Cisco UCS C240 Server Installation and Service Guide

Covers Server Generation M3

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Cisco UCS C240 Server Installation and Service Guide
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C O N T E N T S

Preface

This preface describes the audience, organization, and conventions of the *Cisco UCS C240 Server Installation and Service Guide*. It also provides information about how to obtain related documentation.

Related Documentation

The documentation set for the Cisco Unified Computing System (UCS) C-Series rack-mount servers is described in the roadmap document at the following link:

Cisco UCS C-Series Documentation Roadmap

Organization

This guide is organized as follows:

Chapter	Title	Description
Chapter 1	Overview	Provides an overview of the server.
Chapter 2	Installing the Server	Describes how to install the server in a rack, how to cable and power on the server, and how to initially set up the server in standalone mode.
Chapter 3	Maintaining the Server	Describes the server LEDs and buttons, identifies the replaceable components of the server, and describes how to replace them.
Appendix A	Server Specifications	Lists physical, environmental, and power specifications for the server.
Appendix B	Power Cord Specifications	Lists specifications for the supported international power cords.
Appendix C	RAID Controller Considerations	Provides server RAID controller information.
Appendix D	Installation for Cisco UCS Integration	Provides installation and upgrade procedures for installing the server into Unified Computing System (UCS) integration.

Audience

This guide is for experienced network administrators who configure and maintain Cisco servers.

Documentation Feedback

To provide technical feedback on this document, or to report an error or omission, please send your comments to ucs-docfeedback@external.cisco.com. We appreciate your feedback.

Conventions

This document uses the following conventions for notes, cautions, and safety warnings. Notes and cautions contain important information that you should know.

Note Means *reader take note*. Notes contain helpful suggestions or references to material that are not covered in the publication.

Caution Means *reader be careful*. Cautions contain information about something you might do that could result in equipment damage or loss of data.

Safety warnings appear throughout this guide in procedures that, if performed incorrectly, can cause physical injuries. A warning symbol precedes each warning statement.

Warning **IMPORTANT SAFETY INSTRUCTIONS**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

Waarschuwing **BELANGRIJKE VEILIGHEIDSINSTRUCTIES**

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van de standaard praktijken om ongelukken te voorkomen. Gebruik het nummer van de verklaring onderaan de waarschuwing als u een vertaling van de waarschuwing die bij het apparaat wordt geleverd, wilt raadplegen.

BEWAAR DEZE INSTRUCTIES

Varoitus   **TÄRKEITÄ TURVALLISUUSOHJEITA**

Tämä varoitusmerkki merkitsee vaaraa. Tilanne voi aiheuttaa ruumiillisia vammoja. Ennen kuin käsittelet laitteistoa, huomioi sähköpiirien käsittelemiseen liittyvät riskit ja tutustu onnettomuuksien yleisiin ehkäisytapoihin. Turvallisuusvaroitusten käännökset löytyvät laitteen mukana toimitettujen käännettyjen turvallisuusvaroitusten joukosta varoitusten lopussa näkyvien lausuntonumeroiden avulla.

SÄILYTÄ NÄMÄ OHJEET

Attention   **IMPORTANTES INFORMATIONS DE SÉCURITÉ**

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions des avertissements figurant dans les consignes de sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction situé à la fin de chaque avertissement.

CONSERVEZ CES INFORMATIONS

Warnung   **WICHTIGE SICHERHEITSHINWEISE**

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen führen kann. Machen Sie sich vor der Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und den üblichen Verfahren zur Vorbeugung vor Unfällen vertraut. Suchen Sie mit der am Ende jeder Warnung angegebenen Anweisungsnummer nach der jeweiligen Übersetzung in den übersetzten Sicherheitshinweisen, die zusammen mit diesem Gerät ausgeliefert wurden.

BEWAHREN SIE DIESE HINWEISE GUT AUF.

Avvertenza   **IMPORTANTI ISTRUZIONI SULLA SICUREZZA**

Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di intervenire su qualsiasi apparecchiatura, occorre essere al corrente dei pericoli relativi ai circuiti elettrici e conoscere le procedure standard per la prevenzione di incidenti. Utilizzare il numero di istruzione presente alla fine di ciascuna avvertenza per individuare le traduzioni delle avvertenze riportate in questo documento.

CONSERVARE QUESTE ISTRUZIONI

Advarsel   **VIKTIGE SIKKERHETSINSTRUKSJONER**

Dette advarselssymbolet betyr fare. Du er i en situasjon som kan føre til skade på person. Før du begynner å arbeide med noe av utstyret, må du være oppmerksom på farene forbundet med elektriske kretser, og kjenne til standardprosedyrer for å forhindre ulykker. Bruk nummeret i slutten av hver advarsel for å finne oversettelsen i de oversatte sikkerhetsadvarslene som fulgte med denne enheten.

TA VARE PÅ DISSE INSTRUKSJONENE

Aviso   **INSTRUÇÕES IMPORTANTES DE SEGURANÇA**

Este símbolo de aviso significa perigo. Você está em uma situação que poderá ser causadora de lesões corporais. Antes de iniciar a utilização de qualquer equipamento, tenha conhecimento dos perigos envolvidos no manuseio de circuitos elétricos e familiarize-se com as práticas habituais de prevenção de acidentes. Utilize o número da instrução fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham este dispositivo.

GUARDE ESTAS INSTRUÇÕES

¡Advertencia!   **INSTRUCCIONES IMPORTANTES DE SEGURIDAD**

Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Al final de cada advertencia encontrará el número que le ayudará a encontrar el texto traducido en el apartado de traducciones que acompaña a este dispositivo.

GUARDE ESTAS INSTRUCCIONES

Varning!   **VIKTIGA SÄKERHETSANVISNINGAR**

Denna varningssignal signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanliga förfaranden för att förebygga olyckor. Använd det nummer som finns i slutet av varje varning för att hitta dess översättning i de översatta säkerhetsvarningar som medföljer denna anordning.

SPARA DESSA ANVISNINGAR

Figyelem   FONTOS BIZTONSÁGI ELOÍRÁSOK

Ez a figyelmezeto jel veszélyre utal. Sérülésveszélyt rejto helyzetben van. Mielott bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplo figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján keresheto meg.

ORIZZE MEG EZEKET AZ UTASÍTÁSOKAT!

Предупреждение   ВАЖНЫЕ ИНСТРУКЦИИ ПО СОБЛЮДЕНИЮ ТЕХНИКИ БЕЗОПАСНОСТИ

Этот символ предупреждения обозначает опасность. То есть имеет место ситуация, в которой следует опасаться телесных повреждений. Перед эксплуатацией оборудования выясните, каким опасностям может подвергаться пользователь при использовании электрических цепей, и ознакомьтесь с правилами техники безопасности для предотвращения возможных несчастных случаев. Воспользуйтесь номером заявления, приведенным в конце каждого предупреждения, чтобы найти его переведенный вариант в переводе предупреждений по безопасности, прилагаемом к данному устройству.

СОХРАНИТЕ ЭТИ ИНСТРУКЦИИ

警告　重要的安全性说明

此警告符号代表危险。您正处于可能受到严重伤害的工作环境中。在您使用设备开始工作之前，必须充分意识到触电的危险，并熟练掌握防止事故发生的标准工作程序。请根据每项警告结尾提供的声明号码来找到此设备的安全性警告说明的翻译文本。

请保存这些安全性说明

安全上の重要な注意事項

「危険」の意味です。人身事故を予防するための注意事項が記述されています。装置の取り扱い作業を行うときは、電気回路の危険性に注意し、一般的な事故防止策に留意してください。警告の各国語版は、各注意事項の番号を基に、装置に付属の「Translated Safety Warnings」を参照してください。

これらの注意事項を保管しておいてください。

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이 지시 사항을 보관하십시오.

Aviso　**INSTRUÇÕES IMPORTANTES DE SEGURANÇA**

Este símbolo de aviso significa perigo. Você se encontra em uma situação em que há risco de lesões corporais. Antes de trabalhar com qualquer equipamento, esteja ciente dos riscos que envolvem os circuitos elétricos e familiarize-se com as práticas padrão de prevenção de acidentes. Use o número da declaração fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham o dispositivo.

GUARDE ESTAS INSTRUÇÕES

Advarsel　**VIGTIGE SIKKERHEDSANVISNINGER**

Dette advarselssymbol betyder fare. Du befinder dig i en situation med risiko for legemesbeskadigelse. Før du begynder arbejde på udstyr, skal du være opmærksom på de involverede risici, der er ved elektriske kredsløb, og du skal sætte dig ind i standardprocedurer til undgåelse af ulykker. Brug erklæringsnummeret efter hver advarsel for at finde oversættelsen i de oversatte advarsler, der fulgte med denne enhed.

GEM DISSE ANVISNINGER

تحذير　**إرشادات الأمان الهامة**

يوضح رمز التحذير هذا وجود خطر. وهذا يعني أنك متواجد في مكان قد ينتج عنه التعرض لإصابات. قبل بدء العمل، احذر مخاطر التعرض للصدمات الكهربائية وكن على علم بالإجراءات القياسية للحيلولة دون وقوع أي حوادث. استخدم رقم البيان الموجود في أخر كل تحذير لتحديد مكان ترجمته داخل تحذيرات الأمان المترجمة التي تأتي مع الجهاز.
قم بحفظ هذه الإرشادات

Upozorenje   VAŽNE SIGURNOSNE NAPOMENE

Ovaj simbol upozorenja predstavlja opasnost. Nalazite se u situaciji koja može prouzročiti tjelesne ozljede. Prije rada s bilo kojim uređajem, morate razumjeti opasnosti vezane uz električne sklopove, te biti upoznati sa standardnim načinima izbjegavanja nesreća. U prevedenim sigurnosnim upozorenjima, priloženima uz uređaj, možete prema broju koji se nalazi uz pojedino upozorenje pronaći i njegov prijevod.

SAČUVAJTE OVE UPUTE

Upozornění   DŮLEŽITÉ BEZPEČNOSTNÍ POKYNY

Tento upozorňující symbol označuje nebezpečí. Jste v situaci, která by mohla způsobit nebezpečí úrazu. Před prací na jakémkoliv vybavení si uvědomte nebezpečí související s elektrickými obvody a seznamte se se standardními opatřeními pro předcházení úrazům. Podle čísla na konci každého upozornění vyhledejte jeho překlad v přeložených bezpečnostních upozorněních, která jsou přiložena k zařízení.

USCHOVEJTE TYTO POKYNY

Προειδοποίηση   ΣΗΜΑΝΤΙΚΕΣ ΟΔΗΓΙΕΣ ΑΣΦΑΛΕΙΑΣ

Αυτό το προειδοποιητικό σύμβολο σημαίνει κίνδυνο. Βρίσκεστε σε κατάσταση που μπορεί να προκαλέσει τραυματισμό. Πριν εργαστείτε σε οποιοδήποτε εξοπλισμό, να έχετε υπόψη σας τους κινδύνους που σχετίζονται με τα ηλεκτρικά κυκλώματα και να έχετε εξοικειωθεί με τις συνήθεις πρακτικές για την αποφυγή ατυχημάτων. Χρησιμοποιήστε τον αριθμό δήλωσης που παρέχεται στο τέλος κάθε προειδοποίησης, για να εντοπίσετε τη μετάφρασή της στις μεταφρασμένες προειδοποιήσεις ασφαλείας που συνοδεύουν τη συσκευή.

ΦΥΛΑΞΤΕ ΑΥΤΕΣ ΤΙΣ ΟΔΗΓΙΕΣ

אזהרה   **הוראות בטיחות חשובות**

סימן אזהרה זה מסמל סכנה. אתה נמצא במצב העלול לגרום לפציעה. לפני שתעבוד עם ציוד כלשהו, עליך להיות מודע לסכנות הכרוכות במעגלים חשמליים ולהכיר את הנהלים המקובלים למניעת תאונות. השתמש במספר ההוראה המסופק בסופה של כל אזהרה כד לאתר את התרגום באזהרות הבטיחות המתורגמות שמצורפות להתקן.

שמור הוראות אלה

Opomena   ВАЖНИ БЕЗБЕДНОСНИ НАПАТСТВИЈА
Симболот за предупредување значи опасност. Се наоѓате во ситуација што може да предизвика телесни повреди. Пред да работите со опремата, бидете свесни за ризикот што постои кај електричните кола и треба да ги познавате стандардните постапки за спречување на несреќни случаи. Искористете го бројот на изјавата што се наоѓа на крајот на секое предупредување за да го најдете неговиот период во преведените безбедносни предупредувања што се испорачани со уредот.
ЧУВАЈТЕ ГИ ОВИЕ НАПАТСТВИЈА

Ostrzeżenie   **WAŻNE INSTRUKCJE DOTYCZĄCE BEZPIECZEŃSTWA**

Ten symbol ostrzeżenia oznacza niebezpieczeństwo. Zachodzi sytuacja, która może powodować obrażenia ciała. Przed przystąpieniem do prac przy urządzeniach należy zapoznać się z zagrożeniami związanymi z układami elektrycznymi oraz ze standardowymi środkami zapobiegania wypadkom. Na końcu każdego ostrzeżenia podano numer, na podstawie którego można odszukać tłumaczenie tego ostrzeżenia w dołączonym do urządzenia dokumencie z tłumaczeniami ostrzeżeń.

NINIEJSZE INSTRUKCJE NALEŻY ZACHOWAĆ

Upozornenie   **DÔLEŽITÉ BEZPEČNOSTNÉ POKYNY**

Tento varovný symbol označuje nebezpečenstvo. Nachádzate sa v situácii s nebezpečenstvom úrazu. Pred prácou na akomkoľvek vybavení si uvedomte nebezpečenstvo súvisiace s elektrickými obvodmi a oboznámte sa so štandardnými opatreniami na predchádzanie úrazom. Podľa čísla na konci každého upozornenia vyhľadajte jeho preklad v preložených bezpečnostných upozorneniach, ktoré sú priložené k zariadeniu.

USCHOVAJTE SI TENTO NÁVOD

Opozorilo   **POMEMBNI VARNOSTNI NAPOTKI**

Ta opozorilni simbol pomeni nevarnost. Nahajate se v situaciji, kjer lahko pride do telesnih poškodb. Preden pričnete z delom na napravi, se morate zavedati nevarnosti udara električnega toka, ter tudi poznati preventivne ukrepe za preprečevanje takšnih nevarnosti. Uporabite obrazložitveno številko na koncu posameznega opozorila, da najdete opis nevarnosti v priloženem varnostnem priročniku.

SHRANITE TE NAPOTKE!

警告   重要安全性指示
此警告符號代表危險，表示可能造成人身傷害。使用任何設備前，請留心電路相關危險，並熟悉避免意外的標準作法。您可以使用每項警告後的聲明編號，查詢本裝置隨附之安全性警告譯文中的翻譯。
請妥善保留此指示

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html

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C H A P T E R 1

Overview

This chapter provides an overview of the Cisco UCS C240 server features.

External Features Overview

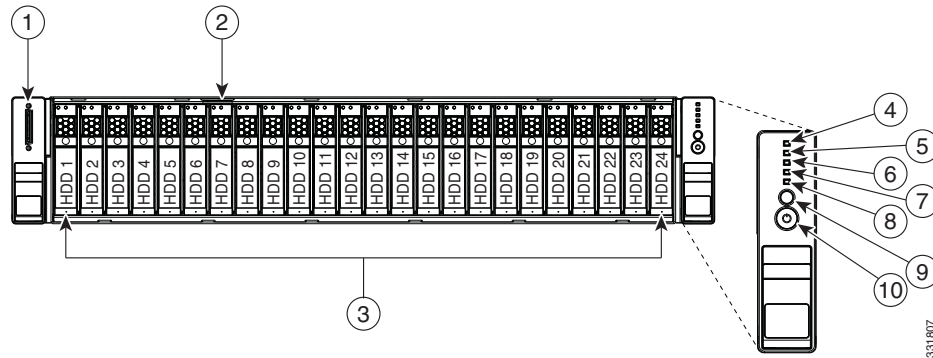The figures in this chapter show an overview of external server features.

(Internal server features are illustrated in Figure 3-5 on page 3-9.)

The server is orderable in three different versions, each with one of three different front panel/backplane configurations:

- Cisco UCS C240 (small form-factor (SFF) drives, with 24-drive backplane and expander). Holds up to twenty-four 2.5-inch hard drives or solid state drives.

- Cisco UCS C240 (small form-factor (SFF) drives, with 16-drive backplane, no expander). Holds up to sixteen 2.5-inch hard drives or solid state drives.

- Cisco UCS C240 (large form-factor (LFF) drives, with 12-drive backplane and expander). Holds up to twelve 3.5-inch hard drives.

Figure 1-1 shows the front panel features of the small form-factor drives version of the server. This version of the server can be ordered with either a 16-drive backplane or a 24-drive backplane with an expander. When the 16-drive backplane is installed, only the first 16 drive bays are used.
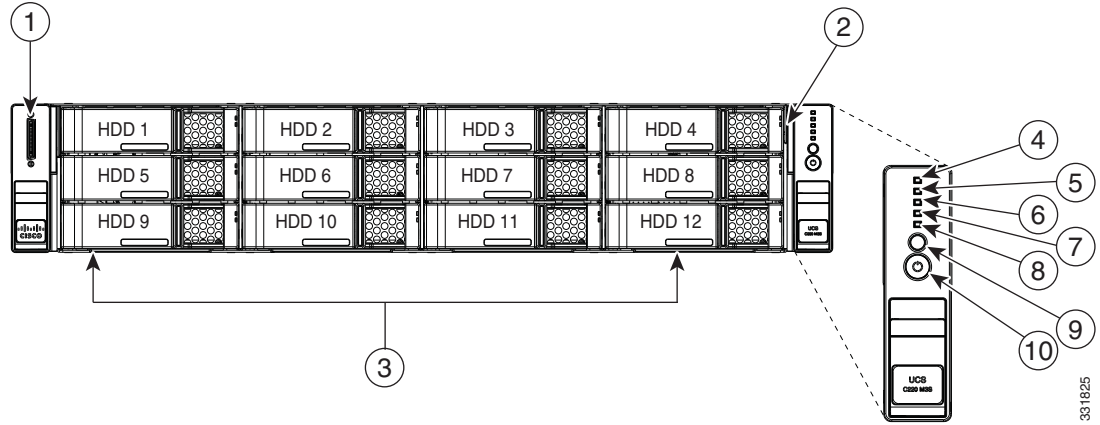
Figure 1-1   Cisco UCS C240 Server (Small Form-Factor Drives) Front Panel Features

1	KVM connector (used with KVM cable that provides two USB 2.0, one VGA, and one serial connector)	**6**	Temperature status LED
2	Pull-out asset tag	**7**	Fan status LED
3	Drives, hot-swappable (up to 24 2.5-inch drives)	**8**	System status LED
4	Network link activity LED	**9**	Identification button/LED
5	Power supply status LED	**10**	**Power button/power status LED**

Figure 1-2 shows the front panel features of the Large Form-Factor drives version of the server. This version of the server has a 12-drive backplane with an expander.
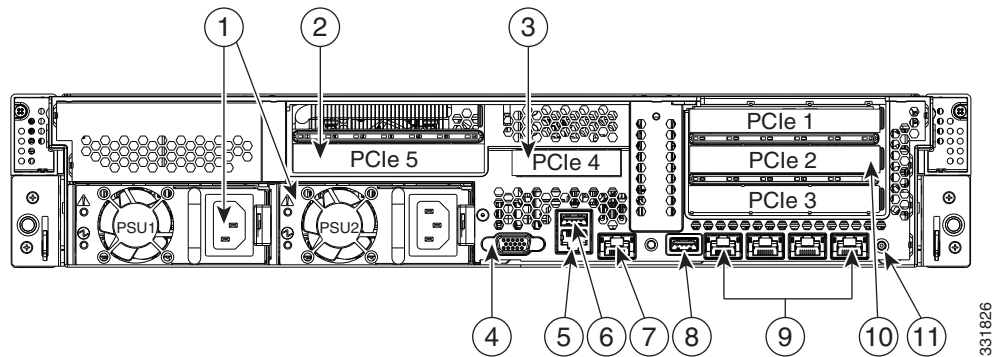
Figure 1-2   Cisco UCS C240 Server (Large Form-Factor Drives) Front Panel Features

1	KVM connector (used with KVM cable that provides two USB 2.0, one VGA, and one serial connector)	**6**	Temperature status LED
2	Pull-out asset tag	**7**	Fan status LED
3	Drives, hot-swappable (up to twelve 3.5-inch drives)	**8**	System status LED
4	Network link activity LED	**9**	Identification button/LED
5	Power supply status LED	**10**	**Power button/power status LED**

Figure 1-3 shows the rear panel features of the server (identical for all versions of the server).

Figure 1-3   Cisco UCS C240 Server Rear Panel Features

1	Power supplies (two)	7	1-Gb Ethernet dedicated management port
2	PCIe slot on riser 2: PCIe 5—full-height, 3/4-length, x16 lane)	8	USB 2.0 port
3	PCIe slot on riser 2: PCIe 4—half-height, 3/4-length, x8 lane)	9	Quad 1-Gb Ethernet ports (LAN1, LAN2, LAN3, and LAN4)
4	VGA video connector	10	PCIe slots on riser 1: PCIe 1—full-height, half-length, x8 lane PCIe 2—full-height, half-length, x16 lane PCIe 3—full-height, half-length, x8 lane
5	Serial port (RJ-45 connector)	11	Rear Identification button/LED
6	USB port		–

Summary of Server Features

Table 1-1 lists a summary of server features.

.

Table 1-1   Cisco UCS C240 Server Features

Chassis	Two rack-unit (2RU) chassis.
Processors	Two Intel Xeon E5-2600 Series processors.
Memory	The server provides 24 DIMM[1] sockets on the motherboard. This provides a possible total of up to 1536 GB of industry-standard DDR3[2] memory.
Baseboard management	Pilot III BMC, running Cisco Integrated Management Controller (CIMC) firmware. Depending on your CIMC settings, the CIMC can be accessed through the 1-Gb Ethernet dedicated management port, the 1-Gb Ethernet LOM ports, or a Cisco P81E virtual interface card.
Network and management I/O	The server provides these connectors: • One 1-Gb Ethernet dedicated management port • Four 1-Gb Base-T Ethernet LAN ports • One RS-232 serial port (RJ-45 connector) • One 15-pin VGA[3] connector • Two USB[4] 2.0 connectors • One front-panel KVM connector that is used with the included KVM cable, which provides two USB, one VGA, and one serial connector.
Power	Two power supplies: Optionally both 650 W each or both 1200 W each. Do not mix power supply types in the server. Redundant as 1+1. See Power Specifications, page A-2.
Cooling	Six hot-swappable fan modules for front-to-rear cooling.
PCIe I/O	Five horizontal PCIe[5] expansion slots on two risers. See Replacing a PCIe Card, page 3-38 for specifications of the slots.
Storage	Drives are installed into front-panel drive bays that provide hot-pluggable access. The server is orderable in three different versions, each with one of three different front panel/backplane configurations: • Cisco UCS C240 (small form-factor (SFF) drives, with 24-drive backplane and expander). Holds up to twenty-four 2.5-inch hard drives or solid state drives. • Cisco UCS C240 (small form-factor (SFF) drives, with 16-drive backplane, no expander). Holds up to sixteen 2.5-inch hard drives or solid state drives. • Cisco UCS C240 (large form-factor (LFF) drives, with 12-drive backplane and expander). Holds up to twelve 3.5-inch hard drives. The server also contains one internal USB port on the motherboard that you can use with a USB thumb drive for additional storage.

Table 1-1 ***Cisco UCS C240 Server Features (continued)***

Cisco Flexible Flash drives	The server can be ordered with one optional Cisco Flexible Flash drive (SD card).
	This drive is pre-loaded with four virtual drives. The four virtual drives contain, respectively, the Cisco Server Configuration Utility, the Cisco Host Upgrade Utility, the Cisco C-Series server drivers set, and a blank VD on which you can install an OS or a hypervisor. See Replacing a Cisco Flexible Flash Card, page 3-56 for more information.
Disk Management (RAID)	For a list of RAID[6] controller options and required cabling, see RAID Controller Considerations, page C-1.
RAID Backup	There are two mounting points inside the chassis that can be used for RAID backup units. This unit can be either of the following:
	• The LSI battery backup unit that can be used with LSI MegaRAID cards.
	• The SuperCap power module that can be used with LSI MegaRAID-CV cards.
Video	Resolution up to 1600x1200, 16bpp at 60 Hz. Up to 256 MB of video memory.

1. DIMM = dual inline memory module

2. DDR3 = double data rate, type 3

3. VGA = video graphics array

4. USB = universal serial bus

5. PCIe = peripheral component interconnect express

6. RAID = redundant array of independent disks

Installing the Server

This chapter describes how to install the server, and it includes the following sections:

- Unpacking and Inspecting the Server, page 2-2
- Preparing for Server Installation, page 2-3
- Installing the Server In a Rack, page 2-5
- Initial Server Setup, page 2-8
- System BIOS and CIMC Firmware, page 2-12
- Updating the BIOS and CIMC Firmware, page 2-12
- Service Headers and Jumpers, page 2-14

Note Before you install, operate, or service a server, review the *Regulatory Compliance and Safety Information for Cisco UCS C-Series Servers* for important safety information.

Warning **IMPORTANT SAFETY INSTRUCTIONS**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

Unpacking and Inspecting the Server

⚠

Caution   When handling internal server components, wear an ESD strap and handle modules by the carrier edges only.

Tip   Keep the shipping container in case the server requires shipping in the future.

Note   The chassis is thoroughly inspected before shipment. If any damage occurred during transportation or any items are missing, contact your customer service representative immediately.

To inspect the shipment, follow these steps:

Step 1   Remove the server from its cardboard container and save all packaging material.

Step 2   Compare the shipment to the equipment list provided by your customer service representative and Figure 2-1. Verify that you have all items.

Step 3   Check for damage and report any discrepancies or damage to your customer service representative. Have the following information ready:

- Invoice number of shipper (see the packing slip)
- Model and serial number of the damaged unit
- Description of damage
- Effect of damage on the installation

Figure 2-1   *Shipping Box Contents*
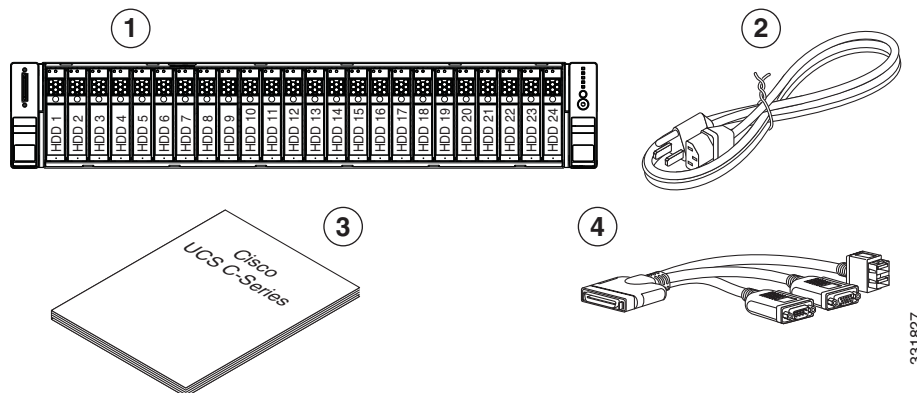
1	Server	**3**	Documentation
2	Power cord (optional, up to two)	**4**	KVM cable

Preparing for Server Installation

This section provides information about preparing for server installation, and it includes the following topics:

Installation Guidelines

Warning **To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of: 35° C (95° F).**
Statement 1047

Warning **The plug-socket combination must be accessible at all times, because it serves as the main disconnecting device.**
Statement 1019

Warning **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 250 V, 15 A.**
Statement 1005

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

Caution Do not block the air vents on the top of the server's cover. Do not stack another server directly on top of the C240 server. Doing so blocks the proper airflow, which could result in overheating, higher fan speeds, and higher power consumption.

Caution Avoid UPS types that use ferroresonant technology. These UPS types can become unstable with systems such as the Cisco UCS, which can have substantial current draw fluctuations from fluctuating data traffic patterns.

When you are installing a server, use the following guidelines:

- Plan your site configuration and prepare the site before installing the server. See the *Cisco UCS Site Preparation Guide* for the recommended site planning tasks.

- Ensure that there is adequate space around the server to allow for servicing the server and for adequate airflow. The airflow in this server is from front to back.

- Ensure that the air-conditioning meets the thermal requirements listed in the Server Specifications.

- Ensure that the cabinet or rack meets the requirements listed in the "Rack Requirements" section on page 2-4.

- Ensure that the site power meets the power requirements listed in the Server Specifications. If available, you can use an uninterruptible power supply (UPS) to protect against power failures.

Rack Requirements

This section provides the requirements for the standard open racks.

The rack must be of the following type:

- A standard 19-in. (48.3-cm) wide, four-post EIA rack, with mounting posts that conform to English universal hole spacing, per section 1 of ANSI/EIA-310-D-1992.

- The rack post holes can be square 0.38-inch (9.6 mm), round 0.28-inch (7.1 mm), #12-24 UNC, or #10-32 UNC when you use the supplied slide rails.

- The minimum vertical rack space per server must be two RUs, equal to 3.5 in. (88.9 mm).

Equipment Requirements

The slide rails supplied by Cisco Systems for this server do not require tools for installation if you install them in a rack that has square 0.38-inch (9.6 mm), round 0.28-inch (7.1 mm), or #12-24 UNC threaded holes. The inner rails are pre-attached to the sides of the server.

However, if you install the slide rails in a rack that has #10-32 round holes, a bladed screwdriver is required to remove the larger square/round mounting pegs from the *front* of the slide rails.

Slide Rail Adjustment Range

The slide rails for this server have an adjustment range of 26 to 36 inches (660 to 914 mm).

Installing the Server In a Rack

This section describes how to install the server in a rack.

⚠️

Warning   **To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:**
This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.
Statement 1006

To install the slide rails and the server into a rack, follow these steps:

Step 1   Install the slide rails into the rack (see Figure 2-2):

a.   Align the slide-rail assembly inside the rack posts with the length-adjustment bracket (Figure 2-2, item 4) toward the rear of the rack.

b.   Compress the length-adjustment bracket until the mounting pegs (item 5) and locking clips (item 6) engage the desired rack holes on the front and rear rack posts.

– The mounting pegs fit square 0.38-inch (9.6 mm), round 0.28-inch (7.1 mm), or #12-24 UNC threaded holes. They fit the shape of the hole when the pegs are compressed.

– The smaller #10-32 round mounting pegs are enclosed in the center of the compressible *rear* pegs. However, to use the #10-32 pegs, you must use a bladed screwdriver to remove the square/round *front* pegs.

Figure 2-2   Attaching a Slide-Rail Assembly
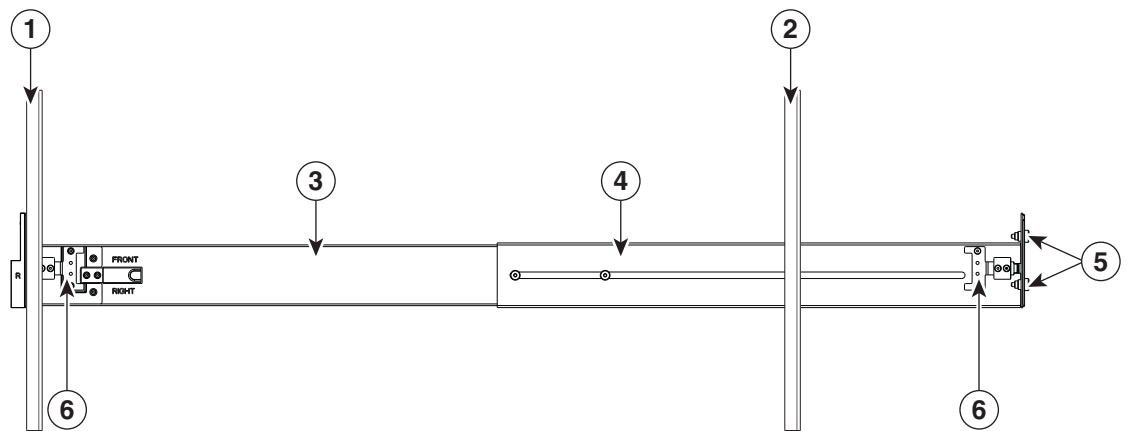
1	Front-right rack post	**4**	Length-adjustment bracket
2	Rear-right rack post	**5**	Mounting pegs (two on each end of assembly)
3	Slide-rail assembly	**6**	Locking clips (one on each end of assembly)

c.   Attach the second slide-rail assembly to the opposite side of the rack. Ensure that the two slide-rail assemblies are level and at the same height with each other.

d. Pull the inner slide rails on each assembly out toward the rack front until they hit the internal stops and lock in place.

Step 2 Insert the server into the slide rails (see Figure 2-3):

⚠

Caution This server weighs approximately 60 pounds (28 kilograms) when fully loaded with components. We recommend that you use a minimum of two people when lifting the server. Attempting this procedure alone could result in personal injury or equipment damage.

✎

Note The inner rails are pre-attached to the sides of the server at the factory. You can order replacement inner rails if these are damaged or lost (Cisco PID UCSC-RAIL-2U-I).

a. Align the inner rails that are attached to the server sides with the front ends of the empty slide rails.

b. Push the server into the slide rails until it stops at the internal stops.

c. Push in the slide rail locking clip (item 2) on each inner rail, and then continue pushing the server into the rack until its front flanges latch onto the rack posts.

Figure 2-3   Inserting the Server Into the Slide Rails
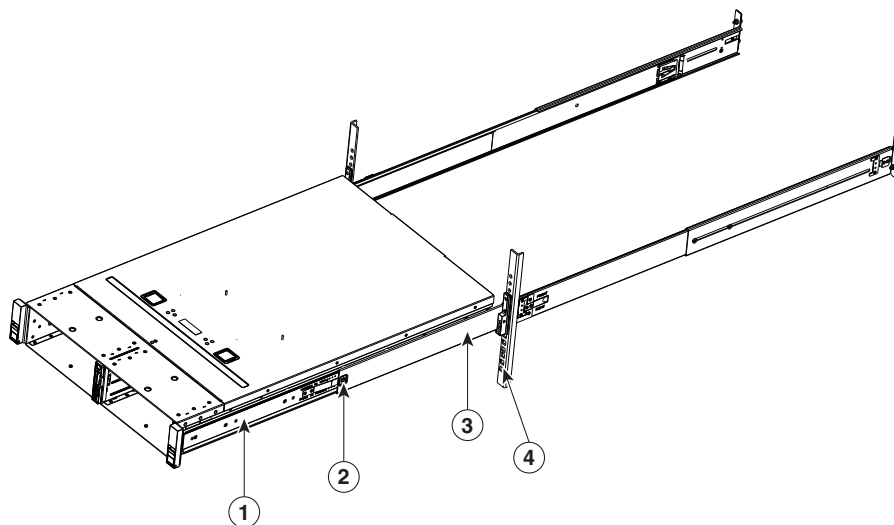
1	Inner rail on server	3	Slide rail assembly on rack post
2	Slide rail locking clip	4	Right-front rack post

Step 3 Attach the (optional) cable management arm (CMA) to the rear of the slide rails (see Figure 2-4):

✎

Note The orientation in these instructions refers to a view from the front of the server.

Note   The CMA is reversible right-to-left.

a. With the server pushed fully into the rack, insert the CMA tab labelled OUTER RAIL (items 1 and
    6) into the clip inside the rear of the outer slide rail. Insert the tab into the clip until it clicks and
    locks.

b. Pull outward on the spring-loaded peg that is on the CMA tab labelled INNER RAIL (items 2 and
    5). You can turn this peg 90 degrees to lock it in the open position.

c. Push the CMA tab labelled INNER RAIL over the end of the inner rail that is attached to the server,
    and then release the spring-loaded peg.

    The peg must align with and enter the hole in the inner rail to lock the CMA in place. If you turned
    the peg 90 degrees to lock it open, now turn it back 90 degrees to release it.

Figure 2-4   Attaching the Cable Management Arm
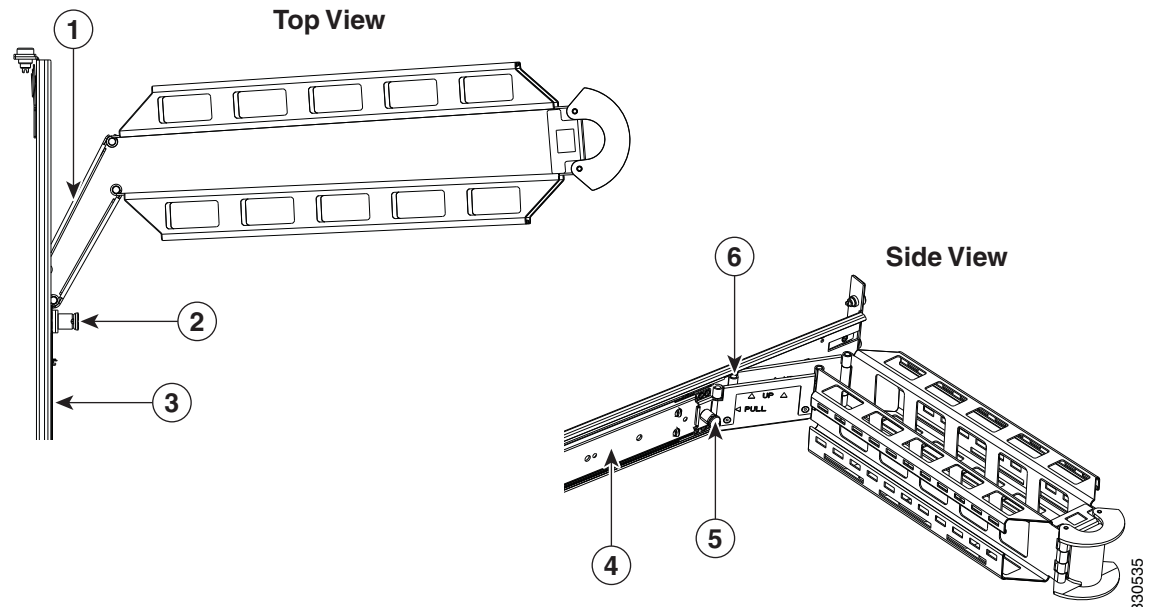
1	OUTER RAIL CMA tab attached to outer slide rail	4	Rear of left slide rail assembly
2	INNER RAIL CMA tab attached to inner rail	5	INNER RAIL CMA tab attached to inner rail
3	Rear of left slide rail assembly	6	OUTER RAIL CMA tab attached to outer slide rail

Cisco UCS C240 Server Installation and Service Guide

Initial Server Setup

This section includes the following topics:

Connecting and Powering On the Server (Standalone Mode)

Note This section describes how to power on the server, assign an IP address, and connect to server management when using the server *in standalone mode*. To use the server in UCS integration, specific cabling and settings are required. See Installation for Cisco UCS Integration, page D-1.

Note The server is shipped with a default NIC mode called Shared LOM EXT, default NIC redundancy is active-active, and DHCP is enabled. Shared LOM EXT mode enables the 1-Gb Ethernet ports and the ports on any installed Cisco virtual interface card (VIC) to access the Cisco Integrated Management Interface (CIMC). If you want to use the dedicated management ports to access the CIMC, you can connect to the server and change the NIC mode as described in Step 3 of the following procedure. In that step, you can also change the NIC redundancy and set static IP settings.

Use the following procedure to perform initial setup of the server:

Step 1 Attach a supplied power cord to each power supply in your server, and then attach the power cord to a grounded AC power outlet. See the Power Specifications, page A-2 for power specifications.

Wait for approximately two minutes to let the server boot in standby power during the first bootup.

You can verify power status by looking at the Power Status LED (see Figure 1-1 on page 1-2):

- Off—There is no AC power present in the server.
- Amber—The server is in standby power mode. Power is supplied only to the CIMC and some motherboard functions.
- Green—The server is in main power mode. Power is supplied to all server components.

Note During bootup, the server beeps once for each USB device that is attached to the server. Even if there are no external USB devices attached, there is a short beep for each virtual USB device such as a virtual floppy drive, CD/DVD drive, keyboard, or mouse. A beep is also emitted if a USB device is hot-plugged or hot-unplugged during BIOS power-on self test (POST), or while you are accessing the BIOS Setup utility or the EFI shell.

Step 2 Connect a USB keyboard and VGA monitor by using the supplied KVM cable connected to the KVM connector on the front panel (see Figure 1-1 on page 1-2).

Note Alternatively, you can use the VGA and USB ports on the rear panel. However, you cannot use the front panel VGA and the rear panel VGA at the same time. If you are connected to one VGA connector and you then connect a video device to the other connector, the first VGA connector is disabled.

Step 3 Set NIC mode, NIC redundancy, and choose whether to enable DHCP or set static network settings:

a. Press the **Power** button to boot the server. Watch for the prompt to press F8.

b. During bootup, press **F8** when prompted to open the BIOS CIMC Configuration Utility.

c. Set the NIC mode to your choice for which ports to use to access the CIMC for server management (see Figure 1-3 for identification of the ports):

- Shared LOM EXT (default)—This is shared LOM extended mode. This is the factory-default setting, along with Active-active NIC redundancy and DHCP-enabled. With this mode, the shared LOM and Cisco Card interfaces are both enabled.

  In this mode, DHCP replies are returned to both the shared LOM ports and the Cisco card ports. If the system determines that the Cisco card connection is not getting its IP address from a Cisco UCS Manager system because the server is in standalone mode, further DHCP requests from the Cisco card are disabled. Use the Cisco Card NIC mode if you want to connect to the CIMC through a Cisco card in standalone mode.

- Dedicated—The dedicated management port is used to access the CIMC. You must select a NIC redundancy and IP setting.

- Shared LOM—The 1-Gb Ethernet ports are used to access the CIMC. You must select a NIC redundancy and IP setting.

- Cisco Card—The ports on an installed Cisco UCS virtual interface card (VIC) are used to access the CIMC. You must select a NIC redundancy and IP setting.

Note The Cisco Card NIC mode is currently supported only with a Cisco UCS VIC that is installed in PCIe slot 2. See also Special Considerations for Cisco UCS Virtual Interface Cards, page 3-41.

d. Use this utility to change the NIC redundancy to your preference. This server has three possible NIC redundancy settings:

- None—The Ethernet ports operate independently and do not fail over if there is a problem.

- Active-standby—If an active Ethernet port fails, traffic fails over to a standby port.

- Active-active—All Ethernet ports are utilized simultaneously.

e. Choose whether to enable DHCP for dynamic network settings, or to enter static network settings.

Note Before you enable DHCP, your DHCP server must be preconfigured with the range of MAC addresses for this server. The MAC address is printed on a label on the rear of the server. This server has a range of six MAC addresses assigned to the CIMC. The MAC address printed on the label is the beginning of the range of six contiguous MAC addresses.

     f. Optional: Use this utility to make VLAN settings, and to set a default CIMC user password.

> **Note**   Changes to the settings take effect after approximately 45 seconds. Refresh with **F5** and wait until the new settings appear before you reboot the server in the next step.

     g. Press **F10** to save your settings and reboot the server.

> **Note**   If you chose to enable DHCP, the dynamically assigned IP and MAC addresses are displayed on the console screen during bootup.

Step 4   Connect to the CIMC for server management. Connect Ethernet cables from your LAN to the server by using the ports that you selected by your NIC Mode setting in Step 3. The Active-active and Active-passive NIC redundancy settings require you to connect to two ports.

Step 5   Use a browser and the IP address of the CIMC to connect to the CIMC Setup Utility. The IP address is based upon the settings that you made in Step 3 (either a static address or the address assigned by your DHCP server).

> **Note**   The default user name for the server is *admin*. The default password is *password*.

To manage the server, see the *Cisco UCS C-Series Rack-Mount Server Configuration Guide* or the *Cisco UCS C-Series Rack-Mount Server CLI Configuration Guide* for instructions on using those interfaces. The links to these documents are in the C-Series documentation roadmap:

http://www.cisco.com/go/unifiedcomputing/c-series-doc

NIC Modes and NIC Redundancy Settings

This server has the following NIC mode settings that you can choose from:

- Shared LOM EXT (default)—This is shared LOM extended mode. This is the factory-default setting, along with Active-active NIC redundancy and DHCP-enabled. With this mode, the shared LOM and Cisco Card interfaces are both enabled.

  In this mode, DHCP replies are returned to both the shared LOM ports and the Cisco card ports. If the system determines that the Cisco card connection is not getting its IP address from a Cisco UCS Manager system because the server is in standalone mode, further DHCP requests from the Cisco card are disabled. If the system determines that the Cisco card connection is getting its IP address from a Cisco UCS Manager system, the reply has parameters that automatically move the server to UCSM mode.

- Dedicated—The dedicated management port is used to access the CIMC. You must select a NIC redundancy and IP setting.

- Shared LOM—The 1-Gb Ethernet ports are used to access the CIMC. You must select a NIC redundancy and IP setting.

- Cisco Card—The ports on an installed Cisco UCS virtual interface card (VIC) are used to access the CIMC. You must select a NIC redundancy and IP setting.

> **Note**   The Cisco Card NIC mode is currently supported only with a Cisco UCS VIC that is installed in PCIe slot 2. See also Special Considerations for Cisco UCS Virtual Interface Cards, page 3-41.

This server has the following NIC redundancy settings that you can choose from:

- None—The Ethernet ports operate independently and do not fail over if there is a problem.

- Active-standby—If an active Ethernet port fails, traffic fails over to a standby port.

- Active-active—All Ethernet ports are utilized simultaneously.

System BIOS and CIMC Firmware

This section includes information about the system BIOS and it includes the following sections:

Updating the BIOS and CIMC Firmware

⚠

Caution   When you upgrade the BIOS firmware, you must also upgrade the CIMC firmware to the same version or the server will not boot. Do not power off the server until the BIOS and CIMC firmware are matching or the server will not boot.

Cisco provides the Cisco Host Upgrade Utility to assist with simultaneously upgrading the BIOS, CIMC, and other firmware to compatible levels.

The server uses firmware obtained from and certified by Cisco. Cisco provides release notes with each firmware image. There are several methods for updating the firmware:

- **Recommended method for systems running firmware level 1.2 or later**: Use the Cisco Host Upgrade Utility to simultaneously upgrade the CIMC, BIOS, LOM, LSI storage controller, and Cisco UCS P81E VIC firmware to compatible levels.

  See the *Cisco Host Upgrade Utility Quick Reference Guide* for your firmware level at the documentation roadmap link below.

✎

Note   Your system firmware must be at minimum level 1.2 to use the Cisco Host Upgrade Utility. If your firmware is prior to level 1.2, you must use the methods below to update the BIOS and CIMC firmware individually.

- You can upgrade the BIOS using the EFI interface, or upgrade from a Windows or Linux platform.

  See the *Cisco UCS C-Series Rack-Mount Server BIOS Upgrade Guide*.

- You can upgrade the CIMC and BIOS firmware by using the CIMC GUI interface.

  See the *Cisco UCS C-Series Rack-Mount Server Configuration Guide*.

- You can upgrade the CIMC and BIOS firmware by using the CIMC CLI interface.

  See the *Cisco UCS C-Series Rack-Mount Server CLI Configuration Guide*.

For links to the documents listed above, see the documentation roadmap at the following URL:

http://www.cisco.com/go/unifiedcomputing/c-series-doc

Accessing the System BIOS

To change the BIOS settings for your server, follow these steps. Detailed instructions are also printed on the BIOS screens.

Step 1   Enter the BIOS setup utility by pressing the **F2** key when prompted during bootup.

> **Note**   The version and build of the current BIOS are displayed on the Main page of the utility.

Step 2   Use the arrow keys to select the BIOS menu page.

Step 3   Highlight the field to be modified by using the arrow keys.

Step 4   Press **Enter** to select the field that you want to change, and then modify the value in the field.

Step 5   Press the right arrow key until the Exit menu screen is displayed.

Step 6   Follow the instructions on the Exit menu screen to save your changes and exit the setup utility (or Press **F10**). You can exit without saving changes by pressing **Esc**.

Service Headers and Jumpers

This section includes the following topics:

-
-
-

Header Locations on the Motherboard

See Figure 2-5. The block of headers is shown in red. The individual headers are shown in the magnified view. The pin numbering is the same for all headers in the block.

Figure 2-5   Service Header Locations
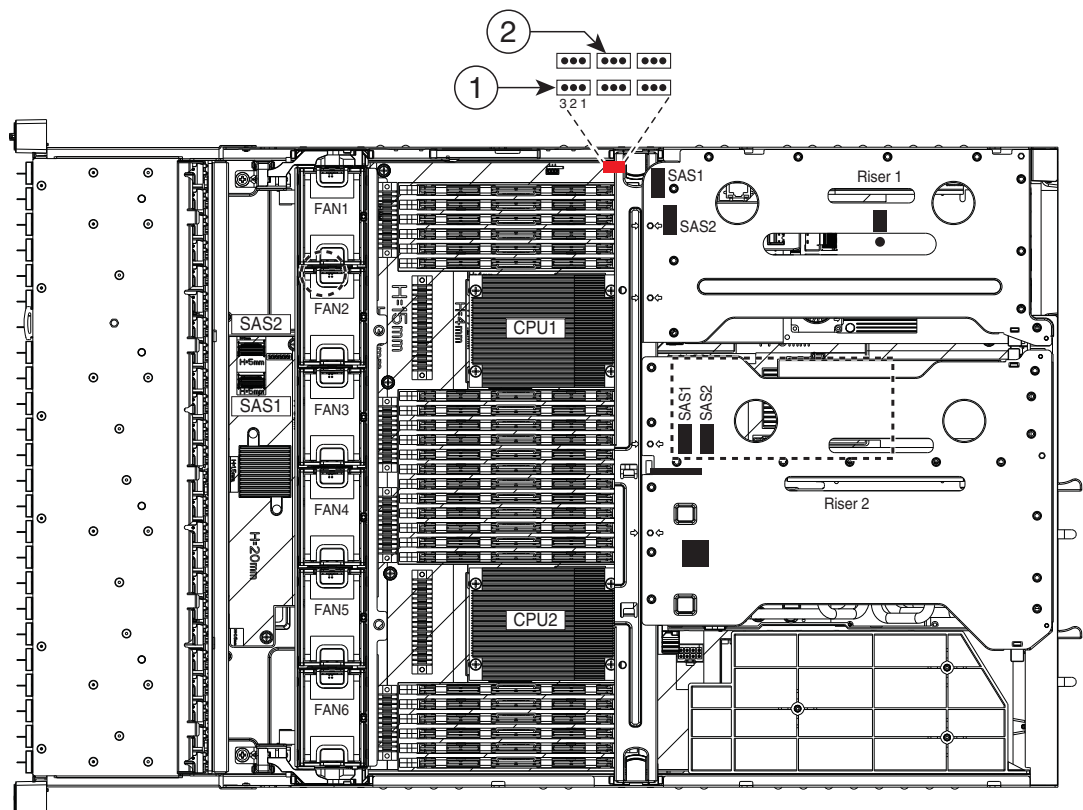
| **1** | J2068 BIOS RCVR BOOT | **2** | J2065 Clear CMOS |

Using the BIOS Recovery Header J2068

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, the following message is displayed:

```
****BIOS FLASH IMAGE CORRUPTED****
Flash a valid BIOS capsule file using CIMC WebGUI or CLI interface.
IF CIMC INTERFACE IS NOT AVAILABLE, FOLLOW THE STEPS MENTIONED BELOW.
1. Connect the USB stick with recovery.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 recovery.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, then if that does not recover the BIOS, use procedure 2.

Note   The server must have CIMC version 1.4(6) or later to use these procedures.

Procedure 1: Reboot With recovery.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 a USB thumb drive. The `recovery` folder contains the `recovery.cap` file that is required in this procedure.

Note   The `recovery.cap` file must be in the root directory of the USB thumb drive. Do not rename this file. The USB thumb drive must be formatted with either FAT16 or FAT32 file systems.

Step 3   Insert the USB thumb 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 `recovery.cap` file on the USB thumb drive, it displays this message:

```
Found a valid recovery file...Transferring to CIMC
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, then remove the USB thumb drive from the server.

Note   During the BIOS update, the CIMC will shut down the server and the screen will be blank for about 10 minutes. Do not unplug the power cords during this update. The CIMC will power on the server after the update is complete.

Procedure 2: Use Recovery Jumper and recovery.cap File

See Figure 2-5 for the location of the J2068 header.

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 a USB thumb drive. The `recovery` folder contains the `recovery.cap` file that is required in this procedure.

> **Note**   The `recovery.cap` file must be in the root directory of the USB thumb drive. Do not rename this file. The USB thumb drive must be formatted with either FAT16 or FAT32 file systems.

Step 3   Power off the server as described in Shutting Down and Powering Off the Server, page 3-7.

Step 4   Disconnect all power cords from the power supplies.

Step 5   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 6   Remove the top cover as described in Removing and Replacing the Server Top Cover, page 3-8.

Step 7   Move the shorting jumper to pins 2 and 3 of the J2068 header (see Figure 2-5).

Step 8   Reconnect AC power cords to the server. The server powers up to standby power mode.

Step 9   Insert the USB thumb drive that you prepared in Step 2 into a USB port on the server.

Step 10   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 `recovery.cap` file on the USB thumb drive, it displays this message:

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

Step 11   Wait for server to complete the BIOS update, then remove the USB thumb drive from the server.

> **Note**   During the BIOS update, the CIMC will shut down the server and the screen will be blank for about 10 minutes. Do not unplug the power cords during this update. The CIMC will power on the server after the update is complete.

Step 12   After the server has fully booted, power off the server again and disconnect all power cords.

Step 13   Move the jumper back to the default pins 1 and 2 of the J41 header.

> **Note**   If you do not move the jumper, after recovery completion you see the prompt, `Please remove the recovery jumper`.

Step 14   Replace the top cover, replace the server in the rack, replace power cords and any other cables, then power on the server by pressing the **Power** button.

Using the Clear CMOS Header J2065

See Figure 2-5 for the location of this header. You can jumper this header 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   Power off the server as described in Shutting Down and Powering Off the Server, page 3-7.

Step 2   Disconnect all power cords from the power supplies.

Step 3   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 4   Remove the top cover as described in Removing and Replacing the Server Top Cover, page 3-8.

Step 5   Move the shorting jumper to pins 2 and 3 of the J2065 header (see Figure 2-5).

Step 6   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 7   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, not just the service processor, to reboot to main power mode to complete the reset. This is because the state of the jumper cannot be determined without the host CPU running.

Step 8   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 9   Remove the top cover from the server.

Step 10   Move the shorting jumper from header pins 2 and 3, back to its default position on pins 1 and 2.

✎

Note   If you do not move the jumper, the CMOS settings are reset to the default every time that you power-cycle the server.

Step 11   Replace the top cover, replace the server in the rack, replace power cords and any other cables, then power on the server by pressing the **Power** button.

Maintaining the Server

This chapter describes how to diagnose server system problems using LEDs. It also provides information about how to install or replace hardware components, and it includes the following sections:

- Server Monitoring and Management Tools, page 3-1
- Status LEDs and Buttons, page 3-2
- Preparing for Server Component Installation, page 3-7
- Installing or Replacing Server Components, page 3-11

Server Monitoring and Management Tools

Cisco Integrated Management Interface (CIMC)

You can monitor the server inventory, health, and system event logs by using the built-in Cisco Integrated Management Controller (CIMC) GUI or CLI interfaces. See the user documentation for your firmware release at the following URL:

http://www.cisco.com/en/US/products/ps10739/products_installation_and_configuration_guides_list.html

Server Configuration Utility

Cisco has also developed the Cisco Server Configuration Utility for C-Series servers, which can aid and simplify the following tasks:

- Monitoring server inventory and health
- Diagnosing common server problems with diagnostic tools and logs
- Setting the BIOS booting order
- Configuring some RAID configurations
- Installing operating systems

This utility is pre-installed on an internal Cisco Flexible Flash card inside the server (see Overview of the Pre-Installed Cisco Flexible Flash Card, page 3-56). You can also download the ISO from Cisco.com. See the user documentation for your version of the utility at the following URL:

http://www.cisco.com/en/US/products/ps10493/products_user_guide_list.html

Status LEDs and Buttons

This section describes the location and meaning of LEDs and buttons and includes the following topics

Front Panel LEDs

Figure 3-1 shows the front panel LEDs. Table 3-1 defines the LED states.

Figure 3-1   Front Panel LEDs
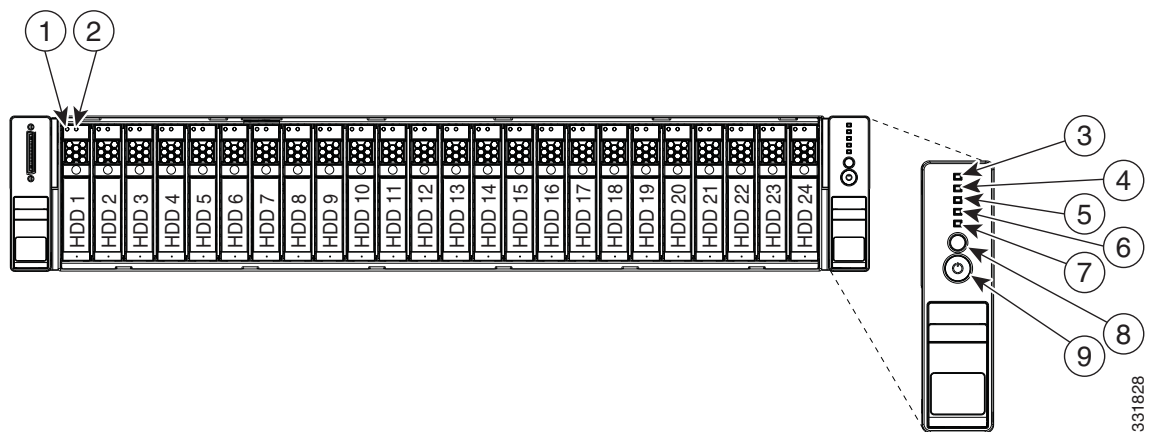
1	Hard drive fault LED	**6**	Fan status LED
2	Hard drive activity LED	**7**	System status LED
3	Network link activity LED	**8**	Identification button/LED
4	Power supply status LED	**9**	Power button/power status LED
5	Temperature status LED		–

Table 3-1   Front Panel LEDs, Definitions of States

LED Name	State
Hard drive fault	• Off—The hard drive is operating properly. • Amber—This hard drive has failed. • Amber, blinking—The device is rebuilding.
Hard drive activity	• Off—There is no hard drive in the hard drive sled (no access, no fault). • Green—The hard drive is ready. • Green, blinking—The hard drive is reading or writing data.
Network link activity	• Off—The Ethernet link is idle. • Green—One or more Ethernet LOM ports are link-active, but there is no activity. • Green, blinking—One or more Ethernet LOM ports are link-active, with activity.

Table 3-1   *Front Panel LEDs, Definitions of States (continued)*

LED Name	State
Power supply status	• Green—All power supplies are operating normally. • Amber, steady—One or more power supplies are in a degraded operational state. • Amber, blinking—One or more power supplies are in a critical fault state.
Temperature status	• Green—The server is operating at normal temperature. • Amber, steady—One or more temperature sensors have exceeded a warning threshold. • Amber, blinking—One or more temperature sensors have exceeded a critical threshold.
Fan status	• Green—All fan modules are operating properly. • Amber, steady—One fan module has failed. • Amber, blinking—Critical fault, two or more fan modules have failed.

System status	• Green—The server is running in normal operating condition.
	• Green, blinking—The server is performing system initialization and memory check.
	• Amber, steady—The server is in a degraded operational state. For example:
	  – Power supply redundancy is lost.
	  – CPUs are mismatched.
	  – At least one CPU is faulty.
	  – At least one DIMM is faulty.
	  – At least one drive in a RAID configuration failed.
	• Amber, blinking—The server is in a critical fault state. For example:
	  – Boot failed.
	  – Fatal CPU and/or bus error is detected.
	  – Server is in over-temperature condition.

Identification	• Off—The Identification LED is not in use. • Blue—The Identification LED is activated.
Power button/Power status LED	• Off—There is no AC power to the server. • Amber—The server is in standby power mode. Power is supplied only to the CIMC and some motherboard functions. • Green—The server is in main power mode. Power is supplied to all server components.

Rear Panel LEDs and Buttons

Figure 3-2 shows the rear panel LEDs and buttons. Table 3-2 defines the LED states.

Figure 3-2   Rear Panel LEDs and Buttons
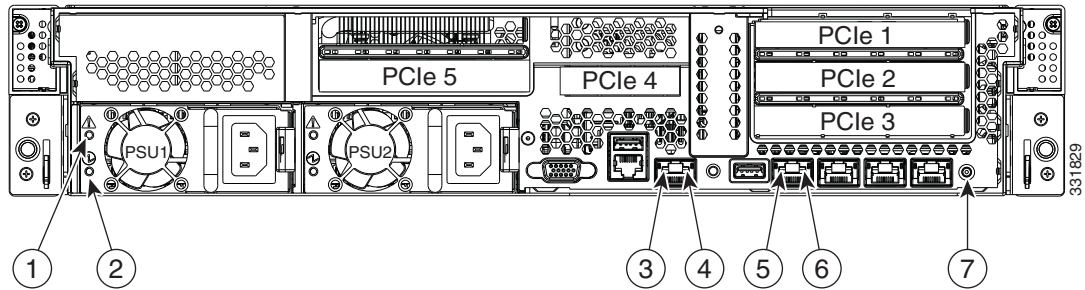
1	Power supply fault LED	**5**	1-Gb Ethernet link speed LED
2	Power supply AC OK LED	**6**	1-Gb Ethernet link status LED
3	1-Gb Ethernet dedicated management link status LED	**7**	Identification button/LED
4	1-Gb Ethernet dedicated management link speed LED		–

Table 3-2   Rear Panel LEDs, Definitions of States

LED Name	State
Power supply fault	• Off—The power supply is operating normally. • Amber, blinking—An event warning threshold has been reached, but the power supply continues to operate. • Amber, solid—A critical fault threshold has been reached, causing the power supply to shut down (for example, a fan failure or an over-temperature condition).
Power supply AC OK	• Off—There is no AC power to the power supply. • Green, blinking—AC power OK, DC output not enabled. • Green, solid—AC power OK, DC outputs OK.
1-Gb Ethernet dedicated management link speed	• Off—link speed is 10 Mbps. • Amber—link speed is 100 Mbps. • Green—link speed is 1 Gbps.
1-Gb Ethernet dedicated management link status	• Off—No link is present. • Green—Link is active. • Green, blinking—Traffic is present on the active link.
1-Gb Ethernet link speed	• Off—link speed is 10 Mbps. • Amber—link speed is 100 Mbps. • Green—link speed is 1 Gbps.

***Table 3-2*** **Rear Panel LEDs, Definitions of States (continued)**

LED Name	State
1-Gb Ethernet link status	• Off—No link is present. • Green—Link is active. • Green, blinking—Traffic is present on the active link.
Identification	• Off—The Identification LED is not in use. • Blue—The Identification LED is activated.

Internal Diagnostic LEDs

The server is equipped with a SuperCap voltage source that can activate internal component fault LEDs up to one half-hour after AC power is removed. The server has internal fault LEDs for fan modules and DIMMs.

To use these LEDs to identify a failed component, press the front or rear Identification button (see Figure 3-1 or Figure 3-2) with AC power removed. An LED lights amber to indicate a failed component.

See Figure 3-3 for the locations of these internal LEDs.

Figure 3-3   Internal Diagnostic LED Locations
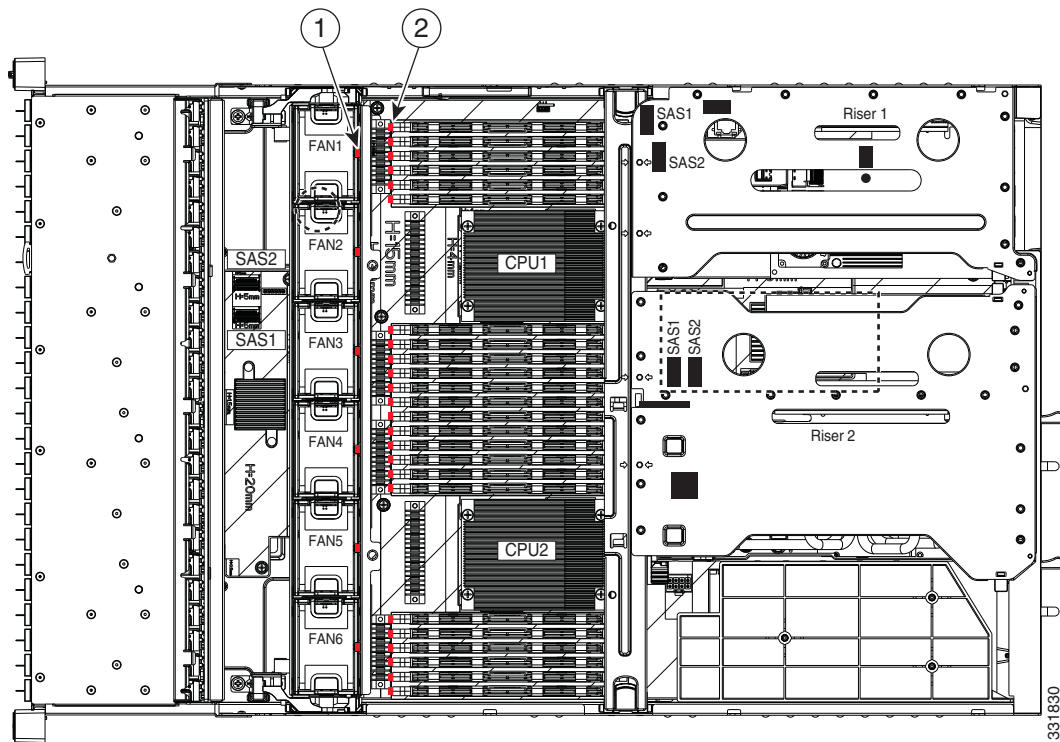
| **1** | Fan module fault LEDs (one on each fan module) | **2** | DIMM fault LEDs (one next to each DIMM socket on the motherboard) |

Table 3-3   Internal Diagnostic LEDs, Definition of States

LED Name	**State**
Internal diagnostic LEDs (all)	• Off—Component is functioning normally. • Amber—Component has failed.

Preparing for Server Component Installation

This section describes how to prepare for component installation, and it includes the following topics:

Required Equipment

The following equipment is used to perform the procedures in this chapter:

- Number 2 Phillips-head screwdriver
- Electrostatic discharge (ESD) strap or other grounding equipment such as a grounded mat

Shutting Down and Powering Off the Server

The server can run in 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 the cooling fans and it is safe to power off the server from this mode.

You can invoke a graceful shutdown or an hard shutdown by using either of the following methods:

- Use the CIMC management interface.
- Use the **Power** button on the server front panel. To use the **Power** button, follow these steps:

Step 1   Check the color of the Power Status LED (see the "Front Panel LEDs" section on page 3-2).

- Green—the server is in main power mode and must be shut down before it can be safely powered off. Go to Step 2.
- Amber—the server is already in standby mode and can be safely powered off. Go to Step 3.

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 Status 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   Disconnect the power cords from the power supplies in your server to completely power off the server.

Removing and Replacing the Server Top Cover

To remove or replace the top cover of the server, follow these steps:

Tip You do not have to remove the cover to replace hard drives or power supplies.

Step 1 Remove the top cover (see Figure 3-4).

a. Loosen the captive thumbscrew that secures the rear edge of the cover to the chassis.

b. Press the release button.

c. Using the rubber finger pads, push the top cover toward the server rear about one-half inch (1.27 cm), until it stops.

d. Lift the top cover straight up from the server and set it aside.

Step 2 Replace the top cover:

a. Place the cover on top of the server about one-half inch (1.27 cm) behind the lip of the chassis front cover panel. The cover should sit flat.

Note The rear of the cover has a wrap-around flanged edge that must be correctly aligned with the chassis rear edge when sliding the cover forward.

b. Slide the top cover toward the front cover panel until it stops and the release button locks.

c. Tighten the captive thumbscrew that secures the rear edge of the cover to the chassis.

Figure 3-4   *Removing the Top Cover*
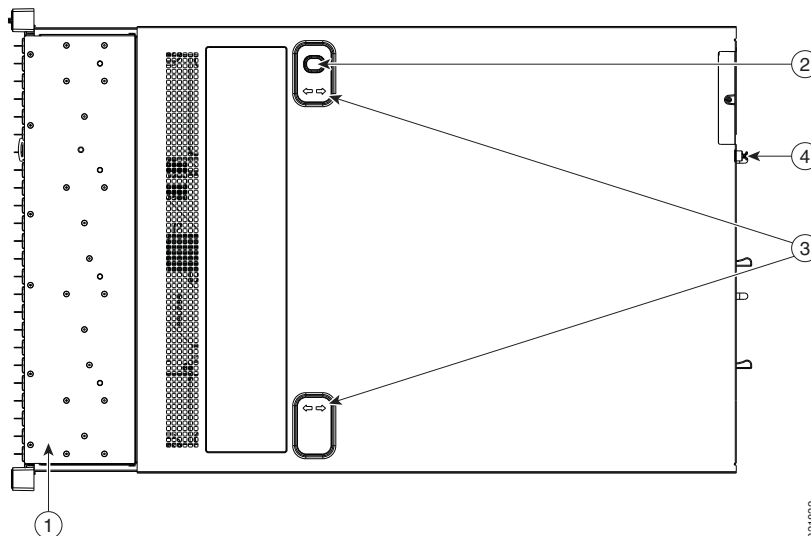
1	Front cover panel	3	Rubber finger pads (two)
2	Release button	4	Captive thumbscrew

Replaceable Component Locations

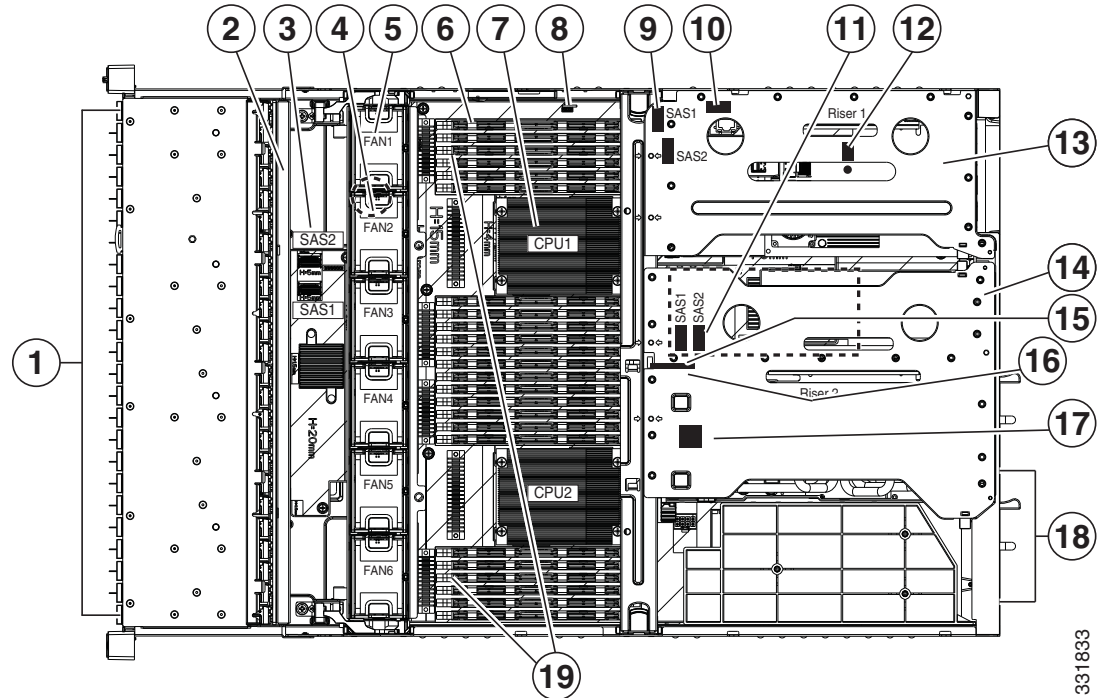This section shows the locations of the components that are discussed in this chapter. The view in Figure 3-5 is from the top down with the top cover and air baffles removed.

Figure 3-5   *Replaceable Component Locations*

1	Drives (hot-swappable, accessed through front panel)	**11**	Optional mezzanine RAID controller card, mini-SAS connectors SAS1 and SAS2
2	Drive backplane	**12**	Trusted platform module socket on motherboard
3	Drive backplane expander	**13**	PCIe riser 1 (three full-height slots)
4	RTC battery (on motherboard under fan tray)	**14**	PCIe riser 2 (one full-height slot and one half-height slot)
5	Fan modules (six, hot-swappable)	**15**	Cisco Flexible Flash card slot SD2
6	DIMM slots on motherboard (24)	**16**	Cisco Flexible Flash card slot SD1
7	CPUs and heatsinks (two)	**17**	Internal USB 2.0 port on motherboard
8	SCU upgrade ROM header (PBG DYNAMIC SKU)	**18**	Power supplies (two, hot-swappable access through rear panel)
9	Integrated RAID mini-SAS connectors on motherboard, SASPORT 1 and SASPORT2	**19**	RAID backup unit mounting locations (two, on air baffle not shown in this view)
10	Software RAID 5 key header (SW RAID KEY)		

The Technical Specifications Sheet for this server, which includes component part numbers, is at: http://www.cisco.com/en/US/prod/collateral/ps10265/ps10493/C240M3_SFF_SpecSheet.pdf.

Serial Number Location

The serial number for the server is printed on a label on the top of the server, near the front.

Color-Coded Touch Points

This server has color-coded touch points that indicate thumbscrews and latches on replaceable and hot-swappable components.

- Hot-swappable components have green plastic touch points. This includes the internal cooling fans and the power supplies. (An exception is the drive trays on the front panel, which are hot-swappable but not green).

- Some replaceable but non-hot-swappable components have light-blue plastic touch-points.

Installing or Replacing Server 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

Warning   **Class 1 laser product.** Statement 1008

Caution   When handling server components, wear an ESD strap to avoid damage.

Tip   You can press the Identification button on the front panel or rear panel to turn on a flashing Identification LED on the front and rear panels of the server. This 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 CIMC interface.See the "Status LEDs and Buttons" section on page 3-2 for locations of these LEDs.

This section describes how to install and replace server components, and it includes the following topics:

- Replacing Hard Drives or Solid State Drives, page 3-12
- Replacing a Drive Backplane, page 3-15
- Replacing Fan Modules, page 3-20
- Replacing DIMMs, page 3-24
- Replacing CPUs and Heatsinks, page 3-29
- Replacing the Motherboard RTC Battery, page 3-22
- Replacing a Mezzanine Card, page 3-34
- Replacing a PCIe Riser, page 3-36
- Replacing a PCIe Card, page 3-38
- Installing an NVIDIA GRID GPU Card, page 3-44
- Replacing a Cisco Flexible Flash Card, page 3-56
- Replacing the LSI RAID Battery Backup Unit or SuperCap Power Module, page 3-60
- Installing a Trusted Platform Module, page 3-62
- Enabling the Intel Trusted Execution Technology (TXT) Feature For the TPM, page 3-63
- Replacing a SCU Upgrade ROM Module, page 3-65
- Replacing a Software RAID Key Module, page 3-66
- Replacing Power Supplies, page 3-67
- Enabling or Disabling the Internal USB Port, page 3-68

Replacing Hard Drives or Solid State Drives

This section includes the following information:

Drive Population Guidelines

The server is orderable in three different versions, each with one of three different front panel/backplane configurations:

- Cisco UCS C240 (small form-factor (SFF) drives, with 24-drive backplane and expander). Holds up to twenty-four 2.5-inch hard drives or solid state drives.

- Cisco UCS C240 (small form-factor (SFF) drives, with 16-drive backplane, no expander). Holds up to sixteen 2.5-inch hard drives or solid state drives.

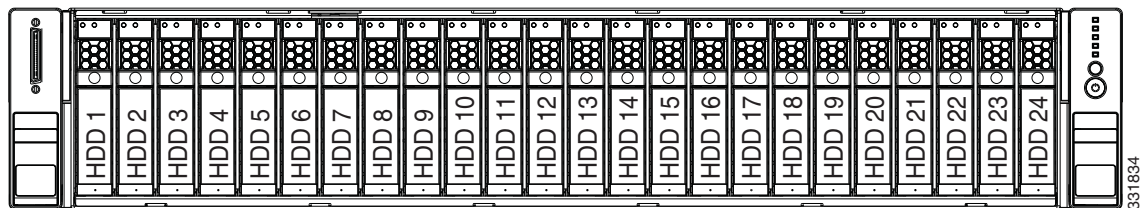![Note pencil icon] **Note**   When the server has the 16-drive backplane, only the first 16 drive bays are used.
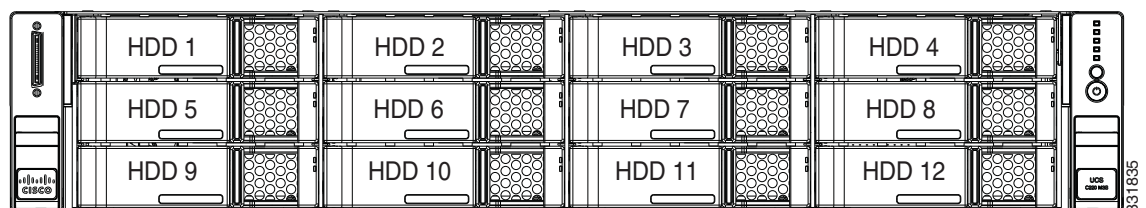
- Cisco UCS C240 (large form-factor (LFF) drives, with 12-drive backplane and expander). Holds up to twelve 3.5-inch hard drives.

The drive-bay numbering is shown in Figure 3-6 and Figure 3-7.

Figure 3-6   Drive Numbering, Small Form-Factor Drives

Figure 3-7   Drive Numbering, Large Form-Factor Drives

Observe these drive population guidelines for optimal performance:

- When populating drives, add drives in the lowest numbered bays first (populate HDD1 to HDD24).

Note   **Sixteen-drive backplane option**: If your SFF drives server has the 16-drive backplane installed, only the first 16 drive bays are used, with population order HDD1 to HDD16. Keep blanking trays in the empty eight bays to ensure optimal air flow and cooling.

- Keep an empty drive blanking tray in any unused bays to ensure optimal air flow and cooling.
- You can mix hard drives and solid state drives 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 hard drives or all SSDs.

Note   The large form-factor drives version of the server does not support 3.5-inch solid state drives.

Drive Replacement Procedure

To replace or install a hot-pluggable hard drive, follow these steps:

Tip   You do not have to shut down or power off the server to replace hard drives or solid state drives (SSDs) because they are hot-pluggable.

Step 1   Remove the drive that you are replacing or remove a blank drive tray from an empty bay:

a.   Press the release button on the face of the drive tray. See Figure 3-8.

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 replace 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, then close the ejector lever to lock the drive in place.

Figure 3-8   *Replacing Hard Drives*
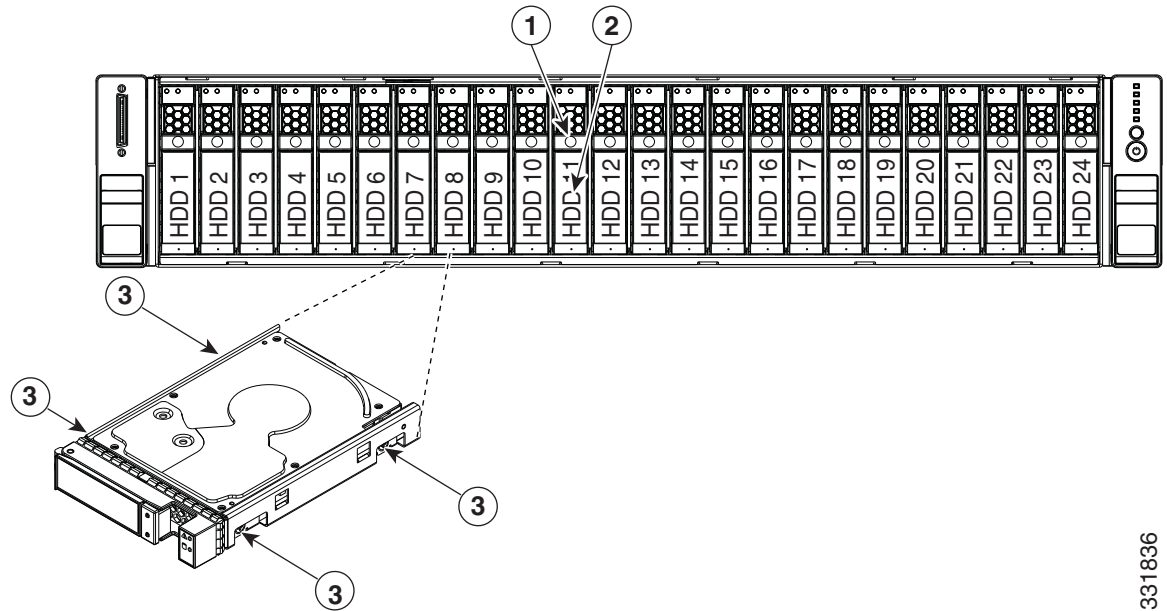
1	Release button	**3**	Drive tray securing screws (4)
2	Ejector lever		–

Replacing a Drive Backplane

✎
Note   The Small Form-Factor (24-drive or 16-drive) and Large Form-Factor (12-drive) backplanes and their corresponding chassis drive bays are factory-configurable options. When replacing a backplane, you must replace it with the same version of the backplane.

To install or replace a drive backplane, follow these steps:

✎
Note   The 16-drive backplane option does not use a SAS expander. You are instructed to skip steps that involve the SAS expander in the following procedure, if your server has the 16-drive backplane.

Step 1   Prepare the server for component replacement:

    a.   Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

    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 as described in "Removing and Replacing the Server Top Cover" section on page 3-8.

Step 2   Remove all drives and any empty drive trays from the server.

🔍
Tip   Label the drive trays as you remove them to aid replacement.

Step 3   Remove the fan tray from the server (see Figure 3-9).

    a.   Pinch the blue-plastic lever at each end of the fan tray to release the lever from the chassis.

    b.   Simultaneously rotate both levers up 90-degrees. The cam action of the levers lifts the fan tray up and disengages the six fan modules from their connectors on the motherboard.

    c.   Lift the fan tray straight up and remove it from the chassis.

Step 4   Disconnect all cables from the backplane.

Step 5   If your server has a SAS expander, disconnect cables from this expander. (The SFF 16-drive backplane option does not use an expander.)

Step 6   Disconnect the first backplane power harness cable from the motherboard to provide clearance. This is motherboard connector `BACKPLANE POWER1`, between fan connectors 5 and 6 (see Figure 3-9).

Step 7   Loosen the two captive thumbscrews that secure the backplane to the chassis (see Figure 3-9).

Step 8   Lift the backplane assembly, including steel tray and any expander card straight up from the chassis and set it on an antistatic mat.

✎
Note   If your SFF server has the 16-drive backplane, it does not use a SAS expander. Skip to Step 11.

Step 9   Remove the SAS expander card from the backplane assembly:

     a.   Use a #2 Phillips-head screwdriver to remove the two screws that secure the SAS expander to the backplane assembly steel tray (see Figure 3-10).

     b.   Pull the SAS expander from the sockets on the drive backplane and then set the SAS expander aside on an antistatic mat.

Step 10   Install the SAS expander card to the new backplane assembly:

     a.   Push the two connectors on the SAS expander into the two sockets on the backplane assembly.

     b.   Use a #2 Phillips-head screwdriver to install the two screws that secure the SAS expander to the backplane assembly steel tray (see Figure 3-10).

Step 11   Align the backplane assembly steel tray with the guides on the chassis walls, and then lower it evenly to the chassis floor.

Step 12   Tighten the two captive thumbscrews that secure the backplane to the chassis.

Step 13   Reconnect the power harness cable to the motherboard connector `BACKPLANE POWER1`.

Step 14   If your server has a SAS expander, reconnect SAS cables to the SAS expander. (The SFF 16-drive backplane option does not use an expander.)

Step 15   Reconnect all cables to the backplane.

Step 16   Replace all drives and drives trays to the drive bays.

Step 17   Replace the fan tray.

     a.   With the blue-plastic lever at each end of the fan tray in the upright and open position, set the fan tray in place in the chassis. Use the chassis guides at each end of the fan tray to keep the fan tray level and straight.

     b.   Rotate each blue-plastic lever down to the locked position. Stop when the levers click and lock.

Step 18   Replace the top cover.

Step 19   Replace the server in the rack, replace cables, and then power on the server by pressing the **Power** button.

Figure 3-9   Replacing the Drive Backplane
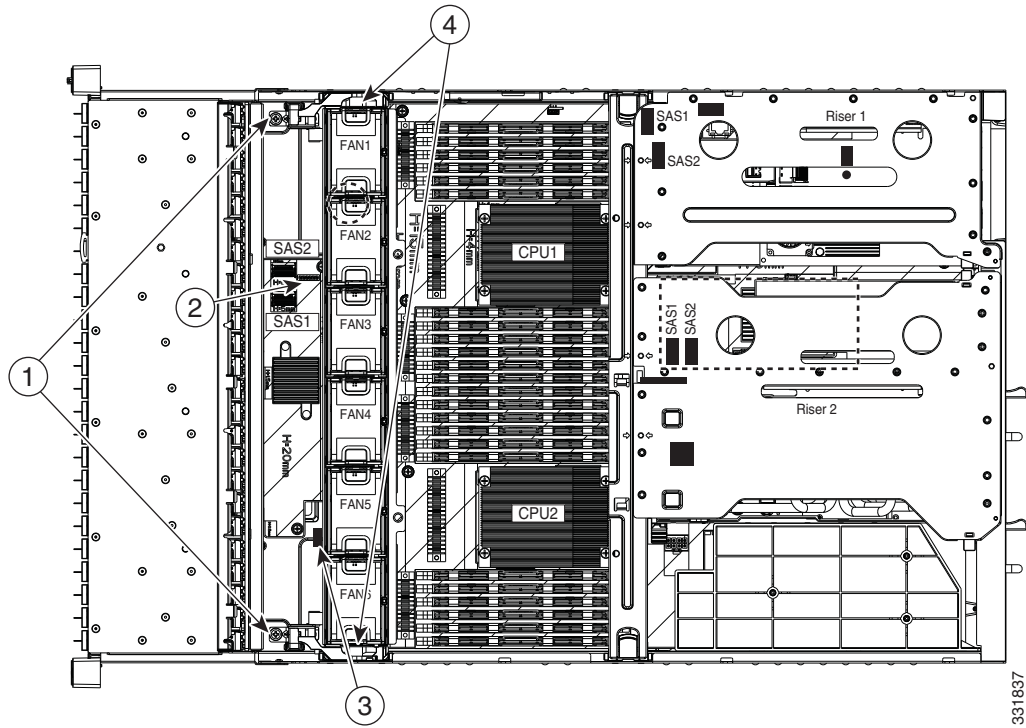
1	Backplane assembly captive thumbscrews (two)	**3**	Location of motherboard connector `BACKPLANE POWER 1`
2	SAS expander cable connectors	**4**	Fan tray blue-plastic locking levers

Replacing a SAS Expander

The SAS expander is a card that plugs directly into the drive backplane. See Appendix C, "RAID Controller Considerations" for more information about supported RAID controllers.

Note The SAS expander is required for the SFF 24-drive option and the LFF 12-drive option. The SFF 16-drive option does not use the SAS expander.

To install or replace a SAS expander, follow these steps:

Step 1 Prepare the server for component replacement:

a. Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

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 as described in "Removing and Replacing the Server Top Cover" section on page 3-8.

Step 2 Remove the fan tray from the server (see Figure 3-10).

a. Pinch the blue-plastic lever at each end of the fan tray to release the lever from the chassis.

b. Simultaneously rotate both levers up 90-degrees. The cam action of the levers lifts the fan tray up and disengages the six fan modules from their connectors on the motherboard.

c. Lift the fan tray straight up and remove it from the chassis.

Step 3 Disconnect all cables from the SAS expander.

Step 4 Remove the SAS expander:

a. Use a #2 Phillips-head screwdriver to remove the two screws that secure the SAS expander to the backplane assembly steel tray (see Figure 3-10).

Caution The motherboard heatsinks in front of the DIMM slots have sharp corners. When you pull the SAS expander from the backplane, use caution to avoid injuring your fingers.

b. Pull on both corners of the SAS expander to disengage it from the sockets on the drive backplane and then set the SAS expander aside on an antistatic mat.

Step 5 Install the new SAS expander:

a. Push the two board-edge connectors on the new SAS expander into the two sockets on the backplane.

b. Use a #2 Phillips-head screwdriver to install the two screws that secure the SAS expander to the backplane assembly steel tray (see Figure 3-10).

Step 6 Reconnect SAS cables to the new SAS expander.

Step 7 Replace the fan tray.

    a. With the blue-plastic lever at each end of the fan tray in the upright and open position, set the fan tray in place in the chassis. Use the chassis guides at each end of the fan tray to keep the fan tray level and straight.

    b. Rotate each blue-plastic lever down to the locked position. Stop when the levers click and lock.

Step 8 Replace the top cover.

Step 9 Replace the server in the rack, replace cables, and then power on the server by pressing the **Power** button.

Figure 3-10   *Replacing the SAS Expander*
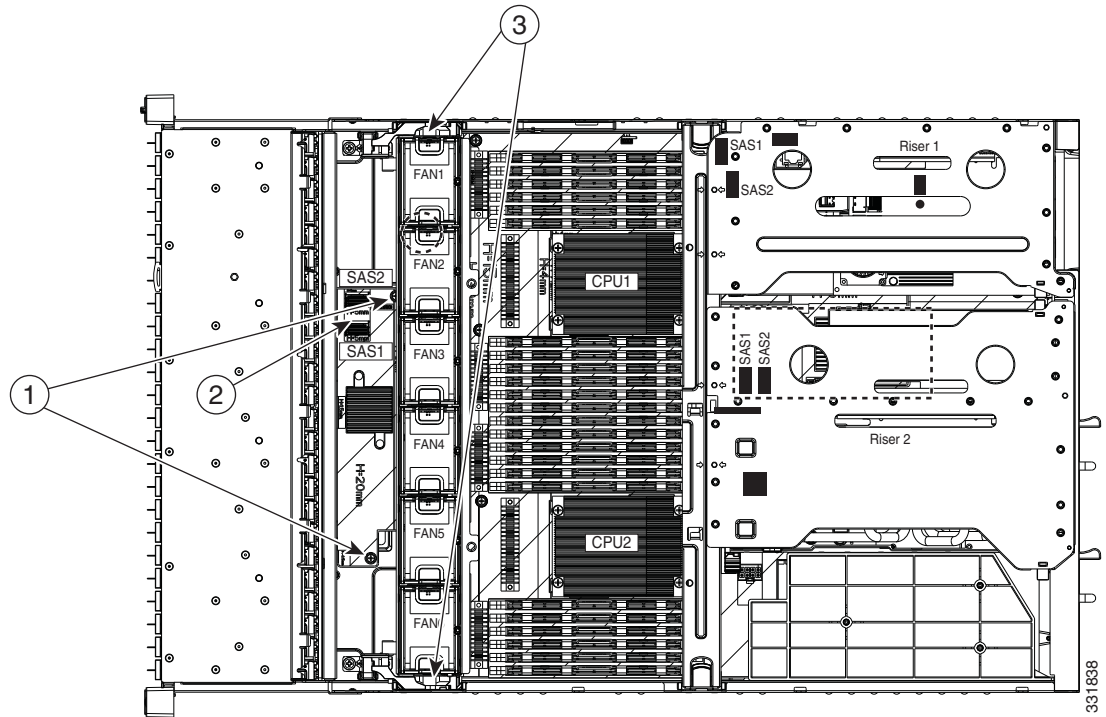
1	SAS expander securing screws (two)	**3**	Fan tray blue-plastic locking levers
2	SAS expander cable connectors		

Replacing Fan Modules

The six hot-pluggable fan modules in the server are numbered as follows when you are facing the front of the server.

Figure 3-11   Fan Module Numbering

FAN 1	FAN 2	FAN 3	FAN 4	FAN 5	FAN 6

Tip There is a fault LED on the top of each fan module that lights amber if the fan module fails. To operate these LEDs from the SuperCap power source, remove AC power cords and then press the Identification button. See also Internal Diagnostic LEDs, page 3-6.

To replace or install a hot-pluggable fan module, follow these steps:

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

Step 1 Remove a fan module that you are replacing (see Figure 3-12):

   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 as described in "Removing and Replacing the Server Top Cover" section on page 3-8.

   c. Grasp and squeeze together the two plastic finger-latches on the top of the fan module and then lift straight up to disengage the fan connector from the motherboard.

Step 2 Install a new fan module:

   a. Set the new fan module in place, aligning the connector on the bottom of the fan module with the connector on the motherboard (see Figure 3-12).

   b. Press down gently on the fan module until the finger-latches click and lock in place.

   c. Replace the top cover.

   d. Replace the server in the rack.

Figure 3-12   *Replacing Fan Modules*
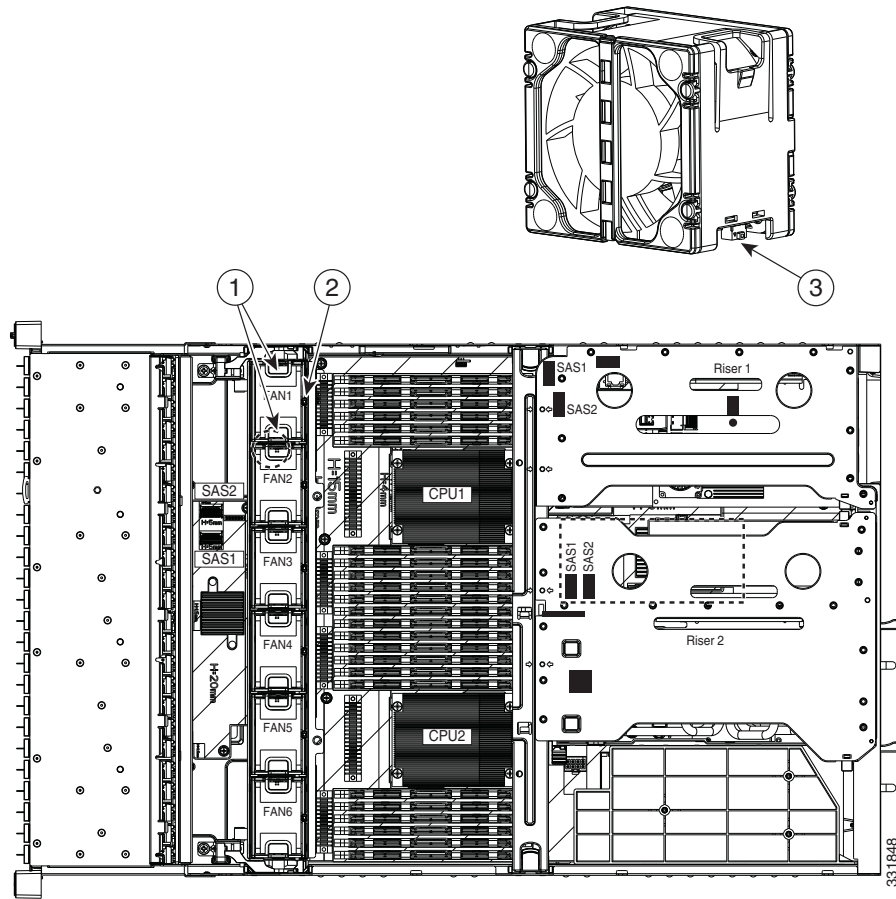
1	Finger latches on each fan module	**2**	Fan module fault LED on each fan module
		3	Connector on underside of fan module

Replacing the Motherboard 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]

The real-time clock (RTC) battery retains system settings when the server is disconnected from power. The RTC battery is on the motherboard under the fan tray.

The battery type is Panasonic CR2032 or equivalent.

To replace or install the motherboard CMOS battery, follow these steps:

Step 1 Remove the RTC battery (see Figure 3-13):

   a. Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

   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 as described in "Removing and Replacing the Server Top Cover" section on page 3-8.

   d. Remove the fan tray from the server (see Figure 3-13).

      1. Pinch the blue-plastic lever at each end of the fan tray to release the lever from the chassis.

      2. Simultaneously rotate both levers up 90-degrees. The cam action of the levers lifts the fan tray up and disengages the six fan modules from their connectors on the motherboard.

      3. Lift the fan tray straight up and remove it from the chassis.

   e. Gently remove the battery from its holder on the motherboard. Use a small screwdriver or pointed object under the battery to gently pry upward.

Step 2 Install an RTC battery:

   **a.** Insert the battery into its holder and press down until it clicks in place.

Note The positive side of the battery marked "3V+" should face upward.

   b. Replace the fan tray.

      1. With the blue-plastic lever at each end of the fan tray in the upright and open position, set the fan tray in place in the chassis. Use the chassis guides at each end of the fan tray to keep the fan tray level and straight.

      2. Rotate each blue-plastic lever down to the locked position. Stop when the levers click and lock.

   c. Replace the top cover.

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

Figure 3-13   *Replacing the Motherboard RTC Battery*
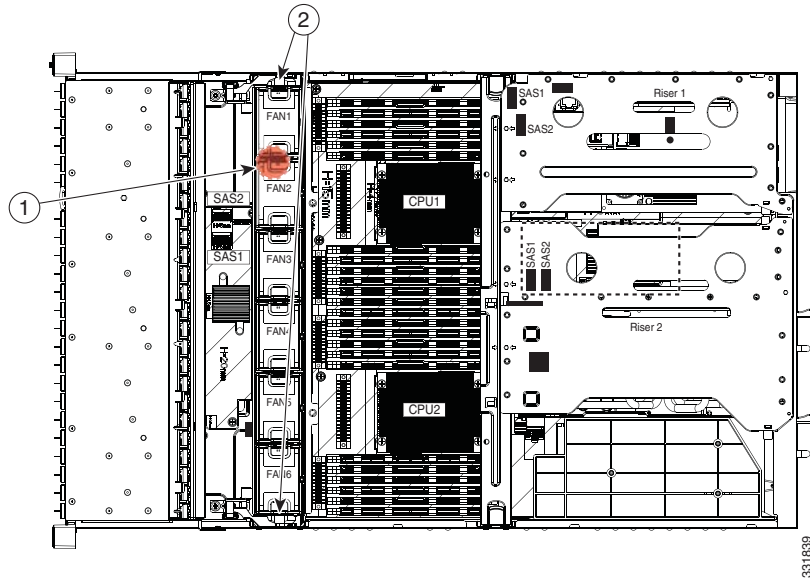
1	RTC battery holder on motherboard (under fan tray)	**2**	Fan tray blue-plastic locking levers

Replacing DIMMs

This section includes the following topics:

⚠

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

⚠

Caution   Cisco does not support 3rd-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 memory.
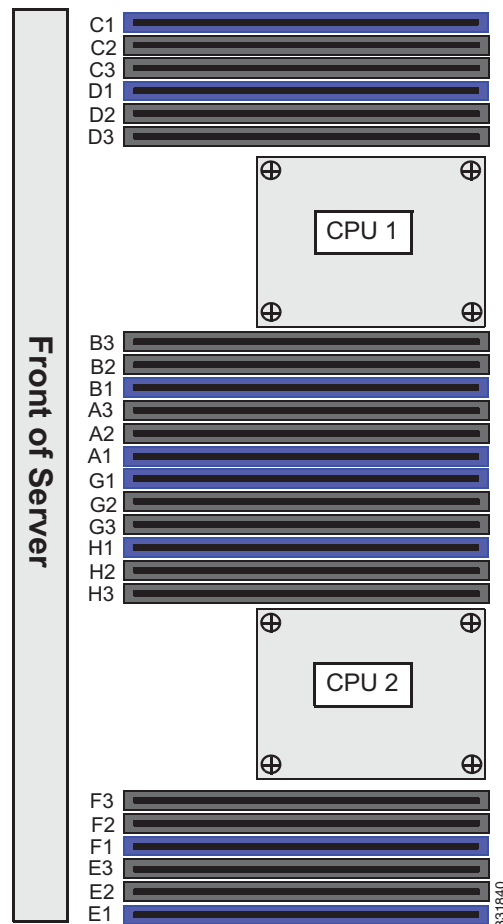
Memory Performance Guidelines and Population Rules

This section describes the type of memory that the server requires and its effect on performance. The section includes the following topics:

DIMM Slot Numbering

Figure 3-14 shows the numbering of the DIMM slots.

Figure 3-14   CPUs and DIMM Slots on Motherboard

DIMM Population Rules

Observe the following guidelines when installing or replacing DIMMs:

- Each CPU supports four memory channels.
    - CPU1 supports channels A, B, C, and D.
    - CPU2 supports channels E, F, G, and H.
- Each channel has three DIMM slots (for example, channel A = slots A1, A2, and A3).
    - A channel can operate with one, two, or three DIMMs installed.
    - If a channel has only one DIMM, populate slot 1 first (the blue slot).
- When both CPUs are installed, populate the DIMM slots of each CPU identically.
    - Fill blue #1 slots in the channels first: A1, E1, B1, F1, C1, G1, D1, H1
    - Fill black #2 slots in the channels second: A2, E2, B2, F2, C2, G2, D2, H2
    - Fill black #3 slots in the channels third: A3, E3, B3, F3, C3, G3, D3, H3

- Any DIMM installed in a DIMM socket for which the CPU is absent is not recognized. In a single-CPU configuration, populate the channels for CPU1 only.

- Although 1600 MHz DIMMs can be run in Power Saving Mode (low-voltage 1.35 V operation), 1600 MHz operation is supported only when the DDR mode is set to Performance Mode (see "Enabling Low-Voltage DIMM Operation.") A 1600 MHz DIMM with DDR mode set to Power Saving Mode operates at 1066 MHz.

- Observe the DIMM mixing rules shown in Table 3-4.

Table 3-4   DIMM Mixing Rules

DIMM Parameter Mixed	Mix Across Single Channel?	Mix Across Multiple Channels?
DIMM size (4, 8, 16 GB)	No—Must be same size in channel.	Yes—Can be different sizes in server.
DIMM speed (1333 or 1600 MHz)	No—Must be same speed in channel.	No—Must be the same speed in server.
DIMM type (U-DIMM or R-DIMM)	No—Must be same type in channel.	No—Must be the same type in server.

- Memory mirroring reduces the amount of memory available by 50% because only one of the two populated channels provides data. When memory mirroring is enabled, DIMMs must be installed in sets of 4, 6, 8, or 12 as described in Memory Mirroring, page 3-27.

- Note the following restrictions when using UDIMMs. Even though a UDIMM might be rated at 1600 MHz, actual operational speeds are slower because of the Intel implementation.

   - UDIMMs do not support 3 DIMMs per channel (3 DPC) configurations.

   - In Performance Mode (1.5 V operation), UDIMMs run at 1333 MHz in 1 DPC and 2 DPC configurations.

   - In Power Saving Mode (1.35 V operation), UDIMMs run at 1066 MHz in 1 DPC and 2 DPC configurations.

Enabling Low-Voltage DIMM Operation

You can enable low voltage (1.35 V) DIMM operation for all DIMMs in the server. There is a setting in the BIOS Setup utility that you can use to change the DDR memory mode to Power Saving mode, as described in the following procedure:

Step 1   Enter the BIOS setup utility by pressing the **F2** key when prompted during bootup.

Step 2   Select the **Advanced** tab.

Step 3   Select **Low Voltage DDR Mode**.

Step 4   In the pop-up window, select either **Power Saving** or **Performance Mode**:

- Power Saving Mode–Prioritizes low-voltage memory operation.

- Performance Mode–Prioritizes performance memory operation. If you mix low-voltage DIMMs with standard DIMMs, the system defaults to this setting.

Step 5   Press **F10** to save your changes and exit the setup utility.

DIMM Sparing and Rank Sparing

DIMM and rank sparing can be enabled in the BIOS configuration utility.

Sparing involves utilizing one of the DIMM pairs or rank pairs within each memory riser as a spare unit. When any of the other DIMM pairs within the same memory riser experiences errors beyond a pre-defined threshold, it fails over to the spare DIMM pair. Spared DIMMs and ranks are hidden from the user and the OS so that the BIOS can migrate to a spare unit when it finds degrading DIMMs.

When sparing is enabled, the available system memory is lesser than the total installed memory.

- When using DIMM sparing, the available memory equals total installed memory minus the size of spared DIMMs.

- When using rank sparing, available memory equals total installed memory minus the size of the spared ranks. Rank size equals DIMM size divided by the number of ranks.

Memory Mirroring

When memory mirroring is enabled, the memory subsystem simultaneously writes identical data to two channels. If a memory read from one of the channels returns incorrect data due to an uncorrectable memory error, the system automatically retrieves the data from the other channel. A transient or soft error in one channel does not affect the mirrored data, and operation continues unless there is a simultaneous error in exactly the same location on a DIMM and its mirrored DIMM. Memory mirroring reduces the amount of memory available to the operating system by 50% because only one of the two populated channels provides data.

If you choose to enable memory mirroring, populate the DIMM slots in the order shown in Table 3-5.

Table 3-5   Memory Mirroring DIMM Population

Number of DIMMs per CPU	CPU 1 Population	CPU2 Population
4	A1, B1; A2, B2	E1, F1; E2, F2
6	A1, B1; A2, B2; A3, B3	E1, F1; E2, F2; E3, F3
8	A1, B1; C1, D1; A2, B2; C2, D2	E1, F1; G1, H1; E2, F2; G2, H2
10	A1, B1; C1, D1; A2, B2; C2, D2; A3, B3	E1, F1; G1, H1; E2, F2; G2, H2; E3, F3
12	A1, B1; C1, D1; A2, B2; C2, D2; A3, B3; C3, D3	E1, F1; G1, H1; E2, F2; G2, H2; E3, F3; G3, H3

DIMM Replacement Procedure

This section includes the following topics:

- Identifying a Faulty DIMM, page 3-28
- Replacing DIMMs, page 3-28

Identifying a Faulty DIMM

Each DIMM slot has a corresponding DIMM fault LED. See Figure 3-3 for the locations of these LEDs.

The LEDs light amber to indicate a faulty DIMM. To operate these LEDs from the SuperCap power source, remove AC power cords and then press the Identification button. See also Internal Diagnostic LEDs, page 3-6.

Replacing DIMMs

To install a DIMM assembly, follow these steps:

Step 1 Remove the DIMMs that you are replacing:

  a. Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

  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 as described in "Removing and Replacing the Server Top Cover" section on page 3-8.

  d. Identify the faulty DIMM by observing the DIMM slot fault LEDs on the motherboard (see Figure 3-3).

  e. Open the ejector levers at both ends of the DIMM slot, then lift the DIMM out of the slot.

Step 2 Install a new DIMM:

✎ **Note**   Before installing DIMMs, refer to the population guidelines. See Memory Performance Guidelines and Population Rules, page 3-24.

  a. Align the new DIMM with the empty slot on the motherboard. Use the alignment key 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.

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

Replacing CPUs and Heatsinks

This server has two CPUs. Each CPU supports four DIMM channels (12 DIMM slots). See Figure 3-14.

- The server can operate with one CPU or two identical CPUs installed.

- The minimum configuration is that the server must have at least CPU1 installed. Install CPU1 first, then CPU2.

Note   The following restrictions apply when using a single-CPU configuration: the maximum number of DIMMs is twelve, the internal mezzanine card slot is unavailable, and PCIe riser 2, which contains PCIe slots 4 and 5, is unavailable.

Caution   CPUs and their motherboard sockets are fragile and must be handled with care to avoid damaging pins during installation. The CPUs must be installed with heatsinks and their thermal pads to ensure proper cooling. Failure to install a CPU correctly might result in damage to the server.

Caution   The Pick-and-Place tools used in this procedure are required to prevent damage to the contact pins between the motherboard and the CPU. Do not attempt this procedure without the required tools, which are included with each CPU option kit. If you do not have the tool, you can order a spare (Cisco PID UCS-CPU-EP-PNP).

To install or replace a CPU heatsink and CPU, follow these steps:

Step 1   Remove the CPU and heatsink that you are replacing:

a.   Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

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 as described in "Removing and Replacing the Server Top Cover" section on page 3-8.

d.   Use a Number 2 Phillips-head screwdriver to loosen the four captive screws that secure the heatsink and then lift it off of the CPU.

Note   Alternate loosening each screw evenly to avoid damaging the heatsink or CPU.

e.   Unclip the first CPU retaining latch labelled with the ⊏⌒ icon, then unclip the second retaining latch labelled with the △ icon. See Figure 3-15.

f.   Open the hinged CPU cover plate.

Figure 3-15   *CPU Heatsink and Socket*
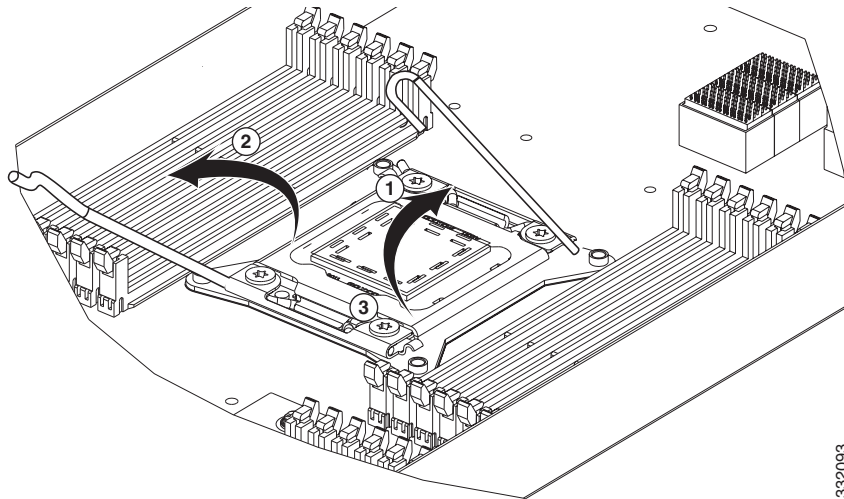
1	CPU retaining latch,	3	Hinged CPU cover plate
2	CPU retaining latch,		–

Step 2   Remove a protective cap or an old CPU from the socket (if present):

- If you are removing an old CPU, skip to Step 3.

- If you are installing a new CPU to a socket that was shipped empty, the socket has a protective cap that is intended to prevent bent contact pins. Use the tool as shown in Figure 3-16 to grasp the protective cap and then pivot to remove the cap.

Figure 3-16   *Protective Cap Removal Tool*
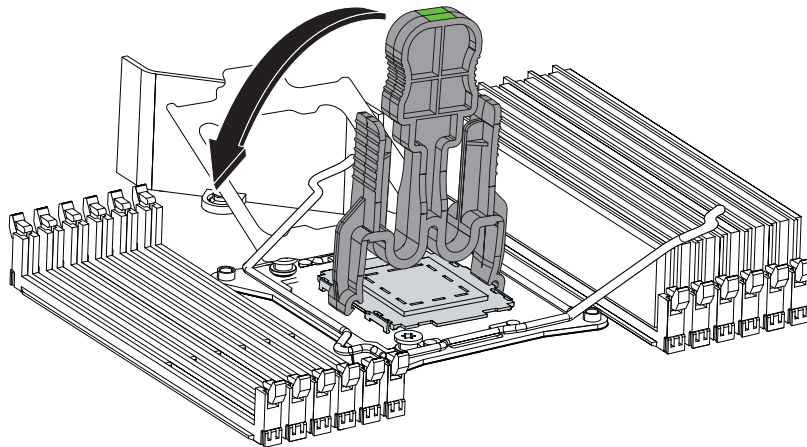
Step 3   Remove an old CPU:

- **a.** Set the Pick-and-Place tool on the CPU in the socket, aligning the arrow on the tool with the registration mark on the socket (the small triangular mark). See Figure 3-17.

- **b.** Press the top button on the tool to grasp the installed CPU.

- **c.** Lift the tool and CPU straight up.

- **d.** Press the top button on the tool to release the old CPU on an anti-static surface.

Figure 3-17   Removing or Inserting a CPU
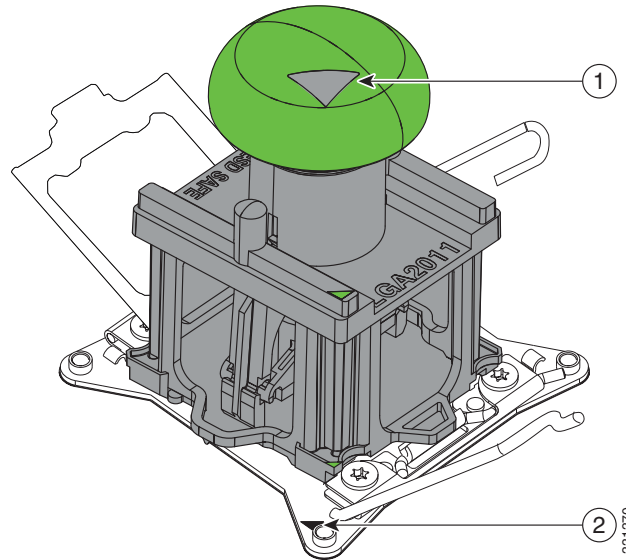
| **1** | Arrow on tool | **2** | Registration mark on CPU socket |

Step 4   Insert the new CPU into the Pick-and-Place tool:

a. Remove the new CPU from the packaging and place it on the pedestal that is included in the kit. Align the registration mark on the corner of the CPU with the arrow on the corner of the pedestal (see Figure 3-18).

b. Press down on the top button of the tool to lock it open.

c. Set the Pick-and-Place tool on the CPU pedestal, aligning the arrow on the tool with the arrow on the corner of the pedestal. Make sure that the tabs on the tool are fully seated in the slots on the pedestal.

d. Press the side lever on the tool to grasp and lock in the CPU.

e. Lift the tool and CPU straight up off the pedestal.

Figure 3-18   *CPU and Pick-and-Place Tool on Pedestal*
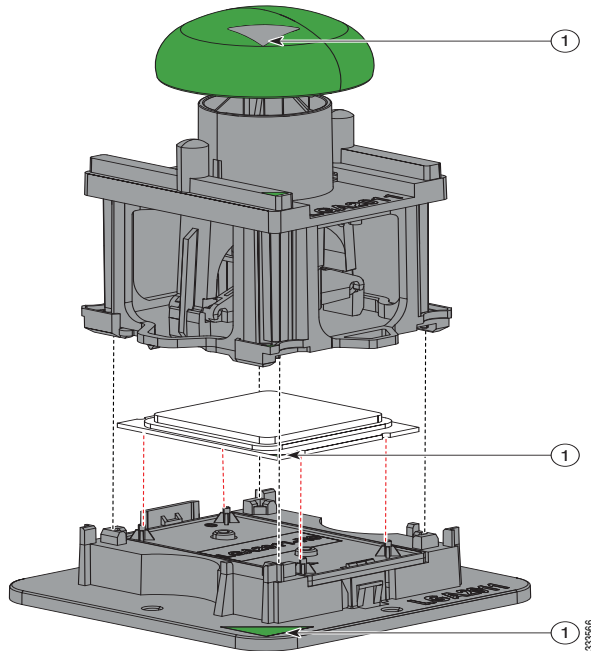
| 1 | Arrow marks for alignment | – |

Step 5   Install a new CPU:

    a. Set the Pick-and-Place tool with CPU over the empty CPU socket on the motherboard.

Note   Align the arrow on the top of the tool with the registration mark (small triangle) that is stamped on the metal of the CPU socket, as shown in Figure 3-17.

    b. Press the top button on the tool to set the CPU into the socket. Remove the empty tool.

    c. Close the hinged CPU cover plate.

    d. Clip down the CPU retaining latch with the   ⌂   icon, then clip down the CPU retaining latch with the   ⌂   icon. See Figure 3-15.

**Step 6**   Install a heatsink:

Caution   The heatsink must have a new, undamaged thermal pad on the heatsink-to-CPU surface to ensure proper cooling. If you are replacing a heatsink that was previously used, you must remove the old thermal pad. If you are installing a new heatsink, skip to step d. below.

    a. Apply an alcohol-based cleaning solution to the old thermal pad and let it soak for a least 15 seconds.

    b. Wipe all of the old thermal pad off the old heatsink using a soft cloth that will not scratch the heatsink surface.

    c. Apply thermal grease from an included syringe to the top of the CPU.

       Apply about 2 cubic centimeters of grease (about half the syringe contents) to the top of the CPU in the pattern that is shown in Figure 3-19.

✎

Note   If you do not have a syringe of thermal grease, you can order a spare
(Cisco PID UCS-CPU-GREASE2).

Figure 3-19   Thermal Grease Application Pattern
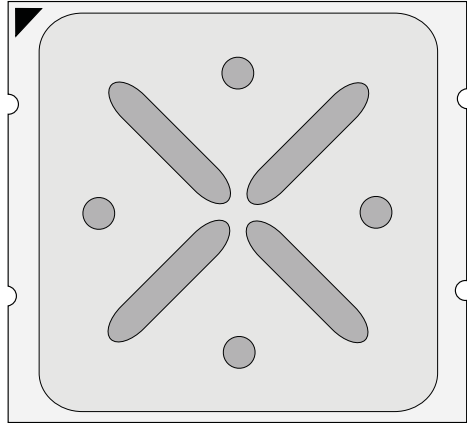
d. For a new heatsink, peel the protective film from the thermal pad that is on the bottom of the new
heatsink.

✎

Note   Do not apply a syringe of thermal grease if you are installing a new heatsink that already has a
pre-applied thermal pad.

e. Align the heatsink captive screws with the motherboard standoffs, then use a Number 2
Phillips-head screwdriver to tighten the captive screws evenly.

✎

Note   Alternate tightening each screw evenly to avoid damaging the heatsink or CPU.

f. Replace the top cover.

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

Replacing a Mezzanine Card

The server has a dedicated socket on the motherboard for a mezzanine-style RAID controller card.

Note See RAID Controller Considerations, page C-1 for more information about supported cards and cabling.

To install or replace a mezzanine card, follow these steps:

Step 1 Remove the mezzanine card that you are replacing (see Figure 3-20):

    a. Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

    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 as described in "Removing and Replacing the Server Top Cover" section on page 3-8.

    d. Remove PCIe riser 2 from the server to provide clearance (see Figure 3-20).

    e. Disconnect all cables from the mezzanine card.

Tip Label the cables before you disconnect them to aid replacement.

    f. Use a #2 Phillips-head screwdriver to remove the two screws that secure the card to the motherboard standoffs.

    g. Pull the mezzanine card straight up to disengage it from its motherboard socket, and then remove the card from the chassis.

Step 2 Install a new mezzanine card:

    a. Set the new mezzanine card in place on the motherboard, aligning its connector with the motherboard socket.

    b. Push down on both ends of the mezzanine card evenly to engage the card's connector with the socket on the motherboard.

    c. Use a #2 Phillips-head screwdriver to install the two screws that secure the card to the motherboard standoffs.

    d. Reconnect cables to the new mezzanine card. See RAID Controller Considerations, page C-1 for more information about supported cards and cabling.

    e. Replace PCIe riser 2 to the server.

    f. Replace the top cover.

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

    h. If this was a replacement card, continue with Restoring RAID Configuration After Replacing a RAID Controller, page C-22.

Figure 3-20   *Replacing the Mezzanine Card (Shown With PCIe Riser 2 Removed)*
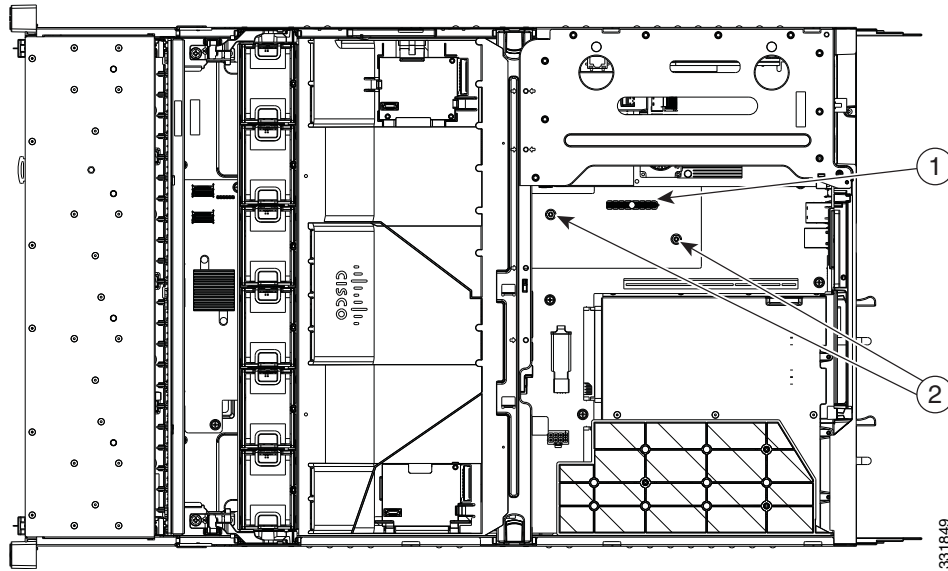
1	Mezzanine card connector on motherboard	2	Mezzanine card securing screws (two)

Replacing a PCIe Riser

The server contains two toolless PCIe risers for horizontal installation of PCIe cards. PCIe riser 2 also includes two internal sockets for Cisco Flexible Flash cards (SD cards). See Replacing a PCIe Card, page 3-38 for specifications of the PCIe slots on the risers.

Figure 3-21   Rear Panel, Showing PCIe Slots
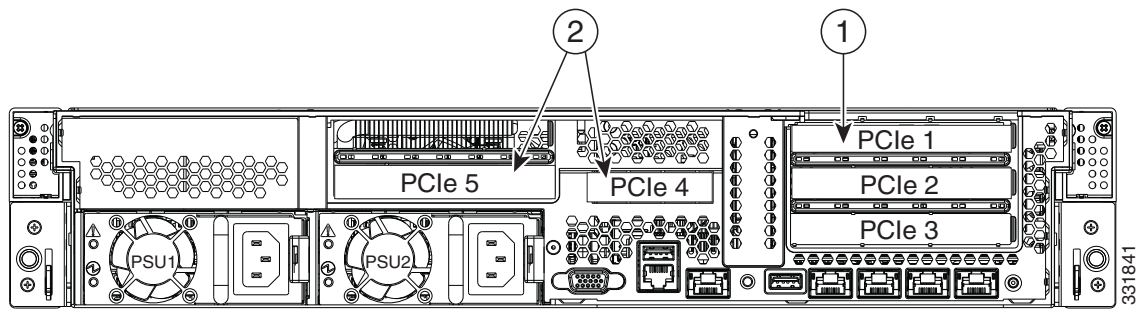
1	PCIe riser 1 slots (three)	2	PCIe riser 2 slots (two)

To install or replace a PCIe riser, follow these steps:

Step 1   Remove the PCIe riser that you are replacing (see Figure 3-20):

a. Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

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 as described in "Removing and Replacing the Server Top Cover" section on page 3-8.

d. Disconnect external cables from any PCIe cards that are installed in the PCIe riser.

e. Use the finger holes to lift straight up on both ends of the riser to disengage its circuit board from the socket on the motherboard. Set the riser on an antistatic mat.

f. If the riser has a card installed, remove the card from the riser.

To remove a card, push down on the retaining clip on the hinged card retainer and then swing open the retainer to free the rear-panel tab of the card (see Replacing a PCIe Card, page 3-38).

Step 2   Install a new PCIe riser:

a. If you removed a card from the old PCIe riser, install the card to the new riser (see Replacing a PCIe Card, page 3-38).

b. Position the PCIe riser over its socket on the motherboard and over its alignment slots in the chassis (see Figure 3-22).

c. Carefully push down on both ends of the PCIe riser to fully engage its circuit board connector with the socket on the motherboard.

d. Connect external cables to any PCIe cards installed in the riser.

e. Replace the top cover.

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

Figure 3-22   Replacing the PCIe Riser
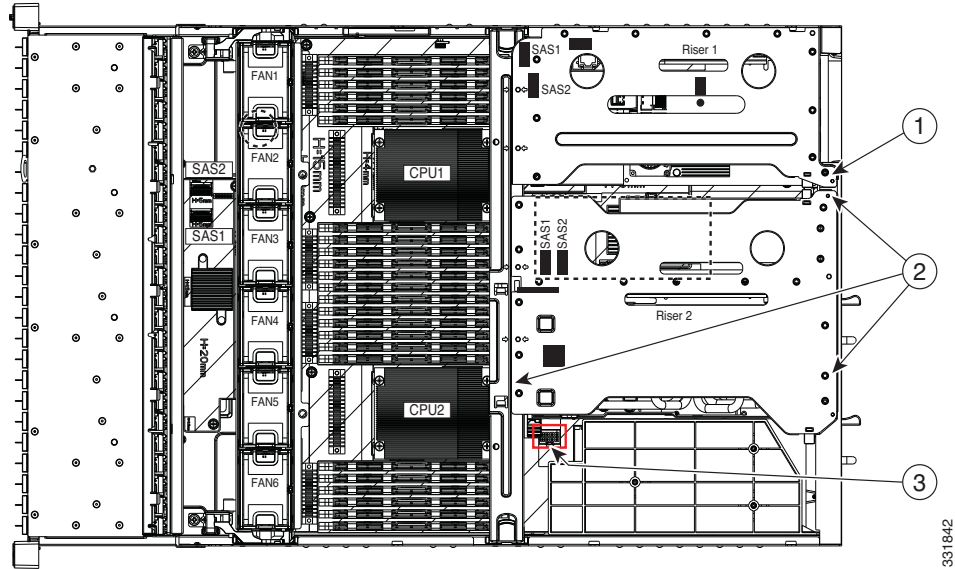
1	PCIe riser 1 alignment slot location	**2**	PCIe riser 2 alignment slot locations (three)

Replacing a PCIe Card

⚠ **Caution** 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 third-party card occurs.

This section includes the following topics:

- PCIe Slots, page 3-38
- Replacing a PCIe Card, page 3-39
- Special Considerations for Cisco UCS Virtual Interface Cards, page 3-41
- RAID Controller Card Cable Routing, page 3-41
- Installing Multiple PCIe Cards and Resolving Limited Resources, page 3-42

PCIe Slots

The server contains two toolless PCIe risers for horizontal installation of PCIe cards. See Figure 3-23 and Table 3-6.

Figure 3-23   ***Rear Panel PCIe Slots***
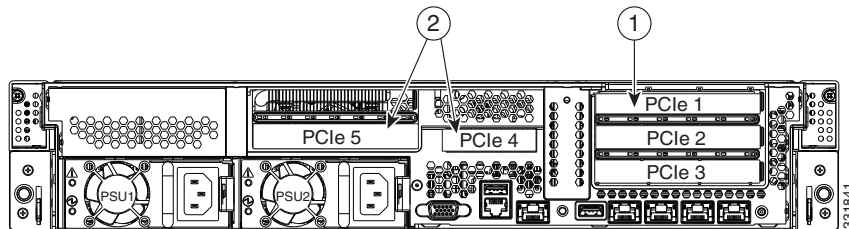
| 1 | PCIe riser 1 (slots 1, 2, and 3) | 2 | PCIe riser 2 (slots 4 and 5) |

Table 3-6   ***PCIe Expansion Slots***

Slot Number	Electrical Lane Width	Connector Length	Card Length[1]	Card Height [2]	NCSI[3] Support
1	Gen-3 x8	x16 connector	1/2 length	Full-height	No
2	Gen-3 x16	x24 extended	1/2 length	Full-height	Yes[4]
3	Gen-3 x8	x16 connector	1/2 length	Full-height	No
4 [5]	Gen-3 x8	x16 connector	3/4 length	Half-height	No
5 [6]	Gen-3 x16	x24 extended	3/4 length	Full-height, also supports double-width cards	Yes

1. This is the supported length because of internal clearance.
2. This is the size of the rear panel opening.
3. Network Communications Services Interface protocol
4. Slot 2 can operate when the server is in standby power mode.
5. Slot 4 is not available in single-CPU configurations.
6. Slot 5 is not available in single-CPU configurations.

Replacing a PCIe Card

Note   For the list of supported PCIe adapters and other components, see the Technical Specifications Sheet at http://www.cisco.com/en/US/prod/collateral/ps10265/ps10493/C240M3_SFF_SpecSheet.pdf.

Note   If you are installing a Cisco UCS Virtual Interface Card, there are prerequisite considerations. See Special Considerations for Cisco UCS Virtual Interface Cards, page 3-41.

Note   If you are installing a RAID controller card, see RAID Controller Considerations, page C-1 for more information about supported cards and cabling.

To install or replace a PCIe card, follow these steps:

Step 1   Remove a PCIe card (or a blank filler panel) from the PCIe riser assembly:

  a.   Shut down and power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

  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 as described in the "Removing and Replacing the Server Top Cover" section on page 3-8.

  d.   Disconnect cables from any PCIe cards that are installed in the PCIe riser.

Tip   Label the cables when you disconnect them to aid correct connection to the new card.

  e.   Use the finger holes to lift straight up on both ends of the riser to disengage its circuit board from the socket on the motherboard. Set the riser on an antistatic mat.

  f.   Push down on the securing clip on the hinged card retainer and then swing open the retainer to free the rear-panel tab of the existing card (or blanking panel). See Figure 3-24.

Note   Slot 5 on PCIe riser 2 has an additional plastic retaining clip that stabilizes the front end of a card. Push down on this clip before pulling the card from the riser socket (see Figure 3-24).

  g.   Pull evenly on both ends of the PCIe card to disengage it from the socket on the PCIe riser (or remove a blanking panel) and then set the card aside.

Step 2   Install a PCIe card:

  a.   Align the new PCIe card with the empty socket on the PCIe riser.

  b.   Push down evenly on both ends of the card until it is fully seated in the socket.

    Ensure that the card rear panel tab sits flat against the PCIe riser rear panel opening.

c. Close the hinged card retainer over the rear panel tab of the card and push in on the retainer until its clip clicks into place to secure the card.

d. Position the PCIe riser over its socket on the motherboard and over its alignment features in the chassis (see Figure 3-22).

e. Carefully push down on both ends of the PCIe riser to fully engage its circuit board connector with the socket on the motherboard.

f. Connect cables to the PCIe card. See RAID Controller Considerations, page C-1 for more information about supported cards and cabling.

g. Replace the top cover.

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

i. If you replaced a RAID controller card, continue with Restoring RAID Configuration After Replacing a RAID Controller, page C-22.

Figure 3-24   PCIe Riser card Retainers (Slot 5 on PCIe Riser 2 Shown)
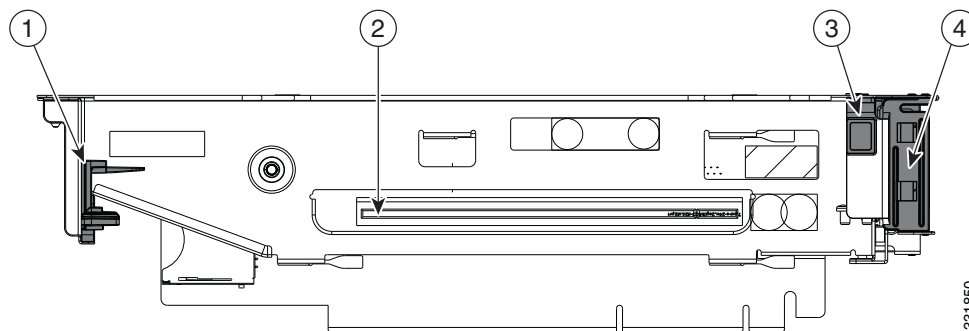
1	Long card retainer (on riser 2, slot 5 only)	3	Securing clip on hinged card retainer
2	Card socket on riser	4	Hinged card retainer

Special Considerations for Cisco UCS Virtual Interface Cards

Table 3-7 describes the requirements for the supported Cisco UCS virtual interface cards (VICs).

Table 3-7   *Cisco UCS C240 Requirements for Virtual Interface Cards*

Virtual Interface Card (VIC)	Number of VICs Supported in Server	Slots That Support VICs [1]	Primary Slot For UCS Integration or Cisco Card NIC Mode	Minimum CIMC Firmware	Minimum VIC Firmware	Minimum Nexus OS on an Upstream Nexus Fabric Interconnect
Cisco UCS VIC P81E N2XX-ACPCI01	2	PCIE 2 PCIE 5	PCIE 2	1.4(4)	2.0(2)	5.0
Cisco UCS VIC1225 UCSC-PCIE-CSC-02	2	PCIE 2 PCIE 5	PCIE 2	1.4(6)	2.1(0)	5.0
Cisco UCS VIC1225T UCSC-PCIE-C10T-02	2	PCIE 2 PCIE 5	PCIE 2[2]	1.5(1)	2.1(1)	6.0

1. See PCIe Slots, page 3-38.

2. The Cisco UCS VIC1225T is not supported for UCS integration at this time.

RAID Controller Card Cable Routing

If the PCIe card that you are installing or replacing is a RAID controller card, see RAID Controller Considerations, page C-1 for cable routing and other guidelines.

Installing Multiple PCIe Cards and Resolving Limited Resources

When a large number of PCIe add-on cards are installed in the server, the system may run out of the following resources required for PCIe devices:

- Option ROM memory space
- 16-bit I/O space

The topics in this section provide guidelines for resolving the issues related to these limited resources.

- Resolving Insufficient Memory Space to Execute Option ROMs, page 3-42
- Resolving Insufficient 16-Bit I/O Space, page 3-43

Resolving Insufficient Memory Space to Execute Option ROMs

The system has very limited memory to execute PCIe legacy option ROMs, so when a large number of PCIe add-on cards are installed in the server, the system BIOS might not able to execute all of the option ROMs. The system BIOS loads and executes the option ROMs in the order that the PCIe cards are enumerated (Slot 1, Slot 2, Slot 3, etc.).

If the system BIOS does not have sufficient memory space to load any PCIe option ROM, it skips loading that option ROM, reports a system event log (SEL) event to the CIMC controller and reports the following error in the Error Manager page of the BIOS Setup utility:

```
ERROR CODE  SEVERITY    INSTANCE    DESCRIPTION
146         Major       N/A         PCI out of resources error.
                                    Major severity requires user
                                    intervention but does not
                                    prevent system boot.
```

To resolve this issue, disable the Option ROMs that are not needed for system booting. The BIOS Setup Utility provides the setup options to enable or disable the Option ROMs at the PCIe slot level for the PCIe expansion slots and at the port level for the onboard NICs. These options can be found in the BIOS Setup Utility **Advanced** → **PCI Configuration** page.

- **Guidelines for RAID controller booting:**

  If the server is configured to boot primarily from RAID storage, make sure that the option ROMs for the slots where your RAID controllers installed are enabled in the BIOS, depending on your RAID controller configuration.

  If the RAID controller does not appear in the system boot order even with the option ROMs for those slots are enabled, the RAID controller option ROM might not have sufficient memory space to execute. In that case, disable other option ROMs that are not needed for the system configuration to free up some memory space for the RAID controller option ROM.

  See also Factory-Default Option ROM Settings, page C-4.

- **Guidelines for onboard NIC PXE booting:**

  If the system is configured to primarily perform PXE boot from onboard NICs, make sure that the option ROMs for the onboard NICs to be booted from are enabled in the BIOS Setup Utility. Disable other option ROMs that are not needed to create sufficient memory space for the onboard NICs.

Resolving Insufficient 16-Bit I/O Space

The system has only 64 KB of legacy 16-bit I/O resources available. This 64 KB of I/O space is divided between the CPUs in the system because the PCIe controller is integrated into the CPUs. This server BIOS has the capability to dynamically detect the 16-bit I/O resource requirement for each CPU and then balance the 16-bit I/O resource allocation between the CPUs accordingly during the PCI bus enumeration phase of the BIOS POST.

When a large number of PCIe cards are installed in the system, the system BIOS might not have sufficient I/O space for some PCIe devices. If the system BIOS is not able to allocate the required I/O resources for any PCIe devices, the following symptoms have been observed:

- The system might get stuck in an infinite reset loop.
- The BIOS might appear to hang while initializing PCIe devices.
- The PCIe option ROMs might take excessive time to complete, which appears to lock up the system.
- PCIe boot devices might not be accessible from the BIOS.
- PCIe option ROMs might report initialization errors. These errors are seen before the BIOS passes control to the operating system.
- The keyboard might not work.

To work around this problem, rebalance the 16-bit I/O load using the following methods:

1. Physically remove any unused PCIe cards.

2. If the system has one or more Cisco virtual interface cards (VICs) installed, disable the PXE boot on the VICs that are not required for the system boot configuration by using the Network Adapters page in the CIMC WebUI to free up some 16-bit I/O resources. Each VIC uses a minimum 16 KB of 16-bit I/O resource, so disabling PXE boot on Cisco VICs would free up some 16-bit I/O resources that can be used for other PCIe cards that are installed in the system.

Installing an NVIDIA GRID GPU Card

This section contains the following topics:

- Overview of Firmware Requirements, page 3-44
- Configuration Rules, page 3-44
- How to Determine Your Server Version, page 3-45
- Installing the GRID GPU Card in Version 01 Servers, page 3-46
- Installing the GRID GPU Card in Version 02 Servers, page 3-52
- Installing Drivers to Support the NVIDIA GRID GPU Cards, page 3-55

Overview of Firmware Requirements

The minimum required Cisco UCS C240 M3 server CIMC/BIOS is 1.5(1).

Configuration Rules

The rules for configuring the server with GPUs differ, depending on the server version and other factors. This section includes the following topics:

- CPU and Power Supply Considerations, page 3-44
- Slot Population Rules, page 3-45

CPU and Power Supply Considerations

Observe the following rules regarding the number of CPUs in your server and the power supplies required. See Figure 3-30 on page 3-50 for the PCIe riser and slot numbering.

Table 3-8   CPU Configuration Rules

Number of CPUs	Number of GPUs Supported	PCIe Slot/Riser Supported for GPU	Minimum Power Supplies Required
1	1	Slot 2 (riser 1)	One 1200W PSU
2	2	Slot 2 (riser 1) Slot 5 (riser 2)	Two 1200W PSUs

Slot Population Rules

Table 3-9 shows the rules for populating single or dual NVIDIA GRID GPU cards in the server.

The motherboard in version 02 servers has been updated to allow more configurations. The GRID K2 has a higher power draw than the GRID K1. Therefore, the population rules are different, depending on whether the server is Version 01 or Version 02.

Table 3-9   GRID GPU Population Rules By Server Version

| C240 M3 Server Version	K1	K1 + K1[1]	K2	K1 + K2[2]	K2 + K2[3]
Server version V01	Slot 2 or 5	Slots 2 and 5	Slot 5	Not supported	Not supported
Server version V02	Slot 2 or 5	Slots 2 and 5	Slot 2 or 5	Not supported	Slots 2 and 5

1. Dual-GPU support requires two CPUs and two power supplies.
2. Mixing GRID K1 and GRID 2 in the same server is not supported at this time.
3. Dual-GPU support requires two CPUs and two power supplies. Dual GRID K2 GPUs are not supported in server Version 01.

How to Determine Your Server Version

The version of your server can be seen in the version ID on the PID/VID label. The PID/VID label is on the top of the server (see Figure 3-25).

- A version ID with "V01" designates version 01 of the server.
- A version ID with "V02" designates version 02 of the server.

Figure 3-25   Serial Number Label and Version ID
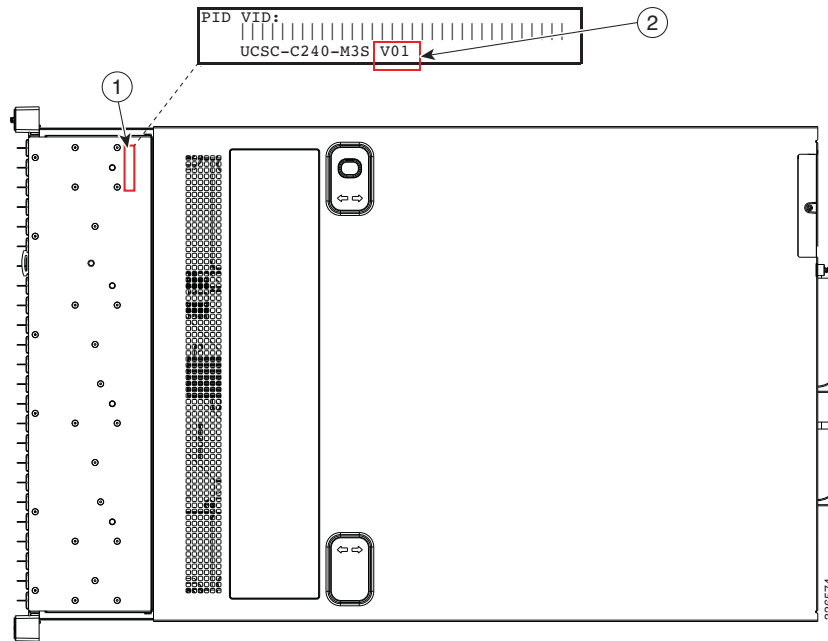
1	PID/VID label on top of server	**2**	Version ID on label

Installation Procedures

Use one of the following two procedures, depending on your server version:

- If you have a version 01 server, use the procedure in Installing the GRID GPU Card in Version 01 Servers, page 3-46. You are required to upgrade the server with a GPU upgrade kit before you can install the GPU card.

- If you have a version 02 server, use the procedure in Installing the GRID GPU Card in Version 02 Servers, page 3-52. In this case, the GPU upgrade kit is not required.

See How to Determine Your Server Version, page 3-45 if you do not know your server version.

Installing the GRID GPU Card in Version 01 Servers

The procedure in this section requires that you use the GPU upgrade kit to ready the server for GPU card installation.

- GPU Upgrade Kit, page 3-46
- Installation Procedure, page 3-47

GPU Upgrade Kit

The GPU upgrade kit includes the following components (see Figure 3-26):

- Two replacement PCIe risers
- One replacement chassis mid-brace
- One 8-to-8 pin power-cable adapter (connects between the motherboard and the GPU power cable)
- One straight GPU power cable (for a single GPU)
- One "Y" GPU power cable (for dual GPUs)

Figure 3-26   C240 GPU Kit
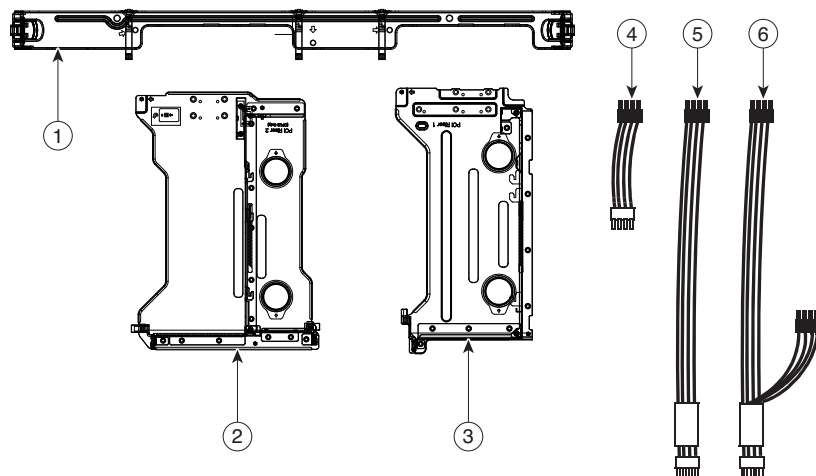
1	Chassis mid-brace	4	8-to-8 pin GPU power cable adapter
2	PCIe riser 2	5	Straight GPU power cable
3	PCIe riser 1	6	Y GPU power cable

Installation Procedure

Summary of procedure steps:

1. Prepare the server for component installation.

2. Replace the chassis mid-brace.

3. Connect the 8-to-8 pin power cable adapter and the power cable to the motherboard.

4. Install the GPU card into the new replacement riser.

5. Install the new replacement riser into the chassis.

6. Connect the power cable to the GPU card.

Use the following procedure to make the necessary chassis and cabling changes to a version 01 server before you install the GPU card.

Step 1 Prepare the server for component installation:

   a. Shut down and power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

   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 as described in the "Removing and Replacing the Server Top Cover" section on page 3-8.

   d. Remove the air baffle that covers the CPUs and DIMMs.

Step 2 Replace the chassis mid-brace:

   a. Remove the existing PCIe risers. Use the finger holes in each PCIe riser to lift straight up on both ends. Set the risers on an antistatic mat.

   b. Remove the existing chassis mid-brace. Compress the finger-latches on each end of the mid-brace toward the center, then lift it straight up (see Figure 3-27).

   c. Install the new chassis mid-brace. Set the mid-brace in place while compressing the finger-latches on each end toward the center. Release the latches to lock the mid-brace into position.
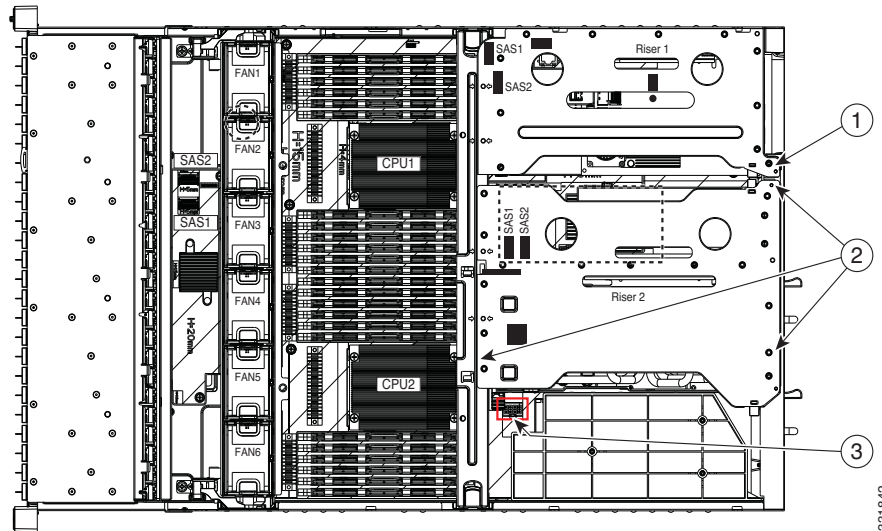
Figure 3-27   *Removing the Chassis Mid-Brace and PCIe Risers*
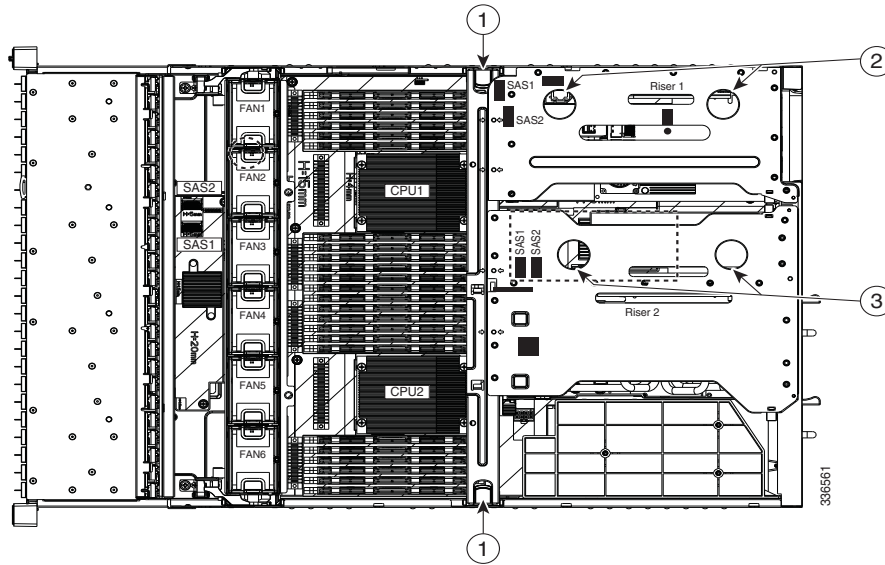
1	Chassis mid-brace finger-latch	**3**	PCIe riser 2 finger holes
2	PCIe riser 1 finger holes		

Step 3   Connect the 8-to-8 pin power cable adapter to the motherboard connector GPU PWR (see Figure 3-28).

Figure 3-28   *GPU PWR Motherboard Connector and PCIe Riser Alignment Slots*

| **1**	PCIe riser 1 alignment slot location	**3**	Motherboard connector GPU PWR
2	PCIe riser 2 alignment slot locations (three)		

Step 4   Connect a GPU power cable to the free end of the 8-to-8 pin adapter (see Figure 3-29):

- If you are installing only one GPU, use the straight GPU power cable.

- If you are installing two GPU cards, use the "Y" GPU power cable.

Note   Do not connect the power cable to the GPU card at this point.

Figure 3-29   *Cabling Diagram, Single- and Dual-GPU Card Examples*
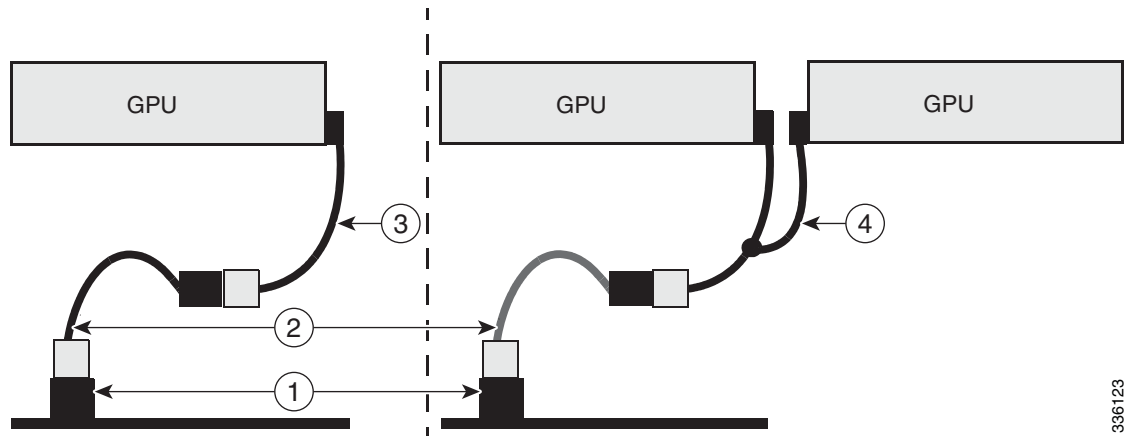
1	Motherboard connector GPU PWR	**3**	Straight GPU power cable for single GPU
2	8-to-8 pin cable adapter	**4**	Y GPU power cable for dual GPUs

Note   See Configuration Rules, page 3-44 before you install the GPU cards to the risers. Slot population restrictions apply.

Step 5   Install your first GPU card into either PCIe slot 2 or into PCIe slot 5. See Figure 3-30 for the riser and slot locations.

Note   The option ROM for the slot in which you are installing the GPU card must be enabled in the BIOS Setup Utility or it will not be recognized by the system.

Figure 3-30   Rear Panel, Showing PCIe Risers and PCIe Slots
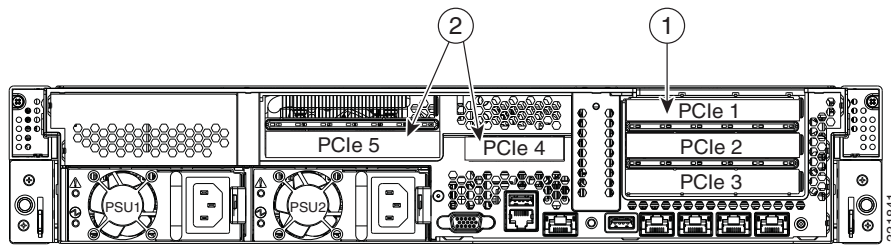
1	PCIe riser 1 slots (Slots 1, 2, 3)	2	PCIe riser 2 slots (Slots 4, 5)

a. Open the riser's hinged card retainer and the long-card retainer (see Figure 3-31).

b. Align the GPU card with the socket on the riser, then gently push the card's edge connector into the socket. Press evenly on both corners of the card to avoid damaging the connector.

c. Close the hinged card retainer, then the long-card retainer over the end of the card.

Figure 3-31   PCIe Riser (Slot 5 on PCIe Riser 2 Shown)
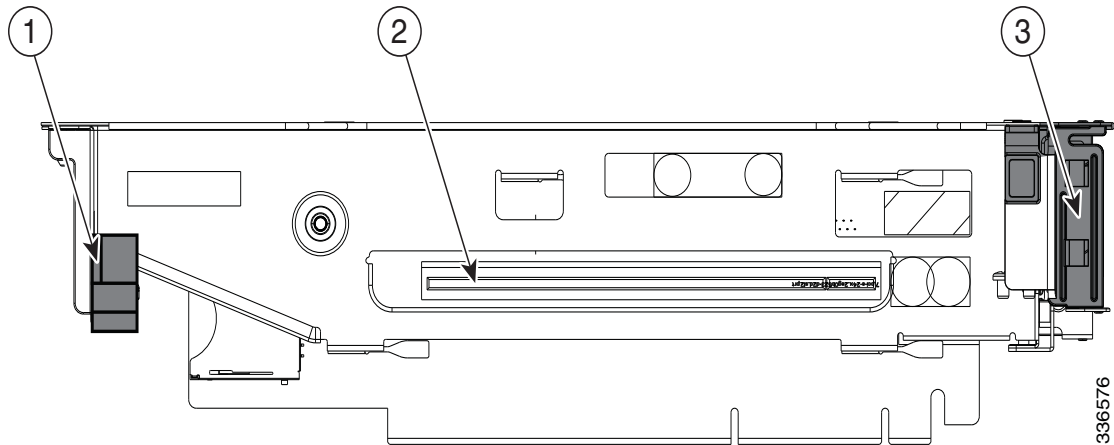
1	Long-card retainer	3	Hinged card retainer for PCIe slot 5
2	Card socket		

Step 6   If you are installing a second GPU card, repeat the actions in Step 5 for the second riser.

Step 7   Install the new PCIe risers:

    a. Install any other PCIe cards that you want to install into the new risers.

Note   When a GPU card is in slot 2, slot 1 is blocked and unavailable for use.

Note   If you are installing a Cisco UCS Virtual Interface Card (VIC), see the slot restrictions in Special Considerations for Cisco UCS Virtual Interface Cards, page 3-41.

    b. Install riser 2 first. Position the PCIe riser over its socket on the motherboard and over its alignment slots in the chassis (see Figure 3-28).

✎

Note   It is easier to view and position the riser 2 connector over its socket with riser 1 removed.

c. Carefully push down on both ends of the PCIe riser to fully engage its circuit board connector with the socket on the motherboard. The riser top surfaces should sit flat on the chassis and the mid-brace.

d. Install riser 1.

Step 8   Connect the power cable to the GPU cards. See Figure 3-29.

- If you installed one GPU card, connect the free end of the straight cable to the GPU card power connector that is underneath the chassis mid-brace.

- If you installed two GPU cards, connect the shorter branch of the Y cable to the GPU card in slot 5. Connect the longer branch to the GPU card in slot 2.

✎

Note   There are cable clips on the underside of the chassis mid-brace through which you can route the power cable.

Step 9   Install the air baffle.

Step 10   Replace the top cover.

Step 11   Replace the server in the rack, replace cables, and then power on the server by pressing the **Power** button.

Step 12   Continue with Installing Drivers to Support the NVIDIA GRID GPU Cards, page 3-55.

Installing the GRID GPU Card in Version 02 Servers

Use the following procedure to install a GPU card into a version 02 server, for which the GPU upgrade kit is not required. For these newer servers, the new risers and mid-brace are already installed and the power cable adapter is not required because the motherboard connector is already updated.

Step 1 Prepare the server:

   a. Shut down and power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

   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.

   c. Remove the air baffle that covers the CPUs and DIMMs.

Step 2 Remove the PCI risers:

   a. Use the finger holes in each PCIe riser to lift straight up on both ends. Set the risers on an antistatic mat.

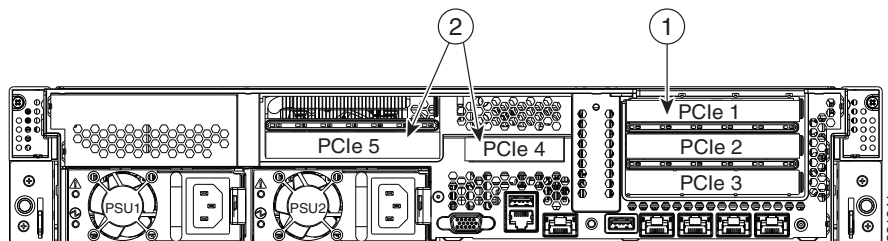   **b.** Remove any existing cards from the PCIe slots that you will use for GPUs (slot 5 or slot 2).

Note See Configuration Rules, page 3-44 before you install the GPU cards to the risers. Slot population restrictions apply.

Step 3 Install your first GPU card into either PCIe slot 2 on riser 1 or into PCIe slot 5 on riser 2. See Configuration Rules, page 3-44 when planning which slots to use. See Figure 3-32 for the riser and slot locations.

Note The option ROM must be enabled in the BIOS Setup Utility for the slot in which you are installing the GPU card or it will not be recognized by the system.

Figure 3-32   *Rear Panel, Showing PCIe Risers and PCIe Slots*

1	PCIe riser 1 slots (Slots 1, 2, 3)	**2**	PCIe riser 2 slots (Slots 4, 5)

   a. Open the riser's hinged card retainer and the long-card retainer (see Figure 3-33).

   b. Align the GPU card with the socket on the riser, then gently push the card's edge connector into the socket. Press evenly on both corners of the card to avoid damaging the connector.

   c. Close the hinged card retainer, then the long-card retainer over the end of the card.

Figure 3-33   PCIe Riser (Slot 5 on PCIe Riser 2 Shown)
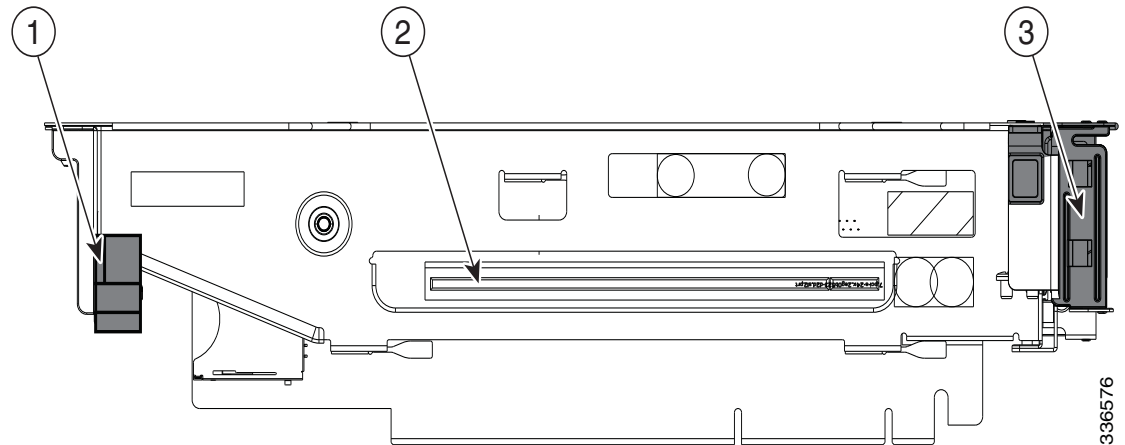
1	Long-card retainer	3	Hinged card retainer for PCIe slot 5
2	Card socket		

Step 4   If you are installing a second GPU card, repeat the actions in Step 3 for the second riser.

Step 5   Install the new PCIe risers:

    a.   Install any other PCIe cards that you want to install into the new risers.

> **Note**   When a GPU card is in slot 2, slot 1 is blocked and unavailable for use.

> **Note**   If you are installing a Cisco UCS Virtual Interface Card (VIC), see the slot restrictions in Special Considerations for Cisco UCS Virtual Interface Cards, page 3-41.

    b.   Install riser 2 first. Position the PCIe riser over its socket on the motherboard and over its alignment slots in the chassis (see Figure 3-34).

> **Note**   It is easier to view and position the riser 2 connector over its socket with riser 1 removed.

    c.   Carefully push down on both ends of the PCIe riser to fully engage its circuit board connector with the socket on the motherboard. The riser top surfaces should sit flat on the chassis and the mid-brace.

    d.   Install riser 1.

Step 6   Connect the GPU power cable to motherboard connector GPU PWR (see Figure 3-34).

- If you installed one GPU card, connect the white end of the straight cable to GPU PWR.
- If you installed two GPU cards, connect the white end of the Y cable to GPU PWR.

Step 7   Connect the power cable to the GPU cards (see Figure 3-35).

- If you installed one GPU card, connect the free end of the straight cable to the GPU card power connector that is underneath the chassis mid-brace.
- If you installed two GPU cards, connect the shorter branch of the Y cable to the GPU card in slot 5. Connect the longer branch to the GPU card in slot 2.
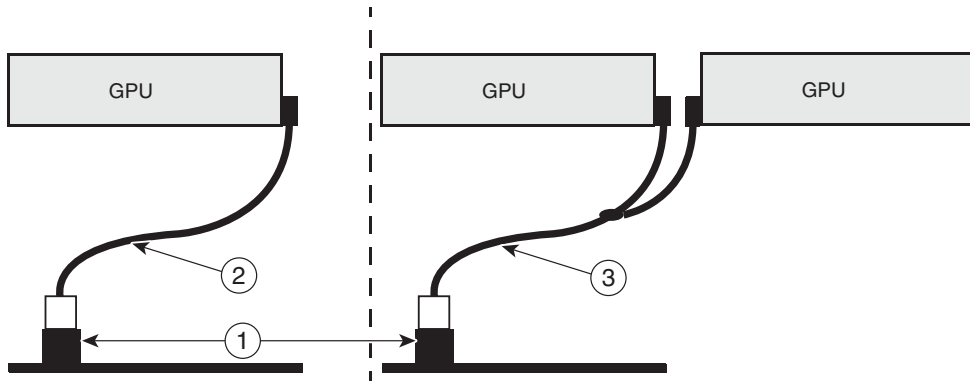
> **Note** There are cable clips on the underside of the chassis mid-brace through which you can route the power cable.

Figure 3-34   GPU Motherboard Connector and PCIe Riser Alignment Slots
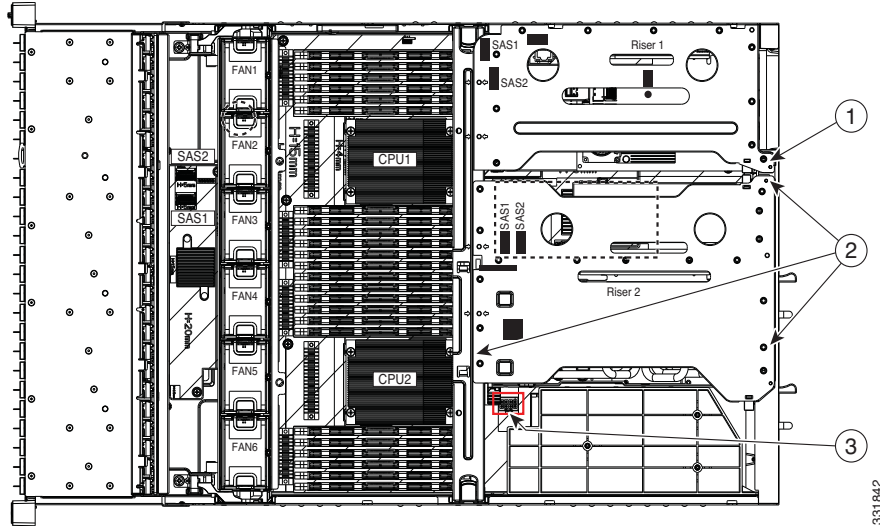
1	PCIe riser 1 alignment slot location	3	Motherboard connector GPU PWR
2	PCIe riser 2 alignment slot locations (three)		

Figure 3-35   Cabling Diagram, Single- and Dual-GPU Card Examples

1	Motherboard connector GPU PWR	3	Y GPU power cable for dual GPUs
2	Straight GPU power cable for single GPU		

Step 8 Replace the air baffle.

Step 9 Replace the top cover.

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

Step 11 Continue with Installing Drivers to Support the NVIDIA GRID GPU Cards, page 3-55.

Installing Drivers to Support the NVIDIA GRID GPU Cards

After you install the hardware, you must update to the correct level of server BIOS and then install NVIDIA drivers and other software.

- 1. Update the C240 M3 Server BIOS, page 3-55
- 2. Update the NVIDIA Drivers, page 3-55

1. Update the C240 M3 Server BIOS

The minimum required Cisco UCS C240 M3 server BIOS is 1.5(1).

Install the latest Cisco UCS C240 server BIOS by using the Host Upgrade Utility for the Cisco UCS C240 M3 server. This will include drivers that support the NVIDIA GRID cards in this server.

Download the Host Upgrade Utility ISO file as follows:

Step 1   Navigate to the following URL: http://www.cisco.com/cisco/software/navigator.html.

Step 2   Click Servers–Unified Computing in the middle column.

Step 3   Click Cisco UCS C-Series Rack-Mount Standalone Server Software in the right-hand column.

Step 4   Click the name of your model of server in the right-hand column.

Step 5   Click Unified Computing System (UCS) Server Firmware.

Step 6   Click the release number.

Step 7   Click Download Now to download the ucs-server platform-huu-version_number.iso file.

Step 8   Verify the information on the next page, then click Proceed With Download.

Step 9   Continue through the subsequent screens to accept the license agreement and browse to a location where you want to save the file.

Step 10   Use the Host Upgrade Utility to update the server BIOS.

The user guides for the Host Upgrade Utility are at: Utility User Guides.

2. Update the NVIDIA Drivers

After you update the server BIOS, you can install NVIDIA drivers to your hypervisor virtual machine.

Step 1   Install your hypervisor software on a computer. Refer to your hypervisor documentation for the installation instructions.

Step 2   Create a virtual machine in your hypervisor. Refer to your hypervisor documentation for instructions.

Step 3   Install the NVIDIA drivers to the virtual machine. Download the drivers from http://www.nvidia.com/Download/index.aspx.

Step 4   Restart the server.

Step 5   Check that the virtual machine is able to recognize the NVIDIA card. In Windows, use the Device Manager and look under Display Adapters.

Replacing a Cisco Flexible Flash Card

This section includes the following topics:

Overview of the Pre-Installed Cisco Flexible Flash Card

The internal slots for these cards are on the circuit board of PCIe riser 2 (see Figure 3-36).

Note Dual cards are supported only with CIMC 1.5(1) or later. With releases earlier than CIMC 1.5(1), only a single card is supported and it must be in slot SD1.

The Cisco Flexible Flash card is pre-installed with three software bundles, each on one of four preconfigured virtual drives (VDs). The fourth VD allows you to install an OS or embedded hypervisor.

The VDs are configured as follows:

1. Cisco UCS Server Configuration Utility (SCU).
2. Hypervisor (HV). This is a VD that you can use for your own purposes.
3. Cisco Drivers (Drivers).
4. Cisco Host Upgrade Utility (HUU).

Figure 3-36   Cisco Flexible Flash Card Slot Locations on PCIe Riser 2

1	Slot SD2	2	Slot SD1
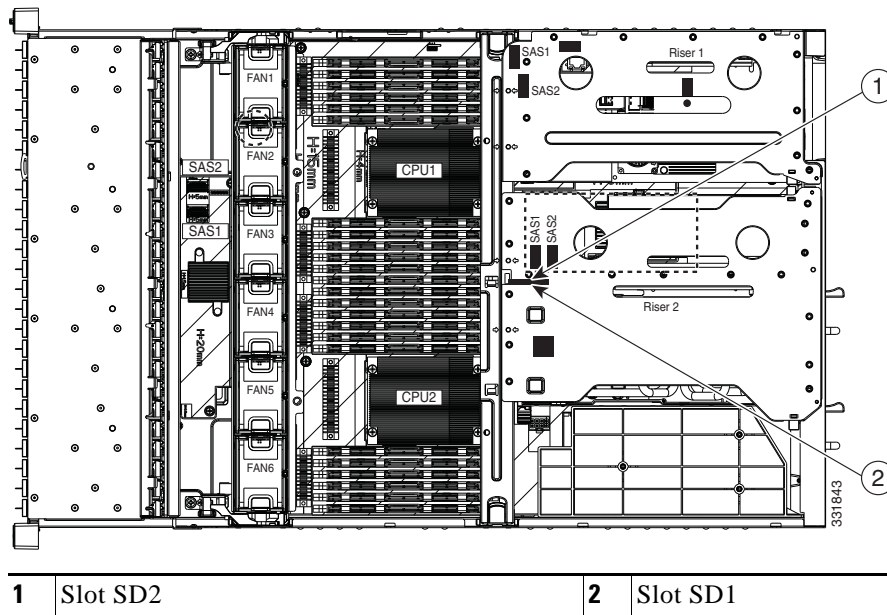
Enabling a Cisco Flexible Flash Virtual Drive

Each of the VDs on the pre-installed Cisco Flexible Flash card can be separately enabled or hidden from the host. The default as shipped from the factory is for all VDs to be hidden.

To enable VDs and expose them to the host, follow these steps:

Step 1   Log in to CIMC interface for the server, using the IP address of the server.

Step 2   Navigate through GUI tabs to **Server > Inventory > Storage**.

Step 3   Click **FlexFlash-0** in the Storage Adapters list.

Step 4   Click on **Configure Operational Profile** in the Actions area.

The Operational Profile dialog opens.

Step 5   Check the box for each VD that you want to enable and expose to the host, then click **Save Changes**.

Booting a Cisco Flexible Flash Virtual Drive

When you want to access the Cisco SCU or Cisco HUU software, you boot its VD with a one-time boot option. When you want to boot the hypervisor (HV) VD, you boot it with a permanent boot order selection. See the following topics in this section:

- Booting the Cisco SCU and Cisco HUU Software VDs, page 3-57
- Booting the Hypervisor VD, page 3-58

Booting the Cisco SCU and Cisco HUU Software VDs

You can access the preinstalled Cisco SCU and Cisco HUU software bundles on a Cisco Flexible Flash card by booting their respective VDs with a one-time boot option:

Step 1   Enable the SCU or HUU VD.

See Enabling a Cisco Flexible Flash Virtual Drive, page 3-57.

Step 2   In the CIMC GUI interface, navigate through the tabs to **Server > BIOS.**

Step 3   Click **Configure Boot Override Priority**.

The Boot Override Priority dialog opens.

Step 4   Pull down the menu and select **SCU** or **HUU**, then click **OK**.

Step 5   Reboot the server.

The server boots the selected VD.

Note   This is a one-time boot option. After running Cisco SCU or Cisco HUU, the server returns to its previously configured boot path.

Booting the Hypervisor VD

You can boot the hypervisor (HV) VD with a more permanent boot selection. (To change the boot order one time, use the procedure in Booting the Cisco SCU and Cisco HUU Software VDs, page 3-57.

To permanently set the boot order for an HV VD, use the following steps:

Step 1 Boot the server and watch for the prompt to press F2 to open the BIOS Setup utility.

Step 2 When prompted, press **F2** to open the BIOS Setup utility.

Step 3 Navigate to the **Boot Options** tab.

Step 4 Use the Boot Options screen to set the HV VD to your desired boot order for the server.

Monitoring and Managing a Cisco Flexible Flash Card

You can monitor and manage your installed Cisco Flexible Flash cards by using the CIMC GUI interface or the CLI interface. See the *Cisco UCS C-Series Rack-Mount Server Configuration Guide* or the *Cisco UCS C-Series Rack-Mount Server CLI Configuration Guide* in the documentation roadmap linked below.

The links to these documents are in the C-Series documentation roadmap:

http://www.cisco.com/go/unifiedcomputing/c-series-doc

Cisco Flexible Flash Card Replacement Procedure

To install or replace a Cisco Flexible Flash card, follow these steps:

Step 1   Remove the card that you are replacing. See Figure 3-36:

    a. Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

    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 as described in "Removing and Replacing the Server Top Cover" section on page 3-8.

    d. Use the finger holes to lift straight up on both ends of the PCIe riser 2 to disengage its circuit board from the socket on the motherboard. Set the riser on an antistatic mat.

    e. Locate the Cisco Flexible Flash card that you are replacing on PCIe riser 2. See Figure 3-36.

    f. Push down on the top of the Cisco Flexible Flash card, then release it to allow it to spring up in the slot.

    g. Remove the Cisco Flexible Flash card from the slot.

Step 2   Install a Cisco Flexible Flash card:

Note   To be usable for Cisco Flexible Flash, an SD card must be at least 16 GB in size.

Note   Any SD card that is installed into the Cisco Flexible Flash slot is configured with the VD partitioning described in Overview of the Pre-Installed Cisco Flexible Flash Card, page 3-56. This overwrites data on the SD card where Cisco stores the configuration metadata.

    a. Insert the Cisco Flexible Flash card into the slot with the label side facing outward.

Note   Dual cards are supported only with CIMC 1.5(1) or later. With releases earlier than CIMC 1.5(1), only a single card is supported and it must be in slot SD1 (see Figure 3-36).

    b. Press down on the top of the card until it clicks in the slot and stays in place.

    c. Position the PCIe riser over its socket on the motherboard and over its chassis alignment features (see Figure 3-22).

    d. Carefully push down on both ends of the PCIe riser to fully engage its circuit board connector with the socket on the motherboard.

    e. Replace the top cover.

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

Replacing the LSI RAID Battery Backup Unit or SuperCap Power Module

This server supports installation of two RAID battery backup units (BBUs) or SuperCap Power Modules (SCPMs). The units mount to clips on the removable air baffle (see Figure 3-37).

- The BBU is available only when using the LSI MegaRAID controller cards. This BBU provides approximately 72 hours of battery backup for the disk write-back cache DRAM in the case of sudden power loss.

- The SCPM is available only when using the LSI MegaRAID-CV controller cards. This supercap module provides approximately 3 years of backup for the disk write-back cache DRAM in the case of sudden power loss by offloading the cache to the NAND flash.

Note LSI recommends that you replace the LSI BBU once per year or after 1,000 recharge cycles, whichever comes first. Verify whether BBU replacement is required by looking in the CIMC. Log in to CIMC for the server, then click **Server—Inventory—Storage—Battery Backup Unit**. If the Battery Replacement Required field says, "True," then you must purchase a replacement BBU and replace it.

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

To replace the RAID controller BBU or SCPM backup unit, follow these steps:

Step 1 Remove a backup unit (see Figure 3-37).

    a. Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

    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 as described in the "Removing and Replacing the Server Top Cover" section on page 3-8.

    d. Disconnect the cable that is attached to the existing backup unit.

    e. Slide the backup unit free of the clips on the air baffle mounting point (see Figure 3-37).

Step 2 Install a new backup unit:

    a. Slide the new backup unit into the clips on the air baffle mounting point.

    b. Connect the cable from the RAID controller to the new backup unit.

    c. Replace the top cover.

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

Figure 3-37   *Replacing a BBU or SCPM RAID Backup Unit*
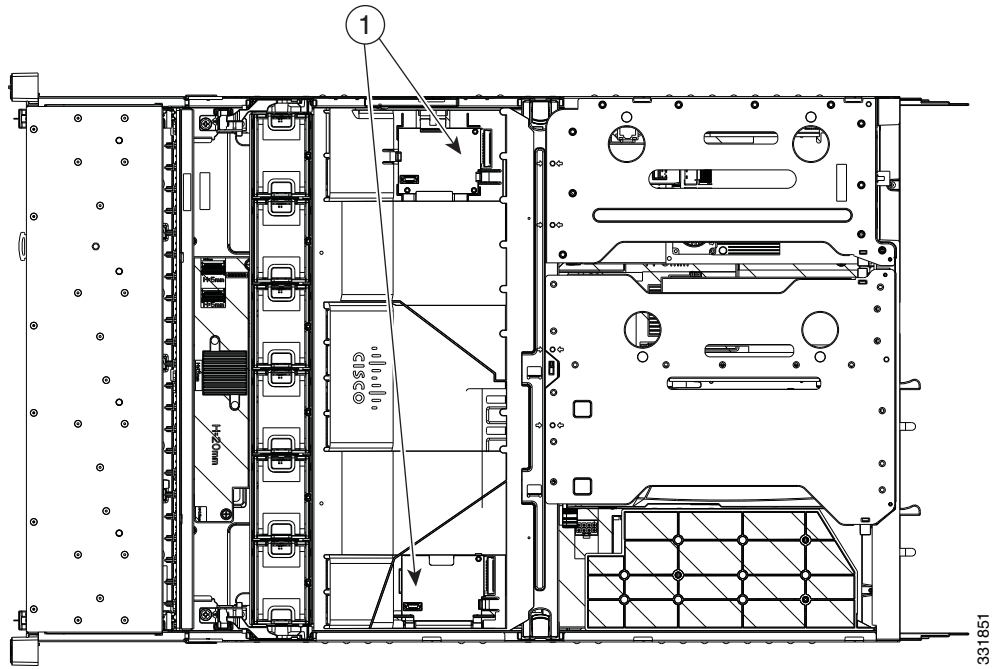
| **1** | RAID backup unit mounting points on removable air baffle | | |

Installing a Trusted Platform Module

The trusted platform module (TPM) is a small circuit board that attaches to a motherboard socket. The socket location is on the motherboard, underneath PCIe riser 1 (see Figure 3-38).

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

To install a trusted platform module (TPM), follow these steps:

Step 1 Prepare the server for component installation.

    a. Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

    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 as described in the "Removing and Replacing the Server Top Cover" section on page 3-8.

    d. Is there a card installed in PCIe riser 1? See Figure 3-38.

      • If there is no card installed in PCIe riser 1, you can access the TPM socket. Go to Step 2.

      • If there is a card installed in PCIe riser 1, you must remove the riser. Use the finger holes on the top of PCIe riser 1 to lift straight up on both ends and disengage its circuit board from the socket on the motherboard. Set the riser aside on an antistatic mat.

Step 2 Install a TPM (see Figure 3-38):

    a. Locate the TPM socket on the motherboard, as shown in Figure 3-38.

    b. Align the connector that is on the bottom of the TPM circuit board with the motherboard TPM socket. Align the screw hole and standoff on the TPM board with the screw hole 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.

    e. If you removed PCIe riser 1, replace it now.

    f. Replace the top cover.

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

Step 3 Enable the TPM:

    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. On the BIOS Setup utility screen, select the **Advanced** tab.

    d. Select **Trusted Computing** to open the TPM Security Device Configuration screen.

    e. Change TPM SUPPORT to **Enabled**.

    f. Press **F10** to save your settings and reboot the server.

Step 4   Verify that the TPM 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. Select the **Advanced** tab.

    d. Select **Trusted Computing** to open the TPM Security Device Configuration screen.

    e. Verify that TPM SUPPORT is Enabled.

Note   If you want to use the Intel Trusted Execution Technology (TXT) feature, it must be enabled in the server BIOS as described in Enabling the Intel Trusted Execution Technology (TXT) Feature For the TPM, page 3-63.

Figure 3-38   *TPM Socket Location on Motherboard*
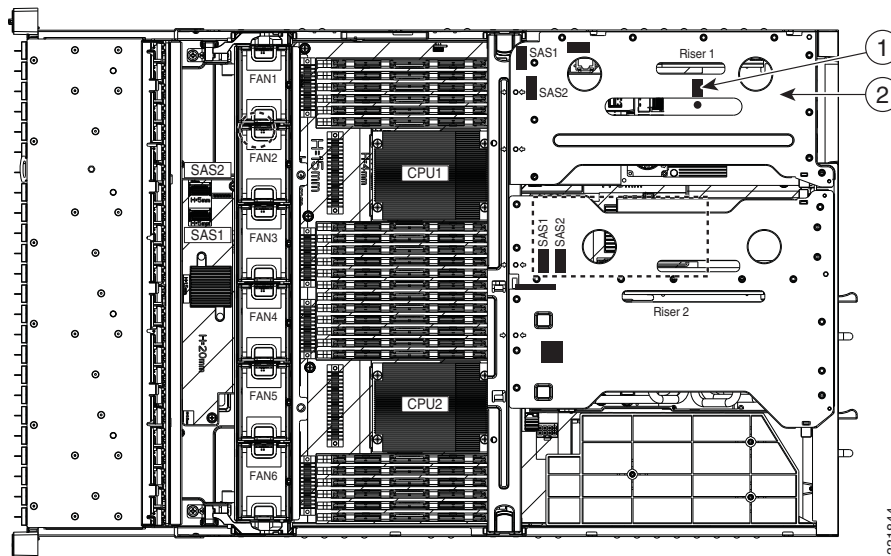
1	TPM socket and screw hole on motherboard	**2**	PCIe riser 1

Enabling the Intel Trusted Execution Technology (TXT) Feature For the TPM

Intel TXT provides greater protection for information that is used and stored on the business server. A key aspect of that protection is the provision of an isolated execution environment and associated sections of memory where operations can be conducted on sensitive data, invisibly to the rest of the system. Likewise, Intel TXT provides for a sealed portion of storage where sensitive data such as encryption keys can be kept, helping to shield them from being compromised during an attack by malicious code.

To enable the TXT feature, follow these steps:

Step 1 Verify that a TPM is now installed and enabled in the server:

   a. Either attach a VGA monitor and USB keyboard to the server, or log in remotely to the CIMC interface of the server and open a virtual KVM console window.

   b. Reboot the server.

   c. Watch during bootup for the F2 prompt, and then press **F2** to enter BIOS setup.

   d. Log in to the BIOS Setup utility with your BIOS Administrator password.

> **Note** You must be logged in as the BIOS administrator to perform this procedure. If you have not done so already, set a BIOS administrator password on the Security tab of the BIOS Setup utility.

   e. Select the **Advanced** tab.

   f. On the Advanced tab, select **Trusted Computing** to open the TPM Security Device Configuration screen.

   g. Verify that **TPM SUPPORT** is **Enabled**. If it is not, set TPM SUPPORT to Enabled.

   h. Press **Escape** to return to the BIOS Setup utility **Advanced** tab.

Step 2 Enable the Intel Trusted Execution Technology (TXT) feature:

   a. On the Advanced tab, select **Intel TXT(LT-SX) Configuration** to open the Intel TXT(LT-SX) Hardware Support screen.

> **Note** The Intel Trusted Execution Technology feature can be enabled only when the server has a TPM installed on the TPM header.

   b. Set **TXT Support** to **Enabled**.

Step 3 On the same screen, verify that the Intel Virtualization Technology (VT) and the Intel VT for Directed I/O (VT-d) features are enabled (the factory default).

   a. On the Intel TXT(LT-SX) Hardware Support screen, verify that **VT-d Support** and **VT Support** are both listed as **Enabled**.

     – If they are already enabled, skip to Step 4.

     – If VT-d Support and VT Support are not enabled, continue with the next steps to enable them.

   b. Press **Escape** to return to the BIOS Setup utility **Advanced** tab.

   c. On the Advanced tab, select **Processor Configuration** to open the Processor Configuration screen.

   d. Set **Intel (R) VT** and **Intel (R) VT-d** to Enabled.

Step 4 Press **F10** to save your changes and exit the BIOS Setup utility.

Step 5 Verify that the Intel TXT, VT, and VT-d features are enabled:

   a. Reboot the server.

   b. Watch during bootup for the F2 prompt, and then press **F2** to enter BIOS setup.

   c. Select the **Advanced** tab.

   d. Select **Intel TXT(LT-SX) Configuration** and verify that TXT Support, VT-d Support, and VT Support are Enabled.

Replacing a SCU Upgrade ROM Module

To remove and replace a module, use the following procedure.

Step 1 Prepare the server for component installation:

  a. Power off the server as described in Shutting Down and Powering Off the Server, page 3-7.

  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 as described in Removing and Replacing the Server Top Cover, page 3-8.

Step 2 Remove the SCU upgrade ROM module:

  a. Locate the module on the motherboard (see Figure C-1).

  b. Grasp the printed circuit board of the module and lift it from the header.

✎

Note The module has a small retention feature that must have clearance from the header before the module can be pulled up. Tilt the module back, then pull up as shown in Figure 3-39.

Step 3 Install a new SCU upgrade ROM module:

  a. Align the module with the pins in the motherboard header.

  b. Gently press down on the module until it is seated and the retention feature locks into the header.

Figure 3-39   *SCU Upgrade ROM Module Retention Feature*
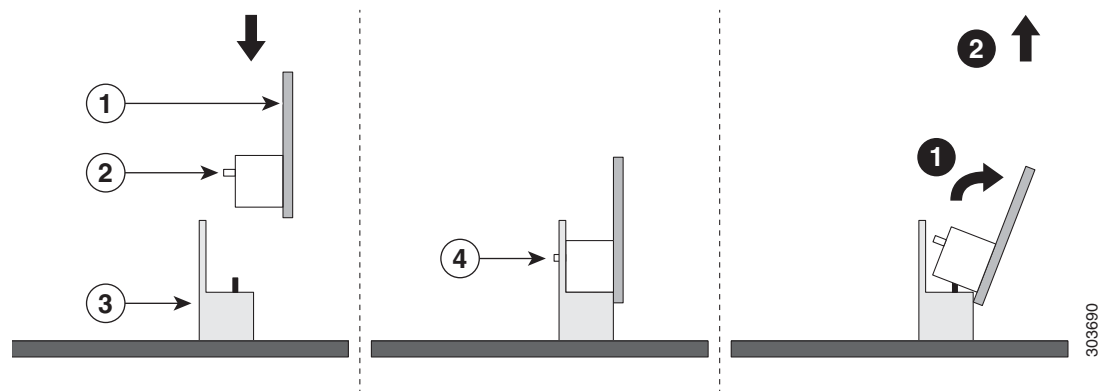
1	Printed circuit board on module	3	Motherboard header
2	Retention feature on module	4	Retention feature in installed position

For more information about using the module and embedded RAID, see Embedded MegaRAID Controller, page C-6.

Replacing a Software RAID Key Module

To remove and replace a software RAID key module, use the following procedure.

Step 1 Prepare the server for component installation:

a. Power off the server as described in Shutting Down and Powering Off the Server, page 3-7.

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 as described in Removing and Replacing the Server Top Cover, page 3-8.

Step 2 Remove the software RAID key module:

a. Locate the module on the motherboard (see Figure C-1).

b. Grasp the printed circuit board of the module and lift it from the header.

✎

Note The module must have clearance from the retention clip on the header before the module can be pulled up. Open the retention clip, then pull up as shown in Figure 3-40.

Step 3 Install a new software RAID key module:

a. Align the module with the pins in the motherboard header.

b. Gently press down on the module until it is seated and the retention clip locks over the module.

Figure 3-40   *Software RAID Key Module Retention Feature*
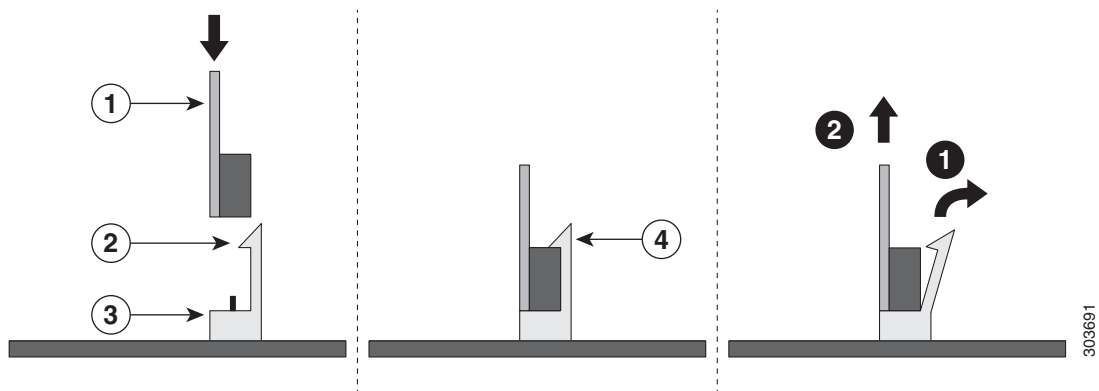
1	Printed circuit board on module	3	Motherboard header
2	Retention feature on motherboard header	4	Retention feature in installed position

For more information about using the module and embedded RAID, see Embedded MegaRAID Controller, page C-6.

Replacing Power Supplies

The server can have one or two power supplies. When two power supplies are installed they are redundant as 1+1.

See Power Specifications, page A-2 for more information about the power supplies. See Rear Panel LEDs and Buttons, page 3-4 for information about the power supply LEDs.

To replace or install a power supply, follow these steps:

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 power supplies because they are redundant as 1+1.

Note Do not mix power supply types in the server. Both power supplies must be either 650W or 1200W.

Step 1 Remove the power supply that you are replacing or a blank panel from an empty bay (see Figure 3-41):

   a. Perform one of the following actions:

   – If your server has only one power supply, shut down and power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

   – If your server has two power supplies, you do not have to shut down the server.

   b. Remove the power cord from the power supply that you are replacing.

   c. Grasp the power supply handle while pinching the release lever towards the handle.

   d. 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. If you shut down the server, press the **Power** button to return the server to main power mode.

Figure 3-41   Removing and Replacing Power Supplies
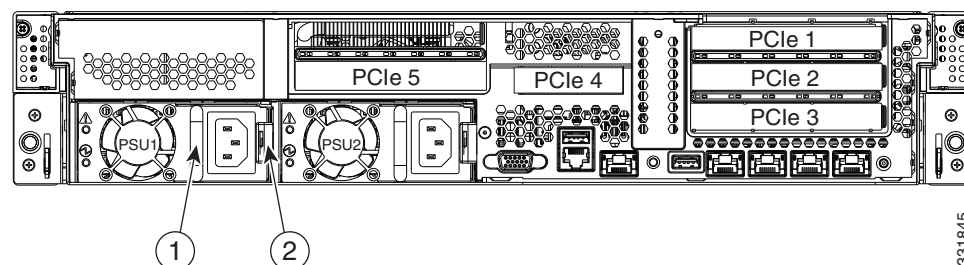
| 1 | Power supply handle | 2 | Power supply release lever |

Enabling or Disabling the Internal USB Port

The factory default is for all USB ports on the server to be enabled. However, the internal USB port can be enabled or disabled in the server BIOS. To enable or disable the internal USB port, follow these steps:

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 select either Enabled or Disabled from the pop-up menu.

Step 6   Press F10 to save and exit the utility.

APPENDIX A

Server Specifications

This appendix lists the technical specifications for the server and includes the following sections:

Physical Specifications

Table A-1 lists the physical specifications for the server.

Table A-1   *Physical Specifications*

Description	Specification
Height	3.4 in. (8.70 cm)
Width (including slam-latches)	17.5 in. (44.55 cm)
Depth	28.0 in. (71.23 cm)
Weight (fully loaded)	60.0 lbs. (27.2 Kg)

Power Specifications

The power specifications for the two power supply options are listed in the following sections:

- 650 W Power Supply, page A-2
- 1200 W Power Supply, page A-2

You can get more specific power information for your exact server configuration by using the Cisco UCS Power Calculator:

http://www.cisco.com/assets/cdc_content_elements/flash/dataCenter/cisco_ucs_power_calculator/

650 W Power Supply

Table A-2 lists the specifications for each 650 W power supply (Cisco part number UCSC-PSU-650W).

Table A-2   **Power Supply Specifications**

Description	Specification
AC input voltage range	90 to 264 VAC (self-ranging, 180 to 264 VAC nominal)
AC input frequency	Range: 47 to 63 Hz (single phase, 50 to 60Hz nominal)
AC line input current (steady state)	7.6 A peak at 100 VAC 3.65 A peak at 208 VAC
Maximum output power for each power supply	650 W
Power supply output voltage	Main power: 12 VDC Standby power: 12 VDC

1200 W Power Supply

Table A-3 lists the specifications for each 1200 W power supply (Cisco part number UCSC-PSU2-1200).

Table A-3   **Power Supply Specifications**

Description	Specification
AC input voltage range	90 to 264 VAC (self-ranging, 180 to 264 VAC nominal)
AC input frequency	Range: 47 to 63 Hz (single phase, 50 to 60Hz nominal)
AC line input current (steady state)	11A peak at 100 VAC 7 A peak at 208 VAC
Maximum output power for each power supply	1200 W
Power supply output voltage	Main power: 12 VDC Standby power: 12 VDC

Environmental Specifications

Table A-4 lists the environmental specifications for the server.

Table A-4   Environmental Specifications

Description	Specification
Temperature, operating:	41 to 104°F (5 to 40°C) Derate the maximum temperature by 1°C per every 305 meters of altitude above sea level.
Temperature, non-operating	–40 to 149°F (–40 to 65°C)
Humidity (RH), noncondensing	10 to 90%
Altitude, operating	0 to 10,000 feet
Altitude, non-operating	0 to 40,000 feet
Sound power level Measure A-weighted per ISO7779 LwAd (Bels) Operation at 73°F (23°C)	5.8
Sound pressure level Measure A-weighted per ISO7779 LpAm (dBA) Operation at 73°F (23°C)	43

Power Cord Specifications

This appendix provides supported power cable specifications.

Supported Power Cords and Plugs

Each power supply has a separate power cord. Standard power cords or jumper power cords are available for connection to the server. The jumper power cords, for use in racks, are available as an optional alternative to the standard power cords.

Note Only the approved power cords or jumper power cords provided with the server are supported.

Table B-1 lists the power cords for the server power supplies.

Table B-1 *Supported Power Cords for the Server*

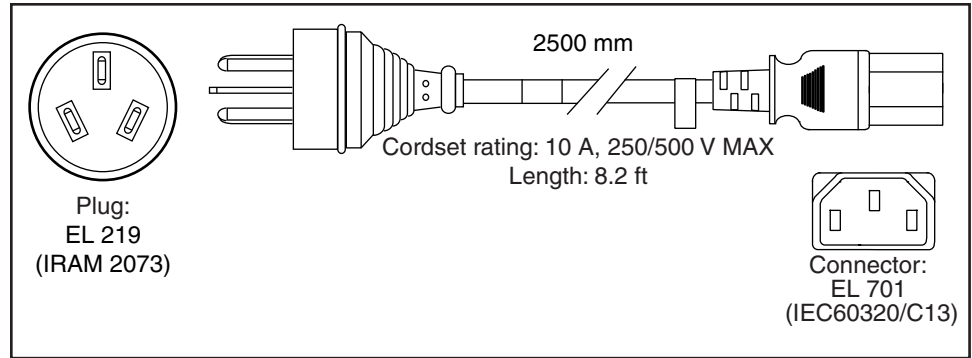| Description	Length		Power Cord Reference Illustration
	Feet	Meters	
SFS-250V-10A-AR Power Cord, 250 VAC 10 A IRAM 2073 Plug Argentina	8.2	2.5	Figure B-1
CAB-9K10A-AU 250 VAC 10 A 3112 Plug, Australia	8.2	2.5	Figure B-2
SFS-250V-10A-CN Power Cord, 250 VAC 10 A GB 2009 Plug China	8.2	2.5	Figure B-3
CAB-9K10A-EU Power Cord, 250 VAC 10 A M 2511 Plug Europe	8.2	2.5	Figure B-4
SFS-250V-10A-ID Power Cord, 250 VAC 16A EL-208 Plug South Africa, United Arab Emirates, India	8.2	2.5	Figure B-5
SFS-250V-10A-IS Power Cord, 250 VAC 10 A SI32 Plug Israel	8.2	2.5	Figure B-6

Table B-1   Supported Power Cords for the Server (continued)

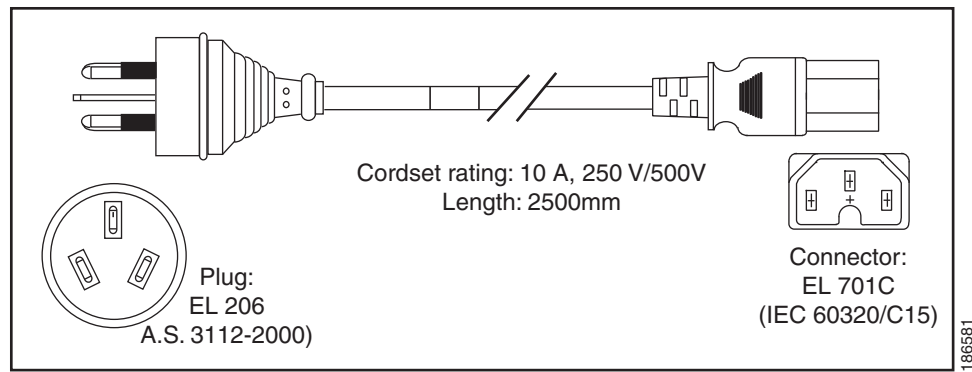| Description	Length		Power Cord Reference Illustration
	Feet	**Meters**	
CAB-9K10A-IT Power Cord, 250 VAC 10 A CEI 23-16 Plug Italy	8.2	2.5	Figure B-7
CAB-9K10A-SW Power Cord, 250 VAC 10 A MP232 Plug Switzerland	8.2	2.5	Figure B-8
CAB-9K10A-UK Power Cord, 250 VAC 10 A BS1363 Plug (13 A fuse) United Kingdom	8.2	2.5	Figure B-9
CAB-AC-250V/13A Power Cord, 250 VAC 13 A IEC60320 Plug North America	6.6	2.0	Figure B-10
CAB-N5K6A-NA Power Cord, 250 VAC 13 A NEMA 6-15 Plug, North America	8.2	2.5	Figure B-11
CAB-9K12A-NA Power cord, 125 VAC, 13 A, NEMA 5-15 Plug North America	8.2	2.5	Figure B-12
CAB-C13-CBN Cabinet Jumper Power Cord, 250 VAC 10 A, C13-C14 Connectors	2.2	0.68	Figure B-13
CAB-C13-C14-2M Cabinet Jumper Power Cord, 250 VAC 10 A, C13-C14 Connectors	6.6	2.0	Figure B-14
CAB-C13-C14-AC Cabinet Jumper Power Cord, 250 VAC 10 A, C13-C14 Connectors	9.8	3.0	Figure B-15

AC Power Cord Illustrations

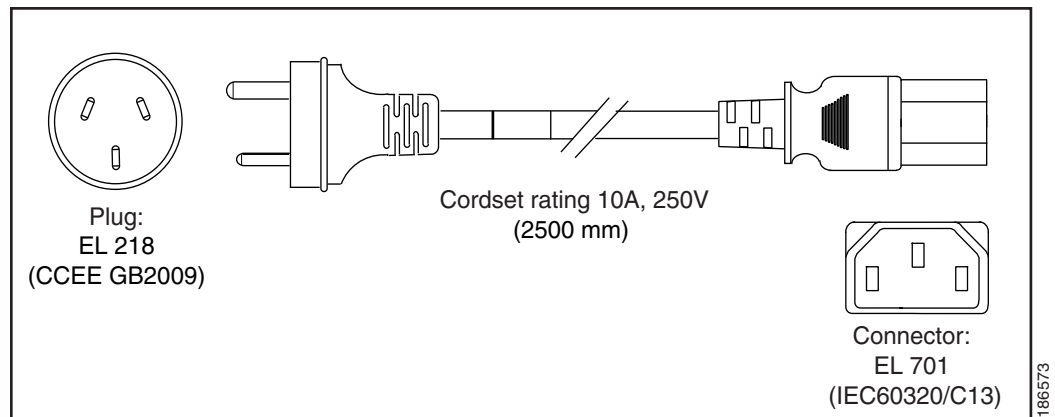This section includes the AC power cord illustrations. See Figure B-1 through Figure B-15.
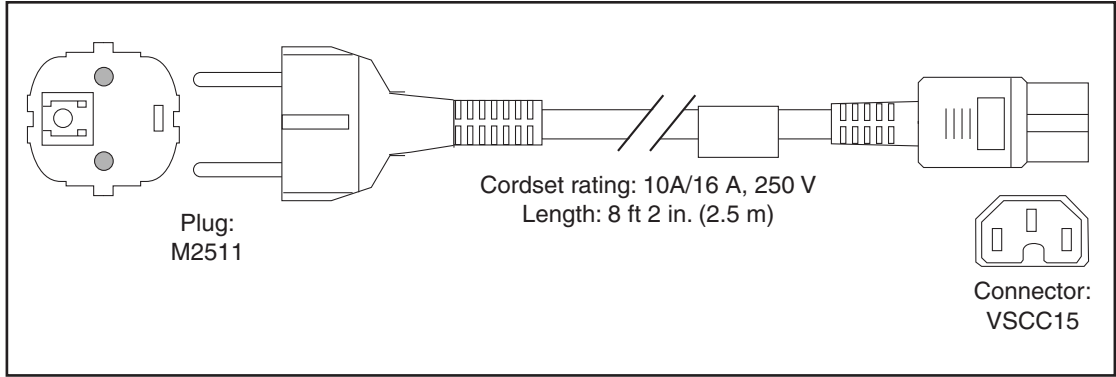
Figure B-1   ***SFS-250V-10A-AR***

Plug:
EL 219
(IRAM 2073)

2500 mm

Cordset rating: 10 A, 250/500 V MAX
Length: 8.2 ft

Connector:
EL 701
(IEC60320/C13)

186571

Figure B-2   ***CAB-9K10A-AU***

Cordset rating: 10 A, 250 V/500V
Length: 2500mm

Plug:
EL 206
A.S. 3112-2000)

Connector:
EL 701C
(IEC 60320/C15)

186581

Figure B-3   ***SFS-250V-10A-CN***

Plug:
EL 218
(CCEE GB2009)

Cordset rating 10A, 250V
(2500 mm)

Connector:
EL 701
(IEC60320/C13)

186573

Figure B-4*   *CAB-9K10A-EU

Plug:
M2511

Cordset rating: 10A/16 A, 250 V
Length: 8 ft 2 in. (2.5 m)

Connector:
VSCC15

186576

Figure B-5*   *SFS-250V-10A-ID

Plug:
EL 208

Cordset rating 16A, 250V
(2500mm)

Connector:
EL 701
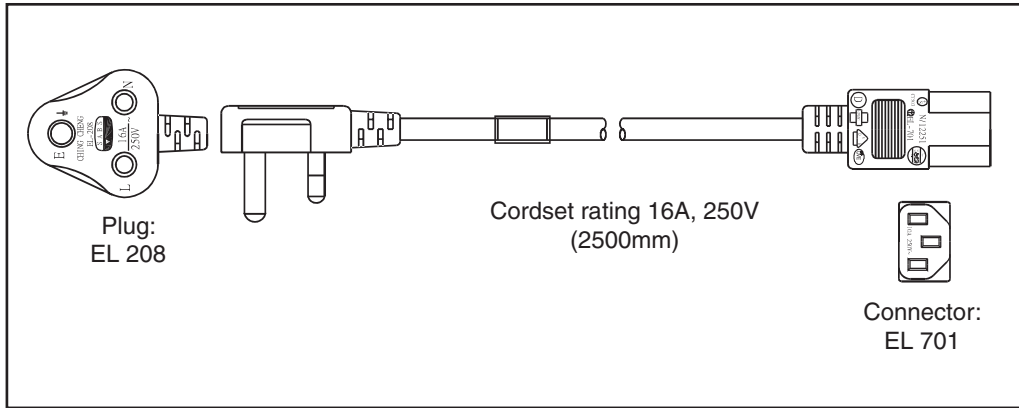
187490

Figure B-6*   *SFS-250V-10A-IS

EL-212
16A
250V

Cordset rating 10A, 250V/500V MAX
(2500 mm)

Plug:
EL 212
(SI-32)

Connector:
EL 701B
(IEC60320/C13)
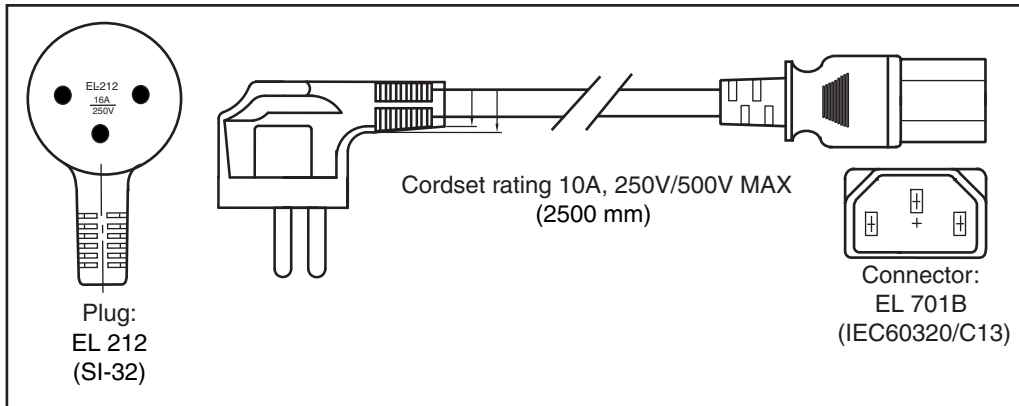
186574

Figure B-7   CAB-9K10A-IT

Plug:
I/3G
(CEI 23-16)

Cordset rating: 10 A, 250 V
Length: 8 ft 2 in. (2.5 m)

Connector
C15M
(EN60320/C15)

186575

Figure B-8   CAB-9K10A-SW

Plug:
MP232-R

Cordset rating: 10 A, 250 V
Length: 8 ft. 2 in (2.5 m)

Connector:
IEC 60320 C15

186578

Figure B-9   CAB-9K10A-UK

Cordset rating: 10 A, 250 V/500 V MAX
Length: 2500mm

Plug:
EL 210
(BS 1363A) 13 AMP fuse

Connector:
EL 701C
(EN 60320/C15)

186580
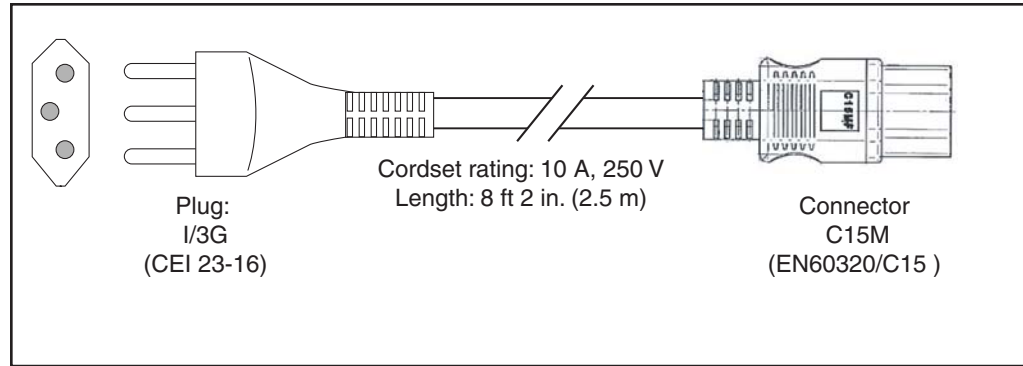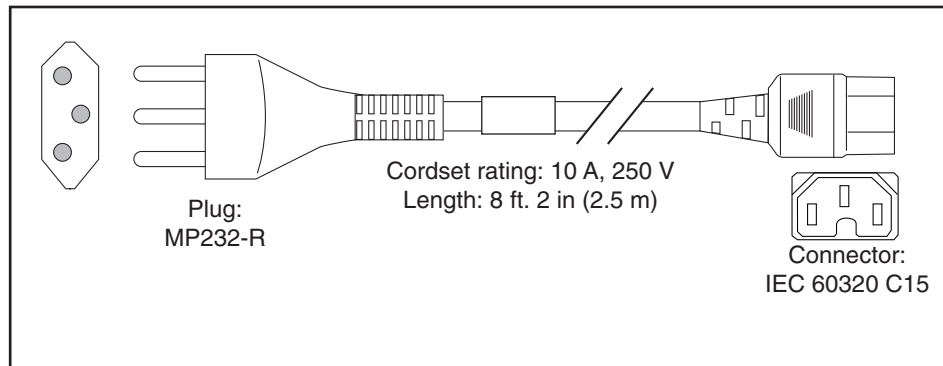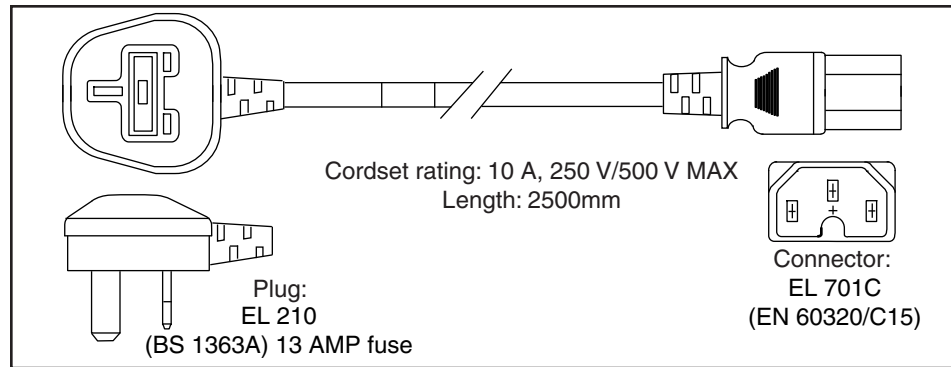
Figure B-10   *CAB-AC-250V/13A*

Cordset rating 13A, 250V
(6.6 feet) (79±2m)

Plug:
EL312MoldedTwistlock
(NEMA L6-20)

Connector:
EL 701
(IEC60320/C13)

186568

Figure B-11   *CAB-N5K6A-NA*

Plug: NEMA 6-15P

Cordset rating: 10 A, 250 V
Length: 8.2 ft

Connector:
IEC60320/C13

186570

Figure B-12   *CAB-9K12A-NA*

Cordset rating 13A, 125V
(8.2 feet) (2.5m)

Plug:
NEMA 5-15P

Connector:
IEC60320/C15

192260
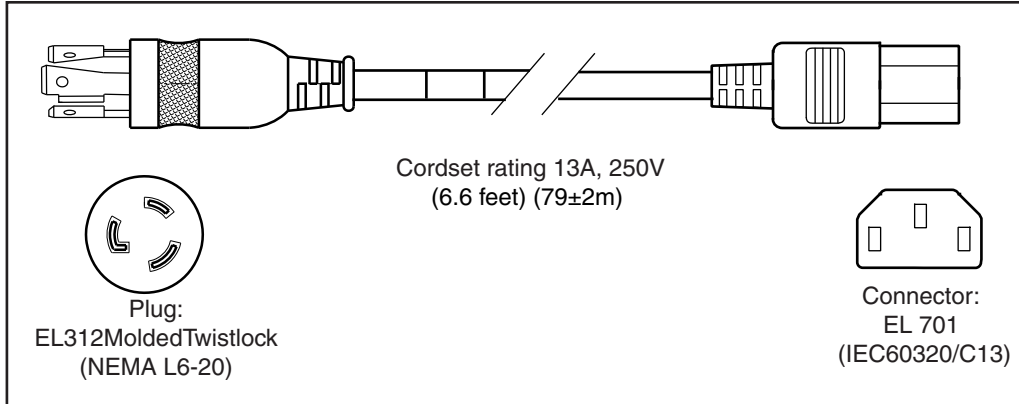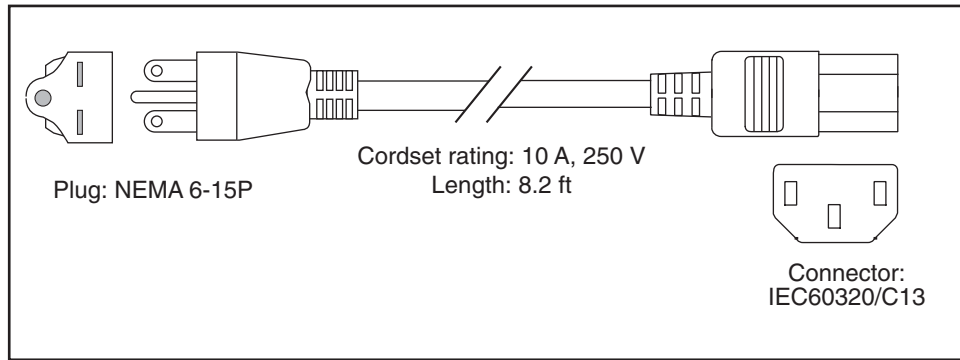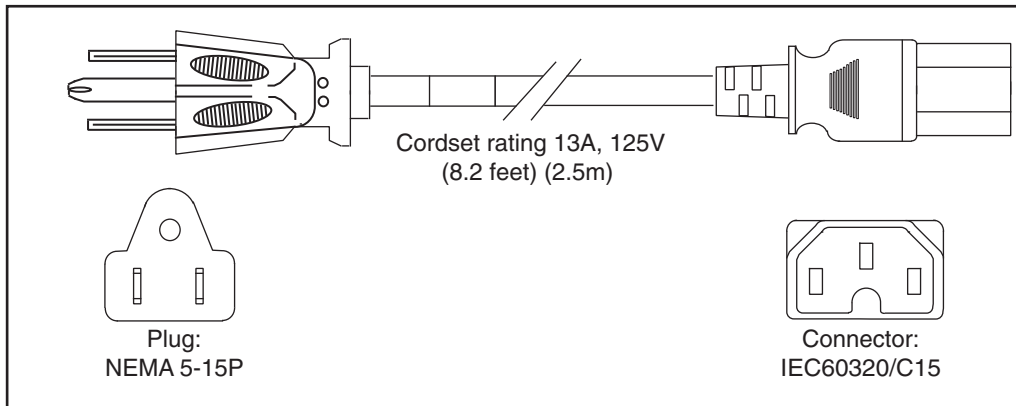
Figure B-13   *CAB-C13-CBN, Jumper Power Cord (0.68 m)*

Cordset rating 10A, 250V
(686mm)

Plug:
SS10A

Connector:
HS10S

186569
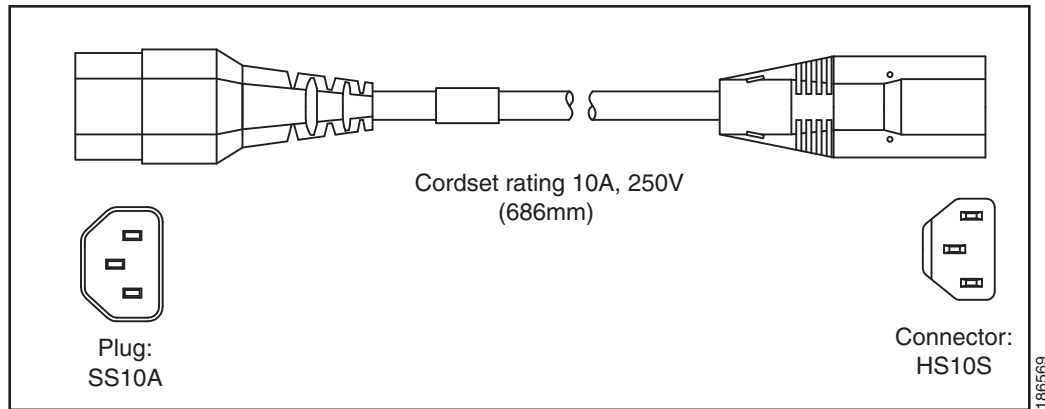
Figure B-14   *CAB-C13-C14-2M, Jumper Power Cord (2 m)*

Cordset rating 10A, 250V
(2.0 m)

Plug:
SS10A

Connector:
HS10S

336014
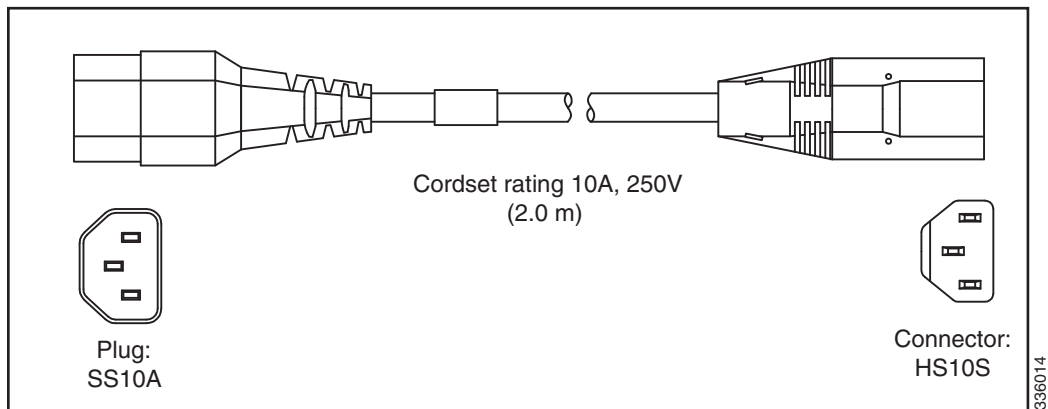
Figure B-15   *CAB-C13-C14-AC, Jumper Power Cord (3 m)*

Cordset rating 10A, 250V
(3.0 m)

Plug:
SS10A

Connector:
HS10S

336013
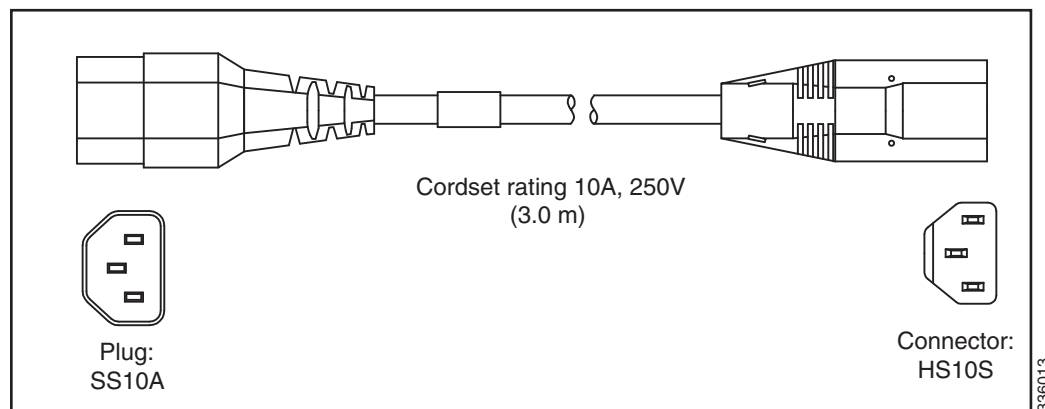
RAID Controller Considerations

This appendix contains the following sections:

Supported RAID Controllers and Required Cables

This server supports the RAID controller options, cable requirements, and RAID backup units shown in Table C-1.

Caution   Do not mix controller types in the server. Do not use the embedded MegaRAID controller and a hardware RAID controller card at the same time. This is not supported and could result in data loss.

Note   This server supports up to two PCIe-style RAID controllers. Do not mix controller types in the server.

Note   The SAS expander is required for the SFF 24-drive option and the LFF 12-drive option. The SFF 16-drive option does not use the SAS expander.

Note   The embedded RAID option is available only with the SFF 16-drive backplane. It does not operate through an expander.

Table C-1   Cisco UCS C240 RAID Options

Controller	Style	Maximum Drives	BBU or SCPM[1]	RAID Levels	Required Cables
Embedded RAID[2]	Onboard	• 4 SATA internal (default) • SFF/no expander: 8 SAS internal[3]	No	0, 1, 5[4], 10	• 8 drives, SFF/no expander: (kit of 4 `UCSC-CABLE2`)
Cisco UCS RAID SAS 2008M-8i: **PID** UCSC-RAID-MZ-C240	Mezzanine	• SFF/expander: 16 internal • LFF/expander: 12 internal • SFF/no expander: 8 internal	No	0, 1, 1E, 10	• 16 drives SFF/expander: (kit pair `UCSC-CABLE6`) • 12 drives, LFF/expander: (kit pair `UCSC-CABLE4`) • 8 drives, SFF/no expander: (kit of 4 `UCSC-CABLE2`)
Cisco UCS RAID SAS 2008M-8i: **PID** UCSC-RAID-11-C240 (Includes RAID 5 & 50)	Mezzanine	• SFF/expander: 16 internal • LFF/expander: 12 internal • SFF/no expander: 8 internal	No	0, 1, 1E, 5, 10, 50	• 16 drives SFF/expander: (kit pair `UCSC-CABLE6`) • 12 drives, LFF/expander: (kit pair `UCSC-CABLE4`) • 8 drives, SFF/no expander: (kit of 4 `UCSC-CABLE2`)

Table C-1   Cisco UCS C240 RAID Options (continued)

Controller	Style	Maximum Drives	BBU or SCPM[1]	RAID Levels	Required Cables
LSI MegaRAID SAS 9266-8i The cache memory of this controller is ECC-protected.	PCIe	• SFF/expander: 24 internal • LFF/expander: 12 internal • SFF/no expander: 8 internal or 16 internal with dual controllers	BBU	0, 1, 5, 6, 10, 50, 60	• 24 drives, SFF/expander: (kit pair `UCSC-CABLE6`) • 12 drives, LFF/expander: (kit pair `UCSC-CABLE4`) • 8 drives, no expander: (kit of 4 `UCSC-CABLE2`) • 16 drives, no expander: (kit of 4 `UCSC-CABLE2`)
LSI MegaRAID SAS 9266CV-8i The cache memory of this controller is ECC-protected.	PCIe	• SFF/expander: 24 internal • LFF/expander: 12 internal • SFF/no expander: 8 internal or 16 internal with dual controllers	SCPM	0, 1, 5, 6, 10, 50, 60	• 24 drives, SFF/expander: (kit pair `UCSC-CABLE6`) • 12 drives, LFF/expander: (kit pair `UCSC-CABLE4`) • 8 drives, no expander: (kit of 4 `UCSC-CABLE2`) • 16 drives, no expander: (kit of 4 `UCSC-CABLE2`)
LSI MegaRAID SAS 9285CV-8e	PCIe	8 external	SCPM	0, 1, 5, 6, 10, 50, 60	Not sold by Cisco

1. BBU = battery backup unit. SCPM = SuperCap power module.
2. The embedded RAID controller must be enabled in the BIOS.
3. Embedded RAID SAS drive control requires an optional SCU ROM upgrade chip to be installed on the motherboard.
4. Embedded RAID 5 support requires an optional software key.

Mixing Drive Types in RAID Groups

Following are the rules for mixing hard disk drive (HDD) and solid state drive (SSD) types in a RAID group with the supported controllers.

Table C-2   Drive Type Mixing in RAID Groups

Mix of Drive Types in RAID Group	Allowed?
SAS HDD + SATA HDD	Yes
SAS SSD + SATA SSD	Yes
HDD + SSD	No

Factory-Default Option ROM Settings

Table C-3 describes the option ROM (OPROM) settings for card slots that are made at the factory for various configurations. The version of server and the number of CPUs affect the OPROM settings.

Note If an option is listed as "not allowed" in Table C-3, that is because it is not supported in the particular configuration described in that table row. See the footnotes below the table for more information.

For additional information about RAID controller support, see Supported RAID Controllers and Required Cables, page C-2.

Table C-3   Cisco UCS C240 Factory-Default Option ROM Settings

Server Version	Number of CPUs	Embedded SW RAID Enabled?	Mezz. RAID Controller Installed?	PCIe RAID Controller 1 Installed?	PCIe RAID Controller 2 Installed?	LOM ports	Comments
C240 SFF 24 HDD/ C240 LFF 12 HDD	1	Not allowed[1]	Not allowed[2]	**Installed**: PCIe slot 3 enabled[3]	Not allowed	Always enabled	All other OPROM is disabled. Requires expander.
C240 SFF 24 HDD/ C240 LFF 12 HDD	2	Not allowed	**Installed**: connector enabled	Not allowed[4]	Not allowed	Always enabled	All other OPROM is disabled. Requires expander.
C240 SFF 24 HDD/ C240 LFF 12 HDD	2	Not allowed	Not allowed[5]	**Installed**: PCIe slot 4 enabled	Not allowed	Always enabled	All other OPROM is disabled. Requires expander.
C240 SFF 16 HDD	1	**Enabled**	Not allowed[6]	Not allowed	Not allowed	Always enabled	All other OPROM is disabled. Maximum 8 drives.
C240 SFF 16 HDD	1	Not allowed	Not allowed	**Installed**: PCIe slot 3 enabled	Not allowed	Always enabled	All other OPROM is disabled. Maximum 8 drives.
C240 SFF 16 HDD	2	**Enabled**	Not allowed	Not allowed	Not allowed	Always enabled	All other OPROM is disabled. Maximum 8 drives.
C240 SFF 16 HDD	2	Not allowed	**Installed**: connector enabled	Not allowed	Not allowed	Always enabled	All other OPROM is disabled. Maximum 8 drives.
C240 SFF 16 HDD	2	Not allowed	Not allowed	**Installed**: PCIe slot 4 enabled	Absent	Always enabled	All other OPROM is disabled. Maximum 8 drives.
C240 SFF 16 HDD	2	Not allowed	Not allowed	**Installed**: PCIe slot 4 enabled	**Installed**: PCIe slot 3 enabled	Always enabled	All other OPROM is disabled. Max. 16 drives[7].

1. The embedded SW RAID controller is supported only with the 16 HDD direct-connect backplane. It is not supported with an expander.
2. In a single-CPU configuration, the mezzanine card slot is not supported.
3. In a single-CPU configuration, PCIe slots 4 and 5 are not supported.
4. You cannot mix controller types in a server. A PCIe-style controller cannot be used when a mezzanine-style controller is used.
5. You cannot mix controller types in a server. A mezzanine-style controller cannot be used when a PCIe-style controller is used.
6. You cannot use the embedded SW RAID and HW RAID (mezzanine or PCIe card) at the same time.
7. Control of all 16 drives requires 2 PCIe-style RAID controllers.

Battery Backup Units

This server supports installation of up to two RAID battery backup units (BBUs) or SuperCap power modules (SCPMs). The units mount to clips on the removable air baffle (see Figure 3-37).

- The LSI BBU is available only when using the LSI MegaRAID controller cards. This BBU provides approximately 72 hours of battery backup for the disk write-back cache DRAM in the case of sudden power loss.

- The SCPM is available only when using the optional LSI MegaRAID-CV controller cards. This supercap module provides approximately 3 years of backup for the disk write-back cache DRAM in the case of sudden power loss by offloading the cache to the NAND flash.

For RAID backup unit replacement instructions, see Replacing the LSI RAID Battery Backup Unit or SuperCap Power Module, page 3-60.

RAID Controller Migration

This server supports hardware RAID (mezzanine and PCIe controller cards) and embedded software RAID. See Table C-4 for which migrations are allowed and a summary of migration steps.

Table C-4   RAID Controller Migration

Starting RAID Controller	Migrate to HW RAID Allowed?	Migrate to SW RAID Allowed?
None (no drives) Onboard SCU Storage support is Disabled in BIOS	Allowed 1. Install card. 2. Install cables.	Allowed 1. Install desired upgrade modules to motherboard. 2. Enable SCU storage support in BIOS. 3. Install cables.
Embedded SW RAID Onboard SCU Storage support is Enabled in BIOS	⚠️ **Caution** Data migration from SW RAID to HW RAID is *not* supported and could result in data loss. Allowed only *before* there is data on the drives; data migration is not supported. 1. Disable SCU storage support in BIOS. 2. Install card. 3. Install cables.	Not applicable
HW RAID Onboard SCU Storage support is Disabled in BIOS	Not applicable	Not allowed

Embedded MegaRAID Controller

Note VMware ESX/ESXi or any other virtualized environments are not supported for use with the embedded MegaRAID controller. Hypervisors such as Hyper-V, Xen, or KVM are also not supported for use with the embedded MegaRAID controller.

Note The embedded RAID option is available only with the SFF 16-drive backplane. It does not operate through an expander.

This server includes an embedded MegaRAID controller with two mini-SAS connectors on the motherboard.

- The default setting for this embedded controller is SATA RAID 0, 1, and 10 support for up to four SATA drives.

- You can upgrade this to support to SAS RAID 0, 1, and 10 support for up to eight SAS drives by installing a Storage Controller Unit (SCU) upgrade ROM chip on the motherboard. See Installing a SCU Upgrade ROM Module For Embedded RAID SAS Support, page C-8.

- You can further upgrade this support by adding SAS RAID 5 support with an optional software key. See Installing a Software RAID Key Module for Embedded RAID 5 Support, page C-9.

- When you order the server with this controller, the controller is enabled in the BIOS. Instructions for enabling the controller are included for the case in which a server is reset to defaults (Disabled). See Enabling the Embedded RAID Controller in the BIOS, page C-9.

Note You cannot downgrade from using a RAID controller card to using the embedded controller (see RAID Controller Migration, page C-5). Instructions for installing upgrade modules and enabling the embedded controller in the BIOS are included here for those upgrading a server with no RAID controller or drives.

Caution Data migration from SW RAID (embedded RAID) to HW RAID (a controller card) is *not* supported and could result in data loss. Migrations from SW RAID to HW RAID are supported only *before* there is data on the drives, or the case in which there are no drives in the server (see RAID Controller Migration, page C-5).

- You can migrate from using the embedded controller to using a RAID card only *before* there is data on the drives. In this case, you must disable the embedded controller. See Disabling the Embedded RAID Controller in the BIOS, page C-10.

- The required drivers for this controller are already installed and ready to use with the LSI SWRAID Configuration Utility. However, if you will use this controller with Windows or Linux, you must download and install additional drivers for those operating systems. See Installing LSI MegaSR Drivers For Windows and Linux, page C-10.

This section contains the following topics:

Notes on Supported Embedded MegaRAID Levels

The following RAID levels are supported by the embedded MegaRAID controller.

- RAID 0—You can configure a RAID 0 virtual drive (VD) using one or more physical drives (PDs). This level supports up to eight VDs and PDs.
- RAID 1—A RAID 1 VD is configured from only two PDs. This level supports up to eight PDs (four RAID arrays) and eight VDs.
- RAID 5—You can configure a RAID 5 VD using three or more PDs. This level supports up to eight PDs and eight VDs.
- RAID 10—This is a spanned VD; that is, RAID 0 is implemented on two or more RAID 1 VDs. This level supports up to eight PDs (two to four RAID 1 volumes spanned) and one VD.

Note   None of these RAID levels require drives of the same size. The smallest drive in the array determines the size of the VD.

Note   An array can be divided into multiple VDs of the same RAID level, except when using RAID 10. Mixed arrays are not permitted. For example, you cannot configure a three-drive array into RAID 0 and RAID 5 VDs. Unlike RAID 0, 1, and 5, you cannot create multiple RAID 10 VDs from the same array. A single RAID 10 VD uses up the entire array.

Installing a SCU Upgrade ROM Module For Embedded RAID SAS Support

The SCU Upgrade ROM module contains a chip on a small circuit board. This module attaches to a motherboard header. This chip upgrades the standard four-drive SATA support to add SAS support for up to eight drives.

To install a SCU upgrade ROM module, follow these steps:

Step 1   Locate the header labelled "PCH UPGRD SKU ROM" under any cables that are routed along the chassis wall (see Figure C-1).

Step 2   Align the connector on the SCU upgrade ROM module with the pins on the header, then gently push the connector onto the pins.

Step 3   Replace the top cover.

Step 4   Replace the server in the rack, replace cables, and then power on the server by pressing the **Power** button.

Step 5   Continue with either Installing a Software RAID Key Module for Embedded RAID 5 Support, page C-9 or Enabling the Embedded RAID Controller in the BIOS, page C-9.

Figure C-1   SCU Upgrade ROM and RAID 5 Key Header Locations on Motherboard
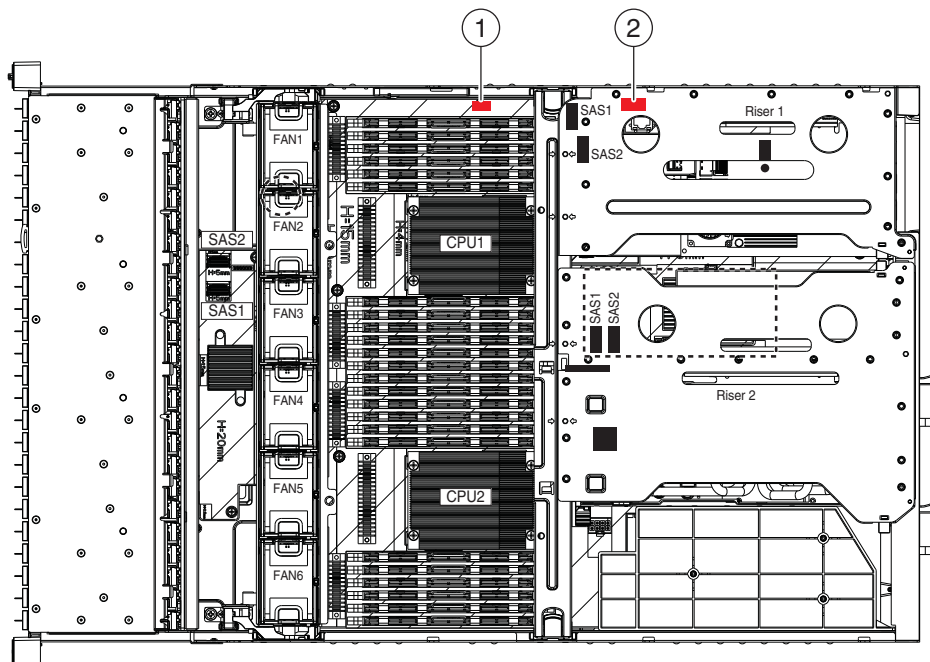
1	SCU upgrade ROM header PCH UPGRD SKU ROM (adds SAS drive support)	2	Software RAID 5 key header SW RAID KEY (adds RAID 5 support)

Installing a Software RAID Key Module for Embedded RAID 5 Support

The software RAID key module contains a chip on a small circuit board. This module attaches to a motherboard header. This chip upgrades SAS support to add RAID 5 support (RAID 0, 1, 5, and 10 for up to eight drives).

Note You must have the SCU upgrade ROM module installed before you can use this module.

To install a RAID 5 software key module, follow these steps:

Step 1 Locate the header that is labeled "SW RAID KEY" (see Figure C-1).

Step 2 Install the RAID 5 software key module onto the pins of the header.

Step 3 Replace the top cover.

Step 4 Replace the server in the rack, replace cables, and then power on the server by pressing the **Power** button.

Enabling the Embedded RAID Controller in the BIOS

When you order the server with this controller, the controller is enabled in the BIOS at the factory.

Note The default setting in the BIOS for the embedded controller is Disabled. When you order the server with the embedded controller, the BIOS setting is Enabled at the factory. However, if a server is reset to defaults, this BIOS setting is reverted to Disabled. Use the procedure below to re-enable the embedded controller.

Use the following procedure to enable the LSI MegaSR drivers.

Step 1 Boot the server and press **F2** when prompted to enter the BIOS Setup utility.

Step 2 Select the **Advanced** tab, then **South Bridge**.

Step 3 Set Onboard SCU Storage Support to **Enabled**.

Step 4 Press **F10** to save your changes and exit the utility.

Disabling the Embedded RAID Controller in the BIOS

⚠️

Caution   Data migration from SW RAID to HW RAID is *not* supported and could result in data loss. Migrations from SW RAID to HW RAID are supported only *before* there is data on the drives, or the case in which there are no drives in the server.

If you migrate from using this embedded controller to a RAID controller card, you must disable the embedded controller in the server BIOS (see caution above).

Use the following procedure to disable the LSI MegaSR drivers.

Step 1   Boot the server and press **F2** when prompted to enter the BIOS Setup utility.

Step 2   Select the **Advanced** tab, then **South Bridge**.

Step 3   Set Onboard SCU Storage Support to **Disabled**.

Step 4   Press **F10** to save your changes and exit the utility.

Launching the LSI Embedded RAID Configuration Utility

Launch the utility by pressing **Ctrl+M** when you see the prompt during system boot.

For more information about using the Embedded MegaRAID software to configure your disk arrays, see the LSI Embedded MegaRAID Software User Guide.

Installing LSI MegaSR Drivers For Windows and Linux

✎

Note   The required drivers for this controller are already installed and ready to use with the LSI SWRAID Configuration Utility. However, if you will use this controller with Windows or Linux, you must download and install additional drivers for those operating systems.

This section explains how to install the LSI MegaSR drivers for the following supported operating systems:

- Microsoft Windows Server 2008R2
- Red Hat Enterprise Linux (RHEL) 5.7, 6.1, and 6.2
- SuSE Linux Enterprise Server (SLES) 11 (SP1 and SP2)

This section contains the following topics:

- Downloading the LSI MegaSR Drivers, page C-11
- Microsoft Windows Driver Installation, page C-11
- Linux Driver Installation, page C-13

Downloading the LSI MegaSR Drivers

The MegaSR drivers are included in the C-series driver ISO for your server and OS. Download the drivers from Cisco.com:

Step 1   Find the drivers ISO file download for your server online and download it to a temporary location on your workstation:

    a.   See the following URL: **http://www.cisco.com/cisco/software/navigator.html**

    b.   Click **Unified Computing and Servers** in the middle column.

    c.   Click **Cisco UCS C-Series Rack-Mount Standalone Server Software** in the right-hand column.

    d.   Click your model of server in the right-hand column.

    e.   Click **Unified Computing System (UCS) Drivers**.

    f.   Click the release number that you are downloading.

    g.   Click **Download** to download the drivers ISO file.

    h.   Verify the information on the next page, then click **Proceed With Download**.

    i.   Continue through the subsequent screens to accept the license agreement and then browse to a location where you want to save the drivers ISO file.

Microsoft Windows Driver Installation

This section explains the steps to install the LSI MegaSR driver in a Windows installation.

This section contains the following topics:

- Windows Server 2008R2 Driver Installation, page C-11
- Updating the Windows Driver, page C-12
- Linux Driver Installation, page C-13

Windows Server 2008R2 Driver Installation

Perform the following steps to install the LSI MegaSR device driver in a new Windows Server 2008R2 operating system. The Windows operating system automatically adds the driver to the registry and copies the driver to the appropriate directory.

Step 1   Create a RAID drive group using the LSI SWRAID Configuration utility before you install this driver for Windows. Launch this utility by pressing **Ctrl+M** when LSI SWRAID is shown during BIOS post.

Step 2   Download the Cisco UCS C-Series drivers ISO, as described in Downloading the LSI MegaSR Drivers, page C-11.

Step 3   Prepare the drivers on a USB thumb drive:

    a.   Burn the ISO image to a disc.

    b.   Browse the contents of the drivers folders to the location of the embedded MegaRAID drivers:

        `/<OS>/Storage/Intel/C600/`

    c.   Expand the Zip file, which contains the folder with the MegaSR driver files.

    d.   Copy the expanded folder to a USB thumb drive.

Step 4   Start the Windows driver installation using one of the following methods:

- To install from local media: Connect an external USB DVD drive to the server and then insert the first Windows install disc into the drive. Skip to Step 6.

- To install from remote ISO: Log in to the server's CIMC interface and continue with the next step.

Step 5   Launch a Virtual KVM console window and select the **Virtual Media** tab.

    a.   Click **Add Image** and browse to select your remote Windows installation ISO file.

    b.   Select the check box in the Mapped column for the media that you just added, then wait for mapping to complete.

Step 6   Power cycle the server.

Step 7   Press **F6** when you see the F6 prompt during bootup. The Boot Menu window opens.

Step 8   On the Boot Manager window, select the physical disc or virtual DVD and press **Enter**. The Windows installation begins when the image is booted.

Step 9   Press Enter when you see the prompt, "Press any key to boot from CD."

Step 10   Observe the Windows installation process and respond to prompts in the wizard as required for your preferences and company standards.

Step 11   When Windows prompts you with "Where do you want to install Windows," install the drivers for embedded MegaRAID:

    a.   Click **Load Driver**. You are prompted by a Load Driver dialog to select the driver to be installed.

    b.   Connect the USB thumb drive that you prepared in Step 3 to the target server.

    c.   On the Windows Load Driver dialog that you opened in Step a, click Browse.

    d.   Use the dialog to browse to the location of the drivers folder on the USB thumb drive, and click **OK**.

        Windows loads the drivers from the folder and when finished, the driver is listed under the prompt, "Select the driver to be installed."

    e.   Click **Next** to install the drivers.

Updating the Windows Driver

Perform the following steps to update the LSI MegaSR driver for Windows or to install this driver on an existing system booted from a standard IDE drive.

Step 1   Click **Start**, point to **Settings**, and then click **Control Panel**.

Step 2   Double-click **System**, click the **Hardware** tab, and then click **Device Manager**. Device Manager starts.

Step 3   In Device Manager, double-click **SCSI and RAID Controllers**, right-click the device for which you are installing the driver, and then click **Properties**.

Step 4   On the Driver tab, click **Update Driver** to open the Update Device Driver wizard, and then follow the wizard instructions to update the driver.

Linux Driver Installation

This section explains the steps to install the embedded MegaRAID device driver in a Red Hat Enterprise Linux installation or a SuSE Linux Enterprise Server installation.

This section contains the following topics:

- Obtaining the Driver Image File, page C-13
- Preparing Physical Installation Diskettes For Linux, page C-13
- Installing the Red Hat Linux Driver, page C-15
- Installing the SUSE Linux Enterprise Server 11 Driver, page C-16

Obtaining the Driver Image File

See Downloading the LSI MegaSR Drivers, page C-11 for instructions on obtaining the drivers. The Linux driver is offered in the form of `dud-[`*driver version*`].img`, which is the boot image for the embedded MegaRAID stack.

Note The LSI MegaSR drivers that Cisco provides for Red Hat Linux and SUSE Linux are for the original GA versions of those distributions. The drivers do not support updates to those OS kernels.

Preparing Physical Installation Diskettes For Linux

This section describes how to prepare physical Linux installation diskettes from the driver image files, using either the Windows operating system or the Linux operating system.

Note Alternatively, you can mount the `dud.img` file as a virtual floppy disk, as described in the installation procedures.

Preparing Physical Installation Diskettes With the Windows Operating System:

Under Windows, you can use the RaWrite floppy image-writer utility to create disk images from image files. Perform the following steps to build installation diskettes.

Step 1 Download the Cisco UCS C-Series drivers ISO, as described in Downloading the LSI MegaSR Drivers, page C-11 and save it to your Windows system that has a diskette drive.

Step 2 Extract the `dud.img` file:

  a. Burn the ISO image to a disc.

  b. Browse the contents of the drivers folders to the location of the embedded MegaRAID drivers:

  `/<`*OS*`>/Storage/Intel/C600/`

  c. Expand the Zip file, which contains the folder with the driver files.

Step 3 Copy the driver update disk image `dud-[driver version].img` and your file `raw write.exe` to a directory.

Note RaWrite is not included in the driver package.

Step 4 If necessary, use this command to change the file name of the driver update disk to a name with fewer than eight characters: **copy dud-[***driver version***].img dud.img**

Step 5 Open the DOS Command Prompt and navigate to the directory where `raw write.exe` is located.

Step 6 Type the following command to create the installation diskette: **raw write**

Step 7 Press **Enter**.

You are prompted to enter the name of the boot image file.

Step 8 Type the following: **dud.img**

Step 9 Press **Enter**.

You are prompted for the target diskette.

Step 10 Insert a floppy diskette into the floppy drive and type: **A:**

Step 11 Press **Enter**.

Step 12 Press **Enter** again to start copying the file to the diskette.

Step 13 After the command prompt returns and the floppy disk drive LED goes out, remove the diskette.

Step 14 Label the diskette with the image name.

Preparing Installation Disks With a Linux Operating System:

Under Red Hat Linux and SuSE Linux, you can use a driver diskette utility to create disk images from image files. Perform the following steps to create the driver update disk:

Step 1 Download the Cisco UCS C-Series drivers ISO, as described in Downloading the LSI MegaSR Drivers, page C-11 and save it to your Linux system that has a diskette drive.

Step 2 Extract the `dud.img` file:

   a. Burn the ISO image to a disc.

   b. Browse the contents of the drivers folders to the location of the embedded MegaRAID drivers:

   `/<OS>/Storage/Intel/C600/`

   c. Expand the Zip file, which contains the folder with the driver files.

Step 3 Copy the driver update disk image `dud-[driver version].img` to your Linux system.

Step 4 Insert a blank floppy diskette into the floppy drive.

Step 5 Confirm that the files are in the selected directory.

Step 6 Create the driver update diskette using the following command:

   dd if=dud-[*driver version***].img of=/dev/fd0**

Step 7 After the command prompt returns and the floppy disk drive LED goes out, remove the diskette.

Step 8 Label the diskette with the image name.

Installing the Red Hat Linux Driver

This section describes the fresh installation of the Red Hat Enterprise Linux 5.7, 6.1, or 6.2 device driver on systems with the embedded MegaRAID stack.

Step 1   Create a RAID drive group using the LSI SWRAID Configuration utility before you install this driver for the OS. Launch this utility by pressing **Ctrl+M** when LSI SWRAID is shown during BIOS post.

Step 2   Prepare the `dud.img` file using one of the following methods:

- To install from a physical diskette: Use one of the procedures in Preparing Physical Installation Diskettes For Linux, page C-13.
  Then return to Step 4 of this procedure.

- To install from a virtual floppy disk: Download and save the Cisco UCS C-Series drivers ISO, as described in Downloading the LSI MegaSR Drivers, page C-11.
  Then continue with the next step.

Step 3   Extract the `dud.img` file:

   a. Burn the ISO image to a disc.

   b. Browse the contents of the drivers folders to the location of the embedded MegaRAID drivers:

   `/<OS>/Storage/Intel/C600/`

   c. Copy the `dud-<driver version>.img` file to a temporary location on your workstation.

Step 4   Start the Linux driver installation using one of the following methods:

- To install from local media: Connect an external USB DVD drive to the server and then insert the first RHEL install disc into the drive.
  Then continue with Step 6.

- To install from remote ISO: Log in to the server's CIMC interface. Then continue with the next step.

Step 5   Launch a Virtual KVM console window and select the **Virtual Media** tab.

   a. Click **Add Image** and browse to select your remote RHEL installation ISO file.

   b. Click **Add Image** again and browse to select your `dud.img` file.

   c. Select the check boxes in the Mapped column for the media that you just added, then wait for mapping to complete.

Step 6   Power cycle the server.

Step 7   Press **F6** when you see the F6 prompt during bootup. The Boot Menu window opens.

Step 8   On the Boot Manager window, select the physical disc or virtual DVD and press **Enter**.

The RHEL installation begins when the image is booted.

Step 9   Type one of the following commands at the boot prompt:

- For RHEL 5.7 (32- and 64-bit), type:
  Linux dd blacklist=isci blacklist=ahci noprobe=<ata*drive number*>

- For RHEL 6.1 and 6.2 (32- and 64-bit), type:
  Linux dd blacklist=isci blacklist=ahci nodmraid noprobe=<ata*drive number*>

> **Note**   The **noprobe** values depend on the number of drives. For example, to install RHEL 5.7 on a RAID 5 configuration with three drives, enter:
> **Linux dd blacklist=isci blacklist=ahci noprobe=ata1 noprobe=ata2 noprobe=ata3**

Step 10 Press Enter.

The prompt asks whether you have a driver disk.

Step 11 Use the arrow key to select **Yes**, and then press **Enter**.

Step 12 Select **fd0** to indicate that you have a floppy diskette with the driver on it.

Step 13 Do one of the following actions:

- If you prepared the IMG file on a physical diskette in Step 2: Connect an external USB diskette drive to the target server and then insert the diskette in the A:/ drive and press **Enter**.

- If you mapped the IMG file as a virtual floppy in Step 5: Select the location of the virtual floppy.

The installer locates and loads the driver for your device. The following message appears:

```
Loading megasr driver...
```

Step 14 Follow the Red Hat Linux installation procedure to complete the installation.

Step 15 Reboot the system.

Installing the SUSE Linux Enterprise Server 11 Driver

This section describes the installation of the SuSE Linux Enterprise Server 11 driver on a system with the embedded MegaRAID stack.

Us e the following procedure to install the SLES drivers.

Step 1 Create a RAID drive group using the LSI SWRAID Configuration utility before you install this driver for the OS. Launch this utility by pressing **Ctrl+M** when LSI SWRAID is shown during BIOS post.

Step 2 Prepare the dud.img file using one of the following methods:

- To install from a physical diskette: Use one of the procedures in Preparing Physical Installation Diskettes For Linux, page C-13.
  Then return to Step 4 of this procedure.

- To install from a virtual floppy disk: Download and save the Cisco UCS C-Series drivers ISO, as described in Downloading the LSI MegaSR Drivers, page C-11.
  Then continue with the next step.

Step 3 Extract the dud.img file:

- **a.** Burn the ISO image to a disc.

- **b.** Browse the contents of the drivers folders to the location of the embedded MegaRAID drivers:

  /<*OS*>/Storage/Intel/C600/

- **c.** Copy the dud-<*driver version*>.img file to a temporary location on your workstation.

Step 4 Start the Linux driver installation using one of the following methods:

- To install from local media: Connect an external USB DVD drive to the server and then insert the first RHEL install disc into the drive. Skip to Step 6.

- To install from remote ISO: Log in to the server's CIMC interface and continue with the next step.

Step 5 Launch a Virtual KVM console window and select the **Virtual Media** tab.

- **a.** Click **Add Image** and browse to select your remote RHEL installation ISO file.

- **b.** Click **Add Image** again and browse to select your dud.img file.

c. Select the check box in the Mapped column for the media that you just added, then wait for mapping to complete.

Step 6 Power cycle the server.

Step 7 Press **F6** when you see the F6 prompt during bootup. The Boot Menu window opens.

Step 8 On the Boot Manager window, select the physical disc or virtual DVD and press **Enter**. The SLES installation begins when the image is booted.

Step 9 When the first SLES screen appears, select **Installation** on the menu.

Step 10 Type one of the following in the Boot Options field:

- For SLES 11 and SLES 11 SP1 (32- and 64-bit), type: **brokenmodules=ahci**
- For SLES 11 SP2 (32-and 64-bit), type: **brokenmodules=ahci brokenmodules=isci**

Step 11 Press **F6** for the driver and select **Yes**.

Step 12 Do one of the following actions:

- If you prepared the IMG file on a physical diskette in Step 2: Connect an external USB diskette drive to the target server and then insert the diskette in the A:/ drive and press **Enter**.
- If you mapped the IMG file as a virtual floppy in Step 5: Select the location of the virtual floppy.

"Yes" appears under the F6 Driver heading.

Step 13 Press **Enter** to select Installation.

Step 14 Press **OK**.

The following message appears: LSI Soft RAID Driver Updates added.

Step 15 At the menu, select the driver update medium and press the **Back** button.

Step 16 Continue and complete the installation process by following the prompts.

RAID Controller Cabling

This section includes the following topics:

Cable Routing

The RAID controller connectors in this server are shown in Figure C-2. The red line indicates the recommended cable routing path from the backplane to the possible controller locations.

Figure C-2   RAID Controller Connectors
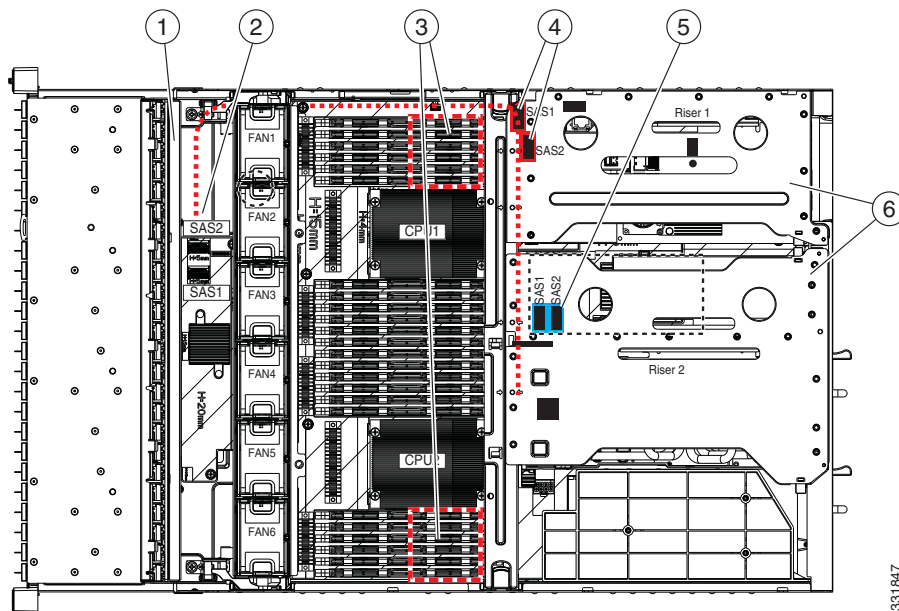
1	Drive backplane (Only the SFF 16-drive option uses direct connection to the backplane.)	4	Embedded RAID connectors on motherboard
2	Expander (Only the SFF 24-drive and LFF 12-drive options require the expander.)	5	Mezzanine card SAS connectors (if present)
3	RAID backup unit mounting locations on removable air baffle (not shown)	6	PCIe risers for LSI MegaRAID cards

Cisco UCS C240 Server Cabling Instructions

This section contains the following topics:

Backplane and Expander Options

The server is orderable in three different versions, each with one of three different front panel/backplane configurations:

- Cisco UCS C240 (small form-factor (SFF) drives, with 24-drive backplane and expander). Holds up to twenty-four 2.5-inch hard drives or solid state drives.
- Cisco UCS C240 (small form-factor (SFF) drives, with 16-drive backplane, no expander). Holds up to sixteen 2.5-inch hard drives or solid state drives.
- Cisco UCS C240 (large form-factor (LFF) drives, with 12-drive backplane and expander). Holds up to twelve 3.5-inch hard drives.

Note   The SAS expander is required for the SFF 24-drive option and the LFF 12-drive option. The SFF 16-drive option does not use the SAS expander.

Note   This server supports up to two PCIe-style RAID controllers. However, do not mix controller types in the server.

Note   The embedded RAID option is available only with the SFF 16-drive backplane. It does not operate through an expander.

SFF 24-Drive Backplane With Expander Cabling

The cable connections required for each type of controller are as follows:

ICisco UCS RAID SAS 2008M-8i Mezzanine Card

This option can control up to 16 drives.

The required `UCSC-CABLE4` cable kit has two cables. Cable 1 controls drives 1–8 and cable 2 controls drives 9–16.

1. Connect cable 1 from connector SAS1 on the card to the SAS1 connector on the expander.
2. Connect cable 2 from connector SAS2 on the card to the SAS2 connector on the expander.

LSI MegaRAID SAS 9266-8i or 9266CV-8i PCIe Card

This option can control up to 24 drives.

The required `UCSC-CABLE6` cable kit has two cables. Cable 1 controls drives 1–12 and cable 2 controls drives 13–24.

1. Connect cable 1 from connector SAS1 on the card to the SAS1 connector on the expander.

2. Connect cable 2 from connector SAS2 on the card to the SAS2 connector on the expander.

SFF 16-Drive Backplane, No Expander

The SFF 16-drive option does not use a SAS expander, so connections from the controller are made directly to the backplane. The cable connections required for each type of controller are as follows:

Embedded RAID

This option can control up to eight drives.

The required `UCSC-CABLE2` cable kit has four cables. Cable 1 controls drives 1–4 and cable 2 controls drives 5–8. (With this embedded RAID option, only two of the four cables in the kit are used.)

1. Connect cable 1 from connector SASPORT 1 on the motherboard to the SAS1 connector on the backplane.

2. Connect cable 2 from connector SASPORT 2 on the motherboard to the SAS2 connector on the backplane.

Cisco UCS RAID SAS 2008M-8i Mezzanine Card

This option can control up to 8 drives.

The required `UCSC-CABLE2` cable kit has four cables. Cable 1 controls drives 1–4 and cable 2 controls drives 5–8.

1. Connect cable 1 from the card connector SAS1 to the SAS1 connector on the backplane.

2. Connect cable 2 from the card connector SAS2 to the SAS2 connector on the backplane.

LSI MegaRAID SAS 9266-8i or 9266CV-8i PCIe Card

This option can control up to 8 drives with one controller; you can control up to 16 drives with two identical PCIe-style controllers and the four cables that are included in the `UCSC-CABLE2` kit.

The required `UCSC-CABLE2` cable kit has four cables.

- Cable 1 controls drives 1–4 and cable 2 controls drives 5–8.
- With a second PCIe-style controller in the server, cable 3 controls drives 9–12 and cable 4 controls drives 13–16.

Make the following connections to your first controller card to control up to eight drives:

1. Connect cable 1 from the first card SAS1 connector to the SAS1 connector on the backplane.

2. Connect cable 2 from the first card SAS2 connector to the SAS2 connector on the backplane.

Make the following connections to your second controller card to control 9 to 16 drives:

1. Connect cable 1 from the second card SAS1 connector to the SAS3 connector on the backplane.

2. Connect cable 2 from the second card SAS2 connector to the SAS4 connector on the backplane.

LFF 12-Drive Backplane With Expander

Cisco UCS RAID SAS 2008M-8i Mezzanine Card

This option can control up to 12 drives.

The required `UCSC-CABLE4` cable kit has two cables. Cable 1 controls drives 1–6 and cable 2 controls drives 7–12.

1. Connect cable 1 from connector SAS1 on the card to the SAS1 connector on the expander.

2. Connect cable 2 from connector SAS2 on the card to the SAS2 connector on the expander.

LSI MegaRAID SAS 9266-8i or 9266CV-8i PCIe Card

This option can control up to 12 drives.

The required `UCSC-CABLE4` cable kit has two cables. Cable 1 controls drives 1–6 and cable 2 controls drives 7–12.

1. Connect cable 1 from connector SAS1 on the card to the SAS1 connector on the expander.

2. Connect cable 2 from connector SAS2 on the card to the SAS2 connector on the expander.

Restoring RAID Configuration After Replacing a RAID Controller

When you replace a RAID controller, the RAID configuration that is stored in the controller is lost. Use the following procedure to restore your RAID configuration to your new RAID controller.

Step 1   Replace your RAID controller. See Replacing a PCIe Card, page 3-38.

Step 2   If this was a full chassis swap, replace all drives into the drive bays, in the same order that they were installed in the old chassis.

Step 3   Reboot the server and watch for the prompt to press F.

Step 4   Press **F** when you see the following on-screen prompt:

```
Foreign configuration(s) found on adapter.
Press any key to continue or 'C' load the configuration utility,
or 'F' to import foreign configuration(s) and continue.
```

Step 5   Press any key (other than C) to continue when you see the following on-screen prompt:

```
All of the disks from your previous configuration are gone. If this is
an unexpected message, then please power of your system and check your cables
to ensure all disks are present.
Press any key to continue, or 'C' to load the configuration utility.
```

Step 6   Watch the subsequent screens for confirmation that your RAID configuration was imported correctly.

   • If you see the following message, your configuration was successfully imported. The LSI virtual drive is also listed among the storage devices.

   N Virtual Drive(s) found on host adapter.

   • If you see the following message, your configuration was not imported. This can happen if you do not press F quickly enough when prompted. In this case, reboot the server and try the import operation again wen you are prompted to press F.

   0 Virtual Drive(s) found on host adapter.

For More Information

The LSI utilities have help documentation for more information about using the utilities.

For basic information about RAID and for using the utilities for the RAID controller cards supported in Cisco servers, see the Cisco UCS Servers RAID Guide.

For more information about using the Embedded MegaRAID software to configure your disk arrays, see the LSI Embedded MegaRAID Software User Guide.

Full LSI documentation is also available:

   • LSI MegaRAID SAS Software User's Guide (for LSI MegaRAID)

      http://www.cisco.com/en/US/docs/unified_computing/ucs/3rd-party/lsi/mrsas/userguide/LSI_MR_SAS_SW_UG.pdf

   • LSI SAS2 Integrated RAID Solution User Guide (for LSI SAS 2008)

      http://www.cisco.com/en/US/docs/unified_computing/ucs/3rd-party/lsi/irsas/userguide/LSI_IR_SAS_UG.pdf

Installation for Cisco UCS Integration

The Cisco UCS integration instructions have been moved to the integration guides found here:

Cisco UCS C-Series Server Integration with UCS Manager Guides

Refer to the guide that is for the version of Cisco UCS Manager that you are using.