



# CHAPTER 5

## Hardware Maintenance Tasks—MARS 55, 110R, 110, 210, GC2R, and GC2

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This chapter contains the following sections:

- [Field Replaceable Units, page 5-1](#)
- [Removing and Replacing the Front Bezel, page 5-2](#)
- [Removing the Chassis Cover, page 5-3](#)
- [Replacing the RAID Battery Backup Unit, page 5-4](#)
- [Replacing the System Battery, page 5-7](#)
- [Hard Drive Troubleshooting and Replacement, page 5-8](#)
- [Hot-swapping a Power Supply Unit, page 5-21](#)
- [Installing the Inline Modem Filter, page 5-22](#)
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### Field Replaceable Units

[Table 5-1](#) lists the field replaceable units (FRUs) supported for the MARS 55, 110R, 110, 210, GC2R, and GC2 appliances.

**Table 5-1** List of Field Replaceable Units for the Cisco Security MARS Appliances 6.X

FRU Description	FRU Part Number
SR2500 (Driskill 2) 750 Watt Power Supply Module	CS-MARS-D750-PS =
500 GB SATA-IO Hard Drive (MARS 55)	CS-MARS-H500-HD =
500 GB SATA-IO Hard Drive (MARS 110R, 110)	CS-MARS-S500-HD =
750 GB SATA-IO Hard Drive	CS-MARS-S750-HD =
RAID Controller Back-Up Battery Unit	CS-MARS-X10-BB =
Rack-mount Kit	CS-MARS-X10-RAIL=

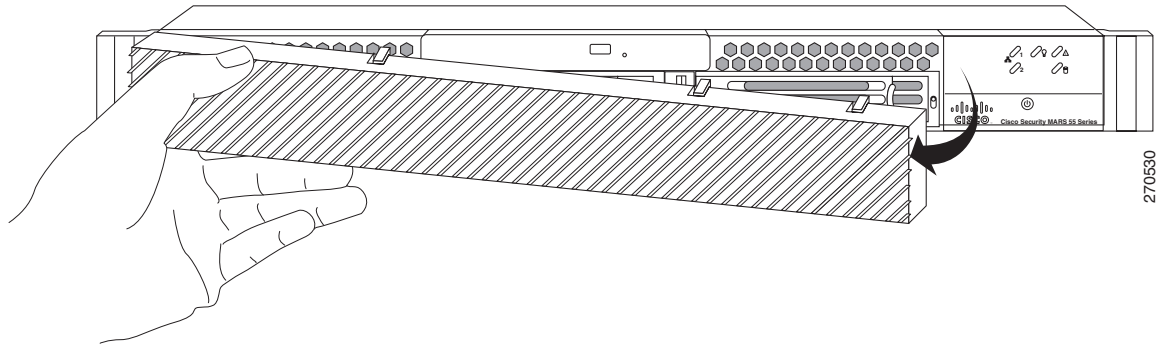
## Removing and Replacing the Front Bezel

For the MARS 55, 110R, 110, 210, GC2, and GC, you must remove the front bezel to access the DVD ROM, hard drives, and control panel buttons. The bezel does not lock. The MARS 25R and 25 front panel features are accessible without removing the bezel.

### MARS 55

To remove the MARS 55 bezel, support the left-side hinge with your hand, pull the bezel from the right-hand side, swing open, then gently detach left-hand side from hinge, as shown in [Figure 5-1](#).

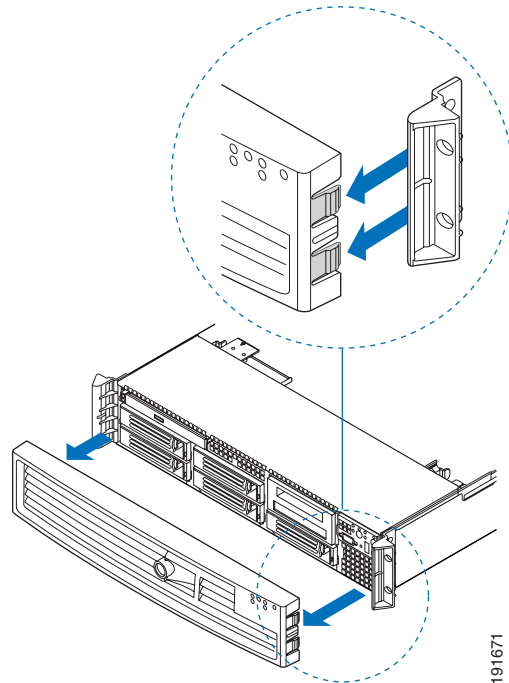
**Figure 5-1** Removing the Front Bezel from a MARS 55



### MARS 110R, 110, 210, GC2R, and GC2

To remove the bezel, pull the bezel from the appliance, as shown in [Figure 5-2](#).

To replace the bezel, line up the center notch on the bezel with the center guide on the rack handles, then push the bezel onto the front of the MARS Appliance until it clicks into place.

**Figure 5-2** Removing the Front Bezel

## Removing the Chassis Cover

This section pertains only to the MARS 110R, 110, 210, GC2R, and GC2 appliances.

The MARS Appliance must be operated with the chassis cover in place to ensure proper cooling. Remove the top cover to add or replace components inside of the appliance. Before removing the chassis cover, power down the appliance and unplug all peripheral devices and the AC power cables.



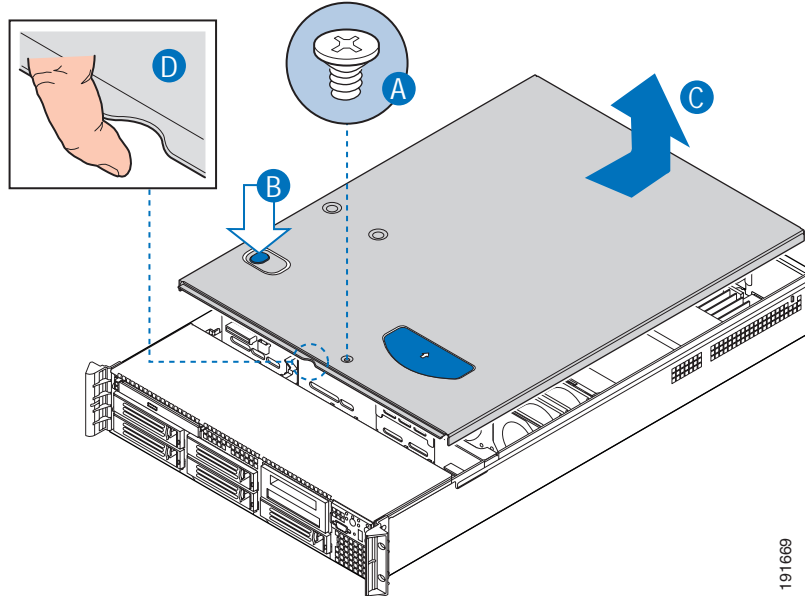
### Note

A nonskid surface or a stop behind the MARS Appliance may be needed to prevent the MARS Appliance from sliding on your work surface.

### Removing the Chassis Cover

- Step 1** Observe all safety and ESD precautions. See “[Safety Information](#)” section on page 5-22.”
- Step 2** Turn off the appliance.
- Step 3** Disconnect the AC power cords.
- Step 4** Remove the safety screw if it is installed, as shown in callout A of [Figure 3](#).
- Step 5** While holding in the blue button at the top of the MARS Appliance (callout B), slide the top cover back until it stops, as shown in callout C of [Figure 3](#).
- Step 6** Insert your finger in the notch shown in callout D of [Figure 3](#), then lift the cover upward to remove it.

**Figure 3** Removing the MARS Appliance Cover



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End of Procedure

### Replacing the Chassis Cover

- Step 1** Place the cover over the MARS Appliance so that the side edges of the cover sit just inside the MARS Appliance sidewalls.
- Step 2** Slide the cover forward until it clicks into place.
- Step 3** (Optional) Insert the safety screw at the center of the top cover if required.
- Step 4** Reconnect the AC power cords.

End of Procedure

## Replacing the RAID Battery Backup Unit

This section pertains only to the MARS 110R, 110, 210, GC2R, and GC2 appliances.

### RAID Controller Back-Up Battery Part number: CS-MARS-X10-BB=

The RAID Backup Battery Unit (RAID BBU) prevents RAID data loss by preserving data held in the RAID cache module during a power outage. The RAID BBU can provide up to 72 hours of battery power until the system power is restored.

The RAID BBU requires 24 hours to fully charge from when the appliance is first powered on, and is continually charged thereafter from the system power. The total charge capacity of the battery degrades over time. The **show healthinfo** CLI command reports the relative charge state of the RAID BBU.

There is a direct relationship between the relative charge and the battery backup time ( $100\%_{\text{charge}} = 72_{\text{hours}}$ ). A 100 percent charge provides 72 hours RAID cache protection. Similarly, a 75 percent charge provides 54 hours of protection ( $100\%_{\text{charge}} * .75 = 72_{\text{hours}} * .75$ ).

Make sure there is sufficient charge to provide RAID cache protection for the total probable hours the MARS Appliance could be without system power. For example, a 90.3% charge (65 hours) would allow 2 hours to manually restore system power if a total power outage occurred in an unattended facility between 17h00 Friday to 8h00 Monday (63 hours).

[Example 5-1](#) displays BBU status information in an excerpt of the `show healthinfo` CLI command.

#### **Example 5-1 RAID Battery Backup Unit show healthinfo Command Output**

```
[pnadmin]$ show healthinfo
<snip>
BBU information :
Relative state of charge : 93 %
Full charge capacity : 920 mAh
Remain capacity : 858 mAh

<snip>
```

#### **Summary of steps required to replace the RAID BBU:**

1. Remove the chassis cover.
2. Remove the large air baffle.
3. Remove the RAID BBU.
4. Install the replacement RAID BBU.
5. Replace the large air baffle.
6. Replace the chassis cover.

## **Procedure to Replace the Raid Battery Backup Unit**

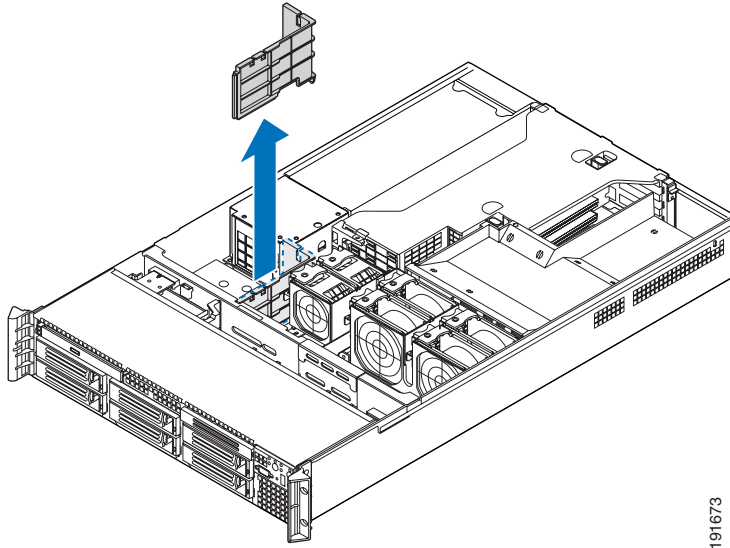
### **Remove the Cover**

- 
- Step 1** Observe all safety and ESD precautions. See [“Safety Information” section on page 5-22](#).
  - Step 2** Power down the appliance and unplug all the AC power cables.
  - Step 3** Remove the chassis cover. For instructions, see the [“Removing the Chassis Cover” section on page 5-3](#).

### **Remove the Large Air Baffle**

- Step 4** Write down how the cables are routed over and under the air baffle (if any). You will need to re-route these cables.
- Step 5** Pull up on the air baffle to remove it, as shown in [Figure 4](#). You may need to remove or hold cables out of the way.

**Figure 4** Removing the Large Air Baffle

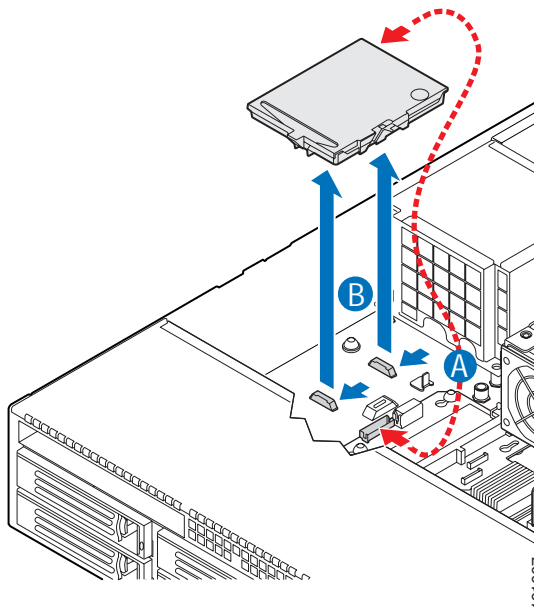


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**Remove the RAID BBU**

- Step 6** Disconnect the cable from the rear of the RAID battery backup unit and the mid-plane board as shown in callout A of [Figure 5](#).
- Step 7** Slide the RAID battery backup unit forward and lift it up from the appliance, as shown in callout B of [Figure 5](#).

**Figure 5** Removing the RAID Battery Backup Unit



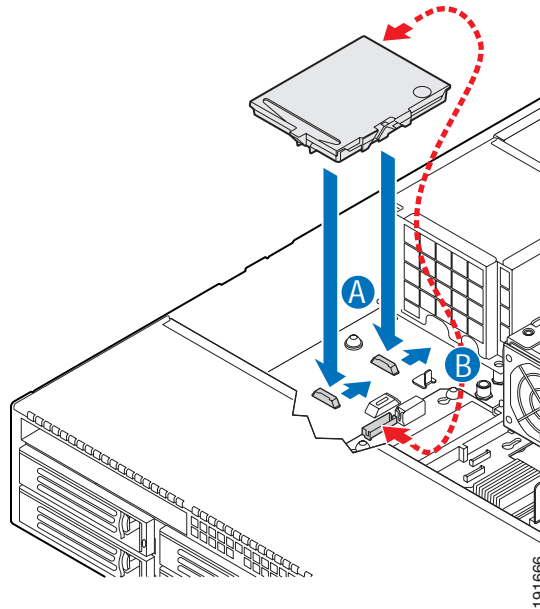
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**Install the Replacement RAID BBU**

- Step 8** Insert the RAID battery backup unit into the appliance and slide it back until it locks into place as shown in callout A of [Figure 6](#).

- Step 9** Attach the cable from the rear of the RAID battery backup unit to the mid-plane board as shown in callout B of [Figure 6](#).

**Figure 6** *Installing the RAID Battery Backup Unit*



#### **Replace the Large Air Baffle**

- Step 10** Lower the baffle into the appliance and snap it into the appliance board standoff. Make sure to route the cables beneath the air baffle as were recorded in [Step 4](#).

#### **Replace the chassis cover.**

- Step 11** Replace the chassis cover.  
**Step 12** Reconnect the AC power cables to the power supplies.

End of Procedure

## Replacing the System Battery

This section pertains only to the MARS 110R, 110, 210, GC2R, and GC2 appliances.

The lithium battery on the appliance board can power the system real-time clock for up to 10 years in the absence of power. When the battery starts to weaken, it loses voltage, and the appliance settings stored in CMOS RAM (for example, the date and time) may be wrong.

If the system battery of the MARS Appliance fails contact Technical Support for replacement procedures.

**Warning**

**There is the 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

## Hard Drive Troubleshooting and Replacement

This section pertains only to the MARS 55, 110R, 110, 210, GC2R, and GC2 appliances and contains the following subsections:

- [Hard Drive Status LEDs, page 5-8](#)
- [Partition Checking, page 5-9](#)
- [Overview of RAID Subsystem, page 5-9](#)
- [Hotswapping Hard Drives, page 5-10](#)
- [Viewing RAID Array Status with the raidstatus CLI Command, page 5-11](#)
- [Procedure to Hotswap a Hard Drive, page 5-16](#)
- [Hotswap CLI Example, page 5-18](#)
- [Replacing a Hard Drive in the Hard Drive Carrier, page 5-20](#)

**Note**

Hard drives are also termed HDDs throughout this section.

Cisco Security MARS HDDs are Cisco field replaceable units (FRUs). The following table provides the correct FRU part numbers for your MARS appliance.

MARS Model	Hard Drive Descriptions and Part Numbers
CS-MARS-55-K9	500 GB SATA-IO Hard Drive Part number: <b>CS-MARS-H500-HD=</b>
CS-MARS-110R-K9 CS-MARS-110-K9	500 GB SATA-IO Hard Drive Part number: <b>CS-MARS-S500-HD=</b>
CS-MARS-210-K9 CS-MARS-GC2R-K9 CS-MARS-GC2-K9	750 GB SATA-IO Hard Drive Part number: <b>CS-MARS-S750-HD=</b>

**Note**

Hard drives can consume up to 17 watts of power each. Drives are specified to run at a maximum ambient temperature of 45 °C.

### Hard Drive Status LEDs

Each HDD has a status LED. A flickering green light indicates activity. The control panel has a status LED that flickers with any HDD activity.

## Partition Checking

The appliance automatically runs checks on HDD partitions after the system has been re-booted 25–30 times, or if the appliance has not been re-booted in 180 days.

## Overview of RAID Subsystem

This section pertains to the following MARS Appliances equipped with a Serial ATA RAID controller card:

- CS-MARS-55-K9
- CS-MARS-110R-K9
- CS-MARS-110-K9
- CS-MARS-210-K9
- CS-MARS-GC2R-K9
- CS-MARS-GC2-K9

Except for the MARS 55, the MARS RAID controller cards operate the hard drives in a RAID 10 configuration, also called RAID 1+0 because it combines the data handling techniques of RAID 1 and RAID 0. The MARS 55 operates as RAID 1 only. For additional information on RAID concepts and terminology, access the following URL: <http://en.wikipedia.org/wiki/RAID>

### RAID 0 Data Striping

In a MARS RAID 10 configuration, half the total number of drives are arrayed as a single logical drive, wherein a data block is distributed across all of the physical drives in the logical drive using RAID 0 striping techniques. Data striping results in better performance for a data intensive application such as MARS, because hard drive random access times are minimized when data is read and written simultaneously from more than one physical hard drive.



#### Note

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The MARS 55 does not do RAID 0 striping. It is RAID 1 only.

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### RAID 1 Mirroring and Subunits

Half the number of drives in the MARS RAID 10 array mirror the RAID 0 virtual drive. Each physical drive in the RAID 0 array is mirrored by an identical physical drive using RAID 1 techniques. Data written to one of the drives within the RAID 0 array is simultaneously written to its dedicated RAID 1 partner, thereby providing fault tolerance through data redundancy. The RAID 1 hard drive pairs are listed in [Table 5-4](#). For the MARS 55, one drive mirrors the other in a simple RAID 1 configuration.

### Rebuilding a Degraded Array

Either drive in a RAID 1 pair can serve in place of its partner should either drive become degraded (unavailable, physically inoperative, or data corrupted). A physical drive degraded but still physically operative can be rebuilt from the data of its undegraded partner and rejoin the array. An inoperative physical drive can be replaced with an operative one which is then rebuilt to join the array.

When any physical drive of the RAID 10 array is degraded, the entire array is considered degraded. While the array still functions, it is not working to its optimal throughput or redundancy capacity.

In a degraded RAID 10 array, data destined for a degraded physical drive is written to available space on the RAID 1 partner until the degraded drive can be rebuilt or replaced. Degraded drives are rebuilt in sequence, one rebuilding process must complete before the next process can begin. Between 200 and 300 minutes are required to rebuild a RAID 1 subunit.

## Hotswapping Hard Drives

This section pertains only to the MARS 55, 110R, 110, 210, GC2R, and GC2 appliances.

An HDD can be hotswapped, that is, replaced without rebooting the MARS appliance. The hotswap actions can be summarized in the following five steps. The detailed procedure is in the section, [Procedure to Hotswap a Hard Drive](#).

1. Establish a console connection to the MARS appliance.
2. Enter the **raidstatus** command to determine the status and the chassis HDD slot number of the HDD to hotswap.
3. Execute a **hotswap remove disk** command, then remove the HDD.
4. Execute a **hotswap add disk** command then insert the replacement HDD.
5. Enter the **raidstatus** command to monitor the progress of the replacement HDD as it is rebuilt.

Use the **raidstatus** CLI command to view the status of the RAID array (virtual disk) and of the individual HDDs. [Table 5-2](#) lists the status conditions that require an HDD to be hotswapped. These status conditions cause MARS to send an email alert to the administrator.



### Caution

Always use the **hotswap remove disk** CLI command before you remove a hard drive and **hotswap add disk** before you insert a hard drive. The *disk* argument is the hard drive slot number. Use the **hotswap list all** command to view the slot number to Port and PD number map.

The rebuilding process duration is between 200 and 300 minutes, depending on CPU load.



### Note

To match original performance, hotswapped HDDs should be the same make, model and size as the original HDDs.



### Caution

The RAID 10 array will not function if both HDDs of any RAID 1 pair are removed or corrupted.

**Table 5-2** HDD Actions for MARS 55, 110R, 110, 210, GC2R, and GC2

Hard Drive Status <sup>1</sup>	Possible Cause	Recommended Action
Failed	Unrecoverable error on previously operative HDD.	Hotswap with a new HDD.
Offline	The <b>hotswap remove</b> command was executed for this HDD.	Execute a <b>hotswap add</b> on the HDD if the HDD is known to be good.
Unconfigured Good	An online HDD was removed and inserted without executing a <b>hotswap</b> command sequence.	Execute a <b>hotswap remove</b> and <b>hotswap add</b> on the HDD.

**Table 5-2 HDD Actions for MARS 55, 110R, 110, 210, GC2R, and GC2 (continued)**

Hard Drive Status <sup>1</sup>	Possible Cause	Recommended Action
Unconfigured Bad	An online HDD was removed or inserted without executing a <b>hotswap</b> sequence and the HDD has a media error.	Hotswap with a new HDD.
N/A	The HDD slot is empty.	Insert a new HDD with the <b>hotswap add</b> command.

1. For the MARS 55, only the Failed status and Recommend Action is applicable, the other error messages will not appear.

## Failed Hard Drive Alert

MARS sends an email alert when the hard drive status changes from Online to Failed, Offline, Unconfigured Good, Unconfigured Bad, or N/A. [Example 5-2](#) displays the contents of an e-mail alert sent to the administrator for a failed HDD. In the alert, the DISK number is the same as the chassis HDD slot or **raidstatus** PD number.

### Example 5-2 MARS Hard Drive Replacement Alert

```
From: csmars-system.SJ-LC-86@cisco.com [mailto:csmars-system.SJ-LC-86@cisco.com]
Sent: Tuesday, March 20, 2007 12:22 PM
To: Liu Bang (liubang)
Subject: Hard disk failure (host: SJ-LC-86, disk No.: 4)
Importance: High
```

```
Hard disk failure: RAID error
```

```
-----
HOST      : SJ-LC-86
DISK      : 4
STATUS    : FAILED
MODEL     : ST3750640NS
SIZE      : 750GBs
```

Hard disk 4 on adapter a0 has failed. As a result, the disk array on adapter a0 is running in degrade mode and is no longer fault tolerant. Please replace hard disk 4 as soon as possible. Instructions for doing so can be found in the user's manual.

## Viewing RAID Array Status with the raidstatus CLI Command

This section pertains only to the MARS 55, 110R, 110, 210, GC2R, and GC2 appliances.

[Example 5-3](#) displays the output of the **raidstatus** command executed on a Local Controller 55. [Example 5-4](#) displays the output of the **raidstatus** command executed on a Local Controller 210. [Table 5-3](#) describes the **raidstatus** command output fields.

### Example 5-3 MARS raidstatus CLI Command Output for MARS 55

```
[pnadmin]$ raidstatus
RAID Controller Information:
-----
Product Name      : Intel Embedded Server RAID Technology
Driver Version    : 05.08y
Controller Type   : SATA

Adapter  Raid Type  Status          Stripe      Size
```

```
-----
a0      Raid 1      Optimal      64 KB      476772 MB

Port Status      Size      Model      Serial #      Write Cache
-----
0      Online      476772 MB  HDS725050KLA360  KRVN67ZAHY8NXF  Enabled
1      Online      476772 MB  HDS725050KLA360  KRVN37ZAJP565F  Enabled
```

Rebuild Progress on Device at Enclosure 0, Slot 1 Completed 8%

In [Example 5-4](#), HDDs p2 and p5 were hotswapped and are in the final stages of being rebuilt.

#### **Example 5-4 MARS raidstatus CLI Command Output for MARS 110R, 110, 210, GC2R, and GC2**

```
[pnmars]# raidstatus
Adapter Information:
-----
Product Name      : Intel(R) RAID Controller SROMBSAS18E
Firmware Version  : 1.02.00-0119
BIOS Version      : MT25

Adapter RaidType      Status      Stripe      Size      Cache
-----
a0      Raid-10      Degraded    64kB      2097151MB  Enabled

PD      Status  Size & Block      Model      Serial#
-----
p0      Online  715404MB [0x575466f0 Sectors]  ATA      ST3750640NS  E      3QD09ZNT
p1      Online  715404MB [0x575466f0 Sectors]  ATA      ST3750640NS  E      3QD07ZYK
p2      Rebuild 715404MB [0x575466f0 Sectors]  ATA      ST3750640NS  E      3QD091BZ
p3      Online  715404MB [0x575466f0 Sectors]  ATA      ST3750640NS  E      3QD09E3A
p4      Online  715404MB [0x575466f0 Sectors]  ATA      ST3750640NS  E      3QD0A03B
p5      Rebuild 715404MB [0x575466f0 Sectors]  ATA      ST3750640NS  E      3QD0A04G

Rebuild Progress on Device at Enclosure 20, Slot 2 Completed 71% in 279 Minutes.
Rebuild Progress on Device at Enclosure 20, Slot 5 Completed 60% in 259 Minutes.
=====
```


**Table 5-3 raidstatus CLI command for MARS 55, 110R, 110, 210, GC2R, and GC2**

Output Field	Description
<b>RAID Controller Information Fields</b>	
Product Name	RAID controller manufacturer and serial number
Firmware Version : 1.02.00-0119	Indicates version of the RAID controller firmware
BIOS Version : MT25	Indicates the RAID BIOS version. This is different from the system BIOS version.
<b>RAID Array Information Fields ( The RAID 10 Virtual Drive Information)</b>	
Adapter	Identifier for the physical RAID controller.
RaidType	RAID Level of Array. MARS is always RAID 10.

**Table 5-3** *raidstatus CLI command for MARS 55, 110R, 110, 210, GC2R, and GC2 (continued)*

<b>Output Field</b>	<b>Description</b>
Status	The current state of the RAID 10 virtual drive. <ul style="list-style-type: none"> <li>• Optimal—All component HDDs are operating as configured.</li> <li>• Degraded—At least one of the component HDDs has failed or is offline. Troubleshooting is advised to prevent possible data loss.</li> <li>• Offline—The array is not available or is unusable.</li> </ul>
Stripe	The MARS RAID 10 data stripe is always 64 KB.
Size	The available storage in megabytes of the RAID array.
Cache (not displayed for the MARS 55)	The MARS RAID 10 array cache is always enabled.
<b>Individual Hard Drive Information Fields</b>	
PD or Port (MARS 55)	p0–p5. The physical hard drive numbers. 0 or 1 for the MARS 55

Table 5-3 *raidstatus CLI command for MARS 55, 110R, 110, 210, GC2R, and GC2 (continued)*

Output Field	Description
Status	The current state of the physical HDD.
 <b>Note</b> Only <b>Online</b> , <b>Failed</b> , <b>Rebuild</b> , and <b>Undefined</b> are supported on the MARS 55.	<ul style="list-style-type: none"> <li>• <b>Online</b>—The HDD is functioning normally within the RAID 10 array.</li> <li>• <b>Rebuild</b>—The HDD is being reimaged from its RAID 1 partner to restore full redundancy to a the virtual disk. The RAID 10 array efficiency is not yet optimal.</li> <li>• <b>Failed</b>—The HDD originally was Online, but now has an unrecoverable error. An email alert is sent to the administrator.</li> <li>• <b>Offline</b>—The HDD was removed by executing a <b>hotswap remove</b> command, but the HDD was not physically removed from the slot. An email alert is sent to the administrator.</li> <li>• <b>Unconfigured Good</b>—The HDD is usable, but the RAID information is out of sync with the RAID 1 partner. An email alert is sent to the administrator.</li> <li>• <b>Unconfigured Bad</b>— The firmware detected a media error on the hard drive. An online HDD was probably removed or inserted without executing a <b>hotswap</b> sequence and the HDD now has a media error. An alert is sent to the administrator.</li> <li>• <b>Undefined</b>—(MARS 55 only) A new HDD has been added but is not RAID 1 formatted, may appear briefly before “Rebuild.”</li> <li>• <b>N/A</b>—There is no HDD in the slot. An email alert is sent to the administrator.</li> </ul>
Size & Block (not displayed for MARS 55)	Size of the usable storage on the HDD
Model	The model number of the physical HDD
Serial#	The serial number of the physical HDD. The string, “This drive is foreign” is appended to the serial number when an HDD formatted with metadata from a different RAID controller is introduced. The message is removed when the HDD is assimilated into the array.
Write Cache (MARS 55 only)	RAID 1 Write Cache is always enabled.
<b>Progress Messages</b>	

**Table 5-3** *raidstatus CLI command for MARS 55, 110R, 110, 210, GC2R, and GC2 (continued)*

Output Field	Description
Rebuild Progress on Device at Enclosure 0, Slot 1 Completed 8%	(MARS 55) Indicates the slot number and percentage complete of the physical drive being rebuilt.
Rebuild Progress on Device at Enclosure 20, Slot 2 Completed 71% in 279 Minutes.	Indicates the status, elapsed rebuilding time, and slot number of each physical drive being rebuilt.

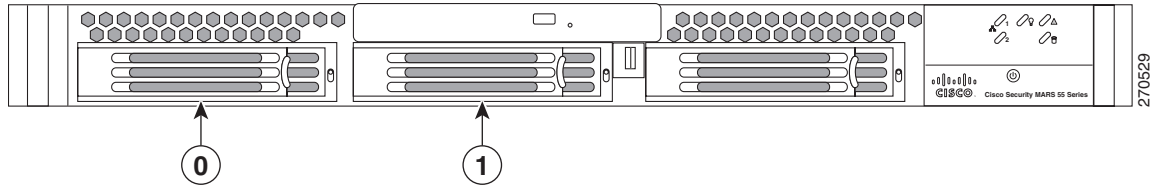
## Hard Drive Slot Number Diagrams

Figure 5-7 shows the chassis HDD slot numbers of the MARS 55. Figure 5-8 shows the chassis HDD slot numbers of the MARS 110R, 110, 210, GC2R, and GC2. Table 5-4 shows how slot numbers correspond to PD and Port numbers used in the **raidstatus** CLI.

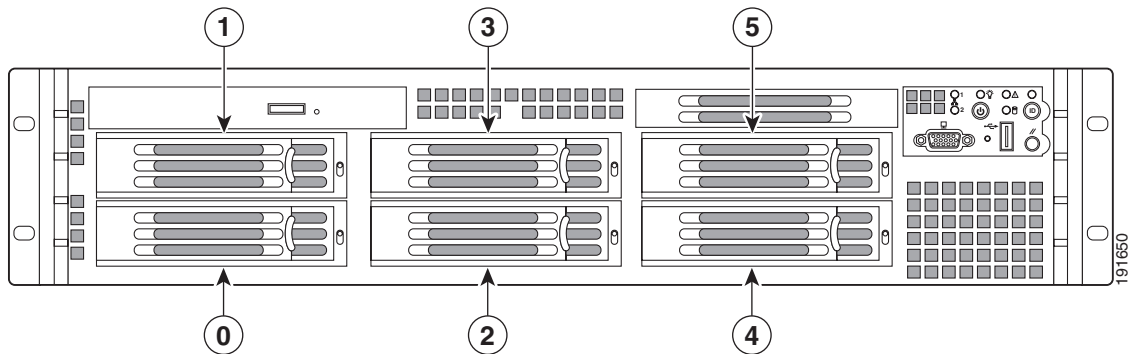
 **Note**

For Release 5.3.2 and more recent, the **hotswap list all** CLI command displays the physical slot number to PD and Port Number layout in ASCII art.

**Figure 5-7** *HDD Slot Numbers –MARS 55*



**Figure 5-8** *HDD Slot Numbers—MARS 110R, 110, 210, GC2R, and GC2*



**Table 5-4 Mapping HDD Slot Number to raidstatus CLI Command PD number—MARS 55, 110R, 110, 210, GC2R, and GC2**

MARS Appliance	Storage Capacity <sup>1</sup>	Chassis HDD Slot to Port or PD Numbers <sup>2</sup>	RAID 1 Pairs
MARS 55	500GB RAID 1 2 X 500GB SATA-IO 3.0 Gbps HDD 7200 RPM, 16MB Buffer Hot-Swappable Front Accessible	Slot 0 is Port 0 Slot 1 is Port 1	Slot 0 and Slot 1
MARS 110R, 110	1.5TB RAID 10 6 X 500GB SATA-IO 3.0 Gbps HDD 7200 RPM, 16MB Buffer Hot-swappable Front accessible	Slot 0 is p0 Slot 1 is p1 Slot 2 is p2 Slot 3 is p3 Slot 4 is p4 Slot 5 is p5	Slot 0 and Slot 1 Slot 2 and Slot 3 Slot 4 and Slot 5
MARS 210, GC2R, GC2	2.0TB <sup>3</sup> RAID 10 6 X 750GB SATA-IO 3.0 Gbps HDD 7200 RPM, 16MB Buffer Hot-swappable Front accessible		

1. The stated storage capacity is the sum of the rated capacity of all the hard drives and does not reflect bytes reserved for the RAID overhead on each drive.
2. As of Release 5.3.2, the **hotswap list all** command displays a map of physical slot locations with their Port and PD Numbers
3. Although there is a total of 4.5 TB storage, RAID 10 has a maximum size configuration of 2 TB Redundant, or 4 TB

## Procedure to Hotswap a Hard Drive

This section pertains only to the MARS 55, 110R, 110, 210, GC2R, and GC2 appliances.

In the **hotswap** command, the *disk* parameter is the chassis slot number of the HDD, but the **raidstatus** command reports physical drive (PD) numbers or Port numbers (MARS 55). To determine the physical location of the slot in the chassis (chassis slot number), see [Figure 5-7](#) or [Figure 5-8](#) or use the **hotswap list all** command.

To hotswap an HDD, complete the following steps:

- Step 1** Remove the front bezel. See the [“Removing and Replacing the Front Bezel”](#) section on page 5-2.
- Step 2** Establish a console connection with MARS.
- Step 3** Identify the slot number of the HDD to replace with the **raidstatus** command.
- Step 4** Enter **hotswap remove disk**. (where *disk* is the slot number of the HDD)

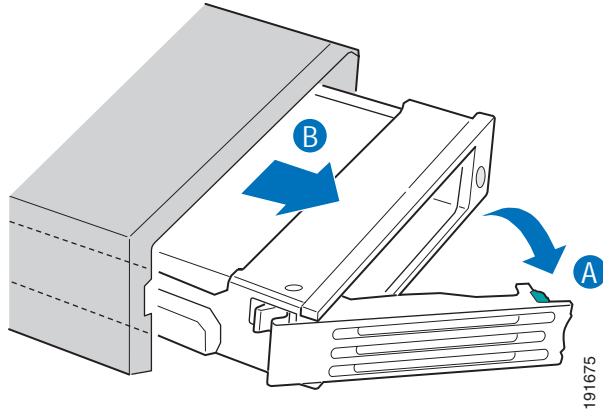
A message informs you that it is safe to remove the HDD.



**Note** Make sure that you remove the correct physical HDD. If you remove the wrong one accidentally then reinsert it, that HDD will register as Unconfigured Good (or Failed for MARS 55).

- Step 5** Pull out the black lever of the hard drive carrier and slide the carrier from the chassis as shown in callout B of [Figure 5-9](#).

**Figure 5-9** Removing a Hard Drive from the MARS Appliance Chassis



The `raidstatus` command should now report the slot status as N/A (or Failed for MARS 55).

- Step 6** At the CLI prompt, enter `hotswap add disk`. Be sure to use the same slot number as in [Step 2](#).
- Step 7** With the black lever in the fully open position, slide the replacement HDD and carrier into the chassis. The green latch at the front of the drive carrier must be to the right. Do not push on the black drive carrier lever until the lever begins to close by itself.
- Step 8** When the black drive carrier lever begins to close by itself, push it closed to lock the drive assembly into place.
- A console message informs you that the HDD (disk) is added successfully (to the logical array).
- Step 9** Replace the front bezel. (See [“Removing and Replacing the Front Bezel”](#) section on page 5-2).
- Step 10** From the CLI, enter `raidstatus` to verify that the HDD is being rebuilt into the RAID array.
- The status message indicates the progress of the added HDD.
- The rebuilding process can last from 200 to 300 minutes.
- End of Procedure, [Hotswapping Hard Drives](#).

## Hotswap CLI Example

This section pertains only to the MARS 55, 110R, 110, 210, GC2R, and GC2 appliances.

The following CLI output example hotswaps an HDD in slot 1 of a MARS 55.

### Example 5-5 Hotswap Procedure for MARS 55—CLI Output Example

```
[pnadmin]$ version
5.3.2 (2688)

[pnadmin]$ hotswap list all
Hardware RAID is found with 2 disks!
Disks available to be hotswapped:
  |=====|=====|
  |          |          |
  |      Port 0      |      Port 1      |
  |=====|=====|

[pnadmin]$ hotswap remove 1

Broadcast message from root (console) (Fri Jan 18 08:45:08 2008):

Physical drive 'PORT # 1' status : Failed
Disk 1 can now be safely removed from the system.

[pnadmin]$ raidstatus
RAID Controller Information:
-----
Product Name      : Intel Embedded Server RAID Technology
Driver Version    : 05.08y
Controller Type   : SATA

Adapter  Raid Type  Status          Stripe   Size
-----
a0       Raid 1     Degraded        64 KB   476772 MB

Port Status      Size          Model          Serial #      Write Cache
-----
0    Online       476772 MB    HDS725050KLA360  KRVN0AZBH5R3LJ  Enabled
1    Failed       476772 MB    HDS725050KLA360  KRVN0AZBH5R8RJ  Enabled

[pnadmin]$ hotswap add 1
Disk 1 has been successfully added to RAID

[pnadmin]$ raidstatus
RAID Controller Information:
-----
Product Name      : Intel Embedded Server RAID Technology
Driver Version    : 05.08y
Controller Type   : SATA

Adapter  Raid Type  Status          Stripe   Size
-----
a0       Raid 1     Degraded, Rebuilding  64 KB   476772 MB

Port Status      Size          Model          Serial #      Write Cache
-----
0    Online       476772 MB    HDS725050KLA360  KRVN0AZBH5R3LJ  Enabled
1    Rebuilding   476772 MB    HDS725050KLA360  KRVN0AZBH5R8RJ  Enabled

Rebuild Progress on Device at Enclosure 0, Slot 1 Completed 0%
```

The following CLI output example hotswaps an HDD in slot 2 of a MARS 110.

**Example 5-6 Hotswap Procedure for MARS 110R, 110, 210, GC2R, and GC2—CLI Output Example**

In the following example, a hard drive is hotswapped in slot 5 of a MARS 210. The hard drive status is verified with the **raidstatus** command:

```
[pnadmin]$ version
5.3.2 (2702)
[pnadmin]$ hotswap list all
Hardware RAID is found with 6 disks!
Disks available to be hotswapped:
    |=====|=====|=====|
    |   PD 1   |   PD 3   |   PD 5   |
    |-----|-----|-----|
    |   PD 0   |   PD 2   |   PD 4   |
    |=====|=====|=====|
[pnadmin]$ hotswap remove 5

Adapter: 0: EnclId-14 SlotId-5 state changed to OffLine.
Disk 5 can now be safely removed from the system.

[pnadmin]$ raidstatus
Adapter Information:
-----
Product Name      : Intel(R) RAID Controller SROMBSAS18E
Firmware Version  : 1.03.00-0211
BIOS Version      : MT30

Adapter RaidType      Status      Stripe  Size      Cache
-----
a0      Raid-10      Degraded      64kB      2097151MB      Enabled

PD      Status  Size & Block      Model      Serial#
-----
p0      Online  715404MB [0x575466f0 Sectors]  ATA      ST3750640NS E      3QD09EEZ
p1      Online  715404MB [0x575466f0 Sectors]  ATA      ST3750640NS E      3QD09CQT
p2      Online  715404MB [0x575466f0 Sectors]  ATA      ST3750640NS E      3QD094KY
p3      Online  715404MB [0x575466f0 Sectors]  ATA      ST3750640NS E      3QD08NZX
p4      Online  715404MB [0x575466f0 Sectors]  ATA      ST3750640NS E      3QD09EWP
p5      Offline 715404MB [0x575466f0 Sectors]  ATA      ST3750640NS E      3QD06AQ2

[pnadmin]$ hotswap add 5

Started rebuild progress on device(Encl-14 Slot-5)
Disk 5 has been successfully added to RAID
[pnadmin]$ raidstatus
Adapter Information:
-----
Product Name      : Intel(R) RAID Controller SROMBSAS18E
Firmware Version  : 1.03.00-0211
BIOS Version      : MT30

Adapter RaidType      Status      Stripe  Size      Cache
-----
a0      Raid-10      Degraded      64kB      2097151MB      Enabled

PD      Status  Size & Block      Model      Serial#
-----
p0      Online  715404MB [0x575466f0 Sectors]  ATA      ST3750640NS E      3QD09EEZ
p1      Online  715404MB [0x575466f0 Sectors]  ATA      ST3750640NS E      3QD09CQT
p2      Online  715404MB [0x575466f0 Sectors]  ATA      ST3750640NS E      3QD094KY
p3      Online  715404MB [0x575466f0 Sectors]  ATA      ST3750640NS E      3QD08NZX
```

```

p4      Online  715404MB [0x575466f0 Sectors]  ATA      ST3750640NS E    3QD09EWP
p5      Rebuild 715404MB [0x575466f0 Sectors]  ATA      ST3750640NS E    3QD06AQ2

```

Rebuild Progress on Device at Enclosure 14, Slot 5 Completed 17% in 32 Minutes.

## Replacing a Hard Drive in the Hard Drive Carrier

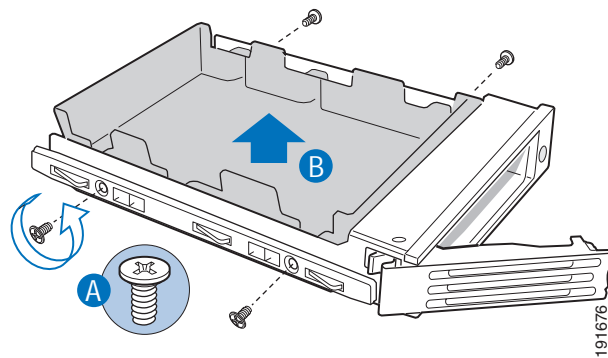
This section pertains only to the MARS 55, 110R, 110, 210, GC2R, and GC2 appliances.

To match original performance, HDDs should be the same make, model and size as the original hard drives.

- Step 1** Remove the four screws that attach the hard drive or empty retention device to the drive carrier, as shown in callout A of [Figure 5-10](#).

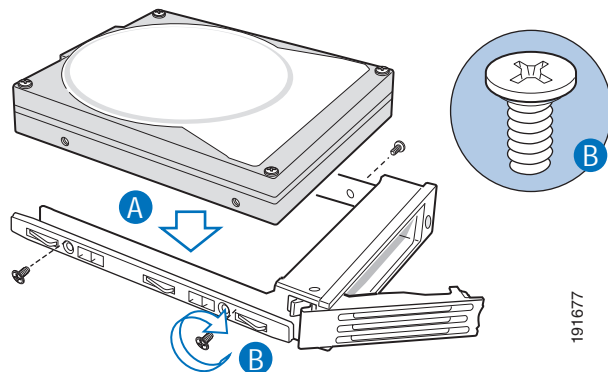
Two screws are at each side of the retention device or the hard drive. Store the plastic retention device for future use.

**Figure 5-10** *Removing Hard Drive or Retention Device from Drive Carrier (Retention Device Shown Here)*



- Step 2** Remove the hard drive from its wrapper and place it on an antistatic surface.
- Step 3** With the hard drive circuit-side down, position the connector end of the drive so that it is facing the rear of the drive carrier, as shown in callout A of [Figure 5-11](#).
- Step 4** Align the holes in the drive to the holes in the drive carrier and attach it to the carrier with the screws that were attached to the plastic retention device, as shown in callout B of [Figure 5-11](#).

**Figure 5-11** *Installing a Hard Drive into a Carrier*



End of Procedure

## Hot-swapping a Power Supply Unit

### SR2500 (Driskill 2) 750 Watt Power Supply Module Part number: CS-MARS-D750-PS =

This section pertains only to the MARS 110R, 110, 210, GC2R, and GC2 appliances.

Up to two power supply modules may be on a single AC line. The lower power supply (PS1) supplies most of the power requirements. The upper power supply (PS2) is the redundant power supply.

A power supply module can be replaced without powering down the system (hotswapped). [Example 5-7](#) is an excerpt of the **show healthinfo** CLI command. The power supply unit should be evaluated for hotswapping if its status is “down.”

#### Example 5-7 Power Supply Status in the show healthinfo CLI Command.

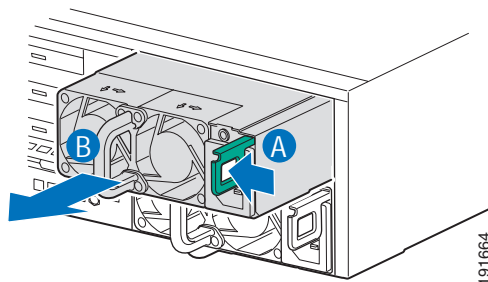
```
[pnadmin]$ show healthinfo
<SNIP>
Power Supply          Value  Status
-----
PS1 AC Current      2.36 Amps    ok
PS2 AC Current      0.12 Amps    ok
PS1 +12V Current    21 Amps     ok
PS2 +12V Current    0 Amps      ok
PS1 +12V Power      248 Watts   ok
PS2 +12V Power      0 Watts     ok
PS1 Status           0x01        ok
PS2 Status           0x09        ok

<SNIP>
```

To hotswap a power supply, do the following:

- Step 1** Observe all safety and ESD precautions. See “[Safety Information](#)” section on page 5-22.”
- Step 2** Unplug the AC power cord of power supply to be replaced.
- Step 3** Release the latch (callout A) and remove the power supply by pulling on the handle (callout B) as shown in [Figure 5-12](#).

**Figure 5-12** Removing Power Supply Module from the MARS Appliance



- Step 4** Insert the replacement power supply module into the power supply cage until it clicks into place.

**Step 5** Connect the AC power cord to the replacement power supply.

End of Procedure

## Installing the Inline Modem Filter

An inline filter for line impedance matching is shipped in the Accessory Kit. The following countries require the filter to be used with the MARS modem:

Australia, Austria, Belgium, China, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Korea, Luxembourg, Netherlands, Poland, Portugal, Spain, Sweden, and the UK.

Insert the male RJ-11 connector of the filter into the line-in socket of the MARS modem. Insert the local telephone cable into the RJ-11 socket of the filter.

The modem line-in socket is labeled with a socket icon, the external telephone socket is labeled with a telephone icon.

## Diagnostic Beep Codes

[Table 5-5](#) lists Power-on Self Test (POST) error beep codes. Prior to system Video initialization, BIOS uses these beep codes to signal error conditions. The beep code is followed by a user visible code on the POST Progress LEDs (not shown). Beep codes are sounded each time the problem is discovered, such as on each power-up attempt, but they are not sounded continuously. The beep code sequence is read left to right. For example, 4–7 represents four beeps followed by seven beeps.

**Table 5-5** *POST Error Beep Codes*

Number of Beeps	Error Message	Description
1, 2, or 3 (3 for MARS 55)	Memory Error	Fatal memory error. Reseat the memory or replace the DIMMs with known good modules.
6 (Not applicable to MARS 25R, 25, and 55)	BIOS Error	The system has detected a corrupted BIOS in the flash part, and is rolling back to the last good BIOS.
4–7 or 9–11 (Not applicable to MARS 25R, 25, and 55)	System Error	Fatal error indicating a possible serious system problem. Contact Technical Support.
8 (Not applicable for MARS 55)	Video Card Error	Contact Technical Support.

## Safety Information

These safety instructions apply to all Cisco Security Monitoring, Analysis, and Response System models

To reduce the risk of bodily injury, electrical shock, fire, and equipment damage, read this section and observe all warnings and precautions before maintaining your Cisco Security MARS appliance.

## Intended Application Uses

This product was evaluated as Information Technology Equipment (ITE), which may be installed in offices, schools, computer rooms, and similar commercial type locations. The suitability of this product for other product categories and environments (such as medical, industrial, residential, alarm systems, and test equipment), other than an ITE application, may require further evaluation.

## Equipment Handling Practices

Reduce the risk of personal injury or equipment damage:

- Conform to local occupational health and safety requirements when moving and lifting equipment.
- Use mechanical assistance or other suitable assistance when moving and lifting equipment.
- To reduce the weight for easier handling, remove any easily detachable components.

## Power and Electrical Warnings



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The power button, indicated by the stand-by power marking, DOES NOT completely turn off the system AC power, 5V standby power is active whenever the system is plugged in.

---



---

**This unit might have more than one power supply connection. All connections must be removed to de-energize the unit.** Statement 1028

---



---

Do not attempt to modify or use an AC power cord if it is not the exact type required. A separate AC cord is required for each system power supply.

---



---

Some power supplies in Cisco Security MARS appliances use Neutral Pole Fusing. To avoid risk of shock use caution when working with power supplies that use Neutral Pole Fusing.

---



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The power supply in this product contains no user-serviceable parts. Do not open the power supply. Hazardous voltage, current and energy levels are present inside the power supply. Return to manufacturer for servicing.

---

**Caution**


---

When replacing a hot-plug power supply, unplug the power cord to the power supply being replaced before removing it from the server.

---

**Caution**


---

To avoid risk of electric shock, turn off the server and disconnect the power cord, telecommunications systems, networks, and modems attached to the appliance before opening.

---

## Power Cord Warnings

If an AC power cord was not provided with your product, purchase one that is approved for use in your country.

To avoid electrical shock or fire, check the power cords that will be used with the product as follows:

- Do not attempt to modify or use the AC power cord(s) if they are not the exact type required to fit into the grounded electrical outlets
- The power cord(s) must meet the following criteria:
  - The power cord must have an electrical rating that is greater than that of the electrical current rating marked on the product.
  - The power cord must have safety ground pin or contact that is suitable for the electrical outlet.
  - The power supply cord(s) is/are the main disconnect device to AC power. The socket outlet(s) must be near the equipment and readily accessible for disconnection.
  - The power supply cord(s) must be plugged into socket-outlet(s) that is /are provided with a suitable earth ground.

## System Access Warnings

To avoid personal injury or property damage, the following safety instructions apply whenever accessing the inside of the product:

- Turn off all peripheral devices connected to this product.
- Turn off the system by pressing the power button to off.
- Disconnect the AC power by unplugging all AC power cords from the system or wall outlet.
- Disconnect all cables and telecommunication lines that are connected to the system.
- Retain all screws or other fasteners when removing access cover(s). Upon completion of accessing inside the product, refasten access cover with original screws or fasteners.
- Do not access the inside of the power supply. There are no serviceable parts in the power supply. Return to manufacturer for servicing.
- Power down the appliance and disconnect all power cords before adding or replacing any non hot-plug component.
- When replacing a hot-plug power supply, unplug the power cord to the power supply being replaced before removing the power supply from the appliance.

**Caution**

---

If the appliance has been running, any installed processor(s) and heat sink(s) may be hot. Unless you are adding or removing a hot-plug component, allow the appliance to cool before opening the covers. To avoid the possibility of coming into contact with hot component(s) during a hot-plug installation, be careful when removing or installing the hot-plug component(s).

---

**Caution**

---

To avoid injury do not contact moving fan blades. If your system is supplied with a guard over the fan, do not operate the appliance without the fan guard in place.

---

## Rack Mount Warnings

The equipment rack must be anchored to an unmovable support to prevent it from tipping when a server or piece of equipment is extended from it. The equipment rack must be installed according to the rack manufacturer's instructions.

Install equipment in the rack from the bottom up, with the heaviest equipment at the bottom of the rack.

Extend only one piece of equipment from the rack at a time.

You are responsible for installing a main power disconnect for the entire rack unit. This main disconnect must be readily accessible, and it must be labeled as controlling power to the entire unit, not just to the appliance.

To avoid risk of potential electric shock, a proper safety ground must be implemented for the rack and each piece of equipment installed in it.

## Electrostatic Discharge (ESD)

**Caution**

---

ESD can damage disk drives, boards, and other parts. We recommend that you perform all procedures at an ESD workstation. If one is not available, provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground -- any unpainted metal surface -- on your server when handling parts. Always handle boards carefully. They can be extremely sensitive to ESD. Hold boards only by their edges. After removing a board from its protective wrapper or from the server, place the board component side up on a grounded, static free surface. Use a conductive foam pad if available but not the board wrapper. Do not slide board over any surface.

---

## Battery Replacement

**Caution**

---

Do not attempt to recharge a battery. Do not attempt to disassemble, puncture, or otherwise damage a battery.

---

**Warning**

**There is the 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 33

## Cooling and Airflow

Carefully route cables as directed to minimize airflow blockage and cooling problems. For proper cooling and airflow, operate the system only with the chassis covers installed. Operating the system without the covers in place can damage system parts.

To install the covers:

- Check first to make sure you have not left loose tools or parts inside the system.
- Check that cables, add-in boards, and other components are properly installed.
- Attach the covers to the chassis according to the product instructions.

## Laser Peripherals or Devices

To avoid risk of radiation exposure and/or personal injury:

- Do not open the enclosure of any laser peripheral or device
- Laser peripherals or devices have are not user serviceable
- Return to manufacturer for servicing