



Storage Controller Considerations

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Supported Storage Controllers and Cables

This server supports a single, PCIe-style, SAS RAID or HBA controller that plugs into a dedicated internal riser. Alternatively, the server has a software-based SATA RAID controller embedded in the system.



Note Do not mix controller types in the server. Do not use the embedded SATA controller and a hardware-based RAID controller card at the same time. This combination is not supported and could result in data loss.



Note NVMe PCIe SSDs cannot be controlled by a SAS/SATA RAID controller.

This server supports the RAID and HBA controller options and cable requirements shown in the following table.

Controller	Server Version/Maximum Drives Controlled	RAID Levels	Optional Supercap Backup?	Required Cables

Embedded RAID (PCH SATA)	This controller is supported only in these server versions: <ul style="list-style-type: none"> • All server versions can use the embedded SATA controller to control two internal SATA M.2 drives. • SFF 10-drives (C220M5SX): 8 front-loading SATA drives (drive bays 1 - 8) • LFF 4-drives (C220M5L): 4 front-loading SATA drives 	0, 1, 10	No	Use SAS/SATA cable included with chassis to connect interposer board to drive backplane.
Cisco 12G Modular RAID Controller Controller is orderable only as UCSC-MRAID1G-KIT	This controller is supported only in this server version: <ul style="list-style-type: none"> • LFF 4-drives (C220M5L): 4 front-loading SAS/SATA drives 	0, 1, 5, 6, 10, 50, 60 JBOD mode is also supported.	Yes	Use SAS/SATA cable included with chassis to connect controller to drive backplane.
Cisco 12G Modular RAID Controller with 2-GB cache UCSC-RAID-M5 Includes 2-GB cache	This controller is supported only in these server versions: <ul style="list-style-type: none"> • SFF 10-drives (C220M5SX): 10 front-loading SAS/SATA drives 	0, 1, 5, 6, 10, 50, 60 JBOD mode is also supported.	Yes	Use SAS/SATA cable included with chassis to connect controller to drive backplane.
Cisco 12G Modular SAS HBA UCSC-SAS-M5	This controller is supported only in these server versions: <ul style="list-style-type: none"> • SFF 10-drives (C220M5SX): 10 front-loading SAS/SATA drives 	Non-RAID	No	Use SAS/SATA cable included with chassis to connect controller to drive backplane.
Cisco 12G 9400-8e HBA for external JBOD attach UCSC-9400-8E	Supported in all server versions: 8 external SAS/SATA ports, controlling up to 1024 external drives.	Non-RAID	No	External drive cables not sold by Cisco. NOTE: This HBA does not support optical cables for connection to external storage (copper only).
Cisco Boot-Optimized M.2 RAID Controller UCS-M2-HWRAID	Supported in all server versions. Controls two SATA M.2 drives that mount to this controller.	1 JBOD mode is also supported.	No	None. Controller connects to motherboard socket.

Storage Controller Card Firmware Compatibility

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

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



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

RAID Backup (Supercap)

This server supports installation of one supercap unit. The unit mounts to a bracket in-line with the fan modules.

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

For supercap unit replacement instructions, see [Replacing the Supercap \(RAID Backup\)](#).

Write-Cache Policy for Cisco 12G SAS Modular RAID Controller

For this server and other Cisco Generation M5 servers, the default write-cache policy for the Cisco Modular RAID controller is *Write Through* (irrespective of the presence of a charged Supercap or “good BBU”). This utilizes the optimal performance characteristics of the controller.

The write policy can be set to *Write Back*, if preferred. You can set the write policy using the following methods:

- For standalone servers, use the Cisco IMC interface to set Virtual Drive Properties > Write Policy. See the “Managing Storage Adapters” section in your Cisco IMC Configuration Guide.

[Cisco IMC GUI and CLI Configuration Guides](#)

- For Cisco UCS-integrated servers, use the Cisco UCS Manager interface to set the write-cache policy as part of virtual drive configuration in your storage profile.

[Cisco UCS Manager Configuration Guides](#)

- Use the LSI Option ROM Configuration Utility.

Mixing Drive Types in RAID Groups

The following table lists the technical capabilities for mixing hard disk drive (HDD) and solid state drive (SSD) types in a RAID group. However, see the recommendations that follow for the best performance.

Table 1: Mixing Drive Types

Mix of Drive Types in RAID Group	Allowed?
SAS HDD + SATA HDD	Yes
SAS SSD + SATA SSD	Yes
HDD + SSD	No

Drive Type Mixing Best Practices

For the best performance follow these guidelines:

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

RAID Controller Migration

This server supports SAS/SATA hardware RAID (controller card) and embedded software SATA RAID. You cannot use hardware RAID and software RAID at the same time. See the table below for which data migrations are allowed and a summary of migration steps.

Starting RAID Controller	Migrate to Hardware RAID Allowed?	Migrate to Software RAID Allowed?
None (no drives).	Allowed	Allowed
Embedded RAID is disabled in the BIOS.	<ol style="list-style-type: none"> 1. Install RAID card. 2. Install SAS cables. 	<ol style="list-style-type: none"> 1. Install SATA interposer card. 2. Install SATA cables. 3. Enable embedded RAID in BIOS.

<p>Embedded software RAID.</p> <p>Embedded RAID is enabled in the BIOS.</p>	<p>Caution Data migration from software RAID to hardware RAID is <i>not</i> supported and could result in data loss.</p> <p>Allowed only before there is data on the drives; data migration is not supported.</p> <ol style="list-style-type: none"> 1. Disable embedded RAID in the BIOS. 2. Install RAID card. 3. Install SAS cables. 	-
<p>Hardware RAID.</p> <p>Embedded RAID is disabled in the BIOS.</p>	-	Not allowed.

Storage Controller and Backplane Connectors

This section describes cabling connections for the storage controllers and the backplane. The SAS/SATA cables are factory-installed and are used for all supported internal controllers in both the SFF 10-drive (UCSC-C220-M5SX) and LFF 4-drive (UCSC-C220-M5L) versions of the server.

This section also contains diagrams that show the cable-to-drive mapping.



Note The SFF 10-drive version UCSC-C220-M5SN supports NVMe drives only, and so does not use SAS or SATA RAID. This version of the server comes with an NVMe-switch card factory-installed in the internal mRAID riser and a PCIe cable connected to PCIe riser 2. The NVMe switch card is not orderable separately.

Embedded RAID

This SW RAID option can control up to 8 SATA drives in the SFF 10-drive version and up to 4 SATA drives in the LFF 4-drive version.

This embedded RAID option requires that you have a SATA interposer card installed in internal mRAID riser 3. Use the SAS/SATA cables that came with the server.

1. Connect SAS/SATA cable A1 from the A1 interposer connector to the A1 backplane connector.
2. Connect SAS/SATA cable A2 from the A2 interposer connector to the A2 backplane connector.



Note See the following figures that illustrate cable connections and which drives are controlled by each cable. In the SFF 10-drive version, drives 5 and 10 cannot be controlled by the embedded SATA RAID controller.

Figure 1: Embedded RAID Interposer Cable-to-Drive Backplane Mapping, LFF 4-Drive Version

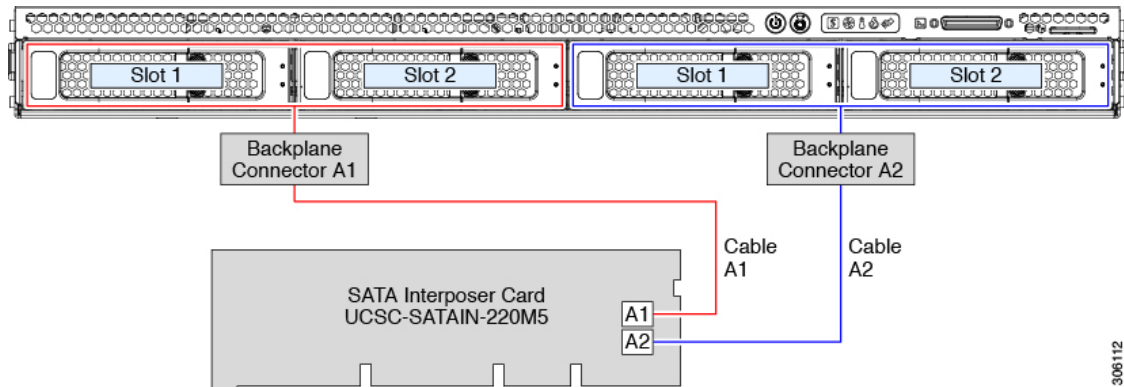
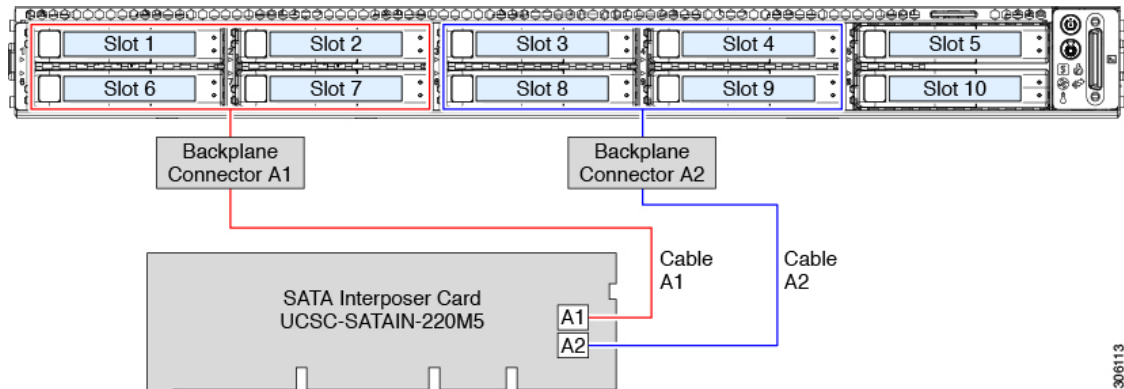


Figure 2: Embedded RAID Interposer Cable-to-Drive Backplane Mapping, SFF 10-Drive Version



Cisco 12G Modular SAS RAID Controller or HBA

This HW RAID option can control up to 10 SAS/SATA drives in the SFF 10-drive version and up to 4 SAS/SATA drives in the LFF 4-drive version.

This option requires that you have a SAS RAID or HBA card installed in internal mRAID riser 3. Use the SAS/SATA cables that came with the server.

1. Connect SAS/SATA cable A1 from the A1 card connector to the A1 backplane connector.
2. Connect SAS/SATA cable A2 from the A2 card connector to the A2 backplane connector.
3. For SFF-10-drive servers only: Connect SAS/SATA cable B2 from the B2 card connector to the B2 backplane connector.



Note See the following figures that illustrate cable connections and which drives are controlled by each cable.

Figure 3: Hardware RAID Card Cable-to-Drive Backplane Mapping, LFF 4-Drive Version

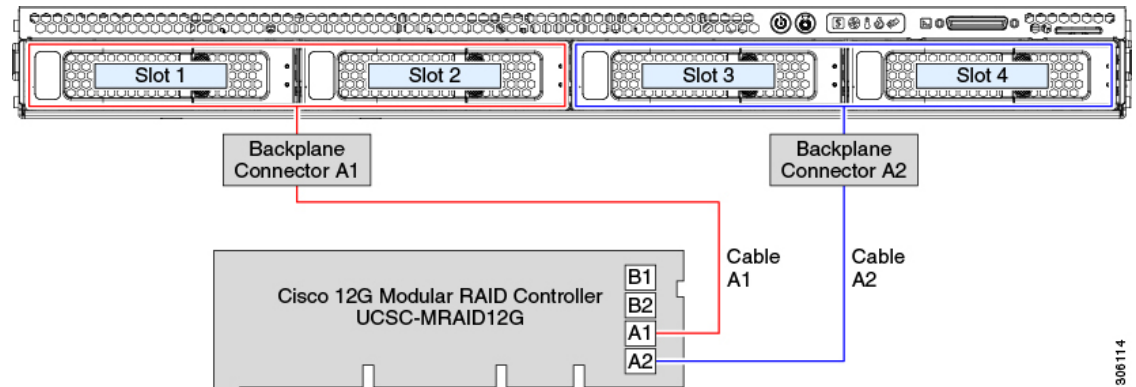
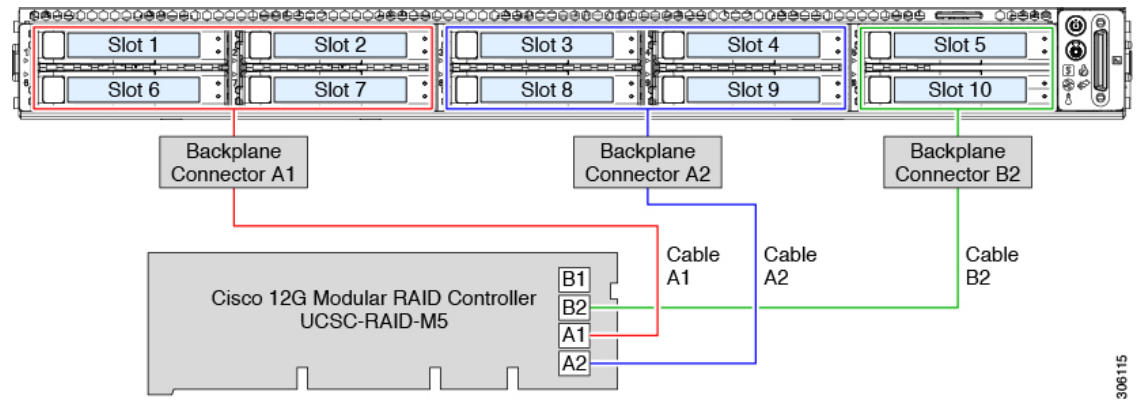


Figure 4: Hardware RAID Card Cable-to-Drive Backplane Mapping, SFF 10-Drive Version



Embedded SATA RAID Controller

This server includes an embedded MegaRAID controller that supports RAID levels 0 and 1. The primary controller can control up to eight front-loading SATA-only drives. The secondary controller can control two internal M.2 SATA drives.



Note The VMware ESX/ESXi operating system is not supported with the embedded SATA MegaRAID controller in SW RAID mode. You can use VMWare in AHCI mode.



Note The Microsoft Windows Server 2016 Hyper-V hypervisor is supported for use with the embedded MegaRAID controller in SW RAID mode, but all other hypervisors are not supported. All Hypervisors are supported in AHCI mode.



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

Embedded SATA RAID Requirements

The embedded SATA RAID controller requires the following items:

- Interposer card UCSC-SATAIN-220M5. This must be installed in internal mRAID riser 3.
- The SAS/SATA cables that are preinstalled in the chassis.
- Primary controller: SATA drives only (up to eight, in front drive bays 1–8).
- Secondary controller: M.2 mini-storage module with two SATA M.2 SSDs.
- The embedded SATA RAID controllers must be enabled in the server BIOS. If you ordered the server with embedded SATA RAID, it is enabled at the factory.
- (Optional) LSI MegaSR drivers for Windows or Linux.
- The software RAID controller requires UEFI boot mode; Legacy boot mode is not supported.
- If you use an embedded RAID controller with Linux, both the pSATA and the sSATA controller must be set to `LSI SW RAID` mode.

Embedded SATA RAID Controller Considerations

Note the following considerations:

- The default setting for this embedded controller hub is SATA RAID 0, 1, and 10 support for up to eight front-loading SATA drives, and up to two internal M.2 SATA drives. The hub is divided into two SATA controllers that have different functions. See [Embedded SATA RAID: Two SATA Controllers, on page 9](#).
- When you order the server with this embedded controller, the controller is enabled in the BIOS. Instructions for enabling the controller are included for the case in which a server is reset. See [Enabling SATA Mode For the Embedded Controllers, on page 9](#).
- You cannot downgrade from using a hardware RAID controller card to using the software RAID embedded controller (see [RAID Controller Migration, on page 4](#)).



Caution Data migration from software RAID (embedded RAID) to hardware RAID (a controller card) is not supported and could result in data loss. Migrations from software RAID to hardware RAID are supported only before there is data on the drives, or when there are no drives in the server.

- The required drivers for this controller are already installed and ready to use with the LSI SWRAID Configuration Utility. However, if you will use this controller with Windows or Linux, you must download

and install additional drivers for those operating systems. See [Installing LSI MegaSR Drivers For Windows and Linux, on page 11](#).

Embedded SATA RAID: Two SATA Controllers

The embedded RAID platform controller hub (PCH) is split into two controllers: primary SATA (pSATA) and secondary SATA (sSATA). These two controllers are seen as separate RAID controllers in the Cisco IMC interface and are configurable separately.

- SFF 10-drives server UCSC-C220-M5SX:
 - The pSATA controller controls up to eight front SATA drives (drive bays 1–8).
 - The sSATA controller controls two internal SATA M.2 drives, when they are present in the M.2 mini-storage module option.
 - If the M.2 mini-storage module is not present, or if M.2 NVMe drives are installed in the mini-storage module, the sSATA controller is automatically disabled.
- SFF 10-drives NVMe-optimized server UCSC-C220-M5SN:
 - The pSATA controller is disabled.
 - The sSATA controller controls two internal SATA M.2 drives, when they are present in the M.2 mini-storage module option.
 - If the M.2 mini-storage module is not present, or if M.2 NVMe drives are installed in the mini-storage module, the sSATA controller is automatically disabled.
- LFF 4-drives server UCSC-C220-M5L:
 - The pSATA controller controls front-loading SATA drives in bays 1-4.
 - The sSATA controller controls two internal SATA M.2 drives, when they are present in the M.2 mini-storage module option.
 - If the M.2 mini-storage module is not present, or if M.2 NVMe drives are installed in the mini-storage module, the sSATA controller is automatically disabled.
- Each controller is listed separately in the BIOS. You can enable or disable the controllers in the BIOS. See [Embedded SATA RAID: Two SATA Controllers, on page 9](#).

Enabling SATA Mode For the Embedded Controllers

This procedure uses the server's BIOS Setup Utility.



Note If you use an embedded RAID controller with Linux, both the pSATA and the sSATA controller must be set to LSI SW RAID mode.

Step 1 Boot the server and press **F2** when prompted to enter the BIOS Setup utility.

Step 2 Set the SATA mode:

a) Choose the **Advanced** tab, and then choose **LOM and PCIe Slots Configuration**.

b) For the primary pSATA controller, select **pSATA** and then choose one of the options from the dialog:

- LSI SW RAID—Enable the embedded pSATA RAID controller.

Note This menu option does not appear when the server is set to boot in Legacy mode (UEFI mode is required). To change the boot mode, use the BIOS setting for **Boot Options > Boot Mode**.

- Disabled—Disable the embedded pSATA RAID controller.

c) For the secondary sSATA controller, select **M.2** and then choose one of the options from the dialog:

- LSI SW RAID—Enable the embedded sSATA RAID controller for control of internal SATA M.2 drives.

Note This menu option does not appear when the server is set to boot in Legacy mode (UEFI mode is required). To change the boot mode, use the BIOS setting for **Boot Options > Boot Mode**.

Note This menu option does not appear when the server has no M.2 mini storage module, or when no SATA M.2 drive is installed in the mini-storage module.

- AHCI—Enable control of the internal SATA M.2 drives by AHCI through your OS rather than the embedded RAID controller.

- Disabled—Disable the embedded sSATA RAID controller.

Step 3 Press **F10** to save your changes and exit the utility.

Accessing the Software RAID Configuration Utility

To configure RAID settings for the embedded SATA RAID controllers, use the utility that is built into the BIOS. Each controller is controlled by its own instance of the utility.

Step 1 Boot the server and press **F2** when prompted to enter the BIOS Setup utility.

Step 2 Choose the **Advanced** tab.

Step 3 Select the instance of the utility that is for the controller that you want to manage (primary or secondary):

- For the pSATA controller, select **LSI Software RAID Configuration Utility (SATA)**.
 - For the sSATA controller, select **LSI Software RAID Configuration Utility (sSATA)**.
-

Installing LSI MegaSR Drivers For Windows and Linux



Note The required drivers for this controller are already installed and ready to use. However, if you will use this controller with Windows or Linux, you must download and install additional drivers for those operating systems.

This section explains how to install the LSI MegaSR drivers for the following supported operating systems:

- Microsoft Windows Server
- Red Hat Enterprise Linux (RHEL)
- SUSE Linux Enterprise Server (SLES)

For the specific supported OS versions, see the [Hardware and Software Compatibility Matrix](#) for your server release.

Downloading the MegaSR Drivers

The MegaSR drivers are included in the C-Series driver ISO for your server and OS.

-
- Step 1** Find the drivers ISO file download for your server online and download it to a temporary location on your workstation:
- a) See the following URL: <http://www.cisco.com/cisco/software/navigator.html>.
 - b) Type the name of your server in the **Select a Product** search field and then press **Enter**.
 - c) Click **Unified Computing System (UCS) Drivers**.
 - d) Click the release number that you are downloading.
 - e) Click the Download icon to download the drivers ISO file.
- Step 2** Continue through the subsequent screens to accept the license agreement and then browse to a location where you want to save the driver ISO file.
-

Microsoft Windows Server Drivers

Installing Microsoft Windows Server Drivers

The Windows Server operating system automatically adds the driver to the registry and copies the driver to the appropriate directory.

Before you begin

Before you install this driver on an embedded controller, you must configure a RAID drive group on the embedded controller for the drives where you will install the OS (pSATA and/or sSATA).

To access the configuration utility, open the BIOS Setup Utility, go to the **Advanced** tab, and then choose the utility instance for the embedded controller:

- For pSATA, select **LSI Software RAID Configuration Utility (SATA)**
- For sSATA, select **LSI Software RAID Configuration Utility (sSATA)**

-
- Step 1** Download the Cisco UCS C-Series drivers' ISO, as described in [Downloading the MegaSR Drivers, on page 11](#).
- Step 2** Prepare the drivers on a USB thumb drive:
- Burn the ISO image to a disk.
 - Browse the contents of the drivers folders to the location of the embedded MegaRAID drivers:
/<OS>/Storage/Intel/C600-M5/
 - Expand the Zip file, which contains the folder with the MegaSR driver files.
 - Copy the expanded folder to a USB thumb drive.
- Step 3** Start the Windows driver installation using one of the following methods:
- To install from local media, connect an external USB DVD drive to the server and then insert the first Windows installation disk into the drive. Skip to Step 6.
 - To install from remote ISO, log in to the server's Cisco IMC interface and continue with the next step.
- Step 4** Launch a Virtual KVM console window and click the **Virtual Media** tab.
- Click **Add Image** and browse to select your remote Windows installation ISO file.
 - Check the check box in the **Mapped** column for the media that you just added, and then wait for mapping to complete.
- Step 5** Power cycle the server.
- Step 6** Press **F6** when you see the F6 prompt during bootup. The Boot Menu window opens.
- Step 7** On the Boot Manager window, choose the physical disk or virtual DVD and press **Enter**. The Windows installation begins when the image is booted.
- Step 8** Press **Enter** when you see the prompt, "Press any key to boot from CD."
- Step 9** Observe the Windows installation process and respond to prompts in the wizard as required for your preferences and company standards.
- Step 10** When Windows prompts you with "Where do you want to install Windows," install the drivers for embedded MegaRAID:
- Click **Load Driver**. You are prompted by a Load Driver dialog box to select the driver to be installed.
 - Connect the USB thumb drive that you prepared in Step 3 to the target server.
 - On the Windows Load Driver dialog, click **Browse**.
 - Use the dialog box to browse to the location of the drivers folder on the USB thumb drive, and then click **OK**.
Windows loads the drivers from the folder and when finished, the driver is listed under the prompt, "Select the driver to be installed."
 - Click **Next** to install the drivers.
-

Updating Microsoft Windows Server Drivers

- Step 1** Click **Start**, point to **Settings**, and then click **Control Panel**.
- Step 2** Double-click **System**, click the **Hardware** tab, and then click **Device Manager**. Device Manager starts.
- Step 3** In Device Manager, double-click **SCSI and RAID Controllers**, right-click the device for which you are installing the driver, and then click **Properties**.

- Step 4** On the Driver tab, click **Update Driver** to open the Update Device Driver wizard, and then follow the wizard instructions to update the driver.

Linux Drivers

Downloading the Driver IMG or ISO File

See [Downloading the MegaSR Drivers, on page 11](#) for instructions on downloading the drivers. Within the Cisco UCS Drivers ISO image, the MegaSR driver is included in a `dud-[driver version].img` (or `dd.iso`).



Note The LSI MegaSR drivers that Cisco provides for RHEL and SLES are for the original GA versions of those distributions. The drivers do not support updates to those OS kernels.

Preparing Physical Thumb Drive for Linux

This topic describes how to prepare physical Linux thumb drive from the driver image files.

This procedure requires a CD or DVD drive that you can use to burn the ISO image to disk; and a USB thumb drive.

Alternatively, you can mount the `dud.img` file as a virtual disk, as described in the installation procedures.

For RHEL and SLES, you can use a driver disk utility to create disk images from image files.

- Step 1** Download the Cisco UCS C-Series drivers ISO, as described in [Downloading the MegaSR Drivers, on page 11](#) and save it to your Linux system.

- Step 2** Extract the `dud.img` or `dd.iso` driver file:

Note For RHEL 7.1 and later, there is no `dud.img` file--the driver is contained in a `dd.iso` file.

- a) Burn the Cisco UCS C-Series Drivers ISO image to a disc.
- b) Browse the contents of the drivers folders to the location of the embedded MegaRAID drivers:
/`<OS>`/Storage/Intel/C600-M5/
- c) Expand the Zip file, which contains the folder with the driver files.

- Step 3** Copy the driver update disk image `dud-[driver version].img` (or `dd.iso`) to your Linux system.

- Step 4** Insert a blank USB thumb drive into a port on your Linux system.

- Step 5** Create a directory and mount the `dud.img` or `dd.iso` image to that directory:

Example:

```
mkdir <destination_folder>
mount -o loop <driver_image> <destination_folder>
```

- Step 6** Copy the contents in the directory to your USB thumb drive.

Installing the Red Hat Enterprise Linux Driver

For the specific supported OS versions, see the [Hardware and Software Compatibility Matrix](#) for your server release.

This topic describes the fresh installation of the RHEL device driver on systems that have the embedded MegaRAID stack.



Note If you use an embedded RAID controller with Linux, both the pSATA and the sSATA controller must be set to `LSI SW RAID` mode.

Before you begin

Before you install this driver on an embedded controller, you must configure a RAID drive group on the embedded controller that controls the drives where you will install the OS (pSATA and/or sSATA).

To access the configuration utility, open the BIOS Setup Utility, go to the **Advanced** tab, and then choose the utility instance for the embedded controller:

- For pSATA, select **LSI Software RAID Configuration Utility (SATA)**
- For sSATA, select **LSI Software RAID Configuration Utility (sSATA)**

Step 1 Prepare the `dud.img` (or `dd.iso`) file using one of the following methods:

Note For RHEL 7.1 and later, there is no `dud.img` file--the driver is contained in a `dd.iso` file.

- To install from physical drive, use the procedure in [Preparing Physical Thumb Drive for Linux, on page 13](#), then continue with step 3.
- To install from *virtual* disk, download the Cisco UCS C-Series drivers' ISO, as described in [Downloading the MegaSR Drivers, on page 11](#), then continue with the next step.

Step 2 Extract the `dud.img` (or `dd.iso`) file:

- Burn the Cisco UCS C-Series Drivers ISO image to a disk.
- Browse the contents of the drivers folders to the location of the embedded MegaRAID drivers:
`/<OS>/Storage/Intel/C600-M5/`
- Copy the `dud-<driver version>.img` (or `dd.iso`) file to a temporary location on your workstation.
- If you are using RHEL 7.x, rename the saved `dd.iso` to `dd.img`.

Note If you are using RHEL 7.x, renaming the `dd.iso` file to `dd.img` simplifies this procedure and saves time. The Cisco UCS virtual drive mapper can map only one `.iso` at a time, and only as a virtual CD/DVD. Renaming the file to `dd.img` allows you to mount the RHEL installation ISO as a virtual CD/DVD and the renamed `dd.img` as a virtual floppy disk or removable disk at the same time. This avoids the steps of unmounting and remounting the RHEL ISO when the `dd.iso` driver file is prompted for.

Step 3 Start the Linux driver installation using one of the following methods:

- To install from local media, connect an external USB CD/DVD drive to the server and then insert the first RHEL installation disk into the drive. Then continue with Step 5.

- To install from virtual disk, log in to the server's Cisco IMC interface. Then continue with the next step.

Step 4 Launch a Virtual KVM console window and click the **Virtual Media** tab.

- Click **Add Image** and browse to select your remote RHEL installation ISO image.

Note An .iso file can be mapped only as a virtual CD/DVD.

- Click **Add Image** again and browse to select your RHEL 6.x `dud.img` or the RHEL 7.x `dd.img` file that you renamed in step 2.

Note Map the .img file as a virtual floppy disk or virtual removable disk.

- Check the check boxes in the **Mapped** column for the media that you just added, then wait for mapping to complete.

Step 5 Power-cycle the target server.

Step 6 Press **F6** when you see the F6 prompt during bootup. The Boot Menu window opens.

Note Do not press Enter in the next step to start the installation. Instead, press **e** to edit installation parameters.

Step 7 On the Boot Menu window, use the arrow keys to select **Install Red Hat Enterprise Linux** and then press **e** to edit installation parameters.

Step 8 Append one of the following blacklist commands to the end of the line that begins with **linuxefi**:

- For RHEL 6.x (32- and 64-bit), type:

```
linux dd blacklist=iscsi blacklist=ahci nodmraid noprobe=<atadrive number>
```

Note The noprobe values depend on the number of drives. For example, to install RHEL 6.x on a RAID 5 configuration with three drives, type:

```
Linux dd blacklist=iscsi blacklist=ahci nodmraid noprobe=ata1 noprobe=ata2
```

- For RHEL 7.x (32- and 64-bit), type:

```
linux dd modprobe.blacklist=ahci nodmraid
```

Step 9 **Optional:** To see full, verbose installation status steps during installation, delete the **Quiet** parameter from the line.

Step 10 On the Boot Menu window, press **Ctrl+x** to start the interactive installation.

Step 11 Below **Driver disk device selection**, select the option to install your driver .img file. (Type **r** to refresh the list if it is not populated.)

Note The installer recognizes the driver file as an .iso file, even though you renamed it to dd.img for mapping.

Type the number of the driver device ISO in the list. Do *not* select the RHEL ISO image. In the following example, type **6** to select device sdb:

```
5) sr0 iso9660 RHEL-7.6\x20Server.x
```

```
6) sdb iso9660 CDROM
```

```
# to select, 'r' - refresh, or 'c' -continue: 6
```

The installer reads the driver file and lists the drivers.

Step 12 Under **Select drivers to install**, type the number of the line that lists the megasr driver. In the following example, type **1**:

```
1) [ ] /media/DD-1/rpms/x86_61/kmod-megasr-18.01.2010.1107_e17.6-1.x86_61.rpm
# to toggle selection, or `c` -continue: 1
```

Your selection is displayed with an X in brackets.

```
1) [X] /media/DD-1/rpms/x86_61/kmod-megasr-18.01.2010.1107_e17.6-1.x86_61.rpm
```

Step 13 Type **c** to continue.

Step 14 Follow the RHEL installation wizard to complete the installation.

Step 15 When the wizard's Installation Destination screen is displayed, ensure that **LSI MegaSR** is listed as the selection. If it is not listed, the driver did not load successfully. In that case, select **Rescan Disc**.

Step 16 After the installation completes, reboot the target server.

Installing the SUSE Linux Enterprise Server Driver

For the specific supported OS versions, see the [Hardware and Software Compatibility Matrix](#) for your server release.

This topic describes the fresh installation of the SLES driver on systems that have the embedded MegaRAID stack.



Note If you use an embedded RAID controller with Linux, both the pSATA and the sSATA controller must be set to `LSI SW RAID` mode.

Before you begin

Before you install this driver on an embedded controller, you must configure a RAID drive group on the embedded controller that controls the drives where you will install the OS (pSATA and/or sSATA).

To access the configuration utility, open the BIOS Setup Utility, go to the **Advanced** tab, and then choose the utility instance for the embedded controller:

- For pSATA, select **LSI Software RAID Configuration Utility (SATA)**
- For sSATA, select **LSI Software RAID Configuration Utility (sSATA)**

Step 1 Prepare the `dud.img` file using one of the following methods:

- To install from physical disk, use the procedure in [Preparing Physical Thumb Drive for Linux, on page 13](#), then continue with step 4.
- To install from *virtual* disk, download the Cisco UCS C-Series drivers ISO, as described in [Downloading the MegaSR Drivers, on page 11](#), then continue with the next step.

Step 2 Extract the `dud.img` file that contains the driver:

- Burn the ISO image to a disk.
- Browse the contents of the drivers folders to the location of the embedded MegaRAID drivers:


```
/<OS>/Storage/Intel/C600-M5/...
```


- c) Within the SLES folder for your version, the `dud-<driver version>.img` file is packaged in a compressed `.gz` file. Extract the `.img` file from the `.gz` file.
- d) Copy the `dud-<driver version>.img` file to a temporary location on your workstation.

Step 3 Start the Linux driver installation using one of the following methods:

- To install from local media, connect an external USB DVD drive to the server and then insert the first SLES installation disk into the drive. Then continue with Step 5.
- To install from remote ISO, log in to the server's Cisco IMC interface. Then continue with the next step.

Step 4 Launch a Virtual KVM console window and click the **Virtual Media** tab.

- a) Click **Add Image** and browse to select your remote SLES installation ISO file.
- b) Click **Add Image** again and browse to select your `dud-<driver version>.img` file.
- c) Check the check boxes in the **Mapped** column for the media that you just added, then wait for mapping to complete.

Step 5 Power-cycle the target server.

Step 6 Press **F6** when you see the F6 prompt during bootup. The Boot Menu window opens.

Step 7 On the Boot Manager window, select the physical or virtual SLES installation ISO and press **Enter**.

The SLES installation begins when the image is booted.

Step 8 When the first SLES screen appears, select **Installation**.

Step 9 Press **e** to edit installation parameters.

Step 10 Append the following parameter to the end of the line that begins with **linuxefi**:

```
brokenmodules=ahci
```

Step 11 **Optional:** To see detailed status information during the installation, add the following parameter to the line that begins with **linuxefi**:

```
splash=verbose
```

Step 12 Press **Ctrl+x** to start the installation.

The installation proceeds. The installer finds the LSI driver automatically in the `dud-<driver version>.img` file that you provided. With verbose status messages, you see the driver being installed when `LSI MegaRAID SW RAID Module` is listed.

Step 13 Follow the SLES installation wizard to complete the installation. Verify installation of the driver when you reach the **Suggested Partitioning** screen:

- a) On the **Suggested Partitioning** screen, select **Expert Partitioner**.
- b) Navigate to **Linux > Hard disks** and verify that there is a device listed for the `LSI - LSI MegaSR` driver. The device might be listed as a type other than `sda`. For example:

```
dev/sdd: LSI - LSI MegaSR
```

If no device is listed, the driver did not install properly. In that case, repeat the steps above.

Step 14 When installation is complete, reboot the target server.

For More RAID Utility Information

The Broadcom utilities have help documentation for more information about using the utilities.

- For basic information about RAID and for using the utilities for the RAID controller cards that are supported in Cisco servers, see the [Cisco Servers RAID Guide](#).
- For hardware SAS MegaRAID configuration—[Broadcom 12Gb/s MegaRAID SAS Software User Guide, Version 2.8](#)
- For embedded software MegaRAID and the utility that is accessed via the server BIOS (refer to Chapter 4)—[Broadcom Embedded MegaRAID Software User Guide, March 2018](#).