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# Cisco UCS B250 Extended Memory Blade Server Installation and Service Note

**Last Revised: August 22, 2011**

The UCS B250 blade server (shown in [Figure 1](#)) is available in both M1 and M2 versions. This document applies equally to both versions. The Cisco UCS B250 is a full-width blade with 48 DIMM slots for up to 384 GB of memory; it supports two adapters. You may install up to four UCS B250 Blade Servers to a UCS chassis.

**Figure 1** UCS B250 Extended Memory Blade Server



|          |                             |           |                          |
|----------|-----------------------------|-----------|--------------------------|
| <b>1</b> | Hard drive bay 1            | <b>8</b>  | Power button and LED     |
| <b>2</b> | Hard drive bay 2            | <b>9</b>  | Network link status LED  |
| <b>3</b> | Left ejector captive screw  | <b>10</b> | Blade health LED         |
| <b>4</b> | Left blade ejector handle   | <b>11</b> | Console connector        |
| <b>5</b> | Asset tab <sup>1</sup>      | <b>12</b> | Reset button access      |
| <b>6</b> | Right blade ejector handle  | <b>13</b> | Beaconing LED and button |
| <b>7</b> | Right ejector captive screw |           |                          |

1. Each server has a blank plastic tag that pulls out of the front panel, provided so you can add your own asset tracking label without interfering with the intended air flow.



## LEDs

The LED indicators (see [Table 1](#)) indicate whether the blade server is in active or standby mode, the status of the network link, the overall health of the blade server, and whether the server is set to give a flashing blue beaconing indication.

The removable hard disks also have LEDs indicating hard disk access activity and hard disk health.

**Table 1** Blade Server LEDs

| LED   | Color              | Description   |
|---|--------------------|---|
|  <b>Power</b>                      | Off                | Power off   |
|   | Green              | Normal operation  |
|   | Amber              | Standby   |
|  <b>Link</b>                       | Off                | None of the network links are up  |
|   | Green              | At least one network link is up   |
|  <b>Health</b>                     | Off                | Power off   |
|   | Green              | Normal operation  |
|   | Amber              | Minor error   |
|   | Blinking Amber     | Critical error  |
|  <b>Beaconing</b>                 | Off                | Beaconing not enabled.  |
|   | Blinking blue 1 Hz | Beaconing to locate a selected blade—If the LED is not blinking, the blade is not selected. You can initiate beaconing in UCS Manager or with the button. |
|  <b>Activity</b><br>(Disk Drive) | Off                | Inactive.   |
|   | Green              | Outstanding I/O to disk drive   |
|  <b>Health</b><br>(Disk Drive)   | Off                | No fault  |
|   | Amber              | Some fault  |

## Buttons

The Reset button is just inside the chassis and must be pressed using the tip of a paper clip or a similar item. Hold the button down for five seconds and then release it to restart the server if other methods of restarting are not working.

The beaconing function for an individual server may be turned on or off by pressing the combination button and LED. See [Table 1](#) for details. Beaconing will be reflected in the UCS Manager interface and can also be turned off and on from there.

The power button and LED allows you to manually take a server temporarily out of service but leave it in a state where it can be restarted quickly, or to bring it back into service. If the desired power state for a service profile associated with a blade server or an integrated rack-mount server is set to "off", using the power button or Cisco UCS Manager to reset the server will cause the desired power state of the server to become out of sync with the actual power state and the server may unexpectedly shutdown at a later time. To safely reboot a server from a power-down state, use the Boot Server action in Cisco UCS Manager.

## Connectors

A console port is provided to give a direct connection to a blade server to allow operating system installation and other management tasks to be done directly rather than remotely. The port uses the KVM dongle device included in the chassis accessory kit.

The KVM cable (N20-BKVM, shown in [Figure 2](#)) provides a connection into a Cisco UCS blade server; it has a DB9 serial connector, a VGA connector for a monitor, and dual USB ports for a keyboard and mouse. With this cable you can create a direct connection to the operating system and the BIOS running on a blade server.

**Figure 2** KVM Cable for Blade Servers



|   |                                |   |   |
|---|--------------------------------|---|---|
| 1 | Connector to blade server slot | 3 | VGA connection for a monitor                  |
| 2 | DB9 serial connector           | 4 | 2-port USB connector for a mouse and keyboard |

## 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*. You are capable of doing something that might result in equipment damage or loss of data.

Safety warnings appear throughout this publication 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**

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**Aviso INSTRUÇÕES IMPORTANTES DE SEGURANÇA**

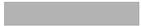
Este símbolo de aviso significa perigo. Você se encontra em uma situação em que há risco de lesões corporais. Antes de trabalhar com qualquer equipamento, esteja ciente dos riscos que envolvem os circuitos elétricos e familiarize-se com as práticas padrão de prevenção de acidentes. Use o número da declaração 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 legemeskade. 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**



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## Installing and Removing a Blade Server Hard Drive

There are up to 2 front-accessible, hot-swappable, 2.5-inch drives per blade. An LSI 1064E RAID controller is embedded in the motherboard (it is not separately replaceable) and it supports RAID 0 and 1. You can remove blade server hard drives without removing the blade server from the chassis. All other component replacement for a blade server requires removing the blade from the chassis. Unused hard drive bays should always be covered with cover plates (N20-BBLKD) to assure proper cooling and ventilation. The chassis is omitted from illustrations here to simplify the drawing.



### Caution

To prevent ESD damage, wear grounding wrist straps during these procedures and handle modules by the carrier edges only.



### Note

Seagate SATA disks and Intel or Samsung SATA SSDs are not supported in UCS Manager release 1.2(1) and cannot be used with servers using UCS Manager release 1.2(1).

Replacing an HDD or SSD with a drive of the same size, model, and manufacturer generally causes few problems with UCS Manager. If the drive being replaced was part of a RAID array we recommend using a newly ordered drive of identical size, model, and manufacturer to replace the failed drive. Cisco recommends following industry standard practice of using drives of the same capacity when creating RAID volumes. If drives of different capacities are used, the usable portion of the smallest drive will be used on all drives that make up the RAID volume. Before upgrading or adding an HDD to a running system, check the service profile in UCS Manager and make sure the new hardware configuration will be within the parameters allowed by the service profile.

Hard disk and RAID troubleshooting information is in the “Troubleshooting Server Hardware” chapter of the [Cisco UCS Troubleshooting Guide](#).

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Table 2 shows the drives supported in this blade server.

**Table 2 Supported Hard Disk Drives (HDD)**

| Product ID        | Description   |
|-------------------|---|
| A03-D073GC2       | 73 GB 6Gb SAS transfer rate <sup>1</sup> , 15K RPM HDD/hot plug/drive sled mounted      |
| A03-D146GA2       | 146 GB 6Gb SAS transfer rate <sup>1</sup> , 10K RPM SFF HDD/hot plug/drive sled mounted |
| A03-D146GC2       | 146 GB 6Gb SAS transfer rate <sup>1</sup> , 10K RPM SFF HDD/hot plug/drive sled mounted |
| A03-D300GA2       | 300 GB, 6Gb SAS transfer rate <sup>1</sup> , 15K RPM HDD/hot plug/drive sled mounted    |
| A03-D100SSD       | 100 GB SATA SSD HDD/hot plug/drive sled mounted (no longer sold)                        |
| A03-D600GA2       | 600 GB, 6Gb SAS transfer rate <sup>1</sup> , 10K RPM HDD/hot plug/drive sled mounted    |
| A03-D500GC3       | 500GB 6Gb SATA 7.2K RPM SFF hot plug/drive sled mounted                                 |
| UCS-SSD100GI1F104 | 100 GB Low-Height 7mm SATA SSD hot plug/drive sled mounted                              |
| A03-D1TBSATA      | 1 TB SATA 7.2K RPM SFF HDD /hot plug/drive sled mounted                                 |
| UCS-HDD300GI2F105 | 300GB 6Gb SAS 15K RPM SFF HDD/hot plug/drive sled mounted <sup>2</sup>                  |
| UCS-HDD900GI2F106 | 900GB 6Gb SAS 10K RPM SFF HDD/hot plug/drive sled mounted <sup>3</sup>                  |

1. The built-in 1064E RAID controller runs at 1.5Gb Link Speed instead of 3Gb with 6Gb Local Disks when running UCS 1.4(2) and earlier software releases.
2. This drive requires UCS capability catalog version 1.0.50.T or 2.0.1nT or later.
3. This drive requires UCS capability catalog version 1.0.54.T or 2.0.1pT or later.

## Removing a Blade Server Hard Drive

To remove a hard drive from a blade server, follow these steps:

- 
- Step 1** Push the button to release the ejector, and then pull the hard drive from its slot.
  - Step 2** Place the hard drive on an antistatic mat or antistatic foam if you are not immediately reinstalling it in another blade server.
  - Step 3** Install a blank faceplate (N20-BBLKD) to keep dust out of the blade server if the slot will remain empty.
-

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Figure 3 shows the removal and installation of a hard drive within a blade server.

**Figure 3** *Installing and Removing a Hard Drive in a Blade Server*



## Installing a Blade Server Hard Drive

To install a blade server hard drive in either type of blade server, follow these steps:

- 
- Step 1** Place the hard drive lever into the open position by pushing the release button (see [Figure 3](#)).
  - Step 2** Gently slide the hard drive into the opening in the blade server until it seats into place.
  - Step 3** Push the hard drive lever into the closed position.
-

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With the B-250 blade server, the displayed ESX and Linux OS HDD Boot Device Order is the reverse of the BIOS HDD Boot Order. To rectify this, review both the disks (and drive labels as applicable), during installations of ESX and Linux versions and choose the correct disk for installation.

You can use UCS Manager to format and configure RAID services. refer to the UCS Manager configuration guide for your software release for details on RAID configuration.

If you need to move a RAID cluster, refer to the Moving a RAID Cluster section of the “Troubleshooting Server Hardware” chapter of the *Cisco UCS Troubleshooting Guide*.

## Removing and Installing a UCS B250 Extended Memory Blade Server

Before performing any internal operation on a blade server, you must remove it from the chassis. To prevent ESD damage, wear grounding wrist straps during these procedures and handle modules by the carrier edges only.

### Shutting Down and Powering Off A Blade 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.

After establishing a connection to the blade server’s operating system, you can directly shut down the blade server using the operating system.

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

- Use the UCS Manager. See either the Cisco UCS Manager GUI Configuration Guide or the Cisco UCS Manager CLI Configuration Guide.
- 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.

- 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.
- Amber indicates that the server is already in standby mode and can be safely powered off. Go to Step 3.

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



**Caution**

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

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

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- Emergency shutdown—Press and hold the Power button for 4 seconds to force the main power off and immediately enter standby mode.
- Step 3** If you are shutting down all blade servers in a chassis, you should now disconnect the power cords from the chassis to completely power off the servers. If you are only shutting down one server, you can skip unplugging the chassis and move to removing the server.
- 

## Removing a Cisco UCS B250 Extended Memory Blade Server

Using UCS Manager, decommission the server using UCS Manager before physically removing the server. To remove a Extended Memory blade server from the chassis, follow these steps:

---

- Step 1** Completely loosen the captive screws on the front of the blade.
- Step 2** Remove the blade from the chassis by pulling the ejector levers on the blade until it unseats the extended memory blade server.
- Step 3** Slide the blade part of the way out of the chassis, and place your other hand under the blade to support its weight.
- Step 4** Once removed, place the blade on an antistatic mat or antistatic foam if you are not immediately reinstalling it into another slot.
- Step 5** If the slot is to remain empty, reinstall the slot divider (N20-CDIVV) and install two blank faceplates (N20-CBLKB1) to assure proper ventilation and cooling.
- 

## Installing a Cisco UCS B250 Extended Memory Blade Server

Extended memory blade servers reside within the upper slots of the chassis. To install an Extended memory blade server, follow these steps:

---

- Step 1** If necessary, remove the slot divider (N20-CDIVV) from the chassis. To do this, follow these steps:
- a. Simultaneously pull up on the left side catch and push down on the right side catch as shown in callout 1 of [Figure 4](#).
  - b. Pull the slot divider out of the chassis as shown in callout 2 of [Figure 4](#). Keep the slot divider in case it is needed at another time.

To reinstall the slot divider, align it with the dimples in the slot top and bottom and slide it back in until it clicks into place.

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**Figure 4** *Removing a Chassis Partition*



- Step 2** Grasp the front of the Extended Memory blade server and place your other hand under the blade to support it. See [Figure 5](#).

**Figure 5** *Positioning an Extended Memory Blade Server in the Chassis*



- Step 3** Open the ejector levers in the front of the extended memory blade server.
- Step 4** Gently slide the blade into the opening until you cannot push it any farther.
- Step 5** Press the ejector levers so that they catch the edge of the chassis and press the extended memory blade server all the way in.

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- Step 6** Tighten the captive screw on the front of the blade to no more than 3 in-lbs. Tightening with bare fingers only is unlikely to lead to stripped or damaged captive screws.
- Step 7** Power on the server. UCS Manager will automatically re acknowledge, reassociate, and recommission the server, provided any hardware changes are allowed by the service profile.

## Removing an Extended Memory Blade Server Cover

To open an extended memory blade server, follow these steps:

- Step 1** Press and hold the button down as shown in [Figure 6](#)
- Step 2** While holding the back end of the cover, pull the cover up and back.

**Figure 6** *Opening an Extended Memory Blade Server*



## Installing and Removing the B250 M2 Air Baffle

The air baffle available with the M2 servers may need to be installed in M1 servers. You will need a #1 Phillips Screw Driver and a 1/4" Nut Driver to install the baffle. To install the baffle:

- Step 1** Remove the top cover from the enclosure of UCS B250 Blade Server.
- Step 2** Using the screwdriver, remove the pan head screws securing the motherboard to the tray where the standoffs are shown in [Figure 7](#).
- Step 3** Using the nut driver, replace the pan head screws with the standoffs that are provided through the field upgrade kit (N20-BBFLB=).



**Note**

If a Cisco UCS B250 M1 server with a single processor is installed in a chassis next to a Cisco UCS B440 or B230 server, the Cisco UCS B440 or B230 may throttle down due to insufficient available cooling. To avoid this, you will need to order or place an RMA for the Cisco UCS B250 M1 internal air baffle N20-BBFLB=. This baffle is only required when co-installed Cisco UCS B250 M1 servers are

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configured with a single CPU. Cisco UCS B250 M1 servers shipped beginning July 2010 and all Cisco UCS B250 M2 servers are automatically shipped with a baffle pre-installed. Installation requires no tools and is shown in [Figure 7](#). The baffle provides needed back pressure that allows the fans and heat sinks to work together optimally.

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**Figure 7**      ***Air Baffle (N20-BBFLB) Installation***



- Step 4** Carefully place the air baffle (provided through the field upgrade kit) so that two alignment holes will align with and are engaged with the top of the standoffs.
- Step 5** Replace the top cover onto the enclosure of the UCS B250 Blade Server.
-

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## Internal Components

Figure 8 calls out the various components within the extended memory blade server.

**Figure 8** *Inside View of a Extended Memory Blade Server*



|          |                   |          |                     |
|----------|-------------------|----------|---------------------|
| <b>1</b> | Hard drive bays   | <b>4</b> | DIMM slots          |
| <b>2</b> | CMOS Battery      | <b>5</b> | Adapter card slot 0 |
| <b>3</b> | CPU and heat sink | <b>6</b> | Adapter card slot 1 |

## Diagnostics Button and LEDs

At blade start-up, POST diagnostics test the CPUs, DIMMs, HDDs and adapter cards, and any failure notifications are sent to UCSM. You can view these notification in the System Error Log or in the output of the **show tech-support** command. If errors are found, an amber diagnostic LED will also light up next to the failed component. During run time, the blade BIOS, component drivers, and OS all monitor for hardware faults and will light up the amber diagnostic LED for a component if an uncorrectable error or correctable errors (such as a host ECC error) over the allowed threshold occur.

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LED states are saved, and if you remove the blade from the chassis the LED values will persist for up to 10 minutes. Pressing the LED diagnostics button on the motherboard will cause the LEDs that currently show a component fault to light for up to 30 seconds for easier component identification. LED fault values are reset when the blade is reinserted into the chassis and booted, and the process begins from its start.

If DIMM insertion errors are detected, they may cause the blade discovery to fail and errors will be reported in the server POST information, viewable using the UCS Manager GUI or CLI. UCS blade servers require specific rules to be followed when populating DIMMs in a blade server, and the rules depend on the blade server model. Refer to the documentation for a specific blade server for those rules.

HDD status LEDs are on the front face of the HDD. Faults on the CPU, DIMMs, or adapter cards will also cause the server health LED to light solid Amber for minor error conditions or blinking Amber for critical error conditions.

## Working Inside the Extended Memory Blade Server

This section describes how to perform the following tasks within a extended memory blade server. All of these procedures require you to first remove the server from the chassis, and then remove the cover.

- [Installing a Motherboard CMOS Battery, page 18](#)
- [Installing a CPU or Heat Sink, page 21](#)
- [Installing Memory, page 22](#)
- [Removing or Installing an Adapter Card, page 30](#)

### Installing a Motherboard CMOS Battery

This blade uses the following Cisco component:

| Supported Components | Part Number  |
|----------------------|--------------|
| CR2032 battery       | N20-MBLIBATT |



#### Warning

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

Statement 1015

To install or replace a motherboard complementary metal-oxide semiconductor (CMOS) battery, follow these steps:

#### Step 1

Remove a motherboard CMOS battery:

- Set the blade power to standby, remove it from the chassis, and remove the top cover as described in the [“Working Inside the Extended Memory Blade Server” section on page 18](#).
- Press the battery socket retaining clip toward the chassis wall (see [Figure 9](#)).
- Lift the battery from the socket. Use needle-nose pliers to grasp the battery if there is not enough clearance for your fingers.

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- Step 2** Install a motherboard CMOS battery:
- a. Press the battery socket retaining clip toward the chassis wall.
  - b. Insert the new battery into the socket with the battery's positive (+) marking toward the chassis wall. Ensure that the retaining clip clicks over the top of the battery.
  - c. Replace the top cover.
  - d. Replace the server in the chassis, and then power on the server by pressing the **Power** button.

**Figure 9** *Removing and Replacing a Motherboard CMOS Battery*



CMOS battery replacement will not have any impact on UCS Manager.

## Removing a CPU or Heat Sink

You can order your blade server with two CPUs, or upgrade later to a second CPU. Both CPUs must be of the same type, and memory in slots intended for the second CPU will not be recognized if the second CPU is not present (see [Memory Arrangement, page 26](#)). You may need to use these procedures to move a CPU from one server to another, or to replace a faulty CPU.

[Table 3](#) and [Table 4](#) show the available CPU options:

**Table 3** *CPU Options, M1 Models*

| Product ID              | Power Draw (W) | Clock Speed | DDR3              | Cache | Low Voltage |
|-------------------------|----------------|-------------|-------------------|-------|-------------|
| N20-X00001 / Xeon X5570 | 95 W           | 2.93 GHz    | 1333 <sup>1</sup> | 8 MB  | N           |
| N20-X00002 / Xeon E5540 | 80 W           | 2.53 GHz    | 1066              | 8 MB  | N           |

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**Table 3 CPU Options, M1 Models (continued)**

| Product ID              | Power Draw (W) | Clock Speed | DDR3              | Cache | Low Voltage |
|-------------------------|----------------|-------------|-------------------|-------|-------------|
| N20-X00003 / Xeon E5520 | 80 W           | 2.26 GHz    | 1066              | 8 MB  | N           |
| N20-X00004 / Xeon L5520 | 60 W           | 2.26 GHz    | 1066              | 8 MB  | N           |
| N20-X00006 / Xeon X5550 | 95 W           | 2.66 GHz    | 1333 <sup>1</sup> | 8 MB  | N           |
| N20-X00009 / Xeon E5504 | 80 W           | 2.00 GHz    | 800               | 8 MB  | N           |

1. While the CPU and DIMMs in an M1 server might in some cases seem to support 1333 DDR, the optimal setting due to BIOS concerns is 1066.

**Table 4 CPU Options, M2 Models**

| Product ID              | Power Draw (W) | Clock Speed | DDR3              | Cache | Low Voltage Mode |
|-------------------------|----------------|-------------|-------------------|-------|------------------|
| N20-X00001 / Xeon X5570 | 95 W           | 2.93 GHz    | 1333 <sup>1</sup> | 8 MB  | N                |
| N20-X00002 / Xeon E5540 | 80 W           | 2.53 GHz    | 1066              | 8 MB  | N                |
| N20-X00003 / Xeon E5520 | 80 W           | 2.26 GHz    | 1066              | 8 MB  | N                |
| N20-X00004 / Xeon L5520 | 60 W           | 2.26 GHz    | 1066              | 8 MB  | N                |
| N20-X00006 / Xeon X5550 | 95 W           | 2.66 GHz    | 1333 <sup>1</sup> | 8 MB  | N                |
| N20-X00009 / Xeon E5504 | 80 W           | 2.00 GHz    | 800               | 8 MB  | N                |
| A01-X0100 / Xeon X5680  | 130 W          | 3.33 GHz    | 1333              | 12 MB | Y                |
| A01-X0102 / Xeon X5670  | 95 W           | 2.93 GHz    | 1333              | 12 MB | Y                |
| A01-X0105 / Xeon X5650  | 95 W           | 2.66 GHz    | 1333              | 12 MB | Y                |
| A01-X0106 / Xeon L5640  | 60 W           | 2.26 GHz    | 1333              | 12 MB | Y                |
| A01-X0109 / Xeon E5640  | 80 W           | 2.66 GHz    | 1066 <sup>2</sup> | 12 MB | Y                |
| A01-X0111 / Xeon E5620  | 80 W           | 2.40 GHz    | 1066 <sup>2</sup> | 12 MB | Y                |
| A01-X0115 / Xeon X5690  | 130 W          | 3.46 GHz    | 1333              | 12 MB | Y                |
| A01-X0117 / Xeon X5675  | 95W            | 3.06 GHz    | 1333              | 12 MB | Y                |
| A01-X0120 / Xeon E5649  | 80W            | 2.53 GHz    | 1333              | 12 MB | Y                |

1. While the CPU and DIMMs in an M1 server might in some cases seem to support 1333 DDR, the optimal setting due to BIOS concerns is 1066.
2. If the CPU and DIMM speeds do not match, the system will run at the slower of the two speeds.



**Note**

The default in the M2 BIOS is low voltage mode, which has the CPU running at 1.35V @ 1066 MHz, while Performance mode uses 1.5V @ 1333 MHz. You will need to change the BIOS settings to access Performance mode.

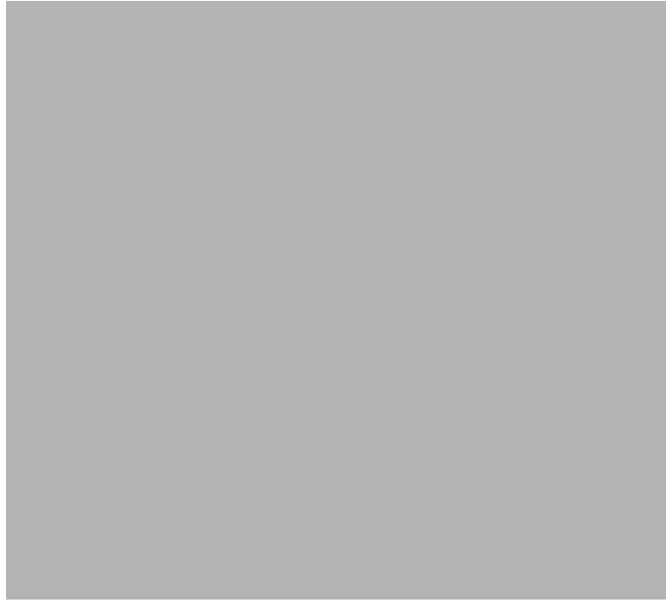
To remove a CPU or heat sink, follow these steps:

- Step 1** Unscrew the four captive screws securing the heat sink to the motherboard. See [Figure 10](#), callout 1.

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- Step 2** Remove the heat sink (N20-BHTS2 for M1 models, N20-BHTS4 for M2 models). See [Figure 10](#), callout 2. Remove the old thermal compound from the bottom of the heat sink using the cleaning kit (UCSX-HSCK) available from Cisco. Follow the instructions on the two bottles of cleaning solvent.
- Step 3** Unhook the socket latch. See [Figure 10](#), callout 3.
- Step 4** Open the socket latch. See [Figure 10](#), callout 4.
- Step 5** Remove the CPU or socket protective cover. See [Figure 10](#), callout 5.

**Figure 10** *Removing the Heat Sink and Accessing the CPU Socket*



## **Installing a CPU or Heat Sink**

Before installing a new CPU in a server, verify the following:

- The CPU is supported for that model server.
- A BIOS is available that supports the CPU/DIMM and server combination.
- The service profile for this server in UCS Manager will recognize and allow the new CPU. This is especially important if you have been using a single processor and install a second processor.

To install a CPU or heat sink, follow these steps:

- Step 1** Place the CPU on the base with the notches aligned to the pins on the base. See [Figure 11](#), callout 1.

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**Figure 11**      **Inserting the CPU and Replacing the Heat Sink**



- Step 2** Close the socket latch. See [Figure 11](#), callout 2.
- Step 3** Lock the socket latch into place with the hook. See [Figure 11](#), callout 3.
- Step 4** Using the tube of thermal compound provided with replacement CPUs and servers (Dow-Corning TC-1996, Intel D54816-0 or an equivalent may also be used), add a protective film of thermal compound to the bottom of the heat sink where it will contact the CPU. If the heat sink shipped with a thermal pad, remove the protective film and verify that the CPU is clean and will bond successfully with the heat sink.
- Step 5** Replace the heat sink. See [Figure 11](#), callout 5.



**Caution** Make sure that the heat sink fins are aligned to run along the length of the blade server (see [Figure 11](#)).

- Step 6** Secure the heat sink to the motherboard by tightening the four captive screws in an X pattern. See [Figure 11](#), callout 6.

## Installing Memory



**Note** Always install Cisco-supplied DIMMs according to the population rules in [Table 7](#), and follow the guidelines in [Supported DIMMs](#).

Check the server's service profile setting in UCS Manager before adding memory to make sure that the new memory will be recognized. The service profile may not be set up for the added memory.

To install a DIMM into the extended memory blade server, follow these steps:

- Step 1** Open both DIMM connector latches, refer to callout 1 in [Figure 12](#).

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**Figure 12**      *Installing DIMMs in the Blade Server*



- Step 2**      Press the DIMM into its slot evenly on both ends until it clicks into place, refer to callout 2 in [Figure 12](#). The DIMM connector latches will snap into place.
- Step 3**      Press the DIMM connector latches inward slightly to seat them fully. Refer to callout 3 in [Figure 12](#).
- 

## Memory and Performance

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

- [Supported DIMMs, page 24](#)
- [Low-Voltage DIMM Considerations, page 25](#)
- [Memory Arrangement, page 26](#)
- [Memory Performance, page 28](#)
- [Memory Mirroring and RAS, page 30](#)

Modern processors are designed to support several generations of memory technology. Cisco's Extended Memory Technology allows us to replace high-density DIMMs with multiple lower-density DIMMs in a way that is transparent to the processor and to applications. In some configurations, we are emulating DIMMs that are not available, such as making four 8-GB DIMMs appear to be a single 32-GB DIMM. In other cases we can emulate high cost-per-bit DIMMs with multiple low cost-per-bit DIMMs; for example, making four 4 GB DIMMs emulate a 16 GB DIMM.

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## Supported DIMMs

Table 5 and Table 6 list the DIMMs that Cisco Systems makes available for use with this blade server:

**Table 5** Cisco Systems Supported DIMMs for M1 Series

| Cisco Product ID | Description   |
|------------------|---|
| A02-M308GB1-2    | Two DIMMs, each 4GB dual-rank DDR3-1333                     |
| A02-M316GB1-2    | Two DIMMs, each 8GB dual-rank DDR3-1333                     |
| A02-M308GB1-2-L  | Two DIMMs, each 4 GB DDR3-1333 MHz Low Voltage <sup>1</sup> |
| A02-M316GB1-2-L  | Two DIMMs, each 8 GB DDR3-1333 MHz Low Voltage <sup>1</sup> |
| UCS-MR-2X041RX-B | Two DIMMs, each 4 GB DDR3-1333 MHz Low Voltage              |

1. Low voltage DIMMs require Cisco UCS Manager version 1.2(1) or later, and the related BIOS package.

**Table 6** Cisco Systems Supported DIMMs for M2 Series

| Cisco Product ID | Description   |
|------------------|---|
| A02-M308GB1-2    | Two DIMMs, each 4 GB dual-rank DDR3-1333 MHz                            |
| A02-M308GB2-2-L  | Two DIMMs, each 4 GB single-rank DDR3-1333 MHz Low Voltage <sup>1</sup> |
| A02-M316GB1-2    | Two DIMMs, each 8 GB dual-rank DDR3-1333 MHz                            |
| A02-M308GB1-2-L  | Two DIMMs, each 4 GB DDR3-1333 MHz Low Voltage <sup>2</sup>             |
| A02-M316GB1-2-L  | Two DIMMs, each 8 GB DDR3-1333 MHz Low Voltage <sup>2</sup>             |
| UCS-MR-2X041RX-B | Two DIMMs, each 4 GB single-rank DDR3-1333 MHz Low Voltage<br>PC3-10600 |
| UCS-MR-2X082RX-B | Two DIMMs, each 8 GB dual-rank DDR3-1333 MHz Low Voltage<br>PC3-10600   |

1. 4 GB single Rank low voltage DIMMs require Cisco UCS Manager version 1.4(1) or later, and the related BIOS package.

2. Low voltage DIMMs require Cisco UCS Manager version 1.2(1) or later, and the related BIOS package.



### Note

The following guidelines must be observed when making memory changes:

- Only Cisco memory is supported. Third party DIMMs are not tested or supported.
- If the system has two CPUs, both CPU DIMM slots should be populated in an identical manner.
- The B250 uses Cisco's extended memory technology, where writes happen simultaneously to both DIMMs in the pair, so they must be identical. Therefore, B250 server memory is always sold as a correctly matched pair with identical manufacturer, type, speed, and size, intended to be installed together in the two paired banks of a single UCS Server memory channel. Mixing of unpaired DIMMs (even with other DIMMs sold under the same product ID) will result in a memory errors should a mismatch occur. When installing DIMMs in a B250, you must add matched pairs to the channel slots in the order shown in Table 7. This server does not support odd numbers of DIMMs in a channel, or a configuration of 6 DIMMs per channel.
- Carefully match CPU and DIMM speed. If the CPU and DIMM speeds do not match, the system runs at the slower of the two speeds.

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- Populate DIMMs of different size and organization in separate memory channels. Populating different sized DIMMs within a channel is not supported. For example you cannot put single-rank 4GB DIMMs in the same channel as dual-rank 4GB DIMMs.
- 

## Low-Voltage DIMM Considerations

The server can be ordered with low-voltage (1.35 V) DIMM pairs or standard-voltage (1.5 V) DIMM pairs. Note the following considerations:

- The two low-voltage DIMMs within a DIMM pair must have the identical manufacturer, type, speed, and size. Cisco provides spare DIMMs for this product in matched pair kits.
- Low-voltage DIMM pairs and standard-voltage DIMM pairs 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 the Power Saving Mode unless all DIMM pairs in the server are low-voltage DIMMs.

There is a setting in the BIOS Setup utility that you can use to change the DDR memory mode when the server has all low-voltage DIMMs installed. To access this setting, follow these steps:

- 
- Step 1** Enter the BIOS setup utility by pressing the **F2** key when prompted during bootup.
- Step 2** Select the **Advanced** tab.
- Step 3** Select **Low Voltage DDR Mode**.
- Step 4** In the pop-up window, select either **Power Saving Mode** or **Performance Mode**.
- Power Saving Mode—Enables low-voltage memory operation. This setting is available only if all DIMMs installed are low-voltage DIMMs.
  - Performance Mode—Disables low-voltage memory operation. If you mix low-voltage DIMM pairs with standard-voltage DIMM pairs, the system defaults to this setting.
- Step 5** Press **F10** to save your changes and exit the setup utility, or you can exit without saving changes by pressing **Esc**.
-

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## Memory Arrangement

The Extended Memory blade server contains 48 slots for installing DIMMs—24 for each CPU. The DIMMs for each CPU are divided into 3 channels, and each channel contains 4 pairs of DIMM slots (see [Figure 13](#)). You must install additional DIMMs in the pairs laid out in [Table 7](#) on page 26.

**Figure 13** Memory Slots Within the Extended Memory Blade Server



|          |                                   |          |                                   |
|----------|-----------------------------------|----------|-----------------------------------|
| <b>1</b> | CPU 2 memory channels D, E, and F | <b>2</b> | CPU 1 memory channels A, B, and C |
|----------|-----------------------------------|----------|-----------------------------------|

## Physical DIMMs and Channels

Each channel is identified by a letter: A, B, C for CPU 1, and D, E, F for CPU 2. Each physical DIMM is identified by numbers from 0 to 7.

[Figure 15](#) shows how banks and channels are physically laid out on the extended memory blade server. The DIMM slots in the right are associated with the right CPU, while the DIMM slots in the left are associated with the left CPU.

When installing DIMMs, you must add them in matched pairs in the configurations shown in [Table 7](#):

**Table 7** Adding DIMMs to a Channel

| # of DIMMs to Install in a Channel | Install DIMMs in Channel Slot numbers |
|------------------------------------|---------------------------------------|
| 2                                  | 0, 1                                  |
| 4                                  | (0, 1) – (4, 5)                       |
| 8                                  | (0, 1) – (4, 5) – (2, 3) – (6, 7)     |

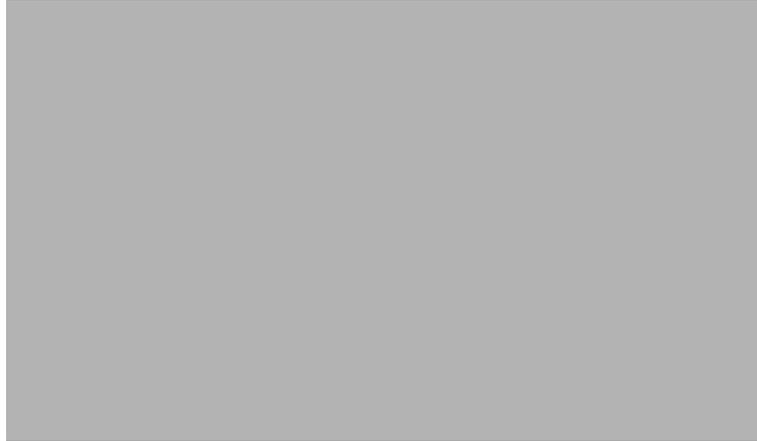
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**Note**

This server does not support odd numbers of DIMMs in a channel, or a configuration of 6 DIMMs per channel. These are the only three supported DIMM configurations for a channel. The DIMMs are sold in matched pairs which must be installed in the pairs shown in [Table 7](#). Mixing pairs, even otherwise identical sets within a channel, will lead to memory errors.

[Figure 14](#) shows a logical view of DIMMs and Channels.

**Figure 14**      ***Logical DIMMs and Channels***

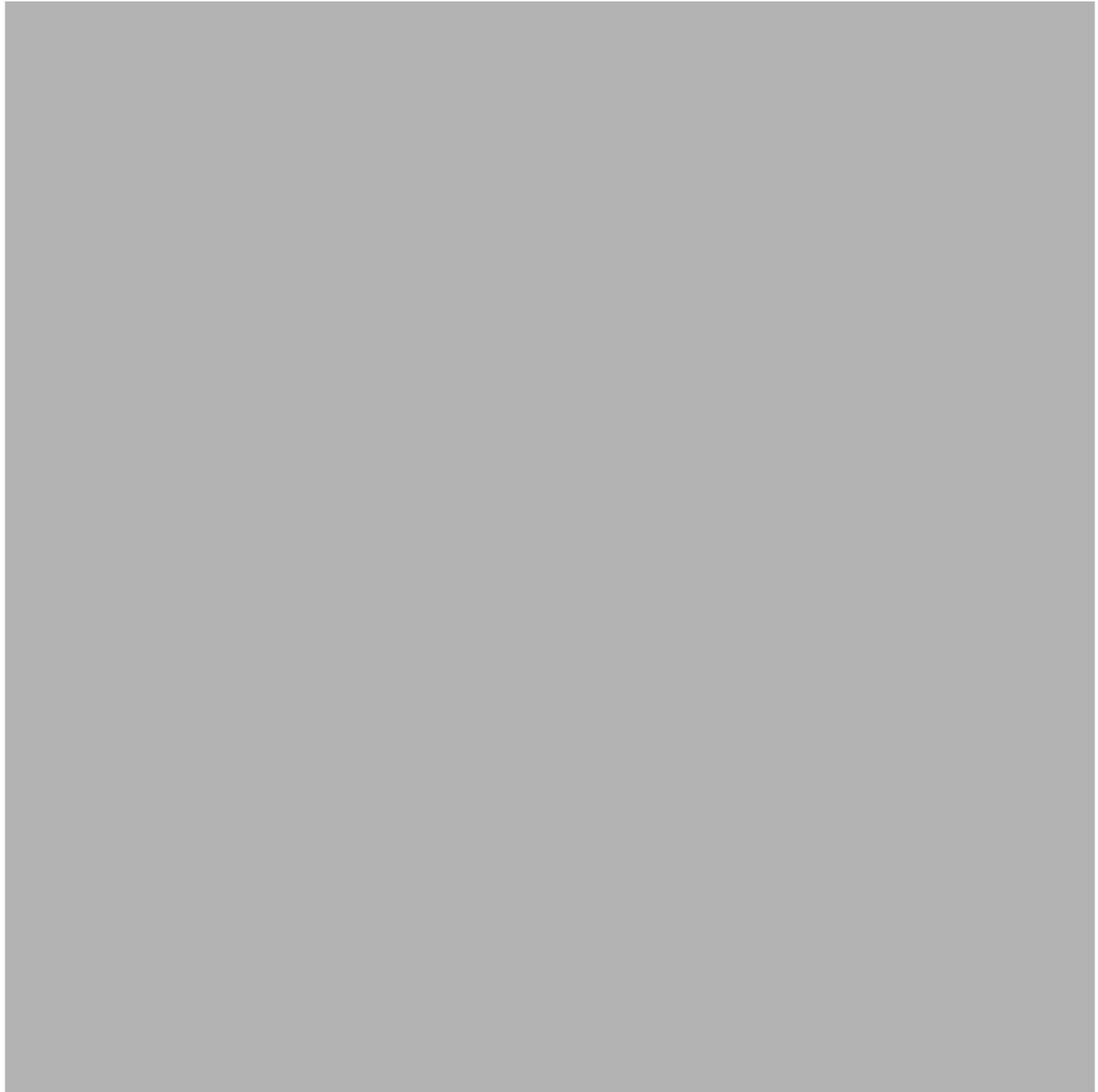


Each CPU in a Cisco UCS B250 blade server supports 2 logical DIMMs (up to 8 physical DIMMs) and 3 channels.

DIMMs can be used in the extended memory blade server in a 2 DIMM per Channel (2 DPC) configuration, a 4 DIMM per channel (4 DPC), or in an 8 DIMMs per Channel (8 DPC) configuration using the slots described in [Table 7](#). The physical layout of the slots is shown in [Figure 15](#).

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**Figure 15**      *Physical Representation of DIMMs and Channels*



**Note**

---

The memory in the right column cannot communicate with the memory in left column unless both CPUs are present.

---

## Memory Performance

When considering the memory configuration of your extended memory blade server, there are several things you need to consider.

- All DIMMs within the Extended Memory blade server should use the same clock frequencies. Mixing clock frequencies is not supported.
- Your selected CPU(s) can have some effect on performance. If two CPUs are used, both must be of the same type.

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- DIMMs can be run in a 2 DIMM per-Channel, 4 DIMM per-Channel, or an 8 DIMM per-channel configuration. Each arrangement can provide different behavior.

## Bandwidth and Performance

You can achieve maximum bandwidth, performance, and system memory using the following configuration:



**Note**

M1 models are optimized at 1066 MT/s DDR3 operation. M2 models support 1333 MT/s DDR3 operation when running with a memory voltage of 1.5V, given CPUs supporting this speed; and 1066MT/s DDR operation when running in LV mode, given CPUs and DIMMs supporting this configuration.

- 8 DIMM per-Channel (48 DIMMs)
- Maximum capacity of 384 GB (using 8-GB DIMMs)

Recommendations for achieving performance of 1333 MHz on B250 M1 servers:

- Ensure the server is running the 1.3(1) or later BIOS version. If a BIOS upgrade is needed, do it before installing processors or memory.
- Use Intel Xeon X5570 or X5550 processors (PIDs N20-X00001 and N20-X00006).
- Use only Cisco certified single or dual rank DIMMs that support 1333 MHz speeds (see [Table 3](#)). DIMMs do not have to be identical in type or capacity, but beware of the caveats listed in the section below regarding performance degradation.
- Always set the system BIOS to operate the DIMMs in "Performance" mode in order to run at 1333 MHz.
- Fully populating 1 bank or 2 banks with DIMMs will ensure optimal memory bandwidth running at the 1333 MHz speed. If DIMMs are partially populated in 1 bank (less than 6 DIMMs) or 2 bank patterns (less than 12 but greater than 6 DIMMs) the 1333 MHz speed can be used, but the overall memory bandwidth will not be optimal.

Recommendations for achieving performance of 1333 MHz on B250 M2 servers:

- Use Intel Xeon X5680, X5670, or X5650 processors (see [Table 4](#)).
- Use only Cisco certified single or dual rank DIMMs that support 1333 MHz speeds (see [Table 6](#)). DIMMs do not have to be identical in type or capacity, but beware of the caveats listed in the section below regarding performance degradation.
- Always set the system BIOS to operate the DIMMs in "Performance" mode in order to run at 1333 MHz.
- Fully populating 1 bank or 2 banks with DIMMs will ensure optimal memory bandwidth running at the 1333 MHz speed. If DIMMs are partially populated in 1 bank (less than 6 DIMMs) or 2 bank patterns (less than 12 but greater than 6 DIMMs) the 1333 MHz speed can be used, but the overall memory bandwidth will not be optimal.

### Performance Loss

Performance will be less than optimal if you unevenly populate DIMMs between CPUs. Depending on the application needed, performance loss might or might not be noticeable or measurable.

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## Memory Mirroring and RAS

The Intel CPUs within the blade server support memory mirroring only when no more than two channels are populated with DIMMs. If three channels are populated with DIMMs, memory mirroring is automatically disabled. Furthermore, if memory mirroring is used, DRAM size is reduced by 50% for reasons of reliability.

If this RAS (Reliability, Availability, and Serviceability) option is required, Memory RAS Config should be set to 'Mirroring' and channel 3 must not be populated. Other RAS features (such as ECC) are not related to the status of the third memory channel.

## Removing or Installing an Adapter Card

The Cisco UCS B250 blade server can accept up to two dual-port adapter card connections for up to 40 Gbps of redundant I/O throughput. The network adapters and interface cards all have a shared installation process. [Table 8](#) and [Table 9](#) show the available options:

**Table 8** M1 Model Adapter Card Options

| Cisco Product ID            | Name   |
|-----------------------------|--|
| N20-AI0002                  | Cisco UCS 82598KR-CI 10 Gb Ethernet Adapter                          |
| N20-AQ0002 or<br>N20-AE0002 | Cisco UCS M71KR-E/Q Converged Network Adapter                        |
| N20-AC0002                  | Cisco UCS M81KR Virtual Interface Card                               |
| N20-AB0002                  | Cisco UCS NIC M51KR-B Broadcom BCM57711 Network Adapter <sup>1</sup> |
| N20-AI0102                  | Cisco UCS CNA M61KR-I Intel Converged Network Adapter <sup>1</sup>   |
| N20-AQ0102                  | Cisco UCS CNA M72KR-Q QLogic Converged Network Adapter <sup>1</sup>  |
| N20-AE0102                  | Cisco UCS CNA M72KR-E Emulex Converged Network Adapter <sup>1</sup>  |

1. Requires UCS Manager 1.3(1) or later.

**Table 9** M2 Model Adapter Card Options

| Cisco Product ID            | Name   |
|-----------------------------|--|
| N20-AI0002                  | Cisco UCS 82598KR-CI 10 Gb Ethernet Adapter                          |
| N20-AQ0002 or<br>N20-AE0002 | Cisco UCS M71KR-E/Q Converged Network Adapter                        |
| N20-AB0002                  | Cisco UCS NIC M51KR-B Broadcom BCM57711 Network Adapter <sup>1</sup> |
| N20-AI0102                  | Cisco UCS CNA M61KR-I Intel Converged Network Adapter <sup>1</sup>   |
| N20-AQ0102                  | Cisco UCS CNA M72KR-Q QLogic Converged Network Adapter <sup>1</sup>  |
| N20-AE0102                  | Cisco UCS CNA M72KR-E Emulex Converged Network Adapter <sup>1</sup>  |
| N20-AC0002                  | Cisco UCS M81KR Virtual Interface Card                               |
| UCS-VIC-M82-8P              | Cisco UCS Virtual Interface Card 1280 <sup>2</sup>                   |

1. Requires UCS Manager 1.3(1) or later.

2. Requires UCS Manager 2.0(2) or later.

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A UCS B250 Extended Memory Blade Server can hold two Virtual interface cards of the same type, and as of UCS Manager 1.3(1) you can mix supported Virtual interface cards with either M72KR-E or M72KR-Q (other combinations are not supported).

If you are switching from one type of adapter card to another, before you physically perform the switch make sure you have downloaded the device drivers that match your version of UCS Manager and loaded them into the server's OS. For details refer to the firmware management chapter of one of the UCS Manager software configuration guides. The firmware version for the adapter must match the version of UCS Manager used, and the adapter card must be supported in the UCS Manager version your system uses.



### **Note**

To deploy two Virtual Interface Cards on the UCS B250 Extended Memory Blade Server running ESX 4.0, you will need to upgrade to patch 5 (ESX4.0u1p5) or later release of ESX 4.0.

To remove an adapter card from the extended memory blade server, follow these steps:

- 
- Step 1** Loosen the three captive screws shown in [Figure 16](#).
  - Step 2** Remove the adapter connector from the motherboard connector and pull straight up. Be careful not to damage the connectors.
- 

**Figure 16**      ***Installing an Adapter Card***



To install an adapter card on the extended memory blade server, follow these steps:

- 
- Step 1** Position the adapter board connector above either mother board connector and align the three adapter captive screws to the posts on the motherboard.
  - Step 2** Firmly press the adapter connector into the motherboard connector. If the seating is bad, it may cause the network connection LED to stay amber when the server is restarted.

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**Step 3** Tighten the three captive screws as shown in [Figure 16](#).

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## Server Troubleshooting

For general server troubleshooting information, refer to the “Troubleshooting Server Hardware” chapter of the *Cisco UCS Troubleshooting Guide*.

## Server Configuration

UCS servers are intended to be configured and managed using UCS Manager. Refer to the [UCS Manager configuration guide](#) appropriate for your UCS Manager version.

## Server Specifications

**Table 10** Physical Specifications for the Cisco UCS B250 Blade Server

| Specification | Value                          |
|---------------|--------------------------------|
| Height        | 1.95 inches (50 mm)            |
| Width         | 16.50 inches (419.1 mm)        |
| Depth         | 24.4 inches (620 mm)           |
| Weight        | 25 lbs (11.34 kg) <sup>1</sup> |

1. The system weight listed here is an estimate for a fully configured system and will vary depending on peripheral devices installed.

## Related Documentation

The documentation set for the Cisco Unified Computing System environment is described in full at:

- <http://www.cisco.com/go/unifiedcomputing/b-series-doc>

## Obtaining Documentation and Submitting a Service Request

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

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

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