Cisco UCS C460 Server Installation and Service Guide

Covers Server Generation M1 and Generation M2

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Cisco UCS C460 Server Installation and Service Guide

CONTENTS

Preface

This preface describes the audience, organization, and conventions of the *Cisco UCS C460 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 road map document at the following link:

Cisco UCS C-Series Documentation Roadmap

Audience

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

Organization

This guide is organized as follows:

Chapter	Title	Description
Chapter 1	Overview	Provides an overview of the Cisco UCS (Unified Computing System) C460 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 the server up.
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.

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

Opozorilo **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

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

的标准工作程序。请

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。

주의

중요 안전 지침

이 경고 기호는 위험을 나타냅니다. 작업자가 신체 부상을 일으킬 수 있는 위험한 환경에 있습니다. 장비에 작업을 수행하기 전에 전기 회로와 관련된 위험을 숙지하고 표준 작업 관례를 숙지하여 사고를 방지하십시오. 각 경고의 마지막 부분에 있는 경고문 번호를 참조하여 이 장치와 함께 제공되는 번역된 안전 경고문에서 해당 번역문을 찾으십시오.

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

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

Subscribe to the *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS Version 2.0.

CHAPTER 1

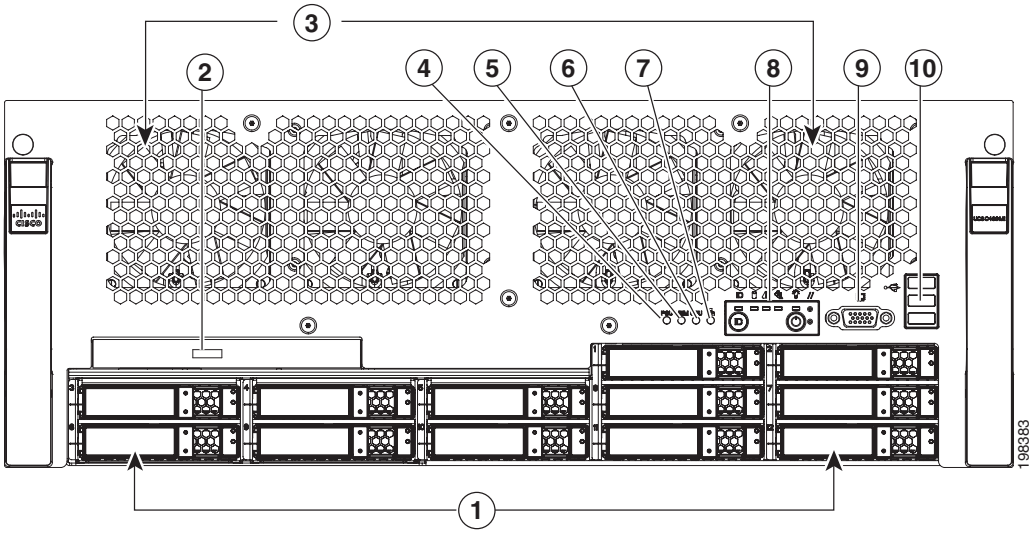
Overview

This chapter provides an overview of the Cisco UCS C460 server features.

The Cisco UCS C460 server is a part of the Cisco UCS C-Series rack-mount server family. It is a high-performance, high-memory-capacity server designed with the performance and reliability to power compute-intensive, enterprise-critical standalone applications and virtualized workloads.It operates in a wide range of data center environments. These environments include the Cisco Unified Computing System, the Cisco Nexus switches, and discrete Ethernet and Fibre Channel switches from Cisco and third parties.

Figure 1-1 shows the front panel features.

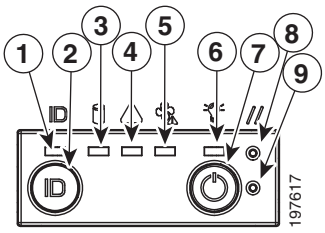
Figure 1-1 Front Panel Features



1	HDDs, up to twelve	**2**	DVD drive
3	Fans, up to eight	**4**	Power supply status LED
5	Memory status LED	**6**	CPU status LED
7	Network activity LED	**8**	Operations panel (see Figure 1-2 for a detailed view)
9	VGA connector	**10**	USB ports, three

Figure 1-2 shows the operations panel LEDs and buttons.

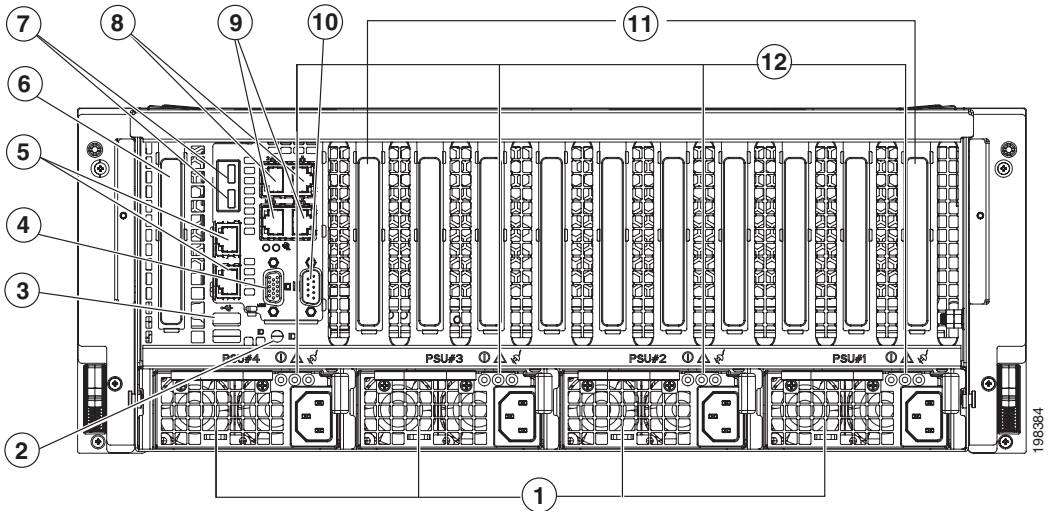
Figure 1-2 Operations Panel LEDs and Buttons



1	ID LED	**2**	ID button
3	HDD fault LED	**4**	System health LED
5	Fan fault LED	**6**	Power status LED
7	Power button	**8**	Reset button
9	NMI button		

Figure 1-3 shows the rear panel features.

Figure 1-3 Rear Panel Features



1	Power supplies, up to four	**2**	ID button
3	USB ports, two total	**4**	VGA connector
5	10GBase-T LOM ports, two total	**6**	SAS riser slot
7	10G SFP+ LOM ports, two total	**8**	1G LOM ports, two total
9	10/100 Management ports M1 and M2	**10**	Serial connector
11	PCIe slots 1 through 10 (left to right as shown)	**12**	Power supply LEDs

Table 1-1 lists the features of the C460 server.

Table 1-1 Cisco UCS C460 Server Features

Chassis	Four rack-unit (4RU) chassis
Processors	• Cisco UCS C460 M1 server: Either 2 or 4 Intel Xeon 7500 Series processors. • Cisco UCS C460 M2 server: Either 2 or 4 Intel E7-4800 or E7-8800 Series processors. Two-CPU configurations require 2 power supplies and 4-CPU configurations require 4 power supplies.
Memory	Up to 64 DIMMs[1], populated in 8 slots on each of the 8 memory risers. Up to 512 GB of industry-standard DDR3[2] memory.
Multi-bit error protection	This server supports multi-bit error protection.
Storage	Up to twelve, 2.5" SAS[3] or SATA[4] hard drives or solid state drives. Up to 6 TB of hot-pluggable storage.
Disk Management	Factory-configured RAID[5] support options: • RAID 0, 1, and 10 support for up to 8 SAS or SATA drives, with the optional LSI MegaRAID SAS 9240-8i RAID controller • RAID 0, 1, 5, 6, 10, 50, and 60 support for up to 12 SAS or SATA drives, with the optional LSI MegaRAID SAS 9260-8i RAID controller There is a dedicated SAS riser slot for the RAID controller card in the chassis. There is also a mounting point inside the chassis for the optional RAID battery backup unit that is available when using the LSI MegaRAID SAS 9260-8i controller. See RAID Controller Considerations, page C-1 for more information.
PCIe I/O	Ten PCIe[6] expansion slots, four hot-pluggable. See Replacing a PCIe Card, page 3-38 for details.
InfiniBand	The bus slots in this server support the InfiniBand architecture.

Table 1-1 Cisco UCS C460 Server Features (continued)

Network and management I/O	The server provides these rear-panel connectors: • Two dedicated 10/100 Ethernet management ports • Two 1Gb Ethernet ports These integrated Gigabit ports support the Wake on LAN (WoL) and TCP/IP Offload Engine (TOE) standards. • Two 10Gb Base-T Ethernet ports • Two 10Gb SFP+ Ethernet ports **Note** See Using the 10 Gb Ports, page 2-12 for more information about the SFP+ and 10GBase-T 10 Gb ports. • One DB9 serial connector. • One 15-pin VGA[7] connector. • Two USB[8] 2.0 connectors. The server provides these front-panel connectors: • One 15-pin VGA connector. • Three USB 2.0 connectors.
WoL	The 1-Gb Base-T Ethernet LAN ports support the wake-on-LAN (WoL) standard.
Power	Either 2 or 4 power supplies, 850W each. Hot-swappable, rear-accessible, and redundant as 2+2 or 3+1. **Note** You can use 2 power supplies with a 2-CPU configuration. In this case, 1+1 redundancy is supported only if your server's overall power consumption can be supported by a single 850W power supply during the failure and hot-swap. For more information about your server's power consumption, consult with your Cisco sales representative or use the power calculator accessible at the Unified Computing System Partner Resource Center: http://www.ciscoprc.com/resourcelib.asp?id=937
ACPI	This server supports the advanced configuration and power interface (ACPI) 4.0 standard.
Cooling	Up to 8 fans, hot-swappable, redundant as 7+1, or non-redundant as 4. Also, there are 4 fans in each power supply for lower-section cooling.
Removable media	One DVD drive. The drive supports the following media types: CD-R, CD-ROM, CD-RW, DVD+R, DVD+RW, DVD-R, DVD-ROM, DVD-RW, +R DL

1. DIMM = dual inline memory module
2. DDR = double data rate (transfer mode)
3. SAS = serial attached SCSI
4. SATA = serial advanced technology attachment
5. RAID = redundant array of independent disks
6. PCIe = peripheral component interconnect express
7. VGA = video graphics array
8. USB = universal serial bus

CHAPTER 2

Installing the Server

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

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 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:

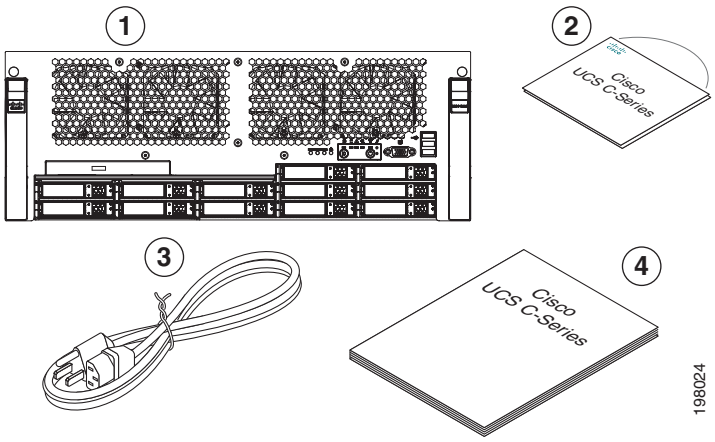
Step 1 Remove the server from its cardboard container and save all packaging material.

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	**2**	Drivers and utilities disk
3	Power cord (optional, up to four)	**4**	Documentation

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

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 appendix.
- 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 appendix. If available, you can use an uninterruptible power supply (UPS) to protect against power failures.

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.

Rack Requirements

This section provides the requirements for the standard open racks, assuming an external ambient air temperature range of 32°F to 95°F (0°C to 35°C).

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 must be square when you use the supplied slide rails.
- The minimum vertical rack space per server must be four RUs, equal to 7 in. (17.8 cm).

Tip The Cisco R-Series racks and RP-Series PDUs have been designed for optimum performance with Cisco products and are available from Cisco.

Equipment Requirements

The slide rails supplied by Cisco Systems do not require any tools for installation, but you might want to use a tape measure and level to help level the slide rails during installation.

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

The qualified and supported part numbers for this component are subject to change over time. For the most up-to-date list of replaceable components, see the following URL and then scroll to *Technical Specifications*:

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

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

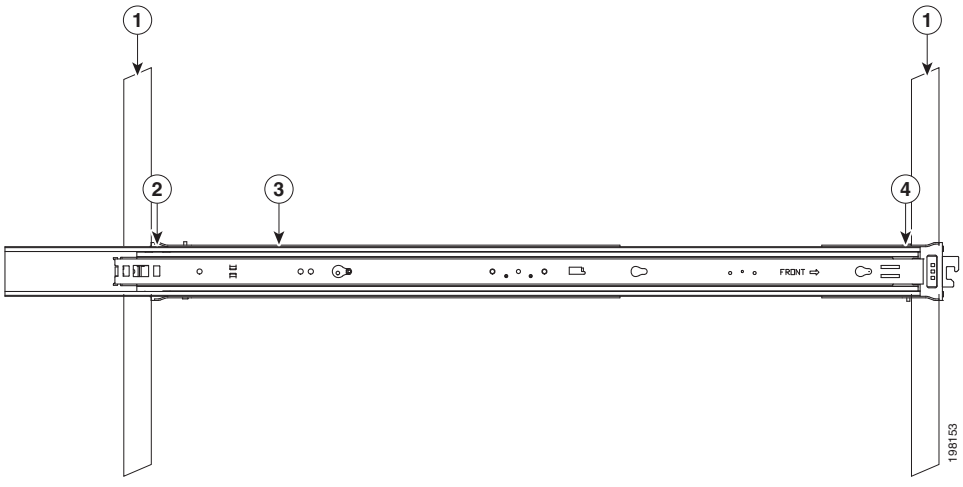
Step 1 Install the slide rail assemblies in the rack. See Figure 2-2.

a. Place the slide-rail assembly (item 3) against the inside of the front and rear rack posts (item 1), with the slide rail facing the inside of the rack and the front mounting pegs in front of the front rack-post holes (item 4).

b. Expand the slide rail assembly toward the rear of the rack, until the rear mounting pegs seat in the rear rack-post holes (item 2).

c. Compress the slide-rail assembly until the mounting pegs are fully seated and the locking clips at both ends of the assembly lock.

Figure 2-2 Installing the Slide Rail Assemblies in the Rack



1	Rack posts	**2**	Rear mounting pegs and locking clip
3	Slide rail assembly	**4**	Front mounting pegs and locking clip

d. Attach the second slide-rail assembly to the opposite side of the rack.

e. Ensure that the two slide-rail assemblies are level and at the same height.

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

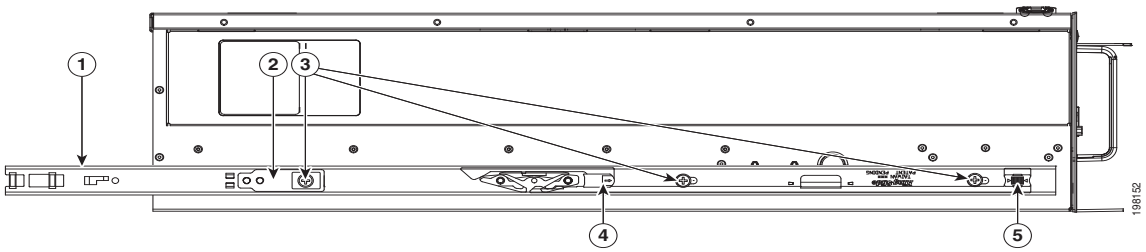
Step 2 Attach mounting brackets to the server. See Figure 2-3:

a. Place the mounting bracket (item 1) against the side of the server, with the end of the bracket marked *Front* toward the front of the server.

b. Match the three bracket mounting holes with the three mounting pegs (item 3) on the side of the server.

c. Slide the bracket toward the rear of the server until the metal tab on the bracket (item 2) locks over the rear mounting peg.

Figure 2-3 Attaching the Mounting Brackets to the Server



1	Mounting bracket	**2**	Metal tab
3	Mounting pegs	**4**	Removal release clip
5	Installation release clip		

Step 3 Insert the server into the slide rails:

a. Align the rear of the mounting brackets with the front of the empty slide rails that you installed in Step 1.

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

c. Push the plastic installation release clip on each mounting bracket toward the server rear (see item 5 in Figure 2-3).

d. Continue pushing the server into the rack until its front flanges touch the rack posts and the thumb latches engage.

Step 4 (Optional) Attach the Cable Management Arm (CMA) to the rear of the slide rails. Directions in this step use the orientation of facing the rear of the rack and server. See Figure 2-4.

a. Attach the square metal connector with the blue tab (item 4) to the rear of the left slide rail assembly. Push in the clip until it locks in place.

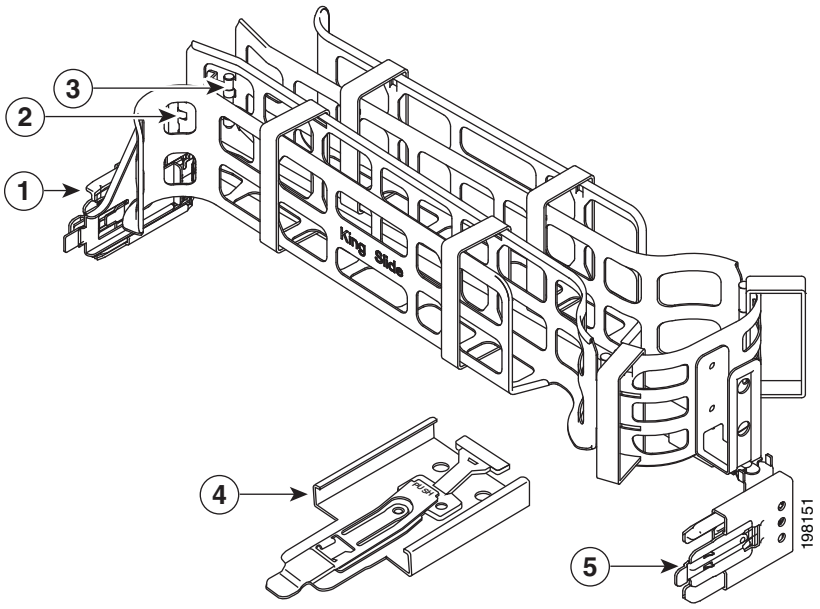
b. Attach Connector B (item 5) to the metal connector that you attached to the left slide rail in step a.

c. Attach Connector A (item 2) to the rear end of the right slide rail. Snap the rectangular hole in the end of the connector over the rectangular peg at the end of the slide rail.

d. Attach the blue clip connector (item 3) to the right slide rail.

e. Attach the metal connector (item 1) to the rear of the mounting bracket that is attached to the right side of the server.

Figure 2-4 Attaching the Cable Management Arm



1	Metal connector	**2**	Connector A
3	Blue clip connector	**4**	Square metal connector with blue tab
5	Connector B		

Step 5 Continue with the Initial Server Setup, page 2-8.

Initial Server Setup

This section contains 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.

Note Depending on how much memory is installed in the server, bootup might take two minutes or more because of the memory verification operation during bootup.

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

- Off—The server is in standby power mode or no power is present. Power is supplied only to the CIMC and some motherboard functions.
- Solid 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 to the USB and VGA connectors on the front panel (see Figure 1-1 on page 1-1).

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. You can then reactivate the first VGA connector only by rebooting the server.

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 on page 1-2 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.
- Shared LOM 10G—The two 10Gb Ethernet ports are used to access the CIMC. You have to select a NIC redundancy and IP setting.

Note See Using the 10 Gb Ports, page 2-12 for more information about the SFP+ and 10G Base-T ports.

Note The Cisco Card NIC mode is currently supported only with a Cisco UCS VIC that is installed in PCIe slot 1. See also Special Considerations for Cisco UCS Virtual Interface Cards, page 3-42.

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

  – None—(Available only with the Shipping NIC mode) 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. See NIC Modes and NIC Redundancy Settings, page 2-11 for more information.

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

Step 6 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.
- Shared LOM 10G—The two 10Gb Ethernet ports are used to access the CIMC. You have to 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 4. See also Special Considerations for Cisco UCS Virtual Interface Cards, page 3-42.

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

- None—(Available only with the Shipping NIC mode) 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.

  The active/active setting uses Mode 5 or Balance-TLB (adaptive transmit load balancing). This is channel bonding that does not require any special switch support. The outgoing traffic is distributed according to the current load (computed relative to the speed) on each slave. Incoming traffic is received by the current slave. If the receiving slave fails, another slave takes over the MAC address of the failed receiving slave.

Using the 10 Gb Ports

This server has four 10 Gb ports on the rear panel (see Figure 1-3 on page 1-2):

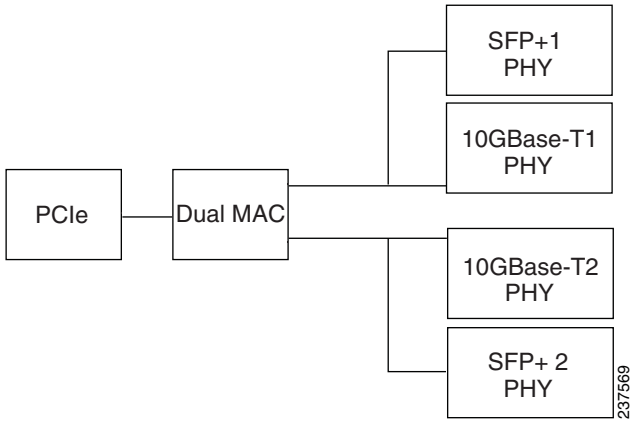
- Two 10GBase-T ports
- Two SFP+ ports

We recommend that you use either the two SFP+ ports or the two 10GBase-T ports.

Although there are four physical ports, only two can have active PHY links at one time. However, the dual media feature of this server does enable more advanced connections that can switch PHY links to alternate media when a PHY link goes down.

The underlying architecture has a dual media-access control (MAC) sub-layer that manages the PHY links for all four ports, as shown in Figure 2-5:

Figure 2-5 10 Gb Port Architecture



Note the following considerations:

- Your OS will report only the two PHY links that are active, rather than the four physical ports (for example, `10GE 1` and `10GE 2`). These could be the SFP+ ports or the 10GBase-T ports, depending on which have active links.
- You can connect to all four physical 10 Gb ports at once. However, only two of the ports will have active links at one time.
- If you connect to all four 10 Gb ports, the 10GBase-T PHY links have priority and they will be the active PHY links. If a 10GBase-T PHY link goes down or is disabled in this configuration, the dual MAC switches traffic to the corresponding SFP+ port.
- The driver firmware allows you to change the PHY link priority to the SFP+ ports, or to disable the PHY links for either the SFP+ or the 10GBase-T ports. Consult with your Cisco service provider for details of this advanced procedure.

System BIOS and CIMC Firmware

This section contains 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 down 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 firmware by using the CIMC GUI interface.

  See the *Cisco UCS C-Series Rack-Mount Server Configuration Guide.*
- You can upgrade the CIMC 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

You can change the BIOS settings for your server by using the procedure in this section. 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.

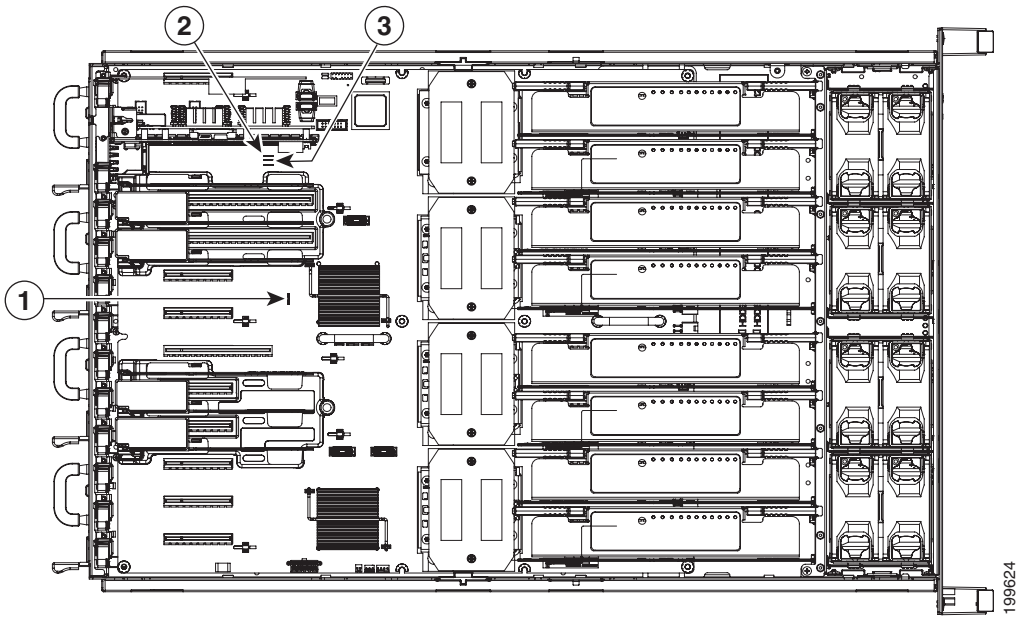
Step 6 Follow the instructions on the Exit menu screen to save your changes and exit the setup utility (or Press **F10**). You can exit without saving changes by pressing **Esc**.

Motherboard Jumpers for Clearing BIOS Settings

You can use the following three jumpers to clear CMOS settings, to clear the BIOS administrator password, and to initiate BIOS recovery.

- Using a BIOS Recovery Jumper on Header J6D1, page 2-15
- Using a Clear BIOS Admin Password Jumper on Header J5C3, page 2-16
- Using a Clear CMOS Jumper on Header J5C2, page 2-17

Figure 2-6 Service Jumper Locations



1	Header J6D1 (BIOS recovery)	**3**	Header J5C3 (clear BIOS password)
2	Header J5C2 (clear CMOS)		

Using a BIOS Recovery Jumper on Header J6D1

The J6D1 jumper is a 3-pin header on the motherboard (see Figure 2-6). You can install a jumper to force the server to flash a new BIOS in the case of a system hang. For example, if the system hangs after a BIOS update, use this procedure to force the server to look for the new firmware.

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

Step 2 Copy the BIOS recovery files to the root directory of a USB thumb drive using either one of the following methods:

- Copy the contents of the extracted UEFI folder to the root directory of a USB thumb drive.
- The recovery folder contains a recovery ISO image. Extract and copy the contents of the recovery ISO image to the root directory of a USB thumb drive.

Step 3 Power off the server as described in Shutting Down and Powering Off the Server, page 3-6.

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 3-7.

Step 7 Install a shorting jumper on pins 2 and 3 of the J6D1 header (see Figure 2-6).

Step 8 Reinstall the top cover and 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 is in main power mode when the Power LED is green.

The server boots with the updated BIOS boot block. When the BIOS detects a valid recovery.cap file on the USB thumb drive, it proceeds with the BIOS update.

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 11 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 12 Remove the top cover from the server.

Step 13 Remove the shorting jumper from the header pins.

Note If you do not remove the jumper, the CIMC attempts to recover the BIOS every time the server is booted.

Step 14 Reinstall the top cover.

Step 15 Replace the server in the rack, replace power cords and any other cables, then power on the server by pressing the **Power** button.

Using a Clear BIOS Admin Password Jumper on Header J5C3

The J5C3 jumper is a 3-pin header on the motherboard (see Figure 2-6 on page 2-14). This procedure describes how to clear the Admin password for the BIOS back to the default in case the user-selected password is lost of forgotten.

Step 1 Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-6.

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

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

Step 3 Remove the top cover as described in the "Removing and Replacing the Server Top Cover" section on page 3-7.

Step 4 Move the shorting jumper to pins 2 and 3 of the J5C3 header (see Figure 2-6 on page 2-14).

Step 5 Replace the top cover.

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

Note You must allow the entire server to reboot to main power mode to complete the password reset. This is because the state of the jumper cannot be determined without the host CPU running. The password is then cleared.

Step 7 Press the **Power** button to shut down the server to standby power mode.

Step 8 Remove the top cover from the server.

Step 9 Replace the jumper to the default pins 1 and 2 on the J5C3 header.

Note If you do not remove the jumper, the password is cleared every time you power-cycle the server.

Step 10 Replace the top cover.

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

Using a Clear CMOS Jumper on Header J5C2

The J5C3 jumper is a 3-pin header on the motherboard (see Figure 2-6 on page 2-14). You can use this procedure 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.

Note The Clear CMOS function on header J5C2 does not restore the defaults to CIMC-controlled BIOS setup parameters. If you need to restore defaults on CIMC-controlled BIOS setup parameters, go to the CIMC GUI's **Server** —>**BIOS** page, then click **Configure BIOS** to open the Configure BIOS Parameters window. On that window, use the **Restore Defaults** button to restore defaults.

Step 1 Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-6.

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

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

Step 3 Remove the top cover as described in the "Removing and Replacing the Server Top Cover" section on page 3-7.

Step 4 Install a shorting jumper to pins 2 and 3 of the J5C2 header and leave it there for about 5 seconds (see Figure 2-6 on page 2-14).

Step 5 Replace the jumper to the default pins 1 and 2 on the J5C2 header.

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

Step 6 Replace the top cover.

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

CHAPTER 3

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

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 shipped with new servers on CD. You can also download the ISO from Cisco.com. See the user documentation for this utility at the following URL:

http://www.cisco.com/en/US/docs/unified_computing/ucs/sw/ucsscu/user/guide/20/SCUUG20.html

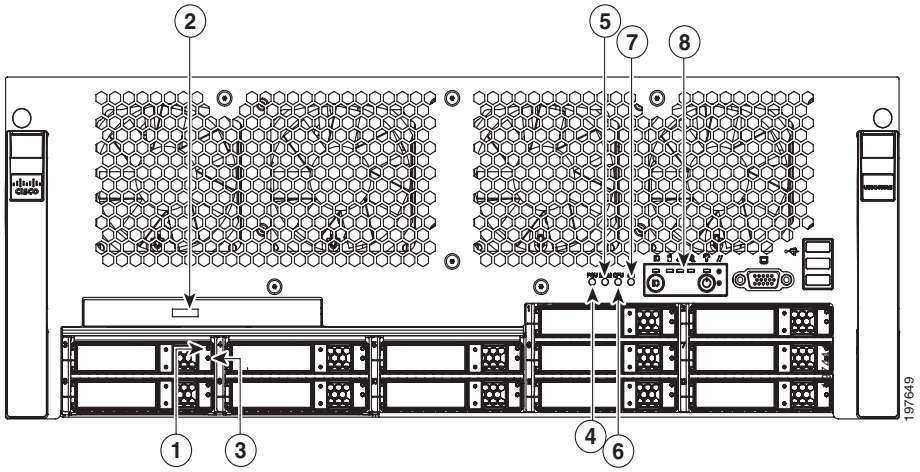
Status LEDs and Buttons

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

Front Panel LEDs

Figure 3-1 shows the front panel LEDs.

Figure 3-1 Front Panel LEDs



1	Hard drive activity LED	**2**	DVD drive activity LED
3	Hard drive fault LED	**4**	Power supply fault LED
5	Memory fault LED	**6**	CPU fault LED
7	Network activity LED	**8**	Operations panel (see Operations Panel LEDs and Buttons, page 3-4).

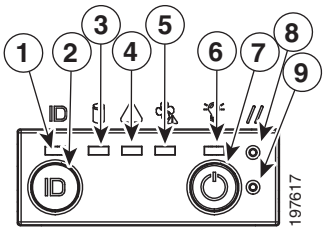
Table 3-1 Front Panel LEDs

LED Name	State
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. There are activity LED differences between SATA and SAS hard drives. For SATA drives, the LED stays off during the reading or writing activity. • Amber and steady—The hard drive is in fault. The LED will also turn amber and steady when the locate hard drive function is used. • Amber and blinking—The hard drive is in predictive failure.
DVD drive activity	• Green and steady—The drive is not accessing data. • Green and blinking—The drive is accessing data.
Hard drive fault	• Off—The hard drive is operating properly. • Amber—This hard drive has failed. • Amber, blinking—The device is rebuilding.
Power supply fault	• Green—All power supplies are operating properly. • Off—One or more power supplies are not operating properly.
Memory fault	• Green—All DIMMs are operating properly. • Off—One or more DIMMs are not operating properly.
CPU fault	• Green—All CPUs are operating properly. • Off—One or more CPUs are not operating properly.
Network activity	• Off—The Ethernet link is idle. • Green and blinking —The Ethernet link is active. • Green and steady—The Ethernet link is detected but not active. The blink rate gets faster as network activity increases.
Operations panel LEDs	See Operations Panel LEDs and Buttons, page 3-4.

Operations Panel LEDs and Buttons

Figure 3-2 shows the operations panel LEDs and buttons.

Figure 3-2 Operations Panel LEDs and Buttons



1	ID LED	**2**	ID button
3	Hard drive fault LED	**4**	System health LED
5	Fan fault LED	**6**	Power status LED
7	Power button	**8**	Reset button
9	NMI button		

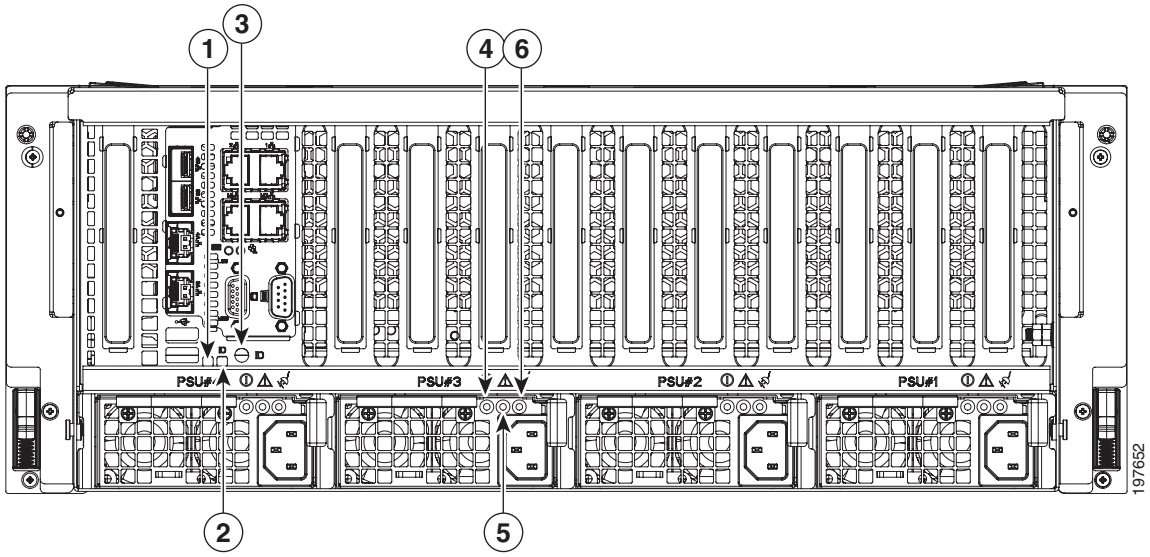
Table 3-2 Operations Panel LEDs

LED Name	State
ID	• Off—The ID LED is not in use. • Blue and blinking—System ID is active via the remote ID button. • Blue and steady—System ID is active via the local ID button.
Hard drive fault	• Green—No hard drives have a fault. • Amber—At least one hard drive has failed.
System health	• Green—The system is not in fault. • Amber and steady—The system is in moderate fault. • Amber and blinking—The system is in severe fault.
Fan fault	• Off—All fan modules are operating properly. • Amber—At least one fan module has a moderate fault. • Amber, blinking—At least one fan module has a severe fault.
Power status	• Off—The server is in standby power mode or no power is present. • Green—The server is in main power mode.

Rear Panel LEDs and Buttons

Figure 3-3 shows the rear panel LEDs and buttons.

Figure 3-3 Rear Panel LEDs and Buttons



1	System health LED	**2**	ID LED
3	ID button	**4**	Power supply status LED
5	Power supply fault LED	**6**	Power supply AC input LED

Table 3-3 Operations Panel LEDs

LED Name	State
System health	• Green—The system is not in fault. • Amber and steady—The system is in moderate fault. • Amber and blinking—The system is in severe fault.
ID	• Off—The ID LED is not in use. • Blue and blinking—System ID is active via the remote ID button. • Blue and steady—System ID is active via the local ID button.
Power supply status LED	• Green and steady—The server is in main power mode. • Green and blinking—The power supply is off and it is in cold redundancy mode.
Power supply fault LED	• Off—The power supply is operating properly. • Amber and blinking—The power supply is warning of an event, but continues to operate. • Amber and steady—The power supply is in critical fault, causing a shut down.
Power supply AC input LED	• Green and steady—The AC power cord is plugged in and the power is present. • Green and blinking—The AC power cord is not plugged in.

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
- Number 1 Phillips-head screwdriver
- Needle-nose pliers
- 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 hard 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 emergency shutdown (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 "Operations Panel LEDs and Buttons" section on page 3-4).

- Green indicates that the server is in main power mode and must be shut down before it can be safely powered off. Go to Step 2.
- Off indicates that the server is already powered off or is 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 will perform a graceful shutdown and the server goes to standby mode, which is indicated by the Power Status LED being off.

- 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

Use the following procedure to remove or replace the top cover of the server:

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

Step 1 Remove the top cover:

a. Simultaneously press the two green release buttons. See Figure 3-4.

b. Push the cover toward the server rear about three inches, until it stops.

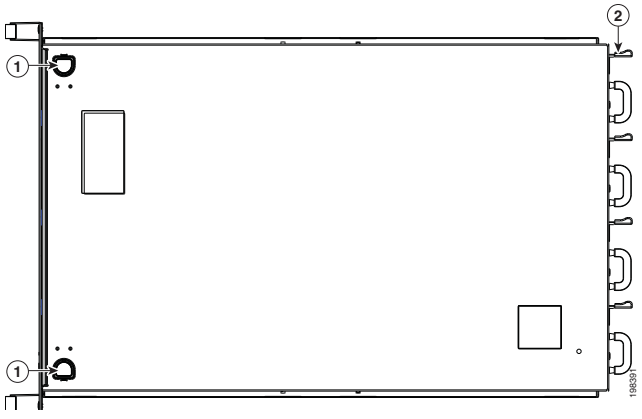
c. Lift the cover straight up from the server and set it aside.

Step 2 Replace the top cover:

a. Place the cover on top of the server about 3 inches behind the front of the chassis. The cover should sit flat when the cover flanges are sitting in the grooves in the chassis.

b. Slide the cover toward the front of the server until it stops at the front panel and the green buttons lock.

Figure 3-4 Removing the Top Cover

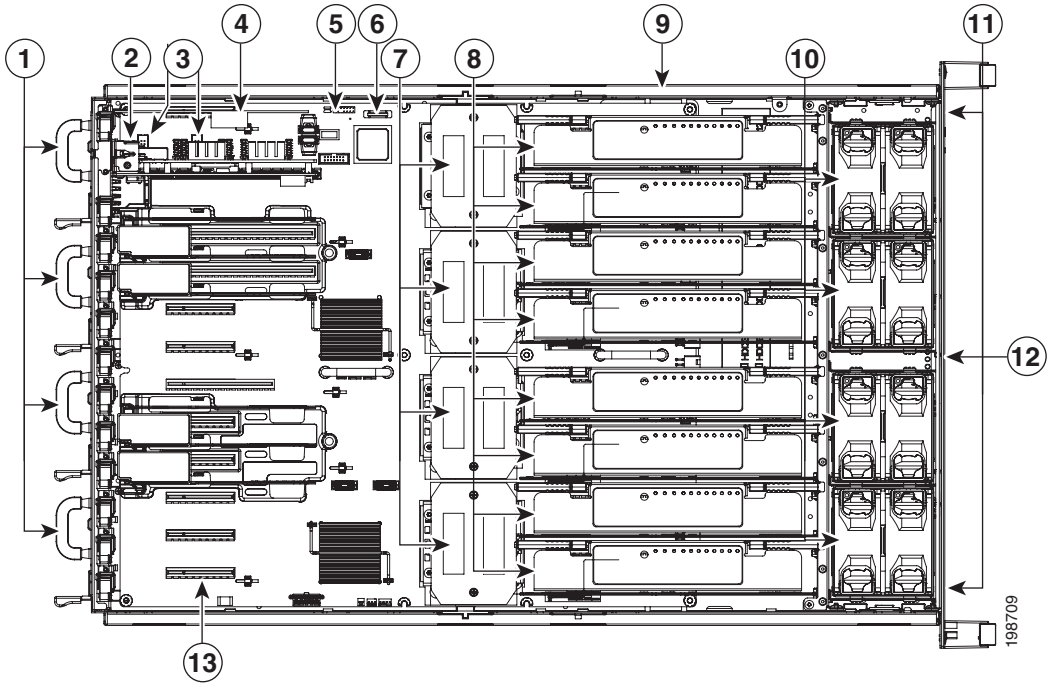


1	Green release buttons	2	Rear of the server

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 internal CPU cage removed.

Figure 3-5 Replaceable Component Locations



1	Power supplies, up to 4 (accessed through the rear panel).	**8**	Memory risers, which provide slots for up to 8 DIMMs on each riser.
2	I/O riser module.	**9**	RAID battery backup unit (optional when using the LSI 9260 controller)
3	eUSB connectors (2 on motherboard).	**10**	Fan modules (up to 8)
4	SAS riser (a dedicated slot for the RAID controller card)	**11**	Hard drives (up to 12, accessed through the front panel)
5	Trusted Platform Module (TPM) header	**12**	DVD drive (accessed through the front panel)
6	CMOS battery	**13**	PCIe connector 10 (10 of 10) See also Figure 3-27 on page 3-38 for all slot locations and details.
7	CPUs and heat sinks (up to 4, shown without CPU cage)		

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 ID button on the front panel or rear panel to turn on a flashing ID 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. See the "Status LEDs and Buttons" section on page 3-2 for locations of the LEDs.

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

Replacing Power Supplies

The server can have two or four power supplies. Four power supplies are required for four-CPU configurations.

The qualified and supported part numbers for this component are subject to change over time. For the most up-to-date list of replaceable components, see the following URL and then scroll to *Technical Specifications*:

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

This section contains the following topics:

Replacement Procedure

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

Note If you have ordered a server with power supply redundancy (at least four power supplies), you do not have to power off the server to replace power supplies. Also see the note below about 1+1 redundancy.

Step 1 Remove the power supply that you are replacing or a blank panel from an empty bay. See Figure 3-6:

a. Do one of the following actions:

- If your server has only two power supplies, shut down and power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-6. See the following note.

Note You can use 2 power supplies with a 2-CPU configuration. In this case, 1+1 redundancy is supported only if your server's overall power consumption can be supported by a single 850W power supply during the failure and hot-swap. For more information about your server's power consumption, consult with your Cisco sales representative or use the power calculator accessible at the Unified Computing System Partner Resource Center:

http://www.ciscoprc.com/resourcelib.asp?id=937

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

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

a. Grasp the power supply handle while squeezing the release lever towards the handle.

b. Pull the power supply out of the slot.

Step 2 Install a new power supply:

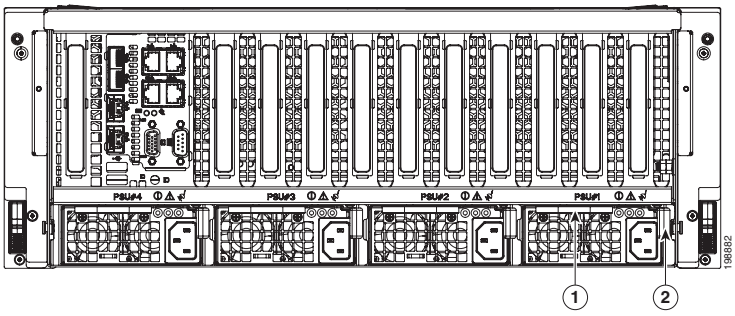
a. Grasp the power supply handle and insert the power supply into the power supply bay.

b. Push the power supply into the bay until the release lever locks.

c. Replace the power cord to the new power supply.

d. Press the **Power** button to return the server to main power mode.

Figure 3-6 Removing and Replacing Power Supplies



1	Power supply handle	**2**	Power supply release lever

Power Supply Cold Redundancy

Depending on the power being drawn by the server, one or more power supplies might actively provide all power to the system while the remaining power supplies are put into a standby state. This is known as cold redundancy.

The server's CIMC interface reports the power supply redundancy based on the number of supplies that are plugged in with AC power applied. For example:

- 2 PSUs: Redundancy lost
- 3 PSUs: Redundancy degraded
- 4 PSUs: Full redundancy

With cold redundancy, depending on the server's power usage, one or more supplies might actively provide all power to the system while the remaining supplies are put into a standby state. For example, if you have two supplies connected to AC power, but the power consumption can be satisfied by power supply 1, then power supply 2 is put into a standby state.

Replacing the I/O Riser

The I/O riser is module that connects to the motherboard and that provides the ports for rear panel connectivity. To install or replace the I/O riser, follow these steps:

Step 1 Remove the I/O riser you are replacing. See Figure 3-7:

a. Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-6.

b. Disconnect all cables from the ports on the I/O riser.

Tip Label the cables when you remove them to aid in identifying them for replacement.

c. Slide the server out the front of the rack far enough so that you can remove the top cover.

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

d. Remove the top cover as described in "Removing and Replacing the Server Top Cover" section on page 3-7.

e. Pinch and lift up the green retaining clip that secures the I/O riser to the chassis rear panel.

f. Lift the riser straight up from the motherboard connector and out of the chassis.

Step 2 Install a new I/O riser:

a. Align the I/O riser with the empty I/O riser connector on the motherboard.

b. Push down evenly on both ends of the I/O riser until it is fully seated in the motherboard connector.

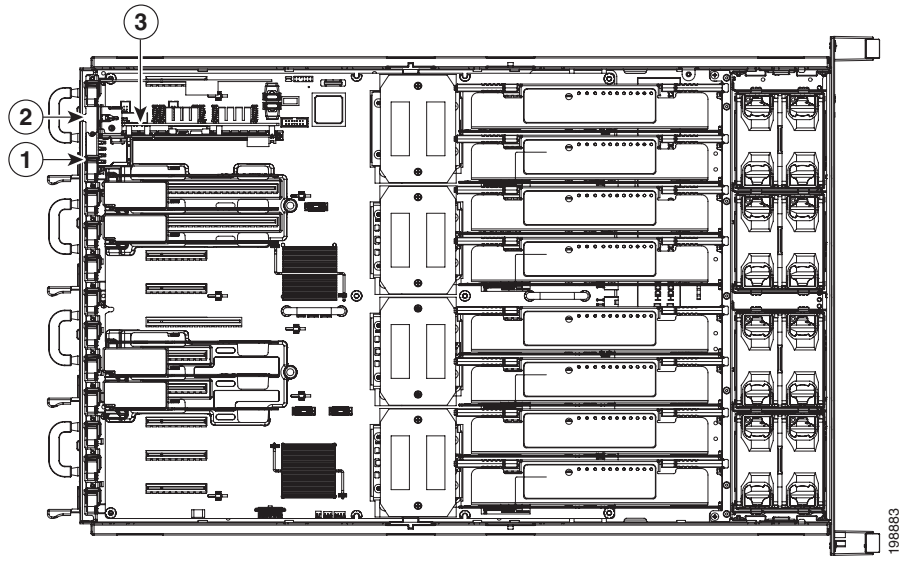
c. Ensure that the I/O riser rear panel sits flat against the chassis back panel opening.

d. Push the green retaining clip down until it locks over the top of the I/O 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 3-7 Removing and Replacing the I/O Riser



1	Retaining clip	**2**	I/O riser back panel
3	I/O riser		

Replacing an Internal Flash eUSB Drive

The eUSB drive is a small solid-state flash drive card that connects to the motherboard in either of two eUSB drive connectors.

The qualified and supported part numbers for this component are subject to change over time. For the most up-to-date list of replaceable components, see the following URL and then scroll to *Technical Specifications*:

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

This section contains the following topics:

Replacement Procedure

To install or replace the eUSB drive, follow these steps:

Step 1 Remove the eUSB drive you are replacing. See Figure 3-8:

a. Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-6.

b. Slide the server out the front of the rack far enough so that you can remove the top cover.

Note 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 3-7.

d. Remove the I/O riser to provide clearance. See Replacing the I/O Riser, page 3-12.

e. Locate the eUSB drive and remove the single screw that secures it to the motherboard standoff.

f. Lift straight up on both ends the eUSB drive to disengage it from the motherboard connector.

Step 2 Install a new eUSB drive.

a. Align the connector on the underside of the eUSB drive with the empty drive connector on the motherboard and push on both ends of the drive evenly to seat the connector.

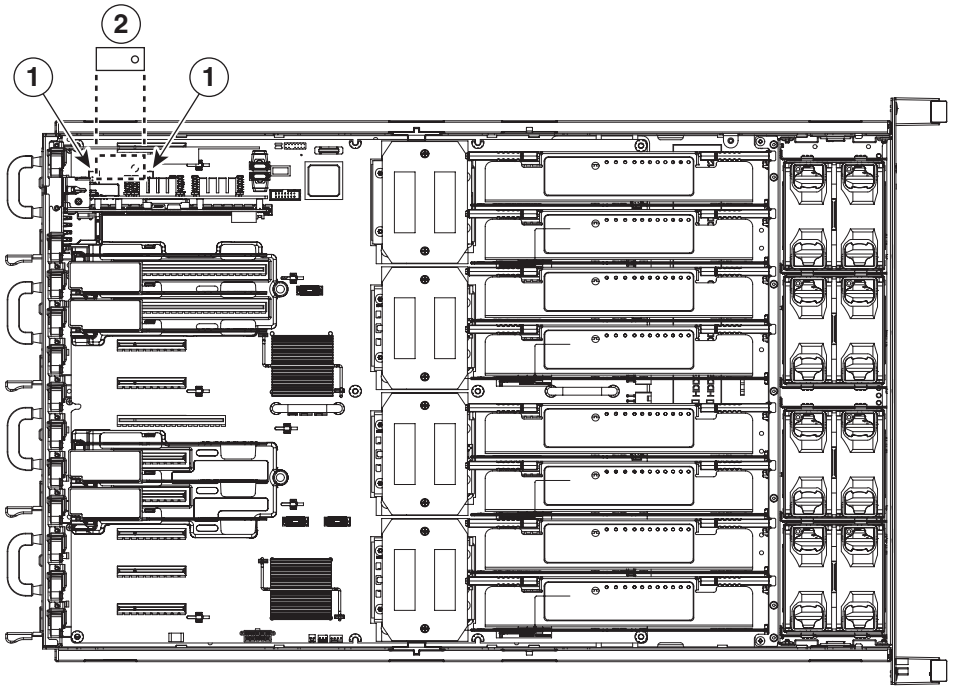
b. Replace the single mounting screw that secures the eUSB drive to the motherboard standoff.

c. Replace the I/O riser. See Replacing the I/O Riser, page 3-12.

d. Replace the top cover.

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

Figure 3-8 Removing and Replacing the eUSB Drive



1	eUSB connectors on motherboard (two)	**2**	eUSB drive, showing orientation of hole for securing screw

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.

Replacing a SAS Riser (RAID Controller)

The SAS riser is a RAID controller card that has a designated position and motherboard connector inside the server. To install or replace a SAS riser, follow these steps:

Step 1 Remove the SAS riser you are replacing. See Figure 3-9:

a. Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-6.

b. Slide the server out the front of the rack far enough so that you can remove the top cover.

Note 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 3-7.

d. Pinch and lift up the green retaining clip that secures the SAS riser to the chassis rear panel.

e. Lift the SAS riser straight up from the motherboard connector.

Note Lift up on both ends of the card evenly to avoid damaging its connector.

f. Disconnect the SAS cables and any battery backup unit (BBU) cable from the SAS riser. See Figure 3-10.

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

Step 2 Install a new SAS riser:

a. Connect the SAS cables and BBU cable to the new SAS riser. See Figure 3-10.

b. Align the SAS riser with the empty SAS riser connector on the motherboard.

c. Push down evenly on both ends of the SAS riser until it is fully seated in the motherboard connector.

d. Ensure that the SAS riser rear panel sits flat against the server back panel opening.

e. Push the green retaining clip down until it locks over the top of the SAS riser.

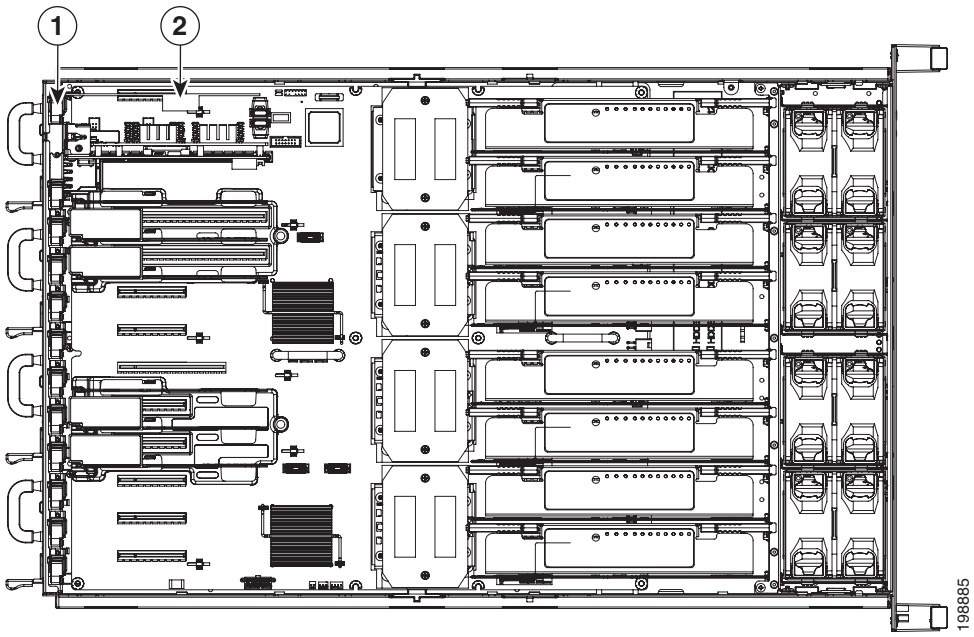
f. Replace the top cover.

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

Step 3 Restore the RAID configuration on your drives to the new mass storage controller.

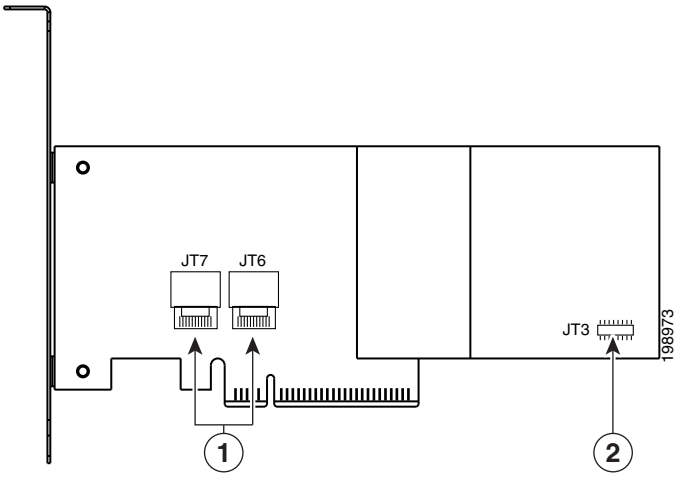
See Restoring RAID Configuration After Replacing a RAID Controller, page C-4.

Figure 3-9 Removing and Replacing a SAS Riser



1	Retaining clip	2	SAS riser

Figure 3-10 SAS Riser Card Connectors



1	SAS cable connectors JT6 = Ports 0 - 3 JT7 = Ports 4 - 7	2	LSI BBU connector JT3 (on LSI 9260-8i only)

Replacing the SAS Riser Battery Backup Unit

Note This optional battery backup unit (BBU) is available only when using the optional LSI 9260-8i SAS RAID controller card as the SAS riser. This BBU provides approximately 72 hours of battery backup for the disk write-back cache DRAM in the case of sudden power loss.

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

The qualified and supported part numbers for this component are subject to change over time. For the most up-to-date list of replaceable components, see the following URL and then scroll to *Technical Specifications*:

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

To replace the SAS riser BBU, follow these steps:

Step 1 Remove the BBU that you are replacing. See Figure 3-11.

a. Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-6.

b. Slide the server out the front of the rack far enough so that you can remove the top cover.

Note 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 3-7.

d. Remove the memory riser that sits closest to the BBU. See Replacing Memory Risers, page 3-26.

e. Slide the battery assembly toward the front of the chassis to disengage its retaining clips from the chassis wall slots.

f. Disconnect the cable that is attached to the BBU.

Step 2 Install a new BBU:

Note When you install the cable from the LSIBBU06, LSIBBU07 or LSIBBU08 BBU (varying capacities) to the LSI 9260-8i RAID controller, make sure to align the red dot on the cable with the red dot on the connector that is on the card to ensure correct polarity.

a. Connect the cable from the SAS riser to the replacement BBU.

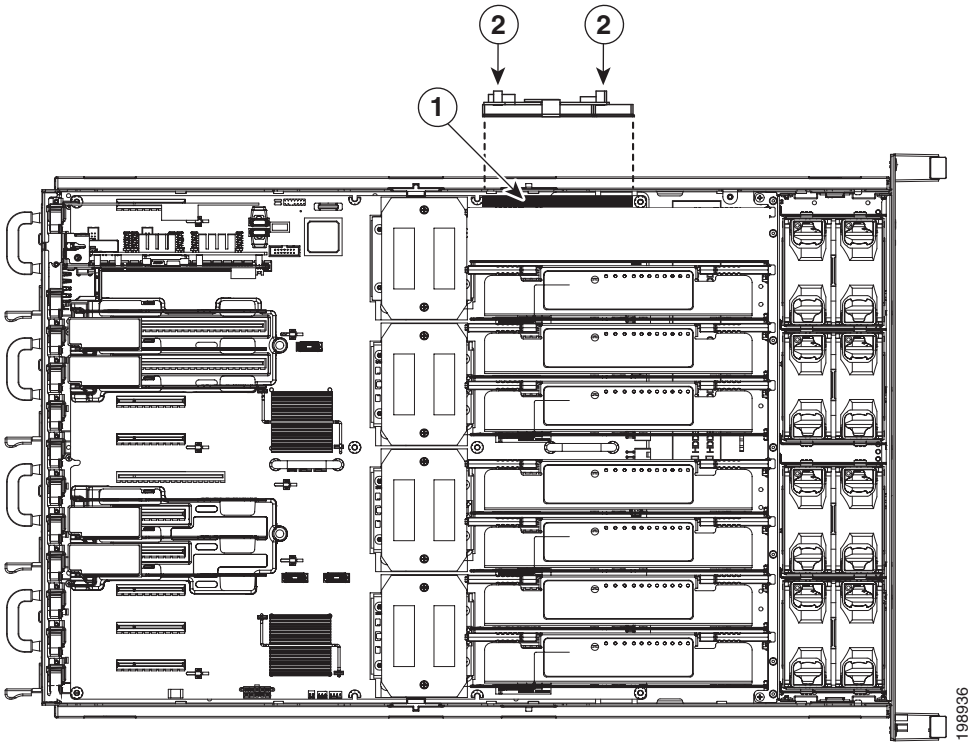
b. Insert the two retaining clips on the rear of the BBU into the chassis wall slots and slide the BBU toward the chassis rear until it locks into place.

c. Replace the memory riser that you removed for clearance. See Replacing Memory Risers, page 3-26.

d. Replace the top cover.

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

Figure 3-11 Removing and Replacing the RAID Battery Assembly



1	BBU position on inside chassis wall	2	BBU retaining clips

Replacing the Motherboard CMOS 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 CMOS battery retains system settings when the server is disconnected from power.

The qualified and supported part numbers for this component are subject to change over time. For the most up-to-date list of replaceable components, see the following URL and then scroll to *Technical Specifications*:

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

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

Step 1 Remove the CMOS battery. See Figure 3-12:

a. Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-6.

b. Slide the server out the front of the rack far enough so that you can remove the top cover.

Note 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 3-7.

d. Remove the I/O riser to provide clearance. See Replacing the I/O Riser, page 3-12.

e. Locate the CMOS battery.

f. Bend the battery retaining clip away from the chassis wall and pull the battery from the socket.

Step 2 Install a CMOS battery:

a. Bend the retaining clip away from the chassis wall and insert the battery in the socket.

Note The positive side of the battery marked "+" should face the chassis wall.

b. Push the battery into the socket until it is fully seated.

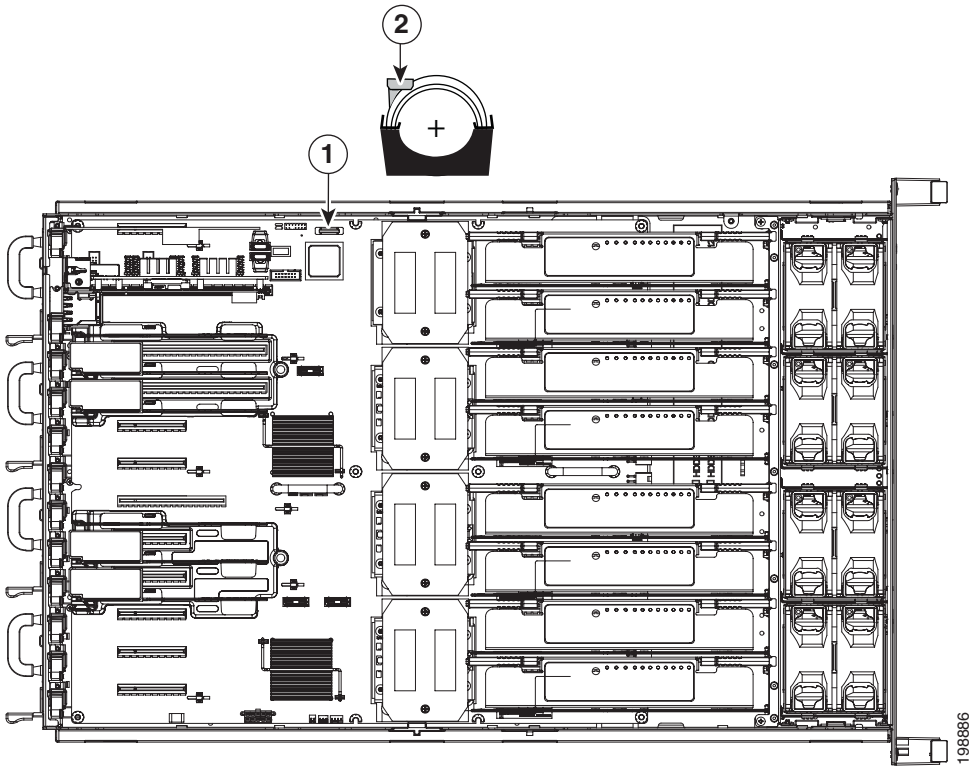
Note Ensure that the retaining clip clicks over the top of the battery.

c. Replace the I/O riser. See Replacing the I/O Riser, page 3-12.

d. Replace the top cover.

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

Figure 3-12 Removing and Replacing the Motherboard CMOS Battery



1	CMOS battery socket	**2**	Retaining clip

Replacing CPUs and Heatsinks

This server can operate with 2-, 3-, or 4-CPU configurations. Each CPU supports two memory risers (four memory buffers) connected by serial memory interface (SMI). Each memory buffer has two DDR3 memory bus interfaces.

The qualified and supported part numbers for this component are subject to change over time. For the most up-to-date list of replaceable components, see the following URL and then scroll to *Technical Specifications*:

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

Note The minimum CPU configuration is that CPU1 and CPU3 must be installed. See Figure 3-13, which has a view shown facing the front of the server. Only CPU1 and CPU3 are connected to the internal PCIe hub. With CPU1 and CPU3 installed, any other combination operates.

Figure 3-13 CPUs and Memory Risers

CPU 4		CPU 3		CPU 2		CPU 1	
MEM 8	MEM 7	MEM 6	MEM 5	MEM 4	MEM 3	MEM 2	MEM 1

This section contains the following topics:

Additional CPU-Related Parts To Order With RMA Replacement Motherboards

When a return material authorization (RMA) of the motherboard or CPU is done on a Cisco UCS C-series server, there are additional parts that might not be included with the CPU or motherboard spare bill of materials (BOM). The TAC engineer might need to add the additional parts to the RMA to help ensure a successful replacement.

- Scenario 1—You are re-using the existing heatsinks:
  - Heat sink cleaning kit (UCSX-HSCK=)
  - Thermal interface pad for C460 (RC-460-TIM=)
- Scenario 2—You are replacing the existing heatsinks:
  - Heat sink (RC460-BHTS1=)
  - Heat sink cleaning kit (UCSX-HSCK=)

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

New heatsink spares have preinstalled thermal interface material covered by a small sheet of plastic. It is important to clean the old thermal interface material off of the CPU prior to installing the heatsinks. Therefore, when ordering new heatsinks it is still necessary to order the heatsink cleaning kit at a minimum.

CPU Replacement Procedure

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 3-6.

b. Slide the server out the front of the rack far enough so that you can remove the top cover.

Note 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 3-7.

d. Remove all memory risers to uncover the CPU cage screws. See Replacing Memory Risers, page 3-26.

e. Remove all the memory riser dividers by lifting them straight up and sliding them free of the CPU cage. See Figure 3-14.

f. Remove the CPU cage by loosening the six captive screws that secure the cage to the motherboard. See Figure 3-14 for the screw locations.

g. Loosen the two captive screws that secure the heatsink and lift it off of the CPU. See Figure 3-14 and Figure 3-15.

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

h. Unclip the CPU retaining lever and lift the CPU retaining lid. See Figure 3-15.

i. Lift the CPU out of the socket and set it aside on an antistatic mat or in an antistatic bag.

Step 2 Install a new CPU:

a. Insert the replacement CPU in the socket with the arrow on the CPU pointing toward the arrow on the socket.

b. Close the CPU retaining lid and clip down the CPU retaining lever.

Step 3 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 installed, you must remove the old thermal pad. If you are installing a new heatsink, skip to step d. below.

a. Apply the supplied 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 heatsink using a soft cloth that will not scratch the heatsink surface.

Caution Damage to the heatsink surface can damage the heat transferring properties of the heatsink.

c. Apply the supplied preparation solution to the center bottom of the heatsink, where the new thermal pad will be applied.

d. Apply the new thermal pad to the center bottom of the heatsink.

e. Align the heatsink captive screws with the motherboard standoffs, then tighten the captive screws evenly, until the screws stop against the captive springs.

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

f. Replace the CPU cage. Align the six captive screws with the holes in the motherboard, then tighten each screw evenly.

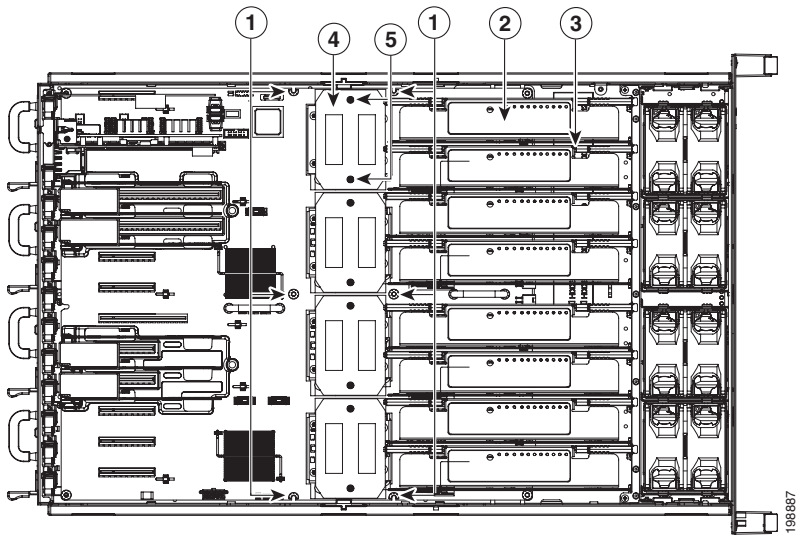
g. Replace the memory riser dividers. Slide each one into the slots on the CPU cage and the chassis.

h. Replace all memory risers. See Replacing Memory Risers, page 3-26.

i. Replace the top cover.

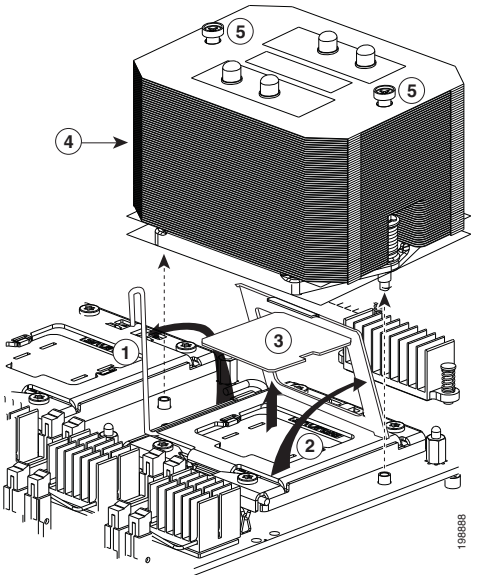
j. Replace the server in the rack, replace cables, and then power on the server by pressing the **Power** button.

Figure 3-14 Locations of CPU Cage Screws



1	CPU cage screw locations (six) on motherboard (cage not shown)	**2**	Memory risers (eight)
3	Memory riser dividers (eight)	**4**	CPU heatsink
5	CPU heatsink captive screws (two on each heatsink)		

Figure 3-15 Removing a CPU and Heatsink

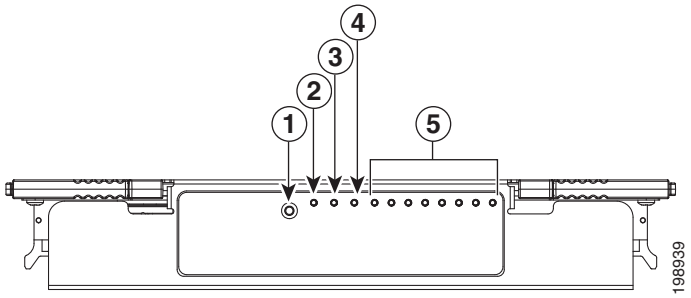


1	CPU retaining lever	**2**	CPU retaining lid
3	CPU	**4**	Heatsink
5	Heatsink captive screws (two)		

Replacing Memory Risers

The memory risers connect to the motherboard and each riser provides eight DIMM slots. The memory riser is hot-swappable when you use the Attention button, as described in the following procedure.

Figure 3-16 Memory Riser LEDs (Top View)



1	Attention button (used for hot-swapping and hot-adding)	**2**	Attention LED (indicates when hot-swapping is safe)
3	Power LED (indicates whether the riser has power)	**4**	Mirror activity LED (indicates whether memory mirroring is enabled)
5	DIMM fault LEDs 1 through 8 (indicate which DIMM has failed)		

The qualified and supported part numbers for this component are subject to change over time. For the most up-to-date list of replaceable components, see the following URL and then scroll to *Technical Specifications*:

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

To replace or install a hot-swappable memory riser, follow these steps:

Step 1 Remove the memory riser that you are replacing: See Figure 3-17:

- **a.** Slide the server out the front of the rack far enough so that you can remove the top cover.
- **b.** Remove the top cover as described in "Removing and Replacing the Server Top Cover" section on page 3-7.
- **c.** Press the attention button (ATTN BUTTON) on the top of the memory riser (see Figure 3-16).
- **d.** Wait until the attention LED (ATTN) and the power LED turn off.
- **e.** Simultaneously press both green release buttons on the top of the memory riser to release the riser retaining latches. The latches open up to a 45-degree angle when they are released.
- **f.** Grasp the open retaining latches and lift the memory riser straight up and out of the motherboard connector.
- **g.** If you are installing or replacing DIMMs on the memory riser, use the instructions in Replacing DIMMs, page 3-28.

Step 2 Install (hot-add) a new memory riser:

- **a.** Ensure that the riser release latches are in the open position.
- **a.** Align the riser with the empty motherboard connector.
- **b.** Push the riser into the connector until it is seated and the open release levers engage.

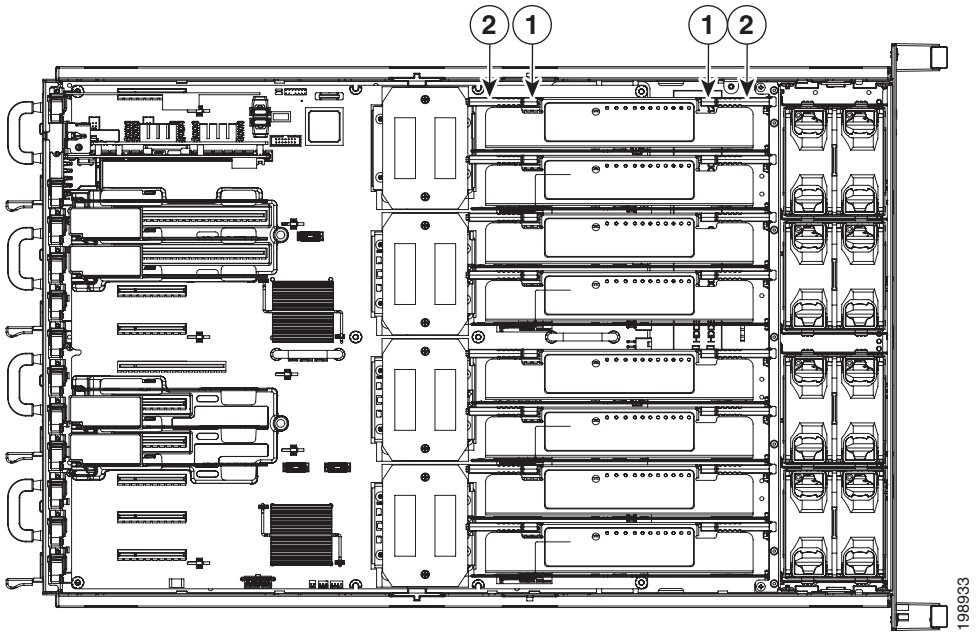
c. Simultaneously press down on each release lever to put them in the locked position. This ensures that the riser is properly seated in the motherboard connector.

d. Press the attention button, then wait until the attention LED turns off.

e. Replace the top cover.

f. Replace the server in the rack and replace any cables.

Figure 3-17 Removing and Replacing Memory Risers



1	Memory riser release buttons	2	Memory riser release latches

Replacing DIMMs

This section includes the following sections:

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 modules.

Memory Performance Guidelines and Population Rules

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

Supported DIMMs

The qualified and supported part numbers for this component are subject to change over time. For the most up-to-date list of replaceable components, see the following URL and then scroll to *Technical Specifications*:

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

Memory Channels

Each CPU supports two memory risers. Figure 3-18 shows the placement of the CPUs and their corresponding memory risers. The view shown is facing the front of the server. This numbering is also inscribed on the top of the CPU cage.

Figure 3-18 CPUs and Memory Risers

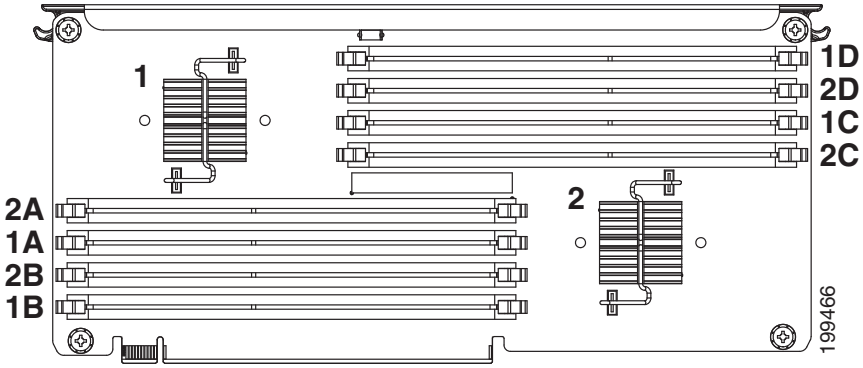
CPU 4		CPU 3		CPU 2		CPU 1	
MEM 8	MEM 7	MEM 6	MEM 5	MEM 4	MEM 3	MEM 2	MEM 1

Each memory riser contains two memory buffers that are connected to the CPU by serial memory interface (SMI) channels. Each memory buffer has two channels, each containing a pair of DDR3 DRAM slots.

In Figure 3-19, the buffers and channels are:

- Buffer 1, channel 1: slots 1B and 1D
- Buffer 1, channel 2: slots 1A and 1C
- Buffer 2, channel 1: slots 2B and 2D
- Buffer 2, channel 2: slots 2A and 2C

Figure 3-19 DIMM Slots and Memory Buffers



1	Memory Buffer 1	2	Memory Buffer 2

DIMM Population Rules

Following are the DIMM population rules:

- The minimum configuration for the server is, at least one matched DIMM pair installed in a memory riser on either CPU1 or CPU2 (see Figure 3-18). All four CPUs can run from a single DIMM pair.
- DIMMs are required to be populated in pairs. DIMMs for this server are sold as two-DIMM kits.
- The DIMMs in any given pair must be identical.
- Any DIMM installed in a memory riser corresponding to an empty CPU slot becomes inaccessible.
- For optimal performance, distribute DIMMs evenly across all installed CPUs and memory buffers.
- DIMMs within a channel are populated starting with the DIMMs farthest from the memory buffer in a fill-farthest approach.

  For example, the order that you should populate the four channels on a memory riser is as follows (see also Figure 3-19):

  1. Slots 1B and 1D
  2. Slots 1A and 1C
  3. Slots 2B and 2D
  4. Slots 2A and 2C

DIMM 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.

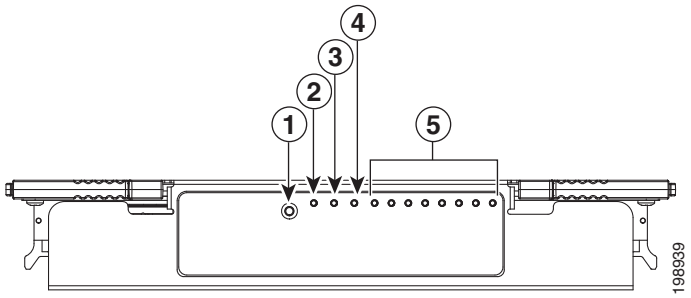
DIMM Installation Procedure

This section contains the following topics:

Identifying a Faulty DIMM

The memory riser has LEDs on it supper surface that can assist you in isolating a faulty DIMM. The faulty DIMMs are indicated by the DIMM fault LEDs, which light amber to indicate which DIMMs are faulty. See Figure 3-20.

Figure 3-20 Memory Riser LEDs (Top View)



1	Attention button (used for hot-swapping)	**2**	Attention LED (indicates when hot-swapping is safe)
3	Power LED (indicates whether the riser has power)	**4**	Mirror activity LED (indicates whether memory mirroring is enabled)
5	DIMM fault LEDs 1 through 8 (indicate which DIMM has failed)		

DIMM Replacement Procedure

To install a DIMM pair, follow these steps:

Note DIMM risers are hot-swappable when you use the attention button, so you do not have power off the server or disconnect power cords. Use the following procedure.

Step 1 Remove the DIMMs that you are replacing: See Figure 3-21:

a. Slide the server out the front of the rack far enough so that you can remove the top cover.

Note 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 3-7.

c. Press the attention button (ATTN BUTTON) on the top of the memory riser that contains the faulty DIMM (see Figure 3-20).

d. Wait until the attention LED (ATTN) and the power LED turn off.

e. Simultaneously press both green release buttons on the top of the memory riser to release the riser retaining latches. The latches open up to a 45-degree angle when they are released.

f. Lift the memory riser straight up and out of the motherboard connector.

g. Locate the faulty DIMM and remove it from the connector on the memory riser.

Step 2 Install a new DIMM:

a. Insert the DIMM assembly into the connector on the riser.

b. Push the DIMM into the connector until it is seated properly, and the white clips on either side of the connector lock into place.

c. Push the hot-addable memory riser into the motherboard connector until it is seated and the open release levers engage the chassis and the CPU cage.

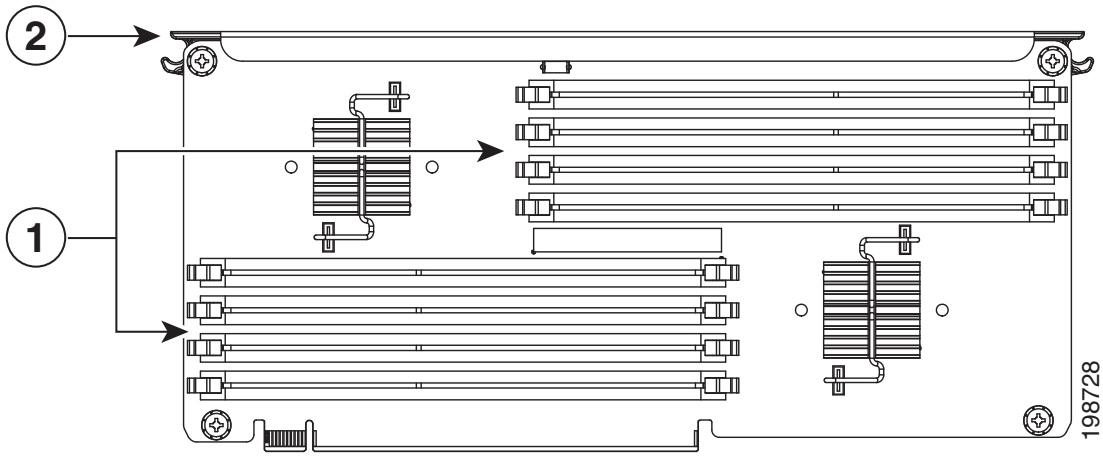
d. Simultaneously press down on each release lever to put them in the closed position. This ensures that the riser is properly seated in the motherboard connector.

e. Press the attention button on the top of the memory riser, then wait until the attention LED turns off (see Figure 3-20).

f. Replace the top cover.

g. Replace the server in the rack and replace any cables.

Figure 3-21 Removing and Replacing DIMMs



1	DIMM slots	2	Memory riser

Replacing Fan Modules

The eight fan modules in the server are numbered as follows when you are facing the front of the server. Each fan module has a fault LED that lights amber when the fan module fails.

Figure 3-22 Fan Module Numbering

FAN 8	FAN 7	FAN 6	FAN 5
FAN 4	FAN 3	FAN 2	FAN 1

The qualified and supported part numbers for this component are subject to change over time. For the most up-to-date list of replaceable components, see the following URL and then scroll to *Technical Specifications*:

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

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 the fan module that you are replacing: See Figure 3-23:

a. Slide the server out the front of the rack far enough so that you can remove the top cover.

Note 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 3-7.

c. Insert your thumb and forefinger in the two green release latches on top of the fan module.

d. Squeeze the release latches together and lift out the fan module.

Step 2 Install a new fan module:

a. Grasp the fan module by the release latches and align it with the empty fan bay and the motherboard connector.

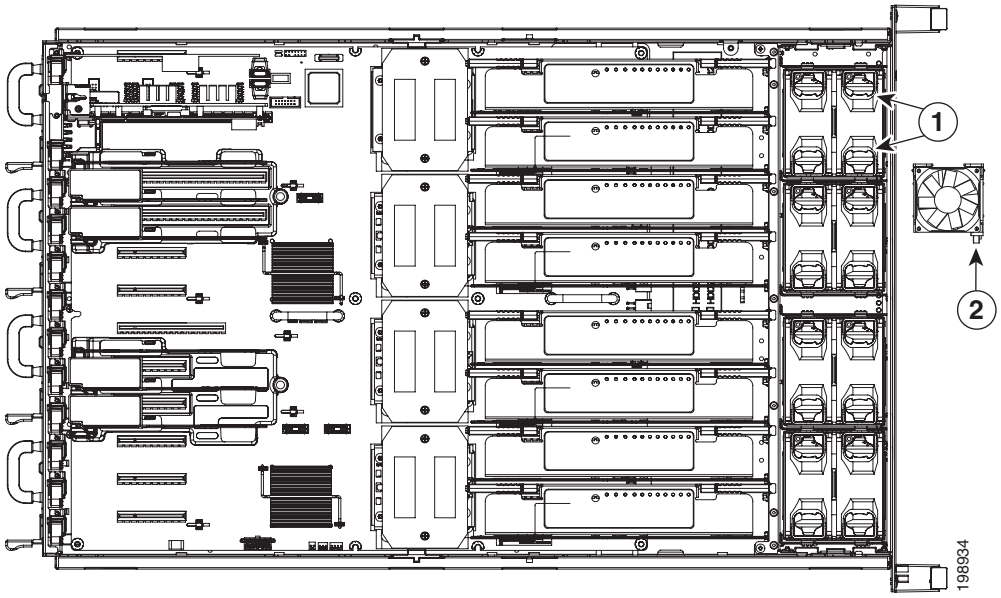
Note As you face the front of the server, the connector on underside of the fan module should be oriented on the right-bottom side of the fan module. See Figure 3-23.

b. Press down on the top corners of the fan module until the connector is fully seated and the release latches lock in place.

c. Replace the top cover.

d. Replace the server in the rack.

Figure 3-23 Removing and Replacing Fan Modules



1	Fan module release latches	**2**	Fan module, front view showing connector on underside of the module

Replacing Hard Drives or Solid State Drives

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

Note You can mix hard drives and solid state drives (SSDs) in the same server. However, You cannot configure a logical volume (virtual drive) that contains a mix of hard drives and SSDs. That is, when you create a logical volume, it must contain all hard drives or all SSDs.

Note Cisco recommends following the industry-standard practice of using drives of the same capacity when configuring RAID volumes. If you use drives of different capacities, the usable portion of the smallest drive will be used on all drives of the RAID volume.

Note The 500 GB SATA drives (A03-D500GC3) and the 1 TB SATA drives (A03-D1TBSATA) that are sold with the UCS C460 M2 server are supported at full 6G speeds.

The qualified and supported part numbers for this component are subject to change over time. For the most up-to-date list of replaceable components, see the following URL and then scroll to *Technical Specifications*:

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

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

Step 1 Remove the drive that you are replacing or remove a blank panel from an empty bay (See Figure 3-25):

- **a.** Press the release button on the face of the hard drive.
- **b.** Grasp the ejector lever and pull the hard 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.

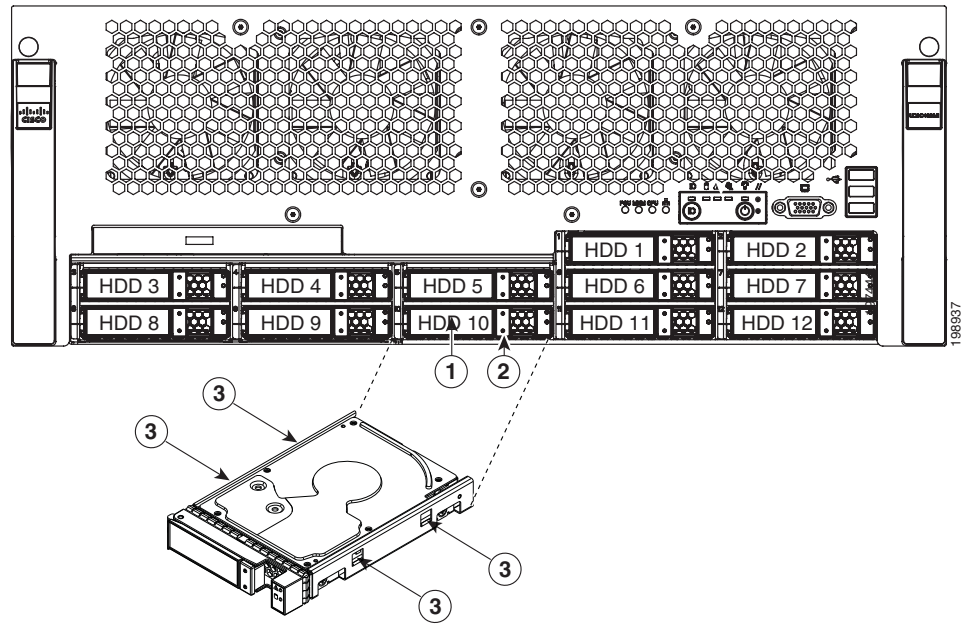
Step 2 Install a new drive:

- **a.** Place a new hard drive in the empty drive tray and replace the four drive tray screws.
- **b.** Insert the drive tray into the empty drive bay.
- **c.** Push the tray into the slot until the drive connectors are fully seated in the backplane.
- **d.** Press the ejector lever flat to lock the drive and tray in place.

Figure 3-24 Drive Numbering and Physical Orientation, Facing Server Front

			HDD_01	HDD_02
HDD_03	HDD_04	HDD_05	HDD_06	HDD_07
HDD_08	HDD_09	HDD_10	HDD_11	HDD_12

Figure 3-25 Removing and Replacing Hard Drives



1	Ejector lever	**2**	Release button
3	Drive tray securing screws		

Replacing a DVD Drive

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

The qualified and supported part numbers for this component are subject to change over time. For the most up-to-date list of replaceable components, see the following URL and then scroll to *Technical Specifications*:

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

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

Step 1 Remove the DVD drive that you are replacing. See Figure 3-26:

a. Power off the server as described in Shutting Down and Powering Off the Server, page 3-6.

b. Slide the server out the front of the rack far enough so that you can remove the top cover.

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 3-7.

d. Remove all memory risers. See Replacing Memory Risers, page 3-26.

e. Remove all memory riser dividers.

f. Remove the black plastic cover from the floor of the chassis by removing the four screws that secure it. This strip covers the width of the chassis floor behind the fan modules.

g. Push the release button on the rear of the DVD drive, and then push the DVD drive out the front panel.

Step 2 Install a new DVD drive:

a. Insert the rear of the new DVD drive into the empty DVD drive bay on the front panel.

b. Push the drive inward until it seats in its connector and the release button locks in place.

c. Replace the black strip to the floor of the chassis by replacing its four screws.

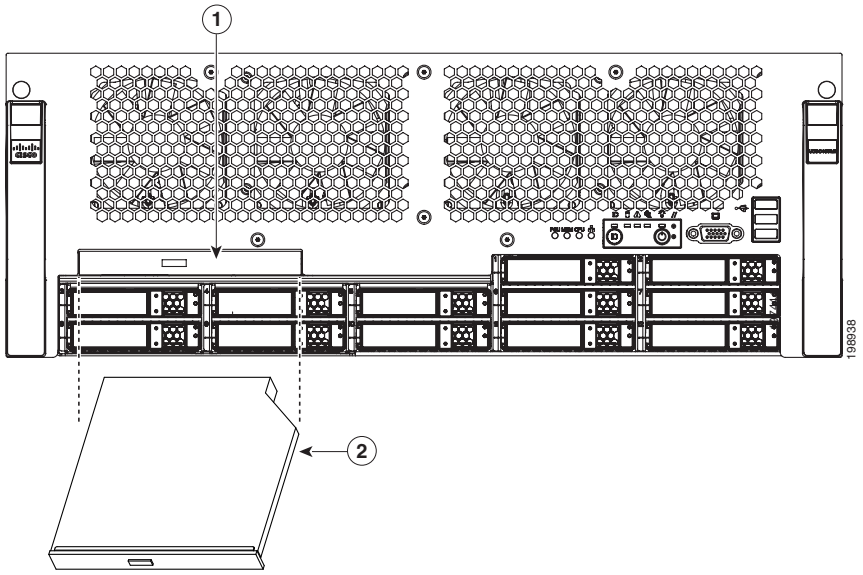
d. Replace all memory riser dividers.

e. Replace all memory risers.

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.

Figure 3-26 Removing and Replacing the DVD Drive



1	DVD drive bay	**2**	Rear of DVD drive

Replacing a PCIe Card

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 3-42.

This server has 10 PCIe expansion slots. See Figure 3-27 and Table 3-4 for information about the slots and which slots are hot-swappable. The replacement procedures differ depending on whether the PCIe slot is hot-swappable or not. This section contains the following topics:

PCIe Slots

Figure 3-27 PCIe Slots

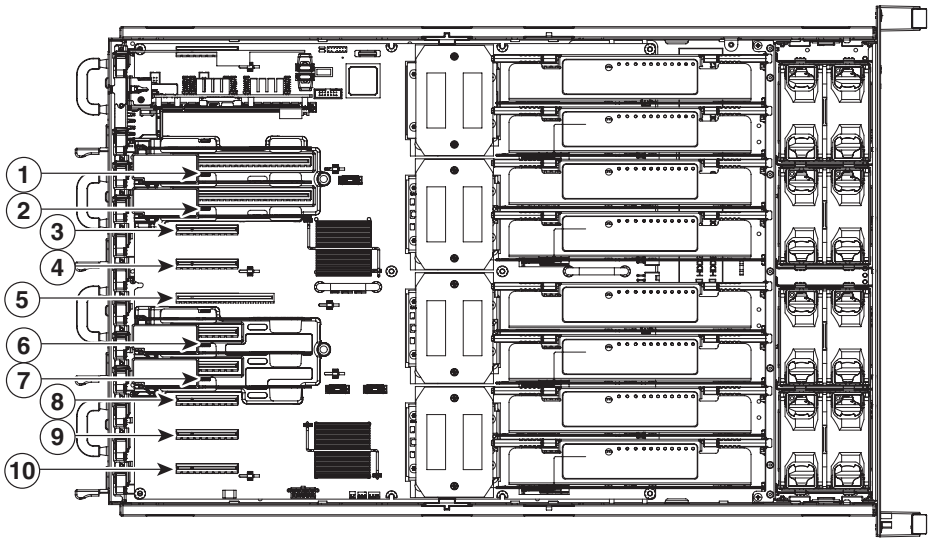


Table 3-4 PCIe Slots

Slot Number	Electrical Lane Width	Connector Length	Card Length[1]	Card Height [2]	NCSI[3] Support	Hot Pluggable
1	Gen-2 x8	x24 connector	3/4 length	Full-height	Yes[4]	Yes
2	Gen-2 x8	x24 connector	3/4 length	Full-height	Yes	Yes
3	Gen-2 x4	x8 connector	1/2 length	Full-height	No	No
4	Gen-2 x4	x8 connector	1/2 length	Full-height	No	No
5	Gen-2 x16	x16 connector	3/4 length	Full-height	No	No
6	Gen-2 x8	x8 connector	3/4 length	Full-height	No	Yes
7	Gen-2 x8	x8 connector	3/4 length	Full-height	No	Yes
8	Gen-1 x4	x8 connector	3/4 length	Full-height	No	No
9	Gen-1 x4	x8 connector	1/2 length	Full-height	No	No
10	Gen-2 x4	x8 connector	1/2 length	Full-height	No	No

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 1 can operate when the server is in standby power mode.

Note CPU3 must be installed to support PCIe slots 5, 6, 7, 9, and 10.

Note Legacy I/O devices like video cards are only supported on slots 1, 2, 3, 4 and 8.

Replacing a PCIe Card in a Non Hot-Swappable Slot

The qualified and supported part numbers for this component are subject to change over time. For the most up-to-date list of replaceable components, see the following URL and then scroll to *Technical Specifications*:

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

To install or replace a PCIe card in slots 3, 4, 5, 8, 9, or 10, follow these steps:

Step 1 Remove a PCIe card:

a. Shut down and power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-6.

b. Slide the server out the front of the rack far enough so that you can remove the top cover.

Note 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 3-7.

d. Remove any cables from the ports of the PCIe card that you are replacing.

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

e. Pinch and lift up the green retaining clip that secures the card to the chassis rear panel.

f. Lift the card straight up from the motherboard connector.

Note Lift up on both ends of the card evenly to avoid damaging its connector.

Step 2 Install a PCIe card:

a. Align the PCIe card with the empty PCIe connector on the motherboard.

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

c. Ensure that the card rear panel sits flat against the server back panel opening.

d. Push the green retaining clip down until it locks over the top of the card.

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 a PCIe Card in a Hot-Swappable Slot

The qualified and supported part numbers for this component are subject to change over time. For the most up-to-date list of replaceable components, see the following URL and then scroll to *Technical Specifications*:

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

To install or replace a PCIe card in slots 1, 2, 6, or 7, follow these steps:

Step 1 Remove a hot-swappable PCIe card:

a. Slide the server out the front of the rack far enough so that you can remove the top cover.

Note 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 the "Removing and Replacing the Server Top Cover" section on page 3-7.

c. Remove any cables from the ports of the PCIe card that you are replacing.

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

d. Press the lightpipe switch that is on the top of the plastic divider for the hot-swappable PCIe slot.

Note Wait for the lightpipe switch LED to turn off before removing the card in the next step.

e. Pinch and lift up the green retaining clip that secures the card to the chassis rear panel.

f. Lift the card straight up from the motherboard connector.

Note Lift up on both ends of the card evenly to avoid damaging its connector.

Step 2 Install a hot-swappable PCIe card:

a. Align the PCIe card with the empty PCIe connector on the motherboard.

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

c. Ensure that the card rear panel sits flat against the server back panel opening.

d. Push the green retaining clip down until it locks over the top of the card.

e. Press the lightpipe switch that is on top of the plastic divider for the hot-swappable PCIe slot. Wait for the LED to turn on to ensure that the PCIe slot receives power.

f. Replace the top cover.

g. Replace the server in the rack and replace cables.

Special Considerations for Cisco UCS Virtual Interface Cards

Table 3-5 describes the requirements for the supported Cisco UCS virtual interface cards (VICs).

Table 3-5 Cisco UCS C460 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 For Use With UCS Integration	Minimum Nexus OS on an Upstream Nexus Fabric Interconnect
Cisco UCS VIC P81E N2XX-ACPCI01	2	PCIE 1 PCIE 2	PCIE 1	1.4(3)	2.0(2)	5.0
Cisco UCS VIC 1225 UCSC-PCIE-CSC-02	2	PCIE 1 PCIE 2	PCIE 1	1.4(6)	2.1(0)	5.0
Cisco UCS VIC1225T UCSC-PCIE-C10T-02	2	PCIE 1 PCIE 2	PCIE 1[2]	1.5(1)	2.1(1)	5.0

1. See PCIe Slots, page 3-38.
2. The Cisco UCS VIC1225T is not supported for UCS integration at this time.

Special Considerations for Cisco UCS Fusion ioDrive2 Storage Accelerator Cards

Table 3-6 describes the requirements for the supported Cisco UCS Fusion ioDrive2 cards.

Table 3-6 Cisco UCS C460 Requirements for Fusion ioDrive2 Cards

Card	Max. Number of Cards Supported	Slots That Support Cards [1]	Minimum CIMC Firmware	Card Height (rear-panel tab)
Cisco UCS 3.0 TB MLC Fusion ioDrive2 UCSC-F-FIO-3000M	10	All[2]	1.5(2)	Full height
Cisco UCS 1205 GB MLC Fusion ioDrive2 UCSC-F-FIO-1205M	10	All	1.5(2)	Half height[3]
Cisco UCS 785 GB MLC Fusion ioDrive2 UCSC-F-FIO-785M	10	All	1.5(2)	Half height
Cisco UCS 365 GB MLC Fusion ioDrive2 UCSC-F-FIO-365M	10	All	1.5(2)	Half height

1. See PCIe Slots, page 3-38.
2. See note below regarding slots 8 and 10.
3. A rear-panel tab adapter is required to fit the half-height cards in the full-height slots.

Note PCIe slots 8 and 10 are Gen1 x4 electrical lane width slots and provide limited bandwidth if used with these cards.

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 3-43
- Resolving Insufficient 16-Bit I/O Space, page 3-44

Resolving Insufficient Memory Space to Execute Option ROMs

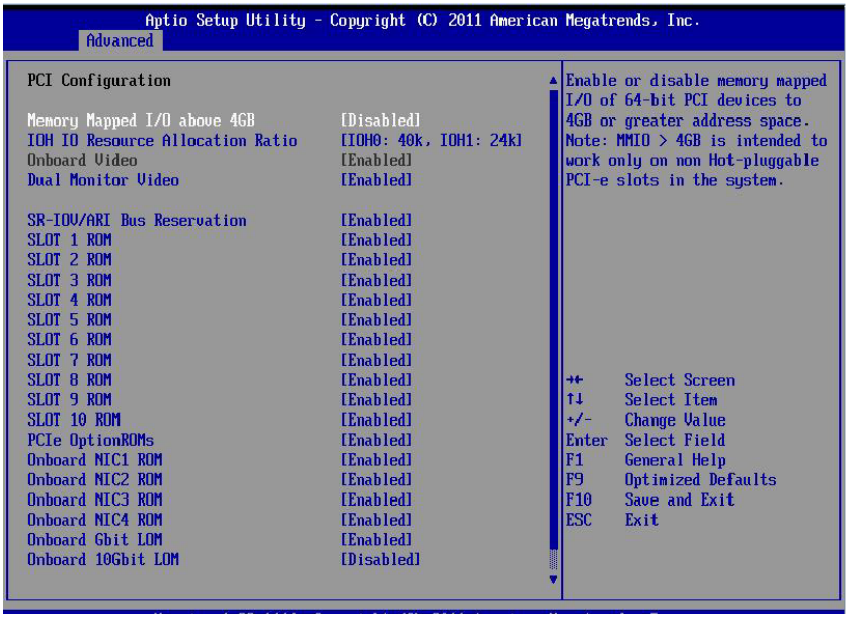
The system has very limited memory to execute PCIe legacy option ROMs, so when a large number of PCIe add-on cards are installed in the server, the system BIOS might not able to execute all of the option ROMs. The system BIOS loads and executes the option ROMs in the order that the PCIe cards are enumerated (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 (see Figure 3-28).

Figure 3-28 BIOS Setup Utility Advanced > PCI Configuration Page



- **Guidelines for RAID controller booting:**

  If the RAID controller does not appear in the system boot order, even if the option ROMs for the RAID controller 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.

- **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 two I/O Hubs (IOH0 and IOH1) in the system.

The default BIOS setting is to allocate 40 KB to IOH0 and 24 KB to IOH1. Every PCIe device that is connected to IOH0 has to share the 40 KB of I/O. Every PCIe device connected to IOH1 must share that 24 KB of I/O.

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 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 hands control to the operating system.
- The keyboard might not work.

To work around this problem, rebalance the load on each IOH using the following methods:

1. Adjust the IOH IO Resource Allocation ratio. This option is included in the BIOS Setup Utility **Advanced → PCI Configuration** page (see Figure 3-28).
2. Physically remove any unused PCIe cards.
3. Physically rearrange the PCIe cards to create a balance between IOH0 and IOH1.

   In this server, the PCIe slots are connected to IOH0 and IOH1 as follows:

   - Slot 1: IOH 0
   - Slot 2: IOH 0
   - Slot 3: IOH 0
   - Slot 4: IOH 0
   - Slot 5: IOH 1
   - Slot 6: IOH 1
   - Slot 7: IOH 1
   - Slot 8: IOH 0
   - Slot 9: IOH 1
   - Slot 10: IOH 1

Installing an NVIDIA Tesla C2050 GPU Card

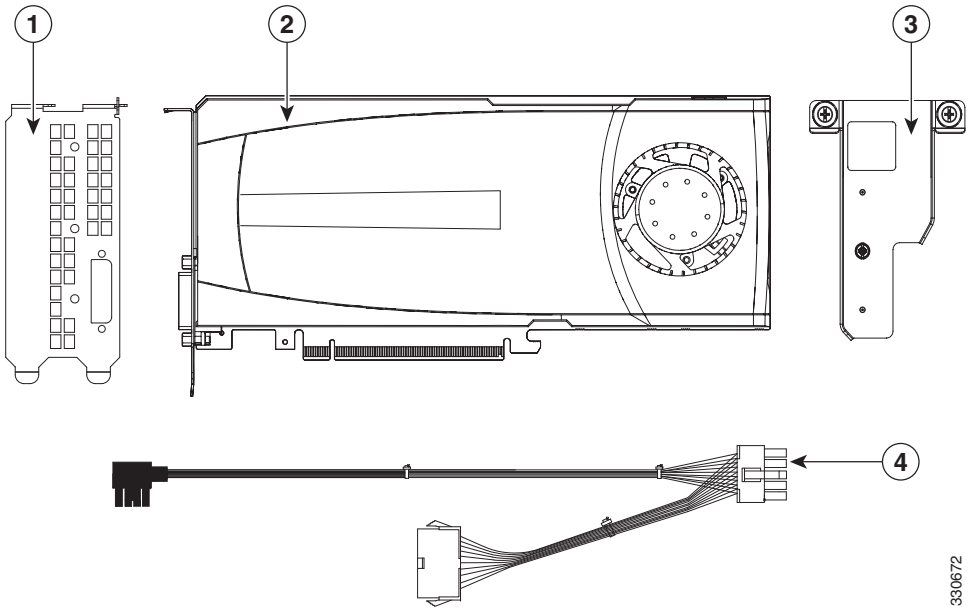
Note The NVIDIA Tesla C2050 GPU card is supported in Generation M2 servers only. This card is supported only in PCIe slot 5 of the server (see Figure 3-27 on page 3-38). When installed in PCIe slot 5, this double-wide card physically covers two slots, slot 5 and slot 6.

Note The DVI connector on the rear panel of the GPU card is disabled. Connect your monitor to one of the VGA connectors on the server instead.

Cisco ships an accessory kit (UCSC-GPU_N01-C460) that includes two adapters that you must use to customize the card for installation in the Cisco C460 M2 server. Each kit includes the following components (see Figure 3-29):

- One rear-panel faceplate
- One front bracket
- One power cable adapter

Figure 3-29 Cisco Adapters For NVIDIA Tesla C2050 GPU Card



1	Rear-panel faceplate	**3**	Front bracket
2	GPU card (not included in kit)	**4**	Power cable adapter

To install or replace an NVIDIA Tesla C2050 GPU card, follow these steps:

Step 1 Prepare the server for installation of the card:

a. Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-6.

b. Disconnect all power cords from the power supplies.

c. 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.

d. Remove the top cover as described in the "Removing and Replacing the Server Top Cover" section on page 3-7.

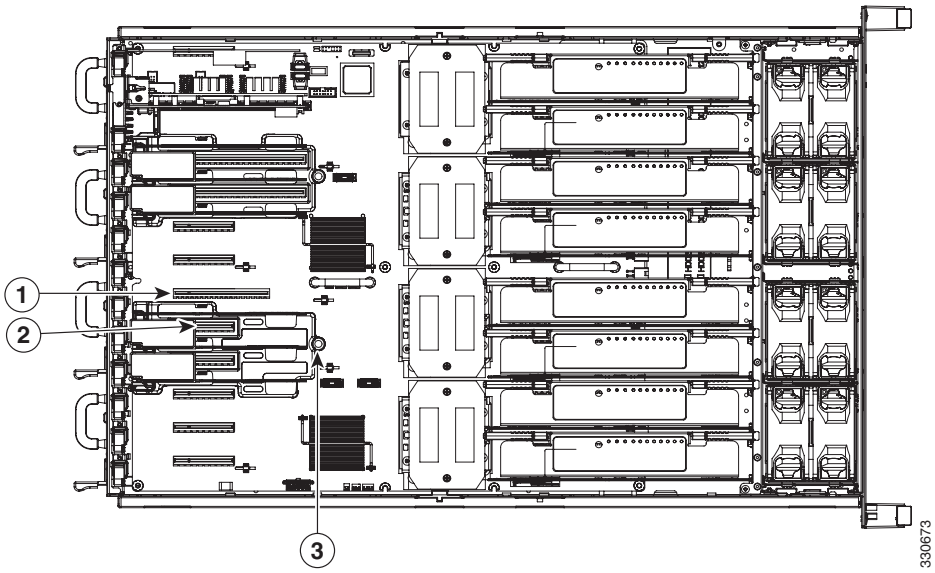
e. Open the two green PCIe retainer latches on PCIe slots 5 and 6 (see Figure 3-30).

f. Remove any PCIe cards or blanking panels from PCIe slots 5 and 6.

g. Remove the plastic divider assembly that is over PCIe slots 6 and 7 to make clearance for the card.

Pull up on the pin that attaches this divider assembly to the motherboard, then lift the assembly out of the server. This pin is on the front end of the divider assembly where it touches the motherboard (see Figure 3-30).

Figure 3-30 Cisco C2050 GPU Card Slots



1	PCIe slot 5	**3**	Release pin on front of divider assembly
2	PCIe slot 6		

Step 2 Install adapters on the GPU card to prepare for installation:

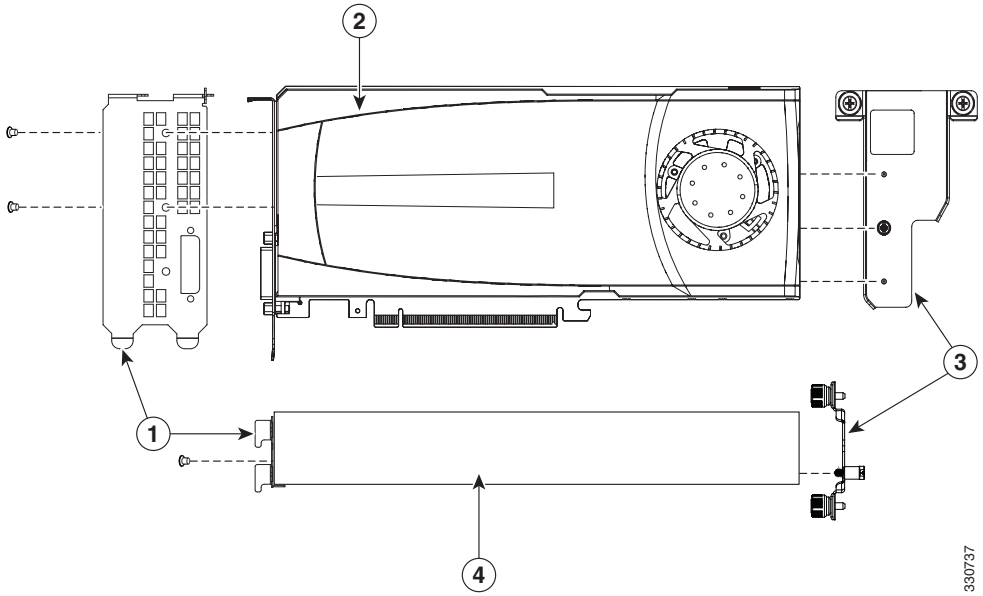
a. Remove the default rear-panel faceplate from the rear end of a new card. Remove the two securing screws and set them aside.

b. Install the new rear-panel faceplate to the rear end of the card (see Figure 3-31). Install the two securing screws that you removed in the prior step.

c. Install the front bracket to the front end of the card (see Figure 3-31). Insert the pins on the bracket into the corresponding holes in the card and then tighten the single securing thumbscrew.

d. Connect the power cable adapter to the card. Insert the six-pin connector on the cable into the six-pin connector on the front end of the card.

Figure 3-31 Assembling Cisco C2050 GPU Card Components



1	Rear-panel faceplate with two securing screws	**3**	Front bracket
2	GPU card, side view	**4**	GPU card, top view

Step 3 Install a new GPU card to the server:

a. Align the card so that its bottom-edge connector is over PCIe slot 5.

b. Tilt the front end of the card downward as you lower it into the chassis so that the attached power cable goes under the CPU cage (behind CPU3). The two thumbscrews on the front bracket that you installed must align with the two threaded holes in the CPU cage (see Figure 3-32).

c. Perform the following two actions simultaneously:

- Insert the two tabs on the rear-panel faceplate of the card into the two chassis rear-panel openings for slots 5 and 6.
- Carefully push down on both ends of the card to seat its connector in the PCIe slot 5 motherboard connector.

d. Close the two green PCIe retainer latches for slots 5 and 6 over the top of the rear-panel faceplate.

e. Tighten the two thumbscrews on the front bracket of the card to secure it to the CPU cage.

Step 4 Install the power cable adapter:

a. Disconnect the PCIe power cable from the motherboard. This is 10-pin connector J166 (see Figure 3-32).

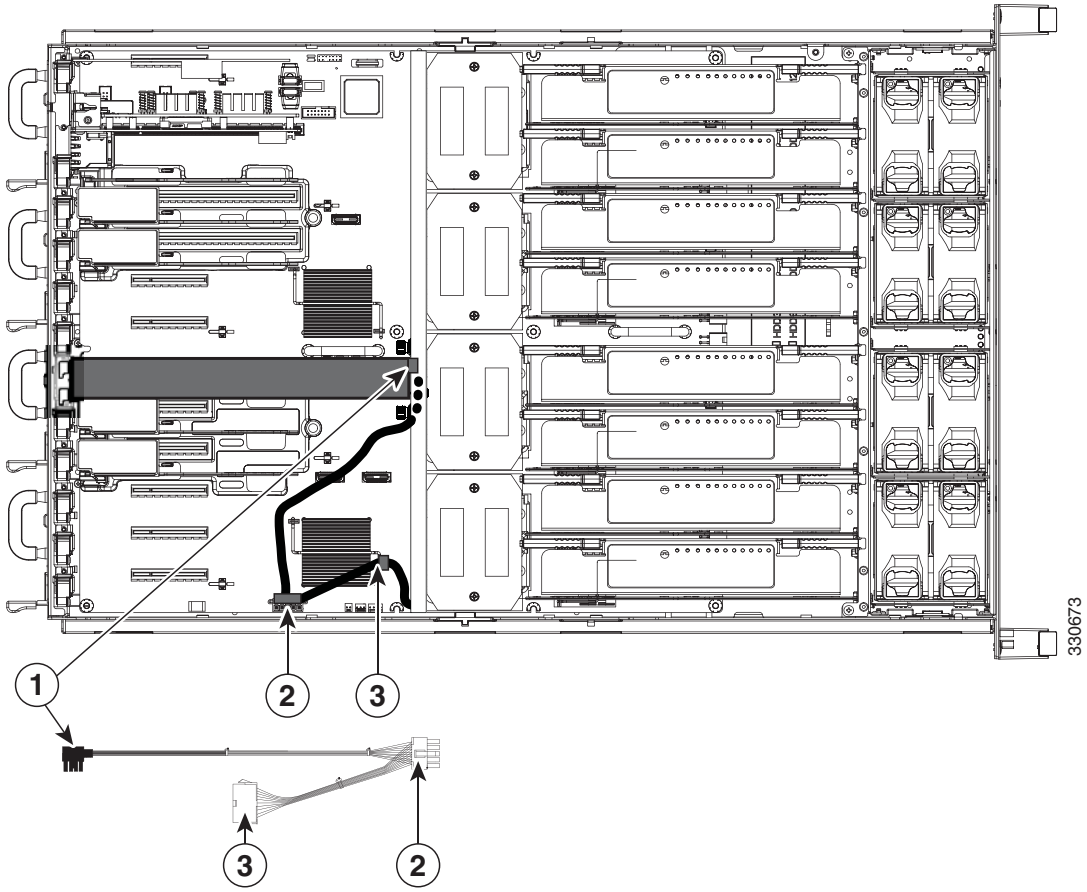
b. Connect the male 10-pin connector of the power cable adapter to the motherboard connector J166.

c. Connect the PCIe power cable into the female 10-pin connector on the power cable adapter, which you attached to the card in Step 2.

Step 5 Replace the top cover.

Step 6 Replace the server in the rack, replace power cords and any other cables, and then power on the server by pressing the **Power** button.

Figure 3-32 Installing and Cabling the GPU Card



1	Six-pin connector to GPU card	**3**	Ten-pin female connector to PCIe power cable
2	Ten-pin male connector to motherboard socket J166		

Replacing a Trusted Platform Module (TPM)

The qualified and supported part numbers for this component are subject to change over time. For the most up-to-date list of replaceable components, see the following URL and then scroll to *Technical Specifications*:

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

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

Step 1 Remove a TPM (see Figure 3-33):

a. Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-6.

b. Disconnect all power cords from the power supplies.

c. 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.

d. Remove the top cover as described in the "Removing and Replacing the Server Top Cover" section on page 3-7.

e. Remove the securing screw that holds the TPM to the motherboard. The TPM header is on the motherboard just behind the CMOS battery (see Figure 3-33).

f. Lift up on both ends of the TPM to free it from the TPM header pins on the motherboard.

Step 2 Install a TPM:

a. Align the connector that is on the underside of the new TPM with the TPM header pins on the motherboard, and then press firmly on both ends of the TPM to seat it.

b. Replace the securing screw that holds the TPM to the motherboard.

c. Replace the top cover.

d. Replace the server in the rack, replace power cords and any other 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.

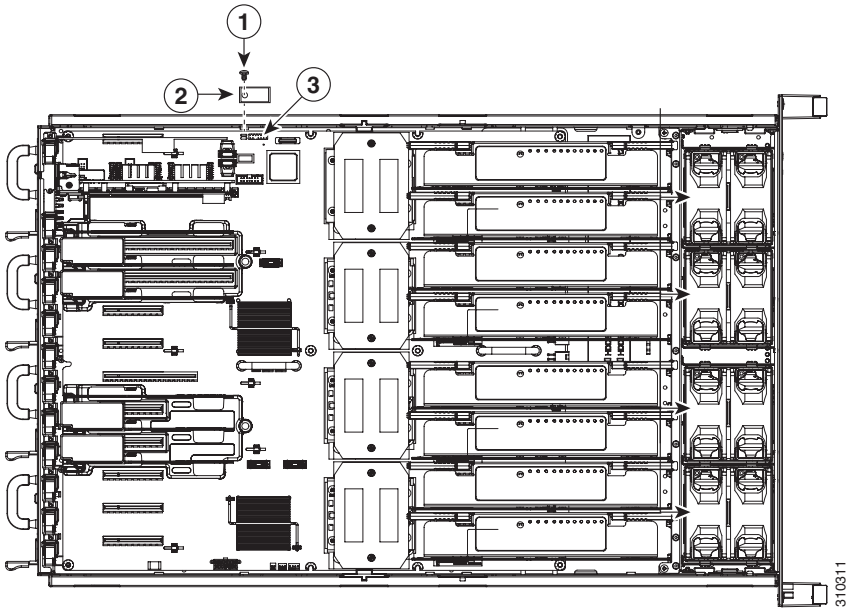
c. Select the **Advanced** tab.

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 3-51.

Figure 3-33 Removing and Replacing a TPM



1	Securing screw	**3**	TPM header on motherboard
2	TPM		

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.

APPENDIX A

Server Specifications

This appendix lists the technical specifications for the Cisco UCS C460 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	6.8 in (174 mm)
Width	16.7 in (424 mm)
Depth	27.7 in (704 mm)
Weight	110.23 lbs (50 kg)

Caution The Cisco UCS C460 server weighs approximately 110 pounds, or 50 kilograms, when fully loaded with components. We recommend that you use a minimum of two people when lifting the server. Attempting to lift the Cisco UCS C460 server alone could result in personal injury or equipment damage.

Environmental Specifications

Table A-2 lists the environmental specifications for the server.

Table A-2 Environmental Specifications

Description	Specification
Temperature, operating	10ºC to 35ºC (50ºF to 95ºF)
Temperature, non-operating	-40ºC to 70ºC (-40ºF to 158ºF)
Humidity, non-operating	95%, non-condensing at temperatures of 25ºC (77ºF) to 30ºC (86ºF)
Altitude	-30m to 1500m (-100ft to 5000ft)

Power Specifications

Table A-3 lists the specifications for each power supply.

Table A-3 Power Supply Specifications

Description	Specification
AC input voltage	115 to 230 VAC nominal (Range: 90 to 264 VAC)
AC input frequency	50 to 60 Hz nominal (Range: 47 to 63 Hz)
Maximum AC-input current	10A
Maximum output power for each power supply	850W (up to four power supplies can be installed)
Power supply output voltage	Main power: 12 VDC Standby power: 3.3 VDC

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/

APPENDIX B

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

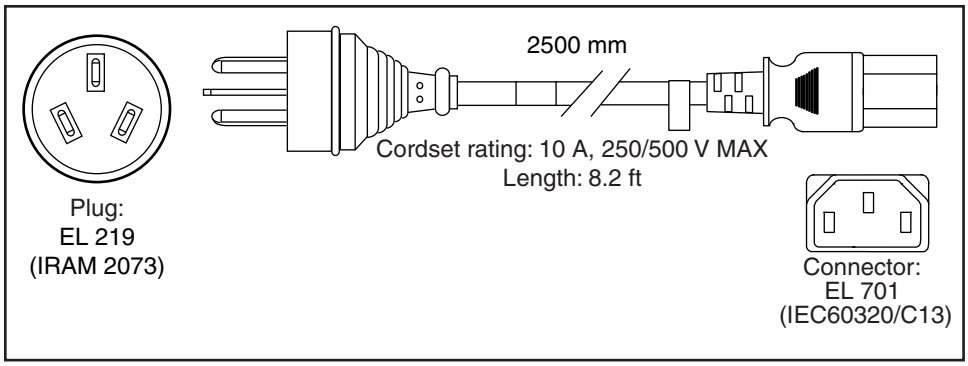


Figure B-2 CAB-9K10A-AU

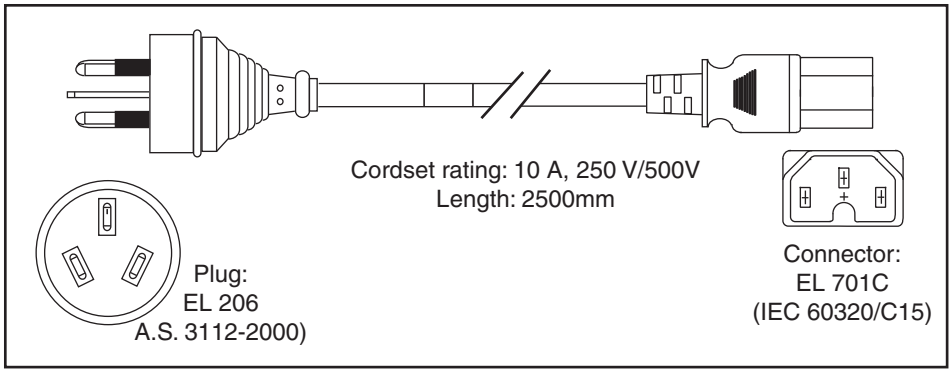


Figure B-3 SFS-250V-10A-CN

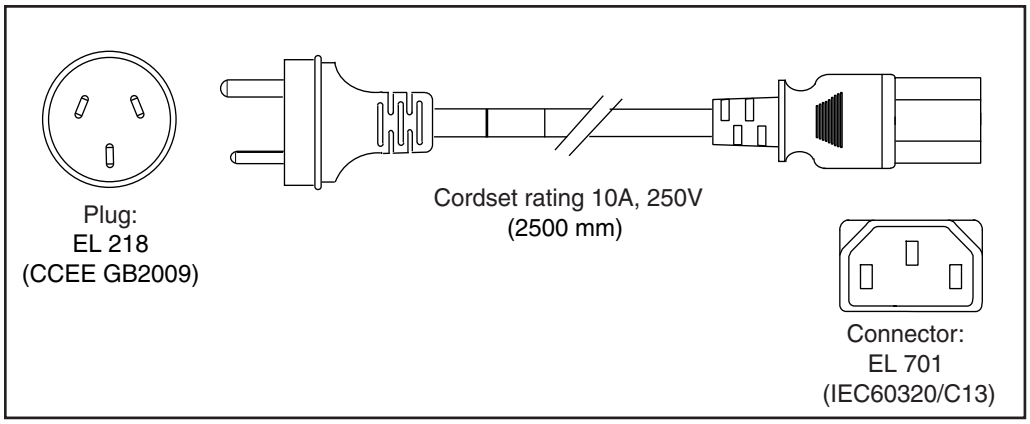


Figure B-4 CAB-9K10A-EU

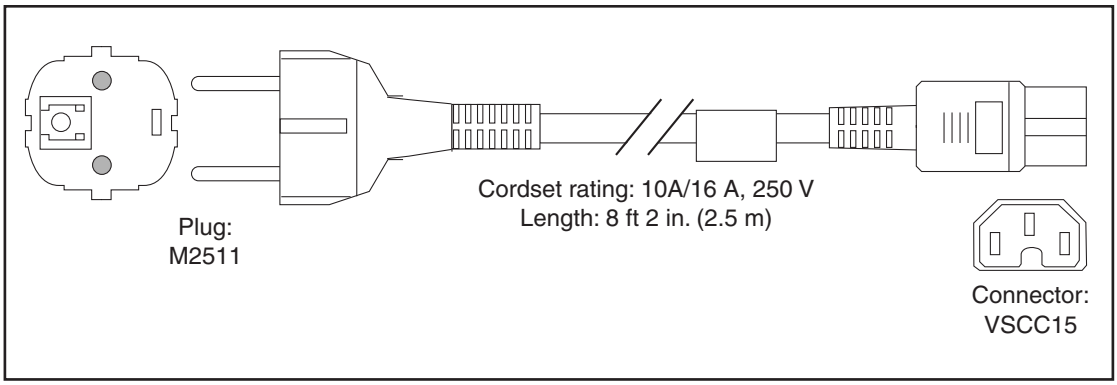


Figure B-5 SFS-250V-10A-ID

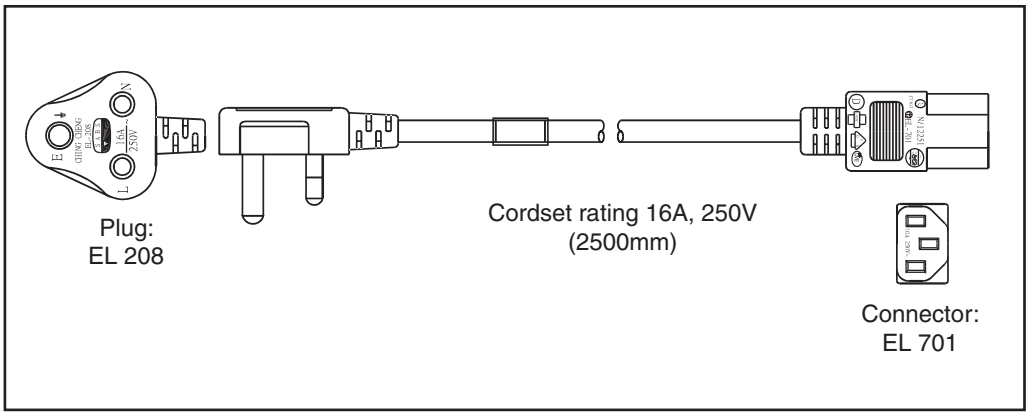


Figure B-6 SFS-250V-10A-IS

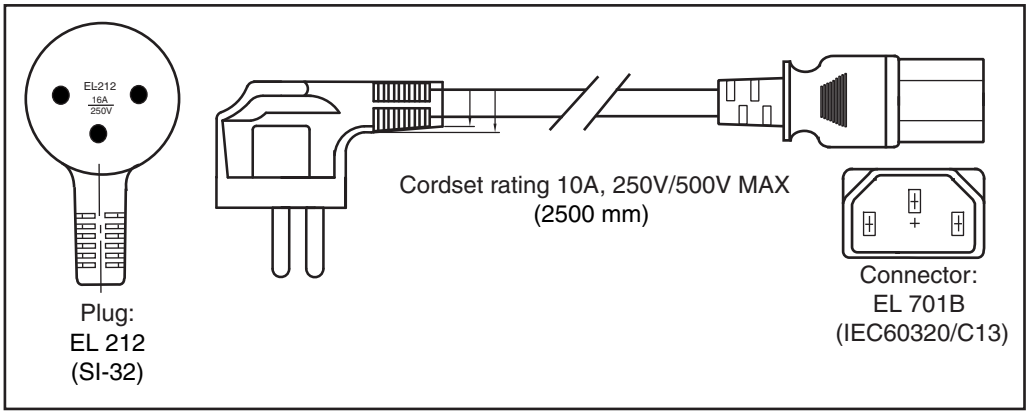


Figure B-7 CAB-9K10A-IT

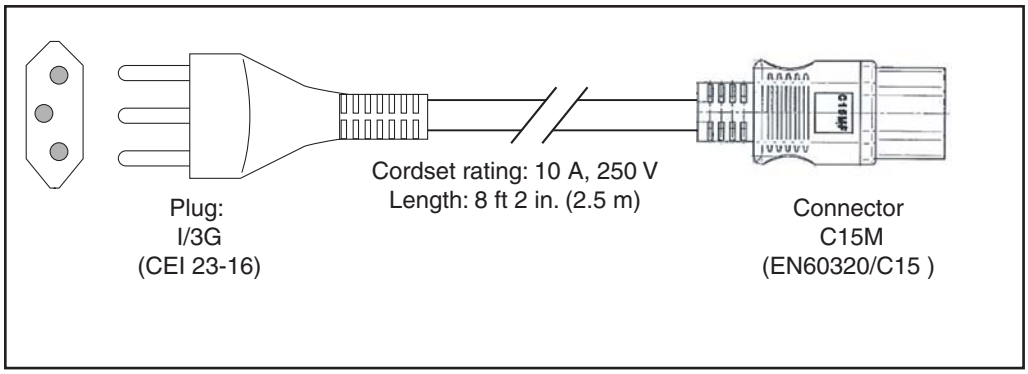


Figure B-8 CAB-9K10A-SW

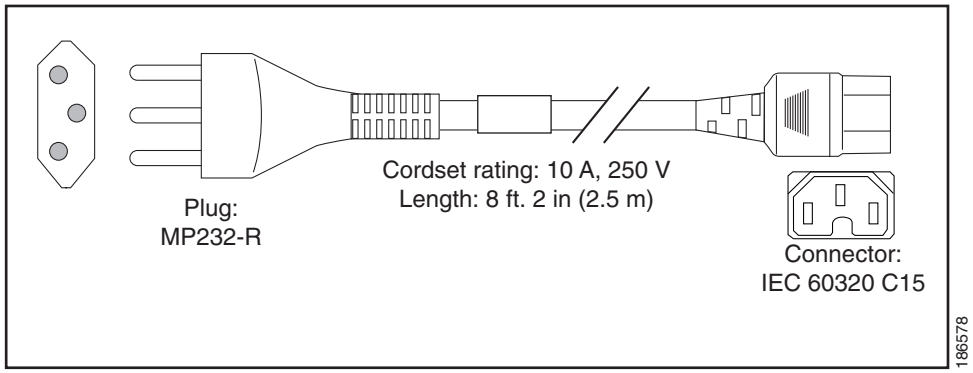


Figure B-9 CAB-9K10A-UK

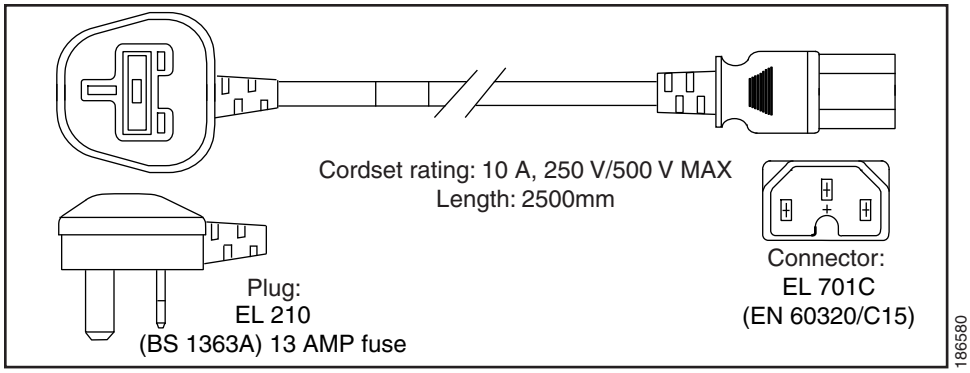


Figure B-10 CAB-AC-250V/13A

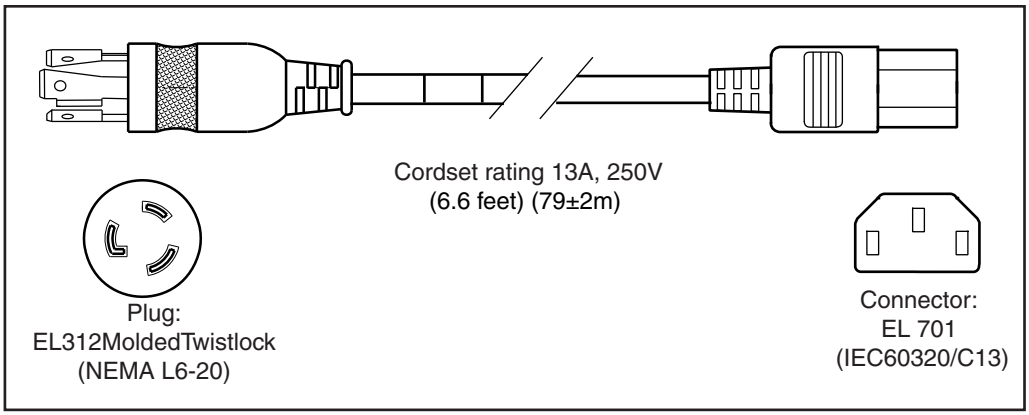


Figure B-11 CAB-N5K6A-NA

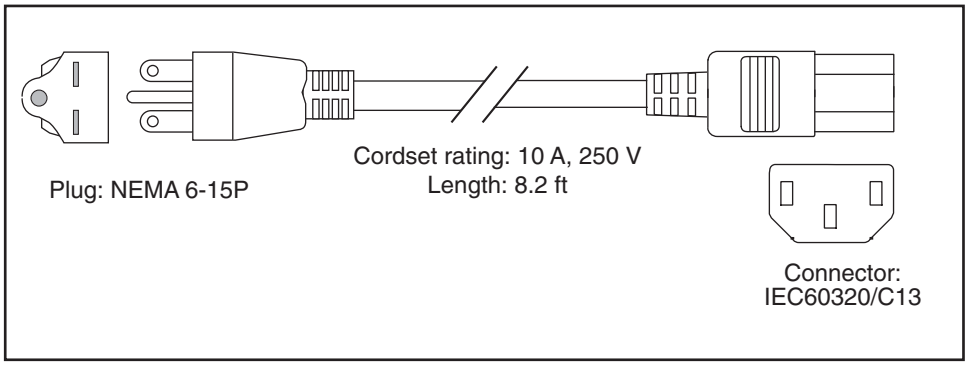


Figure B-12 CAB-9K12A-NA

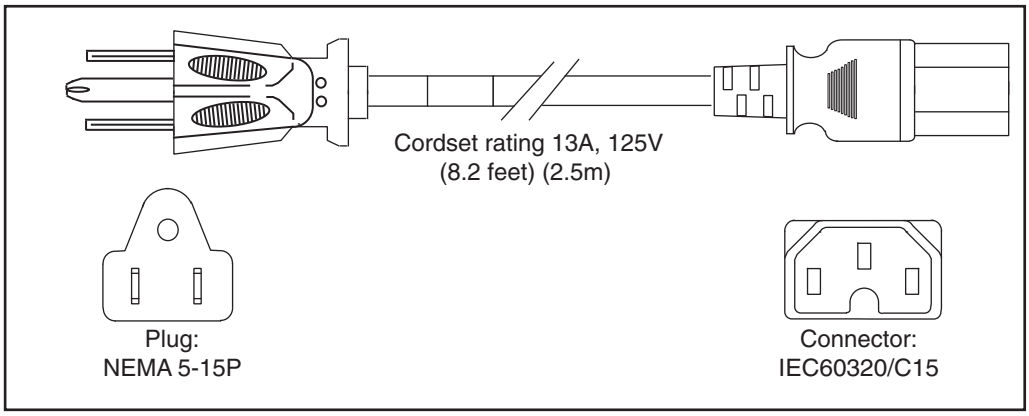


Figure B-13 CAB-C13-CBN, Jumper Power Cord (0.68 m)

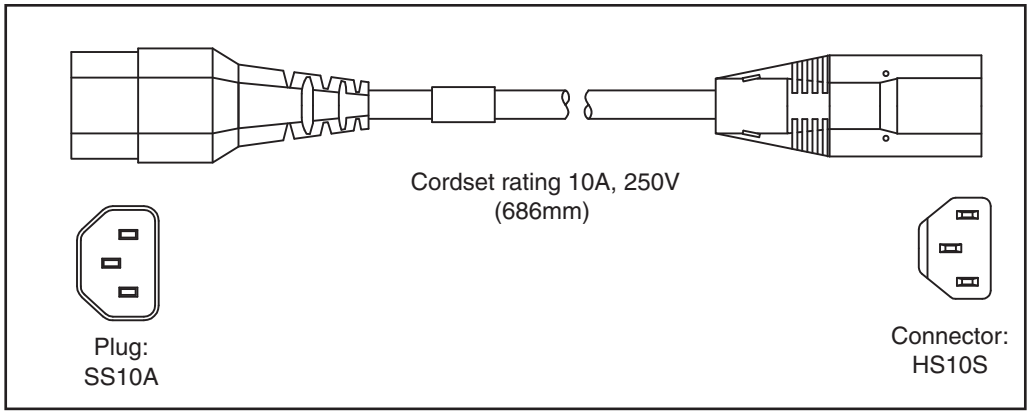


Figure B-14 CAB-C13-C14-2M, Jumper Power Cord (2 m)

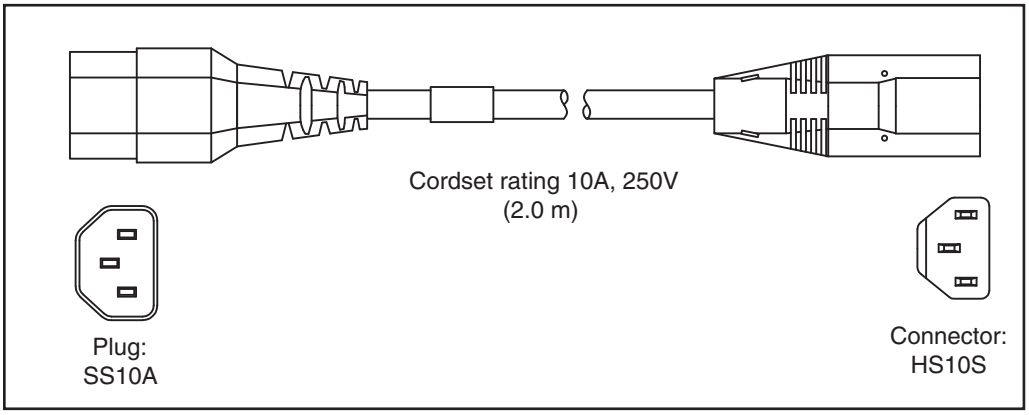
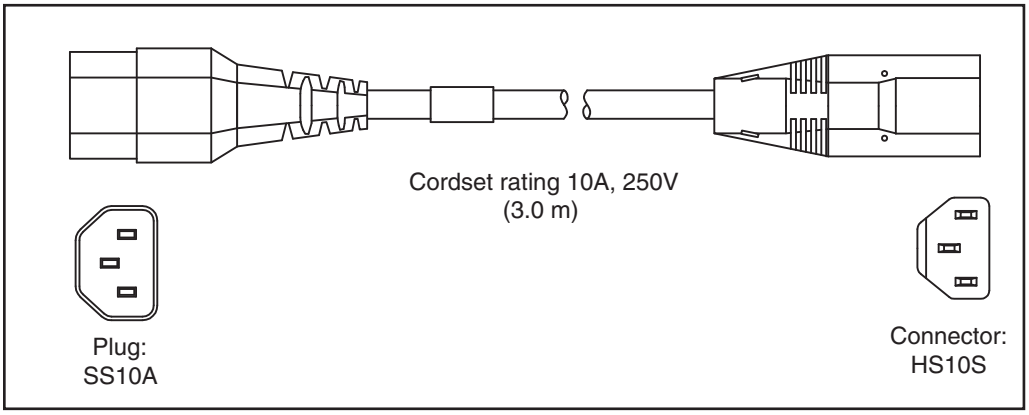


Figure B-15 CAB-C13-C14-AC, Jumper Power Cord (3 m)



APPENDIX C

RAID Controller Considerations

This appendix provides RAID controller information, and it includes the following sections:

Supported RAID Controllers and Required Cables

This server supports the RAID controller options and cable requirements shown in Table C-1.

Note Do not mix controller types in the server. Dual controllers are not supported.

Table C-1 Cisco UCS C460 Server Supported RAID Options

Controller	Style	Max. Internal Drives	SAS	SATA	Opt. BBU	RAID Levels	Required Cables
LSI MegaRAID SAS 9240-8i	PCIe	8	Yes[1]	No	No	0, 1, 10	2 SAS (use cables included)
LSI MegaRAID SAS 9260-8i	PCIe	12	Yes[2]	Yes	Yes	0, 1, 5, 6, 10, 50, 60	2 SAS (use cables included)

1. You can mix SAS and SATA drives when using an LSI SAS3081E-R card. However, you cannot mix SAS and SATA drives within a volume.
2. You can mix SAS and SATA drives when using an LSI MegaRAID card. However, you cannot mix SAS and SATA drives within a volume.

Mixing Drive Types in RAID Groups

Table C-2 lists the technical capabilities for mixing hard disk drive (HDD) and solid state drive (SSD) types in a RAID group. However, see the best practices recommendations that follow for the best performance.

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

Best Practices For Mixing Drive Types in RAID Groups

For the best performance, follow these guidelines:

- Use either all SAS or all SATA drives in a RAID group.
- Use the same capacity for each drive in the RAID group.
- Never mix HDDs and SSDs in the same RAID group.

Battery Backup Unit

This server supports installation of one LSI RAID battery backup unit (BBU). The unit mounts to the chassis wall (see Replacing the SAS Riser Battery Backup Unit, page 3-18).

The optional LSI BBU is available only when using an LSI MegaRAID 9260-8i controller card. This BBU provides approximately 72 hours of battery backup for the disk write-back cache DRAM in the case of sudden power loss.

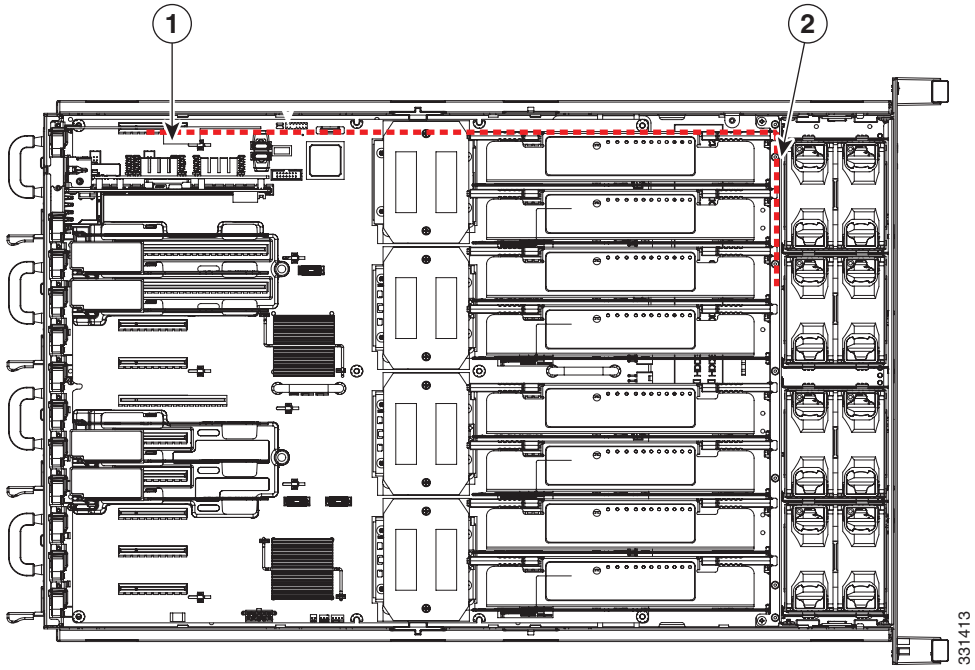
RAID Controller Cabling

This section includes the following topics:

Cable Routing

The red line in Figure C-1 shows the recommended cable routing path from the backplane to the SAS riser connectors.

Figure C-1 RAID Controller Connectors



1	SAS riser slot (RAID controller)	**2**	Drive backplane

Cisco UCS C460 Server Cabling

The cable connections required for each type of supported controller are as follows:

LSI MegaRAID SAS 9240-8i PCIe Card

This controller can control a maximum of 8 internal drives. The required two SAS cables are included with the server. Cable 1 controls drives 1–4 and cable 2 controls drives 5–8.

1. Connect SAS cable 1 from connector SAS1 on the controller to the SAS1 connector on the backplane.
2. Connect SAS cable 2 from connector SAS2 on the controller to the SAS2 connector on the backplane.

LSI MegaRAID SAS 9260-8i PCIe Card

This controller can control a maximum of 12 internal drives. The required two SAS cables are included with the server. Cable 1 controls drives 1–6 and cable 2 controls drives 7–12.

1. Connect SAS cable 1 from connector SAS1 on the controller to the SAS1 connector on the backplane.
2. Connect SAS cable 2 from connector SAS2 on the controller to the SAS2 connector on the backplane.

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 SAS Riser (RAID Controller), page 3-16.

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 If Quiet Boot is enabled, disable it in the system BIOS.

Step 4 Reboot the server and watch for the prompt to press F.

Note For newer RAID controllers, you are not prompted to press F. Instead, the RAID configuration is imported automatically. In this case, skip to Step 7.

Step 5 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 6 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 7 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, see the Cisco UCS Servers RAID 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

APPENDIX D

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.