

Dell PowerEdge C8000
Hardware Owner's
Manual

Regulatory Model: B10S
Regulatory Type: B10S001



Notes, Cautions, and Warnings



NOTE: A NOTE indicates important information that helps you make better use of your computer.



CAUTION: A CAUTION indicates potential damage to hardware or loss of data if instructions are not followed.



WARNING: A WARNING indicates a potential for property damage, personal injury, or death.

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Regulatory Model B10S

Regulatory Type: B10S001

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About the System

The PowerEdge C8000 server enclosure features ten vertically aligned sled bays which support a full sled or a mixed sled enclosure. A full sled enclosure can include up to five C8220X double-wide compute sleds, ten C8220 single-wide compute sleds, or five C8000XD storage sleds. A mixed sled enclosure can support a mixture of differing sled types. To function as a system, a compute sled is inserted into the PowerEdge C8000 server enclosure that supports fans and is connected to an external power source or an internal power source (power sleds). The redundant system fans are shared resources of the sleds in the PowerEdge C8000 server enclosure.



NOTE: To ensure proper operation and cooling, all bays in the enclosure must be populated at all times with either a sled or with a sled blank.



NOTE: Throughout this manual, the PowerEdge C8000 server enclosure is referred to as simply the "server enclosure" or the "chassis".

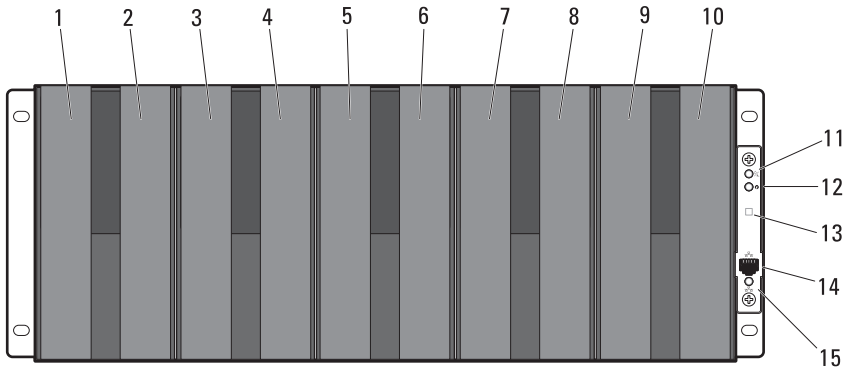
Accessing System Features During Startup

The following keystrokes provide access to system features during startup. The SAS/SATA card or PXE hotkey support are available only in the BIOS boot mode. Hotkey function is not available in the Unified Extensible Firmware Interface (UEFI) boot mode.





Keystroke	Description
<F2>	Enters the System Setup program. See "System Setup Menu" on page 67.
<F11>	Enters the BIOS Boot Manager or the Unified Extensible Firmware Interface (UEFI) Boot Manager, depending on the system's boot configuration.
<F12>	Starts Preboot eXecution Environment (PXE) boot.
<Ctrl> <C>	Enters the LSI 2008 SAS Mezzanine Card Configuration Utility. For more information, see the SAS adapter documentation.
<Ctrl> <H>	Enters the LSI 2008 SAS Mezzanine Card Configuration Utility. For more information, see the documentation for your SAS RAID card.
<Ctrl> <S>	Enters the utility to configure onboard NIC settings for PXE boot. For more information, see the documentation for your integrated NIC.
<Ctrl> <I>	Enters the onboard SAS and SATA controller's configuration utility.

Front-Panel Features and Indicators

Figure 1-1. Front-Panel Features and Indicators

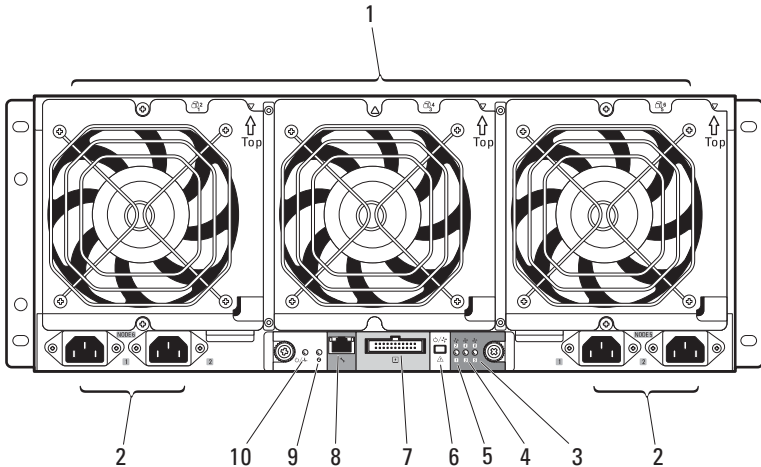


Item	Feature	Icon	Description
1 - 10	Sled bays 1 to 10		<p>Installs up to five C8220X compute sleds, ten C8220 compute sleds, five C8000XD storage sleds, or a mixture of differing sled types.</p> <p>NOTE: Sled bays 1 and 2 support installation of two C8220 or one C8220X compute sleds. For server enclosure with internal power source, C8000XD storage sleds install in sled bays 3 to 10 only.</p>
	Sled bays 5 and 6		<p>Installs up to two power sleds or two C8220 compute sleds or a combination of the two sled types.</p> <p>NOTE: If the enclosure is configured with only one power sled, a C8220 compute sled or a power sled blank must be mounted into the adjacent sled bay.</p> <p>NOTE: The sled bays must always be populated with either a sled or a sled blank to ensure proper system cooling.</p>

Item	Feature	Icon	Description
11	Chassis status indicator		Indicates the power and health status of the whole system.
12	Chassis identification indicator		Lights blue when the chassis ID signal is generated.
13	Thermal sensor		Monitors the inlet ambient temperature.
14	Ethernet connector		Embedded 10/100 Mbit NIC connector.
15	NIC link/activity indicator		Indicates state of the network link and activity.

Back-Panel Features and Indicators

Figure 1-2. Back-Panel Features and Indicators — Server Enclosure with Internal Power Source



Item	Feature	Icon	Description
1	Fan modules		Provides cooling solution to the enclosure.
2	AC power sockets		Connect the power cables to these power sockets. When connected to a power source, main power is automatically distributed to the enclosure. NOTE: Always connect the enclosure's AC power sockets to a single power source, switch, or PDU. NOTE: Before installing a compute or storage sled to the front of the enclosure, install the power sleds and connect power to the enclosure.
3, 4, 5	Fan fault indicators 1 to 6		Indicates the function status of the system fans.






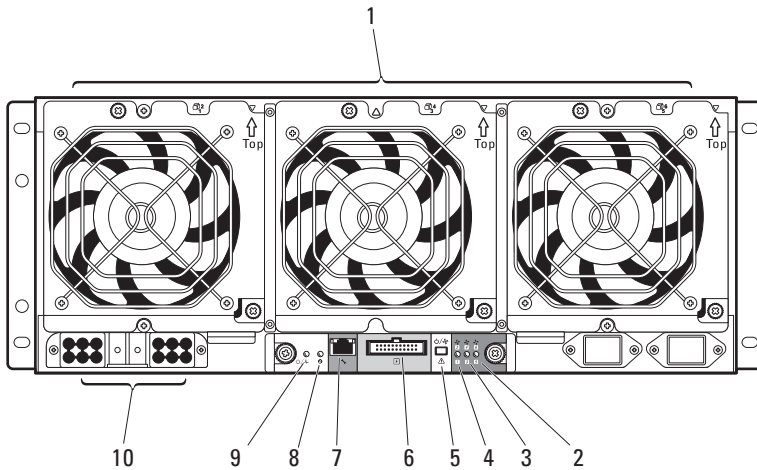







Item	Feature	Icon	Description
6	Service mode button		Press this button within 4 seconds to enter service mode.
7	External PDU connector		Connects to a PDU control connector.
8	BMC management port		Dedicated management port.
9	Chassis identification indicator		Lights blue when the chassis ID signal is generated.
10	Power/event indicator		Indicates the power and health status of the enclosure.

Figure 1-3. Back-Panel Features and Indicators — Server Enclosure with External Power Source

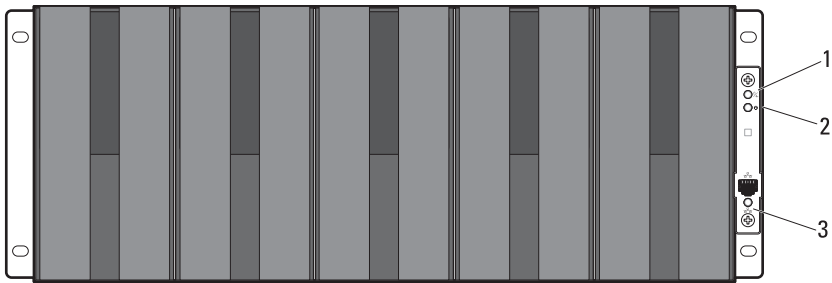


Item	Feature	Icon	Description
1	Fan modules		Provides cooling solution to the enclosure.
2, 3, 4	Fan fault indicators 1 to 6		Indicates the function status of the system fans.
5	Service mode button	 	Press this button within 4 seconds to enter service mode.
6	External PDU connector		Connects to a PDU control connector.
7	BMC management port		Dedicated management port.
8	Chassis identification indicator		Lights blue when the chassis ID signal is generated.
9	Power/event indicator		Indicates the power and health status of the enclosure.
10	DC power socket		<p>Connect the DC power cable to this power socket. When connected to an external PDU, main power is automatically distributed to the enclosure.</p> <p>NOTE: Always connect the enclosure's DC power socket to a PDU.</p> <p>NOTE: Before installing a compute or storage sled to the front of the enclosure, connect power to the enclosure.</p>

Server Enclosure Indicator Codes

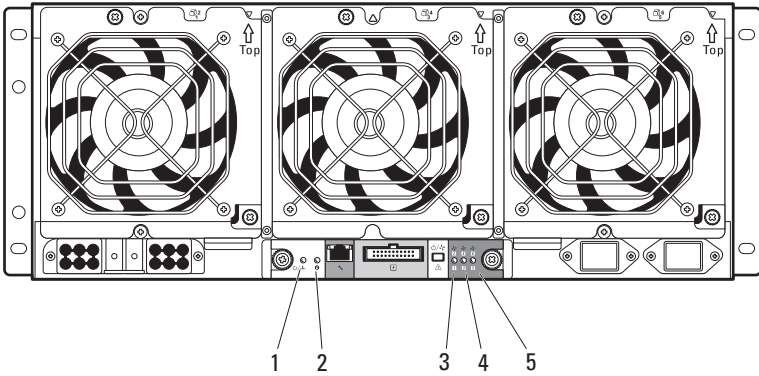
The indicators on the front and back of the server enclosure displays operational status of the enclosure, fan modules, and chassis controller boards.

Figure 1-4. Server Enclosure Front-Panel Indicators



Item	Indicator	Color	Status	Indicator Code
1	Chassis status indicator	Green	Solid	Indicates a valid power source is connected to the server enclosure and that the enclosure is operational.
		Off	Off	Power is not connected.
		Amber	Blinking	Indicates a fault event occurred.
2	Chassis identification indicator	Blue	Blinking	Indicates a chassis ID signal is generated.
		Blue	Off	Chassis ID signal is not generated.
3	NIC link/activity indicator	Green	Solid	Linking at 100 Mbps speed (maximum).
		Green	Blinking	Transmit or receive activity.
		Off	Off	No activity.

Figure 1-5. Server Enclosure Back-Panel Indicators

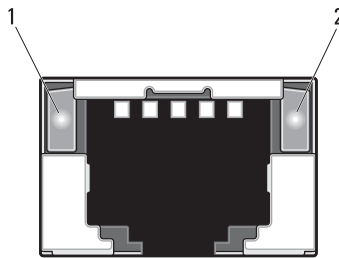


Item	Indicator	Color	Status	Indicator Code
1	Power/event indicator	Green	Solid	Indicates a valid power source is connected to the server enclosure and that the enclosure is operational and power is applied to the fan controller board.
		Green	Blinking	Power is connected to the enclosure but the managed devices' or sleds' power is off.
		Amber	Blinking	Indicates a fault event occurred.
		Off	Off	Power is not connected.
2	Chassis identification indicator	Blue	Blinking	Indicates a chassis ID signal is generated.
		Blue	Off	Chassis ID signal is not generated.
3	Fan 1 and 2 fault indicator	Amber	Blinking	Indicates a fault event occurred in fans 1 and 2.
		Off	Off	Fans 1 and 2 are operational.
4	Fan 3 and 4 fault indicator	Amber	Blinking	Indicates a fault event occurred in fans 3 and 4.
		Off	Off	Fans 3 and 4 are operational.

Item	Indicator	Color	Status	Indicator Code
5	Fan 5 and 6 fault indicator	Amber	Blinking	Indicates a fault event occurred in fans 5 and 6.
		Off	Off	Fans 5 and 6 are operational.

NIC Indicator Codes

Figure 1-6. NIC Indicators (Front-Panel Ethernet Connector)

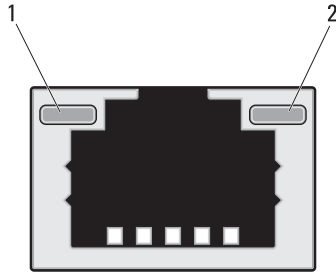


1 link indicator

2 activity indicator

Indicator	Status	Indicator Code
Link indicator	Solid amber	Linking at 10 Mbps port speed
	Solid green	Linking at 100 Mbps port speed (maximum)
Activity indicator	Solid green	No activity
	Blinking green	Transmit or receive activity
	Off	Idle

Figure 1-7. NIC Indicators (BMC management port)



1 link indicator

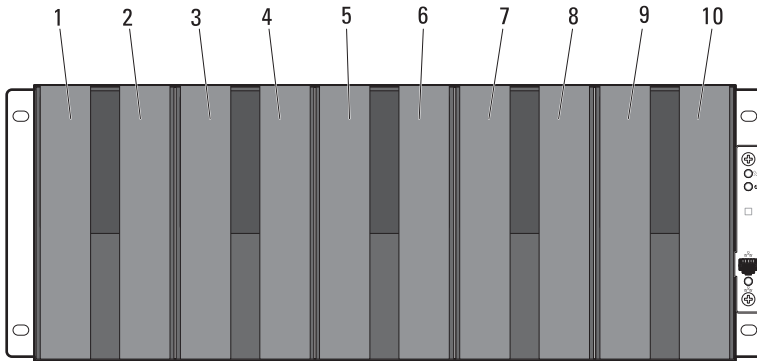
2 activity indicator

Indicator	Status	Indicator Code
Link indicator	Blinking amber	Linking at 10 Mbps port speed
	Blinking green	Linking at 100 Mbps port speed (maximum)
Activity indicator	Solid green	No activity
	Blinking green	Transmit or receive activity
	Off	Idle

Sled Bay Numbering

The front of the server enclosure is divided into ten vertical bays. A C8220 single-wide compute sled occupies one sled bay in the server enclosure and a C8220X double-wide compute sled or C8000XD storage sled occupies two sled bays in the server enclosure. When installing a sled module into the server enclosure, you should install the sled module in sled bay 1 first, then work toward the right of the enclosure.

Figure 1-8. Sled Bay Numbering



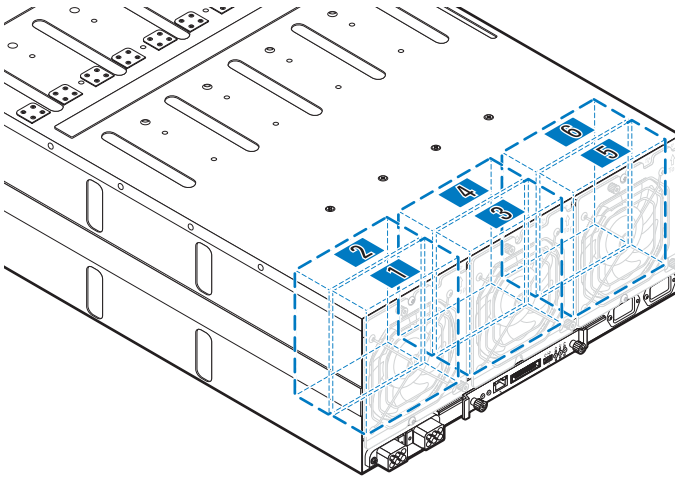
Sled module type	Sled Bays									
	1	2	3	4	5 ^a	6 ^a	7	8	9	10
C8220 single-wide compute sled	√	√	√	√	√	√	√	√	√	√
C8220X double-wide compute sled	√		√		√		√		√	
C8000XD storage ^b sled	—	—	√		√		√		√	
Power sled ^c	—	—	—	—	√	√	—	—	—	—

- a. Sled bays 5 and 6 support installation of two power sleds or two C8220 compute sleds or a combination of the two sled types.
- b. For server enclosure with internal power source, install C8000XD storage sleds in sled bays 3 to 10 only.
- c. Install power sleds in sled bays 5 and 6 only.

Fan Bay Numbering

The back of the PowerEdge C8000 server enclosure includes three hot-swappable fan modules that provide the system with a redundant cooling source. Each fan module contains two cooling fans. All three fan modules must be installed at all times to ensure proper cooling.

Figure 1-9. Fan Bay Numbering



Fan Bay	Cooling Fans
Fan module 1	Fan 2 Fan 1
Fan module 2	Fan 4 Fan 3
Fan module 3	Fan 6 Fan 5

Sled Module Configuration

The following illustrations are sample sled module configurations available on the PowerEdge C8000 server enclosure.

Figure 1-10. C8220 Single-Wide Compute Sleds

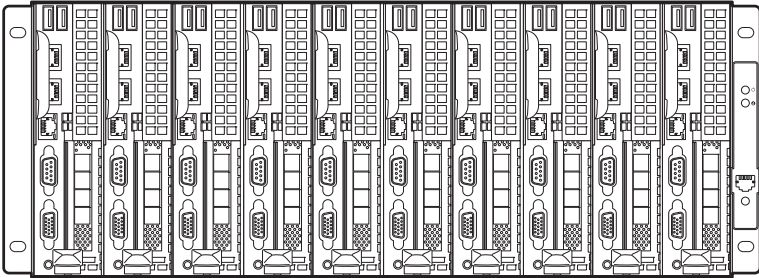


Figure 1-11. C8220X Double-Wide Compute Sleds

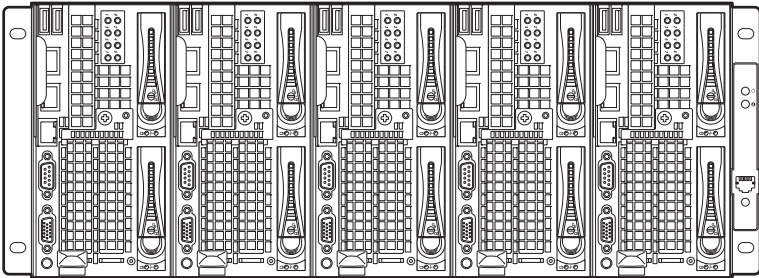


Figure 1-12. Mixed Sleds — Server Enclosure with Internal Power Source

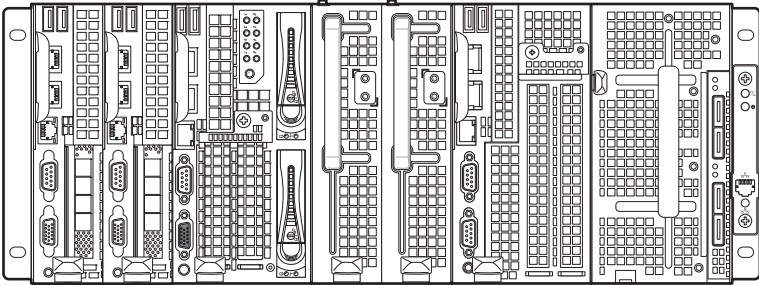
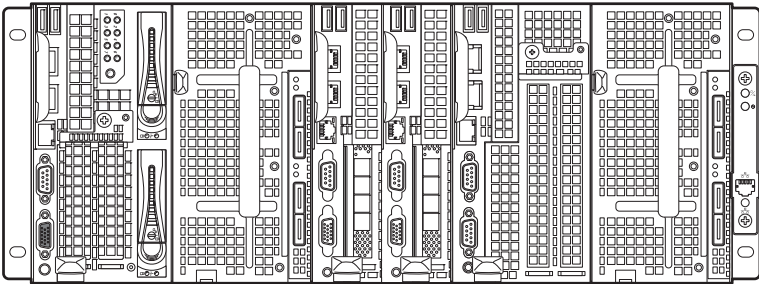


Figure 1-13. Mixed Sleds — Server Enclosure with External Power Source



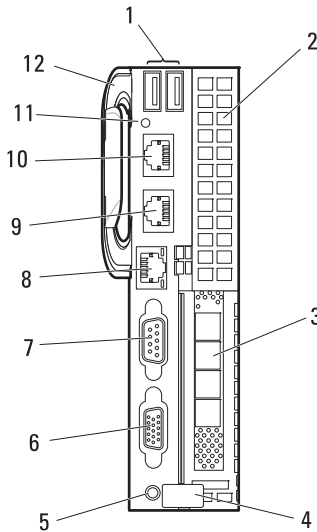
Sled Features


Compute Sleds


The PowerEdge C8000 server enclosure holds up to ten single-wide compute sleds or five double-wide compute sleds. Each compute sled is equivalent to a standard server built with a processor(s), memory, network interface, baseboard management controller, and local hard-drive storage.







Single-Wide Compute Sled

Figure 1-14. Sled Features — C8220 Single-Wide Compute Sled



Item	Indicator, Button, or Connector	Icon	Description
1	USB connectors		Connects USB devices to the sled. The ports are USB 2.0 compliant.
2	Mezzanine card expansion slot		Installs an I/O module mezzanine card.
3	Low profile PCIe expansion slot		Installs a low profile PCI Express x16 card.

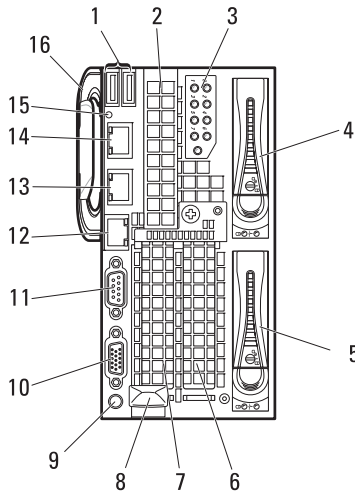
Item	Indicator, Button, or Connector	Icon	Description
4	Release latch		Press to release the sled from the enclosure.
5	Power-on indicator/ power button		<p>The power-on indicator lights when the sled power is on. The power-on indicator lights amber when the system critical event occurs.</p> <p>NOTE: The power-on indicator lights amber according to critical system error log (SEL) assertion. If the SEL is full or a deassertion event occurred while sensor monitoring is paused (e.g. fan monitoring is paused during system power off), the power-on indicator turns amber. To turn off an amber LED and reset the power-on indicator to normal condition (solid green), either perform a BMC cold reset or reseal the sled in the server enclosure.</p> <p>The power button turns the compute sled on.</p> <p>NOTES:</p> <ul style="list-style-type: none"> • When powering on the sled, the video monitor can take from several seconds to over 2 minutes to display an image, depending on the amount of memory installed in the system. • On ACPI-compliant operating systems, turning off the sled using the power button causes the sled to perform a graceful shutdown before power to the sled is turned off. • To force an ungraceful shutdown, press and hold the power button for five seconds.



Item	Indicator, Button, or Connector	Icon	Description
6	VGA connector		Connects a VGA display to the system.
7	Serial connector		Connects a serial device to the system.
8	BMC management port		Dedicated management port.
9	Ethernet connector 2	 2	Embedded 10/100/1000 Mbit NIC connector.
10	Ethernet connector 1	 1	Embedded 10/100/1000 Mbit NIC connector.
11	Sled identification indicator		Lights blue to identify a particular sled and system board.
12	Handle		Hold to pull the sled from the enclosure.




Double-Wide Compute Sled

The C8220X double-wide compute sled includes two types of configuration, a double-wide compute sled with front-access 2.5-inch hot-plug hard-drives and a double-wide compute sled with general-purpose graphics processing unit (GPGPU).

Figure 1-15. Sled Features — C8220X Double-Wide Compute Sled with Front-Access Hot-Plug Hard-Drives



Item	Indicator, Button, or Connector	Icon	Description
1	USB connectors		Connects USB devices to the sled. The ports are USB 2.0 compliant.
2	Mezzanine card expansion slot		Installs an I/O module mezzanine card.
3	Hard-drive indicators 0 to 7		Indicates drive activity and status.
4, 5	Hard-drive bay		Installs two 2.5-inch hot-plug hard-drives.
6, 7	Low profile PCIe expansion slots		Installs up to two low profile PCI Express x8 card when plugged into horizontal expansion card connectors.

Item	Indicator, Button, or Connector	Icon	Description
8	Sled release latch		Press to release the sled from the enclosure.
9	Power-on indicator/ power button		<p>The power-on indicator lights when the sled power is on. The power-on indicator lights amber when the system critical event occurs.</p> <p>NOTE: The power-on indicator lights amber according to critical system error log (SEL) assertion. If the SEL is full or a deassertion event occurred while sensor monitoring is paused (e.g. fan monitoring is paused during system power off), the power-on indicator turns amber. To turn off an amber LED and reset the power-on indicator to normal condition (solid green), either perform a BMC cold reset or reseal the sled in the server enclosure.</p> <p>The power button turns the compute sled on.</p> <p>NOTES:</p> <ul style="list-style-type: none"> • When powering on the sled, the video monitor can take from several seconds to over 2 minutes to display an image, depending on the amount of memory installed in the system. • On ACPI-compliant operating systems, turning off the sled using the power button causes the sled to perform a graceful shutdown before power to the sled is turned off. • To force an ungraceful shutdown, press and hold the power button for five seconds.
10	VGA connector		Connects a VGA display to the system.
11	Serial connector		Connects a serial device to the system.





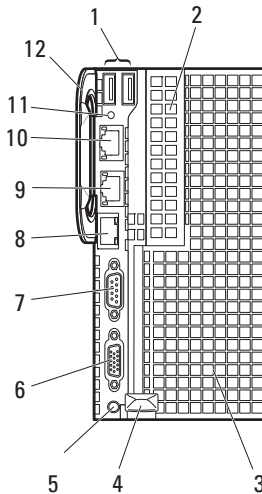








Item	Indicator, Button, or Connector	Icon	Description
12	BMC management port		Dedicated management port.
13	Ethernet connector 2		Embedded 10/100/1000 Mbit NIC connector.
14	Ethernet connector 1		Embedded 10/100/1000 Mbit NIC connector.
15	Sled identification indicator		Lights blue to identify a particular sled and system board.
16	Handle		Hold to pull the sled from the enclosure.

Figure 1-16. Sled Features — C8220X Double-Wide Compute Sled with GPGPU



Item	Indicator, Button, or Connector	Icon	Description
1	USB connectors		Connects USB devices to the sled. The ports are USB 2.0 compliant.
2	Mezzanine card expansion slot		Installs an I/O module mezzanine card.

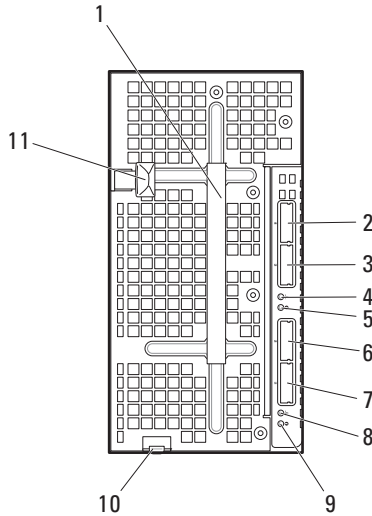
Item	Indicator, Button, or Connector	Icon	Description
3	Sled cover/ GPGPU card assembly		Installs up to two GPGPU cards when plugged into horizontal GPGPU card risers.
4	Sled release latch		Press to release the sled from the enclosure.
5	Power-on indicator/ power button		<p>The power-on indicator lights when the sled power is on. The power-on indicator lights amber when the system critical event occurs.</p> <p>NOTE: The power-on indicator lights amber according to critical system error log (SEL) assertion. If the SEL is full or a deassertion event occurred while sensor monitoring is paused (e.g. fan monitoring is paused during system power off), the power-on indicator turns amber. To turn off an amber LED and reset the power-on indicator to normal condition (solid green), either perform a BMC cold reset or reseal the sled in the server enclosure.</p> <p>The power button turns the compute sled on.</p> <p>NOTES:</p> <ul style="list-style-type: none"> • When powering on the sled, the video monitor can take from several seconds to over 2 minutes to display an image, depending on the amount of memory installed in the system. • On ACPI-compliant operating systems, turning off the sled using the power button causes the sled to perform a graceful shutdown before power to the sled is turned off. • To force an ungraceful shutdown, press and hold the power button for five seconds.
6	VGA connector		Connects a VGA display to the system.
7	Serial connector		Connects a serial device to the system.

Item	Indicator, Button, or Connector	Icon	Description
8	BMC management port		Dedicated management port.
9	Ethernet connector 2		Embedded 10/100/1000 Mbit NIC connector.
10	Ethernet connector 1		Embedded 10/100/1000 Mbit NIC connector.
11	Sled identification indicator		Lights blue to identify a particular sled and system board.
12	Handle		Hold to pull the sled from the enclosure.



Storage Sleds

The C8000XD storage sled is a direct attached storage for the server enclosure. The storage sled provides dedicated data storage to a C8220X sled or C8220 sled. Each storage sled supports up to a maximum of 12 x 3.5-inch/ 2.5-inch hard-drives or 24 x 2.5-inch SSD hard-drives.

Figure 1-17. Sled Features — C8000XD Storage Sled



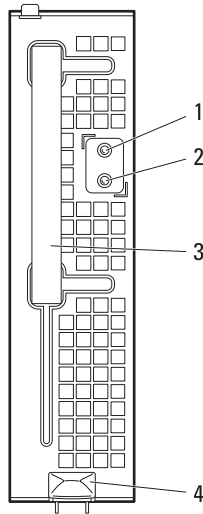
Item	Indicator, Button, or Connector	Icon	Description
1	Handle		Hold to pull the hard-drive cage from the sled.
2	Mini-SAS connector A2		Connects to a compute sled's host bus adapter (HBA) or RAID controller card.
3	Mini-SAS connector A1		Connects to a compute sled's HBA or RAID controller card.



Item	Indicator, Button, or Connector	Icon	Description
4, 8	Sled power/status indicator		The power-on indicator lights green when the sled power is on and power is applied to the SAS expander board. The power-on indicator alternately lights green and blinks amber when a critical event occurs.
5, 9	Sled identification indicator		Lights blue to identify a particular mini-SAS connector and sled.
6	Mini-SAS connector B2		Connects to a compute sled's HBA or RAID controller card.
7	Mini-SAS connector B1		Connects to a compute sled's HBA or RAID controller card.
10	Sled release tab		Press to release the sled from the enclosure.
11	Hard-drive cage release latch		Press to release the hard-drive cage from the sled.

Power Sleds

You can install up to two hot-swappable power sleds in the server enclosure that supports internal power source. Each power sled installs up to two 1400 W power supply modules that are capable of delivering 2800 W power to the server enclosure at an input range of 200-240 V.

Figure 1-18. Sled Features — Power Sled



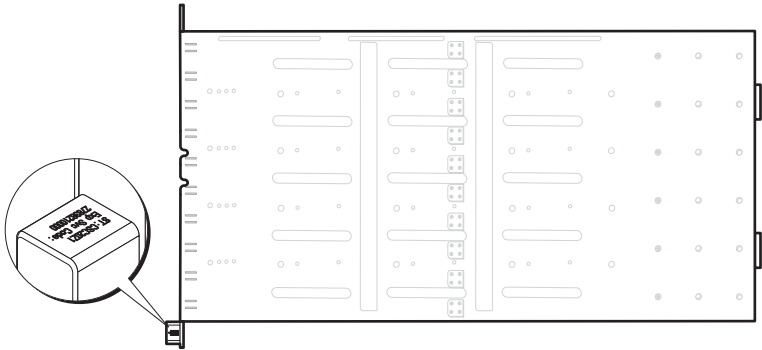
Item	Indicator, Button, or Connector	Icon	Description
1	PSU1/3 status indicator		<p>The PSU1/3 status indicator lights green indicating that a valid power source is connected to the power supply and that power supply is operational.</p> <p>The PSU1/3 status indicator lights amber indicating a problem with the PSU module.</p> <ul style="list-style-type: none"> • PSU module fan locked (15 s) • PSU module over temperature protection (OTP) • PSU module over current protection (OCP) • PSU module over voltage protection (OVP) • PSU module under voltage protection (UVP)
2	PSU2/4 status indicator		<p>The PSU2/4 status indicator lights green indicating that a valid power source is connected to the power supply and that power supply is operational.</p> <p>The PSU2/4 status indicator lights amber indicating a problem with the PSU module.</p> <ul style="list-style-type: none"> • PSU module fan locked (15 s) • PSU module over temperature protection (OTP) • PSU module over current protection (OCP) • PSU module over voltage protection (OVP) • PSU module under voltage protection (UVP)
3	Handle		Hold to pull the sled from the enclosure.
4	Release latch		Press to release the sled from the enclosure.

Service Tag

The following illustrations provide location of the Service Tag number on the server enclosure, compute sleds, and storage sleds.

Server Enclosure

Figure 1-19. Service Tag Location for Server Enclosure



Sleds

Figure 1-20. Service Tag Location for C8220 Single-Wide Compute Sled

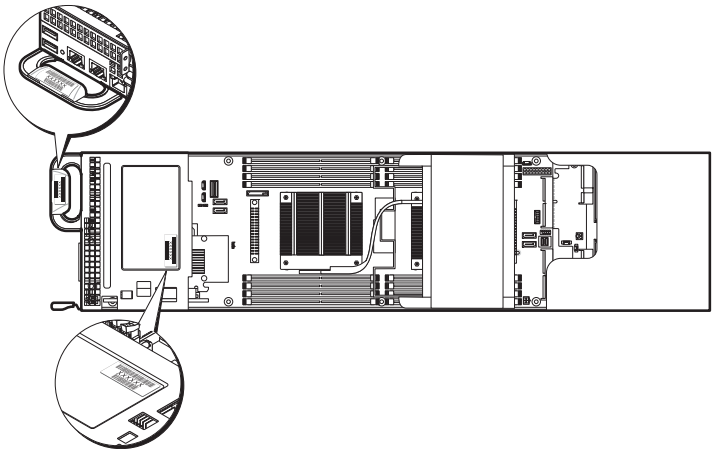


Figure 1-21. Service Tag Location for C8220X Double-Wide Compute Sled with 3.5-inch (4-Drive Bay) Hard-Drives

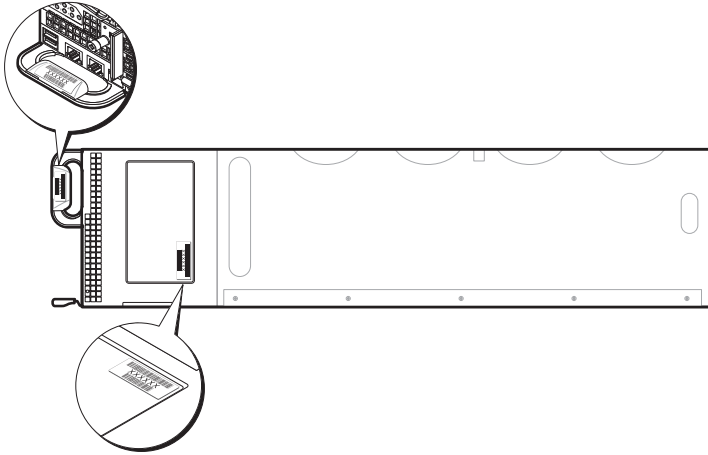


Figure 1-22. Service Tag Location for C8220X Double-Wide Compute Sled with 2.5-inch (8-Drive Bay) Hard-Drives

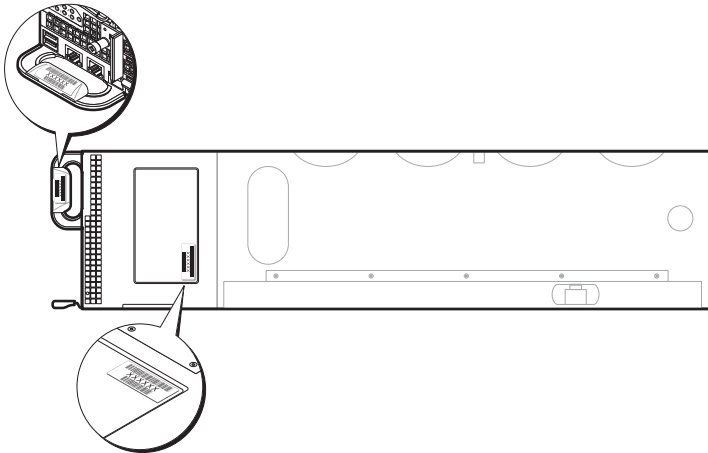


Figure 1-23. Service Tag Location for C8220X Double-Wide Compute Sled with GPGPU

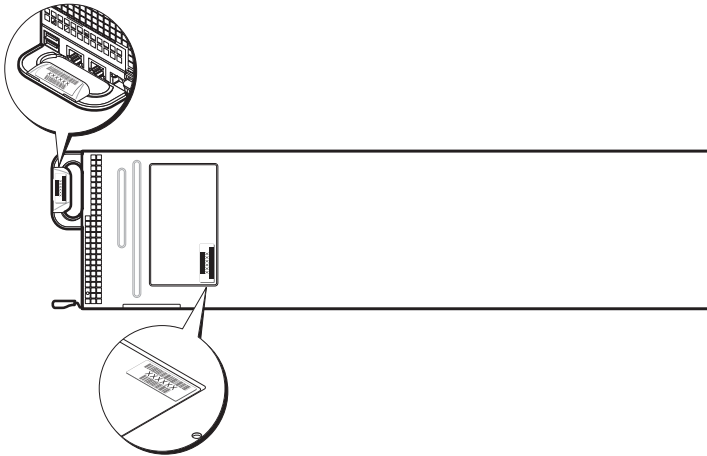
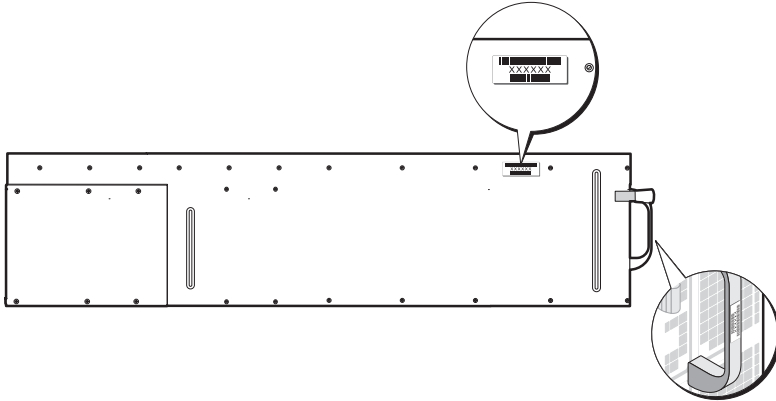


Figure 1-24. Service Tag Location for C8000XD Storage Sled



POST Error Codes

Collecting System Event Log for Investigation

Whenever possible, the system BIOS will output the current boot progress codes on the video screen. Progress codes are 32-bit quantities plus optional data. The 32-bit numbers include class, subclass, and operation information. The class and subclass fields point to the type of hardware that is being initialized. The operation field represents the specific initialization activity. Based on the data bit availability to display progress codes, a progress code can be customized to fit the data width. The higher the data bit, the higher the granularity of information that can be sent on the progress port. The progress codes may be reported by the system BIOS or option ROMs.

The Response section in the following table may be divided into 3 types:

- Warning or Not an error – The message is displayed on the screen. An error record is logged to the SEL. The system will continue booting with a degraded state. The user may want to replace the erroneous unit.
- Pause – The message is displayed on the screen, an error is logged to the SEL, and user input is required to continue. The user can take immediate corrective action or choose to continue booting.
- Halt – The message is displayed on the screen, an error is logged to the SEL, and the system cannot boot unless the error is resolved. The user needs to replace the faulty part and restart the system.

Error Code	Error Message	Response	Error Cause	Corrective Actions
0010h	Local Console Resource Conflict	Pause	Video device initialization failed	See "Troubleshooting the Video Subsystem" on page 252. If the problem persists, see "Getting Help" on page 289.
0011h	Local Console Controller Error	Pause	Video device initialization failed	See "Troubleshooting the Video Subsystem" on page 252. If the problem persists, see "Getting Help" on page 289.

Error Code	Error Message	Response	Error Cause	Corrective Actions
0012h	Local Console Output Error	Pause	Video device initialization failed	See "Troubleshooting the Video Subsystem" on page 252. If the problem persists, see "Getting Help" on page 289.
0013h	ISA IO Controller Error	Pause	ISA device initialization failed	See "Troubleshooting Expansion Cards" on page 270. If the problem persists, see "Getting Help" on page 289.
0014h	ISA IO Resource Conflict	Pause	ISA device initialization failed	See "Troubleshooting Expansion Cards" on page 270. If the problem persists, see "Getting Help" on page 289.
0015h	ISA IO Controller Error	Pause	ISA device initialization failed	See "Troubleshooting Expansion Cards" on page 270. If the problem persists, see "Getting Help" on page 289.
0016h	ISA Floppy Controller Error	Pause	Floppy device initialization failed	See "Troubleshooting a USB Device" on page 252. If the problem persists, see "Getting Help" on page 289.
0017h	ISA Floppy Input Error	Pause	Floppy device initialization failed	See "Troubleshooting a USB Device" on page 252. If the problem persists, see "Getting Help" on page 289.
0018h	ISA Floppy Output Error	Pause	Floppy device initialization failed	See "Troubleshooting a USB Device" on page 252. If the problem persists, see "Getting Help" on page 289.

Error Code	Error Message	Response	Error Cause	Corrective Actions
0019h	USB Read Error	Pause	USB port initialization failed	See "Troubleshooting a USB Device" on page 252. If the problem persists, see "Getting Help" on page 289.
001Ah	USB Write Error	Pause	USB port initialization failed	See "Troubleshooting a USB Device" on page 252. If the problem persists, see "Getting Help" on page 289.
001Bh	USB Interface Error	Pause	USB port initialization failed	See "Troubleshooting a USB Device" on page 252. If the problem persists, see "Getting Help" on page 289.
001Ch	Mouse Interface Error	Pause	Mouse device initialization failed	To enable USB device, see "USB Configuration" on page 105. See "Troubleshooting a USB Device" on page 252. If the problem persists, see "Getting Help" on page 289.
001Eh	Keyboard Not Detected	Pause	No keyboard detected	To enable USB device, see "USB Configuration" on page 105. See "Troubleshooting a USB Device" on page 252. If the problem persists, see "Getting Help" on page 289.
001Fh	Keyboard Controller Error	Pause	Keyboard controller initialization failed	See "Troubleshooting a USB Device" on page 252. If the problem persists, see "Getting Help" on page 289.

Error Code	Error Message	Response	Error Cause	Corrective Actions
0020h	Keyboard Stuck Key Error	Pause	Keyboard key stuck	Disconnect and reconnect the keyboard to the compute sled. If the problem persists, see "Getting Help" on page 289.
0021h	Keyboard Locked Error	Pause	Keyboard locked	Disconnect and reconnect the keyboard to the compute sled. If the problem persists, see "Getting Help" on page 289.
0023h	Memory Correctable Error	Pause	Memory correctable error detected	Remove AC power to the system for 10 seconds and restart the system. See "Troubleshooting System Memory" on page 267. If the problem persists, see "Getting Help" on page 289.
0024h	Memory Uncorrectable Error	Pause	Memory uncorrectable error detected	See "Troubleshooting System Memory" on page 267. If the problem persists, see "Getting Help" on page 289.
0025h	Memory Non-Specific Error	Pause	Memory non-specific error detected	See "Troubleshooting System Memory" on page 267. If the problem persists, see "Getting Help" on page 289.
0026h	MP Service Self Test Error	Pause	MP service self test error detected	See "Troubleshooting Processors" on page 270. If the problem persists, see "Getting Help" on page 289.
0027h	PCI IO Controller Error	Pause	PCI device initialization failed	See "Troubleshooting Expansion Cards" on page 270. If the problem persists, see "Getting Help" on page 289.

Error Code	Error Message	Response	Error Cause	Corrective Actions
0028h	PCI IO Read Error	Pause	PCI device initialization failed	See "Troubleshooting Expansion Cards" on page 270. If the problem persists, see "Getting Help" on page 289.
0029h	PCI IO Write Error	Pause	PCI device initialization failed	See "Troubleshooting Expansion Cards" on page 270. If the problem persists, see "Getting Help" on page 289.
002Ah	Serial Port Not Detected	Pause	Serial device initialization failed	See "Troubleshooting a Serial I/O Device" on page 253. If the problem persists, see "Getting Help" on page 289.
002Bh	Serial Port Controller Error	Pause	Serial device initialization failed	See "Troubleshooting a Serial I/O Device" on page 253. If the problem persists, see "Getting Help" on page 289.
002Ch	Serial Port Input Error	Pause	Serial device initialization failed	See "Troubleshooting a Serial I/O Device" on page 253. If the problem persists, see "Getting Help" on page 289.
002Dh	Serial Port Output Error	Pause	Serial device initialization failed	See "Troubleshooting a Serial I/O Device" on page 253. If the problem persists, see "Getting Help" on page 289.
002Eh	Microcode Update Error	Pause	Processor microcode update error	Check microcode. A BIOS update is required. If the problem persists, see "Getting Help" on page 289.

Error Code	Error Message	Response	Error Cause	Corrective Actions
002Fh	No Microcode Be Updated	Pause	Processor microcode load failed	Ensure that your processors match and conform to the type described in the processor technical specifications outlined in your system's Getting Started Guide.
8012h	SATA 0 Device Not Found	Pause	SATA 0 device not found	Check if the SATA port 0 is enabled. See "SATA Configuration" on page 95. Install a SATA device to SATA port 0. If the problem persists, see "Getting Help" on page 289.
8013h	SATA 1 Device Not Found	Pause	SATA 1 device not found	Check if the SATA port1 is enabled. See "SATA Configuration" on page 95. Install a SATA device to SATA port 1. If the problem persists, see "Getting Help" on page 289.
8014h	SATA 2 Device Not Found	Pause	SATA 2 device not found	Check if the SATA port 2 is enabled. See "SATA Configuration" on page 95. Install a SATA device to SATA port 2. If the problem persists, see "Getting Help" on page 289.
8015h	SATA 3 Device Not Found	Pause	SATA 3 device not found	Check if the SATA port 3 is enabled. See "SATA Configuration" on page 95. Install a SATA device to SATA port 3. If the problem persists, see "Getting Help" on page 289.

Error Code	Error Message	Response	Error Cause	Corrective Actions
8016h	SATA 4 Device Not Found	Pause	SATA 4 device not found	<p>Check if the SATA port 4 is enabled. See "SATA Configuration" on page 95. Install a SATA device to SATA port 4.</p> <p>If the problem persists, see "Getting Help" on page 289.</p>
8017h	SATA 5 Device Not Found	Pause	SATA 5 device not found	<p>Check if the SATA port 5 is enabled. See "SATA Configuration" on page 95. Install a SATA device to SATA port 5.</p> <p>If the problem persists, see "Getting Help" on page 289.</p>
8018h	Sparing Mode is not be Configured!!, Please check Memory Configuration!!	Pause	Memory Sparing Mode Failed	<p>Check if the memory configuration is set to Sparing mode. See "Memory Configuration" on page 92.</p> <p>If the problem persists, see "Getting Help" on page 289.</p>
8019h	Mirror Mode is not be Configured!!, Please check Memory Configuration!!	Pause	Memory Mirror Mode Failed	<p>Check if the memory configuration is set to Sparing mode. See "Memory Configuration" on page 92.</p> <p>If the problem persists, see "Getting Help" on page 289.</p>
8020h	Supervisor and User Passwords have been cleared	Pause	Supervisor and User Passwords have been cleared	<p>Reset password. See the compute sled's documentation for more information.</p> <p>If the problem persists, see "Getting Help" on page 289.</p>

Error Code	Error Message	Response	Error Cause	Corrective Actions
8021h	CMOS Battery Error	Pause	No CMOS battery	See the compute sled's documentation for more information.
8100h	Memory device disabled by BIOS	Pause	Memory Device Error	See "Troubleshooting System Memory" on page 267. If the problem persists, see "Getting Help" on page 289.

System Event Log

Processor Error

Message: “Processor Sensor, IERR error, Processor 1”

Table 1-1. Processor Error

Byte	Field	Value	Description
1	NetFunLun	10h	
2	Platform Event Command	02h	
3	Generator ID	01h	Generated by BIOS
4	Event Message Format Version	04h	Event Message Format Revision. 04h for this specification
5	Sensor Type	07h	Processor
6	Sensor Number	04h	Processor Sensor Number (depends on platform)
7	Event Direction Event Type	6Fh	Bit 7: 0 = Assert Event Bit 6: 0 = Event Type Code
8	Event Data1	AXh	00h: IERR 01h: Thermal Trip 02h: FRB1/BIST Failure 03h: FRB2/Hang in POST Failure 04h: FBR3/Processor Startup/Initialization Failure 0Ah: Processor Automatically Throttled
9	Event Data2	XXh	00h: Processor1 01h: Processor2 02h: Processor3 04h: Processor4
10	Event Data3	FFh	FFh: Not Present

Memory Ecc

Message: “Memory Sensor, Correctable ECC error, SBE warning threshold, CPU1 DIMM_A1”

Table 1-2. Memory ECC

Byte	Field	Value	Description
1	NetFunLun	10h	
2	Platform Event Command	02h	
3	Generator ID	01h	Generated by BIOS
4	Event Message Format Version	04h	Event Message Format Revision. 04h for this specification
5	Sensor Type	0Ch	Memory
6	Sensor Number	60h	Memory Sensor Number (depend on platform)
7	Event Direction Event Type	6Fh	Bit 7: 0 = Assert Event Bit 6: 0 = Event Type Code
8	Event Data1	AXh	00h: Correctable ECC Error 01h: Uncorrectable ECC Error 03h: Memory Scrub Failed 04h: Memory Device Disabled 08h: Spare

Table 1-2. Memory ECC

Byte	Field	Value	Description
9	Event Data2	XXh	Bit 7:4 0x00: SBE warning threshold 0x01: SBE critical threshold 0x0F: Unspecified Bit 3:0 0x00: CPU1 DIMM A1-8 slots (1~8) 0x01: CPU2 DIMM B1-8 slots (9~16) 0x02: CPU3 DIMM C1-8 slots (17~24) 0x03: CPU4 DIMM D1-8 slots (25~32) And so on...
10	Event Data3	XXh	DIMM bit-map location of bits Bit 0=1: DIMM1 error event Bit 1=1: DIMM2 error event ... Bit7=1: DIMM8 error event

PCIe Error

Message: “Critical Interrupt Sensor, PCI PERR, Device#, Function#, Bus#”

Table 1-3. PCIe Error

Byte	Field	Value	Description
1	NetFunLun	10h	
2	Platform Event Command	02h	
3	Generator ID	01h	Generated by BIOS
4	Event Message Format Version	04h	Event Message Format Revision. 04h for this specification
5	Sensor Type	13h	Critical Interrupt
6	Sensor Number	73h	PCI Sensor ID (depend on platform)
7	Event Direction Event Type	6Fh	Bit 7: 0 = Assert Event Bit 6: 0 = Event Type Code
8	Event Data1	AXh	04h: PCI PERR 05h: PCI SERR 07h: Bus Correctable Error 08h: Bus Uncorrectable Error 0Ah: Bus Fatal Error
9	Event Data2	XXh	Bit 7:3 Device Number Bit 2:0 Function Number
10	Event Data3	XXh	Bit 7:0 Bus Number

IOH Core Error

Message: “Critical Interrupt Sensor, Fatal Error, xxxx bit, QPI[0] Error”

Table 1-4. IOH Core Error

Byte	Field	Value	Description
1	NetFunLun	10h	
2	Platform Event Command	02h	
3	Generator ID	01h	Generated by BIOS
4	Event Message Format Version	04h	Event Message Format Revision. 04h for this specification
5	Sensor Type	C0h	OEM Defined Interrupt
6	Sensor Number	XXh	71h: QPI Sensor ID (depend on platform) 72h: INT Sensor ID (depend on platform)
7	Event Direction Event Type	6Fh	Bit 7: 0 = Assert Event Bit 6: 0 = Event Type Code
8	Event Data1	AXh	07h: Core 08h: Non-Fatal 0Ah: Fatal
9	Event Data2	XXh	Local Error Bit
10	Event Data3	XXh	00h: QPI[0] Error 01h: QPI[1] Error 02h: QPI[2] Error 03h: QPI[3] Error 04h: QPI[0] Protocol Error 05h: QPI[1] Protocol Error 06h: QPI[2] Protocol Error 07h: QPI[3] Protocol Error 23h: Miscellaneous Error 24h: IOH Core Error

SB Error

Message: “Critical Interrupt Sensor, Correctable, MCU Parity Error”

Table 1-5. SB Error

Byte	Field	Value	Description
1	NetFunLun	10h	
2	Platform Event Command	02h	
3	Generator ID	01h	Generated by BIOS
4	Event Message Format Version	04h	Event Message Format Revision. 04h for this specification
5	Sensor Type	13h	Critical Interrupt
6	Sensor Number	77h	SB Sensor ID (depend on platform)
7	Event Direction Event Type	6Fh	Bit 7: 0 = Assert Event Bit 6: 0 = Event Type Code
8	Event Data1	AXh	07h: Correctable 08h: Uncorrectable
9	Event Data2	XXh	Bit 7:5Reserved Local error bit number (4 ~ 0) 00000b: HT Periodic CRC Error 00001b: HT Protocol Error 00010b: HT Flow-Control Buffer Overflow 00011b: HT Response Error 00100b: HT Per-Packet CRC Error 00101b: HT Retry Counter Error 00111b: MCU Parity Error
10	Event Data3	FFh	FFh: Not Present

POST Start Event

Message: “System Event, POST starts with BIOS xx.xx.xx”

Table 1-6. POST Start Event

Byte	Field	Value	Description
1	NetFunLun	10h	
2	Platform Event Command	02h	
3	Generator ID	01h	Generated by BIOS
4	Event Message Format Version	04h	Event Message Format Revision. 04h for this specification
5	Sensor Type	12h	System Event
6	Sensor Number	81h	POST Start (depend on platform)
7	Event Direction Event Type	6Fh	Bit 7: 0 = Assert Event Bit 6: 0 = Event Type Code
8	Event Data1	AXh	01h: OEM System Boot Event
9	Event Data2	XXh	7~4: BIOS 1st Field Version (0~15) 3~0: BIOS 2nd Field Version higher 4bits (0~63)
10	Event Data3	XXh	7~6: BIOS 2nd Field Version lower 2bits (0~63) 5~0: BIOS 3rd Field Version (0~63)

POST End Event

Table 1-7. POST End Event

Byte	Field	Value	Description
1	NetFunLun	10h	
2	Platform Event Command	02h	
3	Generator ID	01h	Generated by BIOS
4	Event Message Format Version	04h	Event Message Format Revision. 04h for this specification
5	Sensor Type	12h	System Event
6	Sensor Number	85h	POST End (depend on platform)
7	Event Direction Event Type	6Fh	Bit 7: 0 = Assert Event Bit 6: 0 = Event Type Code
8	Event Data1	AXh	01h: OEM System Boot Event
9	Event Data2	XXh	Bit 7 = Boot Type 0b: PC Compatible Boot (Legacy) 1b: uEFI Boot Bit 3:0 = Boot Device 0001b: Force PXE Boot 0010b: NIC PXE Boot 0011b: Hard Disk Boot 0100b: RAID HDD Boot 0101b: USB Storage Boot 0111b: CD/DVD ROM Boot 1000b: iSCSI Boot 1001b: uEFI Shell 1010b: ePSA Diagnostic Boot
10	Event Data3	FFh	FFh: Not Present

POST Error Code Event

Message: “System Firmware Progress, POST error code: UBLBh.”

Table 1-8. POST Error Code Event

Byte	Field	Value	Description
1	NetFunLun	10h	
2	Platform Event Command	02h	
3	Generator ID	01h	Generated by BIOS
4	Event Message Format Version	04h	Event Message Format Revision. 04h for this specification
5	Sensor Type	0Fh	System Firmware Progress
6	Sensor Number	86h	POST Error (depend on platform)
7	Event Direction Event Type	6Fh	Bit 7: 0 = Assert Event Bit 6: 0 = Event Type Code
8	Event Data1	AXh	00: System Firmware Error (POST Error)
9	Event Data2	XXh	Upper Byte
10	Event Data3	XXh	Lower Byte

BIOS Recovery Event

Table 1-9. BIOS Recovery Event

Byte	Field	Value	Description
1	NetFunLun	10h	
2	Platform Event Command	02h	
3	Generator ID	01h	Generated by BIOS
4	Event Message Format Version	04h	Event Message Format Revision. 04h for this specification
5	Sensor Type	12h	System Event
6	Sensor Number	89h	BIOS Recovery fail (depend on platform)
7	Event Direction Event Type	6Fh	Bit 7: 0 = Assert Event Bit 6: 0 = Event Type Code
8	Event Data1	AXh	01h: OEM BIOS recovery Event
9	Event Data2	XXh	01h:Start Recovery 02h:Recovery Success 03h:Load Image Fail 04h:Signed Fail
10	Event Data3	FFh	FFh: Not Present

ME Fail Event

Table 1-10. BIOS Recovery Event

Byte	Field	Value	Description
1	NetFunLun	10h	
2	Platform Event Command	02h	
3	Generator ID	01h	Generated by BIOS
4	Event Message Format Version	04h	Event Message Format Revision. 04h for this specification
5	Sensor Type	12h	System Event
6	Sensor Number	8Ah	ME fail (depend on platform)

Table 1-10. BIOS Recovery Event

Byte	Field	Value	Description
7	Event Direction Event Type	6Fh	Bit 7: 0 = Assert Event Bit 6: 0 = Event Type Code
8	Event Data1	AXh	01h: OEM ME fail Event
9	Event Data2	XXh	01h:ME fail
10	Event Data3	FFh	FFh: Not Present

SEL Generator ID**Table 1-11. SEL Generator ID**

Generator ID	
BIOS	0x0001
BMC	0x0020
ME	0x002C
Windows 2008	0x0137

BMC

The following table includes an overview of the system sensors.

In the Offset column:

- SI = Sensor Initialization
- SC = Sensor Capabilities
- AM = Assertion Mask
- DM = Deassertion Mask
- RM = Reading Mask
- TM = Settable/Readable Threshold Mask

Table 1-12. Sensor Summary

Sensor Number	Sensor Name	Sensor Type	Event/Reading Type	Offset
01h	SEL Fullness	Event Logging Disabled (10h)	Sensor-specific (6Fh)	SI: 67h SC: 40h AM: 0035h DM: 0000h RM: 0035h
02h	P1 Thermal Trip	Processor (07h)	Sensor-specific (6Fh)	SI: 01h SC: 40h AM: 0002h DM: 0000h RM: 0002h
03h	P2 Thermal Trip	Processor (07h)	Sensor-specific (6Fh)	SI: 01h SC: 40h AM: 0002h DM: 0000h RM: 0002h

Table 1-13. Sensor Summary (continued)

Sensor Number	Sensor Name	Sensor Type	Event/Reading Type	Offset
04h	CPU ERR2	Processor (07h)	Sensor-specific (6Fh)	SI: 01h SC: 40h AM: 0001h DM: 0000h RM: 0001h
05h	12V Standby	Voltage (02h)	Threshold (01h)	SI: 7Fh SC: 59h AM: 7A95h DM: 7A95h TM: 3F3Fh
06h	5V	Voltage (02h)	Threshold (01h)	SI: 7Fh SC: 59h AM: 7A95h DM: 7A95h TM: 3F3Fh
07h	5V Standby	Voltage (02h)	Threshold (01h)	SI: 7Fh SC: 59h AM: 7A95h DM: 7A95h TM: 3F3Fh
08h	3.3V	Voltage (02h)	Threshold (01h)	SI: 7Fh SC: 59h AM: 7A95h DM: 7A95h TM: 3F3Fh

Table 1-14. Sensor Summary (continued)

Sensor Number	Sensor Name	Sensor Type	Event/Reading Type	Offset
09h	3.3V Standby	Voltage (02h)	Threshold (01h)	SI: 7Fh SC: 59h AM: 7A95h DM: 7A95h TM: 3F3Fh
0Ah	Battery low	Battery (29h)	Sensor-specific (6Fh)	SI: 67h SC: 40h AM: 0001h DM: 0000h RM: 0001h
41h	MEZZ1 TEMP	Temperature (01h)	Threshold (01h)	SI: 7Fh SC: 68h AM: 0A80h DM: 0A80h TM: 3838h
41h	CPU1 Temp	Temperature (01h)	Threshold (01h)	SI: 7Fh SC: 68h AM: 0A80h DM: 0A80h TM: 3838h
42h	CPU2 Temp	Temperature (01h)	Threshold (01h)	SI: 7Fh SC: 68h AM: 0A80h DM: 0A80h TM: 3838h

Table 1-15. Sensor Summary (continued)

Sensor Number	Sensor Name	Sensor Type	Event/Reading Type	Offset
43h	DIMM ZONE 1 Temp	Temperature (01h)	Threshold (01h)	SI: 7Fh SC: 68h AM: 0A80h DM: 0A80h TM: 3838h
44h	DIMM ZONE 1 Temp	Temperature (01h)	Threshold (01h)	SI: 7Fh SC: 68h AM: 0A80h DM: 0A80h TM: 3838h
45h	PCH Temp	Temperature (01h)	Threshold (01h)	SI: 7Fh SC: 68h AM: 0A80h DM: 0A80h TM: 3838h
60h	Memory	Memory (0Ch)	Sensor-specific (6Fh)	SI: 01h SC: 40h AM: 0023h DM: 0000h RM: 0023h
A0h	Watchdog	Watchdog 2 (23h)	Sensor-specific (6Fh)	SI: 67h SC: 40h AM: 000Fh DM: 0000h RM: 000Fh

Table 1-16. Sensor Summary (continued)

Sensor Number	Sensor Name	Sensor Type	Event/Reading Type	Offset
A1h	Soft Reset	System Boot/ Restart Initiated (1Dh)	Sensor-specific (6Fh)	SI: 01h SC: 40h AM: 0004h DM: 0000h RM: 0004h
A2h	AC lost	Power Unit (09h)	Sensor-specific (6Fh)	SI: 01h SC: 40h AM: 0010h DM: 0000h RM: 0010h
A3h	Power off	Power Unit (09h)	Sensor-specific (6Fh)	SI: 01h SC: 40h AM: 0002h DM: 0000h RM: 0002h

Other Information You May Need



WARNING: See the safety and regulatory information that shipped with your system. Warranty information may be included within this document or as a separate document.

- The Getting Started Guide provides an overview of rack installation, system features, setting up your system, and technical specifications.
- The compute or storage sleds' documentation provides information about the sled features, configuring and managing the sled. This document is available online at dell.com/support/manuals.
- The Baseboard Management Controller Guide provides information about installing and using the systems management utility. This document is available online at dell.com/support/manuals.



NOTE: Always check for updates on dell.com/support/manuals and read the updates first because they often supersede information in other documents.

Using the System Setup Program

The System Setup program is the BIOS program that enables you to manage your system hardware and specify BIOS-level options. From the System Setup program, you can:

- Change the NVRAM settings after you add or remove hardware
- View the system hardware configuration
- Enable or disable integrated devices
- Set performance and power management thresholds
- Manage system security

System Setup Menu

The system employs the latest Insyde® BIOS, which is stored in Flash memory. The Flash memory supports the Plug and Play specification, and contains a System Setup program, the Power On Self Test (POST) routine, and the PCI auto-configuration utility.

This system supports system BIOS shadowing which enables the BIOS to execute from 64-bit onboard write-protected DRAM.


You can configure items such as:


- Hard-drives and peripherals
- Password protection
- Power management features

The Setup utility should be executed under the following conditions:

- When changing the system configuration
- When a configuration error is detected by the system and you are prompted to make changes to the Setup utility
- When redefining the communication ports to prevent any conflicts

- When changing the password or making other changes to the security setup

 **NOTE:** Only items in brackets [] can be modified, Items that are not in brackets are display only.

 **NOTE:** PowerEdge C8000 server enclosure is referred to as simply the "server enclosure" or the "chassis" in this manual.

System Setup Options at Boot

You can initiate Setup by pressing the following keys during POST:

Keystroke	Description
<F2>	Enter the System Setup
<F8>	Load customized defaults
<F9>	Load optimal defaults in Setup menu
<F10>	Save and exit Setup

Using the System Setup Program Navigation Keys

The following table lists the keys found in the legend bar with their corresponding alternates and functions:

Keys	Function
F1	General Help
← or →	Select Screen
↑ or ↓	Select Item
←	Change Option/Field
Tab	Select Field
Esc	Exit
Enter	Go to Sub Screen
Home	Go to Top of Screen
End	Go to Bottom of Screen
F10	Save and Exit

General Help

In addition to the Item Specific Help window, the Setup Utility also provides a General Help screen. This screen can be called up from any menu by pressing <F1>. The General Help screen lists the legend keys with their corresponding alternates and functions. To exit the help window, press <Enter> or <Esc>.

Console Redirection

The console redirection allows a remote user to diagnose and fix problems on a server, which has not successfully booted the operating system (OS). The centerpiece of the console redirection is the BIOS Console. The BIOS Console is a Flash ROM-resident utility that redirects input and output over a serial or modem connection.

The BIOS supports console redirection to a serial port. If serial port based headless server support is provided by the system, the system must provide support for redirection of all BIOS driven console I/O to the serial port. The driver for the serial console must be capable of supporting the functionality documented in the ANSI Terminal Definition.

The console redirection behavior shows a change of string displays that reduce the data transfer rate in the serial port and cause the absence or an incomplete POST screen. If you see an abnormal POST screen after you connect to the console, it is recommended to press <Ctrl><R> to reflash the screen.

Enabling and Configuring Console Redirection

Console redirection is configured through the System Setup program. There are three options available to establish console redirection on the system.

- External serial port
- Internal serial connector as Serial Over LAN (SOL)
- BMC SOL

Enabling and Configuring Console Redirection Via COM1

To activate console redirection via COM1, you must configure the following settings:

- 1 Connect the serial cable to the serial port and host system. See "Compute Sleds" on page 26 for the location of the serial port on the sled.
- 2 Press <F2> immediately after a power-on or reboot to enter System Setup.
- 3 In the System Setup screen, select the **Server** menu and press <Enter>.
- 4 In the Server screen, select **Remote Access Configuration** and press <Enter>.
- 5 In the Remote Access Configuration screen, verify the following settings:
 - Remote Access: Enabled
 - Serial port number: COM1
 - Serial Port Mode: 115200 8,n,1
 - Flow Control: None
 - Redirection After BIOS POST: Always
 - Terminal Type: ANSISee "Remote Access Configuration" on page 113 for details. Make sure the last four options syncs with the host and client.
- 6 Press <Esc> to return to the System Setup screen. Press <Esc> again, and a message prompts you to save the changes.

Enabling and Configuring Console Redirection Via COM2 SOL

To activate console redirection via COM2 SOL, you must configure the following settings:

- 1 Connect the serial cable to the serial port and host system. See "Compute Sleds" on page 26 for the location of the serial port on the sled.
- 2 Press <F2> immediately after a power-on or reboot to enter System Setup.
- 3 In the System Setup screen, select the **Server** menu and press <Enter>.
- 4 In the Server screen, select **Remote Access Configuration** and press <Enter>.

- 5 In the Remote Access Configuration screen, verify the following settings:
 - Remote Access: Enabled
 - Serial port number: COM2 as SOL
 - Serial Port Mode: 115200 8, n,1
 - Flow Control: None
 - Redirection After BIOS POST: Always
 - Terminal Type: ANSI

See "Remote Access Configuration" on page 113 for details. Make sure the host and client are on the same network.

- 6 Press <Esc> to return to the System Setup screen. Press <Esc> again, and a message prompts you to save the changes.

Enabling and Configuring Console Redirection Via BMC SOL

When using the BMC management port, you have two options for connecting and managing servers: Dedicated-NIC mode and Shared-NIC mode. The following procedures show the setup option of the BMC management port through a Dedicated-NIC or Shared-NIC.

To activate console redirection via a dedicated BMC management port, you must configure the following settings:

- 1 Connect the sled system board and node power distribution board with a BMC cable.
- 2 Connect the network cable to the BMC management port. See "Compute Sleds" on page 26 for the location of the BMC management port on the sled.
- 3 Press <F2> immediately after a power-on or reboot to enter System Setup.
- 4 In the System Setup screen, select the **Server** menu and press <Enter>.
- 5 In the Server screen, select **Remote Access Configuration** and press <Enter>.
- 6 In the Remote Access Configuration screen, verify the following settings:
 - Remote Access: Enabled
 - Serial port number: COM2 as SOL

- Serial Port Mode: 115200 8, n, 1
- Flow Control: None
- Redirection After BIOS POST: Always
- Terminal Type: ANSI

See "Remote Access Configuration" on page 113 for details. Make sure the last four options syncs with the host and client.

7 In the Server screen, select **BMC LAN Configuration** and press <Enter>.

8 In the BMC LAN Configuration screen, verify the following settings:

- BMC LAN Port Configuration: Dedicated-NIC
- BMC NIC IP Source: DHCP or Static (Use DHCP if your network servers are using automatic assignment of IP addresses)
- IP Address: 192.168.001.003
- Subnet Mask: 255.255.255.000
- Gateway Address: 000.000.000.000

See "Set BMC LAN Configuration" on page 111 for details. Make sure the host and client are on the same network

9 Press <Esc> to return to the System Setup screen. Press <Esc> again, and a message prompts you to save the changes.

To activate console redirection via a shared BMC management port, you must configure the following settings:

- 1** Connect the sled system board and node power distribution board with a BMC cable.
- 2** Connect the network cable to the Ethernet connector 1. See "Compute Sleds" on page 26 for the location of the Ethernet connector 1 on the sled.
- 3** Press <F2> immediately after a power-on or reboot to enter System Setup.
- 4** In the System Setup screen, select the **Server** menu and press <Enter>.
- 5** In the Server screen, select **Remote Access Configuration** and press <Enter>.

- 6** In the Remote Access Configuration screen, verify the following settings:
- Remote Access: Enabled
 - Serial port number: COM2
 - Serial Port Mode: 115200 8, n, 1
 - Flow Control: None
 - Redirection After BIOS POST: Always
 - Terminal Type: ANSI

See "Remote Access Configuration" on page 113 for details. Make sure the last four options syncs with the host and client.

- 7** In the Server screen, select **BMC LAN Configuration** and press <Enter>.

- 8** In the BMC LAN Configuration screen, verify the following settings:

- BMC LAN Port Configuration: Shared-NIC
- BMC NIC IP Source: DHCP or Static (Use DHCP if your network servers are using automatic assignment of IP addresses)
- IP Address: 192.168.001.003
- Subnet Mask: 255.255.255.000
- Gateway Address: 000.000.000.000

See "Set BMC LAN Configuration" on page 111 for details. Make sure the host and client are on the same network

- 9** Press <Esc> to return to the System Setup screen. Press <Esc> again, and a message prompts you to save the changes.


Serial Port Connection List

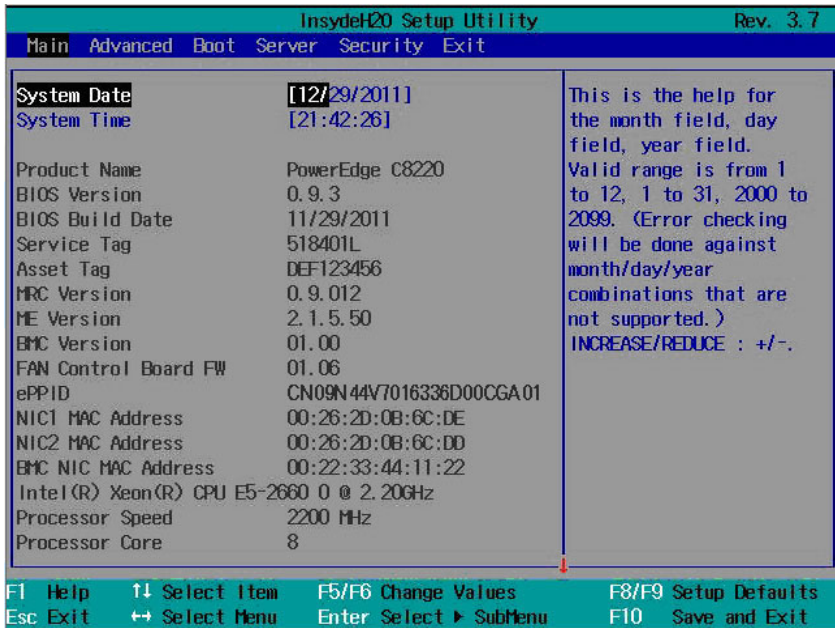
Signal Type	Setup Option			OS Setting	Output
	Remote Access	Serial Port Number	Serial Port Address		
Serial Console Redirection	Enabled	COM1	3F8h/2F8h	ttyS0	Serial Port
	Enabled	COM1	2F8h/3F8h	ttyS1	
BMC Serial Over LAN	Enabled	COM2 as SOL	3F8h/2F8h	ttyS1	Management Port
	Enabled	COM2 as SOL	2F8h/3F8h	ttyS0	

Main Menu


The main menu displays information about your system boards and BIOS.

Main Screen

 **NOTE:** Press <Alt><H> to enter the BIOS debug mode and reset the BIOS to default settings.



 **NOTE:** The options for the System Setup program change based on the system configuration.

 **NOTE:** The System Setup program defaults are listed under their respective options in the following sections, where applicable.

System Settings

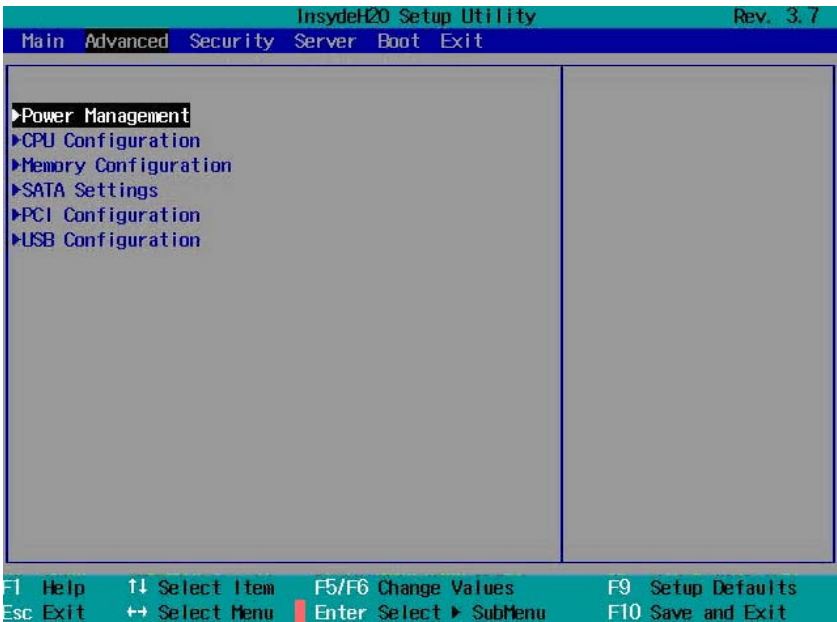
Option	Description
System Date	Scroll to this item to adjust the date. Use <Enter>, <Tab> or <Shift><Tab> to select a field. Use [+] or [-] to configure system date.
System Time	Scroll to this item to adjust the time. Use <Enter>, <Tab> or <Shift><Tab> to select a field. Use [+] or [-] to configure system time.
Product Name	Displays the system product name.
BIOS Version	Displays the BIOS version. NOTE: Check this version number when updating BIOS from the manufacturer.
BIOS Build Date	Displays the date the BIOS was created.
Service Tag	Displays the system service tag number. The service tag field should match what is physically on the service tag of the system.
Asset Tag	Displays the system asset tag number.
MRC Version	Displays the Memory Reference Code (MRC) firmware version.
ME Version	Displays the Manageability Engine (ME) firmware version.
BMC Version	Displays the Baseboard Management Controller (BMC) firmware version.
FAN Control Board FW	Displays the Fan Controller Board (FCB) firmware version.
ePPID	Displays the information from Electronic Piece Part Identification (ePPID) label.
NIC1 MAC Address	Displays the Media Access Control (MAC) address for the NIC1 connector.
NIC2 MAC Address	Displays the MAC address for the NIC2 connector.
BMC NIC MAC Address	Displays the MAC address of the BMC management port.
Processor Type	Displays the processor type.
Processor Speed	Displays the current speed of the processor.

Option	Description
Processor Core	Displays the processor core.
System Memory Size	Displays total memory size installed on the system board.
System Memory Speed	Displays the maximum speed of your system memory.
System Memory Voltage	Displays the maximum voltage of your system memory.

Advanced Menu

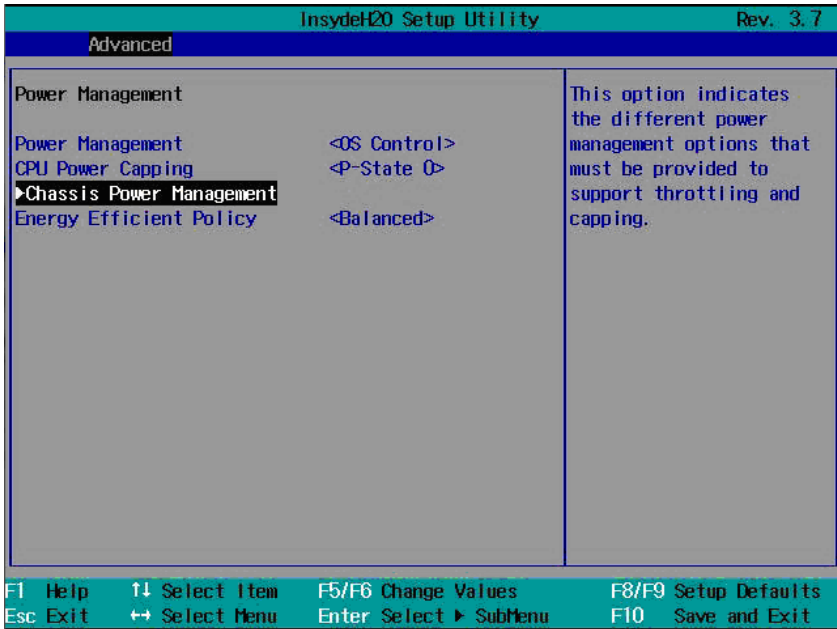
The advanced menu displays a table of items that defines advanced information about your system. Scroll to this item and press <Enter> to view the following screen.

⚠ CAUTION: Making incorrect settings to items on these pages may cause the system to malfunction. Unless you have experience adjusting these items, it is recommended that you leave these settings at the default values. If making settings to items on these pages causes your system to malfunction or prevents the system from booting, open BIOS and choose "Load Optimal Defaults" in the Exit menu to boot up normally.



Power Management

Scroll to this item and press <Enter> to view the following screen.



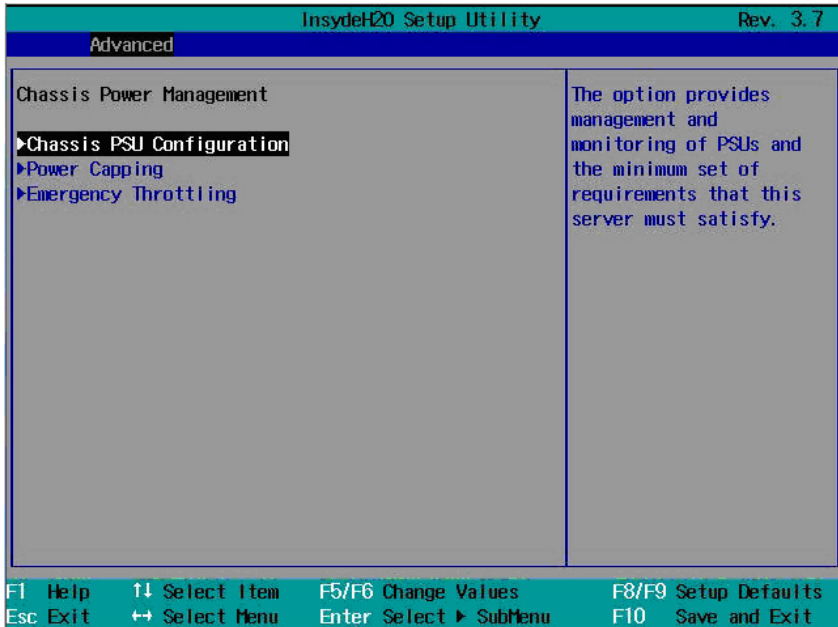
Power Management

Option	Description
Power Management (OS Control default)	<p>Select a system power management mode.</p> <ul style="list-style-type: none"> • Maximum Performance: Sets the system power management to maximum performance. • OS Control: Allows the operating system to control the power management. • Node Manager: Enables Node Manager to moderate power consumption and performance of the processors in the compute sled. Node manager delivers power reporting and power capping functionality for individual compute sleds.

Option	Description
CPU Power Capping (P-State 0 default)	<p>Select a processor performance state (P-state). Options are [P-State 0], [P-State 1], [P-State 2], [P-State 3], and [P-state 4].</p> <p>NOTE: This option is enabled when Power Management is set to OS Control mode.</p>
Chassis Power Management	<p>Press <Enter> to set chassis power management.</p> <p>This option indicates the different power management options that control the system power consumption by processor throttling and power capping.</p>
Energy Efficient Policy (Balanced default)	<p>Select a power policy option.</p> <ul style="list-style-type: none"> • Max Performance: Sets the processors at the highest performance state at all times. • Balanced: Offers full performance and saves power by reducing system power consumption during periods of inactivity. • Low Power: Use different processor power saving modes (C-states) to reduce system power consumption. <p>NOTE: This option works when the OS does not support power management control of the processor.</p>

Chassis Power Management

Scroll to this item and press <Enter> to view the following screen.



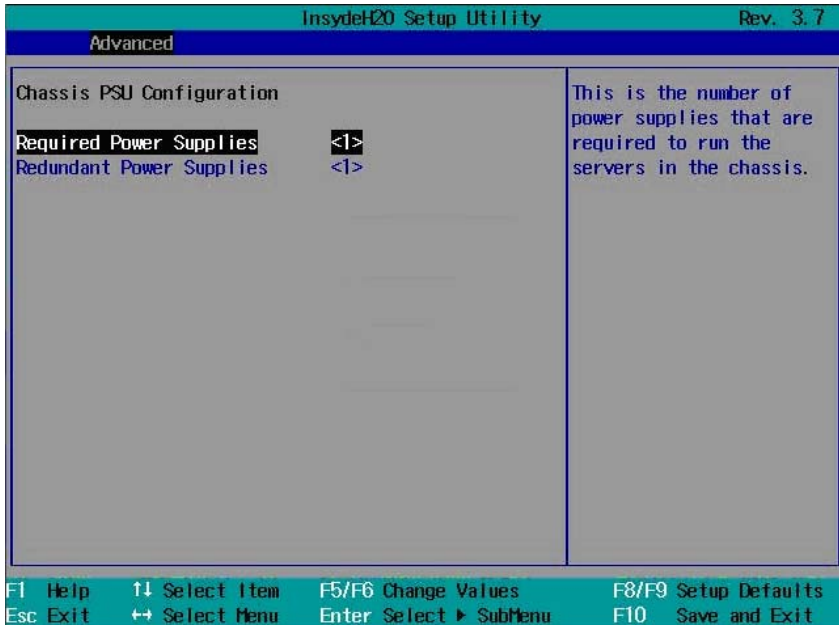
Chassis Power Management

Option	Description
Chassis PSU Configuration	<p>Press <Enter> to configure the chassis power supply.</p> <p>This option provides management and monitoring of the power supplies and the minimum set of requirements that this server must satisfy.</p>
Power Capping	<p>Press <Enter> to set power capping values.</p> <p>This option controls system power by node manager through the processor to limit power consumption in watts for a sled.</p> <p>NOTE: The sled's total power consumption does not include enclosure fan power energy use. The enclosure fan operates at a maximum of 280 W of power.</p>

Option	Description
Emergency Throttling	<p data-bbox="413 240 990 295">Press <Enter> to configure the compute sled and chassis emergency throttle functions.</p> <p data-bbox="413 311 990 422">This option sets the policy to take effect when the sled detects a system emergency failure (such as fan error, chassis critical power events, PSU critical power events, abnormal ambient temperature, etc.).</p> <p data-bbox="413 438 990 549">NOTE: The FCB initiates emergency throttling when active power supplies do not meet the maximum PSU configurations or when the exhaust temperature control PWM output is above 100%.</p>

Chassis PSU Configuration

Scroll to this item and press <Enter> to view the following screen.



Chassis PSU Configuration

Option	Description
Required Power Supplies (1 default)	Select the number of power supplies to provide load-shared power to run the sleds in the enclosure. Options are [1], [2], [3], and [4].
Redundant Power Supplies (1 default)	Select the number of power supplies to provide power redundancy to the enclosure. Options are [0], [1], and [2].

Refer to the Boundaries of PSU Configuration table on page 83 when changing the configuration of the power supplies to load-shared or redundant power.

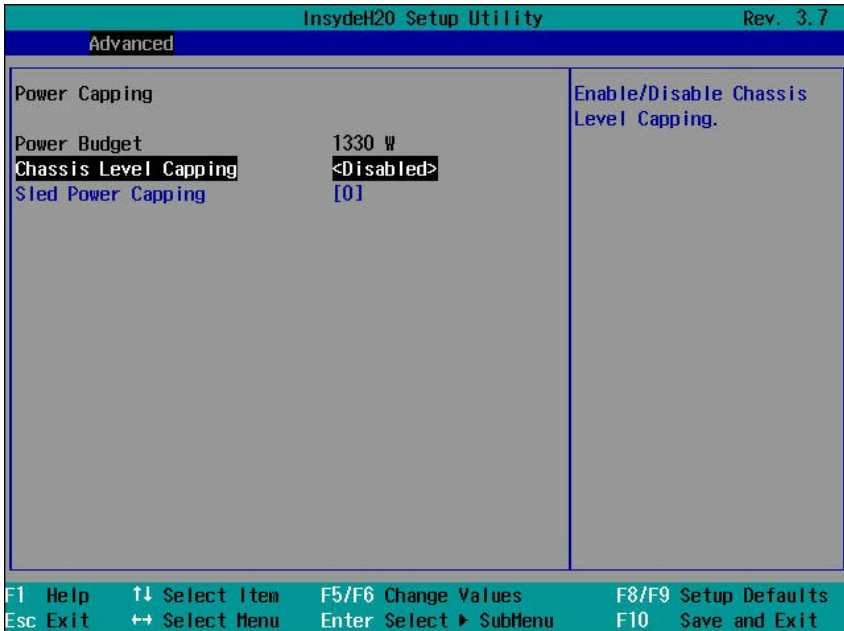
Boundaries of PSU Configuration

PSU Number	Required PSU (X)	Redundant PSU (N)
4	4	0
	3	1
	2	2
3	2	1
2	2	0
	1	1

The number of power supplies required for PSU configuration is determined by the following formula: $X + N$, where X is the required PSU and N is the redundant PSU.

Power Capping

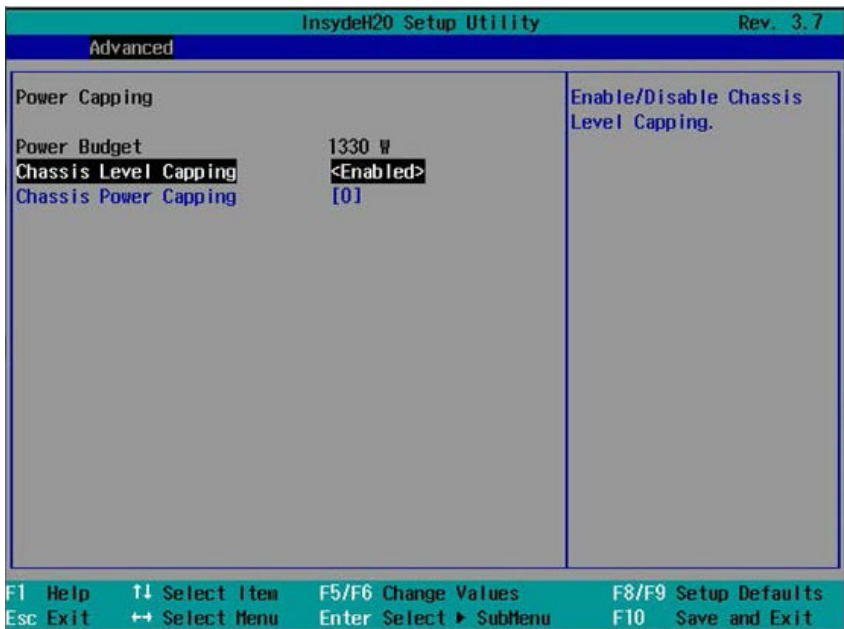
Scroll to this item and press <Enter> to view the following screens.



Power Capping

Option	Description
Power Budget	<p>Displays the enclosure available power wattage.</p> <p>It is the summary of each PSU's capacity (i.e. based on the number of PSUs and the maximum capacity of each PSU). Each PSU supports a maximum output wattage of 1100 W or 1400 W. Power budget in the enclosure must not exceed 2660 W.</p> <p>The power budget is determined by the following formula, power budget = (maximum output wattage of the installed PSU x sum of the PSUs in the enclosure) x 0.95. For example, in an enclosure with two PSUs the power budget is (1400 W x 2 PSU) x 0.95 = 2660 W.</p>

Option	Description
Chassis Level Capping (Disabled default)	Set as chassis level or sled level power capping. (The default setting is referred from BMC). The system determines the power consumption of the enclosure and sleds, and constantly attempts to maintain the enclosure's power consumption below the cap.
Sled Power Capping (0 default)	<p>NOTE: This option is enabled when the Chassis Level Capping is set to Disabled.</p> <p>The sled's own power capping infrastructure is able to determine power consumption of the sleds. When set to 0, the power capping function is disabled. The minimum wattage rating should not less than 100 W and the maximum wattage rating should not be more than the power budget value. Settings range from 100 to 1000 W.</p>



Power Capping

Option	Description
Power Budget	<p>Displays the enclosure available power wattage.</p> <p>It is the summary of each PSU's capacity (i.e. based on the number of PSUs and the maximum capacity of each PSU). Each PSU supports a maximum output wattage of 1100 W or 1400 W. Power budget in the enclosure must not exceed 2660 W.</p> <p>The power budget is determined by the following formula, power budget = (maximum output wattage of the installed PSU x sum of the PSUs in the enclosure) x 0.95. For example, in an enclosure with two PSUs the power budget is (1400 W x 2 PSU) x 0.95 = 2660 W.</p>
Chassis Level Capping (Disabled default)	<p>Set as chassis level or sled level power capping. (The default setting is referred from BMC). The system determines the power consumption of the enclosure and sleds, and constantly attempts to maintain the enclosure's power consumption below the cap.</p>
Chassis Power Capping (0 default)	<p>NOTE: This option is enabled when the Chassis Level Capping is set to Enabled.</p> <p>Determines the power consumption of the chassis. The minimum wattage rating should not less than 1500 W and the maximum wattage rating should not be more than the power budget value. Settings range from 1500 to 9000 W.</p>

Emergency Throttling

Scroll to this item and press <Enter> to view the following screen.



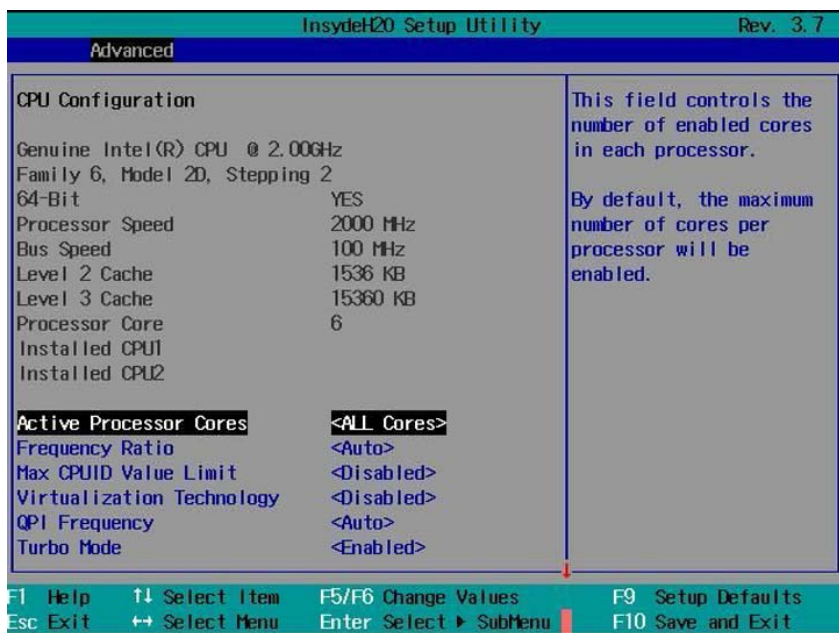
Emergency Throttling

Option	Description
Sled Level Policy (Chassis Level default)	Select a sled level policy when an emergency throttle event is triggered. <ul style="list-style-type: none"> Chassis Level: Overrides the chassis level policy for a specific server. Throttling: Allows compute sled throttling when an emergency throttle event is triggered. Power Off: Turns off the compute sled when an emergency throttle event is triggered. Do Nothing: The compute sled will do nothing when an emergency throttle event is triggered.

Option	Description
Chassis Level Policy (Throttling default)	<p>Select a chassis level policy when an emergency throttle event is triggered. This option can be configured when the Sled Level Policy is set to Chassis Level policy.</p> <ul style="list-style-type: none"> • Throttling: Allows server throttling when an emergency throttle event is triggered. • Power Off: Turns off the server power when an emergency throttle event is triggered.

CPU Configuration

Scroll to this item and press <Enter> to view the following screen.



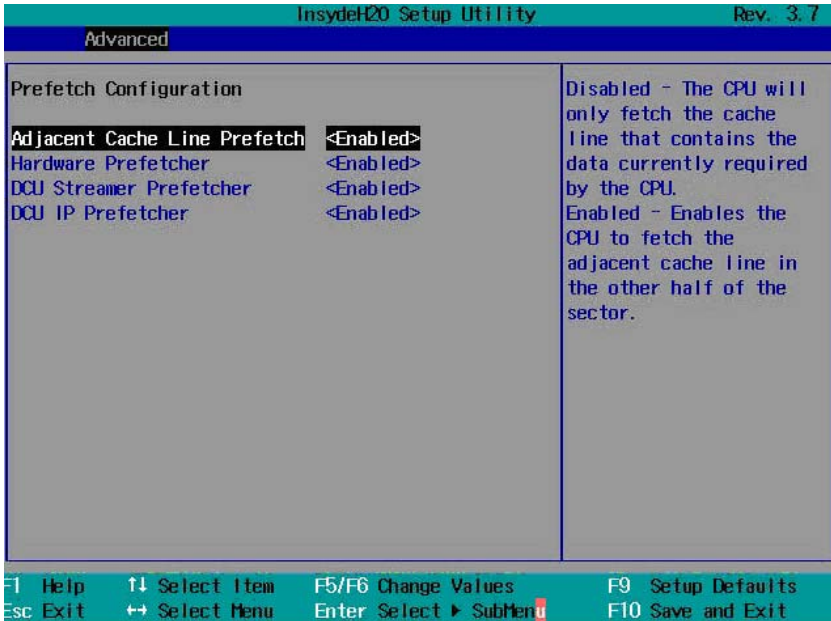
CPU Configuration

Option	Description
Active Processor Cores (All Cores default)	Allows you to control the number of enabled cores in each processor. Options are [1], [2], [4], [6], [8], [10]and [All Cores]. (Option depends on processor core.)
Frequency Ratio (Auto default)	Sets the frequency multipliers as maximum level.
Max CPUID Value Limit (Disabled default)	Some OS, which is (NT4), fails if the value returned in EAX is > 3 when CPUID instruction is executed with EAX=0. When enabled, this setting limits CPUID function to 3. When disabled, this setting disables the 3 or less.
Virtualization Technology (Disabled default)	Allows you to set the Virtualization Technology in applicable CPUs. Enabled (applicable CPUs)/Disabled (unusable in any OS).
QPI Frequency (Auto default)	Select the link speed. Options are [6.4GTs], [7.2GTs], and [8.0GTs].
Turbo Mode (Enabled default)	Enables or disables processor Turbo mode.
C-States (Enabled default)	When enabled, the processor(s) can operate in all available power C states. When disabled, the user power C states are not available for the processor.
C1E State (Enabled default)	Enables or disables the Enhanced Halt (C1E) state. NOTE: Disable this option at your own risk. When you disable this option, pop up message appears on the screen and warning appears in the System Setup Help.
C6 State (Enabled default)	Enables or disables the processor C6 state. NOTE: Disable this option at your own risk. When you disable this option, pop up message appears on the screen and warning appears in the System Setup Help.

Option	Description
C7 State (Enabled default)	<p>Enables or disables the processor C7 state.</p> <p>NOTE: This feature is available when the processor supports C7 state.</p> <p>NOTE: Disable this option at your own risk. When you disable this option, a pop up message appears on the screen and warning appears in the System Setup Help.</p>
XD Bit Capability (Enabled default)	<p>Enables or disables the processor's Execute Disable (XD) Memory Protection Technology feature.</p>
Direct Cache Access (Enabled default)	<p>Enables or disables the direct cache access.</p>
Hyper-Threading Technology (Enabled default)	<p>Enables or disables the Hyper-Threading technology.</p>
Prefetch Configuration	<p>Press <Enter> to configure the prefetch settings.</p> <p>NOTE: This feature is available when supported by the processor.</p>

Prefetch Configuration

Scroll to this item and press <Enter> to view the following screen.



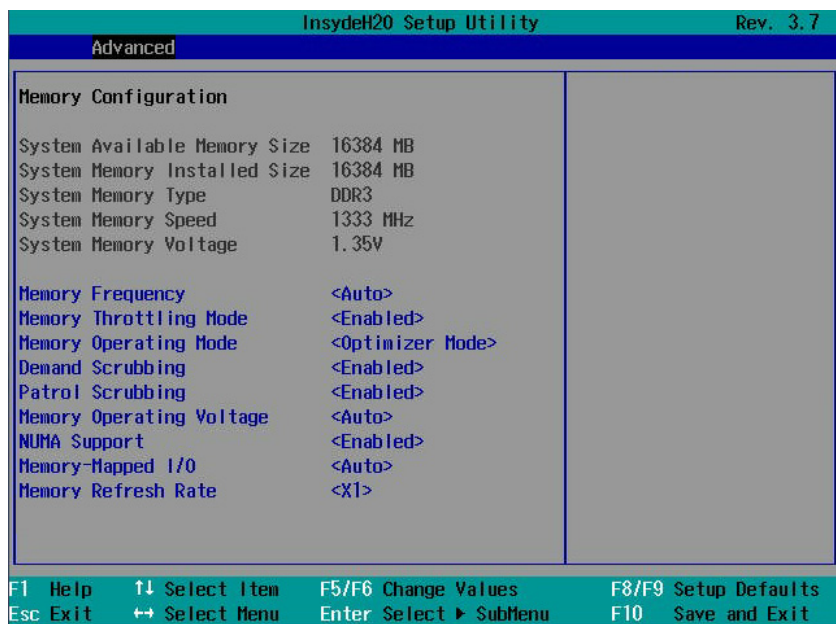
Prefetch Configuration

Option	Description
Adjacent Cache Line Prefetch (Enabled default)	Enables or disables system optimization for sequential memory access.
Hardware Prefetcher (Enabled default)	Enables or disables the speculative unit within the processor(s).
DCU Streamer Prefetcher (Enabled default)	Enables or disables Data Cache Unit (DCU) streamer prefetcher. NOTE: This feature is available when supported by the processor.

Option	Description
DCU IP Prefetcher (Enabled default)	Enables or disables DCU IP prefetcher. NOTE: This feature is available when supported by the processor.

Memory Configuration

Scroll to this item and press <Enter> to view the following screen.



Memory Configuration

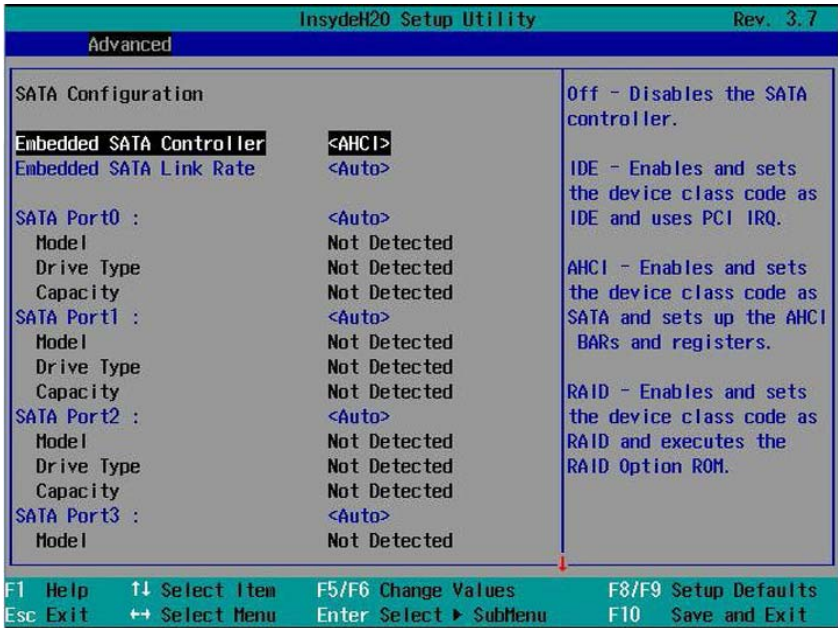
Option	Description
Memory Frequency (Auto default)	Select an operating memory frequency. Options are [Auto], [800], [1066], [1333], [1600], and [1866].
Memory Turbo Mode (Disabled default)	Enables or disables the memory turbo mode. NOTE: This feature is not available for Intel Xeon E5-2600 v2 processors.

Option	Description
Memory Throttling Mode (Enabled default)	Enables or disables the memory to run in closed-loop thermal throttling mode.
Memory Operating Mode (Optimizer Mode default)	<p>Select the type of memory operation if a valid memory configuration is installed.</p> <ul style="list-style-type: none"> • Optimizer Mode: The two memory controllers run in parallel 64-bit mode for improved memory performance. • Spare Mode: Enables memory sparing. In this mode, one rank per channel is reserved as a spare. If persistent correctable errors are detected on a rank, the data from this rank is copied to the spare rank and the failed rank is disabled. With memory sparing enabled, the system memory available to the operating system is reduced by one rank per channel. For example, in a dual-processor configuration with sixteen 32 GB quad-rank DIMMs, the available system memory is: 32 GB x 16(DIMMs) – 32/4 (rank size) x 8 (channels) = 448 GB. With sixteen 64 GB 8-rank LRDIMMs which use Rank Multiplication(RM)=4, the available system memory is: 64 GB x 16(DIMMs) – 64/8x4 (rank size) x 8 (channels) = 768 GB. • Mirror Mode: Enables memory mirroring • Advanced ECC Mode: Controllers are joined in 128-bit mode running multi-bit advanced ECC.
Demand Scrubbing (Enabled default)	<p>Enables or disables DRAM scrubbing.</p> <p>DRAM scrubbing is the ability to write corrected data back to the memory once a correctable error is detected on read transaction.</p>
Patrol Scrubbing (Enabled default)	<p>Enables or disables patrol scrubbing.</p> <p>Patrol scrubbing proactively searches the system memory, repairing correctable errors.</p>

Option	Description
Memory Operating Voltage (Auto default)	<p>If set to Auto, the system sets the voltage to an optimal value based on the capacity of the installed memory modules. You can also set the voltage of the memory module to a higher value (1.5 V) provided that the modules support multiple voltages. Options are [Auto], [1.5 volts], and [1.35 volts].</p> <p>NOTE: BIOS will auto restrict selection if DIMM is not supporting low voltage.</p>
NUMA Support (Enabled default)	<p>Enables or disables Non-Uniform Memory Access (NUMA) support to improve processor performance.</p> <p>NOTE: This option is available for NUMA systems that allow memory interleaving across all processor nodes.</p>
Memory Mapped I/O (Auto default)	<p>Select the base address register for the PCIe memory space. Options are [Auto], [32-bit], and [64-bit].</p>
Memory Refresh Rate (X1 default)	<p>Enables or disables the 2X memory refresh rate.</p>

SATA Configuration

Scroll to this item and press <Enter> to view the following screen.



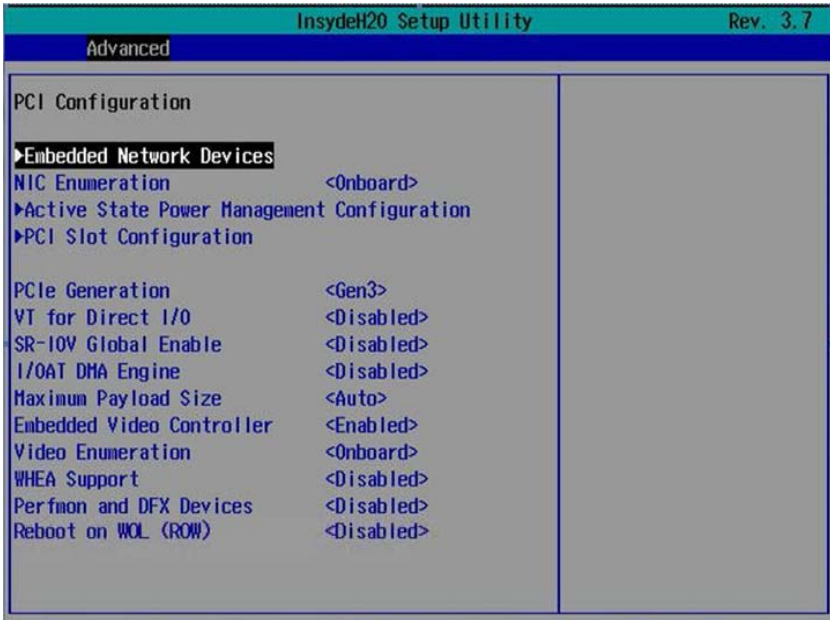
SATA Configuration

Option	Description
Embedded SATA Controller (AHCI default)	Select an operation mode for the onboard SATA controller. <ul style="list-style-type: none">• Off: Disables the SATA controller. This token applies to the first onboard SATA controller.• IDE: Enables the SATA controller to run in IDE mode. Sets the device class code as IDE and uses PCI IRQ (referred as Native mode). This token applies to the first onboard SATA controller.• AHCI: Enables the SATA controller to run in AHCI mode. Sets the device class code as SATA and sets up the AHCI BARs and registers. This token applies to the first onboard SATA controller.• RAID: Enables the SATA controller to run in RAID mode. Sets the device class code as RAID and executes the RAID Option ROM. This token applies to the first onboard SATA controller. This provides access to the RAID setup utility during system bootup.
Embedded SATA Link Rate (Auto default)	Select a SATA link speed. <ul style="list-style-type: none">• Auto: Sets the SATA link speed at maximum 6.0 Gbps.• 1.5 Gbps: Sets the SATA link speed to 1.5 Gbps. For power consumption.• 3.0 Gbps: Sets the SATA link speed to 3.0 Gbps.
SATA Port 0 (Auto default)	When set to off, turns off the 1st Serial ATA drive controller. When set to auto, enables BIOS support for the 1st Serial ATA drive controller (enabled if present, POST error if not present).
SATA Port 1 (Auto default)	When set to off, turns off the 2nd Serial ATA drive controller. When set to auto, enables BIOS support for the 2nd Serial ATA drive controller (enabled if present, POST error if not present).

Option	Description
SATA Port 2 (Auto default)	<p>When set to off, turns off the 3rd Serial ATA drive controller.</p> <p>When set to auto, enables BIOS support for the 3rd Serial ATA drive controller (enabled if present, POST error if not present).</p>
SATA Port 3 (Auto default)	<p>When set to off, turns off the 4th Serial ATA drive controller.</p> <p>When set to auto, enables BIOS support for the 4th Serial ATA drive controller (enabled if present, POST error if not present).</p>
SATA Port 4 (Auto default)	<p>When set to off, turns off the 5th Serial ATA drive controller.</p> <p>When set to auto, enables BIOS support for the 5th Serial ATA drive controller (enabled if present, POST error if not present).</p>
SATA Port 5 (Auto default)	<p>When set to off, turns off the 6th Serial ATA drive controller.</p> <p>When set to auto, enables BIOS support for the 5th Serial ATA drive controller (enabled if present, POST error if not present).</p>
Power Saving Features (Auto default)	Enables or disables the feature that allows SATA hard-drives to initiate link power management transitions.
HDD Security Erase (Disabled default)	Enables or disables the hard-drive security freeze lock feature.

PCI Configuration

Scroll to this item and press <Enter> to view the following screen.



PCI Configuration

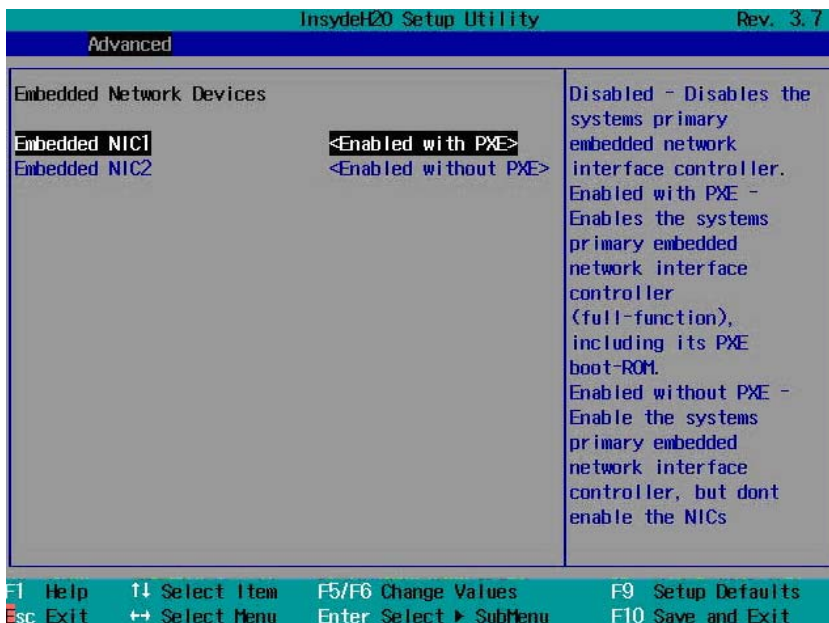
Option	Description
Embedded Network Devices	Press <Enter> to configure available network drives.
NIC Enumeration (Onboard default)	Select a LAN boot ROM option. <ul style="list-style-type: none"> Onboard: Uses the PXE boot on NICs to boot the system. Add-in: Use the PXE boot on add-in network adapters to boot the system.
Active State Power Management Configuration	Press <Enter> to configure power management for PCI Express devices.

Option	Description
PCI Slot Configuration	Press <Enter> to configure PCI Express devices. NOTE: When you install an Intel Xeon Phi card in the C8220X sled, BIOS automatically enables the PCI memory 64-bit decode option.
PCIe Generation (Gen3 default)	Select a PCI signaling rate. <ul style="list-style-type: none"> • Gen1: 2.5 GT/s • Gen2: 5 GT/s • Gen3: 8 GT/s
VT for Direct I/O (Disabled default)	Enables or disables Intel hardware virtualization support.
SR-IOV Global Enable (Disabled default)	Enables or disables BIOS configuration of Single Root I/O Virtualization (SR-IOV) devices.
I/OAT DMA Engine (Disabled default)	If set to Enabled, the I/O Acceleration Technology (I/OAT) feature is enabled for network controllers that support this technology.
Maximum Payload Size (Auto default)	Sets the maximum payload size of the PCI Express controller. Options are Auto, 128 bytes, and 256 bytes.
Embedded Video Controller (Enabled default)	Enables or disables the onboard video controller. NOTE: This option should always be set to Enabled. The remote KVM function cannot function if set to disabled.
Video Enumeration (Onboard default)	Select video controller enumeration type. <ul style="list-style-type: none"> • Onboard - The onboard video controller is used for boot-time messages. • Add-in - The first add-in video controller is used for boot-time messages. Depending on the BIOS search order and system slot layout.
WHEA Support (Disabled default)	Enables or disables the Windows Hardware Error Architecture (WHEA) feature.
Perfmon and DFX Devices (Disabled default)	Enables or disables the Perfmon devices (e.g. disk usage, memory consumption, and CPU load) DFX devices (such as a USB adaptor) installed in the system.

Option	Description
Reboot on WOL (ROW) (Disabled default)	Enables or disables reboot on wake-on-LAN feature. Reboot On WOL targets network controllers when the network controller receives a magic packet. This option displays when the network chip supports Reboot on WOL feature.

Embedded Network Devices

Scroll to this item and press <Enter> to view the following screen.

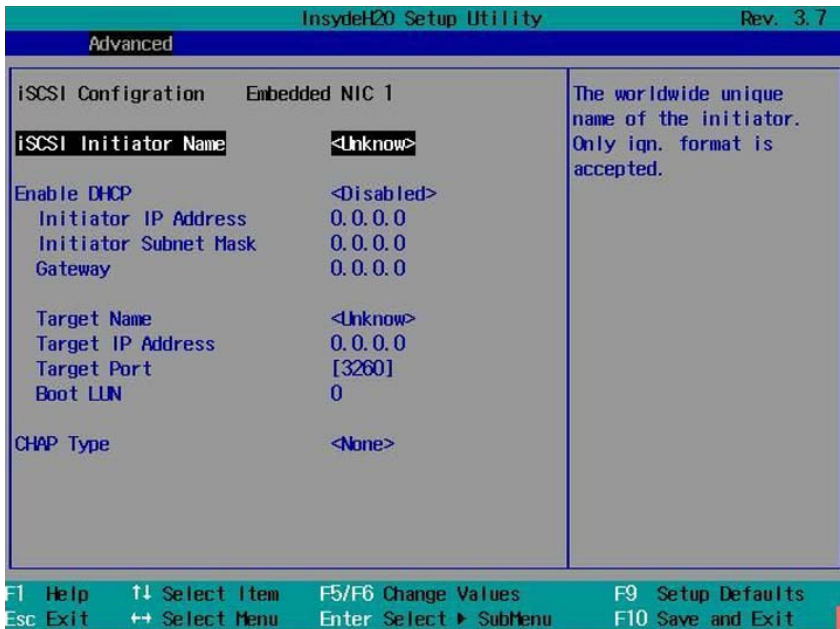


Embedded Network Devices

Option	Description
Embedded NIC1 (Enabled with PXE default)	<p>Enables or disables the onboard NIC1 controller.</p> <ul style="list-style-type: none">• Enabled with PXE: Allows you to enable the system's primary embedded NIC (full function), including its PXE boot-ROM.• Enabled without PXE: Allows you to enable the system's primary embedded NIC only. The NIC associated PXE or RPL boot-ROM are disabled in this option.• iSCSI Remote Boot: Allows you to configure the iSCSI target and initiator variables to support iSCSI Remote Boot. Changes take effect after the system reboots.• Disabled: Allows you to disable the system's primary embedded NIC.
Embedded NIC2 (Enabled without PXE default)	<p>Enables or disables the onboard NIC2 controller.</p> <ul style="list-style-type: none">• Enabled with PXE: Allows you to enable the system's secondary embedded NIC (full function), including its PXE boot-ROM.• Enabled without PXE: Allows you to enable the system's secondary embedded NIC only. The NIC associated PXE or RPL boot-ROM are disabled in this option.• iSCSI Remote Boot: Allows you to configure the iSCSI target and initiator variables to support iSCSI Remote Boot. Changes take effect after the system reboots.• Disabled: Allows you to disable the system's primary embedded NIC.

iSCSI Remote Boot

Select iSCSI Remote Boot in the Embedded NIC1/NIC2 option and press <Enter> to view the following screen.



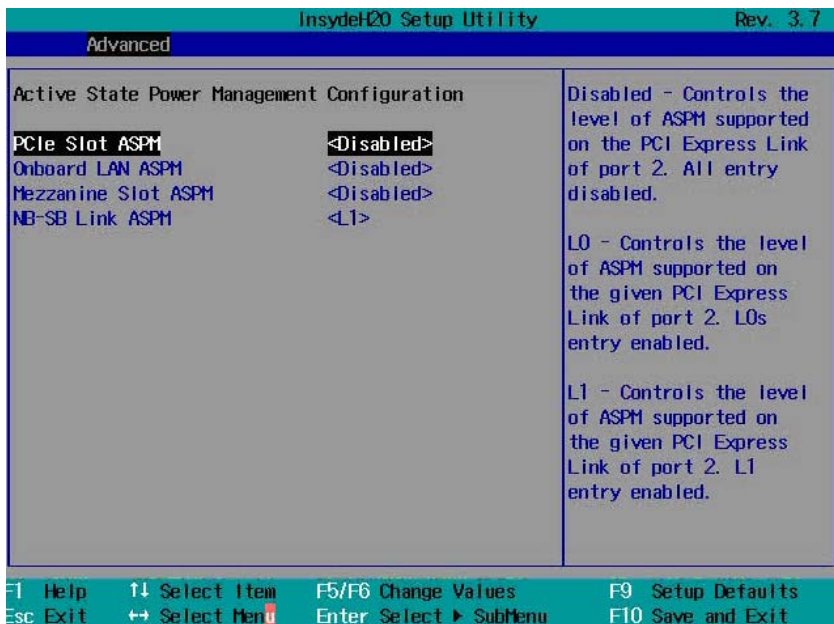
iSCSI Remote Boot

Option	Description
iSCSI Initiator Name	Displays the worldwide unique name of the initiator. NOTE: Only iqn format is accepted.
Enable DHCP (Disabled default)	Enables or disables the DHCP network settings.
Initiator IP Address	Sets the initiator's static IP address.
Initiator Subnet Mask	Sets the subnet mask for the static IP address.
Gateway	Sets the IP gateway for the static IP address.
Target Name	Sets the name for the target IP.
Target IP Address	Sets the target's IP address.

Option	Description
Target Port	Sets the target port.
Boot LUN	Sets the hexadecimal representation of LU number.
CHAP Type (None default)	Select CHAP type. Options are [None], [One Way CHAP], and [Mutual CHAP].

Active State Power Management Configuration

Scroll to this item and press <Enter> to view the following screen.



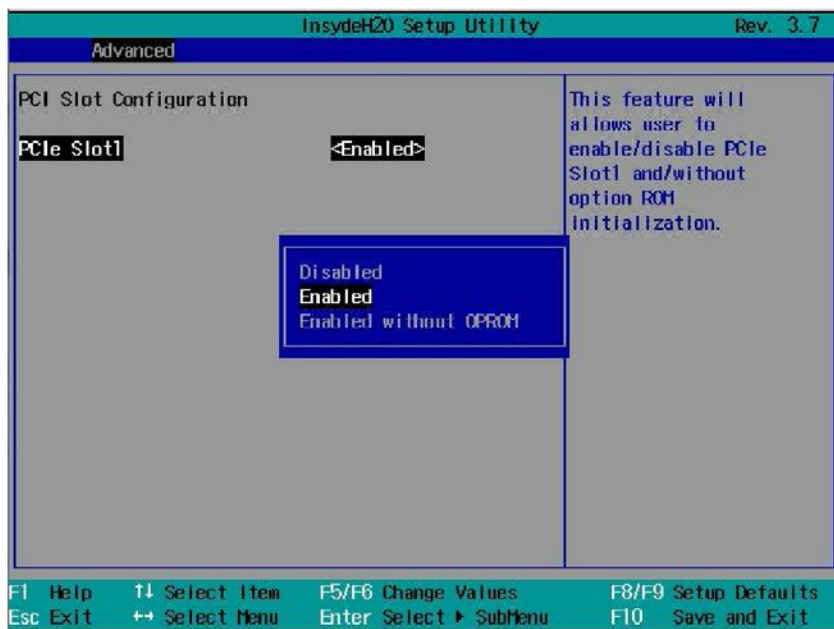
Active State Power Management Configuration

Option	Description
PCIe Slot ASPM (Disabled default)	Select an active state power management (ASPM) protocol for the PCI Express slot. Options are [Disabled] and [L1].
Onboard LAN ASPM (Disabled default)	Select an ASPM protocol for the onboard network controller. Options are [Disabled] and [L1].

Option	Description
Mezzanine Slot ASPM (Disabled default)	Select an ASPM protocol for the mezzanine slot.
NB-SB Link ASPM (L1 default)	Select an ASPM protocol for the northbridge and southbridge chipsets.

PCI Slot Configuration

Scroll to this item and press <Enter> to view the following screen.

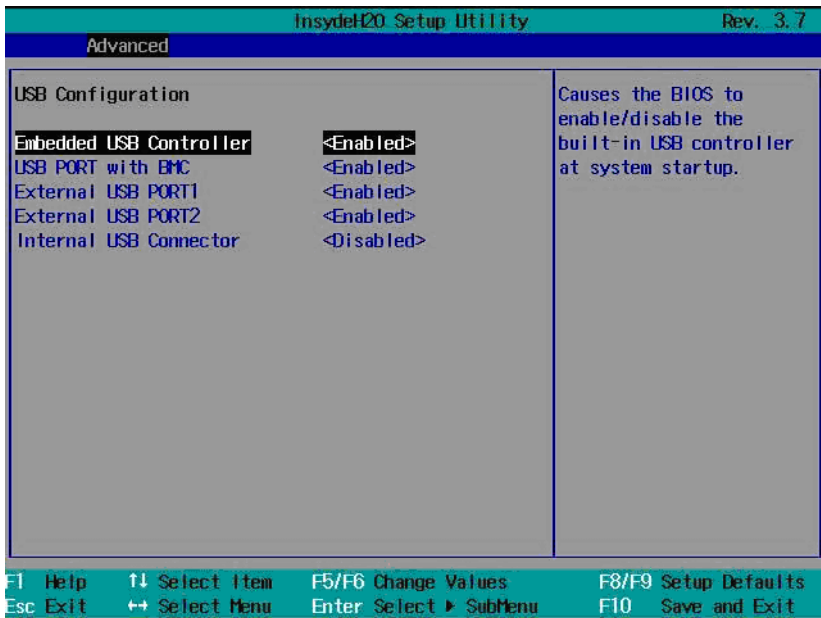


PCI Slot Configuration

Option	Description
PCIe Slot1 (Enabled default)	Enables or disables the PCI Express slot. Options are [Disabled], [Enabled], [Enabled without OPROM]. NOTE: When you install an Intel Xeon Phi card in the C8220X sled, BIOS automatically enables the PCI memory 64-bit decode option. You can set the GPGPU information using IPMI commands. See Table 2-18 for more information.

USB Configuration

Scroll to this item and press <Enter> to view the following screen.

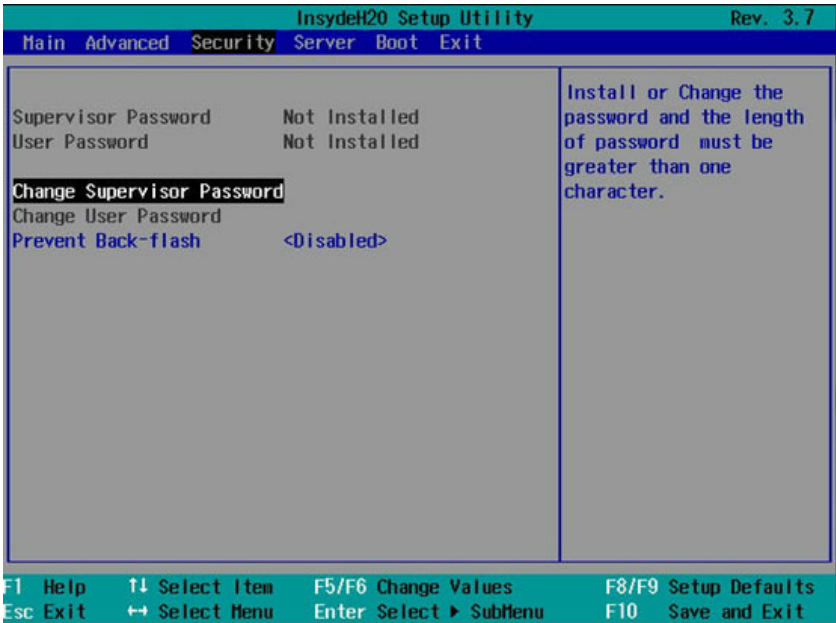


USB Configuration

Option	Description
Embedded USB Controller (Enabled default)	Enables or disables the onboard USB controller at system startup.
USB Port with BMC (Enabled default)	Enables or disables internal USB port with BMC support.
External USB Port1 (Enabled default)	Enables or disables the external USB port1.
External USB Port2 (Enabled default)	Enables or disables the external USB port2.
Internal USB Connector (Enabled default)	Enables or disables the internal USB port.

Security Menu

The security menu enables you to set the security parameters. Scroll to this item and press <Enter> to view the following screen.



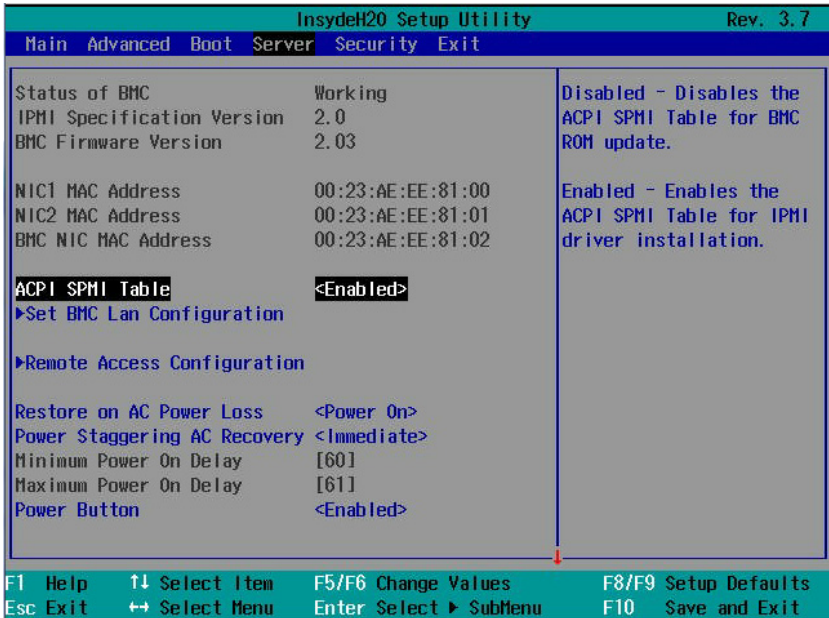
Security Settings

Option	Description
Supervisor Password	Indicates whether a supervisor password has been set. If the password has been installed, Installed is displayed. If not, Not Installed is displayed.
User Password	Indicates whether a supervisor password has been set. If the password has been installed, Installed displays. If not, Not Installed displays.

Option	Description
Change Supervisor	<p>You can install a Supervisor password, and if you install a supervisor password, you can then install a user password. A user password does not provide access to many of the features in the Setup utility. Note, the Change User Password option only appears after a Supervisor password has been set.</p> <p>Select this option and press <Enter> to access the sub menu, a dialog box appears which lets you enter a password. You can enter no more than six letters or numbers. Press <Enter> after you have typed in the password. A second dialog box asks you to retype the password for confirmation. Press <Enter> after you have retyped it correctly. If the password confirmation is incorrect, an error message appears. The password is stored in NVRAM after ezPORT completes. The password is required at boot time, or when the user enters the Setup utility.</p>
Change User Password	<p>Installs or changes the User password.</p>
Prevent Back-flash (Disabled default)	<p>This option, when enabled, will prohibit the system BIOS to downgrade to version 2.1.0 or earlier version.</p> <p>WARNING: You will not be able to change the setting once the feature is enabled. It is strongly recommended not to enable this unless absolutely necessary.</p> <p>NOTE: Once enabled, you cannot use the NVRAM clear jumper to change the prevent back-flash settings to disabled.</p>

Server Menu

The server menu enables you to configure compute sled parameters. Scroll to this item and press <Enter> to view the following screen.



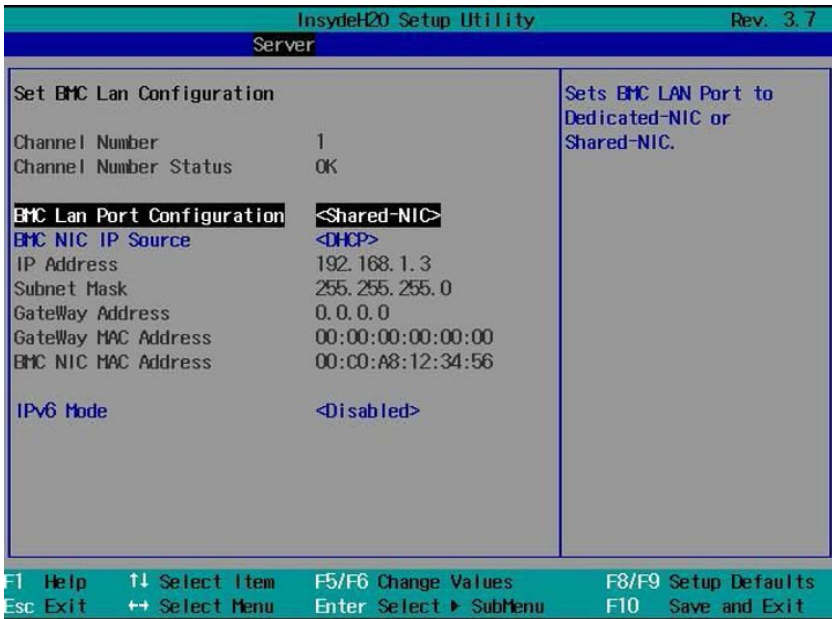
Server Settings

Option	Description
Status of BMC	Displays BMC status.
IPMI Specification Version	Displays the Intelligent Platform Management Interface (IPMI) firmware version number.
BMC Firmware Version	Displays the BMC firmware version number.
NIC1 MAC Address	Displays the MAC address for the NIC1 connector.
NIC2 MAC Address	Displays the MAC address for the NIC2 connector.
BMC NIC MAC Address	Displays the MAC address for the BMC NIC connector.

Option	Description
ACPI SPMI Table (Enabled default)	When enabled, BIOS enables Advanced Configuration and Power Interface (ACPI) Service Processor Management Interface (SPMI) table for IPMI driver installation. When disabled, BIOS disables the ACPI SPMI table for BMC ROM update.
Set BMC LAN Configuration	Press <Enter> to set the BMC network.
Remote Access Configuration	Press <Enter> to configure serial port settings related to console redirection.
Restore on AC Power Loss (Power On default)	Select the power state when the AC power is back. <ul style="list-style-type: none"> • Power Off: System remains off until the power button is pressed. • Last State: System reverts to the last power state before power loss. • Power On: System switches back on after the AC power loss.
Power Staggering AC Recovery (Immediate default)	Set the time period for the system to turn back on from an AC power loss once power is resumed. <ul style="list-style-type: none"> • Immediate: Power On (No Delay) • Random: Auto • User Defined: User defined delay time.
Power Button (Enabled default)	When enabled, the power button can turn the system's power off. When disabled, the power button can only turn on system power.
View System Event Log	Press <Enter> to view the BMC system event log.
Event Logging (Enabled default)	Enables or disables BIOS to log system events.
NMI on Error (Enabled default)	Enables or disables BIOS to generate a Non-masked Interrupt (NMI) when an uncorrectable PCI Express error occurs.

Set BMC LAN Configuration

Scroll to this item and press <Enter> to view the following screen.



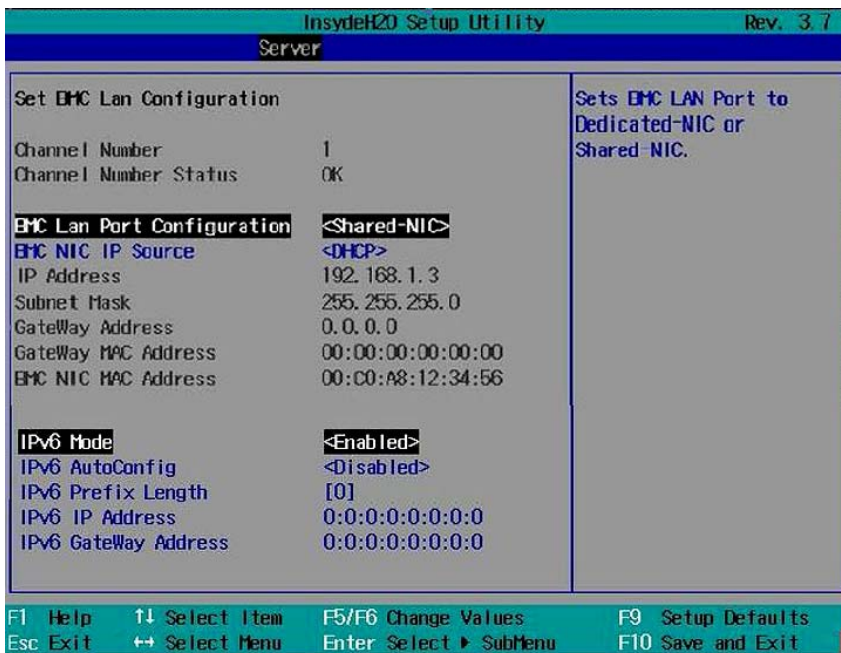
Set BMC LAN Configuration

Option	Description
Channel Number	Displays the channel number used for BMC LAN.
Channel Number Status	Displays the BMC channel number status.
BMC LAN Port Configuration (Shared-NIC default)	Set the BMC management port to dedicated or shared NIC port. Options are [Dedicated NIC] and [Shared NIC].
BMC NIC IP Source (DHCP default)	Set BMC to obtain its IP address using DHCP or establish a static IP address.
IP Address	Sets the static IP address.
Subnet Mask	Sets the subnet mask for the static IP address.
Gateway Address	Sets the IP gateway for the static IP address.

Option	Description
Gateway MAC Address	Sets the MAC address for the static IP address.
BMC NIC MAC Address	Sets the MAC address for the BMC management port.
IPv6 Mode (Disabled default)	Enables or disables the IPv6 internet protocol support. If set to enabled, configure the IPv6 prefix, IP and gateway addresses.

IPv6 Mode

Select Enabled in the IPv6 Mode option and press <Enter> to view the following screen.



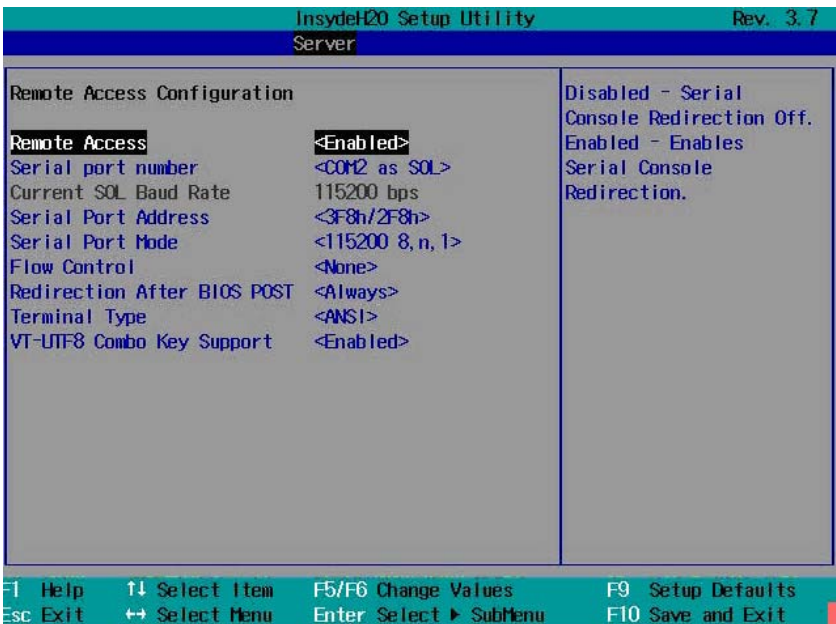
IPv6 Mode

Option	Description
IPv6 AutoConfig	Enables or disables IPv6 auto configuration.

Option	Description
IPv6 Prefix Length	Sets prefix length of the IPv6 address.
IPv6 IP Address	Set the BMC management port to dedicated or shared NIC port. Options are [Dedicated NIC] and [Shared NIC].
IPv6 IP Address	Sets the BMC IPv6 address.
IPv6 Gateway Address	Sets the MAC address for the static IPv6 address.

Remote Access Configuration

Scroll to this item and press <Enter> to view the following screen.



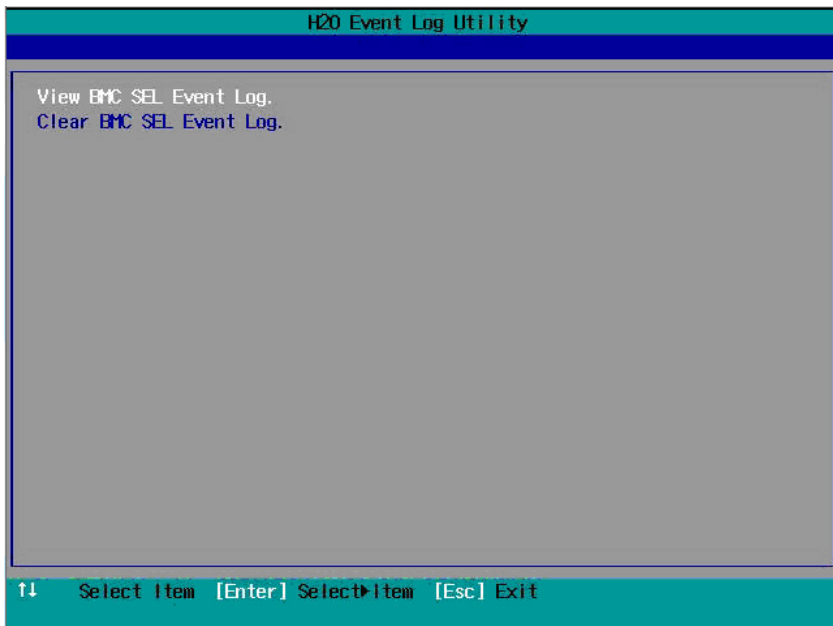
Remote Access Configuration

Option	Description
Remote Access (Enabled default)	Enables or disables serial console redirection.

Option	Description
Serial port number (COM1 default)	Select a serial port for console redirection. <ul style="list-style-type: none"> • COM1: Enables console redirection via COM1. See token D7h. • COM2 as SOL: Enables console redirection via COM2.
Serial Port Address (3F8h/2F8h default)	Specifies the base I/O port address of the serial port. <ul style="list-style-type: none"> • 3F8h/2F8h: Sets the front serial port address as 0x3F8 and internal serial port address as 0x2F8. • COM2 as SOL: Sets the front serial port address as 0x2F8 and internal serial port address as 0x3F8.
Serial Port Mode (115200 8,n,1 as default)	Select a baud rate for the serial port. Options are [115200 8,n,1], [57600 8,n,1], [38400 8,n,1], [19200 8,n,1], and [9600 8,n,1].
Flow Control (None default)	Select a flow control for console redirection. Options are [None] and [Software].
Redirection After BIOS POST (Always default)	If set to Always, the console redirection is always active. When Disabled, console redirection is turned off after POST.
Terminal Type (ANSI default)	Select a target terminal type for console redirection. Options are [ANSI], [VT100], and [VT-UTF8].
VT-UTF8 Combo Key Support (Enabled default)	Enables or disables the VT-UTF8 Combination Key support for ANSI/VT100 terminals.

View System Log

Scroll to this item and press <Enter> to view the following screen.

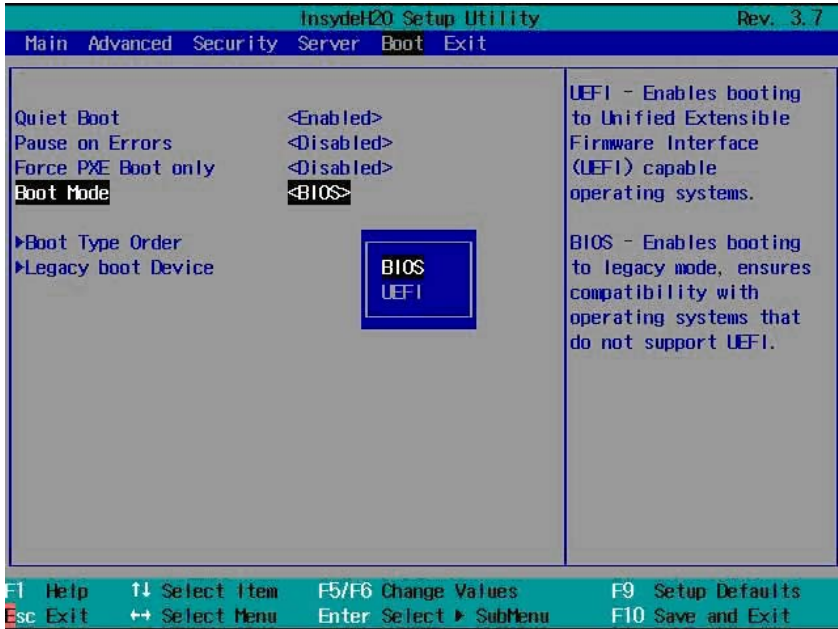


View System Log

Option	Description
View BMC SEL Event Log	View all events in the BMC system event log.
Clear BMC SEL Event Log	Deletes all records in the BMC system event log.

Boot Menu

The boot menu enables you to set POST boot parameters. Scroll to this item and press <Enter> to view the following screen.



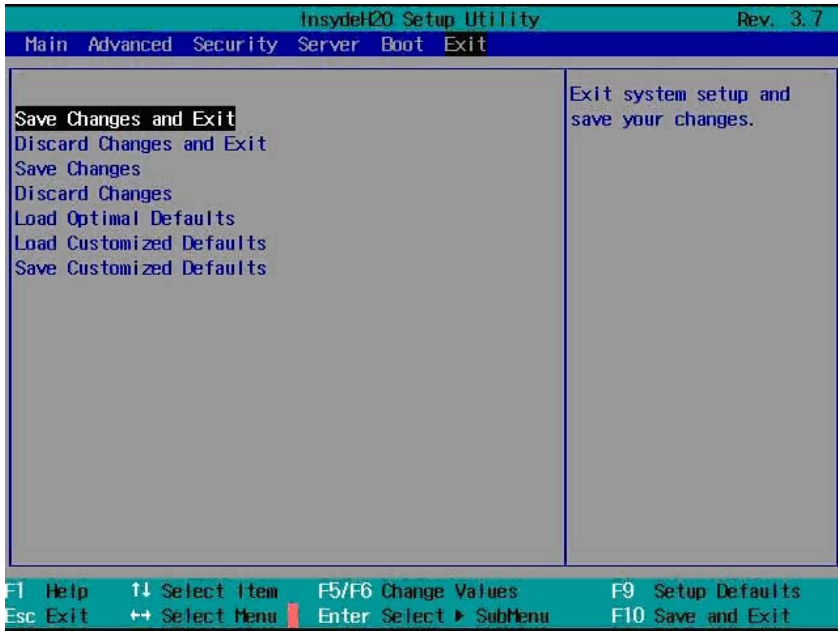
Boot Settings

Option	Description
Quiet Boot (Enabled default)	Enable this item to display the splash or summary screen, rather than the detail of the POST flow. When disabled, normal POST messages appear.
Pause on Errors (Disabled default)	Enables or disables BIOS to prompt you to press <F1> or <F2> keys on errors during POST.
Force PXE Boot only (Disabled default)	Enables or disables PXE to be the only boot device.

Option	Description
Boot Mode (BIOS default)	Select a system boot mode. <ul style="list-style-type: none">• BIOS: The standard BIOS-level boot interface• UEFI: An enhanced 64-bit boot interface based on Unified Extensible Firmware Interface (UEFI) specifications that overlays the system BIOS.
Boot Type Order	Press <Enter> to set the preferred boot sequence from the available devices.
Legacy Boot Device	Press <Enter> to set the preferred boot sequence from the available legacy USB devices.

Exit Menu

Scroll to this item and press <Enter> to view the following screen.



Exit Options

Option	Description
Save Changes and Exit	Highlight this item and press <Enter> to save any changes that you have made in the Setup utility and exit the Setup utility. When the Save Changes and Exit dialog box appears, press <Y> to save the changes and exit, or press <N> to return to the setup main menu.
Discard Changes and Exit	Highlight this item and press <Enter> to discard any changes that you have made in the Setup utility and exit the Setup utility. When the Discard Changes and Exit dialog box appears, press <Y> to discard changes and exit, or press <N> to return to the setup main menu.

Option	Description
Save Changes	Select this item and press <Enter> to save changes you have made without leaving the setup utility.
Discard Changes	Select this item and press <Enter> to discard any changes you have made without leaving the setup utility.
Load Optimal Defaults	<p>If you highlight this item and press <Enter>, a dialog box asks if you want to install optimal settings for all the items in the Setup utility. Press the <Y> key to indicate Yes, and then press <Enter> to install the optimal settings.</p> <p>The optimal settings default values are quite demanding and your system might not function properly if you are using slower memory chips or other kinds of low-performance components.</p>
Load Customized Defaults	Load 2nd default values from NVRAM for all the setup parameters.
Save Customized Defaults	Save all the setup parameters to NVRAM as 2nd default values.

Command Line Interfaces for System Setup Options

The options in the System Setup menu allows you to control the System Configuration Utility (syscfg). This utility is included in the Dell OpenManage Deployment Toolkit (DTK).

See the Deployment Toolkit Version 1.3 User's Guide for additional information about installing and using the DTK utilities, and the Deployment Toolkit Version 1.3 Command Line Interface Reference Guide for a complete list of all valid options, suboptions, and arguments for using the BMCCFG.EXE to configure and manage your BMC.

You can use the system configuration utility for the following conditions:

- To change the System Setup option by D4 token:
`./syscfg -t=D4_token_id`
(Example: `./syscfg -t=0x002D` to enable NIC1 Option ROM)
- To check token activity status:
`./syscfg --istokenactive=D4_token_id`
(Example: `./syscfg --istokenactive=0x002D` to check the token active status of NIC1 Option ROM)
- To directly change the System Setup option through BMC memory:
`./ipmitool raw <command> <data>`
(Example: `./ipmitool raw 0xc 1 1 3 10 106 42 120` to set IP address of BMC management port as 10.106.42.120)

Table 2-1. D4 Token Table

Token	Setup Option	Description
002D	Embedded NIC1	Enables the onboard NIC1 controller (full-function), including its PXE boot-ROM.
002E	Embedded NIC1	Disables the onboard NIC1 controller.
0051	N/A	For the next system boot, set the IPL priority to: USB storage, hard disk, CD/DVD-ROM, RAID, Network (if the devices are available).

Table 2-1. D4 Token Table (continued)

Token	Setup Option	Description
0052	N/A	For the next system boot, set the IPL priority to: hard disk then option ROMs (if the devices are available).
0053	N/A	For the next system boot, set the IPL priority to: Network, hard disk, RAID,USB storage, CD/DVD-ROM (if the devices are available).
0054	N/A	For the next system boot, set the IPL priority to: CD/DVD-ROM, USB Storage, hard disk, RAID, Network (if the devices are available).
005C	N/A	Enables BIOS remote update on the next reboot, to search for an operating-system initiated BIOS update image.
005D	N/A	Disables BIOS remote update on the next reboot, to search for an operating-system initiated BIOS update image.
006E	Embedded NIC1	Enables the onboard NIC1 controller, but disables the NIC associated PXE or RPL boot-ROM.
0087	Video Enumeration	Allows BIOS to use the onboard video controller for boot-time messages.
0088	Video Enumeration	Allows BIOS to use the first add-in video controller for boot-time messages. Depending on the BIOS search order and system slot layout.
008C	Embedded USB Controller	Allows BIOS to enable the built-in USB controller at system startup.
008D	Embedded USB Controller	Allows BIOS to enable the built-in USB controller at system startup.
00A1	Restore on AC Power Loss	System remains off until the power button is pressed.
00A2	Restore on AC Power Loss	System reverts to the last power state before power loss.
00A3	Restore on AC Power Loss	System switches back on after the AC power loss.
00BA	Embedded NIC2	Disables the onboard NIC2 controller.

Table 2-1. D4 Token Table (continued)

Token	Setup Option	Description
00BB	Embedded NIC2	Enables the onboard NIC2 controller, but disables the NIC associated PXE or RPL boot-ROM.
00BC	Embedded NIC2	Enables the onboard NIC2 controller (full-function), including its PXE boot-ROM.
00BF	Remote Access	Disables serial console redirection.
00C0	Serial port number	Enables console redirection via COM1. See token D7h.
00C1	Power Button	Enables the power button to turn off the system power. (default)
00C2	Power Button	Disables the power button to turn off the system power.
00D1	Hyper-Threading Technology	Enables Hyper-Threading Technology.
00D2	Hyper-Threading Technology	Disables Hyper-Threading Technology.
00D7	Serial port number	Enables console redirection via COM2.
00D8	Load Optimal Defaults	Install optimal default settings for all the items in the Setup utility on the next boot.
00FE	Legacy USB Support	Disables the system to provide legacy USB support for the operating system.
00FF	Legacy USB Support	Enables the system to provide legacy USB support for the operating system.
0117	SATA Port0	Turns off the 1st Serial ATA drive controller.
0118	SATA Port0	Enables BIOS support for the 1st Serial ATA drive controller (enabled if present, POST error appears if not present).
0119	SATA Port1	Turns off the 2nd Serial ATA drive controller.
011A	SATA Port1	Enables BIOS support for the 2nd Serial ATA drive controller (enabled if present, POST error appears if not present).

Table 2-1. D4 Token Table (continued)

Token	Setup Option	Description
011B	SATA Port2	Turns off the 3rd Serial ATA drive controller.
011C	SATA Port2	Enables BIOS support for the 3rd Serial ATA drive controller (enabled if present, POST error appears if not present).
011D	SATA Port3	Turns off the 4th Serial ATA drive controller.
011E	SATA Port3	Enables BIOS support for the 4th Serial ATA drive controller (enabled if present, POST error appears if not present).
011F	SATA Port4	Turns off the 5th Serial ATA drive controller.
0120	SATA Port4	Enables BIOS support for the 5th Serial ATA drive controller (enabled if present, POST error appears if not present).
0121	SATA Port5	Turns off the 6th Serial ATA drive controller.
0122	SATA Port5	Enables BIOS support for the 6th Serial ATA drive controller (enabled if present, POST error appears if not present).
0135	Embedded SATA Controller	Disables the SATA controller. This token applies to the first onboard SATA controller.
0137	Embedded SATA Controller	Enables the SATA controller to run in IDE mode. Sets the device class code as IDE and uses PCI IRQ (referred as Native mode). This token applies to the first onboard SATA controller.
0138	Embedded SATA Controller	Enables the SATA controller. Sets the device class code as SATA and sets up the AHCI BARs and registers. This token applies to the first onboard SATA controller.
0139	Embedded SATA Controller	Enables the SATA controller. Sets the device class code as RAID and executes the RAID Option ROM. This token applies to the first onboard SATA controller.
013E	Memory Remapping (3GB - 4GB)	When disabled, memory remapping relocates memory space behind PCI hole to the space above 4 GB.

Table 2-1. D4 Token Table (continued)

Token	Setup Option	Description
013F	Memory Remapping (3GB~4GB)	When enabled, memory remapping relocates memory space (3GB - 4 GB) to the space above 4 GB.
0140	Execute-Disable (XD) Bit Capability	When disabled, the Intel processors supporting the XD feature reports the support to the operating system.
0141	Execute-Disable (XD) Bit Capability	When enabled, the Intel processors supporting the XD feature reports the support to the operating system. If the operating system supports this extended paging mechanism, it will provide some protection against software viruses that exploit buffer overflows.
014A	Virtualization Technology	Allows you to disable the VT technology in applicable processors. If disabled, the VT feature is unusable in any OS.
014B	Virtualization Technology	Allows you to enable the VT technology in applicable processors.
014E	External USB PORT1	Allows you to electrically disable the external USB connector 1.
014F	External USB PORT1	Allow you to electrically enable the external USB connector 1.
0168	Max CPUID Value Limit	Some OS, which is (NT4), fails if the value returned in EAX is >3 when CPUID instruction is executed with EAX=0. This setting disables the 3 or less.
0169	Max CPUID Value Limit	Some OS, which is (NT4), fails if the value returned in EAX is >3 when CPUID instruction is executed with EAX=0. This setting limits CPUID function to 3.
016F	Embedded SAS Controller	Disables the SAS controller. This token applies to the onboard SAS controller.
0170	Embedded SAS Controller	Enables the SAS controller. Sets the device class code as AHCI/RAID and executes the RAID Option ROM. This token applies to the onboard SAS controller.

Table 2-1. D4 Token Table (continued)

Token	Setup Option	Description
0171	Adjacent Cache Line Prefetch	Disables system optimization for sequential memory access. The processor fetches the cache line that contains the data it currently requires.
0172	Adjacent Cache Line Prefetch	Enables system optimization for sequential memory access. The processor fetches the adjacent cache line in the other half of the sector.
0173	Hardware Prefetcher	Disables the processor's HW prefetcher.
0174	Hardware Prefetcher	Enables the processor's HW prefetcher.
0178	Remote Access	Enables serial console redirection.
0189	External USB PORT2	Allows you to electrically disable the external USB connector 2.
018A	External USB PORT2	Allow you to electrically enable the external USB connector 2.
0199	Power Saving Features	Disables the feature that allows SATA hard-drives to initiate link power management transitions.
019A	Power Saving Features	Enables the feature that allows SATA hard-drives to initiate link power management transitions.
01C4	NUMA Support	Disables the NUMA support to improve processor performance. This option is available for NUMA systems that allow memory interleaving across all processor nodes.
01C5	NUMA Support	Enables the NUMA support to improve processor performance. This option is available for NUMA systems that allow memory interleaving across all processor nodes.
01C4	Node Interleave	Disables the node interleave option. This option is available for NUMA systems that allow memory interleaving across all processor nodes.
01C5	Node Interleave	Enable the node interleave option. This option is available for NUMA systems that allow memory interleaving across all processor nodes.

Table 2-1. D4 Token Table (continued)

Token	Setup Option	Description
01CF	I/OAT DMA Engine	Enables the I/O Acceleration Technology (I/OAT) DMA Engine feature. Set to enabled only if the hardware and software support I/OAT.
01D0	I/OAT DMA Engine	Disables the I/OAT DMA Engine feature. This option should be disabled only if the hardware and software support I/OAT.
01DA	Embedded NIC1	Enables NIC1 with iSCSI Remote Boot.
01DB	Embedded NIC2	Enables NIC2 with iSCSI Remote Boot.
01EA	Turbo Mode	Disables memory turbo mode. It disables the processor core to increase its frequency.
01EB	Turbo Mode	Enables memory turbo mode. It allows the processor core to increase its frequency.
01F0	Embedded NIC3	Enables the onboard NIC3 controller.
01F1	Embedded NIC3	Enables the onboard NIC3 controller, but disables the NIC associated PXE or RPL boot-ROM.
01F2	Embedded NIC3	Enables the onboard NIC3 controller (full-function), including its PXE boot-ROM.
01F3	Embedded NIC3	Enables NIC3 with iSCSI Remote Boot.
0204	VT for Direct I/O	Disables Intel Virtualization Technology for Direct I/O (VT-d) that enhances I/O support (DMA) when running a Virtual Machine Monitor.
0205	VT for Direct I/O	Enables Intel Virtualization Technology for Direct I/O (VT-d) that enhances I/O support (DMA) when running a Virtual Machine Monitor.
0211	Internal USB PORT	Disables the internal USB connector.
0212	Internal USB PORT	Enables the internal USB connector.
021F	Maximum Performance	Sets the system power management to maximum performance.
0221	OS Control	Allows the OS to change the P-state.

Table 2-1. D4 Token Table (continued)

Token	Setup Option	Description
0224	Embedded Video Controller	Enables the onboard video controller as the primary video device.
0225	Embedded Video Controller	Disables the onboard video controller.
022D	Boot Mode	Enables booting to Unified Extensible Firmware Interface (UEFI) capable operating systems.
022E	Boot Mode	Enables booting to legacy mode, ensures compatibility with operating systems that do not support UEFI.
0231	Active Processor Cores	Four cores of the processor are enabled This applies to Quad-core processors only.
0232	Active Processor Cores	Two cores of the processor are enabled. This applies to Quad-core and Dual-core processors.
0233	Active Processor Cores	Single core of the processor is enabled. This applies to Quad-core and Dual-Core processors.
024B	C States	When enabled, the processor can operate in all available Power C States. (default)
024C	C States	When disabled, there are no C states available for the processor.
024D	Pause on Errors	Enables the BIOS from prompting for F1/F2 on error. BIOS pauses at F1/F2 prompt.
024E	Pause on Errors	Disables the BIOS from prompting for F1/F2 on error. BIOS pauses at F1/F2 prompt.
024F	Quiet Boot	Enables the display of the splash or summary screen, rather than the detail of the POST flow.
0250	Quiet Boot	Disables the display of the splash or summary screen. The user is able to see the detail of the POST messages.
0251	N/A	The NIC1 is used for PXE boot, followed by NIC2.
0252	N/A	The NIC2 is used for PXE boot, followed by NIC1.
0254	3F8h/2F8h	Sets the back serial port address to 0x3F8 and internal serial port address to 0x2F8

Table 2-1. D4 Token Table (continued)

Token	Setup Option	Description
0257	2F8h/3F8h	Sets the back serial port address to 0x2F8 and internal serial port address to 0x3F8.
025D	Optimizer Mode	Selects optimizer mode as the memory operating mode.
025E	Spare Mode	Selects spare mode as the memory operating mode.
025F	Mirror Mode	Selects mirror mode as the memory operating mode.
0260	Advanced ECC Mode	Selects Advanced ECC (i.e. Lockstep, Chipkill) as the memory operating mode.
026A	Coherent HT Link Speed	Sets to support HyperTransport 1 specification.
026B	Coherent HT Link Speed	Sets to support HyperTransport 3 specification.
026E	Active Processor Cores	This field controls the number of enabled all of cores in each processor. By default, the maximum number of cores per processor will be enabled.
026F	Active Processor Cores	This field controls the number of enabled 6 cores in each processor. By default, the maximum number of cores per processor will be enabled.
0270	Active Processor Cores	This field controls the number of enabled 8 cores in each processor. By default, the maximum number of cores per processor will be enabled.
0271	Active Processor Cores	This field controls the number of enabled 10 cores in each processor. By default, the maximum number of cores per processor will be enabled.
0272	Active Processor Cores	This field controls the number of enabled 12 cores in each processor. By default, the maximum number of cores per processor will be enabled.
027B	HT Assist	Disables the Probe Filter chipset option in the System setup. There are some applications that may lower chipset performance when this is enabled.
027C	HT Assist	Enables the Probe Filter chipset option in the System setup. There are some applications that may lower chipset performance when this is disabled.

Table 2-1. D4 Token Table (continued)

Token	Setup Option	Description
02A1	C1E State	Enables the processor Enhanced Halt (C1E) state. (default)
02A2	C1E State	Disables the processor C1-E state. Do at your own risk. When you disable this option, a warning appears in the BIOS Setup help text and a pop up message appears when this option is changing.
02A9	DRAM Prefetcher	Disables DRAM references from triggering DRAM prefetch requests.
02AA	DRAM Prefetcher	Turns on the DRAM prefetch unit in the Northbridge.
02AB	HW Prefetch Training on SW	Disables hardware prefetcher from considering software prefetches when detecting strides for prefetch requests.
02AC	HW Prefetch Training on SW	Enables Hardware prefetcher considers software prefetches when detecting strides for prefetch requests. (default)
02AD	SR-IOV Global Enable	Enables BIOS support for SRIOV devices.
02AE	SR-IOV Global Enable	Disables BIOS support for SRIOV devices.
02B6	Memory Operating Voltage	Indicates all DIMMs in the system are operating at 1.5 volts.
02B7	Memory Operating Voltage	Indicates all DIMMs in the system are operating at 1.35 volts.
02B8	Memory Operating Voltage	This setting indicates the memory operating voltage will be set automatically by the Memory initialization code and depending upon the installed DIMM's capability and the memory configuration of the system. This is the default setting and will set the Memory Operating voltage to the POR voltage.
02C5	DCU Streamer Prefetcher	Enables the DCU Streamer Prefetcher. (default)
02C6	DCU Streamer Prefetcher	Disables the DCU Streamer Prefetcher.

Table 2-1. D4 Token Table (continued)

Token	Setup Option	Description
02C7	Data Reuse Optimization	Sets to enable for HPC applications. (default)
02C8	Data Reuse Optimization	Sets to disable for energy efficiency.
02C9	QPI Bandwidth Priority	Sets to compute for computation-intensive applications. (default)
02CA	QPI Bandwidth Priority	Sets to I/O for I/O-intensive applications.
02CE	DCU IP Prefetcher	Enables the DCU IP Prefetcher. (default)
02CF	DCU IP Prefetcher	Disables the DCU IP Prefetcher.
401A	Terminal Type	The BIOS console redirection, if enabled, operates in VT100 emulation model. See tokens BFh, C0h, and D7h.
401B	Terminal Type	The BIOS console redirection, if enabled, operates in ANSI emulation model. See also tokens BFh, C0h, and D7h.
401C	Redirection After BIOS POST	The BIOS console redirection, if enabled, continues to operate after the OS boot hand-off.
401D	Redirection After BIOS POST	The BIOS console redirection, if enabled, operates during the BIOS boot only and is disabled prior to OS boot hand-off. See also tokens BFh, C0h, D7h, 401Ah, and 401Bh.
4022	1st Boot Device	Whenever the BIOS boots the system, the first PXE-capable device is inserted as the first device in the boot sequence. Enabling this feature causes the BIOS operation to occur on the next and all subsequent boots and causes a change in the system's defined boot sequence. The BIOS chooses the first PXE-capable device as the system's onboard network controller, if present and enabled, or the first bootable network device found in the system's standard PCI search order.

Table 2-1. D4 Token Table (continued)

Token	Setup Option	Description
4026	Manufacturing Mode	Enables the manufacturing mode to bypass POST tasks/memory tests and F1/F2 prompts on specific error messages. Used by manufacturers only and is not for general use.
4027	Manufacturing Mode	Disables the manufacturing mode to bypass POST tasks/memory tests and F1/F2 prompts on specific error messages. Used by manufacturers only and is not for general use.
4033	Serial Port Mode	Console Redirection baud rate is set to 115,200 bits per second.
4034	Serial Port Mode	Console Redirection baud rate is set to 57,600 bits per second
4035	Serial Port Mode	Console Redirection baud rate is set to 19,200 bits per second.
4036	Serial Port Mode	Console Redirection baud rate is set to 9,600 bits per second.
403F	Clear SMBIOS System Event Log	Deletes all records in the BMC system event log on the next boot.
4800	Node Manager	Enables the Node Manager mode for Intel processors.
4801	APML	Enable the Advanced Platform Management Link mode for AMD processors.
4802	CPU Power Capping	To decide the highest processor performance state in the OS. (P0-state)
4803	CPU Power Capping	To decide the highest processor performance state in the OS. (P1-state)
4804	CPU Power Capping	To decide the highest processor performance state in the OS. (P2-state)
4805	CPU Power Capping	To decide the highest processor performance state in the OS. (P3-state)
4806	CPU Power Capping	To decide the highest processor performance state in the OS. (P4-state)

Table 2-1. D4 Token Table (continued)

Token	Setup Option	Description
480A	C6 State	Disables the processor C6 state. Do at your own risk. When you disable this option, a warning appears in the BIOS Setup help text and a pop up message appears when this option is changing.
480B	C6 State	Enables the processor C6 state. (default)
480C	L3 Cache Power Control	Disable the clock stop for an idle subcache.
480D	L3 Cache Power Control	Enable the clock stop for an idle subcache.
480E	C7 State	Disables the processor C7 state. Do at your own risk. When you disable this option, a warning appears in the BIOS Setup help text and a pop up message appears when this option is changing.
480F	C7 State	Enables the processor C7 state. (default)
4810	Non Coherent HT Link Width	Sets the HT link to 8 bit width.
4811	Non Coherent HT Link Width	Sets the HT link to 16 bit width.
4812	Non Coherent HT Link Speed	Sets the HT link speed to 800 MHz.
4813	Non Coherent HT Link Speed	Sets the HT link speed to 1000 MHz.
4814	Non Coherent HT Link Speed	Sets the HT link speed to 1200 MHz.
4815	Non Coherent HT Link Speed	Sets the HT link speed to 1600 MHz.
4816	Non Coherent HT Link Speed	Sets the HT link speed to 2000 MHz.
4817	Non Coherent HT Link Speed	Sets the HT link speed to 2600 MHz.
4820	Memory Turbo Mode	Disables memory turbo mode.

Table 2-1. D4 Token Table (continued)

Token	Setup Option	Description
4821	Memory Turbo Mode	Enables memory turbo mode.
4822	NUMA Support	Enables the node interleave option for SLES11. This applies to NUMA systems that allow memory interleaving across all processor nodes.
4823	Memory Frequency	Detects the memory running speed from H/W designed (SPD, memory population).
4824	Memory Frequency	Sets memory running speed up to 800 MHz.
4825	Memory Frequency	Sets memory running speed up to 1066 MHz.
4826	Memory Frequency	Sets memory running speed up to 1333 MHz.
4827	Memory Frequency	Sets memory running speed up to 1600 MHz.
4960	Memory Frequency	Sets memory running speed up to 1866 MHz.
4828	Memory Throttling Mode	Sets memory running as Open Loop Throughput Throttling (OLTT). (default)
4829	Memory Throttling Mode	Sets memory running as Closed Loop Thermal Throttling (CLTT).
482A	DRAM Scrubbing	Disables DRAM scrubbing to write corrected data back to the memory once a correctable error is detected on a read transaction.
482B	DRAM Scrubbing	Enables Dram scrubbing to write corrected data back to the memory once a correctable error is detected on a read transaction.
482C	Demand Scrubbing	Disables Demand scrubbing to write corrected data back to the memory once a correctable error is detected on a read transaction.

Table 2-1. D4 Token Table (continued)

Token	Setup Option	Description
482D	Demand Scrubbing	Enables Demand scrubbing to write corrected data back to the memory once a correctable error is detected on a read transaction.
482E	Patrol Scrubbing	Disables Patrol scrubbing to proactively search the system memory, repairing correctable errors.
482F	Patrol Scrubbing	Enables Patrol scrubbing to proactively search the system memory, repairing correctable errors.
4830	HDD Security Erase	Sets security freeze lock to all hard-drives.
4831	HDD Security Erase	Unlocks the security freeze lock on all hard-drives.
4832	AHCI-AMD	Supports AMD inbox AHCI driver.
4833	AHCI-MS	Supports Microsoft inbox AHCI driver.
4834	Embedded SATA Link Rate	Sets the SATA link rate at maximum rate speed of 6.0 Gbps.
4835	Embedded SATA Link Rate	Sets the SATA link rate at minimum rate speed of 1.5 Gbps. For power consumption.
4836	Embedded SATA Link Rate	Sets the SATA link rate at minimum rate speed of 3.0 Gbps.
4840	PCIe Slot ASPM	Controls the level of ASPM supported on the PCI Express Link of port. All entry disabled.
4841	PCIe Slot ASPM	Controls the level of ASPM supported on the given PCI Express Link of port. L0s entry enabled.
4842	PCIe Slot ASPM	Controls the level of ASPM supported on the given PCI Express Link of port. L1 entry enabled.
4843	PCIe Slot ASPM	Controls the level of ASPM supported on the given PCI Express Link of port. L0s and L1 entry enabled.
4844	PCIe Slot ASPM	Controls the level of ASPM supported on the given PCI Express Link of port. L0s entry downstream enabled.

Table 2-1. D4 Token Table (continued)

Token	Setup Option	Description
4845	PCIe Slot ASPM	Controls the level of ASPM supported on the given PCI Express Link of port. L0s entry downstream and L1 enabled
4846	Onboard LAN ASPM	Controls the level of ASPM supported to onboard LAN. All entry disabled.
4847	Onboard LAN ASPM	Controls the level of ASPM supported to onboard LAN. L0s entry enabled.
4848	Onboard LAN ASPM	Controls the level of ASPM supported to onboard LAN. L1 entry enabled.
4849	Onboard LAN ASPM	Controls the level of ASPM supported to onboard LAN. L0s and L1 entry enabled.
484A	Onboard LAN ASPM	Controls the level of ASPM supported to onboard LAN. L0s entry downstream enabled.
484B	Onboard LAN ASPM	Controls the level of ASPM supported to onboard LAN. L0s entry downstream and L1 enabled.
484C	Mezzanine Slot ASPM	Controls the level of ASPM supported on Mezzanine Slot. All entry disabled.
484D	Mezzanine Slot ASPM	Controls the level of ASPM supported on Mezzanine Slot. L0s entry enabled.
484E	Mezzanine Slot ASPM	Controls the level of ASPM supported on Mezzanine Slot. L1 entry enabled.
484F	Mezzanine Slot ASPM	Controls the level of ASPM supported on Mezzanine Slot. L0s and L1 entry enabled.
4850	Mezzanine Slot ASPM	Controls the level of ASPM supported on Mezzanine Slot. L0s entry downstream enabled.
4851	Mezzanine Slot ASPM	Controls the level of ASPM supported on Mezzanine Slot. L0s entry downstream and L1 enabled.
4852	NB-SB Link ASPM	Controls the level of ASPM supported on the NB-SB. All entry disabled.
4853	NB-SB Link ASPM	Controls the level of ASPM supported on the NB-SB. L1 entry enabled.

Table 2-1. D4 Token Table (continued)

Token	Setup Option	Description
4854	Maximum Payload Size	Auto detects the PCIe maximum payload size.
4855	Maximum Payload Size	Sets the PCIe maximum payload size to 128 Bytes.
4856	Maximum Payload Size	Sets the PCIe maximum payload size to 256 Bytes.
4857	WHEA Support	Disables Windows Hardware Error Architecture.
4858	WHEA Support	Enables Windows Hardware Error Architecture.
4859	NIC Enumeration	Sets PXE boot from onboard NIC to Add-on NIC adapter. (default)
485A	NIC Enumeration	Sets PXE boot from Add-on NIC adapter to onboard NIC.
485B	PCIe Generation	Sets the PCI signaling rate at Gen3 8.0 Gigabits bandwidth.
485C	PCIe Generation	Sets the PCI signaling rate at Gen2 5.0 Gigabits bandwidth.
485D	PCIe Generation	Sets the PCI signaling rate at Gen1 2.5 Gigabits bandwidth.
485E	Reboot on WOL (ROW)	Disables ROW. (default) The ROW repurposes the Wake on LAN (WOL) signal to reboot the system board when the system is in S0/S3 state.
485F	Reboot on WOL (ROW)	Enables ROW. ROW repurposes the WOL signal to reboot the system board when the system is in S0/S3 state. When a WOL packet is received by the NIC, the wake up signal generated by the NIC shall cause a hardware reboot of the system board.
4860	USB PORT with BMC	Allows you to electrically disable the internal USB port which contacts to BMC.

Table 2-1. D4 Token Table (continued)

Token	Setup Option	Description
4861	USB PORT with BMC	Allow the users to electrically enable the internal USB port which contacts to BMC.
4870	Force PXE Boot only	Disables PXE to be the boot device only.
4871	Force PXE Boot only	Enables PXE to be the boot device only. The system retrying to boot from PXE device.
4873	Active Processor Cores	This field controls the number of enabled 16 cores in each processor. By default, the maximum number of cores per processor will be enabled.
4877	PCIe Slot1	Allows you to electrically disable PCIe Slot1.
4878	PCIe Slot1	Allows you to electrically enable PCIe Slot1 and option ROM initialization.
4879	PCIe Slot2	Allows you to electrically disable PCIe Slot2.
487A	PCIe Slot2	Allows you to electrically enable PCIe Slot2 and option ROM initialization.
487B	PCIe Slot3	Allows you to electrically disable PCIe Slot3.
487C	PCIe Slot3	Allows you to electrically enable PCIe Slot3 and option ROM initialization.
487F	Mezzanine Slot	Allows you to electrically disable Mezzanine Slot.
4880	Mezzanine Slot	Allows you to electrically enable Mezzanine Slot and option ROM initialization.
4881	1st Boot Device	Sets the hard-drive as the first boot device.
4882	1st Boot Device	Sets RAID as the first boot device.
4883	1st Boot Device	Sets a USB storage device as the first boot device.
4884	1st Boot Device	Sets a CD/DVD ROM as the first boot device.
4885	2nd Boot Device	Sets a network device as the 2nd boot device.
4886	2nd Boot Device	Sets the hard-drive as the 2nd boot device.
4887	2nd Boot Device	Sets RAID as the 2nd boot device.

Table 2-1. D4 Token Table (continued)

Token	Setup Option	Description
4888	2nd Boot Device	Sets a USB storage device as the 2nd boot device.
4889	2nd Boot Device	Sets the CD/DVD ROM as the 2nd boot device.
488A	3rd Boot Device	Sets the network device as the 3rd boot device.
488B	3rd Boot Device	Sets the hard-drive as the 3rd boot device.
488C	3rd Boot Device	Sets RAID as the 3rd boot device.
488D	3rd Boot Device	Sets a USB storage device as the 3rd boot device.
488E	3rd Boot Device	Sets the CD/DVD ROM as the 3rd boot device.
488F	4th Boot Device	Sets the network device as the 4th boot device.
4890	4th Boot Device	Sets the hard-drive as the 4th boot device.
4891	4th Boot Device	Sets RAID as the 4th boot device.
4892	4th Boot Device	Sets a USB storage device as the 4th boot device.
4893	4th Boot Device	Sets the CD/DVD ROM as the 4th boot device.
4894	5th Boot Device	Sets the network device as the 5th boot device.
4895	5th Boot Device	Sets the hard-drive as the 5th boot device.
4896	5th Boot Device	Sets RAID as the 5th boot device.
4897	5th Boot Device	Sets a USB storage device as the 5th boot device.
4898	5th Boot Device	Sets the CD/DVD ROM as the 5th boot device.
48A0	ACPI SPMI Table	Disables the ACPI SPMI Table for BMC ROM update.
48A1	ACPI SPMI Table	Enables the ACPI SPMI Table for IPMI driver installation.
48A2	BMC LAN Port Configuration	Sets BMC LAN Port to Dedicated-NIC.
48A3	BMC LAN Port Configuration	Sets BMC LAN Port to Shared-NIC.
48A4	BMC NIC IP Source	Sets BMC LAN to get LAN IP from Static mode.

Table 2-1. D4 Token Table (continued)

Token	Setup Option	Description
48A5	BMC NIC IP Source	Sets BMC LAN to get LAN IP from DHCP mode.
48A6	IPv6 Mode	Disables IPv6 internet protocol support.
48A7	IPv6 Mode	Enables IPv6 internet protocol support.
48A8	IPv6 AutoConfig	Disables IPv6 auto configuration.
48A9	IPv6 AutoConfig	Enables IPv6 auto configuration.
48AA	Serial Port Mode	Sets the console redirection baud rate to 3,8400 bits per second.
48AB	Flow Control	Selects none as the flow control for console redirection.
48AC	Flow Control	Selects hardware as the flow control for console redirection.
48AD	Flow Control	Selects software as the flow control for console redirection.
48AE	Terminal Type	The BIOS console redirection, if enabled, operates in VTUTF8 emulation model. See also tokens BFh, C0h, and D7h.
48AF	VT-UTF8 Combo Key Support	Disables VT-UTF8 Combination Key Support for ANSI/VT100 terminals.
48B0	VT-UTF8 Combo Key Support	Enables VT-UTF8 Combination Key Support for ANSI/VT100 terminals.
48B1	Event logging	Disables BIOS to log system events to BMC, errors include ECC/PCI/PCIe/HT...etc.
48B2	Event logging	Enables BIOS to log system events to BMC, errors include ECC/PCI/PCIe/HT...etc.
48B3	NMI on Error	Disables BIOS to generate NMI when PCIe uncorrectable errors occur.
48B4	NMI on Error	Enables BIOS to generate NMI when PCIe uncorrectable errors occur.

Table 2-1. D4 Token Table (continued)

Token	Setup Option	Description
48B5	Memory Operating Voltage	Indicates all DIMMs in the system are operating at 1.25 volts.
48C0	Frequency Ratio	Sets frequency multiplier as maximum level.
48C1	Frequency Ratio	Downgrades frequency multiplier one level.
48C2	Frequency Ratio	Downgrades frequency multiplier two levels.
48C3	Frequency Ratio	Downgrades frequency multiplier three levels.
48C8	QPI Frequency	Sets the QPI frequency runs at maximum speed.
48C9	QPI Frequency	Sets the QPI frequency runs at 4.800GT.
48CA	QPI Frequency	Sets the QPI frequency runs at 5.866GT.
48CB	QPI Frequency	Sets the QPI frequency runs at 6.400GT.
48CC	QPI Frequency	Sets the QPI frequency runs at 7.200GT.
48CD	QPI Frequency	Sets the QPI frequency runs at 8.000GT.
48D0	Energy Efficient Policy	Controls the energy efficient policy as performance profile to configure all necessary settings. This option is supported for processor power management that is independent of the entire OS.
48D1	Energy Efficient Policy	Controls the energy efficient policy as balance profile to configure all necessary settings. This option is supported for processor power management that is independent of the entire OS. (default)
48D2	Energy Efficient Policy	Controls the energy efficient policy as low power profile to configure all necessary settings. This option is supported for processor power management that is independent of the entire OS.
48D3	Direct Cache Access	Disables the Direct Cache Access.
48D4	Direct Cache Access	Enables the Direct Cache Access.
48D8	Load Customized Defaults	Requests a customized default of SETUP values on the next boot.

Table 2-1. D4 Token Table (continued)

Token	Setup Option	Description
48DA	Save Customized Defaults	Saves current settings to customized defaults of SETUP on next boot.
48DB	N/A	Requests maximum performance settings of SETUP values on the next boot.
48DC	N/A	Requests a energy efficiency settings of SETUP values on the next boot.
48DD	N/A	Requests HPCC efficiency settings of SETUP values on the next boot. Dell will provide the settings before A-can BIOS.
48DE	Shell	Requests the EFI Shell as first boot device on the next boot.
48DF	Dell ePSA Diagnostic Tool	Requests auto launches ePSA (Enhanced Preboot System Assessment) diagnostic tool on the next boot.
48E0	N/A	Use NIC3 as the 1st PXE boot device on the next boot followed by NIC1.
48E1	N/A	Use NIC4 as the 1st PXE boot device on the next boot followed by NIC1.
48E2	N/A	Use NIC5 as the 1st PXE boot device on the next boot followed by NIC1.
48E3	N/A	Use NIC6 as the 1st PXE boot device on the next boot followed by NIC1.
48E4	N/A	Use NIC7 as the 1st PXE boot device on the next boot followed by NIC1.
48E5	N/A	Use NIC8 as the 1st PXE boot device on the next boot followed by NIC1.
48E6	N/A	Use HDD1 as the 1st HDD boot device on the next boot.
48E7	N/A	Use HDD2 as the 1st HDD boot device on the next boot.
48E8	N/A	Use HDD3 as the 1st HDD boot device on the next boot.

Table 2-1. D4 Token Table (continued)

Token	Setup Option	Description
48E9	N/A	Use HDD4 as the 1st HDD boot device on the next boot.
48EA	N/A	Use HDD5 as the 1st HDD boot device on the next boot.
48EB	N/A	Use HDD6 as the 1st HDD boot device on the next boot.
48EC	N/A	Use RAID HDD1 as the 1st RAID boot device on the next boot.
48ED	N/A	Use RAID HDD2 as the 1st RAID boot device on the next boot.
48EE	N/A	Use RAID HDD3 as the 1st RAID boot device on the next boot.
48EF	N/A	Use RAID HDD4 as the 1st RAID boot device on the next boot.
48F0	N/A	Use RAID HDD5 as the 1st RAID boot device on the next boot.
48F1	N/A	Use RAID HDD6 as the 1st RAID boot device on the next boot.
48F2	N/A	Use RAID HDD7 as the 1st RAID boot device on the next boot.
48F3	N/A	Use RAID HDD8 as the 1st RAID boot device on the next boot.
48F4	N/A	Use RAID HDD9 as the 1st RAID boot device on the next boot.
48F5	N/A	Use RAID HDD10 as the 1st RAID boot device on the next boot.
48F6	N/A	Use RAID HDD11 as the 1st RAID boot device on the next boot.
48F7	N/A	Use RAID HDD12 as the 1st RAID boot device on the next boot.
48F8	N/A	Use RAID HDD13 as the 1st RAID boot device on the next boot.

Table 2-1. D4 Token Table (continued)

Token	Setup Option	Description
48F9	N/A	Use RAID HDD14 as the 1st RAID boot device on the next boot.
48FA	N/A	Use RAID HDD15 as the 1st RAID boot device on the next boot.
48FB	N/A	Use RAID HDD16 as the 1st RAID boot device on the next boot.
48FC	N/A	Use HDD7 as the 1st boot device on the next boot.
48FD	N/A	Use HDD8 as the 1st boot device on the next boot.
4900	PCIe Slot1	Enables the PCIe expansion slot1 without executing the option ROM initialization.
4901	PCIe Slot2	Enables the PCIe expansion slot2 without executing the option ROM initialization.
4902	PCIe Slot3	Enables the PCIe expansion slot3 without executing the option ROM initialization.
4903	PCIe Slot4	Enables the PCIe expansion slot4 without executing the option ROM initialization.
4904	Mezzanine Slot	Enables the mezzanine card expansion slot without executing the option ROM initialization.
4910	Chassis Level Capping	Disables the chassis level capping function.
4911	Chassis Level Capping	Enables the chassis level capping function. (default)
4912	Sled Level Policy	Selects chassis level as the sled level policy when an emergency throttling event is triggered. (default)
4913	Sled Level Policy	Selects throttling as the sled level policy when an emergency throttling event is triggered.
4914	Sled Level Policy	Selects power off as the sled level policy when an emergency throttling event is triggered.
4915	Sled Level Policy	Sets sled level policy to do nothing when an emergency throttling event is triggered.

Table 2-1. D4 Token Table (continued)

Token	Setup Option	Description
4916	Chassis Level Policy	Selects throttling as the chassis level policy when an emergency throttling event is triggered. (default)
4917	Chassis Level Policy	Selects power off as the chassis level policy when an emergency throttling event is triggered.
4918	N/A	Disables clock spread spectrum. (default)
4919	N/A	Enables clock spread spectrum.
491A		Disables the PCIe memory 64-bit decode option.
491B		Enables the PCIe memory 64-bit decode option.
491C		Automatically configures to PCIe memory 64-bit decode option.
4875	Perfmon and DFX Devices	Disables Perfmon and DFX Devices.
4876	Perfmon and DFX Devices	Enables Perfmon and DFX Devices.
4B00h	Prevent Back-flash	When enabled, will prohibit the system BIOS to downgrade to version 2.1.0 or earlier version. NOTE: You will not be able to change the setting once the feature is enabled.
4B01h	Prevent Back-flash	By default, this feature is set to disabled for the compliance of updating the system BIOS. This token works with the password jumper when the jumper is set to enabled. When the setting is disabled, the system BIOS can be updated to any revision that contains a valid digital signature.
4961h	PCIe Slot5	Allows you to electrically disable PCIe slot5.
4962h	PCIe Slot5	Allows you to electrically enable PCIe slot5 and option ROM initialization.
4964h	PCIe Slot6	Allows you to electrically disable PCIe slot6.
4965h	PCIe Slot6	Allows you to electrically enable PCIe slot6 and option ROM initialization.

Table 2-1. D4 Token Table (continued)

Token	Setup Option	Description
4963h	PCIe Slot5	Enables the PCIe slot5 without executing the option ROM initialization.
4966h	PCIe Slot6	Enables the PCIe slot6 without executing the option ROM initialization.

IPMI Command List

The following tables include all commands defined in the IPMI v2.0 specifications. All mandatory commands and some optional functions are supported. Special functions beyond the scope of IPMI v2.0 are implemented as original equipment manufacturer (OEM) commands.

In the O/M column:

- M = Mandatory in the IPMI spec and is implemented.
- O = Optional command supported in this implementation.
- N = Not supported in this implementation.

See the Deployment Toolkit Version 1.3 User's Guide for additional information about installing and using the DTK utilities, and the Deployment Toolkit Version 1.3 Command Line Interface Reference Guide for a complete list of all valid options, suboptions, and arguments for using the BMC_CFG.EXE to configure and manage your BMC.



NOTE: For more information about the standard IPMI tool commands, see ipmitool.sourceforge.net/manpage.html.

Table 2-2. IPMI Device Global Commands (NetFn: 0x06H)

Command	NetFn	Code	IPMI 2.0	BMC
Get Device ID	App	0x01h	M	Yes
Broadcast Get Device ID	App	0x02h	M	Yes
Cold Reset	App	0x03h	O	Yes
Warm Reset	App	0x04h	O	No
Get Self Test Results	App	0x05h	M	Yes
Manufacture Test On	App	0x06h	O	Yes
Get ACPI Power State	App	0x07h	O	Yes
Get Device GUID	App	0x08h	O	Yes
Get NetFn Support	App	0x09h	O	Yes
Get Command Support	App	0x0Ah	O	Yes
Get Command Sub-function Support	App	0x0Bh	O	Yes

Table 2-2. IPMI Device Global Commands (NetFn: 0x06H)(continued)

Command	NetFn	Code	IPMI 2.0	BMC
Get Configurable Commands	App	0x0C	O	Yes
Get Configurable Command Sub-functions	App	0x0Dh	O	Yes
Set Command Enables	App	0x60h	O	Yes
Get Command Enables	App	0x61h	O	Yes
Set Command Sub-function Enables	App	0x62h	O	Yes
Get Command Sub-function Enables	App	0x63h	O	Yes
Get OEM NetFn IANA Support	App	0x64h	O	Yes

Table 2-3. BMC Watchdog Timer Commands (NetFn: 0x06H)

Command	NetFn	Code	IPMI2.0	BMC
Reset Watchdog Timer	App	0x22h	M	Yes
Set Watchdog Timer	App	0x24h	M	Yes
Get Watchdog Timer	App	0x25h	M	Yes

Table 2-4. BMC Device and Messaging Commands (NetFn: 0x06H)

Command	NetFn	Code	IPMI 2.0	BMC
Set BMC Global Enables	App	0x2Eh	M	Yes
Get BMC Global Enables	App	0x2Fh	M	Yes
Clear Message Buffer Flags	App	0x30h	M	Yes
Get Message Buffer Flags	App	0x31h	M	Yes
Enable Message Channel Receive	App	0x32h	O	Yes
Get Message	App	0x33h	M	Yes
Send Message	App	0x34h	M	Yes
Read Event Message Buffer	App	0x35h	O	Yes

Table 2-5. BMC Device and Messaging Commands (NetFn: 0x 06H) (continued)

Command	NetFn	Code	IPMI2.0	BMC
Get BT Interface Capabilities	App	0x36h	M	No
Get System GUID	App	0x37h	M	Yes
Set System Info Parameters	App	0x58h	O	Yes
Get System Info Parameters	App	0x59h	O	Yes
Get Channel Authentication Capabilities	App	0x38h	O	Yes
Get Session Challenge	App	0x39h	O	Yes
Activate Session Command	App	0x3Ah	O	Yes
Set Session Privilege Level Command	App	0x3Bh	O	Yes
Close Session	App	0x3Ch	O	Yes
Get Session Information	App	0x3Dh	O	Yes
Get Authentication Code Command	App	0x3Fh	O	Yes
Set Channel Access Commands	App	0x40h	O	Yes
Get Channel Access Commands	App	0x41h	O	Yes
Get Channel Info Command	App	0x42h	O	Yes
Set User Access Commands	App	0x43h	O	Yes
Get User Access Commands	App	0x44h	O	Yes
Set User Name Commands	App	0x45h	O	Yes
Get User Name Commands	App	0x46h	O	Yes
Set User Password Commands	App	0x47h	O	Yes
Active Payload Command	App	0x48h	O	Yes
Deactivate Payload Command	App	0x49h	O	Yes
Get Payload Activation Status	App	0x4Ah	O	Yes
Get Payload Instance Info Command	App	0x4Bh	O	Yes
Set User Payload Access	App	0x4Ch	O	Yes
Get User Payload Access	App	0x4Dh	O	Yes
Get Channel Payload Support	App	0x4Eh	O	Yes

Table 2-5. BMC Device and Messaging Commands (NetFn: 0x 06H) (continued)

Command	NetFn	Code	IPMI2.0	BMC
Get Channel Payload Version	App	0x4Fh	O	Yes
Get Channel OEM Payload Info	App	0x50h	O	Yes
Master Write-Read I2C	App	0x52h	M	Yes
Get Channel Cipher Suites	App	0x54h	O	Yes
Suspend/Resume Payload Encryption	App	0x55h	O	Yes
Set Channel Security Keys	App	0x56h	O	Yes
Get System Interface Capabilities	App	0x57h	O	No

Table 2-6. Chassis Device Commands (NetFn: 0x00H)

Command	NetFn	Code	IPMI2.0	BMC
Get Chassis Capabilities	Chassis	0x00h	M	Yes
Get Chassis Status	Chassis	0x01h	M	Yes
Chassis Control	Chassis	0x02h	M	Yes
Chassis Reset	Chassis	0x03h	O	No
Chassis Identify	Chassis	0x04h	O	Yes
Set Chassis Capabilities	Chassis	0x05h	O	Yes
Set Power Restore Policy	Chassis	0x06h	O	Yes
Get System Restart Cause	Chassis	0x07h	O	Yes
Set System Boot Options	Chassis	0x08h	O	Yes
Get System Boot Options	Chassis	0x09h	O	Yes
Set Front Panel Button Enable	Chassis	0x0Ah	O	Yes
Set Power Cycle Interval	Chassis	0x0Bh	O	Yes
Get POH Counter	Chassis	0x0Fh	O	No

Table 2-7. Event Commands (NetFn: 0x04H)

Command	NetFn	Code	IPMI2.0	BMC
Set Event Receiver	S/E	0x00h	M	Yes
Get Event Receiver	S/E	0x01h	M	Yes
Platform Event	S/E	0x02h	M	Yes

Table 2-8. PEF/PET Alerting Commands (NetFn: 0x04H)

Command	NetFn	Code	IPMI2.0	BMC
Get PEF Capabilities	S/E	0x10h	M	Yes
Arm PEF Postpone Timer	S/E	0x11h	M	Yes
Set PEF Configuration Parameters	S/E	0x12h	M	Yes
Get PEF Configuration Parameters	S/E	0x13h	M	Yes
Set Last Processed Event ID	S/E	0x14h	M	Yes
Get Last Processed Event ID	S/E	0x15h	M	Yes
Alert Immediate	S/E	0x16h	O	Yes
PET Acknowledge	S/E	0x17h	O	Yes

Table 2-9. Sensory Device Commands (NetFn: 0x04H)

Command	NetFn	Code	IPMI2.0	BMC
Get Device SDR Info	S/E	0x20h	O	No
Get Device SDR	S/E	0x21h	O	No
Reserve Device SDR Repository	S/E	0x22h	O	No
Get Sensor Reading Factors	S/E	0x23h	O	Yes
Set Sensor Hysteresis	S/E	0x24h	O	Yes
Get Sensor Hysteresis	S/E	0x25h	O	Yes
Set Sensor Threshold	S/E	0x26h	O	Yes
Get Sensor Threshold	S/E	0x27h	O	Yes
Set Sensor Event Enable	S/E	0x28h	O	Yes

Table 2-10. Sensory Device Commands (NetFn: 0x04H) (continued)

Command	NetFn	Code	IPMI2.0	BMC
Get Sensor Event Enable	S/E	0x29h	O	Yes
Set Sensor Reading and Event Status	S/E	0x30h	O	Yes
Re-arm Sensor Events	S/E	0x2Ah	O	Yes
Get Sensor Event Status	S/E	0x2Bh	O	Yes
Get Sensor Reading	S/E	0x2Dh	M	Yes
Set Sensor Type	S/E	0x2Eh	O	No
Get Sensor Type	S/E	0x2Fh	O	No

Table 2-11. FRU Inventory Device Commands (NetFn: 0x0AH)

Command	NetFn	Code	IPMI2.0	BMC
Get FRU Inventory Area Info	Storage	0x10h	M	Yes
Read FRU Inventory Data	Storage	0x11h	M	Yes
Write FRU Inventory Data	Storage	0x12h	M	Yes

Table 2-12. SDR Repository Commands (NetFn: 0x0AH)

Command	NetFn	Code	IPMI2.0	BMC
Get SDR Repository Info	Storage	0x20h	M	Yes
Get SDR Repository Allocation Info	Storage	0x21h	O	Yes
Reserve SDR Repository	Storage	0x22h	M	Yes
Get SDR	Storage	0x23h	M	Yes
Add SDR	Storage	0x24h	M	Yes
Partial ADD SDR	Storage	0x25h	O	Yes
Delete SDR	Storage	0x26h	O	Yes
Clear SDR Repository	Storage	0x27h	M	Yes
Get SDR Repository Time	Storage	0x28h	O	Yes

Table 2-12. SDR Repository Commands (NetFn: 0x0AH) (continued)

Command	NetFn	Code	IPMI2.0	BMC
Set SDR Repository Time	Storage	0x29h	O	Yes
Enter SDR Repository Update Mode	Storage	0x2Ah	O	No
Exit SDR Repository Update Mode	Storage	0x2Bh	O	No
Run Initialization Agent	Storage	0x2Ch	O	Yes

Table 2-13. SEL Commands (NetFn: 0x40H)

Command	NetFn	Code	IPMI2.0	BMC
Get SEL Info	Storage	0x40h	M	Yes
Get SEL Allocation Info	Storage	0x41h	O	Yes
Reserve SEL	Storage	0x42h	O	Yes
Get SEL Entry	Storage	0x43h	M	Yes
Add SEL Entry	Storage	0x44h	M	Yes
Partial Add SEL Entry	Storage	0x45h	M	No *
Delete SEL Entry	Storage	0x46h	O	Yes
Clear SEL	Storage	0x47h	M	Yes
Get SEL Time	Storage	0x48h	M	Yes
Set SEL Time	Storage	0x49h	M	Yes
Get Auxiliary Log Status	Storage	0x5Ah	O	No
Set Auxiliary Log Status	Storage	0x5Bh	O	No
Get SEL Time UTC Offset	Storage	0x5Ch	O	No
Set SEL Time UTC Offset	Storage	0x5D	O	No

* Support for Partial Add SEL is not required when Add SEL is supported.

Table 2-14. LAN Device Commands (NetFn: 0x0CH)

Command	NetFn	Code	IPMI2.0	BMC
Set LAN Configuration Parameters (Note: Parameter 9 and 25 are not supported.)	Transport	0x01h	M	Yes
Get LAN Configuration Parameters (Note: Parameter 9 and 25 are not supported.)	Transport	0x02h	M	Yes
Suspend BMC ARP	Transport	0x03h	O	Yes
Get IP/UDP/RMCP Statistics	Transport	0x04h	O	No

Table 2-15. Serial/Modem Device Commands (NetFn: 0x 0CH)

Command	NetFn	Code	IPMI2.0	BMC
Set Serial/Modem Configuration	Transport	0x10h	M	Yes
Get Serial/Modem Configuration	Transport	0x11h	M	Yes
Set Serial/Modem Mux	Transport	0x12h	O	Yes
Get TAP Response Codes	Transport	0x13h	O	No
Set PPP UDP Proxy Transmit Data	Transport	0x14h	O	No
Get PPP UDP Proxy Transmit Data	Transport	0x15h	O	No
Send PPP UDP Proxy Packet	Transport	0x16h	O	No
Get PPP UDP Proxy Receive Data	Transport	0x17h	O	No
Serial/Modem Connection Active	Transport	0x18h	M	Yes
Callback	Transport	0x20h	O	No
SOL Activating	Transport	0x19h	O	Yes
Set SOL Configuration	Transport	0x20h	O	Yes
Get SOL Configuration	Transport	0x21h	O	Yes
Set User Callback Options	Transport	0x1Ah	O	No
Get User Callback Options	Transport	0x1Bh	O	No
Set Serial Routing Mux	Transport	0x1Ch	O	Yes

Table 2-16. Command Forwarding Commands (NetFn: 0x0CH)

Command	NetFn	Code	IPMI2.0	BMC
Forwarded Command	Transport	0x30h	O	Yes
Set Forwarded Commands	Transport	0x31h	O	Yes
Get Forwarded Commands	Transport	0x32h	O	Yes
Enable Forwarded Commands	Transport	0x33h	O	Yes

Table 2-17. Firmware Update Commands (NetFn: 0x08H)

Command	NetFn	Code	IPMI2.0	BMC
Firmware Update Phase 1	Firmware	0x10h	O	Yes
Firmware Update Phase 2	Firmware	0x11h	O	Yes
Get Firmware Update Status	Firmware	0x12h	O	Yes
Get Firmware Version	Firmware	0x13h	O	Yes
Set Firmware Update Status	Firmware	0x16h	O	Yes
Firmware Update Phase 3	Firmware	0x21h	O	Yes

Table 2-18. GPGPU Setting Commands (NetFn: 0x30H)

Command	NetFn	LUN	CMD	Privelege
Set GPGPU ID	0x30h	0h	32h	Admin
Get GPGPU ID	0x30h	0h	33h	Admin

Table 2-19. Fresh Air Mode Setting Commands (NetFn: 0x30H)

Command	NetFn	CMD	O/M	Supported
Enable Fresh Air Mode	Firmware	43h	O	Yes
Get Fresh Air Status	Firmware	44h	O	Yes
Disable Fresh Air Mode	Firmware	43h	O	Yes

Power Management Settings

The system BIOS provides various options for power settings to help you save energy, maximize system performance. The following table provides a guide for power management settings.

Table 2-20. Power Management Settings

System Setup Menu Setting		Maximum Performance (48DB)		Energy Efficiency (48DC)	
Setup Page	Setting	Option	D4 Token	Option	D4 Token
Power Management	Power Management	Max. Performance	021F	Node Manager	4800
	Energy Efficiency Policy	Performance	48D0	Low Power	48D2
CPU Configuration	Active Processor Cores	All	026E	1/2	0233/ 0232
	Frequency Ratio	Auto	48C0	3	48C3
	QPI Frequency	Auto	48C8	4.80GT/s	48C9
	Turbo Mode	Enabled	01E8	Disabled	01EA
	C State	Disabled	024C	Enabled	024B
	C1E State	Disabled	02A2	Enabled	02A1
	C6 State	Disabled	480A	Enabled	480B
	C7 State	Disabled	480E	Enabled	480F
	Direct Cache Access	Enabled	48D4	Disabled	48D3
	Hyper-Threading Technology	Enabled	00D1	Disabled	00D2
	Adjacent Cache Line Prefetch	Enabled	0172	Disabled	0171
	Hardware Prefetcher	Enabled	0174	Disabled	0173
	DCU Streamer Prefetcher	Enabled	02C5	Disabled	02C6
DCU IP Prefetcher	Enabled	02CE	Disabled	02CF	

Table 2-20. Power Management Settings (continued)

System Setup Menu Setting		Maximum Performance (48DB)		Energy Efficiency (48DC)	
Setup Page	Setting	Option	D4 Token	Option	D4 Token
Memory Configuration	Memory Frequency	Auto	4823	800 MHz	4824
	Memory Turbo Mode	Enabled	4821	Disabled	4820
	Memory Throttling Mode	Disabled	4828	Enabled	4829
	Memory Operating Voltage	1.5 V	02B6	1.35V/ 1.25V	02B7/ 48B5
SATA Configuration	Embedded SATA Link State	Auto	4834	1.5 Gbps	4835
	Power Saving Features	Disabled	0199	Enabled	019A
PCI Configuration	PCIe Slot ASPM	Disabled	4840	L0s & L1	4843
	Onboard LAN ASPM	Disabled	4846	L0s & L1	4849
	Mezzanine Slot ASPM	Disabled	484C	L0s & L1	484F
	NB-SB Link ASPM	Disabled	4852	L1	4853
	PCIe Generation	Gen3/Gen2	485B/ 485C	Gen1	485D

SNMP

The Simple Network Management Protocol (SNMP) is an application layer protocol that facilitates the monitoring and management of server enclosure and the PDU device.

About MIB and Traps

A Management Information Base (MIB) is a collection of managed information that is organized hierarchically. Managed entities are called managed objects and are identified by object identifiers. Network management protocols such as SNMP use MIBs to retrieve managed information about managed nodes or devices. The managed information is then transmitted to management applications through SNMP.

SNMP traps are used by managed nodes or devices to asynchronously report events to the management software. When certain types of events occur, the managed device sends a trap to the management software.

SNMP Support for the Server Enclosure Fan Controller Board

When an error occurs in the PowerEdge C8000 server enclosure that is populated with compute sleds, the fan controller board (FCB) provides a status update to the compute sled's BMC, and BMC send traps to the remote client.

When an error occurs in the server enclosure that is fully populated with 5 storage sleds, SNMP sends a trap message to the remote client.

There is a common OID (object identifiers) defined in the MIB (Management Information Base) file. Use the SNMP utility to get the SNMPv2-MIB file and load the MIB files that are required for managing and monitoring the server enclosure.

FCB Network Connection

By default, the FCB is configured to automatically obtain an IP address via DHCP server. A special button-press-sequence **MUST** be defined that does not conflict with legacy fan controller uses,

- Long press in 4 seconds, service mode.
- 3 short presses in less than 5 seconds provide switch between default static IP and reset to default

After FCB resets, all network and configuration settings restore back to their default values. FCB is configured with the following default network settings.

- IP address: 192.168.0.120
- Subnet mask: 255.255.255.0

When the reset to default button is pressed, the FCB status and identification indicator lights to indicate the following behaviors

- Blinking amber (500 ms off/5 s on) — Restarts the FCB firmware and reset to factory default is completed.
- Blinking amber (250 ms off/5 s on) — Restores the default network settings to their default values.

FCB Configuration Information

The FCB configuration information is stored in the FCB board's internal EEPROM, instead of the Chassis FRU/EEPROM as it is board level configuration. Please refer to file format as shown below. Keep all attributes and key words of the configuration and only modify "value" if it is allowed. Firmware will drop configuration file if configurations are incorrect when user uploads the file.

For example, a configuration data should have the following information:

```
CONNECT.TYPE=STATIC/DHCP
IP=192.168.0.120
NETMASK=255.255.255.0
GATEWAY=192.168.0.1
TRAPDESTINATION1=0.0.0.0
TRAPDESTINATION2=0.0.0.0
TRAPDESTINATION3=0.0.0.0
TRAPDESTINATION4=0.0.0.0
TRAPDESTINATION5=0.0.0.0
SNMPRD.COMMUNITY.STR=public
SNMPRW.COMMUNITY.STR=private
POWERCAPPING.R=3
POWERCAPPING.W_DELTA=20
POWERCAPPING.K_CNT=3
```

By default, the FCB controller uses DHCP to acquire an IP address. The system **MUST** follow the same DHCP retry mechanism that exists in the BMCs (any parameter needed for this **MUST** be stored in the configuration file). DHCP client **MUST** retry forever.

FCB Firmware Behavior

The following table lists the FCB firmware behavior.

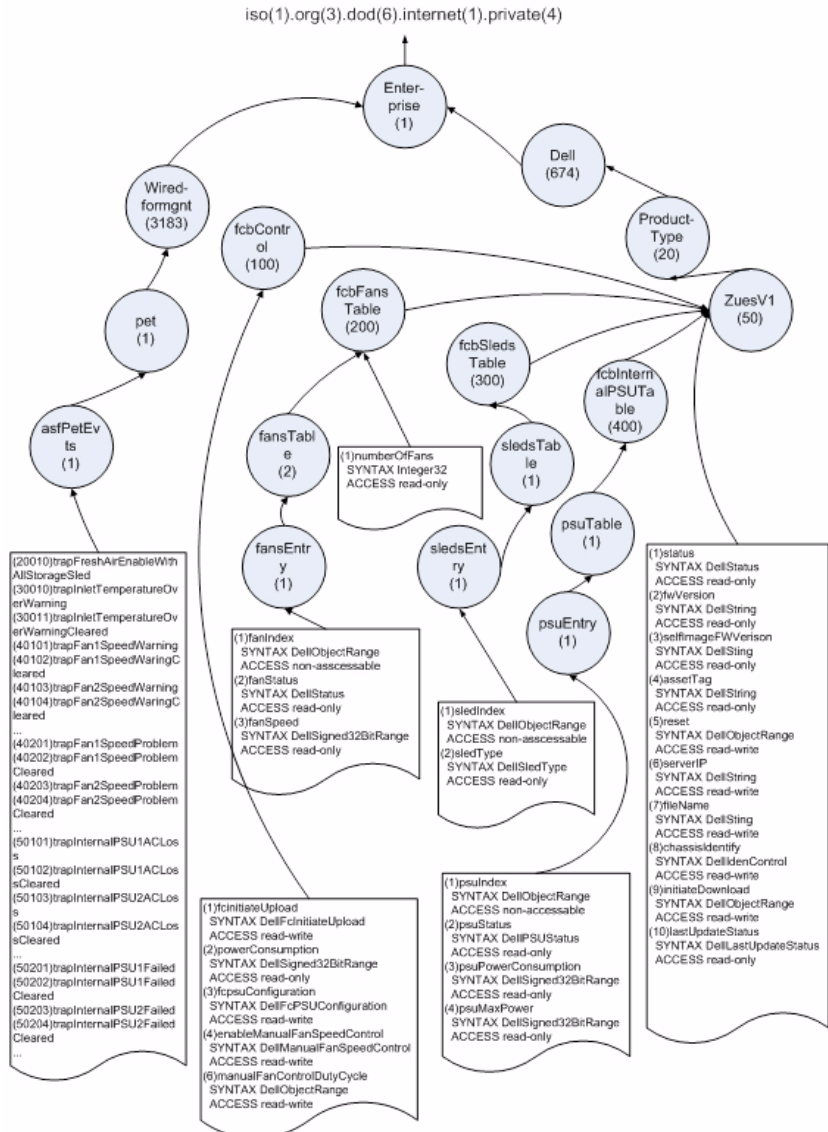
Table 2-21. FCB Firmware Behavior

System Configuration	Safe Boot Code Firmware Behavior	Operational Code Firmware Behavior
Server enclosure with storage sleds only	<ul style="list-style-type: none"> • FCB firmware enables network/SNMP service • FCB firmware update is done by TFTP via SNMP set object property • FCB firmware detects sled modules during initialization only. When you replace a storage sled with a compute sled, the FCB controller needs to reset to detect the compute sled. • The reset to default button works 	<ul style="list-style-type: none"> • FCB firmware enables network/SNMP service • FCB firmware update is done by TFTP via SNMP set object property • Use the SNMP SET/GET commands to request for a specific variable • FCB firmware send traps to remote client when critical errors occur. • You can download or upload the FCB configuration information by TFTP via SNMP set object property • The firmware update may fail but not be broken if you install a compute sled into the server enclosure while the FCB firmware update is in progress • The reset to default button works

Table 2-21. FCB Firmware Behavior

System Configuration	Safe Boot Code Firmware Behavior	Operational Code Firmware Behavior
Server enclosure with compute sleds	<ul style="list-style-type: none">• FCB firmware stays in safe boot mode and waits for BMC to update firmware.• FCB firmware detects sled modules during initialization only. When you replace a compute sled, the FCB controller needs to reset to detect the new sled.• The reset to default button does not work	<ul style="list-style-type: none">• FCB firmware disables network/SNMP service• FCB firmware update is done by the BMC• FCB firmware updates status to BMC via SC-BMC protocol• The firmware update may fail but not be broken if you install a compute sled into the server enclosure while the FCB firmware update is in progress• The reset to default button does not work

MIB Tree Diagram for FCB



FCB SNMP MIB

Table 2-22. FCB SNMP MIB

Category	Object Name	Read/Write	Value Type	Operation FW	Safe Boot FW	Note
Common	Status	read-only	values: ok, error, safeBoot	v	v	Firmware Status
	FW Version	read-only	string	v		Firmware Version (OP code)
	Safe Image FW Version	read-only	string	v	v	Firmware Version (Safe Boot code)
	Asset Tag	read-write	string	v		Asset Tag, max string length is 16 characters
	Reset	read-write	value: start	v	v	Firmware will reset once this field is set
	Server IP	read-write	IpAddress	v	v	TFTP server IP
	File Name	read-write	string	v	v	max string length is 100 characters
	Chassis Identify	read-write	integer	v		Chassis Identification
	Initiate Download	read-write	value: start	v		Initiate download
	Last Update Status	read-only	Values: na, successfully, error, imageError, start, downloadIn Progress, download Successfully, download Failed, upgradeIn Progress	v	v	Last update status, firmware will check header (CRC23) and image (MD5) before update, if checksum is incorrect, this file will be set as imageError.

Table 2-22. FCB SNMP MIB

Category	Object Name	Read/Write	Value Type	Operation FW	Safe Boot FW	Note
FCB Control	fc Initiate Upload	read-write	values: FC/CPLD/NetConfig	v	v	Initiate upload
	power Consumption	read-only	Integer	v		Power consumption
	fcpsu Configuration	read-write	values: x1n1, x2n0	v		PSU Configuration, X1n1: X+N=1+1 X2n0: X+N=2+0
	enable Manual Fan Control	read-write	values: 1/0	v		Default is disabled (0)
	manual Fan Control Duty Cycle	read-write	integer	v		Manual Fan Control Duty Cycle, 0 - 100, default 100
FCB FansTable	number Of Fans	read-only	integer	v		Number of FAN
	fan Index	not-accessible				Fan Index
	fan Status	read-only	values: ok, error	v		FAN Status
	fan Speed	Read-only	integer	v		FAN Speed
	sled Index	not-accessible		v		Sled Index
FCB Sleds Table	sled Type	read-only	values: ok, na, storage, dummy, psu	v		Sled Type
	psu Index	not-accessible		v		PSU Index

Table 2-22. FCB SNMP MIB

Category	Object Name	Read/Write	Value Type	Operation FW	Safe Boot FW	Note
FCB Internal PSU Table	psu Status	read-only	values: ok, error, na, across	v		PSU Status
	psu Power Consumption	read-only	integer	v		PSU Power Consumption
	psu Max Power	read-only	integer	v		PSU Max Power
FCB-Trap	trap Fresh Air Enabled With All StorageSled					Trap for Fresh Air Enabled with All Storage sleds
	trap Inlet Temperature OverWarning					Trap for Inlet Temperature Over Warning
	trap Inlet Temperature Over Warning Cleared					Trap for Inlet Temperature Over Warning Cleared
	trap Fan1 Speed Warning					Trap for Fan 1 Speed Warning
	trap Fan2 Speed Warning					Trap for Fan 2 Speed Warning
	trap Fan3 Speed Warning					Trap for Fan 3 Speed Warning
	trap Fan4 Speed Warning					Trap for Fan 4 Speed Warning
	trap Fan5 Speed Warning					Trap for Fan 5 Speed Warning
	trap Fan6 Speed Warning					Trap for Fan 6 Speed Warning

Table 2-22. FCB SNMP MIB

Category	Object Name	Read/Write	Value Type	Operation FW	Safe Boot FW	Note
	trap Fan1 Speed Warning Cleared					Trap for FAN 1 Speed Warning Cleared
	trap Fan2 Speed Warning Cleared					Trap for FAN 2 Speed Warning Cleared
	trap Fan3 Speed Warning Cleared					Trap for FAN 3 Speed Warning Cleared
	trap Fan4 Speed Warning Cleared					Trap for FAN 4 Speed Warning Cleared
	trap Fan5 Speed Warning Cleared					Trap for FAN 5 Speed Warning Cleared
	trap Fan6 Speed Warning Cleared					Trap for FAN 6 Speed Warning Cleared
	trap Fan1 Speed Problem					Trap FAN 1 Speed Problem
	trap Fan2 Speed Problem					Trap FAN 2 Speed Problem
	trap Fan3 Speed Problem					Trap FAN 3 Speed Problem
	trap Fan4 Speed Problem					Trap FAN 4 Speed Problem
	trap Fan5 Speed Problem					Trap FAN 5 Speed Problem
	trap Fan6 Speed Problem					Trap FAN 6 Speed Problem

Table 2-22. FCB SNMP MIB

Category	Object Name	Read/Write	Value Type	Operation FW	Safe Boot FW	Note
FCB-Trap	trap Fan1 Speed Problem Cleared					Trap for FAN 1 Speed Problem Cleared
	trap Fan2 Speed Problem Cleared					Trap for FAN 2 Speed Problem Cleared
	trap Fan3 Speed Problem Cleared					Trap for FAN 3 Speed Problem Cleared
	trap Fan4 Speed Problem Cleared					Trap for FAN 4 Speed Problem Cleared
	trap Fan5 Speed Problem Cleared					Trap for FAN 5 Speed Problem Cleared
	trap Fan6 Speed Problem Cleared					Trap for FAN 6 Speed Problem Cleared
	trap Internal PSU1 ACLoss					Trap for Internal PSU1 AC Lost
	trap Internal PSU2 ACLoss					Trap for Internal PSU2 AC Lost
	trap Internal PSU3 ACLoss					Trap for Internal PSU3 AC Lost
	trap Internal PSU4 ACLoss					Trap for Internal PSU4 AC Lost
trap Internal PSU1 ACLoss Cleared					Trap for Internal PSU1 AC Lost Cleared	

Table 2-22. FCB SNMP MIB

Category	Object Name	Read/Write	Value Type	Operation FW	Safe Boot FW	Note
FCB-Trap	trap Internal PSU2 AC Loss Cleared					Trap for Internal PSU2 AC Lost Cleared
	trap Internal PSU3 AC Loss Cleared					Trap for Internal PSU3 AC Lost Cleared
	trap Internal PSU4 AC Loss Cleared					Trap for Internal PSU4 AC Lost Cleared
	trap Internal PSU1 Failed					Trap for Internal PSU1 Failed
	trap Internal PSU2 Failed					Trap for Internal PSU2 Failed
	trap Internal PSU3 Failed					Trap for Internal PSU3 Failed
	trap Internal PSU4 Failed					Trap for Internal PSU4 Failed
	trap Internal PSU1 Failed Cleared					Trap for Internal PSU1 Failed Cleared
	trap Internal PSU2 Failed Cleared					Trap for Internal PSU2 Failed Cleared
	trap Internal PSU3 Failed Cleared					Trap for Internal PSU3 Failed Cleared
	trap Internal PSU4 Failed Cleared					Trap for Internal PSU4 Failed Cleared

NOTE: In the Common category, both FC and PMC provides common OID.

SNMP Support for the External PDU Power Management Controller Board

The PowerEdge C8000 server enclosure is primarily connected to an external PDU. The external PDU includes a power management controller (PMC) board that allows you to monitor the PDU power supply modules over the network. When an error occurs in the PDU, the PMC via SNMPv2 send notifications to the remote client.

There is a common OID (object identifiers) defined in the MIB (Management Information Base) file. Use the SNMP utility to get the SNMPv2-MIB file and load the MIB files that are required for managing and monitoring the PDU.

PMC Network Connection

By default, the PMC is configured to automatically obtain an IP address via DHCP server. A special button-press-sequence **MUST** be defined that does not conflict with legacy fan controller,

- Long press in 4 seconds, service mode.
- 3 short presses in less than 5 seconds provide switch between default static IP and reset to default

After PMC resets, all network and configuration settings restore back to their default values. PMC is configured with the following default network settings.

- IP address: 192.168.0.120
- Subnet mask: 255.255.255.0

The power/status indicator on the front of the PMC board displays the following behaviors

- Blinking amber (500 ms off/5 s on) — Restarts the PMC firmware and reset to factory default is completed.
- Blinking amber (250 ms off/5 s on) — Restores the default network settings to their default values.

PMC Configuration Information

The PMC configuration information is stored in the PMC board's internal EEPROM. You must use TFTP server to retrieve the configuration data and then use Notepad or a text editor to view or change the configuration data.

For example, a configuration data should have the following information:

```
CONNECT.TYPE=STATIC/DHCP
IP=192.168.0.120
NETMASK=255.255.255.0
GATEWAY=192.168.0.1
TRAPDESTINATION1=0.0.0.0
TRAPDESTINATION2=0.0.0.0
TRAPDESTINATION3=0.0.0.0
TRAPDESTINATION4=0.0.0.0
TRAPDESTINATION5=0.0.0.0
SNMPRD.COMMUNITY.STR=public
SNMPRW.COMMUNITY.STR=private
MANAGE.AC SOCKET.A.DEFAULT.POWER=ON/OFF
MANAGE.AC SOCKET.B.DEFAULT.POWER=ON/OFF
MANAGE.AC SOCKET.C.DEFAULT.POWER=ON/OFF
MANAGE.PDU.DEFAULT.POWER=ON/OFF
MANAGE.PSU.CONFIGURATION=5+1
```

By default, the PMC controller uses DHCP to acquire an IP address. The system **MUST** follow the same DHCP retry mechanism that exists in the BMCs (any parameter needed for this **MUST** be stored in the configuration file). DHCP client **MUST** retry forever.

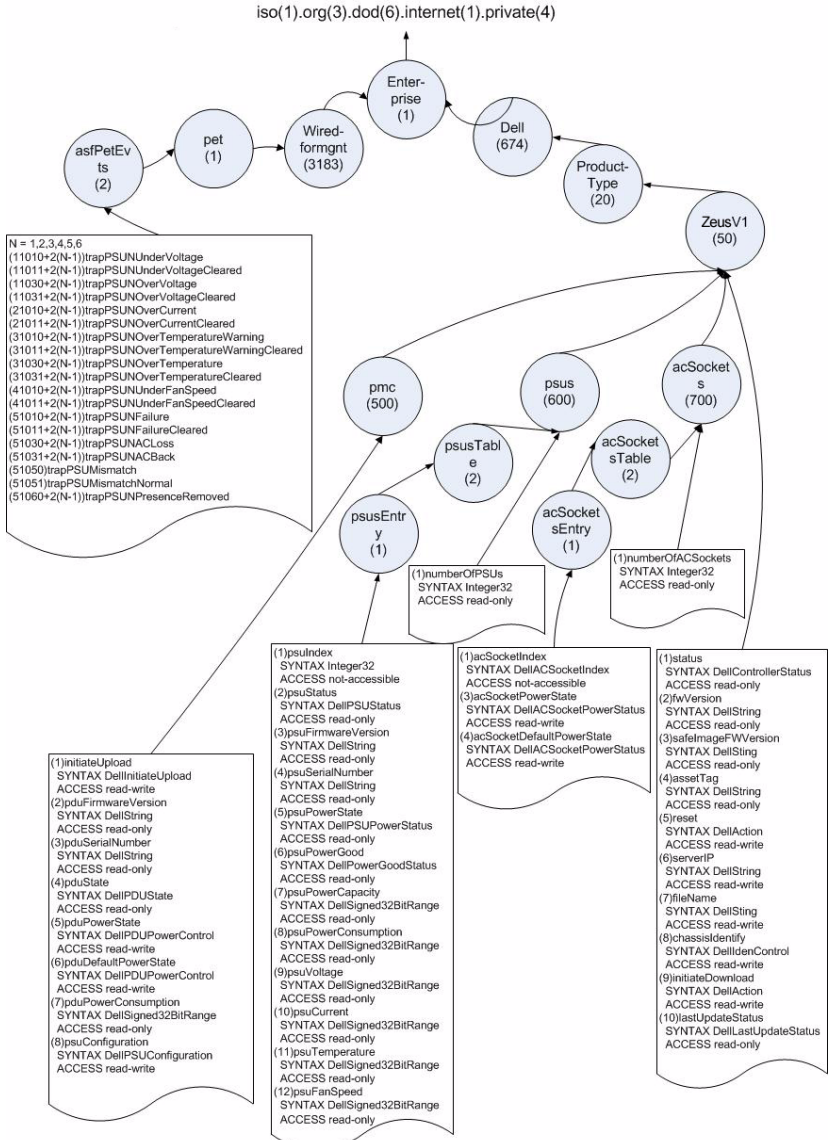
PMC Firmware Behavior

The following table lists the PMC firmware behavior.

Table 2-23. PMC Firmware Behavior

Safe Boot Code Firmware Behavior	Operational Code Firmware Behavior
<ul style="list-style-type: none">• PMC firmware enables network/SNMP service• PMC firmware update is done by TFTP via SNMP set object property• The reset to default button works	<ul style="list-style-type: none">• PMC firmware enables network/SNMP service• PMC firmware update is done by TFTP via SNMP set object property• Use the SNMP SET/GET commands to request for a specific variable• PMC firmware send traps to remote client when critical errors occur.• You can download or upload the PMC configuration information by TFTP via SNMP set object property• The reset to default button works

MIB Tree Diagram for PMC



PMC SNMP MIB

Table 2-24. PMC SNMP MIB

Category	Object Name	Read/Write	Value Type	Operation FW	Safe Boot FW	Note
Common	Status	read-only	values: ok, error, safeBoot	v	v	Firmware Status
	FW Version	read-only	string	v		Firmware Version (OP code)
	Safe Image FW Version	read-only	string	v	v	Firmware Version (Safe Boot code)
	Asset Tag	read-write	string	v		Asset Tag, max string length is 16 characters
	Reset	read-write	value: start	v	v	Firmware will reset once this field is set
	Server IP	read-write	Ip Address	v	v	TFTP server IP
	File Name	read-write	string	v	v	max string length is 100 characters
	Chassis Identify	read-write	integer	v		Chassis Identification
	InitiateDownload	read-write	value: start	v		Initiate download

Table 2-24. PMC SNMP MIB

Category	Object Name	Read/Write	Value Type	Operation FW	Safe Boot FW	Note
Common	lastUpdateStatus	read-only	Values: na, successfully, error, imageError, start, downloadInProgress, downloadSuccessfully, downloadFailed, upgradeInProgresspduUpgradeSuccessfully, psuUpgradeSuccessfully, pduUpgradeFailed, psuUpgradeFailed pduUpgradeSuccessfully, psuUpgradeSuccessfully, pduUpgradeFailed, psuUpgradeFailed	v	v	Last update status, firmware will check header (CRC23) and image (MD5) before update, if checksum is incorrect, this file will be set as image Error.

Table 2-24. PMC SNMP MIB

Category	Object Name	Read/Write	Value Type	Operation FW	Safe Boot FW	Note
PMC	PDU Firmware Version	read-only	string	v		PDU firmware version
	PDU Serial Number	read-only	string	v		PDU serial number, only supports when PDU version is 6.00.05 or later
	PDU State	read-only	values: ok, error, bootLoader	v		PDU state
	PDU Power State	read-write	values: on/off	v		PDU power state
	PDU Default Power State	read-write	values: on/off	v		PDU Default Power State
	PDU Power Consumption	read-only	integer	v		Total PSU power, Unit:W
	pmc Initiate Upload	read-write	vaules: pmc, config, pdu, psu1, psu2, psu3, psu4, psu5, psu6	v	v	Initiate upload
	pmc psu Configuration	read-write	values: x4n2, x5n1	v		PSU configuration, x4n2: X+N=4+2 x5n1: X+N=5+1

Table 2-24. PMC SNMP MIB

Category	Object Name	Read/Write	Value Type	Operation FW	Safe Boot FW	Note
PSUs Table	Number Of Psus	read-only	integer	v		Number of PSU
	PSUIndex	not-accessible	integer	v		PSU index
	PSUStatus	read-only	values: ok, error, na, across, bootLoader	v		PSU status
	PSU Firmware Version	read-only	string	v		PSU firmware version
	PSU Serial Number	read-only	string	v		PSU serial number
	PSU Power State	read-only	values: on/off	v		PSU power state
	PSU Power Good	read-only	values: ok, error	v		PSU power good
	PSU Power Capacity	read-only	integer	v		PSU power capacity, Unit:W
	PSU Power Consumption	read-only	integer	v		PSU power consumption, Unit:W
	PSU Voltage	read-only	integer	v		PSU voltage, Unit:mV
	PSU Current	read-only	integer	v		PSU current, Unit:mA
	PSU Temperature	read-only	integer	v		PSU temperature, Unit:degrees C
PSU Fan Speed	read-only	integer	v		PSU fan speed, Unit:rpm	

Table 2-24. PMC SNMP MIB

Category	Object Name	Read/Write	Value Type	Operation FW	Safe Boot FW	Note
AC Sockets Table	Number Of AC Sockets	read-only	integer	v		Number of AC socket
	AC Socket Index	not-accessible	integer	v		AC socket index
	AC Socket Power State	read-write	values: on/off	v		AC socket power state
	AC Socket Default Power State	read-write	values: on/off	v		AC socket default power state
PMC - Traps	trap PSU1 Under Voltage			v		Trap for PSU1 under voltage
	trap PSU2 Under Voltage			V		Trap for PSU2 under voltage
	trap PSU3 Under Voltage			v		Trap for PSU3 under voltage
	trap PSU4 Under Voltage			v		Trap for PSU4 under voltage
	trap PSU5 Under Voltage			V		Trap for PSU5 under voltage
	trap PSU6 Under Voltage			V		Trap for PSU6 under voltage
	trap PSU1 Under Voltage Cleared			V		Trap for PSU1 under voltage cleared
	trap PSU2 Under Voltage Cleared			V		Trap for PSU2 under voltage cleared

Table 2-24. PMC SNMP MIB

Category	Object Name	Read/Write	Value Type	Operation FW	Safe Boot FW	Note
PMC - Traps	trap PSU3 Under Voltage Cleared			V		Trap for PSU3 under voltage cleared
	trap PSU4 Under Voltage Cleared			V		Trap for PSU4 under voltage cleared
	trap PSU5 Under Voltage Cleared			V		Trap for PSU5 under voltage cleared
	trap PSU6 Under Voltage Cleared			V		Trap for PSU6 under voltage cleared
	trap PSU1 Over Voltage			V		Trap for PSU1 over voltage
	trap PSU2 Over Voltage			V		Trap for PSU2 over voltage
	trap PSU3 Over Voltage			V		Trap for PSU3 over voltage
	trap PSU4 Over Voltage			V		Trap for PSU4 over voltage
	trap PSU5 Over Voltage			V		Trap for PSU5 over voltage
	trap PSU6 Over Voltage			V		Trap for PSU6 over voltage
	trap PSU1 Over Voltage Cleared			V		Trap for PSU1 over voltage cleared
	trap PSU2 Over Voltage Cleared			V		Trap for PSU2 over voltage cleared

Table 2-24. PMC SNMP MIB

Category	Object Name	Read/Write	Value Type	Operation FW	Safe Boot FW	Note
PMC - Traps	trap PSU3 Over Voltage Cleared			V		Trap for PSU3 over voltage cleared
	trap PSU4 Over Voltage Cleared			V		Trap for PSU4 over voltage cleared
	trap PSU5 Over Voltage Cleared			V		Trap for PSU5 over voltage cleared
	trap PSU6 Over Voltage Cleared			V		Trap for PSU6 over voltage cleared
	trap PSU1 Over Current			V		Trap for PSU1 over current
	trap PSU2 Over Current			V		Trap for PSU 2 over current
	trap PSU3 Over Current			V		Trap for PSU3 over current
	trap PSU4 Over Current			V		Trap for PSU4 over current
	trap PSU5 Over Current			V		Trap for PSU5 over current
	trap PSU6 Over Current			V		Trap for PSU6 over current
	trap PSU1 Over Current Cleared			V		Trap for PSU1 over current cleared
	trap PSU2 Over Current Cleared			V		Trap for PSU2 over current cleared
	trap PSU3 Over Current Cleared			V		Trap for PSU3 over current cleared

Table 2-24. PMC SNMP MIB

Category	Object Name	Read/Write	Value Type	Operation FW	Safe Boot FW	Note
PMC - Traps	trap PSU4 Over Current Cleared			V		Trap for PSU4 over current cleared
	trap PSU5 Over Current Cleared			V		Trap for PSU5 over current cleared
	trap PSU6 Over Current Cleared			V		Trap for PSU6 over current cleared
	trap PSU1 Over Temperature Warning			V		Trap for PSU1 over temperature warning
	trap PSU2 Over Temperature Warning			V		Trap for PSU2 over temperature warning
	trap PSU3 Over Temperature Warning			V		Trap for PSU3 over temperature warning
	trap PSU4 Over Temperature Warning			V		Trap for PSU4 over temperature warning
	trap PSU5 Over Temperature Warning			V		Trap for PSU5 over temperature warning
	trap PSU6 Over Temperature Warning			V		Trap for PSU6 over temperature warning

Table 2-24. PMC SNMP MIB

Category	Object Name	Read/Write	Value Type	Operation FW	Safe Boot FW	Note
PMC - Traps	trap PSU1 Over Temperature Warning Cleared			V		Trap for PSU1 over temperature warning cleared
	trap PSU2 Over Temperature Warning Cleared			V		Trap for PSU2 over temperature warning cleared
	trap PSU3 Over Temperature Warning Cleared			V		Trap for PSU3 over temperature warning cleared
	trap PSU4 Over Temperature Warning Cleared			V		Trap for PSU4 over temperature warning cleared
	trap PSU5 Over Temperature Warning Cleared			V		Trap for PSU5 over temperature warning cleared
	trap PSU6 Over Temperature Warning Cleared			V		Trap for PSU6 over temperature warning cleared
	trap PSU1 Over Temperature			V		Trap for PSU1 over temperature
	trap PSU2 Over Temperature			V		Trap for PSU2 over temperature

Table 2-24. PMC SNMP MIB

Category	Object Name	Read/Write	Value Type	Operation FW	Safe Boot FW	Note
PMC - Traps	trap PSU3 Over Temperature			V		Trap for PSU3 over temperature
	trap PSU4 Over Temperature			V		Trap for PSU4 over temperature
	trap PSU5 Over Temperature			V		Trap for PSU5 over temperature
	trap PSU6 Over Temperature			V		Trap for PSU6 over temperature
	trap PSUN Over Temperature Cleared			V		Trap PSU1 over temperature cleared
	trap PSUN Over Temperature Cleared			V		Trap PSU2 over temperature cleared
	trap PSUN Over Temperature Cleared			V		Trap PSU3 over temperature cleared
	trap PSUN Over Temperature Cleared			V		Trap PSU4 over temperature cleared
	trap PSUN Over Temperature Cleared			V		Trap PSU5 over temperature cleared
trap PSUN Over Temperature Cleared			V		Trap PSU6 over temperature cleared	

Table 2-24. PMC SNMP MIB

Category	Object Name	Read/Write	Value Type	Operation FW	Safe Boot FW	Note
PMC - Traps	trap PSU1 Under Fan Speed			V		Trap for PSU1 under FAN speed
	trap PSU2 Under Fan Speed			V		Trap for PSU2 under FAN speed
	trap PSU3 Under Fan Speed			V		Trap for PSU3 under FAN speed
	trap PSU4 Under Fan Speed			V		Trap for PSU4 under FAN speed
	trap PSU5 Under Fan Speed			V		Trap for PSU5 under FAN speed
	trap PSU6 Under Fan Speed			V		Trap for PSU6 under FAN speed
	trap PSU1 Under Fan Speed Cleared			V		Trap for PSU1 under FAN speed cleared
	trap PSU2 Under Fan Speed Cleared			V		Trap for PSU2 under FAN speed cleared
	trap PSU3 Under Fan Speed Cleared			V		Trap for PSU3 under FAN speed cleared
	trap PSU4 Under Fan Speed Cleared			V		Trap for PSU4 under FAN speed cleared

Table 2-24. PMC SNMP MIB

Category	Object Name	Read/Write	Value Type	Operation FW	Safe Boot FW	Note
PMC - Traps	trap PSU5 Under Fan Speed Cleared			V		Trap for PSU5 under FAN speed cleared
	trap PSU6 Under Fan Speed Cleared			V		Trap for PSU6 under FAN speed cleared
	Trap PSU1 Failure			V		Trap for PSU1 failure
	Trap PSU2 Failure			V		Trap for PSU2 failure
	Trap PSU3 Failure			V		Trap for PSU3 failure
	Trap PSU4 Failure			V		Trap for PSU4 failure
	Trap PSU5 Failure			V		Trap for PSU5 failure
	Trap PSU6 Failure			V		Trap for PSU6 failure
	Trap PSU1 Ac Lost			V		Trap for PSU1 AC lost
	Trap PSU2 Ac Lost			V		Trap for PSU2 AC lost
	Trap PSU3 Ac Lost			V		Trap for PSU3 AC lost
	Trap PSU4 Ac Lost			V		Trap for PSU4 AC lost
	Trap PSU5 Ac Lost			V		Trap for PSU5 AC lost
	Trap PSU6 Ac Lost			V		Trap for PSU6 AC lost

Table 2-24. PMC SNMP MIB




Category	Object Name	Read/Write	Value Type	Operation FW	Safe Boot FW	Note
PMC - Traps	Trap PSU Mismatch			V		A mismatch between PSU X+N configuration and populated PSU
	Trap PSU1 Presence Removed			V		Trap for PSU1 Presence Removed
	Trap PSU2 Presence Removed			V		Trap for PSU2 Presence Removed
	Trap PSU3 Presence Removed			V		Trap for PSU3 Presence Removed
	Trap PSU4 Presence Removed			v		Trap for PSU4 Presence Removed
	Trap PSU5 Presence Removed			V		Trap for PSU5 Presence Removed
	Trap PSU6 Presence Removed			V		Trap for PSU6 Presence Removed
	Trap PSU1 Failure Cleared			V		Trap for PSU1 Failure Cleared
	Trap PSU2 Failure Cleared			V		Trap for PSU2 Failure Cleared
	Trap PSU3 Failure Cleared			V		Trap for PSU3 Failure Cleared
	Trap PSU4 Failure Cleared			V		Trap for PSU4 Failure Cleared

Table 2-24. PMC SNMP MIB

Category	Object Name	Read/Write	Value Type	Operation FW	Safe Boot FW	Note
PMC - Traps	Trap PSU5 Failure Cleared			V		Trap for PSU5 Failure Cleared
	Trap PSU6 Failure Cleared			V		Trap for PSU6 Failure Cleared
	Trap PSU1 Ac Back			V		Trap for PSU1 AC Back
	Trap PSU2 Ac Back			V		Trap for PSU2 AC Back
	Trap PSU3 Ac Back			V		Trap for PSU3 AC Back
	Trap PSU4 Ac Back			V		Trap for PSU4 AC Back
	Trap PSU5 Ac Back			V		Trap for PSU5 AC Back
	Trap PSU6 Ac Back			V		Trap for PSU6 AC Back
	Trap PSU Mismatch Normal			V		Trap for PSU mismatch normal

Installing System Components

Safety Instructions

-  **WARNING:** Working on systems that are still connected to a power supply can be extremely dangerous.
-  **CAUTION:** System components and electronic circuit boards can be damaged by discharge of static electricity.
-  **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

To avoid injury to yourself or damage to your system, follow these guidelines:

- Always disconnect the system from the power outlet whenever you are working inside the system.
- If possible, wear a grounded wrist strap when you are working inside the system. Alternatively, discharge any static electricity by touching the bare metal chassis of the system case, or the bare metal body of any other grounded appliance.
- Hold electronic circuit boards by the edges only. Do not touch the components on the board unless it is necessary to do so. Do not flex or stress the circuit board.
- Leave all components inside the static-proof packaging until you are ready to use the component for the installation.

- Some cables have a connector with locking tabs; if you are disconnecting this type of cable, press in on the locking tabs before you disconnect the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before you connect a cable, ensure that both connectors are correctly oriented and aligned.

About the Illustrations

The illustrations used in this chapter identifies the component parts and does not show step-by-step component removal or replacement instructions.

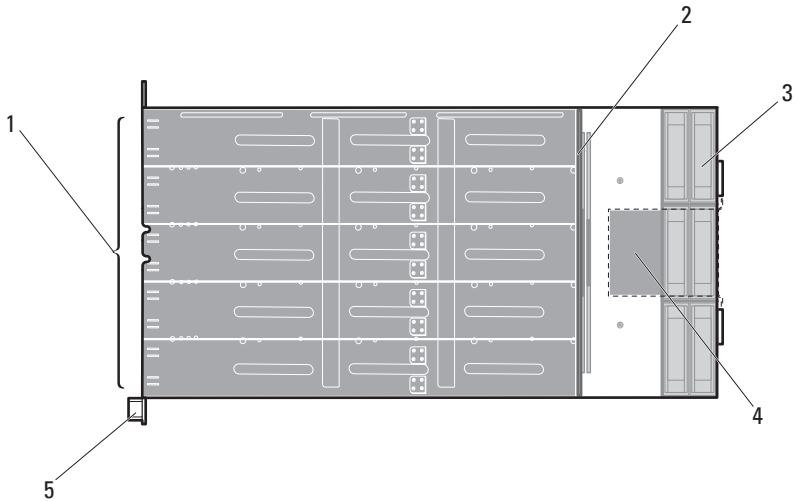
Recommended Tools

- #1 Phillips screwdriver
- #2 Phillips screwdriver
- Torx drivers
- Set of jeweler screwdrivers

Inside the System

- ⚠ **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized is not covered by warranty. Read and follow the safety instructions that came with the product.
- ⚠ **CAUTION:** This system must be operated with the sled or sled blank installed to make sure of proper cooling.

Figure 3-1. Inside the Server Enclosure — Top View



- 1 sled bays (10)
- 2 power management board
- 3 fan modules (3 fan module sets, each fan module with 2 fans)
- 4 fan controller board
- 5 front panel board

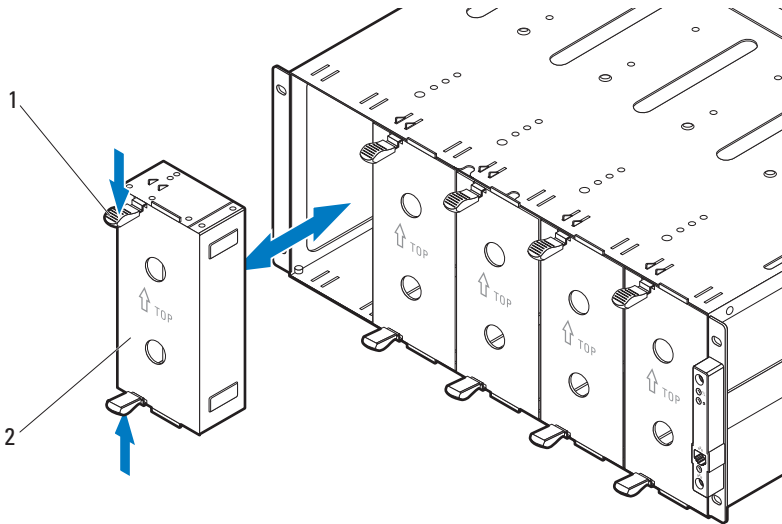
Sled Blank

CAUTION: To ensure proper airflow in the system, if a module is removed it should be immediately replaced with another sled or sled blank.

Removing a Double-Wide Sled Blank

Squeeze and hold the release latches and slide the blank out of the enclosure. See Figure 3-2.

Figure 3-2. Removing and Installing a Double-Wide Sled Blank



1 release latches (2)

2 double-wide sled blank

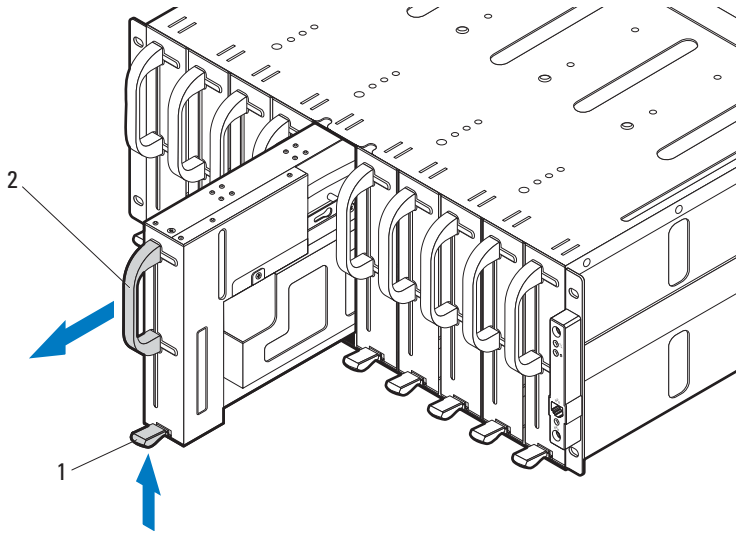
Installing a Double-Wide Sled Blank

Hold the blank with the guide rail facing forward. Slide the blank into the enclosure until it is fully seated and the release latches snap into place. See Figure 3-2.

Removing a Single-Wide Sled Blank

- 1 Pull up on the sled blank latch at the bottom of the sled to disengage the sled from the server enclosure. See Figure 3-3.
- 2 Using the handle, slide the sled out of the enclosure. See Figure 3-3.

Figure 3-3. Removing and Installing a Single-Wide Sled Blank



1 release latch


2 single-wide sled blank


Installing a Single-Wide Sled Blank

- 1 Orient the sled blank so that the release latch is in the bottom of the sled. See Figure 3-3.
- 2 Slide the sled blank into the enclosure until the release latch snaps into place. See Figure 3-3.

Compute Sleds

Removing a Compute Sled

 **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized is not covered by warranty. Read and follow the safety instructions that came with the product.

 **CAUTION:** To ensure proper airflow in the system, if a sled is removed it should be immediately replaced with another sled or sled blank.

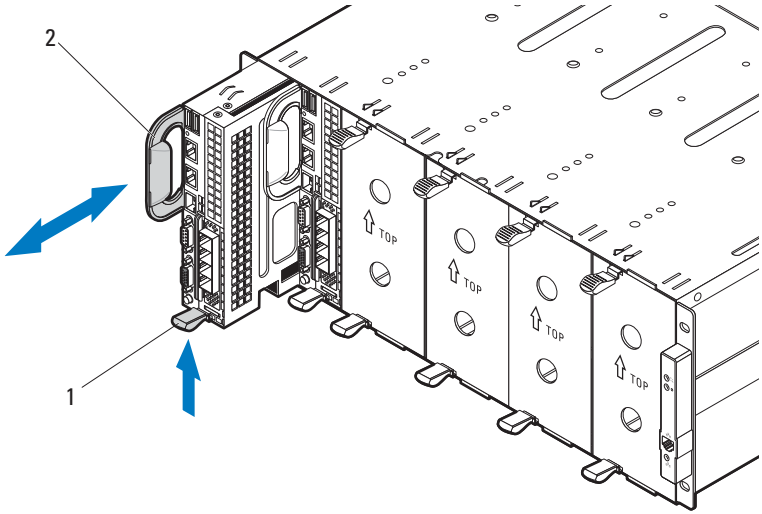
 **CAUTION:** Operating the system without a sled or sled blank installed can cause the enclosure to overheat. See "Installing a Double-Wide Sled Blank" on page 190.

- 1 Power down the sled using OS commands or the Baseboard Management Controller, and ensure that the sled's power is off.

When the sled is powered off, its front-panel indicator is off.

- 2 Pull up on the compute sled release latch at the bottom of the sled to disengage the sled from the server enclosure. See Figure 3-4 or Figure 3-5.
- 3 Using the handle, slide the sled out of the enclosure. See Figure 3-4 or Figure 3-5.

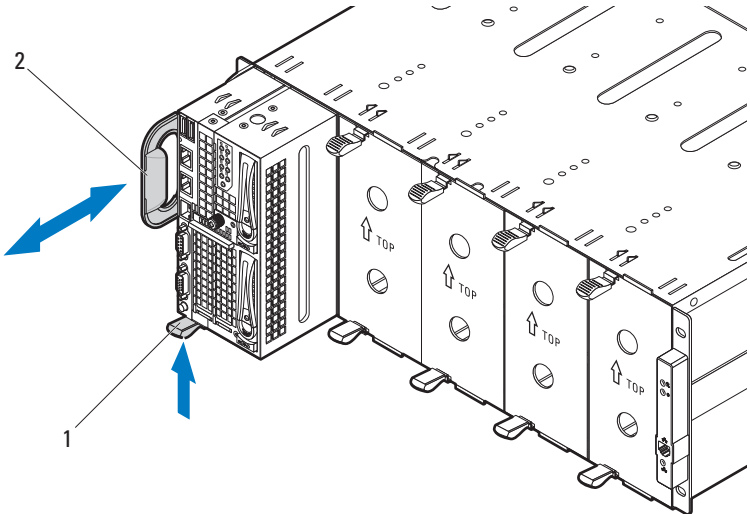
Figure 3-4. Removing and Installing a C8220 Compute Sled



1 release latch

2 handle


Figure 3-5. Removing and Installing a C8220X Compute Sled



1 release latch

2 handle


Installing a Compute Sled


 **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized is not covered by warranty. Read and follow the safety instructions that came with the product.

- 1 Orient the sled so that the release latch is in the bottom of the sled. See Figure 3-4 or Figure 3-5.
- 2 Slide the new sled into the enclosure until the sled is fully seated and the release latch snaps into place. See Figure 3-4 or Figure 3-5.

Storage Sled

Removing a Storage Sled

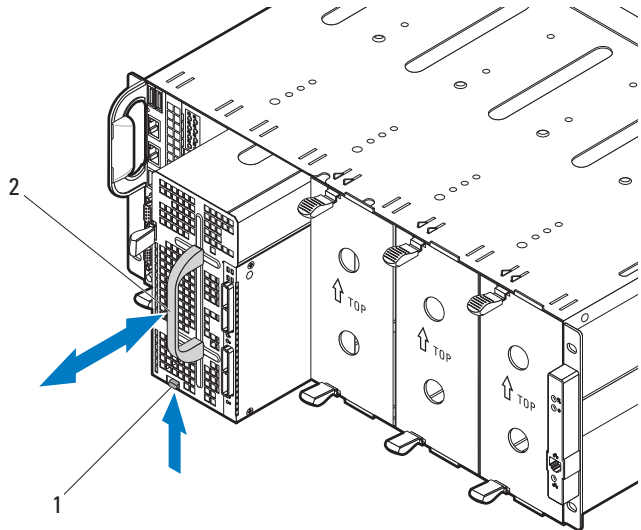
 **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized is not covered by warranty. Read and follow the safety instructions that came with the product.

 **CAUTION:** To ensure proper airflow in the system, if a sled is removed it should be immediately replaced with another sled or sled blank.

 **CAUTION:** Operating the system without a sled or sled blank installed can cause the enclosure to overheat. See "Installing a Double-Wide Sled Blank" on page 190.

- 1 Pull and hold the storage sled release tab at the bottom of the sled to disengage the sled from the server enclosure. See Figure 3-6.
- 2 Using the handle, slide the sled out of the enclosure. See Figure 3-6.

Figure 3-6. Removing and Installing a C8000XD Storage Sled



1 release tab


2 handle

Installing a Storage Sled

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized is not covered by warranty. Read and follow the safety instructions that came with the product.

- 1 Orient the sled so that the release tab is in the bottom of the sled. See Figure 3-6.
- 2 Slide the sled into the enclosure until the sled is fully seated and the tab engages and locks the sled in place.

Power Sled

 **NOTE:** This section applies to PowerEdge C8000 server enclosure with internal power source.

Enclosure Power Guidelines


Observe the following guidelines when connecting power to the enclosure:

- Always connect the enclosure's AC power sockets to a single power source, switch, or PDU.
- Make sure to install the power sleds and connect power to the enclosure before you install any other sled.

Power Sled Installation Guidelines

Follow these guidelines when installing power sleds.

- If a power supply is removed from the enclosure and the power supply number in the enclosure is less than the required number of power supplies, all sleds in the enclosure will be throttled until the failed PSU module is replaced. For example, in a 2+2 PSU configuration, if three PSU modules fail, it would trigger the sleds in the enclosure to throttle. When the failed PSU modules are replaced the enclosure exits power throttling mode and resume operating normally.

 **NOTE:** Throttling reduces power consumption of the sled modules by changing the processor duty cycle, thereby reducing sled performance. When a throttling event occurs the event is logged in the System Event Log (SEL). See the *Using the Baseboard Management Controller Guide* at dell.com/support/manuals for more information.

- The following table lists the supported configuration where power supply redundancy is guaranteed.


 **NOTE:** Configurations higher than indicated in the table may change the power supply mode to non-redundant. In non-redundant mode, if the power requirement exceeds the installed system power capacity, BIOS will throttle the processors. If CPU power capping is enabled, throttling can occur on processors that exceed the cap value. See "Power Management" on page 78 for more information.

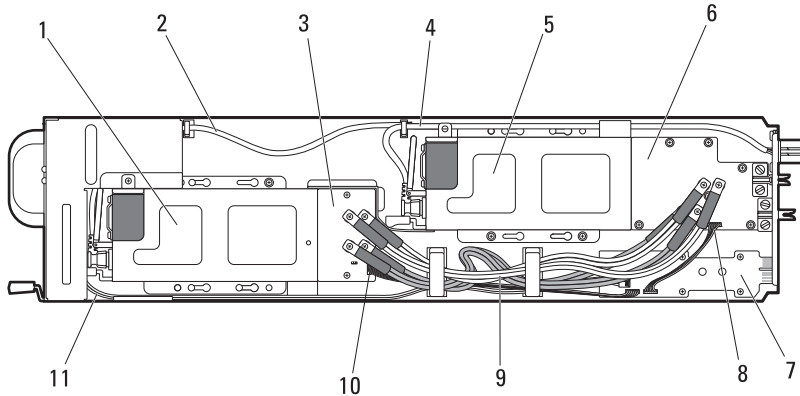
Table 3-1. PSU and Power Sled Support Matrix

PSU Config	Max. Power	Redundant Power	Sled Shutdown	Maintenance Conditions
4+0	5600 W	Not supported	Required	Shut down all sleds in the enclosure before removing or replacing a power sled(s).
3+1	4200 W	Supported	Required	Shut down all sleds in the enclosure before removing or installing a power sled(s).
2+2	2800 W	Supported	Not required	Power sleds can be removed or replaced without powering off the sled(s) in the enclosure.
2+1	2800 W	Supported	Required	Shut down all sleds in the enclosure before removing or replacing the power sled with two PSU modules capacity.
2+0 ^a	2800 W	Not supported	Required	Shut down all sleds in the enclosure before removing or replacing a power sled(s).
1+1	1400 W	Supported	Not required	Power sled can be removed or replaced without powering off the sled in the enclosure.

a. In a 2+0 PSU configuration, a power sled blank or a C8220 compute sled must be installed in the adjacent unoccupied bay to maintain proper cooling airflow in the enclosure.

Inside a Power Sled


Figure 3-7. Inside a Power Sled





- | | | | |
|----|---|------|---------------------------|
| 1 | PSU2/4 module assembly | 2, 4 | AC power cable |
| 3 | front power distribution board | 5 | PSU1/3 module assembly |
| 6 | back power distribution board | 7 | power interposer board |
| 8 | back power distribution board signal cable | 9 | power distribution cables |
| 10 | front power distribution board signal cable | 11 | LED cable |

Removing a Power Sled


- ⚠ **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized is not covered by warranty. Read and follow the safety instructions that came with the product.
- ⚠ **CAUTION:** To ensure proper airflow in the system, if a sled is removed it should be immediately replaced with another sled or sled blank.
- ⚠ **CAUTION:** Operating the system with a power sled removed for extended periods of time can cause the system to overheat.

 **WARNING:** The PSU modules in the power sled may produce high voltages and energy hazards, which can cause bodily harm. Only trained service technicians are authorized to remove any components inside the power sled.

 **WARNING:** To reduce the risk of personal injury from hot surfaces, observe the thermal labels on each PSU module. You can also consider wearing protective gloves.

 **WARNING:** To reduce the risk of personal injury from electric shock hazards, do not open the PSU modules. There are no serviceable parts inside the PSU modules.

 **CAUTION:** Remove and replace only one power sled at a time.

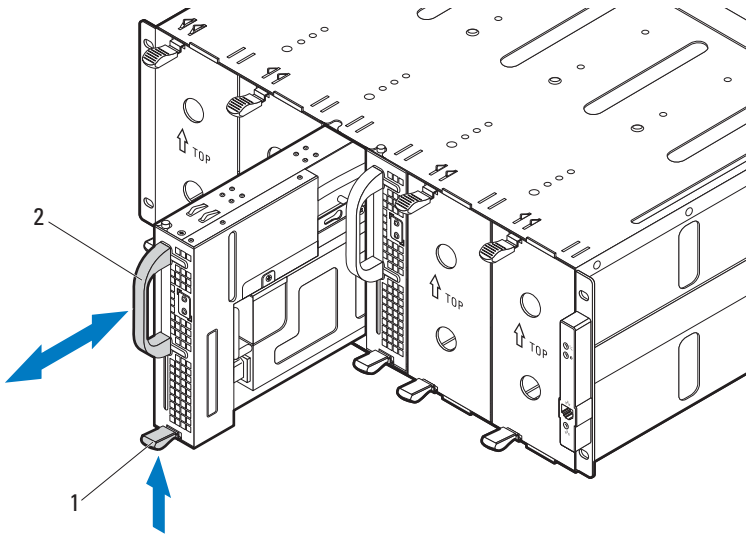
 **NOTE:** The wattage of a PSU module is listed on its regulatory label.

- 1 Power down all sled(s) in the server enclosure using OS commands or the Baseboard Management Controller, and ensure the sled's power is off.

For power sleds in redundant configuration, you can remove and replace the power sled without shutting down the compute sleds in the enclosure. See Table 3-1 for the power sled maintenance conditions.

- 2 Locate the power sled to be removed or the power sled that contains the failed power supply module. If a power supply module is faulty the status indicator lights up amber.
- 3 Wait one minute and then verify that the indicators on the enclosure and power sled are extinguished.
- 4 Pull up on the power sled release latch at the bottom of the sled to disengage the sled from the server enclosure. See Figure 3-8.
- 5 Using the handle, slide the sled out of the enclosure. See Figure 3-8.

Figure 3-8. Removing and Installing a Power Sled



1 release latch

2 handle

Installing a Power Sled

⚠ CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized is not covered by warranty. Read and follow the safety instructions that came with the product.

- 1 Orient the sled so that the release latch is at the bottom of the sled. See Figure 3-8.
- 2 Slide the new sled into the enclosure until the sled is fully seated and the release latch snaps into place. See Figure 3-8.

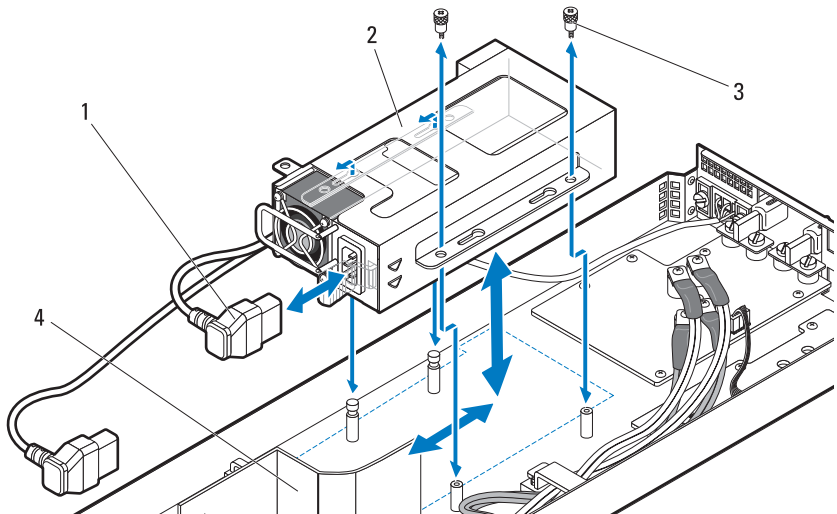
Removing the PSU1/3 Module Assembly

⚠ CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized is not covered by warranty. Read and follow the safety instructions that came with the product.

✎ NOTE: In addition to supplying power to the system, the PSU modules also have internal fans that provide thermal cooling for the PSU modules in the power sleds. A PSU module must be replaced if an internal fan failure occurs.

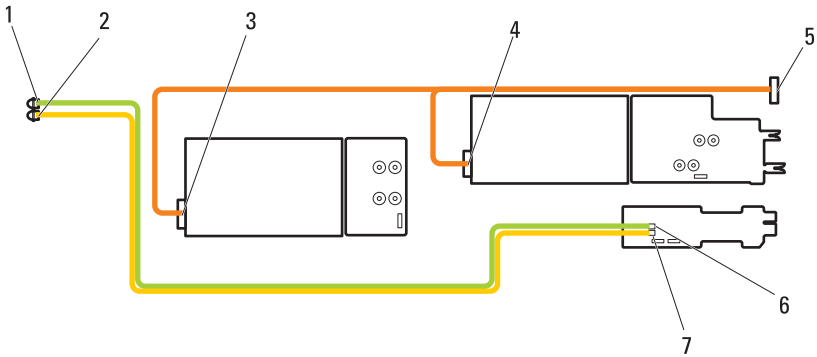
- 1 Remove the power sled. See "Removing a Power Sled" on page 198.
- 2 Remove the two screws securing the PSU1/3 module assembly. See Figure 3-9.
- 3 Slide the module assembly back to free it from the metal guides on the sled tray. See Figure 3-9.
- 4 Lift the module assembly from the sled tray and then disconnect the power cable from the power supply. See Figure 3-9.
- 5 Remove the module assembly from the sled tray. See Figure 3-9.

Figure 3-9. Removing and Installing a PSU1/3 Module Assembly




- | | | | |
|---|-----------------|---|------------------------|
| 1 | PSU power cable | 2 | PSU1/3 module assembly |
| 3 | thumbscrews (2) | 4 | air baffle |

Figure 3-10. Cable Routing for PSU1/3 Module Assembly




- | | | | |
|---|---|---|---|
| 1 | PSU1/3 status indicator | 2 | PSU2/4 status indicator |
| 3 | power connector on PSU2/4 module | 4 | power connector on PSU1/3 module |
| 5 | power cable | 6 | PSU LED connector on power interposer board |
| 7 | PSU LED connector on power interposer board | | |


Installing the PSU1/3 Module Assembly

 **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized is not covered by warranty. Read and follow the safety instructions that came with the product.


- 1 Connect the power cable to the new PSU module. See Figure 3-10 for cable routing.
- 2 Place the PSU module assembly on top of the sled tray.
- 3 Lower the module assembly so that the metal guides on the sled tray fit into the slots on the power supply bracket.
- 4 Slide the module assembly forward until the metal guides engage into the slots on the PSU bracket and ensure that the module assembly is fully seated into the back power distribution board.

 **NOTE:** Make sure the air baffle is properly seated and the power cable is neatly tucked into place. See Figure 3-9.

- 5 Replace the two screws securing the module assembly to the sled tray. See Figure 3-9.

 **NOTE:** After installing a power sled with a new PSU module, allow several seconds for the system to recognize the power supply and to determine if it is working properly. The status indicator turns green to signify that the module is functioning properly.

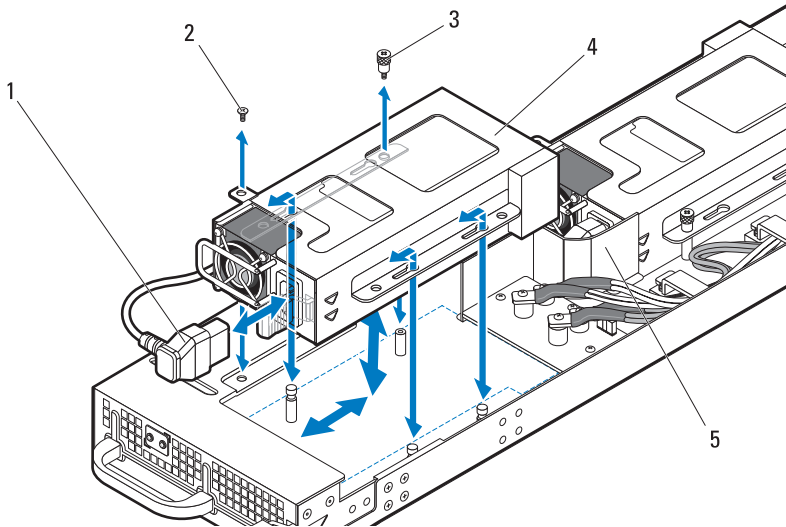
Removing the PSU2/4 Module Assembly

 **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized is not covered by warranty. Read and follow the safety instructions that came with the product.

- 1 Remove the power sled. See "Removing a Power Sled" on page 198.
- 2 Remove the screw and thumbscrew securing the PSU2/4 module assembly. See Figure 3-11.
- 3 Slide the module assembly back to free it from the metal guides on the sled tray.

- 4 Lift the module assembly from the sled tray and then disconnect the power cable from the power supply. See Figure 3-11.
- 5 Remove the module assembly from the sled tray. See Figure 3-11.

Figure 3-11. Removing and Installing a PSU2/4 Module Assembly



- | | | | |
|---|-----------------|---|------------------------|
| 1 | PSU power cable | 2 | screw |
| 3 | thumbscrew | 4 | PSU2/4 module assembly |
| 5 | air baffle | | |

Installing the PSU2/4 Module Assembly



CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized is not covered by warranty. Read and follow the safety instructions that came with the product.

- 1 Connect the power cable to the new PSU module. See Figure 3-10 for cable routing.
- 2 Position the PSU2/4 module assembly on top of the sled tray.

- 3 Slide the module assembly forward until the metal guides engage into the slots on the PSU bracket and ensure that the module assembly is fully seated into the front power distribution board.



NOTE: Make sure the air baffle is properly seated and the power cable is neatly tucked into place. See Figure 3-11.

- 4 Replace the screws securing the module assembly to the sled tray. See Figure 3-11.

Removing the PSU Module



CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized is not covered by warranty. Read and follow the safety instructions that came with the product.

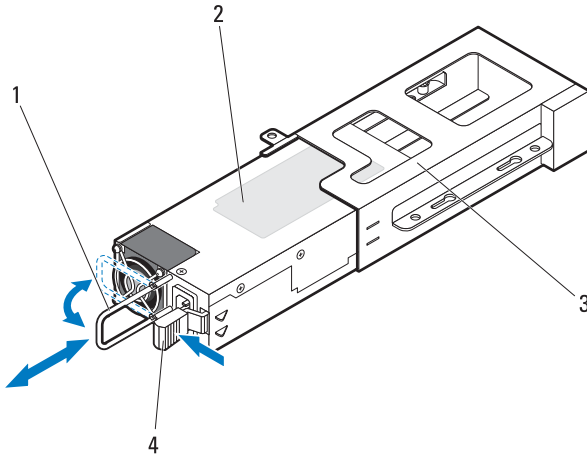


NOTE: In addition to supplying power to the system, the PSU modules also have internal fans that provide thermal cooling for the PSU modules in the power sleds. A PSU module must be replaced if an internal fan failure occurs.

The installation and removal procedures of a power supply module on a PSU1/3 and PSU2/4 module assembly are similar.

- 1 Remove the power sled. See "Removing a Power Sled" on page 198.
- 2 Remove the PSU module assembly containing the failed power supply. See "Removing the PSU1/3 Module Assembly" on page 201 or "Removing the PSU2/4 Module Assembly" on page 203.
- 3 Pull open the handle on the PSU module. See Figure 3-12.
- 4 Press down on the release lever and pull the module out of the bracket. See Figure 3-12.

Figure 3-12. Removing and Installing a PSU Module



- | | | | |
|---|-------------|---|---------------|
| 1 | handle | 2 | PSU module |
| 3 | PSU bracket | 4 | release lever |

Installing the PSU Module


CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized is not covered by warranty. Read and follow the safety instructions that came with the product.

- 1 Slide the new PSU module into the PSU bracket. See Figure 3-12.
- 2 Close the handle on the PSU module. See Figure 3-12.
- 3 Replace the PSU module on the sled tray. See "Installing the PSU1/3 Module Assembly" on page 203 or "Installing the PSU2/4 Module Assembly" on page 204.


NOTE: After installing a power sled with a new PSU module, allow several seconds for the system to recognize the power supply and to determine if it is working properly. The status indicator turns green to signify that the module is functioning properly.


Fan Modules

The PowerEdge C8000 server enclosure includes three pairs of hot-swappable fan modules that provide the system with redundant cooling source. Each fan module contains two separate cooling fans. All three fan modules must be installed at all times to ensure proper cooling.

 **NOTE:** If a fan module is removed from the enclosure, all sleds in the enclosure will be throttled until the fan module is replaced. If two fan modules fail at the same time and are not replaced within **90 seconds**, the enclosure will shutdown automatically. For more information on troubleshooting a fan module(s), see the "Troubleshooting Enclosure Fan Modules" on page 257.

Removing a Fan Module

 **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized is not covered by warranty. Read and follow the safety instructions that came with the product.

 **CAUTION:** To ensure proper airflow in the system, if a fan module is removed it should be immediately replaced with another module.

 **WARNING:** Replace a fan module within 90 seconds to avoid system shutdown.

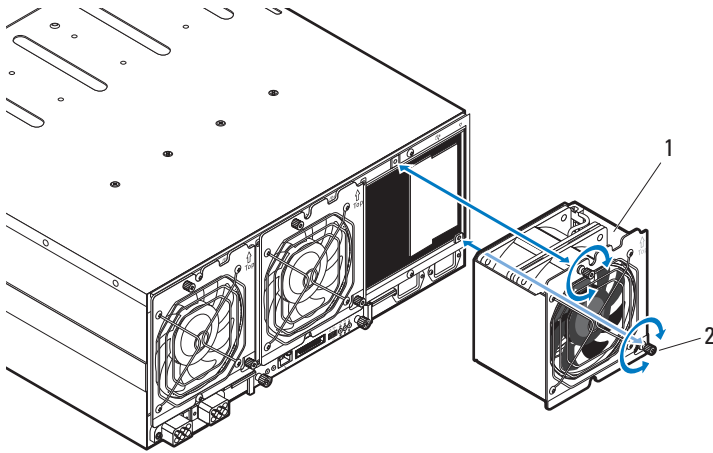
- 1 Identify the failed fan module using the back-panel fan module indicators. See Figure 1-14.

 **CAUTION:** Use caution when handling the fan module until the fan blades stop spinning.

 **WARNING:** When removing the fan module, keep your hands and fingers away from the spinning fan blades.

- 2 Loosen the two thumbscrews securing the fan module you wish to replace.
- 3 Pull out the fan module from the fan bay. See Figure 3-13.

Figure 3-13. Removing and Installing the Fan Module



1 fan module

2 thumbscrews (2)

Installing a Fan Module

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized is not covered by warranty. Read and follow the safety instructions that came with the product.

- 1 Inspect the fan for debris before installing the fan in the fan bay.
- 2 Slide the fan module into the fan bay until it is fully seated. See Figure 3-13.
- 3 Tighten the two thumbscrews to secure the fan module. See Figure 3-13.

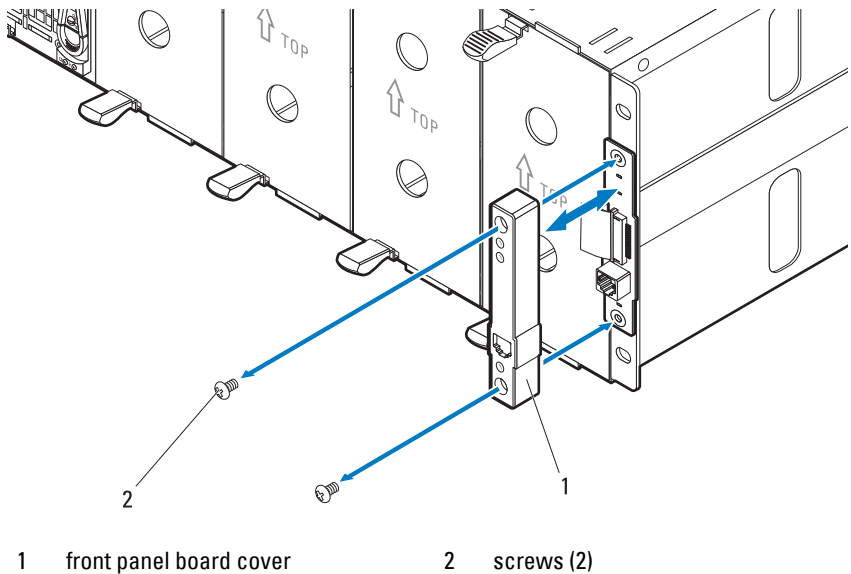
Front Panel Board

Removing the Front Panel Board

⚠ CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized is not covered by warranty. Read and follow the safety instructions that came with the product.

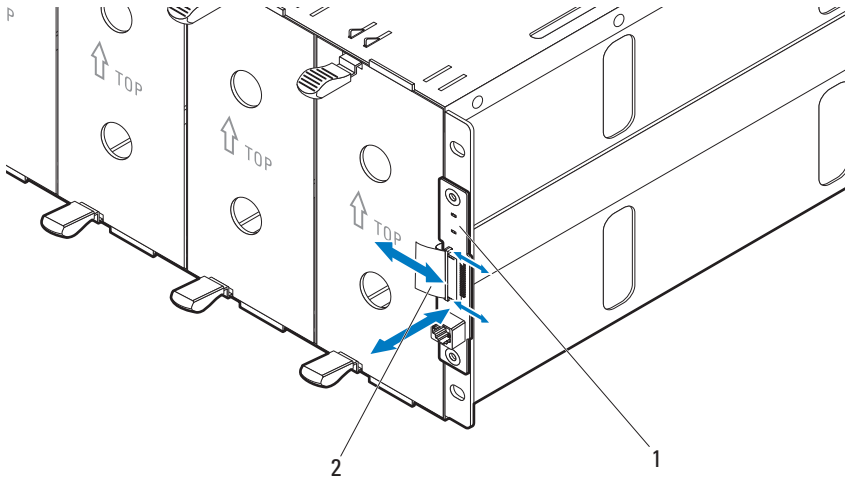
- 1 Remove the two screws securing the front panel board cover. See Figure 3-14.
- 2 Remove the cover from the enclosure.

Figure 3-14. Removing and Installing the Front Panel Board Cover



- 3 Disconnect the front panel board cable. See Figure 3-15.
- 4 Remove the front panel board from the enclosure. See Figure 3-15.

Figure 3-15. Removing and Installing the Front Panel Board



1 front panel board

2 front panel board cable

Installing the Front Panel Board

⚠ CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized is not covered by warranty. Read and follow the safety instructions that came with the product.

- 1 Attach the new front panel board to its enclosure standoffs. See Figure 3-15.
- 2 Connect the front panel board cable to the board. See Figure 3-15.
- 3 Position the front panel board cover over the board. See Figure 3-14
- 4 Replace the two screws securing the front panel board cover to the enclosure. See Figure 3-14.

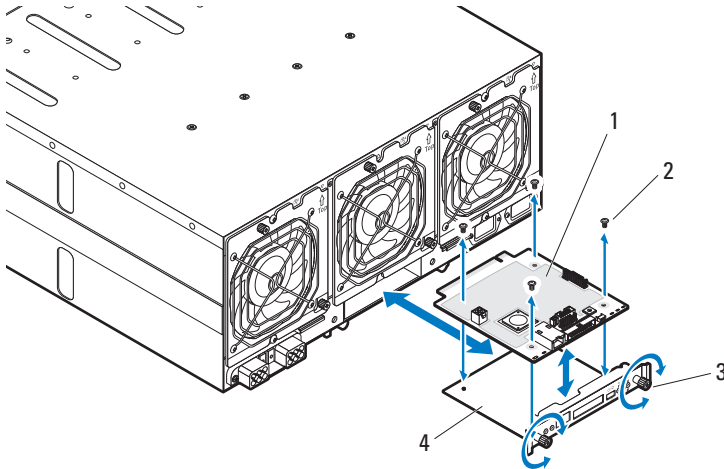
Fan Controller Board

Removing the Fan Controller Board

⚠ CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized is not covered by warranty. Read and follow the safety instructions that came with the product.

- 1 Loosen the two thumbscrews that secure the fan controller board tray to the server enclosure. See Figure 3-16.
- 2 Pull out the fan controller board tray from the enclosure.
- 3 Remove the four screws securing the fan controller board.
- 4 Remove the fan controller board from its tray. See Figure 3-16.

Figure 3-16. Removing and Installing the Fan Controller Board



- | | | | |
|---|----------------------|---|---------------------------|
| 1 | fan controller board | 2 | screws (4) |
| 3 | thumbscrews (2) | 4 | fan controller board tray |

Installing the Fan Controller Board



CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized is not covered by warranty. Read and follow the safety instructions that came with the product.



NOTE: If you are installing a new fan controller board, prior to upgrading your system, download and install the latest fan controller board firmware version from [dell.com/support](https://www.dell.com/support). Follow the instructions included in the file download to install the update on your system.

- 1 Place the fan controller board into the fan controller bay. See Figure 3-16.
- 2 Replace the four screws securing the fan controller board to its tray. See Figure 3-16.
- 3 Insert the fan controller board assembly into its enclosure bay.
- 4 Secure the fan controller board assembly to the enclosure with the two thumbscrews. See Figure 3-16.

Backplane/Fan Bay Cage

Removing the Backplane/Fan Bay Cage

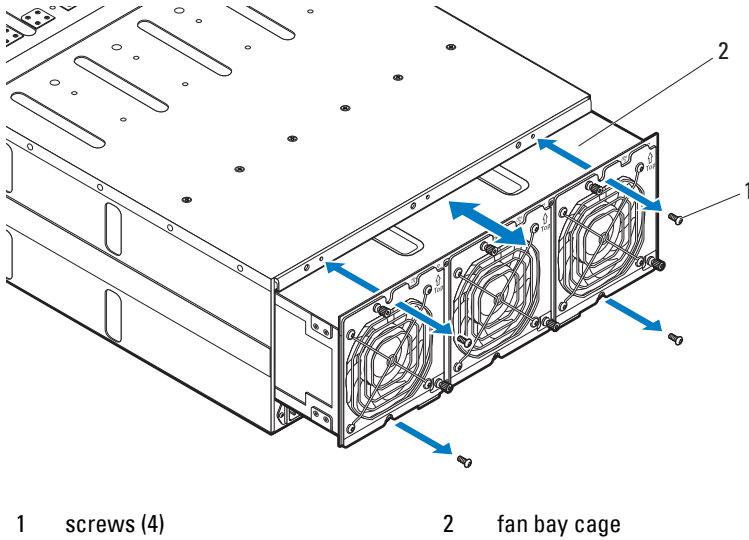


CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized is not covered by warranty. Read and follow the safety instructions that came with the product.

- 1 Disconnect the server enclosure from the electrical outlet or PDU.
- 2 Remove the fan controller board. See "Removing the Fan Controller Board" on page 211.

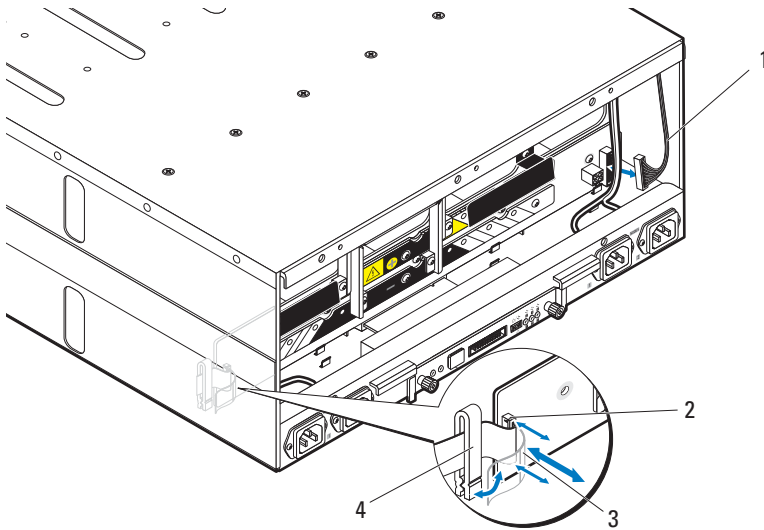
- 3 Remove the four screws securing the fan bay cage and pull it out of the server enclosure. See Figure 3-17.

Figure 3-17. Removing and Installing the Fan Bay Cage



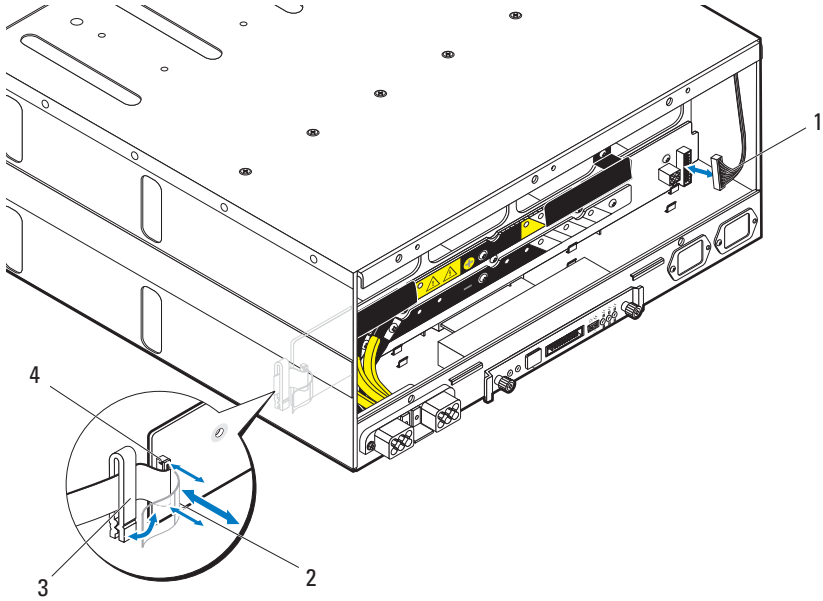
- 4 Open the front panel board cable retaining clip and disconnect the cable from the power management board. See Figure 3-18. For server enclosure with external power source, see Figure 3-19.
- 5 Disconnect the fan cable from the power management board. See Figure 3-18. For server enclosure with external power source, see Figure 3-19.

Figure 3-18. Removing and Installing System Cables in Server Enclosure with Internal Power Source



- | | | | |
|---|-------------------------|---|-----------------------------|
| 1 | fan cable | 2 | front panel board connector |
| 3 | front panel board cable | 4 | clip retaining cable |

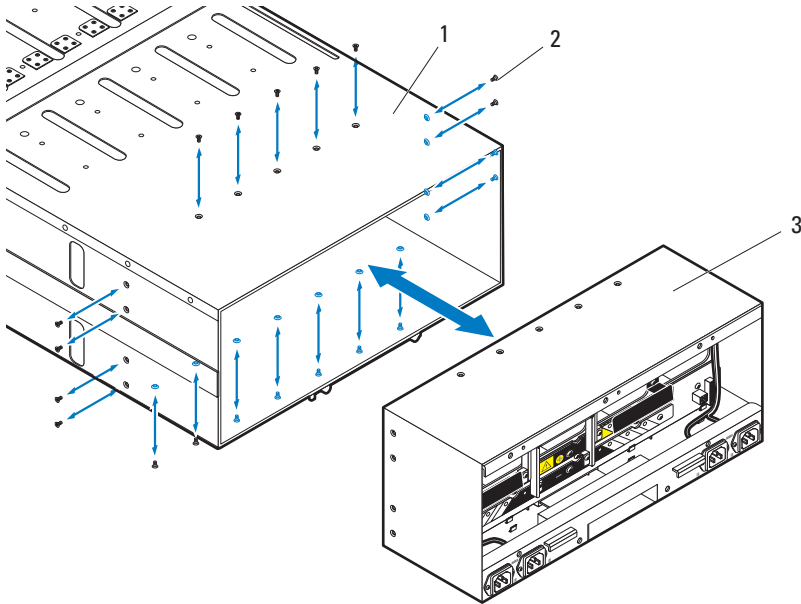
Figure 3-19. Removing and Installing System Cables in Server Enclosure with External Power Source



- | | | | |
|---|----------------------|---|-----------------------------|
| 1 | fan cable | 2 | front panel board cable |
| 3 | clip retaining cable | 4 | front panel board connector |

- 6 Remove the twenty screws securing the backplane cage and pull it out of the server enclosure. See Figure 3-20.

Figure 3-20. Removing and Installing the Backplane Cage



- | | | | |
|---|------------------|---|-------------|
| 1 | server enclosure | 2 | screws (20) |
| 3 | backplane cage | | |

Installing the Backplane/Fan Bay Cage

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized is not covered by warranty. Read and follow the safety instructions that came with the product.

- 1 Slide the new backplane cage into the enclosure until it is fully seated. See Figure 3-20.
- 2 Secure the backplane cage to the enclosure with the twenty screws. See Figure 3-20.

- 3 Connect the front panel board cable to the power management board and secure the cable in the retaining clip. See Figure 3-18. For server enclosure with external power source, see Figure 3-19.
- 4 Connect the fan cable to the power management board. See Figure 3-18. For server enclosure with external power source, see Figure 3-19.
- 5 Slide the new fan bay cage into the enclosure until it is fully seated. See Figure 3-17.
- 6 Secure the fan bay cage to the enclosure with the four screws. See Figure 3-17.
- 7 Reconnect the enclosure to its electrical outlet or PDU.

PDU Power Supply

The external PDU includes six power supply modules. All six power supply modules must remain installed. Use the following procedure to remove and replace a power supply module from the external PDU.



NOTE: The PDU device illustrations in this section is for reference only and may not reflect the appearance of the actual device.

PDU Power Supply Indicator Code

The status indicator on the front of the power supply lights green to indicate a valid power source is connected to the power supply and that power supply is operational. An amber light indicates that a power supply failure event occurred.

Removing a PDU Power Supply



CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized is not covered by warranty. Read and follow the safety instructions that came with the product.



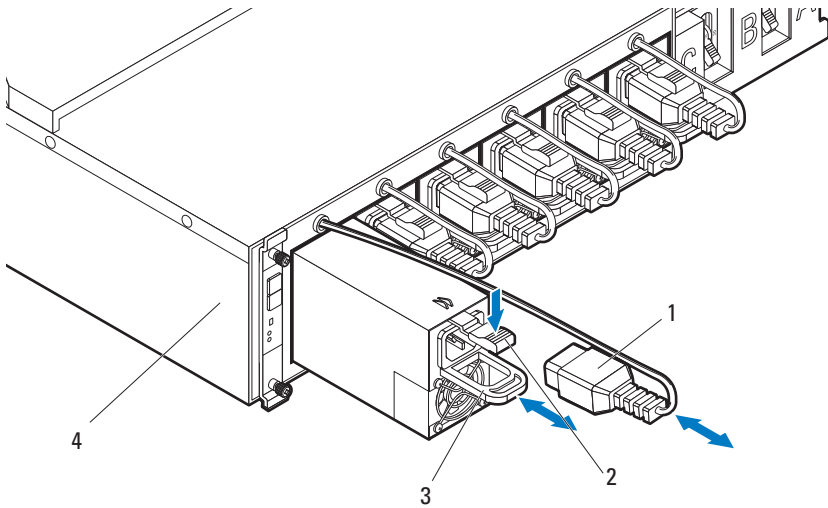
CAUTION: To ensure proper airflow in the PDU, if a PSU module is removed it should be immediately replaced with another module.



NOTE: The PDU power supply replacement procedure are provided as reference only. See PDU device documentation for more information.

- 1 Locate the failed power supply module. If a power supply module is faulty the status indicator lights up amber.
- 2 Disconnect the power cable from the power supply module. See Figure 3-21.
- 3 Grasp the power supply handle and press the release latch. See Figure 3-21.
- 4 Slide the power supply module out of its bay. See Figure 3-21.

Figure 3-21. Removing and Installing a PDU Power Supply



- | | | | |
|---|---------------------|---|---------------|
| 1 | power cable | 2 | release latch |
| 3 | power supply handle | 4 | PDU device |

Installing a PDU Power Supply



CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized is not covered by warranty. Read and follow the safety instructions that came with the product.






- 1** Align the new power supply module with the power supply bay. See Figure 3-21.
- 2** Slide the power supply module into the bay until it is fully seated.
- 3** Connect the power cable to the power supply. Verify that the indicator on the front of the power supply lights. See Figure 3-21.

Rack Mount Configuration

Your PowerEdge C8000 server enclosure can be mounted in a four-post rack cabinet.

Installation Guidelines

Use the following safety guidelines to help ensure your own personal safety and to help protect your system and working environment from potential damage. See additional safety information included with your system.

-  **WARNING:** Whenever you need to lift the system, get others to assist you. To avoid injury, do not attempt to lift the system by yourself.
 -  **WARNING:** The system is not fixed to the rack or mounted on the rails. To avoid personal injury or damage to the system, you must adequately support the system during installation and removal.
 -  **WARNING:** To avoid a potential electrical shock hazard, a third wire safety grounding conductor is necessary for the rack installation. The rack equipment must provide sufficient airflow to the system to maintain proper cooling.
 -  **CAUTION:** Before you install the server enclosure into a rack, it is recommended that you remove all installed sled modules from the enclosure to reduce weight and avoid injury.
 -  **CAUTION:** To prevent possible damage to the server enclosure surface and sled modules, always place the server enclosure and sled modules on an antistatic mat or antistatic foam.
- Prepare an antistatic mat or antistatic foam to set the PowerEdge C8000 server enclosure on during the compute or storage sled removal process.
 - Ensure that proper airflow is provided to components in the rack.

Recommended Tools

Before you begin the installation tasks, ensure that you have the following items:

- #1 Phillips screwdriver
- #2 Phillips screwdriver
- Wrist grounding strap connected to ground
- Antistatic mat or antistatic foam

Installation Tasks

To install the rail and system into the rack, you need to perform the following tasks.

- 1 "Installing the Tool-Less Rail Solution in the Rack" on page 223
- 2 "Removing Sled Modules from the Server Enclosure" on page 228
- 3 "Installing the Server Enclosure into the Rack" on page 228
- 4 "Replacing Sled Modules in the Server Enclosure" on page 230
- 5 "Installing the External PDU into the Rack" on page 231
- 6 "Connecting the Power Cables" on page 237
- 7 "Connecting the Server Enclosure to a Rack PDU" on page 239
- 8 "Connecting the PDU to the Network" on page 243
- 9 "Powering Up the Systems" on page 246

Installing the Tool-Less Rail Solution in the Rack



NOTE: The rack rails are marked LEFT and RIGHT. The rail marked "LEFT" attaches to the left rack posts and the rail marked "RIGHT" attaches to the right rack posts when facing the front of the rack.



NOTE: The rail pegs must be flush with the rack posts to install properly.

- 1 Determine where to place the rails in the rack. Make sure there is enough space in the rack for the 4U server enclosure. In a standard rack, the height of a 4U chassis will span 12 rack post holes.
- 2 Use the marking indicated on the left and right sides of the rail to orient the rail correctly to the rack posts.
- 3 Attach the left rail and stopping bracket to the rack.
 - a Position left rail marked "LEFT" to align with its mounting holes on the rack posts.
 - b Press and hold the rail release button to open the latch on the front end of the rail. See Figure 4-1.
 - c Align the three pegs with the mounting holes on the front rack post. See Figure 4-1.
 - d Release the button when it engages to the front rack post. See Figure 4-1.

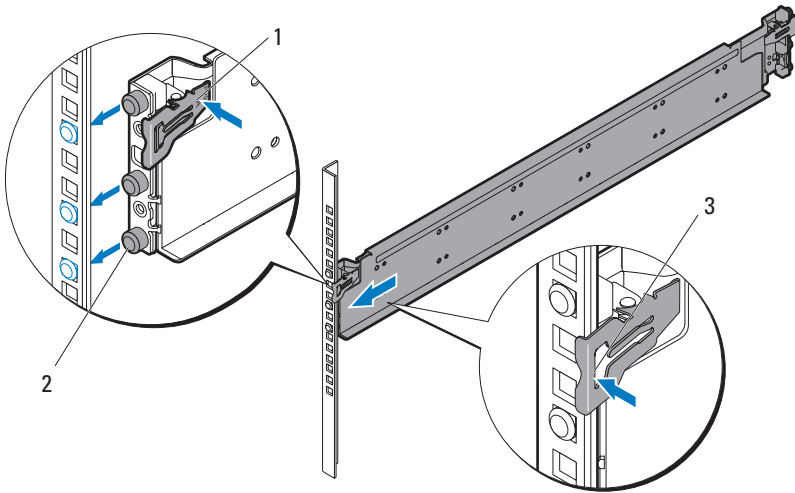


NOTE: Make sure the rail release button is engaged correctly.



NOTE: The rails can be used in both square-hole and round-hole racks.

Figure 4-1. Installing the Front End of the Rail



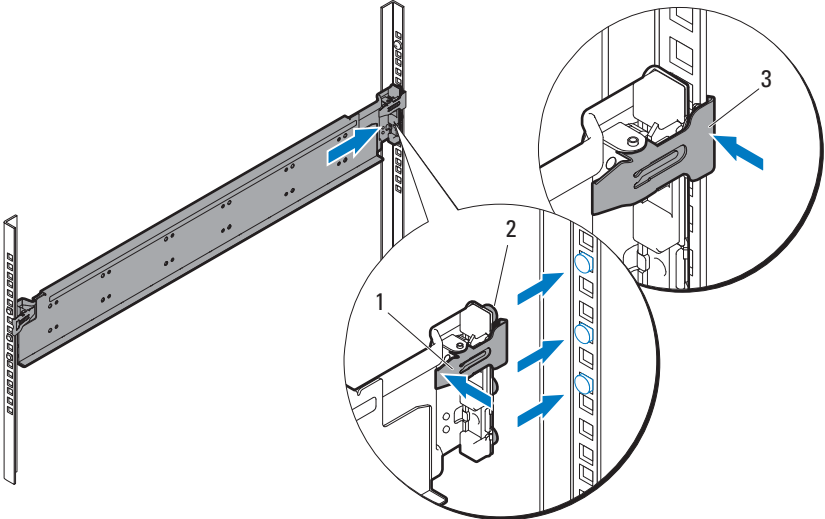
1 rail release button

2 rail pegs (3)

3 rack post

- e Press and hold the rail release button to open the latch on the back end of the rail. See Figure 4-2.
- f Align the three pegs with the mounting holes on the back rack post. See Figure 4-2.
- g Release the button when it engages to the back rack post. See Figure 4-2.

Figure 4-2. Installing the Back End of the Rail

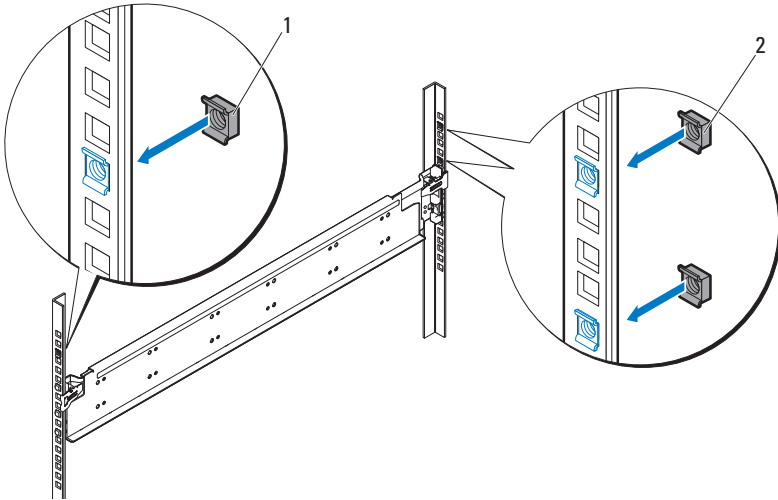


- 1 rail release button
- 3 rack post

- 2 rail pegs (3)

- h Install one cage nut to the front rack post and two cage nuts to the back rack post. See Figure 4-3.

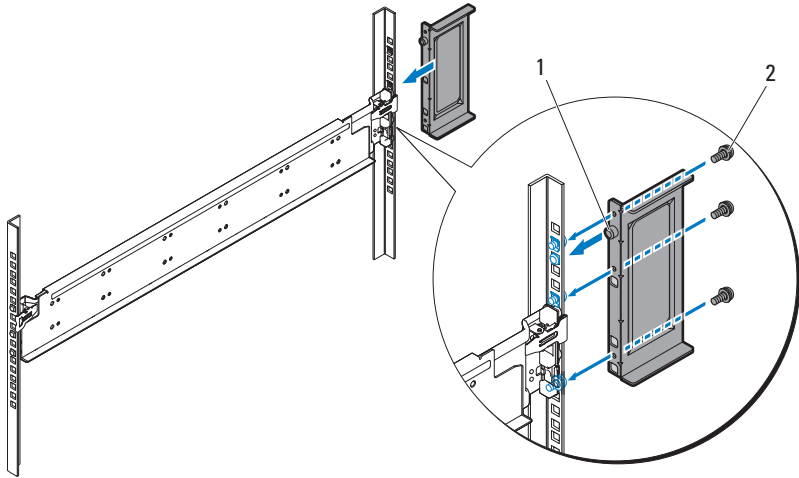
Figure 4-3. Installing the Cage Nuts



1, 2 cage nuts (3)

- i Align the stopping bracket to the back rack post and secure with the three 10-32 screws. Apply 35 in-lbs of torque to the screws. See Figure 4-4.

Figure 4-4. Installing the Stopping Bracket



1 stopping bracket

2 10-32 screws (3)

- 4 Attach the right rail and stopping bracket to the rack.

Use the same procedure to install the right rail and stopping bracket to the right rack posts.



NOTE: To remove the rails, press and hold on the rail release button on the end piece midpoint and unseat each rail.




Removing Sled Modules from the Server Enclosure

Before you install a PowerEdge C8000 server enclosure into a rack, it is recommended that you remove all sled modules from the enclosure to reduce system weight and avoid injury.

For instructions on removing components from the server enclosure, refer to the following sections.

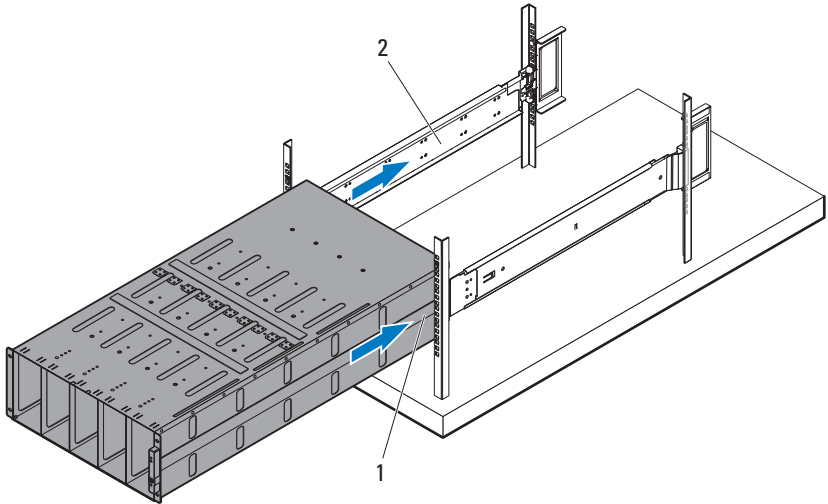
- "Removing a Double-Wide Sled Blank" on page 190
- "Removing a Single-Wide Sled Blank" on page 191
- "Removing a Compute Sled" on page 192
- "Removing a Storage Sled" on page 194
- "Removing a Power Sled" on page 198 (for server enclosure with internal power source only)

Installing the Server Enclosure into the Rack

-  **WARNING:** Whenever you need to lift the system, get others to assist you. To avoid injury, do not attempt to lift the system by yourself.
-  **CAUTION:** To ensure proper operation and cooling, all bays in the enclosure must be populated at all times with either a sled or with a sled blank.
-  **CAUTION:** To maintain proper system cooling, all empty hard-drive slots must have hard-drive blanks installed.

- 1 With assistance, align the server enclosure with the rails and push it fully into the rack. See Figure 4-5.

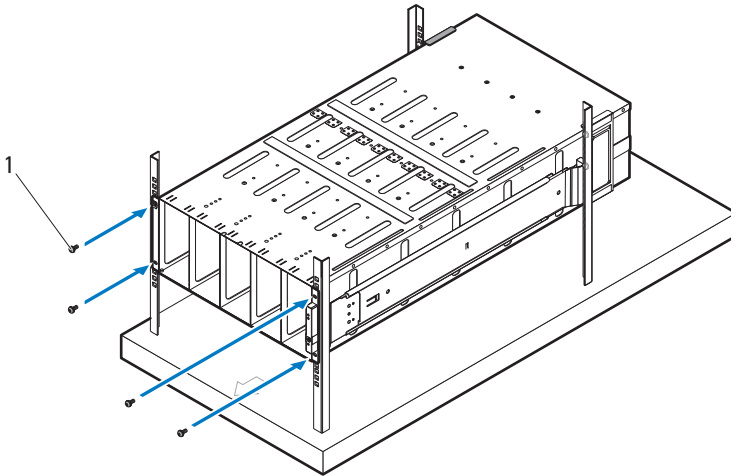
Figure 4-5. Installing the Server Enclosure



- 1 PowerEdge C8000 server enclosure
- 2 tool-less rails (2)

- 2 Secure the front of the enclosure to the rack posts with four 10-32 screws. See Figure 4-6.

Figure 4-6. Securing the Enclosure



- 1 10-32 screws (4)

Replacing Sled Modules in the Server Enclosure

For instructions on replacing sled modules in the server enclosure, refer to the following sections.

- "Installing a Double-Wide Sled Blank" on page 190
- "Installing a Single-Wide Sled Blank" on page 191
- "Installing a Compute Sled" on page 194
- "Installing a Storage Sled" on page 195
- "Installing a Power Sled" on page 200 (for server enclosure with internal power source only)

Installing the External PDU into the Rack

⚠ WARNING: Whenever you need to lift the system, get others to assist you. To avoid injury, do not attempt to lift the system by yourself.

🔗 NOTE: The PDU device illustrations are provided as reference only. See PDU device documentation for more information about the PDU device.

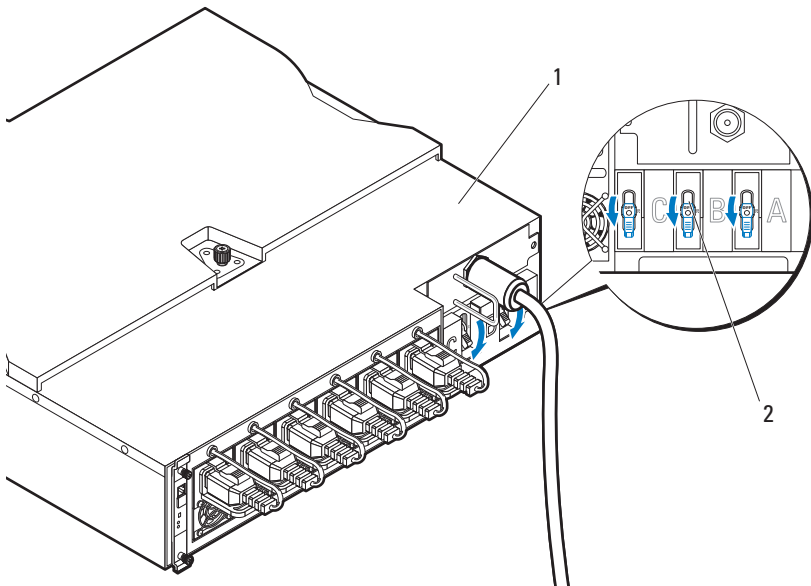
🔗 NOTE: The PDU mounting brackets are marked L and R. The rail marked "L" attaches to the left of the PDU device and the rail marked "R" attaches to the right of the PDU device.

⚠ WARNING: Do not connect or disconnect power cables to the PDU device while the PDU is energized.

⚠ WARNING: Turn off the PDU breaker switches to avoid potentially serious or fatal electric shock.

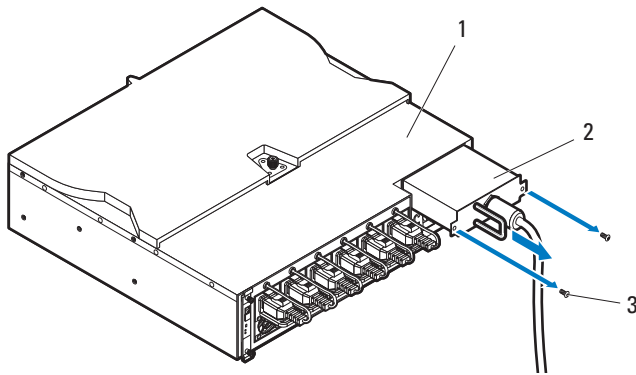
- 1 Power down the PDU.
 - a Turn off the PDU breaker switches by moving the A, B, and C breaker switches to the "OFF" position.

Figure 4-7. Turning off the PDU Breaker Switches



- 1 PDU device
 - 2 breaker switches (3)
- a Disconnect the PDU from the power source.
- 2 Remove the power cable interface box (PCIB) module.
 - a Remove the two screws securing the PCIB module.
 - b Grasp the PCIB handle and pull it out of it's bay.

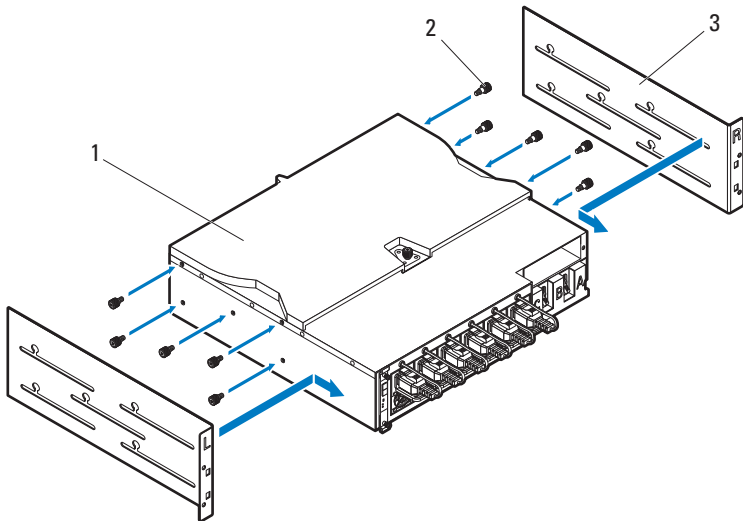
Figure 4-8. Removing the PCIB Module



- 1 PDU device
- 2 PCIB module
- 3 screw (2)

- 3** Attach the mounting brackets to the sides of the PDU.
 - a** Affix the ten screws to the left and right sides of the PDU. See Figure 4-9.
 - b** Position the left mounting bracket marked "L" to align the screw holes with the screws on the PDU and slide the mounting bracket toward the back of the PDU until it locks into place. See Figure 4-9.
 - c** Position the right mounting bracket marked "R" to align the screw holes with the screws on the PDU and slide the mounting bracket toward the back of the PDU until it locks into place. See Figure 4-9.

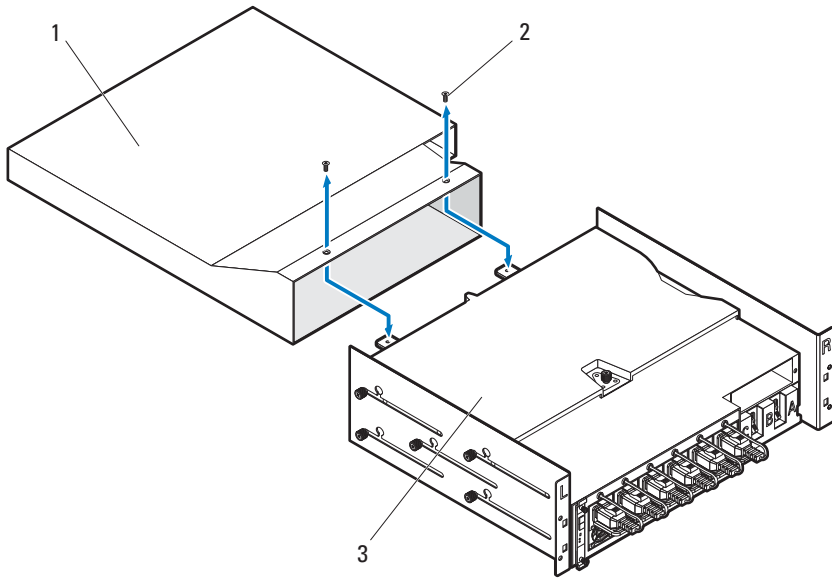
Figure 4-9. Installing the PDU Mounting Brackets



- | | | | |
|---|-----------------------|---|-------------|
| 1 | PDU device | 2 | screws (10) |
| 3 | mounting brackets (2) | | |

- 4 Install the snorkel to the PDU.
 - a Remove the air duct from the snorkel.
 - b Align the air duct with the front of the PDU. See Figure 4-10.
 - c Secure the air duct to the front of the PDU with the two screws. See Figure 4-10.

Figure 4-10. Installing the Snorkel Air Duct to the PDU

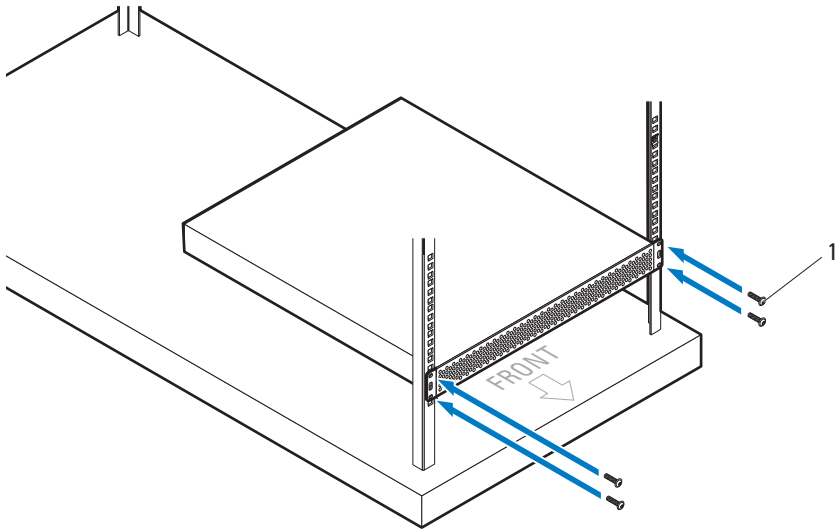


- 1 snorkel air duct
- 3 PDU device

- 2 screws (2)

- d Align the snorkel with the rack posts. See Figure 4-11.
- e Secure the snorkel to the rack posts with the four screws. See Figure 4-11.

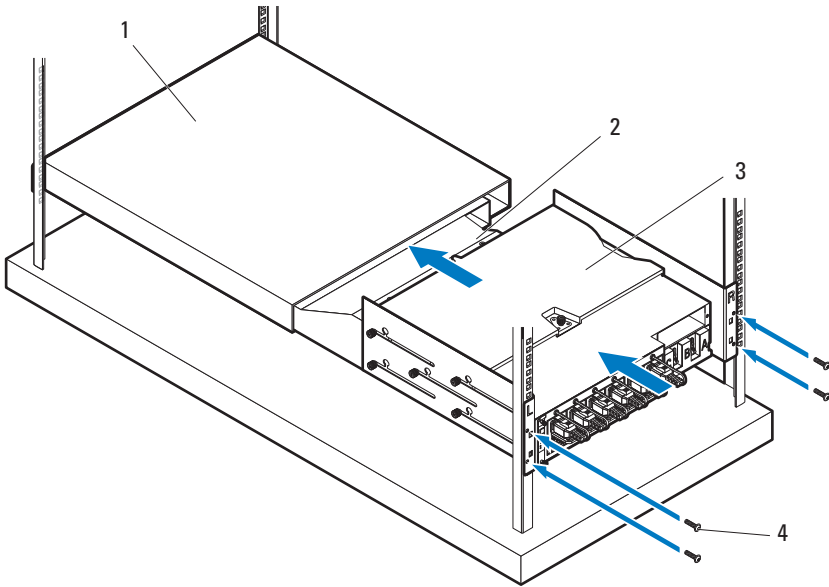
Figure 4-11. Installing the Snorkel



1 screws (4)

- 5 With assistance, slide the air duct into the bay and secure the back of the PDU to the rack posts with four screws. See Figure 4-12.

Figure 4-12. Installing the PDU



- 1 snorkel
- 3 PDU device

- 2 air duct
- 4 screws (4)

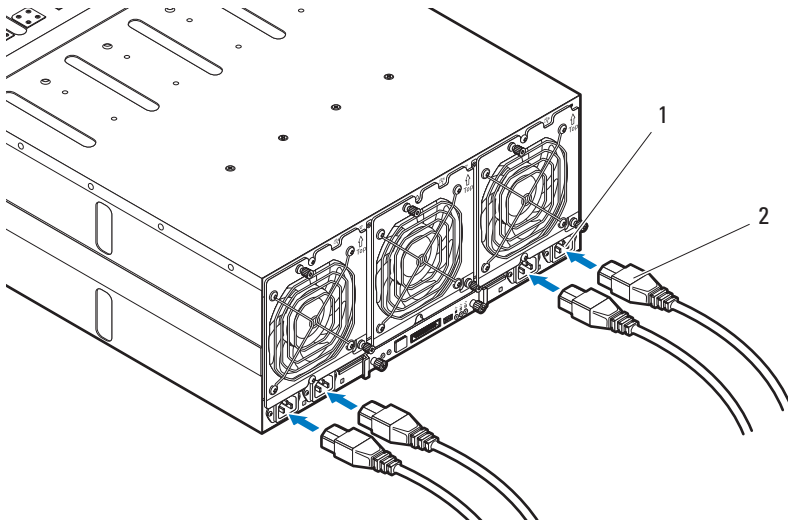
Connecting the Power Cables

This section includes instructions on how to connect the server enclosure with internal or external power source to an external PDU.

Connecting the Power Cables to the Server Enclosure with Internal Power Source

- 1 On the back of the server enclosure, connect the power cables to the AC power sockets. See Figure 4-13.

Figure 4-13. Connecting the Power Cables to the Server Enclosure with Internal Power Source



1 AC power sockets (2)

2 power cables (4)

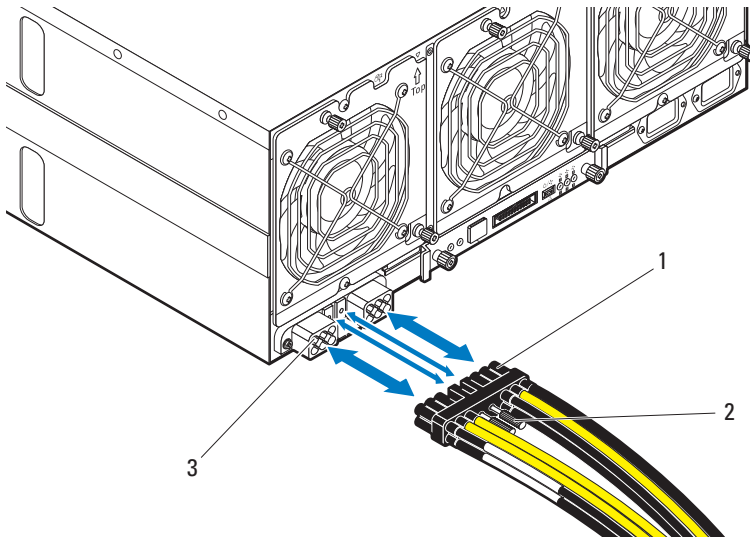
- 2 Plug the other end of the power cables into a grounded electrical outlet or a separate power source such as an uninterruptible power supply or the PDU. For instructions on how to connect the power cables to the rack PDU, see "Connecting the Server Enclosure to a Rack PDU" on page 239.

Connecting the Power Cable to the Server Enclosure with External Power Source

⚠ WARNING: Make sure power is turned off on all devices before making connections.

- 1 On the back of the server enclosure, connect the power cable to the DC power socket. See Figure 4-14.
- 2 Tighten the two center screws on the cable to secure the connection. See Figure 4-14.

Figure 4-14. Connecting the Power Cable to the Server Enclosure with External Power Source



1 power cable

2 screws (2)

3 DC power socket

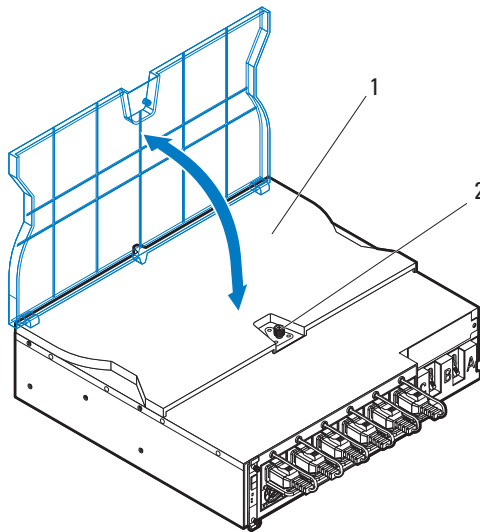
- 3 Plug the other end of the power cables into a separate power source such as a PDU. For instructions on how to connect the power cables to the rack PDU, see "Connecting the Server Enclosure to a Rack PDU" on page 239.

Connecting the Server Enclosure to a Rack PDU

⚠ WARNING: Do not connect or disconnect power cables to the PDU device while the PDU is energized. Turn off the PDU breaker switches to avoid potentially serious or fatal electrical shock. Move the PDU A, B, and C breaker switches to the "OFF" position.

- 1 Unlock the cable cover. See Figure 4-15.
- 2 Rotate the cover back and away from the PDU. See Figure 4-15.

Figure 4-15. Opening the PDU Cover



1 cable cover

2 lock

- 3 Depending on the type of power cable used, connect the server enclosure power cable to the PDU power bus bar or the power sockets.

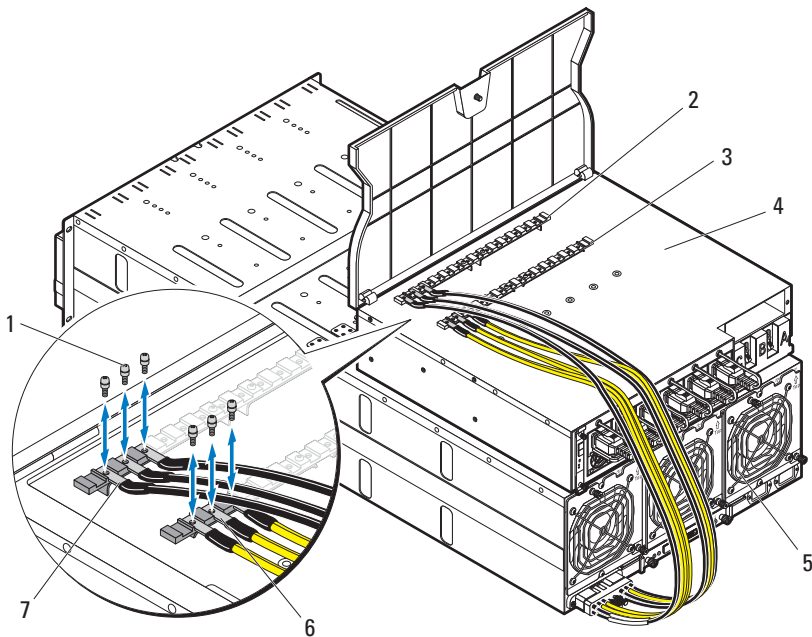
For connecting the power cables to the PDU's front power socket, go to step 6.

4 Attach the server enclosure(s) power cables to the PDU power bus bar.

NOTE: The PDU device supports a maximum of five PowerEdge C8000 server enclosures depending on the system configuration and power budget.

- a Secure the three black power cable lugs to the top power bus bar (GND) with three screws. See Figure 4-16.
- b Secure the three yellow power cable lugs to the bottom power bus bar (12 V) with three screws. See Figure 4-17.
- c For multiple server enclosures cable connection, see Figure 4-17.

Figure 4-16. Connecting a Single Server Enclosure to the PDU



1 screws (6)

3 power bus bar (12 V)

5 server enclosure

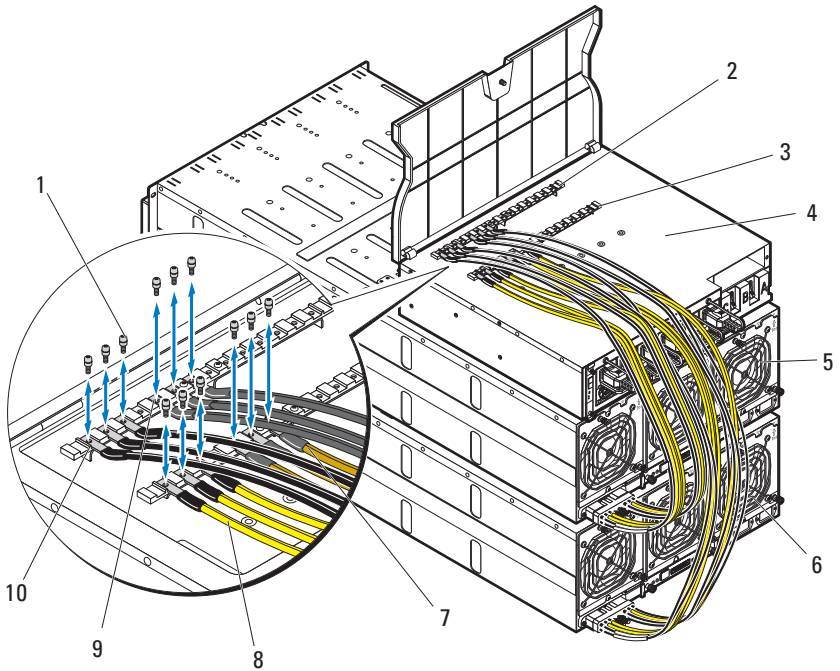
7 black power cables (3)

2 power bus bar (GND)

4 PDU device

6 yellow power cables (3)

Figure 4-17. Connecting Multiple Server Enclosures to the PDU



- | | | | |
|---|--|----|--|
| 1 | screws (12) | 2 | power bus bar (GND) |
| 3 | power bus bar (12 V) | 4 | PDU device |
| 5 | server enclosure 1 | 6 | server enclosure 2 |
| 7 | server enclosure 2 yellow power cables (3) | 8 | server enclosure 1 yellow power cables (3) |
| 9 | server enclosure 2 black power cables (3) | 10 | server enclosure 1 black power cables (3) |

5 Close the cable cover and secure to the PDU. See Figure 4-15.

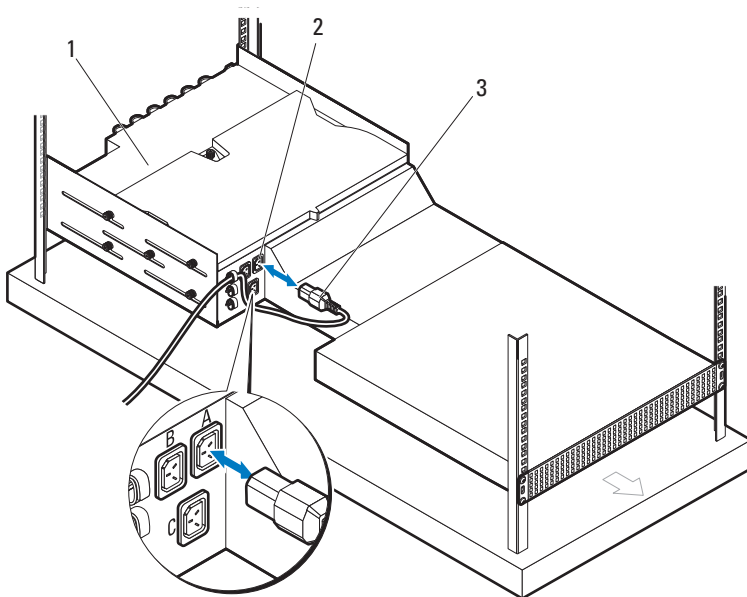
Connecting a Network Switch to a Rack PDU

CAUTION: The PDU device's A, B, and C power sockets are for network switches only. Do not connect server enclosure(s) or server(s) to these sockets.

WARNING: Exceeding 3 amps per outlet could cause sudden rack level power loss.

Connect the network switch power cable to one of the three PDU AC power sockets. See Figure 4-18.

Figure 4-18. Connecting the Network Switch Power Cable to the PDU

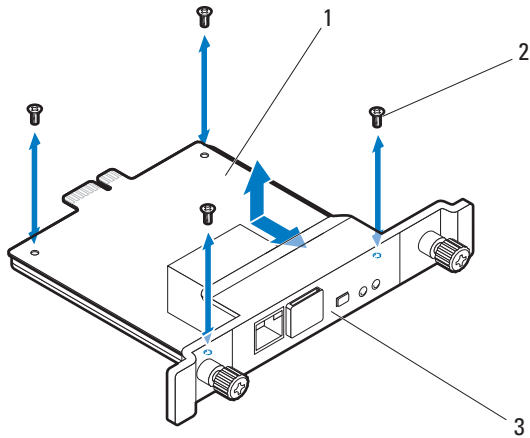


- 1 PDU device
- 2 AC power sockets (3)
- 3 network switch's power cable

Connecting the PDU to the Network

- 1 Install the power management controller (PMC) board into the PDU.
 - a Unpack the PMC kit.
 - b Slide the PMC board into the PMC tray. See Figure 4-19.
 - c Secure the PMC board to the PMC tray with the four screws. See Figure 4-19.

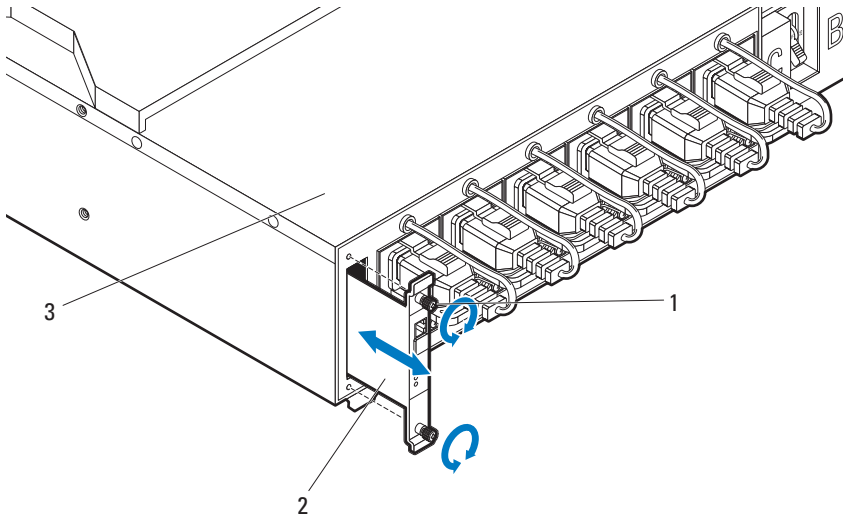
Figure 4-19. Installing the Power Management Controller Board



- 1 power management controller (PMC) board
- 2 screws (4)
- 3 PMC tray

- 2 Insert the PMC assembly into its enclosure bay. See Figure 4-20.
- 3 Secure the PMC assembly to the PDU with the two thumbscrews. See Figure 4-20.

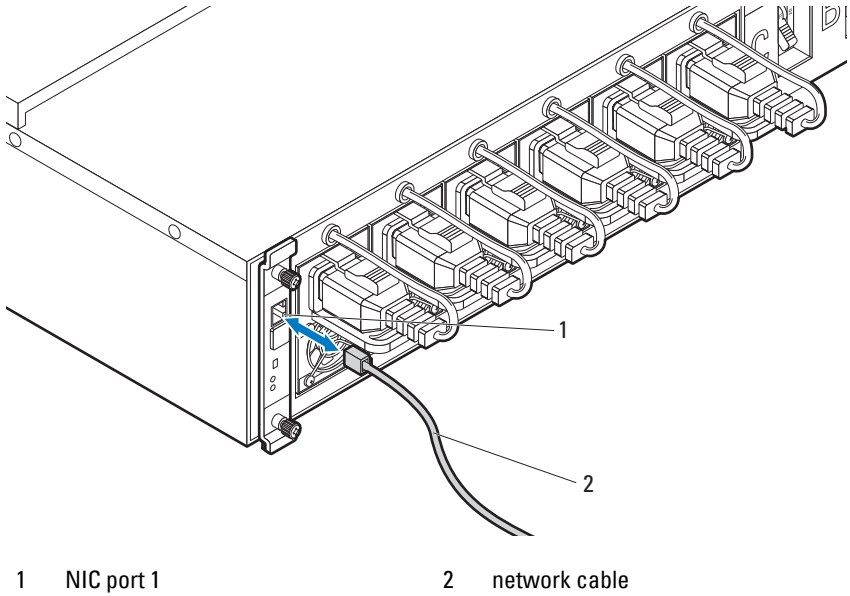
Figure 4-20. Installing the PMC Assembly



- | | | | |
|---|-----------------|---|--------------|
| 1 | thumbscrews (2) | 2 | PMC assembly |
| 3 | PDU device | | |

4 Connect the network cable to the NIC port 1. See Figure 4-21.

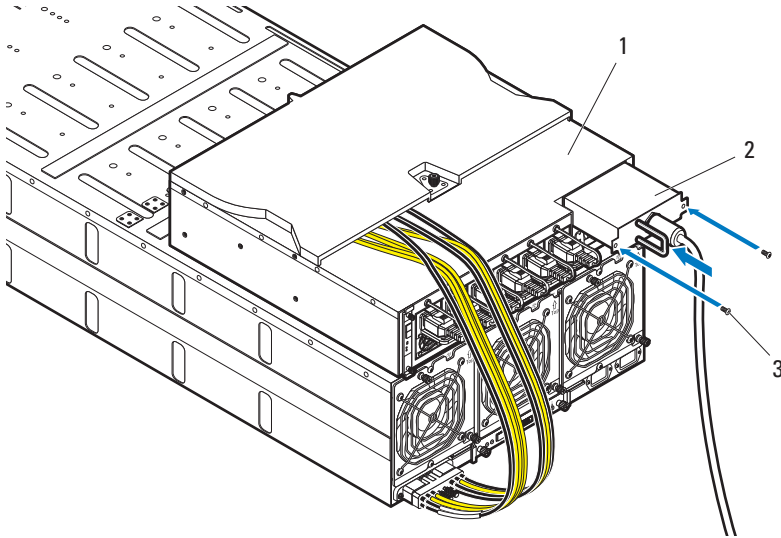
Figure 4-21. Connecting the Network Cable



Powering Up the Systems

- 1 Install the PCIB module into the PDU.
 - a Insert the PCIB module into the PCIB bay. See Figure 4-22.
 - b Secure the PCIB module to the PDU with the two screws. See Figure 4-22.

Figure 4-22. Installing the PCIB Module

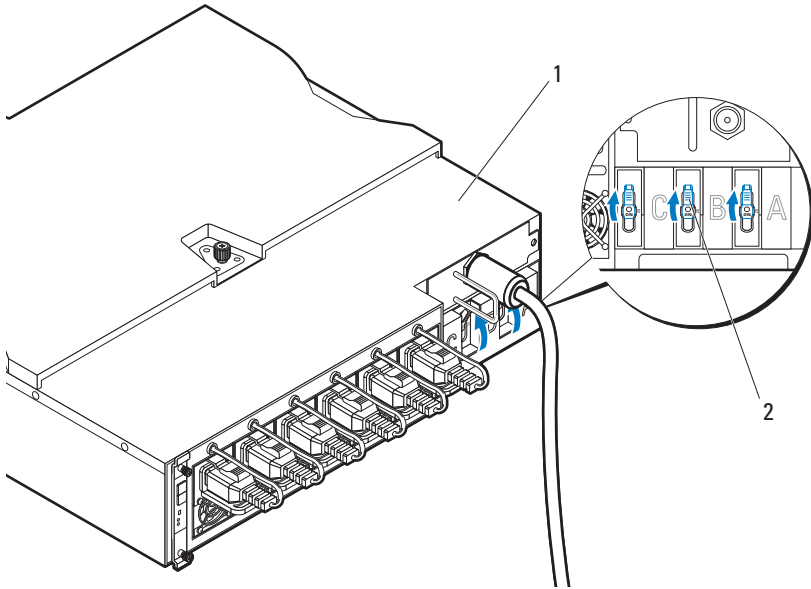


- 1 PDU device
- 2 PCIB module
- 3 screws (2)

- c Connect the PDU to the power source.

- 2 Turn on the PDU breaker switches by moving the A, B, and C breaker switches to the "ON" position. See Figure 4-23.

Figure 4-23. Turning on the PDU Breaker Switches





1 PDU device

2 breaker switches (3)


NOTE: The PMC board and PDU device illustrations used in this manual are provided as reference only. See PDU device documentation for more information about the PMC board and PDU device.

- 3 To enable monitoring of the PDU device over the network, turn on the PMC board by pressing the power button, located on the PMC board. The two indicators located on the front of the PMC board alerts you to the condition of the PDU power supply module, PMC board and managed sled modules.

The following table lists the PMC board indicators functions.

Indicator	Icon	Description
PDU identification indicator		<p>The identification indicator lights blue indicating an ON request is generated.</p> <p>The identification indicator flashes blue indicating a blink request is generated.</p> <p>The identification indicator is off to indicate there is no input power to the PDU or in normal condition.</p>
Power/status indicator		<p>The power/status indicator lights green and flashes amber (about 1 Hz) indicating that a valid power source is connected to the PDU and PMC and that power is applied to the sled modules in the server enclosure.</p> <p>The power/status indicator flashes green (about 1 Hz) and flashes green and amber (about 1 Hz) indicating the PDU is in service or sleep mode.</p> <p>The power/status indicator is off to indicate there is no input power to the PDU.</p> <p>The power/status indicator flashes amber indicating the following conditions:</p> <ul style="list-style-type: none"> • PMC status <ul style="list-style-type: none"> • PMBus error • PMC works in safe boot mode • PDU status <ul style="list-style-type: none"> • Communication error

Indicator	Icon	Description
		<p>The power/status indicator flashes amber indicating the following conditions (<i>continued</i>):</p> <ul style="list-style-type: none"> • PSU module reading exceed threshold limits <ul style="list-style-type: none"> • Power > 1480 W • Voltage > 14.5 V • Voltage < 10.75 V • Current > 13 A • Temperature > 60 °C • Fan speed < 500 rpm • PSU module status (from PSU STATUS_WORD) <ul style="list-style-type: none"> • PSU module OVP • PSU module OCP • PSU module OTP • PSU module fan fault protection (FFP) • PSU module input over current • PSU module input over power • PSU module AC loss • PSU module works in boot mode • Communication error




 **NOTE:** When connected to a power source, main power is automatically distributed to the PowerEdge C8000 server enclosure. After the server enclosure is powered up the power/event indicator on the front of the enclosure will light up green and main power is applied to all sleds in the enclosure.

4 Turn on the sleds in the server enclosure.

To turn on the C8220 or C8220X compute sled, press the power button on each sled, or power on the sled using the baseboard management controller. When power is applied to the sled, the power-on indicator on front of the sled will light up green. When installed into the server enclosure, the C8000XD storage sled automatically powers on.

Troubleshooting

Safety First—For You and Your System

-  **WARNING:** Whenever you need to lift the system, get others to assist you. To avoid injury, do not attempt to lift the system by yourself.
-  **WARNING:** Before removing the system cover, disconnect all power, then unplug the AC power cord, and then disconnect all peripherals, and all LAN lines.
-  **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

Installation Problems

Perform the following checks if you are troubleshooting an installation problem:

- Check all cable and power connections (including all rack cable connections).
- Unplug the power cord and wait for one minute. Then reconnect the power cord and try again.
- If the network is reporting an error, verify that the system has enough memory and disk space.
- Remove all added peripherals, one at a time, and try to turn on the system. If after removing a peripheral the system works, it may be a problem with the peripheral or a configuration problem between the peripheral and the system. Contact the peripheral vendor for assistance.

- If the system does not power on, check the LED display. If the power LED is not on, you may not be receiving AC power. Check the AC power cord to make sure that it is securely connected.

Troubleshooting System Startup Failure

If your system halts during startup, especially after installing an operating system or reconfiguring your system's hardware, check for invalid memory configurations. These could cause the system to halt at startup without any video output. See the compute sled's *Hardware Owner's Manual* for information about the "System Memory".

For all other startup issues, note any system messages that appear onscreen. See "Using the System Setup Program" on page 67 for more information.

Troubleshooting External Connections

Ensure that all external cables are securely attached to the external connectors on your sled before troubleshooting any external devices. See Figure 1-1 and Figure 1-3 for the front- and back-panel connectors on your system.

Troubleshooting the Video Subsystem

- 1 Check the compute sled and power connections to the monitor.
- 2 Check the video interface cabling from the compute sled to the monitor.

Troubleshooting a USB Device

Use the following steps to troubleshoot a USB keyboard and/or mouse. For other USB devices, go to step 5.

- 1 Ensure that the compute sled is turned on.
- 2 Disconnect the keyboard and mouse cables from the sled briefly and reconnect them.
- 3 If the problem is resolved, restart the sled, enter the System Setup program, and check if the nonfunctioning USB ports are enabled.
- 4 Swap the keyboard/mouse with a known-working keyboard/mouse.

- 5** If another sled is installed, connect the USB device to the sled. If the USB device works with a different sled, the first sled may be faulty.
If the problem is resolved, replace the faulty keyboard/mouse.
If the problem is not resolved, proceed to the next step to begin troubleshooting the other USB devices attached to the system.
 - a** Power down all attached USB devices and disconnect them from the sled.
 - b** Restart the sled and, if your keyboard is functioning, enter the System Setup program. Verify that all USB ports are enabled. See "USB Configuration" on page 105.
 - c** If your keyboard is not functioning, you can also use remote access. If the system is not accessible, locate the NVRAM Clear jumper inside your sled and restore the BIOS to the default settings.
 - d** Reconnect and turn on each USB device one at a time.
- 6** If a device causes the same problem, power down the device, replace the USB cable, and power up the device.
If the problem persists, replace the device.
If all troubleshooting fails, see "Getting Help" on page 289.

Troubleshooting a Serial I/O Device

- 1** Ensure that the compute sled is turned on.
- 2** Check the serial device connection to the sled.
- 3** Swap the serial interface cable with another working cable, and turn on the sled and the serial device.
If the problem is resolved, replace the interface cable.
- 4** Swap the serial device with a known-working serial device.
- 5** Connect the serial device to the sled.
- 6** Turn on the sled and the serial device.
- 7** If another sled is installed, connect the serial device to the sled. If the serial device works with a different sled, the first sled may be faulty.
If the problem is resolved, replace the serial device.
If the problem persists, see "Getting Help" on page 289.

Troubleshooting a NIC


- 1 Restart the compute sled and check for any system messages pertaining to the NIC controller.
- 2 Check the appropriate indicator on the NIC connector. See "NIC Indicator Codes" on page 20.
 - If the link indicator does not light, check all cable connections.
 - If the activity indicator does not light, the network driver files might be damaged or missing.
 - Remove and reinstall the drivers if applicable. See the NIC's documentation.
 - Change the auto-negotiation setting, if possible.
 - Use another connector on the switch or hub.

If you are using a NIC card instead of an integrated NIC, see the documentation for the NIC card.

- 3 Ensure that the appropriate drivers are installed and the protocols are bound. See the NIC's documentation.
- 4 Enter the System Setup program and confirm that the NIC ports are enabled. See "Using the System Setup Program" on page 67.
- 5 Ensure that the NICs, hubs, and switches on the network are all set to the same data transmission speed. See the documentation for each network device.
- 6 Ensure that all network cables are of the proper type and do not exceed the maximum length.

If all troubleshooting fails, see "Getting Help" on page 289.

Troubleshooting a Wet Enclosure

 **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

- 1 Turn off the sleds and attached peripherals.
- 2 Disconnect the enclosure from the electrical outlet or the PDU.

 **CAUTION:** Wait until all of the indicators on the power supplies turn off before proceeding.

- 3 Remove all sleds. See "Removing a Compute Sled" on page 192 or "Removing a Storage Sled" on page 194.
- 4 Disassemble components from the sled. See the sled's documentation for more information.
- 5 Remove the fan modules. See "Removing a Fan Module" on page 207.
- 6 Remove the front panel board. See "Removing the Front Panel Board" on page 209.
- 7 Remove the fan controller board. See "Removing the Fan Controller Board" on page 211.
- 8 Let the enclosure dry thoroughly for at least 24 hours.
- 9 Reinstall the fan controller board. See "Installing the Fan Controller Board" on page 212.
- 10 Reinstall the front panel board. See "Installing the Front Panel Board" on page 210.
- 11 Reinstall the fan modules. See "Installing a Fan Module" on page 208.
- 12 Reinstall all sled components you removed in step 4.
- 13 Reinstall all sleds. See "Installing a Compute Sled" on page 194 or "Installing a Storage Sled" on page 195.

- 14 Reconnect the enclosure to the electrical outlet or the PDU.
- 15 Turn on the sleds and attached peripherals.
- 16 If the system fails to start, see "Getting Help" on page 289.


Troubleshooting a Damaged Enclosure




CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

- 1 Turn off the sleds and attached peripherals.
- 2 Disconnect the enclosure from the electrical outlet or the PDU.
- 3 Ensure that the following components are properly installed in the enclosure:
 - Power sleds
 - Fan modules
 - Compute or storage sleds
- 4 Ensure that all components are properly installed in the sled. See the sled's documentation for more information.
- 5 Ensure that all cables are properly connected.
- 6 Ensure that all components are properly installed and free of damage.
- 7 If the system fails to start, see "Getting Help" on page 289.

Troubleshooting Enclosure Fan Modules

 **CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

 **NOTE:** The fan modules are hot-swappable. Remove and replace only one fan module at a time in a server enclosure that is turned on. Operating the system without all three fan modules for extended periods of time can cause the system to overheat. Review the following table before you begin to replace the fan modules.

Fan Module (Fan Controller Firmware) Thermal Behavior Per Sled

Table 5-1. Fan Module (Fan Controller Firmware) Thermal Behavior Per Sled

Fan Module Status	BMC (Processor/Memory)/Server Enclosure Temperature Status			
	OK/OK	OK/Fail	Fail/OK	Fail/Fail
Fan module normal/OK	Close loop, Open loop (curve A) ^a , If the PWM duty cycle value rises above 100%, sled-level throttling is triggered ^b	Close loop, 80% PWM If close loop PWM signal value is > 80%, the PWM output will follow the close loop output	Open loop (curve B) ^e , 100% PWM If the PWM duty cycle value rises above 100%, sled-level throttling is triggered ^b	100% PWM
One fan module fails	Close loop, If the PWM duty cycle value rises above 100%, sled-level throttling is triggered ^b	100% PWM	100% PWM Open loop (curve C) ^d , If the PWM duty cycle value rises above 100%, sled-level throttling is triggered ^b	100% PWM System throttling

Table 5-1. Fan Module (Fan Controller Firmware) Thermal Behavior Per Sled

Fan Module Status	BMC (Processor/Memory)/Server Enclosure Temperature Status			
	OK/OK	OK/Fail	Fail/OK	Fail/Fail
Two fan modules fail	System throttling. After 90 seconds has passed, the system will be forced to shut down	System throttling. After 90 seconds has passed, the system will be forced to shut down	System throttling. After 90 seconds has passed, the system will be forced to shut down	System throttling. After 90 seconds has passed, the system will be forced to shut down
Three fan modules fail	System force shutdown	System force shutdown	System force shutdown	System force shutdown

- a. Open loop (curve A) is fan speed control (FSC) curve with default mode.
- b. Refer to the Fan Controller Firmware Response section for more information.
- c. Open loop (curve B) is FSC curve with emergency mode.
- d. Open loop (curve C) is FSC curve with fan failure mode.

Fan Controller Firmware Response

Refer to the tables below when troubleshooting enclosure fan noise and for the FC firmware responses to the possible PWM duty cycle values.

Table 5-2. Case Scenario 1

Interval (30 secs)	PWM Results	Fan Controller Firmware Action
Interval 1	PWM > 100%	1 Sets PWM = 100% 2 Sled throttling mechanism is active
Interval 2	PWM > 100%	1 Triggers sled throttling for 1 hr.

Table 5-2 lists the FC firmware responses in case scenario 1:

- Interval 1 — If the calculated value of the PWM is higher than 100%, the FC firmware will send a signal to the fan to operate at 100% duty cycle and trigger sled throttling.
- Interval 2 — If the calculated value of the PWM duty cycle is still higher than 100% again, the FC firmware will send a signal to the fan to operate at 100% duty cycle and trigger sled throttling for 1 hour.

Table 5-3. Case Scenario 2

Interval (30 secs)	PWM Results	Fan Controller Firmware Action
Interval 1	PWM > 100%	1 Sets PWM= 100% 2 Sled throttling mechanism is active
Interval 2	PWM ≤ 100%	1 Sets PWM duty cycle 2 Sled throttling mechanism is inactive
Interval 3	PWM > 100%	1 Sets PWM = 100% 2 Triggers sled throttling for 1 hr.

Table 5-3 lists the FC firmware responses in case scenario 2:

- Interval 1 — If the calculated value of the PWM is higher than 100%, the FC firmware will send a signal to the fan to operate at 100% duty cycle and trigger sled throttling.
- Interval 2 — If the calculated value of the PWM duty cycle is less than or equal to 100%, the FC firmware will send a signal to the fan to operate at the set duty cycle.
- Interval 3 — If the calculated value of the PWM duty cycle is still higher than 100% again, the FC firmware will send a signal to the fan to operate at 100% duty cycle and trigger sled throttling for 1 hour.

Table 5-4. Case Scenario 3

Interval (30 secs)	PWM Results	Fan Controller Firmware Action
Interval 1	PWM > 100%	1 Sets PWM = 100% 2 Sled throttling mechanism is active
Interval 2	PWM ≤ 100%	1 Sets PWM duty cycle 2 Sled throttling mechanism is inactive
Interval 3	PWM ≤ 100%	Sets PWM duty cycle
Interval 4	PWM > 100%	1 Sets PWM = 100% 2 Sled throttling mechanism is active
Interval 5	PWM > 100%	1 Triggers sled throttling for 1 hr.

Table 5-4 lists the FC firmware responses in case scenario 3:

- Interval 1 — If the calculated value of the PWM is higher than 100%, the FC firmware will send a signal to the fan to operate at 100% duty cycle and trigger sled throttling.

- Interval 2 — If the calculated value of the PWM duty cycle is less than or equal to 100%, the FC firmware will send a signal to the fan to operate at the set duty cycle.
- Interval 3 — If the calculated value of the PWM duty cycle is less than or equal to 100%, the FC firmware will send a signal to the fan to operate at the set duty cycle.
- Interval 4 — If the calculated value of the PWM duty cycle is higher than 100%, the FC firmware will send a signal to the fan to operate at 100% duty cycle and trigger sled throttling.
- Interval 5 — If the calculated value of the PWM duty cycle is still higher than 100% again, the FC firmware will send a signal to the fan to operate at 100% duty cycle and trigger sled throttling for 1 hour.

Table 5-5. Case Scenario 4

Interval (30 secs)	PWM Results	Fan Controller Firmware Action
Interval 1	PWM > 100%	1 Sets PWM = 100% 2 Sled throttling mechanism is active
Interval 2	PWM ≤ 100%	1 Sets PWM duty cycle 2 Sled throttling mechanism is inactive
Interval 3	PWM ≤ 100%	Sets PWM duty cycle
Interval 4	PWM > 100%	1 Sets PWM = 100% 2 Sled throttling mechanism is active
Interval 5	PWM ≤ 100%	1 Sets PWM duty cycle 2 Sled throttling mechanism is inactive
Interval 6	PWM > 100%	1 Sets PWM duty cycle = 100% 2 Triggers sled throttling for 1 hr.

Table 5-5 lists the FC firmware responses in case scenario 4:

- Interval 1 — If the calculated value of the PWM is higher than 100%, the FC firmware will send a signal to the fan to operate at 100% duty cycle and trigger sled throttling.
- Interval 2 — If the calculated value of the PWM duty cycle is less than or equal to 100%, the FC firmware will send a signal to the fan to operate at the set duty cycle.

- Interval 3 — If the calculated value of the PWM duty cycle is less than or equal to 100%, the FC firmware will send a signal to the fan to operate at the set duty cycle.
- Interval 4 — If the calculated value of the PWM duty cycle is higher than 100%, the FC firmware will send a signal to the fan to operate at 100% duty cycle and trigger sled throttling.
- Interval 5 — If the calculated value of the PWM duty cycle is less than or equal to 100%, the FC firmware will send a signal to the fan to operate at the set duty cycle.
- Sixth interval — If the calculated value of the PWM duty cycle is still higher than 100% again, the FC firmware will send a signal to the fan to operate at 100% duty cycle and trigger sled throttling for 1 hour.

To troubleshoot the enclosure fan modules:

- 1** Locate the faulty fan module in the back of the enclosure.
- 2** Each fan module has indicators that identify a faulty fan. See Figure 1-5.
- 3** Remove the fan module. See "Removing a Fan Module" on page 207.
- 4** Examine the blades for debris. If debris is present, carefully remove it.
- 5** Reseat the fan module. See "Installing a Fan Module" on page 208.
- 6** If none of the fan indicators show a fault LED and the blade do not power on, log into the BMC web interface and check for status messages.
- 7** If the problem is not resolved, install a new fan.
- 8** If the new fan does not operate, see "Getting Help" on page 289.

Troubleshooting Cooling Problems

PowerEdge C8000 server enclosure supports chiller-less fresh air cooling that enables the enclosure to operate at room temperature and tolerate temperature spikes up to 45 °C (113 °F). Fresh air cooling controls temperature in the enclosure through fan speed. Outside air is drawn and circulated through the enclosure interior to cool the enclosure and components. You can use IPMI messaging to switch the air flow in the enclosure to fresh air mode or normal operating mode.

To enable fresh air cooling in the enclosure:

- 1 Enter the following command:

```
ipmitool -I lanplus -P <password> -U <username> -H <BMC IP address> raw <command>
```

where

-I lanplus is the LAN plus interface that uses the Remote Management Control Protocol+ (RMCP+) protocol to communicate with the BMC over an Ethernet LAN connection

-P <password> is the password for the given user ID

-U <username> is the username associated with the given user ID

-H <BMC IP address> is the BMC IP address

<command> is the command for configuring the fresh air mode

For example, the command line should have the following format:

```
ipmitool -I lanplus -P root -U root -H 192.168.70.58 raw 0x30 0x43 0x01 0x01
```

- 2 Enter the following command:

```
ipmitool -I lanplus -P root -U root -H 192.168.70.58 raw 0x30 0x43 0x01 0x01
```

To disable fresh air cooling in the enclosure:

- 1 Enter the following command:

```
ipmitool -I lanplus -P <password> -U <username> -H <BMC IP address> raw <command>
```

where

-I lanplus is the LAN plus interface that uses the Remote Management Control Protocol+ (RMCP+) protocol to communicate with the BMC over an Ethernet LAN connection

-P <password> is the password for the given user ID

-U <username> is the username associated with the given user ID

-H <BMC IP address> is the BMC IP address

<command> is the command for configuring the fresh air mode

For example, the command line should have the following format:

```
ipmitool -I lanplus -P root -U root -H 192.168.70.58 raw 0x30 0x43 0x01 0x01
```

- 2 Enter the following command:

```
ipmitool -I lanplus -P root -U root -H 192.168.70.58 raw 0x30 0x43 0x01 0x0
```

To view the server enclosure fresh air status:

- 1 Enter the following command:

```
ipmitool -I lanplus -P <password> -U <username> -H <BMC IP address> raw <command>
```

where

-I lanplus is the LAN plus interface that uses the Remote Management Control Protocol+ (RMCP+) protocol to communicate with the BMC over an Ethernet LAN connection

-P <password> is the password for the given user ID

-U <username> is the username associated with the given user ID

-H <BMC IP address> is the BMC IP address

<command> is the command for configuring the fresh air mode

For example, the command line should have the following format:

```
ipmitool -I lanplus -P root -U root -H 192.168.70.58 raw 0x30 0x43 0x01 0x01
```

- 2** You can do either of the following commands to view the server enclosure fresh air status:

- To view the server enclosure fresh air status when the fresh air mode is enabled, enter the following command:

```
ipmitool -I lanplus -P root -U root -H 192.168.70.58 raw 0x30 0x44 0x1 01
```

- To view the server enclosure fresh air status when the fresh air mode is disabled, enter the following command:

```
ipmitool -I lanplus -P root -U root -H 192.168.70.58 raw 0x30 0x44 0x01 00
```

Air Inlet Temperature Threshold Settings

The table below lists the enclosure's air inlet temperature thresholds and the different fan controller firmware actions for each threshold.

Table 5-6. Enclosure Air Inlet Temperature Threshold Settings

Enclosure Inlet Condition	Threshold Setting	Ambient Temp	Threshold Level	Action
Normal mode	Upper non-recoverable	43 °C (109.4 °F)	Extremely high	Fan controller (FC) firmware shuts down the system. NOTE: The firmware reads inlet temperature every 5 secs. If the inlet temperature reaches non-recoverable threshold, the firmware will start to check the power status for each sled and initiate the sled for graceful shutdown (pull-low 4 seconds).
	Upper critical	41 °C (105.8 °F)	High	Chassis status indicator lights amber.
	Upper non-critical	38 °C (100.4 °F)	Warning	Temperature events are recorded in the SEL.
	Lower non-critical	N/A	Warning	Temperature events are recorded in the SEL.
	Lower critical	N/A	Low	Chassis status indicator lights amber.
	Lower non-recoverable	5 °C (41 °F)	Extremely low	Chassis status indicator lights amber.

Table 5-6. Enclosure Air Inlet Temperature Threshold Settings (continued)

Enclosure Inlet Condition	Threshold Setting	Ambient Temp	Threshold Level	Action
Fresh air mode	Upper non-recoverable	52 °C (125.6 °F)	Extremely high	Fan controller (FC) firmware shuts down the system. NOTE: The firmware reads inlet temperature every 5 secs. If the inlet temperature reaches non-recoverable threshold, the firmware will start to check the power status for each sled and initiate the sled for graceful shutdown (pull-low 4 seconds).
	Upper critical	50 °C (122 °F)	High	Chassis status indicator lights amber.
	Upper non-critical	48 °C (118.4 °F)	Warning	Temperature events are recorded in the SEL.

Troubleshooting Sled Components

The following procedures describe how to troubleshoot the following compute sled components:

- Memory
- Hard-drives
- Expansion cards
- Processors
- System board
- Battery

Troubleshooting System Memory



CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.



NOTE: Invalid memory configurations can cause your system to halt at startup without video output. See the compute sled's *Hardware Owner's Manual* for information about the "System Memory" and verify that your memory configuration complies with all applicable guidelines.

- 1 If the system is not operational, turn off the sled and attached peripherals.
- 2 After 10 seconds, turn on the sled and attached peripherals and note the messages on the screen.

Go to step 11 if an error message appears indicating a fault with a specific memory module.


- 3 Enter the System Setup program and check the system memory settings. See "Main Menu" on page 74. Make any changes to the memory settings, if needed.

If the memory settings match the installed memory but a problem is still indicated, go to step 11.

- 4 Turn off the sled and attached peripherals.

- 5** Remove the sled from the enclosure. See "Removing a Compute Sled" on page 192. See the compute sled's documentation for more information.
- 6** Check the memory channels and ensure that they are populated correctly.
- 7** Reseat the memory modules in their sockets. See the compute sled's documentation for more information.
- 8** Reinstall the sled into the enclosure.
- 9** Turn on the sled and attached peripherals.
- 10** Enter the System Setup program and check the system memory settings. See "Main Menu" on page 74.
If the problem is not resolved, proceed with the next step.
- 11** Turn off the sled and attached peripherals.
- 12** Remove the sled from the enclosure.
- 13** If a diagnostic test or error message indicates a specific memory module as faulty, swap or replace the module.
- 14** To troubleshoot an unspecified faulty memory module, replace the memory module in the first DIMM socket with a module of the same type and capacity. See the compute sled's documentation for more information.
- 15** Reinstall the sled into the enclosure.
- 16** Turn on the sled and attached peripherals.
- 17** As the system boots, observe any error message that appears and the diagnostic indicators on the front of the system.
- 18** If the memory problem is still indicated, repeat step 11 through step 17 for each memory module installed.
- 19** If the problem persists after all memory modules have been checked, see "Getting Help" on page 289.

Troubleshooting a Hard-Drive

 **CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.**

 **CAUTION: This troubleshooting procedure can destroy data stored on the hard-drive. Before you proceed, back up all files on the hard-drive.**

- 1** If your sled has a RAID controller and your hard-drives are configured in a RAID array, perform the following steps:
 - a** Restart the system and enter the host adapter configuration utility program by pressing <Ctrl><H> for a RAID controller, <Ctrl><C> for a SAS controller, or <Ctrl><I> for the onboard RAID controller.

See the documentation supplied with the host adapter for information about the configuration utility.
 - b** Ensure that the hard-drive(s) have been configured correctly for the RAID array.
 - c** Take the hard-drive offline and reseal the drive.
 - d** Exit the configuration utility and allow the system to boot to the operating system.
- 2** Ensure that the required device drivers for your controller card are installed and are configured correctly. See the operating system documentation for more information.
- 3** Restart the system, enter the System Setup program, and verify that the controller is enabled and the drives appear in the System Setup program. See "Using the System Setup Program" on page 67.
- 4** If the problem persists, see "Getting Help" on page 289.

Troubleshooting Expansion Cards



CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.



NOTE: When troubleshooting an expansion card, see the documentation for your operating system and the expansion card.

- 1 Turn off the sled and attached peripherals.
- 2 Remove the sled from the enclosure. See "Removing a Compute Sled" on page 192.
- 3 Open the sled. See the compute sled's documentation for more information.
- 4 Ensure that each expansion card is firmly seated in its connector.
- 5 Reinstall the sled into the enclosure.
- 6 Turn on the sled and attached peripherals.
- 7 If the problem is not resolved, see "Getting Help" on page 289.

Troubleshooting Processors



CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

- 1 Turn off the sled and attached peripherals.
- 2 Remove the sled from the server enclosure. See "Removing a Compute Sled" on page 192.
- 3 Open the sled. See the compute sled's documentation for more information.
- 4 Remove the cooling shroud.
- 5 Ensure that each heat sink is properly installed.
- 6 Ensure that there is thermal grease on the heat sink and processor.

- 7 Ensure that each processor is properly installed.
- 8 Replace the cooling shroud.
- 9 Reinstall the sled into the enclosure.
- 10 Turn on the sled and attached peripherals.
- 11 If the problem persists, turn off the sled and attached peripherals.
- 12 Remove the sled from the enclosure.
- 13 Remove the cooling shroud.
- 14 Remove processor 2.
- 15 Replace the cooling shroud.
- 16 Reinstall the sled into the enclosure.
- 17 Turn on the sled and attached peripherals.

If the problem persists, the processor is faulty. See "Getting Help" on page 289.

- 18 Turn off the sled and attached peripherals.
- 19 Remove the sled from the enclosure.
- 20 Remove the cooling shroud.
- 21 Replace processor 1 with processor 2.
- 22 Repeat step 12 through step 19.

If you have tested both the processors and the problem persists, the system board is faulty. See "Getting Help" on page 289.

Troubleshooting the System Board



CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

- 1 Remove the sled from the enclosure. See "Removing a Compute Sled" on page 192.
- 2 Open the sled. See the compute sled's documentation for more information.

- 3 Remove the mezzanine cards. See the compute sled's documentation for more information.
- 4 Locate the NVRAM clear jumper on the system board.
- 5 Clear the NVRAM.
- 6 Close the sled.
- 7 If there is still a problem with the compute sled, remove and reinstall the sled.

If the problem persists, see "Getting Help" on page 289.

Troubleshooting the System Battery



NOTE: If the system is turned off for long periods of time (for weeks or months), the NVRAM may lose its system configuration information. This situation is caused by a defective battery.

- 1 Re-enter the time and date through the System Setup program. See "System Setup Options at Boot" on page 68.
- 2 Turn off the sled and remove it from the enclosure for at least one hour.
- 3 Reconnect the sled to the server enclosure and turn on the sled.
- 4 Enter the System Setup program.

If the date and time are not correct in the System Setup program, replace the battery.

If the problem is not resolved by replacing the battery, see "Getting Help" on page 289.



CAUTION: You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

If the problem is not resolved by replacing the battery, see "Getting Help" on page 289.



NOTE: Some software may cause the system time to speed up or slow down. If the system seems to operate normally except for the time kept in the System Setup program, the problem may be caused by software rather than by a defective battery.

IRQ Assignment Conflicts

Most PCI devices can share an IRQ with another device, but they cannot use an IRQ simultaneously. To avoid this type of conflict, see the documentation for each PCI device for specific IRQ requirements.

IRQ Line	Assignment	IRQ Line	Assignment
IRQ0	8254 timer	IRQ8	Real-time clock
IRQ1	Keyboard controller	IRQ9	PCI IRQ pool definition
IRQ2	Cascade for IRQ9	IRQ10	PCI IRQ pool definition
IRQ3	Serial port (COM2) or PCI IRQ pool definition	IRQ11	PCI IRQ pool definition
IRQ4	Serial port (COM1) or PCI IRQ pool definition	IRQ12	Mouse controller
IRQ5	PCI IRQ pool definition	IRQ13	Processor
IRQ6	PCI IRQ pool definition	IRQ14	Primary IDE controller
IRQ7	Reserve	IRQ15	Secondary IDE controller

PCI IRQ pool definition is the BIOS code assigned at run time.

Updating Firmware Images and Monitoring the PDU Power Status

Verifying and Updating the Fan Controller Board Firmware Via the Compute Sled

Viewing the Fan Controller Board Firmware Version Information

- 1 Run the command line interface.
- 2 Enter the following command line:
`cmd > fcbutil /i`

Updating the Fan Controller Board Firmware



NOTE: Removing the FCB during a FCB firmware update will break the firmware update process and could damage or corrupt the image on the FCB. Please contact Dell for more help if this occurred.



NOTE: When updating FCB components, such as the CPLD and fan table, the update sequence is as follows: CPLD > fan table > FCB firmware.


- 1 Download the latest fan controller board firmware from dell.com/support. Browse to the location where you downloaded the firmware package and extract the package.
- 2 Run the fan controller (FC) update utility.
 - MS-DOS — FCBUTIL.EXE
 - Windows — fcbutil_x64.exe
 - Linux — fcbutil_linux or fcbutil_linux64

Sample output:

```
[root@localhost]#./fcbutil_linux64 fcb_fw.bin
FCB Update Utility Ver 0.01.01, 2013/05/24
IPMIVer=02 FWVer=02.20 AuxFW=06000000
FCBVer=02.26 FanTableVer=01.63
Start Copy Image to BMC
100%
Wait: Copy Image to FCB and Update FCB
Done: Update Completed.
Reset BMC!
Wait: BMC Reboot and Connect to FCB
FCBVer=02.27 FanTableVer=01.63
Completed!
[root@localhost]#
```

- 3 After the process is completed, the new firmware and fan table versions display on the screen.

Verifying and Updating the Fan Controller Board Firmware Via SNMP

 **NOTE:** The following procedure applies only when there are no compute sleds installed in the server enclosure.

When the PowerEdge C8000 server enclosure is fully populated with five storage sleds only, you can use Simple Network Management Protocol (SNMP) to verify and update the fan controller board (FCB) firmware. The FCB is integrated with an Ethernet connector and supports SNMP v2c that allows you to monitor the server enclosure status over the network and send traps or notifications when critical situations occur.

Before You Begin

- 1 Install a SNMP utility on your computer. You can install a commercial or a free SNMP utility.

- 2 Install a Trivial File Transfer Protocol (TFTP) server software on your computer.

TFTP is a simplified form of the FTP. It is used with the SNMP v2c command line interfaces to transfer files to and from the FCB, update the FCB firmware and modify the FCB configuration information.

If you are using Linux, install a TFTP server from your distribution.

If you are using Windows, install a commercial or free TFTP server.

Checking FCB Indicators

The FCB status and identification indicators light to indicate an error condition.

- Status indicator blinks amber (about 1 Hz) to indicate an error condition.
- Identification indicator blinks blue (about 1 Hz).

Resetting the FCB Network Connection

By default, the FCB is configured to automatically obtain an IP address via DHCP server.

- 1 Do three short presses of the reset button within 5 seconds to change the DHCP IP address on the FCB over to a static IP address.

After the FCB resets, all network and configuration settings restore back to their default values. The FCB is configured with the following default network settings:

- IP address: 192.168.0.120
- Subnet mask: 255.255.255.0
- Gateway: 192.168.0.1

The status indicator on the FCB displays the following behaviors:

- Blinking amber (500 ms off/5 s on) — Restarts the FCB firmware and reset to factory default is completed.
 - Blinking amber (250 ms off/5 s on) — Restores the default network settings to their default values.
- 2 Do three short presses of the reset button within 5 seconds again to switch static IP back to reset to default (DHCP).

Viewing or Changing the FCB Configuration Information

The FCB configuration information is stored in the FCB board's internal EEPROM. The FCB configuration file is a text (TXT) file. You must use TFTP server to retrieve the configuration data and then use Notepad or a text editor to view or change the configuration data.

For example, a configuration data should have the following information:

```
CONNECT.TYPE=STATIC/DHCP
IP=192.168.0.120
NETMASK=255.255.255.0
GATEWAY=192.168.0.1
TRAPDESTINATION1=0.0.0.0
TRAPDESTINATION2=0.0.0.0
TRAPDESTINATION3=0.0.0.0
TRAPDESTINATION4=0.0.0.0
TRAPDESTINATION5=0.0.0.0
SNMPRD.COMMUNITY.STR=public
SNMPRW.COMMUNITY.STR=private
POWERCAPPING.R=3
POWERCAPPING.W_DELTA=20
POWERCAPPING.K_CNT=3
```

Configuring the SNMP Traps

- 1 Import the FCB configuration data.
- 2 Use a Notepad or text editor to edit the configuration data.
- 3 Enter an IP address in the appropriate Trap Destination field.
- 4 Set the SNMP read community string in SNMP RD COMMUNITY STR. By default, the SNMP read community string is *public*.
- 5 Set the SMP read-write community string in SNMP RW COMMUNITY STR. By default, the SNMP read-write community string is *private*.
- 6 Save the file.
- 7 Use the TFTP server software to upload the configuration file.

Updating the FCB Firmware



NOTE: The following procedure uses NET-SNMP, a free SNMP tool for Linux systems, available at www.net-snmp.org, as an example.



NOTE: The `snmpset` community property command depends on the community string data in the FCB Configuration Information. The default SNMP community string is public.



NOTE: When updating FCB components, such as the CPLD and fan table, the update sequence is as follows: `CPLD > fan table > FCB firmware`.

- 1 Use the TFTP server to upload the FCB firmware image into the FCB EEPROM.
- 2 Launch the NET-SNMP utility.
- 3 Use the `snmpset` command to update the firmware.
 - a To set TFTP Server IP address, enter the following commands.

```
snmpset -v 2c -c community target_ip .1.3.6.1.4.1.674.20.50.6.0 a server_ip
```
 - b To set Image File Name, enter the following commands.

```
snmpset -v 2c -c community target_ip .1.3.6.1.4.1.674.20.50.7.0 s image_file
```
 - c To upgrade FCB firmware, entering the following command.

```
snmpset -v 2c -c community target_ip .1.3.6.1.4.1.674.20.50.100.1.0 i l
```

Sample output:

```
[root@localhost ~]# snmpset -v 2c -c private 10.32.49.67.1.3.6.1.4.1.674.20.50.6.0 a 10.32.49.64 <- Set TFTP Server IP
SNMPv2-SMI::enterprises.674.20.50.6.0 = IPAddress: 10.32.49.64
[root@localhost ~]# snmpset -v 2c -c private 10.32.49.67.1.3.6.1.4.1.674.20.50.7.0 s pmc.01.A.045.01.01.0001.bin <- Set Image File Name
SNMPv2-SMI::enterprises.674.20.50.7.0 = STRING: "pmc.01.A.045.01.01.0001.bin"
[root@localhost ~]# snmpset -v 2c -c private 10.32.49.67.1.3.6.1.4.1.674.20.50.100.1.0 i l <- Upgrade Firmware
SNMPv2-SMI::enterprises.674.20.50.100.1.0 = INTEGER: 1
```

Viewing the FCB Firmware Version Information



NOTE: The following procedure uses NET-SNMP, a free SNMP tool for Linux systems, available at www.net-snmp.org, as an example.

- 1 Launch the NET-SNMP utility.
- 2 Use the snmpset command to view firmware version information.

```
snmpget -v 2c -c private 10.32.49.67 .1.3.6.1.4.1.674.20.50.2.0
```

Sample output:

```
[root@localhost ~]# snmpget -v 2c -c private 10.32.49.67.1.3.6.1.4.1.674.20.50.2.0  
<- Get firmware Version to confirm.  
SNMPv2-SMI::enterprises.674.20.50.2.0 = STRING: "V01.A.045.01.01.0001"
```

Monitoring the External PDU Power Status and Updating the PDU PMC Firmware

The PowerEdge C8000 server enclosure is primarily connected to an external PDU. The external PDU includes a power management controller (PMC) board that is integrated with an Ethernet connector and supports SNMP v2c that allows you to monitor the PDU power supply modules over the network and send traps or notifications when critical situations occur.

Before You Begin

- 1 Install a SNMP utility on your computer. You can install a commercial or a free SNMP utility.
- 2 Install a TFTP server software on your computer.

TFTP is used with the SNMP v2c command line interfaces to transfer files to and from the PDU PMC, update the PMC firmware and modify the PMC configuration information.

If you are using Linux, install a TFTP server from your distribution.

If you are using Windows, install a commercial or free TFTP server.

Checking PDU Indicators

The PMC power/status and identification indicators lights to indicate an error condition.

- Power/status indicator blinks amber (about 1 Hz) to indicate an error condition.
- Identification indicator blinks blue (about 1 Hz).

Resetting the PDU Network Connection

By default, the PMC is configured to automatically obtain an IP address via DHCP server.

- 1** Do three short presses of the reset button within 5 seconds to change the DHCP IP address on the PMC over to a static IP address.

After the PMC resets, all network and configuration settings restore back to their default values. The PMC is configured with the following default network settings:

- IP address: 192.168.0.120
- Subnet mask: 255.255.255.0
- Gateway: 192.168.0.1

The power/status indicator on the front of the PMC board displays the following behaviors:

- Blinking amber (500 ms off/5 s on) — Restarts the PMC firmware and reset to factory default is completed.
 - Blinking amber (250 ms off/5 s on) — Restores the default network settings to their default values.
- 2** Do three short presses of the reset button within 5 seconds again to switch static IP back to reset to default (DHCP).

Viewing or Changing the PMC Configuration Information

The PMC configuration information is stored in the PDU PMC board's internal EEPROM. The PMC configuration file is a text (TXT) file. You must use TFTP server to retrieve the configuration data and then use Notepad or a text editor to view or change the configuration data.

For example, a configuration data should have the following information:

```
CONNECT.TYPE=STATIC/DHCP
IP=192.168.0.120
NETMASK=255.255.255.0
GATEWAY=192.168.0.1
TRAPDESTINATION1=0.0.0.0
TRAPDESTINATION2=0.0.0.0
TRAPDESTINATION3=0.0.0.0
TRAPDESTINATION4=0.0.0.0
TRAPDESTINATION5=0.0.0.0
SNMPRD.COMMUNITY.STR=public
SNMPRW.COMMUNITY.STR=private
MANAGE.AC SOCKET.A.DEFAULT.POWER=ON/OFF
MANAGE.AC SOCKET.B.DEFAULT.POWER=ON/OFF
MANAGE.AC SOCKET.C.DEFAULT.POWER=ON/OFF
MANAGE.PDU.DEFAULT.POWER=ON/OFF
MANAGE.PSU.CONFIGURATION=5+1
```

Configuring the SNMP Traps

- 1 Import the PDU PMC configuration data.
- 2 Use a Notepad or text editor to edit the configuration data.
- 3 Enter an IP address in the appropriate Trap Destination field.
- 4 Set the SNMP read community string in SNMP RD COMMUNITY STR. By default, the SNMP read community string is *public*.
- 5 Set the SMP read-write community string in SNMP RW COMMUNITY STR. By default, the SNMP read-write community string is *private*.
- 6 Save the file.
- 7 Use the TFTP server software to upload the configuration file.

Updating the PMC Firmware



NOTE: The following procedure uses NET-SNMP, a free SNMP tool for Linux systems, available at www.net-snmp.org, as an example.

- 1 Use the TFTP server to upload the PMC firmware image into the PMC EEPROM.
- 2 Launch the NET-SNMP utility.
- 3 Use the snmpset command to update the firmware:
 - a To set TFTP Server IP address, enter the following commands:

```
snmpset -v 2c -c community target_ip .1.3.6.1.4.1.674.20.50.6.0 a server_ip
```
 - b To set Image File Name, enter the following commands:

```
snmpset -v 2c -c community target_ip .1.3.6.1.4.1.674.20.50.7.0 s image_file
```
 - c To upgrade PMC firmware, entering the following commands:

```
snmpset -v 2c -c community target_ip .1.3.6.1.4.1.674.20.50.500.1.0 i l
```




NOTE: The snmpset community property command depends on the community string data in the PMC Configuration Information. The default SNMP community string is public.

Sample output:

```
[root@localhost ~]# snmpset -v 2c -c private 10.32.49.67.1.3.6.1.4.1.674.20.50.6.0 a
10.32.49.64 <- Set TFTP Server IP
SNMPv2-SMI::enterprises.674.20.50.6.0 = IpAddress: 10.32.49.64
[root@localhost ~]# snmpset -v 2c -c private 10.32.49.67.1.3.6.1.4.1.674.20.50.7.0 s
pmc.01.A.045.01.01.0001.bin <- Set Image File Name
SNMPv2-SMI::enterprises.674.20.50.7.0 = STRING: "pmc.01.A.045.01.01.0001.bin"
[root@localhost ~]# snmpset -v 2c -c private 10.32.49.67.1.3.6.1.4.1.674.20.50.500.1.0 i
l <- Upgrade Firmware
SNMPv2-SMI::enterprises.674.20.50.500.1.0 = INTEGER: 1
```

Viewing the PMC Firmware Version Information

 **NOTE:** The following procedure uses NET-SNMP, a free SNMP tool for Linux systems, available at www.net-snmp.org, as an example.

- 1 Launch the NET-SNMP utility.
- 2 Use the snmpset command to view firmware version information.
snmpget -v 2c -c community target_ip .1.3.6.1.4.1.674.20.50.2.0

Sample output:

```
[root@localhost ~]# snmpget -v 2c -c private 10.32.49.67.1.3.6.1.4.1.674.20.50.2.0  
<- Get firmware Version to confirm.  
SNMPv2-SMI::enterprises.674.20.50.2.0 = STRING: "V01.A.045.01.01.0001"
```


Jumpers and Connectors

This section describes the connectors on the various boards in the server enclosure.

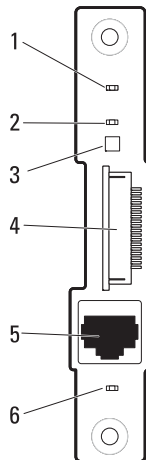
Server Enclosure Boards

The server enclosure has three system boards that make up its building block.

- Front Panel Board
- Fan Controller Board
- Power Management Board

Front Panel Board Connectors

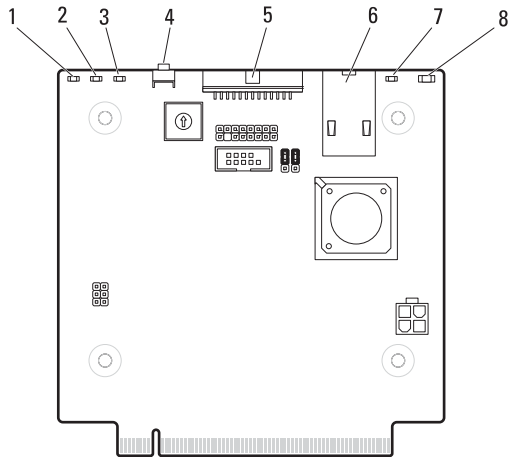
Figure 7-1. Front Panel Board Connectors



- | | | | |
|---|--------------------------|---|---------------------------|
| 1 | power/event LED | 2 | system identification LED |
| 3 | thermal sensor | 4 | front panel connector |
| 5 | 10/100 Mbit NIC LAN port | 6 | LAN activity LED |

Fan Controller Board Connectors

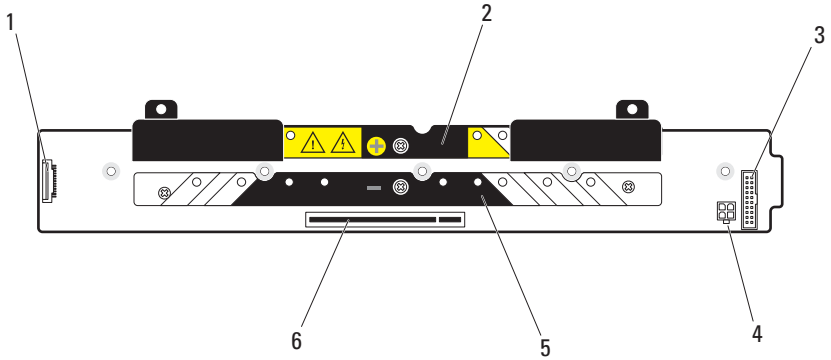
Figure 7-2. Fan Controller Board Connectors



- | | | | |
|---|---------------------------|---|--------------------------|
| 1 | fan 3 fault LED | 2 | fan 2 fault LED |
| 3 | fan 1 fault LED | 4 | Service mode button |
| 5 | PDU PMBus connector | 6 | 10/100 Mbit NIC LAN port |
| 7 | system identification LED | 8 | power/event LED |

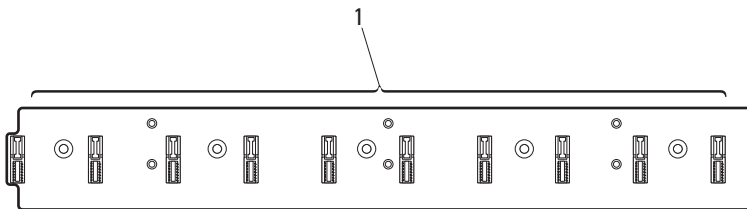
Power Management Board Connectors

Figure 7-3. Front View of the Power Management Board



- | | | | |
|---|-----------------------------|---|----------------------------------|
| 1 | front panel board connector | 2 | power bus bar |
| 3 | system fan connector | 4 | power connector (debug-use only) |
| 5 | power bus bar | 6 | fan controller board connector |

Figure 7-4. Back View of the Power Management Board



- | | |
|---|---|
| 1 | node power distribution board connectors 1-10 |
|---|---|

Getting Help

Contacting Dell



NOTE: If you do not have an active Internet connection, you can find contact information on your purchase invoice, packing slip, bill, or Dell product catalog.

Dell provides several online and telephone-based support and service options. Availability varies by country and product, and some services may not be available in your area. To contact Dell for sales, technical support, or customer service issues:

- 1 Visit dell.com/support.
- 2 Select your support category.
- 3 Verify your country or region in the Choose a Country/Region drop-down menu at the top of the page.
- 4 Select the appropriate service or support link based on your need.

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