# Cisco UCS C24 M3 High-Density Small Form Factor Rack-Mount Server

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# OVERVIEW

The Cisco® UCS C24 M3 Rack Server combines economics and a density-optimized feature set from entry level enterprise to SMB with applications such as scale out, virtualization, IT and web infrastructure, VPN servers, file/print servers, and appliances.

Building on the success of the Cisco UCS C-Series Rack Servers, the Cisco UCS C24 M3 rack server and the Cisco 1225 VIC further extend the capabilities of the Cisco UCS portfolio in a 2 RU form factor with the Intel® Xeon® processor E5-2400 series processor family CPUs, which deliver the best combination of performance, flexibility, and efficiency gains. In addition, the Cisco UCS C24 M3 offers up to 12 DIMM slots, 16 disk drives (with 16-drive backplane), 24 disk drives (with 24-drive backplane), 5 PCIe slots, and two 1 Gigabit Ethernet LAN-on-motherboard (LOM) ports to provide exceptional levels of internal storage and price/performance.

The 24-drive version of the server has a SAS expander enabled backplane that supports up to 24 hard disk drives with a single RAID card. The 16-drive version of the server supports up to two RAID cards, with each RAID card supporting up to 8 drives. Two RAID cards are required to support the maximum capacity of 16 drives.

**Figure 1       Cisco UCS C24 M3 High-Density SFF Rack Server (24-drive system shown)**

**Front View**



**Rear View**

# DETAILED VIEWS

## Chassis Front View

*Figure 2* shows the Cisco UCS C24 M3 High-Density SFF Rack Server.

**Figure 2    Chassis Front View**



| 1 | USB 2.0 ports (two) | 4 | Status LEDs (top to bottom): |
| | | | Network activity LED |
| | | | Power supply status LED |
| | | | Temperature status LED |
| | | | Fan Status LED |
| | | | System status LED |
| 2 | Pull-out asset tag | 5 | Identification button/LED |
| 3 | Drives, hot-swappable (up to twenty-four 2.5-inch drives for the 24-drive backplane option or up to sixteen drives for the 16-drive backplane option) | 6 | Power button/power status LED |

## Chassis Rear View

*Figure 3* shows the external features of the rear panel.

**Figure 3        Chassis Rear View**



| 1 | Power supplies (two) | 6 | VGA video port (DB-15 connector) |
|---|---|---|---|
| 2 | Dual 1 Gb Ethernet ports (LAN1, LAN2) | 7 | 10/100/1000 Ethernet dedicated management port |
| 3 | PCIe Gen 3 half-height slots 3, 4, and 5 on riser 2<br>■ Slot 3: x8 half-height, half-length<br>■ Slot 4: x8 half-height, half-length<br>■ Slot 5: x8 half-height, half-length | 8 | Rear Identification button/LED |
| 4 | USB ports (4) | 9 | PCIe Gen 3 full-height slots 1 and 2 on riser 1<br>■ Slot 1: x16 extended connector (Cisco CNIC), full-height, 3/4-length,<br>■ Slot 2: x4 full-height, one-half length |
| 5 | Serial port (DB-9 connector) | — | — |

# BASE SERVER STANDARD CAPABILITIES and FEATURES

*Table 1* lists the capabilities and features of the base server. Details about how to configure the server for a particular feature or capability (for example, number of processors, disk drives, or amount of memory) are provided in *CONFIGURING the SERVER, page 9*.

**Table 1   Capabilities and Features**

| Capability/Feature | Description |
|---|---|
| Chassis | Two rack unit (2RU) chassis |
| CPU | One or two Intel® Xeon E5-2400 series processor family CPUs |
| Chipset | Intel C600 chipset |
| Memory | 12 DIMM slots |
| NIC | Embedded dual-port Intel I350 PCIe-based Gigabit Ethernet controller |
| Expansion slots | Two riser cards containing PCIe card slots<br><br>■ Riser 1 (slots 1 and 2, controlled by CPU 1)<br>  • Slot 1: PCIe Gen 3 slot, x16 extended connector (Cisco CNIC), half-length, full-height, with NCSI[1] and Cisco CNIC[2] support. The Cisco 1225 virtual interface cards require an NCSI slot.<br>  • Slot 2: PCIe Gen 3 slot, x4 connector, half-length, full-height, no NCSI support<br>■ Riser 2 (slots 3, 4, and 5, controlled by CPU 2)<br>  • Slot 3:PCIe Gen 3 slot, x8 connector, half-length, half-height<br>  • Slot 4: PCIe Gen 3 slot, x8 connector, half-length, half-height<br>  • Slot 5: PCIe Gen 3 slot, x8 connector, half-length, half-height |
| Internal storage devices | ■ With the 24-drive backplane, up to 24 2.5-inch SAS+SATA hot-swappable hard disk drives (HDDs) are supported<br><br>■ With the 16-drive backplane, up to 16 2.5-inch SAS+SATA hot-swappable hard disk drives (HDDs) are supported. Two RAID controllers are required to support 16 drives (8 drives per RAID controller).<br><br>■ One connector on the motherboard that can accommodate a USB 2.0 drive. You can order an 8 GB drive for this connector and use it as a hypervisor or license dongle. The 8 GB USB drive comes blank. |

Cisco UCS C24 M3 High-Density SFF Rack-Mount Server

| Capability/Feature | Description |
|---|---|
| Storage controller | The 24-drive[3] version of the server supports the following RAID controllers: |
| | ■ RAID plug-in controller card options (these cards consume PCIe slots): |
| | • LSI MegaRAID 9265CV-8i with 1 GB Transportable Memory Module (TMM) data cache and chassis-mounted (remote) supercap for data cache power backup, supporting RAID 0, 1, 5, 6, 10, 50, and 60 and up to 24 internal SAS+SATA drives. |
| | • LSI MegaRAID 9240-8i RAID 8-port PCIe plug-in RAID controller card, supporting RAID 0, 1, 5, 10, and 50 and up to 16 internal SAS+SATA drives (this RAID controller supports a maximum of 16 drives in a RAID volume). |
| | • LSI MegaRAID 9220-8i RAID 8-port PCIe plug-in RAID controller supporting RAID 0, 1, and 10 and up to 16 internal SAS+SATA drives (this RAID controller supports a maximum of 16 drives in a RAID volume). |
| | The 16-drive[4] version of the server supports any one (at a time) of the following drive control options: |
| | ■ Embedded RAID (3 Gbs). This implementation of RAID does not consume a PCI slot. |
| | • Embedded SATA-only RAID controller, supporting up to four SATA-only drives (RAID 0, 1, 10) |
| | • ROM5 embedded RAID upgrade, supporting up to 8 SAS+SATA drives (RAID 0, 1, 10). |
| | • ROM55 embedded RAID upgrade, supporting up to 8 SAS+SATA drives (RAID 0, 1, 5, 10). |
| | ■ RAID plug-in controller card options (these cards consume PCIe slots): |
| | • LSI MegaRAID 9265CV-8i with 1 GB Transportable Memory Module (TMM) data cache and chassis-mounted (remote) supercap for data cache power backup, supporting RAID 0, 1, 5, 6, 10, 50, and 60 and up to 8 internal SAS+SATA drives. |
| | • LSI MegaRAID 9240-8i RAID 8-port PCIe plug-in RAID controller card, supporting RAID 0, 1, 5, 10, and 50 and up to eight internal SAS+SATA drives. |
| | • LSI MegaRAID 9220-8i RAID 8-port PCIe plug-in RAID controller supporting RAID 0, 1, and 10 and up to eight internal SAS+SATA drives. |
| | To control 16 drives, two identical RAID controllers are installed (2-CPU configurations only). |
| External Storage Devices | ■ A 16 GB USB 2.0 drive (if ordered) comes as a separate item in the shipping box and contains preloaded drivers and utilities. You can move the 16 GB drive from one server to another an using external USB 2.0 connector in order to install the drivers and utilities onto multiple servers. |

| Capability/Feature | Description |
|---|---|
| Video | The Emulex Pilot 3 Integrated Baseboard Management Controller provides video:<br><br>■ Matrox G200e video controller<br><br>■ Integrated 2D graphics core with hardware acceleration<br><br>■ Supports all display resolutions up to 1920 x 1200 x 16 bpp resolution at 60 Hz<br><br>■ 24-bit color depth for all resolutions less than 1600x1200<br><br>■ 256 MB video memory |
| Interfaces | ■ Rear panel<br>  • One DB9 serial port connector<br>  • Four USB 2.0 port connectors<br>  • One DB15 VGA connector<br>  • One 10/100/1000 Ethernet management port<br>  • Two 1 GbE Ethernet LOM ports<br>■ Front panel<br>  • Two USB 2.0 ports |
| Front Panel | ■ A front panel controller provides status indications and control buttons |
| Power subsystem | One or two power supplies, depending on server configuration and loading. Power supplies available are 450 W or 650 W (no mixing). With two power supplies, 1 + 1 redundancy is provided if the load can be carried with one supply. Prior to making a power supply selection, the UCS Power Calculator should be run to determine the right size power supply for your server configuration. The UCS Power Calculator can be found at the following link:<br><br>https://express.salire.com/Go/Cisco/Cisco-UCS-Power-Calculator.aspx |
| Fans | Chassis:<br><br>■ Four hot-swappable fans for front-to-rear cooling. N + 1 redundant.<br><br>Power supply:<br><br>■ The power supplies are equipped with fans. |
| Integrated management processor | Cisco Integrated Management Controller (CIMC).<br><br>Depending on your CIMC settings, the CIMC can be accessed through the 1-Gb Ethernet dedicated management port, the 1-Gb Ethernet LOM ports, or a Cisco 1225 virtual interface card. |

Notes . . .

1. NCSI = network communications services interface protocol. The slot stays active when the server is in standby power state.
2. CNIC = Cisco network interface card.
3. The 24-drive backplane contains a SAS expander, which allows a single PCIe RAID controller to support 24 drives.
4. The 16-drive backplane does not contain a SAS expander, and thus requires two PCIe RAID controllers to support 16 drives (8 HDDs per controller).

# CONFIGURING the SERVER

Follow these steps to configure the Cisco UCS C24 M3 High-Density SFF Rack Server:

## STEP 1     VERIFY SERVER SKU

There are two server configurations, one with a backplane to accommodate 24 HDDs and one with a backplane to accommodate 16 HDDs.

The 24-drive version of the server has a SAS expander enabled backplane that supports up to 24 hard disk drives with a single RAID card. The 16-drive version of the server supports up to two RAID cards, with each RAID card supporting up to 8 drives. Two RAID cards are required to support the maximum capacity of 16 drives.

Verify the product ID (PID) of the server as shown in *Table 2*.

**Table 2   PID of the C24 M3 High-Density SFF Rack Base Server**

| Product ID (PID) | Description |
|---|---|
| UCSC-C24-M3S | UCS C24 M3 SFF with rail kit, without PSU, CPU, memory, HDD, or PCIe cards |
| UCSC-C24-M3S2 | UCS C24 M3 SFF 16 HDD with rail kit, without PSU, CPU, memory, HDD, or PCIe cards |

The Cisco C24 M3 server:

■   Includes a rail kit

■   Does not include power supply, CPU, memory, hard disk drives (HDDs), or plug-in PCIe cards.

> **NOTE:**  Use the steps on the following pages to configure the server with the components that you want to include.

## STEP 2   SELECT CPU(s)

The standard CPU features are:

- Intel Xeon E5-2400 series processor family CPUs
- Intel C600 chipset
- Cache size of 10, 15, or 20 MB

### Select CPUs

The available CPUs are listed in *Table 3*.

Table 3   Available Intel CPUs: Xeon E5-24xx Series

| Product ID (PID) | Intel Number | Clock Freq (GHz) | Power (W) | Cache Size (MB) | Cores | QPI | Highest DDR3 DIMM Clock Support (MHz)[1] |
|---|---|---|---|---|---|---|---|
| UCS-CPU-E5-2470 | E5-2470 | 2.30 | 95 | 20 | 8 | 8.0 | 1600 |
| UCS-CPU-E5-2450 | E5-2450 | 2.10 | 95 | 20 | 8 | 8.0 | 1600 |
| UCS-CPU-E5-2440 | E5-2440 | 2.40 | 95 | 15 | 6 | 7.2 | 1333 |
| UCS-CPU-E5-2430L | E5-2430L | 2.00 | 60 | 15 | 6 | 6.4 | 1333 |
| UCS-CPU-E5-2420 | E5-2420 | 1.90 | 95 | 15 | 6 | 7.2 | 1333 |
| UCS-CPU-E5-2403 | E5-2403 | 1.80 | 80 | 10 | 4 | 6.4 | 1066 |

Notes . . .

1. If higher or lower speed DIMMs are selected than what is shown in the table for a given CPU, the DIMMs will be clocked at the lowest common denominator of CPU clock and DIMM clock.

### Approved Configurations

(1) 1-CPU configurations:

- Select any one CPU listed in *Table 3*.

(2) 2-CPU Configurations:

- Select two identical CPUs from any one of the rows of *Table 3*.

Caveats

- Select one or two identical CPUs.

- If you select one CPU, only PCIe slots 1 and 2 are available for use.

- For optimal performance, select DIMMs with the highest clock speed for a given processor (see *Table 3 on page 11*). If you select DIMMs whose speeds are lower or higher than that shown in the tables, suboptimal performance will result.

## STEP 3   SELECT MEMORY

The standard memory features are:

■ DIMMs

— Clock speed: 1333 or 1600 MHz

— Ranks per DIMM: 1 or 2

— Operational voltage: dual voltage capable (1.5 V or 1.35 V)

— Registered ECC DDR3 DIMMS (RDIMMS)

■ Memory is organized with three memory channels per CPU, with up to two DIMMs per channel, as shown in *Figure 4*.

**Figure 4      C24 M3 SFF Memory Organization**
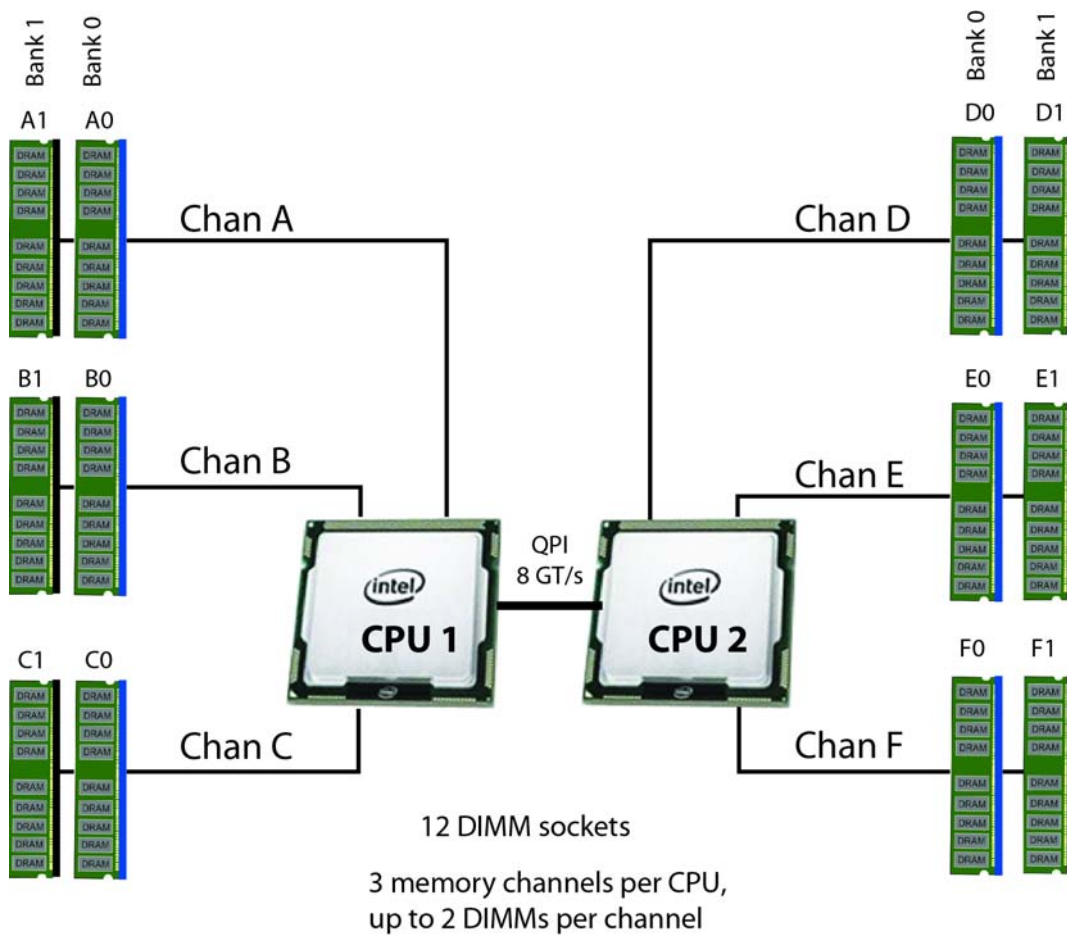
### Select DIMMs

Select the memory configuration. The available memory DIMMs are listed in *Table 4*.

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

**Table 4   Available DDR3 DIMMs**

| Product ID (PID) | PID Description | Voltage | Ranks/DIMM |
|---|---|---|---|
| **DIMM Options** | | | |
| UCS-MR-1X041RY-A | 4GB DDR3-1600-MHz RDIMM/PC3-12800/1R/x4/1.35v/35nm | 1.35 V | 1 |
| UCS-MR-1X082RX-A | 8GB DDR3-1333-MHz RDIMM/PC3-10600/2R/x4/1.35v/35nm | 1.35 V | 2 |
| UCS-MR-1X082RY-A | 8GB DDR3-1600-MHz RDIMM/PC3-12800/2R/x4/1.35v/35nm | 1.35 V | 2 |
| UCS-MR-1X162RY-A | 16GB DDR3-1600-MHz RDIMM/PC3-12800/2R/x4/1.35v/35nm | 1.35 V | 2 |
| **Memory Mirroring Option** | | | |
| N01-MMIRROR | Memory mirroring option | | |

### Approved Configurations

(1) **1-CPU configuration without memory mirroring:**

■ Select from 1 to 6 DIMMs. Refer to *Memory Population Rules, page 53*, for more detailed information.

(2) **1-CPU configuration with memory mirroring:**

■ Select 2 or 4 DIMMs. The DIMMs will be placed by the factory as shown in the following table:

| Number of DIMMs | DIMM Placement (Channel C is not used with memory mirroring) |
|---|---|
| 2 | CPU 1: 1 DIMM in Channel A, 1 DIMM in Channel B |
| 4 | CPU 1: 2 DIMMs in Channel A, 2 DIMMs in Channel B |

(3) **2-CPU configuration without memory mirroring:**

■ Select from 1 to 6 DIMMs per CPU (2 to 12 DIMMs total). Refer to *Memory Population Rules, page 53*, for more detailed information.

(4) **2-CPU configuration with memory mirroring:**

■ Select 2 or 4 DIMMs per CPU (4 or 8 DIMMs total). The DIMMs will be placed by the factory as shown in the following table:

| Number of DIMMs per CPU | DIMM Placement (Channels C and F are not used with memory mirroring) | |
|---|---|---|
| 2 | CPU 1: 1 DIMM in Channel A 1 DIMM in Channel B | CPU 2: 1 DIMM in Channel D 1 DIMM in channel E |
| 4 | CPU 1: 2 DIMMs in Channel A 2 DIMMs in Channel B | CPU 2: 2 DIMMs in Channel D 2 DIMMs in Channel E |

■ Select the memory mirroring option (N01-MMIRROR) as shown in *Table 4 on page 14*.

**NOTE:** System performance is optimized when the DIMM type and quantity are equal for both CPUs.

## Caveats

■ Do not mix 1333-MHz with 1600-MHz DIMMs

■ Do not mix DIMM types (RDIMM, LRDIMM, or UDIMM)

■ Do not select more than two different types of DIMMs (only two PID types allowed)

■ For the 2-CPU configuration, install a minimum of 2 DIMMs (one per CPU).

■ If you use different sizes of DIMMs, the quantity of each size of DIMM must be even (2, 4, or 6). For example, 4 UCS-MR-1X082RY-A DIMMs and 6 UCS-MR-1X162RY-A DIMMs. Also, the sum of all PIDs must adhere to the maximum quantity rule of 12 DIMMs for 2-CPU systems.

■ By default, all DIMMs run at 1.35 V, which yields 1333-MHz memory speeds. To run the memory DIMMS at 1600 MHz, you need to go into the BIOS or set the policy with UCSM (service profile) to run in Performance Mode. This forces the DIMMs to operate at 1.5 V and yields 1600-MHz speeds, provided:

— The DIMMs are 1600-MHz devices

— The CPUs chosen support 1600-MHz operation.

For more information regarding memory, see *CPUs and DIMMs, page 52*.

## STEP 4   SELECT RAID CONFIGURATION

## 24-drive Server Version

NOTE:  The 24-drive version of the server does not support embedded RAID, which is normally installed on the motherboard and does not consume a PCIe slot. The only RAID support available for the 24-drive version is through a plug-in RAID controller PCIe card.

NOTE:  When creating a RAID volume, follow these guidelines:

- Use the same capacity for each drive in the volume
- Use either all SAS drives or all SATA drives
- Use either all HDDs or all SSDs

NOTE:  The number of RAID groups (virtual drives) supported per controller is as follows:

- LSI MegaRAID SAS 9265CV-8i RAID controller card = 64
- LSI MegaRAID 9240-8i RAID controller card = 16
- LSI MegaRAID 9220-8i RAID controller card = 16
- LSI MegaRAID 9220-4i RAID controller card = 16

The RAID controller choices are:

(1) **One plug-in RAID controller card**

Cisco can provide factory-configured RAID systems depending on the RAID controller chosen and the number of drives ordered. Factory-configured RAID options are listed in *Table 5* along with each RAID card description. RAID levels 50 and 60 are supported, although they are not available as factory-configured RAID options.

### Select RAID Controller Options

Select one RAID controller and an appropriate RAID configuration option listed in *Table 5*.

**Table 5  Available Plug-In Card RAID Options**

| Product ID (PID) | PID Description |
|---|---|
| **RAID Controllers** | |
| **Note that for 24-drive backplane systems, plug-in PCIe RAID controllers are installed by default in slot 2 for 1-CPU systems and slot 4 for 2-CPU systems** | |
| **RAID Controllers** | |
| UCS-RAID-9265CV | LSI MegaRAID 9265CV-8i (with supercap power backup)<br>■ Supports up to 24 internal SAS+SATA drives.<br>■ Includes a 1 GB Transportable Memory Module (TMM) cache and chassis-mount (remote) supercap power module for data cache backup<br>■ RAID levels supported: RAID 0, 1, 5, 6, 10, 50, 60 (see the RAID Configuration Options section later in this table) |
| UCSC-RAID-9240-8I | LSI MegaRAID 9240-8i<br>■ Supports up to 16 internal SAS+SATA drives (this RAID controller supports a maximum of 16 drives in a RAID volume).<br>■ RAID levels supported: RAID 0, 1, 5, 10, 50 (see the RAID Configuration Options section later in this table) |
| UCSC-RAID-9220-8I | LSI MegaRAID 9220-8i<br>■ Supports up to 16 internal SAS+SATA drives (this RAID controller supports a maximum of 16 drives in a RAID volume).<br>■ RAID levels supported: RAID 0, 1, 10 (see the RAID Configuration Options section later in this table) |
| **RAID Configuration Options** | |
| R2XX-RAID0 | Factory preconfigured RAID striping option<br>Enable RAID 0 Setting. Requires a minimum of one hard drive. |
| R2XX-RAID1 | Factory preconfigured RAID mirroring option<br>Enable RAID 1 Setting. Requires exactly two drives with the same size, speed, capacity. |
| R2XX-RAID5 | Factory preconfigured RAID option<br>Enable RAID 5 Setting. Requires a minimum of three drives of the same size, speed, capacity. |
| R2XX-RAID6 | Factory preconfigured RAID option<br>Enable RAID 6 Setting. Requires a minimum of four drives of the same size, speed, capacity. |
| R2XX-RAID10 | Factory preconfigured RAID option<br>Enable RAID 10 Setting. Requires an even number of drives (minimum of four drives) of the same size, speed, capacity. |

NOTE: Although RAID levels 50 and 60 are not orderable from the factory, they are supported for selected controllers as shown in *Table 5*.

**Approved Configurations**

### (1) 1-CPU Configurations

For 24 HDD backplane systems, select a PCIe RAID controller from *Table 5 on page 18*. You may also select an appropriate optional RAID configuration listed in *Table 5 on page 18*.

NOTE: In 1-CPU configurations, PCIe slot 2 is the default slot supported for an internal drive RAID controller. PCIe slots 3, 4, and 5 are not supported for 1-CPU systems. You can change the default card slot for a RAID controller to a different slot (slot 1) by going into the BIOS and reconfiguring the option ROM (OPROM) settings.

### (2) 2-CPU Configurations

For 24 HDD backplane systems, select a PCIe RAID controller from *Table 5 on page 18*. You may also select an appropriate optional RAID configuration listed in *Table 5 on page 18*.

NOTE: In 2-CPU 24 HDD backplane configurations, PCIe slot 4 is the default slot supported for an internal drive RAID controller. You can change the default card slot for a RAID controller to a different slot by going into the BIOS and reconfiguring the option ROM (OPROM) settings.

Caveats

- For 1-CPU systems

    — PCIe slots 3, 4, and 5 are not supported.

    — The only supported RAID option for a 24 HDD backplane system is a plug-in PCIe RAID controller, and the default slot is slot 2; however, you can go into the BIOS and change the option ROM (OPROM) setting to enable a different slot for an internal drive RAID controller.

    — If a plug-in RAID controller is not installed, both slots 1 and 2 may be used for any other PCIe expansion cards.

- For 2-CPU configurations:

    — All PCIe slots (1, 2, 3, 4, and 5 are supported).

    — The only supported RAID option for a 24 HDD backplane system is a plug-in PCIe RAID controller, and the default slot is slot 4; however, you can go into the BIOS and change the option ROM (OPROM) setting to enable a different slot for an internal drive RAID controller. Any remaining slot can then be used for a PCIe expansion card.

    — If a plug-in RAID controller is not installed, all of the PCIe slots may be used for any other PCIe expansion cards.

- You can choose an optional RAID configuration (RAID 0, 1, 5, 6, or 10), which is preconfigured at the factory. The RAID level you choose must be an available RAID choice for the controller selected. RAID levels 50 and 60 are supported, depending on the RAID controller selected, although they are not available as configuration options.

- Note that only a single Cisco 1225 Virtual Interface Card (VIC) card is supported and it must be installed in the full-length, full-height PCIe slot (slot 1) on riser 1, which is the only slot that supports NCSI. So take this into account when populating RAID controller cards.

- You can choose one plug-in PCIe RAID controller.

- The 24-drive backplane system supports a maximum of one internal drive RAID controller.

> **NOTE:** For more important information regarding RAID support, see *RAID Summary, page 57* and *RAID Option ROM (OPROM) Settings, page 59*.

# 16-drive Server Version

NOTE: When creating a RAID volume, follow these guidelines:
- Use the same capacity for each drive in the volume
- Use either all SAS drives or all SATA drives
- Use either all HDDs or all SSDs

NOTE: The number of RAID groups (virtual drives) supported per controller is as follows:
- LSI MegaRAID SAS 9265CV-8i RAID controller card = 64
- LSI MegaRAID 9240-8i RAID controller card = 16
- LSI MegaRAID 9220-8i RAID controller card = 16
- LSI MegaRAID 9220-4i RAID controller card = 16

NOTE: To control 16 *physical* drives in this server, two RAID controllers are required. Each RAID controller can control 8 drives.

NOTE: The embedded RAID option is installed on the motherboard and does not consume a PCIe slot. If you select an embedded RAID option, you cannot select a plug-in RAID controller.

The RAID controller choices are:

(1) **Embedded RAID (on motherboard)**

Select one embedded RAID option from *Table 6*.

Table 6   Available Embedded RAID Options

| Product ID (PID) | PID Description |
| --- | --- |
| **Embedded RAID** | |
| UCSC-RAID-ROM5 | Embedded RAID, supporting up to 8 SAS+SATA drives. This option supports RAID 0, 1, and 10, and operates at 3 Gb/s. Operating systems supported are Windows and Linux only (no VMware support). |
| UCSC-RAID-ROM55 | Embedded RAID, supporting up to 8 SAS+SATA drives. This option supports RAID 0, 1, 5, and 10, and operates at 3 Gb/s. Operating systems supported are Windows and Linux only (no VMware support). |

**(2) Plug-in PCIe RAID controller cards**

Cisco can provide factory-configured RAID systems depending on the RAID controller chosen and the number of drives ordered. Factory-configured RAID options are listed in *Table 7* along with each RAID card description. RAID levels 50 and 60 are supported, although they are not available as factory-configured RAID options.

> **NOTE:** If you select a plug-in RAID controller card, you cannot select an embedded RAID option.

> **NOTE:** If you do not select a plug-in PCIe RAID card or one of the embedded RAID upgrade options, you will have an embedded SATA-only RAID controller that supports up to four SATA-only drives (RAID 0, 1, 10)

**Select RAID Controller Options**

From *Table 7*, select one RAID controller if you want to control up 8 drives, or two identical RAID controllers if you want to control up to 16 drives. Also, select an appropriate RAID configuration option listed in *Table 7*.

Table 7   Available Plug-In Card RAID Options

| Product ID (PID) | PID Description |
| --- | --- |
| **RAID Controllers** | |
| **Note that for 16-drive backplane systems, plug-in PCIe RAID controllers are installed by default in slot 2 for 1-CPU systems and slot 4 for 2-CPU systems** | |
| UCS-RAID-9265CV | LSI MegaRAID 9265CV-8i (with supercap power backup) |
| | ■ Supports up to 24 internal SAS+SATA drives (limited to 8 physical drives in the 16-drive backplane version of the server). |
| | ■ Includes a 1 GB Transportable Memory Module (TMM) cache and chassis-mount (remote) supercap power module for data cache backup |
| | ■ RAID levels supported: RAID 0, 1, 5, 6, 10, 50, 60 (see the RAID Configuration Options section later in this table) |
| UCSC-RAID-9240-8I | LSI MegaRAID 9240-8i |
| | ■ Supports up to 16 internal SAS+SATA drives (limited to 8 physical drives in the 16-drive backplane version of the server). |
| | ■ RAID levels supported: RAID 0, 1, 5, 10, 50 (see the RAID Configuration Options section later in this table) |

**Table 7  Available Plug-In Card RAID Options** *(continued)*

| Product ID (PID) | PID Description |
| --- | --- |
| UCSC-RAID-9220-8I | LSI MegaRAID 9220-8i |
|  | ■ Supports up to 16 internal SAS+SATA drives (limited to 8 physical drives in the 16-drive backplane version of the server). |
|  | ■ RAID levels supported: RAID 0, 1, 10 (see the RAID Configuration Options section later in this table) |
| **RAID Configuration Options** | |
| R2XX-RAID0 | Factory preconfigured RAID striping option<br>Enable RAID 0 Setting. Requires a minimum of one hard drive. |
| R2XX-RAID1 | Factory preconfigured RAID mirroring option<br>Enable RAID 1 Setting. Requires exactly two drives with the same size, speed, capacity. |
| R2XX-RAID5 | Factory preconfigured RAID option<br>Enable RAID 5 Setting. Requires a minimum of three drives of the same size, speed, capacity. |
| R2XX-RAID6 | Factory preconfigured RAID option<br>Enable RAID 6 Setting. Requires a minimum of four drives of the same size, speed, capacity. |
| R2XX-RAID10 | Factory preconfigured RAID option<br>Enable RAID 10 Setting. Requires an even number of drives (minimum of four drives) of the same size, speed, capacity. |

NOTE:  Although RAID levels 50 and 60 are not orderable from the factory, they are supported for selected controllers as shown in *Table 7*.

### Select RAID Mixing Options

Select RAID mixing as follows:

- One embedded RAID upgrade option[1] (see *Table 6 on page 21*), or
- One of the following RAID card mixing options[2] (see *Table 7 on page 22*):
    - two MegaRAID 9265CV-8i, or
    - two MegaRAID 9240-8i, or
    - two MegaRAID 9220-8i, or
    - one MegaRAID 9265CV-8i, or
    - one MegaRAID 9240-8i, or
    - one MegaRAID 9220-8i

### Approved Configurations

**(1) 1-CPU Configurations**

For 16 HDD backplane systems, select an embedded RAID option from *Table 6 on page 21* or up to one PCIe RAID controller from *Table 5 on page 18*. For the PCIe RAID controller, you may also select an appropriate optional RAID configuration listed in *Table 5 on page 18*.

> **NOTE:** In 1-CPU configurations, PCIe slot 2 is the default slot supported for one internal drive RAID controller (supports up to 8 drives). PCIe slots 3, 4, and 5 are not supported for 1-CPU systems. You can change the default card slot for a RAID controller to a different slot (slot 1) by going into the BIOS and reconfiguring the option ROM (OPROM) settings. A maximum of one RAID controller and 8 drives are supported in 1-CPU configurations.

**(2) 2-CPU Configurations**

For 16 HDD backplane systems, select an embedded RAID option from *Table 6 on page 21* or up to two identical PCIe RAID controllers from *Table 5 on page 18*. For each PCIe RAID controller, you may also select an appropriate optional RAID configuration listed in *Table 5 on page 18*.

> **NOTE:** In 2-CPU configurations, PCIe slot 4 is the default slot supported for one internal drive RAID controller (supports 8 drives) and PCIe slots 4 and 5 are the default slots for two internal drive RAID controllers (supports 16 drives). You can change the default card slot for a RAID controller to a different slot by going into the BIOS and reconfiguring the option ROM (OPROM) settings. Note that two RAID controllers must be installed to control all 16 drives.

Notes . . .

1. If you select embedded RAID, you cannot select any RAID cards

2. If you select a RAID card, you cannot select embedded RAID

Caveats

- For 1-CPU systems

  — PCIe slots 3, 4, and 5 are not supported.

  — The supported RAID options for a 16 HDD backplane system are embedded RAID or up to one plug-in PCIe RAID controller (controls up to 8 drives). The default slot for a single PCIe RAID controller is slot 2. You can go into the BIOS and change the option ROM (OPROM) setting to enable slot 1 for an internal drive RAID controller.

  — If a plug-in RAID controller is not selected, both slots 1 and 2 may be used for any other PCIe expansion cards.

- For 2-CPU configurations:

  — All PCIe slots (1, 2, 3, 4, and 5) are supported.

  — The supported RAID options for a 16 HDD backplane system are embedded RAID or up to two plug-in PCIe RAID controllers (each RAID controller controls up to 8 drives). The default slot for a single PCIe RAID controller is slot 4. Slots 4 and 5 are the default slots for two PCIe RAID controllers; however, you can go into the BIOS and change the option ROM (OPROM) setting to enable a different slot for an internal drive RAID controller.

  — If a plug-in RAID controller is not selected, all of the slots (1, 2, 3, 4, and 5) may be used for any other PCIe expansion cards.

- For the plug-in PCIe RAID cards, you can choose an optional RAID configuration (RAID 0, 1, 5, 6, or 10), which is preconfigured at the factory. The RAID level you choose must be an available RAID choice for the controller selected. RAID levels 50 and 60 are supported, depending on the RAID controller selected, although they are not available as configuration options.

- Note that only a single Cisco 1225 Virtual Interface Card (VIC) card is supported and it must be installed in the full-length, full-height PCIe slot (slot 1) on riser 1, which is the only slot that supports NCSI. So take this into account when populating RAID controller cards.

- You can choose either embedded RAID, one RAID controller for 1-CPU systems, or up to two plug-in PCIe RAID controller cards for 2-CPU configurations. If you select two RAID controller plug-in cards, they must both be identical.

- The 16-drive backplane system supports up to two identical internal drive RAID controllers (2-CPU configuraitons only), each of which can support up to 8 drives.

> NOTE:  For more important information regarding RAID support, see *RAID Summary, page 57* and *RAID Option ROM (OPROM) Settings, page 59*.

## STEP 5 SELECT HARD DISK DRIVES (HDDs)

The standard disk drive features are:

■ 2.5-inch small form factor

■ Hot-pluggable

■ Sled-mounted

**Select Drives**

The available drives are listed in *Table 8*.

Table 8  Available Hot-Pluggable Sled-Mounted HDDs

| Product ID (PID) | PID Description | Drive Type | Capacity |
|---|---|---|---|
| HDDs | | | |
| A03-D146GC2 | 146 GB 6Gb SAS 15K RPM SFF | SAS | 146 GB |
| UCS-HDD300GI2F105 | 300 GB 6Gb SAS 15K RPM SFF | SAS | 300 GB |
| A03-D300GA2 | 300 GB 6Gb SAS 10K RPM SFF | SAS | 300 GB |
| A03-D500GC3 | 500 GB SATA 7.2K RPM SFF | SATA | 500 GB |
| A03-D600GA2 | 600 GB 6Gb SAS 10K RPM SFF | SAS | 600 GB |
| UCS-HDD900GI2F106 | 900 GB 6Gb SAS 10K RPM SFF | SAS | 600 GB |
| A03-D1TBSATA | 1 TB SATA 7.2K RPM SFF | SATA | 1 TB |

**NOTE:**  When creating a RAID volume, follow these guidelines:

■ Use the same capacity for each drive in the volume

■ Use either all SAS drives or all SATA drives

■ Use either all HDDs or all SSDs

**NOTE:**  The number of RAID groups (virtual drives) supported per controller is as follows:

■ LSI MegaRAID SAS 9265CV-8i RAID controller card = 64

■ LSI MegaRAID 9240-8i RAID controller card = 16

■ LSI MegaRAID 9220-8i RAID controller card = 16

**Approved Configurations**

(1)  **LSI MegaRAID 9265CV-8i (with data cache and supercap)**

■ For the 24-drive backplane, select up to 24 drives listed in *Table 8 on page 26*.

- For the 16-drive backplane option, for each RAID controller installed (two RAID controllers maximum), select up to 8 drives listed in *Table 8 on page 26*.

(2) **LSI MegaRAID 9240-8i or LSI MegaRAID 9220-8i**

- For the 24-drive backplane, select up to 16 drives listed in *Table 8 on page 26*. The quantity of drives is limited to 16 because this RAID controller supports a maximum of 16 drives in a RAID volume.

- For 16-drive backplane option, for each controller installed (two controllers maximum), select up to 8 drives listed in *Table 8 on page 26*.

(3) **Embedded RAID**

- For the 16-drive backplane option, if you select one of the embedded RAID upgrade options (ROM5 or ROM55), you may select up to 8 SAS+SATA drives. If you select embedded RAID, you cannot select a plug-in RAID controller card.

(4) **None of the Above (16-drive backplane server version only)**

- For the 16-drive backplane option, if you did not select embedded RAID or a plug-in PCIe RAID controller card, you can only select up to four SATA drives, which will be controlled by the embedded SATA-only RAID controller.

Caveats

- You can mix SATA and SAS drives.

- If you select one or more HDDs, you must either use the embedded SATA-only controller (for up to four SATA drives), or select either a PCIe RAID controller or, for the 16-drive backplane option, an embedded RAID option.

    — If you select one or more SAS HDDs, you must select a PCIe RAID controller.

- For the 16-drive backplane option, if you do not select a plug-in PCIe RAID card or one of the embedded RAID upgrade options, you will have an embedded SATA-only RAID controller that supports up to four SATA-only drives (RAID 0, 1, 10

## STEP 6   SELECT PCIe OPTION CARD(s)

The standard PCIe card offerings are:

- ■ Converged Network Adapters (CNAs)
- ■ Network Interface Cards (NICs)
- ■ Host Bus Adapters (HBAs)

### Select PCIe Option Cards

The available PCIe option cards are listed in *Table 9*.

Table 9   Available PCIe Option Cards

| Product ID (PID) | PID Description | Card Height |
|---|---|---|
| **Converged Network Adapters (CNAs)** | | |
| UCSC-PCIE-CSC-02 | Cisco VIC 1225 Dual Port 10Gb SFP+ CNA | Half |
| UCSC-PCIE-QSFP[1] | Qlogic QLE8242-CU dual-port 10 GbE FCoE CNA | Half |
| UCSC-PCIE-ESFP | Emulex OCe11102-FX dual-port 10 GbE FCoE CNA | Half |
| **Network Interface Cards (NICs)** | | |
| N2XX-ABPCI01-M3 | Broadcom 5709 Dual-Port Ethernet PCIe Adapter w/TOE for M3 Servers | Half |
| N2XX-ABPCI03-M3 | Broadcom 5709 Quad Port 10/100/1Gb NIC w/TOE iSCSI for M3 Servers | Half |
| UCSC-PCIE-BTG | Broadcom 57712 Dual Port 10GbE 10G-BaseT w/TOE | Half |
| N2XX-AIPCI01 | Intel 10GbE 2-Port Niantec Controller with Copper SFP+ Cable | Half |
| UCSC-PCIE-IRJ45 | Intel Quad Port GbE controller (this is a quad-port i350 controller) | Half |
| UCSC-PCIE-BSFP | Broadcom NetXtreme II 57712 Dual Port 10 Gigabit Ethernet PCIe Adapter Card with SFP+ | Half |
| **Host Bus Adapters (HBAs)** | | |
| N2XX-AEPCI03 | Emulex LPe 11002, 4Gb Fibre Channel PCIe Dual Channel HBA | Half |
| N2XX-AEPCI05 | Emulex LPe 12002, 8Gb dual port Fibre Channel HBA | Half |
| N2XX-AQPCI03 | Qlogic QLE2462, 4Gb dual port Fibre Channel HBA | Half |
| N2XX-AQPCI05 | Qlogic QLE2562, 8Gb dual port Fibre Channel HBA | Half |

Notes . . .

1. The "QSFP" in UCSC-PCIE-QSFP stands for QLogic SFP (QSFP is not to be confused with 40 GbE QSFP)

**Approved Configurations**

(1) **No RAID controller plug-in card**

- If you did not choose a plug-in RAID controller, from *Table 9* you can select up to two PCIe option cards for 1-CPU systems and up to five PCIe option cards for 2-CPU systems.

(2) **One or two RAID controller plug-in cards**

- If you selected one or two plug-in RAID controller cards, you can select additional PCIe option cards listed in *Table 9* until all of the slots are filled, if desired. The PCIe cards plug into riser 1 and riser 2.

> **NOTE:** RAID controllers are always installed in half-height slots.

**Caveats**

- Only a single Cisco UCS 1225 Virtual Interface Card (VIC) card is supported and it must be installed in the half-length, full-height PCIe slot (slot 1) on riser 1, which is the only slot that supports NCSI.

- All PCIe cards will fit in any slot, except the Cisco 1225 VIC card, which must be installed in the half-length, full-height slot (slot 1) of riser 1. The Cisco 1225 VIC card must be plugged into slot 1, which supports NCSI.

- Additional considerations for the Cisco 1225 VIC card:

  — Supports 10G SFP+ optical and copper twinax connections

  — Supported only in PCIe slot 1 of this server. Slot 1 can operate while the server is in standby power mode.

  — Requires that the server has CIMC firmware version 1.4(6) or later installed. There is a heartbeat LED on the top of the card that indicates when firmware is active.

  — To use this card for UCS integration (UCSM mode) with Cisco UCS Manager 2.0(2) or later, the minimum card-firmware and uboot image level is 2.0(2g).

- To help ensure that your operating system is compatible with the card you have selected, check the Hardware Compatibility List at this URL:

  http://www.cisco.com/en/US/products/ps10477/prod_technical_reference_list.html

## STEP 7 ORDER OPTIONAL NETWORK CARD ACCESSORIES

Copper twinax cables and SFP optical modules may be ordered to support the two-port network cards that are available with the server.

### Choose Optional Twinax Cables

*Table 10* lists the copper twinax cables available for the PCIe cards. You can choose cable lengths of 1, 3, 5, 7, or 10 meters. The two longer cables (7 and 10 meters) are active, which means that they contain active components within the SFP+ housing to improve signal quality.

Table 10  Available Twinax Cables

| Product ID (PID) | PID Description |
|---|---|
| SFP-H10GB-CU1M | 10GBASE-CU SFP+ Cable (1 M) |
| SFP-H10GB-CU3M | 10GBASE-CU SFP+ Cable (3 M) |
| SFP-H10GB-CU5M | 10GBASE-CU SFP+ Cable (5 M) |
| SFP-H10GB-ACU7M | 10GBASE-CU SFP+ Cable (7 M) |
| SFP-H10GB-ACU10M | 10GBASE-CU SFP+ Cable (10 M) |

### Approved Configurations

**(1) Choose Up to Two Twinax Cables for Each Network Card Ordered**

■ You may choose one or two twinax cables for each network card ordered. The cables can be different lengths; however, you would normally order two cables of equal lengths to connect to the primary and redundant network switching equipment.

### Caveats

The twinax cables listed in *Table 10* can be ordered only for the following PCIe cards:

— UCSC-PCIE-CSC-02 (Cisco VIC 1225 Dual Port 10Gb SFP+ CNA)

— UCS-PCIE-BSFP (Broadcom 57712)

— N2XX-AEPCI01 (Emulex OCe10102-F)

— N2XX-AIPCI01 (Intel Dual Port Ethernet X520)

## Choose Optional SFP Modules

Optical Cisco SFP+ modules are listed in *Table 11*.

Table 11  Available SFP Modules

| Product ID (PID) | PID Description |
|---|---|
| SFP-10G-SR | 10GBASE-SR SFP+ Module<br>850 nm, multimode, SR, 3.3V, LC connector, with Digital Optical Monitoring |
| DS-SFP-FC8G-SW | 8 Gbit SFP+ Module<br>850 nm, multimode, SR, 3.3V, LC connector, with Digital Optical Monitoring |

## Approved Configurations

**(1) Choose Up to Two SFP+ Modules for Each Network Card Ordered**

■ You may choose one or two SFP+ optical modules cables for each network card ordered. You would normally order two modules for connecting to the primary and redundant network switching equipment. With the SFP+ optical modules, you can use common fiber optic cables, widely available.

See *Figure 5 on page 32* for typical SFP+ and twinax connections to the network cards.

## Caveats

The SFP-10G-SR optical module listed in *Table 11* should be ordered only for the following PCIe cards, as they do not come by default with any optical modules:

— UCSC-PCIE-CSC-02 (Cisco VIC 1225 Dual Port 10Gb SFP+ CNA)

— UCSC-PCIE-BSFP (Broadcom 57712)

— N2XX-ABPCI02 (Broadcom 57711)

— N2XX-AEPCI01 (Emulex OCe10102-F)

The DS-SFP-FC8G-SW optical module listed in *Table 11* should be ordered only for the following PCIe cards, as they do not come by default with any optical modules:

— N2XX-AEPCI05 (Emulex LPe 12002, 8Gb dual-port Fibre Channel HBA)

Figure 5    Network Card Connections



Cisco UCS C24 M3 High-Density SFF Rack-Mount Server
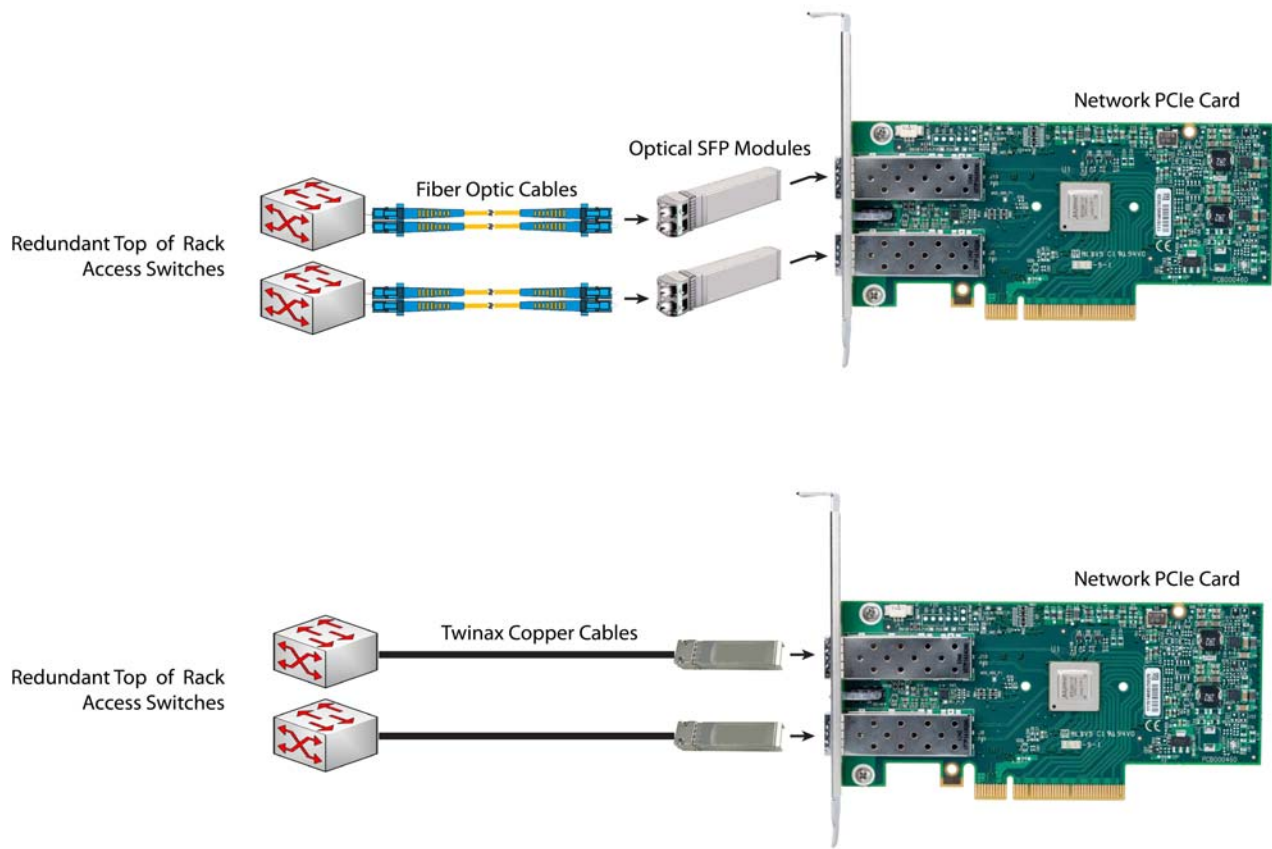
## STEP 8    SELECT AC POWER CORD(s)

Using *Table 12*, select the appropriate AC power cords. You can select a minimum of no power cords and a maximum of two. If you select the option R2XX-DMYMPWRCORD, no power cord is shipped with the server.
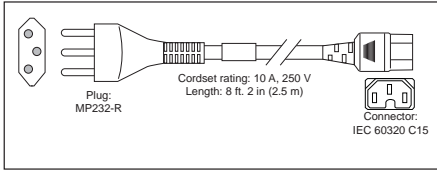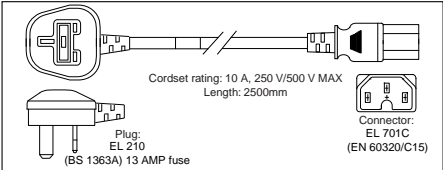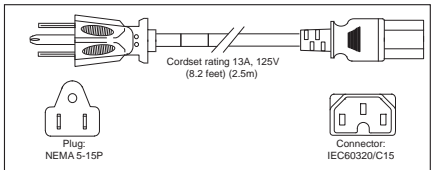
**Table 12  Available Power Cords**

| Product ID (PID) | PID Description | Images |
|---|---|---|
| R2XX-DMYMPWRCORD | No power cord (dummy PID to allow for a no power cord option) | Not applicable |
| CAB-N5K6A-NA | Power Cord, 200/240V 6A, North America |  |
| CAB-AC-L620-C13 | AC Power Cord, NEMA L6-20 - C13, 2M/6.5ft |  |
| CAB-C13-CBN | CABASY,WIRE,JUMPER CORD, 27" L, C13/C14, 10A/250V |  |
| CAB-C13-C14-AC | Power Cord, recessed receptacle AC power cord (27 inches) |  |
| CAB-C13-C14-2M | CABASY,WIRE,JUMPER CORD, PWR, 2 Meter, C13/C14,10A/250V |  |
| SFS-250V-10A-AR | Power Cord, SFS, 250V, 10A, Argentina |  |

**Table 12  Available Power Cords**

| Product ID (PID) | PID Description | Images |
|---|---|---|
| CAB-9K10A-AU | Power Cord, 250VAC 10A 3112 Plug, Australia |  |
| SFS-250V-10A-CN | Power Cord, SFS, 250V, 10A, China |  |
| CAB-250V-10A-CN | AC Power Cord - 250V, 10A - PRC |  |
| CAB-9K10A-EU | Power Cord, 250VAC 10A CEE 7/7 Plug, EU |  |
| SFS-250V-10A-ID | Power Cord, SFS, 250V, 10A, India |  |
| SFS-250V-10A-IS | Power Cord, SFS, 250V, 10A, Israel |  |
| CAB-9K10A-IT | Power Cord, 250VAC 10A CEI 23-16/VII Plug, Italy |  |

Table 12  Available Power Cords

| Product ID (PID) | PID Description | Images |
| --- | --- | --- |
| CAB-9K10A-SW | Power Cord, 250VAC 10A MP232 Plug, Switzerland |  |
| CAB-9K10A-UK | Power Cord, 250VAC 10A BS1363 Plug (13 A fuse), UK |  |
| CAB-9K12A-NA | Power Cord, 125VAC 13A NEMA 5-15 Plug, North America |  |
| CAB-JPN-3PIN | Power Cord 3PIN, Japan | Image not available |

## STEP 9   ORDER POWER SUPPLIES

The C24 M3 server accommodates two power supplies. A lightly loaded server can operate from one 650 W power supply. A fully loaded server might need to be powered with two 450 W or two 650 W power supplies (see *Table 13*).

Prior to making a power supply selection, the UCS Power Calculator should be run to determine the right size power supply for your server configuration. The UCS Power Calculator can be found at the following link:

https://express.salire.com/Go/Cisco/Cisco-UCS-Power-Calculator.aspx

Table 13      Power Supply PIDs

| Product ID (PID) | PID Description |
| --- | --- |
| UCSC-PSU-450W | 450 W power supply |
| UCSC-PSU-650W | 650 W power supply |

Caveats

■   You cannot mix power supply types. If you have two power supplies, they must be identical (either two 450 W or two 650 W power supplies).

## STEP 10  ORDER OPTIONAL REVERSIBLE CABLE MANAGEMENT ARM

The reversible cable management arm mounts on either the right or left slide rails at the rear of the server and is used for cable management. Use *Table 14* to order a cable management arm.

Table 14     Cable Management Arm

| Product ID (PID) | PID Description |
|---|---|
| UCSC-CMA1 | Cable Management Arm for C24 rack servers |

> **NOTE:**  If you order and install a cable management arm, you will need the longest power cable available.

For more information about the cable management arm, see the *Cisco UCS C24 M3 Installation and Service Guide* at this URL:

http://www.cisco.com/en/US/docs/unified_computing/ucs/c/hw/C24/install/C24.pdf

## STEP 11 ORDER A TRUSTED PLATFORM MODULE

Trusted Platform Module (TPM) is a computer chip (microcontroller) that can securely store artifacts used to authenticate the platform (server). These artifacts can include passwords, certificates, or encryption keys. A TPM can also be used to store platform measurements that help ensure that the platform remains trustworthy. Authentication (ensuring that the platform can prove that it is what it claims to be) and attestation (a process helping to prove that a platform is trustworthy and has not been breached) are necessary steps to ensure safer computing in all environments.

The TPM ordering information is listed in *Table 15*.

Table 15    Trusted Platform Module

| Product ID (PID) | PID Description |
| --- | --- |
| UCSX-TPM1-001 | Trusted Platform Module |

## STEP 12 ORDER OPTIONAL USB 2.0 DRIVES

You may order one optional USB 2.0 drive. One socket on the motherboard can accommodate either the 8 GB drive or the 16 GB drive.

The 8 GB drive (if ordered) is blank and comes installed on the motherboard. It can be used for a hypervisor or a license dongle. The 16 GB drive (if ordered) contains preloaded drivers and utilities and comes installed on the motherboard.

The USB drive ordering information is listed in *Table 16*.

Table 16    USB 2.0 Drive

| Product ID (PID) | PID Description |
| --- | --- |
| UCS-USBFLSHA-8GB | 8 GB Flash USB Drive for C22/C24 |
| UCS-USBFLSHA-16GB | 16 GB Flash USB Drive for C22/C24, preloaded with UCS SCU/HUU bootable images and driver ISO file |

See *Figure 6 on page 51* for the location of the internal USB connector.

## STEP 13 SELECT OPERATING SYSTEM

Several operating systems are available from which to choose. Select one of the operating systems shown in *Table 17*.

**Table 17      Operating Systems**

| PID Description | Product ID (PID) |
| --- | --- |
| **SUSE Linux Enterprise Server** | |
| SLES-1A | SLES/1yr subscription/svcs required/0 media |
| SLES-3A | SLES/3yr subscription/svcs required/0 media |
| **Red Hat Enterprise Linux** | |
| RHEL-2S-1G-1A | RHEL/2 Socket/1 Guest/1Yr Svcs Required |
| RHEL-2S-1G-3A | RHEL/2 Socket/1 Guest/3Yr Svcs Required |
| RHEL-2S-4G-1A | RHEL/2 Socket/4 Guest/1Yr Svcs Required |
| RHEL-2S-4G-3A | RHEL/2 Socket/4 Guest/3Yr Svcs Required |
| RHEL-2S-UG-1A | RHEL/2 Socket/U Guest/1Yr Svcs Required |
| RHEL-2S-UG-3A | RHEL/2 Socket/U Guest/3Yr Svcs Required |
| **RHEL Add-Ons** | |
| RHEL-HA-2S-1A | RHEL Option/High-Availability/2 Socket/1Yr Svcs Required |
| RHEL-RS-2S-1A | RHEL Option/Resilient w/Ha /2 Socket/1 Yr Svcs Required |
| RHEL-SFS-2S-1A | RHEL Option/Scalable File System/2 Socket/1 Yr Svcs Required |
| RHEL-HA-2S-3A | RHEL Option/High-Availability/2 Socket/3Yr Svcs Required |
| RHEL-RS-2S-3A | RHEL Option/Resilient Storage w/ HA /2 Socket/3 Yr Svcs Reqd |
| RHEL-SFS-2S-3A | RHEL Option/Scalable File System/2 Socket/3 Yr Svcs Required |
| **Windows Server** | |
| MSWS-08R2-STHV | Windows Svr 2008 ST media R2 ST (1-4CPU, 5CAL) |
| MSWS-08R2-ENHV | Windows Svr 2008 EN media R2 EN (1-8CPU, 25CAL) |
| MSWS-08R2-DCHV2S | Windows Svr 2008 R2-2 CPU-Data Center |
| MSWS-08R2-DCHV4S | Windows Svr 2008 R2-4 CPU-Data Center |

**Table 17    Operating Systems** *(continued)*

| PID Description | Product ID (PID) |
|---|---|
| **VMWare Server** | |
| VMW-VS5-STD-1A | VMware vSphere 5 Standard for 1 Processor, 1 Year, Support Rqd |
| VMW-VS5-STD-2A | VMware vSphere 5 Standard for 1 Processor, 2 Year, Support Rqd |
| VMW-VS5-STD-3A | VMware vSphere 5 Standard for 1 Processor, 3 Year, Support Rqd |
| VMW-VS5-STD-4A | VMware vSphere 5 Standard for 1 Processor, 4 Year, Support Rqd |
| VMW-VS5-STD-5A | VMware vSphere 5 Standard for 1 Processor, 5 Year, Support Rqd |
| VMW-VS5-ENT-1A | VMware vSphere 5 Enterprise for 1 Processor, 1 Year Support |
| VMW-VS5-ENT-2A | VMware vSphere 5 Enterprise for 1 CPU, 2 Yr Support |
| VMW-VS5-ENT-3A | VMware vSphere 5 Enterprise for 1 CPU, 3 Yr Support |
| VMW-VS5-ENT-4A | VMware vSphere 5 Enterprise for 1 Processor, 4 Year Support |
| VMW-VS5-ENT-5A | VMware vSphere 5 Enterprise for 1 CPU, 5 Yr Support |
| VMW-VS5-ENTP-1A | VMware vSphere 5 Enterprise Plus for 1 Processor, 1 Year, Support Rqd |
| VMW-VS5-ENTP-2A | VMware vSphere 5 Enterprise Plus for 1 CPU, 2 Yr Support |
| VMW-VS5-ENTP-3A | VMware vSphere 5 Enterprise Plus for 1 Processor, 3 Year, Support Rqd |
| VMW-VS5-ENTP-4A | VMware vSphere 5 Enterprise Plus for 1 Processor, 4 Year Support |
| VMW-VS5-ENTP-5A | VMware vSphere 5 Enterprise Plus for 1 Processor, 5 Year, Support Rqd |

## STEP 14  SELECT OPERATING SYSTEM MEDIA KIT

Select the optional operating system media listed in *Table 18*.

Table 18     OS Media

| Product ID (PID) | PID Description |
| --- | --- |
| RHEL-6 | RHEL 6 Recovery Media Only (Multilingual) |
| SLES-11 | SLES 11 media only (multilingual) |
| MSWS-08R2-STHV-RM | Windows Svr 2008 R2 ST (1-4CPU, 5CAL), Media |
| MSWS-08R2-ENHV-RM | Windows Svr 2008 R2 EN (1-8CPU, 25CAL), Media |
| MSWS-08R2-DCHV-RM | Windows Svr 2008 R2 DC (1-8CPU, 25CAL), Media |

## STEP 15  SELECT OPTIONAL VALUE-ADDED SOFTWARE

You can select from a variety of value-added software listed in *Table 19*.

Table 19      Value Added Software

| Product ID (PID) | PID Description |
| --- | --- |
| BMC-SE-4C | BMC BladeLogic Standard Edition, 4 Cores, Support Required |
| BMC-SE-6C | BMC BladeLogic Standard Edition, 6 Cores, Support Required |
| BMC-SE-8C | BMC BladeLogic Standard Edition, 8 Cores, Support Required |
| BMC-SE-10C | BMC BladeLogic Standard Edition, 10 Cores, Support Required |
| BMC-AE-4C | BladeLogic Advanced Edition, 4 Cores, Support Required |
| BMC-AE-6C | BMC BladeLogic Advanced Edition, 6 Cores, Support Required |
| BMC-AE-8C | BMC BladeLogic Advanced Edition, 8 Cores, Support Required |
| BMC-AE-10C | BMC BladeLogic Advanced Edition, 10 Cores, Support Required |
| BMC-002 | BMC BladeLogic CM, Physical Server |
| BMC-012 | BMC BPPM Per Server |
| VMW-VC5-STD-1A | VMware vCenter 5 Standard for 1 Processor, 1 Year, Support Rqd |
| VMW-VC5-STD-2A | VMware vCenter 5 Standard for 1 Processor, 2 Year, Support Rqd |
| VMW-VC5-STD-3A | VMware vCenter 5 Standard for 1 Processor, 3 Year, Support Rqd |
| VMW-VC5-STD-4A | VMware vCenter 5 Standard for 1 Processor, 4 Year, Support Rqd |
| VMW-VC5-STD-5A | VMware vCenter 5 Standard for 1 Processor, 5 Year, Support Rqd |

## STEP 16  SELECT SERVICE and SUPPORT LEVEL

A variety of service options are available, as described in this section.

**Unified Computing Warranty, No Contract**

If you have noncritical implementations and choose to have no service contract, the following coverage is supplied:

■ Three-year parts coverage.

■ Next business day (NBD) onsite parts replacement eight hours a day, five days a week.

■ 90-day software warranty on media.

■ Ongoing downloads of BIOS, drivers, and firmware updates.

■ UCSM updates for systems with Unified Computing System Manager. These updates include minor enhancements and bug fixes that are designed to maintain the compliance of UCSM with published specifications, release notes, and industry standards.

**SMARTnet for UCS**

For support of the entire Unified Computing System, Cisco offers the Cisco SMARTnet for UCS Service. This service provides expert software and hardware support to help sustain performance and high availability of the unified computing environment. Access to Cisco Technical Assistance Center (TAC) is provided around the clock, from anywhere in the world.

For UCS blade servers, there is Smart Call Home, which provides proactive, embedded diagnostics and real-time alerts. For systems that include Unified Computing System Manager, the support service includes downloads of UCSM upgrades. The Cisco SMARTnet for UCS Service includes flexible hardware replacement options, including replacement in as little as two hours. There is also access to Cisco's extensive online technical resources to help maintain optimal efficiency and uptime of the unified computing environment. You can choose a desired service listed in *Table 20*.

Table 20    Cisco SMARTnet for UCS Service

| Product ID (PID) | On Site? | Description |
|---|---|---|
| CON-PREM-C24M3S | Yes | ONSITE 24X7X2 UCS C24 M3 Server - SFF |
| CON-OSP-C24M3S | Yes | ONSITE 24X7X4 UCS C24 M3 Server - SFF |
| CON-OSE-C24M3S | Yes | ONSITE 8X5X4 UCS C24 M3 Server - SFF |
| CON-OS-C24M3S | Yes | ONSITE 8X5XNBD UCS C24 M3 Server - SFF |
| CON-S2P-C24M3S | No | SMARTNET 24X7X2 UCS C24 M3 Server - SFF |
| CON-SNTP-C24M3S | No | SMARTNET 24X7X4 UCS C24 M3 Server - SFF |
| CON-SNTE-C24M3S | No | SMARTNET 8X5X4 UCS C24 M3 Server - SFF |
| CON-SNT-C24M3S | No | SMARTNET 8X5XNBD UCS C24 M3 Server - SFF |

**SMARTnet for UCS Hardware Only Service**

For faster parts replacement than is provided with the standard Cisco Unified Computing System warranty, Cisco offers the Cisco SMARTnet for UCS Hardware Only Service. You can choose from two levels of advanced onsite parts replacement coverage in as little as four hours. SMARTnet for UCS Hardware Only Service provides remote access any time to Cisco support professionals who can determine if a return materials authorization (RMA) is required. You can choose a service listed in *Table 21*.

Table 21    SMARTnet for UCS Hardware Only Service

| Product ID (PID) | Service Level GSP | On Site? | Description |
|---|---|---|---|
| CON-UCW7-C24M3S | UCW7 | Yes | UC PLUS 24X7X4OS UCS C24 M3 Server - SFF |
| CON-UCW5-C24M3S | UCW5 | Yes | UC PLUS 8X5XNBDOS UCS C24 M3 Server - SFF |

**Unified Computing Partner Support Service**

Cisco Partner Support Service (PSS) is a Cisco Collaborative Services service offering that is designed for partners to deliver their own branded support and managed services to enterprise customers. Cisco PSS provides partners with access to Cisco's support infrastructure and assets to help them:

■   Expand their service portfolios to support the most complex network environments

■   Lower delivery costs

■   Deliver services that increase customer loyalty

Partner Unified Computing Support Options enable eligible Cisco partners to develop and consistently deliver high-value technical support that capitalizes on Cisco intellectual assets. This helps partners to realize higher margins and expand their practice.

PSS is available to all Cisco PSS partners, but requires additional specializations and requirements. For additional information, see the following URL:

www.cisco.com/go/partnerucssupport

The two Partner Unified Computing Support Options include:

■   Partner Support Service for UCS

■   Partner Support Service for UCS Hardware Only

Partner Support Service for UCS provides hardware and software support, including triage support for third party software, backed by Cisco technical resources and level three support. See *Table 22*.

Table 22    Partner Support Service for UCS

| Product ID (PID) | Service Level GSP | On Site? | Description |
|---|---|---|---|
| CON-PSJ1-C24M3S | PSJ1 | No | UCS SUPP PSS 8X5XNBD UCS C24 M3 Server - SFF |
| CON-PSJ2-C24M3S | PSJ2 | No | UCS SUPP PSS 8X5X4 UCS C24 M3 Server - SFF |
| CON-PSJ3-C24M3S | PSJ3 | No | UCS SUPP PSS 24X7X4 UCS C24 M3 Server - SFF |
| CON-PSJ4-C24M3S | PSJ4 | No | UCS SUPP PSS 24X7X2 UCS C24 M3 Server - SFF |

Partner Support Service for UCS Hardware Only provides customers with replacement parts in as little as two hours. See *Table 23*.

Table 23    Partner Support Service for UCS (Hardware Only)

| Product ID (PID) | Service Level GSP | On Site? | Description |
|---|---|---|---|
| CON-PSW2-C24M3S | PSW2 | No | UCS W PL PSS 8X5X4 UCS C24 M3 Server - SFF |
| CON-PSW3-C24M3S | PSW3 | No | UCS W PL PSS 24X7X4 UCS C24 M3 Server - SFF |
| CON-PSW4-C24M3S | PSW4 | No | UCS W PL PSS 24X7X2 UCS C24 M3 Server - SFF |

**Unified Computing Combined Support Service**

Combined Services makes it easier to purchase and manage required services under one contract. SMARTnet services for UCS help increase the availability of your vital data center infrastructure and realize the most value from your unified computing investment. The more benefits you realize from the Cisco Unified Computing System (Cisco UCS), the more important the technology becomes to your business. These services allow you to:

■  Optimize the uptime, performance, and efficiency of your UCS

■  Protect your vital business applications by rapidly identifying and addressing issues

■  Strengthen in-house expertise through knowledge transfer and mentoring

■  Improve operational efficiency by allowing UCS experts to augment your internal staff resources

■  Enhance business agility by diagnosing potential issues before they affect your operations

You can choose a service listed in *Table 24*.

Table 24    UCS Computing Combined Support Service

| Product ID (PID) | Service Level GSP | On Site? | Description |
|---|---|---|---|
| CON-NCF2-C24M3S | NCF2 | No | CMB SPT SVC 24X7X2 UCS C24 M3 Server - SFF |
| CON-NCF2P-C24M3S | NCF2P | Yes | CMB SPT SVC 24X7X2OS UCS C24 M3 Server - SFF |
| CON-NCF4P-C24M3S | NCF4P | Yes | CMB SPT SVC 24X7X4OS UCS C24 M3 Server - SFF |
| CON-NCF4S-C24M3S | NCF4S | Yes | CMB SPT SVC 8X5X4OS UCS C24 M3 Server - SFF |
| CON-NCFCS-C24M3S | NCFCS | Yes | CMB SPT SVC 8X5XNBDOS UCS C24 M3 Server - SFF |
| CON-NCFE-C24M3S | NCFE | No | CMB SPT SVC 8X5X4 UCS C24 M3 Server - SFF |
| CON-NCFP-C24M3S | NCFP | No | CMB SPT SVC 24X7X4 UCS C24 M3 Server - SFF |
| CON-NCFT-C24M3S | NCFT | No | CMB SPT SVC 8X5XNBD UCS C24 M3 Server - SFF |

**Unified Computing Drive Retention Service**

With the Cisco Unified Computing Drive Retention (UCDR) Service, you can obtain a new disk drive in exchange for a faulty drive without returning the faulty drive. In exchange for a Cisco replacement drive, you provide a signed Certificate of Destruction (CoD) confirming that the drive has been removed from the system listed, is no longer in service, and has been destroyed.

Sophisticated data recovery techniques have made classified, proprietary, and confidential information vulnerable, even on malfunctioning disk drives. The UCDR service enables you to retain your drives and ensures that the sensitive data on those drives is not compromised, which reduces the risk of any potential liabilities. This service also enables you to comply with regulatory, local, and federal requirements.

If your company has a need to control confidential, classified, sensitive, or proprietary data, you might want to consider one of the Drive Retention Services listed in *Table 25*.

> **NOTE:** Cisco does not offer a certified drive destruction service as part of this service.

Table 25  Drive Retention Service Options

| Service Description | Service Program Name | Service Level GSP | Service Level | Product ID (PID) |
|---|---|---|---|---|
| SMARTnet for UCS Service with Drive Retention | UCS DR | UCSD7 | 24x7x4 Onsite | CON-UCSD7-C24M3S |
| | | UCSD7 | 8x5xNBD Onsite | CON-UCSD5-C24M3S |

Table 25  Drive Retention Service Options  *(continued)*

| Service Description | Service Program Name | Service Level GSP | Service Level | Product ID (PID) |
|---|---|---|---|---|
| SMARTnet for UCS HW ONLY+Drive Retention | UCS HW+DR | UCWD7 | 24x7x4 Onsite | CON-UCWD7-C24M3S |
| | | UCWD5 | 8x5xNBD Onsite | CON-UCWD5-C24M3S |

For more service and support information, see the following URL:

http://www.cisco.com/en/US/services/ps2961/ps10312/Unified_Computing_Services_Overview.pdf

For a complete listing of available services for Cisco Unified Computing System, see this URL:

http://www.cisco.com/en/US/products/ps10312/serv_group_home.html

# OPTIONAL STEP - ORDER RACK(s)

The optional R42610 rack is available from Cisco for the C-Series servers, including the C24 M3 SFF server. This rack is a standard 19-inch rack and can be ordered with a variety of options, as listed in *Table 26*. Racks are shipped separately from the C24 M3 SFF server.

**Table 26    Racks and Rack Options**

| Product ID (PID) | PID Description |
|---|---|
| RACK-UCS[1] | Cisco R42610 expansion rack, no side panels |
| RACK-UCS2[1] | Cisco R42610 standard rack, w/side panels |
| RACK-BLANK-001 | Filler panels (qty 12), 1U, plastic, toolless |
| RACK-CBLMGT-001 | Cable mgt D rings (qty 10), metal |
| RACK-CBLMGT-011 | Cable mgt straps (qty 10), Velcro |
| RACK-FASTEN-001 | Mounting screws (qty 100), M6 |
| RACK-FASTEN-002 | Cage nuts (qty 50), M6 |
| RACK-JOIN-001 | Rack joining kit |

Notes . . .

1. Use these same base PIDs to order spare racks (available only as next-day replacements).

For more information about the R42610 rack, see *RACKS, page 60*.

# OPTIONAL STEP - ORDER PDU

An optional power distribution unit (PDU) is available from Cisco for the C-Series rack servers, including theC24 M3 server. This PDU is available in a zero rack unit (RU) style (see *Table 26*).

**Table 27    PDU Options**

| Product ID (PID) | PID Description |
|---|---|
| RP208-30-2P-U-2 | Zero RU PDU |

For more information about the PDU, see *PDUs, page 62*.

**Cisco UCS C24 M3 High-Density SFF Rack-Mount Server**

# SUPPLEMENTAL MATERIAL

## CHASSIS

An internal view of the C24 M3 chassis with the top cover removed is shown in *Figure 6*.

**Figure 6    C24 M3 SFF With Top Cover Off**
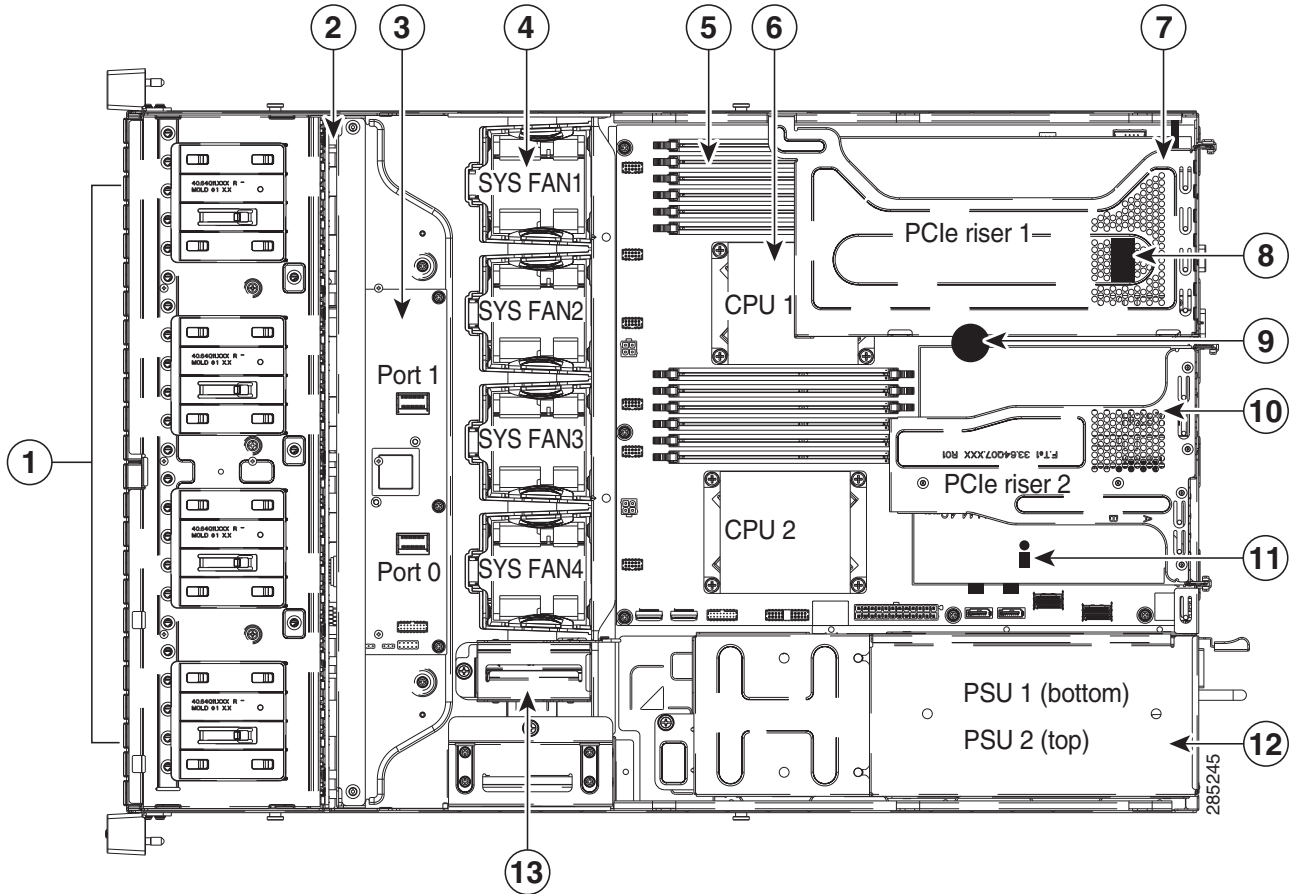


| 1 | Drives (hot-swappable, accessed through front panel) | 8 | Internal USB 2.0 port on motherboard |
|---|---|---|---|
| 2 | Drive backplane | 9 | RTC battery on motherboard |
| 3 | SAS expander | 10 | PCIe riser 2 (three half-height slots) |
| 4 | Fan modules (4) | 11 | Trusted platform module socket on motherboard |
| 5 | DIMM slots on motherboard (12) | 12 | Power supplies (two, hot-swappable access through rear panel) |

| 6 | CPUs and heatsinks (up to two) | 13 | RAID backup unit mounting locations (two) |
|---|---|---|---|
| 7 | PCIe riser 1 (two full-height slots) | - | - |

# CPUs and DIMMs

## Physical Layout

Each CPU has three DIMM channels:

- CPU1 has channels A, B, and C
- CPU2 has channels D, E, and F

Each DIMM channel has two banks: Bank 0 and Bank 1. The blue-colored DIMM banks are for Bank 0 and the black-colored are for Bank 1.

As an example, DIMM slots A0, B0, and C0 belong to Bank 0, while A1, B1, and C1 belong to Bank 1.

*Figure 7* shows how banks and channels are physically laid out on the motherboard. The DIMM slots on the top (channels A, B, and C) are associated with CPU 1, while the DIMM slots on the bottom (channels D, E, and F) are associated with CPU 2. Bank 0 slots (blue) are populated before Bank 1 slots (black).

Figure 7    Physical Layout of CPU DIMM Channels and Banks
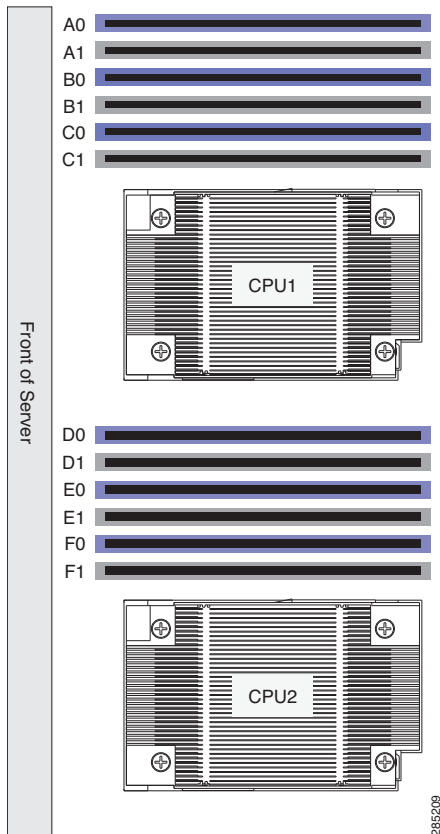
## Memory Population Rules

When considering the memory configuration of your server, you should consider the following items:

- Each channel has two DIMM slots (for example, channel A = slots A0 and A1).

    — Each channel can operate with one or two DIMMs installed.

    — If a channel has only one DIMM, populate slot 0 first (the blue slot).

- When both CPUs are installed, populate the DIMM slots of each CPU identically.

    — Fill blue slots in the channels first: A0, D0, B0, E0, C0, F0

    — Fill black slots in the channels second: A1, D1, B1, E1, C1, F1

- Any DIMM installed in a DIMM socket for which the CPU is absent is not recognized.

- For optimum performance, populate at least one DIMM per memory channel per CPU.

- When populating DIMM slots, multiples of 6 DIMMs are best for achieving optimum performance, since there are 3 memory channels per CPU socket and 2 CPUs must be populated.

- At 1 DPC and 2 DPC, 1600-MHz DIMMS will run at 1600 MHz (provided the CPU supports 1600 MHz DIMMs) and 1333-MHz DIMMs will run at 1333 MHz.

- When mixing DIMMs, the following rules need to be followed:

    — When mixing DIMMs of different densities (sizes), populate DIMMs with the highest density first. For example, if you have to mix 16 GB with 8 GB DIMMs, populate 16 GB DIMMs in blue slots (or bank 0) and then 8 GB in black slots (or bank 1).

    — When mixing DIMMs with different ranks, populate DIMMs with the higher rank first. For example, populate 16 GB 2R or 8 GB 2R before 4 GB 1R DIMMs.

    — DIMMs of different sizes (4 GB, 8 GB, 16 GB) can be mixed across different channels. Total memory size in a single channel should be the same. For example, if you are mixing 4 GB and 8 GB DIMMs to achieve total 72 GB (6x8 GB + 6x4 GB) for a server, then populate blue slots with 8 GB DIMMs and black slots with 4 GB DIMMs and total memory size should be 12 GB across all 3 channels for both CPUs.

    — When mixing DIMMs, all the DIMMs in the server must be the same speed.

## Recommended Memory Population

This section explains the recommended DIMM population order rules for the C24 M3 server.

- All DIMMs must be DDR3 DIMMs.

- Mixing of Registered and Unbuffered DIMMs is not allowed per platform.

- Mixing of ECC and non-ECC DIMMs is not allowed per platform.

- Do not mix 1333-MHz DIMMs with 1600-MHz DIMMs.

Follow *Table 28* when populating DIMMs in the server.

Table 28  Recommended DIMM Population

| Total Memory Size | CPU 1 | | CPU 2 | | Total DIMMs in System |
|---|---|---|---|---|---|
| | Blue Slots Bank 0 (A0, B0, C0) | Black Slots Bank 1 (A1, B1, C1) | Blue Slots Bank 0 (D0, E0, F0) | Black Slots Bank 1 (D1, E1, F1) | |
| 48 GB[1] | 3 x 4 GB | 3 x 4 GB | 3 x 4 GB | 3 x 4 GB | 12 |
| | 3 x 8 GB | — | 3 x 8 GB | — | 6 |
| 72 GB | 3 x 8 GB | 3 x 4 GB | 3 x 8 GB | 3 x 4 GB | 12 |
| 96 GB[2] | 3 x 8 GB | 3 x 8 GB | 3 x 8 GB | 3 x 8 GB | 12 |
| | 3 x 16 GB | — | 3 x 16 GB | — | 6 |
| 120 GB | 3 x 16 GB | 3 x 4 GB | 3 x 16 GB | 3 x 4 GB | 12 |
| 144 GB | 3 x 16 GB | 3 x 8 GB | 3 x 16 GB | 3 x 8 GB | 12 |
| 192 GB | 3 x 16 GB | 3 x 16 GB | 3 x 16 GB | 3 x 16 GB | 12 |

Notes . . .

1. For 48 GB, there are two possible sweet spot configurations:

   6 x 8 GB occupies 1 DPC, so there is a possibility of increasing total memory size in the system (beyond 48 GB) by going to 2 DPC while still maintaining memory speed at 1600 MHz.

   If there is no plan to increase total memory size in the system (beyond 48 GB), then 12 x 4GB is more price effective at this time.

2. For 96 GB, there are two possible optimal configurations:

   6 x 16GB occupies 1 DPC, so there is a possibility of increasing total memory size in the system (beyond 96 GB) by going to 2 DPC while maintaining the maximum memory speed at 1600 MHz.

   12 x 8GB gives the peak performance for this configuration and is recommended if there is no plan of increasing the total memory in the future.

## Supported DIMM Populations

The supported DIMM populations are listed in *Table 29*.

Table 29  Supported DIMM Configurations

| CPU 1 DIMMs | # CPU 1 DIMMs | CPU 1 Capacity | CPU 2 DIMMs | # CPU 2 DIMMs | CPU 2 Capacity | Total DIMMs for both CPUs | Total Capacity for 2 CPUs |
|---|---|---|---|---|---|---|---|
| 1 x 4 GB | 1 | 4 GB | 1 x 4 GB | 1 | 4 GB | 2 | 8 GB |
| 2 x 4 GB | 2 | 8 GB | 2 x 4 GB | 2 | 8 GB | 4 | 16 GB |
| 1 x 8 GB | 1 | 8 GB | 1 x 8 GB | 1 | 8 GB | 2 | 16 GB |
| 3 x 4 GB | 3 | 12 GB | 3 x 4 GB | 3 | 12 GB | 6 | 24 GB |
| 4 x 4 GB | 4 | 16 GB | 4 x 4 GB | 4 | 16 GB | 8 | 32 GB |
| 2 x 8 GB | 2 | 16 GB | 2 x 8 GB | 2 | 16 GB | 4 | 32 GB |
| 1 x 16 GB | 1 | 16 GB | 1 x 16 GB | 1 | 16 GB | 2 | 32 GB |
| 5 x 4 GB | 5 | 20 GB | 5 x 4 GB | 5 | 20 GB | 10 | 40 GB |
| 6 x 4 GB | 6 | 24GB | 6 x 4 GB | 6 | 24GB | 12 | 48 GB |
| 3 x 8 GB | 3 | 24 GB | 3 x 8 GB | 3 | 24 GB | 6 | 48 GB |
| 4 x 8 GB | 4 | 32 GB | 4 x 8 GB | 4 | 32 GB | 8 | 64 GB |
| 2 x 16 GB | 2 | 32 GB | 2 x 16 GB | 2 | 32 GB | 4 | 64 GB |
| 3 x 8 GB + 3 x 4 GB[1] | 6 | 36 GB | 3 x 8 GB + 3 x 4 GB[2] | 6 | 36 GB | 12 | 72 GB |
| 5 x 8 GB | 5 | 40 GB | 5 x 8 GB | 5 | 40 GB | 10 | 80 GB |
| 6 x 8 GB | 6 | 48 GB | 6 x 8 GB | 6 | 48 GB | 12 | 96 GB |
| 3 x 16 GB | 3 | 48 GB | 3 x 16 GB | 3 | 48 GB | 6 | 96 GB |
| 3 x 16 GB + 3 x 4 GB[3] | 6 | 60 GB | 3 x 16 GB + 3 x 4 GB[4] | 6 | 60 GB | 12 | 120 GB |
| 4 x 16 GB | 4 | 64 GB | 4 x 16 GB | 4 | 64 GB | 8 | 128 GB |
| 3 x 8 GB + 3 x 16 GB[5] | 6 | 72 GB | 3 x 8 GB + 3 x 16 GB[6] | 6 | 72 GB | 12 | 144 GB |
| 5 x 16 GB | 5 | 80 GB | 5 x 16 GB | 5 | 80 GB | 10 | 160 GB |
| 6 x 16 GB | 6 | 96 GB | 6 x 16 GB | 6 | 96 GB | 12 | 192 GB |

Notes . . .

1. UCS-MR-1X082RY-A + UCS-MR-1X041RY-A
2. UCS-MR-1X082RY-A + UCS-MR-1X041RY-A
3. UCS-MR-1X162RY-A + UCS-MR-1X041RY-A
4. UCS-MR-1X162RY-A + UCS-MR-1X041RY-A
5. UCS-MR-1X082RY-A + UCS-MR-1X162RY-A
6. UCS-MR-1X082RY-A + UCS-MR-1X162RY-A

## Low-Voltage DIMM Considerations

The C24 M3 server can be ordered with low-voltage (1.35 V) DIMMs only. Note the following considerations:

■ Low-voltage DIMMs within the server must have the identical manufacturer, type, speed, and size.

■ Low-voltage DIMMs and standard-voltage DIMMs can be mixed in the same server. Note that this causes the system BIOS to default to standard-voltage operation (Performance Mode). That is, the server cannot operate in Power Saving Mode unless all DIMMs are low-voltage DIMMs.

■ CPUs that have a maximum memory frequency less than 1333 MHz support low-voltage DIMMs operating in Power Saving Mode only, and do not support Performance Mode.

Cisco UCS C24 M3 High-Density SFF Rack-Mount Server

# RAID Summary

The C24 M3 SFF server can be ordered with a 16-drive backplane (without a SAS expander) or with a 24-drive backplane (with a SAS expander).

- ROM5 and ROM55 embedded RAID upgrade options support up to 8 drives with the 16-drive backplane and are not supported for the 24-drive backplane.

- Drive support is as follows:

    — The LSI MegaRAID SAS 9265CV-8i, 9240-8i, and 9220-8i PCIe cards support up to 8 drives each for the 16-drive backplane.

    — The LSI MegaRAID SAS 9265CV-8i PCIe card supports up to 24 drives for the 24-drive backplane.

    — The LSI MegaRAID SAS 9240-8i and 9220-8i PCIe cards support up to 16 drives for the 24-drive backplane (these RAID controllers are limited to 16 drives for a RAID volume).

> **NOTE:** For the 16-drive server, if you *do not* select a plug-in PCIe RAID card or one of the embedded RAID upgrade options (ROM5 or ROM55), you will have an embedded SATA-only RAID controller that supports up to four SATA-only drives (RAID 0, 1, 10).

See *Table 30* for a summary of the supported RAID configuration options.

**Table 30  Supported RAID Configurations[1]**

| Server | # CPUs | Embedded RAID[2] | Internal PCIe RAID #1[3] | Internal PCIe RAID #2 | # Drives Supported | PCIe Slots[4] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 1 | 2 | 3 | 4 | 5 |
| C24 M3 SFF 24 HDD backplane | 1 | Not allowed | Installed slot 2 (default)[5] | Not allowed | 16 or 24 internal[6] | A | O | U | U | U |
| C24 M3 SFF 24 HDD backplane | 2 | Not allowed | Installed slot 4 (default) | Not allowed | 16 or 24 internal[6] | A | A | A | O | A |
| C24 M3 SFF 16 HDD backplane | 1 | Enabled | Not allowed | Not allowed | 8 internal | A | A | U | U | U |
| C24 M3 SFF 16 HDD backplane | 1 | Not allowed | Installed slot 2 (default) | Not allowed | 8 internal | A | O | U | U | U |
| C24 M3 SFF 16 HDD backplane | 2 | Enabled | Not allowed | Not allowed | 8 internal | A | A | A | A | A |
| C24 M3 SFF 16 HDD backplane | 2 | Not allowed | Installed slot 4 (default) | Card absent | 8 internal | A | A | A | O | A |
| C24 M3 SFF 16 HDD backplane | 2 | Not allowed | Installed slot 4 (default) | Installed slot 5 (default) | 16 internal[7] | A | A | A | O | O |

Notes . . .

1. You cannot mix RAID types. You can use either embedded RAID (16-drive backplane option only) or PCIe RAID, but only one at a time.

2. Embedded RAID is only compatible with the 16 HDD backplane. It cannot be used with the 24 HDD backplane.

3. If you want to boot from a device other than the 9265CV-8i, 9240-8i, or 9220-8i MegaRAID PCIe cards, you can leave the cards installed. Just disable the OPROM for their slots, and the system will boot even with the cards installed.

4. A = available slot, O = occupied slot, U = unsupported slot (slots 3, 4, and 5 are not supported in 1-CPU systems)

5. The OPROM is enabled for the default PCIe RAID controller slots. If you want to enable a different slot, you must go into the BIOS and enable the OPROM for the desired slot and disable the OPROM for the default PCIe slot (see *Figure 8 on page 59*).

6. Number of drives supported is 16 or 24, depending on the PCIe RAID controller installed.

7. Two RAID cards and two CPUs are required to control all 16 drives in the C24 SFF 16 HDD backplane system.

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# RAID Option ROM (OPROM) Settings

The server contains an Option ROM (OPROM) for the PCIe slots. The server has a finite amount of option ROM with which it can boot up devices. Go into the BIOS and disable the OPROM on the PCIe slots not used for booting so that resources are available for the slots that are used for booting. An example OPROM BIOS screen is shown in *Figure 8*.

**Figure 8      Example BIOS Screen for OPROM**

```
            Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
   Advanced

                                                          ▲ SlotID:5 OptionROM execution
   _____                                 control. This slot is
                                                            populated with "LSI 9265CV-8i
   All PCIe Slots OptionROM          [Enabled]              MegaRAID SAS HBA".

   PCIe SlotID:1 OptionROM           [Enabled]
    Option ROM Status                Not Loaded

   PCIe SlotID:2 OptionROM           [Enabled]
    Option ROM Status                Not Loaded

   PCIe SlotID:3 OptionROM           [Enabled]
    Option ROM Status                Not Loaded

   PCIe SlotID:4 OptionROM           [Enabled]
    Option ROM Status                Loaded                →← Select Screen
                                                           ↑↓ Select Item
   PCIe SlotID:5 OptionROM           [Enabled]             Enter Select Field
    Option ROM Status                Loaded                +/-  Change Value
                                                           F1   General Help
                                                           F9   BIOS Defaults
   PCIe Slots Inventory                                    F10  Save & Exit
   _____                                    ESC  Exit

   SlotID:4  LSI 9265CV-8i MegaRAID SAS HBA
   SlotID:5  LSI 9265CV-8i MegaRAID SAS HBA
                                                          ▼
            Version 2.15.1226. Copyright (C) 2012 American Megatrends, Inc.
```

## RACKS

The Cisco R42610 rack (see *Figure 9*) is certified for Cisco UCS installation at customer sites and is suitable for the following equipment:

- Cisco UCS B-Series servers and fabric interconnects
- Cisco UCS C-Series and select Nexus switches

The rack is compatible with hardware designed for EIA-standard 19-inch racks. Rack specifications are listed in *Table 31*.

Table 31  Cisco R42610 Rack Specifications

| Parameter | Standard Rack | Expansion Rack |
|---|---|---|
| Dimensions (H x W x D) | 78.74 x 24 x 43.38 in. (2000 x 610 x 1102 mm) | 78.74 x 23.58 x 43.38 in. (2000 x 599 x 1102 mm) |
| Dimensions (H x W x D) with packaging | 89 x 33 x 47 in. (2261 x 838 x 1194 mm) | 89 x 33 x 47 in. (2261 x 838 x 1194 mm) |
| Distance from front mounting rail to rear mounting rail | 29.2 in (741 mm) | 29.2 in (741 mm) |
| Weight | 299.83 lb (136 kg) | 231. 49 lb (105 kg) |
| Weight with packaging | 354 lb (161 kg) | 284 lb (129 kg) |
| Side panels included | Yes | No |
| Equipment mounting capacity | 42RU | 42RU |
| Static load capacity | 2100 lb (954 kg) | 2100 lb (954 kg) |
| Dynamic load capacity | Not applicable | Not applicable |

**NOTE:** The AC input connector is an IEC 320 C-14 15 A/250 VAC power inlet.

**Figure 9      Cisco R42610 Rack**



Front view - door closed          Front view - door open          Front view - door removed

## PDUs

Cisco RP Series Power Distribution Units (PDUs) offer power distribution with branch circuit protection.

Cisco RP Series PDU models distribute power to up to 24 outlets. The architecture organizes power distribution, simplifies cable management, and enables you to move, add, and change rack equipment without an electrician.

With a Cisco RP Series PDU in the rack, you can replace up to two dozen input power cords with just one. The fixed input cord connects to the power source from overhead or under-floor distribution. Your IT equipment is then powered by PDU outlets in the rack using short, easy-to-manage power cords.

The C-series severs accept the zero-rack-unit (0RU) PDU. See *Figure 10*).

**Figure 10    Zero Rack Unit PDU (PID = RP208-30-2P-U-2)**
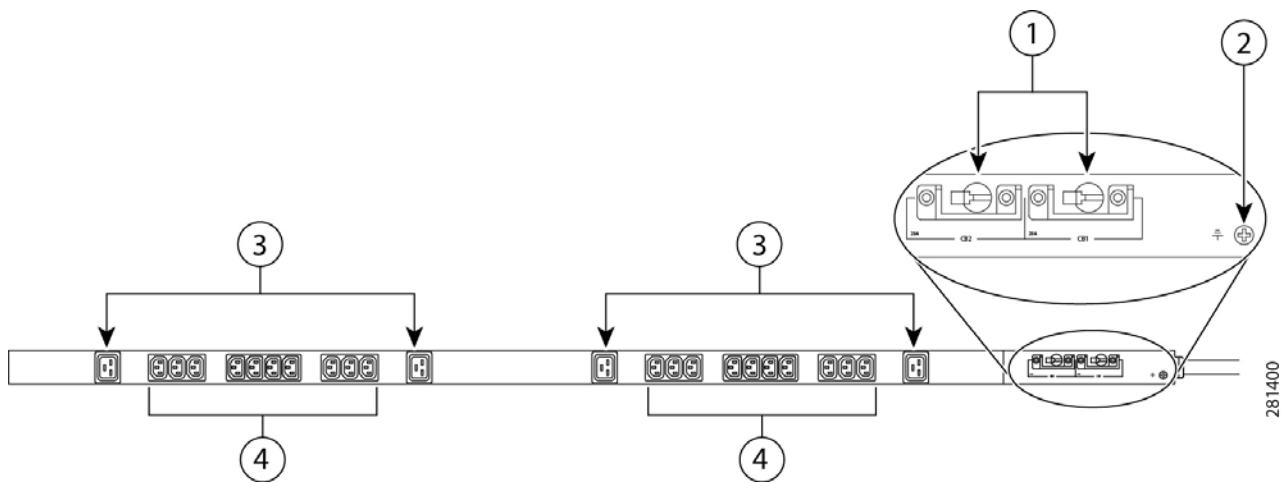


| 1 | Breakers | 3 | C13 plugs |
|---|----------|---|-----------|
| 2 | Ground connection | 4 | C19 plugs |

Cisco RP Series PDU models provide two 20-ampere (A) circuit breakers for groups of receptacles. The effects of a tripped circuit are limited to a receptacle group. Simply press a button to reset that circuit.

# Motherboard USB Port

The C24 M3 SFF motherboard has one general-purpose USB socket as shown in *Figure 11*.

**Figure 11     Motherboard USB Port**
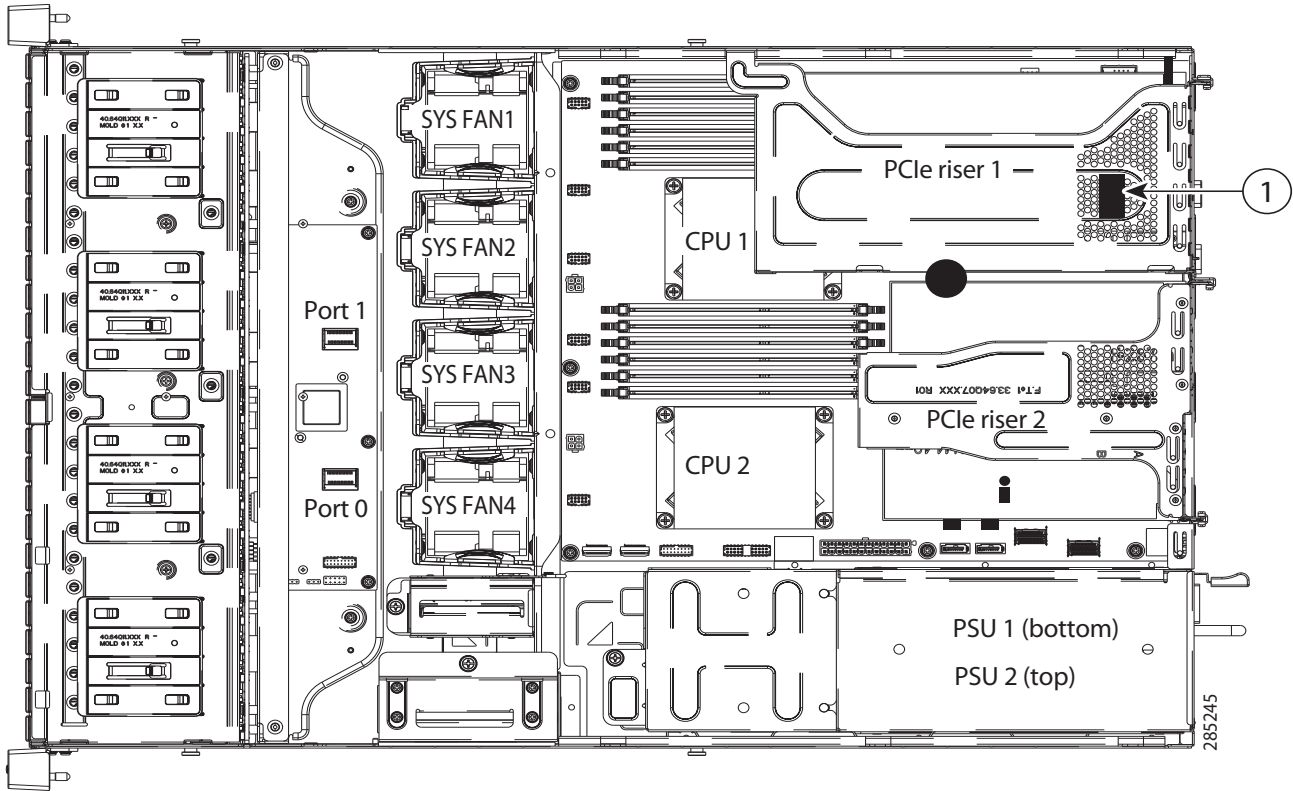


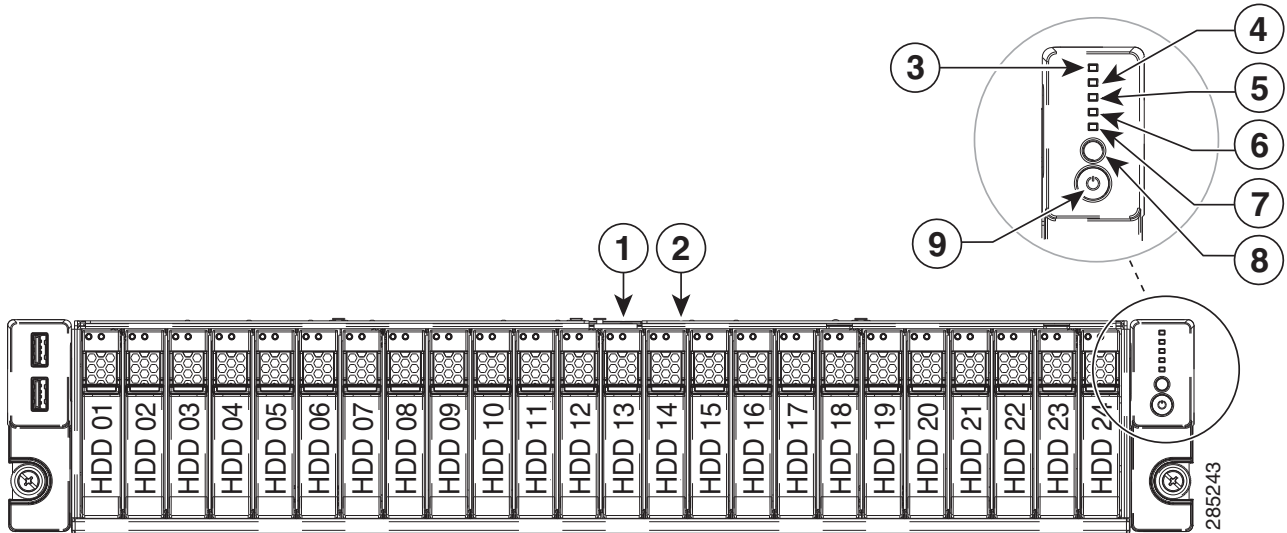| 1 | USB 2.0 port on motherboard | - | - |
|---|---|---|---|

# LED Indicators

The server contains LED indicators on the front and rear panels. Their functions are described in the following sections.

## Front Panel

*Figure 12* shows the front panel LEDs.

**Figure 12     Front Panel LEDs**



| 1 | Hard drive fault LED | 6 | Fan status LED |
|---|---|---|---|
| 2 | Hard drive activity LED | 7 | System status LED |
| 3 | Network link activity LED | 8 | Identification button/LED |
| 4 | Power supply status LED | 9 | Power button/power status LED |
| 5 | Temperature status LED | - | - |

See *Table 32* for the functions of the front panel LEDs.

**Table 32  Front Panel LEDs**

| LED | LED State | Meaning |
|---|---|---|
| **Hard Drive Fault** | Off | The hard drive is operating properly |
| | On (amber) | The hard drive has failed |
| | Blinking (amber) | The hard drive is rebuilding |

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Table 32  Front Panel LEDs  *(continued)*

| LED | LED State | Meaning |
|---|---|---|
| **Hard Drive Activity** | Off | There is no hard drive in the hard drive sled (no access, no fault) |
| | On (green) | The hard drive is ready |
| | Blinking (green) | The hard drive is reading or writing data |
| **Network Link Status** | Off | Undefined |
| | On (green) | Link pulses detected on any of the LOM ports, but no activity. |
| | Blinking (green) | Activity on any of the LOM ports |
| **Temperature Status** | Off | Undefined |
| | On (green) | System is operating at normal temperature and no error conditions have been detected. |
| | On (amber) | One or more temperature sensors exceeded a warning threshold. |
| | Blinking (amber) | One or more temperature sensors exceeded a critical threshold |
| **Fan Status** | Off | Undefined |
| | On (green) | Fans are operating and no error condition has been detected |
| | On (amber) | Fans are in a degraded operational state, indicating that one of the fans has a fault. |
| | Blinking (amber) | Critical fault state, indicating that two or more fans have a fault. |
| **System Status** | Off | Undefined |
| | On (green) | Server is in normal operating condition |
| | On (amber) | Server is in a degraded operational state. For example:<br>■ Power supply redundancy is lost.<br>■ CPUs are mismatched.<br>■ At least one CPU is faulty.<br>■ At least one DIMM is faulty.<br>■ At least one drive in a RAID configuration failed. |
| | Blinking (amber) | Server is in a critical fault state. For example:<br>■ Boot failed.<br>■ Fatal CPU and/or bus error is detected.<br>■ Server is in over-temperature condition |

Table 32  Front Panel LEDs  *(continued)*

| LED | LED State | Meaning |
|---|---|---|
| **Unit ID** (LED is integrated into unit ID button) | Off | Unit ID not active |
| | On (blue) | Unit ID is activated |
| **Power** (LED is integrated into power button) | Off | Server power is off |
| | On (amber) | Server power is soft off (power is supplied only to the CIMC and some motherboard functions) |
| | On (green) | Card power is on |

## Rear Panel

*Figure 13* shows the rear panel LEDs.

**Figure 13**     Rear Panel LEDs
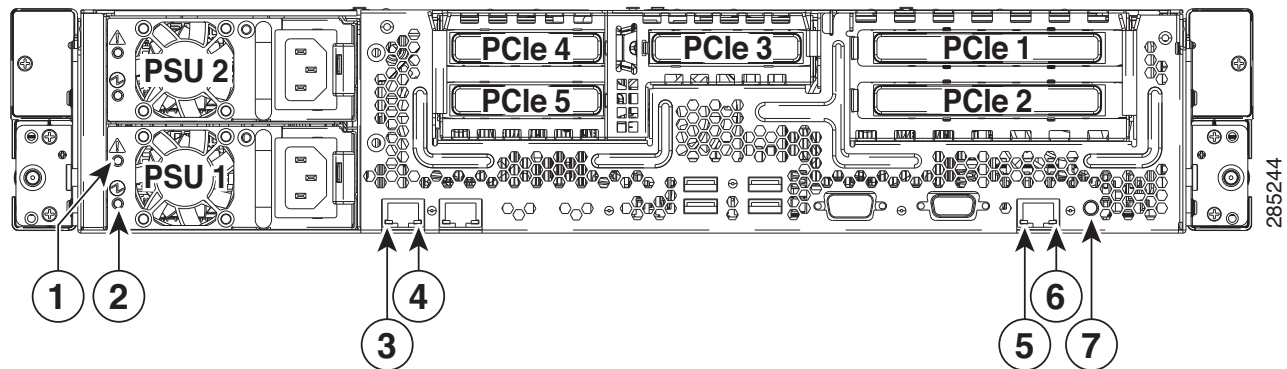


| 1 | Power supply fault LED | 5 | 10/100/1000 Ethernet dedicated management link status LED |
|---|---|---|---|
| 2 | Power supply AC OK LED | 6 | 10/100/1000 Ethernet dedicated management link speed LED |
| 3 | 1-GbE link speed LED | 7 | Identification button/LED |
| 4 | 1-GbE link status LED | - | - |

See *Table 33* for the functions of the rear panel LEDs.

Table 33  Rear Panel LEDs

| LED | LED State | Meaning |
| --- | --- | --- |
| Power Supply Fault | Off | The power supply is operating normally |
| | Blinking (amber) | An event warning threshold has been reached, but the power supply continues to operate |
| | On (amber) | A critical fault threshold has been reached, causing the power supply to shut down (for example, a fan failure or an over-temperature condition). |
| Power Supply AC | Off | There is no AC power to the power supply |
| | Blinking (green) | AC power OK, DC output not enabled |
| | On (green) | AC power OK, DC outputs OK |
| 1 GbE Link Speed | Off | Link Speed = 10 MbpS |
| | On (amber) | Link Speed = 100 MbpS |
| | On (green) | Link Speed = 1 GbpS |
| 1 GbE Link Status | Off | No Link |
| | On (green) | Link is active |
| | Blinking (green) | Traffic is present on the active link |
| 10/100/1000 Base-T Link Speed | Off | Link Speed = 10 Mbps |
| | On (amber) | Link Speed = 100 Mbps |
| | On (green) | Link Speed = 1 Gbps |
| 10/100/1000 Base-T Link Status | Off | No Link |
| | On (green) | Link is active |
| | Blinking (green) | Traffic is present on the active link |
| Unit ID (LED is integrated into unit ID button) | Off | Unit ID not active |
| | On (blue) | Unit ID is activated |

# TECHNICAL SPECIFICATIONS

## Dimensions and Weight

Table 34  UCS C24 M3 Dimensions and Weight

| Parameter | Value |
|---|---|
| Height | 3.45 in (87.6 mm) |
| Width | 16.93 in. (430 mm) |
| Depth | 26.0 in. (660.5 mm) |
| Front Clearance | 3 in. (76 mm) |
| Side Clearance | 1 in. (25 mm) |
| Rear Clearance | 9 in. (233 mm) |
| Weight | |
| Maximum (24 HDDs, 2 CPUs, 12 DIMMs, 2 power supplies) | 47.18 lbs (21.4 kg) |
| Maximum (16 HDDs, 2 CPUs, 12 DIMMs, 2 power supplies) | 42.5 lbs (19.3 kg) |
| Bare (0 HDD, 0 CPU, 0 DIMM, no power supply) | 34.5 lbs (15.65 kg) |

## Power Specifications

The general power specifications for the C24 M3 SFF server 450 W power supply are listed in *Table 35*.

Table 35  UCS C24 M3 SFF 450 W Power Supply Specifications

| Description | Specification |
|---|---|
| AC input voltage | 90 to 264 VAC self-ranging, <br> 100 to 120 VAC nominal <br> 200 to 240 VAC nominal |
| AC input frequency | Range: 47 to 63 Hz (single phase, 50 to 60 Hz nominal) |
| Maximum AC input current | 6 A maximum at 100 VAC <br> 3 A maximum at 208 VAC |
| Maximum AC inrush current | 9 A peak @ 35° C, 208 VAC |
| Maximum output power for the power supply | 450 W |
| Power supply output voltage | Main power: 12 VDC <br> Standby power: 12 VDC |

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Table 35  UCS C24 M3 SFF 450 W Power Supply Specifications  *(continued)*

| Description | Specification |
| --- | --- |
| Power supply efficiency | CSCI Platinum |

> **NOTE:**  AC input connector is an IEC 320 C-14 15A/250VAC power inlet.

The general power specifications for the C24 M3 SFF server 650 W power supply are listed in *Table 35*.

Table 36  UCS C24 M3 SFF 650 W Power Supply Specifications

| Description | Specification |
| --- | --- |
| AC input voltage | 90 to 264 VAC self-ranging, 100 to 120 VAC nominal 200 to 240 VAC nominal |
| AC input frequency | Range: 47 to 63 Hz (single phase, 50 to 60 Hz nominal) |
| Maximum AC input current | 7.6 A maximum at 100 VAC 3.65 A maximum at 208 VAC |
| Maximum AC inrush current | 11 A peak @ 35° C, 208 VAC |
| Maximum output power for the power supply | 650 W |
| Power supply output voltage | Main power: 12 VDC Standby power: 12 VDC |
| Power supply efficiency | CSCI Platinum |

> **NOTE:**  AC input connector is an IEC 320 C-14 15A/250VAC power inlet.

For configuration-specific power specifications, use the Cisco UCS Power Calculator at this URL:

https://express.salire.com/Go/Cisco/Cisco-UCS-Power-Calculator.aspx

# Environmental Specifications

The power specifications for the C24 M3 server are listed in *Table 37*.

**Table 37  UCS C24 M3 Environmental Specifications**

| Parameter | Minimum |
|---|---|
| Temperature operating | 41 to 95° F (5 to 35° C) Maximum temperature is to be derated by 1 degree C for every 305 m (1000 ft.) of altitude above sea level |
| Temperature nonoperating | –40 to 149°F (–40 to 65°C) |
| Humidity (RH) nonoperating, non-condensing | 10 to 90% |
| Altitude operating | 0 to 3,000 m (0 to 10,000 ft.) |
| Altitude nonoperating | 0 to 12,192 m (0 to 40,000 ft.) |
| Sound Power level, Measure A-weighted per ISO7779 LWAd (Bels) Operation at 73°F (23°C) | 5.9 |
| Sound Pressure level, Measure A-weighted per ISO7779 LpAm (dBA) Operation at 73°F (23°C) | 46 |

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# Compliance Requirements

The regulatory compliance requirements for C-Series servers are listed in *Table 38*.

**Table 38  UCS C-Series Regulatory Compliance Requirements**

| Parameter | Description |
|---|---|
| Regulatory Compliance | Products should comply with CE Markings per directives 2004/108/EC and 2006/95/EC |
| Safety | UL 60950-1 Second Edition<br>CAN/CSA-C22.2 No. 60950-1 Second Edition<br>EN 60950-1 Second Edition<br>IEC 60950-1 Second Edition<br>AS/NZS 60950-1<br>GB4943 2001 |
| EMC - Emissions | 47CFR Part 15 (CFR 47) Class A<br>AS/NZS CISPR22 Class A<br>CISPR22 Class A<br>EN55022 Class A<br>ICES003 Class A<br>VCCI Class A<br>EN61000-3-2<br>EN61000-3-3<br>KN22 Class A<br>CNS13438 Class A |
| EMC - Immunity | EN55024<br>CISPR24<br>EN300386<br>KN24 |

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