Dell PowerEdge C6320
Owner's Manual

Regulatory Model: B08S
Regulatory Type: B08S003

Notes, cautions, and warnings

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

CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

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

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Dell PowerEdge C6320 product overview

The **Dell PowerEdge C6320** is an ultra-dense 2U server that can support up to four independent two-socket (2S) servers. Each independent server features dual Intel Xeon E5-2600v3 or Intel Xeon E5-2600v4 series processors with up to 22 cores, C612 chipset for I/O connectivity, DDR4 memory, dual-port embedded 10 Gigabit Ethernet controllers (SFP+), and integrated iDRAC8 systems management with a dedicated RJ45 connection.

Supported configurations for PowerEdge C6320 system

The Dell PowerEdge C6320 system supports the following configurations:

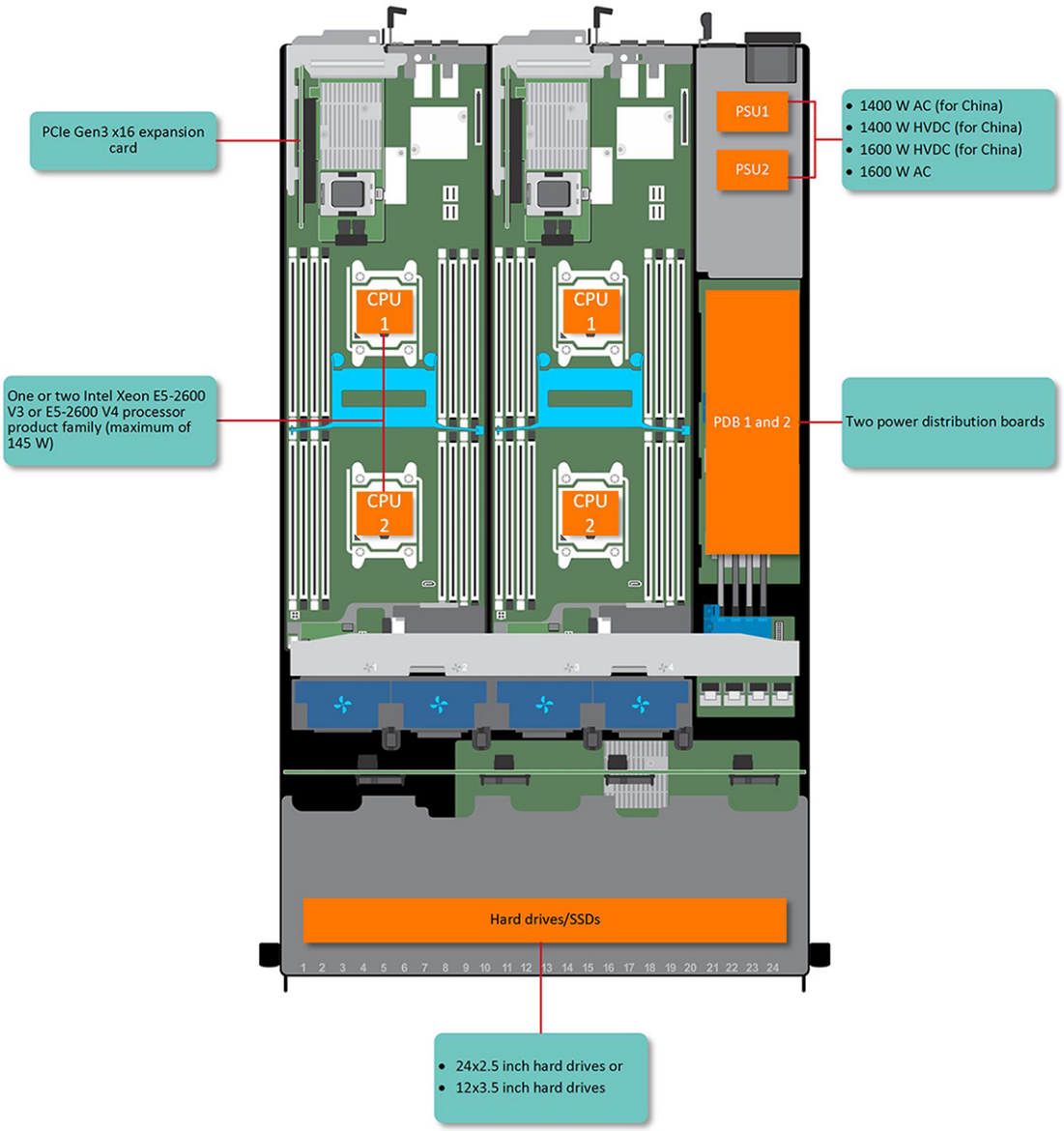

Figure 1. Supported configurations for C6320

Accessing system features during startup

The following keystrokes provide access to system features during startup.

NOTE: The hot keys of SAS or SATA card or PXE support are available in BIOS boot mode only. There is no hot key to boot in the the UEFI mode.

Keystroke	Description
F2	Enters the System Setup program.
F11	Enters the BIOS Boot Manager.
F12	Starts Preboot eXecution Environment (PXE)/iSCSI boot.
Ctrl +C	Enters the LSI 2008 SAS Mezzanine Card Configuration Utility. For more information, see the SAS adapter documentation.
Ctrl+R	Enters the PERC 9 Card Configuration Utility. For more information, see the documentation for your SAS RAID card.
Ctrl+Y	Enters the MegaPCLI SAS RAID Management Tool.
Ctrl+S	Enters the utility to configure onboard LAN settings for PXE boot. For more information, see the documentation for your integrated LAN.
Ctrl+I	Enters onboard SATA Controller's Configuration Utility.
Ctrl+D	Enters the Intel iSCSI setup menu.

Front panel features and indicators

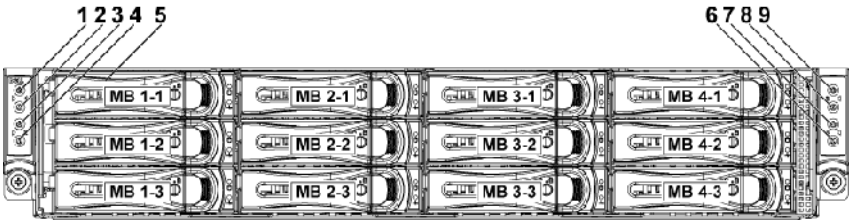

Figure 2. Front panel – 3.5-inch x12 hard drives with four system boards (C6320 RAID card and onboard SATA controller)

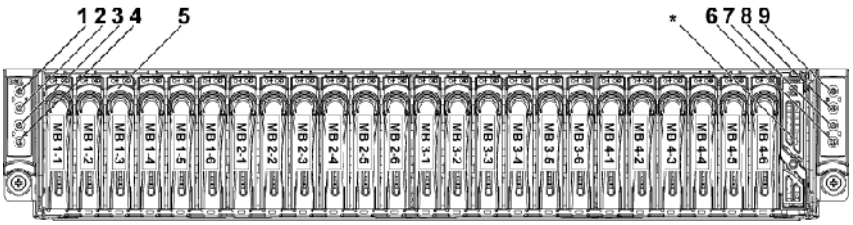

Figure 3. Front panel – 2.5-inch x24 hard drives with four system boards (C6320 RAID card and onboard SATA controller)

NOTE: For more information about the direction details of the 2.5-inch hard drive expander configuration support, see the HDD Zoning configuration tool at Dell.com/support.

Table 1. Front panel features and indicators

Item	Indicator, button or connector	Icon	Description
1	Power-on indicator or system state indicator or power button for system board 1		The power-on indicator turns to green when the system power is on. The power-on indicator turns to amber when the system critical event occurs. The power button controls the DC power supply output to the system. **NOTE: When turning on the system, the video monitor can take from several seconds to over two minutes to display an image, depending on the number and capacity of DIMMs installed in the system.** **NOTE: On ACPI-compliant operating systems (OSs), turning off the system by using the power button causes the system to perform a graceful shutdown before power to the system is turned off.** **NOTE: To force an ungraceful shutdown, press and hold the power button for 5 seconds.**
3	Power-on indicator or system state indicator or power button for system board 2		
7	Power-on indicator or system state indicator or power button for system board 4		
9	Power-on indicator or system state indicator or power button for system board 3		
2	System identification indicator or button for system board 1		The identification button can be used to locate a particular system and system board within a chassis. When the button is pushed, the blue status indicator of the system on the front and rear blinks until the button is pushed again.
4	System identification indicator or button for system board 2		
6	System identification indicator or button for system board 4		
8	System identification indicator or button for system board 3		
5	Hard drives		Up to 12 hot swappable 3.5-inch hard drives. Up to 24 hot swappable 2.5-inch hard drives.
*	Drive cover		Applicable only for 2.5-inch hard drive systems. This is not a usable drive slot.

Hard drive indicator patterns

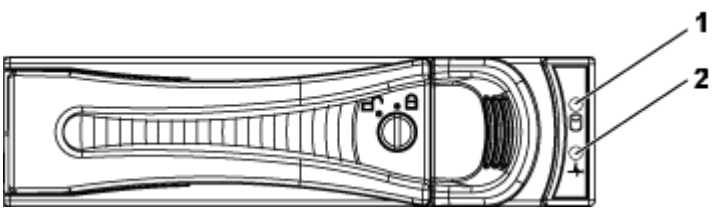

Figure 4. 3.5-inch hard drive indicators

1. hard drive activity indicator (green)
2. hard drive status indicator (green and amber)

Figure 5. 2.5-inch hard drive indicators

1. hard drive status indicator (green and amber)
2. hard drive activity indicator (green)

Table 2. Hard drive indicator patterns

Controller	Hard drive type	Function	Activity LED	Status LED	
			Green	Green	Amber
Onboard Controller	SATA2	Drive on-line	Off/Blinking when active	On	Off
		Fail	Off	On	Off
PERC 9/LSI 2008	SAS/SATA2	Slot Empty	Off	Off	Off
		Drive on-line/ Access	Blinking when active	On	Off
		Drive identify/ prepare for removal	Blinking when active	On 250 ms	Off
				Off 250 ms	
		Drive Failed	Off	Off	On 150 ms
					Off 150 ms
		Drive Rebuild	Blinking when active	On 400 ms	Off
				Off 100 ms	
		Predicted Failure (SMART)	Blinking when active	On 500 ms	Off 500 ms
				Off 500 ms	On 500 ms
				Off 1000 ms	Off 1000 ms
		Rebuild Abort	Off	On 3000 ms	Off 6000 ms

Controller	Hard drive type	Function	Activity LED	Status LED	
			Green	Green	Amber
				Off 9000 ms	On 3000 ms
					Off 000 ms

Back panel features and indicators

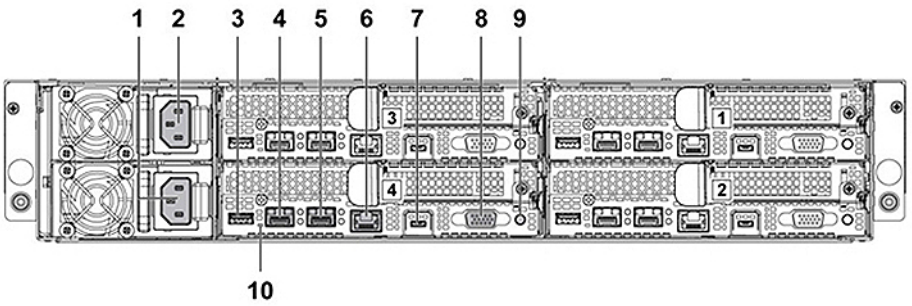

Figure 6. Back panel with four system boards

Table 3. Back panel features and indicators

Item	Indicator, button, or connector	Icon	Description
1	PSU 2		Up to 1400 W AC, 1600 W AC, or 1400 HVDC PSUs.
2	PSU 1		Up to 1400 W AC, 1600 W AC, or 1400 HVDC PSUs.
3	USB port		Enables you to connect USB devices to the system. The ports are USB 3.0-compliant.
4	Ethernet connector		10G NIC 1 connector.
5	Ethernet connector		10G NIC 2 connector.
6	Management port		Dedicated management port.
7	USB to serial port		Connects the system to a host.
8	VGA port		Connects a VGA display to the system.
9	Power button/power and system LED		The power-on indicator glows green when the system power is on. The power-on indicator turns amber when the system critical event occurs. The power button controls the DC PSU output to the system.

Item	Indicator, button, or connector	Icon	Description
			NOTE: When turning on the system, the video monitor can take from several seconds to over two minutes to display an image, on the basis of the disk space available in the system. **NOTE: On ACPI-compliant operating systems, turning off the system by using the power button causes the system to perform a graceful shutdown before the system is turned off.** **NOTE: To force an ungraceful shutdown, press and hold the power button for five seconds.**
10	System identification indicator		The management software of both the systems and the identification buttons on the front can cause the indicator to flash blue to identify a particular system and system board. Indicators turn amber when the system requires attention because of an issue.

LAN indicator codes

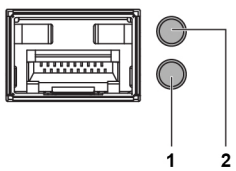

Figure 7. LAN indicators

1. activity indicator
2. link and network speed indicator

Table 4. LAN indicator codes

Component	Indicator	Condition
Link and network speed indicator	Solid amber	Linking at 1 Gbps speed
	Solid green	Linking at 10 Gbps speed
Activity indicator	Blinking green	Activity is present: • Pre OS POST • OS without driver • OS with driver Blinking at speed relative to packet density.
	Off	No link/activity present • D0 (uninitialized)

Component	Indicator	Condition
		• D3 (cold) • S4 (hibernation)

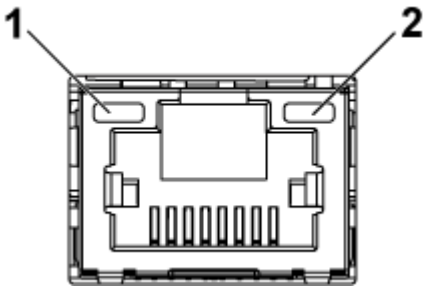

Figure 8. LAN indicators (management port)

1. speed indicator
2. link and activity indicator

Table 5. LAN indicators (management port)

Component	Indicator	Condition
Speed indicator	Solid green	Linking at 1 Gbps speed
	Solid amber	Linking at 10/100 Mbps speed
Link and activity indicator	Off	No access or Idle
	Blinking green	LAN access or Link up

Power and system board indicator codes

The LEDs on the system front panel and back panel display status codes during system startup. For location of the LEDs on the front panel, see the Front panel features and indicators section. For location of the LEDs on the back panel, see the Back panel features and indicators section.

Table 6. Status indicator codes

Component	Indicator		Condition
Power-on indicator (A bicolor LED on power button)	Green	Solid	Power On (S0)
	Amber	Off	
	Green	Off	BMC critical condition event in Power Off mode (S4/S5)
	Amber	Blinking	
	Green	Off	BMC critical condition event in Power On mode (S0)
	Amber	Blinking	
System identification indicator	Steady blue		IPMI using Chassis Identify Command On or ID Button Press ID On
	Blinking blue		Only IPMI using Chassis Identify Command Blink On
	Off		IPMI using Chassis Identify Command Off or ID Button Press ID Off

Related links

Front panel features and indicators

Back panel features and indicators

Power Supply Unit indicator codes

Each AC power supply unit (PSU) has an illuminated translucent handle that indicates whether power is present or whether a power fault has occurred.

1400 W AC/1400 W HVDC PSUs

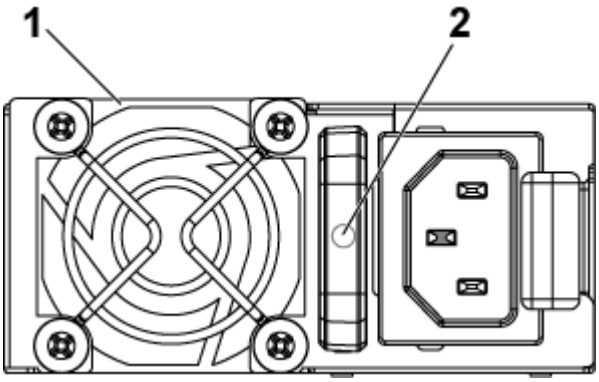

Figure 9. PSU status indicators

1. PSU
2. AC power indicator

Table 7. 1400 W AC/1400 W HVDC PSUs indicators

Component	Indicator	Condition
AC or DC power indicator	Solid amber	Fault (fault of any kind)
	Solid green	DC_OK (power good)
	Blinking green	AC_OK

1600 W AC/1600 W HVDC PSU

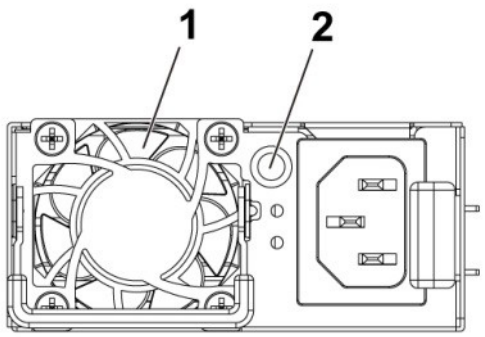

Figure 10. PSU status indicator

1. PSU
2. AC power indicator

Table 8. 1600 W AC/1600 W HVDC PSU indicators

Component	Indicator	Condition
AC power indicator	Solid amber	Standby mode with Fan Lock for 15 seconds.
		Standby mode with OTP range
		Active mode with +12 V DC Fault
		Active mode with Fan Lock for 15 seconds.
	Solid green	DC_OK (power good)
	Blinking green	Standby mode normal
	Off	Unit without AC power

Baseboard Management Controller (BMC) heart beat LED

The system board provides BMC heart beat LED (CR17) for BMC debugs. The BMC heart beat LED is green. When the system AC power is connected, the LED glows. When BMC firmware is ready, the BMC heart beat LED blinks.

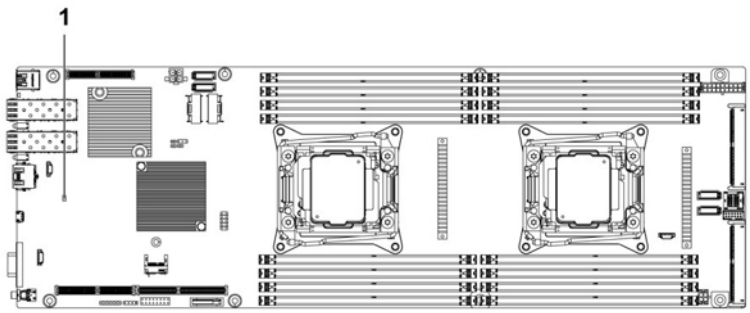

Figure 11. BMC heart beat LED on the C6320 system board

1. BMC heart beat LED

System configuration limitations by Intel Xeon processor E5-2600 v3 and E5-2600 v4 product family

NOTE: Certain system hardware configurations may require reductions in the upper temperature limits.

NOTE: System performance may be impacted when operating above 30°C or with a fan fault.

Table 9. Configuration restrictions with Intel Xeon processor E5-2600 v3 and E5-2600 v4 product family

Processor	3.5-inch hard drive chassis	2.5-inch hard drive chassis
55 W E5-2630L v3 E5-2630L v4 60 W	No configuration restrictions	No configuration restrictions

Processor	3.5-inch hard drive chassis	2.5-inch hard drive chassis
E5-2650L v3		
65 W		
E5-2650L v4		
85 W		
E5-2603 v3		
E5-2630 v3		
E5-2620 v3		
E5-2630 v4		
E5-2623 v4		
E5-2620 v4		
E5-2609 v4		
E5-2603 v4		
90 W		
E5-2640 v3		
E5-2640 v4		
105 W		
E5-2660 v3		
E5-2650 v3		
E5-2623 v3		
E5-2660 v4		
E5-2650 v4		
120 W	PERC H730 is not supported	PERC H730 is not supported
E5-2683 v3		
E5-2685 v3		
E5-2695 v3		
E5-2680 v3		
E5-2670 v3		
E5-2695 v4		
E5-2683 v4		
E5-2680 v4		
135 W (16 cores and 12 cores)	PERC H730/H330 are not supported	PERC H730/H330 are not supported

Processor	3.5-inch hard drive chassis	2.5-inch hard drive chassis
E5-2698 v3 E5-2690 v3 135 W (14 cores and 20 cores) E5-2698 v4 E5-2690 v4	PERC H730/330 are not supported	
135 W (8 cores) and 145 W E5-2667 v3 145 W (14 cores) E5-2697 v3 145 W (18 cores) E5-2699 v3	• PERC H730/H330 are not supported • Restricted to total 8 hard drives	
135W (8/6/4 cores) and 145W (22/18/16 cores) E5-2667 v4 E5-2643 v4 E5-2637 v4 E5-2699 v4 E5-2697 v4 E5-2697A v4	• PERC H730/H330 are not supported • Restricted to total 8 hard drives	PERC H730/330 are not supported

Table 10. Fresh air cooling configuration restrictions

Processor	3.5-inch hard drive chassis	2.5-inch hard drive chassis
55W E5-2630L v4 65W E5-2650L v4 85 W E5-2630 v3 E5-2620 v3 E5-2603 v3 E5-2630 v4 E5-2623 v4	PERC H730 is not supported	PERC H730 is not supported

Processor	3.5-inch hard drive chassis	2.5-inch hard drive chassis
E5-2620 v4 E5-2609 v4 E5-2603 v4 90 W E5-2640 v3 E5-2640 v4 105 W E5-2660 v3 E5-2650 v3 E5-2623 v3 E5-2660 v4 E5-2650 v4 120 W E5-2695 v3 E5-2680 v3 E5-2670 v3 E5-2695 v4 E5-2683 v4 E5-2680 v4 135 W (16 cores and 12 cores) E5-2698 v3 E5-2690 v3 135 W (20 cores and 14 cores) E5-2698 v4 E5-2690 v4 135 W (8 cores) and 145 W E5-2699 v3 145 W (14 cores) E5-2697 v3 135W (8/6/4 cores) and 145W (22/18/16 cores)	Support maximum 8x hard drives PERC H730/H330 are not supported	Support maximum 12x hard drives PERC H730/H330 are not supported
	Not supported	Not supported

Processor	3.5-inch hard drive chassis	2.5-inch hard drive chassis
E5-2667 v4		
E5-2643 v4		
E5-2637 v4		
E5-2699 v4		
E5-2697 v4		
E5-2697A v4		

Locating your system Service Tag

Your system is identified by a unique Express Service Code and Service Tag number. The Express Service Code is found on the front of the system and Service Tag is found on the front of the system. Alternatively, the information may be on a sticker on the chassis of the system. This information is used by Dell to route support calls to the appropriate personnel. The Service Tag locations on the chassis are as follows:

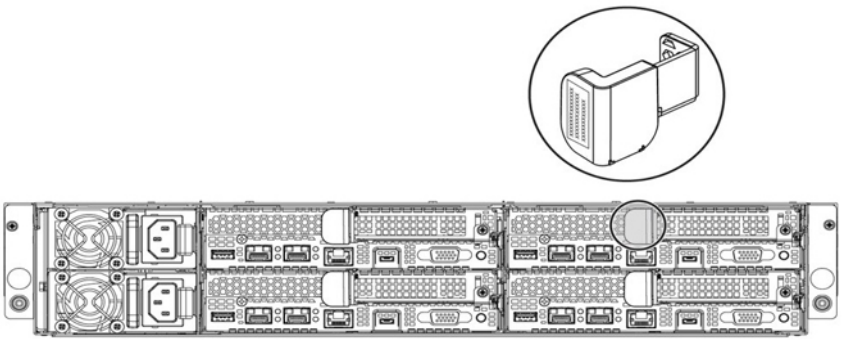

Figure 12. Service Tag location

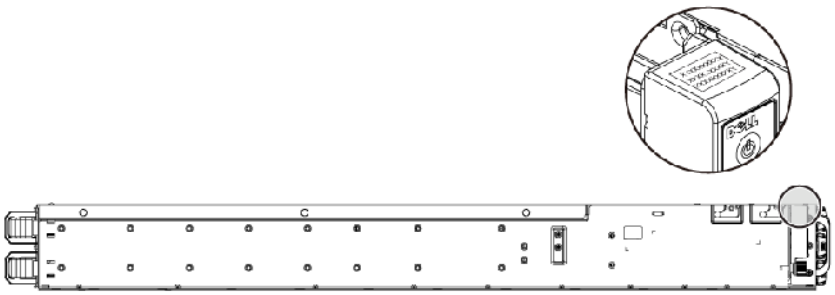

Figure 13. Service Tag location on the left front panel

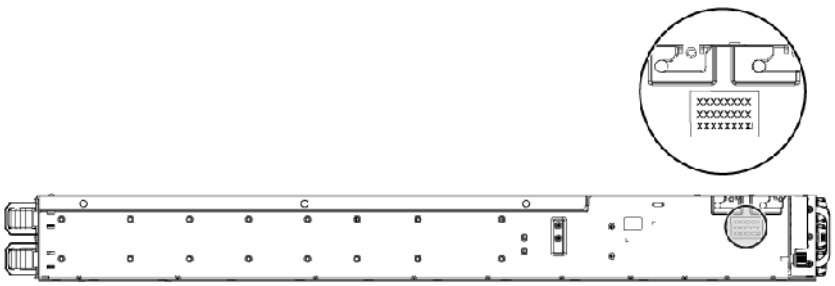

Figure 14. Service Tag location on the chassis

Hard drives under warranties are linked to each node with an appropriate service tag. The linked hard drives with the node is shown in the below figure.

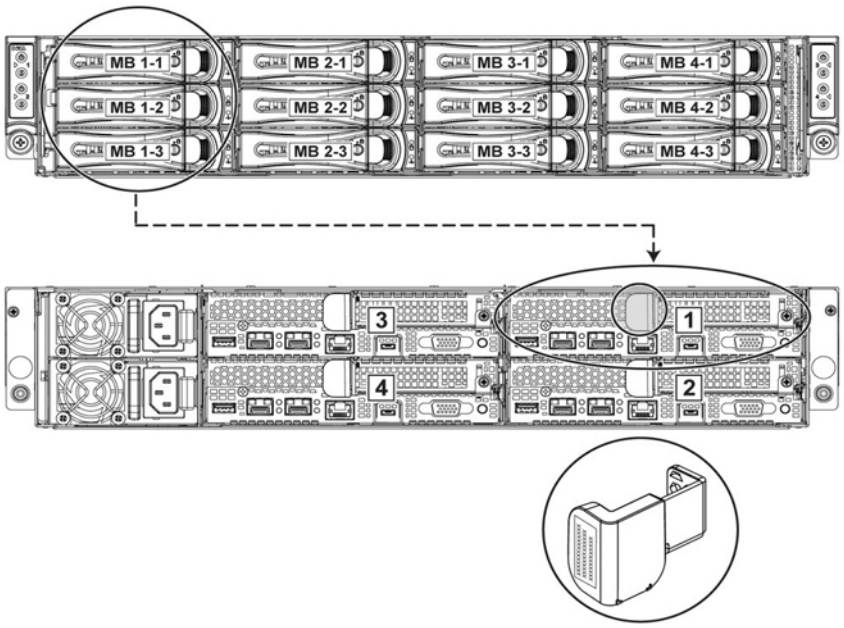

Figure 15. Service Tag linkage

NOTE: Hard drives that are under warranty are linked to the appropriate Service Tag of the node.

2

Documentation resources

This section provides information about the documentation resources for your system.

Table 11. Documentation resources for system

Task	Document	Location
Setting up your system	For information about installing the system into a rack, see theRack documentation included with your rack solution or the *Getting Started With Your System* document that is shipped with your system.	Dell.com/poweredgemanuals
	For information about turning on the system and the technical specifications of your system, see the *Getting Started With Your System* document that is shipped with your system.	Dell.com/poweredgemanuals
Configuring your system	For information about iDRAC features, configuring and logging in to iDRAC, and managing your system remotely, see the Integrated Dell Remote Access Controller User's Guide.	Dell.com/idracmanuals
	For information about installing the operating system, see the operating system documentation.	Dell.com/operatingsystemmanuals
	For information about understanding Remote Access Controller Admin (RACADM) subcommands and supported RACADM interfaces, see the RACADM Command Line Reference Guide for iDRAC.	Dell.com/idracmanuals
	For information about updating drivers and firmware, see theMethods to download firmware and drivers section in this document.	Dell.com/support/drivers
Managing your system	For information about the features of the Dell OpenManage Systems Management, see the Dell OpenManage Systems Management Overview Guide.	Dell.com/openmanagemanuals
	For information about setting up, using, and troubleshooting OpenManage, see the Dell OpenManage Server Administrator User's Guide.	Dell.com/openmanagemanuals
	For information about installing, using, and troubleshooting Dell OpenManage Essentials, see the Dell OpenManage Essentials User's Guide.	Dell.com/openmanagemanuals

Task	Document	Location
	For information about installing and using Dell System E-Support Tool (DSET), see the Dell System E-Support Tool (DSET) User's Guide.	Dell.com/DSET
	For information about installing and using Active System Manager (ASM), see the Active System Manager User's Guide.	Dell.com/asmdocs
	For understanding the features of Dell Lifecycle Controller (LCC), see the Dell Lifecycle Controller User's Guide.	Dell.com/idracmanuals
	For information about partner programs enterprise systems management, see the OpenManage Connections Enterprise Systems Management documents.	Dell.com/omconnectionsenterprisesystemsmanagement
	For information about connections and client systems management, see the OpenManage Connections Client Systems Management documentation.	Dell.com/dellclientcommandsuitemanuals
	For information about viewing inventory, performing configuration and monitoring tasks, remotely turning on or off servers, and enabling alerts for events on servers and components using the Dell Chassis Management Controller (CMC), see the CMC User's Guide.	Dell.com/esmmanuals
Working with Dell PowerEdge RAID controllers	For information about understanding the features of the Dell PowerEdge RAID controllers (PERC) and deploying the PERC cards, see the Storage controller documentation.	Dell.com/storagecontrollermanuals
Understanding event and error messages	For information about checking the event and error messages generated by the system firmware and agents that monitor system components, see the Dell Event and Error Messages Reference Guide.	Dell.com/openmanagemanuals > OpenManage software

3

Technical specifications

The technical and environmental specifications of your system are outlined in this section.

Chassis dimensions

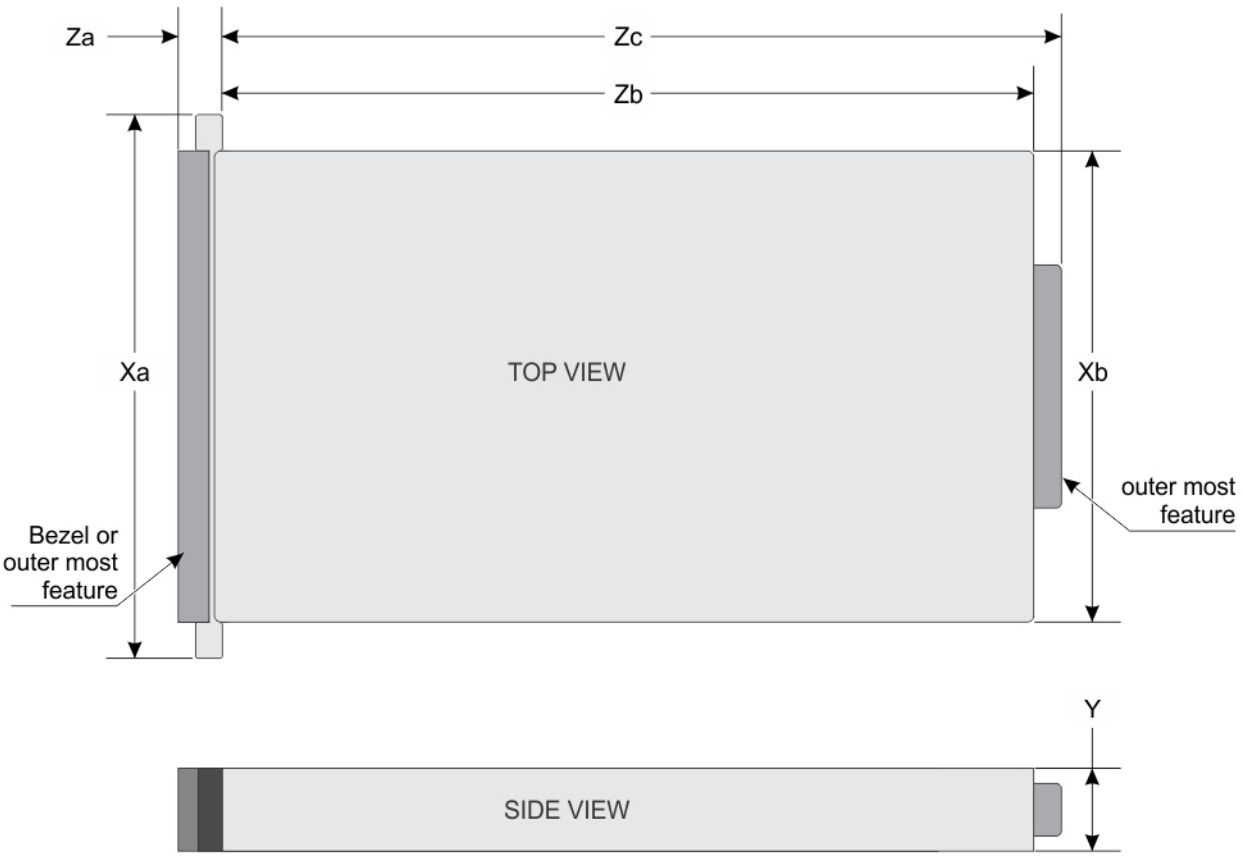

Figure 16. Chassis dimensions of PowerEdge C6320 system

Table 12. Dimensions of the Dell PowerEdge C6320 system

Xa	Xb	Y	Za (with bezel)	Za (without bezel)	Zb	Zc
482.4 mm	448.0 mm	86.8 mm	28.2 mm	28.2 mm	764.2 mm	790.3 mm

Processor specifications

Dell PowerEdge C6320 supports up to two Intel Xeon E5-2600 v3 or Intel Xeon E5-2600 v4 product family processors in four independent servers.

PSU specifications

Dell PowerEdge C6320 system supports up to two AC or HVDC power supply units (PSUs). Dell PowerEdge C6320 does not support a mixed installation of 1400 W and 1600 W power supply units. The 1400 W and 1600 W power supply units are hot swappable, and supports hot swap in any condition if the system has the power throttling feature enabled.

Table 13. PSU specifications

PSU	Heat dissipation (maximum)	Frequency	Voltage	Maximum input current	Maximum inrush current (peak)
1400 W AC	5220.763 BTU/hr	50/60 Hz	200-240 V AC	9 A	Initial inrush current cannot exceed 55 A (peak). Secondary inrush current cannot exceed 25 A (peak).
1600 W AC	5966.586 BTU/hr	50/60 Hz	100-120 V AC 200-240 V AC	12 A 10 A	Initial inrush current and secondary inrush current cannot exceed 35 A (peak).
1400 W HVDC (for China only)	5220.763 BTU/hr	–	240 V DC	9 A	Initial inrush current cannot exceed 55 A (peak). Secondary inrush current cannot exceed 25 A (peak).

System battery specifications

Dell PowerEdge C6320 system supports CR 2032 3.0-V lithium coin cell battery.

Memory specifications

Dell PowerEdge C6320 system supports DDR4 registered DIMMs (RDIMMs).

Table 14. Memory specifications

Memory module sockets	Architecture	Memory capacity	Minimum RAM	Maximum RAM
Sixteen 288-pin	1600 MT/s, 1866 MT/s, 2133 MT/s, or 2400 MT/s DDR4 Registered DIMMs with support for advanced ECC or memory optimized operation	8 GB, 16 GB, and 32 GB dual-rank	16 GB	Up to 512 GB

Environmental specifications

NOTE: For additional information about environmental measurements for specific system configurations, see Dell.com/environmental_datasheets

Table 15. Temperature specifications

Temperature	Specifications
Storage	–40° to 65°C (–40° to 149°F) with a maximum temperature gradation of 20°C per hour.
Continuous operation (for altitude less than 950 m or 3117 ft)	10°C to 35°C (50°F to 95°F) with no direct sunlight on the equipment.
Fresh air	For information on fresh air, see Expanded Operating Temperature section.
Maximum temperature gradient (operating and storage)	20°C/h (36°F/h)

Table 16. Expanded operating temperature specifications

Expanded operating temperature	Specifications
NOTE: When operating in the expanded temperature range, system performance may be impacted.	
NOTE: When operating in the expanded temperature range, ambient temperature warnings may be reported on the LCD and in the System Event Log.	
Continuous operation	5°C to 40°C at 5% to 85% RH with 29°C dew point. **NOTE: Outside the standard operating temperature (10°C to 35°C), the system can operate down to 5°C or up to 40°C.** For temperatures between 35°C and 40°C, de-rate maximum allowable dry bulb temperature by 1°C per 175 m above 950 m (1°F per 319 ft).
≤ 1% of annual operating hours	–5°C to 45°C at 5% to 90% RH with 26°C dew point. **NOTE: Outside the standard operating temperature (10°C to 35°C), the system can operate down to –5°C or up to 45°C for a maximum of 1% of its annual operating hours.** For temperatures between 40°C and 45°C, de-rate maximum allowable dry bulb temperature by 1°C per 125 m above 950 m (1°F per 228 ft).
Expanded operating temperature restrictions	• Do not perform a cold startup below 5 °C. • Maximum 120 W processor is supported. • Maximum of eight 3.5 inch or twelve 2.5 inch hard drives are supported with 120 W processor. The following do not support the expanded operating temperature range: • Dell PowerEdge RAID Controller (PERC) H730/H730P cards with CPU TDP ≥ 85 W. • Dell PowerEdge RAID Controller (PERC) H330 card with CPU TDP ≥ 120 W.

Expanded operating temperature	Specifications
	• Non Dell-qualified peripheral cards and/or peripheral cards greater than 25 W are not supported.

Table 17. Relative humidity specifications

Relative humidity	Specifications
Operating	20% to 80% (noncondensing) with a maximum humidity gradation of 10% per hour
Storage	5% to 95% (non-condensing)

Table 18. Maximum vibration specifications

Maximum vibration	Specifications
Operating	0.26 Grms at 5–350 Hz
Storage	1.88 Grms at 10–500 Hz for 15 minutes

Table 19. Maximum shock specifications

Maximum shock	Specifications
Operating	One shock pulse in the positive z axis (one pulse on each side of the system) of 31 G for 2.6 ms in the operational orientation.
Storage	Six consecutively executed shock pulses in the positive and negative x, y, and z axes (one pulse on each side of the system) of 71 G for up to 2 ms Six consecutively executed shock pulses in the positive and negative x, y, and z axes (one pulse on each side of the system) of 27 G faired square wave pulse with velocity change at 235 inches per second (597 centimeters per second)

Table 20. Maximum altitude specifications

Maximum altitude	Specifications
Operating	-15.2 m to 3,048 m (-50 to 10,000 ft.)
Storage	-15.2 m to 10,668 m (-50 to 35,000 ft.)

Table 21. Airborne contaminant level specification

Airborne contaminant level (Class)	G1 as defined by ISA-S71.04-1985

4

Initial system setup and configuration

Setting up your system

Complete the following steps to set up your system:

1. Unpack the system.
2. Install the system into the rack. For more information about installing the system into the rack, see your *Dell PowerEdge C6320 Getting Started Guide* at **Dell.com/poweredgemanuals**.
3. Connect the peripherals to the system.
4. Connect the system to its electrical outlet.
5. Turn the system on by pressing the power button or by using iDRAC.
6. Turn on the attached peripherals.

iDRAC configuration

The Integrated Dell Remote Access Controller (iDRAC) is designed to make system administrators more productive and improve the overall availability of Dell systems. iDRAC alerts administrators to system issues, helps them perform remote system management, and reduces the need for physical access to the system.

Options to set up iDRAC IP address

You must configure the initial network settings based on your network infrastructure to enable the communication to and from iDRAC. You can set up the IP address by using one of the following interfaces:

Interfaces	Document/Section
iDRAC Settings utility	See *Dell Integrated Dell Remote Access Controller User's Guide* at **Dell.com/idracmanuals**
Dell Deployment Toolkit	See *Dell Deployment Toolkit User's Guide* at **Dell.com/openmanagemanuals**
Dell Lifecycle Controller	See *Dell Lifecycle Controller User's Guide* at **Dell.com/idracmanuals**
Chassis or Server LCD panel	See the LCD panel section

You must use the default iDRAC IP address 192.168.0.120 to configure the initial network settings, including setting up DHCP or a static IP for iDRAC.

NOTE: To access iDRAC, ensure that you install the iDRAC port card or connect the network cable to the Ethernet connector 1 on the system board.

NOTE: Ensure that you change the default user name and password after setting up the iDRAC IP address.

Log in to iDRAC

You can log in to iDRAC as:

- iDRAC user

- Microsoft Active Directory user
- Lightweight Directory Access Protocol (LDAP) user

The default user name and password are `root` and `calvin`. You can also log in by using Single Sign-On or Smart Card.

NOTE: You must have iDRAC credentials to log in to iDRAC.

For more information about logging in to iDRAC and iDRAC licenses, see the *Integrated Dell Remote Access Controller User's Guide* at **Dell.com/idracmanuals**.

Options to install the operating system

If the system is shipped without an operating system, install the supported operating system by using one of the following resources:

Table 22. Resources to install the operating system

Resources	Location
Dell Systems Management Tools and Documentation media	Dell.com/operatingsystemmanuals
Dell Lifecycle Controller	Dell.com/idracmanuals
Dell OpenManage Deployment Toolkit	Dell.com/openmanagemanuals
Dell certified VMware ESXi	Dell.com/virtualizationsolutions
Supported operating systems on Dell PowerEdge systems	Dell.com/ossupport
Installation and How-to videos for supported operating systems on Dell PowerEdge systems	Supported Operating Systems for Dell PowerEdge Systems

Methods to download firmware and drivers

You can download the firmware and drivers by using the following methods:

Table 23. Firmware and drivers

Methods	Location
From the Dell Support site	Dell.com/support/home
Using Dell Remote Access Controller Lifecycle Controller (iDRAC with LC)	Dell.com/idracmanuals
Using Dell Repository Manager (DRM)	Dell.com/openmanagemanuals
Using Dell OpenManage Essentials (OME)	Dell.com/openmanagemanuals
Using Dell Server Update Utility (SUU)	Dell.com/openmanagemanuals
Using Dell OpenManage Deployment Toolkit (DTK)	Dell.com/openmanagemanuals

Downloading the drivers and firmware

Dell recommends that you download and install the latest BIOS, drivers, and systems management firmware on your system.

Prerequisites

Ensure that you clear the web browser cache before downloading the drivers and firmware.

Steps

1. Go to **Dell.com/support/drivers**.
2. Under the **Drivers & Downloads** section, type the Service Tag of your system in the **Service Tag or Express Service Code** box.

   NOTE: If you do not have the Service Tag, select Detect My Product to allow the system to automatically detect your Service Tag, or under General support, navigate to your product.

3. Click **Drivers & Downloads**.
   The drivers that are applicable to your selection are displayed.
4. Download the drivers you need to a USB drive, CD, or DVD.

5

Pre-operating system management applications

You can manage basic settings and features of a system without booting to the operating system by using the system firmware.

Options to manage the pre-operating system applications

Your system has the following options to manage the pre-operating system applications:

- System Setup
- Boot Manager
- Dell Lifecycle Controller
- Preboot Execution Environment (PXE)

Related links

System Setup
Boot Manager
Dell Lifecycle Controller
PXE boot

System Setup

By using the **System Setup** screen, you can configure the BIOS settings, iDRAC settings, and device settings of your system.

NOTE: Help text for the selected field is displayed in the graphical browser by default. To view the help text in the text browser, press F1.

You can access system setup by using two methods:

- Standard graphical browser — The browser is enabled by default.
- Text browser — The browser is enabled by using Console Redirection.

Related links

System Setup details
Viewing System Setup

Viewing System Setup

To view the **System Setup** screen, perform the following steps:

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:
   `F2 = System Setup`

   NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

Related links

System Setup
System Setup details

System Setup details

The **System Setup Main Menu** screen details are explained as follows:

Option	Description
System BIOS	Enables you to configure BIOS settings.
iDRAC Settings	Enables you to configure iDRAC settings. The iDRAC settings utility is an interface to set up and configure the iDRAC parameters by using UEFI (Unified Extensible Firmware Interface). You can enable or disable various iDRAC parameters by using the iDRAC settings utility. For more information about this utility, see *Integrated Dell Remote Access Controller User's Guide* at **Dell.com/idracmanuals**.
Device Settings	Enables you to configure device settings.

Related links

- System Setup
- System BIOS
- iDRAC Settings utility
- Device Settings
- Viewing System Setup

System BIOS

You can use the **System BIOS** screen to edit specific functions such as boot order, system password, setup password, set the RAID mode, and enable or disable USB ports.

Related links

- System BIOS Settings details
- Boot Settings
- Network Settings
- System Information
- Memory Settings
- Processor Settings
- SATA Settings
- Integrated Devices
- Serial Communication
- System Profile Settings
- Miscellaneous Settings
- iDRAC Settings utility
- Device Settings
- Viewing System BIOS

Viewing System BIOS

To view the **System BIOS** screen, perform the following steps:

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

   ```
   F2 = System Setup
   ```

   NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.
3. On the **System Setup Main Menu** screen, click **System BIOS**.

Related links

System BIOS
System BIOS Settings details

System BIOS Settings details

The **System BIOS Settings** screen details are explained as follows:

Option	Description
System Information	Specifies information about the system such as the system model name, BIOS version, and Service Tag.
Memory Settings	Specifies information and options related to the installed memory.
Processor Settings	Specifies information and options related to the processor such as speed and cache size.
SATA Settings	Specifies options to enable or disable the integrated SATA controller and ports.
Boot Settings	Specifies options to specify the boot mode (BIOS or UEFI). Enables you to modify UEFI and BIOS boot settings.
Network Settings	Specifies options to change the network settings.
Integrated Devices	Specifies options to manage integrated device controllers and ports and specify related features and options.
Serial Communication	Specifies options to manage the serial ports and specify related features and options.
System Profile Settings	Specifies options to change the processor power management settings, memory frequency, and so on.
System Security	Specifies options to configure the system security settings, such as system password, setup password, Trusted Platform Module (TPM) security. It also manages the power and NMI buttons on the system.
Miscellaneous Settings	Specifies options to change the system date, time, and so on.

Related links

System BIOS
Viewing System BIOS

System Information

You can use the **System Information** screen to view system properties such as Service Tag, system model name, and the BIOS version.

Related links

System Information details
System BIOS
Viewing System Information

Viewing System Information

To view the **System Information** screen, perform the following steps:

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

   ```
   F2 = System Setup
   ```

   NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.
3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **System Information**.

Related links

System Information

System Information details

System Information details

The **System Information** screen details are explained as follows:

Option	Description
System Model Name	Specifies the system model name.
System BIOS Version	Specifies the BIOS version installed on the system.
System Management Engine Version	Specifies the current version of the Management Engine firmware.
System Service Tag	Specifies the system Service Tag.
System Manufacturer	Specifies the name of the system manufacturer.
System Manufacturer Contact Information	Specifies the contact information of the system manufacturer.
System CPLD Version	Specifies the current version of the system complex programmable logic device (CPLD) firmware.
UEFI Compliance Version	Specifies the UEFI compliance level of the system firmware.

Related links

System Information

System Information details

Viewing System Information

Memory Settings

You can use the **Memory Settings** screen to view all the memory settings and enable or disable specific memory functions, such as system memory testing and node interleaving.

Related links

Memory Settings details

System BIOS

Viewing Memory Settings

Viewing Memory Settings

To view the **Memory Settings** screen, perform the following steps:

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

   ```
   F2 = System Setup
   ```

   NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.
3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **Memory Settings**.

Related links

Memory Settings

Memory Settings details

Memory Settings details

The **Memory Settings** screen details are explained as follows:

Option	Description
System Memory Size	Specifies the memory size in the system.
System Memory Type	Specifies the type of memory installed in the system.
System Memory Speed	Specifies the system memory speed.
System Memory Voltage	Specifies the system memory voltage.
Video Memory	Specifies the amount of video memory.
System Memory Testing	Specifies whether the system memory tests are run during system boot. Options are **Enabled** and **Disabled**. This option is set to **Disabled** by default.
Memory Operating Mode	Specifies the memory operating mode. The available option is **Optimizer Mode**.
Node Interleaving	Specifies if Non-Uniform Memory architecture (NUMA) is supported. If this field is set to **Enabled**, memory interleaving is supported if a symmetric memory configuration is installed. If the field is set to **Disabled**, the system supports NUMA (asymmetric) memory configurations. This option is set to **Disabled** by default.
Snoop Mode	Specifies the Snoop Mode options. The Snoop Mode options available are **Home Snoop**, **Early Snoop**, **Cluster on Die**, and **Opportunist Snoop Broadcast**. This option is set to **Early Snoop** by default. This field is available only when the **Node Interleaving** is set to **Disabled**.

Related links

Memory Settings

Viewing Memory Settings

Processor Settings

You can use the **Processor Settings** screen to view the processor settings, and perform specific functions such as enabling virtualization technology, hardware prefetcher, and logical processor idling.

Related links

Processor Settings details

System BIOS

Viewing Processor Settings

Viewing Processor Settings

To view the **Processor Settings** screen, perform the following steps:

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

   ```
   F2 = System Setup
   ```

   NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.
3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **Processor Settings**.

Related links

Processor Settings

Processor Settings details

Processor Settings details

The **Processor Settings** screen details are explained as follows:

Option	Description
Logical Processor	Enables or disables the logical processors and displays the number of logical processors. If this option is set to **Enabled**, the BIOS displays all the logical processors. If this option is set to **Disabled**, the BIOS displays only one logical processor per core. This option is set to **Enabled** by default.
QPI Speed	Enables you to control QuickPath Interconnect data rate settings.
Alternate RTID (Requestor Transaction ID) Setting	Modifies Requestor Transaction IDs, which are QPI resources. This option is set to **Disabled** by default. **NOTE: Enabling this option may negatively impact the overall system performance.**
Virtualization Technology	Enables or disables the additional hardware capabilities provided for virtualization. This option is set to **Enabled** by default.
Address Translation Service (ATS)	Defines the Address Translation Cache (ATC) for devices to cache the DMA transactions. This option provides an interface between CPU and DMA Memory Management to a chipset's Address Translation and Protection Table to translate DMA addresses to host addresses. This option is set to **Enabled** by default.
Adjacent Cache Line Prefetch	Optimizes the system for applications that need high utilization of sequential memory access. This option is set to **Enabled** by default. You can disable this option for applications that need high utilization of random memory access.
Hardware Prefetcher	Enables or disables the hardware prefetcher. This option is set to **Enabled** by default.
DCU Streamer Prefetcher	Enables or disables the Data Cache Unit (DCU) streamer prefetcher. This option is set to **Enabled** by default.
DCU IP Prefetcher	Enables or disables the Data Cache Unit (DCU) IP prefetcher. This option is set to **Enabled** by default.
Logical Processor Idling	Enables you to improve the energy efficiency of a system. It uses the operating system core parking algorithm and parks some of the logical processors in the system which in turn allows the corresponding processor cores to transition into a lower power idle state. This option can only be enabled if the operating system supports it. It is set to **Disabled** by default.
Configurable TDP	Enables you to reconfigure the processor Thermal Design Power (TDP) levels during POST based on the power and thermal delivery capabilities of the system. TDP verifies the maximum heat the cooling system is needed to dissipate. This option is set to **Nominal** by default. **NOTE: This option is only available on certain stock keeping units (SKUs) of the processors.**
X2Apic Mode	Enables or disables the X2Apic mode.
Number of Cores per Processor	Controls the number of enabled cores in each processor. This option is set to **All** by default.
Processor 64-bit Support	Specifies if the processor(s) support 64-bit extensions.
Processor Core Speed	Specifies the maximum core frequency of the processor.
Process Bus Speed	Displays the bus speed of the processor. **NOTE: The processor bus speed option displays only when both processors are installed.**
Processor 1	**NOTE: Depending on the number of CPUs, there may be up to four processors listed.**

Option	Description
	The following settings are displayed for each processor installed in the system:

Option	Description
Family-Model-Stepping	Specifies the family, model, and stepping of the processor as defined by Intel.
Brand	Specifies the brand name.
Level 2 Cache	Specifies the total L2 cache.
Level 3 Cache	Specifies the total L3 cache.
Number of Cores	Specifies the number of cores per processor.

Related links

Processor Settings
Viewing Processor Settings

SATA Settings

You can use the **SATA Settings** screen to view the SATA settings of SATA devices and enable RAID on your system.

Related links

SATA Settings details
System BIOS
Viewing SATA Settings

Viewing SATA Settings

To view the **SATA Settings** screen, perform the following steps:

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:
   ```
   F2 = System Setup
   ```
   NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.
3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **SATA Settings**.

Related links

SATA Settings
SATA Settings details

SATA Settings details

The **SATA Settings** screen details are explained as follows:

Option	Description
Embedded SATA	Enables the embedded SATA option to be set to **Off**, **ATA**, **AHCI**, or **RAID** modes. This option is set to **AHCI** by default.
Security Freeze Lock	Sends Security Freeze Lock command to the Embedded SATA drives during POST. This option is applicable only for ATA and AHCI modes.
Write Cache	Enables or disables the command for Embedded SATA drives during POST.
Port A	Sets the drive type of the selected device. For **Embedded SATA settings** in **ATA** mode, set this field to **Auto** to enable BIOS support. Set it to **OFF** to turn off BIOS support. For **AHCI** or **RAID** mode, BIOS support is always enabled.

Option	Description

Option	Description
Model	Specifies the drive model of the selected device.
Drive Type	Specifies the type of drive attached to the SATA port.
Capacity	Specifies the total capacity of the hard drive. This field is undefined for removable media devices such as optical drives.

Port B

Sets the drive type of the selected device. For **Embedded SATA settings** in **ATA** mode, set this field to **Auto** to enable BIOS support. Set it to **OFF** to turn off BIOS support.

For **AHCI** or **RAID** mode, BIOS support is always enabled.

Option	Description
Model	Specifies the drive model of the selected device.
Drive Type	Specifies the type of drive attached to the SATA port.
Capacity	Specifies the total capacity of the hard drive. This field is undefined for removable media devices such as optical drives.

Port C

Sets the drive type of the selected device. For **Embedded SATA settings** in **ATA** mode, set this field to **Auto** to enable BIOS support. Set it to **OFF** to turn off BIOS support.

For **AHCI** or **RAID** mode, BIOS support is always enabled.

Option	Description
Model	Specifies the drive model of the selected device.
Drive Type	Specifies the type of drive attached to the SATA port.
Capacity	Specifies the total capacity of the hard drive. This field is undefined for removable media devices such as optical drives.

Port D

Sets the drive type of the selected device. For **Embedded SATA settings** in **ATA** mode, set this field to **Auto** to enable BIOS support. Set it to **OFF** to turn off BIOS support.

For **AHCI** or **RAID** mode, BIOS support is always enabled.

Option	Description
Model	Specifies the drive model of the selected device.
Drive Type	Specifies the type of drive attached to the SATA port.
Capacity	Specifies the total capacity of the hard drive. This field is undefined for removable media devices such as optical drives.

Port E

Sets the drive type of the selected device. For **Embedded SATA settings** in **ATA** mode, set this field to **Auto** to enable BIOS support. Set it to **OFF** to turn off BIOS support.

For **AHCI** or **RAID** mode, BIOS support is always enabled.

Option	Description
Model	Specifies the drive model of the selected device.
Drive Type	Specifies the type of drive attached to the SATA port.
Capacity	Specifies the total capacity of the hard drive. This field is undefined for removable media devices such as optical drives.

Option	Description
Port F	Sets the drive type of the selected device. For **Embedded SATA settings** in **ATA** mode, set this field to **Auto** to enable BIOS support. Set it to **OFF** to turn off BIOS support. For **AHCI** or **RAID** mode, BIOS support is always enabled.

Option	Description
Model	Specifies the drive model of the selected device.
Drive Type	Specifies the type of drive attached to the SATA port.
Capacity	Specifies the total capacity of the hard drive. This field is undefined for removable media devices such as optical drives.

Related links

SATA Settings
Viewing SATA Settings

Boot Settings

You can use the **Boot Settings** screen to set the boot mode to either **BIOS** or **UEFI**. It also enables you to specify the boot order.

Related links

Boot Settings details
System BIOS
Viewing Boot Settings
Choosing the system boot mode
Changing the boot order

Viewing Boot Settings

To view the **Boot Settings** screen, perform the following steps:

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:
   `F2 = System Setup`

   NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.
3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **Boot Settings**.

Related links

Boot Settings
Boot Settings details
Choosing the system boot mode
Changing the boot order

Boot Settings details

The **Boot Settings** screen details are explained as follows:

Option	Description
Boot Mode	Enables you to set the boot mode of the system. **CAUTION: Switching the boot mode may prevent the system from booting if the operating system is not installed in the same boot mode.**

Option	Description
	If the operating system supports UEFI, you can set this option to **UEFI**. Setting this field to **BIOS** allows compatibility with non-UEFI operating systems. This option is set to **BIOS** by default. **NOTE: Setting this field to UEFI disables the BIOS Boot Settings menu. Setting this field to BIOS disables the UEFI Boot Settings menu.**
Boot Sequence Retry	Enables or disables the Boot Sequence Retry feature. If this option is set to **Enabled** and the system fails to boot, the system reattempts the boot sequence after 30 seconds. This option is set to **Enabled** by default.
Hard-Disk Failover	Specifies the hard drive that is booted in the event of a hard drive failure. The devices are selected in the **Hard-Disk Drive Sequence** on the **Boot Option Setting** menu. When this option is set to **Disabled**, only the first hard drive in the list is attempted to boot. When this option is set to **Enabled**, all hard drives are attempted to boot in the order selected in the **Hard-Disk Drive Sequence**. This option is not enabled for UEFI Boot Mode.
Boot Option Settings	Configures the boot sequence and the boot devices.
BIOS Boot Settings	Enables or disables BIOS boot options. **NOTE: This option is enabled only if the boot mode is BIOS.**
UEFI Boot Settings	Enables or disables UEFI Boot options. The Boot options include **IPv4 PXE** and **IPv6 PXE**. This option is set to **IPv4** by default. **NOTE: This option is enabled only if the boot mode is UEFI.**

Related links

Boot Settings
Viewing Boot Settings
Choosing the system boot mode
Changing the boot order

Choosing the system boot mode

System Setup enables you to specify one of the following boot modes for installing your operating system:

- BIOS boot mode (the default) is the standard BIOS-level boot interface.
- Unified Extensible Firmware Interface (UEFI) boot mode is an enhanced 64-bit boot interface. If you have configured your system to boot to UEFI mode, it replaces the system BIOS.

1. From the **System Setup Main Menu**, click **Boot Settings**, and select **Boot Mode**.
2. Select the boot mode you want the system to boot into.

   CAUTION: Switching the boot mode may prevent the system from booting if the operating system is not installed in the same boot mode.
3. After the system boots in the specified boot mode, proceed to install your operating system from that mode.

NOTE: Operating systems must be UEFI-compatible to be installed from the UEFI boot mode. DOS and 32-bit operating systems do not support UEFI and can only be installed from the BIOS boot mode.

NOTE: For the latest information about supported operating systems, go to Dell.com/ossupport.

Related links

Boot Settings
Boot Settings details
Viewing Boot Settings

Changing the boot order

You may have to change the boot order if you want to boot from a USB key or an optical drive. The following instructions may vary if you have selected **BIOS** for **Boot Mode**.

1. On the **System Setup Main Menu** screen, click **System BIOS** → **Boot Settings**.
2. Click **Boot Option Settings** → **Boot Sequence**.
3. Use the arrow keys to select a boot device, and use the plus (+) and minus (-) sign keys to move the device down or up in the order.
4. Click **Exit**, and then click **Yes** to save the settings on exit.

Related links

Boot Settings
Boot Settings details
Viewing Boot Settings

Network Settings

You can use the **Network Settings** screen to modify PXE device settings. The network settings option is available only in the UEFI mode.

NOTE: The BIOS does not control network settings in the BIOS mode. For the BIOS boot mode, the optional Boot ROM of the network controllers handles the network settings.

Related links

UEFI iSCSI Settings
Network Settings screen details
UEFI iSCSI Settings details
System BIOS
Viewing Network Settings
Viewing UEFI iSCSI Settings

Viewing Network Settings

To view the **Network Settings** screen, perform the following steps:

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

   ```
   F2 = System Setup
   ```

   NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.
3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **Network Settings**.

Related links

Network Settings
Network Settings screen details

Network Settings screen details

The **Network Settings** screen details are explained as follows:

Option	Description
PXE Device n (n = 1 to 4)	Enables or disables the device. When enabled, a UEFI boot option is created for the device.
PXE Device n Settings(n = 1 to 4)	Enables you to control the configuration of the PXE device.

Related links

Network Settings

Viewing Network Settings

UEFI iSCSI Settings

You can use the iSCSI Settings screen to modify iSCSI device settings. The iSCSI Settings option is available only in the UEFI boot mode. BIOS does not control network settings in the BIOS boot mode. For the BIOS boot mode, the option ROM of the network controller handles the network settings.

Related links

UEFI iSCSI Settings details

Viewing UEFI iSCSI Settings

UEFI iSCSI Settings

Viewing UEFI iSCSI Settings

Viewing UEFI iSCSI Settings

To view the **UEFI iSCSI Settings** screen, perform the following steps:

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

   ```
   F2 = System Setup
   ```

   NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.
3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **Network Settings**.
5. On the **Network Settings** screen, click **UEFI iSCSI Settings**.

Related links

UEFI iSCSI Settings

UEFI iSCSI Settings

UEFI iSCSI Settings details

The **UEFI ISCSI Settings** screen details are explained as follows:

Option	Description
ISCSI Initiator Name	Specifies the name of the iSCSI initiator (iqn format).
ISCSI Device1	Enables or disables the iSCSI device. When disabled, a UEFI boot option is created for the iSCSI device automatically.

Integrated Devices

You can use the **Integrated Devices** screen to view and configure the settings of all integrated devices including the video controller, integrated RAID controller, and the USB ports.

Related links

Integrated Devices details

System BIOS

Viewing Integrated Devices

Viewing Integrated Devices

To view the **Integrated Devices** screen, perform the following steps:

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

   ```
   F2 = System Setup
   ```

NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **Integrated Devices**.

Related links

Integrated Devices
Integrated Devices details

Integrated Devices details

The **Integrated Devices** screen details are explained as follows:

Option	Description
USB 3.0 Setting	Enables or disables the USB 3.0 support. Enable this option only if your operating system supports USB 3.0. If you disable this option, devices operate at USB 2.0 speed. USB 3.0 is enabled by default.
User Accessible USB Ports	Enables or disables the USB ports. Selecting **All Ports On** enables the front USB ports, selecting **All Ports Off** disables all USB ports. The USB keyboard and mouse operate during boot process in certain operating systems. After the boot process is complete, the USB keyboard and mouse do not work if the ports are disabled.
Embedded NIC1 and NIC2	**NOTE: The Embedded NIC1 and NIC2 options are only available on systems that do not have Integrated Network Card 1.** Enables or disables the Embedded NIC1 and NIC2 options. If set to **Disabled**, the NIC may still be available for shared network access by the embedded management controller. The embedded NIC1 and NIC2 options are only available on systems that do not have Network Daughter Cards (NDCs). The Embedded NIC1 and NIC2 option is mutually exclusive with the Integrated Network Card 1 option. Configure the Embedded NIC1 and NIC2 option by using the NIC management utilities of the system.
I/OAT DMA Engine	Enables or disables the I/OAT option. Enable only if the hardware and software support the feature.
Embedded Video Controller	Enables or disables the **Embedded Video Controller** option. This option is set to **Enabled** by default.
Current State of Embedded Video Controller	Displays the current state of the embedded video controller. The **Current State of Embedded Video Controller** option is a read-only field. If the Embedded Video Controller is the only display capability in the system (that is, no add-in graphics card is installed), then the Embedded Video Controller is automatically used as the primary display even if the **Embedded Video Controller** setting is set to **Disabled**.
SR-IOV Global Enable	Enables or disables the BIOS configuration of Single Root I/O Virtualization (SR-IOV) devices. This option is set to **Disabled** by default.
OS Watchdog Timer	If your system stops responding, this watchdog timer aids in the recovery of your operating system. When this option is set to **Enabled**, the operating system initializes the timer. When this option is set to **Disabled** (the default), the timer does not have any effect on the system.
Memory Mapped I/O above 4 GB	Enables or disables the support for PCIe devices that need large amounts of memory. This option is set to **Enabled** by default.
Slot Disablement	Enables or disables the available PCIe slots on your system. The slot disablement feature controls the configuration of PCIe cards installed in the specified slot. Slots must be disabled only when the installed peripheral card prevents booting into the operating system or causes delays in system startup. If the slot is disabled, both the Option ROM and UEFI drivers are disabled.

Related links

Integrated Devices
Viewing Integrated Devices

Serial Communication

You can use the **Serial Communication** screen to view the properties of the serial communication port.

Related links

Serial Communication details
System BIOS
Viewing Serial Communication

Viewing Serial Communication

To view the **Serial Communication** screen, perform the following steps:

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:
   `F2 = System Setup`

   NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.
3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **Serial Communication**.

Related links

Serial Communication
Serial Communication details

Serial Communication details

The **Serial Communication** screen details are explained as follows:

Option	Description
Serial Communication	Selects serial communication devices (Serial Device 1 and Serial Device 2) in BIOS. BIOS console redirection can also be enabled and the port address can be specified. This option is set to **Auto** by default.
Serial Port Address	Enables you to set the port address for serial devices. This option is set to **Serial Device 1=COM2, Serial Device 2=COM1** by default. **NOTE: You can use only Serial Device 2 for the Serial Over LAN (SOL) feature. To use console redirection by SOL, configure the same port address for console redirection and the serial device.** **NOTE: Every time the system boots, the BIOS syncs the serial MUX setting saved in iDRAC. The serial MUX setting can independently be changed in iDRAC. Loading the BIOS default settings from within the BIOS setup utility may not always revert the serial MUX setting to the default setting of Serial Device 1.**
External Serial Connector	Enables you to associate the External Serial Connector to Serial Device 1, Serial Device 2, or the Remote Access Device by using this option. **NOTE: Only Serial Device 2 can be used for Serial Over LAN (SOL). To use console redirection by SOL, configure the same port address for console redirection and the serial device.** **NOTE: Every time the system boots, the BIOS syncs the serial MUX setting saved in iDRAC. The serial MUX setting can independently be changed in iDRAC. Loading the BIOS default settings from within the BIOS setup utility may not always revert this setting to the default setting of Serial Device 1.**
Failsafe Baud Rate	Specifies the failsafe baud rate for console redirection. The BIOS attempts to determine the baud rate automatically. This failsafe baud rate is used only if the attempt fails, and the value must not be changed. This option is set to `115200` by default.

Option	Description
Remote Terminal Type	Sets the remote console terminal type. This option is set to `VT 100/VT 220` by default.
Redirection After Boot	Enables or disables the BIOS console redirection when the operating system is loaded. This option is set to **Enabled** by default.

Related links

Serial Communication

Viewing Serial Communication

System Profile Settings

You can use the **System Profile Settings** screen to enable specific system performance settings such as power management.

Related links

System Profile Settings details

System BIOS

Viewing System Profile Settings

Viewing System Profile Settings

To view the **System Profile Settings** screen, perform the following steps:

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

   ```
   F2 = System Setup
   ```

   NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.
3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **System Profile Settings**.

Related links

System Profile Settings

System Profile Settings details

System Profile Settings details

The **System Profile Settings** screen details are explained as follows:

Option	Description
System Profile	Sets the system profile. If you set the **System Profile** option to a mode other than **Custom**, the BIOS automatically sets the rest of the options. You can only change the rest of the options if the mode is set to **Custom**. This option is set to **Performance Per Watt Optimized (DAPC)** by default. DAPC is Dell Active Power Controller. **NOTE: All the parameters on the system profile setting screen are available only when the System Profile option is set to Custom.**
CPU Power Management	Sets the CPU power management. This option is set to **System DBPM (DAPC)** by default. DBPM is Demand-Based Power Management.
Memory Frequency	Sets the speed of the system memory. You can select **Maximum Performance**, **Maximum Reliability**, or a specific speed.
Turbo Boost	Enables or disables the processor to operate in the turbo boost mode. This option is set to **Enabled** by default.
Energy Efficient Turbo	Enables or disables the **Energy Efficient Turbo** option.

Option	Description
	Energy Efficient Turbo (EET) is a mode of operation where a processor's core frequency is adjusted to be within the turbo range based on workload.
C1E	Enables or disables the processor to switch to a minimum performance state when it is idle. This option is set to **Enabled** by default.
C States	Enables or disables the processor to operate in all available power states. This option is set to **Enabled** by default.
Collaborative CPU Performance Control	Enables or disables the CPU power management option. When set to **Enabled**, the CPU power management is controlled by the OS DBPM and the System DBPM (DAPC). This option is set to **Disabled** by default.
Memory Patrol Scrub	Sets the memory patrol scrub frequency. This option is set to **Standard** by default.
Memory Refresh Rate	Sets the memory refresh rate to either 1x or 2x. This option is set to **1x** by default.
Uncore Frequency	Enables you to select the **Processor Uncore Frequency** option. Dynamic mode enables the processor to optimize power resources across the cores and uncore during runtime. The optimization of the uncore frequency to either save power or optimize performance is influenced by the setting of the **Energy Efficiency Policy** option.
Energy Efficient Policy	Enables you to select the **Energy Efficient Policy** option. The CPU uses the setting to manipulate the internal behavior of the processor and determines whether to target higher performance or better power savings.
Number of Turbo Boot Enabled Cores for Processor 1	**NOTE: If there are two processors installed in the system, you see an entry for Number of Turbo Boost Enabled Cores for Processor 2.** Controls the number of turbo boost enabled cores for processor 1. The maximum number of cores is enabled by default.
Monitor/Mwait	Enables the Monitor/Mwait instructions in the processor. This option is set to **Enabled** for all system profiles, except **Custom** by default. **NOTE: This option can be disabled only if the C States option in the Custom mode is set to disabled.** **NOTE: When C States is set to Enabled in the Custom mode, changing the Monitor/Mwait setting does not impact the system power or performance.**
Write Data CRC	When set to enabled, DDR4 data bus issues are detected and corrected during `write`operations. Two extra cycles are required for Cyclic Redundancy Check bit generation which impacts system performance. This option is set to **Read-Only** unless system profile is set to Custom by default.

Related links

System Profile Settings

Viewing System Profile Settings

System Security

You can use the **System Security** screen to perform specific functions such as setting the system password, setup password and disabling the power button.

Related links

System Security Settings details
Operating with a setup password enabled
System BIOS
Viewing System Security
Creating a system and setup password
Using your system password to secure your system
Deleting or changing system and setup password

Viewing System Security

To view the **System Security** screen, perform the following steps:

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

   ```
   F2 = System Setup
   ```

   NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.
3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **System Security**.

Related links

System Security
System Security Settings details

System Security Settings details

The **System Security Settings** screen details are explained as follows:

Option	Description
Intel AES-NI	Improves the speed of applications by performing encryption and decryption by using the Advanced Encryption Standard Instruction Set (AES-NI). This option is set to **Enabled** by default.
System Password	Sets the system password. This option is set to **Enabled** by default and is read-only if the password jumper is not installed in the system.
Setup Password	Sets the setup password. This option is read-only if the password jumper is not installed in the system.
Password Status	Locks the system password. This option is set to **Unlocked** by default.
TPM Security	**NOTE: The TPM menu is available only when the TPM module is installed.** Enables you to control the reporting mode of the TPM. The **TPM Security** option is set to **Off** by default. You can only modify the TPM Status, TPM Activation, and Intel TXT fields if the **TPM Status** field is set to either **On with Pre-boot Measurements** or **On without Pre-boot Measurements**.
TPM Information	Changes the operational state of the TPM. This option is set to **No Change** by default.
TPM Status	Specifies the TPM status.
TPM Command	**CAUTION: Clearing the TPM results in the loss of all keys in the TPM. The loss of TPM keys may affect booting to the operating system.** Clears all the contents of the TPM. The **TPM Clear** option is set to **No** by default.

Option	Description
Intel TXT	Enables or disables the Intel Trusted Execution Technology (TXT) option. To enable the **Intel TXT** option, virtualization technology and TPM Security must be enabled with Pre-boot measurements. This option is set to **Off** by default.
Power Button	Enables or disables the power button on the front of the system. This option is set to **Enabled** by default.
NMI Button	Enables or disables the NMI button on the front of the system. This option is set to **Disabled** by default.
AC Power Recovery	Sets how the system behaves after AC power is restored to the system. This option is set to **Last** by default.
AC Power Recovery Delay	Sets the time delay for the system to power up after AC power is restored to the system. This option is set to **Immediate** by default.
User Defined Delay (60s to 240s)	Sets the **User Defined Delay** option when the **User Defined** option for **AC Power Recovery Delay** is selected.
UEFI Variable Access	Provides varying degrees of securing UEFI variables. When set to **Standard** (the default), UEFI variables are accessible in the operating system per the UEFI specification. When set to **Controlled**, selected UEFI variables are protected in the environment and new UEFI boot entries are forced to be at the end of the current boot order.
Secure Boot	Enables Secure Boot, where the BIOS authenticates each pre-boot image by using the certificates in the Secure Boot Policy. Secure Boot is disabled by default.
Secure Boot Policy	When Secure Boot policy is set to **Standard**, the BIOS uses the system manufacturer's key and certificates to authenticate pre-boot images. When Secure Boot policy is set to **Custom**, the BIOS uses the user-defined key and certificates. Secure Boot policy is set to **Standard** by default.
Secure Boot Policy Summary	Specifies the list of certificates and hashes that secure boot uses to authenticate images.

Related links

System Security

Viewing System Security

Creating a system and setup password

Prerequisites

Ensure that the password jumper is enabled. The password jumper enables or disables the system password and setup password features. For more information, see the System board jumper settings section.

NOTE: If the password jumper setting is disabled, the existing system password and setup password are deleted and you need not provide the system password to boot the system.

Steps

1. To enter System Setup, press F2 immediately after turning on or rebooting your system.
2. On the **System Setup Main Menu** screen, click **System BIOS** → **System Security**.
3. On the **System Security** screen, verify that **Password Status** is set to **Unlocked**.
4. In the **System Password** field, type your system password, and press Enter or Tab.

   Use the following guidelines to assign the system password:

   - A password can have up to 32 characters.
   - The password can contain the numbers 0 through 9.
   - Only the following special characters are allowed: space, ("), (+), (,), (-), (.), (/), (;), ([), (\), (]), (`).

   A message prompts you to reenter the system password.
5. Reenter the system password, and click **OK**.
6. In the **Setup Password** field, type your setup password and press Enter or Tab.

   A message prompts you to reenter the setup password.
7. Reenter the setup password, and click **OK**.
8. Press Esc to return to the System BIOS screen. Press Esc again.

A message prompts you to save the changes.

NOTE: Password protection does not take effect until the system reboots.

Related links

System Security

Using your system password to secure your system

If you have assigned a setup password, the system accepts your setup password as an alternate system password.

Steps

1. Turn on or reboot your system.
2. Type the system password and press Enter.

Next steps

When **Password Status** is set to **Locked**, type the system password and press Enter when prompted at reboot.

NOTE: If an incorrect system password is typed, the system displays a message and prompts you to reenter your password. You have three attempts to type the correct password. After the third unsuccessful attempt, the system displays an error message that the system has stopped functioning and must be turned off. Even after you turn off and restart the system, the error message is displayed until the correct password is entered.

Related links

System Security

Deleting or changing system and setup password

Prerequisites

NOTE: You cannot delete or change an existing system or setup password if the Password Status is set to Locked.

Steps

1. To enter System Setup, press F2 immediately after turning on or restarting your system.
2. On the **System Setup Main Menu** screen, click **System BIOS** → **System Security**.
3. On the **System Security** screen, ensure that **Password Status** is set to **Unlocked**.
4. In the **System Password** field, alter or delete the existing system password, and then press Enter or Tab.
5. In the **Setup Password** field, alter or delete the existing setup password, and then press Enter or Tab.

   If you change the system and setup password, a message prompts you to reenter the new password. If you delete the system and setup password, a message prompts you to confirm the deletion.
6. Press Esc to return to the **System BIOS** screen. Press Esc again, and a message prompts you to save the changes.

Related links

System Security

Operating with a setup password enabled

If **Setup Password** is set to **Enabled**, type the correct setup password before modifying the system setup options.

If you do not type the correct password in three attempts, the system displays the following message:

```
Password Invalid. Number of unsuccessful password attempts: <x> Maximum number of password attempts exceeded.System halted.
```

Even after you turn off and restart the system, the error message is displayed until the correct password is typed. The following options are exceptions:

- If **System Password** is not set to **Enabled** and is not locked through the **Password Status** option, you can assign a system password. For more information, see the System Security Settings screen section.
- You cannot disable or change an existing system password.

NOTE: You can use the password status option with the setup password option to protect the system password from unauthorized changes.

Related links

System Security

Miscellaneous Settings

You can use the **Miscellaneous Settings** screen to perform specific functions such as updating the asset tag and changing the system date and time.

Related links

Miscellaneous Settings details

System BIOS

Viewing Miscellaneous Settings

Viewing Miscellaneous Settings

To view the **Miscellaneous Settings** screen, perform the following steps:

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

   ```
   F2 = System Setup
   ```

   NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.
3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **Miscellaneous Settings**.

Related links

Miscellaneous Settings

Miscellaneous Settings details

Miscellaneous Settings details

The **Miscellaneous Settings** screen details are explained as follows:

Option	Description
System Time	Enables you to set the time on the system.
System Date	Enables you to set the date on the system.
Asset Tag	Specifies the asset tag and enables you to modify it for security and tracking purposes.
Keyboard NumLock	Enables you to set whether the system boots with the NumLock enabled or disabled. This option is set to **On** by default. **NOTE: This option does not apply to 84-key keyboards.**
F1/F2 Prompt on Error	Enables or disables the F1/F2 prompt on error. This option is set to **Enabled** by default. The F1/F2 prompt also includes keyboard errors.
Load Legacy Video Option ROM	Enables you to determine whether the system BIOS loads the legacy video (INT 10H) option ROM from the video controller. Selecting **Enabled** in the operating system does not support UEFI video output standards. This field is available only for UEFI boot mode. You cannot set the option to **Enabled** if **UEFI Secure Boot** mode is enabled.

Related links

Miscellaneous Settings

Viewing Miscellaneous Settings

iDRAC Settings utility

The iDRAC settings utility is an interface to set up and configure the iDRAC parameters by using UEFI. You can enable or disable various iDRAC parameters by using the iDRAC settings utility.

NOTE: Accessing some of the features on the iDRAC settings utility needs the iDRAC Enterprise License upgrade.

For more information about using iDRAC, see *Dell Integrated Dell Remote Access Controller User's Guide* at **Dell.com/idracmanuals**.

Related links

Device Settings
System BIOS
Entering the iDRAC Settings utility
Changing the thermal settings

Entering the iDRAC Settings utility

1. Turn on or restart the managed system.
2. Press F2 during Power-on Self-test (POST).
3. On the **System Setup Main Menu** page, click **iDRAC Settings**.
   The **iDRAC Settings** screen is displayed.

Related links

iDRAC Settings utility

Changing the thermal settings

The iDRAC settings utility enables you to select and customize the thermal control settings for your system.

1. Click **iDRAC Settings** → **Thermal**.
2. Under **SYSTEM THERMAL PROFILE** → **Thermal Profile**, select one of the following options:
   - Default Thermal Profile Settings
   - Maximum Performance (Performance Optimized)
   - Minimum Power (Performance per Watt Optimized)
3. Under **USER COOLING OPTIONS**, set the **Minimum Fan Speed**, and **Custom Minimum Fan Speed**.
4. Click **Back** → **Finish** → **Yes**.

Related links

iDRAC Settings utility

Device Settings

Device Settings enables you to configure device parameters.

Related links

System BIOS

Dell Lifecycle Controller

Dell Lifecycle Controller (LC) provides advanced embedded systems management capabilities including system deployment, configuration, update, maintenance, and diagnosis. LC is delivered as part of the iDRAC out-of-band solution and Dell system embedded Unified Extensible Firmware Interface (UEFI) applications.

Related links

Embedded system management

Embedded system management

The Dell Lifecycle Controller provides advanced embedded systems management throughout the system's lifecycle. The Dell Lifecycle Controller can be started during the boot sequence and can function independently of the operating system.

NOTE: Certain platform configurations may not support the full set of features provided by the Dell Lifecycle Controller.

For more information about setting up the Dell Lifecycle Controller, configuring hardware and firmware, and deploying the operating system, see the Dell Lifecycle Controller documentation at **Dell.com/idracmanuals**.

Related links

Dell Lifecycle Controller

Boot Manager

The **Boot Manager** screen enables you to select boot options and diagnostic utilities.

Related links

Boot Manager main menu
System BIOS
Viewing Boot Manager

Viewing Boot Manager

To enter **Boot Manager**:

1. Turn on, or restart your system.
2. Press F11 when you see the following message:

   ```
   F11 = Boot Manager
   ```

   If your operating system begins to load before you press F11, allow the system to complete the booting, and then restart your system and try again.

Related links

Boot Manager
Boot Manager main menu

Boot Manager main menu

Menu item	Description
Continue Normal Boot	The system attempts to boot to devices starting with the first item in the boot order. If the boot attempt fails, the system continues with the next item in the boot order until the boot is successful or no more boot options are found.
One-shot Boot Menu	Enables you to access boot menu, where you can select a one-time boot device to boot from.
Launch System Setup	Enables you to access System Setup.
Launch Lifecycle Controller	Exits the Boot Manager and invokes the Dell Lifecycle Controller program.
System Utilities	Enables you to launch System Utilities menu such as System Diagnostics and UEFI shell.

Related links

Boot Manager
Viewing Boot Manager

One-shot BIOS boot menu

One-shot BIOS boot menu enables you to select a one-shot boot device to boot from the following options:

- Launch Diagnostics
- BIOS Update File Explorer
- Reboot System

Related links

Boot Manager

System Utilities

System Utilities contains the following utilities that can be launched:

- Launch Diagnostics
- BIOS Update File Explorer
- Reboot System

Related links

Boot Manager

PXE boot

The Preboot Execution Environment (PXE) is an industry standard client or interface that allows networked computers that are not yet loaded with an operating system to be configured and booted remotely by an administrator.

6

Installing and removing system components

Safety instructions

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: Opening or removing the system cover while the system is powered on may expose you to a risk of electric shock.

CAUTION: Do not operate the system without the cover for a duration exceeding five minutes.

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 are shipped with your product.

CAUTION: Operating the system without the system cover can result in component damage.

NOTE: Dell recommends that you always use a static mat and static strap while working on components inside the system.

NOTE: To ensure proper operation and cooling, all bays in the system and system fans must be populated always with either a component or with a blank.

To avoid injury to yourself or damage to the 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 as you work inside the system. Or discharge any static electricity by touching the bare metal chassis of 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.

Before working inside your system

Prerequisites

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Turn off the system, including any attached peripherals.
2. Disconnect the system from the electrical outlet and disconnect the peripherals.
3. If applicable, remove the system from the rack.

   For more information, see the *Dell PowerEdge C6320 Getting Started Guide* at **Dell.com/poweredgemanuals**.
4. Remove the system cover.

Related links

Safety instructions

Removing the system cover

After working inside your system

Prerequisites

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Install the system cover.
2. If applicable, install the system into the rack.

   For more information, see the *Dell PowerEdge C6320 Getting Started Guide* at **Dell.com/poweredgemanuals**.
3. Reconnect the peripherals and connect the system to the electrical outlet.
4. Turn on the system, including any attached peripherals.

Related links

Installing the system cover

Recommended tools

You need the following tools to perform the removal and installation procedures:

- Phillips #1 screwdriver
- Phillips #2 screwdriver
- Torx #T20 screwdriver
- Clamper
- Wrist grounding strap

System cover

The system cover protects the components inside the system and helps in maintaining air flow inside the system. Removing the system cover actuates the intrusion switch which aids in maintaining system security.

Removing the system cover

Prerequisites

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 are shipped with your product.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and disconnect the peripherals.

Steps

1. Remove the securing screw from the system cover.
2. Press the cover release latch lock.
3. Hold the system cover on both the sides with your palm on the traction pad, and slide out the system cover.
4. Lift the cover away from the system.

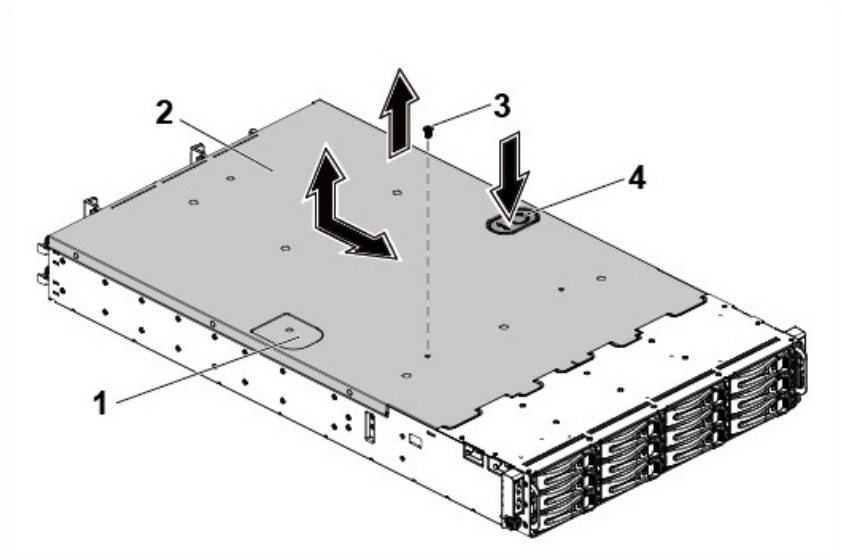

Figure 17. Removing and installing the system cover

1. traction pad
2. system cover
3. securing screw
4. cover release latch lock

Next steps

Install the system cover.

Related links

Safety instructions

Installing the system cover

Installing the system cover

Prerequisites

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 are shipped with your product.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Place the system cover on the chassis and slide it to the front of the chassis until it snaps into place.
2. Secure the cover with the securing screw.

Next steps

1. Reconnect the system to the electrical outlet.
2. Turn on the system, including any attached peripherals.

Related links

Safety instructions

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 by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.

CAUTION: This system must be operated with the system cover installed to ensure proper cooling.

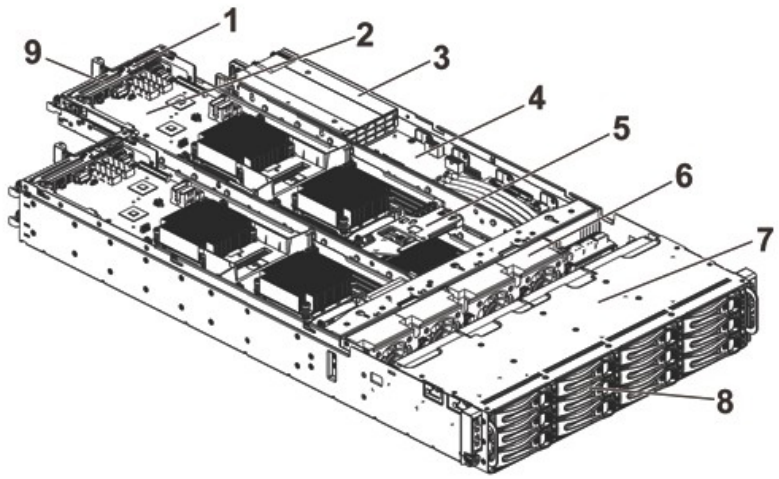

Figure 18. Inside the system

1. mezzanine card bracket
2. system board assembly (4)
3. power supply unit (2)
4. power distribution board (2)
5. Battery backup unit (BBU) bracket
6. cooling fan (4)
7. hard-drive bay
8. hard drive (12)
9. riser card bracket

Cooling fans

Servers use a lot of power to function, and that in turn generates a lot of heat. That heat, without a system in place to dissipate it, can destroy the mechanical parts and damage the server. In most cases, the simplest and most efficient way to dissipate this heat is through the use of fans.

Removing a cooling fan

Prerequisites

WARNING: Do not attempt to operate the system without the cooling fans.

WARNING: The cooling fan can continue to spin for some time after the system has been powered down. Allow time for the fan to stop spinning before removing it from 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 are shipped with your product.

NOTE: Observe the routing of the cable through the cable tie as you remove them from the system. You must route these cables properly when you replace them to prevent the cables from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.

Steps

1. Disconnect the fan's power cable from the power distribution board 1.

2. Lift the cooling fan cage out of the chassis.

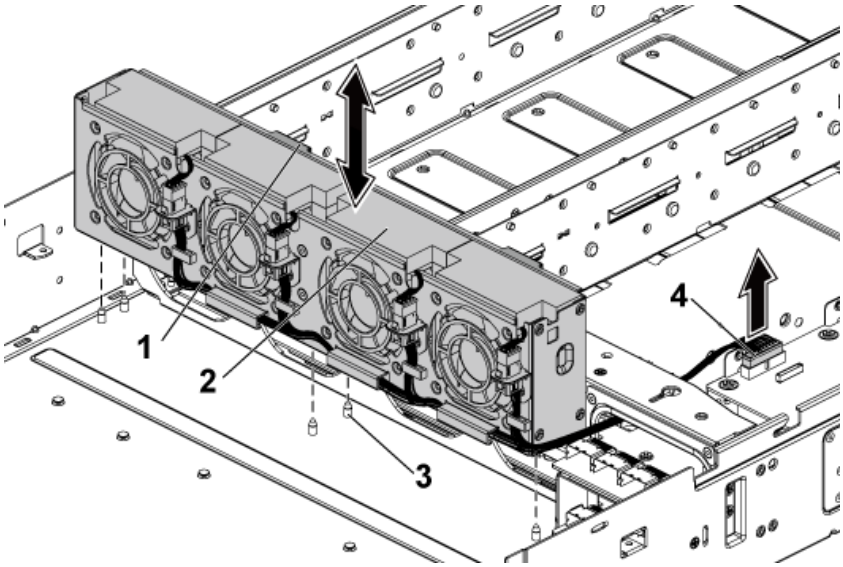

Figure 19. Removing and installing a cooling fan cage

1. locking clips (2)
2. cooling fan cage
3. locating pin (6)
4. power connector

3. Disconnect the fan cable from the fan connector on the cooling fan cage.

4. Lift the cooling fan with the sponge out of the cooling fan cage.

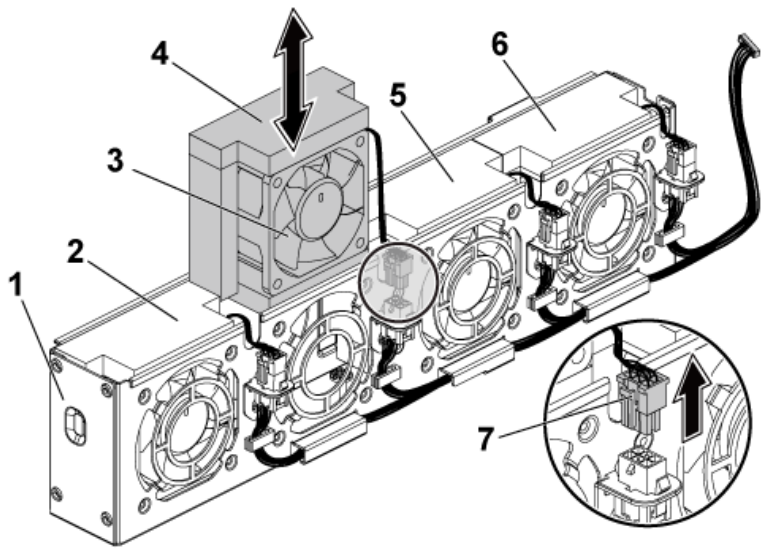

Figure 20. Removing and installing a cooling fan

1. cooling-fan cage
2. cooling fan 1

3. cooling fan 2
4. sponge
5. cooling fan 3
6. cooling fan 4
7. fan cable

Related links

Safety instructions
Removing the system cover
Before working inside your system

Installing a cooling fan

Prerequisites

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 are shipped with your product.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Align the cooling fan with the sponge and slide it in the cooling-fan cage until the cooling fan is firmly seated.

   NOTE: The fan blades should face the control panel of the system.
2. Connect the fan cable to the connector on the cooling-fan cage.
3. Align the cooling-fan cage with the locating pins on the chassis and place it into the chassis until it is firmly seated in place.
4. Connect the fan's power cable to the connector on the power distribution board 1.

   You must route these cables properly through the ties to prevent them from being pinched or crimped.

Next steps

1. Follow the procedure listed in the After working inside your system section.
2. Check the management software to see if the fan is rotating at the optimal speed.

Related links

Safety instructions
After working inside your system

Hard drives

A hard drive is a data storage device used for storing and retrieving digital information by using one or more rigid rapidly rotating disks (platters) coated with magnetic material.

CAUTION: Use only hard drives that have been tested and approved for use with the SAS/SATA backplane.

The following are the recommended guidelines for installing a mix of SAS hard drives, SATA hard drives, and SSDs:

- Only two drive types can be mixed per node.
- Drives 0 and 1 must be of same type.
- The remaining drives must all be the same type.
- SAS hard drive support is based on the add-on card and the onboard configuration supports SATA hard drive only.

Removing a 3.5-inch hard drive blank

Prerequisites

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 are shipped with your product.

CAUTION: To maintain proper system cooling, all empty hard drive bays must have drive blanks installed.

NOTE: This section is applicable to systems with hot swappable hard drives only.

Follow the safety guidelines listed in the Safety instructions section.

Steps

Pull the hard drive blank out of the hard drive bay.

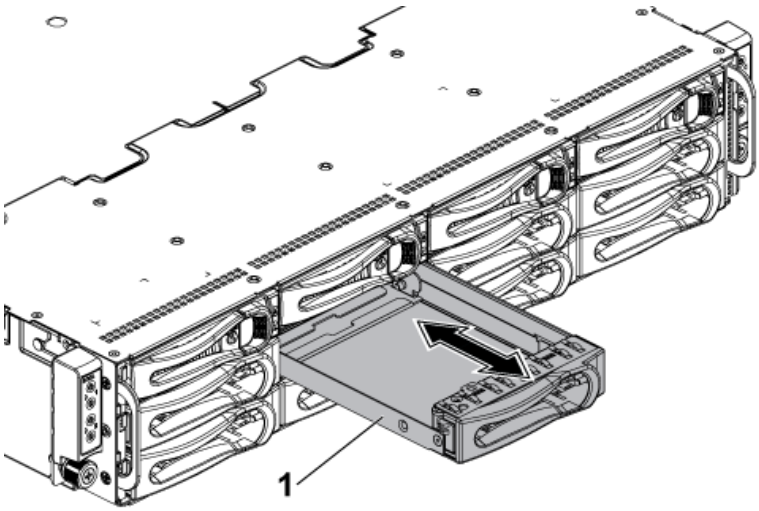

Figure 21. Removing or installing a 3.5-inch hard drive blank

1. 3.5-inch hard drive blank

Related links

Safety instructions

Installing a 3.5-inch hard drive blank

Prerequisites

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 are shipped with your product.

Follow the safety guidelines listed in the Safety instructions section.

Steps

Slide the hard drive blank into the drive bay until the hard drive blank is seated in place.

Related links

Safety instructions

Removing a 2.5-inch hard drive blank

Prerequisites

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 are shipped with your product.

CAUTION: To maintain proper system cooling, all empty hard drive bays must have drive blanks installed.

NOTE: This section is applicable to systems with hot swappable hard drives only.

Follow the safety guidelines listed in the Safety instructions section.

Steps

Pull the handle to remove the 2.5-inch hard drive blank out of the hard drive bay.

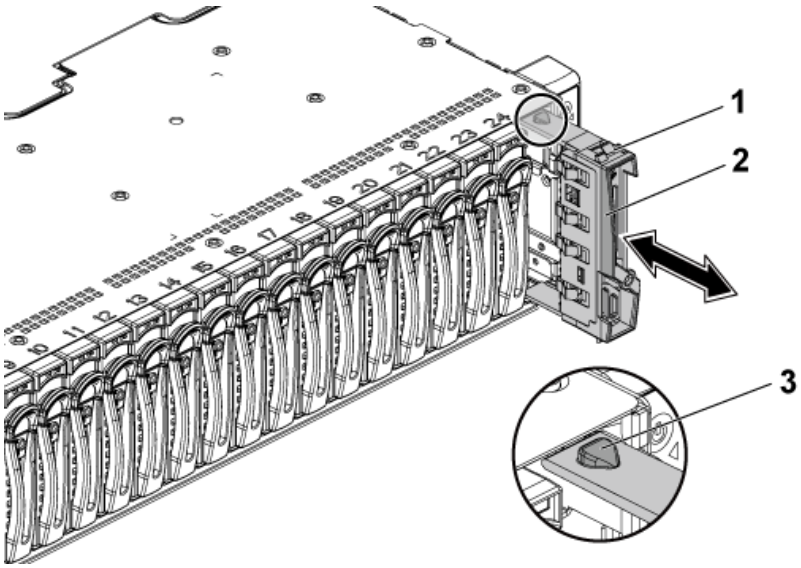

Figure 22. Removing or installing a 2.5-inch hard drive blank

1. 2.5-inch hard drive blank
2. handle
3. latch

Related links

Safety instructions

Installing a 2.5-inch hard drive blank

Prerequisites

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 are shipped with your product.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. With the latch facing up, slide the latch into the hard drive bay.
2. Push the 2.5-inch hard drive with a slight inclination into the hard drive bay until the hard drive blank is seated in place.

Related links

Safety instructions

Removing a hard drive

The installation and removal procedures for the 3.5-inch hard drive and the 2.5-inch hard drive are similar.

Prerequisites

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 are shipped with your product.

CAUTION: To maintain proper system cooling, all empty hard drive bays must have drive blanks installed.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Turn the lock lever counterclockwise until it points to the unlock symbol.
2. Slide the release button to open the release handle.
3. Using the release handle, pull the hard drive carrier out of the hard drive bay.

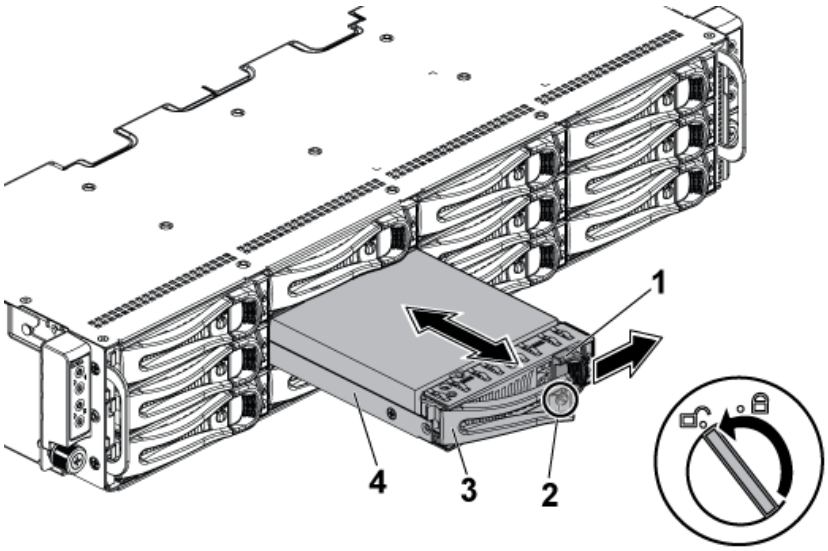

Figure 23. Removing and installing a hard drive

1. release button
2. lock lever
3. release handle
4. hard drive carrier

Related links

Safety instructions

Installing a hard drive

Prerequisites

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 are shipped with your product.

CAUTION: To maintain proper system cooling, all empty hard drive bays must have drive blanks installed.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. With the lever on the hard drive carrier open, slide the hard drive carrier into the drive bay until the hard drive connector engages with the backplane.
2. Close the release handle to lock the hard drive in place.
3. Turn the lock lever clockwise to the lock symbol.

Next steps

1. To check the status of the hard drive, see the hard drive activity and status indicators. For more information, see the Hard drive indicator patterns section.
2. Check the management software to verify the status of the installed hard drive.

Related links

Safety instructions

Hard drive indicator patterns

Removing a hard drive from a hard drive carrier

Prerequisites

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 are shipped with your product.

CAUTION: When installing a hard drive carrier, ensure that the adjacent drives are fully installed. Inserting a hard drive carrier and attempting to lock its handle next to a partially installed carrier can damage the partially installed carrier's shield spring and make it unusable.

CAUTION: To prevent data loss, ensure that your operating system supports hot-swappable drive installation. See the documentation supplied with the operating system.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Remove the screws.
2. Lift the hard drive out of the hard drive carrier.

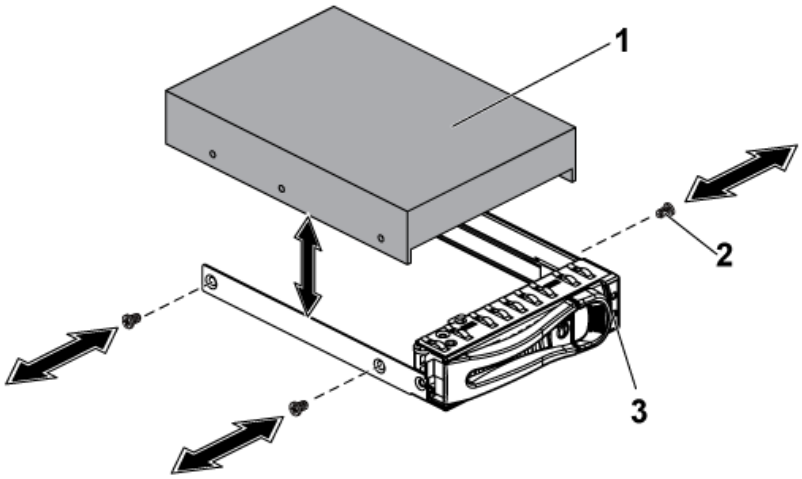

Figure 24. Removing and installing a hard drive from the hard drive carrier

1. hard drive
2. screw (4)
3. hard drive carrier

Related links

Safety instructions

Installing a hard drive into a hard drive carrier

Prerequisites

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 are shipped with your product.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Place the hard drive into the hard drive carrier.
2. Secure the hard drive to the hard drive carrier with screws.

Related links

Safety instructions

Installing a 2.5-inch SSD into a 3.5-inch hard drive carrier

Prerequisites

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 are shipped with your product.

CAUTION: This removal and installation procedure is only for 2.5-inch SSD. Installing a 2.5-inch hard disk drive into the adapter can cause performance issue.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Place the 2.5-inch SSD into the 2.5-inch adapter bracket.
2. Secure the 2.5-inch SSD to the 2.5-inch adapter bracket with M3 screws.

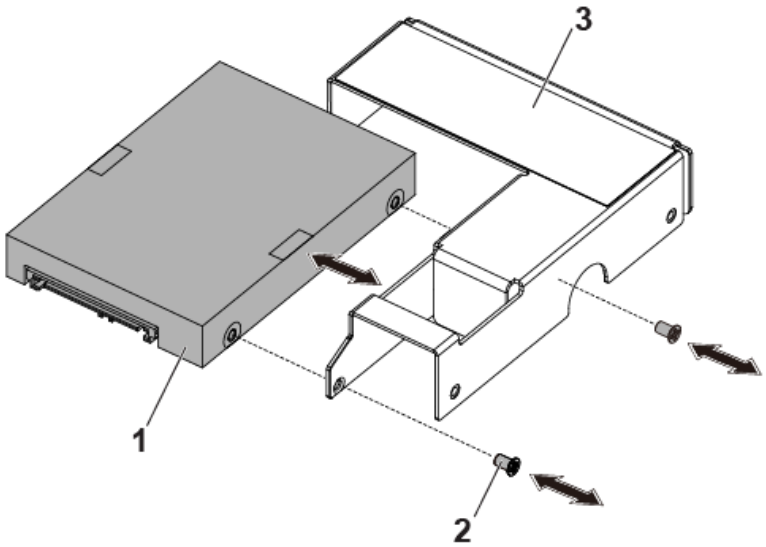

Figure 25. Removing and installing a 2.5-inch SSD from the 2.5-inch adapter bracket

1. 2.5-inch SSD
2. M3 screw (2)
3. 2.5-inch adapter

3. Place the adapter assembly into the 3.5-inch hard drive carrier.
4. Secure the adapter assembly to the 3.5-inch hard drive carrier with screws.

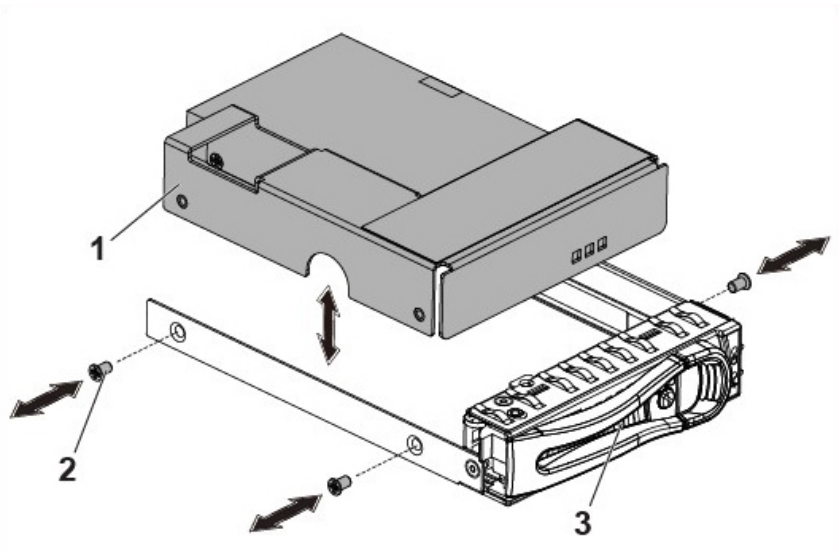

Figure 26. Removing and installing an adapter assembly from the hard drive carrier

1. adapter assembly
2. screw (3)
3. hard drive carrier

NOTE: Do not install screws in the screw holes on the side of SSD, which are occupied by the light pipe.

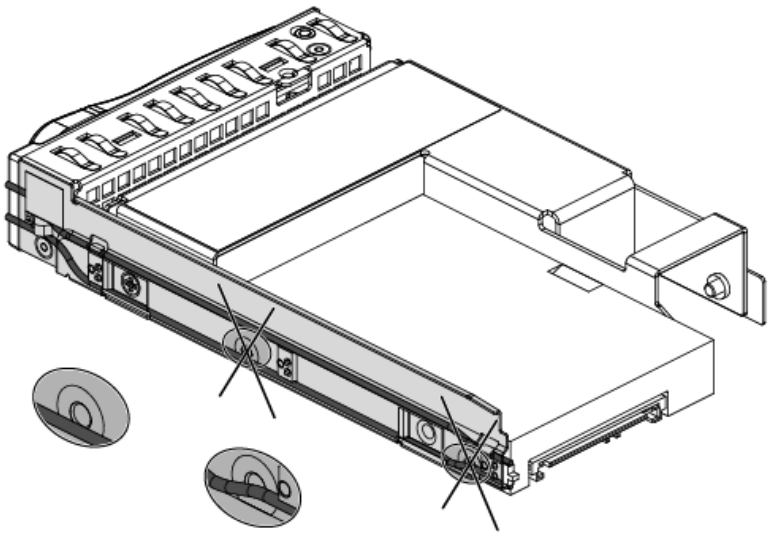

Figure 27. Screw holes on the side of SSD occupied by the light pipe

Related links

Safety instructions

SSD and SSD holder

A solid-state drive (SSD, also known as a solid-state disk although it contains neither an actual disk nor a drive motor to spin a disk) is a solid-state storage device that uses integrated circuit assemblies as memory to store data persistently. SSDs have no moving (mechanical) components. SSDs are typically more resistant to physical shock, run silently, have lower access time, and less latency.

Removing the SSD and SSD Holder

Prerequisites

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 are shipped with your product.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and disconnect the peripherals.
4. Remove the system board assembly.

Steps

1. Disconnect the MicroSATA cables from the system board.
2. Slide the SSD with the MicroSATA cable out of the SSD holder.

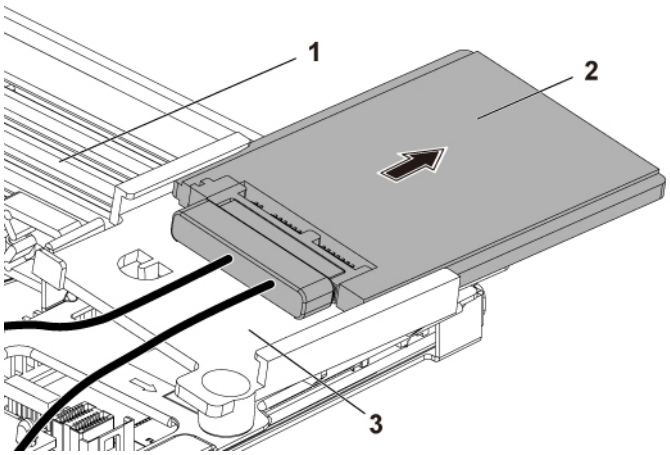

Figure 28. Removing the SSD with MicroSATA cable

1. system-board assembly
2. SSD with MicroSATA cable
3. SSD holder

3. Disconnect the MicroSATA cable from the SSD.

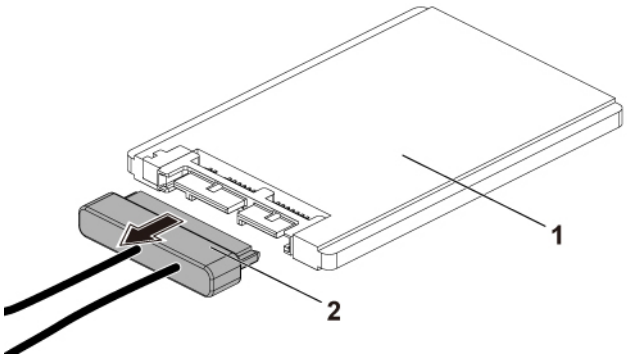

Figure 29. Removing the MicroSATA cable

1. SSD
2. MicroSATA cable

4. Remove the screw that secures the SSD holder to the battery backup unit (BBU) bracket.

5. Remove the SSD holder from the BBU bracket.

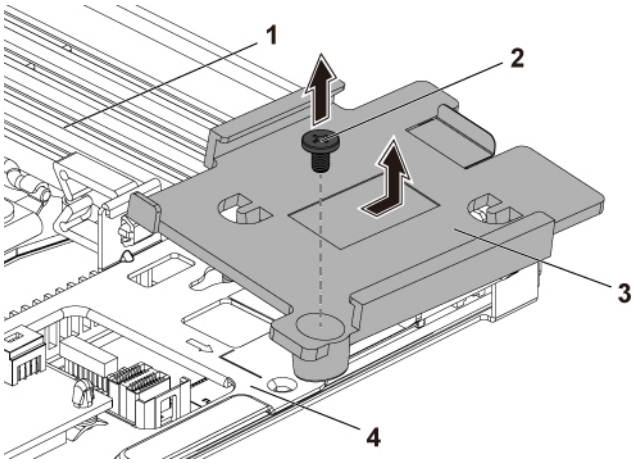

Figure 30. Removing the SSD Holder

1. system-board assembly
2. screw
3. SSD holder
4. BBU Bracket

Related links

Safety instructions

Removing the system board assembly

Installing the SSD and SSD holder

Prerequisites

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 are shipped with your product.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Place the SSD holder on the battery backup unit (BBU) bracket.
2. Replace the screw that secures the SSD holder to the BBU bracket.
3. Connect the MicroSATA cable to the SSD.
4. Slide the SSD with the MicroSATA cable into the SSD holder.
5. Reconnect all the cables.

Next steps

1. Install the system board assembly.
2. Reconnect the peripherals and connect the system to the electrical outlet.
3. Turn on the system, including any attached peripherals.

Related links

Safety instructions

Installing the system board assembly

DC to DC board

DC to DC board is a power regulating board that supplies power to the 1.8 inch SSD.

Removing the DC to DC board

Prerequisites

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 are shipped with your product.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and disconnect the peripherals.
4. Remove the system board assembly.

Steps

1. Disconnect all the cables.
2. Press the space support by using clamper, and lift one side of the DC to DC board.
3. Repeat step 2 for the other space support, and lift the other side of the DC to DC board.
4. Remove the DC to DC board out of the BBU bracket.

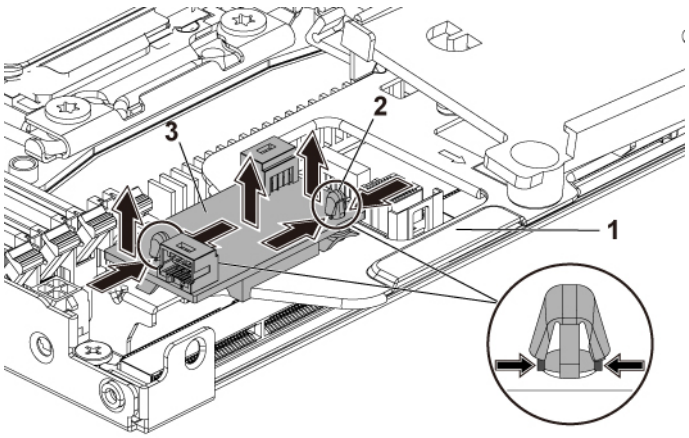

Figure 31. Removing the DC to DC board

1. BBU Bracket
2. Space support (2)
3. DC to DC board

Installing the DC to DC board

Prerequisites

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 are shipped with your product.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Align the space supports with the holes on the BBU bracket, and press the DC to DC board until the retaining clips flip.

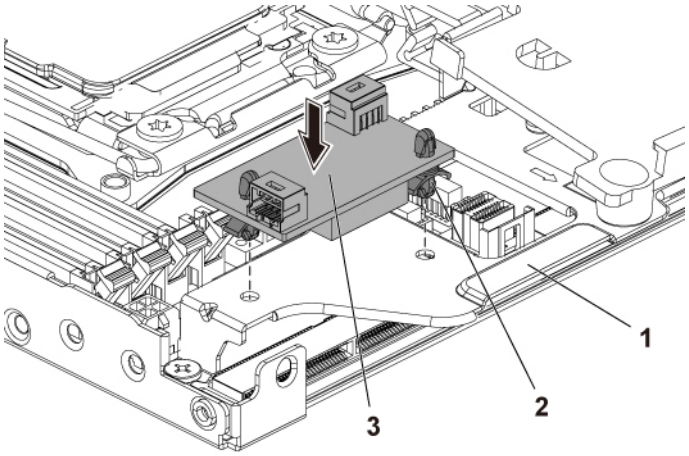

Figure 32. Installing the DC to DC board

1. BBU Bracket
2. space support (2)
3. DC to DC board

2. Reconnect all the cables.

Next steps

1. Install the system board.
2. Reconnect the peripherals and connect the system to the electrical outlet.
3. Turn on the system, including any attached peripherals.

Cable routings for SSD and DC to DC board and LSI 2008

Table 24. Cable routings for SSD and DC to DC Board and LSI 2008

Item	Cable	From (LSI 2008 SAS Mezzanine card)	To (System board)
1	Mini-SAS cable	Mini-SAS connector 4-7 (J4) On LSI 2008 SAS Mezzanine Card	SAS/SATA connectors 4&5
2		Mini-SAS connector 0 - 3 (J3) On LSI 2008 SAS Mezzanine Card	Mini-SAS HD Connector 0-3
3	MicroSATA cable	1.8-inch SSD	Onboard SATA Connector 5 on the system board
4		1.8-inch SSD	DC to DC board (J2)
5	1x4 power cable	DC to DC to DC board (J1)	High Power Connector on the system board

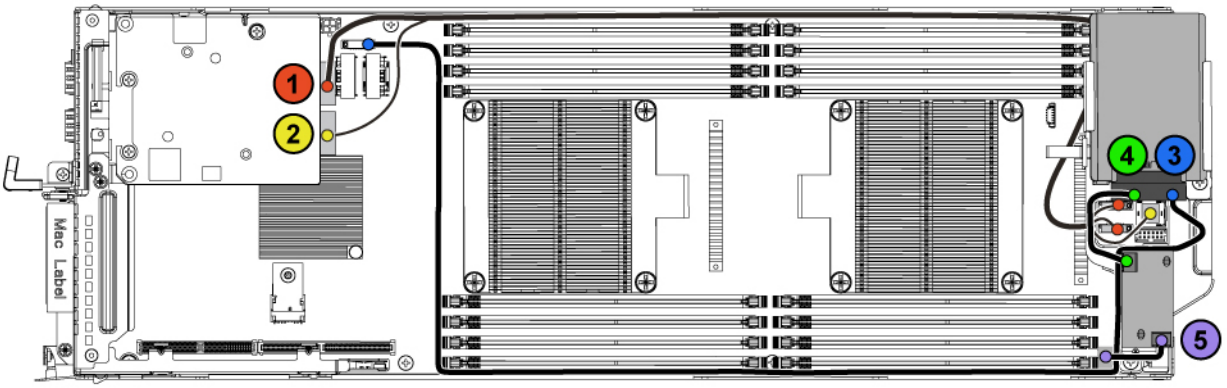

Figure 33. Cable routings for SSD and DC to DC Board and LSI 2008

Table 25. Cable routings for SSD and DC to DC Board and LSI 2008

Item	Cable	From (LSI 2008 SAS Mezzanine card)	To (System board)
1	Mini-SAS cable	Mini-SAS connector 4-7 (J4) On LSI 2008 SAS Mezzanine Card	SAS/SATA connectors 4&5
2		Mini-SAS connector 0-3 (J3) On LSI 2008 SAS Mezzanine Card	Mini-SAS HD Connector 0-3
3	MicroSATA cable	1.8-inch SSD	Onboard SATA Connector 5 on the system board
4		1.8-inch SSD	DC to DC board (J2)
5	1x4 power cable	DC to DC to DC board (J1)	High Power Connector on the system board

SATADOM

Removing the SATADOM

Prerequisites

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 are shipped with your product.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and disconnect the peripherals.

Steps

1. Disconnect the power cable from the SATADOM and the system board.
2. Using a screwdriver, press the metal latch to release the SATADOM.
3. Holding the SATADOM by its edges, pull the SATADOM until the card edge connector disengages from the onboard SATA connector 5 on the system board.

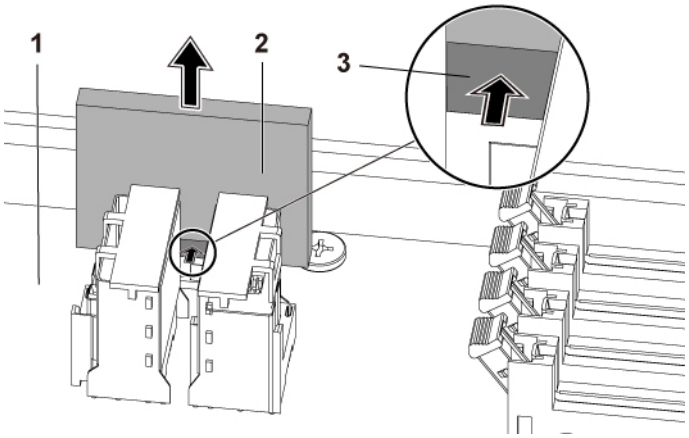

Figure 34. Removing the SATADOM

1. system board assembly
2. SATADOM
3. metal latch

Related links

Safety instructions

Removing the system board assembly

Installing the SATADOM

Prerequisites

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 are shipped with your product.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Holding the SATADOM by its edges, position it so that the card edge connector aligns with the onboard SATA connector 5 on the system board.
2. Press the SATADOM with your thumbs until it is fully seated.
3. Reconnect all the cables.

Next steps

1. Reconnect the peripherals and connect the system to the electrical outlet.
2. Turn on the system, including any attached peripherals.

Related links

Safety instructions

Installing the system board assembly

Cable routing for SATADOM and LSI 2008

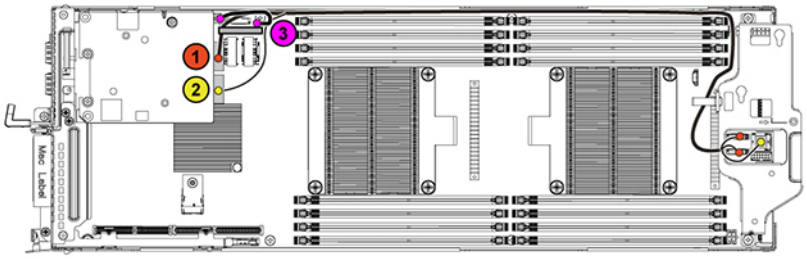

Figure 35. Cable Routing for SATADOM and LSI 2008

Table 26. Cable Routing for SATADOM and LSI 2008

Item	Cable	From (LSI 2008 SAS Mezzanine Card)	To (System Board)
1	Mini-SAS cable	Mini-SAS connector 4-7 (J4) On LSI 2008 SAS Mezzanine Card	SAS/SATA connectors 4&5
2		Mini-SAS connector 0-3 (J3) On LSI 2008 SAS Mezzanine Card	Mini-SAS HD Connector 0-3
3	SATADOM power cable	SATADOM	HDD Power Connector on the system board

Power supply units

NOTE: Configurations higher than indicated in the table may change the PSU mode to non-redundant. In non-redundant mode if the power requirement exceeds the installed system power capacity, the BIOS will throttle the processors. Also, since Processor Power Capping is enabled, processor throttling occurs on configurations that exceed the cap value.

NOTE: Both the PSUs are hot swappable, and they can support hot swap in any condition if the system has power throttling feature.

The following table lists the maximum supported configuration where power supply unit (PSU) redundancy is guaranteed:

Table 27. PSUs configuration

PSU	Four system boards
1400 W	Up to two 120 W processor per system board, three hard drives per system board, and four memory modules per system board
1600 W	Up to two 120 W processor per system board, three hard drivesper system board, and eight memory modulesper system board

Removing a power supply unit

Prerequisites

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 are shipped with your product.

CAUTION: The system requires at least one power supply unit (PSU) to operate normally.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off the system, including any attached peripherals.
3. Disconnect the power cable from the power source and the PSU, and disconnect the peripherals.

Steps

Press the release lever and by using the handle, slide the PSU out of the system.

NOTE: Removing the PSU may require considerable force.

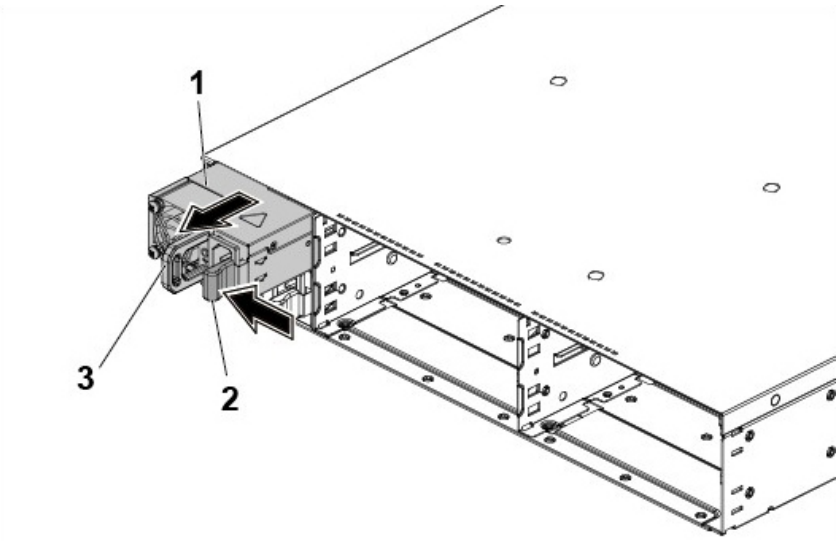

Figure 36. Removing and installing a PSU

1. PSU
2. release lever
3. handle

Related links

Safety instructions

Installing a power supply unit

Prerequisites

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 are shipped with your product.

CAUTION: The system requires at least one power supply unit (PSU) to operate normally.

Verify that both PSUs are of the same type and have the same maximum output power.

NOTE: The maximum output power is printed on the PSU label.

Follow the safety guidelines listed in the Safety instructions section.

Steps

Slide the new PSU into the chassis until the PSU until is fully seated and the release lever snaps into place.

Next steps

Connect the power cable to the PSU and plug the cable into a power outlet.

NOTE: When installing a new PSU in a system with two PSUs, allow several seconds for the system to recognize the PSU and determine its status.

Related links

Safety instructions

System board tray

Removing the system board tray

Prerequisites

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 are shipped with your product.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Remove the screw that secures the retaining latch.
2. Press the retaining latch and slide the system board tray out of the chassis.

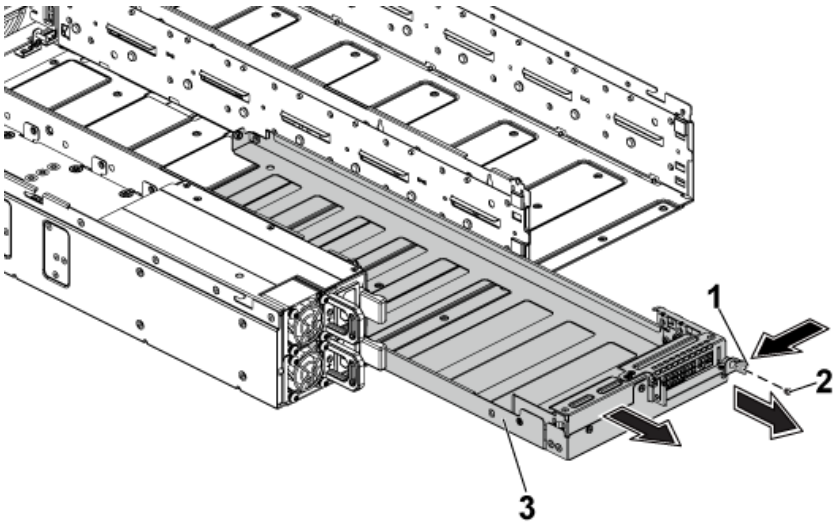

Figure 37. Removing and installing a system board tray

1. retaining latch
2. screw
3. system board tray

Related links

Safety instructions

Installing the system board tray

Prerequisites

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 are shipped with your product.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Slide the system board tray into the chassis until it snaps into place.
2. Replace the screw that secures the retaining latch.

Related links

Safety instructions

System board assembly

Removing the system board assembly

Prerequisites

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 are shipped with your product.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and disconnect the peripherals.
4. Disconnect all the external cables from the system board.

Steps

1. Remove the screw that secures the retaining latch.
2. Press the retaining latch and by using the handle, slide the system board assembly out of the chassis.

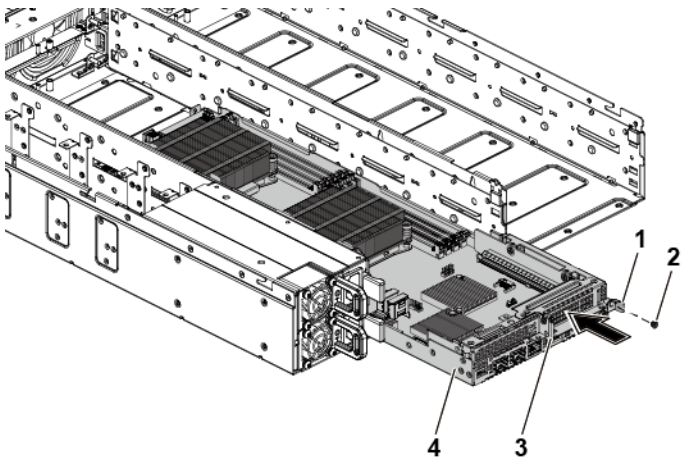

Figure 38. Removing and installing a system board assembly

1. retaining latch
2. screw
3. handle
4. system board assembly

Related links

Safety instructions

Installing the system board assembly

Prerequisites

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 are shipped with your product.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Slide the system board assembly into the chassis until it snaps into place.
2. Replace the screw that secures the retaining latch.

Next steps

1. Reconnect all the external cables to the system board.
2. Reconnect the peripherals and connect the system to the electrical outlet.
3. Turn on the system, including any attached peripherals.

NOTE: To add the service tag of the system board to match the service tag of the physical node, contact technical support.

Related links

Safety instructions

Cooling shroud

The cooling shroud has aerodynamically placed openings that direct the airflow across the entire system. The airflow passes through all the critical parts of the system, where the vacuum pulls air across the entire surface area of the heat sink, thus allowing increased cooling.

Removing the cooling shroud

Prerequisites

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 are shipped with your product.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and disconnect the peripherals.
4. Remove the system board assembly.

Steps

Press the four latches along the direction of the arrows, and then lift the cooling shroud out of the system board assembly.

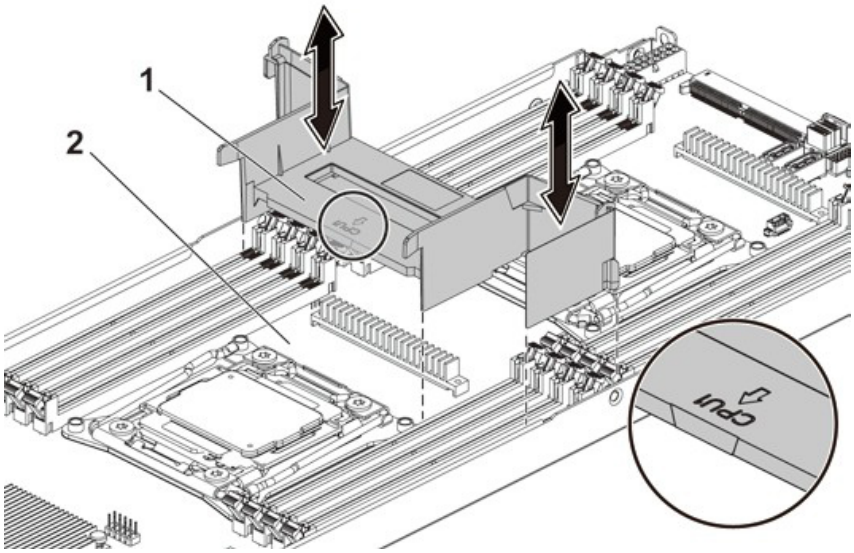

Figure 39. Removing the cooling shroud

1. cooling shroud
2. system board assembly

Related links

Safety instructions

Removing the system board assembly

Installing the cooling shroud

Prerequisites

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 are shipped with your product.

Follow the safety guidelines listed in the Safety instructions section.

Steps

Replace the cooling shroud into the system board assembly. Make sure that the four latches are properly engaged with the heat sink bases and the latches click in place.

NOTE: When installing the cooling shroud, make sure the arrow of the mark on the cooling shroud points to processor 1, and keep the flat surface of the cooling shroud horizontal.

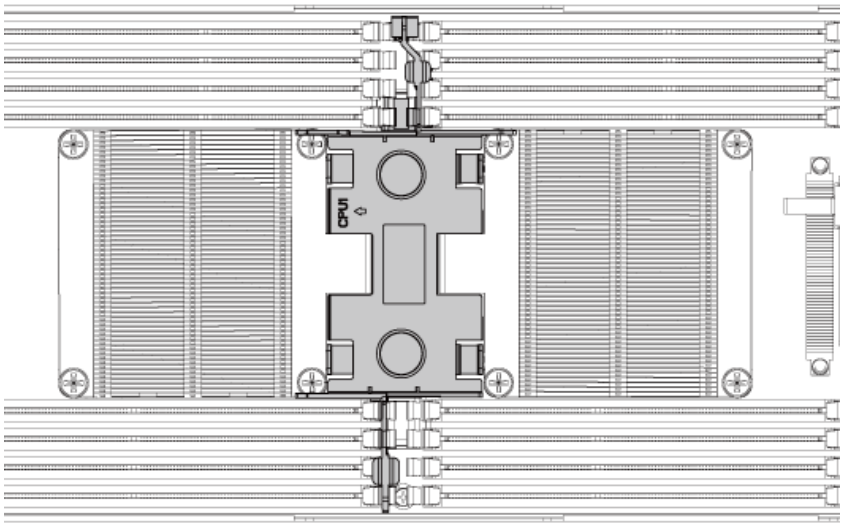

Figure 40. The top view of the installed cooling shroud

Next steps

1. Install the system board assembly.
2. Reconnect the peripherals and connect the system to the electrical outlet.
3. Turn on the system, including any attached peripherals.

Related links

Safety instructions
Installing the system board assembly

Heat sinks

The heat sink transfers heat away form the processor as the processor is unable to dissipate sufficient heat to moderate this temperature. The heat sink is designed to maximize its surface area in contact with the cooling medium surrounding it, such as the air. Thermal grease improve the heat sink's performance by filling air gaps between the heat sink and the heat spreader on the processor.

Removing the heat sink

Prerequisites

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 are shipped with your product.

NOTE: Place the foolproof pins of two processor heat sinks facing inside.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and disconnect the peripherals.
4. Remove the system board assembly.

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.

Steps

1. Using a Phillips screwdriver, loosen one of the heat sink retention screws.

   Wait for 30 seconds for the heat sink to loosen from the processor.
2. Remove the other heat sink retention screws.
3. Lift the heat sink off the processor and set the heat sink aside with thermal grease side facing up.

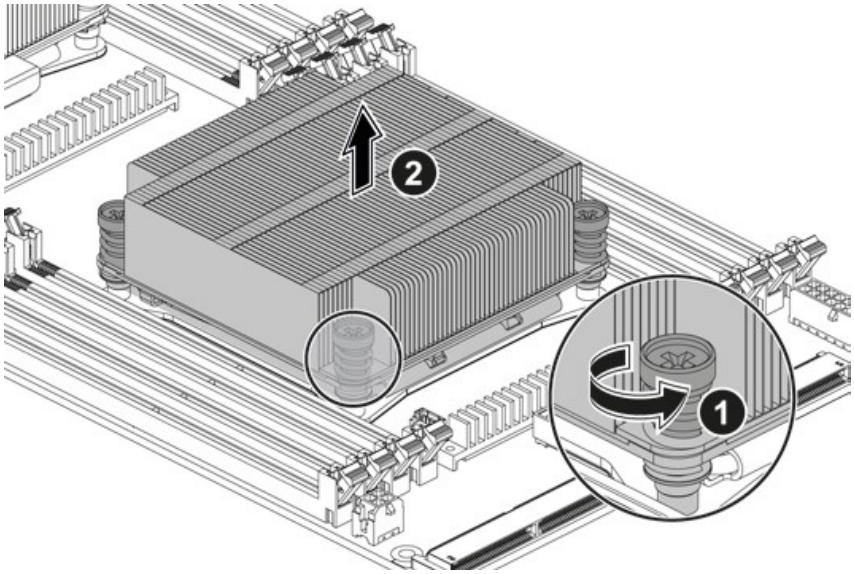

Figure 41. Removing and installing the heat sink

1. screw (4)
2. heat sink

Related links

Safety instructions

Removing the system board assembly

Installing the heat sink

Prerequisites

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 are shipped with your product.

Follow the safety guidelines listed in the Safety instructions section.

Steps

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.

   CAUTION: Using excess thermal grease can cause grease to contact the processor shield, which can cause contamination of the processor socket.
3. Place the heat sink on the processor.
4. Using a Phillips screwdriver, tighten the heat sink retention screws.

Next steps

Replace the system board assembly.

Related links

Safety instructions

Installing the system board assembly

Processors

The processor contains memory, peripheral interfaces, and other components of the system. It may have multiple cores. The system may have multiple processors present. The C6320 system board supports the E5-2600 v3 and E5-2600 v4 processor series.

Removing a processor

Prerequisites

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 are shipped with your product.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Remove the system board assembly.
3. Remove the heat sink.

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

Steps

1. Position your thumbs firmly over the processor socket release levers and release the levers from the locked position. Rotate the levers 90 degrees upward until the processor is released from the socket.
2. Rotate the processor shield upward and out of the way.
3. Lift the processor out of the socket and leave the socket release levers up so that the socket is ready for the new processor.

CAUTION: Be careful not to bend any of the pins on the CPU socket when removing the processor. Bending the pins can permanently damage the system board. Be sure to properly align the process or notch to the socket and insert straight down. Do not move from side to side.

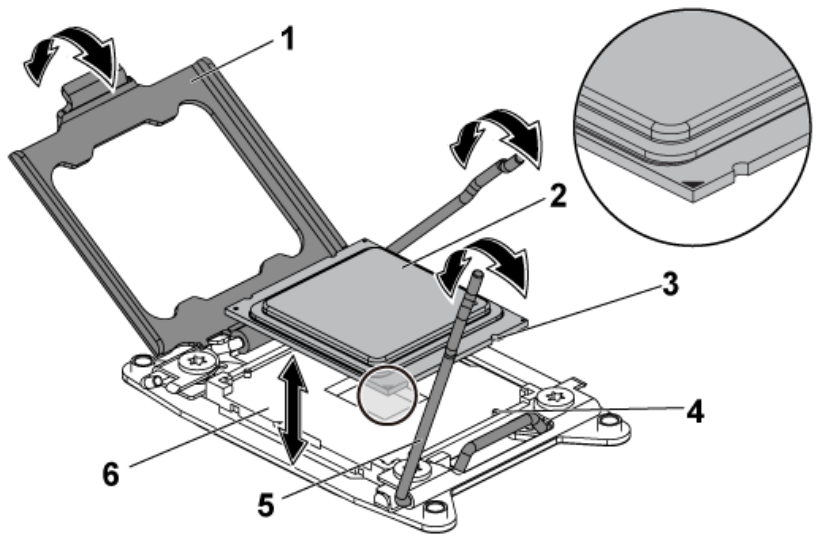

Figure 42. Removing and installing a processor

1. processor shield
2. processor
3. notch in processor (4)
4. socket key (4)

5. socket release lever (2)
6. CPU socket

Related links

Safety instructions
Removing the system board assembly
Removing the heat sink

Installing a processor

Prerequisites

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 are shipped with your product.

NOTE: When installing only one processor, the processor must be installed in the processor 0 (for the socket location, see the System board connectors section).

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

1. Follow the safety guidelines listed in the Safety instructions section.
2. Unpack the processor if it has not been used previously.

   NOTE: If the processor has already been used, remove any thermal grease from the top of the processor by using a lint-free cloth.
3. Remove the system board assembly.

Steps

1. Align the processor with the socket keys on the CPU socket.

   CAUTION: Positioning the processor incorrectly can permanently damage the system board or the processor. Be careful not to bend the pins in the CPU socket.
2. With the release lever on the processor socket in the open position, align the processor with the socket keys and set the processor lightly in the socket.

   CAUTION: Do not use force to seat the processor. When the processor is positioned correctly, it engages easily into the socket.
3. Close the processor shield.
4. Rotate the socket release lever down until it snaps into place.
5. Using a clean lint-free cloth, remove the thermal grease from the heat sink.
6. Apply thermal grease evenly to the center of the top of the new processor.

   CAUTION: Using excess thermal grease can cause grease to contact the processor shield, which can cause contamination of the processor socket.
7. Place the heat sink on the processor.
8. Using a Phillips screwdriver, tighten the heat sink retention screws.

Next steps

1. Replace the system board assembly.
2. Reconnect the system to its electrical outlet and turn on the system, including any attached peripheral devices.
3. Press F2 to enter the System Setup program, and check that the processor information matches the new system configuration. See the System setup options at boot section.

Related links

Safety instructions
Removing the system board assembly
Installing the heat sink
Installing the system board assembly
System Setup
C6320 system board connectors

Expansion card assembly and expansion card

The expansion card in computer is a printed circuit board that can be inserted into an expansion slot on the computer system board riser card to add functionality to the computer system through the expansion bus.

NOTE: A missing or an unsupported expansion card riser logs an SEL event. It does not prevent your system from powering on and no BIOS POST message or F1/F2 pause is displayed.

Removing the expansion card

Prerequisites

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 are shipped with your product.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and disconnect the peripherals.
4. Remove the system board assembly.

Steps

1. Remove the screws that secure the expansion card assembly.
2. Lift the expansion card assembly out of the system board assembly.

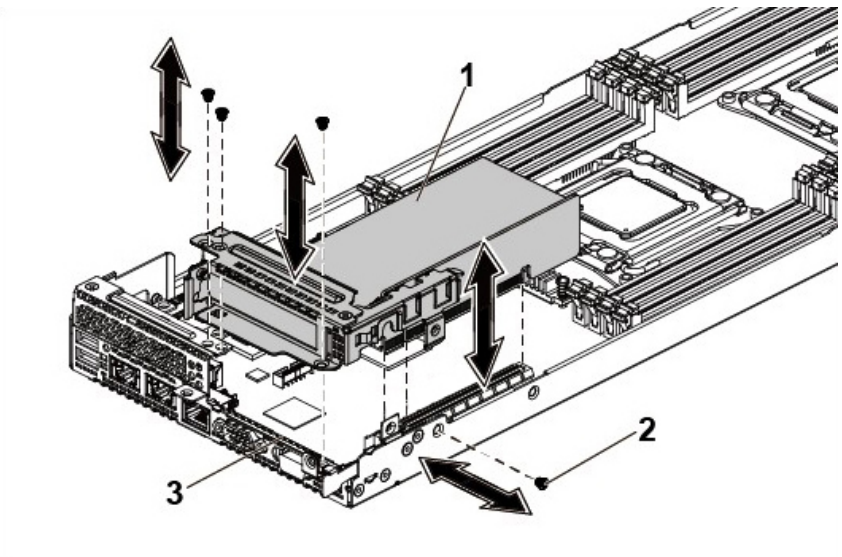

Figure 43. Removing the expansion card assembly

1. expansion card assembly
2. screw (4)
3. system board assembly

3. Remove the screw that secures the expansion card.
4. Hold the expansion card by its edges, and carefully remove it from the riser card.

NOTE: If you are removing the card permanently, install an expansion card slot cover over the empty expansion slot opening, and close the expansion card latch.

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 system.

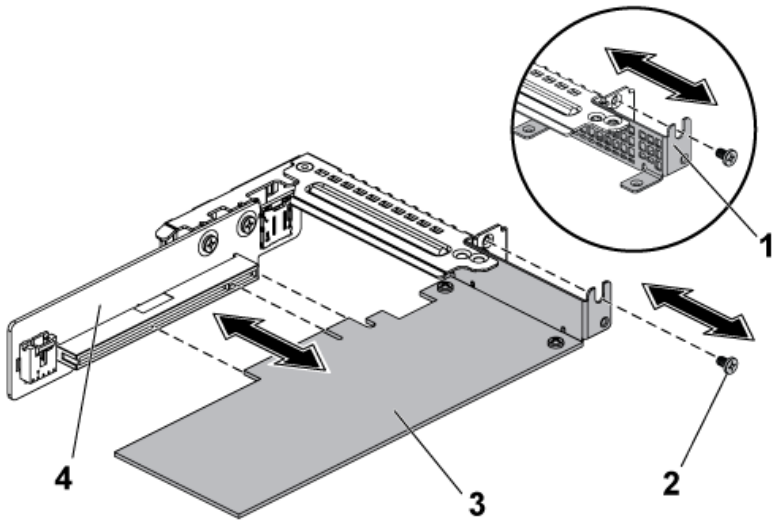

Figure 44. Removing the expansion card

1. expansion card slot cover
2. screw
3. expansion card
4. riser card

Related links

Safety instructions
Removing the system board assembly

Installing the expansion card

Prerequisites

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 are shipped with your 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. Follow the safety guidelines listed in the Safety instructions section.
2. Unpack the expansion card and prepare it for installation. For instructions, see the documentation accompanying the card.

Steps

1. Remove the screws that secure the expansion card assembly.
2. Lift the expansion card assembly away from the system board assembly.
3. Remove the screw that secures the filler bracket.
4. Hold the filler bracket by its edges, and carefully remove it from the riser card.

NOTE: Retain this bracket in case you need to remove the expansion card. Filler brackets must be installed over empty expansion cards slots to maintain 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 system.

5. Holding the card by its edges, position the card so that the card edge connector aligns with the riser card on the riser card.
6. Insert the card edge connector firmly into the riser card until the card is fully seated.
7. Replace the screw that secures the expansion card.
8. Place the expansion card assembly into the system board assembly.
9. Install the screws that secure the expansion card assembly.

Next steps

1. Install the system board assembly.
2. Reconnect the peripherals and connect the system to the electrical outlet.
3. Turn on the system, including any attached peripherals.

Related links

Safety instructions
Removing the system board assembly
Installing the system board assembly

PCI-E slot priority

There is no slot priority for PowerEdge C6320 as the C6320 system board has only one PCI-E Gen 3 x8 mezzanine card slot.

For the system with 1U C6320 system board assembly, only one PCI-E card can be installed in the PCI-E Gen3 x16 slot 1.

PERC cards

Dell PowerEdge C6320 supports H330 and 12 Gbps SAS HBA cards. Dell PowerEdge C6320 also supports H730 with processor under 105 W for thermal restrictions.

Removing the PERC card

Prerequisites

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 are shipped with your product.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.

Steps

1. Locate the PERC card on the system board.
2. To disconnect the storage controller cable:
   a. Remove the screws that secure the cable to the card.
   b. Hold the cable on both sides of the cable connector, and pull the cable away from the PERC card.
3. Angle the card so that the other end of the card disengages from the storage-controller card holder on the system board.

Related links

Safety instructions
Before working inside your system
Installing the PERC card

Installing the PERC card

Prerequisites

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 are shipped with your product.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Locate the PERC card connector on the system board and align one end of the card with the card holder on the system board.

   CAUTION: To prevent damage to the card, you must hold the card by its edges only.
2. Lower the other end of the card into the card holder on the system board.
3. Connect the storage controller cable:
   a. Hold the cable on both sides of the cable connector, and connect to the PERC card.
   b. Attach the crews to secure the cable to the card.
4. Connect the SAS data cable connector to the card.
5. Route the SAS data cable through the clip on the card and through the channel on the inner side of the chassis.
6. Attach the connector labeled "SAS A" to connector SAS A on the backplane, and attach the connector labeled "SAS B" to connector SAS B on the backplane.

Next steps

Follow the procedure listed in the After working inside your system section.

Riser card

Optional riser cards

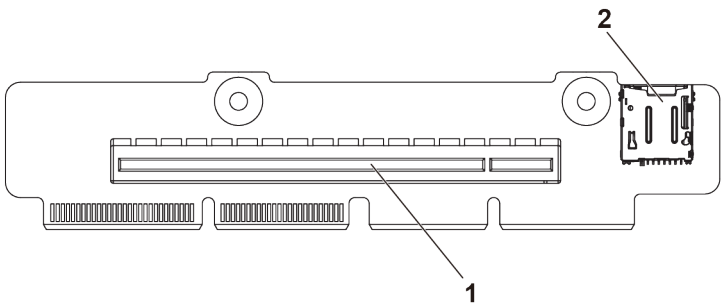

Figure 45. 1U riser card for 1U node

1. PCI-E Gen 3 x16
2. microSD card socket

Removing the riser card

Prerequisites

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 are shipped with your product.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and disconnect the peripherals.
4. Remove the system board assembly.
5. Remove the expansion card.

Steps

1. Remove the screws that secure the riser card to the expansion card bracket.
2. Pull the riser card away from the expansion card bracket.

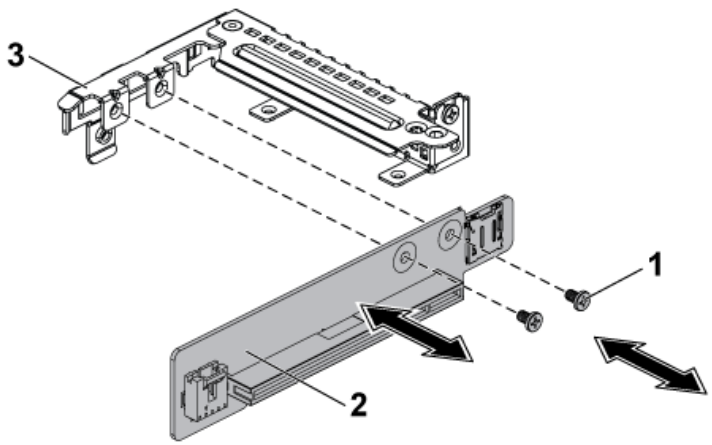

Figure 46. Removing and installing the riser card

1. screw (2)
2. riser card
3. expansion card bracket

Related links

Safety instructions
Removing the system board assembly
Removing the expansion card

Installing the riser card

Prerequisites

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 are shipped with your product.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Place the riser card into the expansion card bracket.
2. Replace the screws that secure the riser card to the expansion card bracket.

Next steps

1. Install the expansion card.
2. Install the system board assembly.

3. Reconnect the peripherals and connect the system to the electrical outlet.
4. Turn on the system, including any attached peripherals.

Related links

Safety instructions
Installing the expansion card
Installing the system board assembly

Optional mezzanine cards

The optional Mezzanine cards supported on C6320 are:

Table 28. Supported mezzanine cards

Type	Card
HBA/RAID	LSI 2008 mezzanine
Dual Port 1GbE	Powerville
Dual Port 10GbE	Twinville
Single port FDR	ConnectX3 VPI
Dual Port QSFP+	ConnectX3 VPI
Dual Port SFP+	ConnectX3-Pro
Dual Port 10GE	Intel 82599 mezzanine
Dual Port QSFP+	ConnectX4 VPI
Single Port QSFP+	ConnectX4 VPI
Dual Port SFP	ConnectX4 LX

Removing the optional LSI 2008 SAS mezzanine card

Prerequisites

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 are shipped with your product.

NOTE: The LSI 2008 SAS mezzanine card is seated in PCI-E Gen3 x8 mezzanine slot 3 on the system board, which is not active in 1-processor configuration. See the C6320 system board connectors section.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and disconnect the peripherals.
4. Remove the system board assembly.

Steps

1. Disconnect all the cables from the mezzanine card.
2. Remove the screws that secure the LSI 2008 SAS mezzanine card.
3. Lift the mezzanine card out of the system-board assembly.

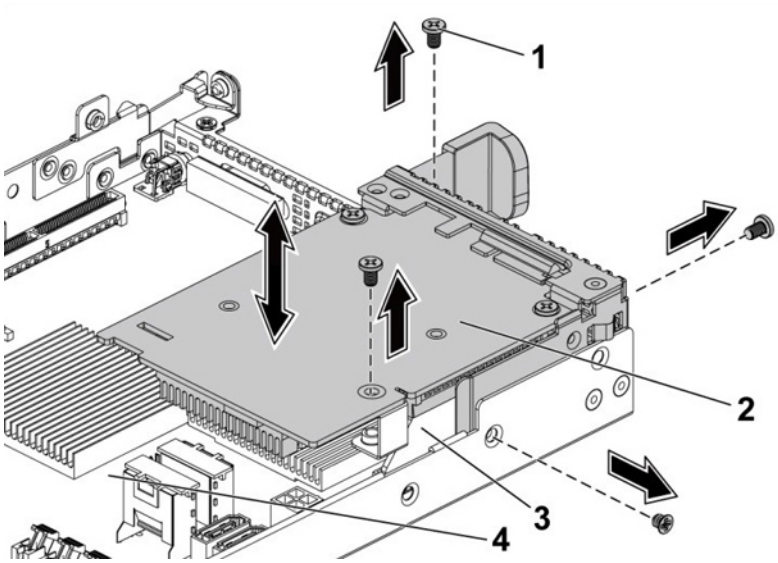

Figure 47. Removing and installing the LSI 2008 SAS mezzanine card

1. screw (3)
2. LSI 2008 SAS mezzanine card
3. card bridge card
4. system board assembly

Related links

Safety instructions

C6320 system board connectors

Installing the optional LSI 2008 SAS mezzanine card

Prerequisites

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 are shipped with your product.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Place the LSI 2008 SAS mezzanine card on the system board assembly.
2. Install the screws that secure the LSI 2008 SAS mezzanine card.
3. Reconnect all the cables to the LSI 2008 SAS mezzanine card.

Next steps

1. Install the system board assembly.
2. Reconnect the peripherals and connect the system to the electrical outlet.
3. Turn on the system, including any attached peripherals.

Related links

Safety instructions

Installing the system board assembly

Cable routing for LSI 2008 SAS mezzanine card

1. Connect the mini-SAS/SGPIO cable to the LSI 2008 SAS Mezzanine card, and connect the other end of the cable to the corresponding connectors on the system board.
2. Connect the mini-SAS cable to the LSI 2008 SAS Mezzanine card, and connect the other end of the cable to the corresponding connector on the system board.

NOTE: The SGPIO cable must be connected before the LSI 2008 SAS Mezzanine card is installed.

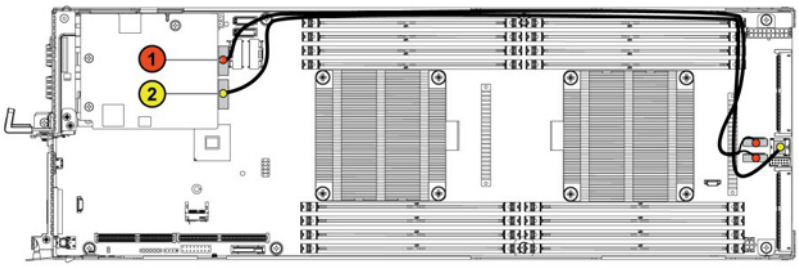

Figure 48. Cable routing for LSI 2008 SAS mezzanine card

Table 29. Cable routing for LSI 2008 SAS mezzanine card

Item	Cable	From (LSI 2008 SAS mezzanine card)	To (system board)
1	Mini-SAS/SGPIO cable	Mini-SAS connector 4-7 (J4)	SAS/SATA input connector 4 and SAS/SATA input connector 5
2	Mini-SAS cable	Mini-SAS connector 0-3 (J3)	Mini SAS HD connector 0-3

3. Press down on the cables, and ensure the cables are routed lower than the height of the CPU heat sinks.

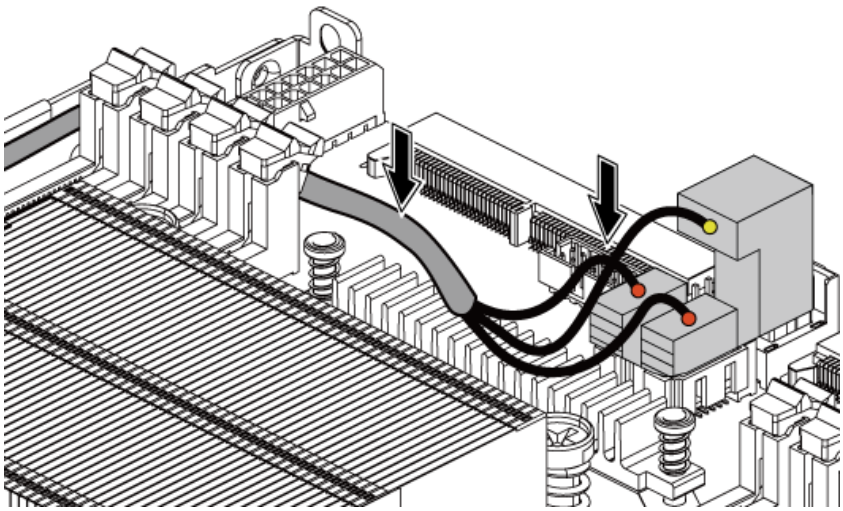

Figure 49. Cable routing down for LSI 2008 SAS mezzanine card (1U node)

Removing the 1GbE mezzanine card

Prerequisites

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 are shipped with your product.

NOTE: The 1GbE mezzanine card is seated in PCI-E Gen3 x8 mezzanine slot 3 on the system board, which is not active in a one processor configuration. See the C6320 system board connectors section.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and disconnect the peripherals.
4. Remove the system board assembly.
5. Disconnect all the cables from the 1GbE mezzanine card.

Steps

1. Remove the screws that secure the expansion card bracket.

2. Lift the expansion card bracket out of the system board assembly.

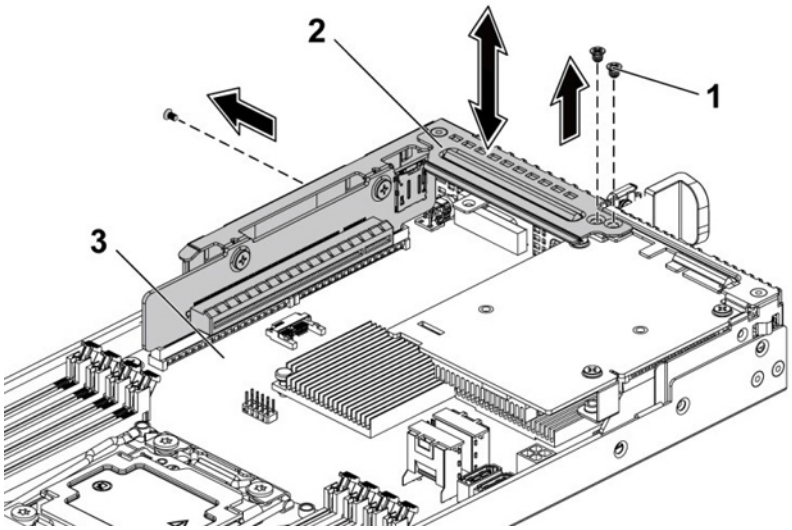

Figure 50. Removing and installing the expansion card bracket

1. screw (3)
2. expansion card bracket
3. system board assembly

3. Remove the screws that secure the 1GbE mezzanine card assembly.

4. Lift the 1GbE mezzanine card assembly away from the card bridge board on the system board.

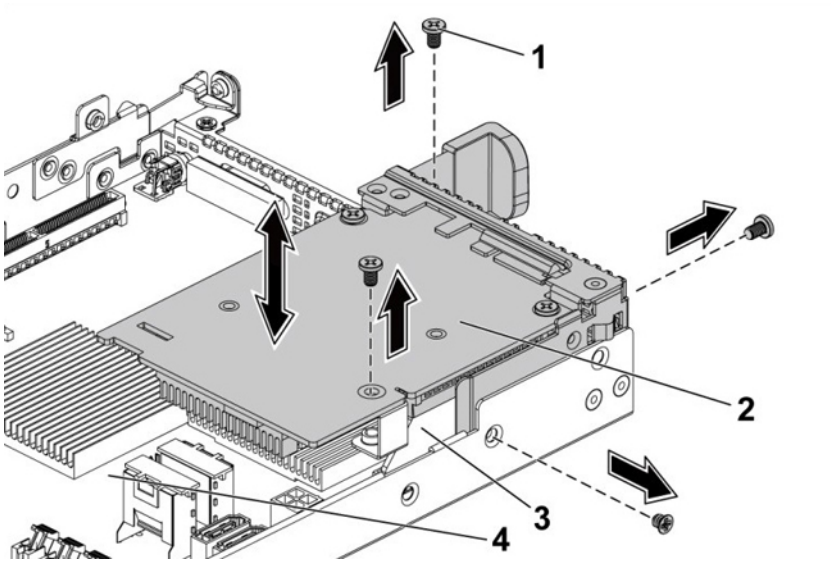

Figure 51. Removing and installing the 1GbE mezzanine card assembly

1. screw (4)
2. 1GbE mezzanine card assembly
3. mezzanine card bridge board
4. system board assembly

5. Remove the screws that secure the 1GbE mezzanine card to the bracket.
6. Remove the 1GbE mezzanine card from the bracket.

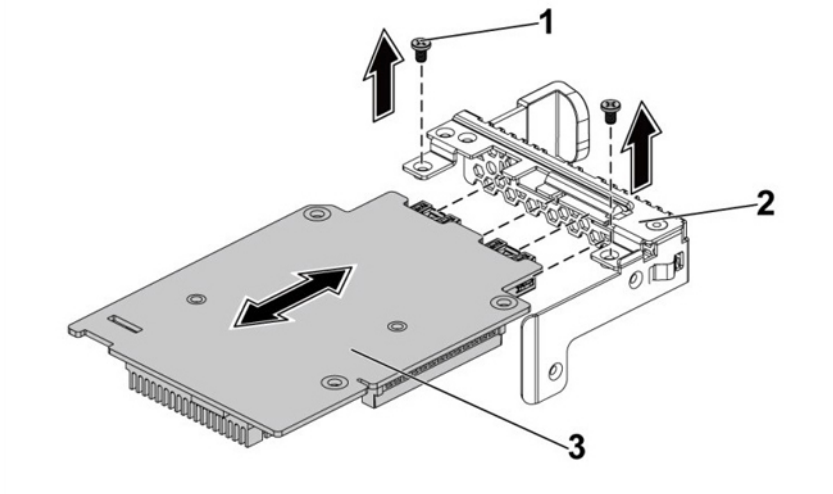

Figure 52. Removing and installing the 1GbE mezzanine card

1. screw (2)
2. mezzanine card bracket
3. 1GbE mezzanine card

Related links

Safety instructions
C6320 system board connectors
Removing the system board assembly

Installing the 1GbE mezzanine card

Prerequisites

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 are shipped with your product.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Attach the 1GbE mezzanine card to the bracket by aligning the four ports to the corresponding port slots on the bracket.
2. Install the screws to secure the 1GbE mezzanine card to the bracket.
3. Install the 1GbE mezzanine card assembly to the card bridge board on the system board assembly.
4. Install the screws to secure the 1GbE mezzanine card assembly to the system board assembly.
5. Place the expansion card bracket into the system board assembly.
6. Replace the screws that secure the expansion card bracket.

NOTE: For more information about setting VLAN in VMware for 1GbE mezzanine card, see VMware* vSphere ESX 5.x iSCSI Boot Support with VLANs.

Next steps

1. Reconnect all the cables to the 1GbE mezzanine card.
2. Replace the system board assembly.
3. Reconnect the peripherals and connect the system to the electrical outlet.
4. Turn on the system, including any attached peripherals.

Related links

Safety instructions
Installing the system board assembly

Removing the 10GbE mezzanine card

Prerequisites

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 are shipped with your product.

NOTE: The 10GbE mezzanine card is seated in PCI-E Gen3 x8 mezzanine slot 3 on the system board, which is not active in 1-processor configuration. See the C6320 system board connectors section.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and disconnect the peripherals.
4. Remove the system board assembly.

Steps

1. Disconnect all the cables from the 10GbE mezzanine card.
2. Remove the screws that secure the expansion card bracket.
3. Lift the expansion card bracket out of the system board assembly.

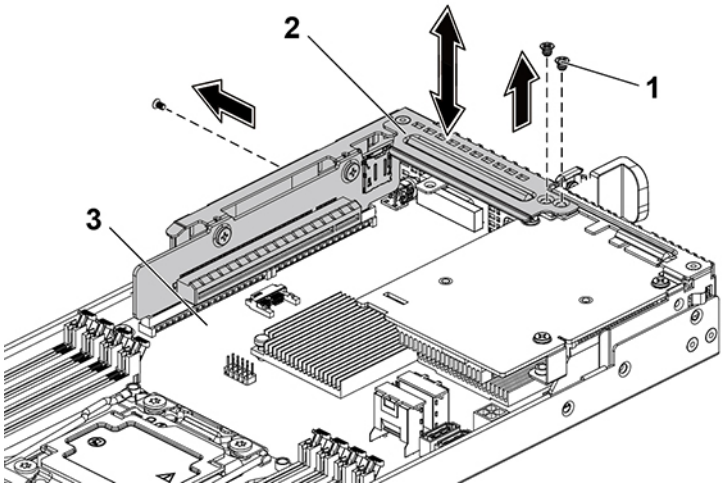

Figure 53. Removing and installing the expansion card bracket

1. screw (3)
2. expansion card bracket
3. system board assembly

4. Remove the screws that secure the 10GbE mezzanine card assembly.
5. Lift the 10GbE mezzanine card assembly away from the card bridge board on the system board.

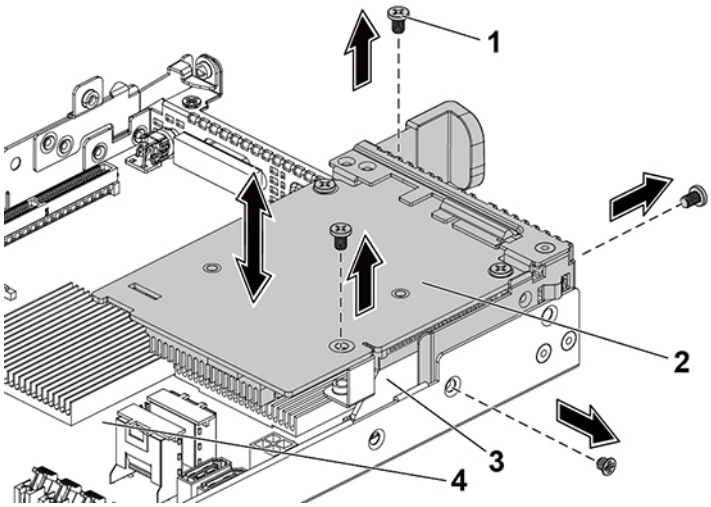

Figure 54. Removing and installing the 10GbE mezzanine card assembly

1. screw (4)
2. 10GbE mezzanine card assembly
3. mezzanine card bridge board
4. system board assembly

6. Remove the screws that secure the 10GbE mezzanine card to the bracket.
7. Remove the 10GbE mezzanine card from the bracket.

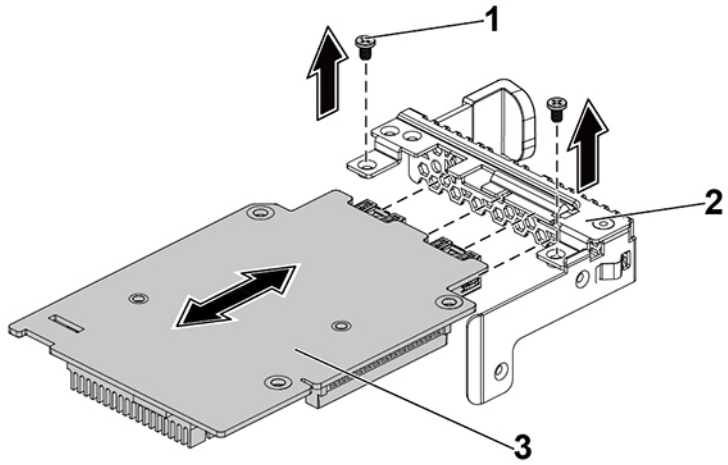

Figure 55. Removing and installing the 10GbE mezzanine card

1. screw (2)
2. mezzanine card bracket
3. 10GbE mezzanine card

Related links

Safety instructions
C6320 system board connectors
Removing the system board assembly

Installing the 10GbE mezzanine card

Prerequisites

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 are shipped with your product.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Attach the 10 GbE mezzanine card to the bracket by aligning the four ports to the corresponding port slots on the bracket.
2. Install the screws to secure the 10GbE mezzanine card to the bracket.
3. Install the 10 GbE mezzanine card assembly to the card bridge board on the system-board assembly.
4. Install the screws to secure the 10 GbE mezzanine card assembly to the syste -board assembly.
5. Place the expansion-card bracket into the system board assembly.
6. Install the screws that secure the expansion card bracket.

NOTE: For more information about setting VLAN in VMware for 10 GbE mezzanine card, see VMware* vSphere ESX 5.x iSCSI Boot Support with VLANs.

Next steps

1. Reconnect all the cables to the 10 GbE mezzanine card.
2. Install the system board assembly.
3. Reconnect the peripherals and connect the system to the electrical outlet.
4. Turn on the system, including any attached peripherals.

Related links

Safety instructions

Installing the system board assembly

Mezzanine card bridge board

Removing the mezzanine card bridge board

Prerequisites

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 are shipped with your product.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and disconnect the peripherals.
4. Remove the system board assembly.
5. Remove the mezzanine card.

Steps

Pull the mezzanine card bridge board away from the mezzanine slot on the system board.

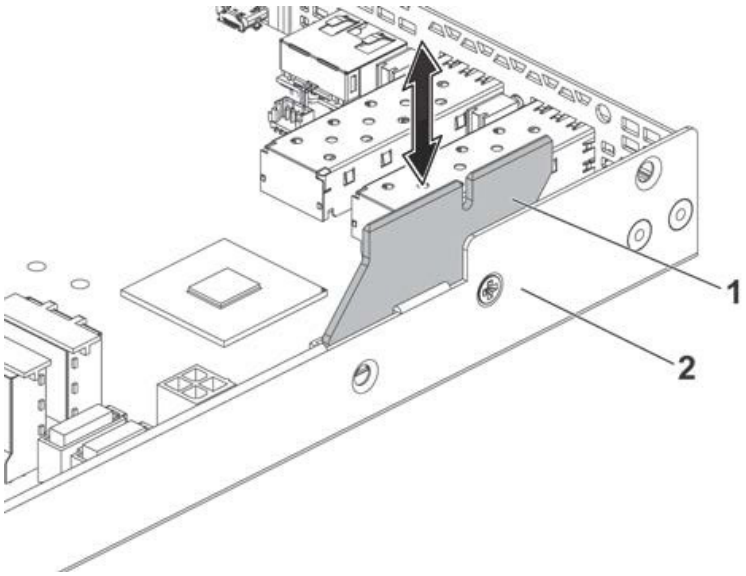

Figure 56. Removing and installing the mezzanine card bridge board

1. system board assembly
2. mezzanine card bridge board

Related links

Safety instructions

Removing the system board assembly

Removing the optional LSI 2008 SAS mezzanine card

Removing the 1GbE mezzanine card

Removing the 10GbE mezzanine card

Installing the mezzanine card bridge board

Prerequisites

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 are shipped with your product.

Follow the safety guidelines listed in the Safety instructions section.

Steps

Install the mezzanine card bridge board into the mezzanine slot on the system board.

Next steps

1. Install the mezzanine card.
2. Install the system board assembly.
3. Reconnect the peripherals and connect the system to the electrical outlet.
4. Turn on the system, including any attached peripherals.

Related links

Safety instructions
Installing the optional LSI 2008 SAS mezzanine card
Installing the 1GbE mezzanine card
Installing the 10GbE mezzanine card
Installing a system board
Installing the system board assembly

System memory

System memory holds the instructions that the processor executes. Each system board has sixteen DDR4 memory module sockets for the installation of up to sixteen registered DDR4-2400 MHz (2400 MHz at 2 memory modules per channel) memory modules to support processor 1 and processor 2. For the location of the memory modules, see the C6320 system board connectors section.

Related links

C6320 system board connectors

Memory slot features

- Support 8 channels, 16 DDR4 registered DIMMs (RDIMMs)
- Speed up to 2400 MT/s
- Maximum capacities: 512 GB with 32 GB RDIMM
- Supports DDR4
- Supports Error Correction Code (ECC)

NOTE: Linux operating system does not support the S4 (hibernation) mode.

Supported memory module configuration

For the sequence of the 16 memory-module sockets, the system requires at least one memory module installed on processor 1's DIMM slot 1 in order to boot up. When you insert the memory modules, always start with CHA_A1. The optimized memory module installation sequence is 1, 2, 3, 4, 5, 6, 7, and 8.

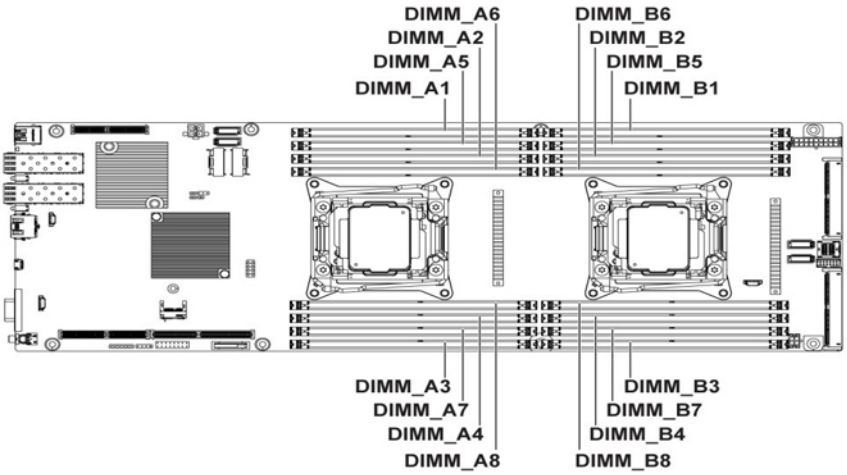

Figure 57. DIMM slot locations

Table 30. Memory module configurations for single processor

	Processor 1							
Memory modules	CHA		CHB		CHC		CHD	
	A1	A5	A2	A6	A3	A7	A4	A8
1	√	–	–	–	–	–	–	–
2	√	–	√	–	–	–	–	–
3	√	–	√	–	√	–	–	–
4	√	–	√	–	√	–	√	–
6	√	√	√	√	√	–	√	–
8	√	√	√	√	√	√	√	√

Table 31. Memory module configurations for dual processors

	Processor 1							
Memory modules	CHA		CHB		CHC		CHD	
	A1	A5	A2	A6	A3	A7	A4	A8
2	√	–	–	–	–	–	–	–
6	√	–	√	–	√	–	–	–
8	√	–	√	–	√	–	√	–
12	√	√	√	√	√	–	√	–
16	√	√	√	√	√	√	√	√

Table 32. Memory module configurations for dual processors

	Processor 2							
Memory modules	CHA		CHB		CHC		CHD	
	B1	B5	B2	B6	B3	B7	B4	B8
2	√	–	–	–	–	–	–	–
6	√	–	√	–	√	–	–	–
8	√	–	√	–	√	–	√	–
12	√	√	√	√	√	–	√	–
16	√	√	√	√	√	√	√	√

Removing the memory modules

Prerequisites

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.

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 are shipped with your product.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and disconnect the peripherals.
4. Remove the system board assembly.
5. Remove the cooling shroud.

Steps

1. Locate the memory module sockets.

CAUTION: Handle each memory module only on either card edge, ensuring 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.

2. Simultaneously press down and out on the ejectors at both ends of the memory module socket until the memory module is released from the socket.

3. Lift the memory module out of the socket by holding the memory module only by its edges.

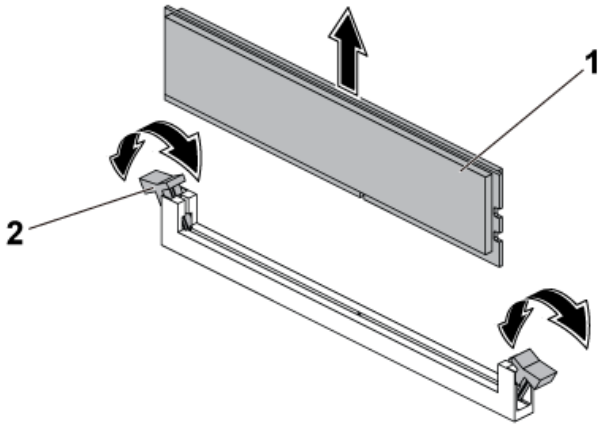

Figure 58. Removing a memory module

1. memory module
2. memory module socket ejector (2)

Related links

Safety instructions
Removing the system board assembly
Removing the cooling shroud

Installing the memory modules

Prerequisites

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.

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 are shipped with your product.

Follow the safety guidelines listed in the Safety instructions section.

Steps

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

   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.
4. Complete the latching of the module into the socket by applying inward pressure to the socket ejectors to ensure 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.

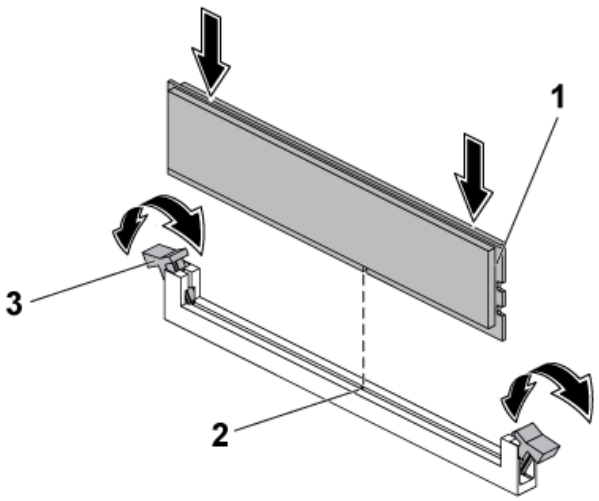

Figure 59. Installing a memory module

1. memory module
2. alignment key
3. memory module socket ejector (2)

Next steps

1. Install the cooling shroud.
2. Install the system board assembly.
3. Press F2 to enter **System Setup**, and check the **System Memory** setting.
4. If the value is incorrect, one or more of the memory modules may not be installed properly. Ensure that the memory modules are firmly seated in the sockets.
5. Run the system memory test in the system diagnostics.

Related links

Safety instructions
Installing the cooling shroud
Installing the system board assembly

System battery

The system battery is used for low-level system functions like powering the real-time clock and storing the computer's BIOS settings.

Replacing the system battery

Prerequisites

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 by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and peripherals.

4. Remove the system board assembly.
5. Remove the cooling shroud.
6. Remove the expansion card assembly.

Steps

1. Push the battery latch and lift the battery out of the connector.

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

2. Hold the new battery with the "+" facing the positive side of battery connector.
3. Insert the battery into the battery holder until it is seated in place.

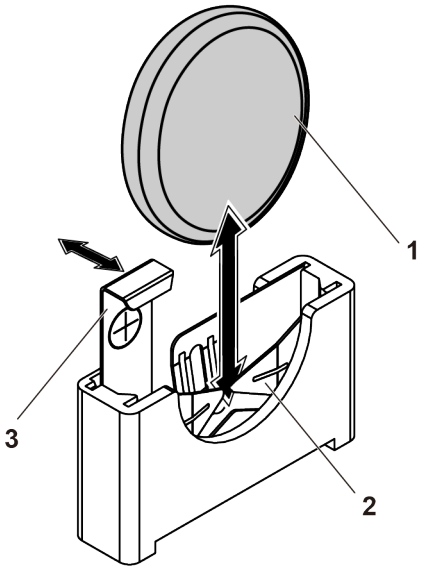

Figure 60. Replacing the system battery

1. system battery
2. negative side of battery connector
3. battery latch

Next steps

1. Replace the system board assembly.
2. Reconnect the system to the electrical outlet.
3. Turn on the system, including any attached peripherals.
4. Enter **System Setup** to confirm that the battery is operating properly. See the System setup section.
5. In **System Setup**, enter correct time and date in the **Time** and **Date** fields.
6. Exit **System Setup**.

Related links

Safety instructions
Removing the system board assembly
Removing the cooling shroud
Removing the expansion card
Installing the system board assembly
System Setup

System board

Removing a system board

Prerequisites

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 are shipped with your product.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off the system, including any attached peripherals.
3. Disconnect the system from the electrical outlet and disconnect the peripherals.
4. Remove the system board assembly.
5. Remove the cooling shroud.
6. Remove the expansion card assembly.
7. Remove the heat sinks.
8. Remove the memory modules.
9. If installed, remove the SAS mezzanine card, 1 GbE mezzanine card, or 10 GbE mezzanine card.
10. Disconnect all the cables from the system board.

Steps

1. Remove the screws that secure the system board to the system board assembly and then slide the system board.

CAUTION: Do not lift the system board by holding a memory module, processor, or other components.

2. Hold the system board by the edges and lift the system board away from the system board assembly.

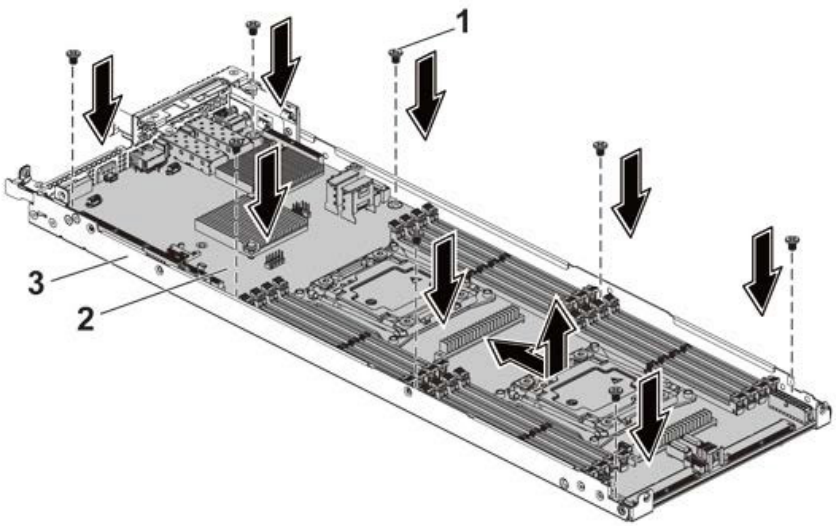

Figure 61. Removing and installing the system board

1. screw (8)
2. system board
3. system board assembly

Related links

Safety instructions
Removing the system board assembly
Removing the cooling shroud
Removing the expansion card
Removing the heat sink
Removing the memory modules
Removing the optional LSI 2008 SAS mezzanine card
Removing the 1GbE mezzanine card
Removing the 10GbE mezzanine card

Installing a system board

Prerequisites

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 are shipped with your product.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Holding the system board by the edges, slide the system board into the system board assembly.
2. Install the screws to secure the system board to the system board assembly.

Next steps

1. Install the Trusted Platform Module (TPM). For information how to install the TPM, see the Installing the Trusted Platform Module section. For more information on the TPM, see the Trusted Platform Module section.

   NOTE: The TPM plug-in module is attached to the system board and cannot be removed. A replacement TPM plug-in module will be provided for all system board replacements where a TPM plug-in module was installed.
2. Transfer the processors to the new system board.
3. Remove the memory modules and transfer them to the same locations on the new board.
4. Replace the heat sinks.
5. Install the expansion card assembly.
6. If applicable, install the SAS mezzanine card, 1 GbE mezzanine card, or 10 GbE mezzanine card.
7. Connect all the cables to the system board.
8. Install the cooling shroud.
9. Follow the procedure listed in the After working inside your system section.
10. Import your new or existing iDRAC Enterprise license. For more information, see Integrated Dell Remote Access Controller User's Guide, at **Dell.com/esmmanuals**.
11. Ensure that you:
    a. Use the Easy Restore feature to restore the Service Tag. For more information, see the Easy restore section.
    b. If the Service Tag is not backed up in the backup flash device, enter the system Service Tag manually. For more information, see the Entering the system Service Tag section.
    c. Update the BIOS and iDRAC versions.
    d. Re-enable the Trusted Platform Module (TPM). For more information, see the Re-enabling the Trusted Platform Module (TPM) section.

Related links

Safety instructions
Removing a processor
Installing a processor
Removing the memory modules
Installing the memory modules
Installing the heat sink
Installing the expansion card
Installing the optional LSI 2008 SAS mezzanine card
Installing the 1GbE mezzanine card
Installing the 10GbE mezzanine card
Installing the cooling shroud
Installing the system board assembly

Entering the system Service Tag by using System Setup

1. Turn on the system.
2. Press F2 to enter System Setup.
3. Click **Service Tag Settings**.
4. Enter the Service Tag.

   NOTE: You can enter the Service Tag only when the Service Tag field is empty. Ensure that you enter the correct Service Tag. After the Service Tag is entered, it cannot be updated or changed.
5. Click **Ok**.

Restoring the Service Tag by using the Easy Restore feature

The Easy Restore feature enables you to restore your system's Service Tag, license, UEFI configuration, and the system configuration data after replacing the system board. All data is automatically backed up in a backup flash device. If BIOS detects a new system board and the Service Tag in the backup flash device, BIOS prompts the user to restore the backup information.

1. Turn on the system.

   If BIOS detects a new system board, and if the Service Tag is present in the backup flash device, BIOS displays the Service Tag, the status of the license, and the **UEFI Diagnostics** version.
2. Perform one of the following steps:

   After the restore process is complete, BIOS prompts to restore the system configuration data.
3. Perform one of the following steps:
   - Press **Y** to restore the system configuration data.
   - Press **N** to use the default configuration settings.

   After the restore process is complete, the system restarts.

Cable routing for onboard SATA cables (1U node)

1. Connect the onboard SATA cables to the system board, and connect the other end of the cable to the corresponding connectors on the system board.

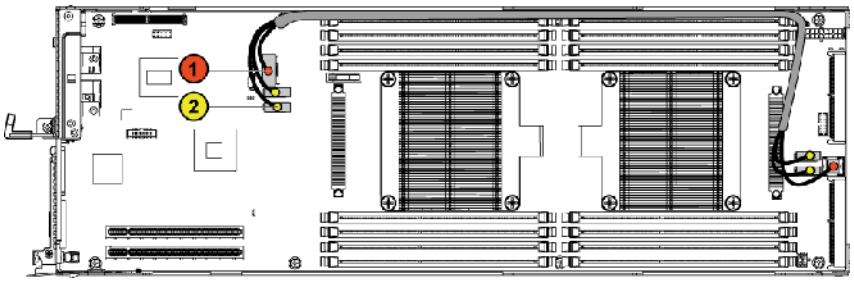

Figure 62. Cable routing for onboard SATA cables (1U node)

Table 33. Cable routing for onboard SATA cables (1U node)

Item	Cable	From (system board)	To (system board)
1	Onboard SATA cable	Onboard SATA output connector 0	SAS/SATA input connector 0
2	Onboard SATA cable	Onboard SATA connectors 4&5	SAS/SATA input connectors 4&5

2. Press down on the cables, and ensure the cables are routed lower than the height of the processor heat sinks.

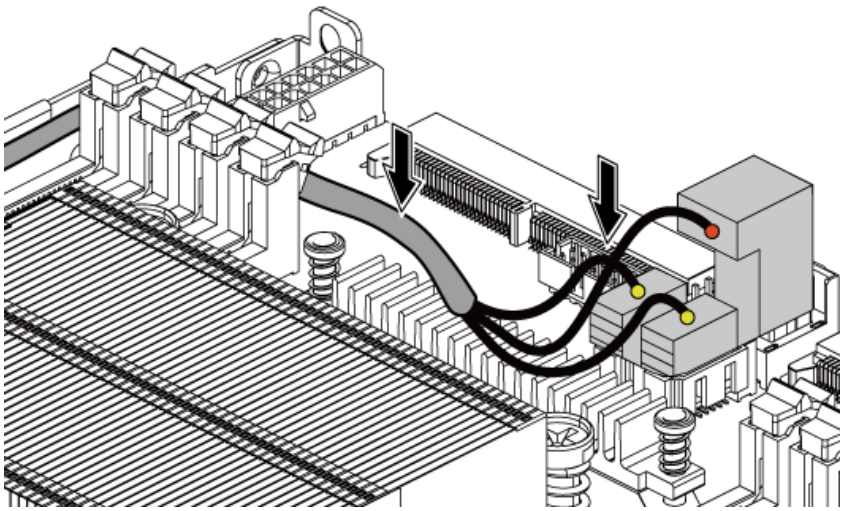

Figure 63. Cable routing down for onboard SATA cables (1U node)

Trusted Platform Module

Trusted Platform Module (TPM) is a dedicated microprocessor designed to secure hardware by integrating cryptographic keys into devices. A software can use a Trusted Platform Module to authenticate hardware devices. As each TPM chip has a unique and secret RSA key burned in as it is produced, it can perform the platform authentication.

CAUTION: Do not attempt to remove the Trusted Platform Module (TPM) from the system board. After the TPM is installed, it is cryptographically bound to that specific system board. Any attempt to remove an installed TPM breaks the cryptographic binding, and it cannot be re-installed or installed on another system board.

NOTE: This is a Field Replaceable Unit (FRU). Removal and installation procedures must be performed only by Dell certified service technicians.

Installing the Trusted Platform Module

Prerequisites

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 are shipped with your product.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.

Steps

1. Locate the TPM connector on the system board.

   NOTE: To locate the TPM connector on the system board, see the System board connectors section.

2. Align the edge connectors on the TPM with the slot on the TPM connector.
3. Insert the TPM into the TPM connector such that the plastic rivet aligns with the slot on the system board.
4. Press the plastic rivet until the rivet snaps into place.

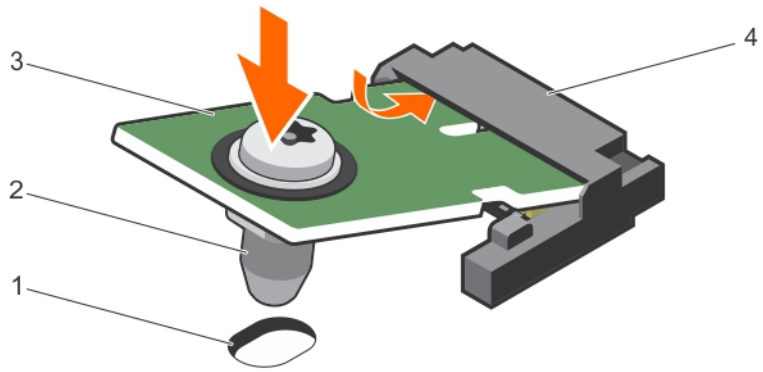

Figure 64. Installing the TPM

1. rivet slot on the system board
2. plastic rivet
3. TPM
4. TPM connector

Next steps

1. Install the system board.
2. Follow the procedure listed in the After working inside your system section.

Initializing the TPM for BitLocker users

Initialize the TPM.

For more information about initializing the TPM, see http://technet.microsoft.com/en-us/library/cc753140.aspx.

The **TPM Status** changes to **Enabled, Activated**.

Initializing the TPM for TXT users

1. While booting your system, press F2 to enter System Setup.
2. On the **System Setup Main Menu** screen, click **System BIOS** → **System Security Settings**.
3. From the **TPM Security** option, select **On with Pre-boot Measurements**.
4. From the **TPM Command** option, select **Activate**.

5. Save the settings.
6. Restart your system.
7. Enter **System Setup** again.
8. On the **System Setup Main Menu** screen, click **System BIOS** → **System Security Settings**.
9. From the **Intel TXT** option, select **On**.

Power distribution boards

The power distribution board is a board that connects the redundant power supplies to the system board. The power distribution board (PDB) is only supported in systems with redundant power supplies. This system has two power distribution boards (PDB). The procedure to remove and install both the power PDBs is similar. To access the PDB 2 at the bottom, remove the PDB 1 at the top.

Removing the power distribution board 1

Prerequisites

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 are shipped with your product.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the power supply units.

Steps

1. Disconnect all the cables from the power distribution board 1 (PDB 1).

   Observe the routing of the cable on the chassis as you remove them from the system. You must route these cables properly when you replace them to prevent the cables from being pinched or crimped.
2. Remove the screw that secures the power cable cover to the PDB 1.
3. Lift it up straight from the locking hole on the PDB 1. Then, lift it completely out of the PDB 1.

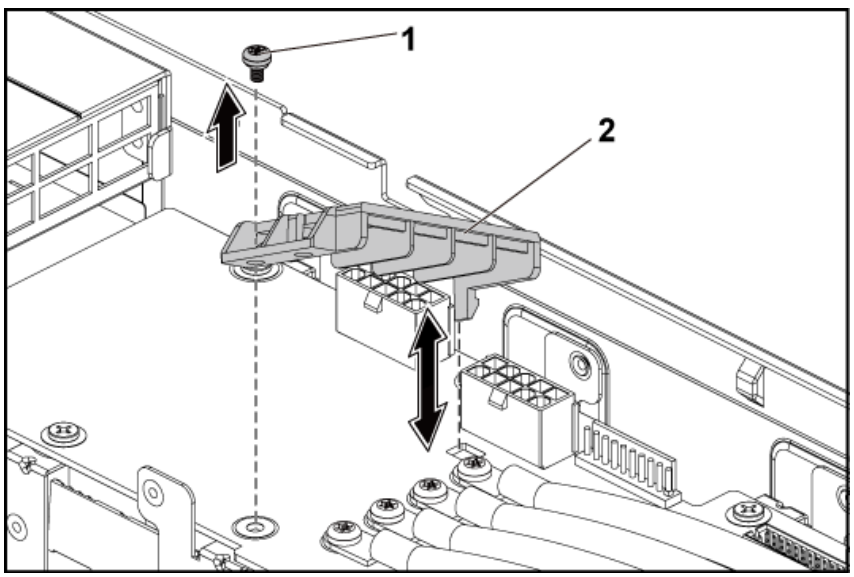

Figure 65. Removing and installing the power cable cover

1. screw
2. power cable cover

4. Remove the screws that secure the power cables to the PDB 1.

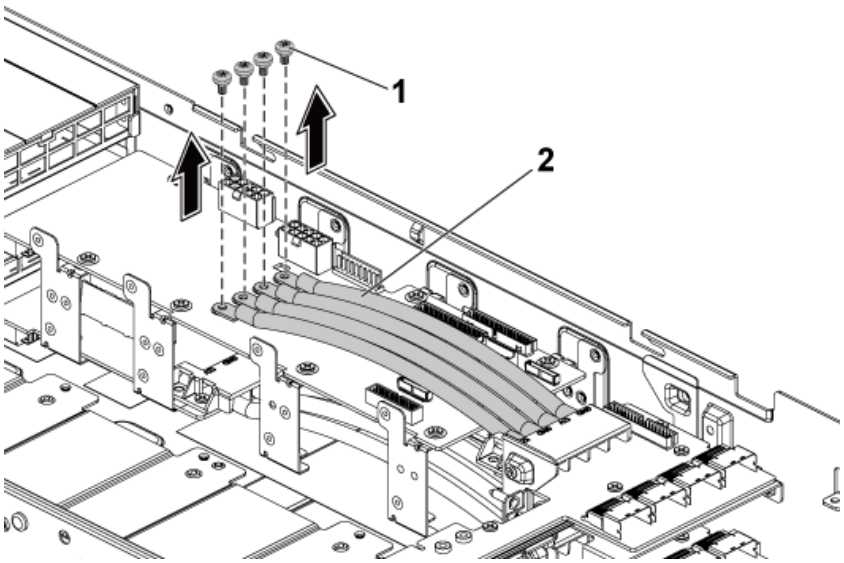

Figure 66. Removing and installing the power cables

1. screw (4)
2. power cables (4)

5. Remove the screws that secure the PDB 1 to the system.
6. Lift the PDB 1 away from the system.

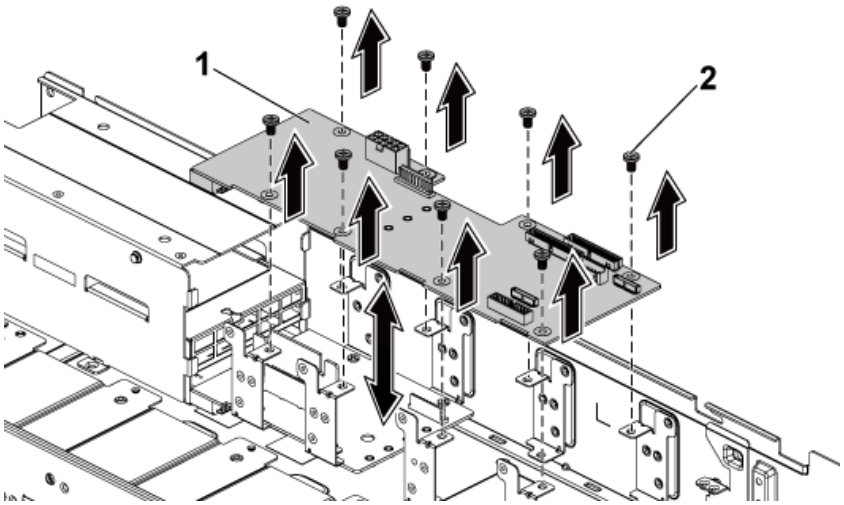

Figure 67. Removing and installing the PDB 1

1. PDB 1
2. screw (8)

7. Lift the PDB connector from the system.
8. Disconnect all the cables from the PDB 2.
9. Remove the power cable cover from the PDB 2.
10. Remove the four power cables from the PDB 2.
11. Remove the screws that secure the PDB 2 to the system.
12. Lift the PDB 2 out of the system.

Related links

Safety instructions
Before working inside your system
Removing the system cover
Installing the power distribution board 1

Removing the power distribution board 2

Prerequisites

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 are shipped with your product.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the power supply units.
4. Remove the power distribution board 1 (PDB 1)

Steps

1. Lift the PDB connector from the system.

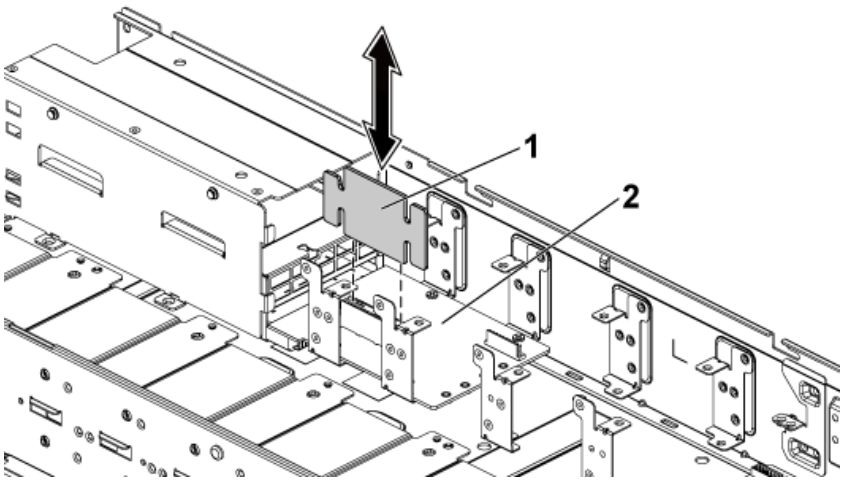

Figure 68. Removing and installing the PDB connector

1. PDB connector
2. PDB 2

2. Disconnect all the cables from the PDB 2.
3. Remove the screw that secures the power cable cover to the PDB.
4. Remove the power cable cover from the PDB 2.
5. Remove the screws that secure the power cables to the PDB 2
6. Remove the screws that secure the PDB 2 to the system.
7. Lift the PDB 2 out of the system.

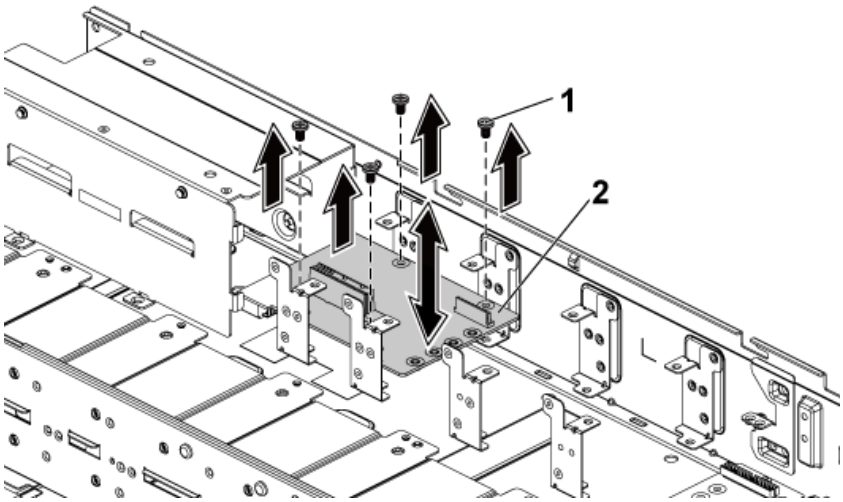

Figure 69. Removing and installing a PDB 2

1. screw (4)
2. PDB 2

Related links

[Safety instructions]
[Before working inside your system]
[Removing the system cover]
[Removing the power distribution board 2]

Installing the power distribution board 2

Prerequisites

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 are shipped with your product.

CAUTION: If removed, you must replace the power distribution board 2 (PDB 2) and the power distribution board-connector before replacing the power distribution board 1 (PDB 1).

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Align the screw holes on the PDB 2 with the holes on the chassis.

   NOTE: To install the PDB 2, angle the board during installation.

2. Install the screws that secure the PDB 2 to the system.
3. Install the power distribution board connector.
4. Connect the power cables to the PDB 2 by using screws.
5. Connect all the other cables to the PDB 2.

   You must route these cables properly through the tabs on the chassis to prevent them from being pinched or crimped.

Next steps

Install the PDB 1

Related links

Safety instructions
Installing the power distribution board 1
After working inside your system

Installing the power distribution board 1

Prerequisites

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 are shipped with your product.

CAUTION: If removed, you must replace the power distribution board 2 (PDB 2) and the power distribution board-connector before replacing the power distribution board 1 (PDB 1).

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Lower the PDB 1 such that the slot at the bottom of the PDB 1 inserts into the PDB connector on the PDB 2.
   When the slot at the bottom of the PDB 1 inserts into the PDB connector on the PDB 2, the screw holes align with the holes on the chassis.
2. Install the screws that secure the PDB 1 to the system.
3. Secure the power cables to the PDB 1 by using the screws.
4. Connect all the cables to the PDB 1.
   You must route these cables properly through the tabs on the chassis to prevent them from being pinched or crimped.

Next steps

1. Install the power supply units.
2. Follow the procedure listed in the After working inside your system section.

Related links

Safety instructions
Installing the system cover
After working inside your system

Cable routing for the power distribution boards

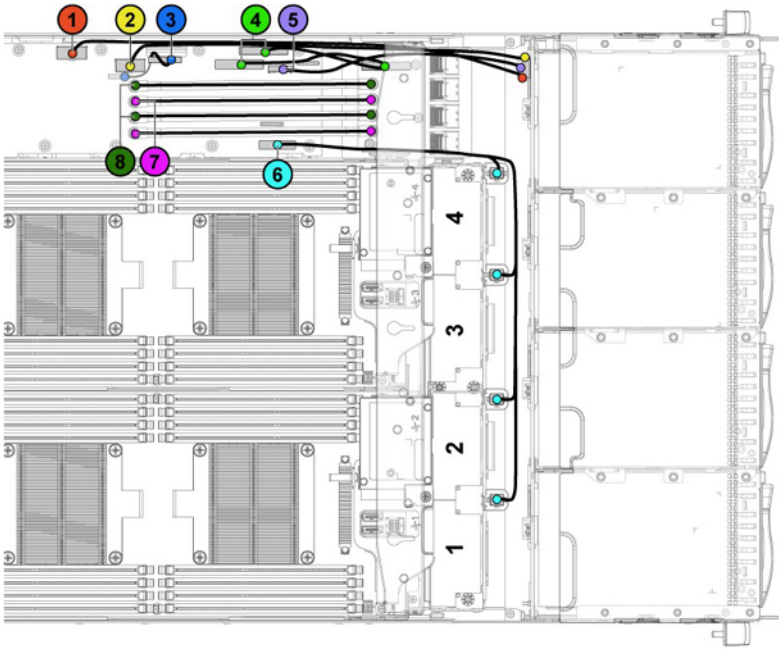

Figure 70. Cable routing–power distribution board 1 (top view)

Table 34. Cable routing–power distribution board 1 (top view)

Item	Cable	From (power distribution boards)	To
1	Hard-drive backplane power cable	Hard-drive backplane power connector (J84)	Backplane
2	Hard-drive backplane power cable	Hard-drive backplane power connector (J29)	Backplane
3	Power distribution board cable	Control connector (J31)	Power distribution board 2
4	I2C cables	System board control connectors (J5&J6)	Midplanes
5	Backplane control cable	Hard-drive backplane control connector (J17)	Backplane
6	System fan cable	System fan connector (J9)	Cooling fans
7	12 V power cables	Power distribution board 1/2	Midplanes
8	Ground power cables	Power distribution board 1/2	Midplanes

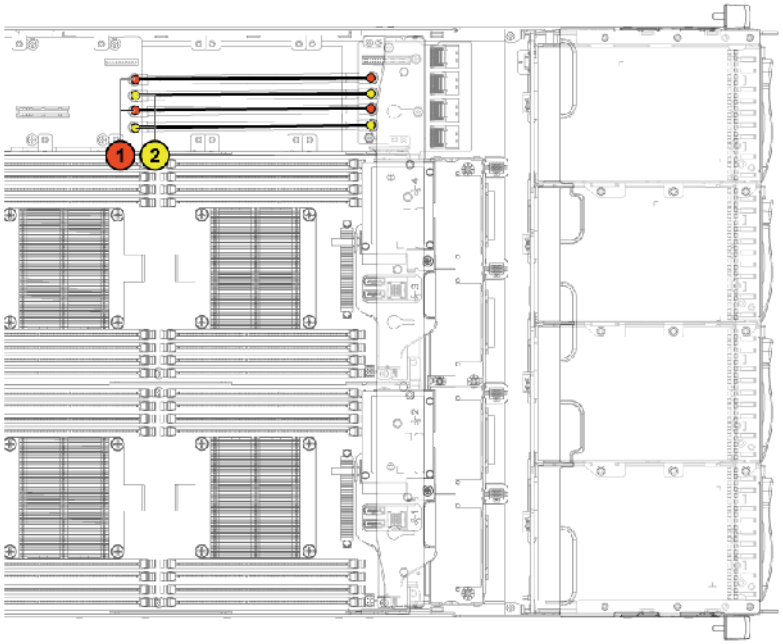

Figure 71. Cable routing–power distribution board 2 (bottom)

Table 35. Cable routing–power distribution board 2 (bottom)

Item	Cable	From (power distribution board 2)	To
1	Ground power cables	Power distribution board 1/2	Midplanes
2	12V power cables	Power distribution board 1/2	Midplanes

Midplanes

In a 3.5 inch hard drive configuration, two midplanes connect the system board to the 3.5 inch hard drive backplane. In a 2.5 inch hard drive configuration, two midplanes connect the system boards the 2.5-inch hard drive backplane for expander configuration.

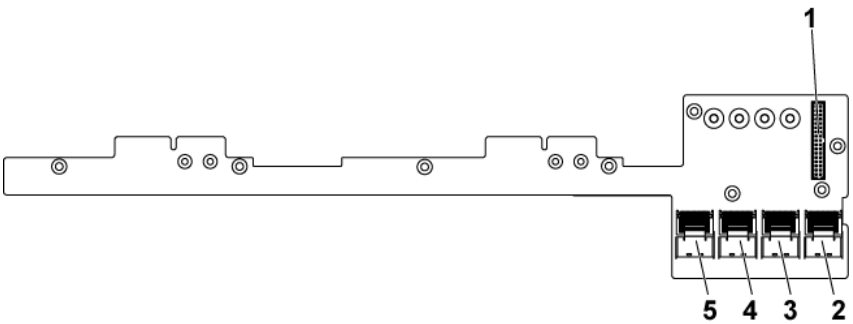

Figure 72. Midplane connectors

1. 2x17pin control connector for power distribution board 1
2. mini-SAS connector for system board 3 and 4 (hard drive 5 and 6)
3. mini-SAS connector for system board 3 and 4 (hard drive 1, 2, 3 and 4)
4. mini-SAS connector for system board 1 and 2 (hard drive 5 and 6)
5. mini-SAS connector for system board 1 and 2 (hard drive 1, 2, 3 and 4)

Removing the midplane

Prerequisites

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 are shipped with your product.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the system boards.
4. Remove the cooling fan cage.

Steps

1. Remove the screws that secure the middle wall bracket to the chassis.
2. Lift the middle wall bracket out of chassis.
3. Disconnect all the cables from the upper midplane.

   Observe the routing of the cable on the chassis as you remove them from the system. You must route these cables properly when you replace them to prevent the cables from being pinched or crimped.
4. Remove the screw that secures the power cable cover to the upper midplane.
5. Lift it up straight from the locking hole on the upper midplane. Then, lift it completely out of the upper midplane.

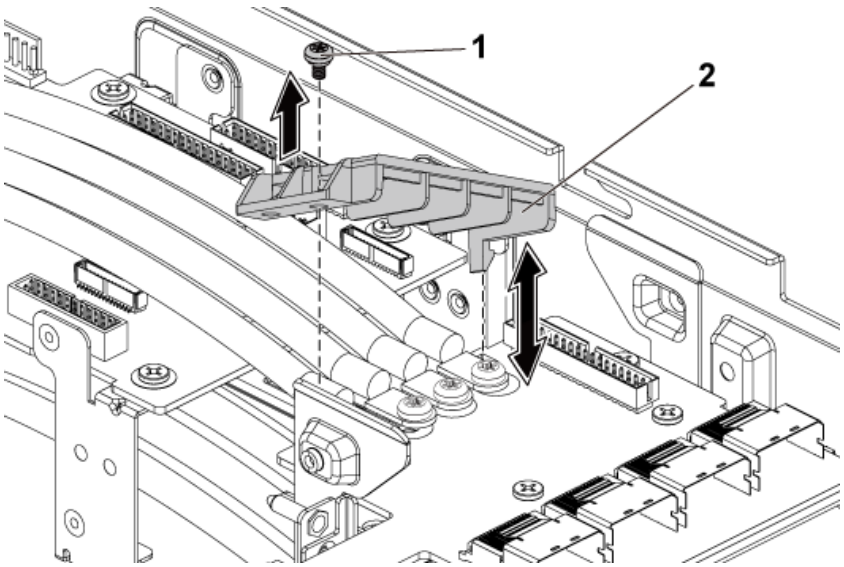

Figure 73. Removing and installing the power cable cover

1. screw
2. power cable cover

6. Remove the screws that secure the power cables to the upper midplane.

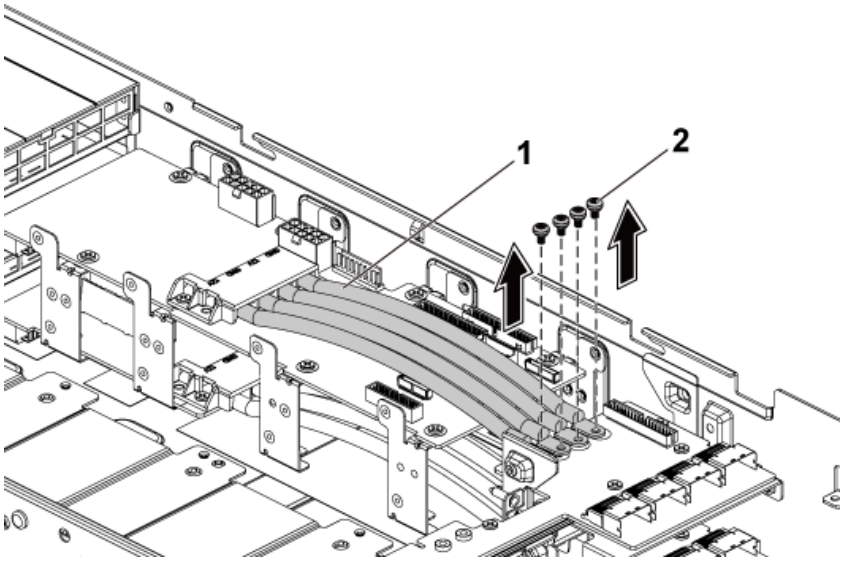

Figure 74. Removing and installing the power cables

1. power cables (4)
2. screw (4)

7. Remove the screws that secure the upper midplane to the midplane holder.
8. Lift the upper midplane out.

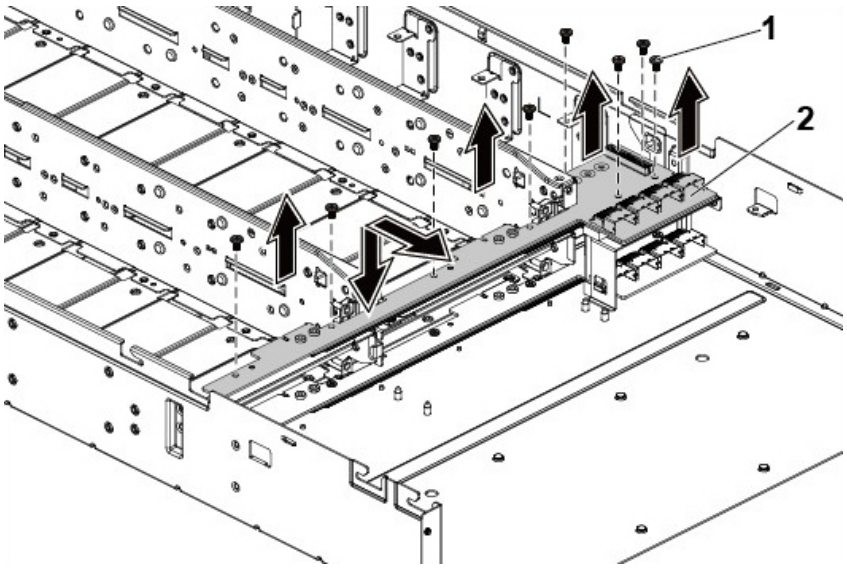

Figure 75. Removing and installing the upper midplane

1. screw (8)
2. upper midplane

9. Remove the screws that secure the midplane holder support to the chassis.
10. Lift the midplane holder support out of the chassis.

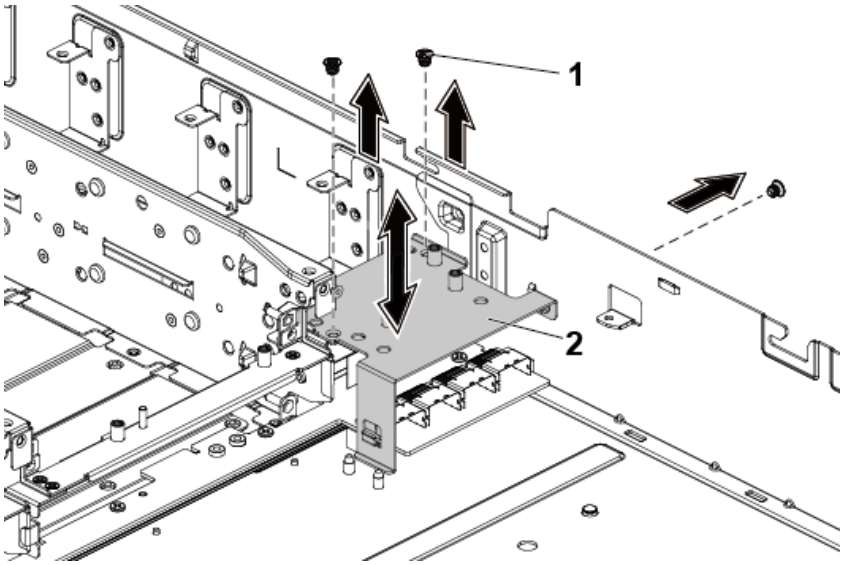

Figure 76. Removing and installing the midplane holder support

1. screw (3)
2. midplane holder support

11. Remove the screws that secure the midplane holder to the chassis.

12. Lift the midplane holder out of the chassis.

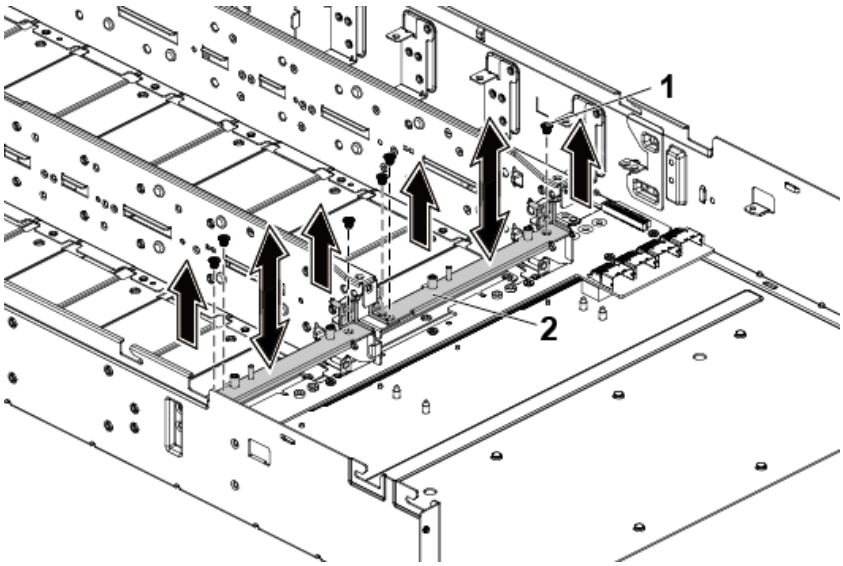

Figure 77. Removing and installing the midplane holder

1. screw (6)
2. midplane holder

13. Disconnect all the cables from the lower midplane.

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

14. Remove the power cable cover from the lower midplane.

15. Remove the four power cables from the lower midplane.

16. Remove the screws that secure the lower midplane to the chassis.

17. Lift the lower midplane out of the chassis.

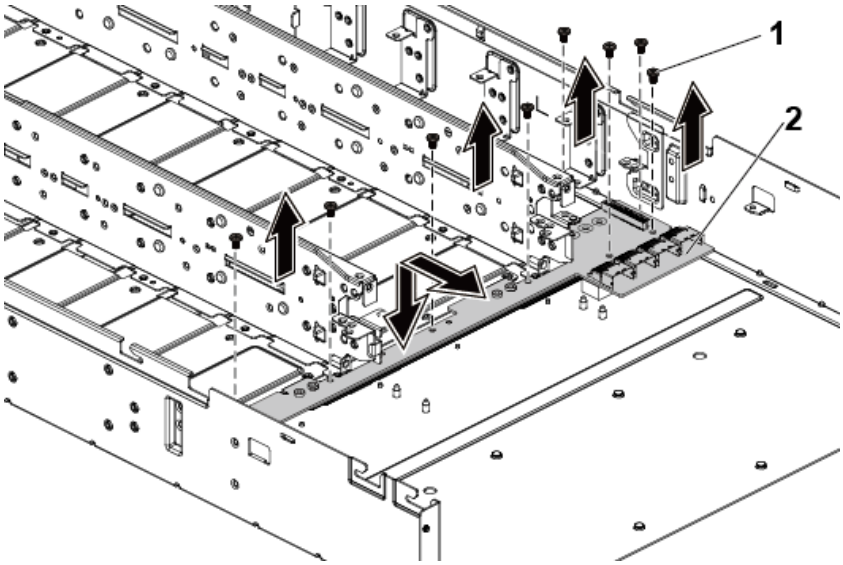

Figure 78. Removing and installing the lower midplane

1. screw (8)
2. lower midplane

Related links

Safety instructions
Before working inside your system
Removing the system cover
Removing the system board assembly
Removing a cooling fan

Installing the midplane

Prerequisites

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 are shipped with your product.

NOTE: You must route the cables properly on the chassis to prevent them from being pinched or crimped.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Place the lower midplane into the chassis.
2. Replace the screws that secure the lower midplane to the chassis.
3. Connect all the cables to the lower midplane.
4. Secure the screws that secure the power cables to the lower midplane.
5. Replace the power cable cover to the lower midplane.
6. Place the midplane holder into the chassis.
7. Replace the screws that secure the midplane holder to the chassis.
8. Place the midplane holder support into the chassis.
9. Replace the screws that secure the midplane holder support to the chassis.
10. Place the upper midplane on the midplane holder.
11. Replace the screws that secure the midplane to the midplane holder.
12. Connect all the cables to the upper midplane.

13. Secure the screws that secure the power cables to the upper midplane.
14. Replace the power cable cover to the upper lower midplane.
15. Place the middle wall bracket into the chassis.
16. Replace the screws that secure the middle wall bracket to the chassis.
17. Replace the cooling fan cage.
    Replace the cooling fans.

Next steps

1. Replace the system boards.
2. Follow the procedure listed in the After working inside your system section.

Related links

Safety instructions
Installing a cooling fan
Installing the system board assembly
Installing the system cover
After working inside your system

Cable routing–midplane to the hard drive backplane

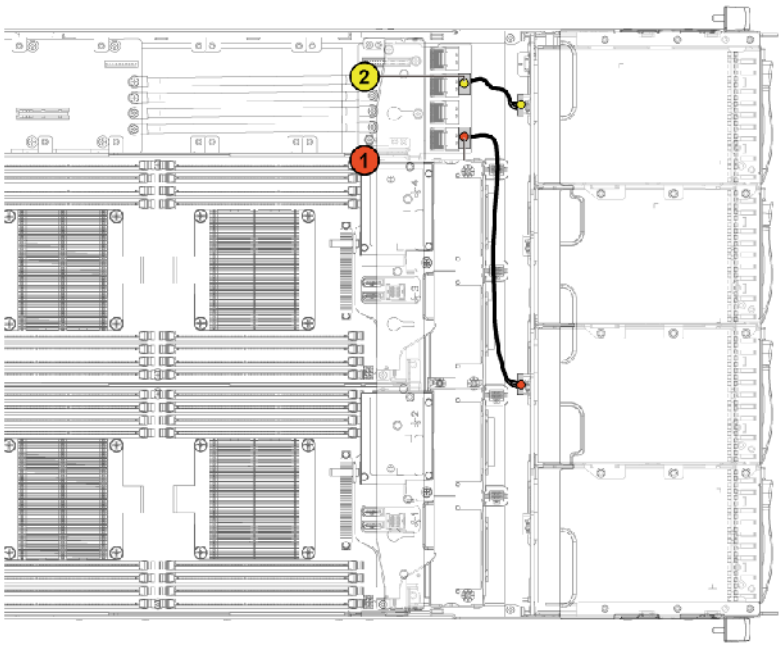

Figure 79. Cable routing–top midplane to backplane for 12 x3.5-inch hard drive configuration

Table 36. Cable routing–bottom midplane to backplane for 12 x3.5-inch hard drive configuration

Item	Cable	From (top midplane)	To (backplane)
1	Hard drive backplane cable	mini-SAS connector for system board 1 (hard drive 1, 2, 3 and 4) (J1)	SATA2 hard drive connectors 1, 2 and 3 for system board 1 (from top to bottom)
2	Hard drive backplane cable	mini-SAS connector for system board 3 (hard drive 1, 2, 3 and 4) (J3)	SATA2 hard drive connectors 1, 2 and 3 for system board 3 (from top to bottom)

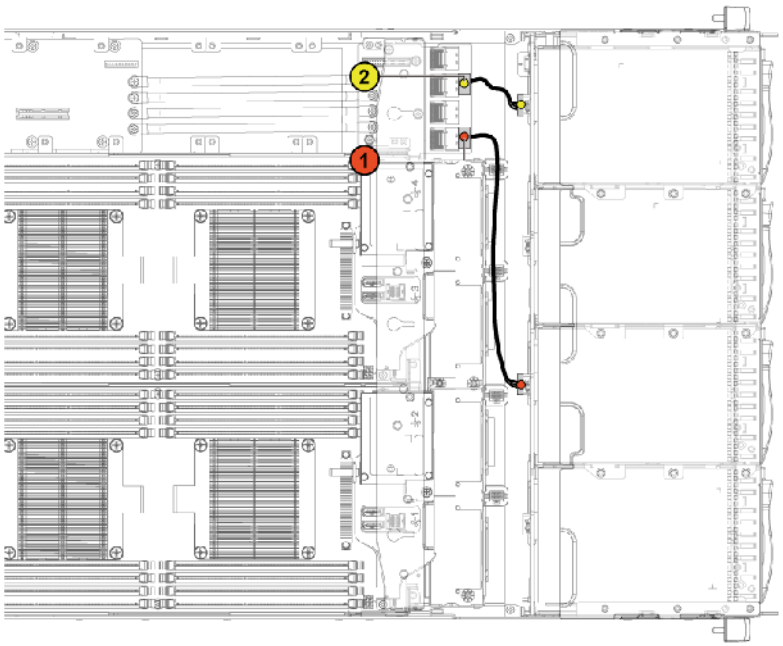

Figure 80. Cable routing–bottom midplane to backplane for 12 x3.5-inch hard drive configurations

Table 37. Cable routing–bottom midplane to backplane for 12 x3.5-inch hard drive configurations

Item	Cable	From (bottom midplane)	To (backplane)
1	Hard drive backplane cable	mini-SAS connector for system board 2 (hard drive 1, 2, 3 and 4) (J1)	SATA2 hard drive connectors 1, 2 and 3 for system board 2 (from top to bottom)
2	Hard drive backplane cable	mini-SAS connector for system board 4 (hard drive 1, 2, 3 and 4) (J3)	SATA2 hard drive connectors 1, 2, and 3 for system board 4 (from top to bottom)

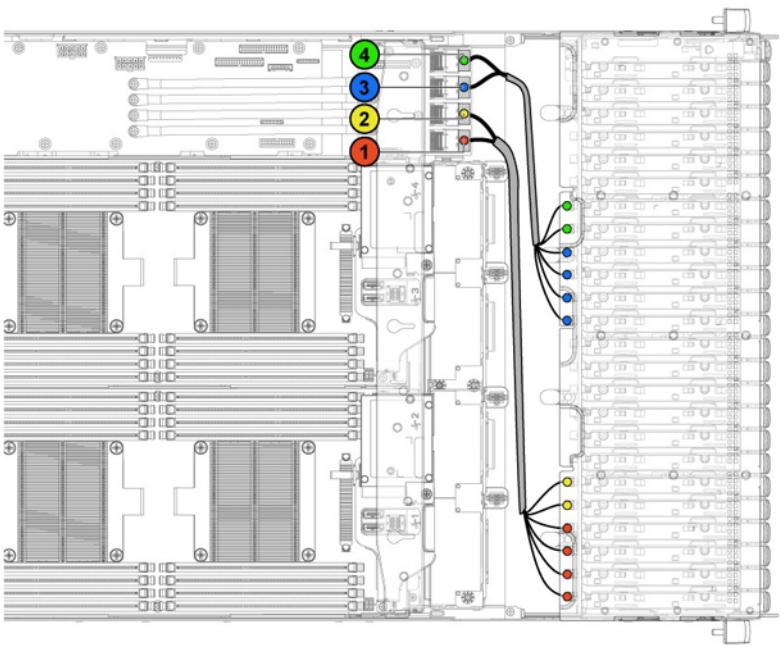

Figure 81. Cable routing–top midplane to backplane for 24 x2.5-inch hard drive configuration

Table 38. Cable routing–top midplane to backplane for 24 x2.5-inch hard drive configuration

Item	Cable	From (top midplane)	To (backplane)
1	Hard drive backplane cable	Mini-SAS connector for system board 1 (hard drive 1, 2, 3 and 4) (J1)	SATA2 hard drive connectors 1 to 4 for system board 1 (from right to left)
2	Hard drive backplane cable	Mini-SAS connector for system board 1 (hard drive 5 and 6) (J2)	SATA2 hard drive connectors 5 to 6 for system board 1 (from right to left)
3	Hard drive backplane cable	Mini-SAS connector for system board 3 (hard drive 1, 2, 3 and 4) (J3)	SATA2 hard drive connectors 1 to 4 for system board 3 (from right to left)
4	Hard drive backplane cable	Mini-SAS connector for system board 3 (hard drive 5 and 6) (J4)	SATA2 hard drive connectors 5 to 6 for system board 3 (from right to left)

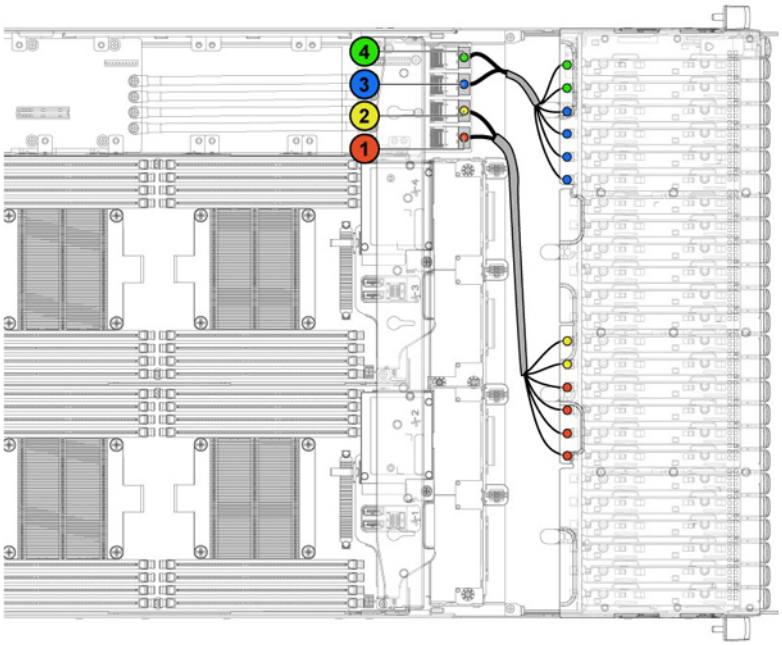

Figure 82. Cable routing–bottom midplane to backplane for 24 x2.5-inch hard drive configuration

Table 39. Cable routing–bottom midplane to backplane for 24 x2.5-inch hard drive configuration

Item	Cable	From (bottom midplane)	To (backplane)
1	Hard drive backplane cable	Mini-SAS connector for system board 2 (hard drive 1, 2, 3 and 4) (J1)	SATA2 hard drive connectors 1 to 4 for system board 2 (from right to left)
2	Hard drive backplane cable	Mini-SAS connector for system board 2 (hard drive 5 and 6) (J2)	SATA2 hard drive connectors 5 to 6 for system board 2 (from right to left)
3	Hard drive backplane cable	Mini-SAS connector for system board 4 (hard drive 1, 2, 3 and 4) (J3)	SATA2 hard drive connectors 1 to 4 for system board 4 (from right to left)

Item	Cable	From (bottom midplane)	To (backplane)
4	Hard drive backplane cable	Mini-SAS connector for system board 4 (hard drive 5 and 6) (J4)	SATA2 hard drive connectors 5 to 6 for system board 4 (from right to left)

Cable routing for middle plane to 2.5-inch hard drive backplane for expander configuration

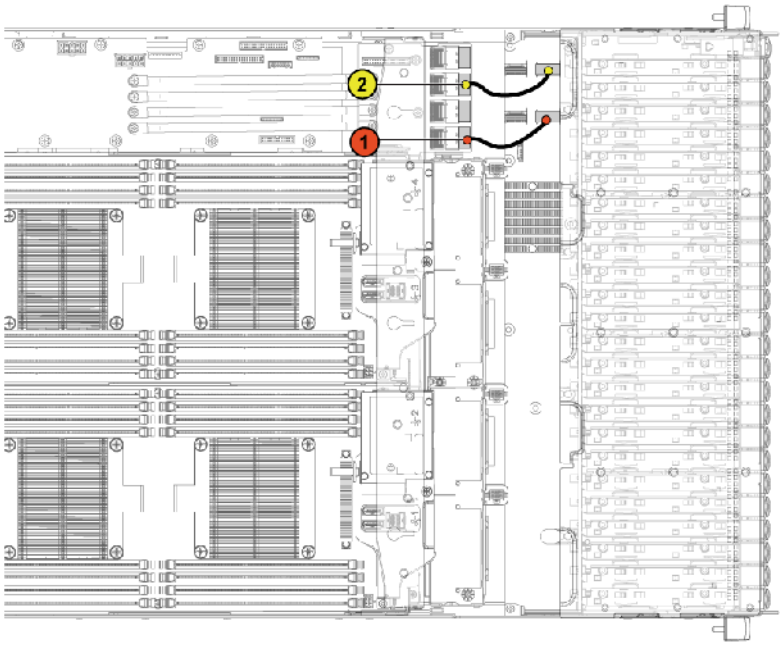

Figure 83. Cable routing–top middle plane to 2.5-inch hard drive for expander configuration

Table 40. Cable routing–top middle plane to 2.5-inch hard drive for expander configuration

Item	Cable	From (top middle plane)	To (expander card)
1	Hard drive backplane cable	Mini-SAS connector for system board 1 (J3)	Mini-SAS connector (0-3) for system board 1
2	Hard drive backplane cable	Mini-SAS connector for system board 3 (J5)	Mini-SAS connector (8-11) for system board 3

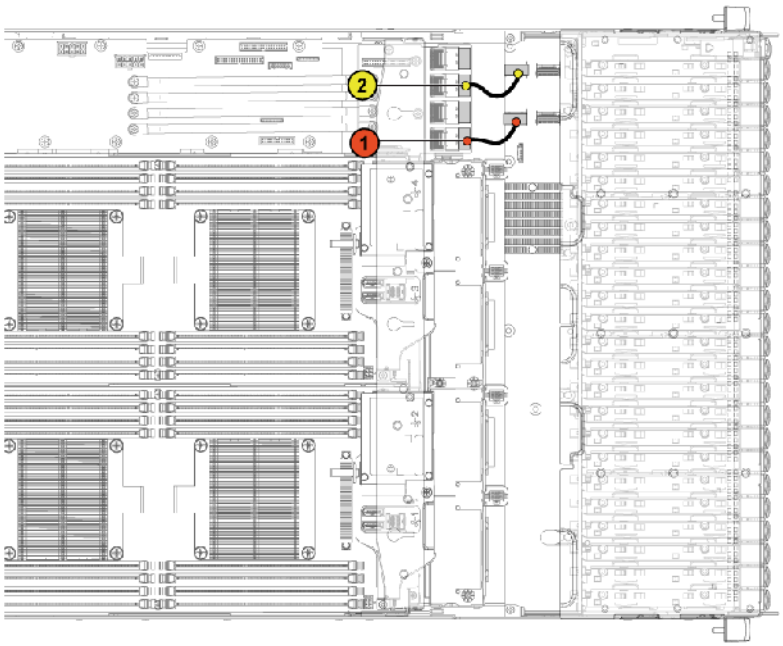

Figure 84. Cable routing–bottom middle plane to 2.5-inch hard drive for expander configuration

Table 41. Cable routing–bottom middle plane to 2.5-inch hard drive for expander configuration

Item	Cable	From (bottom middle plane)	To (expander card)
1	Hard drive backplane cable	Mini-SAS connector for system board 2 (J4)	Mini-SAS connector (4-7) for system board 2
2	Hard drive backplane cable	Mini-SAS connector for system board 4 (J6)	Mini-SAS connector (12-15) for system board 4

Hard drive backplanes

Servers use a backplane to attach hot swappable hard drives. A backplane has pins that pass directly into hard drive sockets without cables. They may have single connector to connect one disk array controller or multiple connectors that can be connected to one or more controllers.

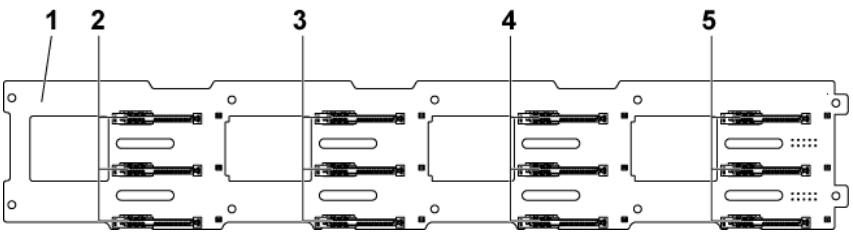

Figure 85. Front view of the 3.5 inch hard drive backplane

1. 3.5 inch backplane
2. hard drive connectors 1, 2 and 3 for system board 1 (from top to bottom)
3. hard drive connectors 1, 2 and 3 for system board 2 (from top to bottom)
4. hard drive connectors 1, 2 and 3 for system board 3 (from top to bottom)
5. hard drive connectors 1, 2 and 3 for system board 4 (from top to bottom)

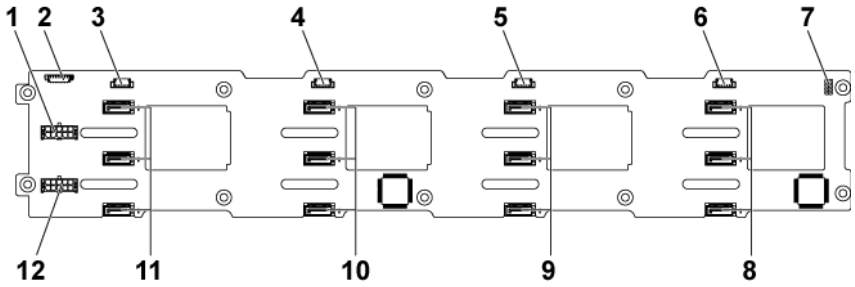

Figure 86. Back view of the 3.5 inch hard drive backplane

1. backplane power connector for power supply unit 1
2. 1x8pin fan controller board connector
3. SGPIO connector 4 for system board 4
4. SGPIO connector 3 for system board 3
5. SGPIO connector 2 for system board 2
6. SGPIO connector 1 for system board 1
7. backplane jumper
8. SATA2 and SAS connectors 1, 2 and 3 for system board 1 (from top to bottom)
9. SATA2 and SAS connectors 1, 2 and 3 for system board 2 (from top to bottom)
10. SATA2 and SAS connectors 1, 2 and 3 for system board 3 (from top to bottom)
11. SATA2 and SAS connectors 1, 2 and 3 for system board 4 (from top to bottom)
12. backplane power connector for power supply unit 2

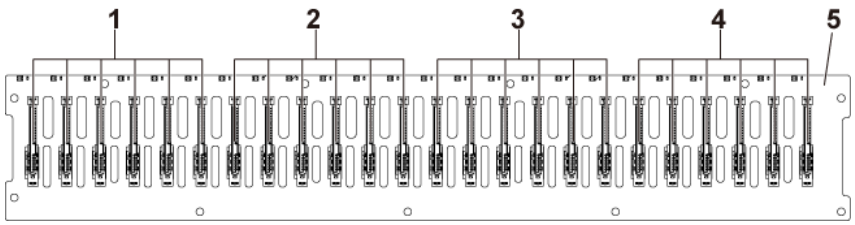

Figure 87. Front view of the 2.5 inch hard drive backplane

1. hard drive connectors 1 to 6 for system board 1 (from left to right)
2. hard drive connectors 1 to 6 for system board 2 (from left to right)
3. hard drive connectors 1 to 6 for system board 3 (from left to right)
4. hard drive connectors 1 to 6 for system board 4 (from left to right)
5. 2.5-inch backplane

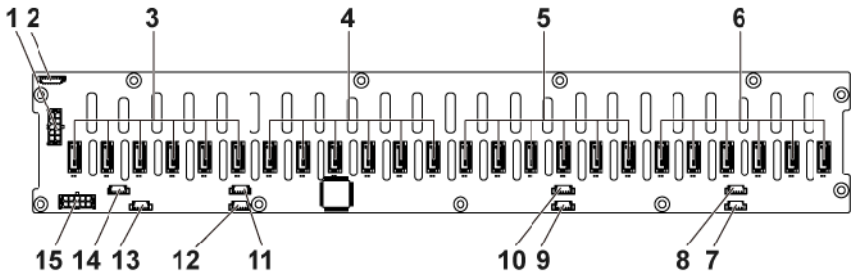

Figure 88. Back view of the 2.5 inch hard drive backplane

1. backplane power connector for power supply 1
2. system fan board connector
3. SATA2 and SAS connectors 1 to 6 for system board 4 (from right to left)
4. SATA2 and SAS connectors 1 to 6 for system board 3 (from right to left)
5. SATA2 and SAS connectors 1 to 6 for system board 2 (from right to left)
6. SATA2 and SAS connectors 1 to 6 for system board 1 (from right to left)
7. SGPIO connector A for system board 1
8. SGPIO connector B for system board 1
9. SGPIO connector A for system board 2
10. SGPIO connector B for system board 2
11. SGPIO connector A for system board 3
12. SGPIO connector B for system board 3

13. SGPIO connector A for system board 4
14. SGPIO Connector B for system board 4
15. backplane power connector for power supply 2

Removing the hard drive backplane

Prerequisites

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 are shipped with your product.

CAUTION: To prevent damage to the drives and backplane, you must remove the hard drives from the system before removing the backplane.

CAUTION: You must note the number of each hard drive and temporarily label them before removal so that you can replace them in the same locations.

NOTE: The removal procedure for 2.5-inch of SATA2 and SAS backplane is similar to the backplane for 3.5-inch hard drive systems.

NOTE: Observe the routing of the cable on the chassis as you remove them from the system. You must route these cables properly when you replace them to prevent the cables from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove all the hard drives.

Steps

1. Disconnect all the cables from the backplane.
2. Disconnect the control panel cables from the power distribution board.
3. Remove the screws that secure the hard drive cage to the chassis.

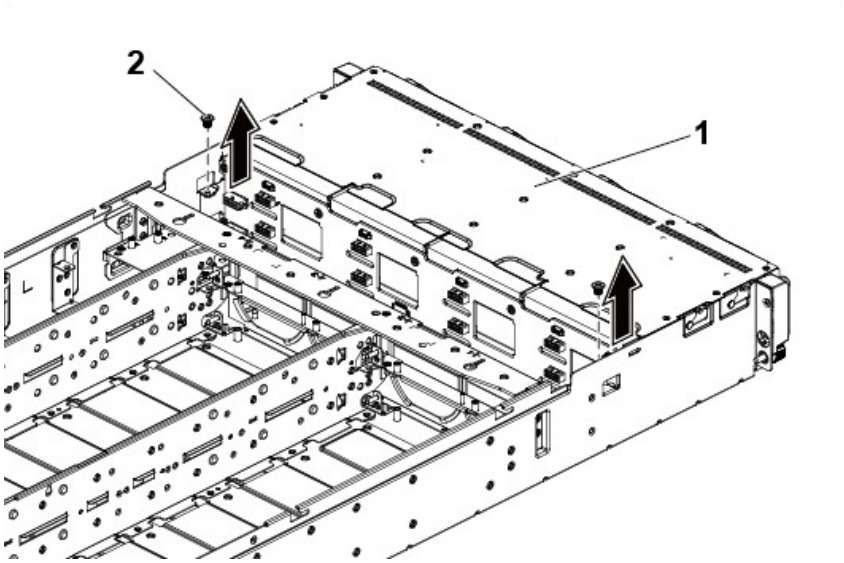

Figure 89. Removing and installing the backplane

1. hard drive cage
2. screw (2)

4. Remove the screws that secure the control panel to the chassis.
5. Remove the hard drive cage from the chassis.

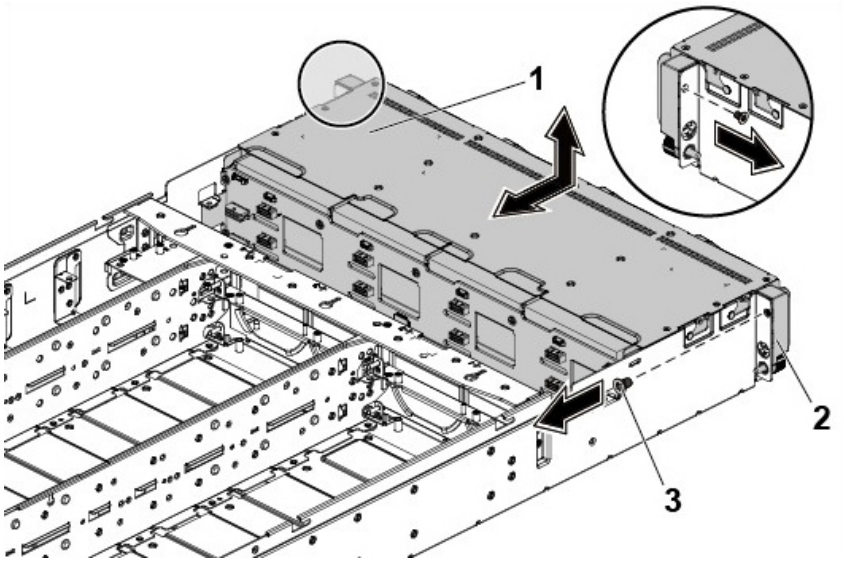

Figure 90. Removing and installing the hard drive cage

1. hard drive cage
2. control panel assembly (2)
3. screw (2)

6. Remove the screws that secure the backplane to the hard drive cage.
7. Remove the backplane from the hard drive cage.

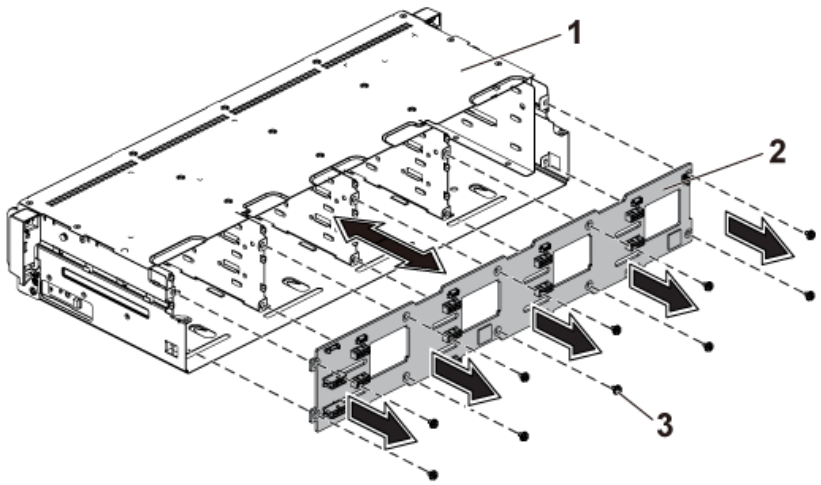

Figure 91. Removing and installing the backplane from the hard drive cage

1. hard drive cage
2. 3.5-inch backplane
3. screw (10)

Related links

Safety instructions
Before working inside your system
Removing a hard drive
Removing the system cover

Installing the hard drive backplane

Prerequisites

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 are shipped with your product.

NOTE: You must route the cables properly through the tabs on the chassis to prevent them from being pinched or crimped.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Install the backplane into the hard drive cage.
2. Install the screws that secure the backplane to the hard drive cage.
3. Install the hard drive cage into the chassis.
4. Install the screws that secure the control panel assemblies to the chassis.
5. Connect all the cables to the backplane.

Next steps

1. Connect the control panel cables to the power distribution board.
2. Install the screws that secure the hard drive cage.
3. Install the hard drives.
4. Follow the procedure listed in the After working inside your system section.

Related links

Safety instructions
Installing the system cover
Installing a hard drive into a hard drive carrier
After working inside your system

2.5-inch hard drive expander configuration

In a 2.5 inch hard drive configuration, an expander card connects the system boards to the 2.5-inch hard drive backplane through the midplane.

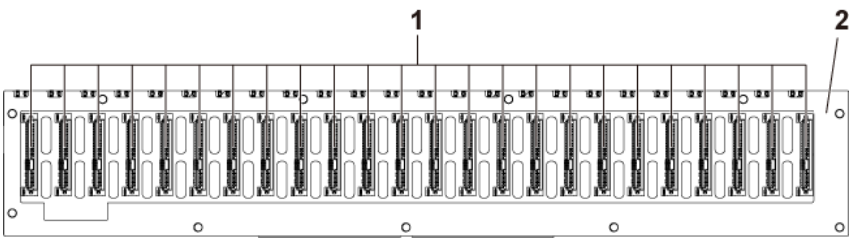

Figure 92. Front view of the backplane

1. hard drive connectors 1 to 24 (from left to right)
2. 2.5 inch backplane for expander configuration

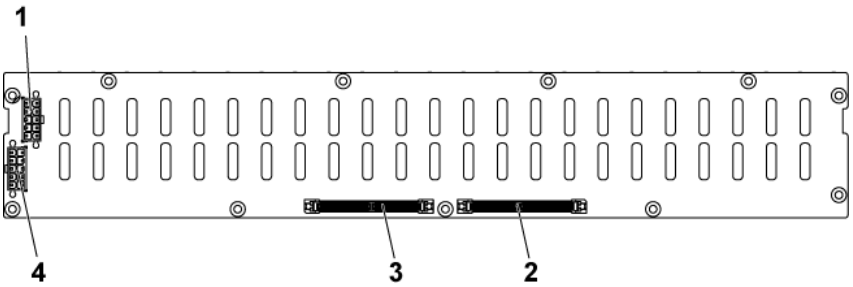

Figure 93. Back view of the backplane

1. backplane power connector for power supply 1
2. expander-card connector 1
3. expander-card connector 2
4. backplane power connector for power supply 2

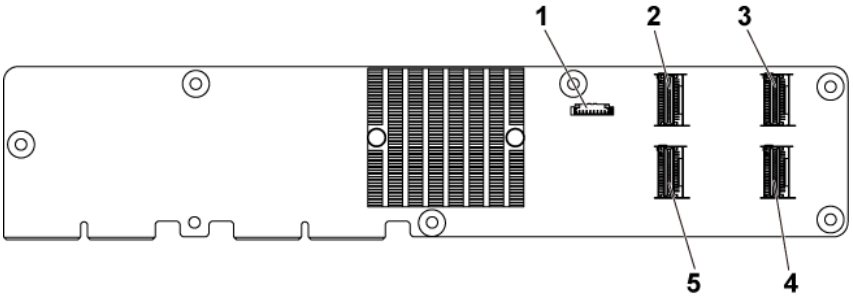

Figure 94. Top view of the 2.5-inch hard drive expander card

1. power control connector
2. mini-SAS connector (4-7)
3. mini-SAS connector (12-15)
4. mini-SAS connector (8-11)
5. mini-SAS connector (0-3)

Following is the replacement procedure of SATA2 and SAS backplane for the 2.5-inch hard drive expander configuration. The configuration is applicable for up to four system boards and supports up to 24 hard drives. For more information, see the HDD Zoning configuration tool under **Drivers & downloads** at **Dell.com/support**.

Removing the 2.5-inch hard drive backplane for expander configuration

Prerequisites

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 are shipped with your product.

CAUTION: To prevent damage to the drives and backplane, you must remove the hard drives from the system before removing the backplane.

CAUTION: You must note the number of each hard drive and temporarily label them before removal so that you can replace them in the same locations.

NOTE: Observe the routing of the cable on the chassis as you remove them from the system. You must route these cables properly when you replace them to prevent the cables from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove all the hard drives.

Steps

1. Disconnect all the cables from the backplane and expander card.

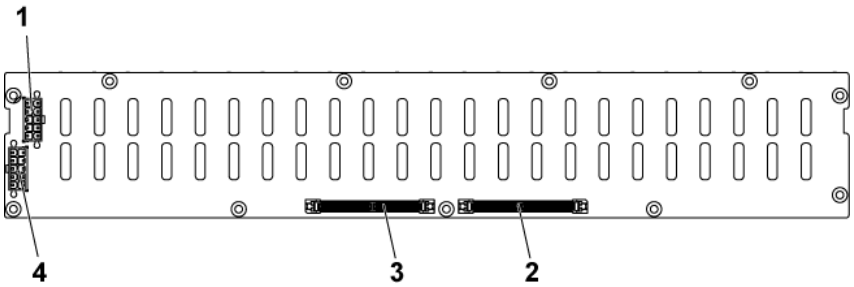

Figure 95. Back view of the 2.5-inch hard drive backplane for expander configuration

1. backplane power connector for power supply 1
2. Expander-card connector 1
3. Expander-card connector 2
4. backplane power connector for power supply 2

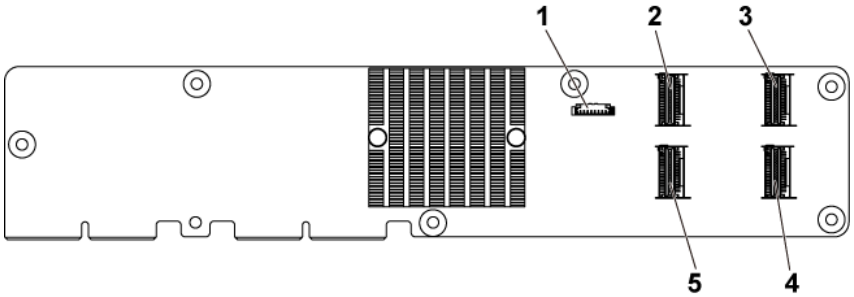

Figure 96. Top view of the expander card

1. power control connector
2. mini-SAS connector (4-7)
3. mini-SAS connector (12-15)
4. mini-SAS connector (8-11)
5. mini-SAS connector (0-3)

2. Disconnect control panel cables from the power distribution board.
3. Remove the screws that secure the hard drive cage to the chassis.

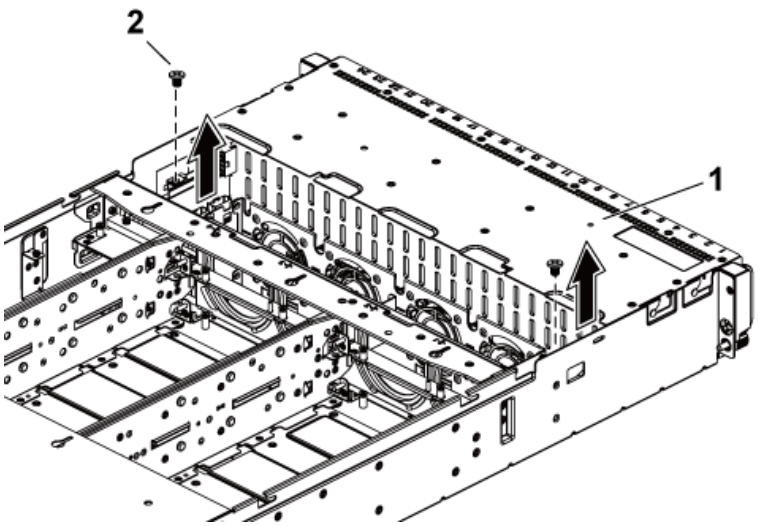

Figure 97. Removing and installing the 2.5-inch hard drive backplane for expander configuration

1. hard drive cage
2. screw (2)

4. Remove the screws that secure the control panel to the chassis.
5. Remove the hard drive cage from the chassis.

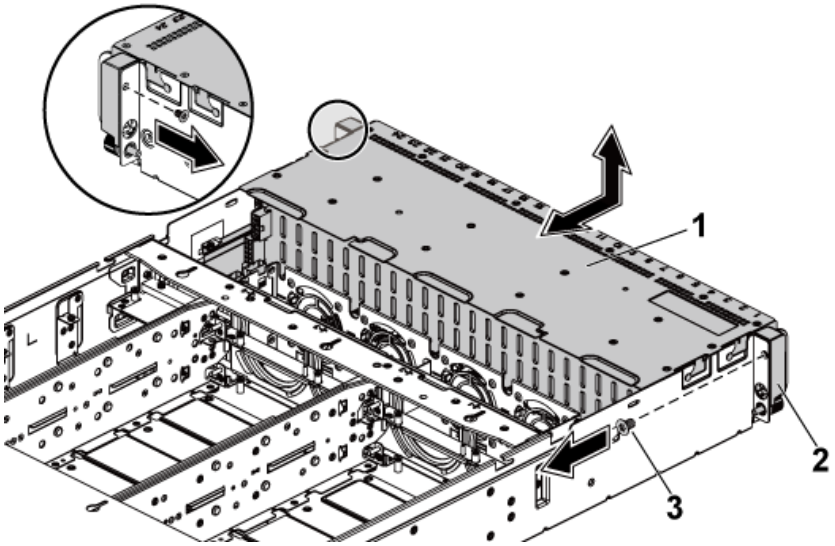

Figure 98. Removing and installing the 2.5-inch hard drive cage for expander configuration

1. hard drive cage
2. control panel assembly (2)
3. screw (2)

6. Remove the screws that secure the expander card assembly to the hard drive cage.

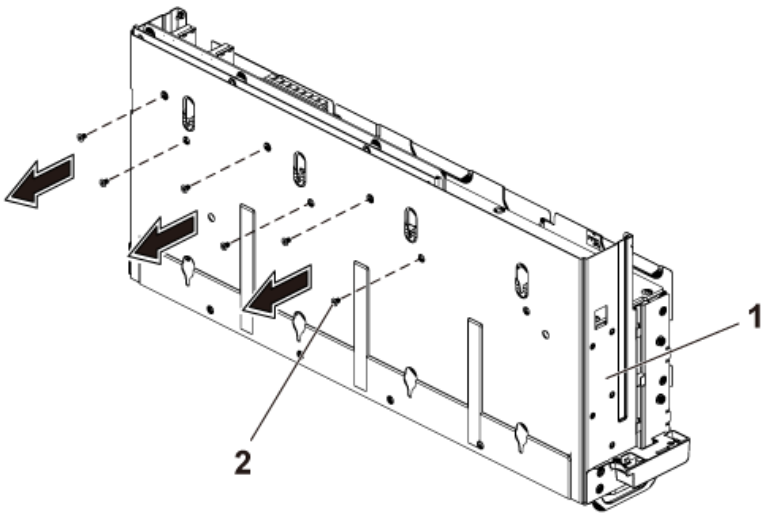

Figure 99. Removing and installing the screws that secure the expander card assembly to the hard drive cage

1. hard drive cage
2. screw (6)

7. Remove the expander card assembly from the hard drive cage.

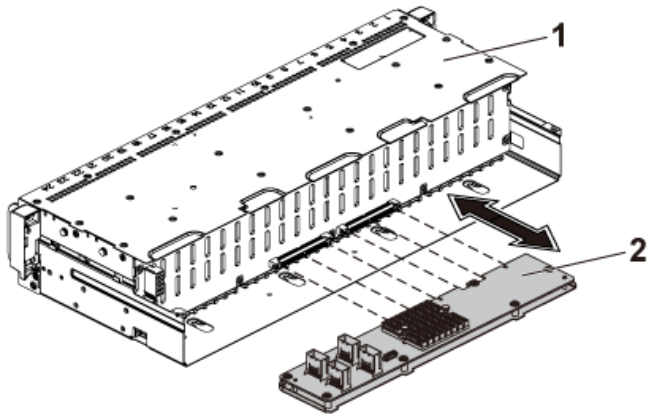

Figure 100. Removing and installing the 2.5-inch hard drive expander card assembly from the hard drive cage

1. hard drive cage
2. expander card assembly

8. Remove the screws that secure the backplane for expander configuration to the hard drive cage.
9. Remove the backplane for expander configuration from the hard drive cage.

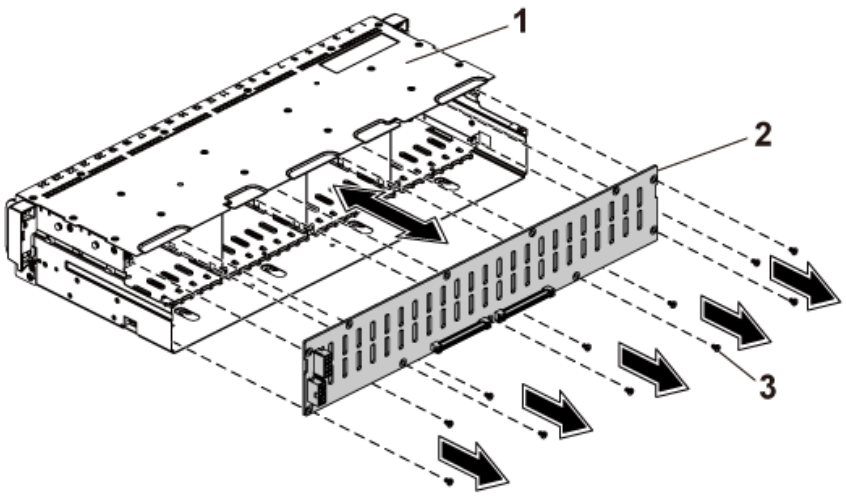

Figure 101. Removing and installing the backplane for expander configuration from the hard drive cage

1. hard drive cage
2. 2.5-inch hard drive backplane for expander configuration
3. screw (11)

Related links

Safety instructions
Before working inside your system
Removing a hard drive
Removing the system cover

Installing the 2.5-inch hard drive backplane for expander configuration

Prerequisites

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 are shipped with your product.

NOTE: You must route these cables properly through the tabs on the chassis to prevent them from being pinched or crimped.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Install the backplane for expander configuration to the hard drive cage.
2. Install the screws that secure the backplane for expander configuration to the hard drive cage.
3. Install the expander card assembly to the hard drive cage.
4. Install the screws that secure the expander card assembly to the hard drive cage.
5. Install the hard drive cage into the chassis.
6. Install the screws that secure the control panel assemblies to the chassis.
7. Connect all the cables to the backplane for expander configuration and expander card.
8. Connect control panel cables to the power distribution board.
9. Replace the screws that secure the hard drive cage.

Next steps

1. Install the hard drives.
2. Follow the procedure listed in the After working inside your system section.

Related links

Safety instructions
Installing the system cover
Installing a hard drive into a hard drive carrier
After working inside your system

Control panel

A control panel allows you to manually control the inputs to the server. Normally the control panel has USB and VGA ports, along with the NMI button, power button, and an optional LCD display unit or diagnostic indicators.

Removing the control panel

Prerequisites

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 are shipped with your product.

NOTE: Observe the routing of the cable on the chassis as you remove them from the system. You must route these cables properly when you replace them to prevent the cables from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove all the hard drives.
4. Disconnect all the cables from the backplane.

5. Disconnect control panel cables from the power distribution board.
6. Remove the screws that secure the hard drive cage to the chassis.

Steps

1. Remove the screws that secure the control panel assemblies to the chassis.
2. Remove the hard drive cage from the chassis.
3. Remove the screws that secure the control panel assembly to the hard drive cage.
4. Remove the control panel assembly from the hard drive cage.

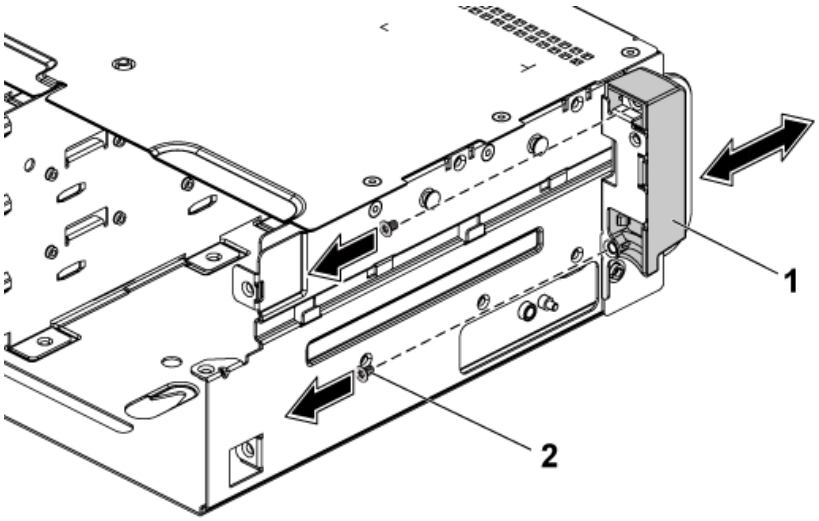

Figure 102. Removing and installing a control panel assembly

1. control panel assembly
2. screw (2)

5. Push aside the retention hooks on the control panel assembly.
6. Remove the control panel from the control panel assembly.

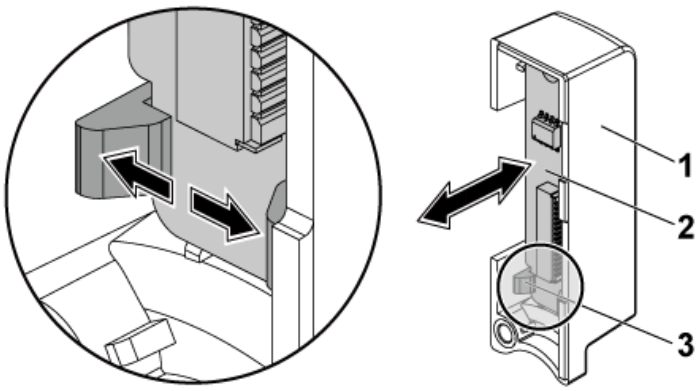

Figure 103. Removing and installing a control panel

1. control panel assembly
2. control panel
3. retention hooks

Related links

Safety instructions
Before working inside your system
Removing a hard drive
Removing the system cover

Installing the control panel

Prerequisites

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 are shipped with your product.

NOTE: Observe the routing of the cable on the chassis as you remove them from the system. You must route these cables properly when you replace them to prevent the cables from being pinched or crimped.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Push aside the retention hooks on the control panel assembly and place the control panel into the control panel assembly.
2. Install the control panel assembly into the hard drive cage.
3. Install the screws that secure the control panel assembly to the hard drive cage.
4. Install the hard drive cage into the chassis.
5. Install the screws that secure the control panel assemblies to the chassis.
6. Install the screws that secure the hard drive cage to the chassis.
7. Connect the control panel cables to the power distribution board.

Next steps

1. Connect all the cables to the backplane.
2. Install the system cover.
3. Install the hard drives.
4. Reconnect the system to its electrical outlet and turn on the system, including any attached peripherals.

Related links

Safety instructions
Installing the system cover
Installing a hard drive into a hard drive carrier
After working inside your system

Sensor boards

Removing the sensor board for 3.5-inch hard drive system

Prerequisites

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 are shipped with your product.

NOTE: Observe the routing of the cable on the chassis as you remove them from the system. You must route these cables properly when you replace them to prevent the cables from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.

3. Remove all the hard drives.
4. Disconnect all the cables from the backplane.
5. Disconnect front panel cables from the power distribution board.

Steps

1. Remove the hard drive cage from the chassis.
2. Disconnect the cable from the sensor board.
3. Remove the screw that secures the sensor board to the hard drive cage.
4. Remove the sensor board from the hard drive cage.

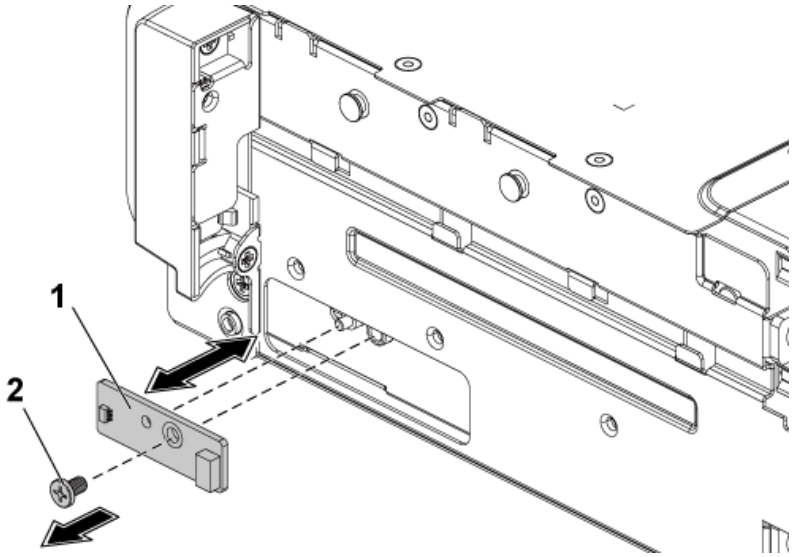

Figure 104. Removing and installing the sensor board

1. sensor board
2. screw

Related links

Safety instructions
Before working inside your system
Removing a hard drive
Removing the system cover

Installing the sensor board for 3.5-inch hard drive system

Prerequisites

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 are shipped with your product.

NOTE: You must route these cables properly on the chassis to prevent them from being pinched or crimped.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Install the sensor board into the hard drive cage.
2. Install the screw that secures the sensor board to the hard drive cage.
3. Connect the sensor board cable to the sensor board.

Next steps

1. Install the hard drive cage into the chassis.
2. Install the screws that secure the hard drive cage to the chassis.
3. Connect all the cables to the backplane.
4. Connect front panel cables to the power distribution board.
5. Install the hard drives.
6. Follow the procedure listed in the After working inside your system section.

Related links

Safety instructions
Installing the system cover
Installing a hard drive into a hard drive carrier
After working inside your system

Cable routing for sensor board and control panel for 3.5-inch hard drive system

1. Connect the Y-shaped cable for sensor board and control panel 2 to the connector on the power distribution board 1, and connect the other two ends of the cable to the connectors on the sensor board and the control panel 2 respectively.
2. Connect the control panel cable to the connector on the power distribution board 1, and connect the other end of the cable to the connector on the control panel 1.

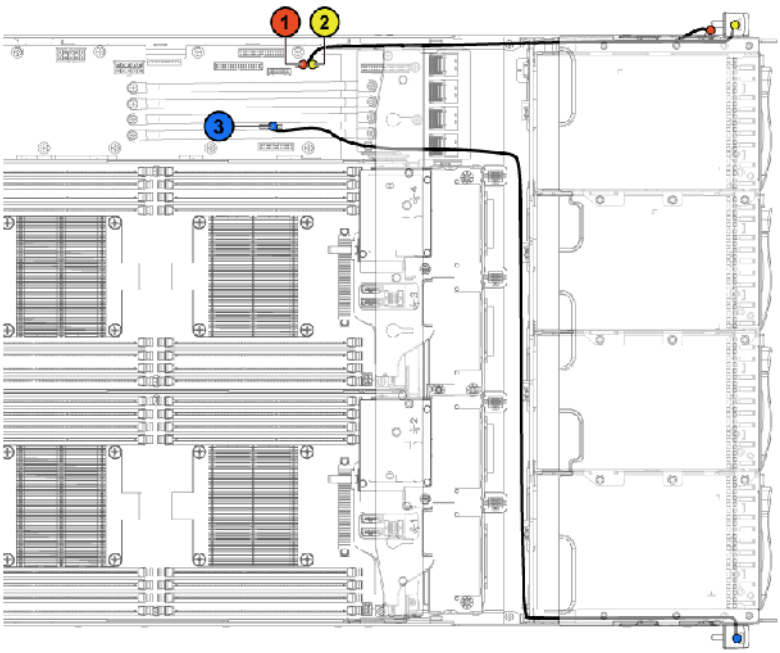

Figure 105. Cable routing–sensor board and control panel

Table 42. Cable routing for sensor board and control panel for 3.5-inch hard drive system

Item	Cable	From (power distribution board)	To (sensor board and control panels)
1	Sensor board cable	Sensor board power connector (J1)	Sensor board
2	Front panel cable	Front panel connector (J16)	Front panel 2
3	Front panel cable	Front panel connector (J18)	Front panel 1

Removing the sensor board for 2.5-inch hard drive system

Prerequisites

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 are shipped with your product.

NOTE: Observe the routing of the cable on the chassis as you remove them from the system. You must route these cables properly when you replace them to prevent the cables from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove all the hard drives.
4. Disconnect all the cables from the backplane.
5. Disconnect control panel cables from the power distribution board.
6. Remove the hard drive cage from the chassis.

Steps

1. Disconnect the cable from the sensor board assembly.
2. Remove the screw that secures the sensor board assembly to the hard drive cage.
3. Remove the sensor board assembly from the hard drive cage.
4. Remove the screw that secures the sensor board to the sensor board holder.
5. Remove the sensor board from the sensor board holder.

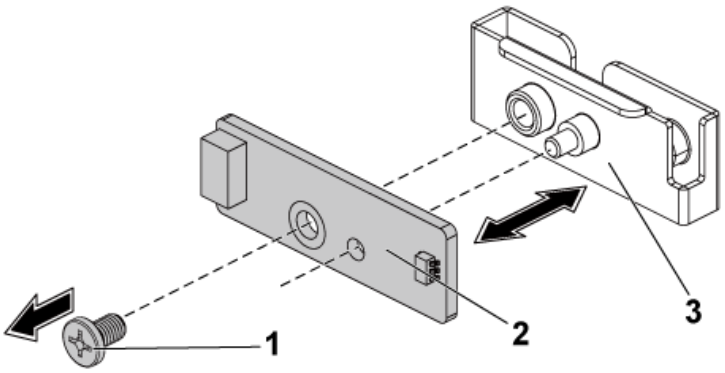

Figure 106. Removing and installing the sensor board

1. screw
2. sensor board
3. sensor board holder

Related links

Safety instructions
Before working inside your system
Removing a hard drive
Removing the system cover

Installing the sensor board for 2.5-inch hard drive system

Prerequisites

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 are shipped with your product.

NOTE: You must route these cables properly on the chassis to prevent them from being pinched or crimped.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Replace the sensor board into the sensor board holder.
2. Replace the sensor board assembly into the hard drive cage.
3. Replace the screw that secures the sensor board to the hard drive cage.
4. Connect the sensor board cable to the sensor board.

Next steps

1. Replace the hard drive cage into the chassis.
2. Replace the screws that secure the hard drive cage to the chassis.
3. Connect all the cables to the backplane.
4. Connect the control panel cables to the power distribution board.
5. Install the hard drives.
6. Follow the procedure listed in the After working inside your system section.

Related links

Safety instructions
Installing the system cover
Installing a hard drive into a hard drive carrier
After working inside your system

Cable routing for sensor board and control panel for 2.5-inch hard drive system

1. Connect the Y-shaped cable for the sensor board and control panel 2 to the connector on the power distribution board 1, and connect the other two ends of the cable to the connectors on the sensor board and the control panel 2 respectively.
2. Connect the control panel cable to the connector on the power distribution board 1, and connect the other end of the cable to the connector on the control panel 1.

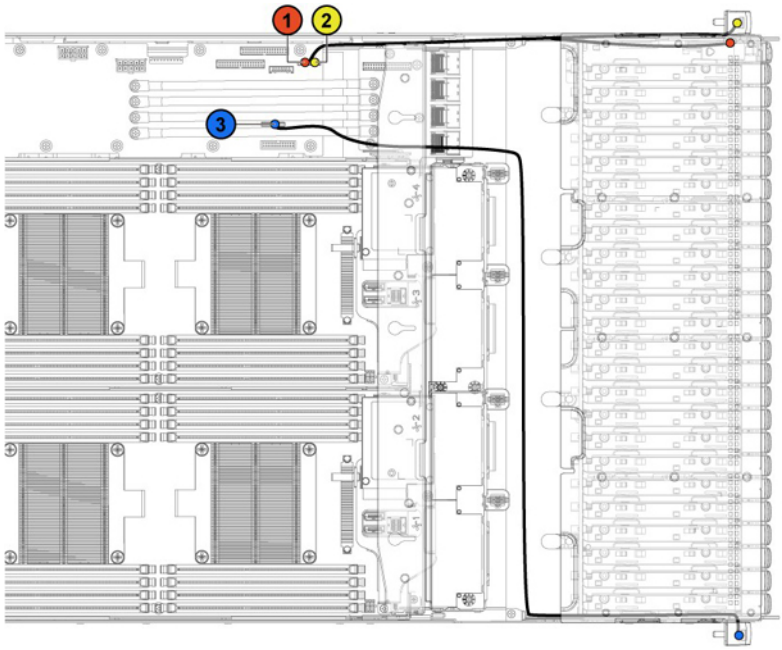

Figure 107. Cable routing–sensor board and control panel

Table 43. Cable routing–sensor board and control panel

Item	Cable	From (power distribution board)	To (sensor board and control panels)
1	Sensor board cable	Sensor board power connector (J1)	Sensor board
2	Front panel cable	Front panel connector (J16)	Front panel 2
3	Front panel cable	Front panel connector (J18)	Front panel 1

7

Jumpers and connectors

This topic provides specific information about the system jumpers. It also provides some basic information about jumpers and switches and describes the connectors on the various boards in the system. Jumpers on the system board help to disable system and setup passwords. You must know the connectors on the system board to install components and cables correctly.

C6320 system board connectors

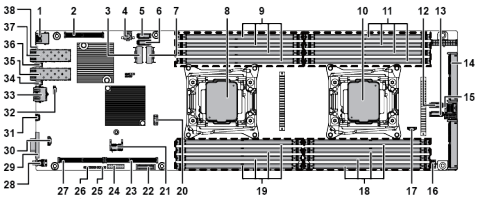

Figure 108. C6320 system board connectors

Table 44. System board connectors

Item	Connector	Description
1	USB1	Rear USB connector 1
2	PCIE_G3_X8 (CPU1)	PCI-E Gen3 x8 mezzanine slot 3 (processor 1)
3	miniSAS0-3	Mini-SAS connector 0-3
4	HDD POWER CON	Hard drive power connector
5	SATA4	Onboard SATA connector 4
6	SATA5	Onboard SATA connector 5
7	miniSAS6-9	Mini-SAS connector 6-9
8	CPU1	Processor 1
9	DIMM_A1, DIMM_A5, DIMM_A2, DIMM_A6	DIMM sockets for processor 1
10	CPU2	Processor 2
11	DIMM_B1, DIMM_B5, DIMM_B2, DIMM_B6	DIMM sockets for processor 2
12	SATA5	SAS/SATA connector 5
13	SATA4	SAS/SATA connector 4
14	CONTROL_PANEL	Middle plane connector
15	miniSAS0-3	Mini-SAS HD connector 0-3
16	HI_PWR_CONN	High-power connector
17	SGPIO	Serial General Purpose Input/Output (SGPIO) connector
18	DIMM_B8, DIMM_B4, DIMM_B7, DIMM_B3	DIMM sockets for processor 2

Item	Connector	Description
19	DIMM_A8, DIMM_A4, DIMM_A7, DIMM_A3	DIMM sockets for processor 1
20	J106	Internal USB connector 2 (left) and USB connector 3 (right)
21	TPM	Trusted Platform Module (TPM) connector
22	BHI	System battery
23	PCIE_G3_X16 (CPU1)	PCI-e Gen3 x16 slot 1 (processor 1)
24	CPLD_DBG	CPLD debug connector
25	UART	Universal Asynchronous Receiver/Transmitter (UART) connector
26	CPLD_JTAG	Complex Programmable Logic Device (CPLD) JTAG connector
27	PCIE_G3_X16 (CPU1)	PCI-E Gen3 x16 Slot 2 (processor 1)
28	SW2	Power button
29	VGA1	VGA port
30	INT_TTL	Internal TTL COM connector
31	USB_DBG1	USB to serial port
32	MGMT	LAN management connector
33	LAN3(BMC)	Management port
34	CR21	LAN 2 LED
35	LAN2	LAN 2 port
36	CR20	LAN 1 LED
37	LAN1	LAN 1 port
38	CR3	UID LED

Related links

System memory

LSI 2008 SAS mezzanine card connectors

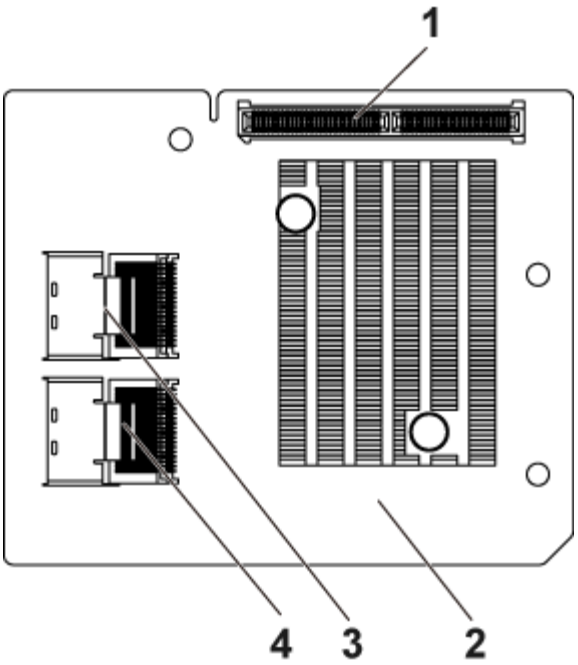

Figure 109. LSI 2008 SAS mezzanine card connectors

1. mezzanine card connectors
2. LSI 2008 mezzanine card
3. mini-SAS connector (port 4-7)
4. mini-SAS connector (port 0-3)

Powerville dual port 1GbE

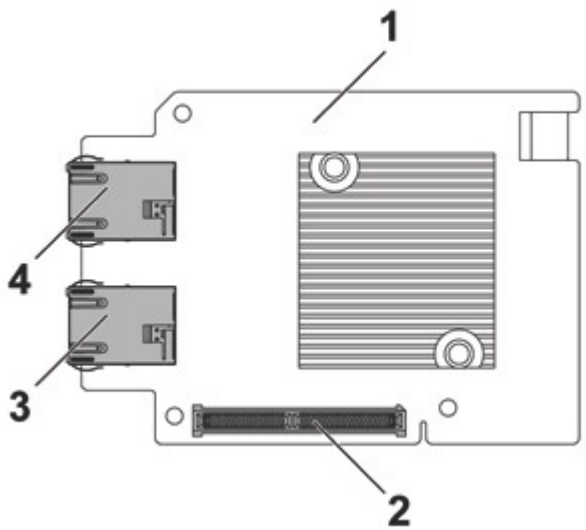

Figure 110. Powerville dual port 1GbE connectors

1. Powerville dual port 1GbE card
2. mezzanine card connector

3. NIC 1 connector
4. NIC 2 connector

Twinville dual port 10GbE

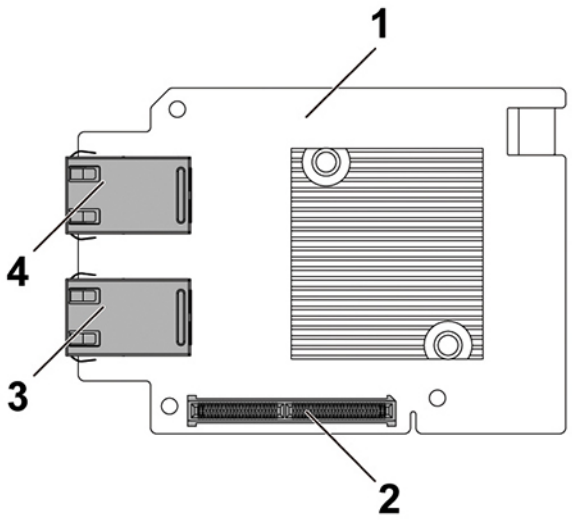

Figure 111. Twinville dual port 10GbE connectors

1. Twinville dual port 10GbE card
2. mezzanine card connector
3. NIC 1 connector
4. NIC 2 connector

Power distribution board 1 connectors

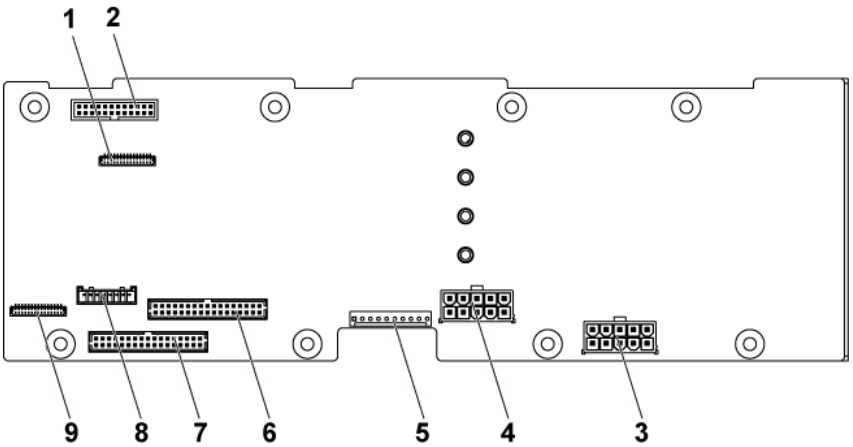

Figure 112. Power distribution board 1 connectors

1. control panel connector for system board 1 and 2
2. system fan connector
3. hard drive backplane power connector 1
4. hard drive backplane power connector 2
5. one 10pin control connector
6. two 17pin control connector for system board 2 and 4
7. two 17pin control connector for system board
8. one 8pin control connector to hard drive backplane

1 and 3

9. control panel connector for system board 3 and 4

Power distribution board 2 connectors

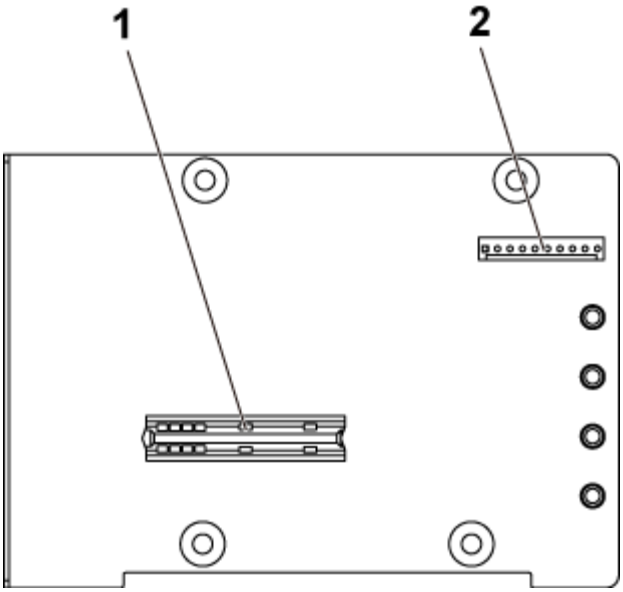

Figure 113. Power distribution board 2 connectors

1. bridge card connector
2. one 10pin control connector

Sensor board connectors

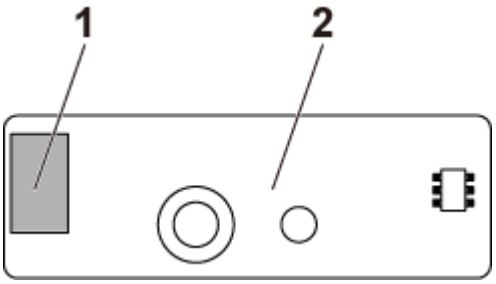

Figure 114. Sensor board connectors

1. power connector
2. sensor board

Jumper settings

System configuration jumper settings on the C6320 system board

The function of system configuration jumper installed on each C6320 system board is shown below:

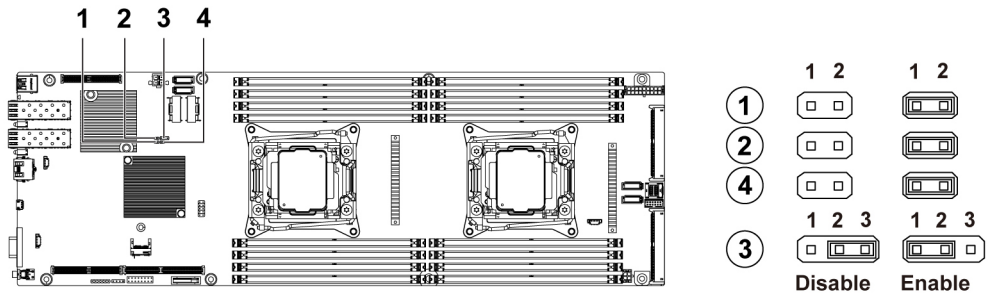

Figure 115. System configuration jumpers on the C6320 system board

Table 45. System configuration jumper on the C6320 system board

Jumpers	Function	Disabled (Default state)	Enabled
1	BIOS Recovery	No pin	Pin 1-2
2	NVRAM Clear	No pin	Pin 1-2
3	PWRD_EN	Pin 1-2	Pin 2-3
4	ME_FM Recovery	No pin	Pin 1-2

Backplane jumper settings

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 are shipped with your product.

The function of jumpers installed on 3.5-inch hard drive backplane and 2.5-inch hard drive backplane is the same. Following is an example using the jumpers installed on 3.5-inch HDD backplane.

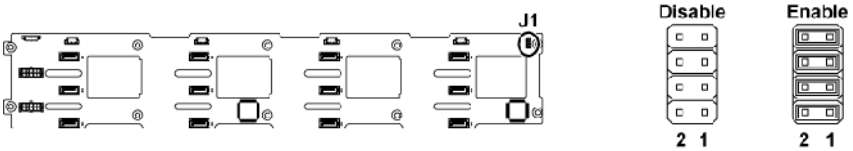

Figure 116. Backplane jumper settings

Table 46. Jumpers installed on backplane

Jumper	Function	Off	On
SW1 (pin1-2)	Reserved	Disable	Enable
SW2 (pin3-4)	Reserved	Disable	Enable
SW3 (pin5-6)	SGPIO I^2C Select	Disable	Enable
SW4 (pin7-8)	MFG Test	Disable	Enable

NOTE: By default, the jumpers on the backplane are disabled.

8

Troubleshooting your system

Safety first — for you and your 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 are shipped with your product.

NOTE: Solution validation was performed by using the factory shipped hardware configuration.

Installation Problems

Perform the following checks when you troubleshoot installation problems:

- 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.

Minimum configuration to POST

The three components mentioned below are the minimum configuration to POST:

- One power supply unit
- One Processor (CPU) in socket CPU1 (minimum for troubleshooting)
- One Memory Module (DIMM) installed in the socket A1

NOTE: When PCI-E slot 1 and Mezzanine slot are to be used, processor 1 must be installed; when PCI-E slot 3 is to be used, both processor 1 and processor 2 must be installed.

Troubleshooting system startup failure

If you boot the system to the BIOS boot mode after installing an operating system from the UEFI Boot Manager, the system stops responding. To avoid this issue, you must boot to the same boot mode in which you installed the operating system.

For all other startup issues, note the system messages that appear on the screen.

Troubleshooting external connections

Before troubleshooting any external devices, ensure that all external cables are securely attached to the external connectors on your system before troubleshooting any external devices.

Troubleshooting the video subsystem

Prerequisites

NOTE: Ensure the Local Server Video Enabled option is selected in the iDRAC Graphical User Interface (GUI), under Virtual Console. If this option is not selected, local video is disabled.

Steps

1. Check the cable connections (power and display) to the monitor.
2. Check the video interface cabling from the system to the monitor.
3. Run the appropriate diagnostic test.

If the tests run successfully, the problem is not related to video hardware.

Next steps

If the tests fail, see the Getting help section.

Related links

Getting help

Troubleshooting a USB device

Prerequisites

NOTE: Follow steps 1 to 6 to troubleshoot a USB keyboard or mouse. For other USB devices, go to step 7.

Steps

1. Disconnect the keyboard and/or mouse cables from the system and reconnect them.
2. If the problem persists, connect the keyboard and/or mouse to another USB port on the system.
3. If the problem is resolved, restart the system, enter System Setup, and check if the non-functioning USB ports are enabled.

   NOTE: Older operating systems may not support USB 3.0.
4. Check if USB 3.0 is enabled in System Setup. If enabled, disable it and see if the issue is resolved.
5. In **iDRAC Settings Utility**, ensure that **USB Management Port Mode** is configured as **Automatic** or **Standard OS Use**.
6. If the problem is not resolved, replace the keyboard and/or mouse with a known working keyboard or mouse.

   If the problem is not resolved, proceed to step 7 to troubleshoot other USB devices attached to the system.
7. Turn off all attached USB devices, and disconnect them from the system.
8. Restart the system.
9. If your keyboard is functioning, enter System Setup, verify that all USB ports are enabled on the **Integrated Devices** screen. If your keyboard is not functioning, use remote access to enable or disable the USB options.
10. Check if USB 3.0 is enabled in System Setup. If it is enabled, disable it and restart your system.
11. If the system is not accessible, reset the NVRAM_CLR jumper inside your system and restore the BIOS to the default settings. See the System board jumper setting section
12. In the **IDRAC Settings Utility**, ensure that **USB Management Port Mode** is configured as **Automatic** or **Standard OS Use**.
13. Reconnect and turn on each USB device one at a time.
14. If a USB device causes the same problem, turn off the device, replace the USB cable with a known good cable, and turn on the device.

Next steps

If all troubleshooting fails, see the Getting help section.

Troubleshooting a serial I/O device

Steps

1. Turn off the system and any peripheral devices connected to the serial port.
2. Swap the serial interface cable with a known working cable, and turn on the system and the serial device.

   If the problem is resolved, replace the interface cable with a known working cable.
3. Turn off the system and the serial device, and swap the serial device with a compatible device.
4. Turn on the system and the serial device.

Next steps

If the problem persists, see the Getting help section.

Related links

Getting help

Troubleshooting a NIC

Steps

1. Run the appropriate diagnostic test. For more information, see the Using system diagnostics section for the available diagnostic tests.
2. Restart the system and check for any system messages pertaining to the NIC controller.
3. Check the appropriate indicator on the NIC connector:
   - If the link indicator does not glow, the cable connected might be disengaged.
   - If the activity indicator does not glow, the network driver files might be damaged or missing.

     Install or replace the drivers as necessary. For more information, see the NIC documentation.
   - If the problem persists, use another connector on the switch or hub.
4. Ensure that the appropriate drivers are installed and the protocols are bound. For more information, see the NIC documentation.
5. Enter System Setup and confirm that the NIC ports are enabled on the **Integrated Devices** screen.
6. Ensure that all the NICs, hubs, and switches on the network are set to the same data transmission speed and duplex. For more information, see the documentation for each network device.
7. Ensure that all network cables are of the proper type and do not exceed the maximum length.

Next steps

If the problem persists, see the Getting help section.

Related links

LAN indicator codes
Integrated Devices details
Getting help

Troubleshooting a wet system

Prerequisites

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 are shipped with your product.

Steps

1. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
2. Remove the system cover.
3. Remove the following components (if installed) from the system:
   - Power supply unit(s)
   - Optical drive
   - Hard drives
   - Hard drive backplane
   - Hard drive tray
   - Cooling shroud
   - Expansion card risers (if installed)
   - Expansion cards
   - Cooling fan assembly (if installed)
   - Cooling fans
   - Memory modules
   - Processor(s) and heat sink(s)
   - System board
4. Let the system dry thoroughly for at least 24 hours.
5. Reinstall the components you removed in step 3 except the expansion cards.
6. Install the system cover.
7. Turn on the system and attached peripherals.

   If the problem persists, see the Getting help section.
8. If the system starts properly, turn off the system, and reinstall all the expansion cards that you removed.
9. Run the appropriate diagnostic test. For more information, see the Using system diagnostics section.

Next steps

If the tests fail, see the Getting help section.

Related links

Getting help

Troubleshooting a damaged system

Prerequisites

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 are shipped with your product.

Steps

1. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
2. Remove the system cover.
3. Ensure that the following components are properly installed:
   - cooling shroud
   - expansion card risers (if installed)
   - expansion cards
   - power supply unit(s)
   - cooling fan assembly (if installed)
   - cooling fans

- processor(s) and heat sink(s)
- memory modules
- hard drive carriers/cage
- hard drive backplane

4. Ensure that all cables are properly connected.
5. Install the system cover.
6. Run the appropriate diagnostic test. For more information, see the Using system diagnostics section.

Next steps

If the problem persists, see the Getting help section.

Related links

Getting help

Troubleshooting the system battery

Prerequisites

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 are shipped with your product.

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 set in System Setup, the problem may be caused by a software, rather than by a defective battery.

Steps

1. Re-enter the time and date in System Setup.
2. Turn off the system, and disconnect it from the electrical outlet for at least an hour.
3. Reconnect the system to the electrical outlet, and turn on the system.
4. Enter System Setup.

   If the date and time displayed in System Setup are not correct, check the System Error Log (SEL) for system battery messages.

Next steps

If the problem persists, see the Getting help section.

Related links

System Setup

Getting help

Troubleshooting power supply units

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 are shipped with your product.

Troubleshooting power source problems

1. Press the power button to ensure that your system is turned on. If the power indicator does not glow when the power button is pressed, press the power button firmly.
2. Plug in another working power supply unit to ensure that the system board is not faulty.
3. Ensure that no loose connections exist.

   For example, loose power cables.
4. Ensure that the power source meets applicable standards.
5. Ensure that there are no short circuits.

6. Have a qualified electrician check the line voltage to ensure that it meets the needed specifications.

Related links

Getting help

Power supply unit problems

1. Ensure that no loose connections exist.
   For example, loose power cables.
2. Ensure that the power supply unit (PSU) handle or LED indicates that the PSU is working properly.
   For more information about PSU indicators, see the Power indicator codes section.
3. If you have recently upgraded your system, ensure that the PSU has enough power to support the new system.
4. If you have a redundant PSU configuration, ensure that both the PSUs are of the same type and wattage.
   You may have to upgrade to a higher wattage PSU.
5. Ensure that you use only PSUs with the Extended Power Performance (EPP) label on the back.
6. Reseat the PSU.

   NOTE: After installing a PSU, allow several seconds for the system to recognize the PSU and determine if it is working properly.

   If the problem persists, see the Getting help section.

Related links

Power Supply Unit indicator codes
Power supply units
Getting help

Troubleshooting cooling problems

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 are shipped with your product.

Ensure that the following conditions exist:

- System cover, cooling shroud, EMI filler panel, memory module blank, or back filler bracket is not removed.
- Ambient temperature is not higher than the system specific ambient temperature.
- External airflow is not obstructed.
- A cooling fan is not removed or has not failed.
- The expansion card installation guidelines have been followed.

Additional cooling can be added by one of the following methods:

From the iDRAC web GUI:

1. Click **Hardware** → **Fans** → **Setup**.
2. From the **Fan Speed Offset** drop-down list, select the cooling level required or set the minimum fan speed to a custom value.

From F2 System Setup:

1. Select **iDRAC Settings** → **Thermal**, and set a higher fan speed from the fan speed offset or minimum fan speed.

From RACADM commands:

1. Run the command `racadm help system.thermalsettings`

For more information, see the Integrated Dell Remote Access User's Guide at **Dell.com/idracmanuals**.

Related links

Getting help

Troubleshooting cooling fans

Prerequisites

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 are shipped with your product.

NOTE: The fan number is referenced by the systems management software. In the event of a problem with a particular fan, you can easily identify and replace it by noting down the fan numbers on the cooling fan assembly.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.

Steps

1. Remove the system cover.
2. Reseat the fan or the fan's power cable.
3. Install the system cover.
4. Restart the system.

Next steps

If the problem persists, see the Getting help section.

Related links

Getting help

Troubleshooting system memory

Prerequisites

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 are shipped with your product.

Steps

1. If the system is operational, run the appropriate system diagnostic test. See the Using system diagnostics section for the available diagnostic tests.

   If the diagnostic tests indicate a fault, follow the corrective actions provided by the diagnostic tests.
2. If the system is not operational, turn off the system and attached peripherals, and unplug the system from the power source. Wait at least for 10 seconds, and then reconnect the system to the power source.
3. Turn on the system and attached peripherals, and note the messages on the screen.

   If an error message is displayed indicating a fault with a specific memory module, go to step 12.
4. Enter System Setup, and check the system memory setting. Make any changes to the memory settings, if needed.

   If the memory settings match the installed memory but the problem still persists, go to step 12.
5. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
6. Remove the system cover.
7. Check the memory channels and ensure that they are populated correctly.

   NOTE: See the system event log or system messages for the location of the failed memory module. Reinstall the memory device.
8. Reseat the memory modules in their sockets.

9. Install the system cover.
10. Enter System Setup and check the system memory setting.

    If the problem is not resolved, proceed with step 11.
11. Remove the system cover.
12. If a diagnostic test or error message indicates a specific memory module as faulty, swap or replace the module with a known working memory module.
13. 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.

    If an error message is displayed on the screen, this may indicate a problem with the installed DIMM type(s), incorrect DIMM installation, or defective DIMM(s). Follow the on-screen instructions to resolve the problem.
14. Install the system cover.
15. As the system boots, observe any error message that is displayed and the diagnostic indicators on the front of the system.
16. If the memory problem persists, repeat step 12 through step 15 for each memory module installed.

Next steps

If the problem persists, see the Getting help section.

Related links

Getting help

Troubleshooting a hard drive

Prerequisites

CAUTION: This troubleshooting procedure can erase data stored on the hard drive. Before you proceed, back up all files on the 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 are shipped with your product.

Steps

1. Run the appropriate diagnostic test. See the Using system diagnostics section.

   Depending on the results of the diagnostics test, proceed as needed through the following steps.
2. If your system has a RAID controller and your hard drives are configured in a RAID array, perform the following steps:
   a. Restart the system and press F10 during system startup to run the Dell Lifecycle Controller, and then run the Hardware Configuration wizard to check the RAID configuration.

      See the Dell Lifecycle Controller documentation or online help for information about RAID configuration.
   b. Ensure that the hard drives are configured correctly for the RAID array.
   c. Take the hard drive offline and reseat the drive.
   d. Exit the configuration utility and allow the system to boot to the operating system.
3. Ensure that the needed device drivers for your controller card are installed and are configured correctly. See the operating system documentation for more information.
4. Restart the system and enter the System Setup.
5. Verify that the controller is enabled and the drives are displayed in the System Setup.

Next steps

If the problem persists, see the Getting help section.

Related links

Getting help
Hard drive indicator patterns
Removing a hard drive
Installing a hard drive

Troubleshooting a storage controller

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 are shipped with your product.

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

1. Run the appropriate diagnostic test. See the Using system diagnostics section.
2. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the system cover.
4. Verify that the installed expansion cards are compliant with the expansion card installation guidelines.
5. Ensure that each expansion card is firmly seated in its connector.
6. Install the system cover.
7. Reconnect the system to the electrical outlet, and turn on the system and attached peripherals.
8. If the problem is not resolved, turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
9. Remove the system cover.
10. Remove all expansion cards installed in the system.
11. Install the system cover.
12. Reconnect the system to the electrical outlet, and turn on the system and attached peripherals.
13. Run the appropriate diagnostic test. See the Using system diagnostics section. If the tests fail, see the Getting help section.
14. For each expansion card you removed in step 10, perform the following steps:
    a. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
    b. Remove the system cover.
    c. Reinstall one of the expansion cards.
    d. Install the system cover.
    e. Run the appropriate diagnostic test. See the Using system diagnostics section.

If the problem persists, see the Getting help section.

Troubleshooting expansion cards

Prerequisites

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 are shipped with your product.

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

Steps

1. Run the appropriate diagnostic test. See the Using system diagnostics section.
2. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the system cover.
4. Ensure that each expansion card is firmly seated in its connector.
5. Install the system cover.
6. Turn on the system and attached peripherals.

7. If the problem is not resolved, turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
8. Remove the system cover.
9. Remove all expansion cards installed in the system.
10. Install the system cover.
11. Run the appropriate diagnostic test. See the Using system diagnostics section.

    If the tests fail, see the Getting help section.
12. For each expansion card you removed in step 8, perform the following steps:
    a. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
    b. Remove the system cover.
    c. Reinstall one of the expansion cards.
    d. Install the system cover.
    e. Run the appropriate diagnostic test. See the Using system diagnostics section.

Next steps

If the problem persists, see the Getting help section.

Troubleshooting processors

Prerequisites

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 are shipped with your product.

Steps

1. Run the appropriate diagnostics test. See the Using system diagnostics section.
2. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the system cover.
4. Ensure that the processor and heat sink are properly installed.
5. Install the system cover.
6. Run the appropriate diagnostic test. See the Using system diagnostics section.
7. If the problem persists, see the Getting help section.

Related links

Getting help

9

Getting help

Contacting Dell

Dell provides several online and telephone-based support and service options. If you do not have an active internet connection, you can find contact information about your purchase invoice, packing slip, bill, or Dell product catalog. Availability varies by country and product, and some services may not be available in your area. To contact Dell for sales, technical assistance, or customer-service issues:

1. Go to **Dell.com/support**.
2. Select your country from the drop-down menu on the lower right corner of the page.
3. For customized support:
   a. Enter your system Service Tag in the **Enter your Service Tag** field.
   b. Click **Submit**.
      The support page that lists the various support categories is displayed.
4. For general support:
   a. Select your product category.
   b. Select your product segment.
   c. Select your product.
      The support page that lists the various support categories is displayed.
5. For contact details of Dell Global Technical Support:
   a. Click Global Technical Support.
   b. The **Contact Technical Support** page is displayed with details to call, chat, or e-mail the Dell Global Technical Support team.

Documentation feedback

You can rate the documentation or write your feedback on any of our Dell documentation pages and click **Send Feedback** to send your feedback.

Accessing system information by using QRL

You can use the Quick Resource Locator (QRL) to get immediate access to the information about your system. The QRL is located on the top of the system cover.

Prerequisites

Ensure that your smartphone or tablet has the QR code scanner installed.

The QRL includes the following information about your system:

About this task

- How-to videos
- Reference materials, including the Owner's Manual, LCD diagnostics, and mechanical overview
- Your system service tag to quickly access your specific hardware configuration and warranty information
- A direct link to Dell to contact technical assistance and sales teams

Steps

1. Go to **Dell.com/QRL** and navigate to your specific product or
2. Use your smartphone or tablet to scan the model-specific Quick Resource (QR) code on your Dell PowerEdge system or in the Quick Resource Locator section.

Quick Resource Locator for C6320