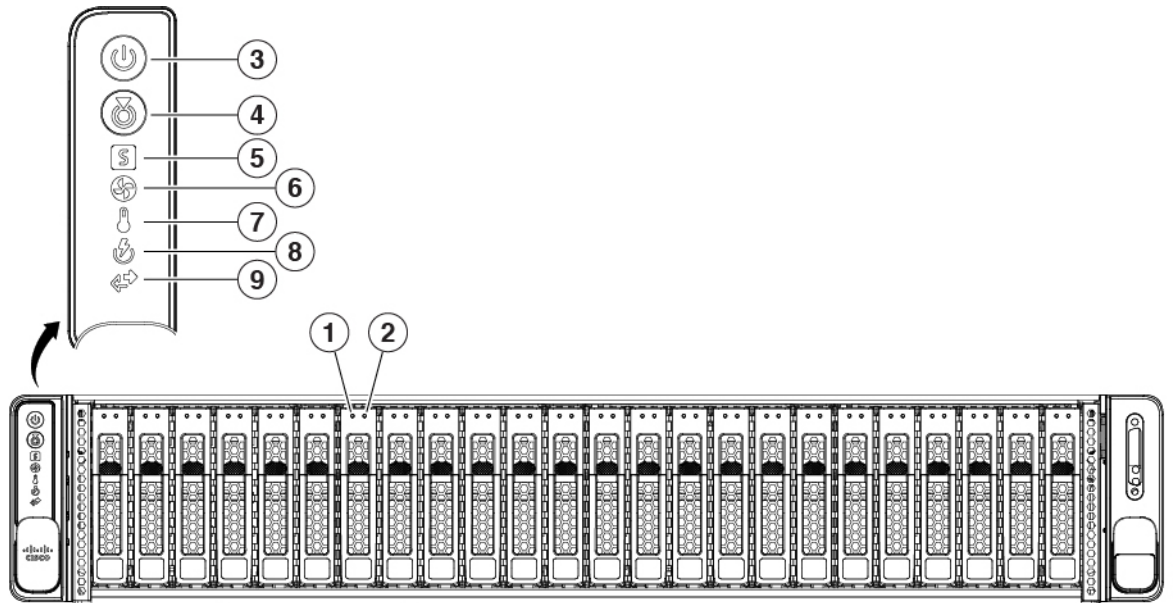
---

- [Status LEDs and Buttons, on page 2](#)
- [Preparing For Component Installation, on page 7](#)
- [Hot Swap vs Hot Plug, on page 10](#)
- [Removing and Replacing Components, on page 11](#)
- [Replacing Front-Loading SAS/SATA Drives, on page 13](#)
- [4K Sector Format SAS/SATA Drives Considerations, on page 14](#)
- [Replacing Rear-Loading SAS/SATA Drives, on page 16](#)
- [Replacing Fan Modules, on page 18](#)
- [Replacing CPUs and Heatsinks, on page 20](#)
- [Replacing Memory DIMMs, on page 28](#)
- [Replacing a Mini-Storage Module, on page 36](#)
- [Replacing a USB Drive, on page 38](#)
- [Replacing the RTC Battery, on page 40](#)
- [Replacing Power Supplies, on page 41](#)
- [Replacing a PCIe Riser, on page 46](#)
- [Replacing a PCIe Card, on page 47](#)
- [Replacing an mLOM Card, on page 53](#)
- [Replacing a SAS Storage Controller Card \(RAID or HBA\), on page 54](#)
- [Replacing the Supercap \(RAID Backup\), on page 56](#)
- [Replacing a Boot-Optimized M.2 RAID Controller Module, on page 57](#)
- [Replacing a Chassis Intrusion Switch, on page 61](#)
- [Installing a Trusted Platform Module \(TPM\), on page 62](#)
- [Removing the PCB Assembly \(PCBA\), on page 65](#)
- [Service Headers and Jumpers, on page 66](#)

# Status LEDs and Buttons

## Front-Panel LEDs

Figure 1: Front Panel LEDs



309481

Table 1: Front Panel LEDs, Definition of States

	LED Name	States
1 SAS	SAS/SATA drive fault <b>Note</b> solid state drive (SSD) drive tray LEDs have different behavior than SAS/SATA drive trays.	<ul style="list-style-type: none"> <li>• Off—The hard drive is operating properly.</li> <li>• Amber—Drive fault detected.</li> <li>• Amber, blinking—The device is rebuilding.</li> <li>• Amber, blinking with one-second interval—Drive locate function activated in the software.</li> </ul>
2 SAS	SAS/SATA drive activity LED	<ul style="list-style-type: none"> <li>• Off—There is no hard drive in the hard drive tray (no access, no fault).</li> <li>• Green—The hard drive is ready.</li> <li>• Green, blinking—The hard drive is reading or writing data.</li> </ul>

3	Power button/LED	<ul style="list-style-type: none"> <li>• Off—There is no AC power to the server.</li> <li>• Amber—The server is in standby power mode. Power is supplied only to the Cisco IMC and some motherboard functions.</li> <li>• Green—The server is in main power mode. Power is supplied to all server components.</li> </ul>
4	Unit identification	<ul style="list-style-type: none"> <li>• Off—The unit identification function is not in use.</li> <li>• Blue, blinking—The unit identification function is activated.</li> </ul>
5	System health	<ul style="list-style-type: none"> <li>• Green—The server is running in normal operating condition.</li> <li>• Green, blinking—The server is performing system initialization and memory check.</li> <li>• Amber, steady—The server is in a degraded operational state (minor fault). For example: <ul style="list-style-type: none"> <li>• Power supply redundancy is lost.</li> <li>• CPUs are mismatched.</li> <li>• At least one CPU is faulty.</li> <li>• At least one DIMM is faulty.</li> <li>• At least one drive in a RAID configuration failed.</li> </ul> </li> <li>• Amber, 2 blinks—There is a major fault with the system board.</li> <li>• Amber, 3 blinks—There is a major fault with the memory DIMMs.</li> <li>• Amber, 4 blinks—There is a major fault with the CPUs.</li> </ul>
6	Fan status	<ul style="list-style-type: none"> <li>• Green—All fan modules are operating properly.</li> <li>• Amber, blinking—One or more fan modules breached the non-recoverable threshold.</li> </ul>
7	Temperature status	<ul style="list-style-type: none"> <li>• Green—The server is operating at normal temperature.</li> <li>• Amber, steady—One or more temperature sensors breached the critical threshold.</li> <li>• Amber, blinking—One or more temperature sensors breached the non-recoverable threshold.</li> </ul>

8	Power supply status	<ul style="list-style-type: none"> <li>• Green—All power supplies are operating normally.</li> <li>• Amber, steady—One or more power supplies are in a degraded operational state.</li> <li>• Amber, blinking—One or more power supplies are in a critical fault state.</li> </ul>
9	Network link activity	<ul style="list-style-type: none"> <li>• Off—Cisco MLOM/VIC and BMC port link is idle.</li> <li>• Green—One ore more Cisco MLOM/VIC and BMC port link are active, but there is no activity.</li> <li>• Green, blinking—One or more Cisco MLOM/VIC and BMC port link are active, with activity.</li> </ul>

## Rear-Panel LEDs

Figure 2: Rear Panel LEDs

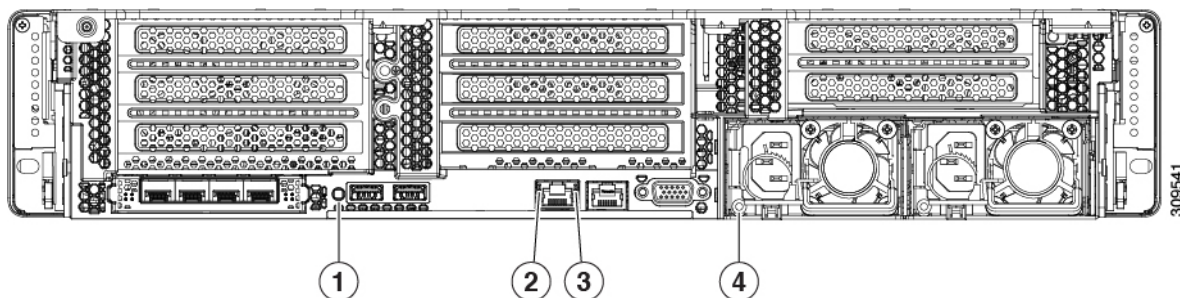


Table 2: Rear Panel LEDs, Definition of States

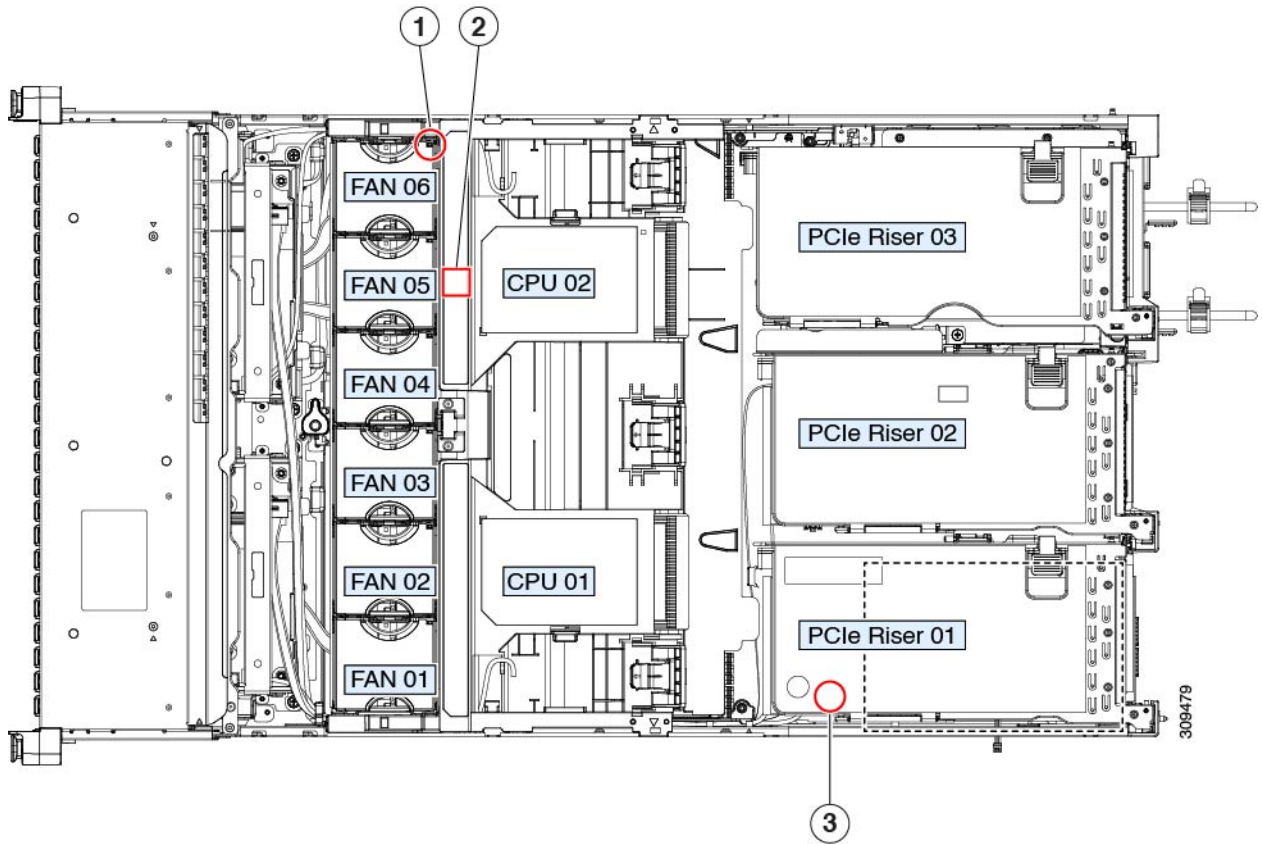
	LED Name	States
1	Unit Identification LED	<ul style="list-style-type: none"> <li>• Off—The unit identification function is not in use.</li> <li>• Blue, blinking—The unit identification function is activated.</li> </ul>
2	1-Gb Ethernet dedicated management link speed	<ul style="list-style-type: none"> <li>• Off—Link speed is 10 Mbps.</li> <li>• Amber—Link speed is 100 Mbps.</li> <li>• Green—Link speed is 1 Gbps.</li> </ul>
3	1-Gb Ethernet dedicated management link status	<ul style="list-style-type: none"> <li>• Off—No link is present.</li> <li>• Green—Link is active.</li> <li>• Green, blinking—Traffic is present on the active link.</li> </ul>

4	Power supply status (one LED each power supply unit)	<p><b>AC power supplies:</b></p> <ul style="list-style-type: none"> <li>• Off—No AC input (12 V main power off, 12 V standby power off).</li> <li>• Green, blinking—12 V main power off; 12 V standby power on.</li> <li>• Green, solid—12 V main power on; 12 V standby power on.</li> <li>• Amber, blinking—Warning threshold detected but 12 V main power on.</li> <li>• Amber, solid—Critical error detected; 12 V main power off (for example, over-current, over-voltage, or over-temperature failure).</li> </ul> <p><b>DC power supply (HX-PSUV2-1050DC):</b></p> <ul style="list-style-type: none"> <li>• Off—No DC input (12 V main power off, 12 V standby power off).</li> <li>• Green, blinking—12 V main power off; 12 V standby power on.</li> <li>• Green, solid—12 V main power on; 12 V standby power on.</li> <li>• Amber, blinking—Warning threshold detected but 12 V main power on.</li> <li>• Amber, solid—Critical error detected; 12 V main power off (for example, over-current, over-voltage, or over-temperature failure).</li> </ul>
---	--	---

## Internal Diagnostic LEDs

The server has internal fault LEDs for CPUs, DIMMs, and fan modules.

Figure 3: Internal Diagnostic LED Locations



<p><b>1</b></p>	<p>Fan module fault LEDs (one on the top of each fan module)</p> <ul style="list-style-type: none"> <li>• Amber—Fan has a fault or is not fully seated.</li> <li>• Green—Fan is OK.</li> </ul>	<p><b>2</b></p>	<p>DIMM fault LEDs (one behind each DIMM socket on the motherboard)</p> <p>These LEDs operate only when the server is in standby power mode.</p> <ul style="list-style-type: none"> <li>• Amber—DIMM has a fault.</li> <li>• Off—DIMM is OK.</li> </ul>
<p><b>2</b></p>	<p>CPU fault LEDs</p> <p>These LEDs operate only when the server is in standby power mode.</p> <ul style="list-style-type: none"> <li>• Amber—CPU has a fault.</li> <li>• Off—CPU is OK.</li> </ul>	<p>-</p>	

# Preparing For Component Installation

## Required Equipment For Service Procedures

The following tools and equipment are used to perform the procedures in this chapter:

- T-20 Torx driver (supplied with replacement CPUs for heatsink removal)
- #1 Phillips-head screwdriver for M.2 SSD replacement.
- #2 Phillips-head screwdriver for PCIe riser/PCIe card replacement.
- ¼-inch (or equivalent) flat-head screwdriver (for TPM installation)
- Electrostatic discharge (ESD) strap or other grounding equipment such as a grounded mat

## Shutting Down and Removing Power From the Server

The server can run in either of two power modes:

- Main power mode—Power is supplied to all server components and any operating system on your drives can run.
- Standby power mode—Power is supplied only to the service processor and certain components. It is safe for the operating system and data to remove power cords from the server in this mode.



---

**Caution**

After a server is shut down to standby power, electric current is still present in the server. To completely remove power, you must disconnect all power cords from the power supplies in the server, as directed in the service procedures.

You can shut down the server by using the front-panel power button or the software management interfaces.

---

## Shutting Down Using the Power Button

---

**Step 1** Check the color of the Power button/LED:

- Amber—The server is already in standby mode and you can safely remove power.
- Green—The server is in main power mode and must be shut down before you can safely remove power.

**Step 2** Invoke either a graceful shutdown or a hard shutdown:

**Caution** To avoid data loss or damage to your operating system, you should always invoke a graceful shutdown of the operating system.

- Graceful shutdown—Press and release the **Power** button. The operating system performs a graceful shutdown and the server goes to standby mode, which is indicated by an amber Power button/LED.

- Emergency shutdown—Press and hold the **Power** button for 4 seconds to force the main power off and immediately enter standby mode.

**Step 3** If a service procedure instructs you to completely remove power from the server, disconnect all power cords from the power supplies in the server.

---

## Shutting Down Using The Cisco IMC GUI

You must log in with user or admin privileges to perform this task.

---

**Step 1** In the Navigation pane, click the **Server** tab.

**Step 2** On the Server tab, click **Summary**.

**Step 3** In the Actions area, click **Power Off Server**.

**Step 4** Click **OK**.

The operating system performs a graceful shutdown and the server goes to standby mode, which is indicated by an amber Power button/LED.

**Step 5** If a service procedure instructs you to completely remove power from the server, disconnect all power cords from the power supplies in the server.

---

## Shutting Down Using The Cisco IMC CLI

You must log in with user or admin privileges to perform this task.

---

**Step 1** At the server prompt, enter:

**Example:**

```
server# scope chassis
```

**Step 2** At the chassis prompt, enter:

**Example:**

```
server/chassis# power shutdown
```

The operating system performs a graceful shutdown and the server goes to standby mode, which is indicated by an amber Power button/LED.

**Step 3** If a service procedure instructs you to completely remove power from the server, disconnect all power cords from the power supplies in the server.

---

## Removing the Server Top Cover

**Step 1** Remove the top cover:



- a) If the cover latch is locked, slide the lock sideways to unlock it.  
When the latch is unlocked, the handle pops up so that you can grasp it.
- b) Lift on the end of the latch so that it pivots vertically to 90 degrees.
- c) Simultaneously, slide the cover back and lift the top cover straight up from the server and set it aside.

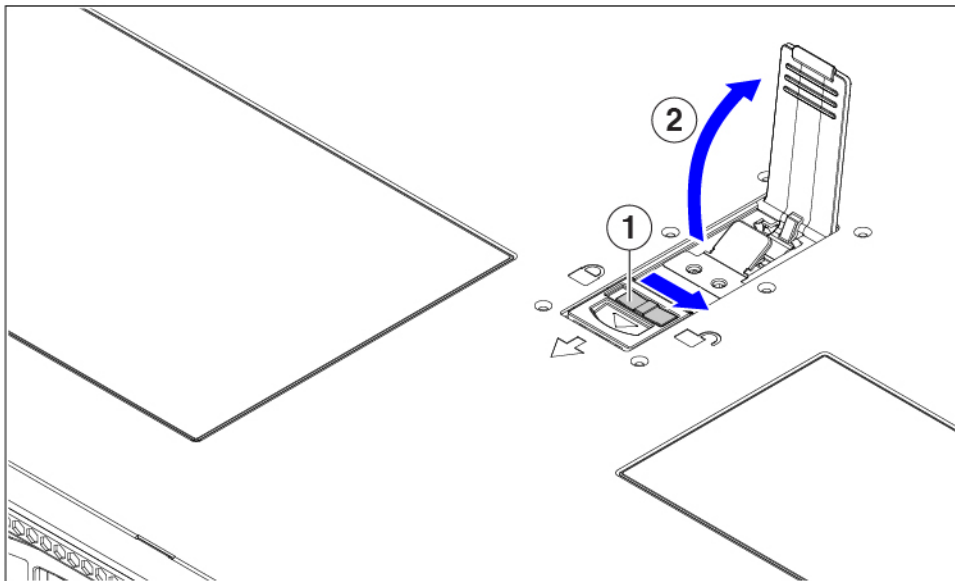
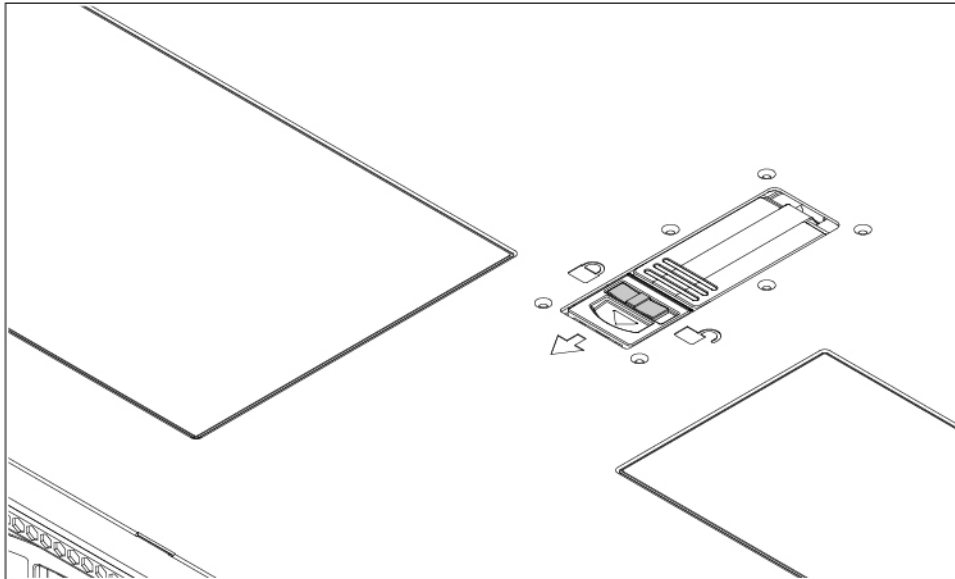
**Step 2**

Replace the top cover:

- a) With the latch in the fully open position, place the cover on top of the server about one-half inch (1.27 cm) behind the lip of the front cover panel.
- b) Slide the cover forward until the latch makes contact.
- c) Press the latch down to the closed position. The cover is pushed forward to the closed position as you push down the latch.
- d) Lock the latch by sliding the lock button to sideways to the left.

Locking the latch ensures that the server latch handle does not protrude when you install the blade.

Figure 4: Removing the Top Cover



309157

1	Cover lock	2	Cover latch handle
---	------------	---	--------------------

## Hot Swap vs Hot Plug

Some components can be removed and replaced without shutting down and removing power from the server. This type of replacement has two varieties: hot-swap and hot-plug.

- Hot-swap replacement—You do not have to shut down the component in the software or operating system. This applies to the following components:
  - SAS/SATA hard drives
  - SAS/SATA solid state drives
  - Cooling fan modules
  - Power supplies (when redundant as 1+1)
- Hot-plug replacement—You must take the component offline before removing it for the following component:
  - None

## Removing and Replacing Components



### Warning

**Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place.**

Statement 1029



### Caution

When handling server components, handle them only by carrier edges and use an electrostatic discharge (ESD) wrist-strap or other grounding device to avoid damage.



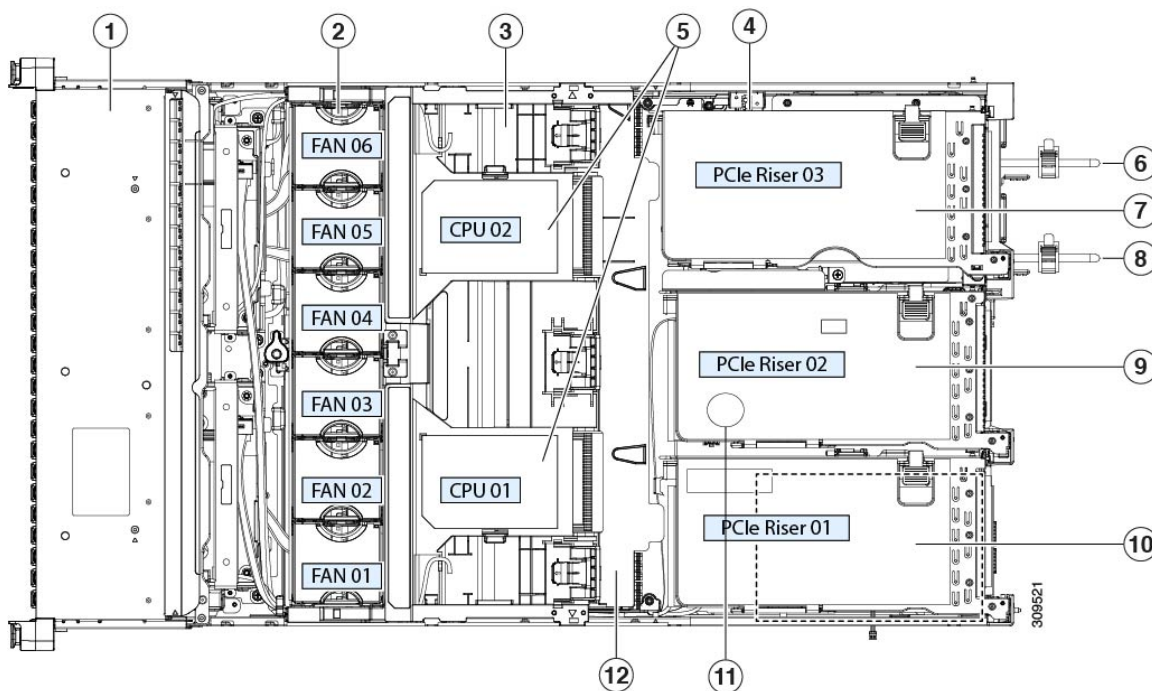
### Tip

You can press the unit identification button on the front panel or rear panel to turn on a flashing, blue unit identification LED on both the front and rear panels of the server. This button allows you to locate the specific server that you are servicing when you go to the opposite side of the rack. You can also activate these LEDs remotely by using the Cisco IMC interface.

## Component Location

This topic shows the locations of the field-replaceable components and service-related items. The view in the following figure shows the server with the top cover removed.

Figure 5: Cisco HyperFlex C245 M6 Server Serviceable Component Locations



1	Front-loading drive bays	2	Cooling fan modules (six, hot-swappable) Power supplies (hot-swappable when redundant as 1+1)
3	<p>DIMM sockets on motherboard (16 per CPU)</p> <p>See <a href="#">DIMM Population Rules and Memory Performance Guidelines</a> for DIMM slot numbering.</p> <p><b>Note</b> An air baffle rests on top of the DIMM and CPUs when the server is operating. The air baffle is not displayed in this illustration.</p>	4	Intrusion switch
5	<p>CPU sockets, 2</p> <p>CPU sockets are arranged side by side and labeled CPU1 and CPU2 next to the CPU socket.</p>	6	Power Supply Unit (PSU) 1

7	<p>Riser 3—Supports Riser 3A, 3B and 3C. PCIe slots 7 and 8 numbered bottom to top with the following options:</p> <ul style="list-style-type: none"> <li>• Riser 3A—Slot 7 PCIe supports full height, full length PCIe Add-in-card; Slot 8 PCIe supports full height, full length PCIe Add-in-card.</li> <li>• Riser 3B—Slot 7 supports 2.5-inch SSD; Slot 8 supports 2.5-inch SSD.</li> <li>• Riser 3C—Slot 7 PCIe supports full height, full length PCIe Add-in-card.</li> </ul>	8	Power Supply Unit (PSU) 2
9	<p>Riser 2—Supports Riser 2A. PCIe slots 4, 5, and 6 numbered bottom to top with the following option:</p> <ul style="list-style-type: none"> <li>• Riser 2A—Slot 4, 5, and 6 PCIe support full height, full length PCIe Add-in-card.</li> </ul>	10	<p>Riser 1—Supports Riser 1A and 1B. PCIe slots 1, 2, and 3 numbered bottom to top with the following options:</p> <ul style="list-style-type: none"> <li>• Riser 1A—Slot 1 PCIe supports full height, full length PCIe Add-in-card; Slot 2 PCIe supports full height, full length PCIe Add-in-card; Slot 3 PCIe supports full height, full length PCIe Add-in-card.</li> <li>• Riser 1B (Storage Option)—Slot 1 PCIe is disabled; Slot 2 supports 2.5-inch SSD; Slot 3 supports 2.5-inch SSD.</li> </ul>
11	RTC Battery	12	Internal USB Port

## Replacing Front-Loading SAS/SATA Drives



**Note** You do not have to shut down the server or drive to replace SAS/SATA hard drives or SSDs because they are hot-swappable.

### Front-Loading SAS/SATA Drive Population Guidelines

Cisco HyperFlex (HX-C245-M6SX) is orderable in one Small form-factor (SFF) drives version, with 24-drive back-plane front panel configuration:

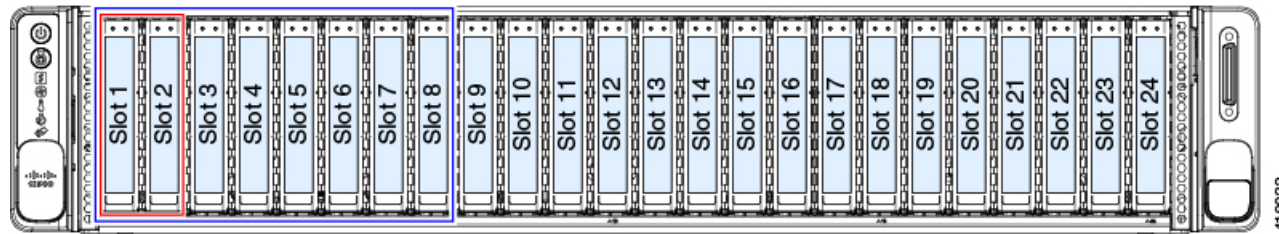
- Front-loading drive bays 1—24 support 2.5-inch SAS/SATA drives.



**Note** Optionally, front-loading drive bays 1 to 4 support 2.5-inch SSDs.

Drive bay numbering is shown in the following figures.

**Figure 6: Small Form-Factor Drive Bay Numbering**



Observe these drive population guidelines for optimum performance:

- When populating drives, add drives to the lowest-numbered bays first.



**Note** For diagrams of which drive bays are controlled by particular controller cables on the backplane, see [Storage Controller Cable Connectors and Backplanes](#).

- Keep an empty drive blanking tray in any unused bays to ensure proper airflow.
- You can mix SAS/SATA hard drives and SAS/SATA SSDs in the same server. However, you cannot configure a logical volume (virtual drive) that contains a mix of hard drives and SSDs. That is, when you create a logical volume, it must contain all SAS/SATA hard drives or all SAS/SATA SSDs.

## 4K Sector Format SAS/SATA Drives Considerations

- You must boot 4K sector format drives in UEFI mode, not legacy mode. See the procedures in this section.
- Do not configure 4K sector format and 512-byte sector format drives as part of the same RAID volume.
- For operating system support on 4K sector drives, see the interoperability matrix tool for your server: [Hardware and Software Interoperability Matrix Tools](#)

## Setting Up UEFI Mode Booting in the BIOS Setup Utility

- Step 1** Enter the BIOS setup utility by pressing the **F2** key when prompted during bootup.
- Step 2** Go to the **Boot Options** tab.
- Step 3** Set **UEFI Boot Options** to **Enabled**.
- Step 4** Under **Boot Option Priorities**, set your OS installation media (such as a virtual DVD) as your **Boot Option #1**.
- Step 5** Go to the **Advanced** tab.
- Step 6** Select **LOM** and **PCIe Slot Configuration**.
- Step 7** Set the **PCIe Slot ID: HBA Option ROM** to **UEFI Only**.
- Step 8** Press **F10** to save changes and exit the BIOS setup utility. Allow the server to reboot.

- Step 9** After the OS installs, verify the installation:
- Enter the BIOS setup utility by pressing the **F2** key when prompted during bootup.
  - Go to the Boot Options tab.
  - Under **Boot Option Priorities**, verify that the OS you installed is listed as your **Boot Option #1**.
- 

## Setting Up UEFI Mode Booting in the Cisco IMC GUI

---

- Step 1** Use a web browser and the IP address of the server to log into the Cisco IMC GUI management interface.
- Step 2** Navigate to **Server > BIOS**.
- Step 3** Under Actions, click **Configure BIOS**.
- Step 4** In the Configure BIOS Parameters dialog, select the **Advanced** tab.
- Step 5** Go to the **LOM and PCIe Slot Configuration** section.
- Step 6** Set the **PCIe Slot: HBA Option ROM** to **UEFI Only**.
- Step 7** Click **Save Changes**. The dialog closes.
- Step 8** Under BIOS Properties, set **Configured Boot Order** to **UEFI**.
- Step 9** Under Actions, click **Configure Boot Order**.
- Step 10** In the Configure Boot Order dialog, click **Add Local HDD**.
- Step 11** In the Add Local HDD dialog, enter the information for the 4K sector format drive and make it first in the boot order.
- Step 12** Save changes and reboot the server. The changes you made will be visible after the system reboots.
- 

## Replacing a Front-Loading SAS/SATA Drive



**Note** You do not have to shut down the server or drive to replace SAS/SATA hard drives or SSDs because they are hot-swappable.

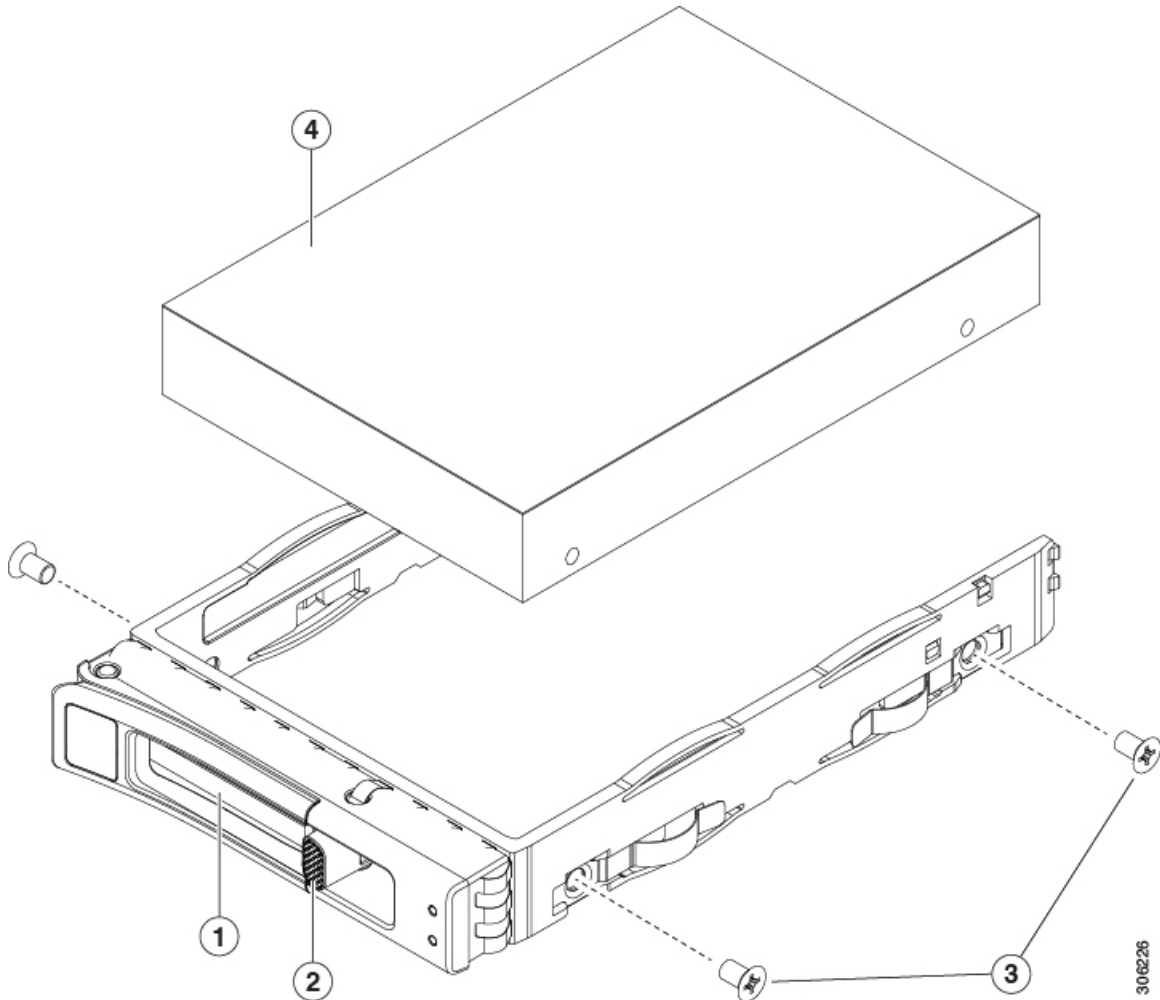
---

Follow this procedure to remove a SAS/SATA drive from a vertical drive bay.

---

- Step 1** Remove the drive that you are replacing or remove a blank drive tray from the front of the server:
- Press the release button on the face of the drive tray.
  - Grasp and open the ejector lever and then pull the drive tray out of the slot.
  - If you are replacing an existing drive, remove the four drive-tray screws that secure the drive to the tray and then lift the drive out of the tray.
- Step 2** Install a new drive:
- Place a new drive in the empty drive tray and install the four drive-tray screws.
  - With the ejector lever on the drive tray open, insert the drive tray into the empty drive bay.
  - Push the tray into the slot until it touches the backplane, and then close the ejector lever to lock the drive in place.

Figure 7: Replacing a Drive in a Drive Tray



1	Ejector lever	3	Drive tray screws (two on each side)
2	Release button	4	Drive removed from drive tray

## Replacing Rear-Loading SAS/SATA Drives



**Note** You do not have to shut down the server or drive to replace SAS/SATA hard drives or SSDs because they are hot-swappable.



## Rear-Loading SAS/SATA Drive Population Guidelines

When using a hardware RAID controller card in the Cisco HyperFlex, up to four SSDs are supported in the rear bays.

- Riser 1—Supports Riser 1A and 1B. PCIe slots 1, 2, and 3 numbered bottom to top with the following options:
  - Riser 1B (Storage Option)—Slot 1 PCIe; Slot 2 supports 2.5-inch SSD; Slot 3 supports 2.5-inch SSD.
- Riser 3—Supports Riser 3A, 3B and 3C. PCIe slots 7 and 8 numbered bottom to top with the following options:
  - Riser 3B —Slot 7 supports 2.5-inch SSD; Slot 8 supports 2.5-inch SSD.

## Replacing a Rear-Loading SAS/SATA Drive



---

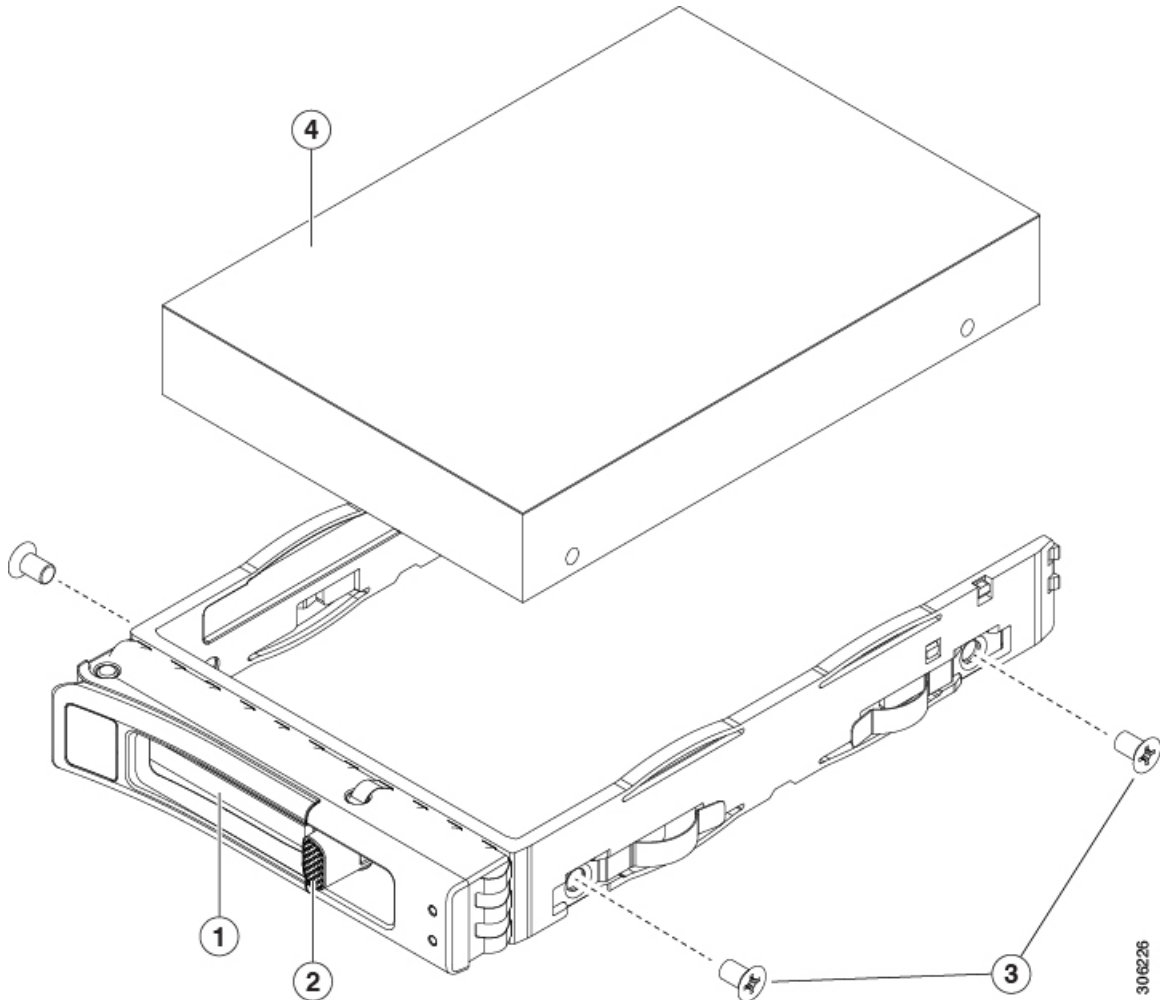
**Note** You do not have to shut down the server or drive to replace SAS/SATA hard drives or SSDs because they are hot-swappable.

---

Follow this procedure to remove a SAS/SATA drive from a vertical drive bay.

- 
- Step 1** Remove the drive that you are replacing or remove a blank drive tray from the rear of the server:
- a) Press the release button on the face of the drive tray.
  - b) Grasp and open the ejector lever and then pull the drive tray out of the slot.
  - c) If you are replacing an existing drive, remove the four drive-tray screws that secure the drive to the tray and then lift the drive out of the tray.
- Step 2** Install a new drive:
- a) Place a new drive in the empty drive tray and install the four drive-tray screws.
  - b) With the ejector lever on the drive tray open, insert the drive tray into the empty drive bay.
  - c) Push the tray into the slot until it touches the backplane, and then close the ejector lever to lock the drive in place.

Figure 8: Replacing a Drive in a Drive Tray



1	Ejector lever	3	Drive tray screws (two on each side)
2	Release button	4	Drive removed from drive tray

## Replacing Fan Modules

The six fan modules in the server are numbered as shown in [Component Location](#).



**Tip** There is a fault LED on the top of each fan module. This LED lights green when the fan is correctly seated and is operating OK. The LED lights amber when the fan has a fault or is not correctly seated.



**Caution** You do not have to shut down or remove power from the server to replace fan modules because they are hot-swappable. However, to maintain proper cooling, do not operate the server for more than one minute with any fan module removed.

**Step 1**

Remove an existing fan module:

- a) Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

**Caution** If you cannot safely view and access the component, remove the server from the rack.

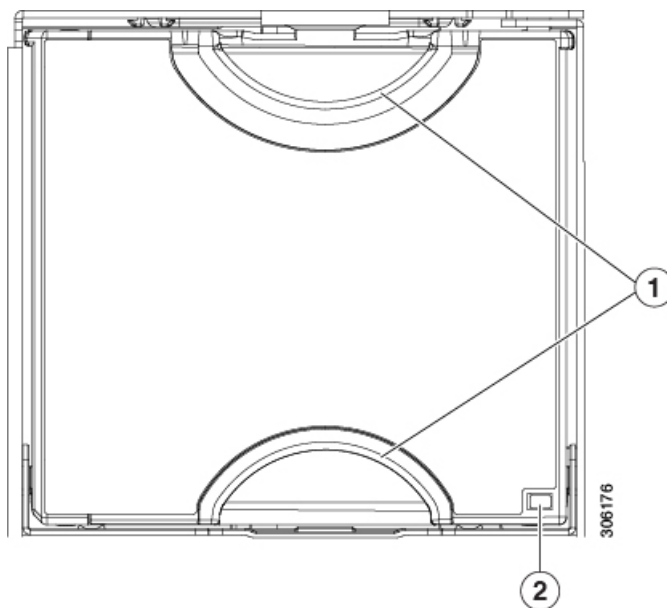
- b) Remove the top cover from the server as described in [Removing the Server Top Cover, on page 8](#).
- c) Grasp and squeeze the fan module release latches on its top. Lift straight up to disengage its connector from the motherboard.

**Step 2**

Install a new fan module:

- a) Set the new fan module in place. The arrow printed on the top of the fan module should point toward the rear of the server.
- b) Press down gently on the fan module to fully engage it with the connector on the motherboard.
- c) Replace the top cover to the server.
- d) Replace the server in the rack, replace cables, and then fully power on the server by pressing the Power button.

**Figure 9: Top View of Fan Module**



1	Fan module release latches	2	Fan module fault LED
---	----------------------------	---	----------------------

# Replacing CPUs and Heatsinks

## CPU Configuration Rules

This server has two CPU sockets on the motherboard. Each CPU supports 8 DIMM channels (16 DIMM slots). See [DIMM Population Rules and Memory Performance Guidelines](#), on page 28.

- The server can operate with one CPU or two identical CPUs installed.
- The minimum configuration is that the server must have at least CPU 1 installed. Install CPU 1 first, and then CPU 2.
- The following restrictions apply when using a single-CPU configuration:
  - Any unused CPU socket must have the socket dust cover from the factory in place.
  - The maximum number of DIMMs is 16 (only CPU 1 channels A through H).

## Tools Required For CPU Replacement

You need the following tools and equipment for this procedure:

- T-20 Torx driver (for heatsink and CPU socket screws).
- Heatsink cleaning kit—Supplied with replacement CPU. Orderable separately as Cisco PID UCSX-HSCK= One cleaning kit can clean up to four CPUs.
- Thermal interface material (TIM)—Syringe supplied with replacement CPU. Use only if you are reusing your existing heatsink (new heatsinks have a pre-applied pad of TIM). Orderable separately as Cisco PID UCS-CPU-TIM= One TIM kit covers one CPU.

See also [Additional CPU-Related Parts to Order with RMA Replacement CPUs or RMA Nodes](#), on page 27.

## Replacing a CPU and Heatsink



---

**Caution** CPUs and their sockets are fragile and must be handled with extreme care to avoid damaging pins. The CPUs must be installed with heatsinks and thermal interface material to ensure cooling. Failure to install a CPU correctly might result in damage to the server.

---



---

**Caution** Always shut down the server before removing it from the chassis, as described in the procedures. Failure to shut down the server before removal results in the corresponding RAID supercap cache being discarded and other data might be lost.

---

**Step 1** Shut down the server by using the software interface or by pressing the server power button, as described in [Shutting Down and Removing Power From the Server, on page 7](#).

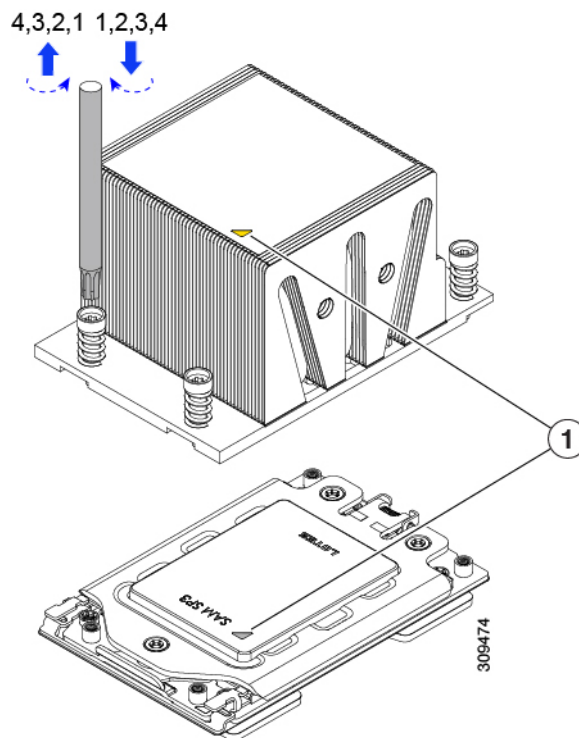
**Step 2** Disconnect any cables from ports on the server or installed cards.

**Step 3** Remove the heatsink from the CPU that you are replacing:

- a) Use a T-20 Torx driver to loosen the four captive screws that secure the heatsink.

**Note** Alternate loosening the heatsink screws evenly so that the heatsink remains level as it is raised. Loosen the heatsink nuts in the order shown on the heatsink label (4, 3, 2, 1).

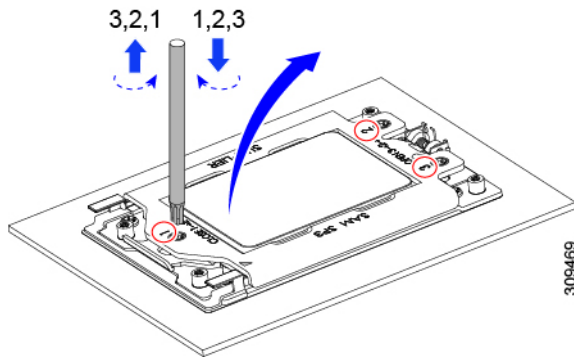
**Figure 10: Removing the Heatsink**



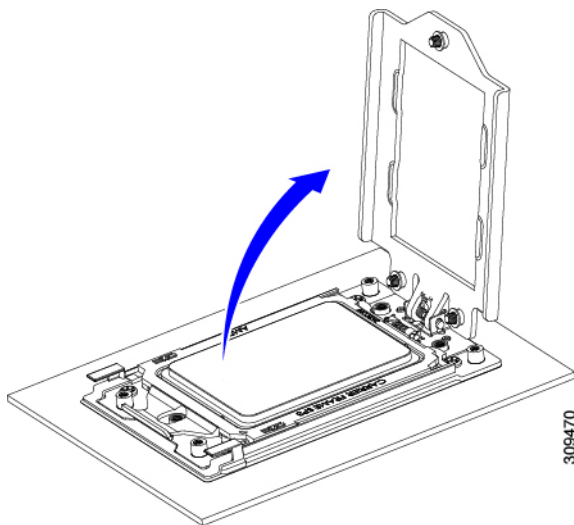
- b) Lift straight up on the heatsink and set it down on an antistatic surface. Use caution to avoid damaging the heatsink-to-CPU surface.

**Step 4** Remove the CPU from the socket:

- a) Use the T-20 Torx driver to loosen the three captive socket-frame screws in this order: 3, 2, 1.

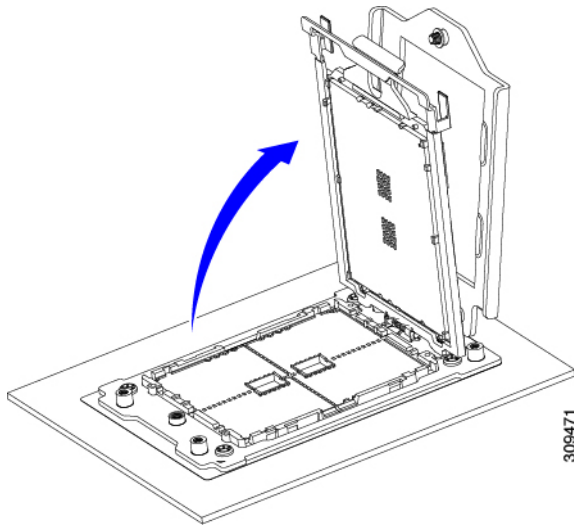
**Figure 11: Loosening the Socket Frame Screws**

- b) Pivot the hinged socket frame to the upright position.

**Figure 12: Opening the Socket Frame**

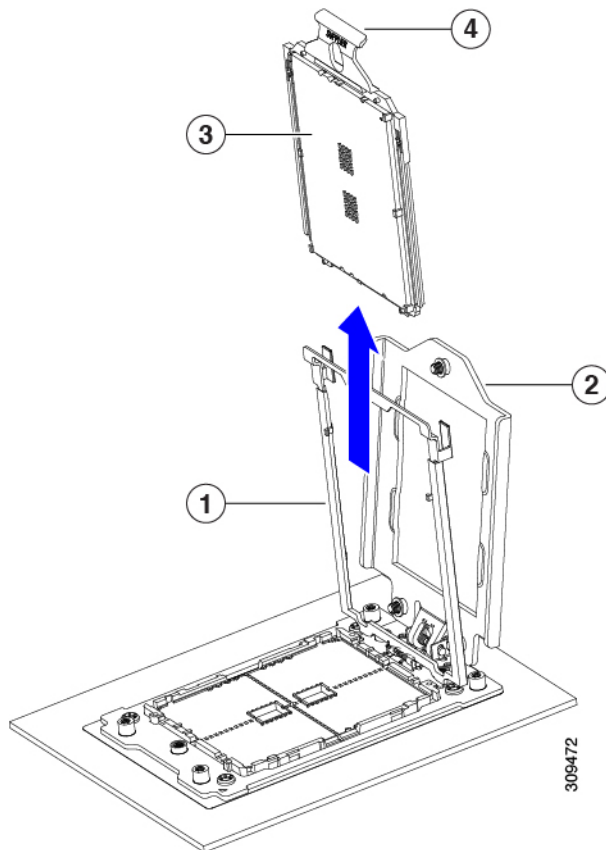
- c) Pivot the rail frame to the upright position.

**Figure 13: Opening the Rail Frame**



- d) Grasp the CPU only by the handling tab that is on its carrier frame and pull straight up to remove the CPU from the rail frame.

**Figure 14: Removing the CPU From the Socket**



<b>1</b>	Rail frame in open position	<b>3</b>	CPU in carrier frame
----------	-----------------------------	----------	----------------------

2	Socket frame in open position	4	Handling tab on CPU carrier frame
---	-------------------------------	---	-----------------------------------

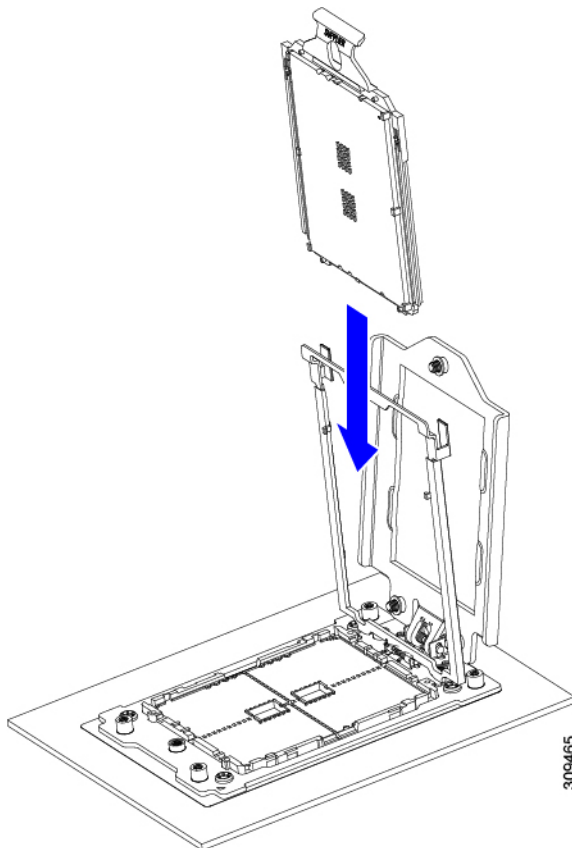
**Step 5** Install the new CPU:

**Caution** The CPU contacts and pins are extremely fragile. In this step, use extreme care to avoid touching or damaging the CPU contacts or the CPU socket pins.

**Note** Ensure that you are following the [CPU Configuration Rules, on page 20](#).

a) Grasping the CPU only by the handling tab on its carrier frame, carefully slide it down into the open rail frame.

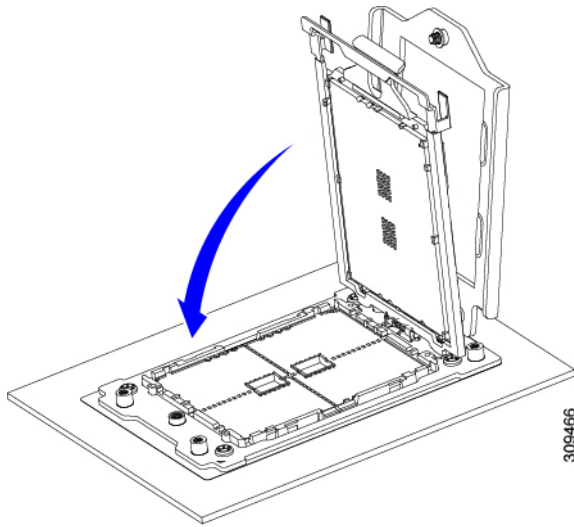
**Figure 15: Inserting the CPU with Carrier Frame**



a) Gently close the rail frame down to the flat, closed position.

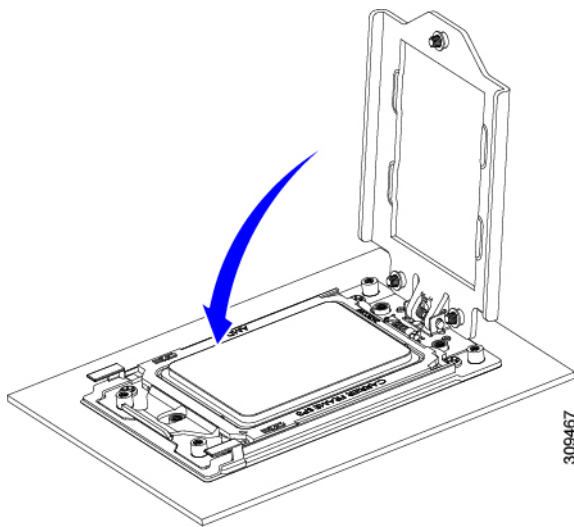


**Figure 16: Closing the Rail Frame**



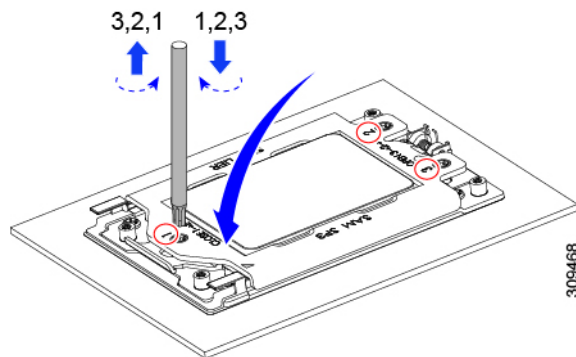
- b) Gently close the socket frame down to the flat, closed position.

**Figure 17: Closing the Socket Frame**



- c) Tighten the three screws on the socket frame in this order: 1, 2, 3.

Figure 18: Closing the Socket Frame

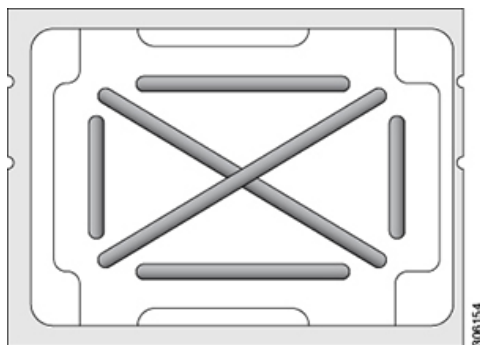


### Step 6 Apply new TIM to the heatsink:

**Note** The heatsink must have new TIM on the heatsink-to-CPU surface to ensure proper cooling and performance.

- If you are installing a new heatsink, it is shipped with a pre-applied pad of TIM. Go to step 7.
  - If you are reusing a heatsink, you must remove the old TIM from the heatsink and then apply new TIM to the CPU surface from the supplied syringe. Continue with step a below.
- a) Apply the cleaning solution that is included with the heatsink cleaning kit (UCSX-HSCK=) to the old TIM on the heatsink and let it soak for a least 15 seconds.
  - b) Wipe all of the TIM off the heatsink using the soft cloth that is included with the heatsink cleaning kit. Be careful to avoid scratching the heatsink surface.
  - c) Using the syringe of TIM provided with the new CPU (UCS-CPU-TIM=), apply 1.5 cubic centimeters (1.5ml) of thermal interface material to the top of the CPU. Use the pattern shown below to ensure even coverage.

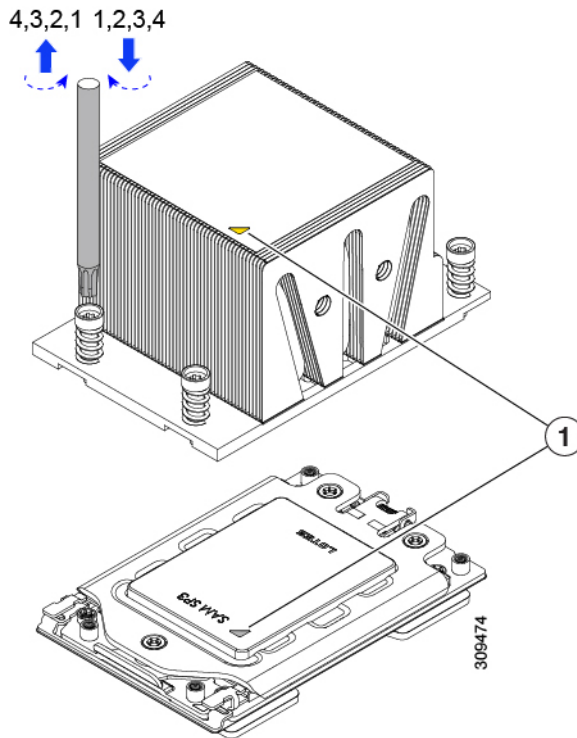
Figure 19: Thermal Interface Material Application Pattern



### Step 7 Install the heatsink to the CPU:

- a) Align the heatsink over the CPU socket. Align the triangle-mark on the heatsink with the triangle-mark on the socket frame, as shown in the following figure.

Figure 20: Heatsink Alignment Marks



1	Triangle marks on front heatsink UCSC-HSHP-C245M6 and CPU socket.
---	---

b) Use a T-20 Torx driver to tighten the four captive screws that secure the heatsink.

**Caution** Alternate tightening the heatsink screws evenly so that the heatsink remains level while it is lowered. Tighten the heatsink screws in the order shown on the heatsink label (1, 2, 3, 4).

**Step 8** Reconnect any cables that you removed.

**Step 9** Power on the server.

## Additional CPU-Related Parts to Order with RMA Replacement CPUs or RMA Nodes

When a return material authorization (RMA) of the CPU is done on a node, additional parts might not be included with the CPU spare. The TAC engineer might need to add the additional parts to the RMA to help ensure a successful replacement.

- Scenario 1—You are reusing the existing heatsinks or moving CPUs and heatsinks to a new node:
  - Heatsink cleaning kit (HX-HSCK=)
    - One cleaning kit can clean up to four CPUs.
  - Thermal interface material (TIM) kit (HX-CPU-TIM=)

One TIM kit covers one CPU.

- Scenario 2—You are replacing the existing heatsinks:
  - Heatsink: HX-HSHP-C245M6=
    - New heatsinks have a pre-applied pad of TIM.
  - Heatsink cleaning kit (HX-HSCK=)
    - One cleaning kit can clean up to four CPUs.

A CPU heatsink cleaning kit is good for up to four CPU and heatsink cleanings. The cleaning kit contains two bottles of solution, one to clean the CPU and heatsink of old TIM and the other to prepare the surface of the heatsink.

New heatsink spares come with a pre-applied pad of TIM. It is important to clean any old TIM off of the CPU surface prior to installing the heatsinks. Therefore, even when you are ordering new heatsinks, you must order the heatsink cleaning kit.

## Replacing Memory DIMMs




---

**Caution** DIMMs and their sockets are fragile and must be handled with care to avoid damage during installation.

---




---

**Caution** Cisco does not support third-party DIMMs. Using non-Cisco DIMMs in the server might result in system problems or damage to the motherboard.

---




---

**Note** To ensure the best server performance, it is important that you are familiar with memory performance guidelines and population rules before you install or replace DIMMs.

---

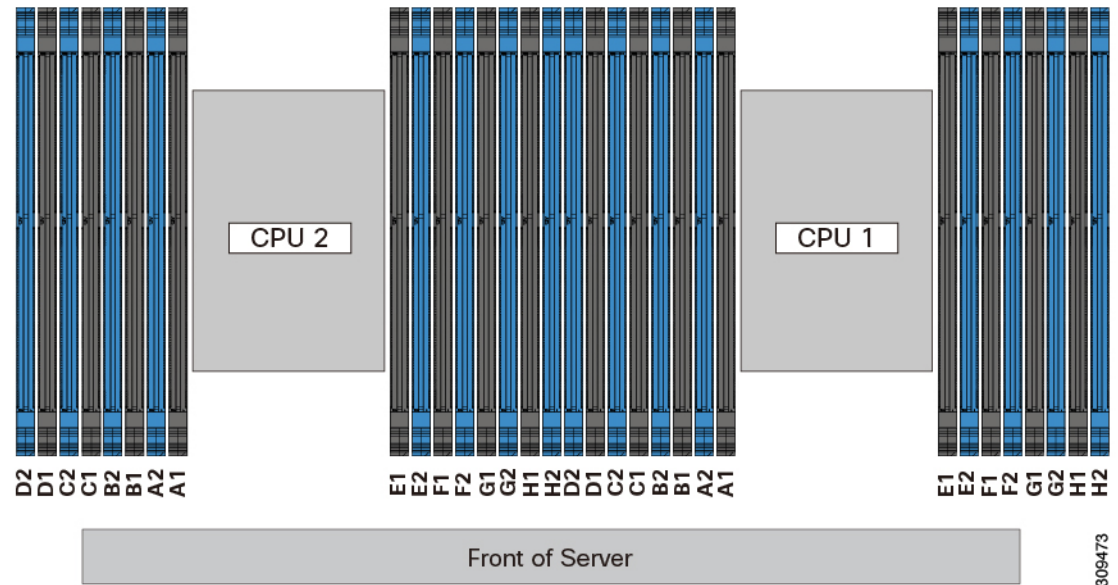
## DIMM Population Rules and Memory Performance Guidelines

This topic describes the rules and guidelines for maximum memory performance.

### DIMM Slot Numbering

The following figure shows the numbering of the DIMM slots on the motherboard.

Figure 21: DIMM Slot Numbering



### DIMM Population Rules

Observe the following guidelines when installing or replacing DIMMs for maximum performance:

- Each CPU supports eight memory channels, A through H.
  - CPU 1 supports channels P1 A1, P1 A2, P1 B1, P1 B2, P1 C1, P1 C2, P1 D1, P1 D2, P1 E1, P1 E2, P1 F1, P1 F2, P1 G1, P1 G2, P1 H1, and P1 H2.
  - CPU 2 supports channels P2 A1, P2 A2, P2 B1, P2 B2, P2 C1, P2 C2, P2 D1, P2 D2, P2 E1, P2 E2, P2 F1, P2 F2, P2 G1, P2 G2, P2 H1, and P2 H2.
- Each channel has two DIMM sockets (for example, channel A = slots A1, A2).
- When both CPUs are installed, populate the DIMM slots of each CPU identically.
- In a single-CPU configuration, populate the channels for CPU1 only (P1 A1 through P1 H2).
- For optimal performance, populate DIMMs in the order shown in the following table, depending on the number of CPUs and the number of DIMMs per CPU. If your server has two CPUs, balance DIMMs evenly across the two CPUs as shown in the table.



**Note** The sections below list recommended configurations. Using 5, 7, 9, 10, or 11 DIMMs per CPU is not recommended.

### Memory Population Order

Memory slots are color coded, blue and black. The color coded channel population order is blue slots first, then black.

The following tables show the memory population order for each memory option.

Table 3: DIMMs Population Order for 2 CPU Configuration

Number of DDR4 DIMMs per CPU (Recommended Configurations)	Populate CPU 1 Slot	Populate CPU2 Slots
1	P1_C2	P2_C2
2	P1_C2 P1_D2	P2_C2 P2_D2
4	P1_C2 P1_D2 P1_G2 P1_H2	P2_C2 P2_D2 P2_G2 P2_H2
6	P1_C2 P1_D2 P1_G2 P1_H2 P1_A2 P1_E2	P2_C2 P2_D2 P2_G2 P2_H2 P2_A2 P2_E2
8	P1_C2 P1_D2 P1_G2 P1_H2 P1_A2 P1_E2 P1_B2 P1_F2	P2_C2 P2_D2 P2_G2 P2_H2 P2_A2 P2_E2 P2_B2 P2_F2

<p>10</p>	<p>P1_C2 P1_D2 P1_G2 P1_H2 P1_A2 P1_E2 P1_B2 P1_F2 P1_D1 P1_E1</p>	<p>P2_C2 P2_D2 P2_G2 P2_H2 P2_A2 P2_E2 P2_B2 P2_F2 P2_D1 P2_E1</p>
<p>12</p>	<p>P1_C2 P1_D2 P1_G2 P1_H2 P1_A2 P1_E2 P1_B2 P1_F2 P1_D1 P1_E1 P1_B1 P1_G1</p>	<p>P2_C2 P2_D2 P2_G2 P2_H2 P2_A2 P2_E2 P2_B2 P2_F2 P2_D1 P2_E1 P2_B1 P2_G1</p>

14	P1_C2 P1_D2 P1_G2 P1_H2 P1_A2 P1_E2 P1_B2 P1_F2 P1_D1 P1_E1 P1_B1 P1_G1 P1_C1 P1_F1	P2_C2 P2_D2 P2_G2 P2_H2 P2_A2 P2_E2 P2_B2 P2_F2 P2_D1 P2_E1 P2_B1 P2_G1 P2_C1 P2_F1
16	All populated (A1,A2) through (H1, H2)	All populated (A1,A2) through (H1, H2)

**Table 4: DIMMs Population Order for 1 CPU Configuration**

Number of DDR4 DIMMs per CPU (Recommended Configurations)	Populate CPU 1 Slot
1	P1_C2
2	P1_C2 P1_D2
4	P1_C2 P1_D2 P1_G2 P1_H2
6	P1_C2 P1_D2 P1_G2 P1_H2 P1_A2 P1_E2



Number of DDR4 DIMMs per CPU (Recommended Configurations)	Populate CPU 1 Slot
8	P1_C2 P1_D2 P1_G2 P1_H2 P1_A2 P1_E2 P1_B2 P1_F2
10	P1_C2 P1_D2 P1_G2 P1_H2 P1_A2 P1_E2 P1_B2 P1_F2 P1_D1 P1_E1
12	P1_C2 P1_D2 P1_G2 P1_H2 P1_A2 P1_E2 P1_B2 P1_F2 P1_D1 P1_E1 P1_B1 P1_G1

Number of DDR4 DIMMs per CPU (Recommended Configurations)	Populate CPU 1 Slot
14	P1_C2 P1_D2 P1_G2 P1_H2 P1_A2 P1_E2 P1_B2 P1_F2 P1_D1 P1_E1 P1_B1 P1_G1 P1_C1 P1_F1
16	All populated (A1,A2) through (H1, H2)

- The maximum combined memory allowed in the 16 DIMM slots controlled by any one CPU is 16 x 256 GB.
- Memory mirroring reduces the amount of memory available by 50 percent because only one of the two populated channels provides data. When memory mirroring is enabled, you must install DIMMs in even numbers of channels.
- NVIDIA M-Series GPUs can support only less-than 1 TB memory in the server.
- NVIDIA P-Series GPUs can support 1 TB or more memory in the server.
- AMD FirePro S7150 X2 GPUs can support only less-than 1 TB memory in the server.
- Observe the DIMM mixing rules shown in the following table.

**Table 5: DIMM Mixing Rules**

DIMM Parameter	DIMMs in the Same Channel	DIMMs in the Same Bank
DIMM Capacity For example, 8GB, 16GB, 32GB, 64GB, 128GB	You can mix different capacity DIMMs in the same channel (for example, A1, A2).	You cannot mix DIMMs with different capacities and Revisions in the same bank (for example A1, B1). The Revision value depends on the manufactures. Two DIMMs with the same PID can have different Revisions.

DIMM speed For example, 2666 GHz	You can mix speeds, but DIMMs will run at the speed of the slowest DIMMs/CPUs installed in the channel.	You cannot mix DIMMs with different speeds and Revisions in the same bank (for example A1, B1). The Revision value depends on the manufactures. Two DIMMs with the same PID can have different Revisions.
DIMM type RDIMMs or LRDIMMs	You cannot mix DIMM types in a channel.	You cannot mix DIMM types in a bank.

### Memory Mirroring

The CPUs in the server support memory mirroring only when an even number of channels are populated with DIMMs. If one or three channels are populated with DIMMs, memory mirroring is automatically disabled.

Memory mirroring reduces the amount of memory available by 50 percent because only one of the two populated channels provides data. The second, duplicate channel provides redundancy.

## Replacing DIMMs

### Identifying a Faulty DIMM

Each DIMM socket has a corresponding DIMM fault LED, directly in front of the DIMM socket. See [Internal Diagnostic LEDs, on page 5](#) for the locations of these LEDs. When the server is in standby power mode, these LEDs light amber to indicate a faulty DIMM.

#### Step 1

Remove an existing DIMM:

- a) Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 7](#).
- b) Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

**Caution** If you cannot safely view and access the component, remove the server from the rack.

- c) Remove the top cover from the server as described in [Removing the Server Top Cover, on page 8](#).
- d) Remove the air baffle that covers the front ends of the DIMM slots to provide clearance.
- e) Locate the DIMM that you are removing, and then open the ejector levers at each end of its DIMM slot.

#### Step 2

Install a new DIMM:

**Note** Before installing DIMMs, see the memory population rules for this server: [DIMM Population Rules and Memory Performance Guidelines, on page 28](#).

- a) Align the new DIMM with the empty slot on the motherboard. Use the alignment feature in the DIMM slot to correctly orient the DIMM.
- b) Push down evenly on the top corners of the DIMM until it is fully seated and the ejector levers on both ends lock into place.
- c) Replace the top cover to the server.

- d) Replace the server in the rack, replace cables, and then fully power on the server by pressing the Power button.
- 

## Replacing a Mini-Storage Module

The mini-storage module plugs into a motherboard socket to provide additional internal storage.

- M.2 SSD Carrier—provides two M.2 form-factor SSD sockets.



**Note** The Cisco IMC firmware does not include an out-of-band management interface for the M.2 drives installed in the M.2 version of this mini-storage module (UCS-MSTOR-M2). The M.2 drives are not listed in Cisco IMC inventory, nor can they be managed by Cisco IMC. This is expected behavior.

---

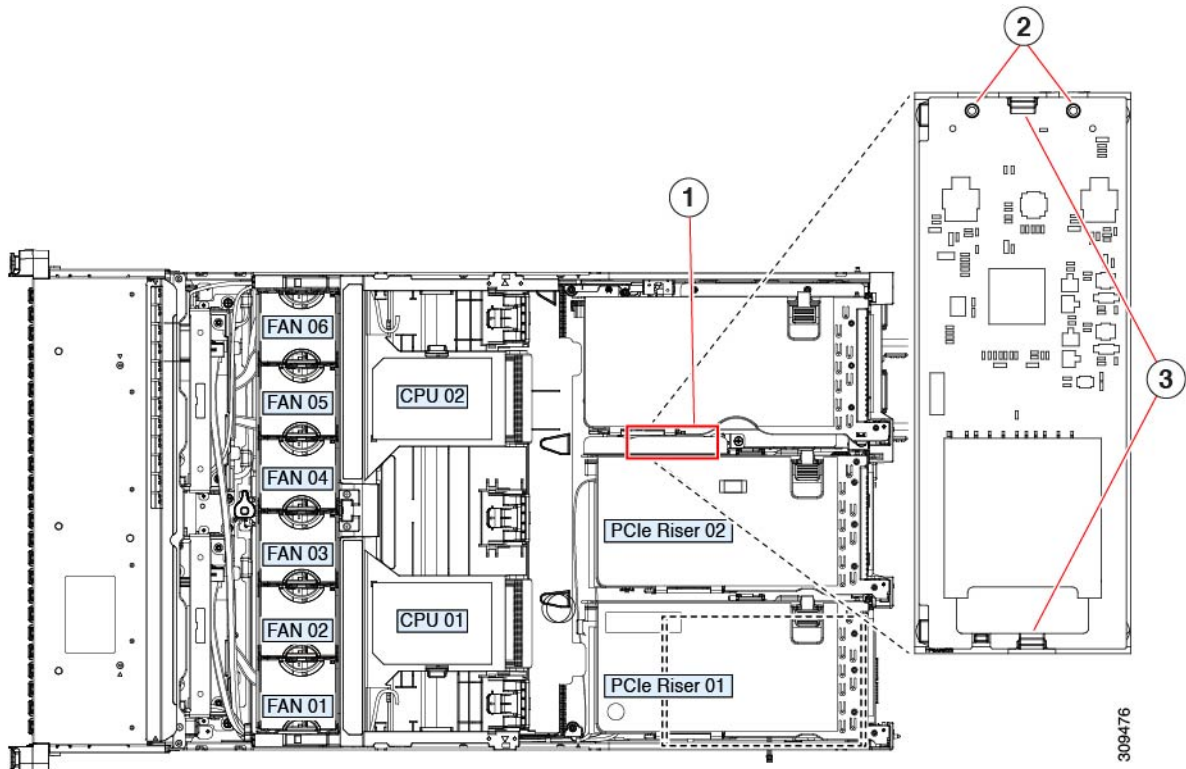
## Replacing a Mini-Storage Module Carrier

This topic describes how to remove and replace a mini-storage module carrier. The carrier has one media socket on its top and one socket on its underside. Use the following procedure for any type of mini-storage module carrier (M.2 SSD).

---

- Step 1** Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 7](#).
- Step 2** Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.
- Caution** If you cannot safely view and access the component, remove the server from the rack.
- Step 3** Remove the top cover from the server as described in [Removing the Server Top Cover, on page 8](#).
- Step 4** Remove a carrier from its socket:
- Locate the mini-storage module carrier in its socket between Riser 2 and Riser 3.
  - Push outward on the securing clips that holds each end of the carrier.
  - Lift both ends of the carrier to disengage it from the socket on the motherboard.
  - Set the carrier on an anti-static surface.
- Step 5** Install a carrier to its socket:
- Position carrier over socket, with the carrier's connector facing down. Two alignment pegs must match with two holes on the carrier.
  - Gently push down the socket end of the carrier so that the two pegs go through the two holes on the carrier.
  - Push down on the carrier so that the securing clips click over it at both ends.
- Step 6** Replace the top cover to the server.
- Step 7** Replace the server in the rack, replace cables, and then fully power on the server by pressing the Power button.

Figure 22: Mini-Storage Module Carrier Socket



1	Location of socket on motherboard	3	Securing clips
2	Alignment pegs	-	

## Replacing an M.2 SSD in a Mini-Storage Carrier For M.2

This server supports Cisco Boot optimized M.2 RAID controller (holds 2 M.2 SATA SSDs). The HX-M2-HWRAID controller is available only with 240 GB (HX-M2-240GB=) and 960 GB (HX-M2-960GB=) M.2 SSDs. This topic describes how to remove and replace an M.2 SATA SSD in a mini-storage carrier for M.2 (HX-M2-HWRAID). The carrier has one M.2 SSD socket on its top and one socket on its underside.



**Note** Cisco recommends that you use M.2 SATA SSDs as boot-only devices.

### Population Rules For Mini-Storage M.2 SSDs

- Both M.2 SSDs must be of same capacity; do not mix different capacity SSDs.
- You can use one or two M.2 SSDs in the carrier.
- M.2 socket 1 is on the top side of the carrier; M.2 socket 2 is on the underside of the carrier (the same side as the carrier's motherboard connector).

- Dual SATA M.2 SSDs can be configured in a RAID 1 array through the BIOS Setup Utility's embedded SATA RAID interface.



---

**Note** You cannot control the M.2 SATA SSDs in the server with a HW RAID controller.

---

- 
- Step 1** Power off the server and then remove the mini-storage module carrier from the server as described in [Replacing a Mini-Storage Module Carrier, on page 36](#).
- Step 2** Remove an M.2 SSD:
- Use a #1 Phillips-head screwdriver to remove the single screw that secures the M.2 SSD to the carrier.
  - Remove the M.2 SSD from its socket on the carrier.
- Step 3** Install a new M.2 SSD:
- Insert the new M.2 SSD connector-end into the socket on the carrier with its label side facing up.
  - Press the M.2 SSD flat against the carrier.
  - Install the single screw that secures the end of the M.2 SSD to the carrier.
- Step 4** Install the mini-storage module carrier back into the server and then power it on as described in [Replacing a Mini-Storage Module Carrier, on page 36](#).
- 

## Replacing a USB Drive



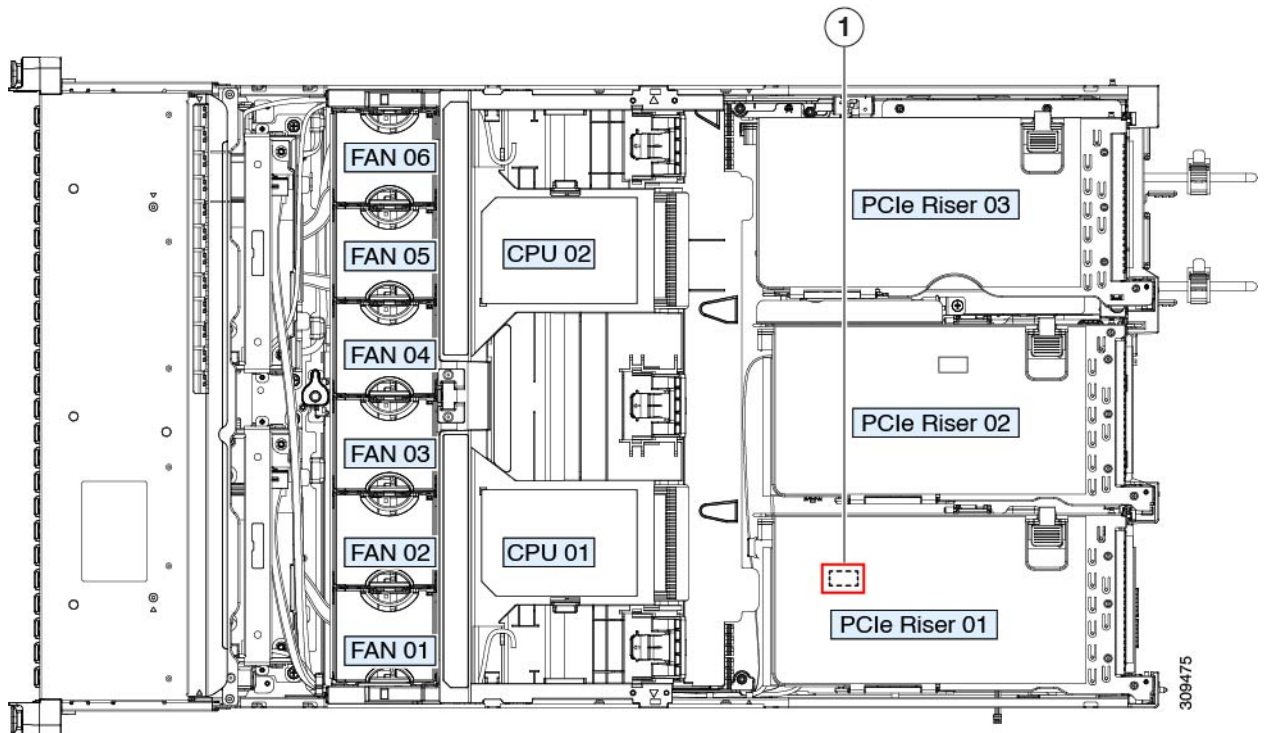
---

**Caution** We do not recommend that you hot-swap the internal USB drive while the server is powered on because of the potential for data loss.

---

- 
- Step 1** Remove an existing internal USB drive:
- Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 7](#).
  - Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.
- Caution** If you cannot safely view and access the component, remove the server from the rack.
- Remove the top cover from the server as described in [Removing the Server Top Cover, on page 8](#).
  - Locate the USB socket on the motherboard, under Riser 1.
  - Grasp the USB drive and pull it vertically to free it from the socket.
- Step 2** Install a new internal USB drive:
- Align the USB drive with the socket.
  - Push the USB drive vertically to fully engage it with the socket.
  - Replace the top cover to the server.
  - Replace the server in the rack, replace cables, and then fully power on the server by pressing the Power button.

Figure 23: Location of Internal USB Port



1	Location of vertical USB socket on motherboard	-
---	--	---

## Enabling or Disabling the Internal USB Port

The factory default is that all USB ports on the server are enabled. However, the internal USB port can be enabled or disabled in the server BIOS.

- Step 1** Enter the BIOS Setup Utility by pressing the **F2** key when prompted during bootup.
- Step 2** Navigate to the **Advanced** tab.
- Step 3** On the Advanced tab, select **USB Configuration**.
- Step 4** On the USB Configuration page, select **USB Ports Configuration**.
- Step 5** Scroll to **USB Port: Internal**, press **Enter**, and then choose either **Enabled** or **Disabled** from the dialog box.
- Step 6** Press **F10** to save and exit the utility.

# Replacing the RTC Battery



**Warning** There is danger of explosion if the battery is replaced incorrectly. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

[Statement 1015]



**Warning Recyclers:** Do not shred the battery! Make sure you dispose of the battery according to appropriate regulations for your country or locale.

The real-time clock (RTC) battery retains system settings when the server is disconnected from power. The battery type is CR2032. Cisco supports the industry-standard CR2032 battery, which can be purchased from most electronic stores.

## Step 1 Remove the RTC battery:

- a) Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 7](#).
- b) Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

**Caution** If you cannot safely view and access the component, remove the server from the rack.

- c) Remove the top cover from the server as described in [Removing the Server Top Cover, on page 8](#).
- d) Remove PCIe riser 1 from the server to provide clearance to the RTC battery socket that is on the motherboard. See [Replacing a PCIe Riser, on page 46](#).
- e) Locate the horizontal RTC battery socket.
- f) Remove the battery from the socket on the motherboard. Gently pry the securing clip to the side to provide clearance, then lift up on the battery.

## Step 2 Install a new RTC battery:

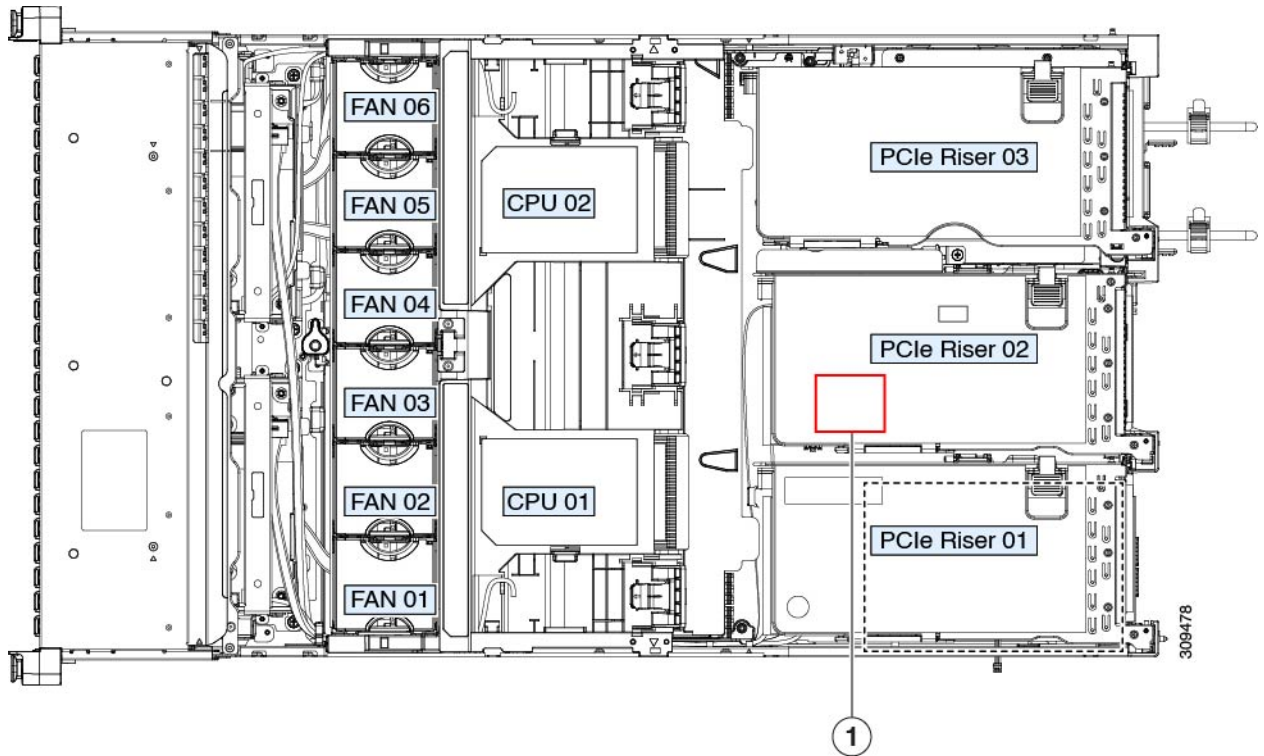
- a) Insert the battery into its socket and press down until it clicks in place under the clip.

**Note** The positive side of the battery marked “3V+” should face up.

- b) Replace PCIe riser 1 to the server. See [Replacing a PCIe Riser, on page 46](#).
- c) Replace the top cover to the server.
- d) Replace the server in the rack, replace cables, and then fully power on the server by pressing the Power button.



Figure 24: RTC Battery Location on Motherboard



<b>1</b>	RTC battery in horizontal socket on motherboard	-	
----------	---	---	--

## Replacing Power Supplies

When two power supplies are installed they are redundant as 1+1 by default, but they also support cold redundancy mode. Cold redundancy (CR) suspends power delivery on one or more power supplies and forces the remainder of the load to be supplied by the active PSU(s). As a result, total power efficiency is improved by best utilizing the PSU efficiency when compared to load characteristics.

- See also [Power Specifications](#)
- See also [Rear-Panel LEDs, on page 4](#) for information about the power supply LEDs.

This section includes procedures for replacing AC and DC power supply units.

## Installing DC Power Supplies (First Time Installation)



**Note** This procedure is for installing DC power supplies to the server for the first time. If you are replacing DC power supplies in a server that already has DC power supplies installed, see [Replacing DC Power Supplies, on page 44](#).



**Warning** A readily accessible two-poled disconnect device must be incorporated in the fixed wiring.

Statement 1022



**Warning** This product requires short-circuit (overcurrent) protection, to be provided as part of the building installation. Install only in accordance with national and local wiring regulations.

Statement 1045



**Warning** Installation of the equipment must comply with local and national electrical codes.

Statement 1074



**Note** Do not mix power supply types or wattages in the server. Both power supplies must be identical.



**Caution** As instructed in the first step of this wiring procedure, turn off the DC power source from your facility's circuit breaker to avoid electric shock hazard.

**Step 1** Turn off the DC power source from your facility's circuit breaker to avoid electric shock hazard.

**Note** The required DC input cable is Cisco part CAB-48DC-40A-8AWG. This 3-meter cable has a 3-pin connector on one end that is keyed to the DC input socket on the power supply. The other end of the cable has no connector so that you can wire it to your facility's DC power.

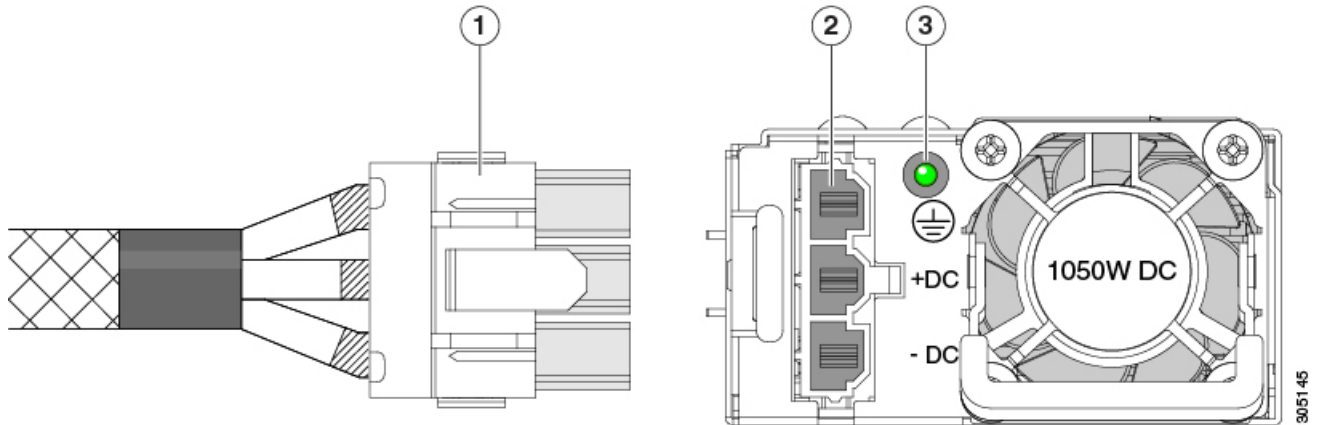
**Step 2** Wire the non-terminated end of the cable to your facility's DC power input source.

**Step 3** Connect the terminated end of the cable to the socket on the power supply. The connector is keyed so that the wires align for correct polarity and ground.

**Step 4** Return DC power from your facility's circuit breaker.

**Step 5** Press the Power button to boot the server to main power mode.

Figure 25: Replacing DC Power Supplies



1	Keyed cable connector (CAB-48DC-40A-8AWG)	3	PSU status LED
2	Keyed DC input socket	-	

**Step 6** See [Grounding for DC Power Supplies, on page 46](#) for information about additional chassis grounding.

## Replacing AC Power Supplies



**Note** If you have ordered a server with power supply redundancy (two power supplies), you do not have to power off the server to replace a power supply because they are redundant as 1+1.



**Note** Do not mix power supply types or wattages in the server. Both power supplies must be identical.

**Step 1** Remove the power supply that you are replacing or a blank panel from an empty bay:

a) Perform one of the following actions:

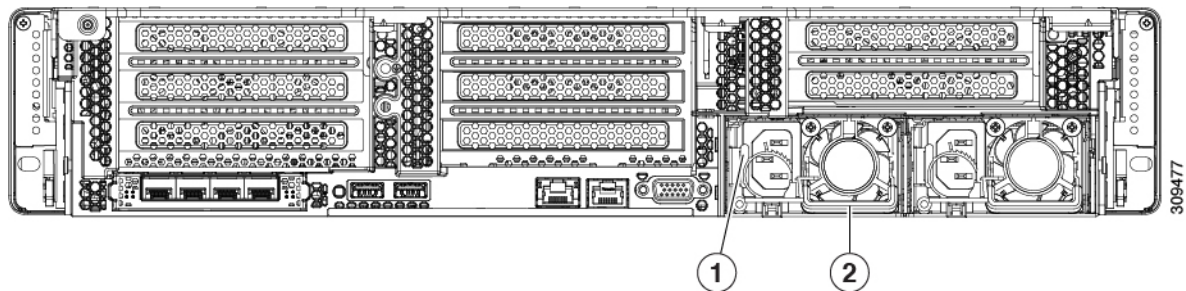
- If your server has only one power supply, shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 7](#).
- If your server has two power supplies, you do not have to shut down the server.

- Remove the power cord from the power supply that you are replacing.
- Grasp the power supply handle while pinching the release lever toward the handle.
- Pull the power supply out of the bay.

**Step 2** Install a new power supply:

- a) Grasp the power supply handle and insert the new power supply into the empty bay.
- b) Push the power supply into the bay until the release lever locks.
- c) Connect the power cord to the new power supply.
- d) Only if you shut down the server, press the Power button to boot the server to main power mode.

**Figure 26: Replacing AC Power Supplies**



1	Power supply release lever	2	Power supply handle
---	----------------------------	---	---------------------

## Replacing DC Power Supplies



**Note** This procedure is for replacing DC power supplies in a server that already has DC power supplies installed. If you are installing DC power supplies to the server for the first time, see [Installing DC Power Supplies \(First Time Installation\)](#), on page 42.



**Warning** A readily accessible two-poled disconnect device must be incorporated in the fixed wiring.  
Statement 1022



**Warning** This product requires short-circuit (overcurrent) protection, to be provided as part of the building installation. Install only in accordance with national and local wiring regulations.  
Statement 1045



**Warning** Installation of the equipment must comply with local and national electrical codes.  
Statement 1074



**Note** If you are replacing DC power supplies in a server with power supply redundancy (two power supplies), you do not have to power off the server to replace a power supply because they are redundant as 1+1.



**Note** Do not mix power supply types or wattages in the server. Both power supplies must be identical.

**Step 1**

Remove the DC power supply that you are replacing or a blank panel from an empty bay:

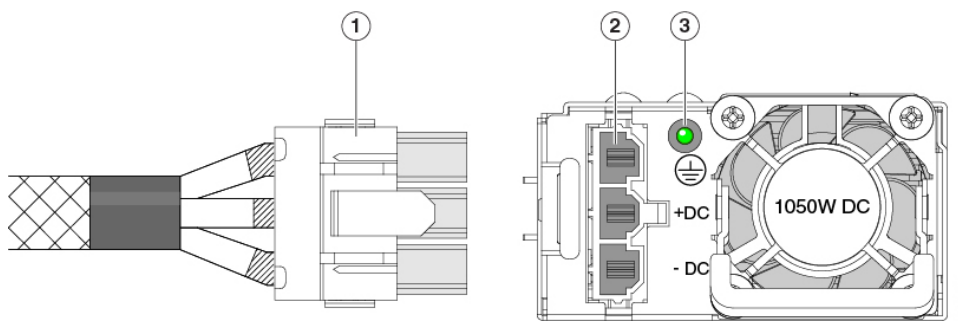
- a) Perform one of the following actions:
  - If you are replacing a power supply in a server that has only one DC power supply, shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 7](#).
  - If you are replacing a power supply in a server that has two DC power supplies, you do not have to shut down the server.
- b) Remove the power cord from the power supply that you are replacing. Lift the connector securing clip slightly and then pull the connector from the socket on the power supply.
- c) Grasp the power supply handle while pinching the release lever toward the handle.
- d) Pull the power supply out of the bay.

**Step 2**

Install a new DC power supply:

- a) Grasp the power supply handle and insert the new power supply into the empty bay.
- b) Push the power supply into the bay until the release lever locks.
- c) Connect the power cord to the new power supply. Press the connector into the socket until the securing clip clicks into place.
- d) Only if you shut down the server, press the Power button to boot the server to main power mode.

**Figure 27: Replacing DC Power Supplies**



<b>1</b>	Keyed cable connector (CAB-48DC-40A-8AWG)	<b>3</b>	PSU status LED
<b>2</b>	Keyed DC input socket	-	

## Grounding for DC Power Supplies

AC power supplies have internal grounding and so no additional grounding is required when the supported AC power cords are used.

When using a DC power supply, additional grounding of the server chassis to the earth ground of the rack is available. Two screw holes for use with your dual-hole grounding lug and grounding wire are supplied on the chassis rear panel.



---

**Note** The grounding points on the chassis are sized for M5 screws. You must provide your own screws, grounding lug, and grounding wire. The grounding lug must be dual-hole lug that fits M5 screws. The grounding cable that you provide must be 14 AWG (2 mm), minimum 60° C wire, or as permitted by the local code.

---

## Replacing a PCIe Riser

This server has two toolless PCIe risers for horizontal installation of PCIe cards. Each riser is available in multiple versions. See [PCIe Slot Specifications, on page 47](#) for detailed descriptions of the slots and features in each riser version.

---

**Step 1** Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 7](#).

**Step 2** Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

**Caution** If you cannot safely view and access the component, remove the server from the rack.

**Step 3** Remove the top cover from the server as described in [Removing the Server Top Cover, on page 8](#).

**Step 4** Remove the PCIe riser that you are replacing:

- Grasp the flip-up handle on the riser and the blue forward edge, and then lift up evenly to disengage its circuit board from the socket on the motherboard. Set the riser on an antistatic surface.
- If the riser has a card installed, remove the card from the riser. See [Replacing a PCIe Card, on page 50](#).

**Step 5** Install a new PCIe riser:

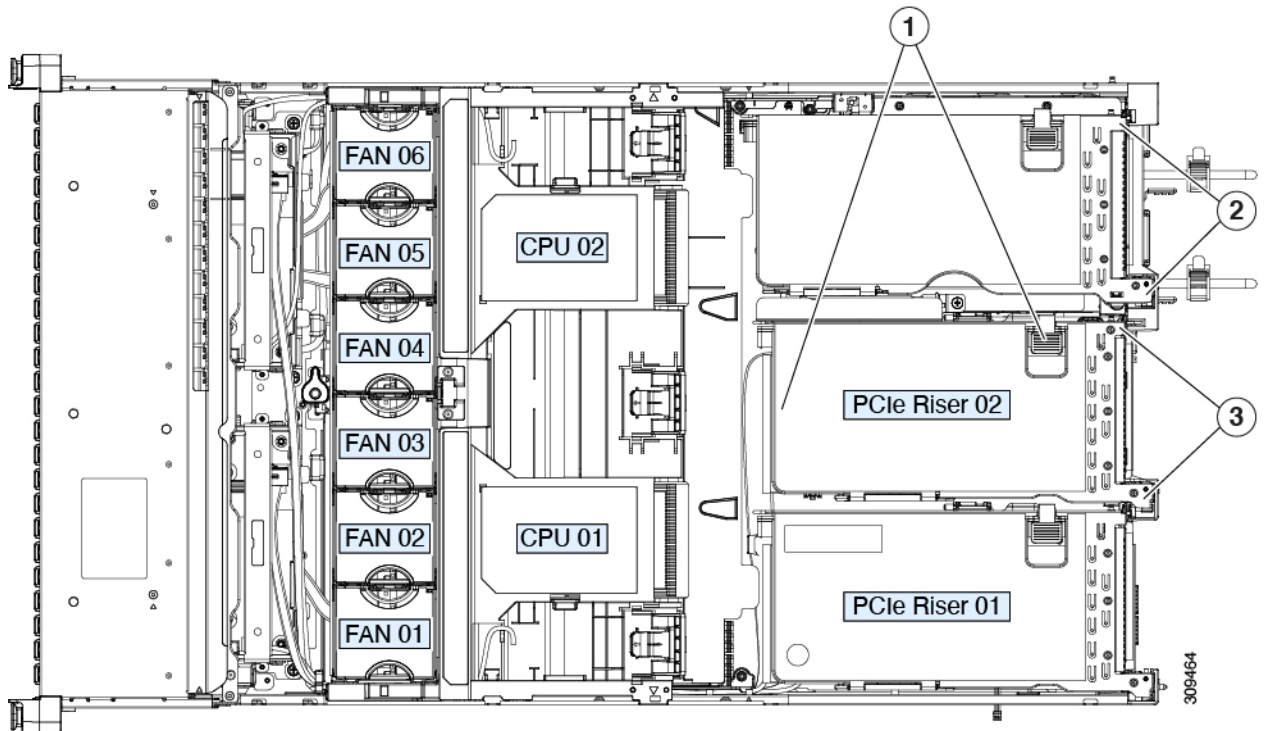
**Note** The PCIe risers are not interchangeable. If you plug a PCIe riser into the wrong socket, the server will not boot. Riser 1 must plug into the motherboard socket labeled “RISER1.” Riser 2 must plug into the motherboard socket labeled “RISER2.”

- If you removed a card from the old PCIe riser, install the card to the new riser. See [Replacing a PCIe Card, on page 50](#).
- Position the PCIe riser over its socket on the motherboard and over its alignment slots in the chassis.
- Carefully push down on both ends of the PCIe riser to fully engage its circuit board connector with the socket on the motherboard.

**Step 6** Replace the top cover to the server.

**Step 7** Replace the server in the rack, replace cables, and then fully power on the server by pressing the Power button.

Figure 28: PCIe Riser Alignment Features



1	Riser handling points (flip-up handle and blue forward edge)	3	Riser 2 alignment features in chassis
2	Riser 3 alignment features in chassis		

# Replacing a PCIe Card

## PCIe Slot Specifications



**Note** Cisco supports all PCIe cards qualified and sold by Cisco. PCIe cards not qualified or sold by Cisco are the responsibility of the customer. Although Cisco will always stand behind and support the C-Series rack-mount servers, customers using standard, off-the-shelf, third-party cards must go to the third-party card vendor for support if any issue with that particular card occurs.

The server contains three toolless PCIe risers for horizontal installation of PCIe cards. Each riser is orderable in multiple versions.

- Riser 1—Supports Riser 1A and 1B. PCIe slots 1, 2, and 3 numbered bottom to top with the following options:

- Riser 1A (HX-RIS1A-240M6)—Slot 1 PCIe supports full height, full length PCIe Add-in-card; Slot 2 PCIe supports full height, full length PCIe Add-in-card; Slot 3 PCIe supports full height, full length PCIe Add-in-card.
- Riser 1B (HX-RIS1B-245M6) (Storage Option)—Slot 1 PCIe is disabled; Slot 2 supports 2.5-inch SSD; Slot 3 supports 2.5-inch SSD.
- Riser 2—Supports Riser 2A. PCIe slots 4, 5, and 6 numbered bottom to top with the following options:
  - Riser 2A (HX-RIS2A-240M6)—Slot 4, 5, and 6 PCIe support full height, full length PCIe Add-in-card.
- Riser 3—Supports Riser 3A, 3B and 3C. PCIe slots 7 and 8 numbered bottom to top with the following options:
  - Riser 3A—Slot 7 PCIe supports full height, full length PCIe Add-in-card; Slot 8 PCIe supports full height, full length PCIe Add-in-card.
  - Riser 3B—Slot 7 supports 2.5-inch SSD; Slot 8 supports 2.5-inch SSD.
  - Riser 3C—Slot 7 PCIe supports full height, full length PCIe Add-in-card.

The following tables describe the specifications for the slots.

**Table 6: PCIe Riser 1A (HX-RIS1A-240M6) PCIe Expansion Slots**

Slot Number	Electrical Lane Width	Connector Length	Maximum Card Length	Card Height (Rear Panel Opening)	NCSI Support	Double-Wide GPU Card Support
1	Gen-3 and Gen-4 x8	x24 connector	¾ length	Full height	Yes <sup>1</sup>	No
2	Gen-3 and Gen-4 x16	x24 connector	Full length	Full height	Yes	Yes
3 <sup>2</sup>	Gen-3 and Gen-4 x8	x16 connector	Full length	Full height	No	No

<sup>1</sup> NCSI is supported in only one slot at a time. If a GPU card is present in slot 2, NCSI support automatically moves to slot 1.

<sup>2</sup> Slot 3 is not available in a single-CPU system.

**Table 7: PCIe Riser 1B (HX-RIS1B-240M6) PCIe Expansion Slots (Storage)**

Slot Number	Electrical Lane Width	Maximum Card Length
1	Disabled	
2	Gen-3 and Gen-4 x4	2.5" drive bay 102
3	Gen-3 and Gen-4 x4	2.5" drive bay 102



**Note** Riser 2 is not available in a single-CPU system.



**Table 8: PCIe Riser 2A (HX-RIS2A-240M6) PCIe Expansion Slots**

Slot Number	Electrical Lane Width	Connector Length	Maximum Card Length	Card Height (Rear Panel Opening)	NCSI Support	Double-Wide GPU Card Support
1	Gen-3 and Gen-4 x8	x24 connector	¾ length	Full height	Yes <sup>3</sup>	No
2	Gen-3 and Gen-4 x16	x24 connector	Full length	Full height	Yes	Yes
3 <sup>4</sup>	Gen-3 and Gen-4 x8	x16 connector	Full length	Full height	No	No

<sup>3</sup> NCSI is supported in only one slot at a time. If a GPU card is present in slot 2, NCSI support automatically moves to slot 1.

<sup>4</sup> Slot 3 is not available in a single-CPU system.

**Table 9: PCIe Riser 3A (HX-RIS3A-240M6) PCIe Expansion Slots**

Slot Number	Electrical Lane Width	Connector Length	Maximum Card Length	Card Height (Rear Panel Opening)	NCSI Support	Double-Wide GPU Card Support
7	Gen-3 and Gen-4 x8	x24 connector	Full length	Full height	No	No
8	Gen-3 and Gen-4 x8	x24 connector	Full length	Full height	No	No

**Table 10: PCIe Riser 3B (HX-RIS3B-240M6) PCIe Expansion Slots (Storage)**

Slot Number	Electrical Lane Width	Maximum Card Length
7	Gen-3 and Gen-4 x4	2.5" drive bay 102
8	Gen-3 and Gen-4 x4	2.5" drive bay 102

**Table 11: PCIe Riser 3C (Not Orderable Separately) PCIe Expansion Slots**

Slot Number	Electrical Lane Width	Connector Length	Maximum Card Length	Card Height (Rear Panel Opening)	NCSI Support	Double-Wide GPU Card Support
7	Gen-3 and Gen-4 x16	x24 connector	Full length	Full height	Yes	Yes
8	Blocked by Double-Wide GPU Card					

## Replacing a PCIe Card



**Note** If you are installing a Cisco UCS Virtual Interface Card, there are prerequisite considerations. See [Cisco Virtual Interface Card \(VIC\) Considerations, on page 51](#).



**Note** RAID controller cards install into a dedicated motherboard socket. See [Replacing Front-Loading SAS/SATA Drives, on page 13](#).



**Note** For instructions on installing or replacing double-wide GPU cards, see [GPU Installation](#).

**Step 1** Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 7](#).

**Step 2** Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

**Caution** If you cannot safely view and access the component, remove the server from the rack.

**Step 3** Remove the top cover from the server as described in [Removing the Server Top Cover, on page 8](#).

**Step 4** Remove the PCIe card that you are replacing:

- Remove any cables from the ports of the PCIe card that you are replacing.
- Use two hands to flip up and grasp the blue riser handle and the blue finger grip area on the front edge of the riser, and then lift straight up.
- On the bottom of the riser, push the release latch that holds the securing plate, and then swing the hinged securing plate open.
- Open the hinged card-tab retainer that secures the rear-panel tab of the card.
- Pull evenly on both ends of the PCIe card to remove it from the socket on the PCIe riser.

If the riser has no card, remove the blanking panel from the rear opening of the riser.

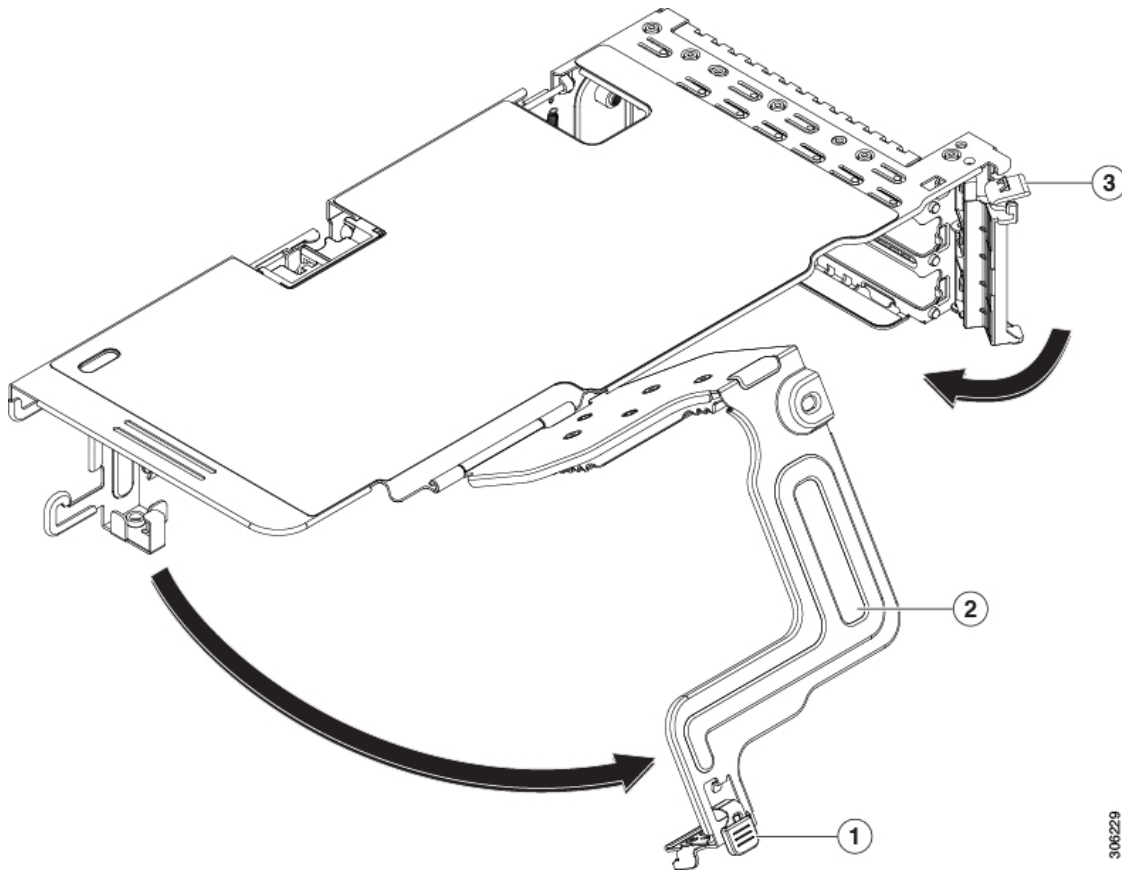
**Step 5** Install a new PCIe card:

- With the hinged card-tab retainer open, align the new PCIe card with the empty socket on the PCIe riser.
- Push down evenly on both ends of the card until it is fully seated in the socket.
- Ensure that the card's rear panel tab sits flat against the riser rear-panel opening and then close the hinged card-tab retainer over the card's rear-panel tab.
- Swing the hinged securing plate closed on the bottom of the riser. Ensure that the clip on the plate clicks into the locked position.
- Position the PCIe riser over its socket on the motherboard and over the chassis alignment channels.
- Carefully push down on both ends of the PCIe riser to fully engage its connector with the sockets on the motherboard.

**Step 6** Replace the top cover to the server.

**Step 7** Replace the server in the rack, replace cables, and then fully power on the server by pressing the Power button.

Figure 29: PCIe Riser Card Securing Mechanisms



306229

1	Release latch on hinged securing plate	3	Hinged card-tab retainer
2	Hinged securing plate	-	

## Cisco Virtual Interface Card (VIC) Considerations

This section describes VIC card support and special considerations for this server.



**Note** If you use the *Cisco Card* NIC mode, you must also make a *VIC Slot* setting that matches where your VIC is installed. The options are Riser1, Riser2, and mLOM. See [NIC Mode and NIC Redundancy Settings](#) for more information about NIC modes.

Table 12: VIC Support and Considerations in This Server

VIC	How Many Supported in Server	Slots That Support VICs	Primary Slot For <i>Cisco Card</i> NIC Mode	Minimum Cisco IMC Firmware
Cisco HX VIC 1467 HX-M-V25-04	1 mLOM	mLOM	mLOM	4.2(1)
Cisco HX VIC 1477 HX-M-V100-04	1 mLOM	mLOM	mLOM	4.2(1)
Cisco HX VIC 1455 HX-PCIE-C25Q-04	2 PCIe	Riser 1 PCIe slot 1 and 2 Riser 2 PCIe slot 4 and 5	Riser 1 PCIe slot 2 Riser 2 PCIe slot 5  <b>Note</b> Cisco PCIe VICs can be installed in slots 1 and 4 if GPUs are installed in slots 2 and 5.	4.2(1)
Cisco HX VIC 1495 HX-PCIE-C100-04	2 PCIe	Riser 1 PCIe slot 1 and 2 Riser 2 PCIe slot 4 and 5	Riser 1 PCIe slot 2 Riser 2 PCIe slot 5  <b>Note</b> Cisco PCIe VICs can be installed in slots 1 and 4 if GPUs are installed in slots 2 and 5.	4.2(1)

- If the server does not have any VIC card, the default NIC mode is set to **Dedicated mode** and NIC redundancy is set to **None**. If the server has a VIC card, the NIC mode is set to **Cisco Card mode** and the NIC redundancy is set to **Active-Active**.

VIC precedence first goes to MLOM, then Riser 1 and then Riser 2.

- A total of 3 VICs are supported in the server: Two PCIe slots and one mLOM slot.




---

**Note** Single wire management is supported on only one VIC at a time. If multiple VICs are installed on a server, only one slot has NCSI enabled at a time. For single wire management, priority goes to the MLOM slot, then slot 2, then slot 5 for NCSI management traffic. When multiple cards are installed, connect the single-wire management cables in the priority order mentioned above.

---

- The primary slot for a VIC card in PCIe riser 1 is slot 2. The secondary slot for a VIC card in PCIe riser 1 is slot 1.




---

**Note** The NCSI protocol is supported in only one slot at a time in each riser. If a GPU card is present in slot 2, NCSI automatically shifts from slot 2 to slot 1.

---

- The primary slot for a VIC card in PCIe Riser 2 is slot 5. The secondary slot for a VIC card in PCIe riser 2 is slot 4.




---

**Note** The NCSI protocol is supported in only one slot at a time in each riser. If a GPU card is present in slot 5, NCSI automatically shifts from slot 5 to slot 4.

---




---

**Note** PCIe riser 2 is not available in a single-CPU system.

---

- In a single CPU configuration, only a single plug-in PCIe VIC card may be installed in slots 1, 2, or 3 of riser 1.

## Replacing an mLOM Card

The server supports a modular LOM (mLOM) card to provide additional rear-panel connectivity. The mLOM socket is on the motherboard, under PCIe Riser 1.

The mLOM socket provides a Gen-3 and Gen-4 x16 PCIe lane. The socket remains powered when the server is in 12 V standby power mode and it supports the network communications services interface (NCSI) protocol.




---

**Note** If your mLOM card is a Cisco HyperFlex Virtual Interface Card (VIC), see [Cisco Virtual Interface Card \(VIC\) Considerations, on page 51](#) for more information and support details.

---

**Step 1** Remove any existing mLOM card (or a blanking panel):

- Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 7](#).
- Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

**Caution** If you cannot safely view and access the component, remove the server from the rack.

- Remove the top cover from the server as described in [Removing the Server Top Cover, on page 8](#).
- Remove PCIe Riser 1 to provide clearance to the mLOM socket on the motherboard. See [Replacing a PCIe Riser, on page 46](#).
- Loosen the single captive thumbscrew that secures the mLOM card to the threaded standoff on the chassis floor.
- Slide the mLOM card horizontally to free it from the socket, then lift it out of the server.

**Step 2** Install a new mLOM card:

- a) Set the mLOM card on the chassis floor so that its connector is aligned with the motherboard socket.
- b) Push the card horizontally to fully engage the card's edge connector with the socket.
- c) Tighten the captive thumbscrew to secure the card to the chassis floor.
- d) Return the storage controller card to the server. See [Replacing a SAS Storage Controller Card \(RAID or HBA\)](#), on page 54.
- e) Replace the top cover to the server.
- f) Replace the server in the rack, replace cables, and then fully power on the server by pressing the Power button.

## Replacing a SAS Storage Controller Card (RAID or HBA)

For hardware-based storage control, the server can use a Cisco modular SAS RAID controller or SAS HBA that plugs into a dedicated, vertical socket on the motherboard.

### Storage Controller Card Firmware Compatibility

Firmware on the storage controller (RAID or HBA) must be verified for compatibility with the current Cisco IMC and BIOS versions that are installed on the server. If not compatible, upgrade or downgrade the storage controller firmware using the Host Upgrade Utility (HUU) for your firmware release to bring it to a compatible level.



**Note** For servers running in standalone mode only: After you replace controller hardware (HX-RAID-M6HD and HX-SAS-M6HD), you must run the Cisco UCS Host Upgrade Utility (HUU) to update the controller firmware, even if the firmware Current Version is the same as the Update Version. This is necessary to program the controller's suboem-id to the correct value for the server SKU. If you do not do this, drive enumeration might not display correctly in the software.

See the HUU guide for your Cisco IMC release for instructions on downloading and using the utility to bring server components to compatible levels: [HUU Guides](#).

## Replacing a SAS Storage Controller Card (RAID or HBA)

The chassis includes a plastic mounting bracket that the card must be attached to before installation.

**Step 1** Prepare the server for component installation:

- a) Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server](#), on page 7.
- b) Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

**Caution** If you cannot safely view and access the component, remove the server from the rack.

- c) Remove the top cover from the server as described in [Removing the Server Top Cover](#), on page 8.

**Step 2** Remove any existing storage controller card from the server:

**Note** The chassis includes a plastic mounting bracket that the card must be attached to before installation. During replacement, you must remove the old card from the bracket and then install the new card to the bracket before installing this assembly to the server.

- a) Disconnect SAS/SATA cables and any Supercap cable from the existing card.
- b) Lift up on the card's blue ejector lever to unseat it from the motherboard socket.
- c) Lift straight up on the card's carrier frame to disengage the card from the motherboard socket and to disengage the frame from two pegs on the chassis wall.
- d) Remove the existing card from its plastic carrier bracket. Carefully push the retainer tabs aside and then lift the card from the bracket.

**Step 3** Install a new storage controller card:

- a) Install the new card to the plastic carrier bracket. Make sure that the retainer tabs close over the edges of the card.
- b) Position the assembly over the chassis and align the card edge with the motherboard socket. At the same time, align the two slots on the back of the carrier bracket with the pegs on the chassis inner wall.
- c) Push on both corners of the card to seat its connector in the riser socket. At the same time, ensure that the slots on the carrier frame engage with the pegs on the inner chassis wall.
- d) Fully close the blue ejector lever on the card to lock the card into the socket.
- e) Connect SAS/SATA cables and any Supercap cable to the new card.

If this is a first-time installation, see [Storage Controller Cable Connectors and Backplanes](#) for cabling instructions.

**Step 4** Replace the top cover to the server.

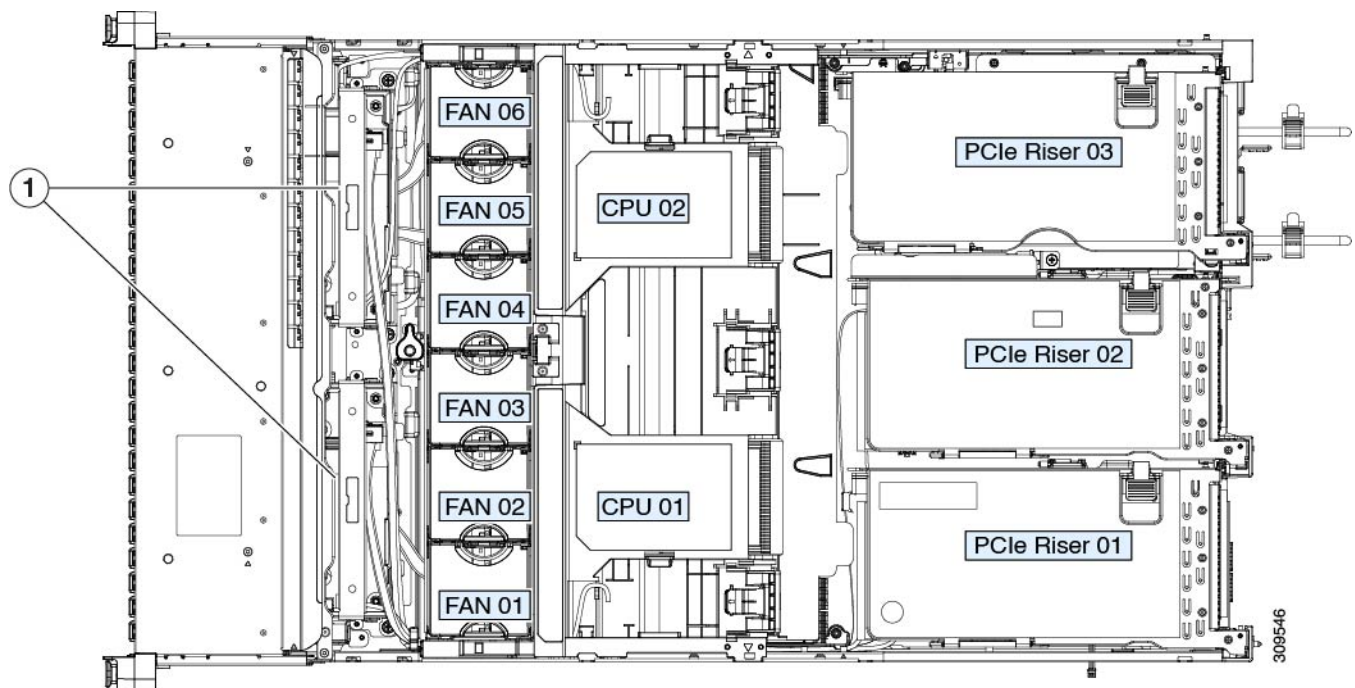
**Step 5** Replace the server in the rack, replace cables, and then fully power on the server by pressing the Power button.

**Step 6** If your server is running in standalone mode, use the Cisco HyperFlex Host Upgrade Utility to update the controller firmware and program the correct suboem-id for the controller.

**Note** **For servers running in standalone mode only:** After you replace controller hardware (HX-RAID-M6HD and HX-SAS-M6HD), you must run the Cisco HyperFlex Host Upgrade Utility (HUU) to update the controller firmware, even if the firmware Current Version is the same as the Update Version. This is necessary to program the controller's suboem-id to the correct value for the server SKU. If you do not do this, drive enumeration might not display correctly in the software. This issue does not affect servers controlled in UCSM mode.

See the HUU guide for your Cisco IMC release for instructions on downloading and using the utility to bring server components to compatible levels: [HUU Guides](#).

Figure 30: Replacing a Storage Controller Card



1	Blue ejector lever on card top edge	2	Pegs on inner chassis wall (two)
---	-------------------------------------	---	----------------------------------

## Replacing the Supercap (RAID Backup)

This server supports installation of one Supercap unit. The unit mounts to a bracket on the removable air baffle.

The Supercap provides approximately three years of backup for the disk write-back cache DRAM in the case of a sudden power loss by offloading the cache to the NAND flash.

**Step 1** Prepare the server for component installation:

- a) Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 7](#).
- b) Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

**Caution** If you cannot safely view and access the component, remove the server from the rack.

- c) Remove the top cover from the server as described in [Removing the Server Top Cover, on page 8](#).

**Step 2** Remove an existing Supercap:

- a) Disconnect the Supercap cable from the existing Supercap.
- b) Push aside the securing tab that holds the Supercap to its bracket on the air baffle.



- c) Lift the Supercap free of the bracket and set it aside.

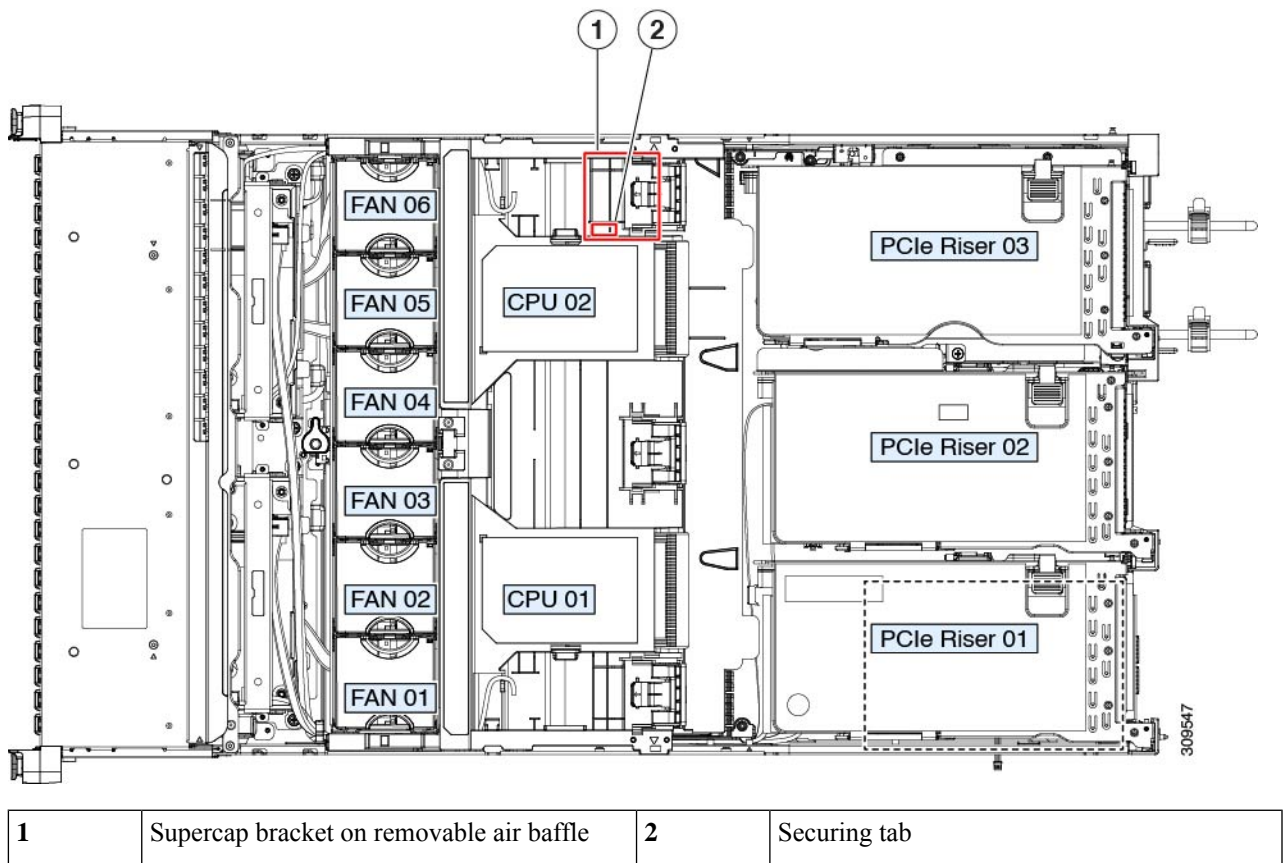
**Step 3** Install a new Supercap:

- a) Set the new Supercap into the mounting bracket.
- b) Push aside the black plastic tab on the air baffle and set the Supercap into the bracket. Relax the tab so that it closes over the top edge of the Supercap.
- c) Connect the Supercap cable from the RAID controller card to the connector on the Supercap cable.

**Step 4** Replace the top cover to the server.

**Step 5** Replace the server in the rack, replace cables, and then fully power on the server by pressing the Power button.

*Figure 31: Supercap Bracket on Air Baffle*



1	Supercap bracket on removable air baffle	2	Securing tab
---	--	---	--------------

## Replacing a Boot-Optimized M.2 RAID Controller Module

The Cisco Boot-Optimized M.2 RAID Controller module connects to the mini-storage module socket on the motherboard. It includes slots for two SATA M.2 drives that can control the SATA M.2 drives in a RAID 1 array and JBOD mode.

## Cisco Boot-Optimized M.2 RAID Controller Considerations

Review the following considerations:



---

**Note** The Cisco Boot-Optimized M.2 RAID Controller is not supported when the server is used as a compute-only node in Cisco HyperFlex configurations.

---

- The minimum version of Cisco IMC that support this controller is 4.1(1) and later.
- This controller supports RAID 1 (single volume) and JBOD mode.



---

**Note** Do not use the server's embedded SW MegaRAID controller to configure RAID settings when using this controller module. Instead, you can use the following interfaces:

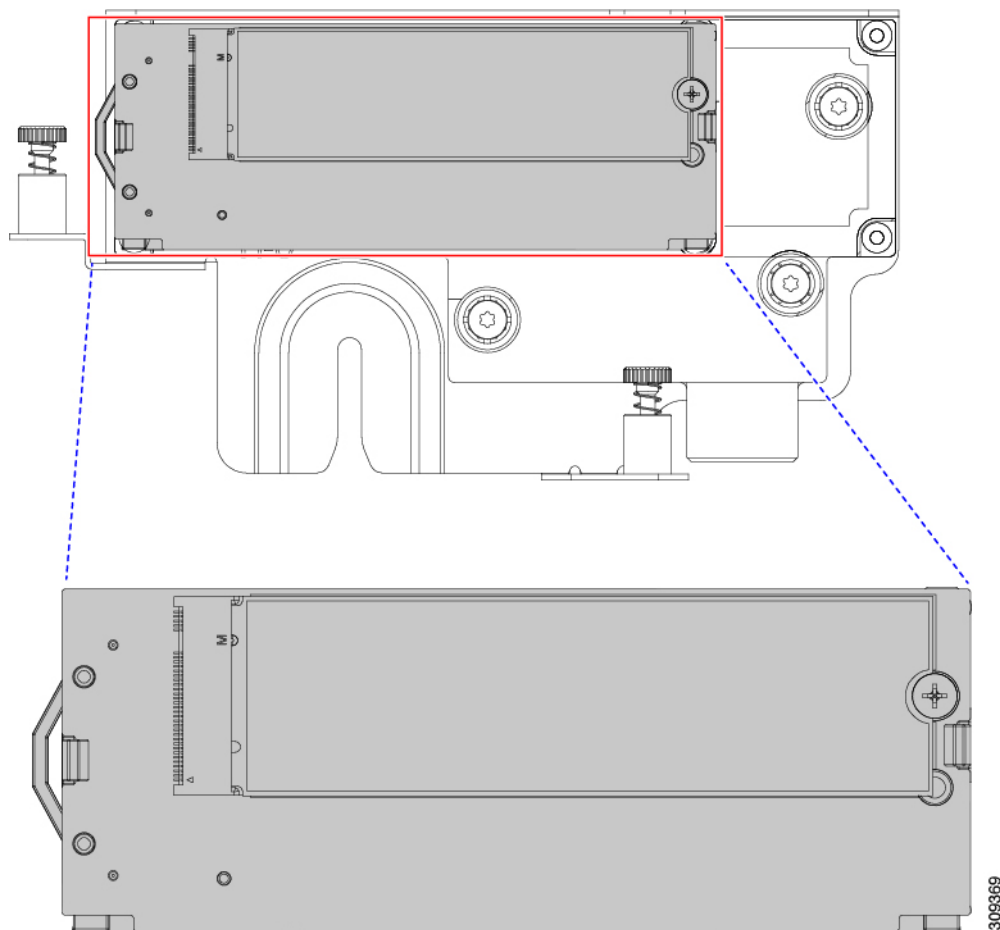
- Cisco IMC 4.1(1) and later
  - BIOS HII utility, BIOS 4.1(1) and later
- 
- A SATA M.2 drive in slot 1 (the top) is the first SATA device; a SATA M.2 drive in slot 2 (the underside) is the second SATA device.
    - The name of the controller in the software is HX-M2-HWRAID.
    - A drive in Slot 1 is mapped as drive 253; a drive in slot 2 is mapped as drive 254.
  - When using RAID, we recommend that both SATA M.2 drives are the same capacity. If different capacities are used, the smaller capacity of the two drives is used to create a volume and the rest of the drive space is unusable.
  - Hot-plug replacement is *not* supported. The server must be powered off.
  - Monitoring of the controller and installed SATA M.2 drives can be done using Cisco IMC. They can also be monitored using other utilities such as UEFI HII, PMCLI, XMLAPI, and Redfish.
  - Updating firmware of the controller and the individual drives:
    - For standalone servers, use the Cisco Host Upgrade Utility (HUU). Refer to the [HUU Documentation](#).
  - The SATA M.2 drives can boot in UEFI mode only. Legacy boot mode is not supported.
  - If you replace a single SATA M.2 drive that was part of a RAID volume, rebuild of the volume is auto-initiated after the user accepts the prompt to import the configuration. If you replace both drives of a volume, you must create a RAID volume and manually reinstall any OS.
  - We recommend that you erase drive contents before creating volumes on used drives from another server. The configuration utility in the server BIOS includes a SATA secure-erase function.
  - The server BIOS includes a configuration utility specific to this controller that you can use to create and delete RAID volumes, view controller properties, and erase the physical drive contents. Access the utility

by pressing **F2** when prompted during server boot. Then navigate to **Advanced > Cisco Boot Optimized M.2 RAID Controller**.

## Replacing a Cisco Boot-Optimized M.2 RAID Controller

This topic describes how to remove and replace a Cisco Boot-Optimized M.2 RAID Controller. The controller board has one M.2 socket on its top (Slot 1) and one M.2 socket on its underside (Slot 2).

- 
- Step 1** Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 7](#).
- Step 2** Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.
- Caution** If you cannot safely view and access the component, remove the server from the rack.
- Step 3** Remove the top cover from the server as described in [Removing the Server Top Cover, on page 8](#).
- Step 4** Remove a controller from its motherboard socket:
- Locate the controller in its socket between PCIe Riser 2 and 3.
  - Using a #2 Phillips screwdriver, loosen the captive screws and remove the M.2 module.
  - At each end of the controller board, push outward on the clip that secures the carrier.
  - Lift both ends of the controller to disengage it from the carrier.



e) Set the carrier on an anti-static surface.

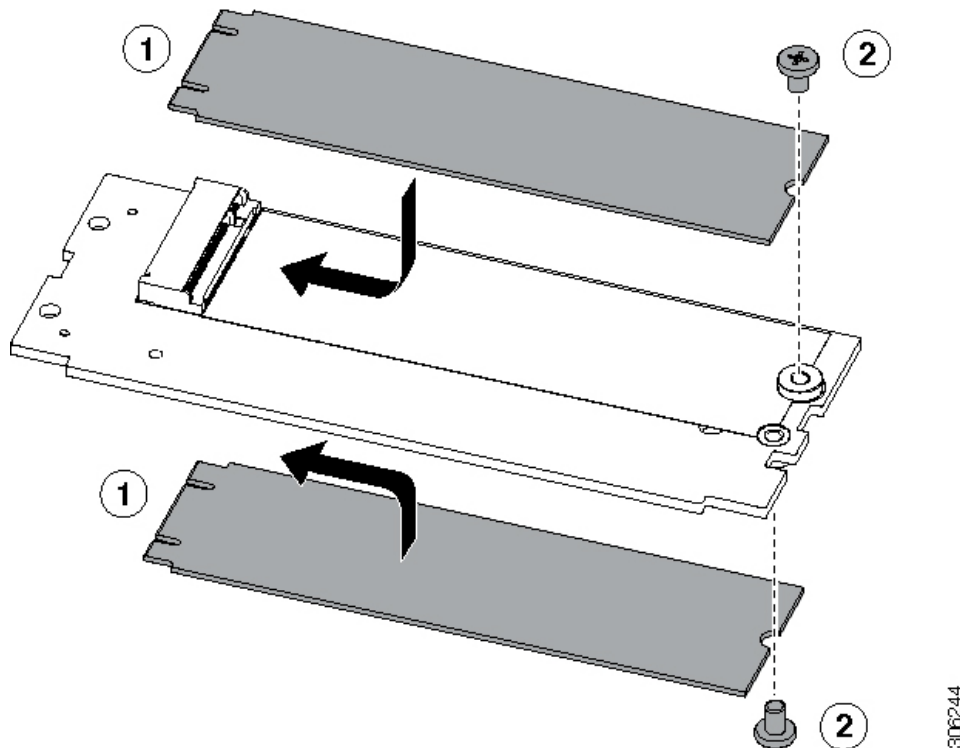
### Step 5

If you are transferring SATA M.2 drives from the old controller to the replacement controller, do that before installing the replacement controller:

**Note** Any previously configured volume and data on the drives are preserved when the M.2 drives are transferred to the new controller. The system will boot the existing OS that is installed on the drives.

- a) Use a #1 Phillips-head screwdriver to remove the single screw that secures the M.2 drive to the carrier.
- b) Lift the M.2 drive from its socket on the carrier.
- c) Position the replacement M.2 drive over the socket on the controller board.
- d) Angle the M.2 drive downward and insert the connector-end into the socket on the carrier. The M.2 drive's label must face up.
- e) Press the M.2 drive flat against the carrier.
- f) Install the single screw that secures the end of the M.2 SSD to the carrier.
- g) Turn the controller over and install the second M.2 drive.

Figure 32: Cisco Boot-Optimized M.2 RAID Controller, Showing M.2 Drive Installation



**Step 6**

Install the controller to its socket on the motherboard:

- a) Position the controller over the socket, with the controller's connector facing down and at the same end as the motherboard socket. Two alignment pegs must match with two holes on the controller.
- b) Gently push down the socket end of the controller so that the two pegs go through the two holes on the controller.
- c) Push down on the controller so that the securing clips click over it at both ends.

**Step 7**

Replace the top cover to the server.

**Step 8**

Replace the server in the rack, replace cables, and then fully power on the server by pressing the Power button.

## Replacing a Chassis Intrusion Switch

The chassis intrusion switch is an optional security feature that logs an event in the system event log (SEL) whenever the cover is removed from the chassis.

**Step 1**

Prepare the server for component installation:

- a) Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 7](#).
- b) Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

**Caution** If you cannot safely view and access the component, remove the server from the rack.

- c) Remove the top cover from the server as described in [Removing the Server Top Cover, on page 8](#).

**Step 2** Remove an existing intrusion switch:

- Disconnect the intrusion switch cable from the socket on the motherboard.
- Use a #1 Phillips-head screwdriver to loosen and remove the single screw that holds the switch mechanism to the chassis wall.
- Slide the switch mechanism straight up to disengage it from the clips on the chassis.

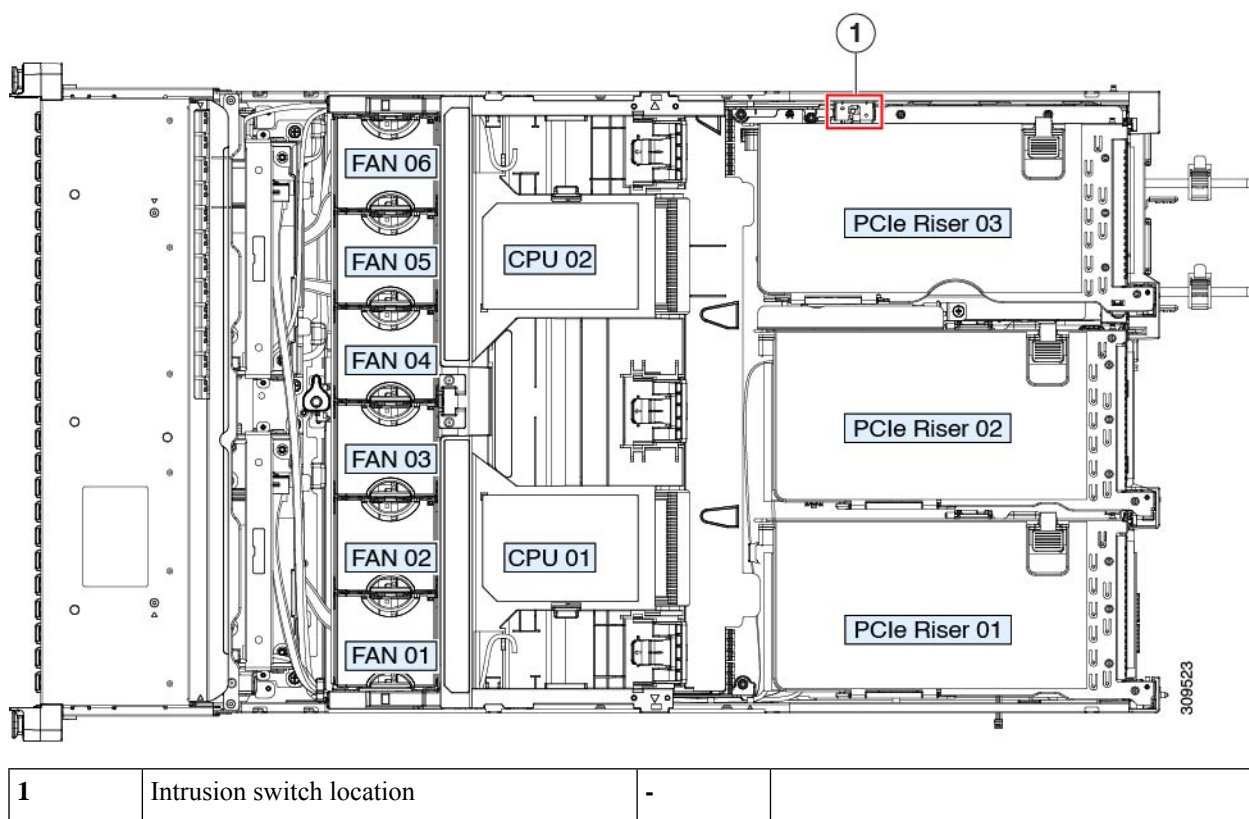
**Step 3** Install a new intrusion switch:

- Slide the switch mechanism down into the clips on the chassis wall so that the screw holes line up.
- Use a #1 Phillips-head screwdriver to install the single screw that secures the switch mechanism to the chassis wall.
- Connect the switch cable to the socket on the motherboard.

**Step 4** Replace the cover to the server.

**Step 5** Replace the server in the rack, replace cables, and then fully power on the server by pressing the Power button.

**Figure 33: Replacing a Chassis Intrusion Switch**



## Installing a Trusted Platform Module (TPM)

The trusted platform module (TPM) is a small circuit board that plugs into a motherboard socket and is then permanently secured with a one-way screw. The socket location is on the motherboard below PCIe riser 2.

## TPM Considerations

- This server supports either TPM version 1.2 or TPM version 2.0.
- Field replacement of a TPM is not supported; you can install a TPM after-factory only if the server does not already have a TPM installed.
- If there is an existing TPM 1.2 installed in the server, you cannot upgrade to TPM 2.0. If there is no existing TPM in the server, you can install TPM 2.0.
- If the TPM 2.0 becomes unresponsive, reboot the server.

## Installing and Enabling a TPM



---

**Note** Field replacement of a TPM is not supported; you can install a TPM after-factory only if the server does not already have a TPM installed.

---

This topic contains the following procedures, which must be followed in this order when installing and enabling a TPM:

1. Installing the TPM Hardware
2. Enabling the TPM in the BIOS
3. Enabling the Intel TXT Feature in the BIOS

## Installing TPM Hardware



---

**Note** For security purposes, the TPM is installed with a one-way screw. It cannot be removed with a standard screwdriver.

---

### Step 1

Prepare the server for component installation:

- a) Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 7](#).
- b) Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

**Caution** If you cannot safely view and access the component, remove the server from the rack.

- c) Remove the top cover from the server as described in [Removing the Server Top Cover, on page 8](#).

### Step 2

Remove PCIe riser 2 from the server to provide clearance to the TPM socket on the motherboard.

### Step 3

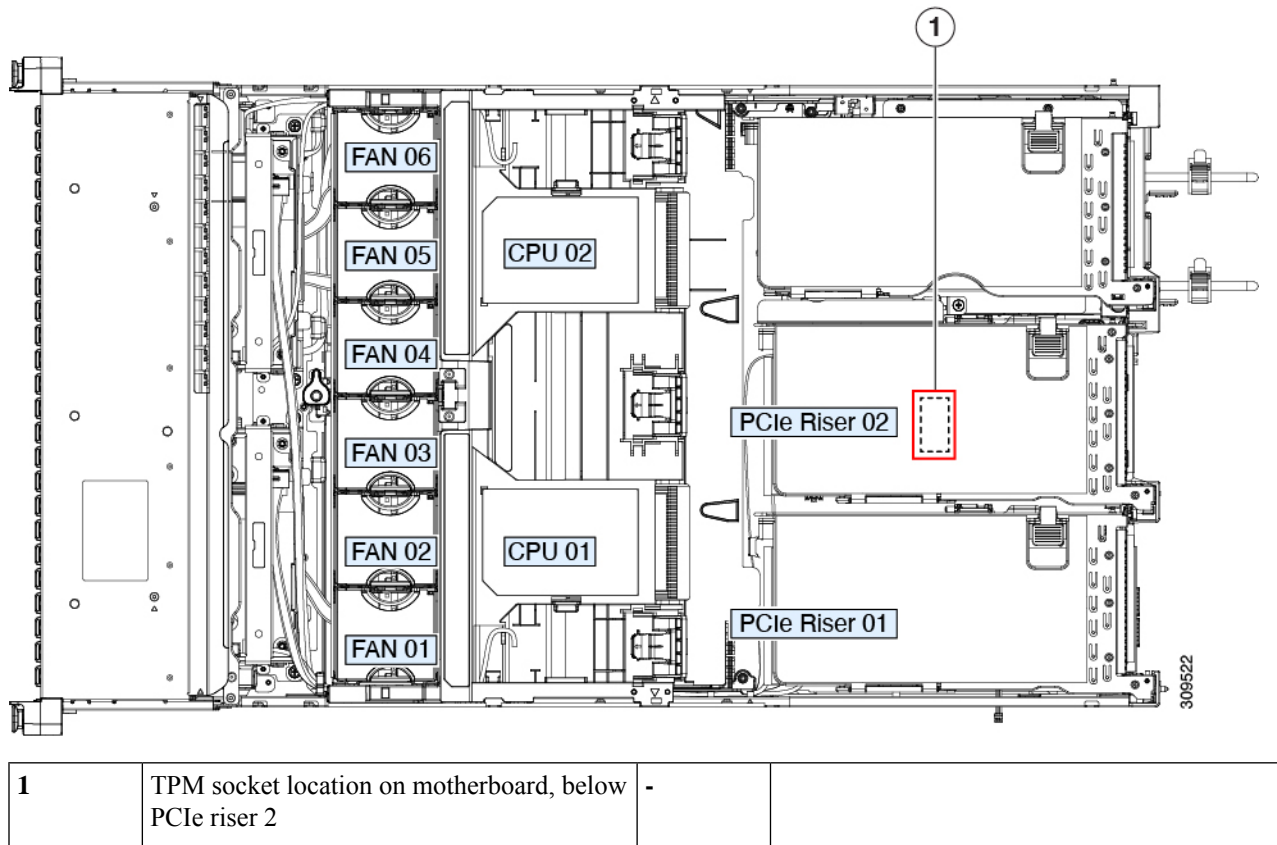
Install a TPM:

- a) Locate the TPM socket on the motherboard.
- b) Align the connector that is on the bottom of the TPM circuit board with the motherboard TPM socket. Align the screw hole on the TPM board with the screw hole that is adjacent to the TPM socket.

- c) Push down evenly on the TPM to seat it in the motherboard socket.
- d) Install the single one-way screw that secures the TPM to the motherboard.

- Step 4** Replace PCIe riser 2 to the server. See [Replacing a PCIe Riser](#), on page 46.
- Step 5** Replace the cover to the server.
- Step 6** Replace the server in the rack, replace cables, and then fully power on the server by pressing the Power button.
- Step 7** Continue with [Enabling the TPM in the BIOS](#), on page 64.

*Figure 34: Location of the TPM Socket*



## Enabling the TPM in the BIOS

After hardware installation, you must enable TPM support in the BIOS.



**Note** You must set a BIOS Administrator password before performing this procedure. To set this password, press the **F2** key when prompted during system boot to enter the BIOS Setup utility. Then navigate to **Security > Set Administrator Password** and enter the new password twice as prompted.

- Step 1** Enable TPM Support:



- a) Watch during bootup for the F2 prompt, and then press **F2** to enter BIOS setup.
- b) Log in to the BIOS Setup Utility with your BIOS Administrator password.
- c) On the BIOS Setup Utility window, choose the **Advanced** tab.
- d) Choose **Trusted Computing** to open the TPM Security Device Configuration window.
- e) Change TPM SUPPORT to **Enabled**.
- f) Press **F10** to save your settings and reboot the server.

**Step 2** Verify that TPM support is now enabled:

- a) Watch during bootup for the F2 prompt, and then press **F2** to enter BIOS setup.
- b) Log into the BIOS Setup utility with your BIOS Administrator password.
- c) Choose the **Advanced** tab.
- d) Choose **Trusted Computing** to open the TPM Security Device Configuration window.
- e) Verify that TPM SUPPORT and TPM State are Enabled.

---

## Removing the PCB Assembly (PCBA)

The PCBA is secured to the server's sheet metal. You must disconnect the PCBA from the tray before recycling the PCBA. The PCBA is secured by different types of fasteners.

### Before you begin



---

**Note** **For Recyclers Only!** This procedure is not a standard field-service option. This procedure is for recyclers who will be reclaiming the electronics for proper disposal to comply with local eco design and e-waste regulations.

---

To remove the printed circuit board assembly (PCBA), the following requirements must be met:

- The server must be disconnected from facility power.
- The server must be removed from the equipment rack.
- The server's top cover must be removed. See [Removing the Server Top Cover, on page 8](#).

Following tools are required:

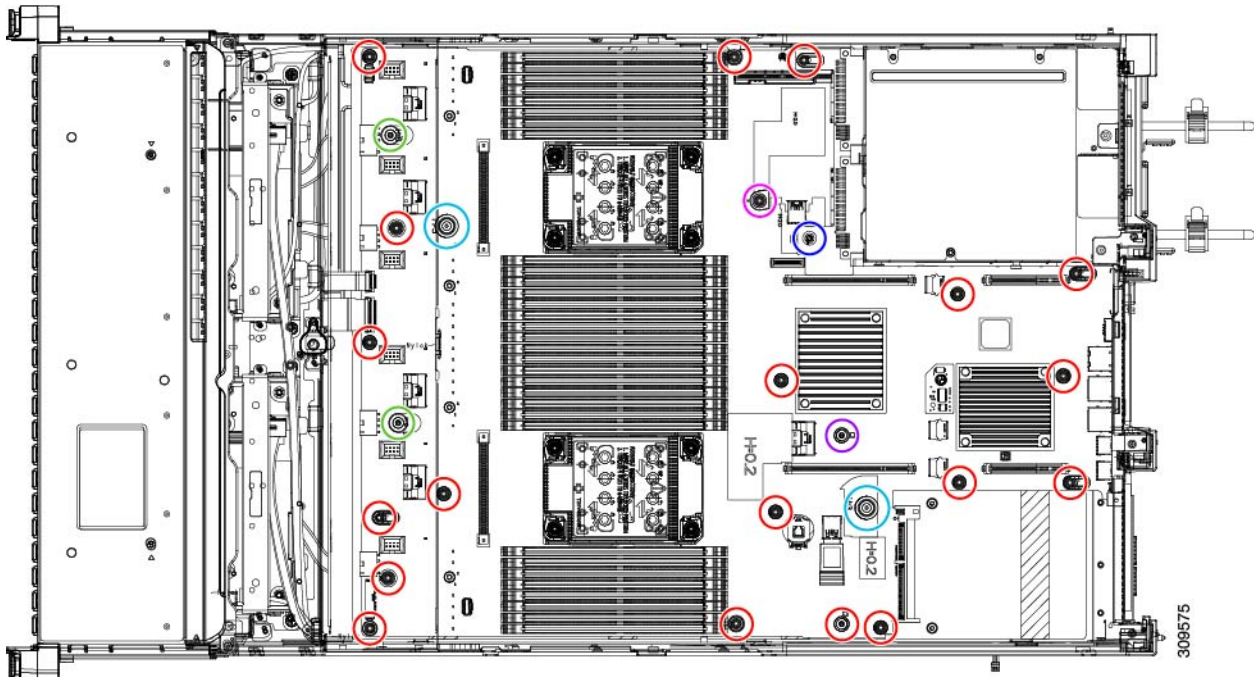
- Pliers
- T10 Torx screwdriver
- #2 Phillips screwdriver

---

**Step 1** Locate the PCBA's mounting screws.

The following figure shows the location of the mounting screws and fasteners.

Figure 35: Screw Locations for Removing the HX C245 M6 PCBA



- Torx T10 - Torque : 10.0 kgf-cm (8.68 in-lbs)
- Torx T10 - Torque : 5.0 kgf-cm (4.34 in-lbs)
- Special fixture - Torque : 10.0 kgf-cm (8.68 in-lbs)
- Special fixture - Torque : 10.0 kgf-cm (8.68 in-lbs)
- #2 PILLIPS (On PSU air duct) - Torque : 5.0 kgf-cm (4.34 in-lbs)
- #2 PILLIPS (On M.2 riser cage) - Torque : 5.0 kgf-cm (4.34 in-lbs)

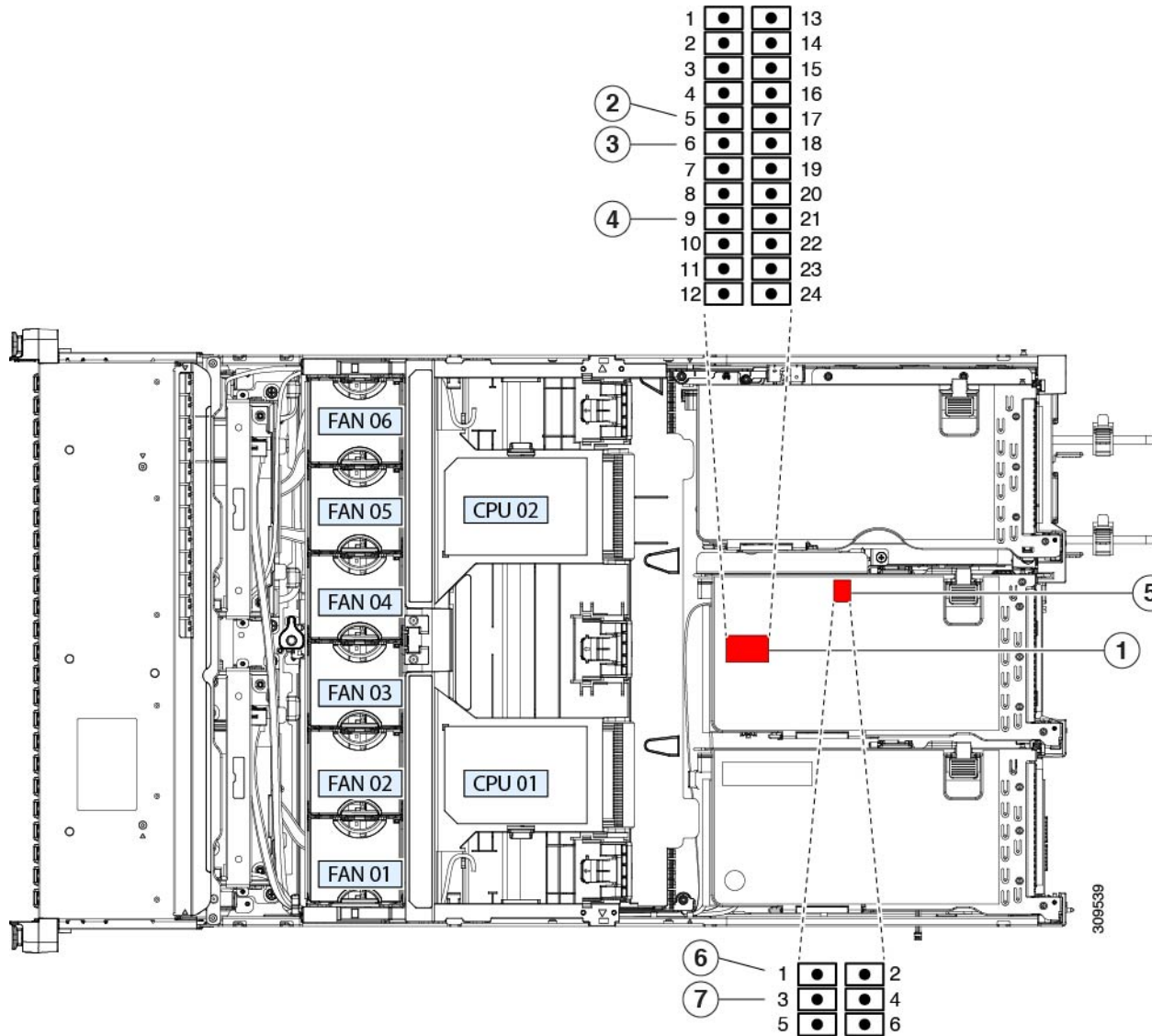
**Step 2** Using the appropriate tools, remove the screws.

**Step 3** Remove the PCBA from the sheetmetal and dispose of each in compliance with your local ewaste and recycling regulations.

## Service Headers and Jumpers

This server includes two blocks of headers (SW4, CN4) that you can jumper for certain service and debug functions.

Figure 36: Location of Service Header Blocks SW4 and CN4



309539

<b>1</b>	Location of header block SW4	<b>5</b>	Location of header block CN4
<b>2</b>	Recover BIOS: SW4 pins 5 - 17 off: Normal; ON: recovery mode	<b>6</b>	Boot Cisco IMC from alternate image: CN4 pins 1 - 2
<b>3</b>	Clear BIOS password: SW4 pins 6 - 18 off: normal; ON: clear	<b>7</b>	System Firmware Secure Erase: CN4 pins 3 - 4
<b>4</b>	Clear CMOS: SW pins 9 - 21 Off: normal; ON: clear		

## Using the BIOS Recovery Header (SW4, Pins 5 - 17)

Depending on which stage the BIOS becomes corrupted, you might see different behavior.

- If the BIOS BootBlock is corrupted, you might see the system get stuck on the following message:

```
Initializing and configuring memory/hardware
```

- If it is a non-BootBlock corruption, a message similar to the following is displayed:

```
****BIOS FLASH IMAGE CORRUPTED****
Flash a valid BIOS capsule file using Cisco IMC WebGUI or CLI interface.
IF Cisco IMC INTERFACE IS NOT AVAILABLE, FOLLOW THE STEPS MENTIONED BELOW.
1. Connect the USB stick with bios.cap file in root folder.
2. Reset the host.
IF THESE STEPS DO NOT RECOVER THE BIOS
1. Power off the system.
2. Mount recovery jumper.
3. Connect the USB stick with bios.cap file in root folder.
4. Power on the system.
Wait for a few seconds if already plugged in the USB stick.
REFER TO SYSTEM MANUAL FOR ANY ISSUES.
```




---

**Note** As indicated by the message shown above, there are two procedures for recovering the BIOS. Try procedure 1 first. If that procedure does not recover the BIOS, use procedure 2.

---

### Procedure 1: Reboot With bios.cap Recovery File

**Step 1** Download the BIOS update package and extract it to a temporary location.

**Step 2** Copy the contents of the extracted recovery folder to the root directory of a USB drive. The recovery folder contains the bios.cap file that is required in this procedure.

**Note** The bios.cap file must be in the root directory of the USB drive. Do not rename this file. The USB drive must be formatted with either the FAT16 or FAT32 file system.

**Step 3** Insert the USB drive into a USB port on the server.

**Step 4** Reboot the server.

**Step 5** Return the server to main power mode by pressing the Power button on the front panel.

The server boots with the updated BIOS boot block. When the BIOS detects a valid bios.cap file on the USB drive, it displays this message:

```
Found a valid recovery file...Transferring to Cisco IMC
System would flash the BIOS image now...
System would restart with recovered image after a few seconds...
```

**Step 6** Wait for server to complete the BIOS update, and then remove the USB drive from the server.

**Note** During the BIOS update, Cisco IMC shuts down the server and the screen goes blank for about 10 minutes. Do not unplug the power cords during this update. Cisco IMC powers on the server after the update is complete.

---

## Procedure 2: Use BIOS Recovery Header and bios.cap File

---

- Step 1** Download the BIOS update package and extract it to a temporary location.
- Step 2** Copy the contents of the extracted recovery folder to the root directory of a USB drive. The recovery folder contains the bios.cap file that is required in this procedure.
- Note** The bios.cap file must be in the root directory of the USB drive. Do not rename this file. The USB drive must be formatted with either the FAT16 or FAT32 file system.
- Step 3** Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 7](#). Disconnect power cords from all power supplies.
- Step 4** Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.
- Caution** If you cannot safely view and access the component, remove the server from the rack.
- Step 5** Remove the top cover from the server as described in [Removing the Server Top Cover, on page 8](#).
- Step 6** Install a two-pin jumper across SW4 pins 5 and 17.
- Step 7** Reconnect AC power cords to the server. The server powers up to standby power mode.
- Step 8** Insert the USB thumb drive that you prepared in Step 2 into a USB port on the server.
- Step 9** Return the server to main power mode by pressing the Power button on the front panel.
- The server boots with the updated BIOS boot block. When the BIOS detects a valid bios.cap file on the USB drive, it displays this message:
- ```
Found a valid recovery file...Transferring to Cisco IMC
System would flash the BIOS image now...
System would restart with recovered image after a few seconds...
```
- Step 10** Wait for server to complete the BIOS update, and then remove the USB drive from the server.
- Note** During the BIOS update, Cisco IMC shuts down the server and the screen goes blank for about 10 minutes. Do not unplug the power cords during this update. Cisco IMC powers on the server after the update is complete.
- Step 11** After the server has fully booted, power off the server again and disconnect all power cords.
- Step 12** Remove the jumper that you installed.
- Note** If you do not remove the jumper, after recovery completion you see the prompt, “Please remove the recovery jumper.”
- Step 13** Replace the top cover, replace the server in the rack, replace power cords and any other cables, and then power on the server by pressing the Power button.
- 

## Using the Clear BIOS Password Header (SW4, Pins 6 - 18)

You can use this switch to clear the administrator password.

---

- Step 1** Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 7](#). Disconnect power cords from all power supplies.

- Step 2** Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.
- Caution** If you cannot safely view and access the component, remove the server from the rack.
- Step 3** Remove the top cover from the server as described in [Removing the Server Top Cover, on page 8](#).
- Step 4** Install a two-pin jumper across SW4 pins 6 and 18.
- Step 5** Reinstall the top cover and reconnect AC power cords to the server. The server powers up to standby power mode, indicated when the Power LED on the front panel is amber.
- Step 6** Return the server to main power mode by pressing the Power button on the front panel. The server is in main power mode when the Power LED is green.
- Note** You must allow the entire server to reboot to main power mode to complete the reset. The state of the jumper cannot be determined without the host CPU running.
- Step 7** Press the Power button to shut down the server to standby power mode, and then remove AC power cords from the server to remove all power.
- Step 8** Remove the top cover from the server.
- Step 9** Remove the jumper that you installed.
- Note** If you do not remove the jumper, the password is cleared every time you power-cycle the server.
- Step 10** Replace the top cover, replace the server in the rack, replace power cords and any other cables, and then power on the server by pressing the Power button.

---

## Using the Clear CMOS Header (SW4, Pins 9 - 21)

You can use this switch to clear the server's CMOS settings in the case of a system hang. For example, if the server hangs because of incorrect settings and does not boot, use this jumper to invalidate the settings and reboot with defaults.




---

**Caution** Clearing the CMOS removes any customized settings and might result in data loss. Make a note of any necessary customized settings in the BIOS before you use this clear CMOS procedure.

---

- Step 1** Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 7](#).
- Step 2** Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.
- Caution** If you cannot safely view and access the component, remove the server from the rack.
- Step 3** Remove the top cover from the server as described in [Removing the Server Top Cover, on page 8](#).
- Step 4** To clear the CMOS, SW4, Pins 9-21 need to be in **ON** position for 5-10 seconds and reverted to **OFF** position.
- Step 5** Reinstall the top cover and reconnect AC power cords to the server. The server powers up to standby power mode, indicated when the Power LED on the front panel is amber.
- Step 6** Return the server to main power mode by pressing the Power button on the front panel. The server is in main power mode when the Power LED is green.

**Note** You must allow the entire server to reboot to main power mode to complete the reset. The state of the jumper cannot be determined without the host CPU running.

**Step 7** Press the Power button to shut down the server to standby power mode, and then remove AC power cords from the server to remove all power.

---

## Using the Boot Alternate Cisco IMC Image Header (CN4, Pins 1 - 2)

You can use this Cisco IMC debug header to force the system to boot from an alternate Cisco IMC image.

---

**Step 1** Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 7](#). Disconnect power cords from all power supplies.

**Step 2** Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

**Caution** If you cannot safely view and access the component, remove the server from the rack.

**Step 3** Remove the top cover from the server as described in [Removing the Server Top Cover, on page 8](#).

**Step 4** Install a two-pin jumper across CN4 pins 1 and 2.

**Step 5** Reinstall the top cover and reconnect AC power cords to the server. The server powers up to standby power mode, indicated when the Power LED on the front panel is amber.

**Step 6** Return the server to main power mode by pressing the Power button on the front panel. The server is in main power mode when the Power LED is green.

**Note** When you next log in to Cisco IMC, you see a message similar to the following:

```
'Boot from alternate image' debug functionality is enabled.  
CIMC will boot from alternate image on next reboot or input power cycle.
```

**Note** If you do not remove the jumper, the server will boot from an alternate Cisco IMC image every time that you power cycle the server or reboot Cisco IMC.

**Step 7** To remove the jumper, press the Power button to shut down the server to standby power mode, and then remove AC power cords from the server to remove all power.

**Step 8** Remove the top cover from the server.

**Step 9** Remove the jumper that you installed.

**Step 10** Replace the top cover, replace the server in the rack, replace power cords and any other cables, and then power on the server by pressing the Power button.

---

## Using the System Firmware Secure Erase Header (CN4, Pins 3 - 4)

You can use this Cisco IMC debug header to force the Cisco IMC settings back to the defaults.

---

**Step 1** Shut down and remove power from the server as described in [Shutting Down and Removing Power From the Server, on page 7](#). Disconnect power cords from all power supplies.

- Step 2** Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.
- Caution** If you cannot safely view and access the component, remove the server from the rack.
- Step 3** Remove the top cover from the server as described in [Removing the Server Top Cover, on page 8](#).
- Step 4** Install a two-pin jumper across CN4 pins 3 and 4.
- Step 5** Reinstall the top cover and reconnect AC power cords to the server. The server powers up to standby power mode, indicated when the Power LED on the front panel is amber.
- Step 6** Return the server to main power mode by pressing the Power button on the front panel. The server is in main power mode when the Power LED is green.
- Note** When you next log in to Cisco IMC, you see a message similar to the following:
- ```
'CIMC reset to factory defaults' debug functionality is enabled.  
On input power cycle, CIMC will be reset to factory defaults.
```
- Note** If you do not remove the jumper, the server will reset the Cisco IMC to the default settings every time that you power cycle the server. The jumper has no effect if you reboot Cisco IMC.
- Step 7** To remove the jumper, press the Power button to shut down the server to standby power mode, and then remove AC power cords from the server to remove all power.
- Step 8** Remove the top cover from the server.
- Step 9** Remove the jumper that you installed.
- Step 10** Replace the top cover, replace the server in the rack, replace power cords and any other cables, and then power on the server by pressing the Power button.
-