Dell PowerEdge C8220

Hardware Owner's Manual

Regulatory Model: B05B
Regulatory Type: B05B001

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 B05B

Regulatory Type: B05B001

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Contents

1

About Your System

Accessing System Features During Startup

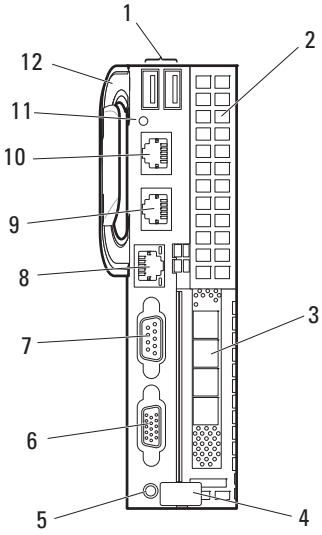
The following keystrokes provide access to system features during startup. The SAS/SATA card or PXE hotkey support are available only in the BIOS boot mode. Hotkey function is not available in the Unified Extensible Firmware Interface (UEFI) boot mode.

Keystroke	Description
<F2>	Enters the System Setup program. See "System Setup Menu" on page 49.
<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.

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

Front-Panel Features and Indicators

Figure 1-1. Front-Panel Features and Indicators



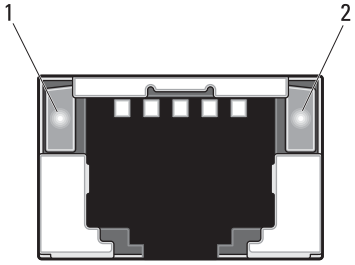
Item	Indicator, Button, or Connector	Icon	Description
1	USB connectors		Connects USB devices to the system. The ports are USB 2.0 compliant.
2	Mezzanine card expansion slot		Installs an I/O module mezzanine card.
3	Low profile PCIe expansion slot		Installs a low profile PCI Express x16 card.
4	Release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

Item	Indicator, Button, or Connector	Icon	Description
5	Power-on indicator/ power button		The power-on indicator lights when the sled power is on. The power-on indicator lights amber when the system critical event occurs. **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 reseat the sled in the server enclosure. The power button turns the compute sled on. **NOTES:** • 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	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 system and system board.
12	Handle		Hold to pull the sled from the enclosure.

NIC Indicator Codes

Figure 1-2. NIC Indicators

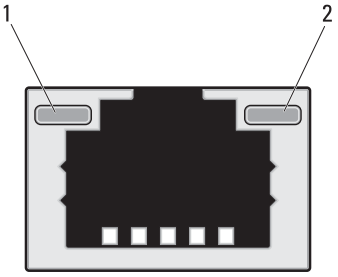


1 link indicator 2 activity indicator

Indicator	Status	Indicator Code
Link indicator	Solid amber	Linking at 100 Mbps port speed
	Solid green	Linking at 1 Gbps port speed (maximum)

Indicator	Status	Indicator Code
	Blinking green	Linking at 1 Gbps port speed Network activity is present • Pre OS POST • OS without driver • OS with driver Blinks at speed relative to packet density
	Off	Linking at 10 Mbps port speed
Activity indicator	Solid green	No activity
	Blinking green	Transmit or receive activity
	Off	Idle

Figure 1-3. 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

Management Interface

The sled includes a BMC that is responsible for monitoring the sled for critical events by communicating with various sensors on the system board, the node power distribution board and, if installed in the PowerEdge C8000 server enclosure, it also communicates with the enclosure's fan controller board and sends alerts and log events when certain parameters exceed their preset thresholds.

You can access BMC using two modes of operation: non-central independent mode or non-central consolidated mode. In the non-central independent mode, you can access BMC through dedicated-NIC using the sled's BMC management port. In the non-central consolidated mode, you can access BMC through shared-NIC using the PowerEdge C8000 server enclosure's BMC management port or Ethernet port.

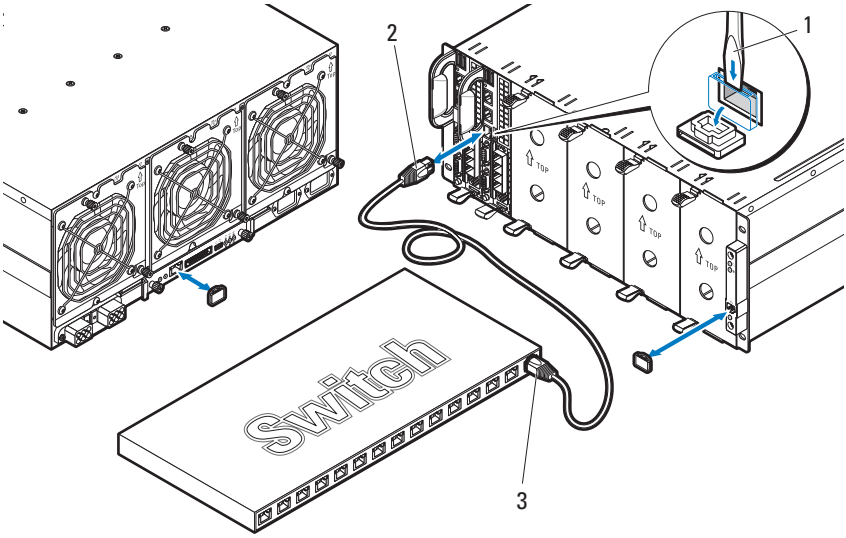
Non-Central Independent Mode

To setup BMC connection using the non-central independent mode:

1. Before you setup BMC, you must first connect the sled to a local console and configure the necessary system BIOS, network, and serial connection settings to enable access to the BMC. See "Enabling and Configuring Console Redirection Via BMC SOL" on page 53.
2. Remove the port cover on the sled's BMC management port by using a small flat blade screwdriver and pry the port cover off of the sled's BMC management port. Save the port cover for future use. See Figure 1-4.
3. Connect one end of the network cable to the sled's BMC management port.
4. Connect the other end of the network cable to an available port on the Ethernet switch.

NOTE: Make sure to install the port covers in the PowerEdge C8000 server enclosure's BMC management port and Ethernet port. See Figure 1-4.

Figure 1-4. Non-Central Independent Mode



1 flat-blade screwdriver on sled's port cover

2 network cable on sled

3 network cable on switch

5 Configure the BMC on the managed sled. You can use the BMC Management Utility to manage the sled's BMC from a remote management station.

For more information about the BMC Management Utility, see Using the Baseboard Management Controller Guide at **dell.com/support/manuals**.

Non-Central Consolidated Mode

There are two setup options available for this mode, you can use the server enclosure's Ethernet connector or BMC management port to connect to an Ethernet switch.

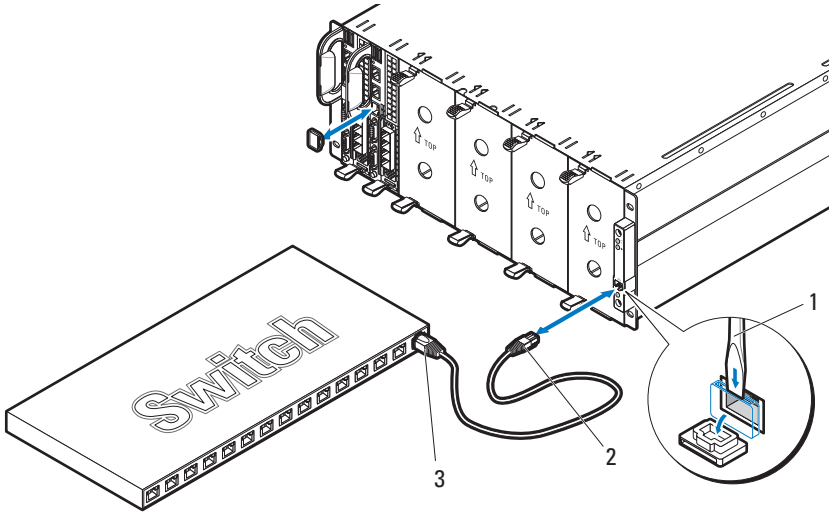
To setup BMC connection using the server enclosure's Ethernet connector:

NOTE: Do not connect the server enclosure's front Ethernet connector and back BMC management port to the same Ethernet switch.

1. Before you setup BMC, you must first connect the BMC management cable in the sled. See "Installing the BMC Management Cable" on page 196.
2. Remove the port cover by using a small flat blade screwdriver and pry the port cover off of the server enclosure's front Ethernet connector. Save the port cover for future use. See Figure 1-5.
3. Connect one end of the network cable to an available port on the Ethernet switch and connect the other end of the network cable to the Ethernet connector located on the front of the server enclosure.

NOTE: Make sure to install the port cover in the sled's BMC management port. See Figure 1-5.

Figure 1-5. Non-Central Consolidated Mode — Ethernet Connector



1	flat-blade screwdriver on server enclosure's port cover	2	network cable on server enclosure
3	network cable on switch		

4 Configure the BMC on the managed sled. You can use the BMC Management Utility to manage the sled's BMC from a remote management station.

For more information about the BMC Management Utility, see Using the Baseboard Management Controller Guide at **dell.com/support/manuals**.

To setup BMC connection using the server enclosure's BMC management port:

NOTE: Do not connect the server enclosure's front Ethernet connector and back BMC management port to the same Ethernet switch.

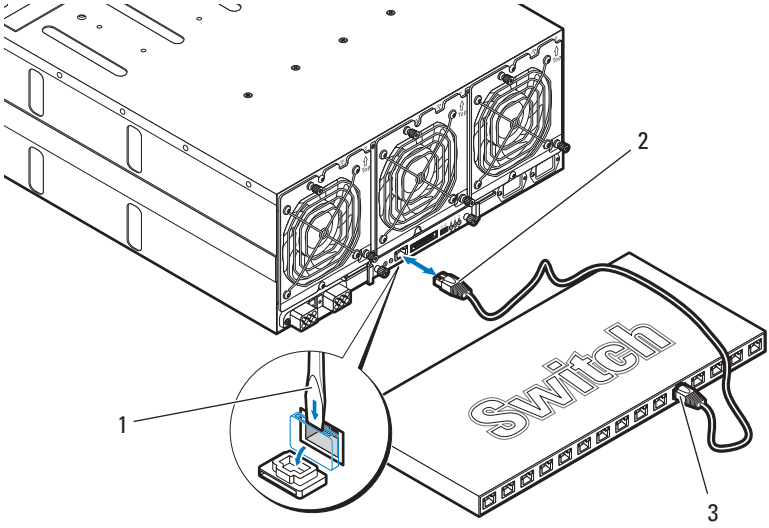
1 Before you setup BMC, you must first connect the BMC management cable in the sled. See "Installing the BMC Management Cable" on page 196.

2 Remove the port cover by using a small flat blade screwdriver and pry the port cover off of the server enclosure's back BMC management port. Save the port covers for future use. See Figure 1-6.

3 Connect one end of the network cable to an available port on the Ethernet switch and connect the other end of the network cable to the BMC management port located on the back of the server enclosure.

NOTE: Make sure to install the port cover in the sled's BMC management port.

Figure 1-6. Non-Central Consolidated Mode — BMC Management Port



1	flat-blade screwdriver on server enclosure's port cover	2	network cable on server enclosure
3	network cable on switch		

4 Configure the BMC on the managed sled. You can use the BMC Management Utility to manage the sled's BMC from a remote management station.

For more information about the BMC Management Utility, see Using the Baseboard Management Controller Guide at **dell.com/support/manuals**.

Power and System Board Indicator Codes

The indicators on the front of the sled display status codes during system startup. For location of the indicators on the front panel, see Figure 1-1.

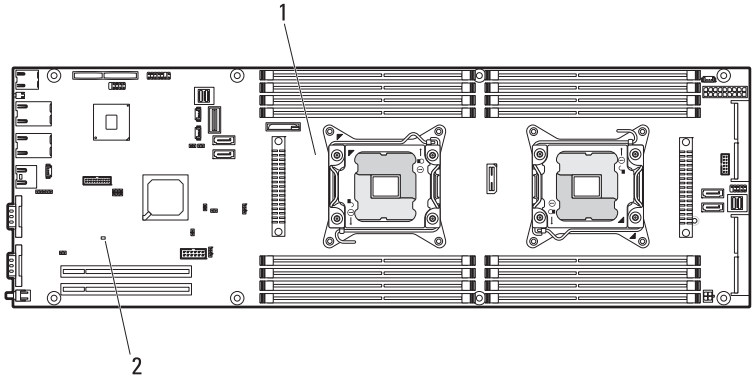
Table 1-1. Power and System Board Indicator Codes

Indicator	Color	Status	Indicator Code
Power-on indicator	Green Amber	Solid Off	Sled power is on (S0)
	Green Amber	Solid Blinking	BMC critical condition event in power off mode (S4/S5)
	Green Amber	Off Blinking	BMC critical condition event in power on mode (S0)
System identification indicator	Blue	Solid	The IPMI via Chassis Identify Command On or ID Button Press ID On is generated
	Blue	Blinking	Only the IPMI via Chassis Identify Command Blink On is generated
	Off		The IPMI via Chassis Identify Command Off or ID Button Press ID Off is generated

BMC Heartbeat Indicator Codes

The system board includes a BMC heartbeat indicator (LED17) for debugging the Baseboard Management Controller (BMC). The BMC heartbeat indicator lights green when power is supplied to the sled and blinks green when the BMC firmware is ready.

Figure 1-7. BMC Heartbeat Indicator

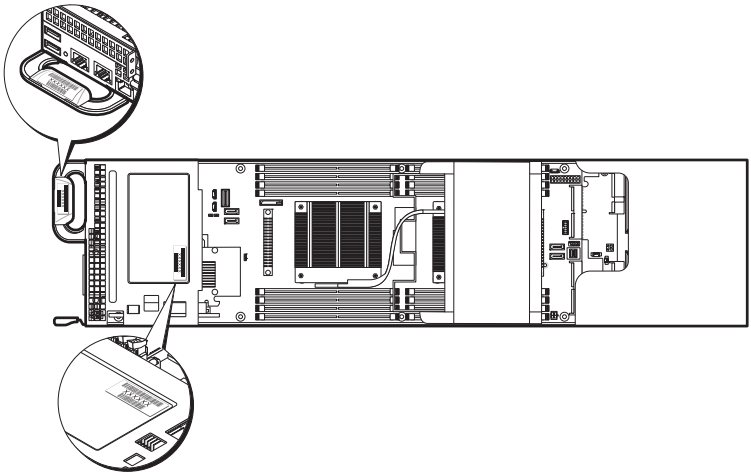


1	system board	2	BMC heartbeat indicator

Service Tag

The following illustration provides location of the Service Tag number on the C8220 single-wide compute sled.

Figure 1-8. Service Tag Location for C8220 Single-Wide Compute 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 210. If the problem persists, see "Getting Help" on page 241.
0011h	Local Console Controller Error	Pause	Video device initialization failed	See "Troubleshooting the Video Subsystem" on page 210. If the problem persists, see "Getting Help" on page 241.

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 210. If the problem persists, see "Getting Help" on page 241.
0013h	ISA IO Controller Error	Pause	ISA device initialization failed	See "Troubleshooting Expansion Cards" on page 219. If the problem persists, see "Getting Help" on page 241.
0014h	ISA IO Resource Conflict	Pause	ISA device initialization failed	See "Troubleshooting Expansion Cards" on page 219. If the problem persists, see "Getting Help" on page 241.
0015h	ISA IO Controller Error	Pause	ISA device initialization failed	See "Troubleshooting Expansion Cards" on page 219. If the problem persists, see "Getting Help" on page 241.
0016h	ISA Floppy Controller Error	Pause	Floppy device initialization failed	See "Troubleshooting a USB Device" on page 210. If the problem persists, see "Getting Help" on page 241.
0017h	ISA Floppy Input Error	Pause	Floppy device initialization failed	See "Troubleshooting a USB Device" on page 210. If the problem persists, see "Getting Help" on page 241.
0018h	ISA Floppy Output Error	Pause	Floppy device initialization failed	See "Troubleshooting a USB Device" on page 210. If the problem persists, see "Getting Help" on page 241.

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 210. If the problem persists, see "Getting Help" on page 241.
001Ah	USB Write Error	Pause	USB port initialization failed	See "Troubleshooting a USB Device" on page 210. If the problem persists, see "Getting Help" on page 241.
001Bh	USB Interface Error	Pause	USB port initialization failed	See "Troubleshooting a USB Device" on page 210. If the problem persists, see "Getting Help" on page 241.
001Ch	Mouse Interface Error	Pause	Mouse device initialization failed	To enable USB device, see "USB Configuration" on page 87. See "Troubleshooting a USB Device" on page 210. If the problem persists, see "Getting Help" on page 241.
001Eh	Keyboard Not Detected	Pause	No keyboard detected	To enable USB device, see "USB Configuration" on page 87. See "Troubleshooting a USB Device" on page 210. If the problem persists, see "Getting Help" on page 241.
001Fh	Keyboard Controller Error	Pause	Keyboard controller initialization failed	See "Troubleshooting a USB Device" on page 210. If the problem persists, see "Getting Help" on page 241.

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 241.
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 241.
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 215. If the problem persists, see "Getting Help" on page 241.
0024h	Memory Uncorrectable Error	Pause	Memory uncorrectable error detected	See "Troubleshooting System Memory" on page 215. If the problem persists, see "Getting Help" on page 241.
0025h	Memory Non-Specific Error	Pause	Memory non-specific error detected	See "Troubleshooting System Memory" on page 215. If the problem persists, see "Getting Help" on page 241.
0026h	MP Service Self Test Error	Pause	MP service self test error detected	See "Troubleshooting Processors" on page 220. If the problem persists, see "Getting Help" on page 241.
0027h	PCI IO Controller Error	Pause	PCI device initialization failed	See "Troubleshooting Expansion Cards" on page 219. If the problem persists, see "Getting Help" on page 241.

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 219. If the problem persists, see "Getting Help" on page 241.
0029h	PCI IO Write Error	Pause	PCI device initialization failed	See "Troubleshooting Expansion Cards" on page 219. If the problem persists, see "Getting Help" on page 241.
002Ah	Serial Port Not Detected	Pause	Serial device initialization failed	See "Troubleshooting a Serial I/O Device" on page 211. If the problem persists, see "Getting Help" on page 241.
002Bh	Serial Port Controller Error	Pause	Serial device initialization failed	See "Troubleshooting a Serial I/O Device" on page 211. If the problem persists, see "Getting Help" on page 241.
002Ch	Serial Port Input Error	Pause	Serial device initialization failed	See "Troubleshooting a Serial I/O Device" on page 211. If the problem persists, see "Getting Help" on page 241.
002Dh	Serial Port Output Error	Pause	Serial device initialization failed	See "Troubleshooting a Serial I/O Device" on page 211. If the problem persists, see "Getting Help" on page 241.
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 241.

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 77. Install a SATA device to SATA port 0. If the problem persists, see "Getting Help" on page 241.
8013h	SATA 1 Device Not Found	Pause	SATA 1 device not found	Check if the SATA port1 is enabled. See "SATA Configuration" on page 77. Install a SATA device to SATA port 1. If the problem persists, see "Getting Help" on page 241.
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 77. Install a SATA device to SATA port 2. If the problem persists, see "Getting Help" on page 241.
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 77. Install a SATA device to SATA port 3. If the problem persists, see "Getting Help" on page 241.

Error Code	Error Message	Response	Error Cause	Corrective Actions
8016h	SATA 4 Device Not Found	Pause	SATA 4 device not found	Check if the SATA port 4 is enabled. See "SATA Configuration" on page 77. Install a SATA device to SATA port 4. If the problem persists, see "Getting Help" on page 241.
8017h	SATA 5 Device Not Found	Pause	SATA 5 device not found	Check if the SATA port 5 is enabled. See "SATA Configuration" on page 77. Install a SATA device to SATA port 5. If the problem persists, see "Getting Help" on page 241.
8018h	Sparing Mode is not be Configured!!, Please check Memory Configuration!!	Pause	Memory Sparing Mode Failed	Check if the memory configuration is set to Sparing mode. See "Memory Configuration" on page 74. If the problem persists, see "Getting Help" on page 241.
8019h	Mirror Mode is not be Configured!!, Please check Memory Configuration!!	Pause	Memory Mirror Mode Failed	Check if the memory configuration is set to Sparing mode. See "Memory Configuration" on page 74. If the problem persists, see "Getting Help" on page 241.
8020h	Supervisor and User Passwords have been cleared	Pause	Supervisor and User Passwords have been cleared	Reset password. See "System Board Jumper Settings" on page 226 for more information. If the problem persists, see "Getting Help" on page 241.

Error Code	Error Message	Response	Error Cause	Corrective Actions
8021h	CMOS Battery Error	Pause	No CMOS battery	See "Troubleshooting the System Battery" on page 222.
8100h	Memory device disabled by BIOS	Pause	Memory Device Error	See "Troubleshooting System Memory" on page 215. If the problem persists, see "Getting Help" on page 241.

System Event Log

Processor Error

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

Table 1-2. 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 1-3. 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 1-3. 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 1-4. 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 7:3Device Number
			Bit 2:0Function 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 1-5. 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 1-6. 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 1-7. 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 1-8. 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 1-9. 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 1-10. 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	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 1-11. 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)
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 1-12. 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 1-13. 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 1-14. 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 1-15. 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 1-16. 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 1-17. 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 PowerEdge C8000 Hardware Owner's Manual for information about the server enclosure features, troubleshooting, and component replacement. This document is available at **dell.com/support/manuals**.
- The Baseboard Management Controller Guide provides information about installing and using the systems management utility. See Using the Baseboard Management Controller Guide 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.

2

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, diskette 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 respective key during the 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

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 Figure 1-1 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: ANSI

   See "Remote Access Configuration" on page 95 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 Figure 1-1 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 95 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 Figure 1-1 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 95 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 93 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 Figure 1-1 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 95 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 93 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

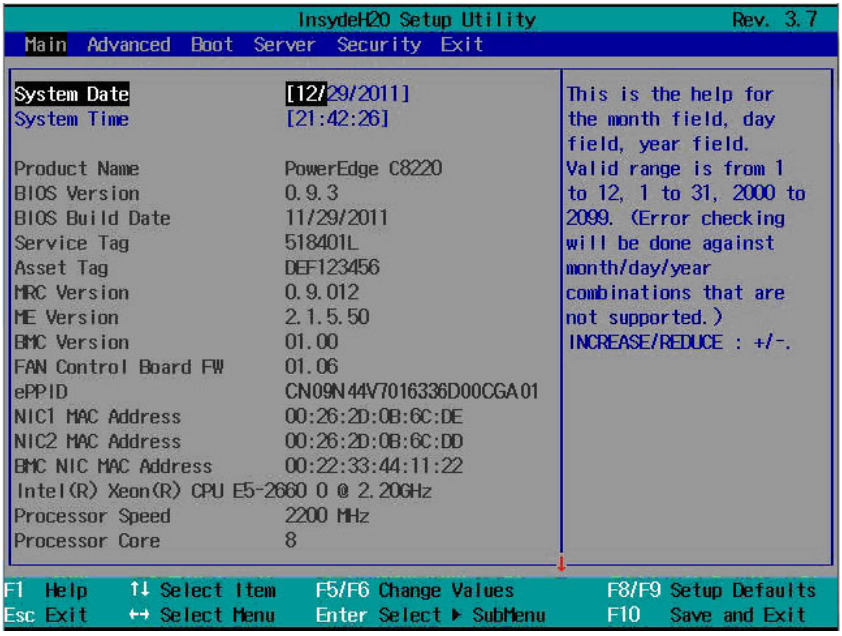
Signal Type	Setup Option			OS Setting	Output
	Remote Access	Serial Port Number	Serial Port Address		
Serial Console Redirection	Enabled	COM1	3F8h/2F8h	ttyS0	Serial Port
	Enabled	COM1	2F8h/3F8h	ttyS1	
BMC Serial Over LAN	Enabled	COM2 as SOL	3F8h/2F8h	ttyS1	Management Port
	Enabled	COM2 as SOL	2F8h/3F8h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

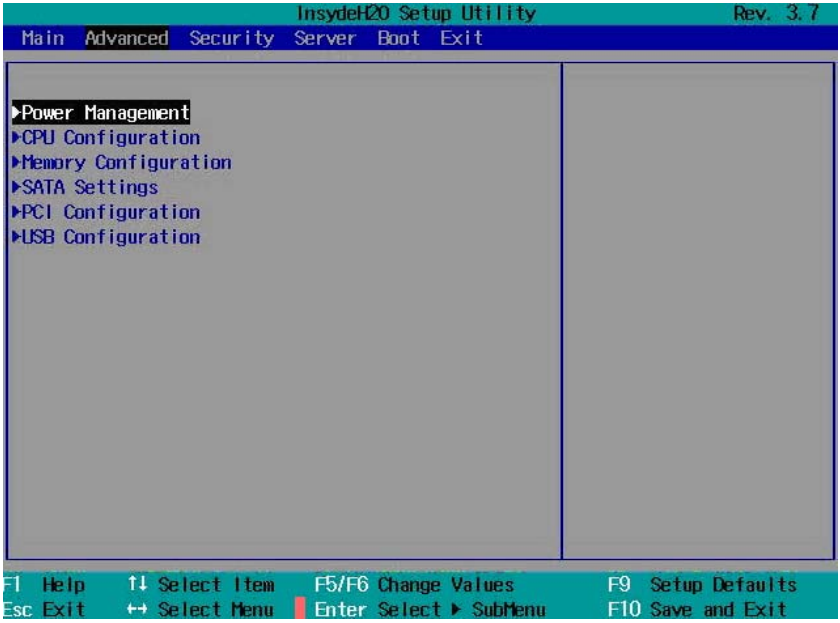
Option	Description
System Date	Scroll to this item to adjust the date. Use <Enter>, <Tab> or <Shift><Tab> to select a field. Use [+] or [-] to configure system date.
System Time	Scroll to this item to adjust the time. Use <Enter>, <Tab> or <Shift><Tab> to select a field. Use [+] or [-] to configure system 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

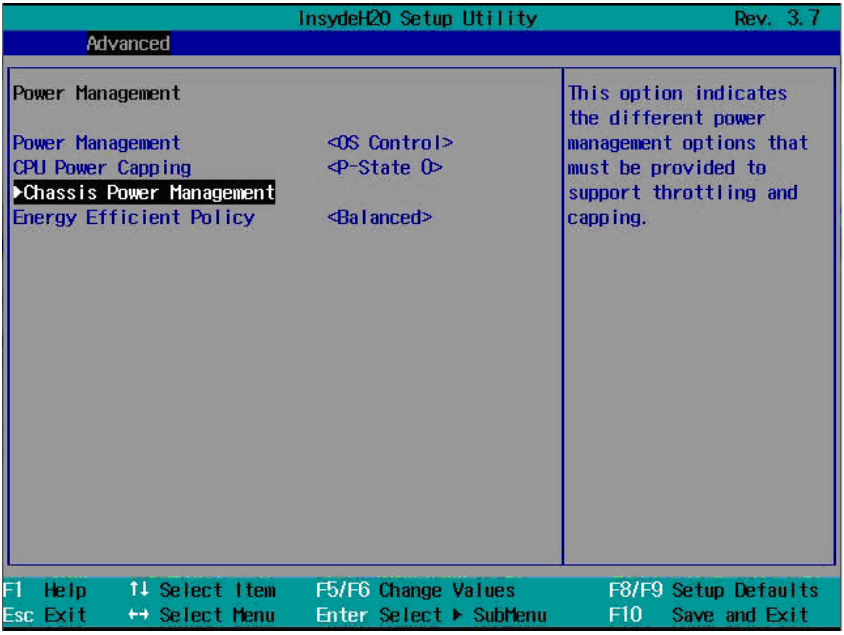
The advanced menu displays a table of items that defines advanced information about your system. Scroll to this item and press <Enter> to view the following screen.

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.



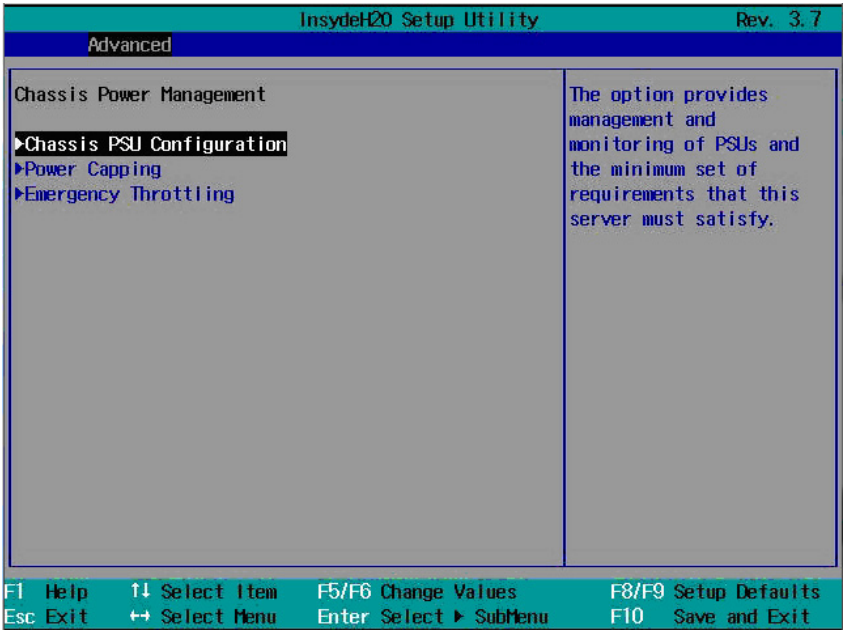
Power Management

Option	Description
Power Management (**OS Control** default)	Select a system power management mode. • 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)	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]. **NOTE:** This option is enabled when Power Management is set to OS Control mode.
Chassis Power Management	Press <Enter> to set chassis power management. This option indicates the different power management options that control the system power consumption by processor throttling and power capping.
Energy Efficient Policy (**Balanced** default)	Select a power policy option. • 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. **NOTE:** This option works when the OS does not support power management control of processor.

Chassis Power Management

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



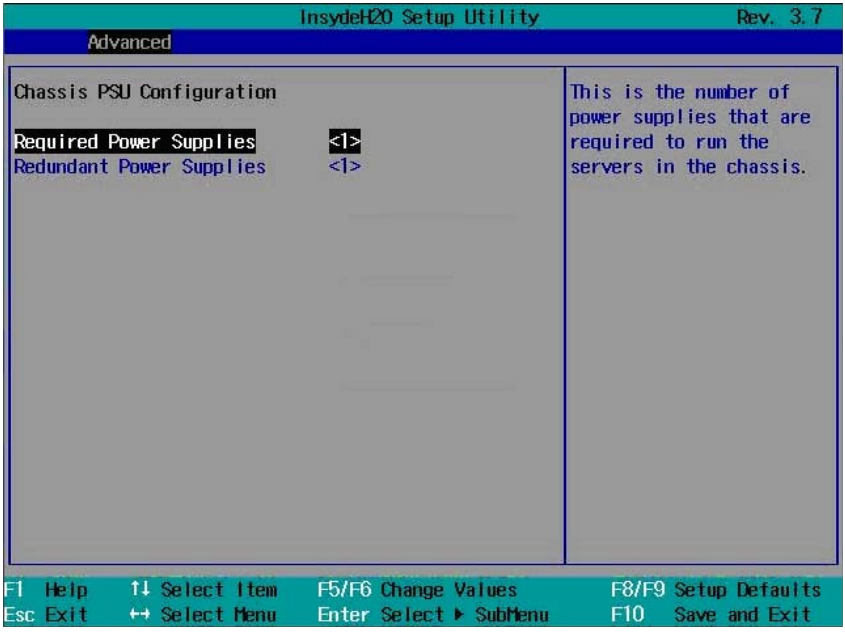
Chassis Power Management

Option	Description
Chassis PSU Configuration	Press <Enter> to configure the chassis power supply. This option provides management and monitoring of the power supplies and the minimum set of requirements that this server must satisfy.
Power Capping	Press <Enter> to set power capping values. This option controls system power by node manager through the processor to limit power consumption in watts for a sled. **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.

Option	Description
Emergency Throttling	Press <Enter> to configure the compute sled and chassis emergency throttle functions. 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.). **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%.

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 65 when changing the configuration of the power supplies to load-shared or redundant power.

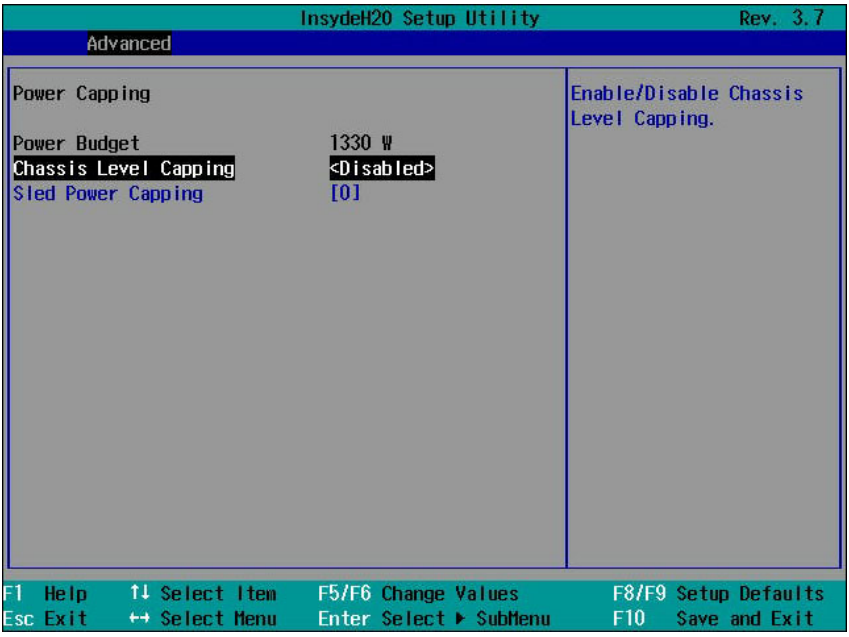
Boundaries of PSU Configuration

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

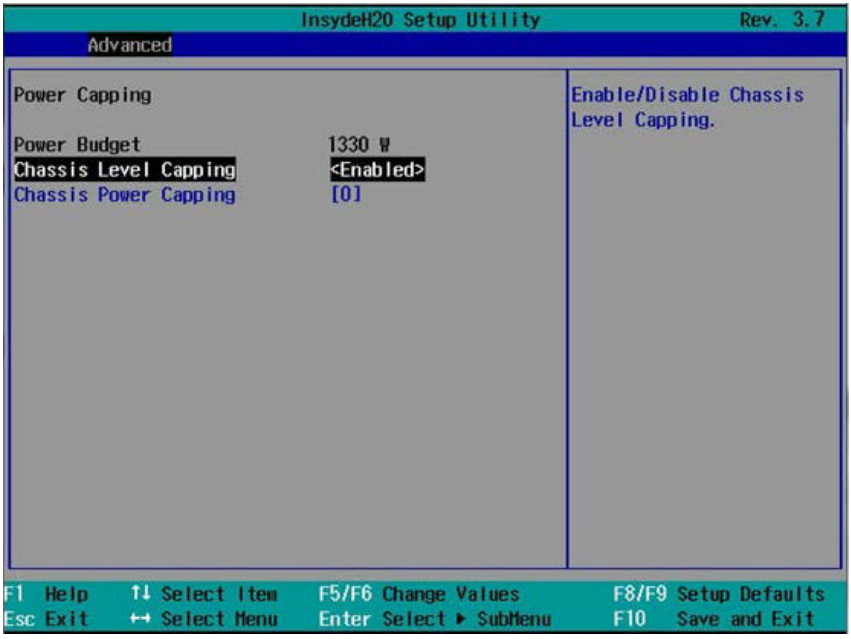
Scroll to this item and press <Enter> to view the following screens.



Power Capping

Option	Description
Power Budget	Displays the enclosure available power wattage. 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. 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.

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)	**NOTE:** This option is enabled when the Chassis Level Capping is set to Disabled. 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.

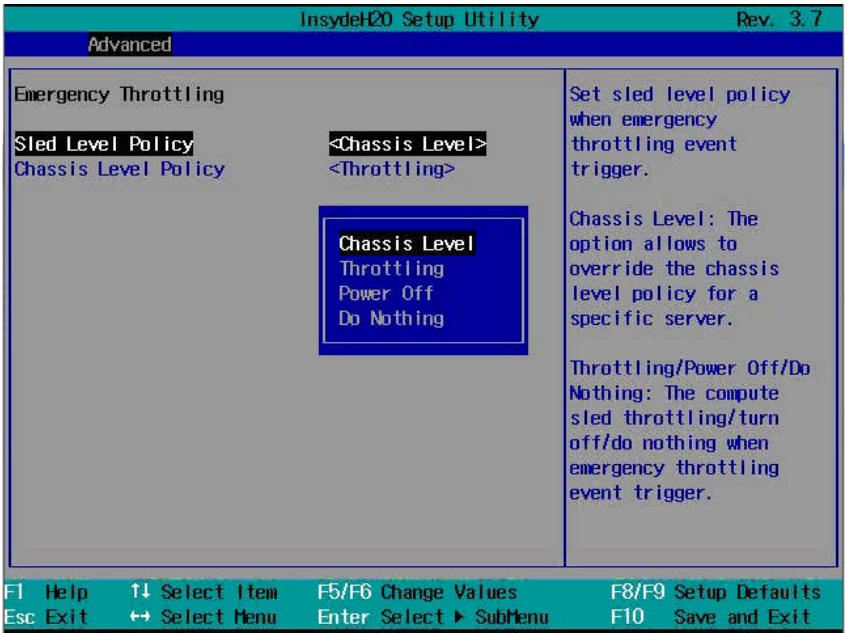


Power Capping

Option	Description
Power Budget	Displays the enclosure available power wattage. 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. 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.
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.
Chassis Power Capping (0 default)	**NOTE:** This option is enabled when the Chassis Level Capping is set to Enabled. 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.

Emergency Throttling

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



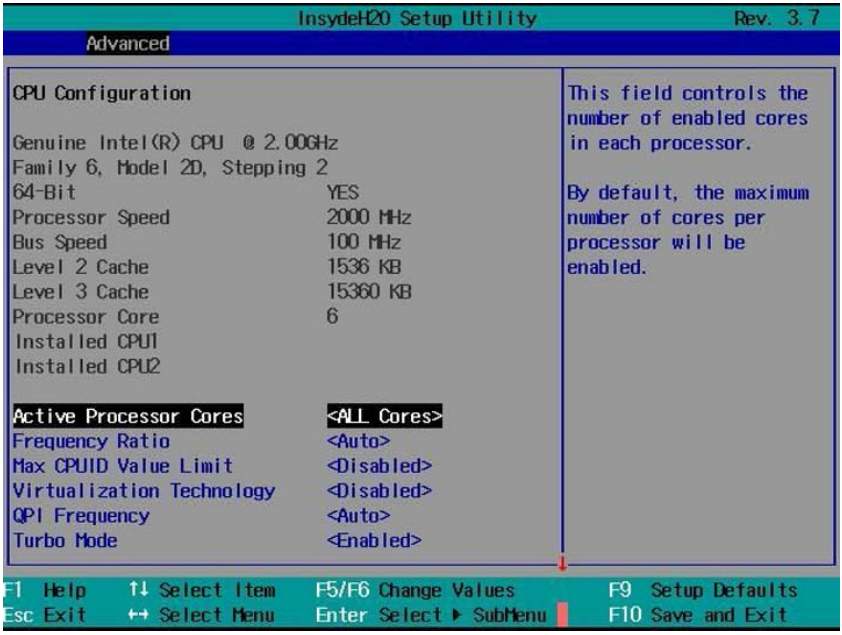
Emergency Throttling

Option	Description
Sled Level Policy (**Chassis Level** default)	Select a sled level policy when an emergency throttle event is triggered. • 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)	Select a chassis level policy when an emergency throttle event is triggered. This option can be configured when the Sled Level Policy is set as Chassis Level. • Throttling: Allows chassis sled throttling when an emergency throttle event is triggered. • Power Off: The server power turns off when an emergency throttle event is triggered.

CPU Configuration

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



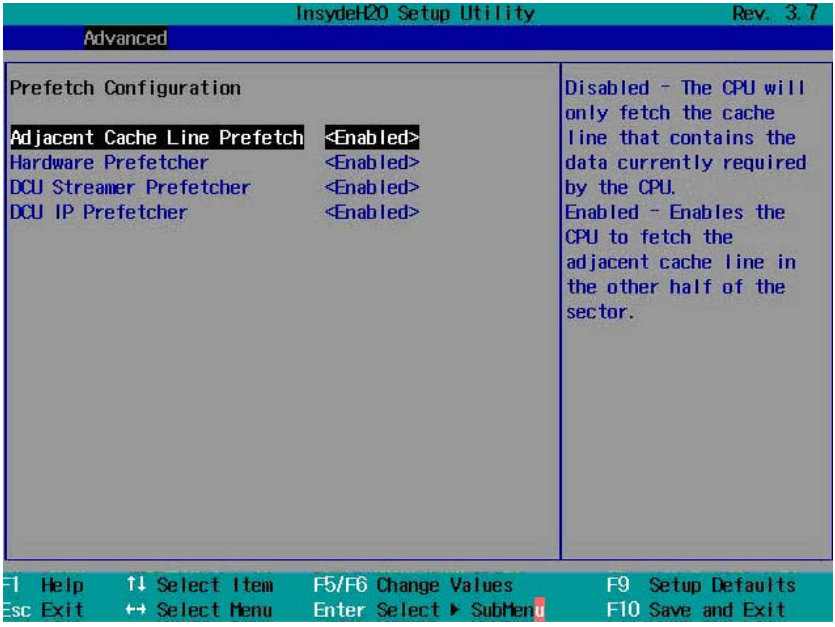
CPU Configuration

Option	Description
Active Processor Cores (**All Cores** default)	Allows you to control the number of enabled core 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)	Enables or disables the processor C7 state. **NOTE:** This feature is visible only when the processor supports C7 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.
XD Bit Capability (**Enabled** default)	Enables or disables the processor's Execute Disable (XD) Memory Protection Technology feature.
Direct Cache Access (**Enabled** default)	Enables or disables the direct cache access.
Hyper-Threading Technology (**Enabled** default)	Enables or disables the Hyper-Threading technology.
Prefetch Configuration	Press <Enter> to configure the prefetch settings. **NOTE:** This feature is available when supported by the processor.

Prefetch Configuration

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



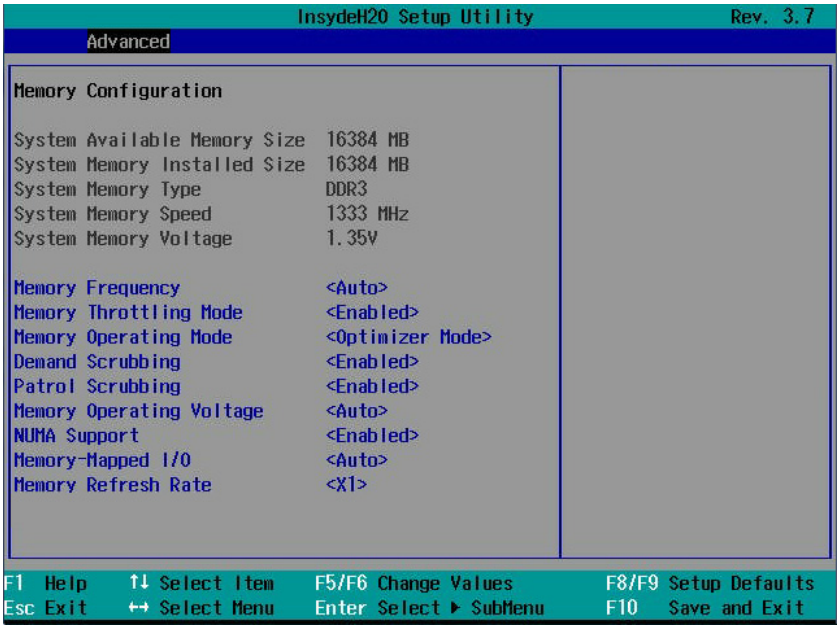
Prefetch Configuration

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

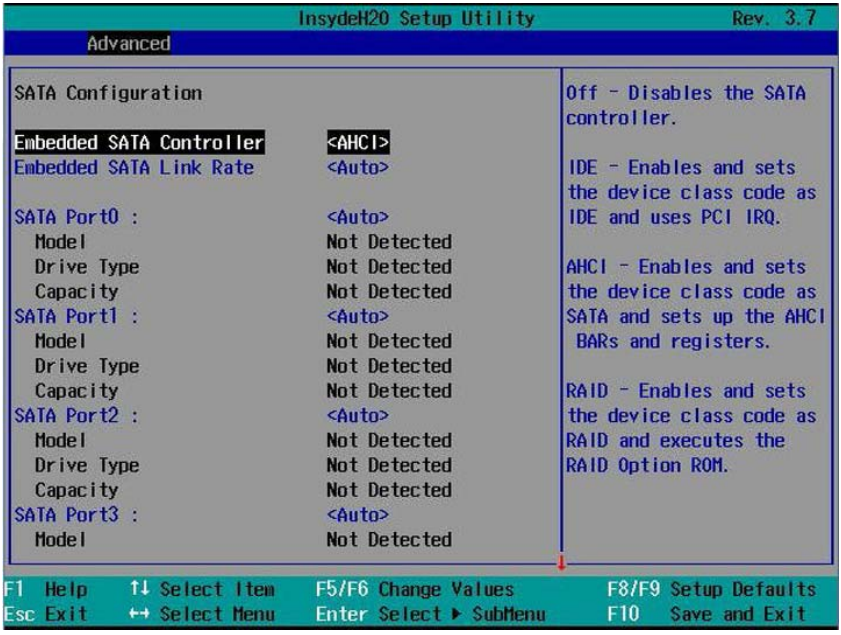
Option	Description
Memory Frequency (**Auto** default)	Select an operating memory frequency. Options are [Auto], [800], [1066], [1333], [1600], and [1866].
Memory Turbo Mode (**Disabled** default)	Enables or disables the memory turbo mode. **NOTE:** This feature is not available for Intel Xeon E5-2600 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)	Select the type of memory operation if a valid memory configuration is installed. • 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)	Enables or disables DRAM scrubbing. DRAM scrubbing is the ability to write corrected data back to the memory once a correctable error is detected on read transaction.
Patrol Scrubbing (**Enabled** default)	Enables or disables patrol scrubbing. Patrol scrubbing proactively searches the system memory, repairing correctable errors.

Option	Description
Memory Operating Voltage (**Auto** default)	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]. **NOTE:** BIOS will auto restrict selection if DIMM is not supporting low voltage.
NUMA Support (**Enabled** default)	Enables or disables Non-Uniform Memory Access (NUMA) support to improve processor performance. **NOTE:** This option is available for NUMA systems that allow memory interleaving across all processor nodes.
Memory Mapped I/O (**Auto** default)	Select the base address register for the PCIe memory space. Options are [Auto], [32-bit], and [64-bit].
Memory Refresh Rate (**X1** default)	Enables or disables the 2X memory refresh rate.

SATA Configuration

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



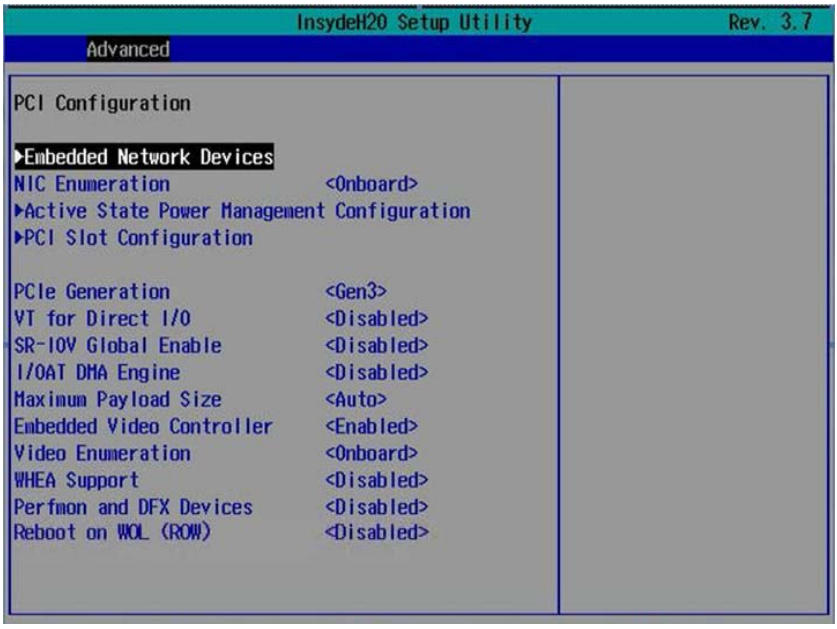
SATA Configuration

Option	Description
Embedded SATA Controller (**AHCI** default)	Select an operation mode for the onboard SATA controller. • 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. • 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)	When set to off, turns off the 3rd Serial ATA drive controller. When set to auto, enables BIOS support for the 3rd Serial ATA drive controller (enabled if present, POST error if not present).
SATA Port 3 (**Auto** default)	When set to off, turns off the 4th Serial ATA drive controller. When set to auto, enables BIOS support for the 4th Serial ATA drive controller (enabled if present, POST error if not present).
SATA Port 4 (**Auto** default)	When set to off, turns off the 5th Serial ATA drive controller. When set to auto, enables BIOS support for the 5th Serial ATA drive controller (enabled if present, POST error if not present).
SATA Port 5 (**Auto** default)	When set to off, turns off the 6th Serial ATA drive controller. When set to auto, enables BIOS support for the 5th Serial ATA drive controller (enabled if present, POST error if not present).
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

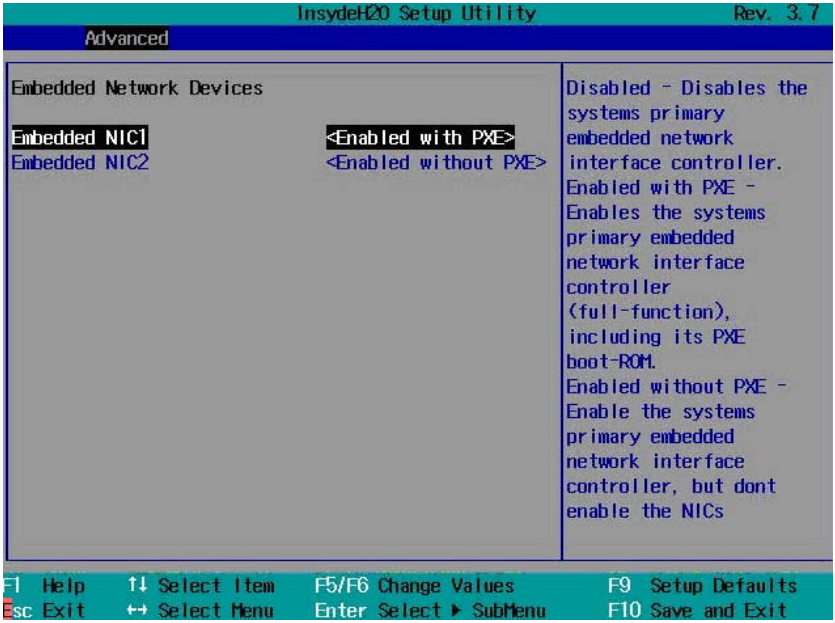
Option	Description
Embedded Network Devices	Press <Enter> to configure available network drives.
NIC Enumeration (**Onboard** default)	Select a LAN boot ROM option. • Onboard: Uses the PXE boot on NICs to boot the system. • Add-in: Use the PXE boot on add-in network adapters to boot the system.
Active 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. • 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. • 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.

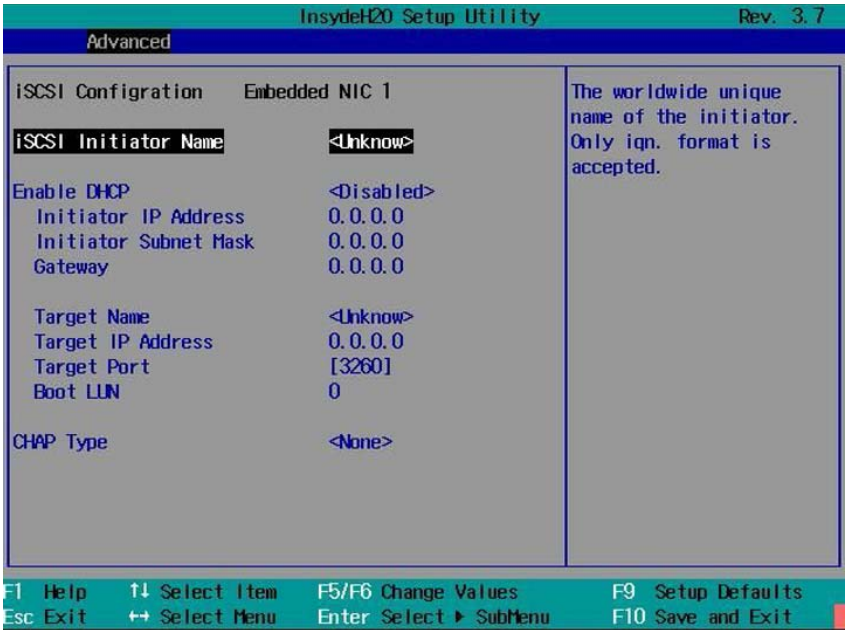


Embedded Network Devices

Option	Description
Embedded NIC1 (**Enabled with PXE** default)	Enables or disables the onboard NIC1 controller. • 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)	Enables or disables the onboard NIC2 controller. • 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.



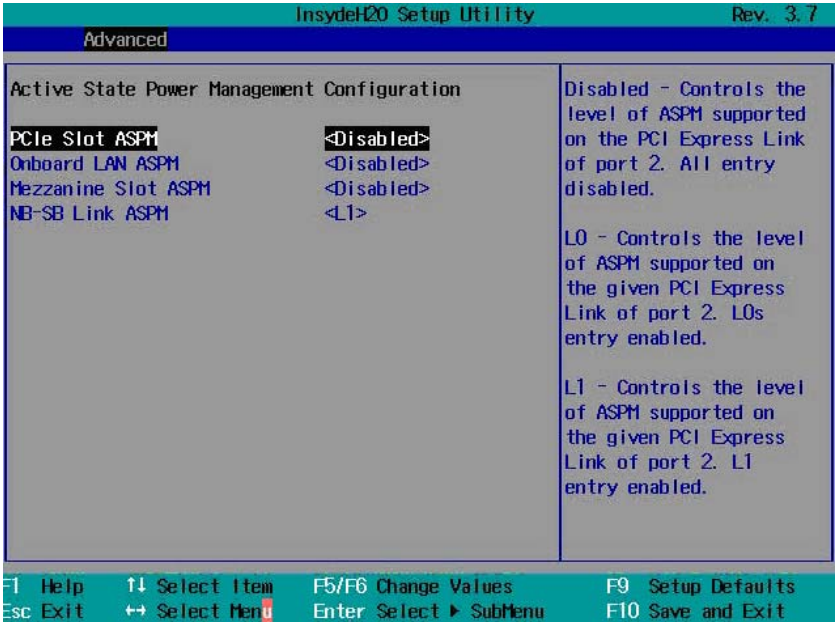
iSCSI Remote Boot

Option	Description
iSCSI Initiator Name	Displays the worldwide unique name of the initiator. 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.



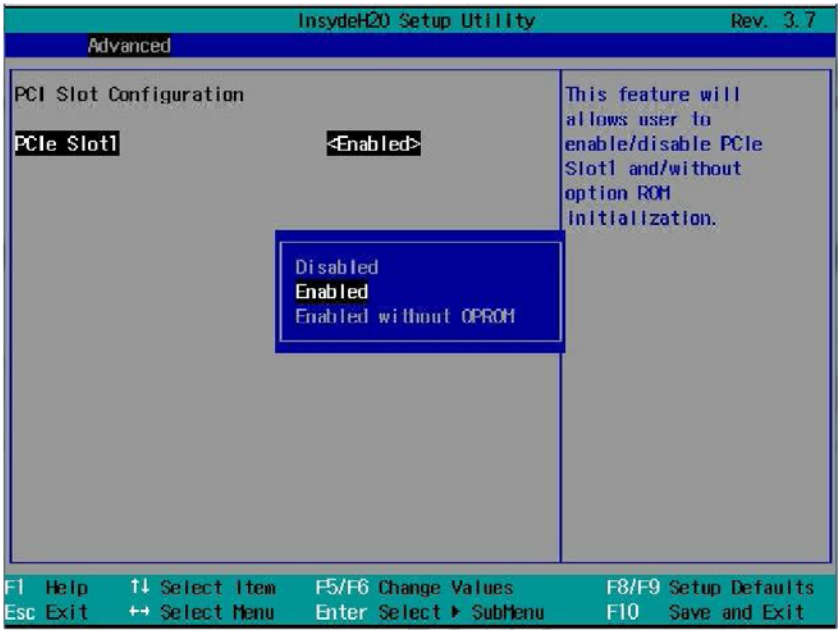
Active State Power Management Configuration

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.

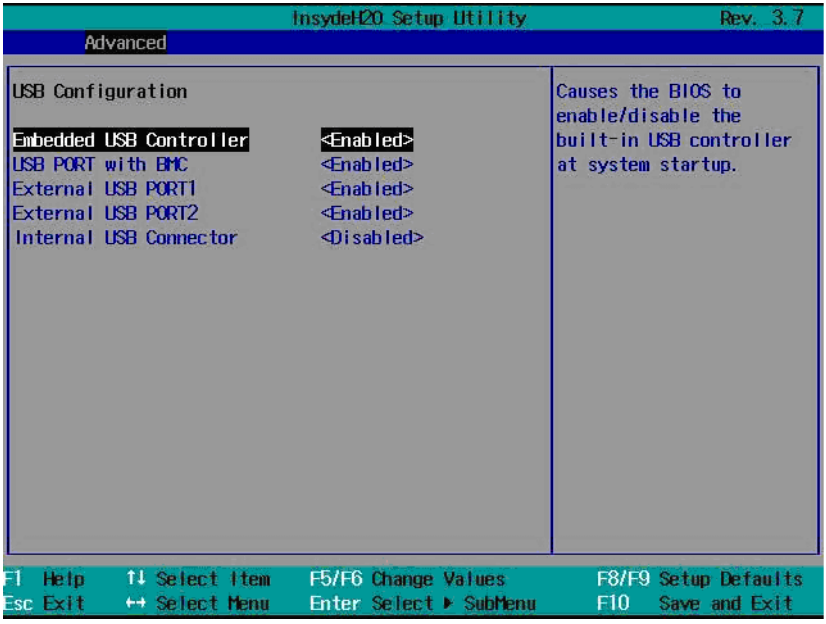


PCI Slot Configuration

Option	Description
PCIe Slot1 (**Enabled** default)	Enables or disables the PCIe slot1. 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.

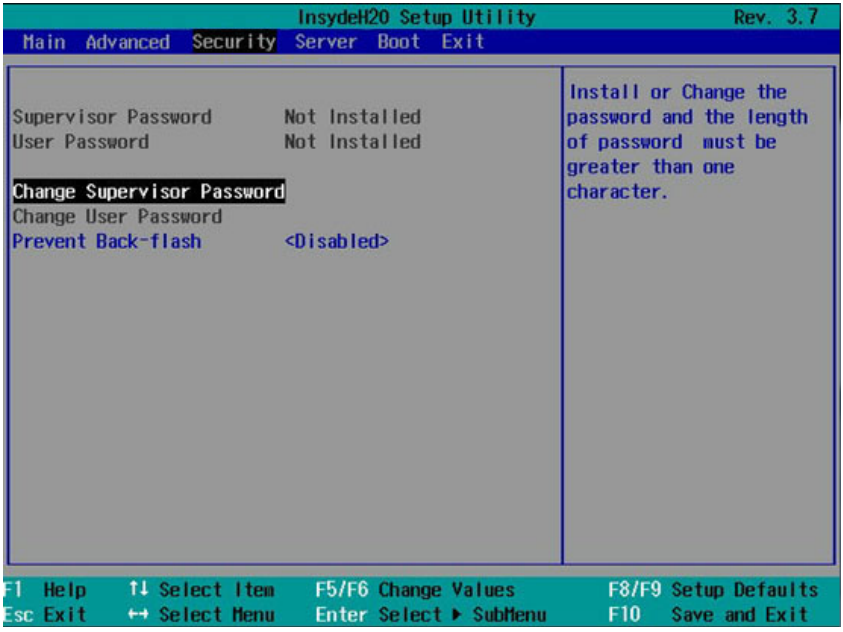


USB Configuration

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.



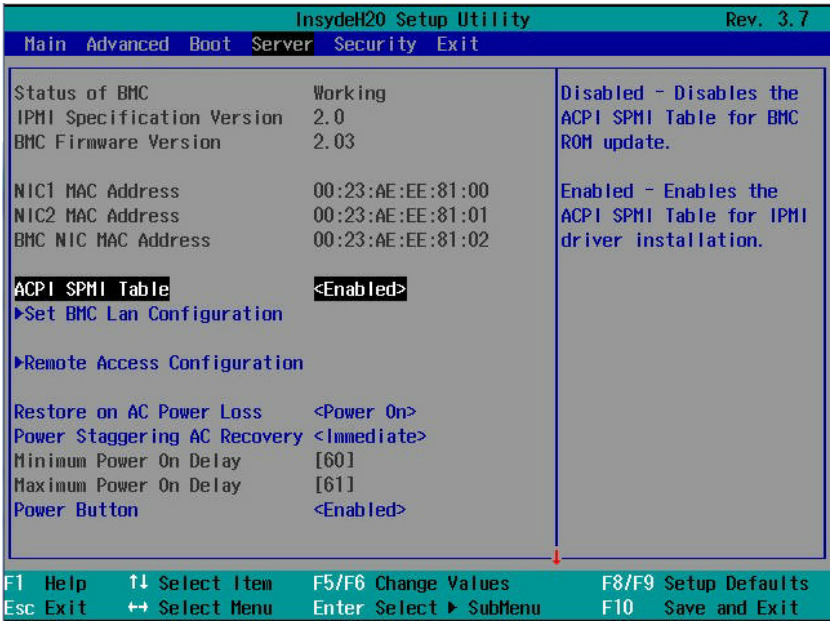
Security Settings

Option	Description
Supervisor Password	Indicates whether a supervisor password has been set. If the password has been installed, Installed displays. If not, Not Installed displays.
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	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. 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.
Change User Password	Installs or changes the User password.
Prevent Back-flash (**Disabled** default)	This option, when enabled, will prohibit the system BIOS to downgrade to version 2.1.0 or earlier version. **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. **NOTE:** Once enabled, you cannot use the NVRAM clear jumper to change the prevent back-flash settings to disabled.

Server Menu

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



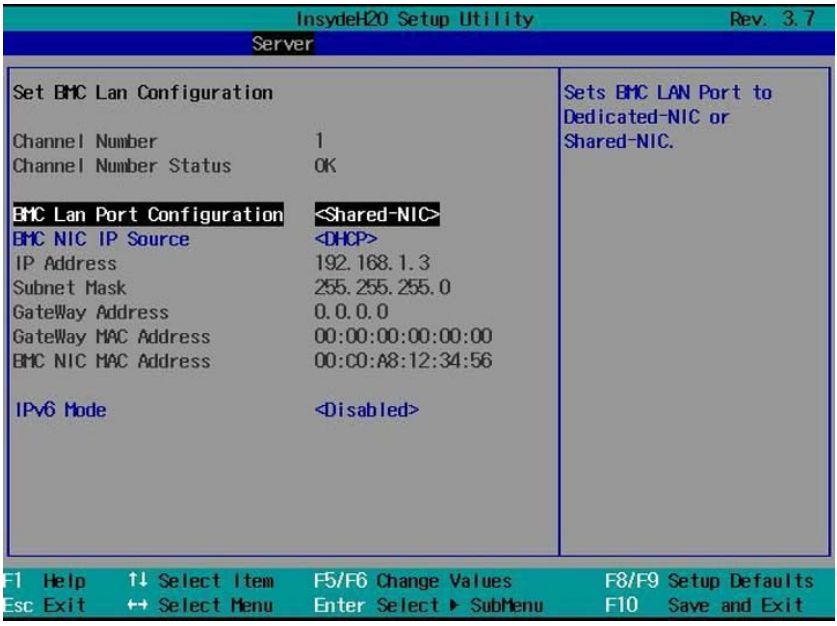
Server Settings

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. • 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. • 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 an 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.



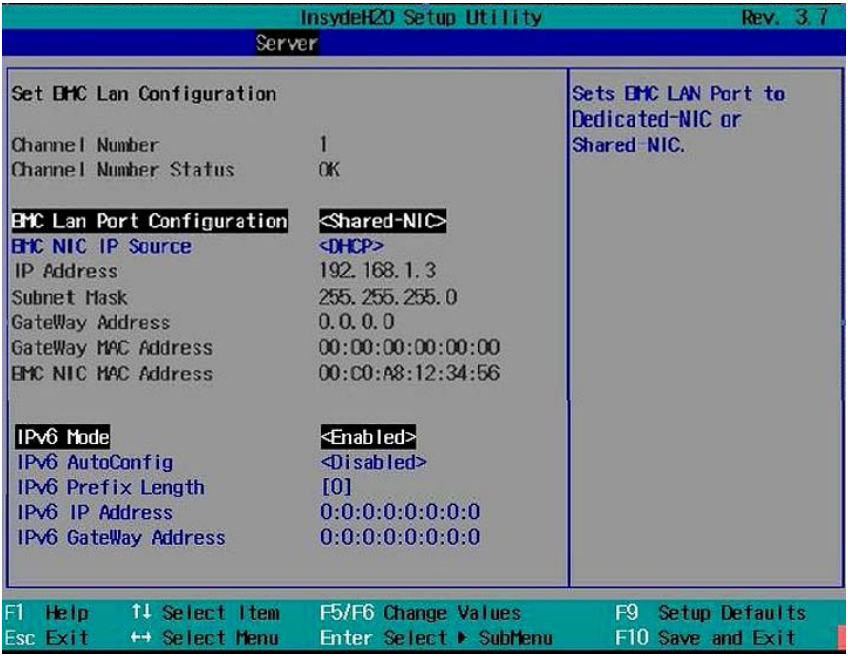
Set BMC LAN Configuration

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.



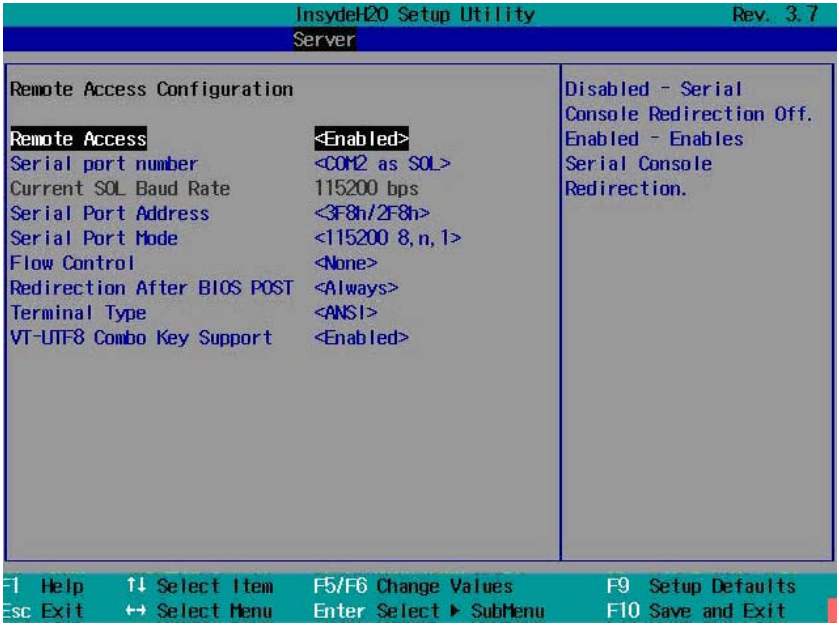
IPv6 Mode

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.



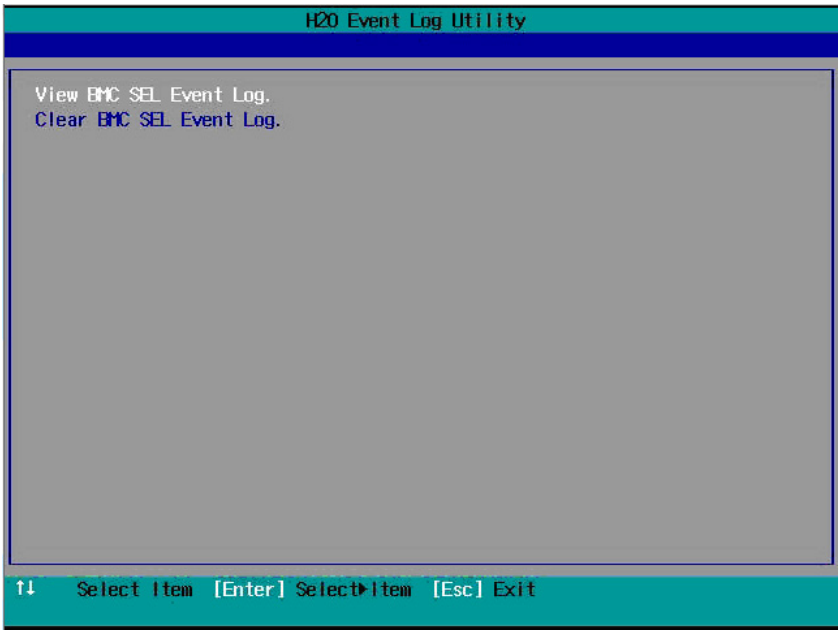
Remote Access Configuration

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. • 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. • 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], [192008,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.

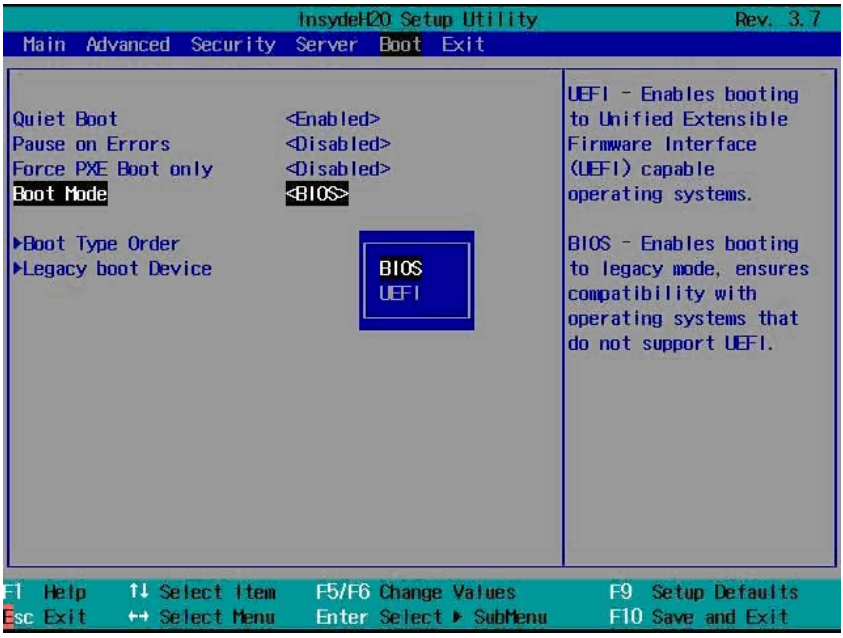


View System Log

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.



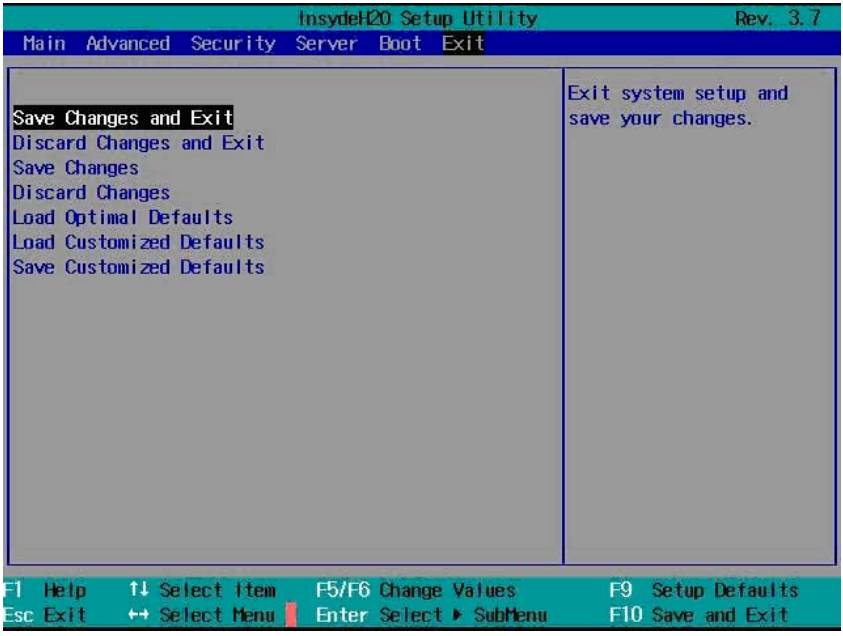
Boot Settings

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. • 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	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. 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.
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 800MHz.
4813	Non Coherent HT Link Speed	Sets the HT link speed to 1000MHz.
4814	Non Coherent HT Link Speed	Sets the HT link speed to 1200MHz.
4815	Non Coherent HT Link Speed	Sets the HT link speed to 1600MHz.
4816	Non Coherent HT Link Speed	Sets the HT link speed to 2000MHz.
4817	Non Coherent HT Link Speed	Sets the HT link speed to 2600MHz.
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 800MHz.
4825	Memory Frequency	Sets memory running speed up to 1066MHz.
4826	Memory Frequency	Sets memory running speed up to 1333MHz.
4827	Memory Frequency	Sets memory running speed up to 1600MHz.
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.
482D	Demand Scrubbing	Enables 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
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.
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.

Table 2-1. D4 Token Table *(continued)*

Token	Setup Option	Description
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.
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.

Table 2-1. D4 Token Table *(continued)*

Token	Setup Option	Description
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.
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.

Table 2-1. D4 Token Table *(continued)*

Token	Setup Option	Description
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.
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.

Table 2-1. D4 Token Table *(continued)*

Token	Setup Option	Description
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.
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.

Table 2-1. D4 Token Table *(continued)*

Token	Setup Option	Description
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.
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.

Table 2-1. D4 Token Table *(continued)*

Token	Setup Option	Description
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.
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.

Table 2-1. D4 Token Table *(continued)*

Token	Setup Option	Description
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.
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 HDD1as 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.

Table 2-1. D4 Token Table *(continued)*

Token	Setup Option	Description
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.
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.

Table 2-1. D4 Token Table *(continued)*

Token	Setup Option	Description
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.
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.

Table 2-1. D4 Token Table *(continued)*

Token	Setup Option	Description
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.
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 BMCCFG.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

3

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

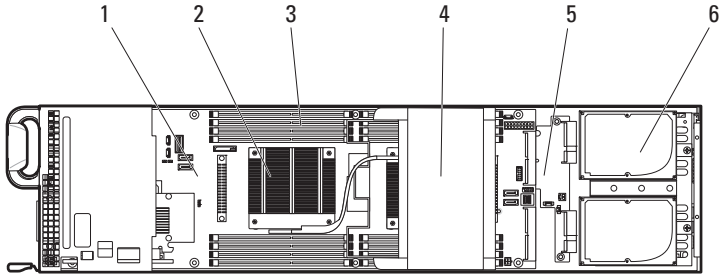
- #1 Phillips screwdriver
- #2 Phillips screwdriver
- Torx drivers
- Set of jeweler screwdrivers

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 a sled blank installed to make sure of proper cooling.

Figure 3-1. Inside the Sled



1	system board	2	heat sinks/processors (2)
3	memory (16)	4	cooling shroud
5	interposer extender	6	internal 2.5-inch hard-drives (2)

Sled Configuration

The following illustrations show a 10-Sled and 8-Sled configuration. A mixture of differing sled types is also supported in the PowerEdge C8000 server enclosure. For more information, refer to the PowerEdge C8000 Hardware Owner's Manual.

Figure 3-2. PowerEdge C8220 10-Sled SKU

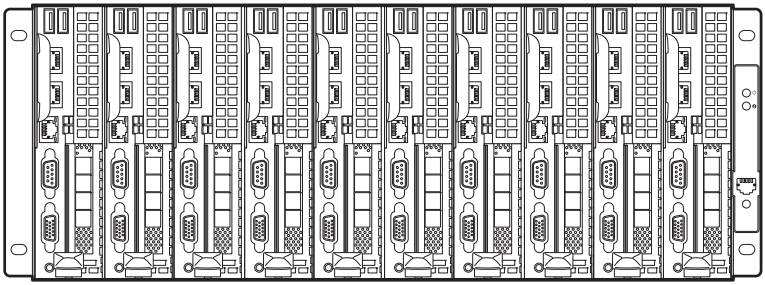
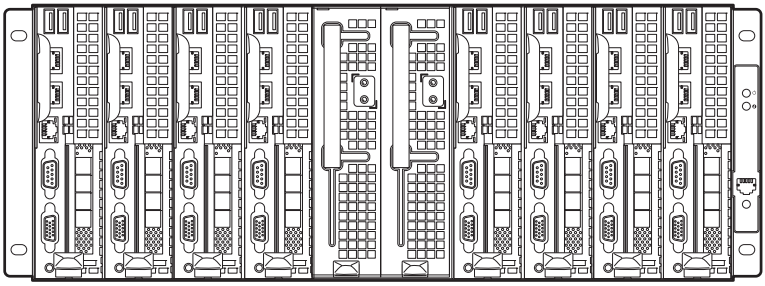


Figure 3-3. PowerEdge C8220 8-Sled SKU



The power sleds shown in Figure 3-3 are available on server enclosures that support internal power source.

Sled

Removing a 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 module is removed it should be immediately replaced with another sled or sled blank.

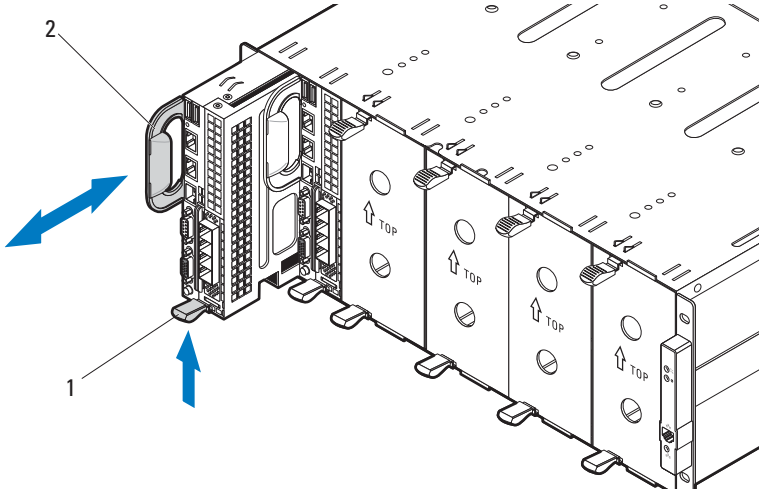
CAUTION: Operating the system for extended periods of time without a sled blank installed can cause the PowerEdge C8000 server enclosure to overheat.
See "Installing a Single-Wide Sled Blank" on page 145.

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

   When a sled is powered off, its front-panel power 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.
3. Using the handle, slide the sled out of the enclosure. See Figure 3-4.

Figure 3-4. Removing and Installing a Sled



1	release latch	2	handle

Installing a 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.
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.

Sled Blank

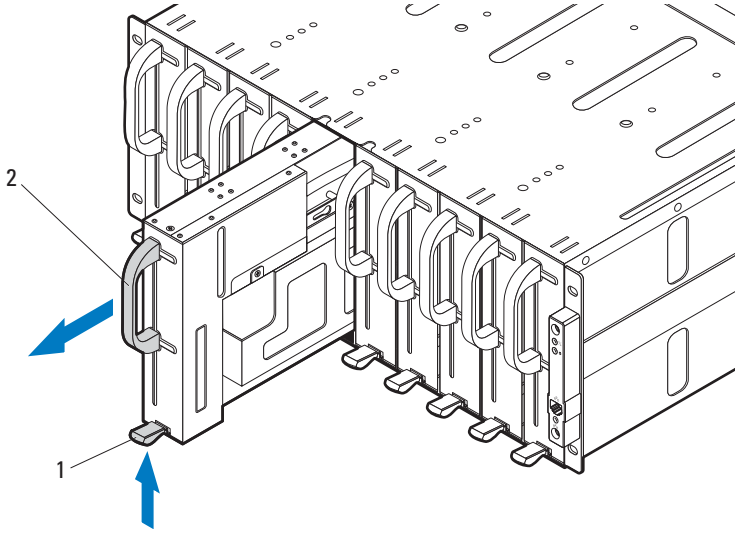
CAUTION: To ensure proper airflow in the system, if a module is removed it should be immediately replaced with another sled or sled blank.

The information in this section include replacement procedures for the single-side and double-wide sled blank.

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 3-5.
2. Using the handle, slide the sled out of the enclosure. See Figure 3-5.

Figure 3-5. Removing and Installing a Single-Wide Sled Blank



1 release latch 2 single-wide sled blank handle

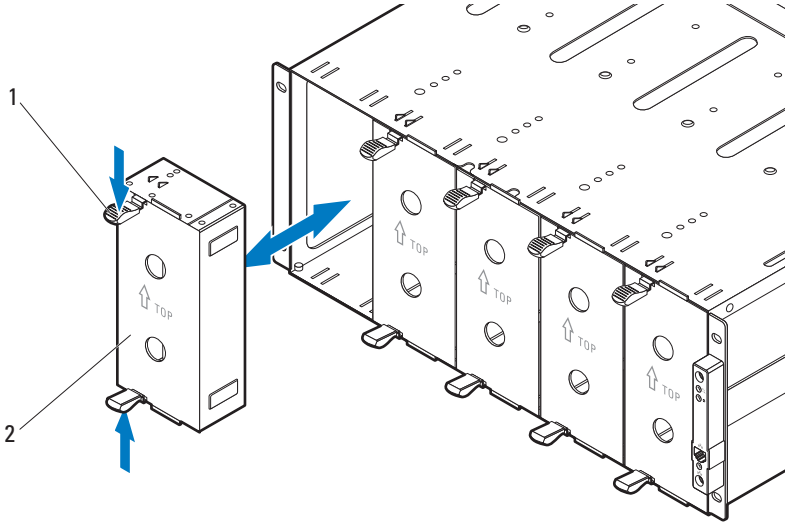
Installing a Single-Wide Sled Blank

1. Orient the sled blank so that the release latch is in the bottom of the sled. See Figure 3-5.
2. Slide the sled blank into the enclosure until the release latch snaps into place. See Figure 3-5.

Removing a Double-Wide Sled Blank

Squeeze and hold the release latches and slide the blank out of the enclosure. See Figure 3-6.

Figure 3-6. 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 3-6.

MicroSD Card

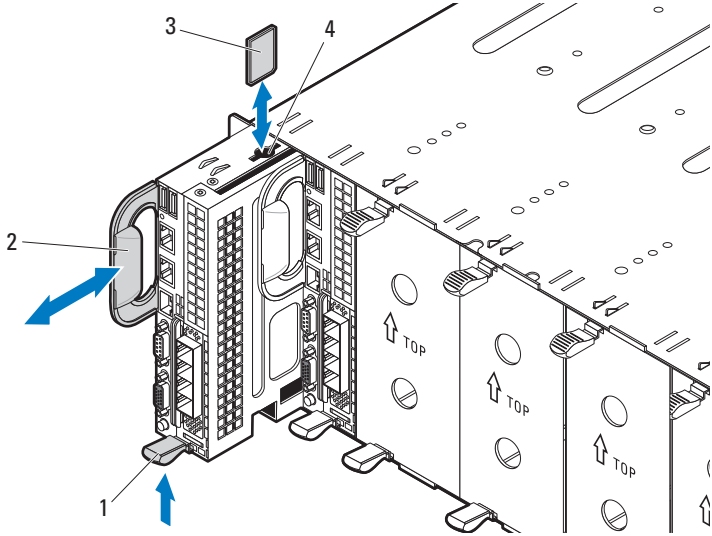
Removing a MicroSD Card

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

   When a sled is powered off, its front-panel power-on indicator is off. See Figure 1-1.

2. Pull up on the sled release latch at the bottom of the sled to disengage the sled from the server enclosure. See Figure 3-7.
3. Using the handle, slide the sled out slightly until you have access to the MicroSD card slot. See Figure 3-7.
4. Press the MicroSD card in to release it from the slot and remove the card. See Figure 3-7.

Figure 3-7. Removing and Installing a MicroSD Card



1	release latch	2	handle
3	MicroSD card	4	MicroSD card slot

Installing a MicroSD Card

Media memory cards are generally marked with a symbol (such as a triangle or an arrow) or a label to indicate which end to insert into the slot. The cards are keyed to prevent incorrect insertion. If card orientation is not clear, see the documentation that came with the card.

NOTE: To use a MicroSD card with your sled, ensure that the MicroSD card slot is enabled in the System Setup program. See "Using the System Setup Program" on page 49.

1. Hold the MicroSD card with the label side facing to the right. See Figure 3-7.
2. Press the card into the slot to lock into place. See Figure 3-7.

   If you encounter too much resistance, do not force the card. Check the card orientation and try again.
3. Slide the sled into the server enclosure until the sled is fully seated and the release latch snaps into place. See Figure 3-7.

Sled Covers

Removing the Front Cover

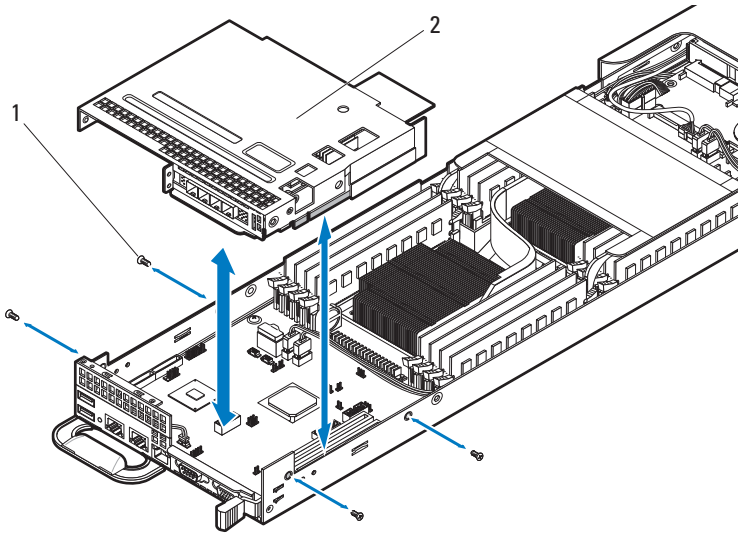
CAUTION: The sled must be operated with the sled covers installed to ensure proper cooling.

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: It is recommended that you always use a static mat and static strap while working on components in the interior of the system.

1. Remove the four screws securing the front cover. See Figure 3-8.
2. Lift the front cover from the sled tray. See Figure 3-8.
3. If installed, disconnect all cables from the expansion card.

Figure 3-8. Removing and Installing the Front Cover



1 M3 screws (4) 2 front cover

Installing the Front Cover

NOTE: It is recommended that you always use a static mat and static strap while working on components in the interior of the system.

1. Check that all cable connections are secure.
2. Place the front cover on top of the sled tray, aligning the notches in the front cover with the corresponding tabs in the sled tray. See Figure 3-8.
3. If an expansion card is installed, make sure the expansion card riser is firmly seated.
4. Replace the four screws securing the front cover to the sled tray. See Figure 3-8.

Removing the Back Cover

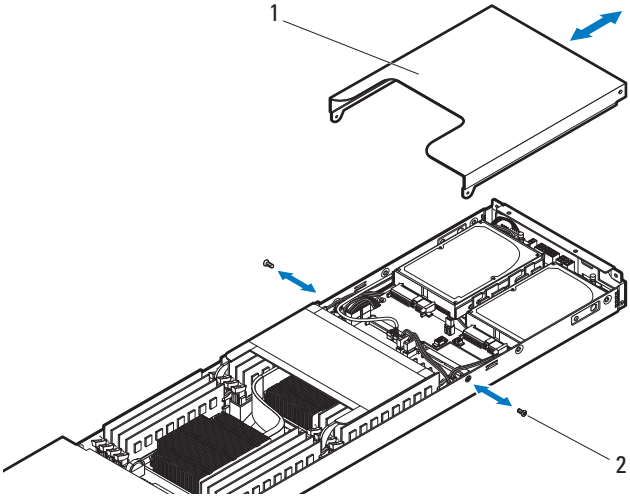
CAUTION: The sled must be operated with the sled covers installed to ensure proper cooling.

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: It is recommended that you always use a static mat and static strap while working on components in the interior of the system.

1. Remove the two screws securing the back cover. See Figure 3-9.
2. Slide the cover off the back of the sled tray. See Figure 3-9.

Figure 3-9. Removing and Installing the Back Cover



1 back cover

2 M3 screws (2)

Installing the Back Cover

NOTE: It is recommended that you always use a static mat and static strap while working on components in the interior of the system.

1. Place the cover on the sled tray and slide it towards the front of the sled tray so that the screw holes on the back cover align with the sled tray. See Figure 3-9.
2. Replace the two screws securing the back cover to the sled tray. See Figure 3-9.

Cooling Shroud

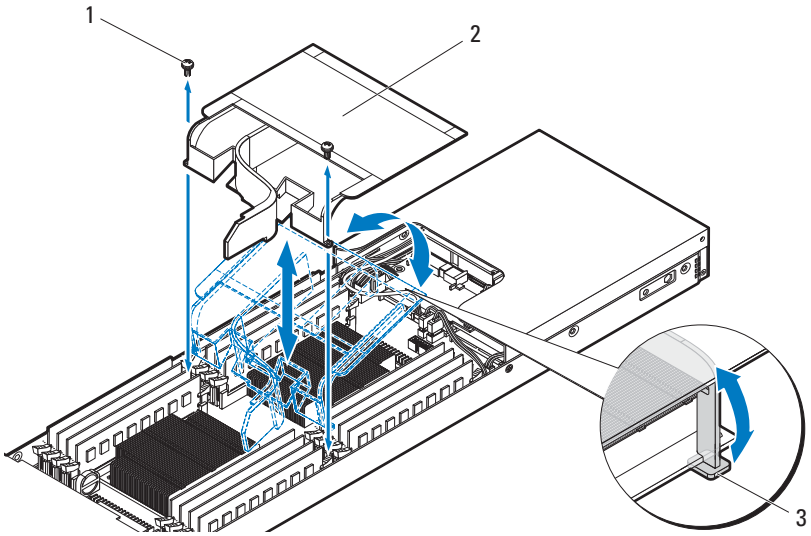
Removing the Cooling Shroud

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: Never operate your system with the cooling shroud removed. The system may get overheated quickly, resulting in shutdown of the system and loss of data.

1. Remove the sled from the enclosure. See "Removing a Sled" on page 143.
2. Remove the two screws securing the cooling shroud to the sled tray. See Figure 3-10.
3. Pull on the anchor tab to release the cooling shroud from the heat sink. See Figure 3-10.
4. Lift the cooling shroud up and out of the sled tray. See Figure 3-10.

Figure 3-10. Removing and Installing the Cooling Shroud



1 M3 screws (2) 2 cooling shroud

3 anchor tab

Installing the Cooling Shroud

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: Never operate your system with the cooling shroud removed. The system may get overheated quickly, resulting in shutdown of the system and loss of data.

1. Lower the cooling shroud to the sled tray. See Figure 3-10.
2. Gently press the cooling shroud until the anchor tab snap securely into place. See Figure 3-10.
3. Replace the two screws securing the cooling shroud to the sled tray. See Figure 3-10.
4. Replace the sled. See "Installing a Sled" on page 144.

Heat Sink

Removing a Heat Sink

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.

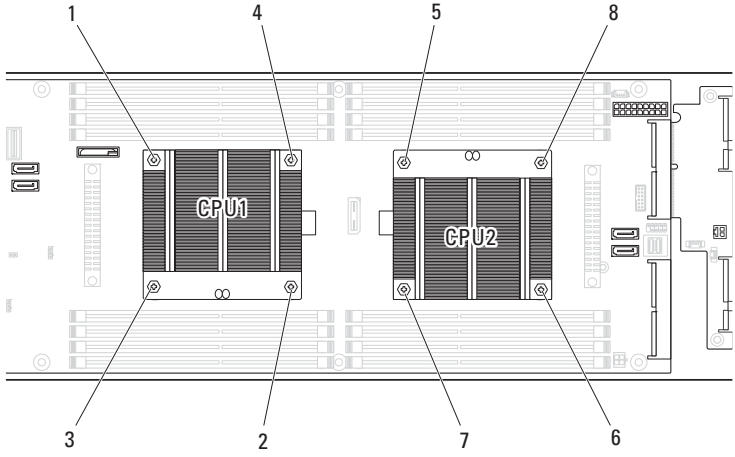
1. Remove the sled from the enclosure. See "Removing a Sled" on page 143.
2. Remove the cooling shroud. See "Removing the Cooling Shroud" on page 151.

WARNING: The heat sink may be hot to touch for some time after the system has been powered down. Allow the heat sink to cool before removing it.

CAUTION: Never remove the heat sink from a processor unless you intend to remove the processor. The heat sink is necessary to maintain proper thermal conditions.

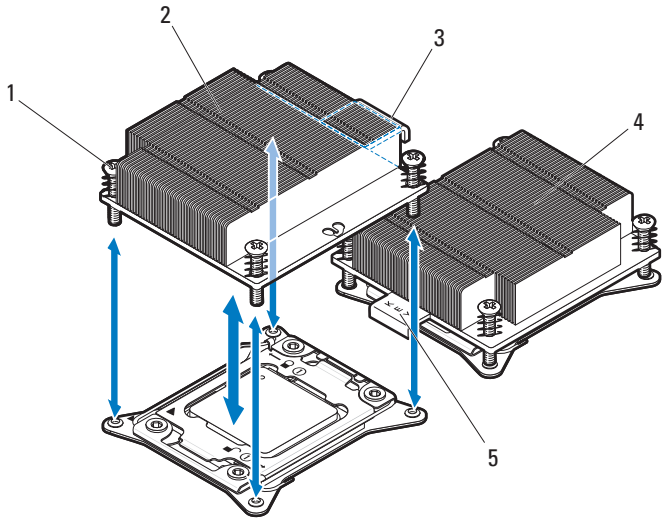
3. Using a Phillips screwdriver, loosen one pair of diagonal retention screws that secure the heat sink to the system board. See screw sequence indicated on Figure 3-11.
4. Loosen the other pair of retention screws. See Figure 3-11.

Figure 3-11. Heat Sink Screw Loosening Sequence



5 Gently lift the heat sink off the processor and set the heat sink aside with thermal grease side facing up. See Figure 3-12.

Figure 3-12. Removing and Installing the Heat Sink



1	screws (4)	2	CPU1 socket heat sink
3	heat sink KEY icon	4	CPU2 socket heat sink
5	heat sink KEY icon		

Installing a Heat Sink

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: When installing the heat sink, be sure to orient the heat sink so that the KEY icon on the heat sink label is facing the neighboring heat sink.

1 Using a clean lint-free cloth, remove the thermal grease from the heat sink.

2 Apply new thermal grease evenly to the center of the top of the new processor.

3 Orient the heat sink so that the KEY icon on the heat sink is facing the neighboring heat sink's KEY icon. See Figure 3-12.

4 Using a Phillips screwdriver, tighten the four heat sink retention screws in a diagonal sequence. See Figure 3-11.

5 Replace the cooling shroud. See "Installing the Cooling Shroud" on page 152.

6 Replace the sled. See "Installing a Sled" on page 144.

Heat Sink Blank

Removing a Heat Sink Blank

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 sled from the enclosure. See "Removing a Sled" on page 143.

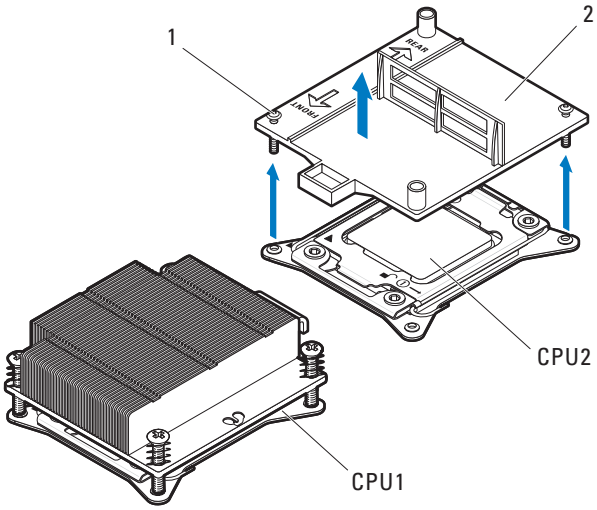
2 Remove the cooling shroud. See "Removing the Cooling Shroud" on page 151.

3 If you are installing a second processor in a socket that was previously unoccupied, remove the heat sink blank and socket protector from the vacant processor socket.

4 Using a Phillips screwdriver, loosen the diagonal retention screws that secure the heat sink blank to the system board. See Figure 3-13.

5 Gently lift the heat sink blank off the processor socket. Save the heat sink blank for future use. See Figure 3-13.

Figure 3-13. Removing and Installing the Heat Sink Blank



1 screws (2) 2 heat sink blank

Installing a Heat Sink Blank

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: Heat sink blank installs on socket CPU2 only.

1. If you are permanently removing a processor from the socket CPU2, you must install a socket protector and heat sink blank to ensure proper system cooling.
2. Place the heat sink blank on the processor socket.
3. Tighten the two retention screws on the heat sink blank. See Figure 3-13.
4. Replace the cooling shroud. See "Installing the Cooling Shroud" on page 152.
5. Replace the sled. See "Installing a Sled" on page 144.

Processors

Use the following procedure when:

- Installing an additional processor
- Replacing a processor

Removing a Processor

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 sled from the enclosure. See "Removing a Sled" on page 143.
2. Remove the cooling shroud. See "Removing the Cooling Shroud" on page 151.
3. Remove the heat sink. See "Removing a Heat Sink" on page 153.

CAUTION: The processor is held in its socket under strong pressure. Be aware that the release lever can spring up suddenly if not firmly grasped.

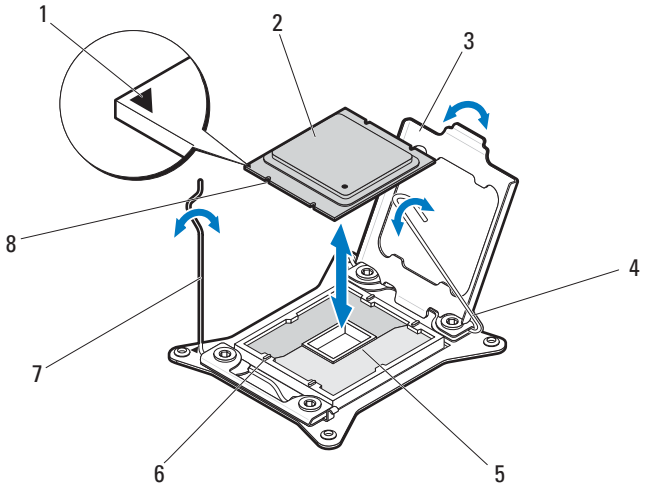
4. Position your thumb firmly over the processor hook-shaped socket-release lever and release the lever from the locked position. Do not force the lever up to the fully open position. See Figure 3-14.
5. Position your thumb firmly over the bent load lever and release the lever from the locked position. Rotate the lever 90 degrees upward to lift the processor shield. See Figure 3-14.
6. Rotate the processor shield upward and out of the way. See Figure 3-14.
7. Lift the processor out of the socket and leave the socket-release lever and load lever up so that the socket is ready for the new processor. See Figure 3-14.

CAUTION: The processor is held in its socket under strong pressure. Be aware that the release and load levers can spring up suddenly if not firmly grasped.

If you are permanently removing a processor, you must install a socket protective cap in the vacant socket to protect the pins and keep the socket free from dust.

NOTE: In single processor configurations, a processor must be installed in socket CPU1. Install the blanks in socket CPU2 only.

Figure 3-14. Removing and Installing a Processor



1	processor alignment mark (triangle)	2	processor
3	processor shield	4	hook-shaped socket-release lever
5	processor socket	6	socket key (4)
7	bent load lever	8	alignment notch

Installing a Processor

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 single processor configurations, a processor must be installed in socket CPU1.

NOTE: If you are upgrading your processors, prior to upgrading your system, download and install the latest system BIOS version from **dell.com/support**. Follow the instructions included in the file download to install the update on your system.

1. If you are installing a second processor in a socket that was previously unoccupied, remove the heat sink blank and socket protective cap from the vacant processor socket. See "Removing a Heat Sink Blank" on page 155.
2. Unpack the processor if it has not been used previously.
3. If the processor has already been used, remove any thermal grease from the top of the processor using a lint-free cloth.
4. Align the processor with the socket keys on the processor socket. See Figure 3-14.

CAUTION: Positioning the processor incorrectly can permanently damage the system board or the processor. Be careful not to bend the pins in the processor socket.

5. With the hook-shaped release and bent load levers on the processor socket in the open position, match the processor with the alignment mark indicator and the socket keys and set the processor lightly in the socket. See Figure 3-14.

CAUTION: Do not use force to seat the processor. When the processor is positioned correctly, it engages easily into the socket.

6. Close the processor shield.
7. Rotate the bent load lever down until it snaps into place.
8. Rotate the hook-shaped socket-release lever down until it snaps into place. See Figure 3-14.
9. Replace the heat sink. See "Installing a Heat Sink" on page 154.
10. Replace the cooling shroud. See "Installing the Cooling Shroud" on page 152.
11. Replace the sled. See "Installing a Sled" on page 144.
12. Press <F2> to enter the System Setup and check that the processor information matches the new system configuration.

System Memory

Each system board has 16 memory module sockets for the installation of DDR3 unbuffered ECC DIMMs (ECC UDIMMs), registered DIMMs (RDIMMs), and load reduced DIMMs (LRDIMMs) to support processor 1 and processor 2. See "System Board Connectors" on page 231 for the location of the memory modules.

Memory Module Installation Guidelines

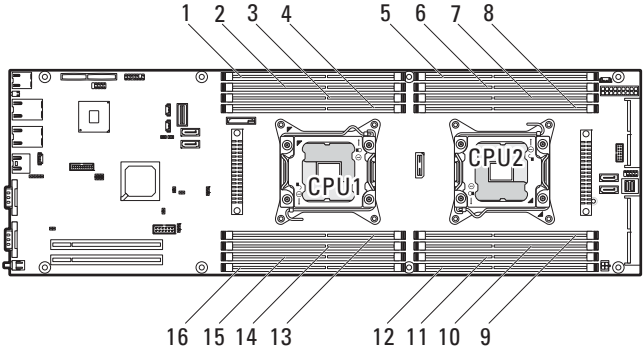
Follow these guidelines when installing memory modules on the sled system board.

- Use only Dell approved R/LR/UDIMM DDR3 memory modules in 2 GB, 4 GB, 8 GB, 16 GB, and 32 GB capacities. DIMM types (R/LR/UDIMM) cannot be mixed.
- DIMM slots are numbered 1 to 8 and designated by two channels. The number of channels used and the allowable configuration depend on the memory mode selected in the System Setup program.
- DIMMs must be installed in each channel starting with the DIMM socket farthest from the processor, per Table 3-1.
- Memory optimized mode is supported on the sled system board.
- Memory sparing and memory mirroring are supported on the sled system board. Memory sparing requires that all the DIMMs are identically populated in all 4 channels. One channel will be the spare and not accessible as system memory until brought online to replace a failing channel. For memory mirroring, two channels operate as mirrors for each other, identical DIMMs must be installed in the same slots across both channels.

Supported DIMM Configuration

For the sequence of the 16 DIMM sockets, see Figure 3-15. When you insert the DIMM(s), always start with DIMM_A1. For single processor configurations, the optimized memory module installation sequence is A1/A2/A3/A4/A5/A6/A7/A8. See Table 3-1 for dual processor configurations.

Figure 3-15. Memory Slot Locations



1	DIMM_A3	2	DIMM_A7
3	DIMM_A4	4	DIMM_A8
5	DIMM_B1	6	DIMM_B5
7	DIMM_B2	8	DIMM_B6
9	DIMM_B8	10	DIMM_B4
11	DIMM_B7	12	DIMM_B3
13	DIMM_A6	14	DIMM_ A2
15	DIMM_A5	16	DIMM_A1

Table 3-1. Memory Module Configuration—Single Processor

DIMM QTY	Processor 1							
	Channel A		Channel B		Channel C		Channel D	
	DIMM		DIMM		DIMM		DIMM	
	A1	A5	A2	A6	A3	A7	A4	A8
1	√	—	—	—	—	—	—	—
2	√	—	√	—	—	—	—	—
3	√	—	√	—	√	—	—	—
4	√	—	√	—	√	—	√	—
6	√	√	√	√	√	—	√	—
8	√	√	√	√	√	√	√	√

Table 3-2. Memory Module Configuration—Dual Processors

DIMM QTY	Processor 1								Processor 2							
	Channel A		Channel B		Channel C		Channel D		Channel A		Channel B		Channel C		Channel D	
	DIMM		DIMM		DIMM		DIMM		DIMM		DIMM		DIMM		DIMM	
	A1	A5	A2	A6	A3	A7	A4	A8	B1	B5	B2	B6	B3	B7	B4	B8
2	√	—	—	—	—	—	—	—	√	—	—	—	—	—	—	—
6	√	—	√	—	√	—	—	—	√	—	√	—	√	—	—	—
8	√	—	√	—	√	—	√	—	√	—	√	—	√	—	√	—
12	√	√	√	√	√	—	√	—	√	√	√	√	√	—	√	—
16	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

NOTE: An empty DIMM socket is marked as "—". For best performance, all the memory modules installed must be of the same speed, capacity, and from the same manufacturer.

Removing Memory 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 is not covered by warranty. Read and follow the safety instructions that came with the product.

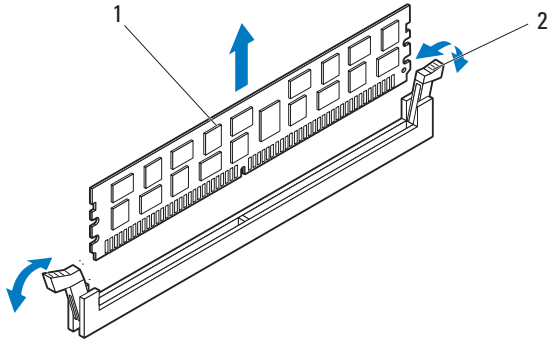
WARNING: The memory modules are hot to the touch for some time after the system has been powered down. Allow time for the memory modules to cool before handling them. Handle the memory modules by the card edges and avoid touching the components on the memory module.

1. Remove the sled from the enclosure. See "Removing a Sled" on page 143.
2. Remove the cooling shroud. See "Removing the Cooling Shroud" on page 151.
3. Locate the memory module sockets. See Figure 3-16.

CAUTION: Handle each memory module only on either card edge, making sure not to touch the middle of the memory module. To avoid damaging components on the memory module, remove only one memory module at a time.

4. Simultaneously press down and out on the ejectors at both ends of the memory module socket until the module is released from the socket. See Figure 3-16.
5. Lift the module out of the socket. See Figure 3-16.

Figure 3-16. Removing a Memory Module



1 memory module

2 memory module socket ejectors (2)

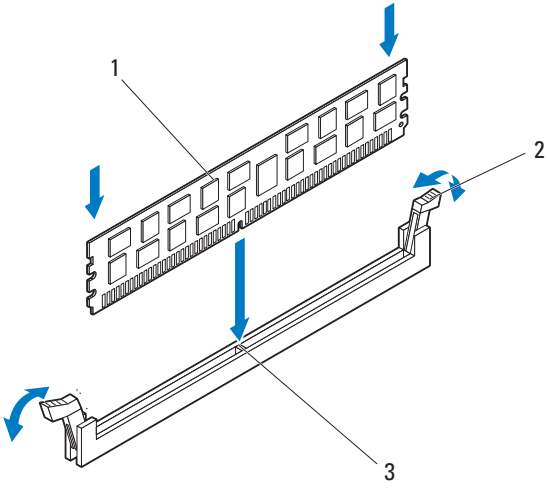
Installing Memory Modules

1. Press down and out on the ejectors on each end of the memory module socket. See Figure 3-17.
2. Align the memory module correctly with the alignment key of the memory module socket. See Figure 3-17.
3. Press down firmly on the memory module with your thumbs until the module snaps into place. See Figure 3-17.

CAUTION: Even pressure during insertion must be applied at both ends of the module simultaneously to prevent damage to the socket. No pressure should be applied to the center of the module.

Complete the latching of the module into the socket by applying inward pressure to the socket ejectors to assure that the ejectors are in a locked position. When the memory module is properly seated in the socket, the ejectors on the memory module socket align with the ejectors on other identical sockets that have memory modules installed.

Figure 3-17. Installing a Memory Module



1 memory module
2 memory module socket ejectors (2)
3 alignment key

4 Replace the cooling shroud. See "Installing the Cooling Shroud" on page 152.

5 Replace the sled. See "Installing a Sled" on page 144.

Expansion Card

The sled supports a low-profile PCIe x16 expansion card installed in the expansion card riser. To locate the expansion card riser, see Figure 3-24.

Removing the Expansion Card

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: Expansion cards can only be installed in the slots on the expansion card riser. Do not attempt to install expansion cards directly into the riser connector on the system board.

1 Remove the sled from the enclosure. See "Removing a Sled" on page 143.

2 Remove the front cover. See "Removing the Front Cover" on page 148.

3 Once the front cover is detached, turn it over to expose the expansion card side. See Figure 3-18.

4 If applicable, disconnect all cables from the expansion card.

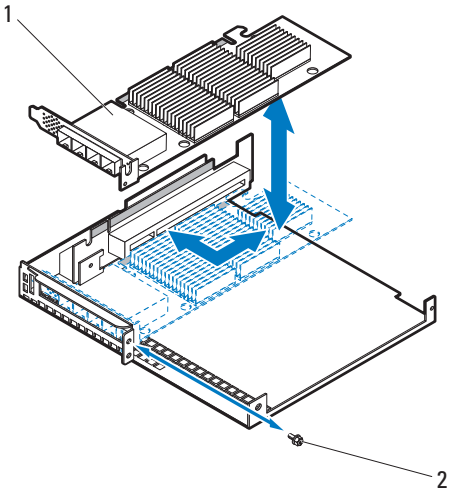
5 Remove the screw securing the expansion card. See Figure 3-18.

6 Grasp the expansion card by its edges and carefully remove it from the expansion card riser. See Figure 3-18.

7 If you are removing the card permanently, install a metal filler bracket over the empty expansion slot opening, and secure with the screw.

NOTE: You must install a filler bracket over an empty expansion slot to maintain Federal Communications Commission (FCC) certification of the system. The brackets also keep dust and dirt out of the system and aid in proper cooling and airflow inside the sled.

Figure 3-18. Removing and Installing the Expansion Card



1 expansion card 2 M3 screw (1)

Installing the Expansion Card

CAUTION: Expansion cards can only be installed in the slots on the expansion card riser. Do not attempt to install expansion cards directly into the riser connector on the system board.

1. Unpack the expansion card and prepare it for installation. For instructions, see the documentation accompanying the card.
2. Hold the card by its edges, position the card so that the card edge connector aligns with the expansion card riser connector on the front cover. See Figure 3-18.
3. Insert the card edge connector firmly into the riser connector until the card is fully seated.
4. Replace the screw securing the expansion card. See Figure 3-18.
5. If applicable, connect any cables to the expansion card.
6. Replace the front cover. See "Installing the Front Cover" on page 149.
7. Replace the sled. See "Installing a Sled" on page 144.

Removing the RAID Controller Card

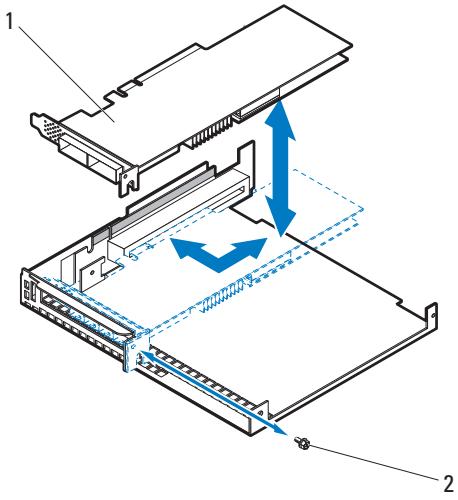
CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized is not covered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

CAUTION: Expansion cards can only be installed in the slots on the expansion card riser. Do not attempt to install expansion cards directly into the riser connector on the system board.

1. Remove the sled from the enclosure. See "Removing a Sled" on page 143.
2. Remove the front cover. See "Removing the Front Cover" on page 148.
3. Once the front cover is detached, turn it over to expose the RAID controller card side. See Figure 3-19.
4. If applicable, disconnect all cables from the RAID controller card.
5. Remove the screw securing the RAID controller card. See Figure 3-19.
6. Grasp the RAID controller card by its edges and carefully remove it from the expansion card riser. See Figure 3-19.
7. If you are removing the card permanently, install a metal filler bracket over the empty expansion slot opening, and secure with the screw.

NOTE: You must install a filler bracket over an empty expansion slot to maintain Federal Communications Commission (FCC) certification of the system. The brackets also keep dust and dirt out of the system and aid in proper cooling and airflow inside the sled.

Figure 3-19. Removing and Installing the RAID Controller Card



1 RAID controller card 2 M3 screw (1)

8 If applicable, remove the RAID battery. See "Removing the RAID Battery" on page 169.

Installing the RAID Controller Card

CAUTION: Expansion cards can only be installed in the slots on the expansion card riser. Do not attempt to install expansion cards directly into the riser connector on the system board.

1 Unpack the RAID controller card and prepare it for installation. For instructions, see the documentation accompanying the card.

2 Hold the RAID controller card by its edges, position the card so that the card edge connector aligns with the expansion card riser connector on the front cover. See Figure 3-19.

3 Insert the card edge connector firmly into the riser connector until the card is fully seated.

4 Replace the screw securing the RAID controller card. See Figure 3-19.

5 If applicable, connect any cables to the RAID controller card.

6 For battery-cached RAID controller cards, install the RAID battery. See "Installing the RAID Battery" on page 171.

7 Replace the front cover. See "Installing the Front Cover" on page 149.

8 Replace the sled. See "Installing a Sled" on page 144.

RAID Battery

The information in this section applies only to systems with the optional battery-cached RAID controller (for example, MegaRAID SAS 9285CV-8e) card.

Removing the RAID Battery

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 sled from the enclosure. See "Removing a Sled" on page 143.

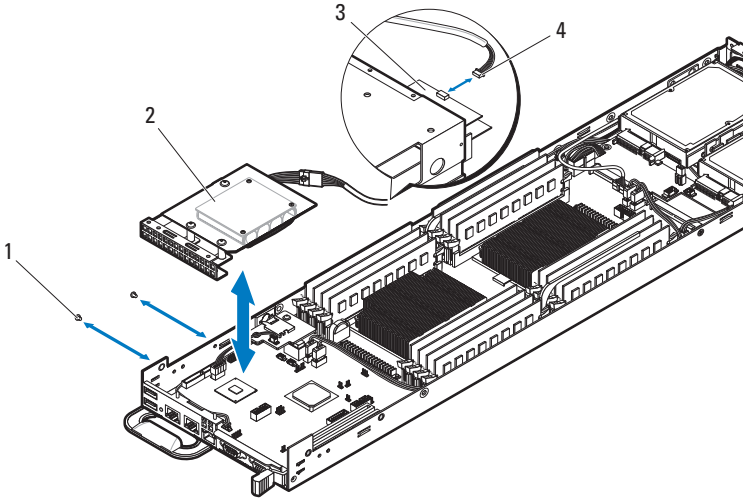
2 Remove the front cover. See "Removing the Front Cover" on page 148.

3 Disconnect the RAID battery cable connecting to the RAID controller card. See Figure 3-20.

4 Remove the two screws securing the RAID battery assembly to the sled tray. See Figure 3-20.

5 Lift the RAID battery assembly from the sled tray. See Figure 3-20.

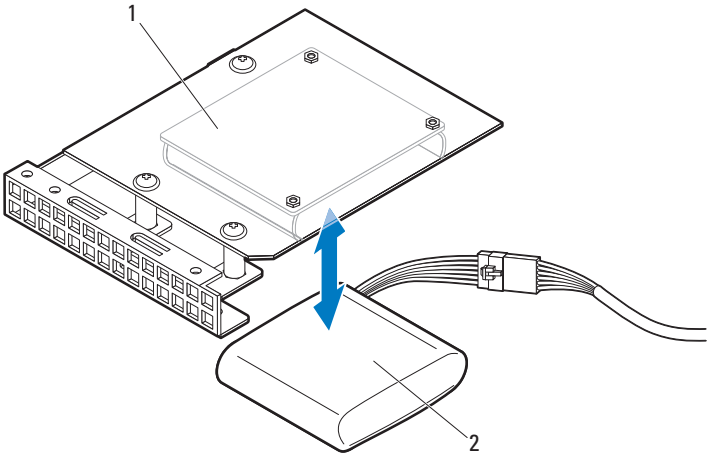
Figure 3-20. Removing and Installing the RAID Battery Assembly



1	M3 screws (2)	2	RAID battery assembly
3	RAID controller card	4	RAID battery cable

6 Pry one end of the RAID battery and pull the battery straight out of the battery holder. See Figure 3-21.

Figure 3-21. Removing and Installing the RAID Battery



1 battery holder 2 RAID battery

Installing the RAID Battery

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.

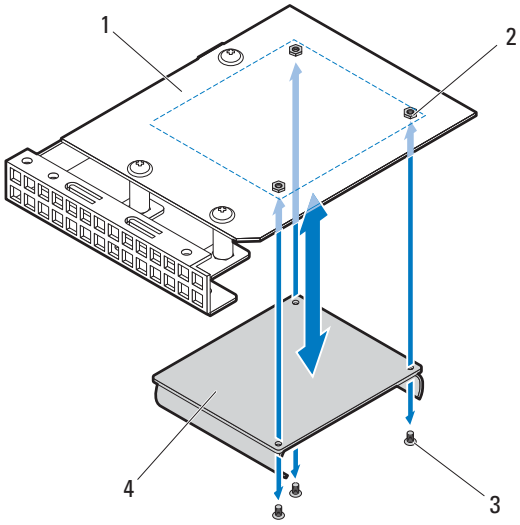
1. Orient the new RAID battery appropriately in the battery holder and push the battery firmly into the battery holder until it snaps into place. See Figure 3-21.
2. Lower the RAID battery assembly to the sled tray. See Figure 3-20.
3. Replace the two screws securing the RAID battery assembly to the sled tray. See Figure 3-20.
4. Connect the RAID battery cable to the RAID controller card. See Figure 3-20.
5. Replace the front cover. See "Installing the Front Cover" on page 149.
6. Replace the sled. See "Installing a Sled" on page 144.

Removing the RAID Battery Holder

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 sled from the enclosure. See "Removing a Sled" on page 143.
2. Remove the front cover. See "Removing the Front Cover" on page 148.
3. Remove the RAID battery. See "Removing the RAID Battery" on page 169.
4. Remove the three screws and hex nuts securing the battery holder to the mounting board. See Figure 3-22.
5. Remove the battery holder. See Figure 3-22.

Figure 3-22. Removing and Installing the Battery Holder

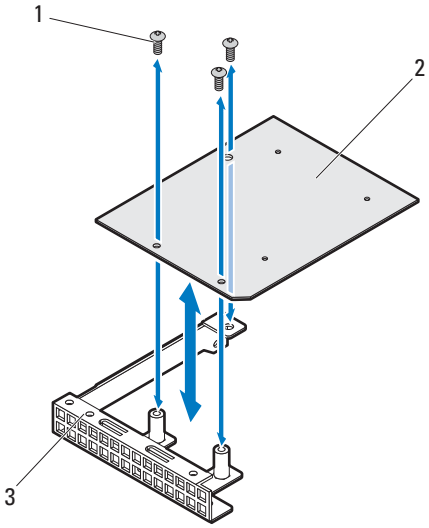


1	mounting board	2	M2 hex nuts (3)
3	M3 screws (3)	4	battery holder

6 Remove the three screws securing the mounting board to the bracket. See Figure 3-23.

7 Lift the mounting board from the bracket. See Figure 3-23.

Figure 3-23. Removing and Installing the Mounting Board



1 M3 screws (3)
2 mounting board
3 bracket

Installing the RAID Battery Holder

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 mounting board with the screw holes on the bracket. See Figure 3-23.
2. Replace the three screws securing the mounting board to the bracket. See Figure 3-23.
3. Align the battery holder with the screw holes on the mounting board. See Figure 3-22.
4. Secure the battery holder to the mounting board using three screws and hex nuts. See Figure 3-22.
5. Replace the RAID battery. See "Installing the RAID Battery" on page 171.
6. Replace the front cover. See "Installing the Front Cover" on page 149.
7. Replace the sled. See "Installing a Sled" on page 144.

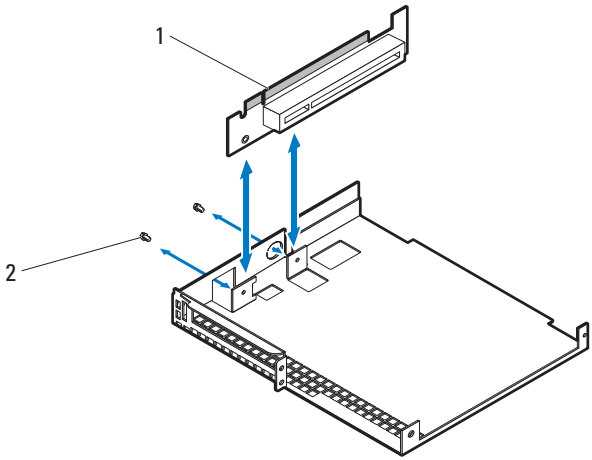
Expansion Card Riser

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.

Removing the Expansion Card Riser

1. Remove the sled from the enclosure. See "Removing a Sled" on page 143.
2. Remove the front cover. See "Removing the Front Cover" on page 148.
3. If installed, remove the expansion card or RAID controller card. See "Removing the Expansion Card" on page 165 or "Removing the RAID Controller Card" on page 167.
4. Remove the two screws securing the expansion card riser to the front cover. See Figure 3-24.
5. Pull the expansion card riser away from the front cover. See Figure 3-24.

Figure 3-24. Removing and Installing the Expansion Card Riser



1 expansion card riser 2 M3 screws (2)

Installing the Expansion Card Riser

1. Place the expansion card riser into the front cover. See Figure 3-24.
2. Replace the two screws securing the expansion card riser. See Figure 3-24.
3. If applicable, replace the expansion card or RAID controller card. See "Installing the Expansion Card" on page 166 or "Installing the RAID Controller Card" on page 168.
4. Replace the front cover. See "Installing the Front Cover" on page 149.
5. Replace the sled. See "Installing a Sled" on page 144.

Mezzanine Cards

The sled supports a variety of optional mezzanine cards.

- Mellanox QDR ConnectX-2 Infiniband mezzanine card
- Mellanox FDR ConnectX-3 Infiniband mezzanine card
- Intel 82599 dual-port 10 GbE mezzanine card

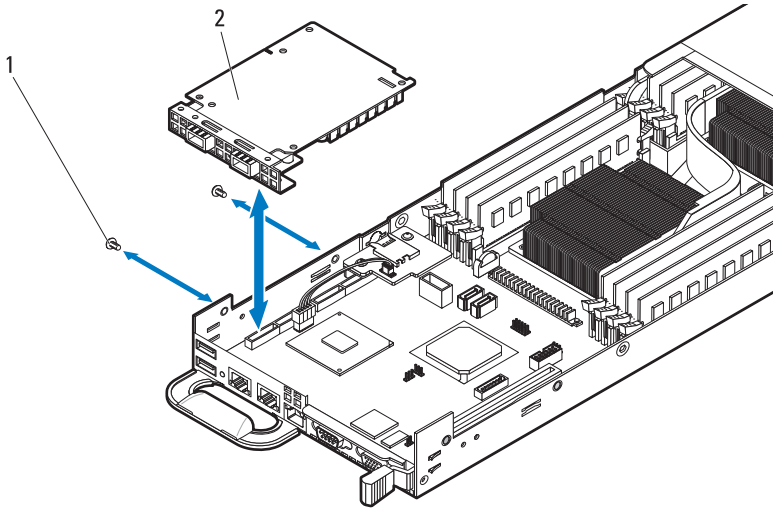
Removing the Infiniband Mezzanine Card

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.

The installation and removal procedures of the dual-port and single port Infiniband mezzanine cards are similar. Following is an example showing the replacement procedure of a dual-port Infiniband mezzanine card.

1. Remove the sled from the enclosure. See "Removing a Sled" on page 143.
2. Remove the front cover. See "Removing the Front Cover" on page 148.
3. Remove the two screws securing the Infiniband mezzanine card assembly to the sled tray. See Figure 3-25.
4. Lift the Infiniband mezzanine card assembly out of the sled tray. See Figure 3-25.

Figure 3-25. Removing and Installing the Infiniband Mezzanine Card Assembly

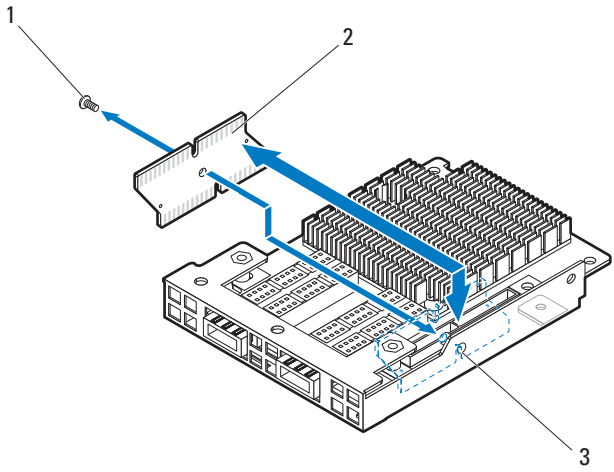


1 M3 screws (2) 2 Infiniband mezzanine card assembly

5 Remove the screw securing the mezzanine card bridge board to the bracket. See Figure 3-26.

6 Pull the mezzanine card bridge board away from the mezzanine slot. See Figure 3-26.

Figure 3-26. Removing and Installing the Mezzanine Card Bridge Board

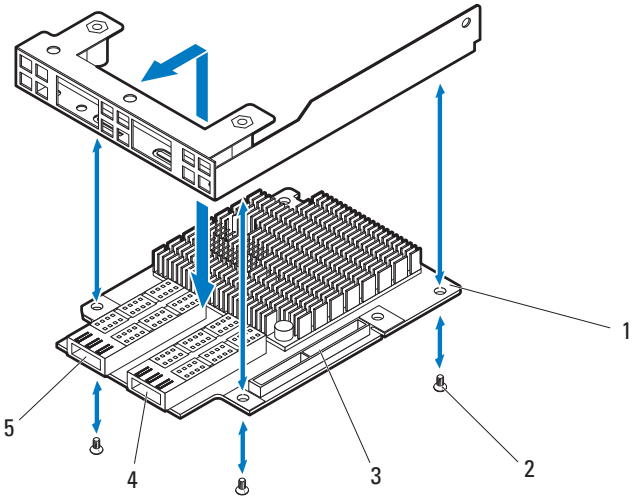


1	M3 screw (1)	2	mezzanine card bridge board
3	bracket		

7 Remove the three screws securing the Infiniband mezzanine card to the bracket. See Figure 3-27.

8 Remove the Infiniband mezzanine card from the bracket. See Figure 3-27.

Figure 3-27. Removing and Installing the Infiniband Mezzanine Card



1	Infiniband mezzanine card	2	M3 screws (3)
3	mezzanine card bridge board connector	4	QSFP cage 1
5	QSFP cage 2		

Installing the Infiniband Mezzanine Card

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 Infiniband mezzanine card with the screw holes on the bracket. See Figure 3-27.
2. Replace the three screws securing the Infiniband mezzanine card to the bracket. See Figure 3-27.
3. Install the mezzanine card bridge board into the mezzanine slot on the Infiniband mezzanine card. See Figure 3-26.
4. Replace the screw securing the mezzanine card bridge board to the bracket. See Figure 3-26.

5 Lower the Infiniband mezzanine card assembly to the sled tray.

6 Replace the two screws securing the Infiniband mezzanine card assembly to the sled tray. See Figure 3-25.

7 Replace the front cover. See "Installing the Front Cover" on page 149.

8 Replace the sled. See "Installing a Sled" on page 144.

Removing the 10 GbE Mezzanine Card

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.

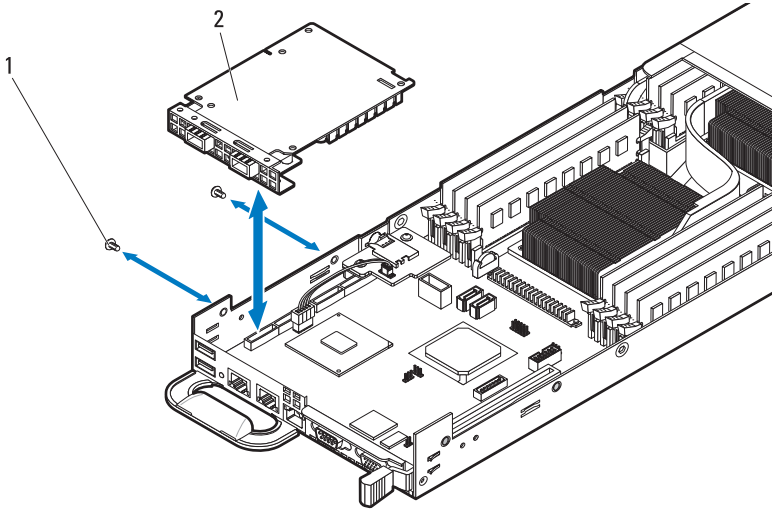
1 Remove the sled from the enclosure. See "Removing a Sled" on page 143.

2 Remove the front cover. See "Removing the Front Cover" on page 148.

3 Remove the two screws securing the 10 GbE mezzanine card assembly to the sled tray. See Figure 3-28.

4 Lift the 10 GbE mezzanine card assembly out of the sled tray. See Figure 3-28.

Figure 3-28. Removing and Installing the 10 GbE Mezzanine Card Assembly

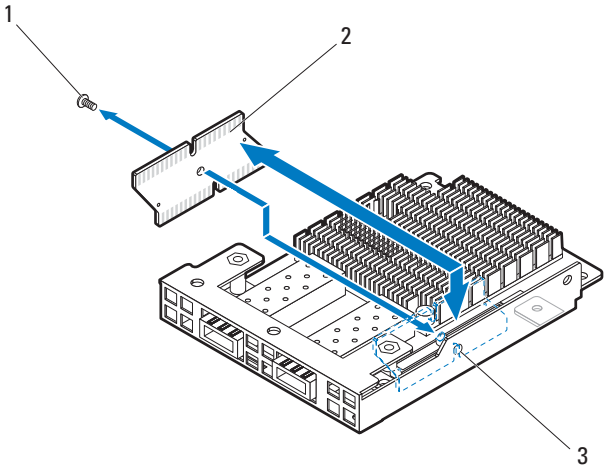


1	M3 screws (2)	2	10 GbE mezzanine card assembly

5 Remove the screw securing the mezzanine card bridge board to the bracket. See Figure 3-29.

6 Pull the mezzanine card bridge board away from the mezzanine slot. See Figure 3-29.

Figure 3-29. Removing and Installing the Mezzanine Card Bridge Board

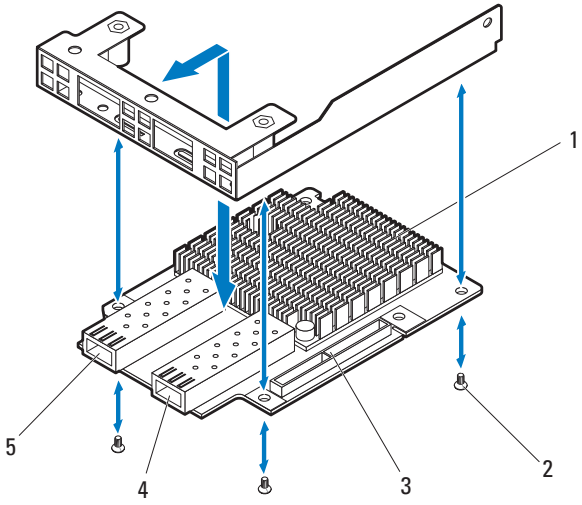


1	M3 screw (1)	2	mezzanine card bridge board
3	bracket		

7 Remove the three screws securing the 10 GbE mezzanine card to the bracket. See Figure 3-30.

8 Remove the 10 GbE mezzanine card from the bracket. See Figure 3-30.

Figure 3-30. Removing and Installing the 10 GbE Mezzanine Card



1	10 GbE mezzanine card	2	M3 screw (3)
3	mezzanine card bridge board connector	4	SFP + port 1
5	SFP + port 0		

Installing the 10 GbE Mezzanine Card

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 10 GbE mezzanine card with the screw holes on the bracket. See Figure 3-30.
2. Replace the three screws securing the 10 GbE mezzanine card to the bracket. See Figure 3-30.
3. Install the mezzanine card bridge board into the mezzanine slot on the 10 GbE mezzanine card. See Figure 3-29.

4 Replace the screw securing the mezzanine card bridge board to the bracket. See Figure 3-29.

5 Lower the 10 GbE mezzanine card assembly to the sled tray. See Figure 3-28.

6 Replace the two screws securing the 10 GbE mezzanine card assembly to the sled tray. See Figure 3-28.

7 Replace the front cover. See "Installing the Front Cover" on page 149.

8 Replace the sled. See "Installing a Sled" on page 144.

MicroSD Card Reader

Removing the MicroSD Card Reader

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 sled from the enclosure. See "Removing a Sled" on page 143.

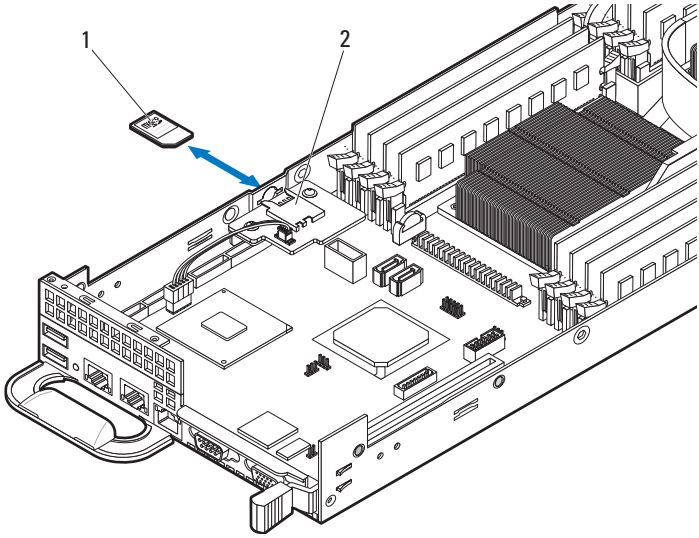
2 Remove the front cover. See "Removing the Front Cover" on page 148.

3 If applicable, remove the RAID battery. See "Removing the RAID Battery" on page 169

4 If applicable, remove the mezzanine card. See "Removing the Infiniband Mezzanine Card" on page 176 or "Removing the 10 GbE Mezzanine Card" on page 180.

5 If installed, remove the MicroSD card. Locate the MicroSD card slot in the MicroSD card reader and press inward on the card to release it from the slot and remove the card. See Figure 3-31.

Figure 3-31. Removing and Installing the MicroSD Card



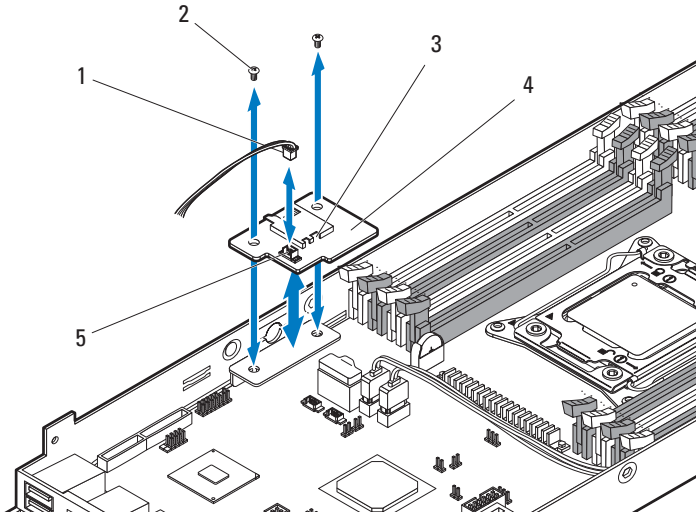
1 MicroSD card 2 MicroSD card slot

6 Disconnect the MicroSD card reader cable from the MicroSD card reader. See Figure 3-32.

7 Remove the two screws securing the MicroSD card reader. See Figure 3-32.

8 Lift the MicroSD card reader from the MicroSD card reader support bracket. See Figure 3-32.

Figure 3-32. Removing and Installing the MicroSD Card Reader



1	MicroSD card reader cable	2	M3 screws (2)
3	MicroSD card slot	4	MicroSD card reader
5	MicroSD card reader connector		

Installing the MicroSD Card Reader

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. Place the MicroSD card reader on the MicroSD card reader support bracket. See Figure 3-32.
2. Replace the two screws securing the MicroSD card reader. See Figure 3-32.
3. Connect the MicroSD card reader cable to the MicroSD card reader. See Figure 3-32.
4. If applicable, install the MicroSD card. Hold the MicroSD card with the label side facing to the right and press the card into the slot to lock into place. See Figure 3-31.

5 If applicable, replace the mezzanine card. See "Installing the Infiniband Mezzanine Card" on page 179 or "Installing the 10 GbE Mezzanine Card" on page 182.

6 If applicable, replace the RAID battery. See "Installing the RAID Battery" on page 171.

7 Replace the front cover. See "Installing the Front Cover" on page 149.

8 Replace the sled. See "Installing a Sled" on page 144.

Removing the MicroSD Card Reader Support Bracket

1 Remove the sled from the enclosure. See "Removing a Sled" on page 143.

2 Remove the front cover. See "Removing the Front Cover" on page 148.

3 If applicable, remove the RAID battery. See "Removing the RAID Battery" on page 169

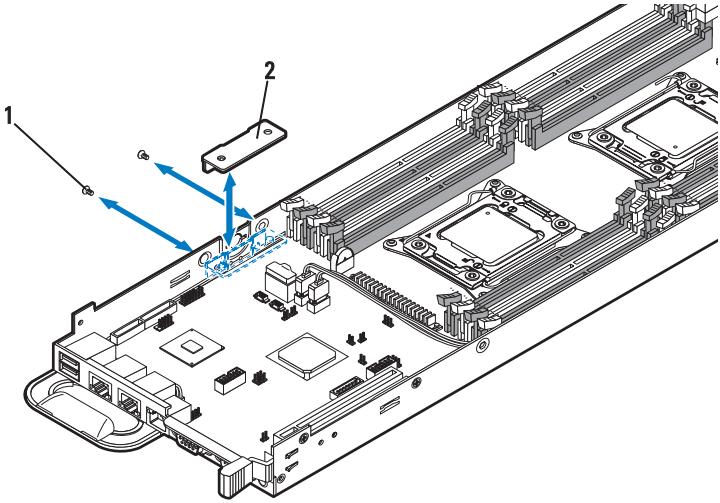
4 If applicable, remove the mezzanine card. See "Removing the Infiniband Mezzanine Card" on page 176 or "Removing the 10 GbE Mezzanine Card" on page 180.

5 Remove the MicroSD card reader. See "Removing the MicroSD Card Reader" on page 183.

6 Remove the two screws securing the MicroSD card reader support bracket. See Figure 3-33.

7 Lift the support bracket out of the sled tray. See Figure 3-33.

Figure 3-33. Removing and Installing the MicroSD Card Reader Support Bracket



1	M3 screws (2)	2	MicroSD card reader support bracket

Installing the MicroSD Card Reader Support Bracket

1. Align the MicroSD card reader support bracket with the screw holes on the sled tray. See Figure 3-33.
2. Replace the two screws securing the MicroSD card reader support bracket. See Figure 3-33.
3. Replace the MicroSD card reader. See "Installing the MicroSD Card Reader" on page 185.
4. If applicable, replace the mezzanine card. See "Installing the Infiniband Mezzanine Card" on page 179 or "Installing the 10 GbE Mezzanine Card" on page 182.
5. If applicable, replace the RAID battery. See "Installing the RAID Battery" on page 171.
6. Replace the front cover. See "Installing the Front Cover" on page 149.
7. Replace the sled. See "Installing a Sled" on page 144.

Internal Hard-Drives

The sled supports up to two 2.5-inch hard-drives attached internally to the sled tray.

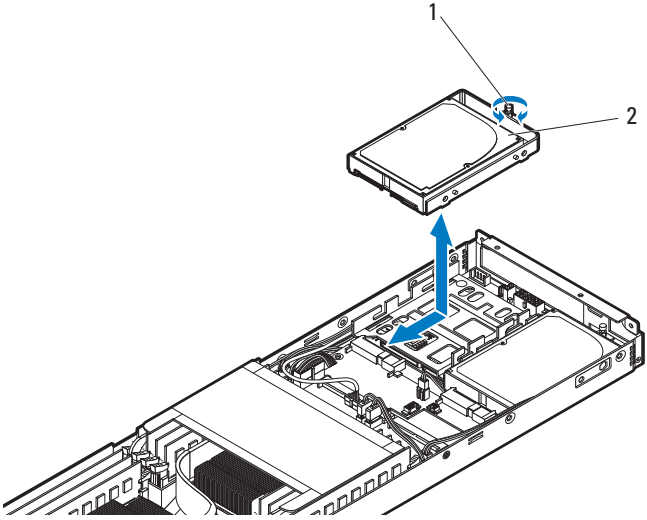
Removing a Hard-Drive Carrier

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: Combining SATA and SAS hard-drives in the same sled configuration is not supported.

1. Remove the sled from the enclosure. See "Removing a Sled" on page 143.
2. Remove the back cover. See "Removing the Back Cover" on page 150.
3. Loosen the thumbscrew securing the hard-drive carrier to the hard-drive bracket. See Figure 3-34.
4. Slide and lift the hard-drive carrier out of the sled tray. See Figure 3-34.

Figure 3-34. Removing and Installing a Hard-Drive Carrier



1	thumbscrew	2	hard-drive carrier

Installing a Hard-Drive Carrier

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: Combining SATA and SAS hard-drives in the same sled configuration is not supported.

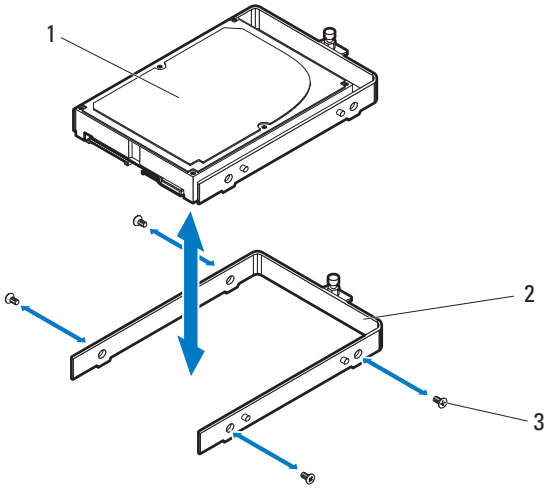
1. Place the hard-drive carrier into the sled tray and slide into place. See Figure 3-34.
2. Tighten the thumbscrew to secure the hard-drive carrier in place. See Figure 3-34.
3. Replace the back cover. See "Installing the Back Cover" on page 151.
4. Replace the sled. See "Installing a Sled" on page 144.

Removing a Hard-Drive From the Hard-Drive Carrier

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 four screws securing the hard-drive. See Figure 3-35.
2. Lift the hard-drive out of the hard-drive carrier. See Figure 3-35.

Figure 3-35. Removing and Installing a Hard-Drive from the Hard-Drive Carrier



1 hard-drive
2 hard-drive carrier
3 M3 screws (4)

Installing a Hard-Drive Into a Hard-Drive Carrier

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.

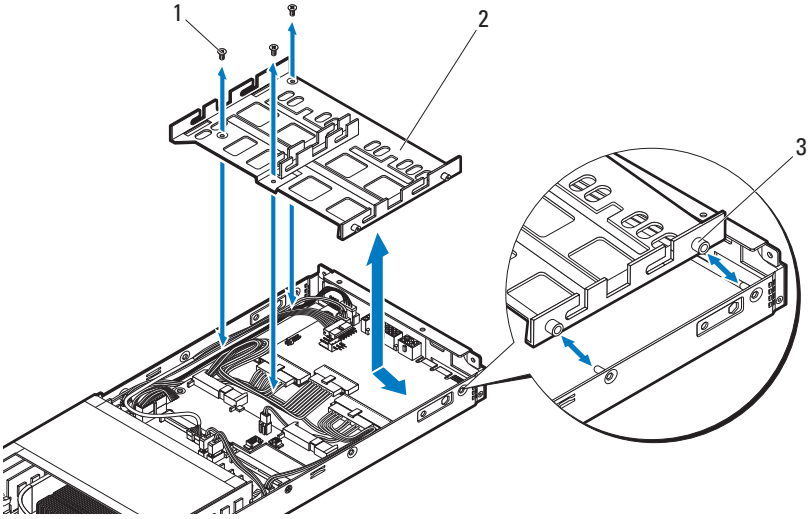
1. Align the hard-drive carrier with the new hard-drive screw holes. See Figure 3-35.
2. Replace the four screws securing the hard-drive. See Figure 3-35.

Removing the Hard-Drive Tray

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 sled from the enclosure. See "Removing a Sled" on page 143.
2. Remove the back cover. See "Removing the Back Cover" on page 150.
3. Remove the internal hard-drives. See "Removing a Hard-Drive Carrier" on page 188.
4. Remove the three screws securing the hard-drive tray. See Figure 3-36.
5. Lift the hard-drive tray at an angle and slide the standoff holes on the hard-drive tray out of the sled tray standoffs. See Figure 3-36.

Figure 3-36. Removing and Installing the Hard-Drive Tray



1 M3 screws (3)
2 hard-drive tray
3 hard-drive tray standoff holes (2)

Installing the Hard-Drive Tray

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. Insert the sled tray's standoff holes into the sled tray standoffs. See Figure 3-36.
2. Replace the three screws securing the hard-drive tray. See Figure 3-36.
3. Replace the internal hard-drives. See "Installing a Hard-Drive Carrier" on page 189.
4. Replace the back cover. See "Installing the Back Cover" on page 151.
5. Replace the sled. See "Installing a Sled" on page 144.

Interposer Extender

The following table lists the types of interposer extenders supported for a specific system board model.

System Board	Interposer Extender
V1.0	V1.0
V1.1	V1.1
V1.2	V1.1

NOTE: For information about identifying the sled's system board model number, see "Identifying System Board Model Number" on page 221.

Removing the Interposer Extender

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 sled from the enclosure. See "Removing a Sled" on page 143.
2. Remove the back cover. See "Removing the Back Cover" on page 150.

3 Remove the internal hard-drives. See "Removing a Hard-Drive Carrier" on page 188.

4 Remove the hard-drive tray. See "Removing the Hard-Drive Tray" on page 191.

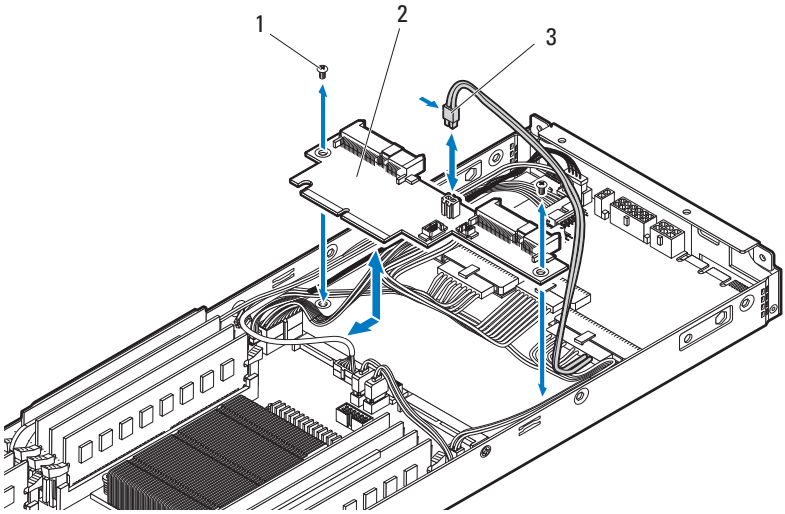
5 Press down the cable-locking tab and disconnect the power cable from the interposer extender. See Figure 3-37.

6 Remove the two screws securing the interposer extender to the sled tray. See Figure 3-37.

7 Grasp the interposer extender by its edges and carefully remove it from the system board connector.

8 Lift the interposer extender out of the sled tray. See Figure 3-37.

Figure 3-37. Removing and Installing the Interposer Extender



1 M3 screws (2)

2 interposer extender

3 power cable

Installing the Interposer Extender

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. Hold the card by its edges, position the interposer extender so that the edge connector aligns with the system board connector. See Figure 3-37.
2. Insert the card edge connector firmly into the system board connector until the card is fully seated.
3. Replace the two screws securing the interposer extender to the sled tray. See Figure 3-37.
4. Connect the power cable to the interposer extender. Press down on the locking tab to secure the power cable. See Figure 3-37.
5. Replace the hard-drive tray. See "Installing the Hard-Drive Tray" on page 192.
6. Replace the internal hard-drives. See "Installing a Hard-Drive Carrier" on page 189.
7. Replace the back cover. See "Installing the Back Cover" on page 151.
8. Replace the sled. See "Installing a Sled" on page 144.

BMC Management Cable (Optional)

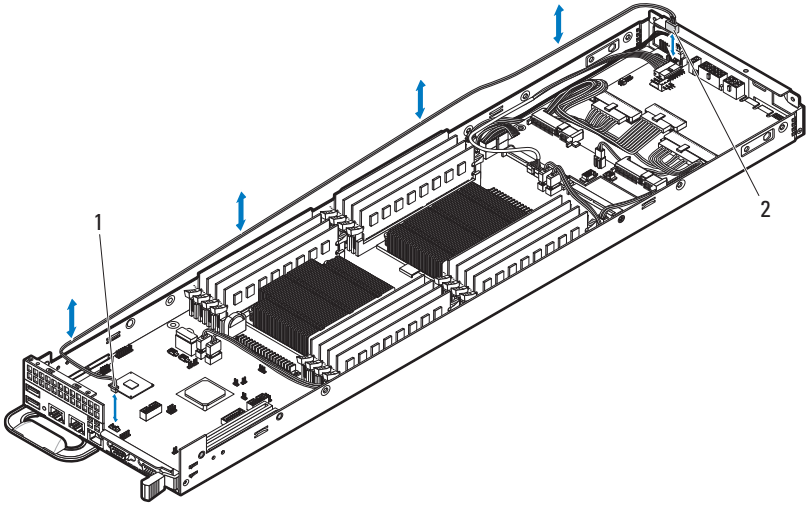
To enable BMC support on the sled, you must connect the BMC management cable to the system board and node power distribution board. Depending on your requirements, you can use the management cable to configure your sled in two separate modes: Dedicated-NIC mode and Shared-NIC mode. See "Set BMC LAN Configuration" on page 93 for more information.

Removing the BMC Management Cable

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 sled from the enclosure. See "Removing a Sled" on page 143.
2. Remove the back cover. See "Removing the Back Cover" on page 150.
3. Remove the internal hard-drives. See "Removing a Hard-Drive Carrier" on page 188.
4. Remove the hard-drive tray. See "Removing the Hard-Drive Tray" on page 191.
5. Locate the LAN passthrough connector on the node power distribution board. See "Node Power Distribution Board Connectors" on page 240.
6. Locate the consolidated BMC cable connector on the system board. See "System Board Connectors" on page 231.
7. Disconnect the BMC management cable from the system board and node power distribution board. See Figure 3-38.

Figure 3-38. Removing and Installing the BMC Management Cable



1	BMC management cable on system board	2	BMC management cable on node power distribution board

Installing the BMC Management Cable

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. Locate the consolidated BMC cable connector on the system board. See "System Board Connectors" on page 231.
2. Locate the LAN passthrough connector on the node power distribution board. See "Node Power Distribution Board Connectors" on page 240.
3. Connect one end of the BMC management cable to the LAN passthrough connector on the NPDB and the other end of the cable to the consolidated BMC cable connector on the system board. See Figure 3-38.
4. Route the cable properly to prevent the cable from being pinched or crimped.
5. Replace the hard-drive tray. See "Installing the Hard-Drive Tray" on page 192.
6. Replace the internal hard-drives. See "Installing a Hard-Drive Carrier" on page 189.
7. Replace the back cover. See "Installing the Back Cover" on page 151.
8. Replace the sled. See "Installing a Sled" on page 144.

Node Power Distribution Board

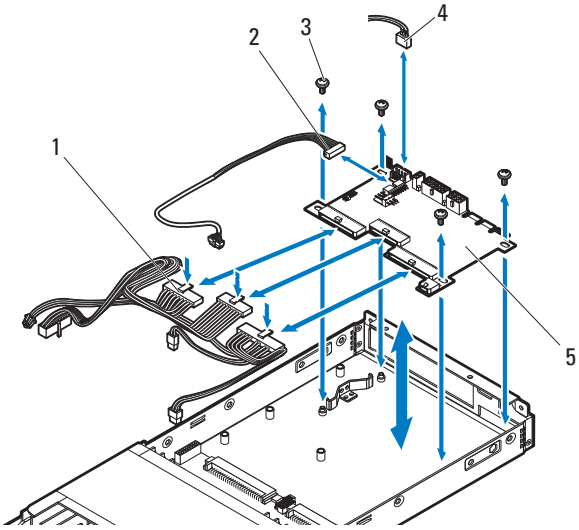
Removing the Node Power Distribution Board

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 sled from the enclosure. See "Removing a Sled" on page 143.
2. Remove the back cover. See "Removing the Back Cover" on page 150.
3. Remove the internal hard-drives. See "Removing a Hard-Drive Carrier" on page 188.
4. Remove the hard-drive tray. See "Removing the Hard-Drive Tray" on page 191.
5. Remove the interposer extender. See "Removing the Interposer Extender" on page 192.
6. Disconnect all cables from the node power distribution board (NPDB). See Figure 3-39. When you disconnect the power cable, press down the cable-locking tab and disconnect the power cable from the NPDB.

   Note the routing of the cables on the sled as you remove them from the sled tray. You must route these cables properly when you replace them to prevent the cables from being pinched or crimped.
7. Remove the four screws securing the NPDB to the sled tray. See Figure 3-39.
8. Lift the NPDB out of the sled tray. See Figure 3-39.

Figure 3-39. Removing and Installing the Node Power Distribution Board



1	power cable	2	system board control cable
3	M3 screws (4)	4	I2C cable
5	node power distribution board		

Installing the Node Power Distribution 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. Insert the new power distribution board into the right retaining clip at a 45-degree angle, and then press the other end of the board down into the left retaining clip to secure the board in place. Make sure to align the new power distribution board with the screw holes on the bracket. See Figure 3-39.
2. Replace the four screws securing the NPDB. See Figure 3-39.
3. Connect all cables to the NPDB. See Figure 3-39.

4 You must route the cables properly on the sled tray to prevent them from being pinched or crimped.

5 Replace the interposer extender. See "Installing the Interposer Extender" on page 194.

6 Replace the hard-drive tray. See "Installing the Hard-Drive Tray" on page 192.

7 Replace the internal hard-drives. See "Installing a Hard-Drive Carrier" on page 189.

8 Replace the back cover. See "Installing the Back Cover" on page 151.

9 Replace the sled. See "Installing a Sled" on page 144.

System Battery

Removing the System Battery

WARNING: There is a danger of a new battery exploding if it is incorrectly installed. Replace the battery only with the same or equivalent type recommended by the manufacturer. See your safety information for additional information.

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 sled from the enclosure. See "Removing a Sled" on page 143.

2 Remove the front cover. See "Removing the Front Cover" on page 148.

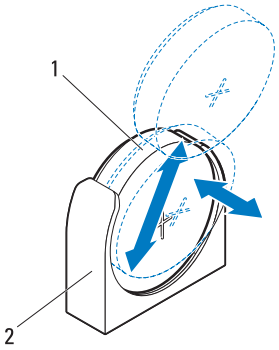
3 Locate the battery socket on the system board. See "System Board Connectors" on page 231.

CAUTION: To avoid damage to the battery connector, you must firmly support the connector while installing or removing a battery.

4 Press the "-" side of the battery outward to allow the battery to pop out from the socket.

5 Lift the battery out of the connector. See Figure 3-40.

Figure 3-40. Removing and Installing the System Battery



1 system battery 2 connector

Installing the System Battery

WARNING: There is a danger of a new battery exploding if it is incorrectly installed. Replace the battery only with the same or equivalent type recommended by the manufacturer. See your safety information for additional information.

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. Hold the new battery with the "+" facing the retention clip on the battery connector. See Figure 3-40.
2. Insert the "-" side of the battery then push the positive side
3. Gently pull the retention clip towards the positive side of the connector and slide the battery into the connector until the retention clip snaps into place. See Figure 3-40.
4. Replace the front cover. See "Installing the Front Cover" on page 149.
5. Replace the sled. See "Installing a Sled" on page 144.
6. Reconnect the system to the electrical outlet and turn the system on, including any attached peripherals.

7 Enter the System Setup program to confirm that the battery is operating properly. See "Using the System Setup Program" on page 49.

8 Enter the correct time and date in the System Setup program's Time and Date fields.

9 Exit the System Setup program.

System Board

The following table lists the different types of system boards, including model numbers, supported in the sled.

System Board	System Board Model Number
V1.0	CN0W6W6G (for sled with Intel Xeon E5-2600 series processor)
V1.1	CN0TND55 (for sled with Intel Xeon E5-2600 series processor)
V1.2	CN09N44V (for sled with Intel Xeon E5-2600V2 series processor)

NOTE: For information about identifying the sled's system board model number, see "Identifying System Board Model Number" on page 221.

Removing 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 is not covered by warranty. Read and follow the safety instructions that came with the product.

1 Remove the sled from the enclosure. See "Removing a Sled" on page 143.

2 Remove the front cover. See "Removing the Front Cover" on page 148.

3 Remove the back cover. See "Removing the Back Cover" on page 150.

4 Remove the cooling shroud. See "Removing the Cooling Shroud" on page 151.

5 Remove the heat sink. See "Removing a Heat Sink" on page 153.

6 Remove the processor. See "Removing a Processor" on page 157.

7 Remove the memory modules. See "Removing Memory Modules" on page 163.

8 If installed, remove the RAID controller card. See "Removing the RAID Controller Card" on page 167.

9 If installed, remove the RAID battery. See "Removing the RAID Battery" on page 169.

10 If installed, remove the mezzanine card. See "Removing the Infiniband Mezzanine Card" on page 176 or "Removing the 10 GbE Mezzanine Card" on page 180.

11 Remove the MicroSD card reader. See "Removing the MicroSD Card Reader" on page 183.

12 Remove the MicroSD card reader support bracket. See "Removing the MicroSD Card Reader Support Bracket" on page 186.

13 Remove the internal hard-drives. See "Removing a Hard-Drive Carrier" on page 188.

14 Remove the hard-drive tray. See "Removing the Hard-Drive Tray" on page 191.

15 Remove the interposer extender. See "Removing the Interposer Extender" on page 192.

16 Remove the node power distribution board. See "Removing the Node Power Distribution Board" on page 197.

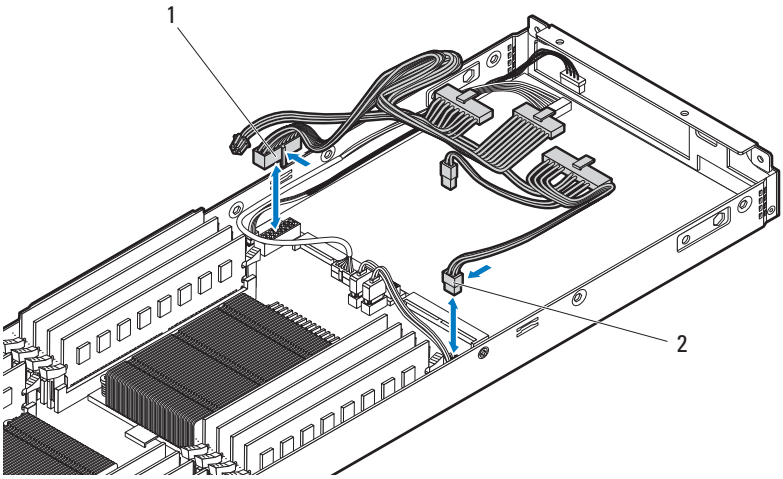
17 Disconnect the following cables from the system board.

Note the routing of the cables as you remove them from the sled tray. You must route these cables properly when you replace them to prevent the cables from being pinched or crimped.

- power cable

When you disconnect the power cable, press down the cable-locking tab and disconnect the power cable from the system board. See Figure 3-41.

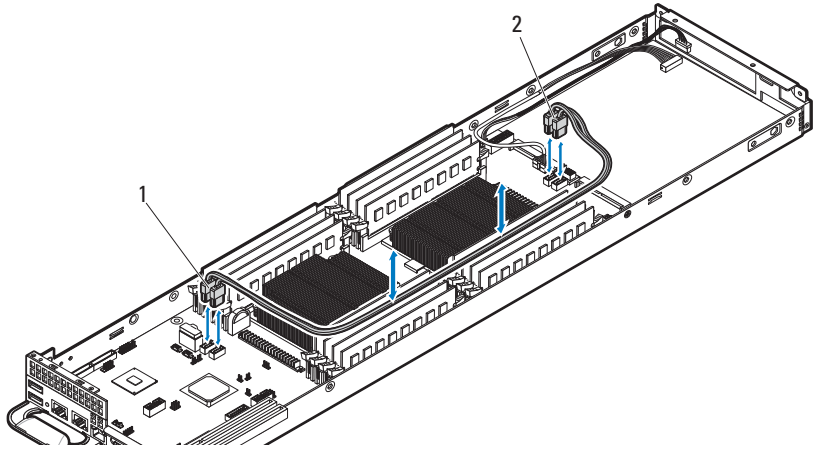
Figure 3-41. Removing and Installing the Power Cable



1, 2 power cable

- SATA cables

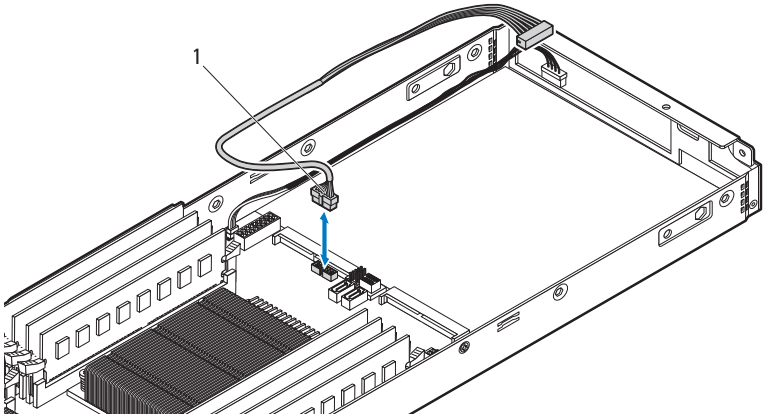
Figure 3-42. Removing and Installing the SATA Cables



1, 2 SATA cables

- system board control cable

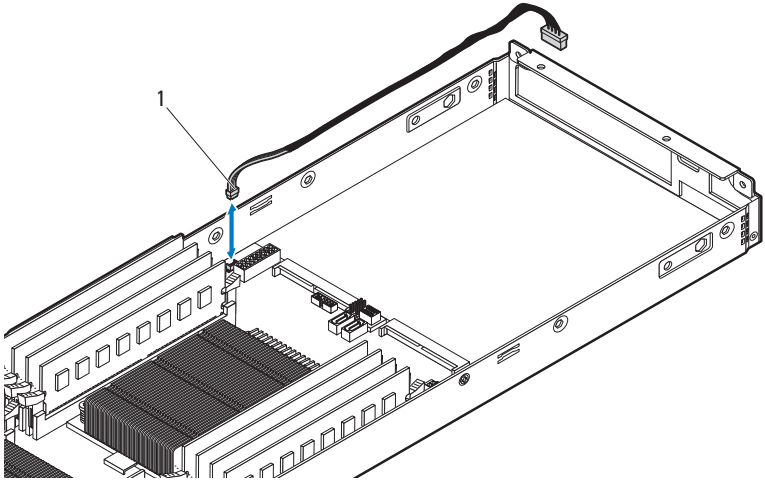
Figure 3-43. Removing and Installing the System Board Control Cable



1 system board control cable

- I2C cable

Figure 3-44. Removing and Installing the I2C Cable

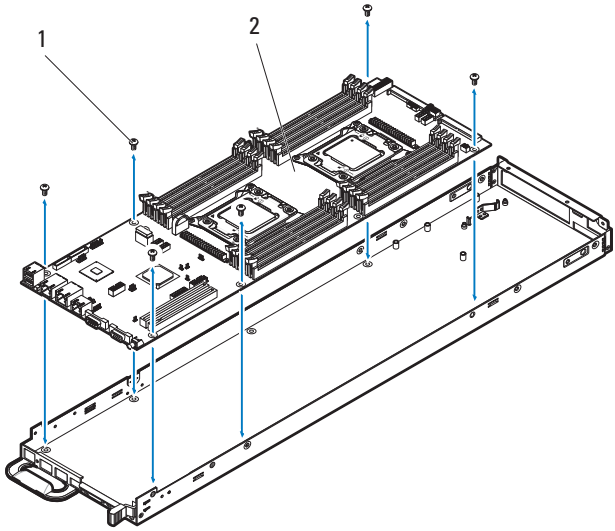


1 I2C cable

18 Remove the six screws securing the system board. See Figure 3-45.

19 Grasp the system board by the edges and lift the system board out of the sled tray. See Figure 3-45.

Figure 3-45. Removing the System Board



1 M3 screws (6) 2 system board

Installing 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 is not covered by warranty. Read and follow the safety instructions that came with the product.

1 Unpack the new system board.

2 Holding the system board by the edges, slide the system board into the sled tray. See Figure 3-45.

3 Replace the six screws securing the system board to the sled tray. See Figure 3-45.

4. Connect the following cables to the system board.
   - I2C cable. See Figure 3-44.
   - System board control cable. See Figure 3-43.
   - SATA cable. See Figure 3-42.
   - Power cable. See Figure 3-41.
5. You must route the cables properly on the sled tray to prevent them from being pinched or crimped.
6. Install the node power distribution board. See "Installing the Node Power Distribution Board" on page 198.
7. Install the interposer extender to the new board. See "Installing the Interposer Extender" on page 194.
8. Install the hard-drive tray. See "Installing the Hard-Drive Tray" on page 192.
9. Install the hard-drives. See "Installing a Hard-Drive Carrier" on page 189.
10. Install the MicroSD card reader support bracket. See "Installing the MicroSD Card Reader Support Bracket" on page 187.
11. Install the MicroSD card reader. See "Installing the MicroSD Card Reader" on page 185.
12. Transfer the processors to the new system board. See "Removing a Processor" on page 157 and "Installing a Processor" on page 158.
13. Remove the memory modules and transfer them to the same locations on the new board. See "Removing Memory Modules" on page 163 and "Installing Memory Modules" on page 164.
14. Replace the cooling shroud. See "Installing the Cooling Shroud" on page 152.
15. If applicable, install the mezzanine card. See "Installing the Infiniband Mezzanine Card" on page 179 or "Installing the 10 GbE Mezzanine Card" on page 182.
16. If applicable, install the RAID controller card and RAID battery. See "Installing the RAID Controller Card" on page 168 and "Installing the RAID Battery" on page 171.

17 Install the expansion card. See "Installing the Expansion Card" on page 166.

18 Replace the front cover. See "Installing the Front Cover" on page 149.

19 Replace the back cover. See "Installing the Back Cover" on page 151.

20 Replace the sled. See "Installing a Sled" on page 144.

4

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.

For all other startup issues, note any system messages that appear onscreen. See "Using the System Setup Program" on page 49 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 for the front-panel connectors on the sled.

Troubleshooting the Video Subsystem

1. Check the sled and power connections to the monitor.
2. Check the video interface cabling from the 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 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 87.

c If your keyboard is not functioning, you can also use remote access. If the system is not accessible, see "System Board Jumper Settings" on page 226 for instructions on setting the NVRAM Clear jumper inside your system and restoring 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 241.

Troubleshooting a Serial I/O Device

1 Turn off the sled and any peripheral devices connected to the serial port.

2 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.

3 Turn off the sled and the serial device, and swap the device with a comparable device.

4 Turn on the sled and the serial device.

If the problem is resolved, replace the serial device.

If the problem persists, see "Getting Help" on page 241.

Troubleshooting a NIC

1. Restart the 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 14.
   - 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 49.
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 241.

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 from the enclosure. See "Removing a Sled" on page 143.
4. Open the sled. See "Sled Covers" on page 148.
5. Disassemble components from the sled. See "Installing System Components" on page 139.
   - Hard-drives
   - Cooling shroud
   - Processors and heat sinks
   - Memory modules
   - Expansion card/ RAID controller card
   - Mezzanine card
   - Interposer extender
   - Node power distribution board
   - MicroSD card reader
6. Remove all server enclosure components. See the PowerEdge C8000 Systems Hardware Owner's Manual for more information.
7. Let the sled dry thoroughly for at least 24 hours.
8. Reinstall all server enclosure components. See the PowerEdge C8000 Systems Hardware Owner's Manual for more information.
9. Reinstall all sled components you removed in step 5.
10. Close the sled. See "Sled Covers" on page 148.

11 Reinstall the sled. See "Installing a Sled" on page 144.

12 Reconnect the server enclosure to the electrical outlet or the PDU.

13 Turn on the sleds and attached peripherals.

14 If the system fails to start, see "Getting Help" on page 241.

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
- Sleds

4 Ensure that the following components are properly installed in the sled:

- MicroSD card reader
- Node power distribution board
- Interposer extender
- Mezzanine card
- Expansion card/RAID controller card
- Memory modules
- Processors and heat sinks
- Cooling shroud
- Hard-drives

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 241.

Troubleshooting the Power Sled

CAUTION: Remove and replace one PSU module at a time. Leave a failed PSU module installed in the power sled until you are ready to replace it. Operating the system with a power sled removed for extended periods of time can cause the system to overheat.

NOTE: The 1400 W power supply module in the power sled require a 200-240 V power source to operate.

1 Locate the power sled to be removed or the power sled that contains the failed PSU module. The PSU module's status indicator will either light up green or amber. If the PSU module is faulty the status indicator lights up amber.

2 Replace the faulty PSU module in the power sled. See the PowerEdge C8000 Systems Hardware Owner's Manual for more information.

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.

If none of the PSU modules show a fault LED and the sleds do not power on, log into the BMC web interface and check for status messages. See Using the Baseboard Management Controller Guide for more information.

If all troubleshooting fails, see "Getting Help" on page 241.

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 "System Memory" on page 160 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 13 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 56. 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 13.
4. Turn off the sled and attached peripherals.
5. Remove the sled from the enclosure. See "Removing a Sled" on page 143.
6. Remove the cooling shroud. See "Removing the Cooling Shroud" on page 151.
7. Check the memory channels and ensure that they are populated correctly. See "Supported DIMM Configuration" on page 161.
8. Reseat the memory modules in their sockets. See "Removing Memory Modules" on page 163 and "Installing Memory Modules" on page 164.
9. Replace the cooling shroud. See "Installing the Cooling Shroud" on page 152.
10. Reinstall the sled into the enclosure. See "Installing a Sled" on page 144.
11. Turn on the sled and attached peripherals.
12. Enter the System Setup program and check the system memory settings. See "Main Menu" on page 56.

    If the problem is not resolved, proceed with the next step.
13. Turn off the sled and attached peripherals.
14. Remove the sled from the enclosure. See "Removing a Sled" on page 143.
15. Remove the cooling shroud. See "Removing the Cooling Shroud" on page 151.
16. If a diagnostic test or error message indicates a specific memory module as faulty, swap or replace the module.

17 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 "Installing Memory Modules" on page 164.

18 Replace the cooling shroud. See "Installing the Cooling Shroud" on page 152.

19 Reinstall the sled into the enclosure. See "Installing a Sled" on page 144.

20 Turn on the sled and attached peripherals.

21 As the system boots, observe any error message that appears and the diagnostic indicators on the front of the system.

22 If the memory problem is still indicated, repeat step 13 through step 21 for each memory module installed.

23 If the problem persists after all memory modules have been checked, see "Getting Help" on page 241.

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 sled and enter the host adapter configuration utility program by pressing <Ctrl><H> for a RAID controller, <Ctrl><C> for a SAS mezzanine card, 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 reseat the drive. See "Removing a Hard-Drive Carrier" on page 188.

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 sled, 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 49.

If the problem persists, see "Getting Help" on page 241.

Troubleshooting a Storage Controller

NOTE: When troubleshooting a SAS RAID controller, also see the documentation for your operating system and the controller.

1 Enter the System Setup program and ensure that the SAS controller is enabled. See "Using the System Setup Program" on page 49.

2 Restart the sled and press the applicable key sequence to enter the configuration utility program.

- <Ctrl><C> for a LSI SAS 2008 mezzanine card
- <Ctl><H> for a LSI 9265-8i SAS RAID Card

See the controller's documentation for information about configuration settings.

3 Check the configuration settings, make any necessary corrections, and restart 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 by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.

4 Turn off the sled and attached peripherals.

5 Remove the sled from the enclosure. See "Removing a Sled" on page 143.

6 Open the sled. See "Sled Covers" on page 148.

7 Ensure that the controller card is firmly seated into the system board connector. See "Installing the RAID Controller Card" on page 168.

8 If you have a battery-cached SAS RAID controller, ensure that the RAID battery is properly connected and, if applicable, the memory module on the RAID card is properly seated.

9 Ensure that the cables are firmly connected to the storage controller.

10 Close the sled. See "Sled Covers" on page 148.

11 Reinstall the sled into the enclosure. See "Installing a Sled" on page 144.

12 Turn on the sled and attached peripherals.

13 If the problem persists, see "Getting Help" on page 241.

Troubleshooting Expansion Cards

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

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 enclosure. See "Removing a Sled" on page 143.

3 Open the sled. See "Sled Covers" on page 148.

4 Ensure that each expansion card is firmly seated in its connector. See "Installing the RAID Controller Card" on page 168.

5 Close the sled. See "Sled Covers" on page 148.

6 Reinstall the sled into the enclosure. See "Installing a Sled" on page 144.

7 Turn on the sled and attached peripherals.

8 If the problem is not resolved, see "Getting Help" on page 241.

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 Sled" on page 143.
3. Remove the cooling shroud. See "Removing the Cooling Shroud" on page 151.
4. Ensure that each heat sink is properly installed. See "Installing a Heat Sink" on page 154.
5. Ensure that there is thermal grease on the heat sink and processor.
6. Ensure that each processor is properly installed. See "Installing a Processor" on page 158.
7. Replace the cooling shroud. See "Installing the Cooling Shroud" on page 152.
8. Reinstall the sled into the enclosure. See "Installing a Sled" on page 144.
9. Turn on the sled and attached peripherals.
10. If the problem persists, turn off the sled and attached peripherals.
11. Remove the sled from the enclosure. See "Removing a Sled" on page 143.
12. Remove the cooling shroud. See "Removing the Cooling Shroud" on page 151.
13. Remove processor 2. See "Removing a Processor" on page 157.
14. Replace the cooling shroud. See "Installing the Cooling Shroud" on page 152.
15. Reinstall the sled into the enclosure. See "Installing a Sled" on page 144.
16. Turn on the sled and attached peripherals.

    If the problem persists, the processor is faulty. See "Getting Help" on page 241.

17 Turn off the sled and attached peripherals.

18 Remove the sled from the enclosure. See "Removing a Sled" on page 143.

19 Remove the cooling shroud. See "Removing the Cooling Shroud" on page 151.

20 Replace processor 1 with processor 2. See "Installing a Processor" on page 158.

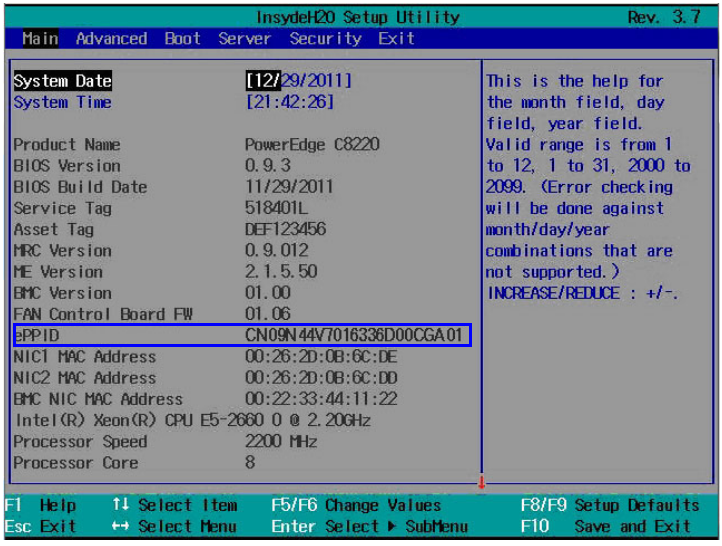
21 Repeat step 13 through step 16.

If you have tested both the processors and the problem persists, the system board is faulty. See "Getting Help" on page 241.

Identifying System Board Model Number

1 Press <F2> immediately after a power-on or reboot to enter System Setup.

2 In the Main menu look for the ePPID entry.



3 The first 8 digits (*CN09N44V*) of the ePPID number represents the system board model number and the remaining 14 digits represents the code for the system's piece part identification code.

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 Sled" on page 143.
2. Open the sled. See "Sled Covers" on page 148.
3. Locate the NVRAM clear jumper on the system board.
4. Clear the NVRAM.
5. Close the sled. See "Sled Covers" on page 148.
6. If there is still a problem with the compute sled, remove and reinstall the sled. See "Installing a Sled" on page 144.

   If the problem persists, see "Getting Help" on page 241.

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 50.
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. See "Removing the System Battery" on page 199.

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 241.

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	Reserved	IRQ15	Secondary IDE controller

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

5

Jumpers and Connectors

This section provides specific information about the system jumpers. It also provides some basic information on jumpers and switches and describes the connectors on the various boards in the system.

System Board Types

The following table lists the different types of system boards, including model numbers, supported in the sled.

System Board	System Board Model Number
V1.0	CN0W6W6G (for sled with Intel Xeon E5-2600 series processor)
V1.1	CN0TND55 (for sled with Intel Xeon E5-2600 series processor)
V1.2	CN09N44V (for sled with Intel Xeon E5-2600V2 series processor)

NOTE: For information about identifying the sled's system board model number, see "Identifying System Board Model Number" on page 221.

System Board Jumper Settings

This section describes the jumper options and settings available on system board v1.0, v1.1 and v1.2.

System Board V1.0 Jumper Settings

Figure 5-1. System Board V1.0 Jumper Settings

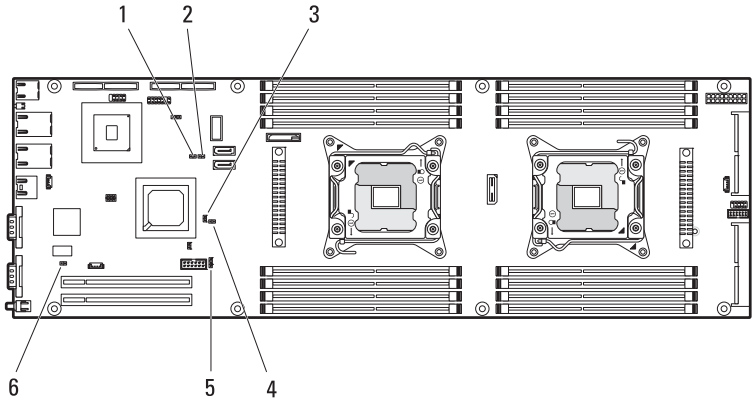


Table 5-1. System Board Jumper Settings

Item	Jumper	Setting		Description
1	Service mode		(default)	The flash security setting is enabled.
				The flash security and NVRAM clear signal is disabled.
2	NVRAM clear		(default)	The configuration settings are retained at system boot.
				The configuration settings are cleared at the next system boot.
3	ME firmware recovery		(default)	The ME firmware recovery jumper is disabled.
				The ME firmware recovery jumper enables ME firmware recovery mode.

Table 5-1. System Board Jumper Settings

Item	Jumper	Setting		Description
4	BIOS recovery		(default)	The BIOS recovery jumper is disabled.
				The BIOS recovery jumper enables the BIOS flash memory special recovery mode.
5	Password enable		(default)	The password feature is enabled.
				The password feature is disabled.
6	Power button pass		(default)	The BMC triggers a power button signal.
				The power button passthrough signal is triggered.

System Board V1.1 Jumper Settings

Figure 5-2. System Board V1.1 Jumper Settings

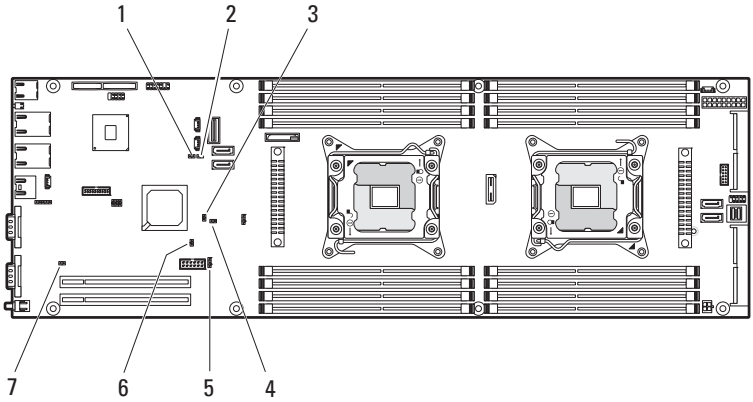


Table 5-2. System Board Jumper Settings

Item	Jumper	Setting		Description
1	Service mode		(default)	The flash security setting is enabled.
				The flash security and NVRAM clear signal is disabled.

Table 5-2. System Board Jumper Settings

Item	Jumper	Setting		Description
2	NVRAM clear		(default)	The configuration settings are retained at system boot.
				The configuration settings are cleared at the next system boot.
3	ME firmware recovery		(default)	The ME firmware recovery jumper is disabled.
				The ME firmware recovery jumper enables ME firmware recovery mode.
4	BIOS recovery		(default)	The BIOS recovery jumper is disabled.
				The BIOS recovery jumper enables the BIOS flash memory special recovery mode.
5	Password enable		(default)	The password feature is enabled.
				The password feature is disabled.
6	Flash descriptor security override		(default)	The flash descriptor security override is enabled.
				The flash descriptor security override is disabled.
7	Power button pass		(default)	The BMC triggers a power button signal.
				The power button passthrough signal is triggered.

System Board V1.2 Jumper Settings

Figure 5-3. System Board V1.2 Jumper Settings

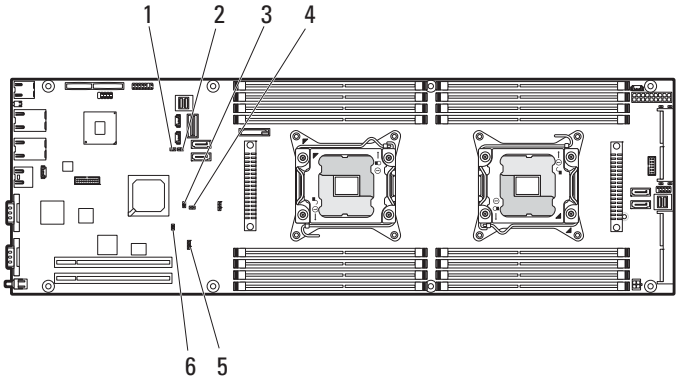


Table 5-3. System Board Jumper Settings

Item	Jumper	Setting		Description
1	Service mode		(default)	The flash security setting is enabled.
				The flash security and NVRAM clear signal is disabled.
2	NVRAM clear		(default)	The configuration settings are retained at system boot.
				The configuration settings are cleared at the next system boot.
3	ME firmware recovery		(default)	The ME firmware recovery jumper is disabled.
				The ME firmware recovery jumper enables ME firmware recovery mode.
4	BIOS recovery		(default)	The BIOS recovery jumper is disabled.
				The BIOS recovery jumper enables the BIOS flash memory special recovery mode.

Table 5-3. System Board Jumper Settings

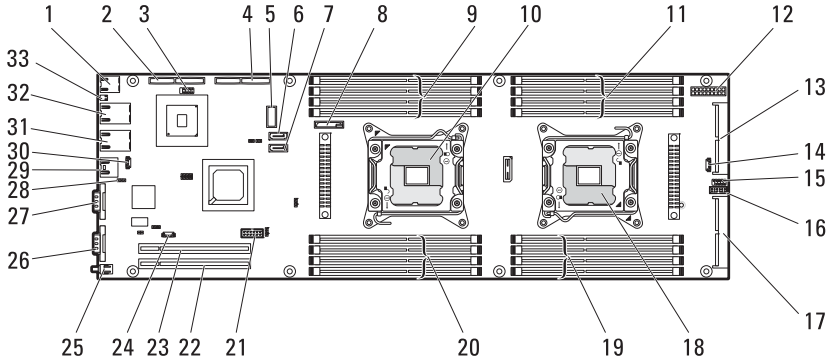
Item	Jumper	Setting		Description
5	Password enable		(default)	The password feature is enabled.
				The password feature is disabled.
6	Flash descriptor security override		(default)	The flash descriptor security override is enabled.
				The flash descriptor security override is disabled.

System Board Connectors

This section describes the connectors available on system board v1.0, v1.1 and v1.2.

System Board V1.0 Connectors

Figure 5-4. System Board V1.0 Connectors

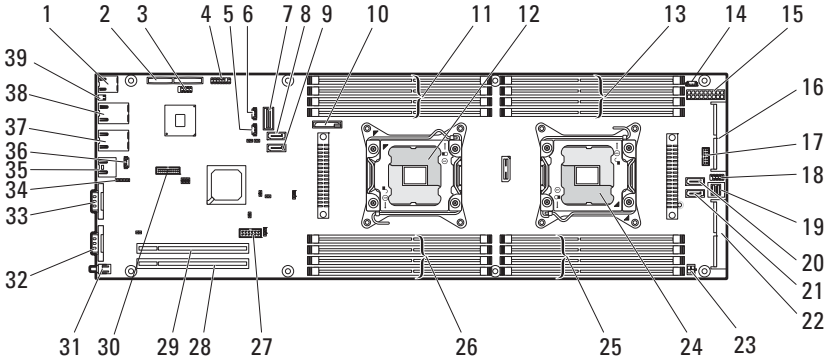


1	USB connectors (2)	2	PCIe x8 slot 3 (mezzanine slot)
3	MicroSD card reader (internal USB) connector	4	internal SAS mezzanine slot
5	mini-SAS connector 0	6	onboard SATA connector 4
7	onboard SATA connector 5	8	system battery
9	DIMM sockets for CPU1 DIMMA3 socket DIMMA4 socket DIMMA7 socket DIMMA8 socket	10	CPU1 socket
11	DIMM sockets for CPU2 DIMMB1 socket DIMMB2 socket DIMMB5 socket DIMMB6 socket	12	main power connector
13	internal hard-drive interposer	14	SGPIO connector 2

15	internal serial connector	16	front panel connector 1
17	PCIe x16 slot 4 (back GPGPU)	18	CPU2 socket
19	DIMM sockets for CPU2 DIMMB3 socket DIMMB4 socket DIMMB7 socket DIMMB3 socket	20	DIMM sockets for CPU1 DIMMA1 socket DIMMA2 socket DIMMA5 socket DIMMA6 socket
21	LAN LED connector	22	PCIe x16 slot 1
23	PCIe x16 slot 2	24	SGPIO connector 1
25	power button/power-on indicator	26	VGA connector
27	serial connector	28	internal BMC serial console connector
29	BMC management port	30	consolidated BMC cable connector
31	NIC1 connector (RJ45)	32	NIC0 connector (RJ45)
33	system identification indicator		

System Board V1.1 Connectors

Figure 5-5. System Board V1.1 Connectors

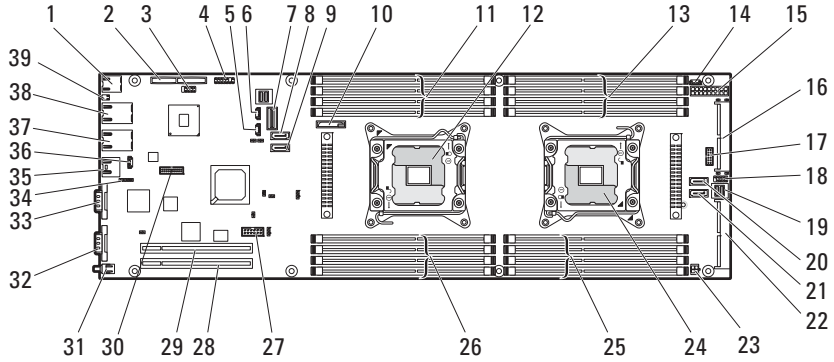


1	USB connectors (2)	2	PCIe x8 slot 3 (mezzanine slot)

3	MicroSD card reader (internal USB) connector	4	low pin count (LPC) debug connector
5	SGPIO connector 2	6	SGPIO connector 1
7	mini-SAS connector 0	8	onboard SATA connector 4
9	onboard SATA connector 5	10	system battery
11	DIMM sockets for CPU1 DIMMA3 socket DIMMA4 socket DIMMA7 socket DIMMA8 socket	12	CPU1 socket
13	DIMM sockets for CPU2 DIMMB1 socket DIMMB2 socket DIMMB5 socket DIMMB6 socket	14	I2C connector
15	main power connector	16	internal hard-drive interposer
17	front panel connector 1	18	internal serial connector
19	mini-SAS connector 1	20	onboard SATA_IN connector 5
21	onboard SATA_IN connector 4	22	PCIe x16 slot 4 (back GPGPU)
23	power connector interposer	24	CPU2 socket
25	DIMM sockets for CPU2 DIMMB3 socket DIMMB4 socket DIMMB7 socket DIMMB3 socket	26	DIMM sockets for CPU1 DIMMA1 socket DIMMA2 socket DIMMA5 socket DIMMA6 socket
27	LAN LED connector	28	PCIe x16 slot 1
29	PCIe x16 slot 2	30	NCSI connector
31	power button/power-on indicator	32	VGA connector
33	serial connector	34	internal BMC serial console connector
35	BMC management port	36	consolidated BMC cable connector
37	NIC1 connector (RJ45)	38	NIC0 connector (RJ45)
39	system identification indicator		

System Board V1.2 Connectors

Figure 5-6. System Board V1.2 Connectors

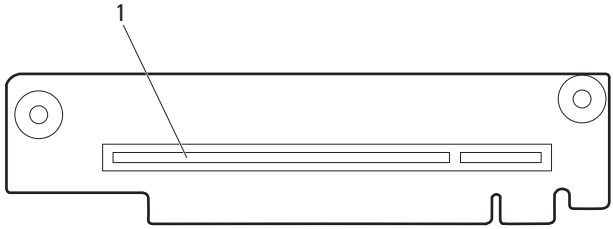


1	USB connectors (2)	2	PCIe x8 slot 3 (mezzanine slot)
3	MicroSD card reader (internal USB) connector	4	low pin count (LPC) debug connector
5	SGPIO connector 2	6	SGPIO connector 1
7	mini-SAS connector 0	8	onboard SATA connector 4
9	onboard SATA connector 5	10	system battery
11	DIMM sockets for CPU1 DIMMA3 socket DIMMA4 socket DIMMA7 socket DIMMA8 socket	12	CPU1 socket
13	DIMM sockets for CPU2 DIMMB1 socket DIMMB2 socket DIMMB5 socket DIMMB6 socket	14	I2C connector
15	main power connector	16	internal hard-drive interposer
17	front panel connector 1	18	internal serial connector
19	mini-SAS connector 1	20	onboard SATA connector 5
21	onboard SATA connector 4	22	PCIe x16 slot 4 (back GPGPU)

23	power connector interposer	24	CPU2 socket
25	DIMM sockets for CPU2 DIMMB3 socket DIMMB4 socket DIMMB7 socket DIMMB3 socket	26	DIMM sockets for CPU1 DIMMA1 socket DIMMA2 socket DIMMA5 socket DIMMA6 socket
27	LAN LED connector	28	PCIe x16 slot 1
29	PCIe x16 slot 2	30	NCSI connector
31	power button/power-on indicator	32	VGA connector
33	serial connector	34	internal BMC serial console connector
35	BMC management port	36	consolidated BMC cable connector
37	NIC1 connector (RJ45)	38	NIC0 connector (RJ45)
39	system identification indicator		

Expansion Card Riser Connector

Figure 5-7. Expansion Card Riser Connector



1 PCIe x16 slot 5

Interposer Extender Connectors

Interposer Extender Types

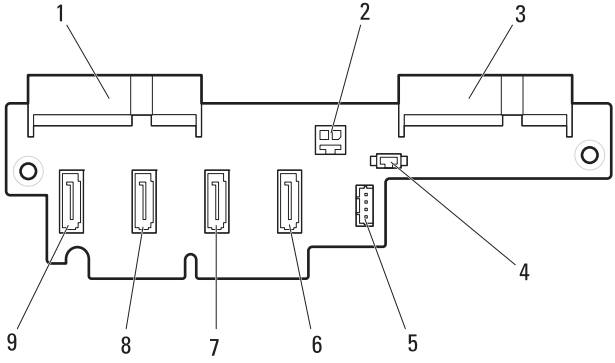
The following table lists the types of interposer extenders supported for a specific system board model.

System Board	Interposer Extender
V1.0	V1.0
V1.1	V1.1
V1.2	V1.1

NOTE: For information about identifying the sled's system board model number, see "Identifying System Board Model Number" on page 221.

Interposer Extender V1.0 Connectors

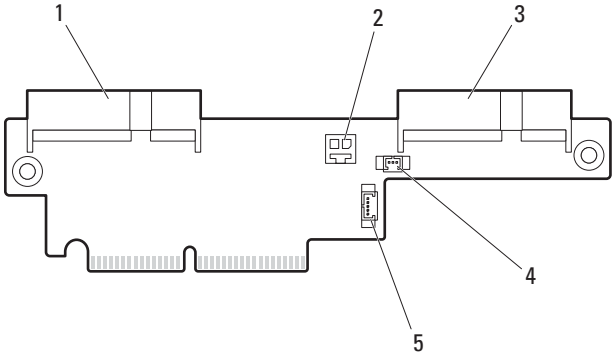
Figure 5-8. Interposer Extender V1.0 Connectors



1	SATA connector 4	2	2-pin power connector
3	SATA connector 5	4	IPMB connector
5	SGPIO connector	6	SATA connector 0
7	SATA connector 1	8	SATA connector 2
9	SATA connector 3		

Interposer Extender V1.1 Connectors

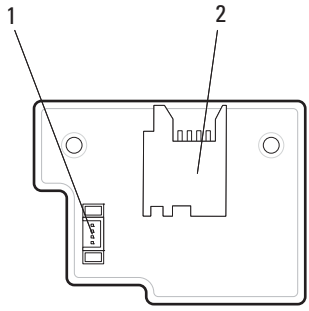
Figure 5-9. Interposer Extender V1.1 Connectors



1	SATA connector 4	2	2-pin power connector
3	SATA connector 5	4	IPMB connector
5	SGPIO connector		

MicroSD Card Reader Connectors

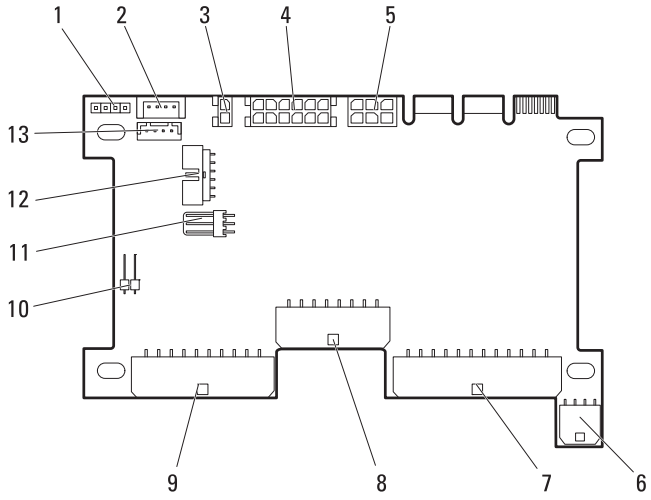
Figure 5-10. MicroSD Card Reader Connectors



1	MicroSD card reader cable connector	2	MicroSD card connector

Node Power Distribution Board Connectors

Figure 5-11. Node Power Distribution Board Connectors



1	power/throttle connector	2	I2C connector
3	12V S2 power connector	4	HDD1 power connector
5	power connector	6	HDD3 power connector
7	HDD2 power connector	8	system board power connector
9	12V S1 power connector	10	remote sensor connector
11	hard-drive LED indicator connector	12	system board control connector
13	LAN pass-through connector		

6

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.

Index

M

N

P

R

S

T