Dell PowerEdge M830
Owner's Manual

Regulatory Model: FHB
Regulatory Type: FHB008

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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About your Dell PowerEdge M830

The Dell PowerEdge M830 is a full-height blade that is configured for the PowerEdge M1000e enclosure. It supports up to four processors based on the Intel Xeon E5-4600 v3 family, up to 48 DIMMs, up to four hard drives/SSDs and twelve SSDs.

The M830 systems are available in the following configurations:

System	Configuration
Four hard drive/SSD systems	Up to four 2.5 inch, hot-swappable hard drives/SSDs
Twelve SSD systems	Up to twelve 1.8 inch, hot-swappable SSDs

Front panel features and indicators—PowerEdge M830

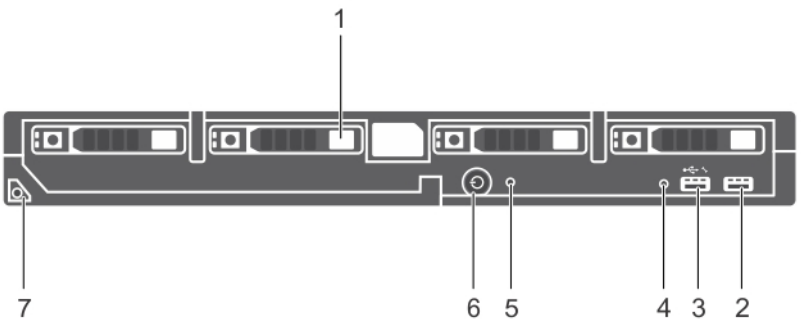

Figure 1. Front panel features and indicators—2.5 inch hard drive/SSD system

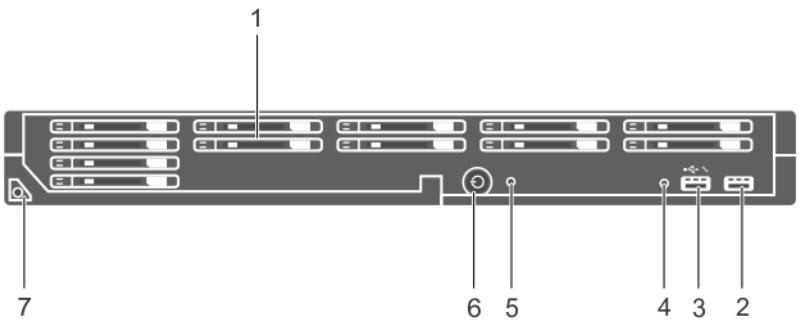

Figure 2. Front panel features and indicators—1.8 inch SSD system

Item	Indicator, Button, or Connector	Icon	Description	
1	Hard drives/SSDs		**2.5 inch hard drive system**	Four 2.5 inch hot-swap SAS/SATA/ PCIe SSDs or SAS/ SATA hard-drives.
			1.8 inch SSD system	Twelve 1.8 inch hot-swap SAS SSDs.
2	USB2 connector		Allows a USB device to be connected to the system.	
3	USB1/iDRAC managed USB port		The USB management port can function as a regular USB port or provide access to the iDRAC features. For more information, see the iDRAC User's Guide at **dell.com/ esmmanuals**.	
4	Management indicator		The management indicator lights when the iDRAC controls the USB1 port for management functions.	
5	Status indicator		Provides information about the status of the system.	
6	Power-on indicator, power button		The power-on indicator lights when the blade power is on. The power button controls the power supply output to the system.	
7	Blade handle		Used to slide the blade out of the enclosure.	

Using USB diskette or USB DVD/CD drives

The blade has USB ports on the front which allow you to connect a USB diskette drive, USB flash drive, USB DVD/CD drive, keyboard, or mouse. The USB drives can be used to configure the blade.

To designate the USB diskette drive as the boot drive:

1. connect the USB drive
2. restart the system
3. enter the System Setup
4. set the drive as first in the boot sequence

The USB device is displayed in the boot order setup screen only if it is attached to the system before you run the System Setup. You can also select the boot device by pressing <F11> during system start-up and selecting a boot device for the current boot sequence.

Hard-drive/SSD indicator patterns

The hard-drive/SSD (Solid State Drives) indicators display different patterns as drive events occur in the system.

NOTE: The blade must have a hard-drive/SSD or a hard-drive blank installed in each drive bay.

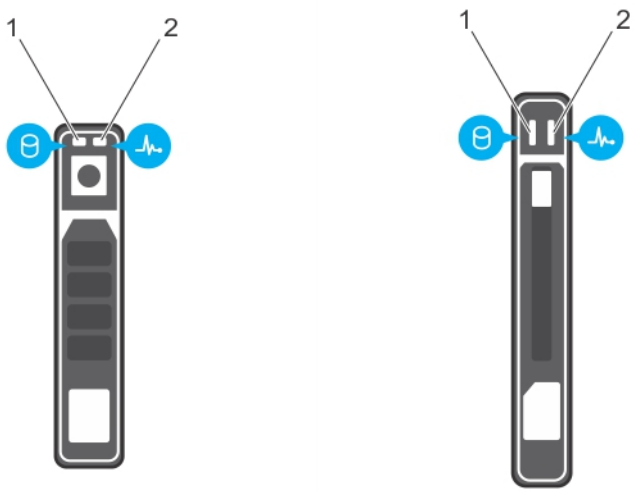

Figure 3. Hard-drive/SSD indicators

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

NOTE: If the drive is in Advanced Host Controller Interface (AHCI) mode, the status LED (on the right side) does not function and remains off.

Drive-Status Indicator Pattern	Condition
Blinks green two times per second	Identifying drive or preparing for removal
Off	Drive ready for insertion or removal **NOTE:** The drive status indicator remains off until all drives are initialized after system power is applied. Drives are not ready for insertion or removal during this time.
Blinks green, amber, and then turns off	Drive predicted failure
Blinks amber four times per second	Drive failed
Blinks green slowly	Drive rebuilding
Steady green	Drive online

Drive-Status Indicator Pattern	Condition
Blinks green three seconds, amber three seconds, and off six seconds	Rebuild aborted

iDRAC Direct LED indicator codes

NOTE: The iDRAC Direct LED indicator does not light up for the USB mode.

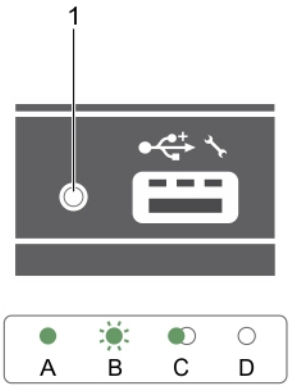

Figure 4. iDRAC Direct LED indicator

1. iDRAC Direct status indicator

The table below displays iDRAC Direct activity when configuring iDRAC Direct by using the management port (USB XML Import).

Convention	iDRAC Direct LED indicator pattern	Condition
A	Steady green	Lights green for a minimum of 2 seconds at the beginning and end of a file transfer.
B	Flashing green	Indicates file transfer or any operation tasks.
C	Green and turns off	Indicates that the file transfer is complete.
D	Turn off	Indicates that the USB is ready to be removed or that a task is complete.

The table below displays iDRAC Direct activity when configuring iDRAC Direct using your laptop and cable (Laptop Connect).

iDRAC Direct LED indicator pattern	Condition
Steady green for two seconds	Indicates that the system is connected.
Flashing green (on for two seconds and off for two seconds)	Indicates that the system connected is recognized.
Turns off	Indicates that the system is unplugged.

Documentation matrix

The documentation matrix provides information about documents that you can refer to, for setting up and managing your system.

To...	Refer to...
Set up your system and know the system technical specifications	Getting Started With Your System
Install the operating system	Operating system documentation at **dell.com/operatingsystemmanuals**
Get an overview of the Dell Systems Management offerings	Dell OpenManage Systems Management Overview Guide at **dell.com/openmanagemanuals**
Configure and log in to iDRAC, set up managed and management system, know the iDRAC features, and troubleshoot using iDRAC	Integrated Dell Remote Access Controller User's Guide at **dell.com/esmmanuals**
Know about the RACADM subcommands and supported RACADM interfaces	RACADM Command Line Reference Guide for iDRAC and CMC at **dell.com/esmmanuals**
Start, enable, and disable Lifecycle Controller, know the features, use, and troubleshoot Lifecycle Controller	Dell Lifecycle Controller User's Guide at **dell.com/esmmanuals**
Use Lifecycle Controller Remote Services	Dell Lifecycle Controller Remote Services Quick Start Guide at **dell.com/esmmanuals**
Set up, use, and troubleshoot OpenManage Server Administrator	Dell OpenManage Server Administrator User's Guide at **dell.com/openmanagemanuals**
Install, use and troubleshoot OpenManage Essentials	Dell OpenManage Essentials User's Guide at **dell.com/openmanagemanuals**
Know the system features, remove and install system components, and troubleshoot components	Owner's Manual at **dell.com/poweredgemanuals**
Know the enclosure features, remove and install enclosure components, and troubleshoot enclosure components	Enclosure Owner's Manual at **dell.com/poweredgemanuals**

To...	Refer to...
Know the features of the storage controller cards, deploy the cards, and manage the storage subsystem	Storage controller documentation at **dell.com/storagecontrollermanuals**
See the event and error messages generated by the system firmware and agents that monitor system components	Dell Event and Error Messages Reference Guide at **dell.com/esmmanuals**

Quick Resource Locator

Use the Quick Resource Locator (QRL) to get immediate access to system information and how-to videos. This can be done by visiting **dell.com/QRL** or by using your smartphone and a model specific Quick Resource (QR) code located on your Dell PowerEdge system. To try out the QR code, scan the following image.

2

Performing initial system configuration

After you receive your PowerEdge system, you must set up your system in the enclosure, install the operating system if it is not pre-installed, and set up and configure the system iDRAC IP address.

Setting up your system

1. Unpack the blade.
2. Remove the I/O connector cover from the blade connectors.

   CAUTION: While installing the blade, ensure that it is properly aligned with the slot on the enclosure to prevent damage to the blade connectors.
3. Install the blade in the enclosure.
4. Turn on the enclosure.

   NOTE: Wait for the chassis to initialize before you press the power button.
5. Turn on the blade by pressing the power button on the blade.

   Alternatively, you can also turn on the blade by using:

   - The blade iDRAC. For more information, see Logging in to iDRAC.
   - The enclosure Chassis Management Controller (CMC), after the blade iDRAC is configured on the CMC. For more information, see the CMC User's Guide at **dell.com/esmmanuals**.

Setting up and configuring the iDRAC IP address

You can set up the iDRAC IP address using one of the following interfaces:

- iDRAC Settings utility
- Dell Lifecycle Controller
- Dell Deployment Toolkit
- Chassis or Server LCD panel
- CMC Web interface

You can configure iDRAC using one of the following interfaces:

- iDRAC Web interface
- RACADM
- Remote services
- IPMI tool

For more information on setting up and configuring iDRAC, see the iDRAC User's Guide at **dell.com/esmmanuals**.

Logging in to iDRAC

You can log in to iDRAC as an iDRAC user, a Microsoft Active Directory user, or a Lightweight Directory Access Protocol (LDAP) user. You can also log in using Single Sign-On or Smart Card. The default user name is `root` and password is `calvin`. For more information on logging in to iDRAC and iDRAC licenses, see the iDRAC User's Guide at **dell.com/esmmanuals**.

You can also access iDRAC using RACADM. For more information, see the *RACADM Reference Guide for iDRAC and CMC* available at **dell.com/esmmanuals**.

Installing the operating system

You can install the supported operating system on the blade by using the following methods:

- Dell Systems Management Tools and Documentation media. See the operating system documentation at **dell.com/operatingsystemmanuals**.
- Dell Lifecycle Controller. See the Lifecycle Controller documentation at **dell.com/esmmanuals**.
- Dell OpenManage Deployment Toolkit. See the OpenManage documentation at **dell.com/openmanagemanuals**.

For information on the list of operating systems supported on your system, see the operating system's support matrix at **dell.com/ossupport**.

Managing your system remotely

To perform out-of-band systems management by using iDRAC, you must configure iDRAC for remote accessibility, set up the management station and managed system, and configure the supported Web browsers. For more information, see the iDRAC User's Guide at **dell.com/esmmanuals**.

You can also remotely monitor and manage the blades from a single workstation, using the Dell OpenManage Server Administrator (OMSA) software and OpenManage Essentials (OME) systems management console. For more information, see **dell.com/openmanagemanuals**.

Downloading drivers and firmware

It is recommended 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.

Steps

1. Go to **dell.com/support/drivers**.
2. In the **Product Selection** section, enter the Service Tag of your system in the **Service Tag or Express Service Code** field.

NOTE: If you do not have the Service Tag, select **Automatically detect my Service Tag for me** to allow the system to automatically detect your Service Tag, or select **Choose from a list of all Dell products** to select your product from the **Product Selection** page.

3. Click **Get drivers and downloads**.

   The drivers that are applicable to your selection are displayed.

4. Download the drivers you require to a diskette drive, USB drive, CD, or DVD.

3

Pre-operating system management applications

The pre-operating system management applications for your system helps you manage different settings and features without booting to the operating system.

Your system has the following pre-operating system management applications:

- System Setup
- Boot Manager
- Dell Lifecycle Controller

Navigation keys

The navigation keys can help you quickly access the pre-operating system management applications.

Key	Description
<Page Up>	Moves to the previous screen.
<Page Down>	Moves to the next screen.
Up arrow	Moves to the previous field.
Down arrow	Moves to the next field.
<Enter>	Enables you to type a value in the selected field (if applicable) or follow the link in the field.
Spacebar	Expands or collapses a drop-down list, if applicable.
<Tab>	Moves to the next focus area. NOTE: This feature is applicable for the standard graphic browser only.
<Esc>	Moves to the previous page until you view the main screen. Pressing <Esc> in the main screen exits System BIOS or iDRAC Settings/ Device Settings/Service Tag Settings and proceeds with system boot.
<F1>	Displays the System Setup help.

About System Setup

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

You can access **System Setup** in two ways:

- Standard Graphical Browser — This is enabled by default.
- Text Browser — This is enabled by using Console Redirection.

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

Entering System Setup

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

   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.

System Setup Main Menu

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. You can enable or disable various iDRAC parameters by using the iDRAC Settings utility. For more information about this utility, see the Integrated Dell Remote Access Controller User's Guide at **dell.com/esmmanuals**.
Device Settings	Enables you to configure device settings.

System BIOS screen

By using the **System BIOS** screen, you can view the BIOS settings as well as edit specific functions such as **Boot Order**, **System Password**, **Setup Password**, setting the RAID mode, and enabling or disabling USB ports.
To view the System BIOS screen click **System BIOS** on the **System Setup Main Menu**.

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

Menu Item	Description
System Information	Displays information about the system such as the system model name, BIOS version and Service Tag.
Memory Settings	Displays information and options related to the installed memory.
Processor Settings	Displays information and options related to the processor such as speed, cache size.
SATA Settings	Displays options to enable or disable the integrated SATA controller and ports.
Boot Settings	Displays options to specify the boot mode (BIOS or UEFI). Enables you to modify UEFI and BIOS boot settings.
Network Settings	Displays options to change the network settings.

Menu Item	Description
Integrated Devices	Displays options to enable or disable integrated device controllers and ports and specify related features and options.
Serial Communication	Displays options to enable or disable the serial ports and specify related features and options.
System Profile Settings	Displays options to change the processor power management settings, memory frequency, and so on.
System Security	Displays options to configure the system security settings such as, system password, setup password, TPM security. It also enables or disables support for the power and NMI buttons on the system.
Miscellaneous Settings	Displays options to change the system date, time, and so on.

System Information screen

You can use the **System Information** screen to view system properties such as Service Tag, system model, and the BIOS version.
To view the **System Information** click **System Setup Main Menu** → **System BIOS** → **System Information**.

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

Menu Item	Description
System Model Name	Displays the system model name.
System BIOS Version	Displays the BIOS version installed on the system.
System Management Engine Version	Displays the current revision of the Management Engine firmware.
System Service Tag	Displays the system service tag.
System Manufacturer	Displays the name of the system manufacturer.
System Manufacturer Contact Information	Displays the contact information of the system manufacturer.
System CPLD Version	Displays the current revision of the system CPLD firmware.
UEFI Compliance Version	Displays the system firmware UEFI compliance level.

System Memory screen

System Memory screen allows you to view all the memory settings as well as enable or disable specific memory functions such as system memory testing and node interleaving.
In the **System Setup Main Menu**, click **System BIOS** → **System Memory**.

Menu Item	Description
System Memory Size	Displays the amount of memory installed in the system.
System Memory Type	Displays the type of memory installed in the system.
System Memory Speed	Displays the system memory speed.
System Memory Voltage	Displays the system memory voltage.
Video Memory	Displays the amount of video memory.

Menu Item	Description
System Memory Testing	Specifies whether system memory tests are run during system boot. Options are **Enabled** and **Disabled**. By default, the **System Memory Testing** option is set to **Disabled**.
Memory Operating Mode	Specifies the memory operating mode. The options available are **Optimizer Mode**, **Advanced ECC Mode**, **Mirror Mode**, **Spare Mode**, **Spare with Advanced ECC Mode**, and **Dell Fault Resilient Mode**. By default, the **Memory Operating Mode** option is set to **Optimizer Mode**. NOTE: The **Memory Operating Mode** can have different defaults and available options based on the memory configuration of your system. NOTE: The **Dell Fault Resilient Mode** establishes an area of memory that is fault resilient. This mode can be used by an operating system that supports the feature to load critical applications or enables the operating system kernel to maximize system availability.
Node Interleaving	If this field is **Enabled**, memory interleaving is supported if a symmetric memory configuration is installed. If **Disabled**, the system supports Non-Uniform Memory architecture (NUMA) (asymmetric) memory configurations. By default, **Node Interleaving** option is set to **Disabled**.
Snoop Mode	Snoop Mode options available are **Disabled**, **Home Snoop**, **Early Snoop**, **Cluster on Die**. By default, the Snoop Mode option is set to **Disabled**. The field is only available when Node Interleaving is **Disabled**.

Processor Settings screen

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.
To view the **Processor Settings** screen click the **System Setup Main Menu → System BIOS → Processor Settings**.

Menu Item	Description
Logical Processor	Enables or disables the logical processors and displays the number of logical processors. If the **Logical Processor** 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. By default, the **Logical Processor** option is set to **Enabled**.
Alternate RTID (Requestor Transaction ID) Setting	Enables you to allocate more RTIDs to the remote socket, thereby increasing cache performance between the sockets or easing work in normal mode for NUMA. By default, the **Alternate RTID (Requestor Transaction ID) Setting** is set to **Disabled**.
Virtualization Technology	Enables or disables the additional hardware capabilities provided for virtualization. By default, the **Virtualization Technology** option is set to **Enabled**.
Address Translation Service (ATS)	Defines the Address Translation Cache (ATC) for devices to cache the DMA transactions. This field provides an interface to a chipset's Address Translation and Protection Table to translate DMA addresses to host addresses. By default, the option is set to **Enabled**.
Adjacent Cache Line Prefetch	Optimizes the system for applications that require high utilization of sequential memory access. By default, the **Adjacent Cache Line Prefetch**

Menu Item	Description
	option is set to **Enabled**. You can disable this option for applications that require high utilization of random memory access.
Hardware Prefetcher	Enables or disables the hardware prefetcher. By default, the **Hardware Prefetcher** option is set to **Enabled**.
DCU Streamer Prefetcher	Allows you to enable or disable the Data Cache Unit (DCU) streamer prefetcher. By default, the **DCU Streamer Prefetcher** option is set to **Enabled**.
DCU IP Prefetcher	Enables or disables the Data Cache Unit (DCU) IP prefetcher. By default, the **DCU IP Prefetcher** option is set to **Enabled**.
Execute Disable	Enables or disables the execute disable memory protection technology feature. By default, the **Execute Disable** option is set to **Enabled**.
Logical Processor Idling	Enables or disables the operating system capability to put logical processors in the idling state in order to reduce power consumption. By default, the option is set to **Disabled**.
Configurable TDP	Allows reconfiguration of Thermal Design Power (TDP) to lower levels. TDP refers to the maximum amount of power the cooling system is required to dissipate.
X2Apic Mode	Enables or disables the X2Apic mode.
Dell Controlled Turbo	NOTE: Depending on the number of installed CPUs, there may be up to four processor listings. Controls the turbo engagement. Enable this option only when **System Profile** is set to **Performance**.
Number of Cores per Processor	Controls the number of enabled cores in each processor. By default, the **Number of Cores per Processor** option is set to **All**.
Processor 64-bit Support	Specifies if the processor(s) support 64-bit extensions.
Processor Core Speed	Displays the maximum core frequency of the processor.
Processor 1	NOTE: Depending on the number of installed CPUs, there may be up to four processor listings. The following settings are displayed for each processor installed in the system.
Family-Model-Stepping	Displays the family, model and stepping of the processor as defined by Intel.
Brand	Displays the brand name reported by the processor.
Level 2 Cache	Displays the total L2 cache.
Level 3 Cache	Displays the total L3 cache.
Number of Cores	Displays the number of cores per processor.

SATA Settings screen

You can use the **SATA Settings** screen to view the SATA settings of SATA devices and enable RAID on your system.
To view the **SATA Settings** screen click **System Setup Main Menu → System BIOS → SATA Settings**.

Menu Item	Description
Embedded SATA	Enables the embedded SATA to be set to **Off**, **ATA**, **AHCI**, or **RAID** modes. By default, the **Embedded SATA** option is set to **AHCI**.
Security Freeze Lock	Sends Security Freeze Lock command to the Embedded SATA drives during POST. This option is applicable only to ATA and AHCI mode.
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** mode or **RAID** mode, BIOS always enables support.
Model	Displays the drive model of the selected device.
Drive Type	Displays the type of drive attached to the SATA port.
Capacity	Displays the total capacity of the hard drive. The 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** mode or **RAID** mode, BIOS always enables support.
Model	Displays the drive model of the selected device.
Drive Type	Displays the type of drive attached to the SATA port.
Capacity	Displays the total capacity of the hard drive. The 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** mode or **RAID** mode, BIOS always enables support.
Model	Displays the drive model of the selected device.
Drive Type	Displays the type of drive attached to the SATA port.
Capacity	Displays the total capacity of the hard drive. The 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** mode or **RAID** mode, BIOS always enables support.
Model	Displays the drive model of the selected device.
Drive Type	Displays the type of drive attached to the SATA port.
Capacity	Displays the total capacity of the hard drive. The field is undefined for removable media devices such as optical drives.

Menu Item	Description
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** mode or **RAID** mode, BIOS always enables support.
Model	Displays the drive model of the selected device.
Drive Type	Displays the type of drive attached to the SATA port.
Capacity	Displays the total capacity of the hard drive. The field is undefined for removable media devices such as optical drives.
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** mode or **RAID** mode, BIOS always enables support.
Model	Displays the drive model of the selected device.
Drive Type	Displays the type of drive attached to the SATA port.
Capacity	Displays the total capacity of the hard drive. The field is undefined for removable media devices such as optical drives.
Port G	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** mode or **RAID** mode, BIOS always enables support.
Model	Displays the drive model of the selected device.
Drive Type	Displays the type of drive attached to the SATA port.
Capacity	Displays the total capacity of the hard drive. The field is undefined for removable media devices such as optical drives.
Port H	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** mode or **RAID** mode, BIOS always enables support.
Model	Displays the drive model of the selected device.
Drive Type	Displays the type of drive attached to the SATA port.
Capacity	Displays the total capacity of the hard drive. The field is undefined for removable media devices such as optical drives.
Port I	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** mode or **RAID** mode, BIOS always enables support.
Model	Displays the drive model of the selected device.
Drive Type	Displays the type of drive attached to the SATA port.

Menu Item	Description
Capacity	Displays the total capacity of the hard drive. The field is undefined for removable media devices such as optical drives.
Port J	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** mode or **RAID** mode, BIOS always enables support.
Model	Displays the drive model of the selected device.
Drive Type	Displays the type of drive attached to the SATA port.
Capacity	Displays the total capacity of the hard drive. The field is undefined for removable media devices such as optical drives.

Boot Settings screen

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.
To view the **Boot Settings** screen, click **System Setup Main Menu → System BIOS → Boot Settings**.

Menu Item	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.** NOTE: Setting this field to **UEFI** disables the **BIOS Boot Settings** menu. Setting this field to **BIOS** disables the **UEFI Boot Settings** menu. 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. By default, the **Boot Mode** option is set to **BIOS**.
Boot Sequence Retry	Enables or disables the Boot Sequence Retry feature. If this field is enabled and the system fails to boot, the system reattempts the boot sequence after 30 seconds. By default, the **Boot Sequence Retry** option is set to **Enabled**.
Hard-Disk Failover	Specifies which devices in the **Hard-Disk Drive Sequence** are attempted in the boot sequence. When the option is set to **Disabled**, only the first hard disk device in the list is attempted to boot. When set to **Enabled**, all hard disk devices are attempted in the order, as listed 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.

Network Settings screen

You can use the **Network Settings** screen to modify PXE device settings. Network Settings are only available in UEFI boot mode. BIOS does not control network settings in the BIOS boot mode. For BIOS boot mode, the network settings are handled by the network controllers option ROM.
To view the **Network Settings** screen, click **System Setup Main Menu → System BIOS → Network Settings**.

Menu Item	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)	Allows you to control the configuration of the PXE device.

Integrated Devices screen

Integrated Devices screen allows you to view and configure the settings of all integrated devices including the video controller, integrated RAID controller, and the USB ports.
In the **System Setup Main Menu**, click **System BIOS** → **Integrated Devices**.

Menu Item	Description
USB 3.0 Setting	Allows you to enable or disable the USB 3.0 support Enable this option only if your operating system support USB 3.0. Disabling this allows devices to operate at USB 2.0 speed. USB 3.0 is disabled by default
User Accessible USB Ports	Allows you to enable or disable the USB ports. Selecting **Only Back Ports On** disables the front USB ports, selecting **All Ports Off** disables all USB ports. The USB keyboard and mouse operates during boot process in certain operating systems. After the boot process is complete, the USB keyboard and mouse does not work if the ports are disabled. NOTE: Selecting **Only Back Ports On** and **All Ports Off** will disable the USB management port and also restrict access to iDRAC features.
Internal USB Port	Allows you to enable or disable the internal USB port.
Integrated RAID Controller	Allows you to enable or disable the integrated RAID controller. NOTE: This feature is not supported for the PowerEdge T630 system.
Integrated Network Card 1	Allows you to enable or disable the integrated network card.
I/OAT DMA Engine	Allows you to enable or disable the I/OAT option Enable only if the hardware and software supports the feature.
Embedded Video Controller	Allows you to enable or disable the **Embedded Video Controller**. By default, the embedded video controller is **Enabled**. Current state of Embedded Video Controller is **Enabled**. Current State of Embedded Video Controller is a read only field, indicating the current state for the Embedded Video Controller. 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 **Disabled**.
SR-IOV Global Enable	Allows you to enable or disable the BIOS configuration of Single Root I/O Virtualization (SR-IOV) devices. By default, the **SR-IOV Global Enable** option is set to **Disabled**.
OS Watchdog Timer	If your system stops responding, this watchdog timer aids in the recovery of your operating system. When this field is set to **Enabled**, the operating system is allowed to initialize the timer. When is set to **Disabled** (the default), the timer will have no effect on the system.

Menu Item	Description
Memory Mapped I/O above 4GB	Allows you to enable support for PCIe devices that require large amounts of memory. By default, the option is set to **Enabled**.
Slot Disablement	Allows you to enable or disable available PCIe slots on your system. The **Slot Disablement** feature controls the configuration of PCIe cards installed in the specified slot. Slot disablement must be used only when the installed peripheral card is preventing booting into the operating system or causing delays in system startup. If the slot is disabled, both the Option ROM and UEFI driver are disabled.

Serial Communication screen

You can use the **Serial Communication** screen to view the properties of the serial communication port. To view the **Serial Communication** click **System Setup Main Menu → System BIOS → Serial Communication**.

Menu Item	Description
Serial Communication	Selects serial communication devices (Serial Device 1 and Serial Device 2) in the BIOS. BIOS console redirection can also be enabled and the port address can be specified. By default, **Serial Communication** option is set to **Auto**.
Serial Port Address	Enables you to set the port address for serial devices. By default, the **Serial Port Address** option is set to **Serial Device 1=COM2, Serial Device 2=COM1** 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. Therefore, 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.
External Serial Connector	You can associate the External Serial Connector to Serial Device 1, Serial Device 2, or the Remote Access Device using this field. 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. Therefore, 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	Displays 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. By default, the **Failsafe Baud Rate** option is set to **115200**.
Remote Terminal Type	Sets the remote console terminal type. By default, the **Remote Terminal Type** option is set to **VT 100/VT 220**.

Menu Item	Description
Redirection After Boot	Enables or disables the BIOS console redirection when the operating system is loaded. By default, the **Redirection After Boot** option is set to **Enabled**.

System Profile Settings screen

You can use the **System Profile Settings** screen to enable specific system performance settings such as power management.
To view the **System Profile Settings** click **System Setup Main Menu → System BIOS → System Profile Settings**.

Menu Item	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**. By default, the **System Profile** option is set to **Performance Per Watt Optimized (DAPC)**. DAPC is Dell Active Power Controller. NOTE: The following parameters are available only when the **System Profile** is set to **Custom**.
CPU Power Management	Sets the CPU power management. By default, the **CPU Power Management** option is set to **System DBPM (DAPC)**. 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 turbo boost mode. By default, the **Turbo Boost** option is set to **Enabled**.
Energy Efficient Turbo	Enables or disables the **Energy Efficient Turbo**. Energy Efficient Turbo (EET) is a mode of operation where a processor's core frequency is adjusted within the turbo range based on workload.
C1E	Enables or disables the processor to switch to a minimum performance state when it is idle. By default, the **C1E** option is set to **Enabled**.
C States	Enables or disables the processor to operate in all available power states. By default, the **C States** option is set to **Enabled**.
Collaborative CPU Performance Control	Enables or disables the CPU power management. When set to **Enabled**, the CPU power management is controlled by the OS DBPM and the System DBPM (DAPC). By default, the option is set to **Disabled**.
Memory Patrol Scrub	Sets the memory patrol scrub frequency. By default, the **Memory Patrol Scrub** option is set to **Standard**.
Memory Refresh Rate	Sets the memory refresh rate to either 1x or 2x. By default, the **Memory Refresh Rate** option is set to **1x**.
Uncore Frequency	Selects the **Processor Uncore Frequency**. Dynamic mode allows 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**.

Menu Item	Description
Energy Efficient Policy	Enables you to select the **Energy Efficient Policy**. 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. By default, the maximum number of cores is enabled.
Monitor/Mwait	Enables the Monitor/Mwait instructions in the processor. By default, the Monitor/Mwait option is set to **Enabled** for all system profiles, except **Custom**. NOTE: This option can be disabled only if the **C States** option in **Custom** mode is set to **disabled**. NOTE: When **C States** set to **Enabled** in **Custom** mode, changing the Monitor/Mwait setting does not impact system power/performance.

System Security Settings screen

The **System Security** screen allows you to perform specific functions such as setting the system password, setup password, and disabling the power button.
To view the **System Security Settings** in the **System Setup Main Menu** screen, click **System BIOS** → **System Security Settings**.

Menu Item	Description
Intel AES-NI	Improves the speed of applications by performing encryption and decryption using the Advanced Encryption Standard Instruction Set and is set to **Enabled** by default.
System Password	Allows you to set 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	Allows you to set the setup password. This option is read-only if the password jumper is not installed in the system.
Password Status	Allows you to lock the system password. By default, the **Password Status** option is set to **Unlocked**.
TPM Security	NOTE: The TPM menu is available only when the TPM module is installed. Allows you to control the reporting mode of the Trusted Platform Module (TPM). By default, the **TPM Security** option is set to **Off**. 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	Allows you to change the operational state of the TPM. By default, the **TPM Activation** option is set to **No Change**.
TPM Status	Displays the TPM status.

Menu Item	Description
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.** Allows you to clear all the contents of the TPM. By default, the **TPM Clear** option is set to **No**.
Intel TXT	Allows you to enable or disable Intel Trusted Execution Technology (TXT). To enable **Intel TXT**, Virtualization Technology must be enabled and TPM Security must be **Enabled** with Pre-boot measurements. By default, the **Intel TXT** option is set to **Off**.
Power Button	Allows you to enable or disable the power button on the front of the system. By default, the **Power Button** option is set to **Enabled**.
AC Power Recovery	Allows you to set how the system reacts after AC power is restored to the system. By default, the **AC Power Recovery** option is set to **Last**.
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	Allows you to enable Secure Boot, where the BIOS authenticates each pre-boot image using the certificates in the Secure Boot Policy. Secure Boot is disabled by default.
Secure Boot Policy	When Secure Boot policy is **Standard**, the BIOS uses the system manufacturer's key and certificates to authenticate pre-boot images. When Secure Boot policy is **Custom**, the BIOS uses the user-defined key and certificates. Secure Boot policy is **Standard** by default.
Secure Boot Policy Summary	Allows you to view the list of certificates and hashes that secure boot uses to authenticated images.

Secure Boot Custom Policy Settings screen

Secure Boot Custom Policy Settings is displayed only when **Secure Boot Policy** is set to **Custom**.
In the **System Setup Main Menu**, click **System BIOS → System Security → Secure Boot Custom Policy Settings**.

Menu Item	Description
Platform Key	Allows you to import, export, delete, or restore the platform key (PK).
Key Exchange Key Database	Allows you to import, export, delete, or restore entries in the Key Exchange Key (KEK) Database
Authorized Signature Database	Allows you to import, export, delete, or restore entries in the Authorized Signature Database (db).
Forbidden Signature Database	Allows you to import, export, delete, or restore entries in the Forbidden Signature Database (dbx).

Miscellaneous Settings screen

You can use the **Miscellaneous Settings** screen to perform specific functions such as updating the asset tag, and changing the system date and time.
To view the **Miscellaneous Settings** screen, click **System Setup Main Menu → System BIOS → Miscellaneous Settings**.

Menu Item	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	Displays 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. By default the **Keyboard NumLock** is set to **On**. NOTE: This option does not apply to 84-key keyboards.
F1/F2 Prompt on Error	Enables or disables the F1/F2 prompt on error. By default, **F1/F2 Prompt on Error** is set to **Enabled**. 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 only for UEFI boot mode. You cannot set this to **Enabled** if **UEFI Secure Boot** mode is enabled.
In-System Characterization	This option enables or disables **In-System Characterization**. By default, **In-System Characterization** is set to **Disabled**. The two other options are **Enabled** and **Enabled - No Reboot**. NOTE: The default setting for **In-System Characterization** is subject to change in future BIOS releases. When enabled, In-System Characterization (ISC) executes during POST upon detecting relevant change(s) in system configuration. This helps in optimizing the system power and performance. ISC takes about 20 seconds to execute, and system reset is required for ISC results to be applied. The **Enabled - No Reboot** option executes ISC and continues without applying ISC results until the next time system reset occurs. The **Enabled** option executes ISC and forces an immediate system reset so that ISC results can be applied. It takes the system longer to be ready due to the forced system reset. When disabled, ISC does not execute.

About Boot Manager

Boot Manager enables you to add, delete, and arrange boot options. You can also access System Setup and boot options without restarting the system.

Entering Boot Manager

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

1. Turn on or restart your system.
2. Press F11 when you see the message `F11 = Boot Manager`.

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

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	Takes you to the 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 Lifecycle Controller program.
System Utilities	Launches System Utilities menu such as System Diagnostics and UEFI shell.

About Dell Lifecycle Controller

Dell Lifecycle Controller allows you to perform tasks such as configuring BIOS and hardware settings, deploying an operating system, updating drivers, changing RAID settings, and saving hardware profiles. For more information about Dell Lifecycle Controller, see the documentation at **dell.com/esmmanuals**.

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 instructions given below may vary if you have selected **BIOS** for **Boot Mode**.

1. In the **System Setup Main Menu**, 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 <+> and <-> keys to move the device down or up in the order.
4. Click **Exit**, click **Yes** to save the settings on exit.

Choosing the system boot mode

System Setup enables you to specify the boot mode 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 overlays the system BIOS.

To select the system **Boot Mode**:

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

NOTE: After the system boots in the specified boot mode, proceed to install your operating system from that mode.

CAUTION: Trying to boot the operating system from the other boot mode will cause the system to halt at startup.

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 on supported operating systems, go to **dell.com/ossupport**.

Assigning a system or setup password

Prerequisites

NOTE: The password jumper enables or disables the System Password and Setup Password features. For more information on the password jumper settings, see "System board jumper settings".

You can assign a new **System Password** or **Setup Password** or change an existing **System Password** or **Setup Password** only when the password jumper setting is enabled and **Password Status** is set to **Unlocked**. If the Password Status is set to **Locked**, you cannot change the System Password or Setup Password.

If the password jumper setting is disabled, the existing System Password and Setup Password is deleted and you need not provide the system password to boot the system.

Steps

1. To enter **System Setup**, press F2 immediately after a power-on or reboot.
2. In the **System Setup Main Menu**, select **System BIOS** and press Enter.
   The **System BIOS** screen is displayed.
3. In the **System BIOS** screen, select **System Security** and press Enter.
   The **System Security** screen is displayed.
4. In the **System Security** screen, verify that **Password Status** is **Unlocked**.
5. Select **System Password**, enter 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 re-enter the system password.

6. Re-enter the system password and click **OK**.
7. Select **Setup Password**, enter your system password and press Enter or Tab.

   A message prompts you to re-enter the setup password.
8. Re-enter the setup password click **OK**.
9. Press Esc to return to the System BIOS screen. Press Esc again, and a message prompts you to save the changes.

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

Using your system password to secure your system

Prerequisites

NOTE: 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 your password and press Enter.

Next steps

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

If an incorrect system password is entered, the system displays a message and prompts you to re-enter your password. You have three attempts to enter the correct password. After the third unsuccessful attempt, the system displays an error message that the system has halted and must be powered down.

Even after you shut down and restart the system, the error message is displayed until the correct password is entered.

NOTE: You can use the **Password Status** option in conjunction with the **System Password** and **Setup Password** options to protect your system from unauthorized changes.

Deleting or changing an existing system password or setup password

Prerequisites

Ensure that the Password jumper is set to **enabled** and the **Password Status** is set to **Unlocked** before attempting to delete or change the existing System password or Setup password. You cannot delete or change an existing System password or Setup password if the **Password Status** is set to **Locked**.

Steps

1. To enter System Setup, press **F2** immediately after a power-on or restart.
2. In **System Setup Main Menu**, select **System BIOS** and press **Enter**.

   The **System BIOS** screen is displayed.
3. In the **System BIOS** screen, select **System Security** and press **Enter**.

   The **System Security** screen is displayed.

4. In the **System Security** screen, verify that **Password Status** is set to **Unlocked**.
5. Select **System Password**, change or delete the existing system password and press **Enter** or **Tab**.
6. Select **Setup Password**, change or delete the existing setup password and press **Enter** or **Tab**.

   NOTE: If you change the System password or Setup password, a message prompts you to re-enter the new password. If you delete the System password or Setup password, a message prompts you to confirm the deletion.
7. Press **Esc** to return to the System BIOS screen. Press **Esc** again, and a message prompts you to save the changes and exit.

Operating with a setup password enabled

If **Setup Password** is set to **Enabled**, enter the correct setup password before modifying most of the System Setup options.

If you do not enter the correct password in three attempts, the system displays the message

```
Incorrect Password! Number of unsuccessful password attempts: <x> System
Halted! Must power down.
```

Even after you shut down and restart the system, the error message is displayed until the correct password is entered. 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.
- You cannot disable or change an existing system password.

NOTE: You can use the **Password Status** option in conjunction with the **Setup Password** option to protect the system password from unauthorized changes.

Embedded systems management

The Dell Lifecycle Controller provides advanced embedded systems management throughout the server's lifecycle. The 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 Lifecycle Controller.

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

iDRAC Settings utility

The iDRAC Settings utility is an interface to set up and configure the iDRAC parameters using UEFI. You can enable or disable various iDRAC parameters using the iDRAC Settings utility, for example:

- Configure, enable, or disable the iDRAC local area network through the dedicated iDRAC Enterprise card port or the embedded NIC
- Enable or disable IPMI over LAN
- Enable a LAN Platform Event Trap (PET) destination
- Attach or detach the Virtual Media devices

For more information on using iDRAC, see the iDRAC User's Guide, at **dell.com/esmmanuals**.

Entering the iDRAC Settings utility

1. Turn on or restart the managed system.
2. Press <F2> during Power-on Self-test (POST).
3. In the **System Setup Main Menu** page, click **iDRAC Settings**.

The iDRAC Settings page is displayed.

4

Installing and removing blade components

This section provides information on installing and removing the blade components. For information on installing and removing the enclosure components, see the enclosure Owner's Manual at **dell.com/poweredgemanuals**.

Customer and field replaceable units—PowerEdge M830

The following components are Customer Replaceable Units (CRUs):

- Cooling shroud
- Memory module
- mezzanine card
- Internal Dual SD Module (IDSDM) card
- SD vFlash card
- SD cards
- rSPI card
- Network Daughter Card (NDC)
- System board battery
- Hard drives/SSDs
- Hard drive/SSD cage
- 2.5 inch (x4) SAS backplane
- 2.5 inch (x4) SATA backplane
- 2.5 inch (x2) SATA plus 2.5 inch (x2) PCIe backplane
- 1.8 inch (x12) SAS SSD backplane

The following components are Field Replaceable Units (FRUs).

NOTE: Removal and installation procedures of the FRUs should be performed only by Dell certified service technicians.

- Storage controller card
- Expander card
- System board
- Processors
- Heat sinks
- Trusted Platform Module (TPM)

Safety instructions

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

NOTE: It is recommended that you always use a antistatic mat and antistatic wrist strap while working on components inside the system.

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

Recommended tools

You may need the following items to perform the procedures in this section:

- #1 and #2 Phillips screwdrivers
- #2 Phillips round screwdriver
- T8 and T10 Torx drivers
- Wrist grounding strap
- 5 mm and 6 mm Hex nut drivers

Before working inside your system

1. Turn off the blade using the CMC.
2. Remove the blade from the enclosure.
3. Install the I/O connector cover.
4. Remove the system cover. See Removing the system cover.

After working inside your system

1. Install the system cover. See Installing the system cover.
2. Install the blade in the enclosure.
3. Turn on the blade.

Removing and installing a blade

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

NOTE: These procedures are applicable only for full-height and half-height blades. For information on removing and installing quarter-height blades from a sleeve, see the blade's Owner's Manual at **dell.com/poweredgemanuals**.

Removing the blade

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 came with the product.

1. Ensure that you read the Safety instructions.
2. Power down the blade using OS commands or the CMC, and ensure that the blade's power is off.

   When a blade is powered off, its front-panel power indicator is off.
3. Before removing the blades from full-height blade slots 3 or 4, rotate the LCD panel to the storage position to prevent accidental damage to the LCD screen.

CAUTION: To protect the I/O connector pins, install the I/O connector cover any time a blade is removed from the enclosure.

CAUTION: If you are permanently removing the blade, install a blade blank. Operating the system for extended periods of time without a blade blank installed can cause the enclosure to overheat.

Steps

1. Press the release button on the handle.
2. Pull out the handle to unlock the blade from the enclosure.
3. Slide the blade out of the enclosure.
4. Install the I/O connector cover over the I/O connector.

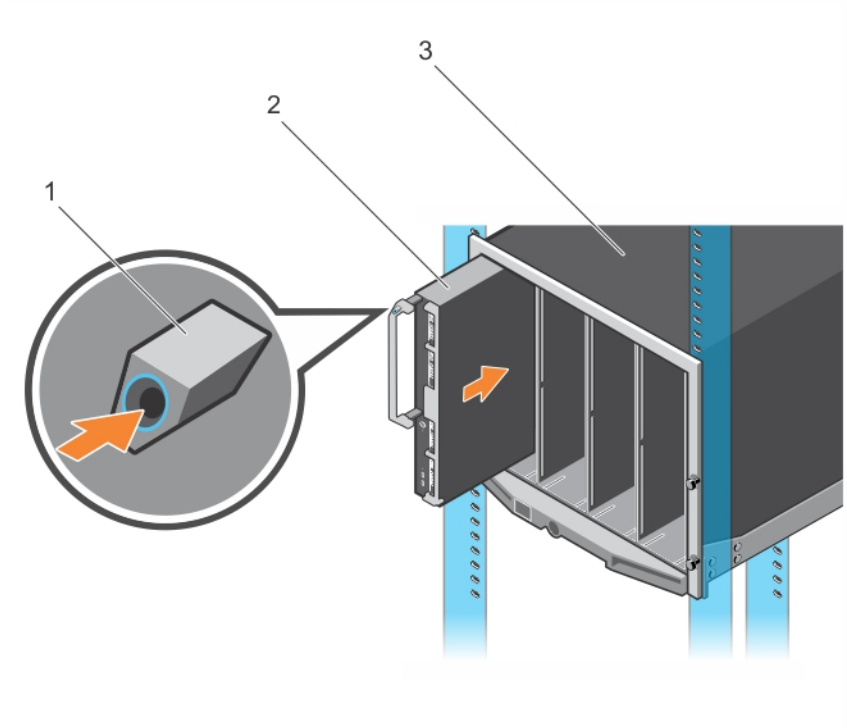

Figure 5. Removing or installing the blade

1. release button
2. blade
3. enclosure

Related Links

Installing a blade

Installing a blade

Prerequisites

Ensure that you read the Safety instructions.

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

Steps

1. If you are installing a new blade, remove the plastic cover from the I/O connector(s) and save for future use.
2. Orient the blade so that the handle is on the left side of the blade.
3. If you are installing the full-height blade in bays 3 or 4, rotate the LCD module to the horizontal storage position to prevent accidental damage to the LCD screen.
4. Align the guide rail on the upper edge of the blade so that the rail fits between the plastic guides on the enclosure.
5. Slide the blade into the enclosure until the handle engages and locks the blade in place.

Related Links

Removing the blade

Removing and installing the system cover

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 came with the product.

NOTE: You must remove the system cover to service other components inside the system.

1. Ensure that you read the Safety instructions.
2. Turn off the blade using CMC.
3. Remove the blade from the enclosure.
4. Install the I/O connector cover.

Steps

1. Press the release buttons and slide the cover toward the back of the blade.
2. Lift the cover away from the blade.

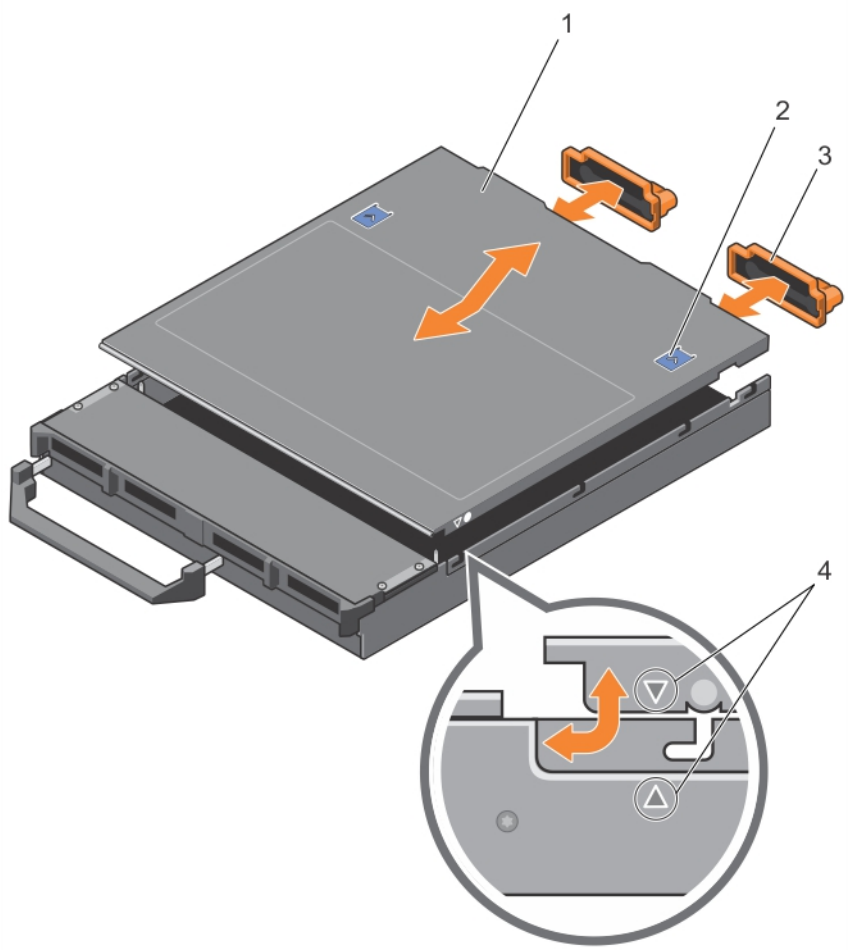

Figure 6. Removing and installing the system cover

1. system cover
2. release button (2)
3. I/O connector cover (2)
4. alignment guides on the system cover and the chassis

Next steps

Install the system cover.

Related Links

Installing the system cover

Removing the blade

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 came with the product.

1. Ensure that you read the Safety instructions.
2. Remove the system cover.

   NOTE: You must remove the system cover to service other components inside the system.
3. Ensure that no tools or parts are left inside the blade.

Steps

1. Align the alignment guide on the system cover with the alignment guide on the chassis.
2. Lower the cover onto the chassis.
3. Slide the cover until it clicks into position.

   A properly seated cover is flush with the surface of the chassis.

Next steps

Follow the procedure listed in After working inside your system.

Related Links

Removing the system cover
Installing a blade

Inside the blade

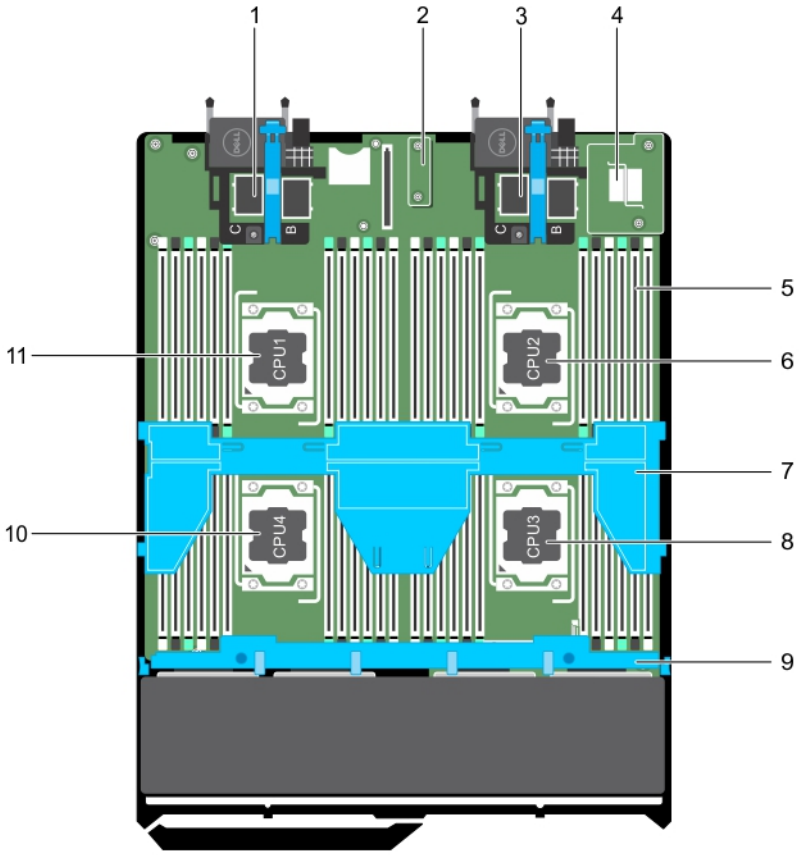

Figure 7. Inside the blade

1.	mezzanine card connectors for card 1 and card 2	2.	restore Serial Peripheral Interface (rSPI) card
3.	mezzanine card connectors for card 3 and card 4	4.	Network Daughter Card (NDC)
5.	memory module (42)	6.	processor 2
7.	cooling shroud	8.	processor 3
9.	hard drive/SSD backplane	10.	processor 4
11.	processor 1		

Cooling shroud

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 came with the product.

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

NOTE: You must remove the cooling shroud to service other components inside the system.

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.

Steps

Hold the cooling shroud at both ends and lift it away from the system.

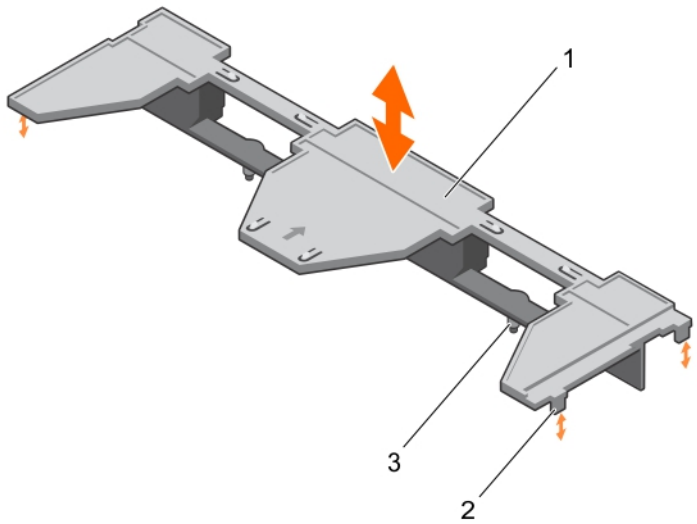

Figure 8. Removing and installing a cooling shroud

1. cooling shroud
2. tab (4)
3. guide pin (2)

Next steps

Install the cooling shroud.

Related Links

Installing the cooling shroud
Removing the blade

Removing the system cover

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 came with the product.

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. Remove the cooling shroud.

   NOTE: You must remove the cooling shroud to service other components inside the system.

Steps

1. Align the guide pins on the cooling shroud with the guide slots on the system board.
2. Lower the cooling shroud into the chassis until the tabs on the sides of cooling shroud engage with the slots on the chassis.

Next steps

Follow the procedure listed in After working inside your system.

Related Links

Removing the cooling shroud
Installing the system cover
Installing a blade

Processor blank and DIMM blank

The processor blank and DIMM blank supplied with your system aids in directing airflow over the unused processor sockets and DIMM slots.

CAUTION: If you are permanently removing a processor, you must install a socket protective cap and a processor blank and DIMM blank in the vacant socket to ensure proper system cooling. The processor blank and DIMM blank covers the vacant sockets for the DIMMs and the processor.

Removing a processor blank and DIMM 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 came with the product.

NOTE: You must remove processor blank and DIMM blank when installing four processors or service other components inside the system.

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.

Steps

Hold the processor blank and DIMM blank by its edges and lift it away from the system.

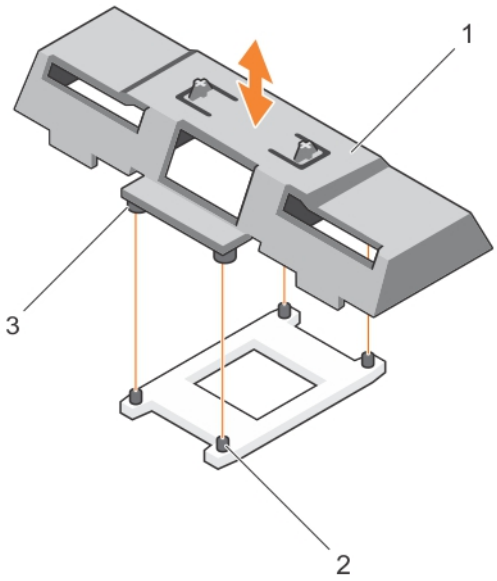

Figure 9. Removing and installing a processor blank and DIMM blank

1. processor blank and DIMM blank
2. heat sink retention socket (4)
3. standoff (4)

Next steps

1. Install the heat sink and the processor.
2. If you are removing a processor permanently, install the processor blank and DIMM blank.

Installing a processor blank and DIMM 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 came with the product.

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. If installed, remove the heat sink and the processor.
4. Remove a processor blank and DIMM blank.

NOTE: You must remove processor blank and DIMM blank when installing two processors or service other components inside the system.

Steps

1. Align the standoffs on the processor blank and DIMM blank with the heat sink retention sockets on the processor socket.
2. Lower the processor blank and DIMM blank onto the system until the standoffs on the processor blank and DIMM blank engage with the heat sink retention sockets.

Next steps

Follow the procedure listed in After working inside your system.

System memory

Your system supports DDR4 registered DIMMs (RDIMMs) and load reduced DIMMs (LRDIMMs). It supports DDR4 voltage specifications.

NOTE: MT/s indicates DIMM speed in MegaTransfers per second.

Memory bus operating frequency can be either 1333 MT/s, 1600 MT/s, 1866 MT/s, or 2133 MT/s depending on the:

- DIMM type (RDIMM or LRDIMM)
- DIMM configuration (number of ranks)
- Maximum frequency of the DIMMs
- Number of DIMMs populated per channel
- System profile selected (for example, Performance Optimized, Custom, or Dense Configuration Optimized)
- Maximum supported DIMM frequency of the processors

Your system contains 48 memory sockets split into four sets of 12 sockets, one set per processor. Each 12-socket set is organized into four channels. In each channel, the release levers of the first socket are marked white, the second socket black, and the third socket green.

NOTE: DIMMs in sockets A1 to A12 are assigned to processor 1, B1 to B12 to processor 2, C1 to C12 to processor 3, and D1 to D12 to processor 4.

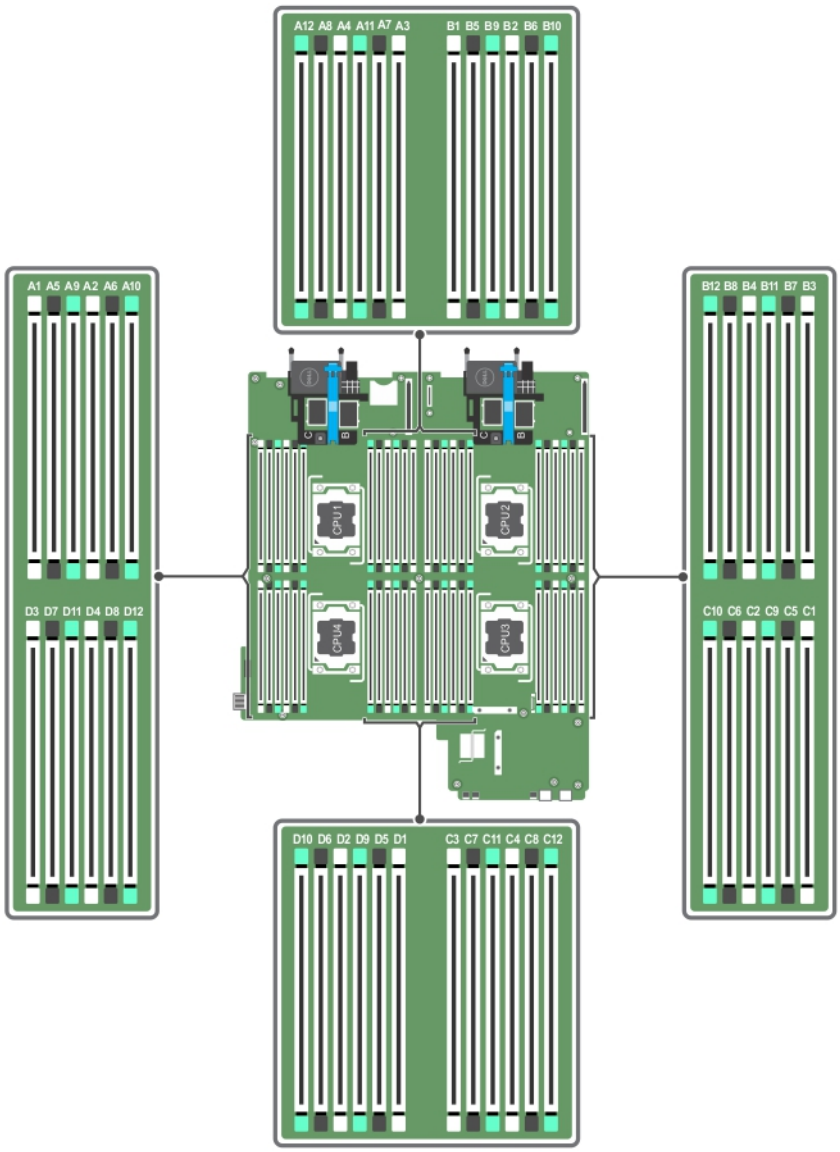

Figure 10. Memory socket locations

Memory channels are organized as follows:

Processor 1	channel 0: memory sockets A1, A5, and A9
	channel 1: memory sockets A2, A6, and A10
	channel 2: memory sockets A3, A7, and A11
	channel 3: memory sockets A4, A8, and A12
Processor 2	channel 0: memory sockets B1, B5, and B9
	channel 1: memory sockets B2, B6, and B10
	channel 2: memory sockets B3, B7, and B11

	channel 3: memory sockets B4, B8, and B12
Processor 3	channel 0: memory sockets C1, C5, and C9
	channel 1: memory sockets C2, C6, and C10
	channel 2: memory sockets C3, C7, and C11
	channel 3: memory sockets C4, C8, and C12
Processor 4	channel 0: memory sockets D1, D5, and D9
	channel 1: memory sockets D2, D6, and D10
	channel 2: memory sockets D3, D7, and D11
	channel 3: memory sockets D4, D8, and D12

The following table shows the memory populations and operating frequencies for the supported configurations.

Processor type	DIMM type	DIMMs populated/ channel	Operating frequency (in MT/s)	Maximum DIMM rank/ channel
			1.2 V	
Intel Xeon Processor E5–4600 v3	RDIMM	1	2133, 1866, 1600, and 1333	single and dual rank
		2	2133, 1866, 1600, and 1333	single and dual rank
		3	1866, 1600, and 1333	single and dual rank
	LRDIMM	1	2133, 1866, 1600, and 1333	quad rank
		2	2133, 1866, 1600, and 1333	quad rank
		3	1866, 1600, and 1333	quad rank

General memory module installation guidelines

This system supports Flexible Memory Configuration, enabling the system to be configured and run in any valid chipset architectural configuration. The following are the recommended guidelines for best performance:

- RDIMMs and LRDIMMs must not be mixed.
- x4 and x8 DRAM based DIMMs can be mixed. For more information, see Mode-Specific Guidelines.
- Up to three dual- or single-rank RDIMMs can be populated per channel.
- Up to three LRDIMMs can be populated regardless of rank count.
- Populate DIMM sockets only if a processor is installed. For dual-processor systems, sockets A1 to A12 and B1 to B12 are available. For four-processor systems, sockets A1 to A12, B1 to B12, C1 to C12, and D1 to D12 are available.
- Populate the sockets by highest rank count in the following order - first in sockets with white release levers, then black, and then green. For example, to mix single-rank and dual-rank DIMMs, populate

dual-rank DIMMs in the sockets with white release tabs and single-rank DIMMs in the sockets with black release tabs.

- In a dual- or four-processor configuration, the memory configuration for each processor must be identical. For example, if you populate socket A1 for processor 1, then you must populate socket B1 for processor 2, and so on.
- Memory modules of different sizes can be mixed provided that other memory population rules are followed (for example, 8 GB and 16 GB memory modules can be mixed).
- Populate four DIMMs per processor (one DIMM per channel) at a time to maximize performance.
- If memory modules with different speeds are installed, they operate at the speed of the slowest installed memory module(s) or slower depending on system DIMM configuration.
- Populate DIMMs based on the following processor-heat sink configurations.

Table 1. Heat sink — processor configurations

Processor Configuration	Processor Type (in Watts)	Heat Sink Width	Number of DIMMs	
			Maximum System Capacity	Reliability, Availability, and Serviceability (RAS) Features
Dual processor	Up to 135 W	74 mm	24	24
Quad processor	Up to 105 W	74 mm	48	48
	120 W or 135 W	94 mm	40 (Three DIMMs in channel 0 and channel 2 and two DIMMs in channel 1 and channel 3)	32 (Two DIMMs per channel)

Mode-specific guidelines

Four memory channels are allocated to each processor. The possible configurations depend on the memory mode selected.

NOTE: x4 and x8 DRAM based DIMMs can be mixed providing support for RAS features. However, all guidelines for specific RAS features must be followed. x4 DRAM based DIMMs retain Single Device Data Correction (SDDC) in memory optimized (independent channel) mode. x8 DRAM based DIMMs require Advanced ECC mode to gain SDDC.

The following sections provide additional slot population guidelines for each mode.

Advanced ECC (lockstep)

Advanced ECC mode extends SDDC from x4 DRAM based DIMMs to both x4 and x8 DRAMs. This protects against single DRAM chip failures during normal operation.

The installation guidelines for memory modules are as follows:

- Memory modules must be identical in size, speed, and technology.
- DIMMs installed in memory sockets with white release levers must be identical and the same rule applies for sockets with black release levers. This ensures that identical DIMMs are installed in matched pair —for example, A1 with A2, A3 with A4, A5 with A6, and so on.

NOTE: Advanced ECC with mirroring is not supported.

Memory optimized (independent channel) mode

This mode supports SDDC only for memory modules that use x4 device width, and this mode does not impose any specific slot population requirements.

Memory sparing

NOTE: To use memory sparing, this feature must be enabled in System Setup.

In this mode, one rank per channel is reserved as a spare. If persistent correctable errors are detected on a rank, the data from this rank is copied to the spare rank, and the failed rank is disabled.

With memory sparing enabled, the system memory available to the operating system is reduced by one rank per channel. For example, in a dual-processor configuration with sixteen 4 GB dual-rank memory modules, the available system memory is: 3/4 (ranks/channel) × 16 (memory modules) × 4 GB = 48 GB, and not 16 (memory modules) × 4 GB = 64 GB.

NOTE: Memory sparing does not offer protection against a multi-bit uncorrectable error.

NOTE: Both Advanced ECC/Lockstep and Optimizer modes support memory sparing.

Memory mirroring

Memory mirroring offers the strongest memory module reliability mode compared to all other modes, providing improved uncorrectable multi-bit failure protection. In a mirrored configuration, the total available system memory is one half of the total installed physical memory. Half of the installed memory is used to mirror the active memory modules. In the event of an uncorrectable error, the system switches over to the mirrored copy. This ensures SDDC and multi-bit protection.

The installation guidelines for memory modules are as follows

- Memory modules must be identical in size, speed, and technology.
- Memory modules installed in memory module sockets with white release levers must be identical and the same rule applies for sockets with black and green release tabs. This ensures that identical memory modules are installed in matched pairs—for example, A1 with A2, A3 with A4, A5 with A6, and so on.

Removing memory modules

Prerequisites

WARNING: The memory modules are hot to 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 or metallic contacts 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 came with the product.

CAUTION: To ensure proper system cooling, memory-module blanks must be installed in any memory socket that is not occupied. Remove memory-module blanks only if you intend to install memory modules in those sockets.

1. Ensure that you read the Safety instructions.

2. Follow the procedure listed in Before working inside your system.
3. Remove the cooling shroud.

Steps

1. Locate the appropriate memory-module socket(s).
2. To release the memory module from the socket, simultaneously press the ejectors on both ends of the memory-module socket.

   CAUTION: Handle each memory module only by the card edges, making sure not to touch the middle of the memory module or metallic contacts.
3. Remove the memory module from the socket.

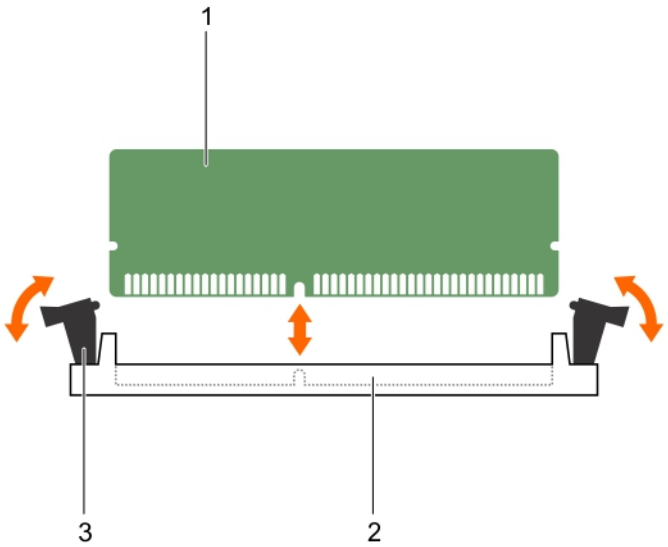

Figure 11. Removing the memory module

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

Next steps

1. If you are removing the memory module permanently, install a memory-module blank. If you are installing a new memory module, see Installing memory modules.
2. Follow the procedure listed in After working inside your system.

Installing memory modules

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 came with the product.

NOTE: You must remove a memory module to upgrade a memory module or replace a faulty memory module.

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. If installed, remove the memory module or the memory-module blank.

WARNING: The memory modules are hot to 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 or metallic contacts on the memory module.

Steps

1. Locate the appropriate memory-module socket.
2. Press the ejectors on the memory-module socket outward to allow the memory module to be inserted into the socket.

   CAUTION: Handle each memory module only on either edges, making sure not to touch the middle of the memory module.
3. Align the edge connector on the memory module with the alignment key on the memory-module socket, and insert the memory module in the socket.

   NOTE: The memory-module socket has an alignment key that allows you to install the memory module in the socket in only one orientation.

   CAUTION: To prevent damage to the memory-module socket during installation, apply pressure at both ends of the memory module evenly. Do not apply pressure to the center of the memory module.
4. Press down on the memory module with your thumbs to lock the memory module into the socket.

   NOTE: When the memory module is properly seated in the socket, the ejectors on the memory-module socket align with the ejectors on the other sockets that have memory modules or memory-module blanks installed.
5. Repeat step 2 through step 5 of this procedure to install the remaining memory modules.

Next steps

1. Follow the procedure listed in After working inside your system.
2. (Optional) Press <F2> to enter the System Setup, and check the **System Memory** setting.

   The system should have already changed the value to reflect the newly installed memory.

   NOTE: If the value is incorrect, one or more of the memory modules may not be installed properly. Check to ensure that the memory modules are firmly seated in their sockets.
3. Run the system memory test in the system diagnostics.

Sample memory configurations

The following tables show sample memory configurations that follow the appropriate memory guidelines stated in this section.

NOTE: 1R, 2R, and 4R in the following tables indicate single-, dual-, and quad-rank DIMMs.

Table 2. Memory configurations – two processors

System capacity (in GB)	DIMM size (in GB)	Number of DIMMs	Organization and speed	DIMM slot population
32	4	8	1R x8, 2133 MT/s	A1, A2, A3, A4, B1, B2, B3, B4
64	4	16	1R x8, 2133 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, B1, B2, B3, B4, B5, B6, B7, B8
64	8	8	2R x8, 2133 MT/s	A1, A2, A3, A4, B1, B2, B3, B4
96	4	24	1R x8, 1866 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12
96	8	12	2R x8, 2133 MT/s	A1, A2, A3, A4, A5, A6, B1, B2, B3, B4, B5, B6
128	8	16	2R x8, 2133 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, B1, B2, B3, B4, B5, B6, B7, B8
128	16	8	2R x4, 2133 MT/s	A1, A2, A3, A4, B1, B2, B3, B4
160	8	20	2R x8, 1866 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, B1, B2, B3, B4, B5, B6, B7, B8, B9, B10
160	16 and 8	12	2R x4, 2133 MT/s 2R x8, 2133 MT/s	A1, A2, A3, A4, A5, A6, B1, B2, B3, B4, B5, B6 **NOTE:** 16 GB DIMMs must be installed in the slots numbered A1, A2, A3, A4, B1, B2, B3, and B4 and 8 GB DIMMs must be installed in slots A5, A6, B5 and B6.
192	8	24	2R x8, 1866 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12
192	16	12	2R x4, 2133 MT/s	A1, A2, A3, A4, A5, A6, B1, B2, B3, B4, B5, B6
256	16	16	2R x4, 2133 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, B1, B2, B3, B4, B5, B6, B7, B8

System capacity (in GB)	DIMM size (in GB)	Number of DIMMs	Organization and speed	DIMM slot population
384	16	24	2R x4, 1866 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12
512	32	16	4R, x4, 2133 MT/s 2R, x4, 2133 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, B1, B2, B3, B4, B5, B6, B7, B8
768	32	24	4R, x4, 1866 MT/s 2R, x4, 1866 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12

Table 3. Memory configurations – four processors

System capacity (in GB)	DIMM size (in GB)	Number of DIMMs	Organization and speed	DIMM slot population
64	4	16	1R x8, 2133 MT/s	A1, A2, A3, A4, B1, B2, B3, B4, C1, C2, C3, C4, D1, D2, D3, D4
96	8	24	2R x8, 2133 MT/s	A1, A2, A3, A4, A5, A6, B1, B2, B3, B4, B5, B6, C1, C2, C3, C4, C5, C6, D1, D2, D3, D4, D5, D6
128	4	32	1R x8, 2133 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, B1, B2, B3, B4, B5, B6, B7, B8, C1, C2, C3, C4, C5, C6, C7, C8, D1, D2, D3, D4, D5, D6, D7, D8
128	8	16	2R x8, 2133 MT/s	A1, A2, A3, A4, B1, B2, B3, B4, C1, C2, C3, C4, D1, D2, D3, D4
192	4	48	1R x8, 1866 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12, C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12
192	8	24	2R x8, 2133 MT/s	A1, A2, A3, A4, A5, A6, B1, B2, B3, B4, B5, B6, C1, C2, C3, C4, C5, C6, D1, D2, D3, D4, D5, D6

System capacity (in GB)	DIMM size (in GB)	Number of DIMMs	Organization and speed	DIMM slot population
256	16	16	2R x4, 2133 MT/s	A1, A2, A3, A4, B1, B2, B3, B4, C1, C2, C3, C4, D1, D2, D3, D4
384	16	24	2R x4, 2133 MT/s	A1, A2, A3, A4, A5, A6, B1, B2, B3, B4, B5, B6, C1, C2, C3, C4, C5, C6, D1, D2, D3, D4, D5, D6
512	32	16	4R, x4, 2133 MT/s 2R, x4, 2133 MT/s	A1, A2, A3, A4, B1, B2, B3, B4, C1, C2, C3, C4, D1, D2, D3, D4
768	32	24	4R, x4, 2133 MT/s 2R, x4, 2133 MT/s	A1, A2, A3, A4, A5, A6, B1, B2, B3, B4, B5, B6, C1, C2, C3, C4, C5, C6, D1, D2, D3, D4, D5, D6
1024	32	32	4R, x4, 2133 MT/s 2R, x4, 2133 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, B1, B2, B3, B4, B5, B6, B7, B8, C1, C2, C3, C4, C5, C6, C7, C8, D1, D2, D3, D4, D5, D6, D7, D8
1536	32	48	4R, x4, 1866 MT/s 2R, x4, 1866 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12, C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12

I/O module mezzanine cards

Your system supports a variety of optional mezzanine cards. If installed, the mezzanine card(s) must be used in conjunction with a matching I/O module(s).

For more information on I/O modules, see "Guidelines for Installing I/O Modules" in the *M1000e Enclosure Owner's Manual* at **dell.com/support/home**.

Mezzanine card installation guidelines

The blade supports up to four mezzanine cards:

- Mezzanine card slot C supports Fabric C. This card must match the fabric type of I/O modules installed in I/O module bays C1 and C2.
- Mezzanine card slot B supports Fabric B. This card must match the fabric type of I/O modules installed in I/O module bays B1 and B2.

The blade supports SFF mezzanine cards. x8 PCIe Gen 3 cards are supported.

Removing a 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 came with the product.

NOTE: You must remove a mezzanine card to replace a faulty mezzanine card or service other components inside the system.

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.

Steps

1. Open the retention latch by pressing the ridged area on the latch, and lifting the end of the latch.

   CAUTION: To prevent damage to the mezzanine card, hold the card only by its edges.

2. Lift the mezzanine card away from the system.
3. Close the retention latch.

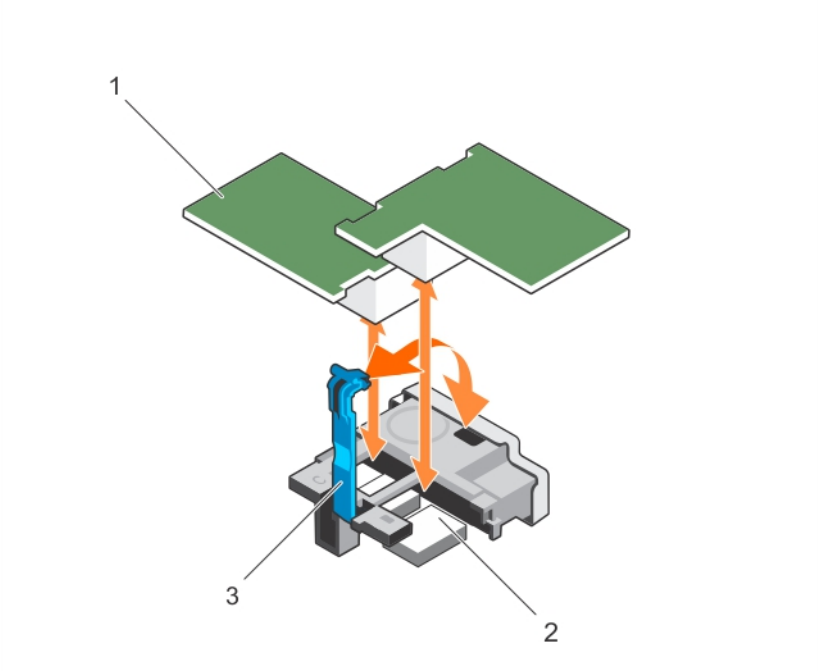

Figure 12. Removing and installing a mezzanine card

1. mezzanine card (2)
2. mezzanine card connector (2)
3. retention latch

Next steps

1. Install the mezzanine card.

Related Links

Installing a mezzanine card
Removing the blade
Removing the system cover

Installing a 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 came with the product.

1. Ensure that you read the Safety instructions.
2. Remove the mezzanine card.

NOTE: You must remove a mezzanine card to replace a faulty mezzanine card or service other components inside the system.

Steps

1. Open the retention latch by pressing the ridged area on the latch, and lifting the end of the latch.
2. If present, remove the connector cover from the mezzanine card bay.

CAUTION: To prevent damage to the mezzanine card, hold the card only by its edges.

NOTE: Mezzanine cards are designed to fit in either card slot.

3. Align the connector on the bottom of the mezzanine card with the corresponding socket on the system board.
4. Lower the card into place until it is fully seated and the plastic clip on the outer edge of the card fits over the side of the blade chassis.
5. Close the retention latch to secure the mezzanine card.

Next steps

Follow the procedure listed in After working inside your system.

Related Links

Removing a mezzanine card
Installing the system cover
Installing a blade

Mezzanine card support bracket

Removing the mezzanine card support bracket

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 came with the product.

NOTE: You must remove the mezzanine card support bracket to replace a faulty system board.

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. Keep the #2 Phillips screwdriver ready.
4. Remove the mezzanine card.

Steps

1. Remove the screw that secures the mezzanine card support bracket to the system board.
2. Orient the mezzanine card support bracket upward and slide it until the tabs on the mezzanine card support bracket disengage from the slots on the system.
3. Lift the mezzanine card support bracket away from the system.

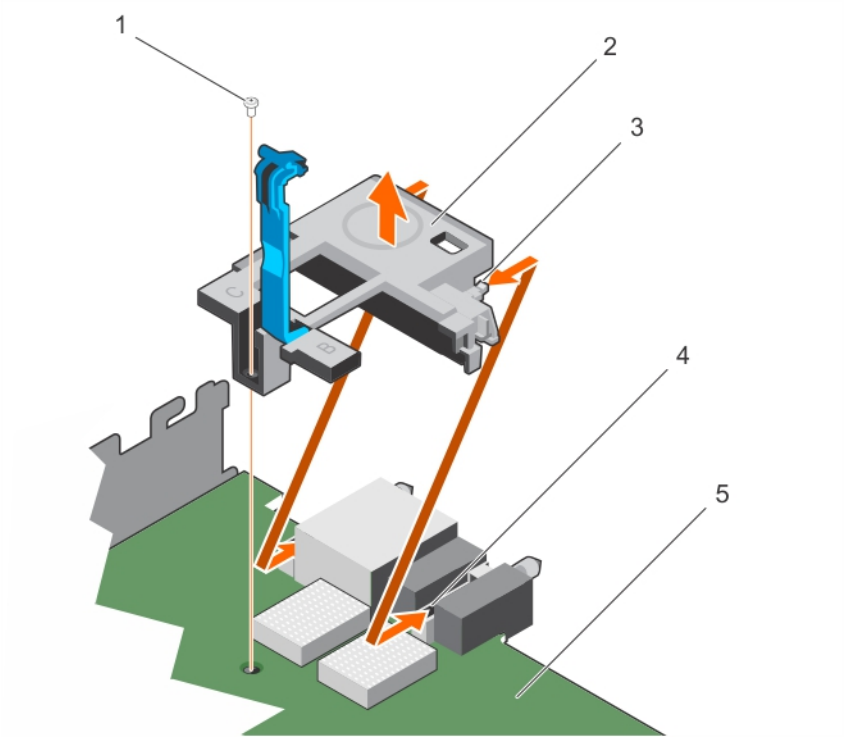

Figure 13. Removing and installing the mezzanine card support bracket

1. screw
2. mezzanine card support bracket
3. tab on the bracket (2)
4. slot on the system (2)
5. system board

Next steps

1. Install the mezzanine card support bracket.

Related Links

Installing the mezzanine card support bracket

Installing the mezzanine card support bracket

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 came with the product.

1. Ensure that you read the Safety instructions.
2. Keep the #2 Phillips screwdriver ready.
3. Remove the mezzanine card support bracket.

NOTE: You must remove the mezzanine card support bracket to replace a faulty system board.

Steps

1. Orient the mezzanine card support bracket toward the back of the system.
2. Align the tabs on the mezzanine card support bracket with the slots on the system and slide it until the tabs on the support bracket engage with the slots on the system.
3. Install the screw to secure the mezzanine card support bracket on the system board.

Next steps

1. Install the mezzanine card.

Related Links

Removing the mezzanine card support bracket

IDSDM card (optional)

The Internal Dual SD Module (IDSDM) card provides two SD card slots and a USB interface dedicated for the embedded hypervisor. This card offers the following features:

- Dual card operation—maintains a mirrored configuration using SD cards in both slots and provides redundancy.
- Single card operation—single card operation is supported, but without redundancy.

Replacing an SD 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 came with the product.

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. Enter the System Setup and ensure that the **Internal SD Card Port** is enabled.

CAUTION: When an SD card failure occurs, and the Internal SD Card Redundancy option in the Integrated Devices screen of the System Setup is set to Mirror Mode, there may be loss of data. To avoid data loss, follow step 4 through step 6 of Troubleshooting an internal SD card.

NOTE: The SD card in the lower card slot is the primary card (SD1) and the SD card in the upper card slot is the secondary card (SD2).

NOTE: When an SD card failure occurs, the **Internal SD Card Redundancy** option in the System Setup is set to **Disabled** and the internal dual SD module controller notifies the system. On the next reboot, the system displays a message indicating the failure.

NOTE: If the **Internal SD Card Redundancy** option is set to **Disabled**, replace the failed SD card with a new SD card.

Steps

1. Locate the SD card slot on the internal dual SD module (IDSDM) card.
2. Press inward on the card to release it from the slot, and remove the card.

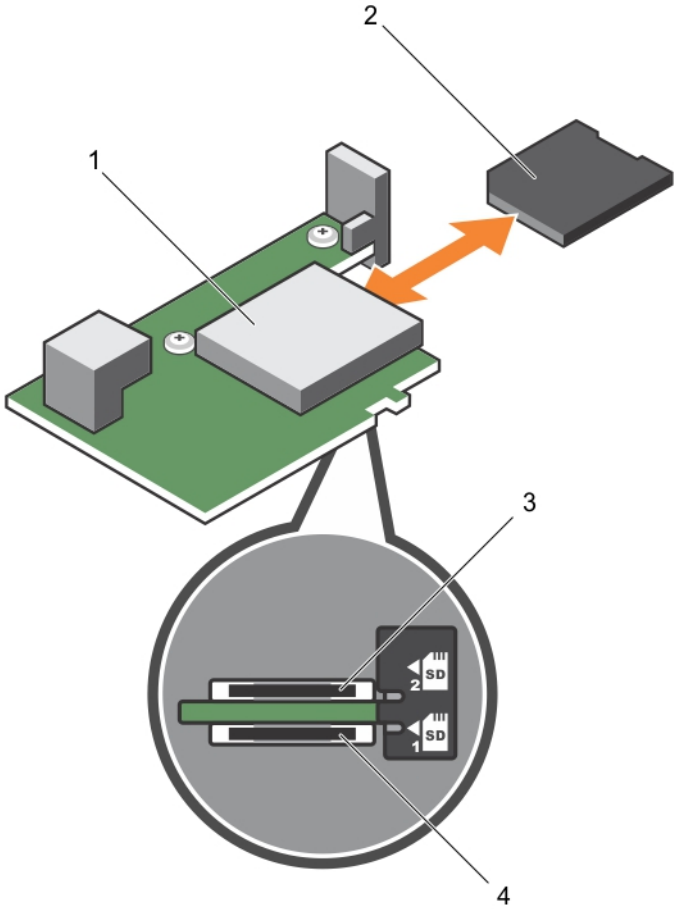

Figure 14. Replacing an SD card

1. IDSDM card
2. SD card
3. upper card slot (SD 2)
4. lower card slot (SD 1)

Next steps

1. Follow the procedure listed in After working inside your system.
2. Enter the System Setup and ensure that the **Internal SD Card Port** and **Internal SD Card Redundancy** modes are enabled.
3. Check if the new SD card is functioning properly. If the problem persists, see Getting Help.

Internal USB key

The blade provides an internal USB connector for a USB flash memory key. The USB memory key can be used as a boot device, security key, or mass storage device. To use the internal USB connector, the **Internal USB Port** option must be enabled in the **Integrated Devices** screen of the System Setup.

To boot from the USB memory key, you must configure the USB memory key with a boot image, and then specify the USB memory key in the boot sequence in the System Setup. For information on creating

a bootable file on the USB memory key, see the user documentation that accompanied the USB memory key.

Replacing the internal USB key

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 came with the product.

CAUTION: To avoid interference with other components in the blade, the maximum permissible dimensions of the USB key are 15.9 mm wide x 57.15 mm long x 7.9 mm high.

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.

Steps

1. Locate the USB connector/USB key.
2. If installed, remove the USB key.
3. Insert the new USB memory key into the USB connector.

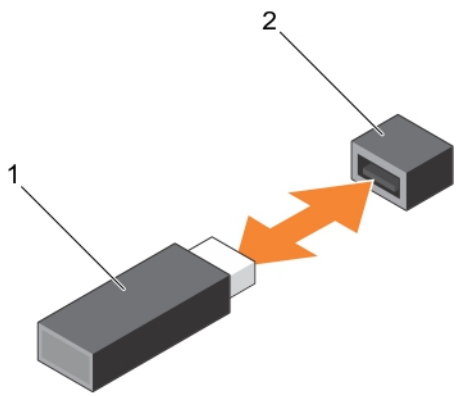

Figure 15. Replacing the USB memory key

1. USB memory key
2. USB memory key connector

Next steps

1. Follow the procedure listed in After working inside your system.
2. Enter the System Setup and ensure that the USB key is detected by the system.

Removing the IDSDM 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 came with the product.

NOTE: You must remove the IDSDM card to replace a faulty IDSDM card or service other components inside the system.

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. Keep the #2 Phillips screwdriver ready.
4. Remove the mezzanine card.
5. If installed, remove the internal USB key.
6. If installed, remove the SD card(s).

Steps

1. Remove the two screws securing the IDSDM card to the system board.
2. Remove the SD card slot bracket.

   CAUTION: To prevent damage to the IDSDM card, hold the card only by its edges.
3. Lift the card away from the system.

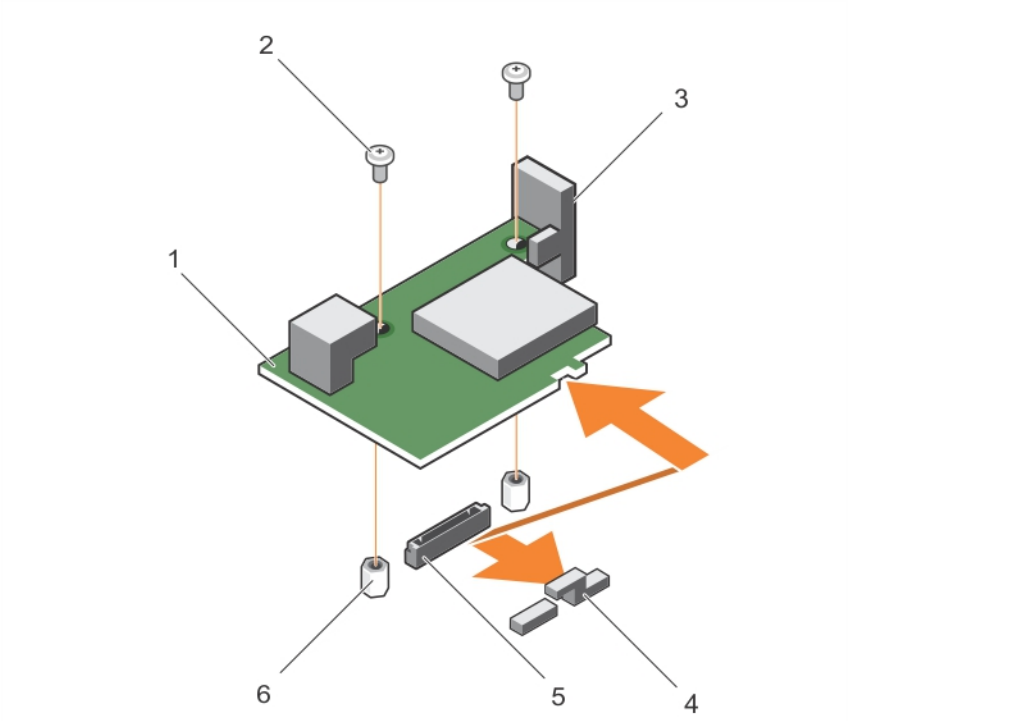

Figure 16. Removing and installing the IDSDM card

1. IDSDM card
2. screw (2)
3. SD card slot bracket
4. mezzanine card support bracket
5. connector
6. standoff (2)

Next steps

1. Install the IDSDM card.

Related Links

[Removing a mezzanine card]
[Replacing the internal USB key]
[Replacing an SD card]
[Installing the IDSDM card]

Installing the IDSDM 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 came with the product.

1. Ensure that you read the Safety instructions.
2. Keep the #2 Phillips screwdriver ready.

3. Remove the IDSDM card.

CAUTION: To prevent damage to the IDSDM card, hold the card only by its edges.

NOTE: You must remove the IDSDM card to replace a faulty IDSDM card or service other components inside the system.

Steps

1. Align the following:
   - The slot on the card edge with the projection tabs on the mezzanine card support.
   - The two screw holes on the IDSDM card with the standoffs on the system board.
   - The hole on the SD card slot bracket with the screw hole on the IDSDM card.
2. Install the two screws to secure the SD card slot bracket and IDSDM card to the system board.

Next steps

1. If applicable, install the SD card(s) and the internal USB key.
2. Install the mezzanine card.
3. Follow the procedure listed in After working inside your system.

Related Links

Replacing an SD card
Replacing the internal USB key
Removing a mezzanine card
Removing the IDSDM card

rSPI card (optional)

rSPI (restore Serial Peripheral Interface) is a SPI flash device to store information about the system Service Tag, system configuration, or iDRAC license.

Removing the rSPI 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 came with the product.

NOTE: You must remove the rSPI card to replace a faulty rSPI card or service other components inside the system.

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. Keep the #2 Phillips screwdriver ready.
4. Remove the mezzanine card.

Steps

1. Remove the two screws securing the rSPI card to the system board.

CAUTION: To prevent damage to the rSPI card, hold the card only by its edges.

2. Lift the card away from the system.

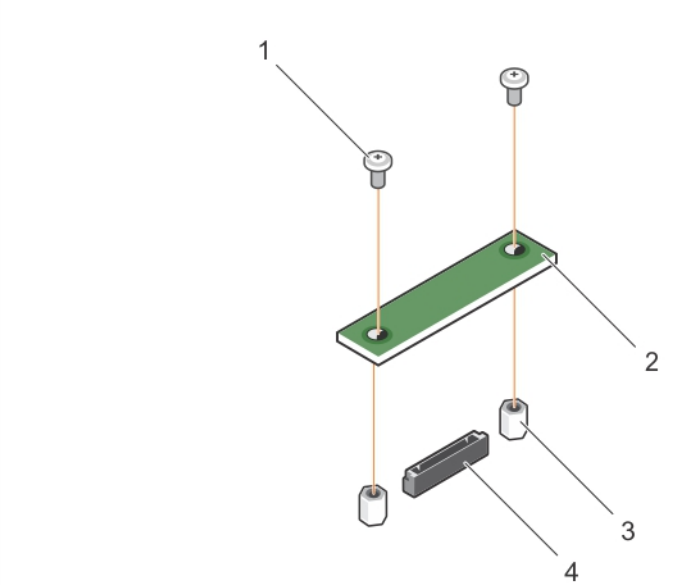

Figure 17. Removing and installing the rSPI card

1. screw (2)
2. rSPI card
3. standoff (2)
4. connector

Next steps

1. Install the rSPI card.

Related Links

Installing the rSPI card
Removing the blade
Removing the system cover
Removing a mezzanine card

Installing the rSPI 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 came with the product.

1. Ensure that you read the Safety instructions.
2. Keep the #2 Phillips screwdriver ready.
3. Remove the rSPI card.

CAUTION: To prevent damage to the rSPI card, hold the card only by its edges.

NOTE: You must remove the rSPI card to replace a faulty rSPI card or service other components inside the system.

Steps

1. Align the two screw holes on the rSPI card with the standoffs on the system board.
2. Install the two screws to secure the rSPI card to the system board.

Next steps

1. Install the mezzanine card.
2. Follow the procedure listed in After working inside your system.

Related Links

Removing the rSPI card
Installing a mezzanine card
Installing the system cover
Installing a blade

SD vFlash card

You can use an SD vFlash card with your system. The card slot is located on the IDSDM card. You can remove and install the SD vFlash card

Replacing the SD vFlash 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 came with the product.

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.

Steps

1. If installed, remove the SD vFlash card from the card slot.

   NOTE: The SD vFlash card slot is below the NDC.
2. Insert the contact-pin end of the SD card into the card slot on the VFlash media unit.

   NOTE: The slot is keyed to ensure correct insertion of the card.
3. Press inward on the card to lock it into the slot.

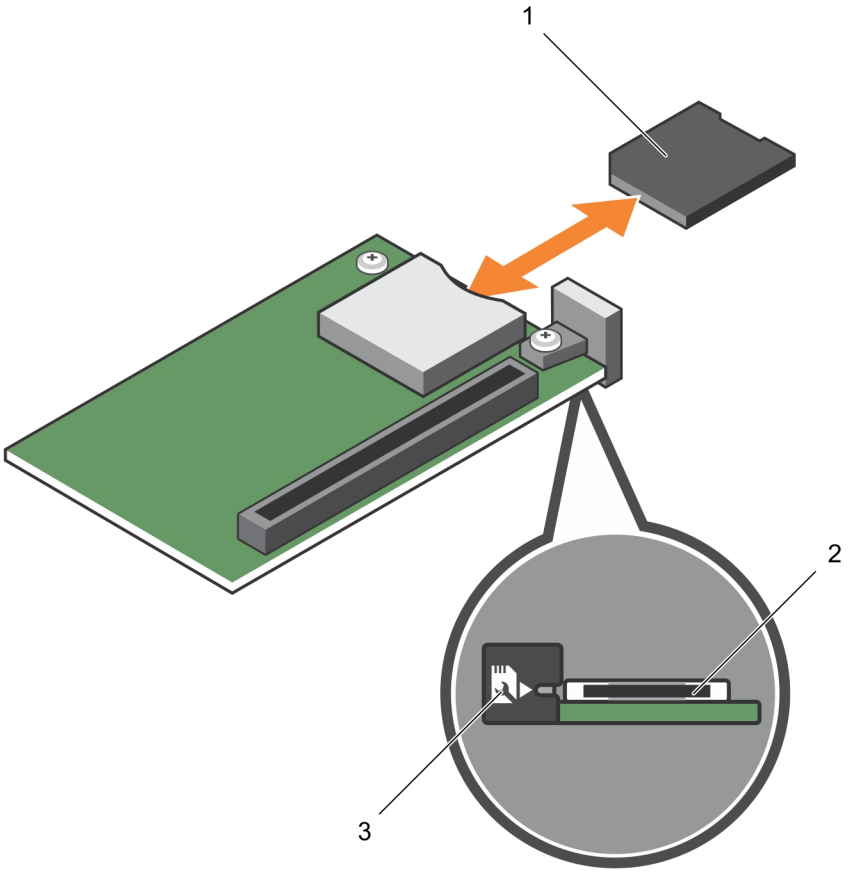

Figure 18. Replacing the SD vFlash card

1. SD vFlash card
2. SD vFlash card slot
3. SD vFlash card slot identification label

Next steps

Follow the procedure listed in After working inside your system.

Network Daughter Card

Removing the Network Daughter 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 came with the product.

NOTE: You must remove the NDC to replace a faulty NDC or service other components inside the system.

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. Keep the #2 Phillips screwdriver ready.
4. Remove the mezzanine card.

Steps

1. Remove the two screws that secure the Network Daughter Card (NDC) to the system board.

CAUTION: To prevent damage to the NDC, hold the card only by its edges.

2. Lift the card away from the system.

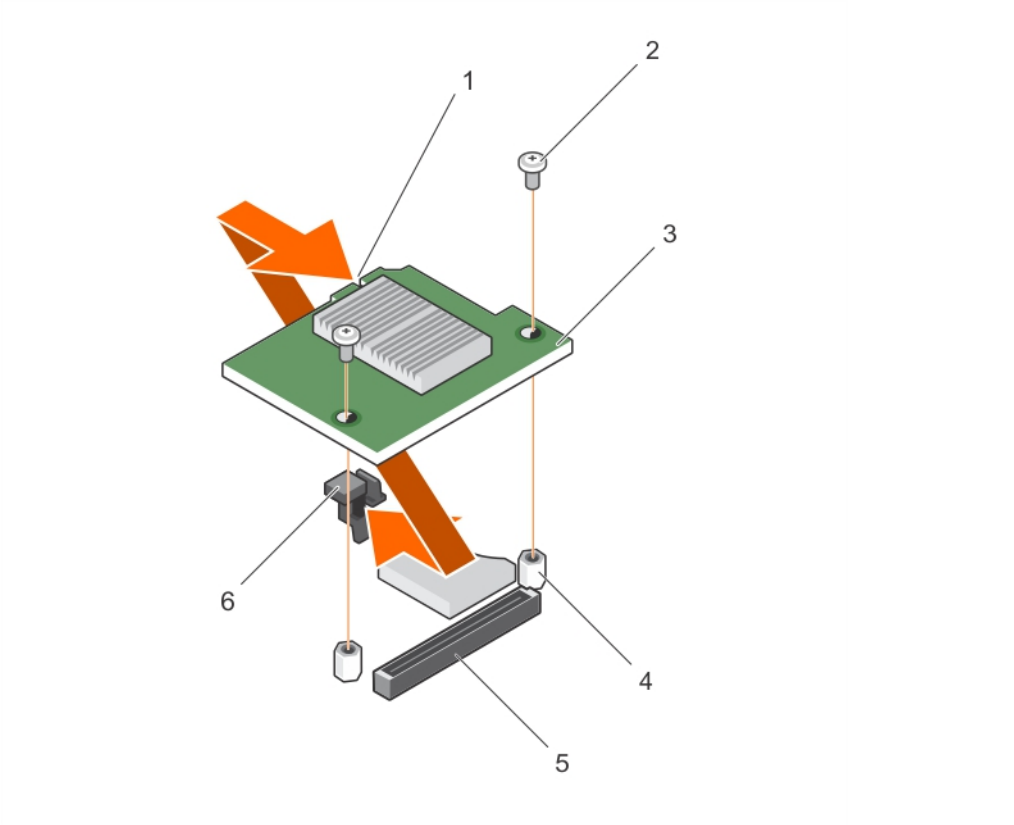

Figure 19. Removing and installing the NDC

1. slot on the NDC
2. screw (2)
3. NDC
4. standoff (2)
5. connector
6. tab projections

Next steps

1. Install the NDC.

Related Links

Installing the Network Daughter Card
Removing the blade
Removing the system cover

Removing a mezzanine card

Installing the Network Daughter 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 came with the product.

1. Ensure that you read the Safety instructions.
2. Keep the #2 Phillips screwdriver ready.
3. Remove the NDC.

CAUTION: To prevent damage to the NDC, hold the card only by its edges.

NOTE: You must remove the NDC to replace a faulty NDC or service other components inside the system.

Steps

1. Align the following:
   a. The slots on the card edge with the projection tabs on the plastic bracket covering the mezzanine card slots.
   b. Screw holes on the card with the standoffs on the system board.
2. Lower the card into place until the card connector fits into the corresponding connector on the system board.
3. Secure the card with the two screws.

Next steps

1. Install the mezzanine card.
2. Follow the procedure listed in After working inside your system.

Related Links

Removing the Network Daughter Card
Installing a mezzanine card
Installing the system cover
Installing a blade

Processors

The blade supports up to four Intel Xeon E5-4600 v3 product family processors.

CAUTION: If you are using a system with two processors, ensure that you use 74 mm wide heat sinks for processors up to 135 W.

CAUTION: If you are using a system with four processors, ensure that you use 74 mm wide heat sinks for processors up to 105 W and 94 mm wide heat sinks for processors up to 120 W or 135 W.

NOTE: Mixing of processors of different wattages is not supported.

Use the following procedure when:

- Installing an additional processor
- Replacing a processor

Removing a 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 came with the product.

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.

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

NOTE: To ensure proper system cooling, you must install a processor blank in any empty processor socket.

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. Keep the #2 Phillips screwdriver ready.
4. Remove the cooling shroud.

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

Steps

1. Loosen one of the screws that secure the heat sink to the system board.

   Wait 30 seconds for the heat sink to loosen from the processor.
2. Remove the screw diagonally opposite the screw you first removed.
3. Repeat the procedure for the remaining two screws.

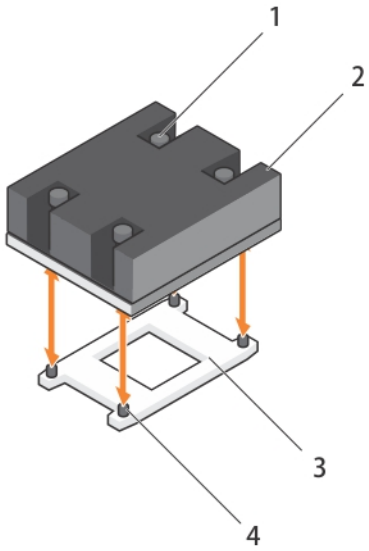

Figure 20. Removing and installing a heat sink

1. retention screw (4)
2. heat sink
3. processor socket
4. heat sink retention socket (4)

Next steps

1. Install the heat sink.

Related Links

Removing the cooling shroud
Removing a processor

Removing a processor

Prerequisites

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

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

CAUTION: If you are permanently removing a processor, you must install a socket protective cap and a processor/DIMM blank in the vacant socket to ensure proper system cooling. The processor/DIMM blank covers the vacant sockets for the DIMMs and the processor.

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

NOTE: You must remove a processor to upgrade a processor or replace a faulty processor.

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. Remove the cooling shroud.
4. Remove the heat sink.
5. If installed, remove the processor/DIMM blank.
6. Use a clean, lint-free cloth to remove any thermal grease from the surface of the processor shield.

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

Steps

1. Position your thumb firmly over the socket-release lever 1 and lever 2 of the processor and release both the levers simultaneously from the locked position by pushing down and out from under the tab.

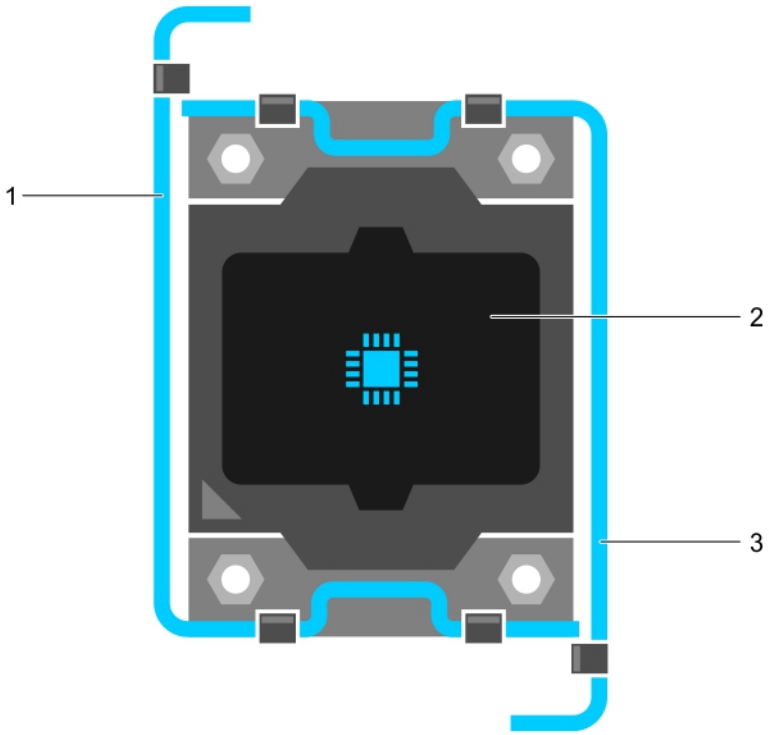

Figure 21. Processor shield opening and closing lever sequence

1. socket-release lever 1
2. processor
3. socket-release lever 2

2. Hold the processor shield and rotate the shield upward and out of the way.

3. Lift the processor out of the socket and leave the release lever up so that the socket is ready for the new processor.

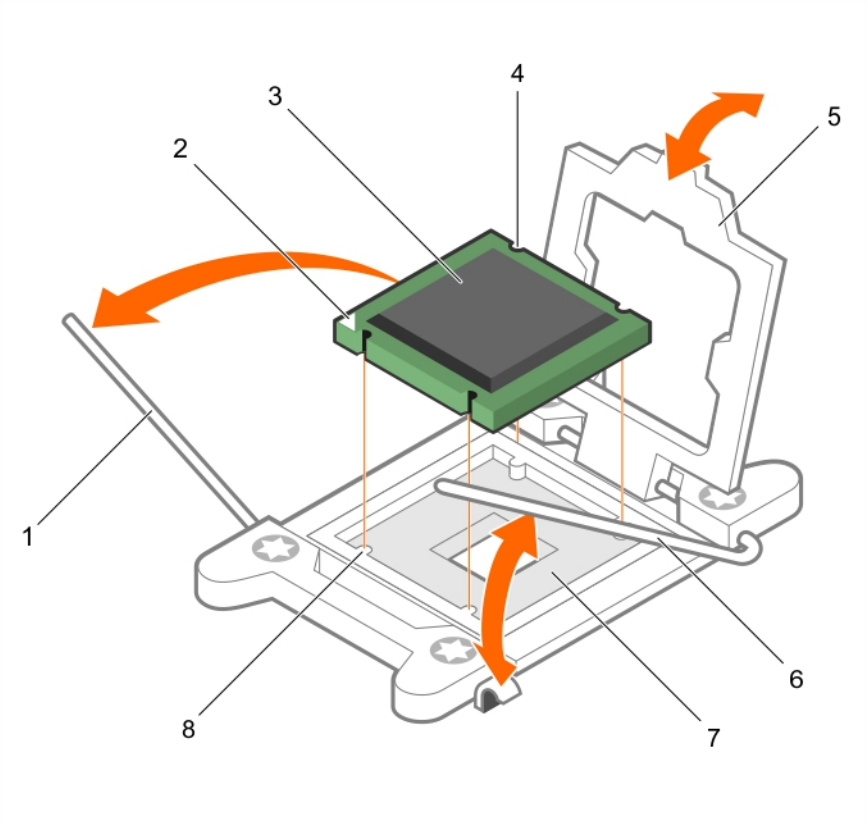

Figure 22. Removing and installing a processor

1. socket-release lever 1
2. pin-1 corner of the processor
3. processor
4. slot (4)
5. processor shield
6. socket-release lever 2
7. processor socket
8. tab (4)

Next steps

1. Replace the processor.
2. Install the heat sink.

Related Links

Removing the cooling shroud
Removing a heat sink
Installing a processor
Installing a 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 came with the product.

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

1. Ensure that you read the Safety instructions.
2. Remove the processor.

   NOTE: You must remove a processor to upgrade a processor or replace a faulty processor.

Steps

1. Unlatch and rotate the socket-release levers 90 degrees upward and ensure that the socket-release lever is fully open.
2. Hold the tab on the processor shield and rotate the shield upward and out of the way.

   NOTE: It is recommended that you install/remove the socket protective cap from the processor shield with the processor shield in the open position.
3. If installed, remove the socket protective cap from the processor shield. To remove the socket protective cap, push the cap from the inside of the processor shield and move it away from the socket pins.

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

   CAUTION: Do not use force to seat the processor. When the processor is positioned correctly, it engages easily into the socket.
4. Install the processor in the socket:
   a. Identify the pin-1 corner of the processor by locating the tiny gold triangle on one corner of the processor. Place this corner in the same corner of the ZIF socket identified by a corresponding triangle on the system board.
   b. Align the pin-1 corner of the processor with the pin-1 corner of the system board.
   c. Set the processor lightly in the socket.

      Because the system uses a ZIF processor socket, do not use force. When the processor is positioned correctly, it drops down into the socket with minimal pressure.
   d. Close the processor shield.
   e. Rotate the socket-release lever 1 and lever 2 simultaneously until it is locked in position.

Next steps

NOTE: Ensure that you install the heat sink after you install the processor. The heat sink is necessary to maintain proper thermal conditions.

1. Install the heat sink.
2. If you are permanently removing the processor and the heat sink, ensure that you install a processor/DIMM blank.
3. Follow the procedure listed in After working inside your system.

Related Links

Removing a processor blank and DIMM blank
Installing a heat sink

Installing a 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 came with the product.

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

1. Ensure that you read the Safety instructions.
2. Keep the #2 Phillips screwdriver ready.
3. Remove the heat sink.

   NOTE: You must remove a heat sink to upgrade a processor or replace a faulty heat sink.

Steps

1. If you are using an existing heat sink, remove the thermal grease from the heat sink by using a clean lint-free cloth.
2. Use the thermal grease syringe included with your processor kit to apply the grease in a thin spiral on the top of the processor as shown in the following figure.

   CAUTION: Applying too much thermal grease can result in excess grease coming in contact with and contaminating the processor socket.

   NOTE: The thermal grease syringe is intended for one-time use only. Dispose of the syringe after you use it.

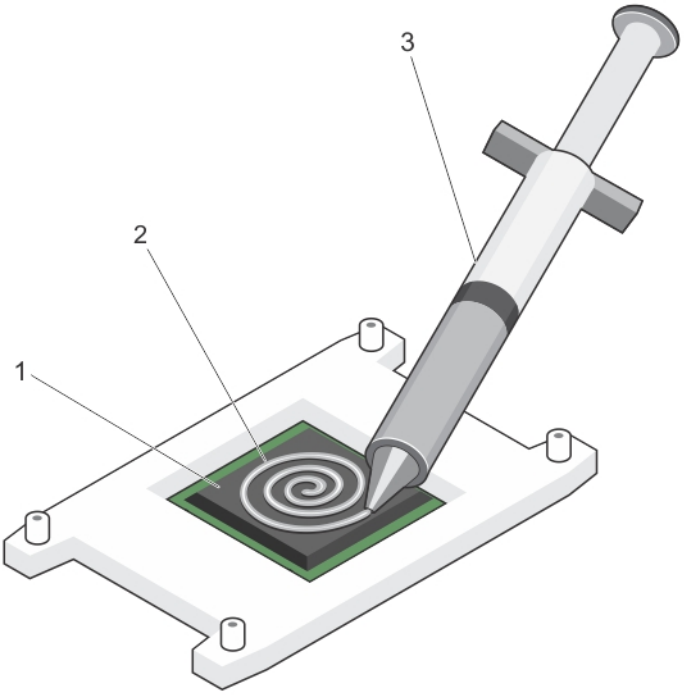

Figure 23. Applying thermal grease on the top of the processor

1. processor
2. thermal grease
3. thermal grease syringe

3. Place the heat sink onto the processor.
4. Tighten one of the four screws to secure the heat sink to the system board.
5. Tighten the screw diagonally opposite to the first screw you tightened.

NOTE: Do not over-tighten the heat sink retention screws when installing the heat sink. To prevent over-tightening, tighten the retention screw until resistance is felt, and stop once the screw is seated. The screw tension should be no more than 6 in-lb (6.9 cm-kg).

6. Repeat the procedure for the remaining two screws.

Next steps

1. Install the cooling shroud.
2. Follow the procedure listed in After working inside your system.
3. While booting, press <F2> to enter System Setup and check that the processor information matches the new system configuration.
4. Run system diagnostics to verify that the new processor operates correctly.

Related Links

Installing a processor
Installing the cooling shroud

Hard drives/SSDs

Your system supports up to four 2.5 inch SAS/SATA/PCIe SSDs or SAS /SATA hard drives and twelve 1.8 inch SAS SSDs. The hard drives/SSDs are supplied in special hot-swappable drive carriers that fit in the drive bays and these drives connect to the system board through the hard-drive/SSD backplane board.

NOTE: Mixing of SSD/SAS/SATA hard drives is not supported.

Hard drive/SSD bay numbering

Figure 24. Hard drive/SSD bay numbering — 2.5 inch hard drive/SSD system

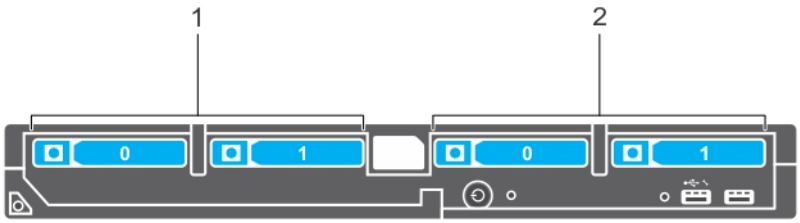

Figure 25. Hard drive/SSD and PCIe SSD bay numbering — 2.5 inch hard drive/SSD and PCIe SSD system

1. hard drive/SSD bay numbering
2. PCIe SSD bay numbering

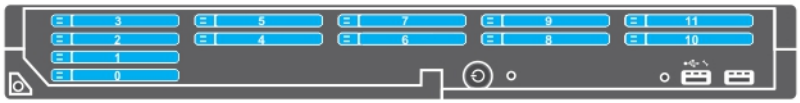

Figure 26. SSD bay numbering — 1.8 inch SSD system

Hard drive/SSD installation guidelines

For single hard drive configuration, a hard drive blank must be installed in the other drive bay to maintain proper cooling airflow.

Removing a hard drive/SSD

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 came with the product.

1. Ensure that you read the Safety instructions.
2. Take the hard drive/SSD offline and wait until the hard drive/SSD indicator codes on the drive carrier stop blinking.

   When all indicators stop blinking, the drive is ready for removal. See your operating system documentation for more information on taking the hard drive/SSD offline.

NOTE: All operating systems do not support hot-swappable drive installation. See the documentation supplied with your operating system.

Steps

1. Press the release button to open the hard drive/SSD carrier handle.
2. Slide the hard drive/SSD carrier out until it is free of the hard drive/SSD slot.
3. Slide the hard drive/SSD out until it is free of the hard drive/SSD bay.

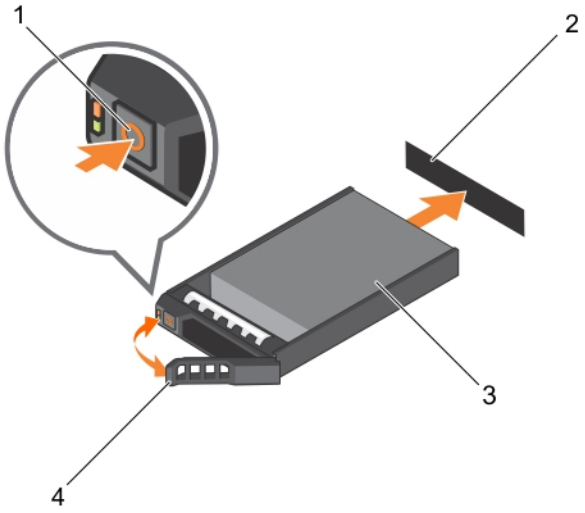

Figure 27. Removing and installing a hard drive/SSD

1. release button
2. hard drive/SSD connector (on backplane)
3. hard drive/SSD
4. hard drive/SSD carrier handle

Next steps

1. If you are removing a hard drive/SSD permanently, install the hard drive/SSD blank. If you are installing a new hard drive/SSD, see Installing a hard drive/SSD.

Installing a hard drive/SSD

Prerequisites

CAUTION: When a replacement hot-swappable hard drive/SSD is installed and the blade is powered on, the hard drive/SSD automatically begins to rebuild. Make absolutely sure that the replacement hard drive/SSD is blank or contains data that you wish to have over-written. Any data on the replacement hard drive/SSD is immediately lost after the hard drive/SSD is installed.

NOTE: You must remove a hard drive/SSD to upgrade a hard drive/SSD or replace a faulty hard drive/SSD.

1. Ensure that you read the Safety instructions.
2. Remove the hard drive/SSD or hard drive/SSD blank.

NOTE: All operating systems do not support hot-swappable drive installation. See the documentation supplied with your operating system.

Steps

1. Press the release button to open the hard drive/SSD carrier handle.
2. Slide the hard drive/SSD carrier into the drive bay. Carefully align the channel on the hard drive/SSD carrier with the appropriate drive slot on the blade.
3. Push the drive carrier into the slot until the handle makes contact with the blade.
4. Rotate the carrier handle to the closed position while pushing the carrier into the slot until it locks into place.

The status LED indicator displays a steady green light if the drive is installed correctly. The drive carrier LED green indicator flashes as the drive rebuilds.

Removing a hard drive/SSD 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 came with the product.

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

1. Ensure that you read the Safety instructions.

Steps

Press the release latch and slide the hard drive/SSD blank out of the hard drive/SSD slot.

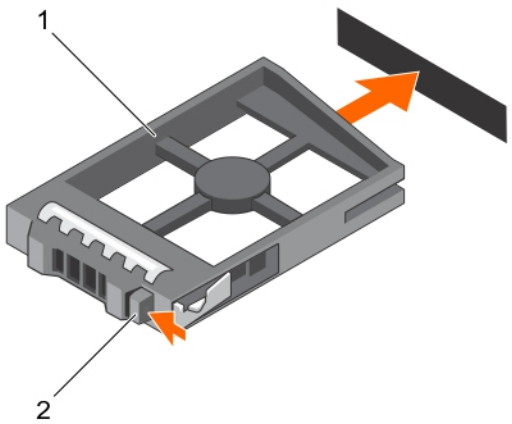

Figure 28. Removing and installing a 2.5 inch hard drive/SSD blank

1. hard drive/SSD blank
2. release latch

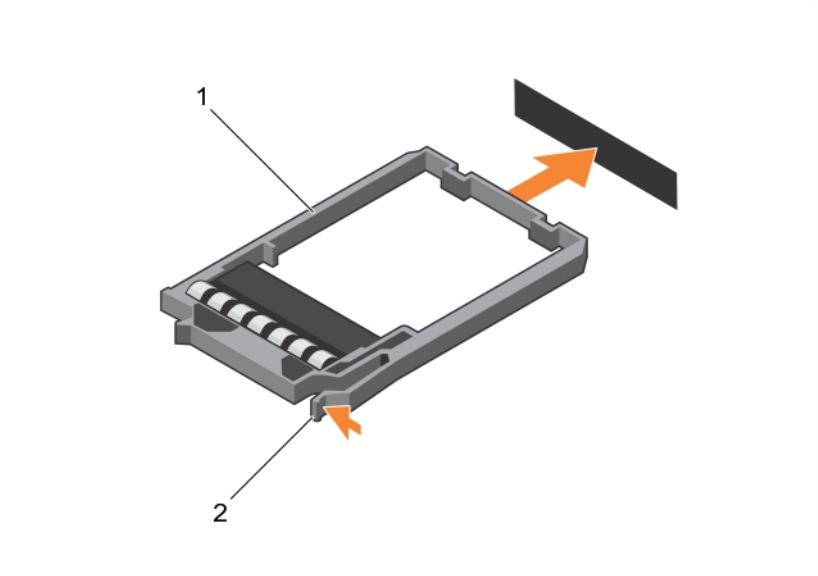

Figure 29. Removing and installing a 1.8 inch SSD blank

1. SSD blank
2. release latch

Next steps

1. Install the hard drive/SSD. See Installing a hard drive/SSD.

Installing a hard drive/SSD blank

Prerequisites

1. Ensure that you read the Safety instructions.
2. Remove a hard drive/SSD. See Removing a hard drive/SSD.

Steps

Insert the hard drive/SSD blank into the hard drive/SSD slot until the release latch clicks into place.

Shutdown procedure for servicing a hard drive/SSD

NOTE: This section applies only to situations where the blade must be powered down to service a hard drive/SSD. In many situations, the hard drive/SSD can be serviced while the blade is powered on.

CAUTION: If you need to power off the blade to service a hard drive/SSD, wait 30 seconds after the blade's power indicator turns off before removing the hard drive/SSD. Otherwise, the hard drive/SSD may not be recognized after it is reinstalled and the blade is powered on again.

Configuring the boot drive

The drive or device from which the system boots is determined by the boot order specified in the System Setup.

Removing a 2.5 inch hard drive/SSD from a 2.5 inch hard drive/SSD 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 came with the product.

1. Ensure that you read the Safety instructions.
2. Keep the #1 Phillips screwdriver ready.

Steps

1. Remove the four screws from the slide rails on the hard drive/SSD carrier.
2. Slide the hard drive/SSD out of the hard drive/SSD carrier.

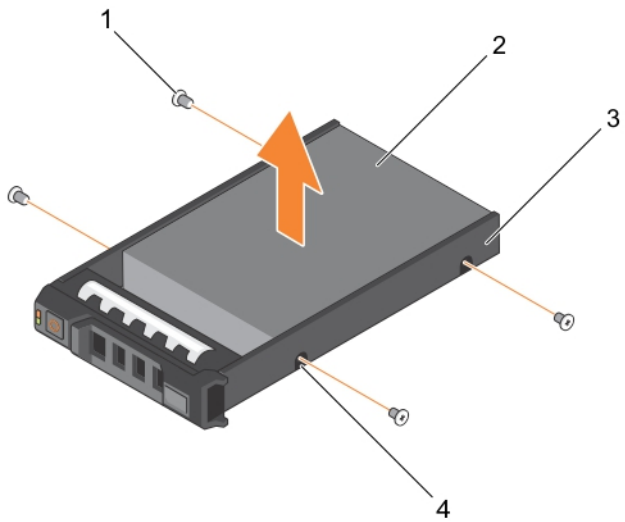

Figure 30. Removing and installing a 2.5 inch hard drive/SSD in a 2.5 inch hard drive/SSD carrier

1. screw (4)
2. hard drive/SSD
3. hard drive/SSD carrier
4. screw hole (4)

Next steps

Install a new 2.5 inch hard drive/SSD in a 2.5 inch hard drive/SSD carrier. See Installing a 2.5 inch hard drive/SSD in a 2.5 inch hard drive/SSD carrier.

Installing a 2.5 inch hard drive/SSD in a 2.5 inch hard drive/SSD 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 came with the product.

NOTE: You must remove the hard drive/SSD from a hard drive/SSD carrier to replace a faulty hard drive/SSD from a hard drive/SSD carrier.

1. Ensure that you read the Safety instructions.
2. Keep the #1 Phillips screwdriver ready.
3. Remove the 2.5 inch hard drive/SSD from the 2.5 inch hard drive/SSD carrier. See Removing a 2.5 inch hard drive/SSD from a 2.5 inch hard drive/SSD carrier.

Steps

1. Slide the hard drive/SSD into the hard drive/SSD carrier.
2. Align the screw holes on the hard drive/SSD with the holes on the hard drive/SSD carrier.

   CAUTION: To avoid damaging the drive or the carrier, do not overtighten the screws.
3. Fasten the four screws to secure the hard drive/SSD to the hard drive/SSD carrier.

Removing a 1.8 inch SSD from a 1.8 inch SSD 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 came with the product.

Ensure that you read the Safety instructions.

Steps

Pull the rails on the side of the carrier and lift the SSD out of the carrier.

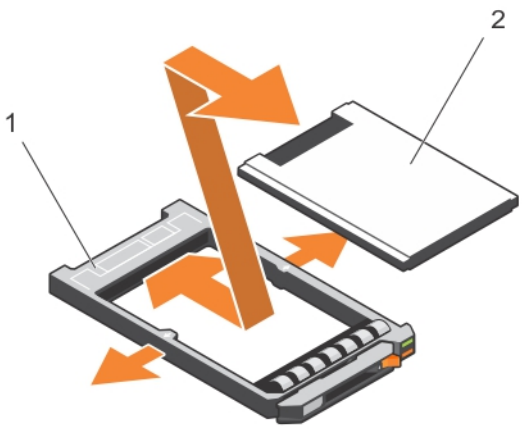

Figure 31. Removing and installing a 1.8 inch SSD in a 1.8 inch SSD carrier

1. SSD carrier
2. SSD

Next steps

Install a 1.8 inch SSD in a 1.8 inch SSD carrier. See Installing a 1.8 inch SSD in a 1.8 inch SSD carrier.

Installing a 1.8 inch SSD in a 1.8 inch SSD 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 came with the product.

NOTE: You must remove the SSD from a SSD carrier to replace a faulty SSD from a SSD carrier.

1. Ensure that you read the Safety instructions.
2. Remove a 1.8 inch SSD from a 1.8 inch SSD carrier. See Removing a 1.8 inch SSD from a 1.8 inch SSD carrier .

Steps

Insert the SSD into the SSD carrier with the connector end of the SSD toward the back. When aligned correctly, the back of the SSD is flush with the back of the SSD carrier.

Hard drive/SSD cage

Removing a hard drive/SSD cage

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 came with the product.

NOTE: You must remove the hard drive/SSD cage to replace a faulty hard drive/SSD cage or service other components inside the system.

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. Keep the #1 Phillips screwdriver ready.
4. Remove the hard drive(s)/SSD(s).
5. Remove the hard drive/SSD backplane.

Steps

1. Remove the five screws securing hard drive/SSD cage to the chassis.
2. Holding the hard drive/SSD cage by its edges, lift it away from the system.

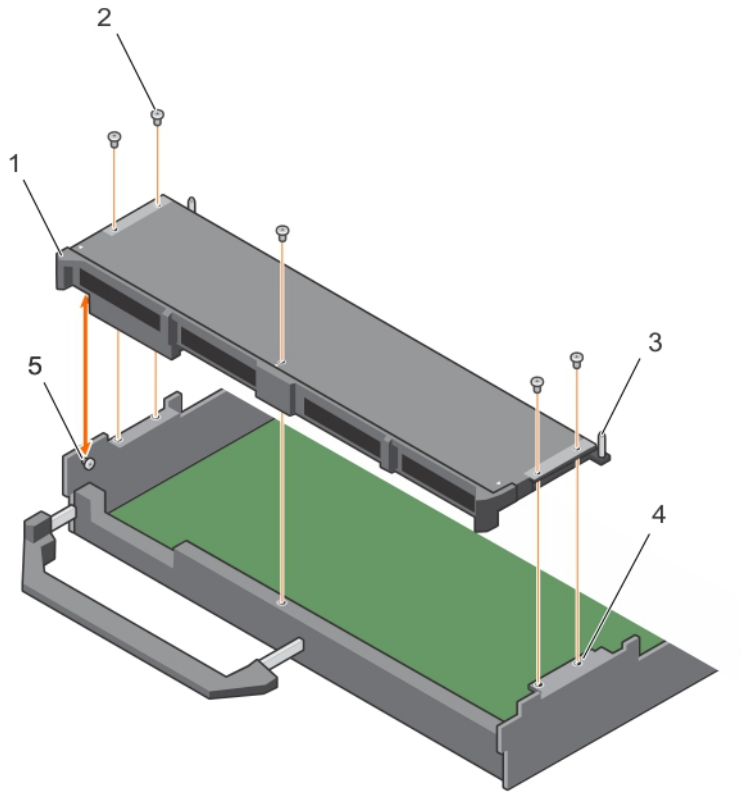

Figure 32. Removing and installing a hard drive/SSD cage

1. hard drive/SSD cage
2. screw (5)
3. guide pin (5)
4. screw hole on the chassis (4)
5. standoff (2)

Next steps

1. Install the hard drive/SSD cage.

Related Links

Installing a hard drive/SSD cage
Removing the blade
Removing the system cover

Installing a hard drive/SSD cage

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 came with the product.

1. Ensure that you read the Safety instructions.
2. Keep the #1 Phillips screwdriver ready.
3. Remove the hard drive/SSD cage.

NOTE: You must remove the hard drive/SSD cage to replace a faulty hard drive/SSD cage or service other components inside the system.

Steps

1. Align the screw holes on the hard drive/SSD cage with the screw holes on the chassis.
2. Lower the hard drive/SSD cage into the chassis until it is seated firmly in place.
3. Install the five screws to secure the hard drive/SSD cage to the chassis.

Next steps

1. Install the hard drive/SSD backplane.
2. Install the hard drive(s)/SSD(s).
3. Follow the procedure listed in After working inside your system.

Related Links

Removing a hard drive/SSD cage
Installing the system cover
Installing a blade

Hard drive/SSD backplane

Backplane	Configuration
2.5 inch (x4) SAS backplane	A full-length SAS hard drive/SSD backplane with a backplane cable. It supports up to four 2.5 inch SAS hard drives/SSDs.
2.5 inch (x4) SATA backplane	A full-length SAS hard drive/SSD backplane with a backplane cable. It supports up to four 2.5 inch SATA hard drives/SSDs.
2.5 inch (x2) SATA plus 2.5 inch (x2) PCIe backplane	A full-length backplane with two backplane cables. It supports up to two 2.5 inch SATA hard drives/ SSDs and two 2.5 inch PCIe SSDs. For information about populating drives in the bay, see Hard drive/SSD bay numbering.
1.8 inch (x12) SAS SSD backplane	A full-length SAS SSD backplane with two backplane cables. It supports up to twelve 1.8 inch SAS SSDs.

NOTE: All drives connect to the system board through the hard-drive/SSD backplane cable connector.

The following table provides information about connecting different backplane configurations to the respective connectors on the system board and expander card.

Drive backplane configurations	Connectors	
	SATA_BP connector on the system board	J_PERC connector on the system board
2.5 inch (x4) SAS backplane	-	SAS backplane cable connector that connects four hard drives/SSDs to the system board.
2.5 inch (x4) SATA backplane	SATA backplane cable connector that connects four hard drives/SSDs to the system board.	-
2.5 inch (x2) SATA plus 2.5 inch (x2) PCIe backplane	SATA drive backplane cable connector that connects two hard drives/SSDs to the system board.	PCIe drive backplane cable connector that connects two PCIe SSDs to the system board.
1.8 inch (x12) SAS SSD backplane	SAS drive backplane cable connector that connects SSDs populated in bays 6-11 to the system board.	SAS backplane cable connector that connects SSDs populated in bays 0-5 to the system board through an expander card. For more information about installing an expander card, see Expander card.

NOTE: Ensure that you install the expander card on the system board if you are using 1.8 inch (x12) SSD system. For information about the installation procedure, see Expander card.

NOTE: For more information about hard drive/SSD bay numbering, see Hard drive/SSD bay numbering.

NOTE: To locate SATA_BP and J_PERC connectors on the system board, see System board connectors.

Removing a 2.5 inch (x4) SAS hard drive/SSD 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 came with the product.

NOTE: You must remove the hard drive/SSD backplane to replace a faulty hard drive/SSD backplane or service other components inside the system.

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. Keep the #2 Phillips screwdriver ready.

CAUTION: To prevent damage to the hard drives/SSDs and the hard drive/SSD backplane, you must remove the hard drives/SSDs from the blade before removing the hard drive/SSD backplane.

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

4. Remove the hard drive(s)/SSD(s).

Steps

1. Press the release latches, lift the backplane until the guide pins on the hard drive/SSD cage disengage from the guides on the hard drive/SSD backplane.
2. Remove the hard drive/SSD cage. See Removing a hard drive/SSD cage.
3. Loosen the two retention screws securing the hard-drive/SSD backplane cable connector to the system board connector.
4. Lift the backplane away from the system.

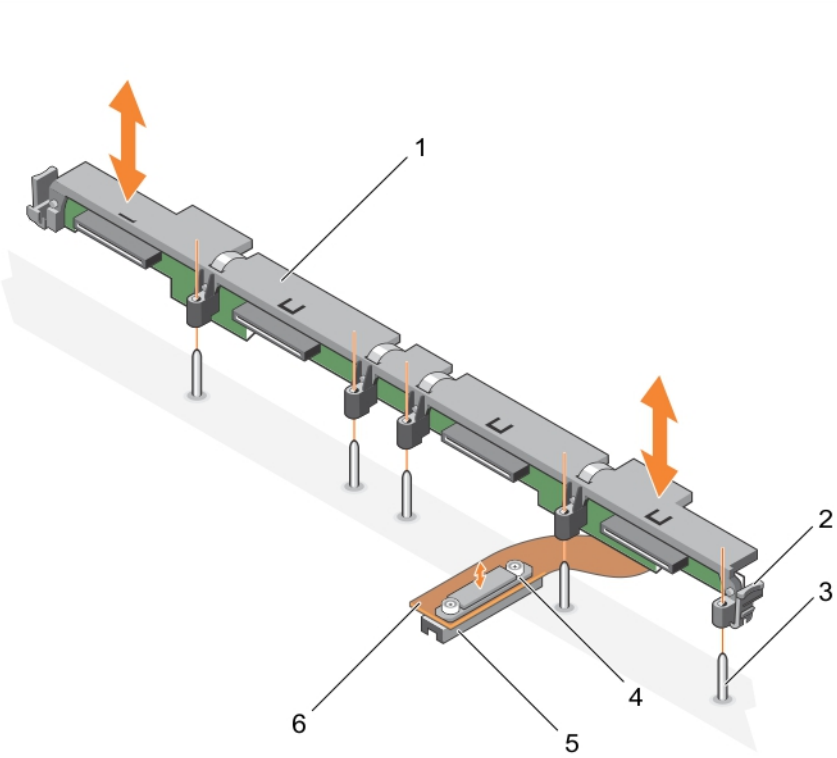

Figure 33. Removing a 2.5 inch (x4) SAS hard drive/SSD backplane

1. hard drive/SSD backplane
2. release latch (2)
3. guide pin (5)
4. retention screw on the hard-drive/SSD backplane cable connector
5. connector
6. hard-drive/SSD backplane cable

Next steps

1. Install the hard drive/SSD backplane.

Related Links

Installing a 2.5 inch (x4) SAS hard drive/SSD backplane
Removing the blade
Removing the system cover

Installing a 2.5 inch (x4) SAS hard drive/SSD 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 came with the product.

NOTE: You must remove the hard drive/SSD backplane to replace a faulty hard drive/SSD backplane or service other components inside the system.

1. Ensure that you read the Safety instructions.
2. Keep the #2 Phillips screwdriver ready.
3. Remove the hard drive/SSD backplane.

   NOTE: You must remove the hard drive/SSD backplane to replace a faulty hard drive/SSD backplane or service other components inside the system.

Steps

1. Align the retention screws on the hard-drive/SSD backplane cable connector with the screw holes on the system board connector.
2. Tighten the two retention screws to secure the backplane cable connector on the system board.
3. Install the hard drive/SSD cage. See Installing a hard drive/SSD cage.
4. Align the guides on the hard drive/SSD backplane with the guide pins on the hard drive/SSD cage.
5. Press down on the hard drive/SSD backplane until the tabs on the release latches engage with the slots on the chassis.

Next steps

1. Install the hard drives/SSDs in their original locations.
2. Follow the procedure listed in After working inside your system.

Related Links

Removing a 2.5 inch (x4) SAS hard drive/SSD backplane
Installing the system cover
Installing a blade

Removing a 2.5 inch (x4) SATA hard drive/SSD 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 came with the product.

NOTE: You must remove the hard drive/SSD backplane to replace a faulty hard drive/SSD backplane or service other components inside the system.

1. Ensure that you read the Safety instructions.

2. Follow the procedure listed in Before working inside your system.
3. Keep the #2 Phillips screwdriver ready.

CAUTION: To prevent damage to the hard drives/SSDs and the hard drive/SSD backplane, you must remove the hard drives/SSDs from the blade before removing the hard drive/SSD backplane.

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

4. Remove the hard drive(s)/SSD(s).

Steps

1. Press the release latches, lift the backplane until the guide pins on the hard drive/SSD cage disengage from the guides on the hard drive/SSD backplane.
2. Remove the hard drive/SSD cage. See Removing a hard drive/SSD cage.
3. Loosen the two retention screws securing the hard-drive/SSD backplane cable connector to the system board connector.
4. Lift the backplane away from the system.

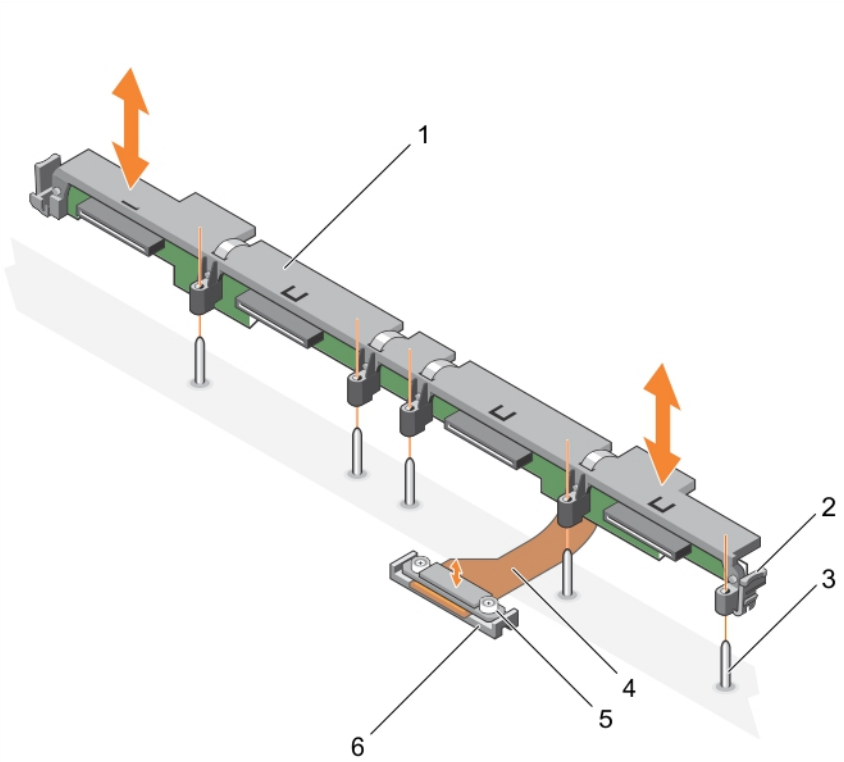

Figure 34. Removing a 2.5 inch (x4) SATA hard drive/SSD backplane

1. hard drive/SSD backplane
2. release latch (2)
3. guide pin (5)
4. hard-drive/SSD backplane cable
5. retention screw on the hard-drive/SSD backplane cable connector (2)
6. connector

Next steps

1. Install the hard drive/SSD backplane.

Related Links

Installing a 2.5 inch (x4) SATA hard drive/SSD backplane
Removing the blade
Removing the system cover

Installing a 2.5 inch (x4) SATA hard drive/SSD 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 came with the product.

1. Ensure that you read the Safety instructions.
2. Keep the #2 Phillips screwdriver ready.
3. Remove the hard drive/SSD backplane.

NOTE: You must remove the hard drive/SSD backplane to replace a faulty hard drive/SSD backplane or service other components inside the system.

Steps

1. Align the retention screws on the hard-drive/SSD backplane cable connector with the screw holes on the system board connector.
2. Tighten the two retention screws to secure the backplane cable connector on the system board.
3. Install the hard drive/SSD cage. See Installing a hard drive/SSD cage.
4. Align the guides on the hard drive/SSD backplane with the guide pins on the hard drive/SSD cage.
5. Press down on the hard drive/SSD backplane until the tabs on the release latches engage with the slots on the chassis.

Next steps

1. Install the hard drives/SSDs in their original locations.
2. Follow the procedure listed in After working inside your system.

Related Links

Removing a 2.5 inch (x4) SATA hard drive/SSD backplane
Installing the system cover
Installing a blade

Removing a 2.5 inch (x2) SATA hard drive/SSD plus 2.5 inch (x2) PCIe SSD 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 came with the product.

NOTE: You must remove the hard drive/SSD backplane to replace a faulty hard drive/SSD backplane or service other components inside the system.

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. Keep the #2 Phillips screwdriver ready.

   CAUTION: To prevent damage to the hard drives/SSDs and the hard drive/SSD backplane, you must remove the hard drives/SSDs from the blade before removing the hard drive/SSD backplane.

   CAUTION: You must note the number of each hard drive/SSD and temporarily label them before removal so that you can replace them in the same locations.
4. Remove the hard drive(s)/SSD(s).

Steps

1. Pressing the release latches, lift the backplane until the guide pins on the hard drive/SSD cage disengage from the guides on the backplane.
2. Remove the hard drive/SSD cage. See Removing a hard drive/SSD cage.
3. Perform the following:
   a. Loosen the two retention screws securing the PCIe SSD backplane cable connector to the system board connector (J_PERC).
   b. Loosen the two retention screws securing the hard-drive/SSD backplane cable connector to the system board connector (SATA_BP).
4. Lift the backplane away from the system.

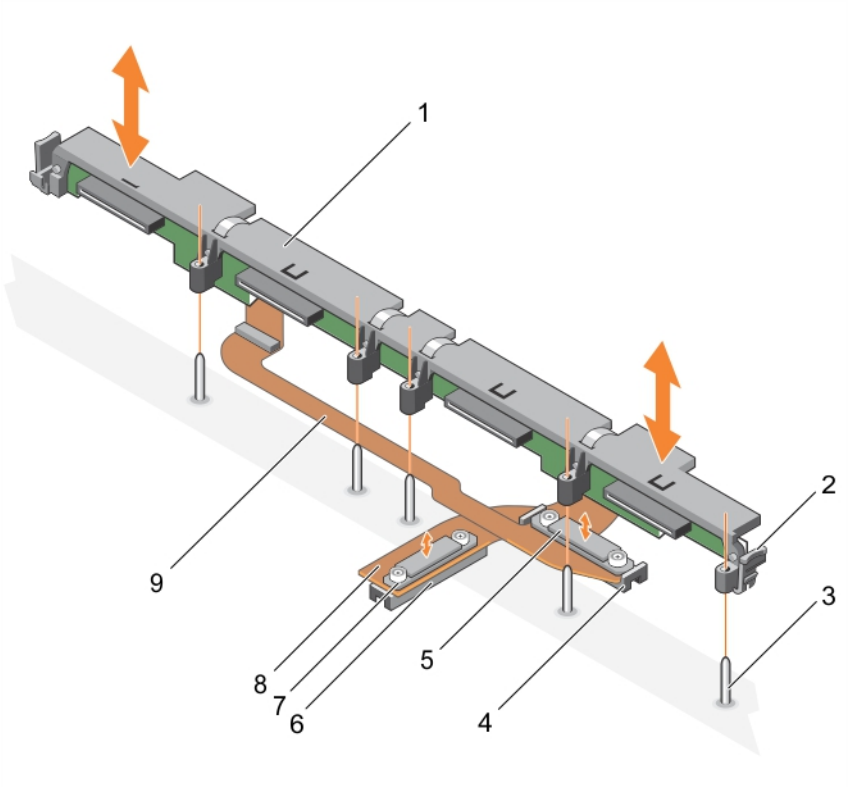

Figure 35. Removing and installing a 2.5 inch (x2) SATA hard drive/SSD plus 2.5 inch (x2) PCIe SSD backplane

1. hard drive/SSD backplane
2. release latch (2)
3. guide pin (5)
4. connector on the system board (SATA_BP)
5. hard-drive/SSD backplane cable connector
6. connector on the system board (J_PERC)
7. PCIe SSD backplane cable connector
8. PCIe SSD backplane cable
9. hard-drive/SSD backplane cable

Next steps

1. Install the hard drive/SSD backplane.

Related Links

Installing a 2.5 inch (x2) SATA hard drive/SSD plus 2.5 inch (x2) PCIe SSD backplane
Removing the blade
Removing the system cover

Installing a 2.5 inch (x2) SATA hard drive/SSD plus 2.5 inch (x2) PCIe SSD 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 came with the product.

NOTE: You must remove the hard drive/SSD backplane to replace a faulty hard drive/SSD backplane or service other components inside the system.

1. Ensure that you read the Safety instructions.
2. Keep the #2 Phillips screwdriver ready.
3. Remove the hard drive/SSD backplane.

   NOTE: You must remove the hard drive/SSD backplane to replace a faulty hard drive/SSD backplane or service other components inside the system.

Steps

1. Align the retention screws on the hard-drive/SSD backplane cable connector with the screw holes on the system board connector (SATA_BP).
2. Tighten the two retention screws to secure the hard-drive/SSD backplane cable connector on the system board.
3. Align the retention screws on the PCIe SSD backplane cable connector with the screw holes on the system board connector (J_PERC).
4. Tighten the two retention screws to secure the PCIe SSD backplane cable connector on the system board.
5. Install the hard drive/SSD cage. See Installing a hard drive/SSD cage.
6. Align the guides on the backplane with the guide pins on the hard drive/SSD cage.
7. Press down on the hard drive/SSD backplane until the tabs on the release latches engage with the slots on the chassis.

Next steps

1. Install the hard drives/SSDs in their original locations.
2. Follow the procedure listed in After working inside your system.

Related Links

Removing a 2.5 inch (x2) SATA hard drive/SSD plus 2.5 inch (x2) PCIe SSD backplane
Installing the system cover
Installing a blade

Removing a 1.8 inch (x12) SAS SSD 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 came with the product.

NOTE: You must remove the SSD backplane to replace a faulty SSD backplane or service other components inside the system.

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. Keep the #2 Phillips screwdriver ready.

   CAUTION: To prevent damage to the SSDs and the SSD backplane, you must remove the SSDs from the blade before removing the SSD backplane.

   CAUTION: You must note the number of each SSD and temporarily label them before removal so that you can replace them in the same locations.
4. Remove the SSD(s).

Steps

1. Press the release latches, lift the backplane until the guide pins on the SSD cage disengage from the guides on the backplane.
2. Remove the SSD cage. See Removing a hard drive/SSD cage.
3. Perform the following:

   NOTE: The 1.8 inch (x12) SSD backplane is a full-length backplane with two backplane cables. The connector on one of the backplane cables connects the SSDs populated in bays 0-5, to the system board through an expander card. For more information about installing an expander card, see Expander card.The connector on the other backplane cable connects the SSDs populated in bays 6-11, to the connector on the system board (SATA_BP).

   a. Loosen the retention screw securing the backplane cable connector to the connector on the expander card (EXP).
   b. Loosen the two retention screws securing the backplane cable connector to the system board connector (SATA_BP).
4. Lift the backplane away from the system.

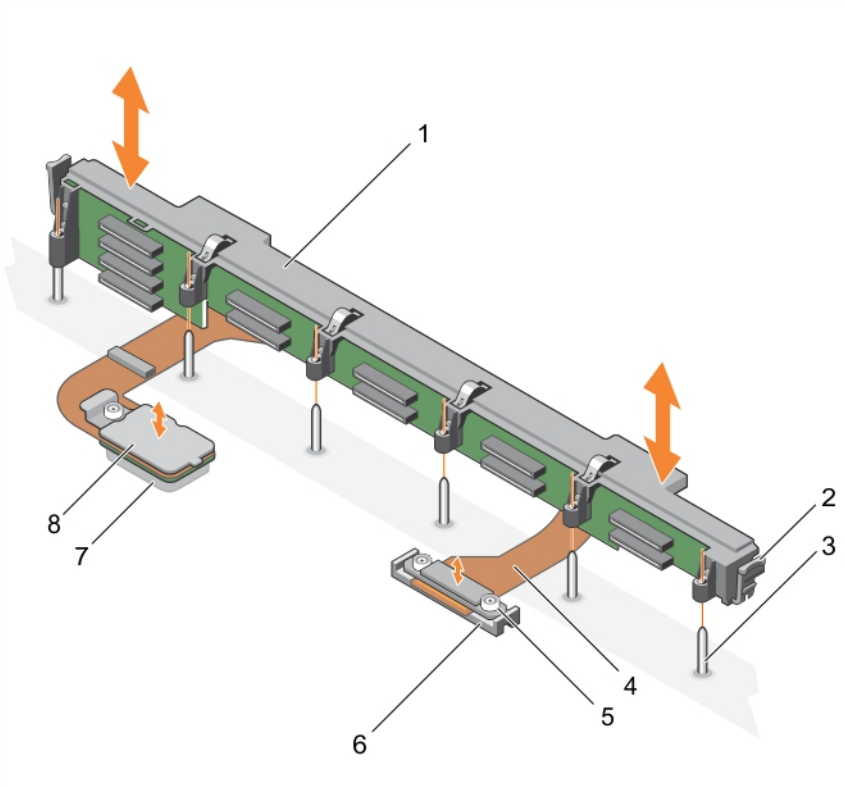

Figure 36. Removing and installing a 1.8 inch (x12) SAS SSD backplane

1. SSD backplane
2. release latch (2)
3. guide pin (6)
4. backplane cable (2)
5. backplane cable connector that connects to the connector on the system board
6. connector on the system board (SATA_BP)
7. connector on the expander card (EXP)
8. backplane cable connector that connects to the connector on the expander card

Next steps

1. Install the SSD backplane.

Related Links

Installing a 1.8 inch (x12) SAS SSD backplane
Removing the blade
Removing the system cover

Installing a 1.8 inch (x12) SAS SSD 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 came with the product.

NOTE: The 1.8 inch (x12) SSD backplane is a full-length backplane with two backplane cables. The connector on one of the backplane cables connects the SSDs populated in bays 0-5, to the system board through an expander card. For more information about installing an expander card, see Expander card.The connector on the other backplane cable connects the SSDs populated in bays 6-11, to the connector on the system board (SATA_BP).

1. Ensure that you read the Safety instructions.
2. Keep the #2 Phillips screwdriver ready.
3. Remove the SSD backplane.

   NOTE: You must remove the SSD backplane to replace a faulty SSD backplane or service other components inside the system.

Steps

1. Align the two retention screws on the backplane cable connector with the two screw holes on the system board connector (SATA_BP).
2. Tighten the two retention screws to secure the backplane cable connector on the system board.
3. Align the retention screw on the backplane cable connector with the screw hole on the expander card connector (EXP).
4. Tighten the retention screw to secure the backplane cable connector on the expander card.
5. Install the SSD cage. See Installing a hard drive/SSD cage.
6. Align the guides on the backplane with the guide pins on the SSD cage.
7. Press down on the backplane until the tabs on the release latches engage with the slots on the chassis.

Next steps

1. Install the SSDs in their original locations.
2. Follow the procedure listed in After working inside your system.

Related Links

Removing a 1.8 inch (x12) SAS SSD backplane
Installing the system cover
Installing a blade

NVRAM backup battery

The NVRAM backup battery installed in your system helps to retain the BIOS settings and configurations even if the power is switched off.

Replacing the NVRAM backup 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. Discard used batteries according to the manufacturer's instructions. See the safety instructions that came with your system 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 came with the product.

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. Remove the following:
    a. system cover
    b. hard drive/SSD
    c. hard drive/SSD backplane
    d. hard drive/SSD cage
4. If installed, remove the memory module.

Steps

1. Locate the system battery on the system.
2. Hold the battery and pull it toward the positive side of the battery until the battery disengages from the connector.
3. Lift the battery away from the system.
4. To install a new system battery, hold the battery with the negative side of battery facing the negative side of the battery connector.
5. Place the battery into the connector and push the positive side of the battery until the battery snaps into place.

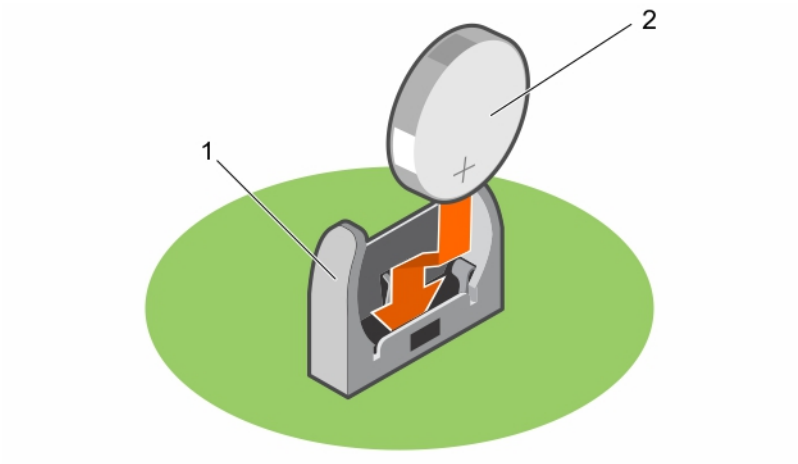

Figure 37. Replacing the NVRAM backup battery

1. negative side of battery connector
2. positive side of battery

Next steps

1. If applicable, install the memory module.
2. Install the following:
   a. hard drive/SSD cage
   b. hard drive/SSD backplane
   c. hard drive/SSD
3. Follow the procedure listed in After working inside your system.
4. Enter System Setup to confirm that the battery is operating properly.
5. Enter the correct time and date in the System Setup's **Time** and **Date** fields.
6. Exit System Setup.
7. To test the newly installed battery, remove the blade for at least an hour.
8. Reinstall the blade after an hour.
9. Enter System Setup and if the time and date are still incorrect, see Getting Help.

Storage controller card

Your system includes dedicated expansion-card slots on the system board for a storage controller card that provides the integrated storage subsystem for your system hard drives/PCIe SSDs. The storage controller card supports SAS hard drives.

NOTE: The storage controller card is located underneath the drive bays.

NOTE: The storage controller card is installed on the system board connector labeled as MiniPERC CARD.

Removing the storage controller 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 came with the product.

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

NOTE: You must remove the storage controller card to replace a faulty storage controller card or service other components inside the system.

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. Keep the #2 Phillips screwdriver ready.
4. Remove the following:
   a. hard drives/SSDs
   b. hard drive/SSD backplane
   c. hard drive/SSD cage

Steps

1. Loosen the two retention screws on the hard-drive/SSD backplane cable connector and lift it away from the storage controller card.

   CAUTION: To prevent damage to the storage controller card, hold the card only by its edges.

2. Lift the storage controller card away from the system.

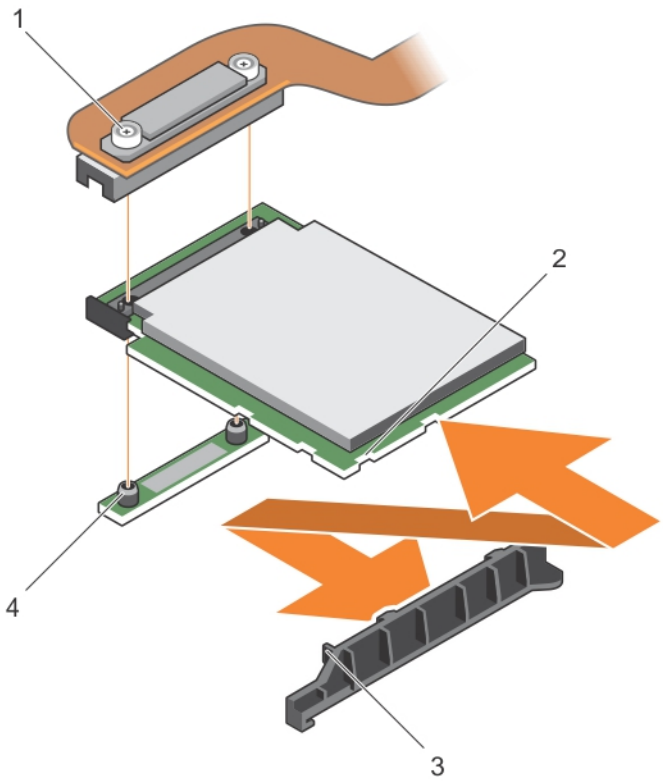

Figure 38. Removing and installing the storage controller card

1. retention screw (2)
2. slot on the storage controller card
3. tab on the storage controller card support bracket
4. standoff (2)

Next steps

1. Install the storage controller card.

Related Links

Installing the storage controller card
Removing the blade
Removing the system cover
Removing a hard drive/SSD cage
Removing a 2.5 inch (x4) SATA hard drive/SSD backplane
Removing a 2.5 inch (x4) SAS hard drive/SSD backplane
Removing a 2.5 inch (x2) SATA hard drive/SSD plus 2.5 inch (x2) PCIe SSD backplane
Removing a 1.8 inch (x12) SAS SSD backplane

Installing the storage controller 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 came with the product.

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

1. Ensure that you read the Safety instructions.
2. Keep the #2 Phillips screwdriver ready.
3. Remove the storage controller card.

   NOTE: You must remove the storage controller card to replace a faulty storage controller card or service other components inside the system.

Steps

1. Align the slots on the storage controller card edge with the tabs on the support bracket.

   CAUTION: To prevent damage to the storage controller card, hold the card only by its edges.

2. Lower the storage controller card on to the connector on the system board.
3. Tighten the two retention screws on the hard-drive/SSD backplane cable connector to secure the card on to the system board.

Next steps

1. Install the following:
   a. hard drives/SSDs
   b. hard drive/SSD backplane
   c. hard drive/SSD cage
2. Follow the procedure listed in After working inside your system.

Related Links

Removing the storage controller card
Installing a 1.8 inch (x12) SAS SSD backplane
Installing a 2.5 inch (x2) SATA hard drive/SSD plus 2.5 inch (x2) PCIe SSD backplane
Installing a 2.5 inch (x4) SAS hard drive/SSD backplane
Installing a 2.5 inch (x4) SATA hard drive/SSD backplane
Installing a hard drive/SSD cage
Installing the system cover
Installing a blade

Expander card

Removing an expander 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 came with the product.

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

NOTE: You must remove the expander card to replace a faulty expander card.

NOTE: Ensure that you install an expander card if you are using 1.8 inch (x12) system.

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. Keep the #1 and #2 Phillips screwdrivers ready.
4. Remove the following:
   a. hard drives/SSDs
   b. hard drive/SSD backplane
   c. hard drive/SSD cage

Steps

1. Loosen the retention screws on the expander-card cable connector that connects to the connector on the system board (J_PERC) and lift the cable up..

   CAUTION: To prevent damage to an expander card, hold the card only by its edges.
2. Remove the screws that secure the expander card to the chassis.
3. Lift the card away from the system.

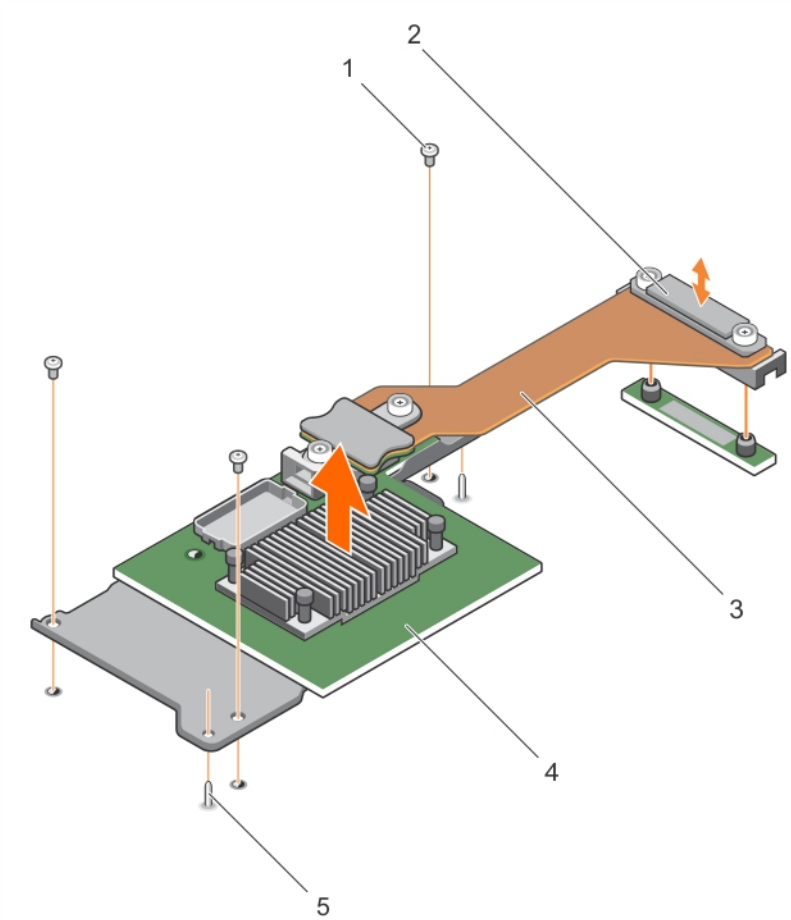

Figure 39. Removing and installing an expander card

1. screw (3)
2. expander-card cable connector that connects to the connector on the system board (J_PERC)
3. expander card cable
4. expander card
5. guide pin (2)

Next steps

1. Install the expander card.

Related Links

Installing an expander card
Removing the blade
Removing the system cover
Removing a hard drive/SSD cage
Removing a 2.5 inch (x4) SATA hard drive/SSD backplane
Removing a 2.5 inch (x4) SAS hard drive/SSD backplane
Removing a 2.5 inch (x2) SATA hard drive/SSD plus 2.5 inch (x2) PCIe SSD backplane
Removing a 1.8 inch (x12) SAS SSD backplane

Installing an expander 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 came with the product.

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

1. Ensure that you read the Safety instructions.
2. Keep the #1 and #2 Phillips screwdrivers ready.
3. Remove the expander card.

   CAUTION: To prevent damage to the expander card, hold the card only by its edges.

   NOTE: You must remove the expander card to replace a faulty expander card.

Steps

1. Align the following:
   a. Guide pins on the chassis with the slots on the expander card.
   b. Screw holes on the expander card with the screw holes on the chassis.
2. Lower the expander card until the guide pins engage with the slots on the expander card.
3. Tighten the screws to secure the expander card to the chassis.
4. Align the expander-card cable connector with the connector on the system board (J_PERC).
5. Tighten the retention screws on the expander-card cable connector until the connector is seated firmly.

Next steps

1. Install the following:
   a. hard drive/SSD cage
   b. hard drive/SSD backplane
   c. hard drives/SSDs
2. Follow the procedure listed in After working inside your system.

Related Links

Removing an expander card
Installing a 1.8 inch (x12) SAS SSD backplane
Installing a 2.5 inch (x2) SATA hard drive/SSD plus 2.5 inch (x2) PCIe SSD backplane
Installing a 2.5 inch (x4) SAS hard drive/SSD backplane
Installing a 2.5 inch (x4) SATA hard drive/SSD backplane
Installing a hard drive/SSD cage
Installing the system cover
Installing a blade

System board

Removing the 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 came with the product.

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

NOTE: You must remove the system board to replace a faulty system board.

1. Ensure that you read the Safety instructions.
2. Follow the procedure listed in Before working inside your system.
3. Keep the 5 mm and 6 mm Hex nut drivers, #2 Phillips screwdriver, and #2 Phillips round screwdriver ready.
4. Remove the following:
    a. processor(s) and heat sink(s)
    b. memory modules
    c. cooling shroud
    d. hard drive(s)/SSD(s)
    e. hard drive/SSD backplane
    f. hard drive/SSD cage
    g. storage controller card
    h. expander card
    i. mezzanine cards
    j. IDSDM/rSPI card
    k. NDC
    l. SD vFlash card
    m. internal USB key
5. Install an I/O connector cover on the I/O connector(s) at the back of the board.

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

CAUTION: Temporarily label the hard drive/SSD before removal so that you can replace them in their original locations.

WARNING: The processor and heat sink can become extremely hot. Be sure the processor has had sufficient time to cool before handling.

WARNING: The memory modules are hot to 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.

Steps

1. Remove the screws on the system board that secure the system board to the chassis.
2. Lift the system board by holding the connector end and orienting it upward.
3. Remove the system board from the chassis by disengaging the USB connectors from the slots on the front wall of the chassis.
4. Ensure that the I/O connector cover is still in place on the I/O connector at the back of the system board.

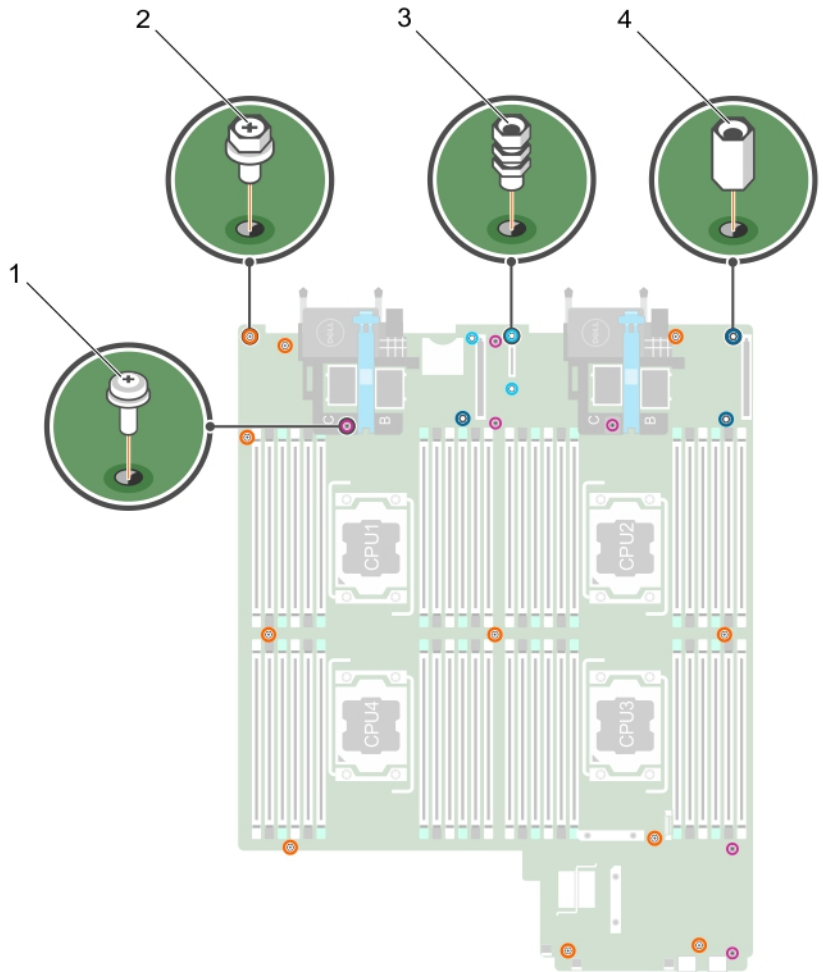

Figure 40. Removing and installing the system board

Item	Icon	Description
1.		#2 Phillips round screw (6)
2.		#2 Phillips hex screw (11)
3.		Hex bolt screw-5 mm (3)
4.		Hex nut screw-6 mm (3)

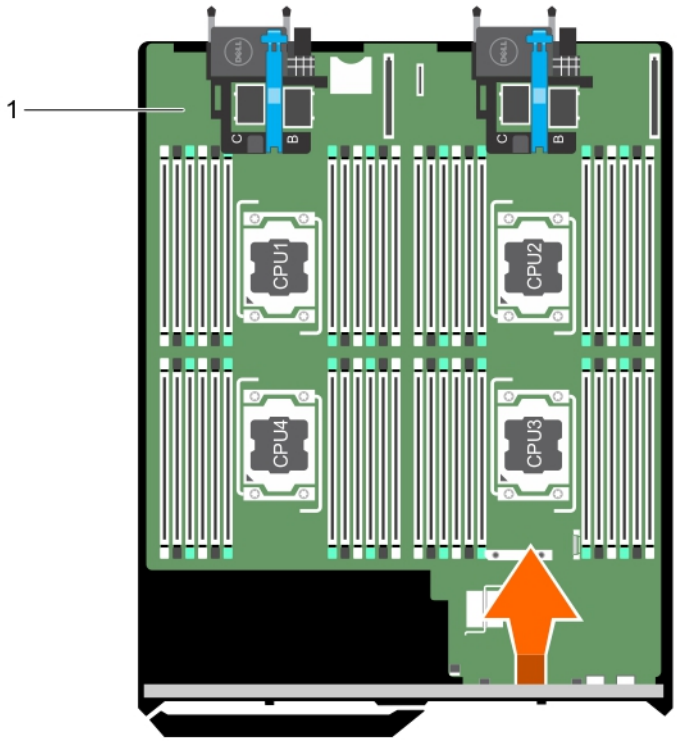

Figure 41. Removing and installing the system board

1. system board

Next steps

1. Install the system board.

Related Links

Installing the system board

Installing the 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 came with the product.

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

1. Ensure that you read the Safety instructions.
2. Keep the 5 mm and 6 mm Hex nut drivers, #2 Phillips screwdriver, and #2 Phillips round screwdriver ready.
3. Remove the system board.

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

CAUTION: Take care not to damage the system identification button while placing the system board into the chassis.

NOTE: You must remove the system board to replace a faulty system board.

Steps

1. Hold the system board by its edges and orient it toward the front of the chassis.
2. Align the USB connectors with the slots on the front wall of the chassis.
3. Lower the system board and install the screws to secure the system board to the chassis.

Next steps

1. Install the following:
    a. internal USB key
    b. SD vFlash card
    c. IDSDM/rSPI card
    d. NDC
    e. mezzanine cards
    f. expander card
    g. storage controller card
    h. hard drive/SSD cage
    i. hard drive/SSD backplane
    j. hard drive(s)/SSD(s)

        NOTE: Ensure that you reinstall the hard drives/SSDs in their original locations.

    k. cooling shroud
    l. memory modules

m. processor(s) and heat sink(s)

2. Remove the plastic I/O connector covers from the back of the system.
3. Follow the procedure listed in After working inside your system.
4. Import your new or existing iDRAC Enterprise license. For more information, see the *iDRAC8 User's Guide* at **dell.com/esmmanuals**.
5. Ensure that you:
   a. Use the Easy Restore feature to restore the Service Tag. For more information, see Restoring the Service Tag using Easy Restore.
   b. If the Service Tag is not backed up in the backup flash device, enter the system Service Tag manually. For more information, see Entering the system Service Tag using System Setup.
   c. Update the BIOS and iDRAC versions.
   d. Re-enable the Trusted Platform Module (TPM). For more information, see Re-enabling the TPM for BitLocker users or Re-enabling the TPM for TXT users.

Related Links

Removing the system board

Restoring the Service Tag using Easy Restore

Use the Easy Restore feature if you do not know the Service Tag of your system. The Easy Restore feature allows you to restore your system's Service Tag, license, UEFI configuration, and the system configuration data after replacing the system board. All data is backed up in an rSPI card automatically. If BIOS detects a new system board and the Service Tag in the rSPI card, 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 rSPI card, BIOS displays the Service Tag, the status of the license, and the **UEFI Diagnostics** version.
2. Do one of the following:
   - Press **Y** to restore the Service Tag, license, and diagnostics information.
   - Press **N** to navigate to the Lifecycle Controller based restore options.
   - Press <F10> to restore data from a previously created **Hardware Server Profile**.

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

   After the restore process is complete, the system reboots.

Entering the system Service Tag using System Setup

If you know the system Service Tag, use System Setup menu to enter the Service Tag.

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. Once the Service Tag is entered, it cannot be updated or changed.

5. Click **Ok**.
6. Import your new or existing iDRAC Enterprise license.

   For more information, see Integrated Dell Remote Access Controller User's Guide, at **dell.com/esmmanuals**.

Trusted Platform Module

The Trusted Platform Module (TPM) is used to generate or store keys, protect or authenticate passwords, and create or store digital certificates. TPM can also be used to enable the BitLocker hard drive encryption feature in Windows Server.

CAUTION: Do not attempt to remove the Trusted Platform Module (TPM) from the system board. Once 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.

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 came with the product.

Ensure that you read the Safety instructions.

Steps

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

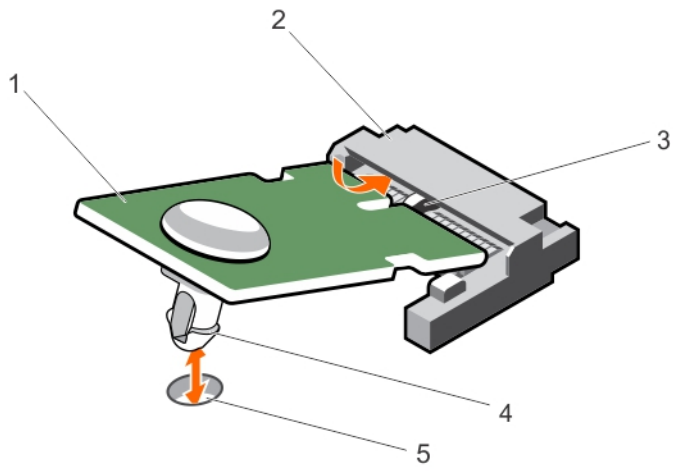

Figure 42. Installing the TPM

1. TPM
2. TPM connector
3. guide pin on the TPM connector
4. plastic bolt
5. slot on the system board

Re-enabling the TPM for BitLocker users

Initialize the TPM.

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

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

Re-enabling the TPM for TXT users

1. While booting your system, press <F2> to enter System Setup.
2. In the **System Setup Main Menu**, click **System BIOS** → **System Security Settings**.
3. In the **TPM Security** option, select **On with Pre-boot Measurements**.
4. In the **TPM Command** option, select **Activate**.
5. Save the settings.
6. Restart your system.
7. Enter System Setup again.
8. In the **System Setup Main Menu**, click **System BIOS** → **System Security Settings**.
9. In the **Intel TXT** option, select **On**.

5

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 came with the product.

NOTE: For troubleshooting information on the M1000e enclosure components, see "Troubleshooting The Enclosure" in the *Dell PowerEdge M1000e Enclosure Owner's Manual* at **dell.com/support/home**.

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 came with the product.

NOTE: Before performing the following procedure, ensure that you have installed the memory modules according to the memory installation guidelines for the blade.

Steps

1. Restart the blade:
   a. Press the power button once to turn off the blade
   b. Press the power button again to apply power to the blade.

   If no error messages appear, go to step 8.
2. Enter the System Setup and check the system memory setting.

   If the amount of memory installed matches the system memory setting, go to step 8.
3. Remove the blade from the enclosure.
4. Open the blade.

   CAUTION: The memory modules are hot to touch for some time after the blade 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.
5. Reseat the memory modules in their sockets.
6. Close the blade.
7. Install the blade in the enclosure.

8. Run the appropriate diagnostic test. For more information, see Using System Diagnostics.
   If the test fails, see Getting Help.

Troubleshooting hard drives

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 came with the product.

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

Steps

1. Run the appropriate controllers test and the hard drive tests in system diagnostics.
   If the tests fail, go to step 3.
2. Take the hard drive offline and wait until the hard-drive indicator codes on the drive carrier signal that the drive may be removed safely, then remove and reseat the drive carrier in the blade.
3. Restart the blade, enter the System Setup and confirm that the drive controller is enabled.
4. Ensure that any required device drivers are installed and are configured correctly.

   NOTE: Installing a hard drive into another bay may break the mirror if the mirror state is optimal.
5. Remove the hard drive and install it in the other drive bay.
6. If the problem is resolved, reinstall the hard drive in the original bay.
   If the hard drive functions properly in the original bay, the drive carrier could have intermittent problems. Replace the drive carrier.
7. If the hard drive is the boot drive, ensure that the drive is configured and connected properly.
8. Partition and logically format the hard drive.
9. If possible, restore the files to the drive.
   If the problem persists, see Getting Help.

Troubleshooting Solid State Drives

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 came with the product.

CAUTION: This troubleshooting procedure can destroy data stored on the SSD. Before you proceed, back up all the files on the SSD, if possible.

Steps

1. Run the appropriate tests in system diagnostics.
   If the tests fail, go to step 3.
2. Take the SSD offline and wait until the indicator codes on the SSD carrier signal that the SSD may be removed safely, then remove and reseat the SSD carrier in the blade.

3. Restart the blade, enter the System Setup and confirm that the drive controller is enabled.
4. Ensure that any required device drivers are installed and are configured correctly.

   NOTE: Installing a SSD into another bay may break the mirror if the mirror state is optimal.
5. Remove the SSD and install it in the other SSD slot.
6. If the problem is resolved, reinstall the SSD in the original slot.

   If the SSD functions properly in the original slot, the SSD carrier could have intermittent problems. Replace the SSD carrier.
7. If the SSD is the boot drive, ensure that the SSD is configured and connected properly.
8. Partition and logically format the SSD.
9. If possible, restore the files to the SSD.

   If the problem persists, see Getting Help.

Troubleshooting USB devices

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 came with the product.

Steps

1. Ensure that the blade is turned on.
2. Check the USB device connection to the blade.
3. Swap the USB device with a known-working USB device.
4. Connect the USB devices to the blade using a powered USB hub.
5. If another blade is installed, connect the USB device to that blade. If the USB device works with a different blade, the first blade may be faulty. See Getting Help.

Troubleshooting an internal SD 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 came with the product.

Steps

1. Enter the System Setup and ensure that the **Internal SD Card Port** is enabled.
2. Note the **Internal SD Card Redundancy** option enabled in the **Integrated Devices** screen of the System Setup (Mirror or Disabled).
3. Remove the blade from the enclosure.
4. If the **Internal SD Card Redundancy** option in the **Integrated Devices** screen of the System Setup is set to Mirror mode and SD card 1 has failed:
   a. Remove the SD card from SD card slot 1.
   b. Remove the SD card present in SD card slot 2 and insert it into SD card slot 1.

c. Install a new SD card in slot 2.

5. If the **Internal SD Card Redundancy** option in the **Integrated Devices** screen of the System Setup is set to Mirror mode and SD card 2 has failed, insert the new SD card into SD card slot 2.
6. If the **Internal SD Card Redundancy** option in **Integrated Devices** screen of the System Setup is set to Disabled, replace the failed SD card with a new SD card.
7. Install the blade in the enclosure.
8. Enter the System Setup and ensure that the **Internal SD Card Port** option is enabled and **Internal SD Card Redundancy** option is set to Mirror mode.
9. Check if the SD card is functioning properly.

   If the problem persists, see Getting Help.

Troubleshooting processors

1. Remove the blade from the enclosure.
2. Open the blade.
3. Ensure that the processor(s) and heat sink(s) are properly installed.
4. If your system only has one processor installed, ensure that it is installed in the primary processor socket (CPU1).
5. Close the blade.
6. Install the blade in the enclosure.
7. Run the appropriate diagnostic test. For more information, see Using System Diagnostics.

   If the problem persists, see Getting Help.

Troubleshooting the blade 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 came with the product.

Steps

1. Remove the blade from the enclosure.
2. Open the blade.
3. Clear the blade NVRAM.
4. If there is a still a problem with the blade, remove and reinstall the blade in the enclosure.
5. Turn on the blade.
6. Run the appropriate diagnostic test. For more information, see Using system diagnostics.

   If the tests fail, see Getting Help.

Troubleshooting the NVRAM backup 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 came with the product.

The battery maintains the blade configuration, date, and time information in the NVRAM when the blade is turned off. You may need to replace the battery if an incorrect time or date is displayed during the boot routine.

You can operate the blade without a battery; however, the blade configuration information maintained by the battery in NVRAM is erased each time you remove power from the blade. Therefore, you must re-enter the system configuration information and reset the options each time the blade boots until you replace the battery.

Steps

1. Re-enter the time and date through the System Setup.
2. Remove the blade from the enclosure for at least one hour.
3. Install the blade in the enclosure.
4. Enter the System Setup.

   If the date and time are not correct in the System Setup, replace the battery. If the problem is not resolved by replacing the battery, see Getting Help.

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

   NOTE: Some software may cause the blade's time to speed up or slow down. If the blade operates normally except for the time maintained by the System Setup, the problem may be caused by a software rather than by a defective battery.

System messages

For a list of event and error messages generated by the system firmware and agents that monitor system components, see the Dell Event and Error Messages Reference Guide at **dell.com/esmmanuals**.

Warning messages

A warning message alerts you to a possible problem and prompts you to respond before the system continues a task. For example, before you format a hard drive, a message warns you that you may lose all data on the hard drive. Warning messages usually interrupt the task and require you to respond by typing y (yes) or n (no).

NOTE: Warning messages are generated by either the application or the operating system. For more information, see the documentation that accompanied the operating system or application.

Diagnostic messages

The system diagnostic utilities may issue messages if you run diagnostic tests on your system. For more information about system diagnostics, see Using system diagnostics.

Alert messages

The systems management software generates alert messages for your system. Alert messages include information, status, warning, and failure messages for drive, temperature, fan, and power conditions. For more information, see the systems management software documentation.

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Using system diagnostics

If you experience a problem with your system, run the system diagnostics before contacting Dell for technical assistance. The purpose of running system diagnostics is to test your system hardware without requiring additional equipment or risking data loss. If you are unable to fix the problem yourself, service and support personnel can use the diagnostics results to help you solve the problem.

Dell Online Diagnostics

Dell Online Diagnostics, a stand-alone suite of diagnostic programs or test modules, allows you to run diagnostic tests on the systems in a production environment, and helps you ensure maximum uptime of your systems. Online Diagnostics allows you to run diagnostic tests on chassis and storage components such as hard drives, physical memory, and network interface cards (NICs). You can use the graphical user interface (GUI) or the command line interface (CLI) to run diagnostic tests on the hardware that Online Diagnostics discovers on your system. For information about using diagnostics, see the *Dell Online PowerEdge Diagnostics User's Guide* under **Software → Serviceability Tools**, at **dell.com/support/manuals**.

Dell Embedded System Diagnostics

NOTE: The Dell Embedded System Diagnostics is also known as Enhanced Pre-boot System Assessment (ePSA) diagnostics.

The embedded system diagnostics provides a set of options for particular device groups or devices allowing you to:

- Run tests automatically or in an interactive mode
- Repeat tests
- Display or save test results
- Run thorough tests to introduce additional test options to provide extra information about the failed device(s)
- View status messages that inform you if tests are completed successfully
- View error messages that inform you of problems encountered during testing

When to use the Embedded System Diagnostics

If a major component or device in the system does not operate properly, running the embedded system diagnostics may indicate component failure.

Running the Embedded System Diagnostics

The embedded system diagnostics program is run from the Dell Lifecycle Controller.

Prerequisites

CAUTION: Use the embedded system diagnostics to test only your system. Using this program with other systems may cause invalid results or error messages.

Steps

1. As the system boots, press **<F11>**.
2. Use the up and down arrow keys to select **System Utilities → Launch Dell Diagnostics**.

   The **ePSA Pre-boot System Assessment** window is displayed, listing all devices detected in the system. The diagnostics starts executing the tests on all the detected devices.

System diagnostic controls

Menu	Description
Configuration	Displays the configuration and status information of all detected devices.
Results	Displays the results of all tests that are executed.
System health	Provides the current overview of the system performance.
Event log	Displays a time-stamped log of the results of all tests run on the system. This is displayed if at least one event description is recorded.

For information about embedded system diagnostics, see the *ePSA Diagnostics Guide (Notebooks, Desktops and Servers)* at **dell.com/support/home**.

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Jumpers and connectors

System board 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 came with the product.

For information on resetting the password jumper to disable a password, see Disabling a forgotten password.

Table 4. System Board Jumper settings

Jumper	Setting	Description
PWRD_EN	 1 2 3 (default)	The password feature is enabled (pins 1–2).
	 1 2 3	The password feature is disabled (pins 2–3).
NVRAM_CLR	 1 2 3 (default)	The configuration settings are retained at system boot (pins 2–3).
	 1 2 3	The configuration settings are cleared at the next system boot. (pins 1–2).

System board connectors

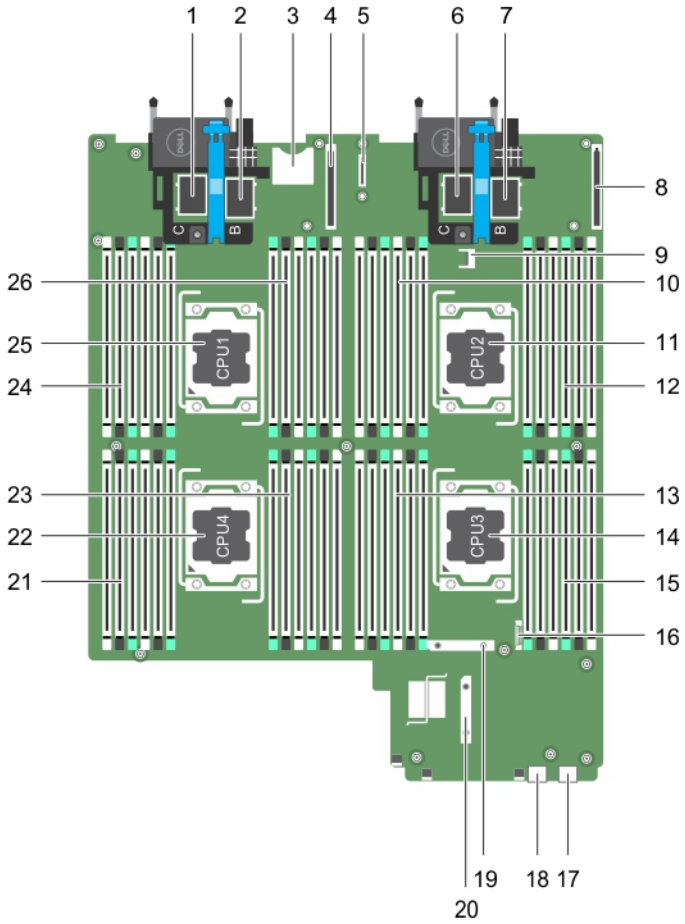

Figure 43. System board connectors

Table 5. System board connectors

Item	Connector	Description
1	MEZZ1_FAB_C1	mezzanine card connector for the expansion bus
2	MEZZ2_FAB_B1	mezzanine card connector for the expansion bus
3	VFLASH	SD vFlash card connector
4	bNDC	Network daughter card connector
5	IDSDM/rSPI	IDSDM/rSPI card connector
6	MEZZ3_FAB_C2	mezzanine card connector for the expansion bus
7	MEZZ4_FAB_B2	mezzanine card connector for the expansion bus
8	bNDC	Network daughter card connector

Item	Connector	Description
9	TPM	TPM connector
10	B1, B2, B5, B6, B9, B10	Memory module sockets (processor 2)
11	CPU2	Processor socket 2
12	B3, B4, B7, B8, B11, B12	Memory module sockets (processor 2)
13	C3, C4, C7, C8, C11, C12	Memory module sockets (processor 3)
14	CPU3	Processor socket 3
15	C1, C2, C5, C6, C9, C10	Memory module sockets (processor 3)
16	BATTERY	Connector for the 3.0 V coin cell battery
17	USB2	USB connector
18	USB1	USB connector
19	SATA_BP	Hard-drive backplane connector
20	J_PERC	Storage controller card connector
21	D3, D4, D7, D8, D11, D12	Memory module sockets (processor 4)
22	CPU4	Processor socket 4
23	D1, D2, D5, D6, D9, D10	Memory module sockets (processor 4)
24	A1, A2, A5, A6, A9, A10	Memory module sockets (processor 1)
25	CPU1	Processor socket 1
26	A3, A4, A7, A8, A11, A12	Memory module sockets (processor 1)

Disabling a forgotten password

The software security features of blade include a system password and a setup password. The password jumper enables these password features or disables them, and clears any password(s) currently in use.

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 came with the product.

Steps

1. Turn off the blade using the operating system commands or the CMC.
2. Remove the blade from the enclosure to access the jumpers.
3. Move the jumper on the system-board jumper from pins 2 and 3 to pins 1 and 2.
4. Install the blade in the enclosure.
5. Turn on the blade.

   When the blade is on, the power-on indicator is solid green. Allow the blade to finish booting.

The existing passwords are not disabled (erased) until the system boots with the password jumper on pins 1 and 2. However, before you assign a new system and/or setup password, you must reinstall the password jumper back to pins 2 and 3.

NOTE: If you assign a new system and/or setup password with the jumper on pins 1 and 2, the system disables the new password(s) the next time it boots.

6. Turn off the blade using the operating system commands or the CMC.
7. Remove the blade from the enclosure to access the jumpers.
8. Move the jumper on the system-board jumper from pins 1 and 2 to pins 2 and 3.
9. Install the blade in the enclosure.
10. Turn on the blade.
11. Assign a new system and/or setup password.

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Technical specifications—PowerEdge M830

Physical	
Height	39.52 cm (15.56 inch)
Width	5.03 cm (1.98 inch)
Depth	54.5 cm (21.45 inch)
Weight (maximum)	14.5 kg (31.9 lb)

Processor	
Processor type	up to four Intel Xeon E5-4600 v3 product family processors

Memory	
Architecture	2133 MT/s, 1600 MT/s, 1333 MT/s, or 1066 MT/s DDR4 and LV-DDR4 DIMMs
Memory module sockets	Forty-eight 240-pin
Memory module capacities	
RDIMMs	4 GB (single-rank), 8 GB (dual-rank), 16 GB (dual-rank), and 32 GB (dual-rank)
LRDIMMs	32 GB (quad-rank) and 64 GB (quad-rank)
Minimum RAM	4 GB (dual-processor configuration)
Maximum RAM	1.5 TB (four-processor configuration)

RAID Controllers	
Controller types	PERC H330, PERC H730, and PERC H730P

Drives	
Hard drives	Up to four 2.5 inch SAS/SATA/PCIe SSDs or SAS / SATA hard drives Up to twelve 1.8 inch SAS SSDs.
Optical drive	External optional USB DVD **NOTE:** DVD devices are data only.

Drives	
Flash drive	Internal optional USB Internal optional SD card Optional vFlash card (with integrated iDRAC Enterprise)

Connectors	
Front	
USB	One 4-pin, USB 2.0-compliant and one 9-pin, USB 3.0-compliant
Internal	
USB	Two 4-pin, USB 2.0-compliant
SD	Two internal SD cards dedicated for the hypervisor One SD card dedicated for future vFlash support

Mezzanine Cards	
Mezzanine slots	Four PCIe x8 Gen 3 slots mezzanine card supporting dual-port 10 Gb Ethernet, quad port 1 Gb, FC8 Fiber Channel, FC16 Fiber Channel, or Infiniband mezzanine cards.

Video	
Video type	Matrox G200 VGA controller integrated with iDRAC
Video memory	2 GB shared with iDRAC application memory

Battery	
NVRAM backup battery	CR 2032 3.0 V lithium coin cell

Environmental specifications

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

Temperature

Storage	–40°C to 65°C (–40°F to 149°F)
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.

Environmental specifications	
Maximum temperature gradient (operating and storage)	20°C/h (36°F/h)
Relative humidity	
Storage	5% to 95% RH with 33°C (91°F) maximum dew point. Atmosphere must be non-condensing at all times.
Operating	10% to 80% Relative Humidity with 29°C (84.2°F) maximum dew point.
Maximum vibration	
Operating	0.26 G_{rms} at 5 Hz to 350 Hz (all operation orientations).
Storage	1.88 G_{rms} at 10 Hz to 500 Hz for 15 min (all six sides tested).
Maximum shock	
Operating	Six consecutively executed shock pulses in the positive and negative x, y, and z axes of 40 G for up to 2.3 ms.
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.
Maximum altitude	
Operating	3048 m (10,000 ft).
Storage	12,000 m (39,370 ft).
Operating temperature de-rating	
Up to 35 °C (95 °F)	Maximum temperature is reduced by 1°C/300 m (1°F/547 ft) above 950 m (3,117 ft).
35 °C to 40 °C (95 °F to 104 °F)	Maximum temperature is reduced by 1°C/175 m (1°F/319 ft) above 950 m (3,117 ft).
40 °C to 45 °C (104 °F to 113 °F)	Maximum temperature is reduced by 1°C/125 m (1°F/228 ft) above 950 m (3,117 ft).
Particulate contamination	

NOTE: This section defines the limits to help avoid IT equipment damage and/or failure from particulates and gaseous contamination. If it is determined that levels of particulates or gaseous pollution are beyond the limits specified below and are the reason for the damage and/or failures to your equipment, it may be necessary for you to re-mediate the environmental conditions that are causing the damage and/or failures. Re-mediation of environmental conditions will be the responsibility of the customer.

Environmental specifications	
Air filtration **NOTE:** Applies to data center environments only. Air filtration requirements do not apply to IT equipment designed to be used outside a data center, in environments such as an office or factory floor.	Data center air filtration as defined by ISO Class 8 per ISO 14644-1 with a 95% upper confidence limit. **NOTE:** Air entering the data center must have MERV11 or MERV13 filtration.
Conductive dust **NOTE:** Applies to data center and non-data center environments.	Air must be free of conductive dust, zinc whiskers, or other conductive particles.
Corrosive dust **NOTE:** Applies to data center and non-data center environments.	• Air must be free of corrosive dust. • Residual dust present in the air must have a deliquescent point less than 60% relative humidity.

Gaseous contamination

NOTE: Maximum corrosive contaminant levels measured at ≤50% relative humidity.

Copper coupon corrosion rate	<300 Å/month per Class G1 as defined by ANSI/ISA71.04-1985.
Silver coupon corrosion rate	<200 Å/month as defined by AHSRAE TC9.9.

Expanded operating temperature	
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 continuously down to 5°C or as high as 40°C. For temperatures between 35°C and 40°C, de-rate maximum allowable 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 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 45°C for a maximum of 1% of its annual operating hours.

Expanded operating temperature	
	For temperatures between 40°C and 45°C, de-rate maximum allowable 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 • Install only 94 mm wide heat sinks • Do not install more than 40 DIMMs • The following do not support expanded operating temperature range: – PCIe SSD – Express flash – LRDIMMs – 130 W or 120 W all core processors – Non Dell-qualified peripheral cards and/or peripheral cards greater than 25 W

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Getting help

Contacting Dell

Prerequisites

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

About this task

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

Steps

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

Quick Resource Locator

Use the Quick Resource Locator (QRL) to get immediate access to system information and how-to videos. This can be done by visiting **dell.com/QRL** or by using your smartphone and a model specific Quick Resource (QR) code located on your Dell PowerEdge system. To try out the QR code, scan the following image.