# Storage Controller Considerations

This appendix provides storage controller (RAID and HBA) information.

## Supported Storage Controllers and Cables

This server supports a single, PCIe-style, SAS RAID or HBA controller that plugs into a dedicated internal socket.

**Note** For SFF, 12-drives version only: Do not mix controller types in the server. Do not use the embedded SATA controller and a hardware-based RAID controller card to control front-loading drives 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.

| Storage Adapter (PID) | Product Name | Supported Server | Maximum Number of Drives Supported | Supported RAID Type | Cache Size (GB) |
|---|---|---|---|---|---|
| UCSC-RAID-M6T | Cisco 12G SAS RAID Controller with 4GB FBWC (16 Drives) | UCSC-C220-M6S | 10<br><br>10 2.5-inch SFF front-loading drives<br><br>Slots 1-10 | RAID | 4 |
| UCSC-RAID-M6T | Cisco 12G SAS RAID Controller with 4GB FBWC (16 Drives) | UCSC-C240-M6S | 14<br><br>12 2.5-inch SFF front loading plus two 2.5-inch rear-loading drives.<br><br>Slot numbers 1 - 12 plus 103 and 104 | RAID | 4 |
| UCSC-RAID-M6HD | Cisco 12G SAS RAID Controller with 4GB FBWC | UCSC-C240-M6L | 20<br><br>12 3.5-inch LFF front-loading + four 3.5-inch LFF mid-plane mounted + 4 2.5-inch SFF rear-loading drives<br><br>Slots 1 - 16 and 101 - 104 | RAID | 4 |
| UCSC-RAID-M6SD | Cisco 12G SAS RAID Controller with 4GB FBWC (28 Drives) | UCSC-C240-M6SX | 28<br><br>24 2.5-inch SFF front-loading + 4 2.5-inch rear-loading drives<br><br>Slots 1-24 plus 101 - 104 | RAID | 4 |

| Storage Adapter (PID) | Product Name | Supported Server | Maximum Number of Drives Supported | Supported RAID Type | Cache Size (GB) |
|---|---|---|---|---|---|
| UCSC-SAS-M6T | Cisco 12G SAS HBA (16 Drives) | UCSC-C220-M6S | 10<br><br>10 2.5-inch SFF front-loading drives<br><br>Slots 1-10 | SAS HBA | NA |
| UCSC-SAS-M6T | Cisco 12G SAS HBA (16 Drives) | UCSC-C240-M6S | 14<br><br>12 2.5-inch SFF front-loading and 2 2.5-inch SFF rear-loading drives<br><br>Slots 1-12 plus 103 and 104. | SAS HBA | NA |
| UCSC-SAS-M6T | Cisco 12G SAS HBA (16 Drives) | UCSC-C240-M6SX | 28<br><br>2 controllers, each manages 14 drives.<br><br>Controller 1: Slots 1-12 plus 103 and 104<br><br>Controller 2: Slots 13-24 plus 101 and 102 | SAS HBA | NA |
| UCSC-SAS-M6HD | Cisco 12G SAS HBA | UCSC-C240-M6L | 20<br><br>12 3.5-inch LFF front-loading, four 3.5-inch LFF mid-plane mounted, and 4 2.5-inch SFF rear-loading drives | SAS HBA | NA |
| UCSC-9500-8E | Cisco 9500-8e 12G SAS HBA for external JBOD attach | All models of UCS C220 M6 and UCS Cs240 M6 server | NA | SAS HBA | NA |

# 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 Host Upgrade Utility (HUU) for your firmware release to bring it to a compatible level.

**Note** **For servers running in standalone mode only:** After you replace controller hardware (UCSC-RAID-M6T, UCSC-RAID-M6HD, UCSC-RAID-M6SD, UCSC-SAS-M6T, or UCSC-SAS-M6HD), you must run the Cisco UCS Host Upgrade Utility (HUU) to update the controller firmware, even if the firmware Current Version is the same as the Update Version. Running HUU is necessary to program any controller specific values to the storage controller for the specific server. If you do not run HUU, the storage controller may not be discovered..

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.

# 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).

# Mixing Drive Types in RAID Groups

For the best performance follow these guidelines:

- Use either all SAS or all SATA drives in a RAID group.

- Use the same capacity for each drive in the RAID group.

- Never mix HDDs and SSDs in the same RAID group.

# Storage Controller Cable Connectors and Backplanes

This section describes cabling for the storage controllers and backplanes. The SAS/SATA cables are factory-installed and are used for all supported internal controllers.

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

### Cisco M6 12G Modular SAS RAID Controller or HBA For Up To 16 Drives (UCSC-RAID-M6T)

The drive support differs by server version, as described in the following sections. These controllers are supported only in these server versions:
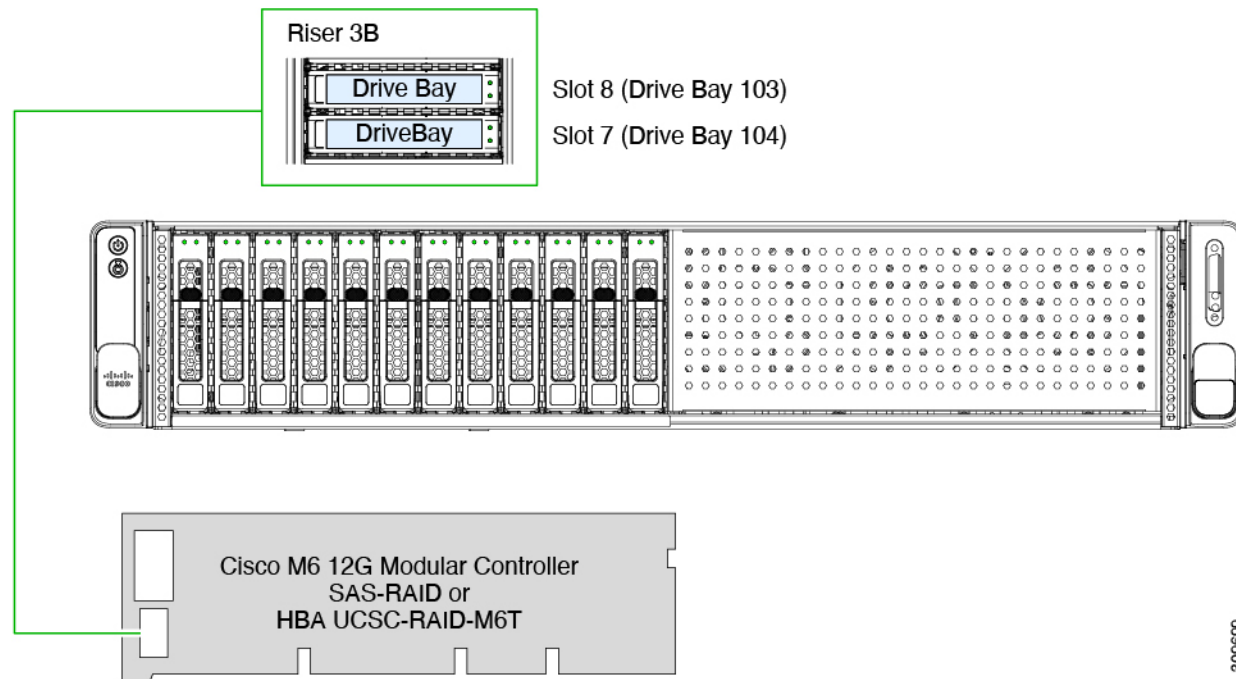
- SFF 12-Drives, SAS/SATA

- SFF 12-Drives NVMe

**SFF 12-Drives SAS/SATA**

This HW RAID or HBA option can control up to 12 front-loading SAS/SATA drives in this server version, plus two rear-loading SAS/SATA drives.

1. Connect a SAS/SATA cable from the small Slimline connector on the RAID card.

2. Connect a SAS/SATA cable to the Riser 3B connector on the PCE Riser 3 cage.

*Figure 1: SFF, 12-Drive UCSC-C240-M6S Cabling With UCSC-RAID-M6T*



### Cisco 12G Modular SAS RAID Controller or HBA For Up To 28 Drives (UCSC-RAID-M6SD)

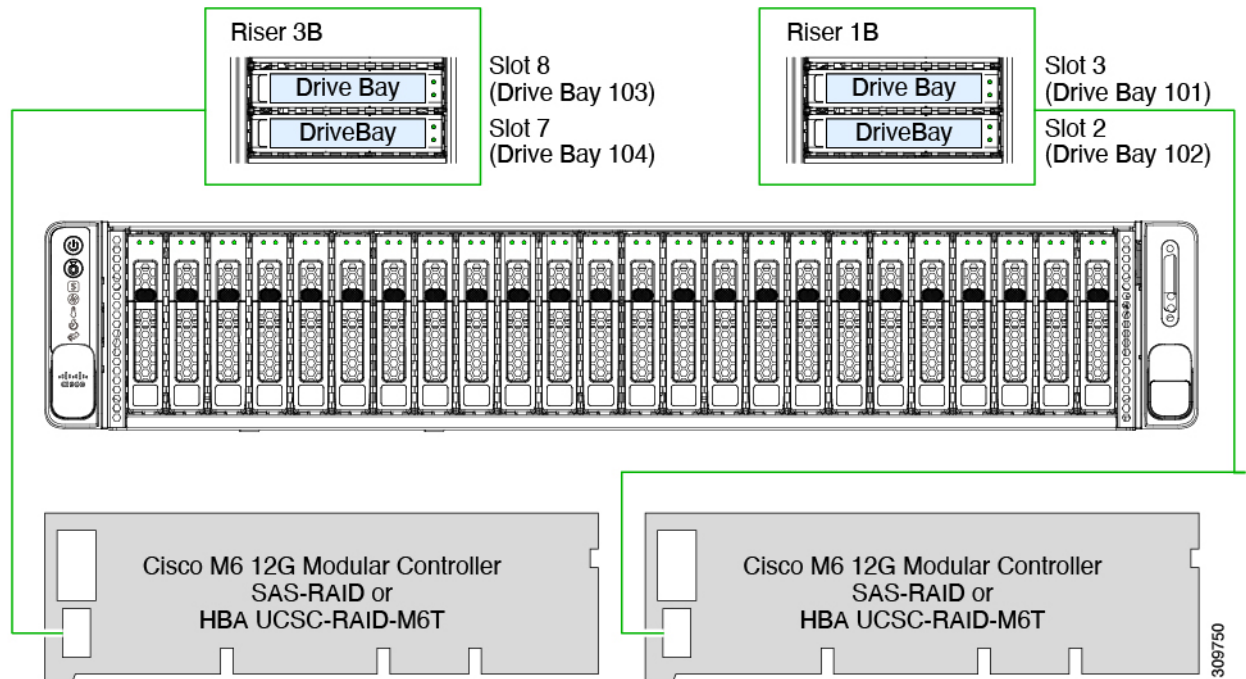This controller is supported only in this server version:

- SFF 24-Drives SAS/SATA

- SFF 24 Drives NVMe

This HW RAID or HBA option can control up to 24 front-loading SAS/SATA drives in this server version, plus 2 rear-loading SAS/SATA drives.

1. Connect a SAS/SATA cable from the small Slimline connector on the RAID card.

2. Connect a SAS/SATA cable to the Riser 3B connector on the PCE Riser 3 cage.

3. Connect a SAS/SATA cable from the second small Slimline connector on the RAID card.

4. Connect a SAS/SATA cable to the Riser 1B connector on the PCE Riser 1 cage.

*Figure 2: SFF, 24-Drive UCSC-C240-M6SX Cabling With UCSC-RAID-M6SD*



### Cisco 12G Modular SAS RAID Controller or HBA For Up To 32 Drives (UCSC-RAID-M6HD)

**LFF 12-Drives**

This HW RAID or HBA option can control up to 12 front-loading SAS/SATA drives in this server version, plus 2 rear-loading SAS/SATA drives, and up to 4 optional mid mount drives. This option is only supported for the LFF drive version of the server.

To connect the RAID card to the front-loading drives, connect the split cable (Y cable) as follows:

1. Connect the single end (1) of the SAS/SATA cable to the RAID card.

2. Connect each of the dual-end connectors (2 and 3) to the two front backplane connectors.
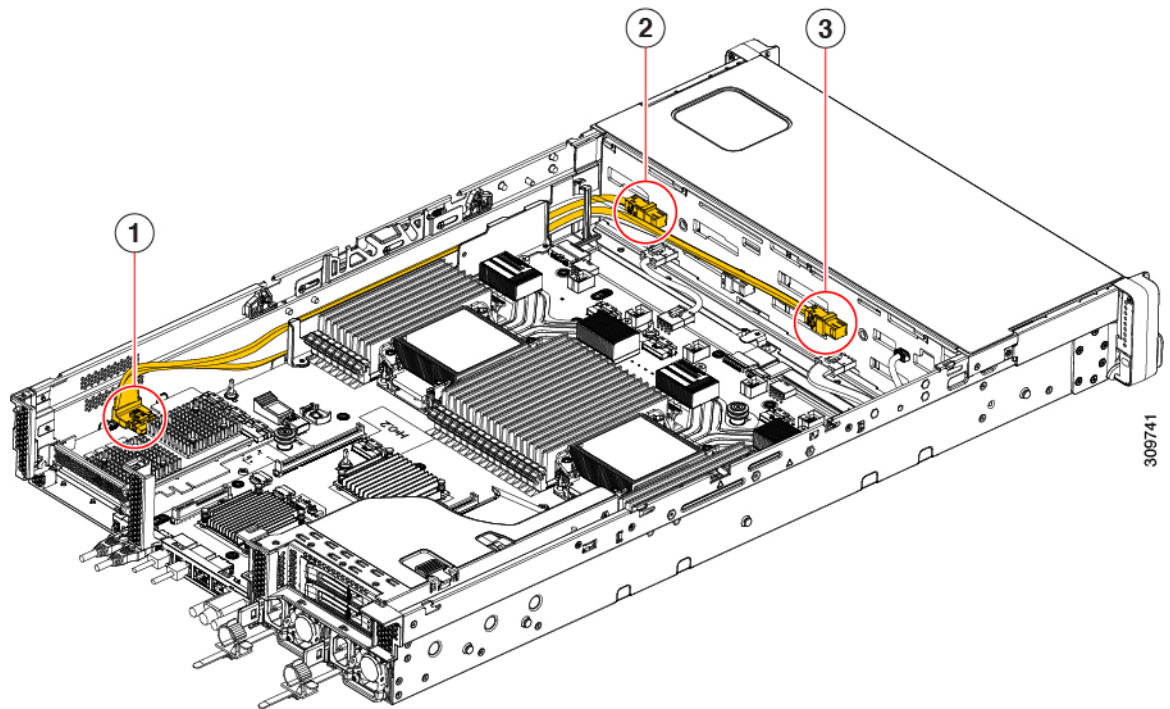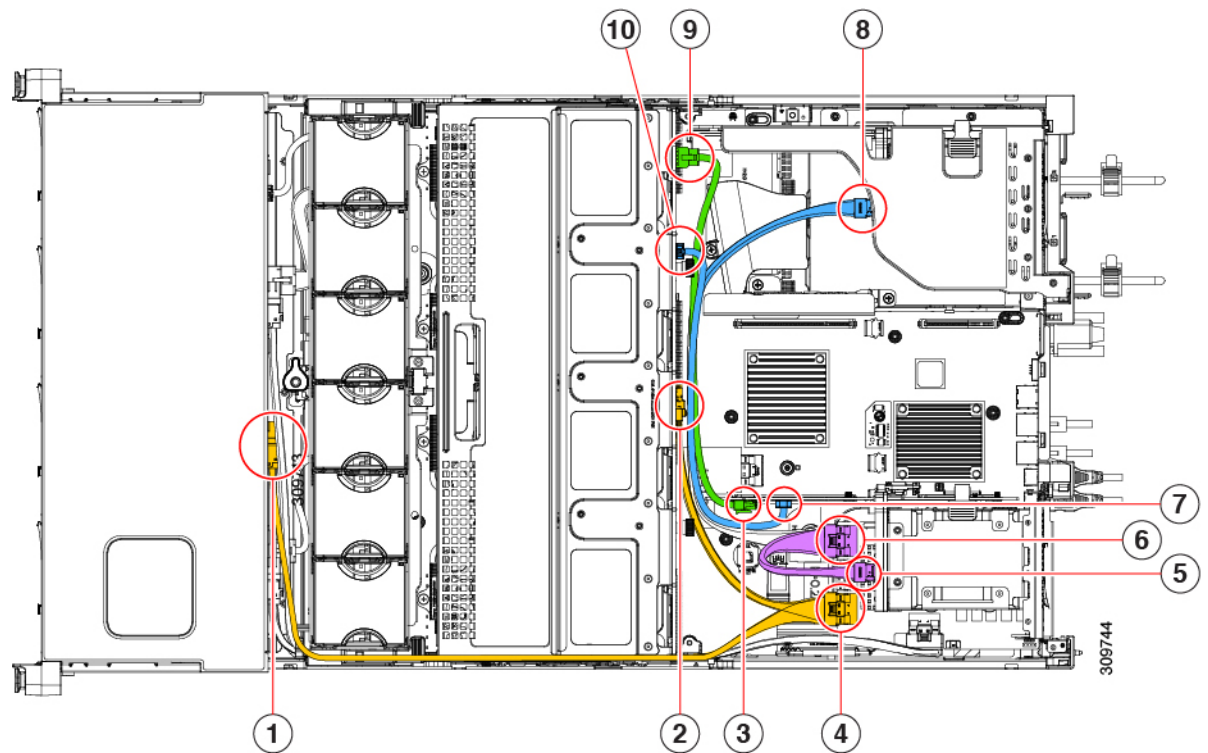
To connect the RAID card to the front drives and the mid-mount drives:

1. Connect one end of the SAS/SATA cable from the RAID card to the midplane connector.

To connect the rear drives:

1. Connect the SAS/SATA cable from the RAID card (6) to the Riser 1 connector (5).

2. Connect the SAS/SATA cable from the RAID card (7) to the Riser 3 connector (8) and the midplane connector (10).

# For More RAID Utility Information

### Cisco RAID Information

- For embedded SATA support of drives connected to pSATA through the SATA Interposer card, the drives are managed directly as AHCI drives.

- The Cisco UCS C Series M6 storage adapter supports only SAS/SATA drives. Tri-mode support is not supported.

- For basic information about RAID and for using the utilities for the RAID controller cards that are supported in Cisco servers, see the Cisco UCS Servers RAID Guide.

### Broadcom RAID Information

- For hardware SAS MegaRAID configuration—Broadcom 12Gb/s MegaRAID® Tri-Mode Software User Guide.

- The Broadcom utilities have help documentation for more information about using the utilities. Go to Broadcom StorCLI 12Gb/s MegaRAID® Tri-Mode User Guide.