Dell PowerVault NX200 Systems

Hardware Owner's Manual

Notes, Cautions, and Warnings

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

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

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

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About Your System

Accessing System Features During Startup

The following keystrokes provide access to system features during startup.

Keystroke	Description
<F2>	Enters the System Setup program. See "Using the System Setup Program and UEFI Boot Manager" on page 51.
<F10>	Enters System Services, which opens the Unified Server Configurator. The Unified Server Configurator allows you to access utilities such as embedded system diagnostics. For more information, see the Unified Server Configurator documentation.
<F11>	Enters the BIOS Boot Manager or the UEFI Boot Manager, depending on the system's boot configuration. See "Using the System Setup Program and UEFI Boot Manager" on page 51.
<F12>	Starts PXE boot.
<Ctrl><E>	Enters the Baseboard Management Controller (BMC) or iDRAC Configuration Utility, which allows access to the System Event Log (SEL) and configuration of remote access to the system. For more information, see the BMC or iDRAC user documentation.
<Ctrl><R>	Enters the PERC configuration utility. For more information, see the PERC card documentation
<Ctrl><S>	Enters the utility to configure NIC settings for PXE boot. For more information, see the documentation for your integrated NIC.

Front-Panel Features and Indicators

Figure 1-1.   Front Panel Features and Indicators

Item	Indicator, Button, or Connector	Icon	Description
1	Optical drive (optional)		Optional internal SATA DVD-ROM or DVD+/-RW
			NOTE: DVD devices are data only.
2	Front bezel lock		Secures the front bezel to the system.
3	Front bezel		Covers the system's front-loading hard drives.
4	USB connectors (2)		Connects USB devices to the system. The ports are USB 2.0-compliant.
5	NMI button		Used to troubleshoot software and device driver errors when using certain operating systems. This button can be pressed using the end of a paper clip.
			Use this button only if directed to do so by qualified support personnel or by the operating system's documentation.

Item	Indicator, Button, or Connector	Icon	Description
6	Power-on indicator, power button	⏻	The power-on indicator lights when the system power is on.
			The power button controls the DC power supply output to the system.
			NOTE: When powering on the system, the video monitor can take several seconds up to over 2 minutes to display an image, depending on the amount of memory installed in the system.
			NOTE: On ACPI-compliant operating systems, turning off the system using the power button causes the system to perform a graceful shutdown before power to the system is turned off.
			NOTE: To force an ungraceful shutdown, press and hold the power button for five seconds.
7	System identification button	🛈	The identification button on the front panel can be used to locate a particular system. When the button is pushed, the LCD panel on the front flashes blue until the button is pushed again.
8	LCD menu buttons		Allows you to navigate the control panel LCD menu.
9	LCD panel		Provides system ID, status information, and system error messages.
			The LCD lights blue during normal system operation. The LCD lights amber when the system needs attention, and the LCD panel displays an error code followed by descriptive text.
			NOTE: If the system is connected to AC power and an error has been detected, the LCD lights amber regardless of whether the system has been powered on.

LCD Panel Features

The system's LCD panel provides system information and status and error messages to signify when the system is operating correctly or when the system needs attention. See "LCD Status Messages" on page 23 for information about specific status codes.

The LCD backlight lights blue during normal operating conditions and lights amber to indicate an error condition. When the system is in standby mode, the LCD backlight is off and can be turned on by pressing the Select button on the LCD panel. The LCD backlight remains off if LCD messaging is turned off through the BMC or iDRAC utility, the LCD panel, or other tools.

Figure 1-2.   LCD Panel Features
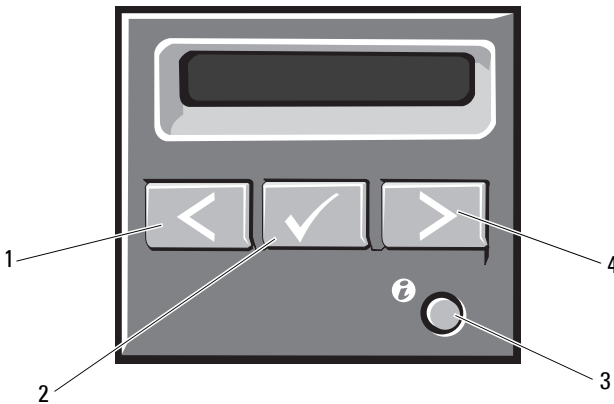
Item	Buttons	Description
1	Left	Moves the cursor back in one-step increments.
2	Select	Selects the menu item highlighted by the cursor.
3	System identification	Turns the system ID mode on (LCD panel flashes blue) and off.
		Press quickly to toggle the system ID on and off. If the system hangs during POST, press and hold the system ID button for more than five seconds to enter BIOS Progress mode.
4	Right	Moves the cursor forward in one-step increments.
		During message scrolling:
		• Press once to increase scrolling speed.
		• Press again to stop.
		• Press again to return to default scrolling speed.
		• Press again to repeat the cycle.

Home Screen

The Home screen displays user-configurable information about the system. This screen is displayed during normal system operation when there are no status messages or errors present. When the system is in standby mode, the LCD backlight will turn off after five minutes of inactivity if there are no error messages. Press one of the three navigation buttons (Select, Left, or Right) to view the Home screen.

To navigate to the Home screen from another menu, continue to select the up arrow ↑ until the Home icon ⬆ is displayed, and then select the Home icon.

From the Home screen, press the **Select** button to enter the main menu. See the following tables for information on the **Setup** and **View** submenus.

Setup Menu

📝 **NOTE:** When you select an option in the **Setup** menu, you must confirm the option before proceeding to the next action.

Option	Description
BMC or iDRAC **NOTE:** If an iDRAC6 Express card is installed on the system, the BMC option is replaced by DRAC.	Select **DHCP** or **Static IP** to configure the network mode. If **Static IP** is selected, the available fields are **IP**, Subnet (**Sub**), and Gateway (**Gtw**). Select **Setup DNS** to enable DNS and to view domain addresses. Two separate DNS entries are available.
Set error	Select **SEL** to display LCD error messages in a format that matches the IPMI description in the SEL. This can be useful when trying to match an LCD message with an SEL entry. Select **Simple** to display LCD error messages in a simplified user-friendly description. See "LCD Status Messages" on page 23 for a list of messages in this format.
Set home	Select the default information to be displayed on the LCD Home screen. See "View Menu" on page 17 to see the options and option items that can be selected to display by default on the Home screen.

View Menu

Option	Description
BMC IP or DRAC IP **NOTE:** If an iDRAC6 Express card is installed on the system, the BMC IP option is replaced by DRAC IP.	Displays the **IPv4** or **IPv6** addresses for the iDRAC6. Addresses include **DNS** (**Primary** and **Secondary**), **Gateway**, **IP**, and **Subnet** (IPv6 does not have Subnet). **NOTE:** BMC IP supports only IPv4 addresses.
MAC	Displays the MAC addresses for **DRAC**, **iSCSI**n, or **NET**n. **NOTE:** If the iDRAC Express card is not installed on the system, the MAC option displays the MAC addresses for **BMC**, **iSCSI**n or **NET**n.
Name	Displays the name of the **Host**, **Model**, or **User String** for the system.
Number	Displays the **Asset tag** or the **Service tag** for the system.
Power	Displays the power output of the system in BTU/hr or Watts. The display format can be configured in the **Set home** submenu of the **Setup** menu. See "Setup Menu" on page 16.
Temperature	Displays the temperature of the system in Celsius or Fahrenheit. The display format can be configured in the **Set home** submenu of the **Setup** menu. See "Setup Menu" on page 16.

Hard-Drive Indicator Patterns
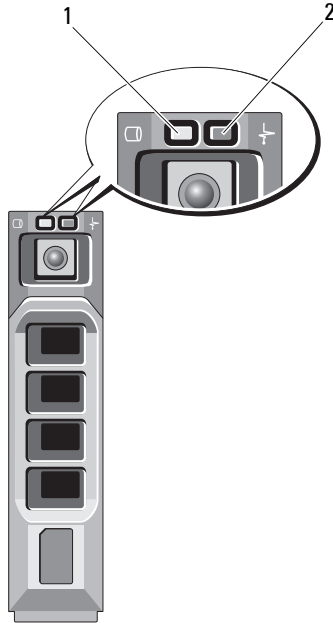
| 1 | hard-drive activity indicator (green) | 2 | hard-drive status indicator (green and amber) |

Drive-Status Indicator Pattern (RAID Only)	Condition
Blinks green two times per second	Identify drive/preparing for removal
Off	Drive ready for insertion or removal
	NOTE: The drive status indicator remains off until all hard drives are initialized after system power is applied. Drives are not ready for insertion or removal during this time.
Blinks green, amber, and off	Drive predicted failure

Drive-Status Indicator Pattern (RAID Only)	Condition
Blinks amber four times per second	Drive failed
Blinks green slowly	Drive rebuilding
Steady green	Drive online
Blinks green three seconds, amber three seconds, and off six seconds.	Rebuild aborted

Back-Panel Features and Indicators

Figure 1-3. Back-Panel Features and Indicators
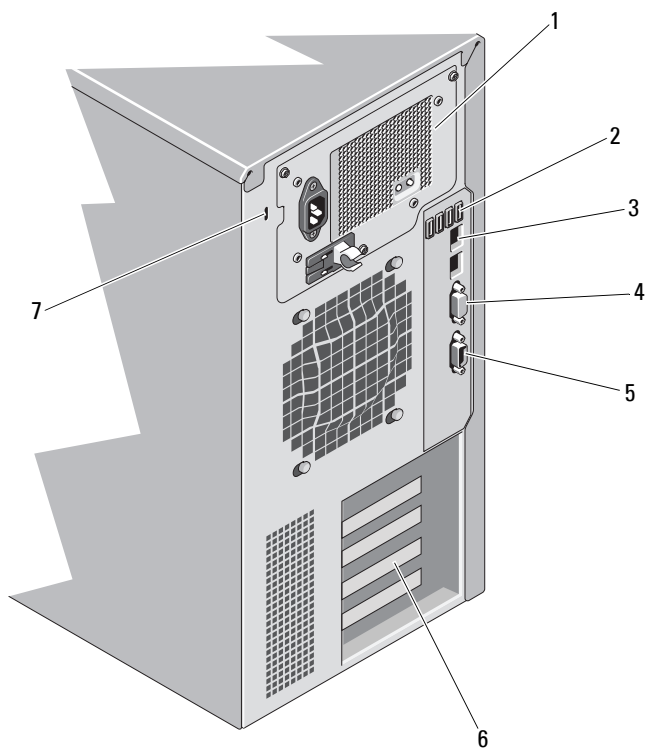
Item	Indicator, Button, or Connector	Icon	Description
1	Power supply		Power supply — 375 W
2	USB connectors (4)		Connects USB devices to the system. The ports are USB 2.0-compliant.
3	Ethernet connectors (2)		Integrated 10/100/1000 NIC connectors.
4	video connector		Connects a VGA display to the system.
5	serial connector		Connects a serial device to the system.
6	PCIe expansion card slots (5)		Connects up to five PCI Express. Generation 2 expansion cards.
7	security cable slot		Connects a cable lock to the system.

Guidelines for Connecting External Devices

- Turn off power to the system and external devices before attaching a new external device. Turn on any external devices before turning on the system (unless the documentation for the device specifies otherwise).

- Ensure that the appropriate driver for the attached device has been installed on the system.

- If necessary, to enable ports on your system, use the System Setup program. See "Using the System Setup Program and UEFI Boot Manager" on page 51.

NIC Indicator Codes
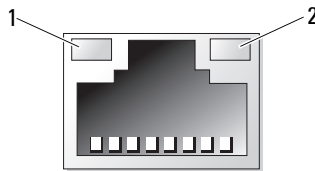
| 1 | link indicator | 2 | activity indicator |

Indicator	Indicator Code
Link and activity indicators are off	The NIC is not connected to the network.
Link indicator is green	The NIC is connected to a valid network link at 1000 Mbps.
Link indicator is amber	The NIC is connected to a valid network link at 10/100 Mbps.
Activity indicator is blinking green	Network data is being sent or received.

Power Supply Indicator Codes

A power supply has an LED indicator that shows whether power is present or whether a power fault has occurred.

- Not lit — AC power is not connected. It also indicates that the system is in standby mode.
- Green — When the system is on, a green light also indicates that the power supply is providing DC power to the system.

Figure 1-4.   Power Supply Status Indicator
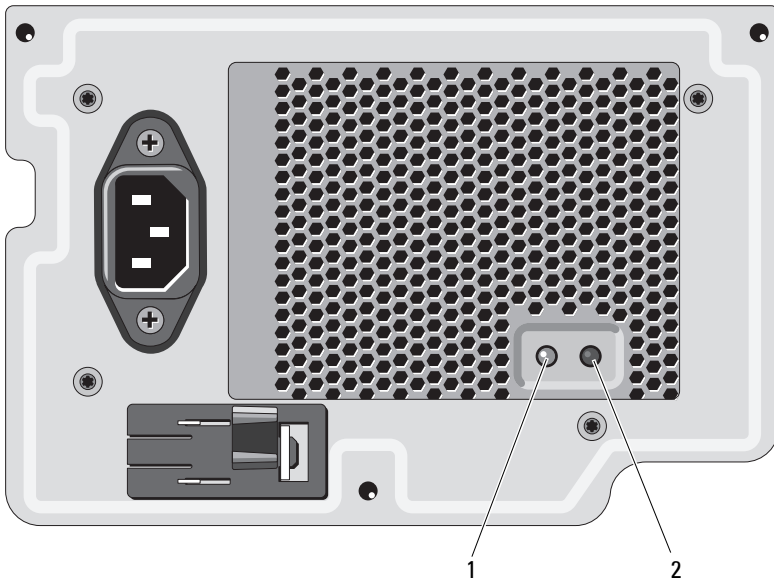
| 1 | power supply status indicator | 2 | power supply test switch |

LCD Status Messages

The LCD messages consist of brief text messages that refer to events recorded in the System Event Log (SEL). For information on the SEL and configuring system management settings, see the systems management software documentation.

NOTE: If your system fails to boot, press the System ID button for at least five seconds until an error code appears on the LCD. Record the code, then see "Getting Help" on page 157.

Viewing Status Messages

If a system error occurs, the LCD screen will turn amber. Press the **Select** button to view the list of errors or status messages. Use the left and right buttons to highlight an error number, and press **Select** to view the error.

Removing LCD Status Messages

For faults associated with sensors, such as temperature, voltage, fans, and so on, the LCD message is automatically removed when that sensor returns to a normal state. For other faults, you must take action to remove the message from the display:

- Clear the SEL — You can perform this task remotely, but you will lose the event history for the system.
- Power cycle — Turn off the system and disconnect it from the electrical outlet; wait for approximately ten seconds, reconnect the power cable, and restart the system.

NOTE: The following LCD status messages are displayed in the Simple format.

Table 1-1. LCD Status Messages

Code	Text	Causes	Corrective Actions
E1000	Failsafe voltage error. Contact support.	Check the system event log for critical failure events.	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 157.
E1114	Ambient Temp exceeds allowed range.	Ambient temperature has reached a point outside of the allowed range.	See "Troubleshooting System Cooling Problems" on page 136.
E1116	Memory disabled, temp above range. Power cycle AC.	Memory has exceeded allowable temperature and has been disabled to prevent damage to the components.	Remove AC power to the system for 10 seconds and restart the system. See "Troubleshooting System Cooling Problems" on page 136. If the problem persists, see "Getting Help" on page 157.
E1210	Motherboard battery failure. Check battery.	CMOS battery is missing or the voltage is outside of the allowable range.	See "Troubleshooting the System Battery" on page 134.
E1216	3.3V Regulator failure. Reseat PCIe cards.	3.3V voltage regulator has failed.	Remove and reseat the PCIe expansion cards. If the problem persists, see "Troubleshooting Expansion Cards" on page 143.

Table 1-1.   LCD Status Messages *(continued)*

Code	Text	Causes	Corrective Actions
E1229	CPU # VCORE Regulator failure. Reseat CPU.	Specified processor VCORE voltage regulator has failed.	Reseat the processor. See "Troubleshooting the Processor" on page 144.
			If the problem persists, see "Getting Help" on page 157.
E122A	CPU # VTT Regulator failure. Reseat CPU.	Specified processor VTT voltage regulator has failed.	Reseat the processor. See "Troubleshooting the Processor" on page 144.
			If the problem persists, see "Getting Help" on page 157.
E122C	CPU Power Fault. Power cycle AC.	A power fault was detected when powering up the processor.	Remove AC power to the system for 10 seconds and restart the system.
			If the problem persists, see "Getting Help" on page 157.
E122D	Memory Regulator # Failed. Reseat DIMMs.	One of the memory regulators has failed.	Reseat the memory modules. See "Troubleshooting System Memory" on page 137.
E122E	On-board regulator failed. Call support.	One of the on-board voltage regulators failed.	Remove AC power to the system for 10 seconds and restart the system.
			If the problem persists, see "Getting Help" on page 157.
E1310	Fan ## RPM exceeding range. Check fan.	RPM of fan is outside of the intended operating range.	See "Troubleshooting System Cooling Problems" on page 136.

Table 1-1. LCD Status Messages *(continued)*

Code	Text	Causes	Corrective Actions
E1410	System Fatal Error detected.	A fatal system error has been detected.	Check LCD for additional scrolling messages. Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 157.
E1414	CPU # temp exceeding range. Check CPU heatsink.	Processor is out of acceptable temperature range.	Ensure that the processor heat sink is properly installed. See "Troubleshooting the Processor" on page 144 and "Troubleshooting System Cooling Problems" on page 136.
E1418	CPU # not detected. Check CPU is seated properly.	Processor is missing or bad, and the system is in an unsupported configuration.	Ensure that the processor is properly installed. See "Troubleshooting the Processor" on page 144.
E141C	Unsupported CPU configuration. Check CPU or BIOS revision.	Processor is in an unsupported configuration.	Ensure that your processor matches and conforms to the type described in the processor technical specifications outlined in your system's *Getting Started Guide*.
E141F	CPU # protocol error. Power cycle AC.	The system BIOS has reported a processor protocol error.	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 157.

Table 1-1.   LCD Status Messages *(continued)*

Code	Text	Causes	Corrective Actions
E1420	CPU Bus parity error. Power cycle AC.	The system BIOS has reported a processor bus parity error.	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 157.
E1422	CPU # machine check error. Power cycle AC.	The system BIOS has reported a machine check error.	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 157.
E1610	Power Supply # (### W) missing. Check power supply.	Specified power supply was removed or is missing from the system.	See "Troubleshooting the Power Supply" on page 135.
E1614	Power Supply # (### W) error. Check power supply.	Specified power supply has failed.	See "Troubleshooting the Power Supply" on page 135.
E1618	Predictive failure on Power Supply # (### W). Check PSU.	A power supply fan failure, an over-temperature condition, or power supply communication error has caused the predictive warning of an impending power supply failure.	See "Troubleshooting the Power Supply" on page 135.
E161C	Power Supply # (### W) lost AC power. Check PSU cables.	Specified power supply is attached to the system, but it has lost its AC input.	Check the AC power source for the specified power supply. If the problem persists, see "Troubleshooting the Power Supply" on page 135.

Table 1-1. LCD Status Messages *(continued)*

Code	Text	Causes	Corrective Actions
E1620	`Power Supply # (### W) AC power error. Check PSU cables.`	Specified power supply's AC input is outside of the allowable range.	Check the AC power source for the specified power supply. If the problem persists, see "Troubleshooting the Power Supply" on page 135.
E1629	`Power required > PSU wattage. Check PSU and config.`	The system configuration requires more power than the power supply can provide, even with throttling.	Turn off power to the system, reduce the hardware configuration or install higher-wattage power supply, and then restart the system.
E1710	`I/O channel check error. Review & clear SEL.`	The system BIOS has reported an I/O channel check.	Check the SEL for more information and then clear the SEL. Remove AC power to the system for 10 seconds and restart the system.
			If the problem persists, see "Getting Help" on page 157.
E1711	`PCI parity error on Bus ## Device ## Function ##`	The system BIOS has reported a PCI parity error on a component that resides in PCI configuration space at bus **##**, device **##**, function **##**.	Remove and reseat the PCIe expansion cards. If the problem persists, see "Troubleshooting Expansion Cards" on page 143.
	`PCI parity error on Slot #. Review & clear SEL.`	The system BIOS has reported a PCI parity error on a component that resides in the specified slot.	Remove and reseat the PCIe expansion cards. If the problem persists, see "Troubleshooting Expansion Cards" on page 143.

Table 1-1. LCD Status Messages *(continued)*

Code	Text	Causes	Corrective Actions
E1712	PCI system error on Bus ## Device ## Function ##	The system BIOS has reported a PCI system error on a component that resides in PCI configuration space at bus ##, device ##, function ##.	Remove and reseat the PCIe expansion cards. If the problem persists, see "Troubleshooting Expansion Cards" on page 143.
E1714	Unknown error. Review & clear SEL.	The system BIOS has determined there has been an error in the system, but is unable to determine its origin.	Check the SEL for more information and then clear the SEL. Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 157.
E1715	Fatal I/O Error. Review & clear SEL.	The system BIOS has determined there has been a fatal error in the system.	Check the SEL for more information, and then clear the SEL. Remove AC power to the system for 10 seconds, and restart the system. If the problem persists, see "Getting Help" on page 157.
E1716	Chipset IERR Bus ## Dev ## Function ##. Review & clear SEL.	The system BIOS has reported a chipset internal error that resides in bus ##, device ##, function ##.	Check the SEL for more information, and then clear the SEL. Remove AC power to the system for 10 seconds, and restart the system. If the problem persists, see "Getting Help" on page 157.

Table 1-1.   LCD Status Messages *(continued)*

Code	Text	Causes	Corrective Actions
E1717	CPU # internal error. Review & clear SEL.	The system BIOS has determined that the processor has had an internal error.	Check the SEL for more information, and then clear the SEL. Remove AC power to the system for 10 seconds, and restart the system.
			If the problem persists, see "Getting Help" on page 157.
E171F	PCIe fatal error on Bus ## Device ## Function ##	The system BIOS has reported a PCIe fatal error on a component that resides in PCI configuration space at bus ##, device ##, function ##.	Remove and reseat the PCIe expansion cards. If the problem persists, see "Troubleshooting Expansion Cards" on page 143.
E1810	Hard drive ## fault. Review & clear SEL.	The specified hard drive has experienced a fault.	See "Troubleshooting a Hard Drive" on page 141.
E1812	Hard drive ## removed. Check drive.	The specified hard drive has been removed from the system.	Information only.
E1A1D	Control panel USB cable not detected. Check cable.	USB cable to the control panel is missing or bad.	Reseat the cable. If the problem persists, replace cable.
			If the problem persists, see "Getting Help" on page 157.
E2010	Memory not detected. Inspect DIMMs.	No memory was detected in the system.	Install memory or reseat the memory modules. See "Installing Memory Modules" on page 100 or "Troubleshooting System Memory" on page 137.

Table 1-1. LCD Status Messages *(continued)*

Code	Text	Causes	Corrective Actions
E2011	`Memory configuratio n failure. Check DIMMs.`	Memory detected, but is not configurable. Error detected during memory configuration.	See "Troubleshooting System Memory" on page 137.
E2012	`Memory configured but unusable. Check DIMMs.`	Memory configured, but is unusable.	See "Troubleshooting System Memory" on page 137.
E2013	`BIOS unable to shadow memory. Check DIMMs.`	The system BIOS failed to copy its flash image into memory.	See "Troubleshooting System Memory" on page 137.
E2014	`CMOS RAM failure. Power cycle AC.`	CMOS failure. CMOS RAM not functioning properly.	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 157.
E2015	`DMA Controller failure. Power cycle AC.`	DMA controller failure.	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 157.
E2016	`Interrupt Controller failure. Power cycle AC.`	Interrupt controller failure.	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 157.

Table 1-1. LCD Status Messages *(continued)*

Code	Text	Causes	Corrective Actions
E2017	`Timer refresh failure. Power cycle AC.`	Timer refresh failure.	Remove AC power to the system for 10 seconds and restart the system.
			If the problem persists, see "Getting Help" on page 157.
E2018	`Programmable Timer error. Power cycle AC.`	Programmable interval timer error.	Remove AC power to the system for 10 seconds and restart the system.
			If the problem persists, see "Getting Help" on page 157.
E2019	`Parity error. Power cycle AC.`	Parity error.	Remove AC power to the system for 10 seconds and restart the system.
			If the problem persists, see "Getting Help" on page 157.
E201A	`SuperIO failure. Power cycle AC.`	SIO failure.	Remove AC power to the system for 10 seconds and restart the system.
			If the problem persists, see "Getting Help" on page 157.
E201B	`Keyboard Controller error. Power cycle AC.`	Keyboard controller failure.	Remove AC power to the system for 10 seconds and restart the system.
			If the problem persists, see "Getting Help" on page 157.

Table 1-1. LCD Status Messages *(continued)*

Code	Text	Causes	Corrective Actions
E201C	SMI initializati on failure. Power cycle AC.	System management interrupt (SMI) initialization failure.	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 157.
E201D	Shutdown test failure. Power cycle AC.	BIOS shutdown test failure.	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Getting Help" on page 157.
E201E	POST memory test failure. Check DIMMs.	BIOS POST memory test failure.	See "Troubleshooting System Memory" on page 137. If the problem persists, see "Getting Help" on page 157.
E2020	CPU configuratio n failure. Check screen message.	Processor configuration failure.	Check screen for specific error messages. See "Troubleshooting the Processor" on page 144.
E2021	Incorrect memory configur- ation. Review User Guide.	Incorrect memory configuration.	Check screen for specific error messages. See "Troubleshooting System Memory" on page 137.
E2022	General failure during POST. Check screen message.	General failure after video.	Check screen for specific error messages.

Table 1-1.   LCD Status Messages *(continued)*

Code	Text	Causes	Corrective Actions
E2023	BIOS unable to mirror memory. Check DIMMs.	The system BIOS could not enable memory mirroring because of a faulty memory module or an invalid memory configuration.	See "Troubleshooting System Memory" on page 137.
E2110	Multibit Error on DIMM ##. Reseat DIMM.	The memory module in slot "##" has had a multi-bit error (MBE).	See "Troubleshooting System Memory" on page 137.
E2111	SBE log disabled on DIMM ##. Reseat DIMM.	The system BIOS has disabled memory single-bit error (SBE) logging and will not log any more SBEs until the system is rebooted. "##" represents the memory module implicated by the BIOS.	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Troubleshooting System Memory" on page 137.
E2113	Mem mirror OFF on DIMM ## & ##. Power cycle AC.	The system BIOS has disabled memory mirroring because it has determined one half of the mirror has had too many errors. "## & ##" represents the memory module pair implicated by the BIOS.	Remove AC power to the system for 10 seconds and restart the system. If the problem persists, see "Troubleshooting System Memory" on page 137.
I1910	Intrusion detected. Check chassis cover.	System cover has been removed.	Information only.

Table 1-1.   LCD Status Messages *(continued)*

Code	Text	Causes	Corrective Actions
I1911	LCD Log Full. Check SEL to review all Errors.	LCD overflow message. A maximum of ten error messages can be displayed sequentially on the LCD. The eleventh message instructs the user to check the SEL for details on the events.	Check the SEL for details on the events. Remove AC power to the system for 10 seconds or clear the SEL.
I1912	SEL full. Review & clear log.	The SEL is full of events and is unable to log any more.	Check the SEL for more information and then clear the SEL.
W1627	Power required > PSU wattage. Check PSU and config.	The system configuration requires more power than what the power supply can provide.	Turn off power to the system, reduce the hardware configuration or install higher-wattage power supply, and then restart the system.
W1628	Performance degraded. Check PSU and system configur-ation.	The system configuration requires more power than what the power supply can provide, but it can boot if throttled.	Turn off power to the system, reduce the hardware configuration or install higher-wattage power supply, and then restart the system.

✎ **NOTE:** For the full name of an abbreviation or acronym used in this table, see the *Glossary* at **support.dell.com/manuals**.

System Messages

System messages appear on the screen to notify you of a possible problem with the system.

✎ **NOTE:** If you receive a system message not listed in the table, check the documentation for the application that is running when the message appears or the operating system's documentation for an explanation of the message and recommended action.

Table 1-2. System Messages

Message	Causes	Corrective Actions
`Alert! iDRAC6 not responding. Rebooting.`	The iDRAC6 is not responding to BIOS communication either because it is not functioning properly or has not completed initialization. The system will reboot.	Wait for the system to reboot.
`Alert! iDRAC6 not responding. Power required may exceed PSU wattage.` `Alert! Continuing system boot accepts the risk that system may power down without warning.`	The iDRAC6 is hung. The iDRAC6 was remotely reset while system was booting After AC recovery, the iDRAC6 takes longer than normal to boot.	Remove AC power to the system for 10 seconds and restart the system.

Table 1-2. System Messages *(continued)*

Message	Causes	Corrective Actions

`Alert! Power required exceeds PSU wattage. Check PSU and system configuration.`
 	
`Alert! Continuing system boot accepts the risk that system may power down without warning.`
	The system configuration of processor, memory modules, and expansion cards may not be supported by the power supply.	If any system components were just upgraded, return the system to the previous configuration. If the system boots without this warning, then the replaced component(s) are not supported with this power supply. See "Chassis Intrusion Switch" on page 118.

`Alert! System fatal error during previous boot.`	An error caused the system to reboot.	Check other system messages for additional information for possible causes.
`BIOS MANUFACTURING MODE detected. MANUFACTURING MODE will be cleared before the next boot. System reboot required for normal operation.`	System is in manufacturing mode.	Reboot to take the system out of manufacturing mode.
`BIOS Update Attempt Failed!`	Remote BIOS update attempt failed.	Retry the BIOS update. If the problem persists, see "Getting Help" on page 157.

Table 1-2.   System Messages *(continued)*

Message	Causes	Corrective Actions
`Caution! NVRAM_CLR jumper is installed on system board`	NVRAM_CLR jumper is installed in the clear setting. CMOS has been cleared.	Move the NVRAM_CLR jumper to the default position (pins 3 and 5). See Figure 6-1 for jumper location. Restart the system and re-enter the BIOS settings. See "Using the System Setup Program and UEFI Boot Manager" on page 51.
`CPU set to minimum frequency.`	The processor speed may be intentionally set lower for power conservation.	If not an intentional setting, check any other system messages for possible causes.
`CPU x installed with no memory.`	Memory modules are required but not installed in the indicated processor's memory slots.	Install memory modules for the processor. See "Expansion Cards" on page 103.
`Current boot mode is set to UEFI. Please ensure compatible bootable media is available. Use the system setup program to change the boot mode as needed.`	The system failed to boot because UEFI boot mode is enabled in BIOS and the boot operating system is non-UEFI.	Ensure that the boot mode is set correctly and that the proper bootable media is available. See "Using the System Setup Program and UEFI Boot Manager" on page 51.
`Decreasing available memory`	Faulty or improperly installed memory modules.	Reseat the memory modules. See "Troubleshooting System Memory" on page 137.

Table 1-2. System Messages *(continued)*

Message	Causes	Corrective Actions
`Embedded NICx and NICy:` `OS NIC=<ENABLED |DISABLED>,` `Management Shared NIC= <ENABLED |DISABLED>`	The OS NIC interface is set in BIOS. The Management Shared NIC interface is set in management tools.	Check the system management software or the System Setup program for NIC settings. If a problem is indicated, see "Troubleshooting a NIC" on page 131.
`Error 8602 – Auxiliary Device Failure. Verify that mouse and keyboard are securely attached to correct connectors.`	Mouse or keyboard cable is loose or improperly connected. Defective mouse or keyboard.	Reseat the mouse or keyboard cable. Ensure that the mouse or keyboard is operational. See "Troubleshooting a USB Device" on page 130.
`Gate A20 failure`	Faulty keyboard controller; faulty system board.	See "Getting Help" on page 157.

Table 1-2.   System Messages *(continued)*

Message	Causes	Corrective Actions
General failure	The operating system is unable to carry out the command.	This message is usually followed by specific information. Note the information, and take the appropriate action to resolve the problem.
Invalid configuration information - please run SETUP program.	An invalid system configuration caused a system halt.	Run the System Setup program and review the current settings. See "Using the System Setup Program and UEFI Boot Manager" on page 51.
Keyboard controller failure	Faulty keyboard controller; faulty system board	See "Getting Help" on page 157.
Keyboard data line failure Keyboard stuck key failure	Keyboard cable connector is improperly connected or the keyboard is defective.	Reseat the keyboard cable. If the problem persists, see "Troubleshooting a USB Device" on page 130.
Keyboard fuse has failed	Overcurrent detected at the keyboard connector.	See "Getting Help" on page 157.
Local keyboard may not work because all user accessible USB ports are disabled. If operating locally, power cycle the system and enter system setup program to change settings.	The USB ports are disabled in the system BIOS.	Power down and restart the system from the power button, and then enter the System Setup program to enable the USB port(s). See "Entering the System Setup Program" on page 52.
Manufacturing mode detected	System is in manufacturing mode.	Reboot to take the system out of manufacturing mode.

Table 1-2. System Messages (continued)

Message	Causes	Corrective Actions
`Maximum rank count exceeded. The following DIMM has been disabled:` *x*	Invalid memory configuration. The system will run but with the specified memory module disabled.	Ensure that the memory modules are installed in a valid configuration. See "General Memory Module Installation Guidelines" on page 98.
`Memory address line failure at` *address*`, read` *value* `expecting` *value*	Faulty or improperly installed memory modules.	See "Troubleshooting System Memory" on page 137.
`Memory double word logic failure at` *address*`, read` *value* `expecting` *value*	Faulty or improperly installed memory modules.	See "Troubleshooting System Memory" on page 137.
`Memory Initialization Warning: Memory size may be reduced`	Invalid memory configuration. The system will run but with less memory than is physically available.	Ensure that the memory modules are installed in a valid configuration. See "General Memory Module Installation Guidelines" on page 98.
`Memory odd/even logic failure at` *address,* `read` *value* `expecting` *value*	Faulty or improperly installed memory modules.	See "Troubleshooting System Memory" on page 137.
`Memory write/read failure at` *address*`, read` *value* `expecting` *value*	Faulty or improperly installed memory modules.	See "Troubleshooting System Memory" on page 137.

Table 1-2. System Messages *(continued)*

Message	Causes	Corrective Actions
`Memory set to minimum frequency.`	The memory frequency may be intentionally set lower for power conservation.	If not an intentional setting, check any other system messages for possible causes.
	The current memory configuration may support only the minimum frequency.	Ensure that your memory configuration supports the higher frequency. See "General Memory Module Installation Guidelines" on page 98.
`Memory tests terminated by keystroke.`	POST memory test was terminated by pressing the spacebar.	Information only.
`MEMTEST lane failure detected on x`	Invalid memory configuration. A mismatched memory module is installed.	Ensure that the memory modules are installed in a valid configuration. See "General Memory Module Installation Guidelines" on page 98.
`No boot device available`	Faulty or missing optical drive subsystem, hard drive, or hard-drive subsystem, or no bootable USB key installed.	Use a bootable USB key, CD, or hard drive. If the problem persists, see "Troubleshooting an Internal USB Key" on page 139, "Troubleshooting a USB Device" on page 130, "Troubleshooting an Optical Drive" on page 140, and "Troubleshooting a Hard Drive" on page 141. See "Using the System Setup Program and UEFI Boot Manager" on page 51 for information on setting the order of boot devices.

Table 1-2.   System Messages *(continued)*

Message	Causes	Corrective Actions
No boot sector on hard drive	Incorrect configuration settings in System Setup program, or no operating system on hard drive.	Check the hard-drive configuration settings in the System Setup program. See "Using the System Setup Program and UEFI Boot Manager" on page 51. If necessary, install the operating system on your hard drive. See your operating system documentation.
No timer tick interrupt	Faulty system board.	See "Getting Help" on page 157.
PCI BIOS failed to install	PCIe device BIOS (Option ROM) checksum failure detected during shadowing. Cables to expansion card(s) loose; faulty or improperly installed expansion card(s).	Reseat the expansion card(s). Ensure that all appropriate cables are securely connected to the expansion card(s). If the problem persists, see "Troubleshooting Expansion Cards" on page 143.
PCIe Training Error: Expected Link Width is *x*, Actual Link Width is *y*.	Faulty or improperly installed PCIe card in the specified slot.	Reseat the PCIe card in the specified slot number. See "Troubleshooting Expansion Cards" on page 143. If the problem persists, see "Getting Help" on page 157.
Plug & Play Configuration Error	Error encountered in initializing PCIe device; faulty system board.	Install the NVRAM_CLR jumper in the clear position (pins 1 and 3) and reboot the system. See Figure 6-1 for jumper location. If the problem persists, see "Troubleshooting Expansion Cards" on page 143.

Table 1-2. System Messages *(continued)*

Message	Causes	Corrective Actions
`Quad rank DIMM detected after single rank or dual rank DIMM in socket.`	Invalid memory configuration.	Ensure that the memory modules are installed in a valid configuration. See "General Memory Module Installation Guidelines" on page 98.
`Read fault` `Requested sector not found`	The operating system cannot read from the hard drive, optical drive, or USB device, the system could not find a particular sector on the disk, or the requested sector is defective.	Replace the optical medium, USB medium or device. Ensure that the SATA backplane, USB, or SATA cables are properly connected. See "Troubleshooting a USB Device" on page 130, "Troubleshooting an Optical Drive" on page 140, or "Troubleshooting a Hard Drive" on page 141 for the appropriate drive(s) installed in your system.
`SATA Portx device not found`	There is no device connected to the specified SATA port.	Information only.
`SATA port x device auto-sensing error` `SATA port x device configuration error` `SATA port x device error`	The drive connected to the specified SATA port is faulty.	Replace the faulty drive.

Table 1-2.   System Messages *(continued)*

Message	Causes	Corrective Actions
Sector not found Seek error Seek operation failed	Faulty hard drive, USB device, or USB medium.	Replace the USB medium or device. Ensure that the USB or SATA backplane cables are properly connected. See "Troubleshooting a USB Device" on page 130 or "Troubleshooting a Hard Drive" on page 141 for the appropriate drive(s) installed in your system.
Shutdown failure	General system error.	See "Getting Help" on page 157.
The amount of system memory has changed	Memory has been added or removed or a memory module may be faulty.	If memory has been added or removed, this message is informative and can be ignored. If memory has not been added or removed, check the SEL to determine if single-bit or multi-bit errors were detected and replace the faulty memory module. See "Troubleshooting System Memory" on page 137.

Table 1-2.   System Messages *(continued)*

Message	Causes	Corrective Actions

`The following DIMMs should match in geometry: x,x,...`
 	
`The following DIMMs should match in rank count: x,x,...`
 	
`The following DIMMs should match in size: x,x,...`
 	
`The following DIMMs should match in size and geometry: x,x,...`
 	
`The following DIMMs should match in size and rank count: x,x,...`
	Invalid memory configuration. The specified memory modules do not match in size, number of ranks, or number of data lanes.	Ensure that the memory modules are installed in a valid configuration. See "General Memory Module Installation Guidelines" on page 98.

`Thermal sensor not detected on x`	A memory module without a thermal sensor is installed in the specified memory slot	Replace the memory module. See "Expansion Cards" on page 103.
`Time-of-day clock stopped`	Faulty battery or faulty chip.	See "Troubleshooting the System Battery" on page 134.

Table 1-2. System Messages *(continued)*

Message	Causes	Corrective Actions
`Time-of-day not set - please run SETUP program`	Incorrect Time or Date settings; faulty system battery.	Check the Time and Date settings. See "Using the System Setup Program and UEFI Boot Manager" on page 51. If the problem persists, replace the system battery. See "Chassis Intrusion Switch" on page 118.
`Timer chip counter 2 failed`	Faulty system board.	See "Getting Help" on page 157.
`TPM configuration operation honored. System will now reset.`	A TPM configuration command has been entered. The system will reboot and execute the command.	Information only.
`TPM configuration operation is pending. Press (I) to Ignore OR (M) to Modify to allow this change and reset the system.` `WARNING: Modifying could prevent security.`	This message is displayed during system restart after a TPM configuration command has been entered. User interaction is required to proceed.	Enter I or M to proceed.
`TPM failure`	A Trusted Platform Module (TPM) function has failed.	See "Getting Help" on page 157.

Table 1-2. System Messages *(continued)*

Message	Causes	Corrective Actions
`Unable to launch System Services image. System halted!`	System halted after F10 keystroke because System Services image is either corrupted in the system firmware or has been lost due to system board replacement.	Restart the system and update the Unified Server Configurator repository to the latest software to restore full functionality. See the Unified Server Configurator user documentation for more information.
`Unexpected interrupt in protected mode`	Improperly seated memory modules or faulty keyboard/mouse controller chip.	Reseat the memory modules. See "Troubleshooting System Memory" on page 137. If the problem persists, see "Getting Help" on page 157.

`Unsupported CPU combination`
 	
`Unsupported CPU stepping detected`
	Processor is not supported by the system.	Install a supported processor. See "Processor" on page 112.

`Unsupported DIMM detected. The following DIMM has been disabled: x`	Invalid memory configuration. The system will run but with the specified memory module disabled.	Ensure that the memory modules are installed in a valid configuration. See "General Memory Module Installation Guidelines" on page 98.
`Unsupported memory configuration. DIMM mismatch across slots detected:` `x,x,...`	Invalid memory configuration. Memory modules are mismatched in the specified slots.	Ensure that the memory modules are installed in a valid configuration. See "General Memory Module Installation Guidelines" on page 98.

Table 1-2.   System Messages *(continued)*

Message	Causes	Corrective Actions
`Warning: A fatal error has caused system reset! Please check the system event log!`	A fatal system error occurred and caused the system to reboot.	Check the SEL for information that was logged during the error. See the applicable troubleshooting section in "Troubleshooting Your System" on page 129 for any faulty components specified in the SEL.
`Warning: Control Panel is not installed.`	The control panel is not installed or has a faulty cable connection.	Install the control panel, or check the cable connections between the display module, the control panel board, and the system board. See "Control Panel Assembly" on page 120.
`Warning! No micro code update loaded for processor n`	Micro code update failed.	Update the BIOS firmware. See "Getting Help" on page 157.

`Warning! Power required exceeds PSU wattage. Check PSU and system configuration.`
 	
`Warning! Performance degraded. CPU and memory set to minimum frequencies to meet PSU wattage. System will reboot.`
	The system configuration of processor, memory modules, and expansion cards may not be supported by the power supply.	If any system components were just upgraded, return the system to the previous configuration. If the system boots without this warning, then the replaced component(s) are not supported with this power supply. See "Chassis Intrusion Switch" on page 118.

Table 1-2. System Messages *(continued)*

Message	Causes	Corrective Actions

`Warning!`
`Unsupported`
`memory`
`configuration`
`detected.`
`The memory`
`configuration is`
`not optimal.`
`The recommended`
`memory`
`configuration`
`is: <message>`
	Invalid memory configuration. The system will run but with reduced functionality.	Ensure that the memory modules are installed in a valid configuration. See "General Memory Module Installation Guidelines" on page 98. If the problem persists, see "Troubleshooting System Memory" on page 137.

`Write fault`
`Write fault on`
`selected drive`
	Faulty USB device, USB medium, optical drive assembly, hard drive, or hard-drive subsystem.	Replace the USB medium or device. Ensure that the USB, SATA backplane, or SATA cables are properly connected. See "Troubleshooting a USB Device" on page 130, "Troubleshooting an Internal USB Key" on page 139, and "Troubleshooting a Hard Drive" on page 141.

> **NOTE:** For the full name of an abbreviation or acronym used in this table, see the *Glossary* at **support.dell.com/manuals**.

Warning Messages

A warning message alerts you of a possible problem and prompts you to respond before the system continues a task. For example, before you format a diskette, a message will warn you that you may lose all data on the diskette. 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.

Diagnostics Messages

The system diagnostic utilities may issue messages if you run diagnostic tests on your system. See "Running the System Diagnostics" on page 147 for more information about system diagnostics.

Alert Messages

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.

Other Information You May Need

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

- The *Getting Started Guide* provides an overview of system features, setting up your system, and technical specifications.

- Any media that ships with your system that provides documentation and tools for configuring and managing your system, including those pertaining to the operating system, system management software, system updates, and system components that you purchased with your system.

- The Unified Server Configurator User's Guide provides information about setting up USC, configuring hardware and firmware, and deploying the operating system.

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

2

Using the System Setup Program and UEFI Boot Manager

Run the System Setup program to familiarize yourself with your system configuration and to:

- Change the NVRAM settings after you add or remove hardware
- Set or change user-selectable options
- Enable or disable integrated devices

Choosing the System Boot Mode

The System Setup program also 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 based on UEFI specifications that overlay the system BIOS. See "Entering the UEFI Boot Manager" on page 63 for more information on this interface.

You select the boot mode in the **Boot Mode** field of the System Setup program. Once you specify the boot mode, the system boots in the specified boot mode and you then proceed to install your operating system from that mode. Thereafter, you must boot the system to the same boot mode (BIOS or UEFI) to access the installed operating system. Trying to boot the operating system from the other boot mode will cause the system to halt immediately at startup.

> **NOTE:** Operating systems must be UEFI-compatible (for example, Microsoft Windows Storage Server 2008 x64 version) 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.

Entering the System Setup Program

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>, allow the system to finish booting, and then restart your system and try again.

Responding to Error Messages

If an error message appears while the system is booting, make a note of the message. See "System Messages" on page 36 for an explanation of the message and suggestions for correcting errors.

✍ **NOTE:** After installing a memory upgrade, it is normal for your system to display a message the first time you start your system.

Using the System Setup Program Navigation Keys

Keys	Action
Up arrow or <Shift><Tab>	Moves to the previous field.
Down arrow or <Tab>	Moves to the next field.
Spacebar, <Enter>, <+>, <−>, left, and right arrows	Cycles through the settings in a field. In many fields, you can also type the appropriate value.
<Esc>	Exits the System Setup program and restarts the system if any changes were made.
<F1>	Displays the System Setup program's help file.

✍ **NOTE:** For most of the options, any changes that you make are recorded but do not take effect until you restart the system.

System Setup Options

Main Screen

```
                    Dell Inc. <www.dell.com>
                    BIOS Version xx.yy.zz [This is DOS Setup]

  Service Tag: xnnnnnn                      Asset Tag: xnnnnnnnnnn


 System Time ............................................00:00:00
 System Date ............................................DAY/MO/DATE/YR

 Memory Settings .......................................<Enter>
 Processor Settings ....................................<Enter>

 SATA Settings .........................................<Enter>

 Boot Settings .........................................<Enter>

 Integrated Devices ....................................<Enter>
 PCI IRQ Assignment ....................................<Enter>

 Serial Communication ..................................<Enter>
 Embedded Server Management ............................<Enter>

 Power Management ......................................<Enter>


  Up,Down Arrow to select │ SPACE, +, - to change │ ESC to exit │ F1 = Help
```

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

Option	Description
System Time	Sets the time on the system's internal clock
System Date	Sets the date on the system's internal calendar
Memory Settings	Displays information related to installed memory. See "Memory Settings Screen" on page 55.
Processor Settings	Displays information related to processors (speed, cache, and so on). See "Processor Settings Screen" on page 56.

Option	Description
SATA Settings	Displays a screen to enable or disable the integrated SATA controller and ports. See "SATA Settings Screen" on page 56.
Boot Settings	Displays a screen to specify the boot mode (BIOS or UEFI). For BIOS boot mode, you can also specify the boot devices. See "Boot Settings Screen" on page 57.
Integrated Devices	Displays a screen to enable or disable integrated device controllers and ports, and to specify related features and options. See "Integrated Devices Screen" on page 58.
PCI IRQ Assignment	Displays a screen to change the IRQ assigned to each of the integrated devices on the PCI bus, and any installed expansion card that requires an IRQ. See "PCI IRQ Assignment Screen" on page 59.
Serial Communication	Displays a screen to enable or disable the serial ports and specify related features and options. See "Serial Communication Screen" on page 59.
Embedded Server Management	Displays a screen to configure the front-panel LCD options and to set a user-defined LCD string. See "Embedded Server Management Screen (Optional)" on page 60.
Power Management	Enables you to manage power usage of the processor, fans, and memory modules with preconfigured or customized settings. See "Power Management Screen" on page 60.
System Security	Displays a screen to configure the system password and setup password features. See "System Security Screen" on page 61.
Keyboard NumLock (**On** default)	Determines whether your system starts up with the NumLock mode activated on 101- or 102-key keyboards (does not apply to 84-key keyboards).

Option	Description
Report Keyboard Errors (**Report** default)	Enables or disables reporting of keyboard errors during the POST. Select **Report** for host systems that have keyboards attached. Select **Do Not Report** to suppress all error messages relating to the keyboard or keyboard controller during POST. This setting does not affect the operation of the keyboard itself if a keyboard is attached to the system.
F1/F2 Prompt on Error (**Enabled** default)	Enables the system to halt on errors during POST, which allows the user to observe events that may scroll by unnoticed during normal POST. The user can press <F1> to continue or <F2> to enter the System Setup program. △ **CAUTION: When setting this option to Disabled, the system will not halt if an error occurs during POST. Any critical errors will be displayed and logged in the system event log.**

Memory Settings Screen

Option	Description
System Memory Size	Displays the amount of system memory.
System Memory Type	Displays the type of system memory.
System Memory Speed	Displays the system memory speed.
Video Memory	Displays the amount of video memory.
System Memory Testing (**Enabled** default)	Specifies whether system memory tests are run at system boot. Options are **Enabled** and **Disabled**.
Error Logging Threshold Mode (**Enabled** default)	Enables error logging

Processor Settings Screen

Option	Description
64-bit	Specifies if the processor supports 64-bit extensions.
Core Speed	Displays the processor clock speed.
Bus Speed	Displays the processor bus speed.
Logical Processor (**Enabled** default)	On processors that support Simultaneous Multi-Threading (SMT) technology, each processor core supports up to two logical processors. If this field is set to **Enabled**, the BIOS reports both logical processors. If set to **Disabled**, only one logical processor is monitored by the BIOS.
Virtualization Technology (**Enabled** default)	**NOTE:** Disable this feature if your system will not be running virtualization software.
	Enabled permits virtualization software to use the virtualization technology incorporated in the processor.
Execute Disable (**Enabled** default)	Enables or disables execute disable memory protection technology.
Number of Cores per Processor (**All** default)	If set to **All**, the maximum number of cores in the processor is enabled.
C States (**Enabled** default)	When set to **Enabled**, the processor(s) can operate in all available power states.
Turbo Mode (**Enabled** default)	If Turbo Boost Technology is supported by the processor, enables or disables **Turbo Mode**.
Processor 1 Family -Model- Stepping	Displays the family, model, and stepping of the processor

SATA Settings Screen

Option	Description
SATA Controller	**ATA Mode** enables the integrated SATA controller. **Off** disables the controller.
Port A (**Off** default)	**Auto** enables BIOS support for the device attached to SATA port A. **Off** disables BIOS support for the device.

Option	Description
Port B (**Off** default)	**Auto** enables BIOS support for the device attached to SATA port B. **Off** disables BIOS support for the device.
Port C (**Off** default)	**Auto** enables BIOS support for the device attached to SATA port C. **Off** disables BIOS support for the device.
Port D (**Off** default)	**Auto** enables BIOS support for the device attached to SATA port D. **Off** disables BIOS support for the device.
Port E (**Auto** default)	**Auto** enables BIOS support for the device attached to SATA port E. **Off** disables BIOS support for the device.

Boot Settings Screen

Option	Description
Boot Mode (**BIOS** default)	⚠ **CAUTION: Switching the boot mode could prevent the system from booting if the operating system was not installed in the same boot mode.** If the system operating system supports Unified Extensible Firmware Interface, you can set this option to **UEFI**. Setting this field to **BIOS** allows compatibility with non-UEFI operating systems. **NOTE:** Setting this field to UEFI disables the **Boot Sequence**, **Hard-Disk Drive Sequence**, and **USB Flash Drive Emulation Type** fields.
Boot Sequence	If **Boot Mode** is set to **BIOS**, this field provides the location of the operating system files for startup. If **Boot Mode** is set to **UEFI**, you can access the UEFI boot manager utility by rebooting the system and pressing <F11> when prompted to do so.
Hard-Disk Drive Sequence	The sequence of hard drives. Use the up and down arrow keys to choose the hard disk.
USB Flash Drive Emulation Type	Determines the emulation type for a USB flash drive. **Auto** automatically chooses the appropriate emulation type for the device.
Boot Sequence Retry (**Disabled** default)	If this field is **Enabled** and the system fails to boot, the system reattempts to boot after 30 seconds.

Integrated Devices Screen

Option	Description
Integrated SATA Controller (Enabled default)	Enables or disables the integrated SATA controller.
User Accessible USB Ports (**All Ports On** default)	Enables or disables the user accessible USB ports. Options are **All Ports On**, **Only Back Ports On**, and **All Ports Off**.
Internal USB Port (**On** default)	Enables or disables the internal USB port.
Embedded NIC1 and NIC2	Enables or disables the operating system interface of the embedded NICs. The NICs may also be accessed through the system's management controller.
Embedded Gb NIC1 (**Enabled with PXE** default)	Enables or disables the embedded NIC. Options are **Enabled**, **Enabled with PXE**, **Enabled with iSCSI Boot, and Disabled**. PXE support allows the system to boot from the network.
MAC Address	Displays the MAC address for the NIC.
Embedded Gb NIC2 (**Enabled** default)	Enables or disables the embedded NIC.
OS Watchdog Timer (**Disabled** default)	Sets a timer to monitor the operating system for activity, and aids in recovery if the system stops responding. When **Enabled**, the operating system is allowed to initialize the timer. When **Disabled**, the timer is not initialized. **NOTE:** This feature is usable only with operating systems that support WDAT implementations of the Advanced Configuration and Power Interface (ACPI) 3.0b specification.
Embedded Video Controller (**Enabled** default)	Displays the total amount of video memory available in the embedded video controller.

PCI IRQ Assignment Screen

Option	Description
<PCIe device>	Use the <+> and <-> keys to manually select an IRQ for a given device, or select Default to allow the BIOS to select an IRQ value at system startup.

Serial Communication Screen

Option	Description
Serial Communication (**On without Console Redirection** default)	Options are **On without Console Redirection**, **On with Console Redirection via COM1**, and **Off**.
Serial Port Address	Specifies the address of the serial ports.
External Serial Connector (**Serial Device1** default)	Specifies whether **Serial Device1**, **Serial Device2**, or **Remote Access Device** has access to the external serial connector.
Failsafe Baud Rate (**115200** default)	Displays the failsafe baud rate used for console redirection. This rate should not be adjusted.
Remote Terminal Type (**VT100/VT220** default)	Options are **VT100/VT220** or **ANSI**.
Redirection After Boot (**Enabled** default)	Enables or disables BIOS console redirection after the operating system boots.

Embedded Server Management Screen (Optional)

Option	Description
Front-Panel LCD Options	Options are **User Defined String**, **Model Number**, and **None**.
	If the LCD Home screen is set to an option other than these three choices, the option will be displayed as "Advanced" in the BIOS. In this event, the option cannot be changed in the BIOS unless it is changed back to **User Defined String**, **Model Number**, or **None** through another LCD configuration utility (such as the BMC or iDRAC Configuration Utility or the LCD panel menu).
User-Defined LCD String	You can enter a name or another identifier for the system, to be displayed on the LCD module screen.

Power Management Screen

Option	Description
Power Management (**Active Power Controller** default)	Options are **OS Control**, **Active Power Controller**, **Custom**, or **Maximum Performance**. For all but the **Custom** setting, the BIOS pre-configures the power settings on this screen as follows:
	• **OS Control** sets the CPU power to **OS DBPM**, the fan power to **Minimum Power**, and the memory power to **Maximum Performance**. In this setting, all processor performance information is passed from the system BIOS to the operating system for control. The operating system sets the processor performance based on processor utilization.
	• **Active Power Controller** sets the CPU power to **System DBPM**, the fan power to **Minimum Power**, and the memory power to **Maximum Performance**. The BIOS sets the processor performance based on processor utilization.
	• **Maximum Performance** sets all fields to **Maximum Performance**.

Option	Description
CPU Power and Performance Management	Options are **OS DBPM**, **System DBPM**, **Maximum Performance**, or **Minimum Power**.
Fan Power and Performance Management	Options are **Maximum Performance** or **Minimum Power**.
Memory Power and Performance Management	Options are **Maximum Performance**, a specified frequency, or **Minimum Power**.

System Security Screen

Option	Description
System Password	Displays the current status of the password security feature and allows a new system password assignment and verification.
	NOTE: See "Using the System Password" on page 66 for more information.
Setup Password	Restricts access to the System Setup program by using a setup password.
	NOTE: See "Using the System Password" on page 66 for more information.
Password Status (**Unlocked** default)	When **Setup Password** is assigned and this field is **Locked**, the system password cannot be changed or disabled at system start-up.
	See "Using the System Password" on page 66 for more information.
TPM Security (**Off** default)	Sets the reporting of the Trusted Platform Module (TPM) in the system.
	If **Off**, the presence of the TPM is not reported to the operating system.
	If **On with Pre-boot Measurements**, the system reports the TPM to the operating system and stores the pre-boot measurements to the TPM during POST.
	If **On without Pre-boot Measurements**, the system reports the TPM to the operating system and bypasses pre-boot measurements.

Option	Description
TPM Activation (**No Change** default)	When set to **Activate**, the TPM is enabled to default settings. When set to **Deactivate**, the TPM is disabled. The **No Change** state initiates no action. The operational state of the TPM remains unchanged (all user settings for the TPM are preserved).
	NOTE: This field is read-only when TPM Security is set to Off.
TPM Clear (**No** default)	⚠ **CAUTION: Clearing the TPM will lose all encryption keys in the TPM. This option prevents booting to the operating system and results in data loss if the encryption keys cannot be restored. Back up the TPM keys prior to enabling this option.**
	When set to **Yes**, all TPM contents are cleared.
	NOTE: This field is read-only when TPM Security is set to Off.
Power Button (**Enabled** default)	If **Enabled**, the power button can turn the system's power off and on. On an ACPI-compliant operating system, the system performs an orderly shutdown before power is turned off.
	When **Disabled**, the button can only turn on system power.
	NOTE: You can still turn on the system by using the power button, even if the Power Button option is set to Disabled.
NMI Button (**Disabled** default)	⚠ **CAUTION: Use the NMI button only if directed to do so by qualified support personnel or by the operating system's documentation. Pressing this button halts the operating system and displays a diagnostic screen.**
	Enables or disables the NMI feature.

Option	Description
AC Power Recovery (**Last** default)	Determines how the system reacts when power is restored. If set to **Last**, the system returns to the last power state. **On** turns on the system after power is restored. **Off** allows the system to remain off after power is restored.
AC Power Recovery Delay (**Immediate** default)	Determines when the system restarts after power is restored. Options are **Immediate**, **Random** (a random value of 30 to 240 seconds), or a user-defined value of 30 to 240 seconds.

Exit Screen

Press <Esc> to exit the System Setup program; the **Exit** screen displays:

- `Save Changes and Exit`
- `Discard Changes and Exit`
- `Return to Setup`

Entering the UEFI Boot Manager

NOTE: Operating systems must be 64-bit UEFI-compatible (for example, Microsoft Windows Server 2008 x64 version) to be installed from the UEFI boot mode. DOS and 32-bit operating systems can only be installed from the BIOS boot mode.

NOTE: The Boot Mode must be set to UEFI in the System Setup program to access the UEFI Boot Manager.

The UEFI Boot Manager enables you to:

- Add, delete, and arrange boot options
- Access the System Setup program and BIOS-level boot options without rebooting

1 Turn on or restart your system.

2 Press <F11> after you see the following message:

`<F11> = UEFI Boot Manager`

NOTE: The system will not respond until the USB keyboard is active.

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.

Using the UEFI Boot Manager Navigation Keys

Keys	Action
Up arrow	Moves to and highlights the previous field.
Down arrow	Moves to and highlights the next field.
Spacebar, <Enter>, <+>, <−>	Cycles through the settings in a field.
<Esc>	Refreshes the UEFI Boot Manager screen, or returns to the UEFI Boot Manager screen from the other program screens.
<F1>	Displays the UEFI Boot Manager help file.

UEFI Boot Manager Screen

Option	Description
Continue	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.
<Boot options>	Displays the list of available boot options (marked with asterisks). Select the boot option you wish to use and press <Enter>. **NOTE:** If you hot-add a boot device, press <ESC> to refresh the list of boot options.
UEFI Boot Settings	Enables you to add, delete, enable, or disable boot options; change boot order; or execute a one-time boot option.
System Utilities	Enables you to access the System Setup program, System Services Unified Server Configurator, Diagnostics, and BIOS-level boot options.

UEFI Boot Settings Screen

Option	Description
Add Boot Option	Adds a new boot option.
Delete Boot Option	Deletes an existing boot option.
Enable/Disable Boot Option	Disables and enables a boot option in the boot option list.
Change Boot Order	Changes the order of the boot option list.
One-Time Boot From File	Sets a one-time boot option not included in the boot option list.

System Utilities Screen

Option	Description
System Setup	Accesses the System Setup program without rebooting.
System Services (USC)	Restarts the system and accesses the USC, which allows you to run utilities such as system diagnostics.
BIOS Boot Manager	Accesses the BIOS-level boot options list without rebooting. This option enables you to conveniently switch to BIOS boot mode if you need to boot to a device with a non-UEFI operating system, such as a bootable DOS media with diagnostics software.
Reboot System	Restarts the system.

System and Setup Password Features

NOTE: For a forgotten password, see "Disabling a Forgotten Password" on page 156.

Your system is shipped without the system password feature enabled. Operate the system only with system password protection.

CAUTION: The password features provide a basic level of security for the data on your system.

CAUTION: Anyone can access the data stored on your system if the system is running and unattended.

Using the System Password

When a system password is assigned, the system prompts for the system password after the system starts and only those with the password have full use of the system.

Assigning a System Password

Before assigning a system password, enter the System Setup program and check the **System Password** option.

When a system password is assigned, **System Password** is **Enabled**. If **Password Status** is **Unlocked**, you can change the system password. If **Locked**, you cannot change the system password. Disabling the password jumper on the system board sets **System Password** to **Disabled**, and you cannot change or enter a new system password.

When a system password is not assigned and the password jumper on the system board is in the enabled position, **System Password** is **Not Enabled** and **Password Status** is **Unlocked**. To assign a system password:

1 Verify that **Password Status** is **Unlocked**.

2 Highlight the **System Password** option and press <Enter>.

3 Type your new system password.

You can use up to 32 characters in your password.

As you type, placeholders appear in the field.

The password assignment is not case-sensitive. Certain key combinations are invalid and if you enter one, the system beeps. To erase a character, press <Backspace> or the left-arrow key.

NOTE: To escape from the field without assigning a system password, press <Enter> to move to another field, or press <Esc> prior to completing step 5.

4 Press <Enter>.

5 To confirm your password, type it a second time and press <Enter>.

System Password changes to **Enabled**. Exit the System Setup program and begin using your system.

6 Either reboot the system now for the password protection to take effect or continue working.

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

Using Your System Password to Secure Your System

NOTE: If you have assigned a setup password (see "Using the Setup Password" on page 68), the system accepts your setup password as an alternate system password.

When **Password Status** is **Unlocked**, you have the option to leave the password security enabled or to disable password security.

To leave the password security enabled:

1 Turn on or reboot your system by pressing <Ctrl><Alt><Del>.

2 Type your password and press <Enter>.

To disable the password security:

1 Turn on or reboot your system by pressing <Ctrl><Alt><Del>.

2 Type your password and press <Ctrl><Enter>.

When **Password Status** is **Locked**, you must 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 will shut down.

Even after you shut down and restart the system, the error message continues to be 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

1 Press <Ctrl><Enter> at the password prompt to disable the existing system password.

If you are asked to enter your setup password, contact your network administrator.

2 Enter the System Setup program by pressing <F2> during POST.

3 Select the **System Security** screen to verify that the **Password Status** is **Unlocked**.

4 Type the system password.

5 Confirm that **Not Enabled** is displayed for the **System Password**.

If **Not Enabled** is displayed for the **System Password**, the system password has been deleted. If **Enabled** is displayed for the **System Password**, press the <Alt><b> key combination to restart the system, and repeat step 1 to step 5.

Using the Setup Password

Assigning a Setup Password

You can assign a setup password only when the **Setup Password** is **Not Enabled**. To assign a setup password, highlight the **Setup Password** option and press the **<+>** or **<–>** key. The system prompts you to enter and verify the password.

> **NOTE:** The setup password can be the same as the system password. If the two passwords are different, the setup password can be used as an alternate system password. The system password cannot be used in place of the setup password.

You can use up to 32 characters in your password.

As you type, placeholders appear in the field.

The password assignment is not case-sensitive. Certain key combinations are invalid and if you enter one, the system beeps. To erase a character, press <Backspace> or the left-arrow key.

When you verify the password, the **Setup Password** changes to **Enabled**. The next time you enter the System Setup program, the system prompts you for the setup password.

A change to the **Setup Password** option becomes effective immediately (restarting the system is not required).

Operating With a Setup Password Enabled

If **Setup Password** is **Enabled**, you must 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 lets you view, but not modify, the System Setup screens. The following options are exceptions: If **System Password** is not **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.

Deleting or Changing an Existing Setup Password

1 Enter the System Setup program and select the **System Security**.

2 Highlight **Setup Password**, press <Enter> to access the setup password window. Press <Enter> twice to clear the existing setup password.

   The setting changes to **Not Enabled**.

3 If you want to assign a new setup password, perform the steps in "Assigning a Setup Password."

Embedded System Management

The Unified Server Configurator (USC) is an embedded utility that enables systems and storage management tasks from an embedded environment throughout the server's lifecycle.

The USC 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 USC.

The following features of USC are supported on systems with Baseboard Management Controller (BMC):

• Installing an operating system

• Running diagnostics to validate the memory, I/O devices, processors, physical disks, and other peripherals

When an optional iDRAC6 Express card is installed, USC provides the following additional features:

- Downloading and applying firmware updates
- Configuring hardware and firmware

For more information about setting up USC, configuring hardware and firmware, and deploying the operating system, see the Dell Unified Server Configurator User's Guide on the Dell Support website at **support.dell.com/manuals**.

Baseboard Management Controller Configuration

📝 **NOTE:** If an iDRAC6 Express card is installed on the system, the BMC utility is replaced by the iDRAC6 utility.

The BMC enables the configuring, monitoring, and recovering of systems remotely. BMC provides the following features:

- Uses the system's integrated NIC
- Enables fault logging and SNMP alerting
- Provides access to system event log and sensor status
- Allows control of system functions including power on and off
- Functions independently of the system's power state or the system's operating system
- Provides text console redirection for system setup, text-based utilities, and operating system consoles

📝 **NOTE:** To remotely access the BMC through the integrated NIC, you must connect the network connection to integrated NIC1.

For additional information on using BMC, see the documentation for the BMC and systems management applications.

Entering the BMC Setup Module

1 Turn on or restart your system.

2 Press <Ctrl><E> when prompted after POST.

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

iDRAC Configuration Utility

The iDRAC Configuration Utility is a pre-boot configuration environment that allows you to view and set parameters for the iDRAC6 and for the managed server.

The iDRAC Configuration Utility provides the following features:

- Enables fault logging and SNMP alerting.
- Provides access to system event log and sensor status.
- Allows control of system functions including power on and off.
- Functions independently of the system's power state or the system's operating system.
- Provides text console redirection for system setup, text-based utilities, and operating system consoles.

In addition the iDRAC Configuration Utility enables you to:

- Configure, enable, or disable the iDRAC6 local area network through the embedded NIC1.
- Enable or disable IPMI over LAN.
- Enable a LAN Platform Event Trap (PET) destination.
- Attach or detach the Virtual Media devices.
- Change the administrative user name and password and manage user privileges.
- View System Event Log (SEL) messages or clear messages from the log.

For additional information on using iDRAC6, see the documentation for iDRAC6 and systems management applications.

Entering the iDRAC Configuration Utility

1. Turn on or restart your system.
2. Press <Ctrl><E> when prompted during POST.

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

3

Installing System Components

Recommended Tools

- Key to the system keylock
- #1 and #2 Phillips screwdrivers
- Wrist grounding strap

Inside the System

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

Figure 3-1.   Inside the System
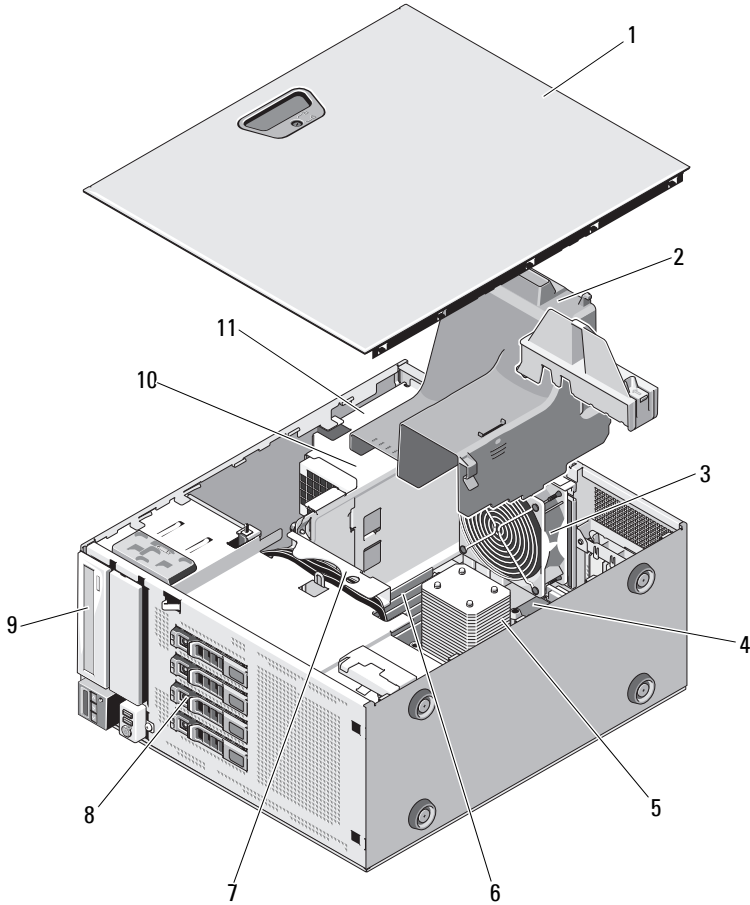
1	system cover	2	cooling shroud
3	system cooling fan	4	expansion card slots (5)
5	heat sink and processor	6	memory modules (6)
7	SATA backplane	8	hard drives (4)
9	optical drive	10	power supply
11	power supply bay		

Front Bezel

![note icon] **NOTE:** If you are removing or installing a hot-swappable hard drive, the system may remain turned on and in the upright position during removal of the front bezel. If you are removing or installing any other system component(s), the system should be turned off and placed in the orientation shown in Figure 3-1.

Removing the Front Bezel

1 Using the system key, unlock the front bezel (if locked).

2 Slide the release latch in the direction of the arrow and rotate the top end of the bezel away from the chassis. See Figure 3-2.

3 Lift the bezel away from the chassis.

Figure 3-2. Removing or Replacing the Front Bezel
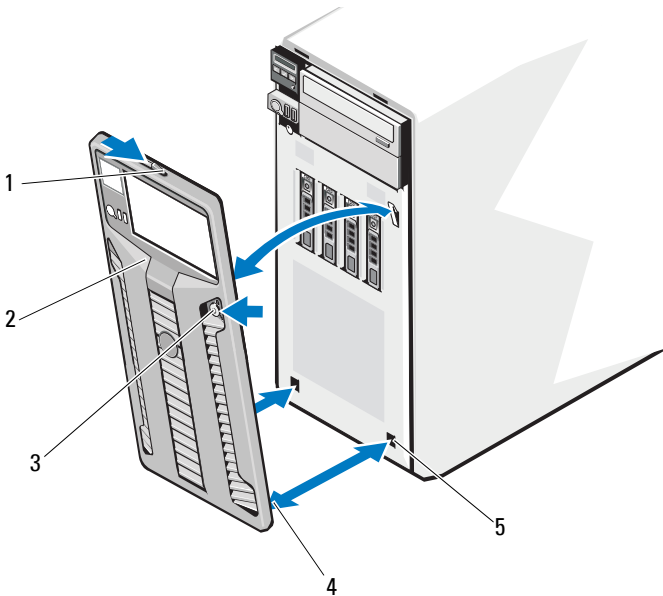
1	release latch	2	bezel
3	bezel key lock	4	bezel tabs (2)
5	tab slots (2)		

Installing the Front Bezel

1   Insert the bezel tabs into the bezel tab slots in the chassis. See Figure 3-2.

2   Press the top end of the bezel into the chassis until the lever locks
    into place.

3   Using the system key, lock the bezel.

Front Bezel Inserts

Removing the Front Bezel Insert

✍ **NOTE:** Before installing a drive in one or more of the front drive bays, remove the
corresponding insert(s) on the front bezel.

✍ **NOTE:** Bezel inserts may contain screws on the inside. You can attach the screws
to new drives, as needed.

1   Remove the front bezel. See "Removing the Front Bezel" on page 75.

2   Press the insert tab and pull the insert away from the bezel. See Figure 3-3.

Figure 3-3.   Removing and Installing the Front Bezel Insert
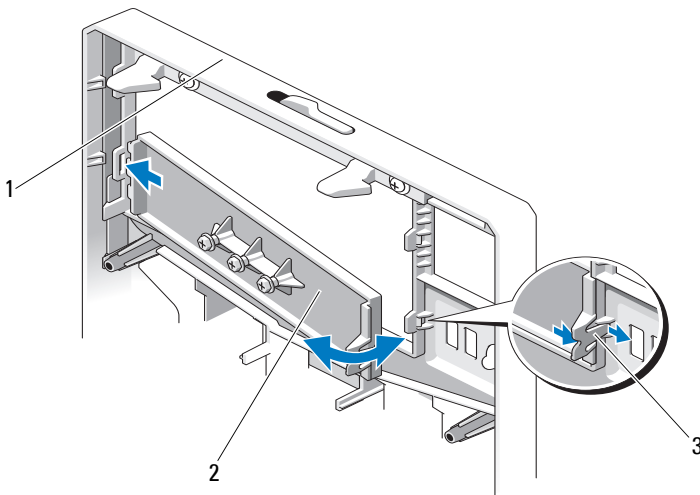
1	front bezel	2	front bezel insert
3	insert tab		

Installing the Front Bezel Insert

✍ **NOTE:** If you remove a drive from one or more of the front drive bays, replace the corresponding insert(s) on the front bezel.

1 From the back of the bezel, align the insert tab with the corresponding notch on the bezel. Press the insert until the tab snaps into place. See Figure 3-3.

2 Replace the front bezel. See "Installing the Front Bezel" on page 76.

EMI Filler Panel

Depending on the configuration of your system, an electromagnetic interference (EMI) filler panel may be installed in one or more of the 5.25-inch optical drive bays at the front of the system. EMI filler panels are essential for airflow efficiency and for EMI protection. To install an optical drive, the corresponding EMI filler panel must first be removed.

Removing an EMI Filler Panel

1 Remove the front bezel. See "Removing the Front Bezel" on page 75.

2 Remove the EMI filler panel out of the chassis by pulling firmly on the holes in the middle of the filler panel. See Figure 3-4.

Figure 3-4.   Removing and Installing an EMI Filler Panel
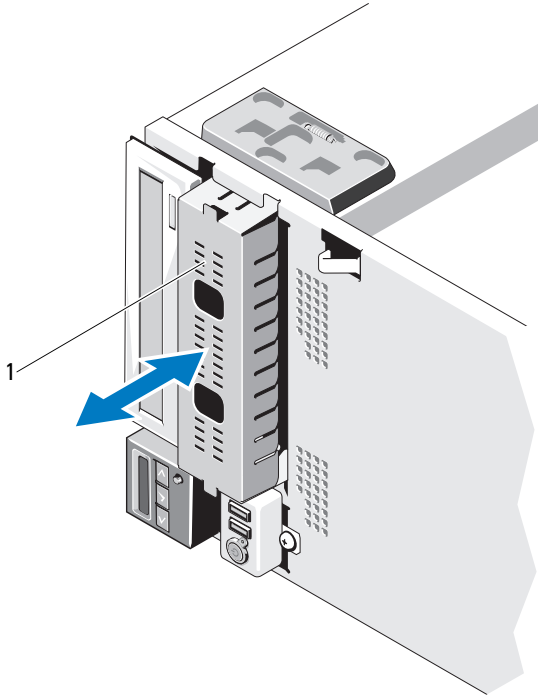
1   EMI filler panel

Installing an EMI Filler Panel

   1   Push the EMI filler panel into the empty drive bay on the front of the
       chassis until the filler panel locks into place. See Figure 3-4.

   2   Replace the front bezel. See "Installing the Front Bezel" on page 76.

Opening and Closing the System

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

⚠️ **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.**

Opening the System

1 Turn off the system and attached peripherals. Disconnect the system from the electrical outlet and peripherals.

2 Lay the system on a flat surface.

3 Turn the lock on the cover release latch counterclockwise to the unlocked position. See Figure 3-5.

4 Press the cover release latch, and rotate the latch end of the cover away from the system. See Figure 3-5.

5 Grasp the cover on both sides and carefully lift the cover away from the system. See Figure 3-5.

Figure 3-5. Opening and Closing the System
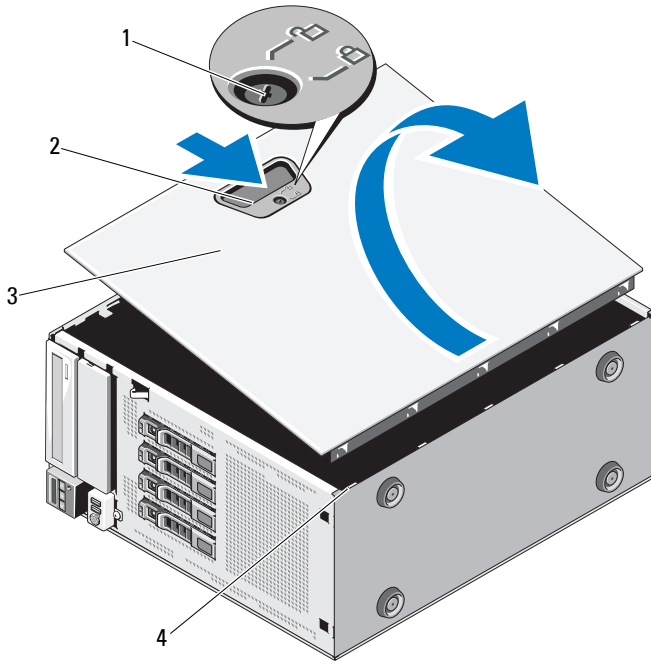
1	cover release latch lock	2	cover release latch
3	system cover	4	chassis slots

Closing the System

1. Ensure that all internal cables are connected and folded out of the way.

2. Ensure that no tools or extra parts are left inside the system.

3. Place the bottom edge of the cover, opposite from the cover release latch, into the slots in the system chassis. See Figure 3-5.

4. Lower the cover into the chassis.

5. Press the latch end of the cover into the chassis until the latch locks into place.

6. Turn the lock on the cover release latch clockwise to the locked position. See Figure 3-5.

7 Place the system upright on a flat surface.

8 Reattach any peripherals and connect the system to an electrical outlet.

9 Turn on the system and attached peripherals.

Expansion Card Stabilizer

Removing the Expansion Card Stabilizer

1 Turn off the system and attached peripherals. Disconnect the system from the electrical outlet and peripherals.

2 Open the system. See "Opening the System" on page 79.

3 While pressing inwards on the touch points of the expansion card stabilizer, lift it away from the system. See Figure 3-6.

Installing the Expansion Card Stabilizer

1 Align the expansion card stabilizer with the slots on the chassis and the cooling shroud.

2 Hold the touch points and lower the expansion card stabilizer. See Figure 3-6.

3 Close the system. See "Closing the System" on page 80.

4 Place the system upright on a flat surface.

5 Reattach any peripherals and connect the system to an electrical outlet.

6 Turn on the system and attached peripherals.

Cooling Shroud

The cooling shroud covers the processor, heat sink, and memory modules, and provides air flow to these components. The cooling shroud directs airflow over the system processor and memory modules.

⚠ **WARNING: The memory modules and heat sink can get very hot during normal operation. Ensure that the memory modules and heat sink have had sufficient time to cool before you touch them.**

⚠ **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 of the system and loss of data.**

Removing the Cooling Shroud

1. Turn off the system and attached peripherals. Disconnect the system from the electrical outlet and peripherals.

2. Open the system. See "Opening the System" on page 79.

3. Remove the expansion card stabilizer. See "Removing the Expansion Card Stabilizer" on page 81.

4. Remove the cable secured into the bracket on the side of the cooling shroud. See Figure 3-6.

5. Hold the touch point and rotate the cooling shroud 180° away from the chassis.

Figure 3-6. Removing and Installing the Cooling Shroud
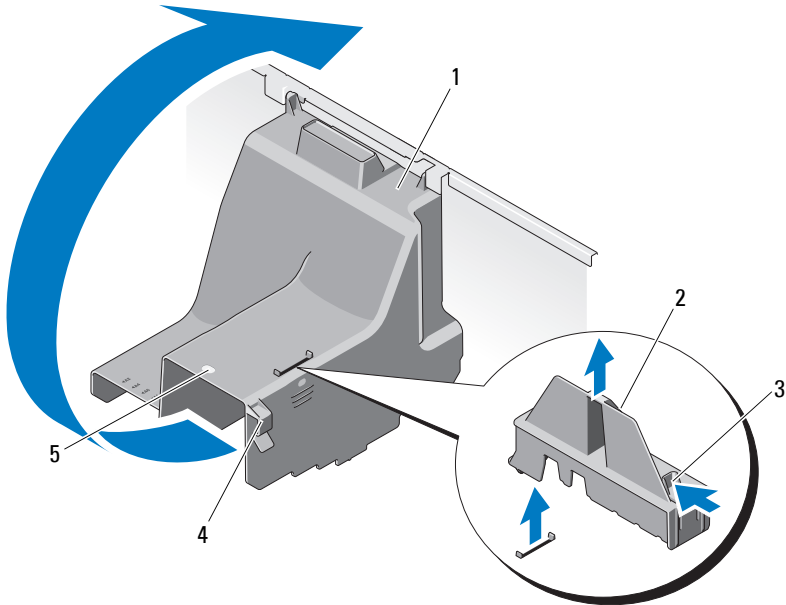
1	cooling shroud	2	expansion card stabilizer
3	expansion card stabilizer touch points (2)	4	cable bracket
5	cooling shroud touch point		

Installing the Cooling Shroud

1. Carefully lower the cooling shroud into the system holding by the touch point.

2. Ensure that no cables are pinned under the edges of the cooling shroud.

3. Secure the cable into the bracket on the side of the cooling shroud.

4. Replace the expansion card stabilizer. See "Installing the Expansion Card Stabilizer" on page 81.

5. Close the system. See "Closing the System" on page 80.

6 Place the system upright on a flat surface.

7 Reattach any peripherals and connect the system to an electrical outlet.

8 Turn on the system and attached peripherals.

Hard Drives

Your system supports up to four internal hot-swap SATA hard drives in 3.5-inch hot-swap hard-drive carriers. The hard drives are installed at the front of the system (see Figure 3-8).

Front-mounted hard drives are connected to a SATA backplane through hard-drive carriers and can be configured as hot-swappable.

⚠ **CAUTION: Before attempting to remove or install a drive while the system is running, see the documentation for the SATA controller card to ensure that the host adapter is configured correctly to support hot-swap drive removal and insertion.**

⚠ **CAUTION: Do not turn off or reboot your system while the drive is being formatted. Doing so can cause a drive failure.**

✎ **NOTE:** Use only drives that have been tested and approved for use with the SATA backplane board.

✎ **NOTE:** When you format a hard drive, allow enough time for the formatting to be completed. Be aware that high-capacity hard drives can take a number of hours to format.

Removing a Hard-Drive Blank

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

1 Remove the front bezel. See "Removing the Front Bezel" on page 75.

2 Grasp the front of the hard-drive blank, press the release handle and slide the blank out until it is free of the drive bay. See Figure 3-7.

3 Slide the drive blank out until it is free of the drive bay.

Figure 3-7.   Removing or Installing a Hard-Drive Blank
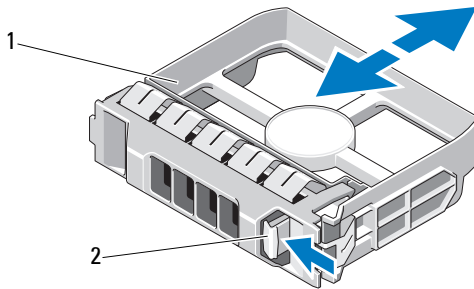
| 1 | hard-drive blank | 2 | release handle |

Installing a Hard-Drive Blank

Align the hard-drive blank with the drive bay and insert the blank into the drive bay until the release lever clicks into place.

Removing a Hot-Swap Hard Drive

⚠ **CAUTION: To prevent data loss, ensure that your operating system supports hot-swap drive removal and installation. See the documentation provided with your operating system for more information.**

1   Remove the front bezel. See "Removing the Front Bezel" on page 75.

2   From the RAID management software, prepare the drive for removal. Wait until the hard-drive indicators on the drive carrier signal that the drive can be removed safely. See your controller documentation for information about hot-swap drive removal.

   If the drive has been online, the green activity/fault indicator will flash as the drive is powered down. When the drive indicators are off, the drive is ready for removal. See "Hard-Drive Indicator Patterns" on page 18.

3   Press the button on the front of the drive carrier to release the carrier handle. See Figure 3-8.

4 Open the hard-drive carrier release handle to release the drive. See Figure 3-8.

5 Slide the hard drive out until it is free of the drive bay.

6 Remove the hard drive from the carrier. See "Removing a Hot-Swap Hard Drive From a Hard-Drive Carrier" on page 88.

7 Insert a drive blank in the vacated drive bay. See "Installing a Hard-Drive Blank" on page 85.

8 Replace the front bezel. See "Installing the Front Bezel" on page 76.

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

Figure 3-8. Removing or Installing a Hot-Swap Hard Drive
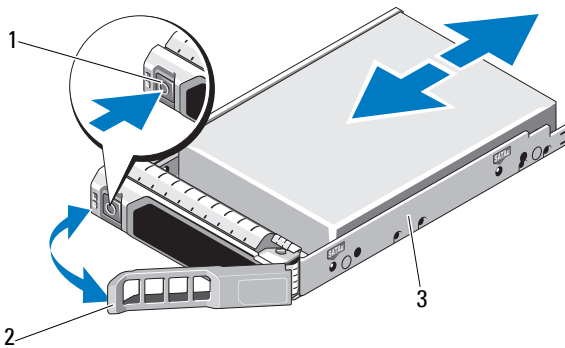
| 1 | release button | 2 | hard-drive carrier handle |
| 3 | hard-drive carrier | | |

Installing a Hot-Swap Hard Drive

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

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

⚠ **CAUTION: Ensure that your operating system supports hot-swap drive installation. See the documentation supplied with your operating system.**

⚠ **CAUTION: Combining SATA and SAS hard drives in the same system configuration is not supported.**

1   Remove the front bezel. See "Removing the Front Bezel" on page 75.

2   If a drive blank is present in the bay, remove it. See "Removing a Hard-Drive Blank" on page 84.

3   Install the hot-swap hard drive into the hard-drive carrier. See "Installing a Hot-Swap Hard Drive Into a Drive Carrier" on page 89.

4   With the handle on the hard-drive carrier open, slide the hard drive into the drive bay until the carrier contacts the backplane.

5   Push in on the hard-drive carrier and rotate the handle up until it snaps into place.

6   Replace the front bezel. See "Installing the Front Bezel" on page 76.

Removing a Hot-Swap Hard Drive From a Hard-Drive Carrier

Remove the screws from the slide rails on the hard-drive carrier and separate the hard drive from the carrier. See Figure 3-9.

Figure 3-9. Removing and Installing a Hot-Swap Hard Drive
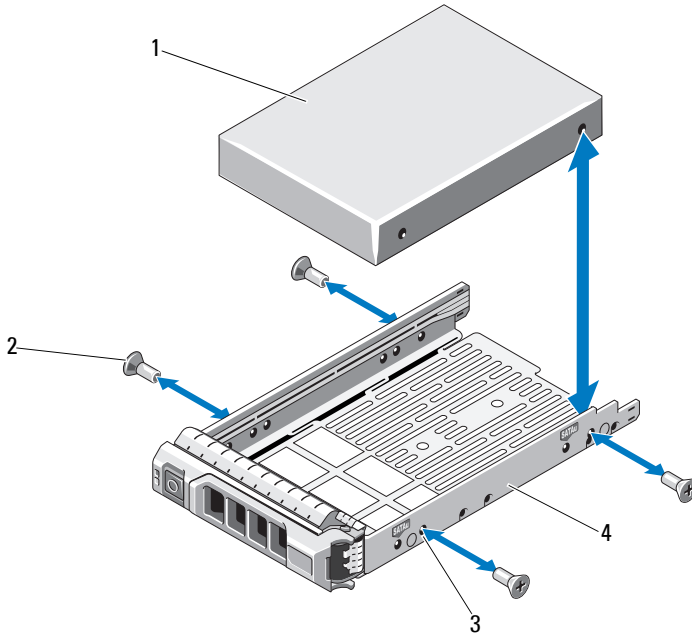
| 1 | hard drive | 2 | screws (4) |
| 3 | SATA screw hole | 4 | hard-drive carrier |

Installing a Hot-Swap Hard Drive Into a Drive Carrier

1 Insert the hard drive into the hard-drive carrier with the connector end of the drive at the rear. See Figure 3-9.

> **NOTE:** For a 2.5-inch hard-drive, secure the hard drive into an insert and then slide in into the drive carrier.

2 Align the screw holes on the hard drive with the back set of holes on the hard-drive carrier.

When aligned correctly, the back of the hard drive will be flush with the back of the hard-drive carrier.

3 Attach the screws to secure the hard drive to the hard-drive carrier.

> **NOTE:** If you are not replacing the hard drive, remove the drive from the drive bracket and insert the empty bracket back into the drive bay.

Optical Drives

The 5.25-inch drive bays at the front of your system provide support for two optical drives.

Removing an Optical Drive

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

1 Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.

2 Remove the front bezel. See "Removing the Front Bezel" on page 75.

3 Open the system. See "Opening the System" on page 79.

4 Disconnect the power and data cables from the back of the drive. See Figure 3-10.

5 Slide the drive release latch in the direction of the arrow to release the shoulder screw and then slide the drive out of the bay. See Figure 3-10.

6 If you are installing another drive in the bay, see "Installing an Optical Drive" on page 91.

   If the drive is being permanently removed:

   a Install an EMI filler panel into the empty drive bay. See "Installing an EMI Filler Panel" on page 78.

   b Install a front bezel insert in the front bezel. See "Installing the Front Bezel Insert" on page 77.

7 Close the system. See "Closing the System" on page 80.

8 Place the system upright on a flat surface.

9 Reattach any peripherals and connect the system to an electrical outlet.

10 Turn on the system and attached peripherals.

Figure 3-10. Removing and Installing an Optical Drive
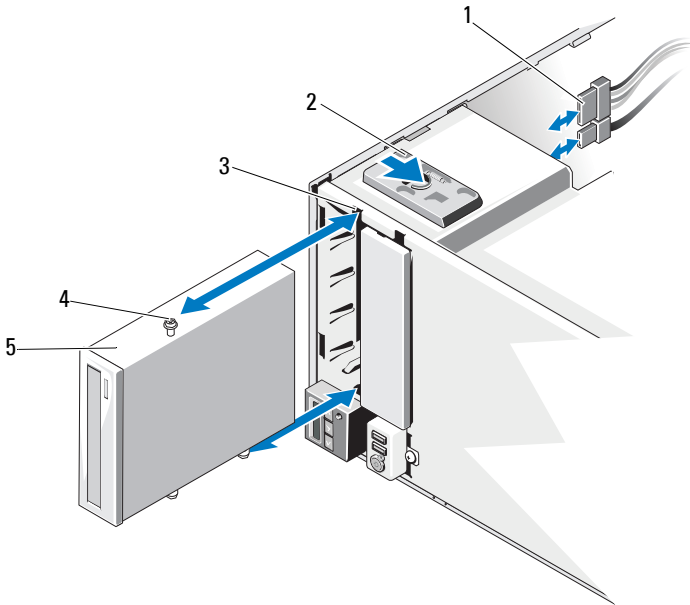
1	power and data cables	2	drive release latch
3	drive bay screw slots	4	shoulder screws (3)
5	optical drive		

Installing an Optical Drive

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

1 Unpack and prepare the drive for installation. For instructions, see the documentation that accompanied the drive.

> **NOTE:** Each device attached to a SCSI host adapter must have a unique SCSI ID number (narrow SCSI devices use IDs 0 to 7; wide SCSI devices use IDs from 0 to 15). Set the drive's SCSI ID to avoid conflicts with other devices on the SCSI bus. For the default SCSI ID setting, see the documentation provided with the drive.

> **NOTE:** There is no requirement that SCSI ID numbers be assigned sequentially or that devices be attached to the cable in order by ID number.

> **NOTE:** SCSI logic requires that the two devices at opposite ends of a SCSI chain be terminated and that all devices in between be unterminated. Enable the drive's termination if it is the last device in a chain of devices (or sole device) connected to the SCSI controller.

2 Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.

3 Open the system. See "Opening the System" on page 79.

4 Remove the front bezel. See "Removing the Front Bezel" on page 75.

5 If you are installing a drive into an empty bay:

   a Remove the EMI filler panel. See "Removing an EMI Filler Panel" on page 77.

   b Remove the front bezel insert. See "Removing the Front Bezel Insert" on page 76.

If you are installing a new drive into a bay that has an optical drive, see "Removing an Optical Drive" on page 90.

6 Attach the three shoulder screws to the drive, one screw on the lower front screw hole on the right side and two screws on the lower screw holes on the left side. See Figure 3-11.

NOTE: If the optical drive you are installing does not have shoulder screws, remove the three shoulder screws from the old drive or the back of the 5.25-inch front bezel insert.

Figure 3-11.   Installing Optical Drive Shoulder Screws
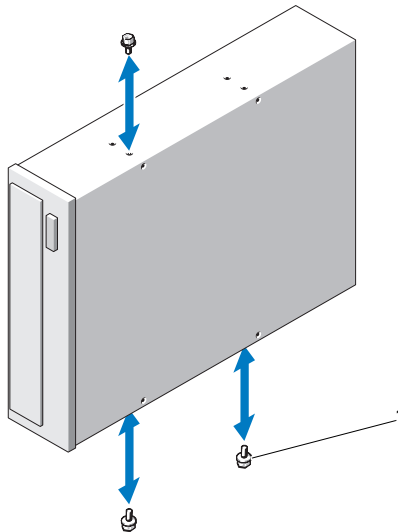
1   shoulder screws (3)

7 From the front of the system, align the shoulder screws with the slots in the chassis and slide the drive into the drive bay until the shoulder screws snap into place. See Figure 3-10.

8 Attach the power and data cables to the drive.

9 Replace the front bezel. See "Installing the Front Bezel" on page 76.

10 Close the system. See "Closing the System" on page 80.

11 Place the system upright on a flat surface.

12 Reattach any peripherals and connect the system to an electrical outlet.

13 Turn on the system and attached peripherals.

14 Test the drive by running system diagnostics (optional). See "Running the System Diagnostics" on page 147.

Power Supply

Removing a Power Supply

1 Turn off the system and all attached peripherals.

2 Disconnect the power cable from the power supply.

3 Open the system. See "Opening the System" on page 79.

4 Disconnect all cables from the power supply to the system board, hard drives and optical drive.

5 Loosen the three screws securing the power supply to the chassis and lift the power supply to remove it from the chassis. See Figure 3-12.

Figure 3-12. Removing and Replacing a Power Supply
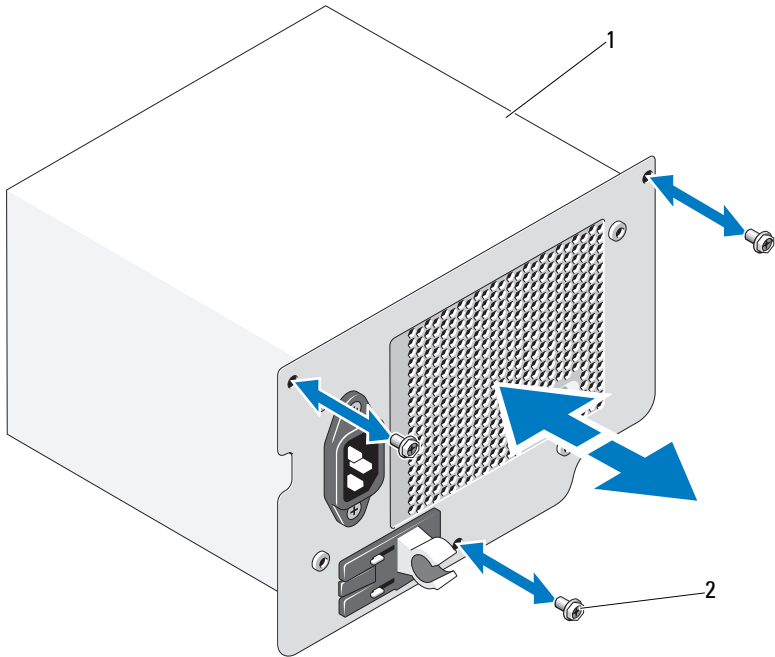
1	Power supply	2	screws (3)

Installing a Power Supply

1 Open the system. See "Opening the System" on page 79.

2 Place the power supply in the chassis. Tighten the three screws to secure the power supply to the chassis.

3 Connect all cables to the system board and drives.

4 Replace the system cover. See "Closing the System" on page 80.

5 Place the system upright on a flat surface.

6 Reattach any peripherals and connect the system to an electrical outlet.

7 Turn on the system and attached peripherals.

System Fan

Removing the System Fan

⚠ **WARNING: The system fan can continue to spin for some time after the system has been powered down. Allow time for the fan to stop spinning before removing it from the system.**

⚠ **WARNING: Do not attempt to operate the system without the system fan.**

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

1 Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

2 Open the system. See "Opening the System" on page 79.

3 Remove the expansion card stabilizer. See "Removing the Expansion Card Stabilizer" on page 81.

4 Remove the cooling shroud. See "Removing the Cooling Shroud" on page 82.

5 Disconnect the system fan power cable from the system board.
See Figure 3-13.

6 Press the fan release tab and slide the fan out of the securing slots on the chassis. See Figure 3-13.

Figure 3-13.   Removing the System Fan
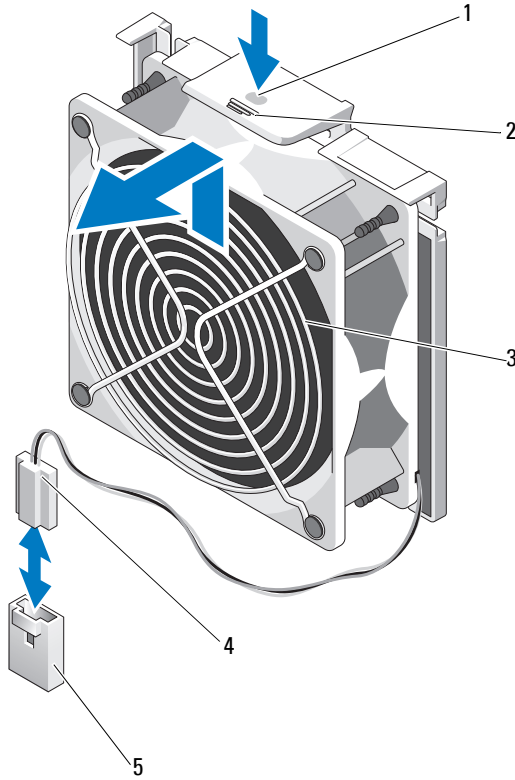
1	touch-point	2	release tab
3	system fan	4	power cable
5	FAN connector on the system board		

Installing the System Fan

1 Align the tabs on the system fan with the securing slots on the chassis.

2 Slide the system fan into the securing slots until the release tab locks into place.

3 Connect the system fan power cable to the system board.

4 Replace the cooling shroud. See "Installing the Cooling Shroud" on page 83.

5 Replace the expansion card stabilizer. See "Installing the Expansion Card Stabilizer" on page 81.

6 Close the system. See "Closing the System" on page 80

7 Lay the system upright on a flat surface.

8 Reattach any peripherals and connect the system to an electrical outlet.

9 Turn on the system and attached peripherals.

System Memory

Your system supports DDR3 unbuffered ECC DIMMs (UDIMMs). Single DIMMs can be 1333-MHz.Your system supports single-channel mode and dual-channel mode. The system contains a total of six memory sockets. UDIMM supports single-rank DIMMs. The maximum memory that is supported on your system varies according to the types and sizes of memory modules being used: 1 GB and 2 GB UDIMMs are supported for a total of up to 12 GB.

General Memory Module Installation Guidelines

To ensure optimal performance of your system, observe the following general guidelines when configuring your system memory.

NOTE: Memory configurations that fail to observe these guidelines can prevent your system from starting and producing any video output.

- RDIMMs and UDIMMs cannot be mixed.

- Except for memory channels that are unused, all populated memory channels must have identical configurations.

- Memory modules of different sizes can be mixed in A1-A3 or B1-B3 (for example, 2-GB and 4-GB), but all populated channels must have identical configurations.

- The memory speed of each channel depends on the memory configuration:
  - For single- or dual-rank memory modules:
    - One memory module per channel supports up to 1333 MHz.
    - Two memory modules per channel support up to 1333 MHz.
    - Three memory modules per channel support up to 800 MHz.
- If memory modules with different speeds are installed, they will operate at the speed of the slowest installed memory module(s).

Mode-Specific Guidelines

There are two memory channels with each channel supporting a maximum of two UDIMMs.

Table 3-1 show sample memory configurations that follow the appropriate memory guidelines stated in this section. The samples show identical memory-module configurations and the physical and available memory totals. The tables do not show mixed or quad-rank memory-module configurations, nor do they address the memory speed considerations of any configuration.

Table 3-1.   Sample UDIMM Memory Configurations

Memory Module Size	Memory Sockets						Processor	
	1	3	5	2	4	6	Physical Memory (GB)	Available Memory (GB)
1-GB	X						1	all
	X			X			2	
	X	X		X	X		4	
2-GB								all
	X			X			4	
	X	X		X	X		8	

Installing Memory Modules

⚠️ **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 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 in those sockets.**

1 Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

2 Open the system. See "Opening the System" on page 79.

3 Remove the expansion card stabilizer. See "Removing the Expansion Card Stabilizer" on page 81.

4 Remove the cooling shroud. See "Removing the Cooling Shroud" on page 82.

5 Locate the memory module sockets. See Figure 6-1.

6 Remove the memory-module blanks from the sockets in which you plan to install memory modules.

7 Press out the ejectors on each end of the socket until the memory-module blank pops out of the socket. See Figure 3-14.

   📝 **NOTE:** Make sure to retain any removed memory-module blanks for future use.

8 Press the ejectors on the memory module socket down and out, as shown in Figure 3-14, to allow the memory module to be inserted into the socket.

9 Handle each memory module only on either card edge, making sure not to touch the middle of the memory module.

Figure 3-14. Installing and Removing a Memory Module
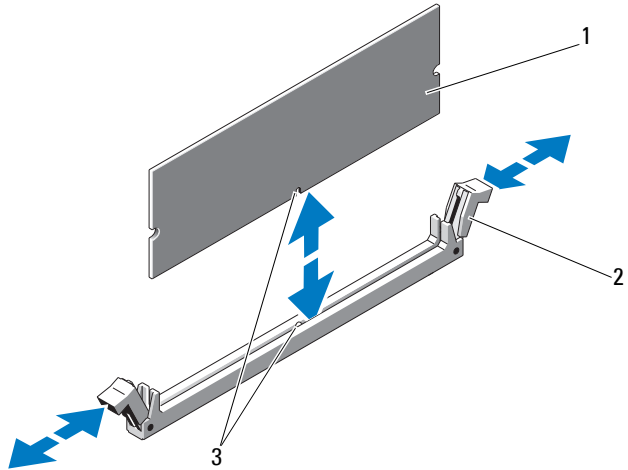
1	memory module	2	memory module socket ejectors (2)
3	alignment key		

10 Align the memory module's edge connector with the alignment key of 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 way.

11 Press down on the memory module with your thumbs to lock the memory module into the socket.

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 installed.

12 Repeat step 8 through step 11 of this procedure to install the remaining memory modules. See Table 3-1.

13 Replace the cooling shroud. See "Installing the Cooling Shroud" on page 83.

14 Replace the expansion card stabilizer. See "Installing the Expansion Card Stabilizer" on page 81.

15 Close the system. See "Closing the System" on page 80.

16 Place the system upright on a flat surface.

17 Reattach any peripherals and connect the system to an electrical outlet.

18 Start up the system, press <F2> to enter the System Setup program, and check the **System Memory** setting on the main System Setup screen.

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

19 If the value is incorrect, one or more of the memory modules may not be installed properly. Repeat step 2 through step 18 of this procedure, checking to ensure that the memory modules are firmly seated in their sockets.

20 Run the system memory test in the system diagnostics. See "Running the System Diagnostics" on page 147.

Removing Memory Modules

⚠ **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 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 in those sockets.**

1 Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

2 Open the system. See "Opening the System" on page 79.

3 Remove the expansion card stabilizer. See "Removing the Expansion Card Stabilizer" on page 81.

4 Remove the cooling shroud. See "Removing the Cooling Shroud" on page 82.

5 Locate the memory module sockets. See Figure 6-1.

6 Press down and out on the ejectors on each end of the socket until the memory module pops out of the socket. See Figure 3-14.

Handle each memory module only on either card edge, making sure not to touch the middle of the memory module.

> ![note icon] **NOTE:** If you are not replacing the memory module, insert a memory module blank in the socket.

7 Replace the cooling shroud. See "Installing the Cooling Shroud" on page 83.

8 Replace the expansion card stabilizer. "Installing the Expansion Card Stabilizer" on page 81.

9 Close the system. See "Closing the System" on page 80.

10 Place the system upright on a flat surface.

11 Reattach any peripherals and connect the system to an electrical outlet.

12 Turn on the system and attached peripherals.

Expansion Cards

Expansion Card Installation Guidelines

Your system supports five PCIe Generation 2 expansion cards. To identify the expansion slots see Figure 6-1.

- The expansion slots support one full-length, and four half-length cards.
- The expansion-card slot is not hot-swappable.

> ⚠ **CAUTION: To ensure proper cooling, only one of the two expansion cards can have a power consumption of greater than 15 W (up to 25 W maximum), not including the integrated storage controller.**

- Table 3-2 provides a guide for installing expansion cards to ensure proper cooling and mechanical fit. The expansion cards with the highest priority should be installed first using the slot priority indicated. All other expansion cards should be installed in card priority and slot priority order.

Table 3-2.   Expansion-Card Installation Priority

Card Priority	Card Type	Slot Priority	Max Allowed	25-W Card?
1	PERC 6/i Adapter	1	1	Y
2	S300 Adapter	1, 2	1	Y
3	SAS 6/iR	1, 2	1	Y
4	SAS 5/iR	3, 1	1	Y
5	PERC 6/E 256	1, 2, 3	2	Y
6	PERC 6/E 512	1, 2, 3	2	Y
7	SAS 5/E	1, 2, 3	2	Y
8	All other NICs	3, 1, 2	3	N*
9	Non-Dell storage cards	1	1	N*
10	Intel PRO/1000PT 1G Cu Single Port NIC	4, 5, 3	3	N*

* Refer to the expansion card's documentation to determine if the maximum power exceeds 15W. Any cards that exceed 15W will be affected by the restriction of one 25W card.

Installing an Expansion Card

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

📝 **NOTE:** Before installing any expansion cards, see "Expansion card installation Guidelines"

1 Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.

2 Open the system. See "Opening the System" on page 79.

3 Remove the expansion card stabilizer. See"Removing the Expansion Card Stabilizer" on page 81.

4 If you are installing a new card, remove the filler bracket.

5 Open the expansion-card latch adjacent to the slot. See Figure 3-15.

    ✍ **NOTE:** Keep this bracket in case you need to remove the expansion card. Filler brackets must be installed over empty expansion-card slots to maintain Federal Communications Commission (FCC) certification of the system. The brackets also keep dust and dirt out of the system and aid in proper cooling and airflow inside the system.

6 Prepare the card for installation.

See the documentation that came with the card for information on configuring the card, making internal connections, or otherwise customizing it for your system.

7 If you are installing a full-length expansion card (slot 2), thread the end of the card into the expansion card guide.

8 Insert the card into the expansion card connector on the system board and press down firmly. Ensure that the card's metal tab is inserted in the expansion card tab slot. See Figure 3-15.

9 Close the expansion-card latch to secure the card in the system.

⚠ **CAUTION: Do not route card cables over or behind the cards. Cables routed over the cards can prevent the system cover from closing properly or cause damage to the equipment.**

10 Connect any expansion-card cables for the new card.

See the documentation that came with the card for information about its cable connections.

11 Replace the expansion card stabilizer. See "Installing the Expansion Card Stabilizer" on page 81.

12 Close the system. See "Closing the System" on page 80.

13 Place the system upright on a flat surface.

14 Reattach any peripherals and connect the system to an electrical outlet.

15 Turn on the system and attached peripherals.

16 Install any device drivers required for the card as described in the documentation for the card.

Figure 3-15. Removing and Installing an Expansion Card
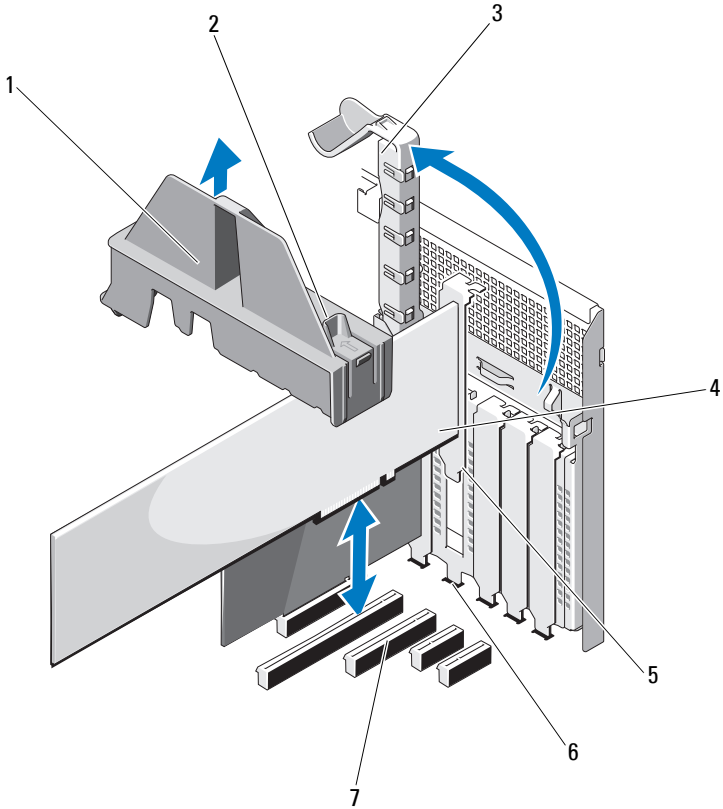
1	expansion card stabilizer	2	expansion card stabilizer touch points (2)
3	expansion card latch	4	expansion card
5	expansion card tab	6	expansion card tab slot
7	expansion card connector		

Removing an Expansion Card

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

1 Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.

2 Open the system. See "Opening the System" on page 79.

3 Remove the expansion card stabilizer. See "Removing the Expansion Card Stabilizer" on page 81.

4 Disconnect any cables connected to the expansion card.

5 Open the expansion card latch adjacent to the slot. See Figure 3-15.

6 Grasp the expansion card by its top corners, and carefully pull the card from the expansion-card connector.

7 If you are removing the card permanently, install a filler bracket in the empty card slot.

   ✎ **NOTE:** Filler brackets must be installed over empty expansion card slots to maintain FCC certification of the system. The brackets also keep dust and dirt out of the system and aid in proper cooling and airflow inside the system.

8 Close the expansion card latch adjacent to the slot. See Figure 3-15.

9 Replace the expansion card stabilizer. See "Installing the Expansion Card Stabilizer" on page 81.

10 Close the system. See "Closing the System" on page 80.

11 Place the system upright on a flat surface.

12 Reattach any peripherals and connect the system to an electrical outlet.

13 Turn on the system and attached peripherals.

14 Remove the card's device driver from the operating system.

iDRAC6 Express Card (Optional)

Installing an iDRAC6 Express Card

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

1 Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

2 Open the system. See "Opening the System" on page 79.

3 Insert the notch on the Integrated Dell Remote Access Controller 6 (iDRAC6) Express card into the clip on the system board.

4 Align the front edge of the card with the connector on the system board. See Figure 3-16 for the location of the connector.

5 Press the card down until it is fully seated. See Figure 3-16.
When the front of the card is fully seated, the plastic standoff tab snaps over the edge of the holder.

Figure 3-16.   Installing or Removing an iDRAC6 Express Card (Optional)
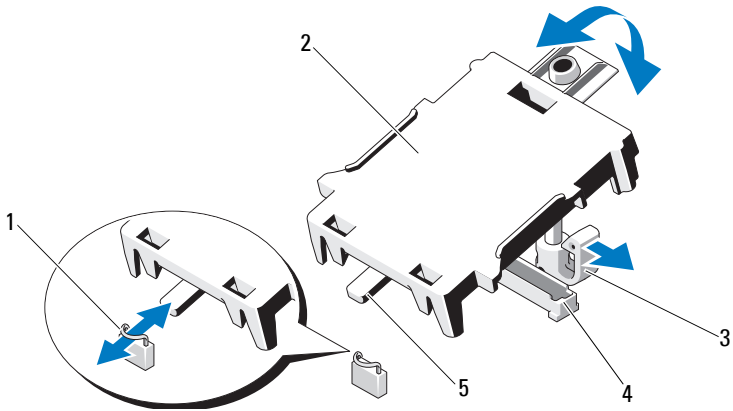
1	clip	2	iDRAC6 Express card
3	retention standoff tab clip	4	iDRAC6 Express card connector
5	notch		

6 Close the system. See "Closing the System" on page 80.

7 Place the system upright on a flat, stable surface.

8 Reattach any peripherals and connect the system to an electrical outlet.

9 Turn on the system and attached peripherals.

Removing an iDRAC6 Express Card (Optional)

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

1 Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

2 Open the system. See "Opening the System" on page 79.

3 Pull back slightly on the retention standoff tab at the front edge of the card and gently lift the card off the retention standoff. See Figure 3-16. As the holder releases from the standoff, the connector under the card disengages from the system board connector.

4 Angle the card so that the notch on the card slips through the clip on the system board.

5 Close the system. See "Closing the System" on page 80.

6 Place the system upright on a flat surface.

7 Reattach any peripherals and connect the system to an electrical outlet.

8 Turn on the system and attached peripherals.

Internal USB Memory Keys

The USB memory key installed inside your system can be used as a boot device, security key, or mass storage device. The USB connector must be enabled by the **Internal USB Port** option in the **Integrated Devices** screen of the System Setup program.

To boot from a USB memory key, configure the USB memory key with a boot image and then specify the USB memory key in the boot sequence in the System Setup program.

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

1 Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

2 Open the system. See "Opening the System" on page 79.

3 Locate the USB connector on the system board. See Figure 6-1.

4 Insert the USB memory key into the USB connector. See Figure 3-17.

5 Close the system. See "Closing the System" on page 80.

6 Place the system upright on a flat surface.

7 Reattach any peripherals and connect the system to an electrical outlet.

8 Turn on the system and attached peripherals.

9 Enter the System Setup program and verify that the USB key has been detected by the system. See "Entering the System Setup Program" on page 52.

Figure 3-17. Removing or Installing a USB Memory Key
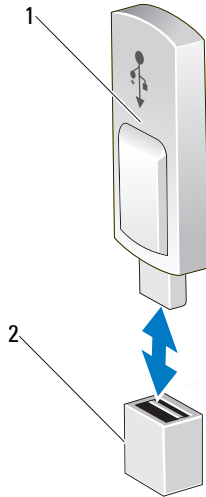
| 1 | USB memory key | 2 | USB memory key connector |

Processor

Removing a Processor

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

1 Prior to upgrading your system, download the latest system BIOS version from **support.dell.com** and follow the instructions included in the compressed download file to install the update on your system.

2 Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet. When disconnected from AC power, press and hold the power button for 3 seconds to fully drain the system of stored power prior to removing the cover.

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

3 Open the system. See "Opening the System" on page 79.

4 Remove the expansion card stabilizer. See "Removing the Expansion Card Stabilizer" on page 81.

5 Remove the cooling shroud. See "Removing the Cooling Shroud" on page 82.

⚠ **WARNING: The heat sink and processor are hot to touch for some time after the system has been powered down. Allow the heat sink and processor to cool before handling them.**

⚠ **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.**

6 Using a #2 Phillips screwdriver, loosen one of the heat-sink retention screws. See Figure 3-18.

7 Wait for 30 seconds for the heat sink to loosen from the processor.

8 Repeat step 6 and step 7 to loosen the three heat-sink retention screws.

9 Gently lift the heat sink off of the processor and set the heat sink aside with the thermal grease side facing up.

Figure 3-18. Installing and Removing the Heat Sink
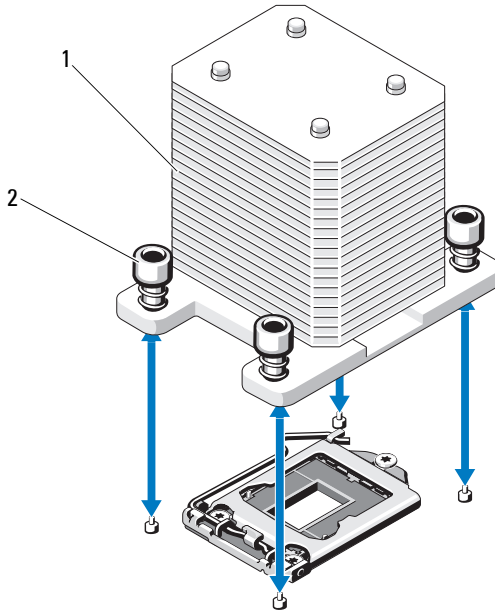

1	heat sink	2	heat-sink retention screws (4)

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

10 Position your thumb firmly over the processor socket-release lever and release the lever from the locked position by pushing down and pulling out from under the tab. Rotate the lever 90° upward until the processor is released from the socket. See Figure 3-19.

11 Use the tab on the processor shield to rotate shield upward and out of the way. See Figure 3-19.

Figure 3-19.   Removing a Processor
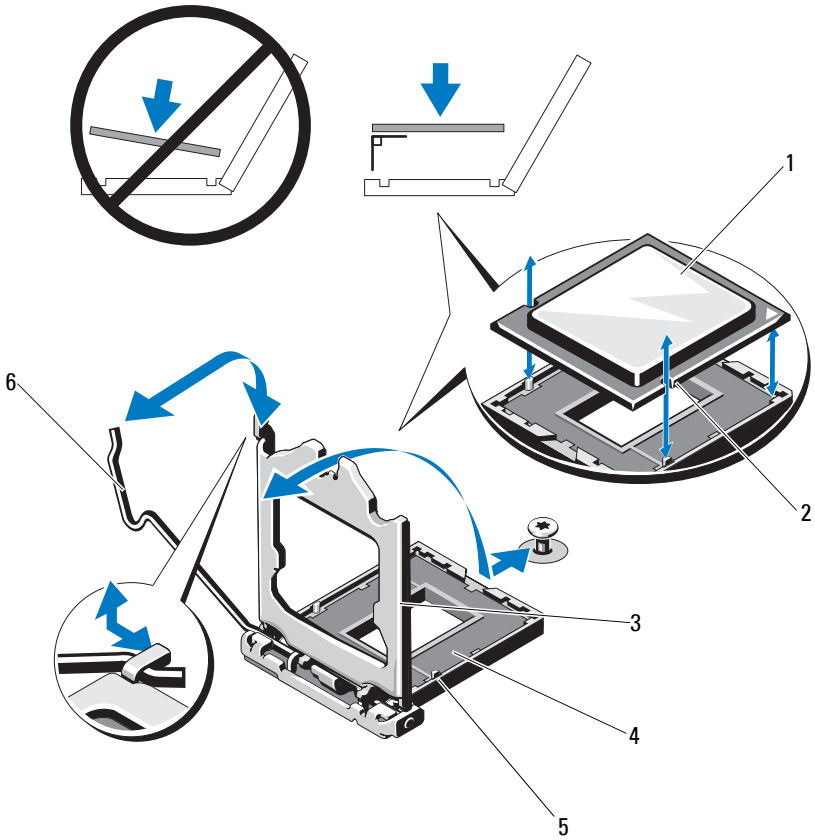
1	processor	2	notch in processor (2)
3	processor shield	4	ZIF socket
5	socket key (2)	6	socket-release lever

⚠ **CAUTION: Be careful not to bend any of the pins on the ZIF socket when removing the processor. Bending the pins can permanently damage the system board.**

12 Carefully, lift the processor out of the socket and leave the release lever up so that the socket is ready for the new processor.

13 After removing the processor, place it in an antistatic container for reuse, return, or temporary storage.

> ![NOTE icon] **NOTE:** Do not touch the bottom of the processor. Touch only the side edges of the processor. If you are permanently removing the processor, you must install a processor blank and a heat-sink blank in the CPU socket to ensure proper system cooling.

14 Adding the blank is similar to installing a processor. See "Installing a Processor" on page 115.

Installing a Processor

1 Unpack the new processor.

2 Align the processor with the socket keys on the ZIF socket. See Figure 3-19.

3 Install the processor in the socket.

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

4 With the release lever on the processor socket in the open position, align the processor with the socket keys and set the processor lightly in the socket.

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

5 Close the processor shield.

6 Rotate the socket release lever down until it snaps into place.

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

8 Open the grease packet included with your processor kit and apply thermal grease evenly to the top of the new processor.

9 Place the heat sink on the processor. See Figure 3-19.

10 Using a #2 Phillips screwdriver, tighten the heat-sink retention screws. See Figure 3-18.

11 Replace the cooling shroud. See "Installing the Cooling Shroud" on page 83.

12 Replace the expansion card stabilizer. See "Installing the Expansion Card Stabilizer" on page 81.

13 Close the system. See "Closing the System" on page 80.

14 Place the system upright on a flat surface.

15 Reattach any peripherals and connect the system to an electrical outlet.

16 Turn on the system and attached peripherals.

17 Press <F2> to enter the System Setup program, and check that the processor information matches the new system configuration. See "Entering the System Setup Program" on page 52.

18 Run the system diagnostics to verify that the new processor operates correctly. See "Running the Embedded System Diagnostics" on page 148 for information about running the diagnostics.

System Battery

The system battery is a 3.0-volt (V), coin-cell battery.

Replacing the System Battery

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

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

1 Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

2 Open the system. See "Opening the System" on page 79.

3 Replace the expansion card stabilizer. See "Installing the Expansion Card Stabilizer" on page 81.

Figure 3-20.   Replacing the System Battery
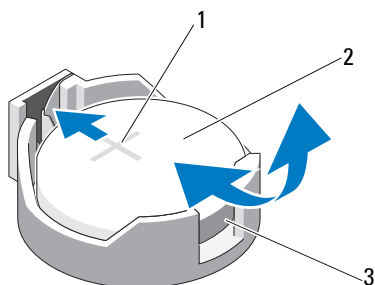
1	positive side of battery connector	2	system battery
3	negative side of battery connector		

4 Remove the PCIe expansion card from slot 1. See "Removing an Expansion Card" on page 107.

5 Locate the battery socket. See "System Board Connectors" on page 152.

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

6 Support the battery connector by pressing down firmly on the positive side of the connector.

7 Press the battery toward the positive side of the connector and lift it up out of the securing tabs at the negative side of the connector.

8 Install the new battery by pressing down firmly on the positive side of the connector.

9 Hold the battery with the "+" facing up, and slide it under the securing tabs at the positive side of the connector.

10 Press the battery straight down into the connector until it snaps into place.

11 Install the expansion card. See "Installing an Expansion Card" on page 104.

12 Install the expansion card stabilizer. See "Installing the Expansion Card Stabilizer" on page 81.

13 Close the system. See "Closing the System" on page 80.

14 Place the system upright on a flat surface.

15 Reattach any peripherals and connect the system to an electrical outlet.

16 Turn on the system and attached peripherals.

17 Enter the System Setup program to confirm that the battery is operating properly. See "Entering the System Setup Program" on page 52.

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

19 Exit the System Setup program.

Chassis Intrusion Switch

Removing the Chassis Intrusion Switch

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

1 Turn off the system and attached peripherals, and disconnect the system from the electrical outlet and peripherals.

2 Open the system. See "Opening the System" on page 79.

3 Disconnect the chassis intrusion switch cable from the connector on the system board. See Figure 3-21.

4 Slide the chassis intrusion switch out of the securing bracket notch.

**Figure 3-21. Removing and Installing the Chassis Intrusion Switch**
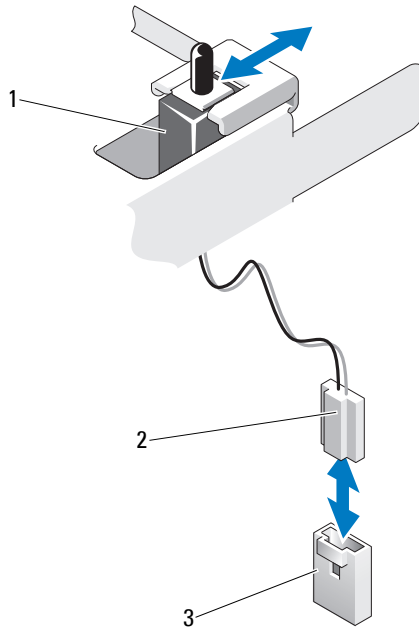
1	chassis intrusion switch	2	chassis intrusion switch cable
3	intrusion connector on the system board		

Installing the Chassis Intrusion Switch

1 Align the chassis intrusion switch with the securing bracket notch. See Figure 3-21.

2 Slide the switch into the securing bracket notch. See Figure 3-21.

3 Connect the chassis intrusion switch cable to the connector on the system board.

4 Close the system. See "Closing the System" on page 80.

5 Place the system upright on a flat surface.

6 Reattach any peripherals and connect the system to an electrical outlet.

7 Turn on the system and attached peripherals.

Control Panel Assembly

Removing the Control Panel Assembly

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

1 Remove the bezel. See "Removing the Front Bezel" on page 75.

2 Turn off the system and attached peripherals, and disconnect the system from the electrical outlet and peripherals.

3 Open the system. See "Opening the System" on page 79.

⚠ **CAUTION: Do not pull the cable to unseat the connector. Doing so can damage the cable.**

4 To disconnect the control panel assembly cable from the connector on the system board, press the metal tabs on the ends of the cable connector. See Figure 3-22.

5 Gently pull the connector out of the socket.

6 Using a Phillips screwdriver, remove the screw that secures the control panel assembly to the chassis. See Figure 3-22.

7 Press the release latch and slide the control panel away from chassis.

⚠ **CAUTION: Do not pull the cable to unseat the connector. Doing so can damage the cable.**

8 To disconnect the control panel cable from the connector on the control panel board, squeeze the metal tabs on the ends of the cable connector. See Figure 3-22.

9 Gently pull the connector out of the socket.

Figure 3-22.   Removing and Installing the Control Panel
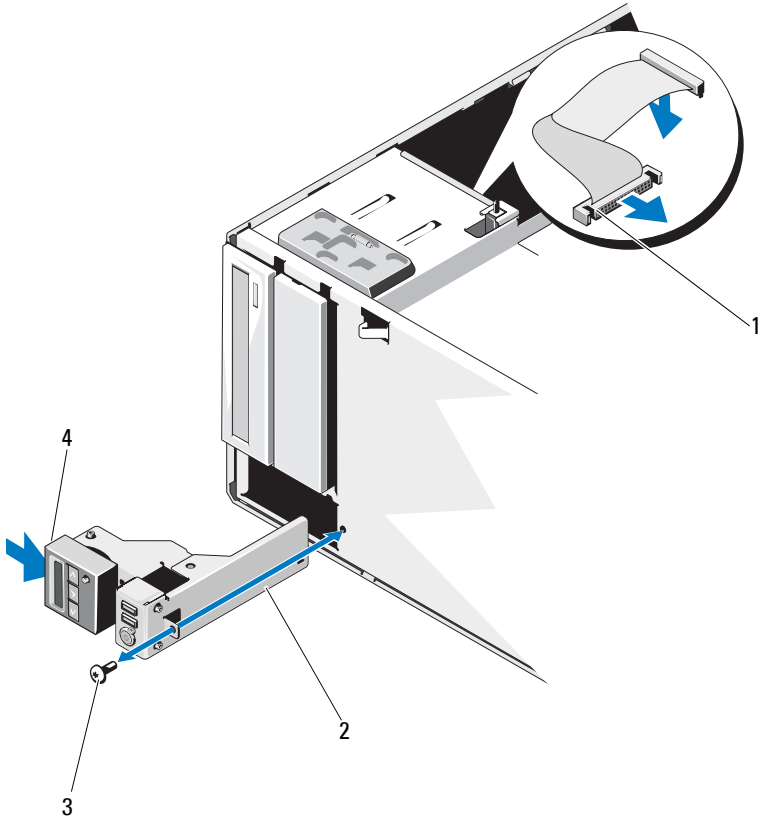
| 1 | control panel cable | 2 | control panel assembly |
| 3 | control panel screw | 4 | release latch |

Installing the Control Panel Assembly

1 Push the control panel gently into the chassis

2 Connect the control panel cable to the control panel board.

3 Using a Phillips screwdriver, replace the screw that secures the control panel assembly to the chassis.

4 Connect the control panel assembly cable to the system board. See Figure 3-22.

5 Close the system. See "Closing the System" on page 80.

6 Place the system upright on a flat surface.

7 Replace the front bezel. See "Installing the Front Bezel" on page 76.

8 Reattach any peripherals and connect the system to an electrical outlet.

9 Turn on the system and attached peripherals.

SATA Backplane

Removing the SATA Backplane

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

1 Remove the front bezel. See "Removing the Front Bezel" on page 75.

2 Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.

**3** Open the system. See "Opening the System" on page 79.

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

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

4 Remove all hard drives. See "Hard Drives" on page 84.

5 Disconnect all of the cables connected to the SATA backplane including the SATA A cable, SATA B cable used for 3.5 inch hard drives, the backplane power cable, and the data cable. See Figure 3-23.

6 To remove the SATA backplane, pull the blue release pin and slide the backplane upwards.

7 Pull the backplane away from the front of the system until the securing slots are free from the tabs on the chassis.

Figure 3-23. Removing and Installing a SATA Backplane
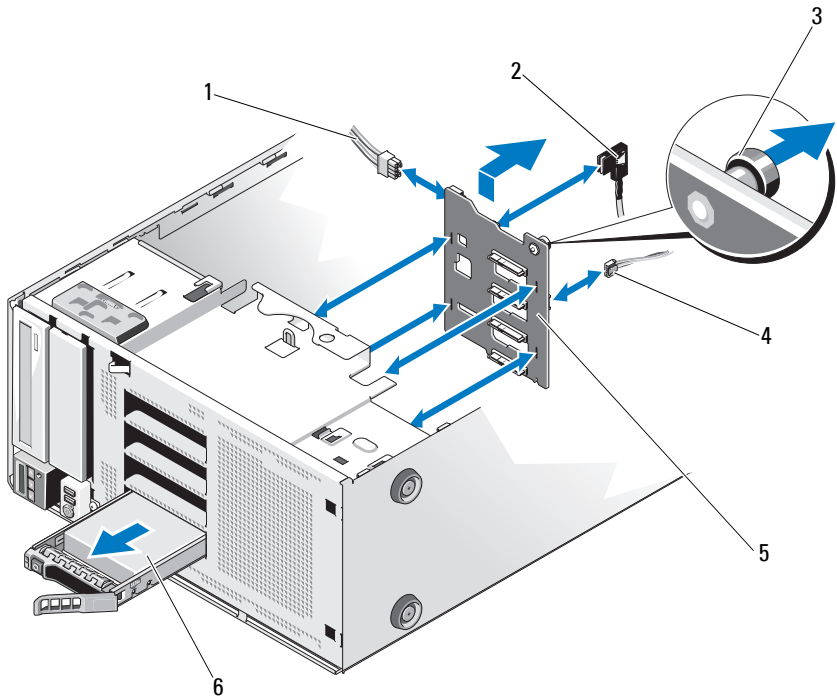
1	power cable	2	SATA A cable
3	blue release pin	4	J_planar cable
5	SATA backplane	6	hard drive

Installing the SATA Backplane

1 Lower the backplane into the system, being careful to avoid damaging components on the face of the board.

2 Align the slots on the SATA backplane with the tabs on the chassis.

3 Slide down the SATA backplane until the release pin snaps into place. See Figure 3-23.

4 Connect the SATA, data, and power cables to the SATA backplane.

5 Connect the SATA, data, and power cables to their respective connectors. See Figure 3-23.

6 Install the hard drives in their original locations. See "Installing a Hot-Swap Hard Drive" on page 87.

7 Close the system. See "Closing the System" on page 80.

8 Replace the front bezel. See "Installing the Front Bezel" on page 76.

9 Place the system upright on a flat surface.

10 Reattach any peripherals and connect the system to an electrical outlet.

11 Turn on the system and attached peripherals.

System Board

Removing the System Board

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

⚠ **CAUTION: If you are using the Trusted Program Module (TPM) with an encryption key, you may be prompted to create a recovery key during program or system setup. Be sure to create and safely store this recovery key. If you replace this system board, you must supply the recovery key when you restart your system or program before you can access the encrypted data on your hard drives.**

1   Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet and peripherals.

2   Open the system. See "Opening the System" on page 79.

3   Remove the expansion card stabilizer. See "Removing the Expansion Card Stabilizer" on page 81.

4   Remove the cooling shroud. See "Removing the Cooling Shroud" on page 82.

5   Disconnect all the cables from the system board.

6   If applicable, remove all expansion cards and any attached cables. See "Removing an Expansion Card" on page 107.

7   If applicable, remove the iDRAC6 Express card. See "Removing an iDRAC6 Express Card (Optional)" on page 109.

8   If required, disconnect the cables from the SATA backplane.

9   Remove all the memory modules and memory blanks. See "Removing Memory Modules" on page 102.

     ✐ **NOTE:** To ensure proper reinstallation of memory modules, record the memory module socket locations.

10 Remove the system fan. See "Removing the System Fan" on page 96.

⚠ **WARNING: The heat sink can get hot during operation. To avoid burns, ensure that the system has sufficient time to cool before removing the system board.**

11 Remove the heat sink and processor. See "Removing a Processor" on page 112.

12 Carefully route any loose cables away from the edges of the system board.

13 To remove the system board, using a Phillips screwdriver, remove all the screws on the board. See Figure 3-24.

14 While holding the two touch points on the system board, slide the system board toward the front of the system. See Figure 3-24.

15 Lift the system board away from the chassis.

Figure 3-24.   Removing and Installing the System Board
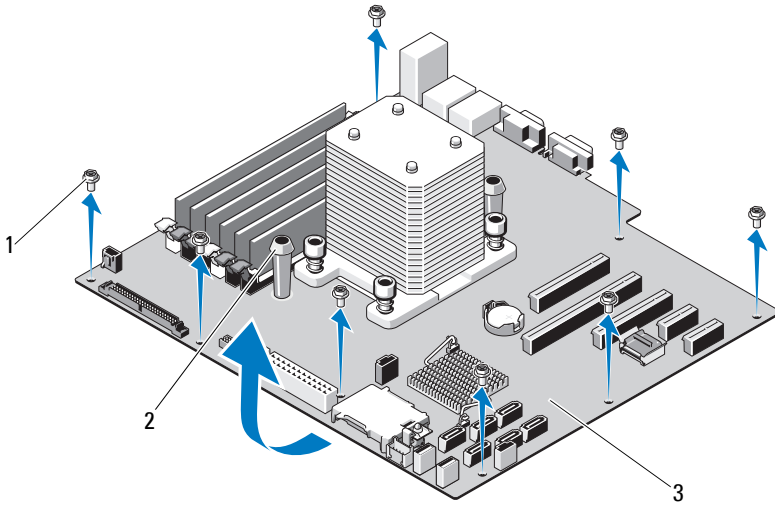
1	screws (8)	2	blue touch points (2)
3	system board		

Installing the System Board

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

1 Unpack the new system board and remove the label that is located on the processor shield.

2 Remove the labels and affix them on the front of the chassis.

3 To replace the system board, grip the system board by holding the blue touch points.

4 Align the screw holes on the system board with that on the chassis and lower the system board into the chassis.

5 Slide the system board toward the back of the system, inserting the connectors into the cutouts in the chassis.

6 Using a Phillips screwdriver, tighten the screws.

7 If applicable, replace the SATA backplane. See "Installing the SATA Backplane" on page 124.

8 Replace the heat sink and processor. See "Installing a Processor" on page 115.

9 Replace the system fan. See "Installing the System Fan" on page 97.

10 Replace all the memory modules and memory blanks. See "Installing Memory Modules" on page 100.

11 If applicable, replace the iDRAC6 Express card. See "Installing an iDRAC6 Express Card" on page 108.

12 If applicable, replace all the expansion cards. See "Installing an Expansion Card" on page 104.

13 Connect all the cables to the system board.

14 Replace the cooling shroud. See "Installing the Cooling Shroud" on page 83.

15 Replace the expansion card stabilizer. See "Installing the Expansion Card Stabilizer" on page 81.

16 Close the system. See "Closing the System" on page 80.

17 Place the system upright on a flat surface.

18 Reattach any peripherals and connect the system to an electrical outlet.

19 Turn on the system and attached peripherals.

NOTE: See "Running the System Diagnostics" on page 147 to verify that the new processor operates correctly. See "Running the Embedded System Diagnostics" on page 148 for information about running the diagnostics.

4

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.**

Troubleshooting System Startup Failure

If your system halts during startup prior to video imaging or LCD messaging, especially after installing an operating system or reconfiguring your system's hardware, check for the following conditions.

- If you boot the system to the BIOS boot mode after installing an operating system from the UEFI Boot Manager, the system will hang. The reverse is also true. You must boot to the same boot mode in which you installed the operating system. See "Using the System Setup Program and UEFI Boot Manager" on page 51.

- Invalid memory configurations could cause the system to halt at startup without any video output. See "Expansion Cards" on page 103.

For all other startup issues, note the LCD panel messages and any system messages that appear onscreen. See "LCD Status Messages" on page 23 and "System Messages" on page 36 for more information.

Troubleshooting External Connections

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

Troubleshooting the Video Subsystem

1 Check the system and power connections to the monitor.

2 Check the video interface cabling from the system to the monitor.

3 Run the appropriate online diagnostic test. See "Using Online Diagnostics" on page 147.

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

   If the tests fail, see "Getting Help" on page 157.

Troubleshooting a USB Device

1 Use the following steps to troubleshoot a USB keyboard and/or mouse. For other USB devices, go to step 2.

   a Disconnect the keyboard and mouse cables from the system briefly and reconnect them.

   b Connect the keyboard/mouse to the USB port(s) on the opposite side of the system.

      If the problem is resolved, restart the system, enter the System Setup program, and check if the nonfunctioning USB ports are enabled.

   c Replace the keyboard/mouse with another working keyboard/mouse.

      If the problem is resolved, replace the faulty keyboard/mouse.

      If the problem is not resolved, proceed to the next step to begin troubleshooting the other USB devices attached to the system.

2 Power down all attached USB devices and disconnect them from the system.

3 Restart the system and, if your keyboard is functioning, enter the system setup program. Verify that all USB ports are enabled. See "Integrated Devices Screen" on page 58.

If your keyboard is not functioning, you can also use remote access. If the system is not accessible, see "Disabling a Forgotten Password" on page 156 for instructions on setting the NVRAM_CLR jumper inside your system and restoring the BIOS to the default settings.

4 Reconnect and power on each USB device one at a time.

5 If a device causes the same problem, power down the device, replace the USB cable, and power up the device.

If the problem persists, replace the device.

If all troubleshooting fails, see "Getting Help" on page 157.

Troubleshooting a Serial I/O Device

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

2 Swap the serial interface cable with a working cable, and turn on the system and the serial device.

If the problem is resolved, replace the interface cable.

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

4 Turn on the system and the serial device.

If the problem is resolved, replace the serial device.

If the problem persists, see "Getting Help" on page 157.

Troubleshooting a NIC

1 Run the appropriate online diagnostic test. See "Using Online Diagnostics" on page 147.

2 Restart the system and check for any system messages pertaining to the NIC controller.

3 Check the appropriate indicator on the NIC connector. See "NIC Indicator Codes" on page 21.

- If the link indicator does not light, check all cable connections.

- If the activity indicator does not light, the network driver files might be damaged or missing.

  Remove and reinstall the drivers if applicable. See the NIC's documentation.

- Change the autonegotiation setting, if possible.

- Use another connector on the switch or hub.

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

4 Ensure that the appropriate drivers are installed and the protocols are bound. See the NIC's documentation.

5 Enter the System Setup program and confirm that the NIC ports are enabled. See "Integrated Devices Screen" on page 58.

6 Ensure that the NICs, hubs, and switches on the network are all set to the same data transmission speed and duplex. See the documentation for each network device.

7 Ensure that all network cables are of the proper type and do not exceed the maximum length.

If all troubleshooting fails, see "Getting Help" on page 157.

Troubleshooting a Wet 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.**

1 Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.

2 Open the system. See "Opening the System" on page 79.

3 Disassemble components from the system. See "Installing System Components" on page 73.

- Hard drives
- SD cards
- USB memory key
- Expansion cards
- iDRAC6 Express card
- Expansion cards
- Power supply
- System fan
- Processor and heat sink
- Memory modules

4 Let the system dry thoroughly for at least 24 hours.

5 Reinstall the components you removed in step 3.

6 Close the system. See "Closing the System" on page 80.

7 Reconnect the system to the electrical outlet, and turn on the system and attached peripherals.

If the system does not start properly, see "Getting Help" on page 157.

8 If the system starts properly, shut down the system and reinstall all of the expansion cards that you removed. See "Installing an Expansion Card" on page 104.

9 Run the appropriate online diagnostic test. See "Using Online Diagnostics" on page 147.

If the tests fail, see "Getting Help" on page 157.

Troubleshooting a Damaged 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.**

1 Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.

2 Open the system. See "Opening the System" on page 79.

3 Ensure that the following components are properly installed:

- Expansion cards
- Power supply
- Fans
- Processor and heat sink
- Memory modules
- Hard-drive carriers

4 Ensure that all cables are properly connected.

5 Close the system. See "Closing the System" on page 80.

6 Run the system board tests in the system diagnostics. See "Using Online Diagnostics" on page 147.

If the tests fail, see "Getting Help" on page 157.

Troubleshooting the System Battery

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

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

1. Re-enter the time and date through the System Setup program. See "Using the System Setup Program and UEFI Boot Manager" on page 51.

2. Turn off the system and disconnect it from the electrical outlet for at least one hour.

3. Reconnect the system to the electrical outlet and turn on the system.

4. Enter the System Setup program.

   If the date and time are not correct in the System Setup program, replace the battery. See "Replacing the System Battery" on page 116.

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

   If the problem is not resolved by replacing the battery, see "Getting Help" on page 157.

Troubleshooting the Power Supply

1. Identify the faulty power supply by the power supply's fault indicator. See "Power Supply Indicator Codes" on page 22.

2. Reseat the power supply by removing and reinstalling it. See "Chassis Intrusion Switch" on page 118.

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

   If the problem persists, replace the faulty power supply.

3. If the problem persists, see "Getting Help" on page 157.

Troubleshooting System Cooling Problems

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

Ensure that none of the following conditions exist:

- System cover, cooling shroud, drive blank, memory-module blank, power-supply blank, or back filler bracket is removed.

- Heat-sink blank is removed (in single-processor configurations).

- Ambient temperature is too high. See your *Getting Started Guide* for your system's operating temperature requirements.

- External airflow is obstructed.

- Cables inside the system obstruct airflow.

- An individual cooling fan is removed or has failed. See "Troubleshooting a Fan" on page 136.

- The expansion card installation guidelines have not been followed. See "Expansion Card Installation Guidelines" on page 103.

Troubleshooting a Fan

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

1 Turn off the system and all attached peripherals.

2 Open the system. See "Opening the System" on page 79.

3 Locate the faulty fan indicated by the LCD panel or the diagnostic software.

4 Reseat the fan's power cable.

5 Restart the system.

If the fan functions properly, close the system. See "Closing the System" on page 80.

6 If the fan does not function, turn off the system and install a new fan. See "Removing the System Fan" on page 96 and "Installing the System Fan" on page 97.

7 Restart the system.

If the problem is resolved, close the system. See "Closing the System" on page 80.

If the replacement fan does not operate, see "Getting Help" on page 157.

Troubleshooting System Memory

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

📝 **NOTE:** Invalid memory configurations can cause your system to halt at startup without video output. See "General Memory Module Installation Guidelines" on page 98 and verify that your memory configuration complies with all applicable guidelines.

1 If the system is operational, run the appropriate online diagnostic test. See "Using Online Diagnostics" on page 147.

If diagnostics indicates a fault, follow the corrective actions provided by the diagnostic program.

2 If the system is not operational, turn off the system and attached peripherals, and unplug the system from the power source. Wait at least 10 seconds and then reconnect the system to power.

3 Turn on the system and attached peripherals and note the messages on the screen.

Go to step 15 if an error message appears indicating a fault with a specific memory module.

4 Enter the System Setup program and check the system memory setting. See "Memory Settings Screen" on page 55. Make any changes to the memory settings, if needed.

If the memory settings match the installed memory but a problem is still indicated, go to step 15.

5 Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.

6 Open the system. See "Opening the System" on page 79.

7 Remove the cooling shroud. See "Removing the Cooling Shroud" on page 82.

8 Check the memory banks and ensure that they are populated correctly. See "General Memory Module Installation Guidelines" on page 98.

9 Reseat the memory modules in their sockets. See "Installing Memory Modules" on page 100.

10 Replace the cooling shroud. See "Installing the Cooling Shroud" on page 83.

11 Close the system. See "Closing the System" on page 80.

12 Place the system upright.

13 Reconnect the system to its electrical outlet, and turn on the system and attached peripherals.

14 Enter the System Setup program and check the system memory setting. See "Memory Settings Screen" on page 55. If the problem is not resolved proceed with the next step.

15 Turn off the system and attached peripherals, and disconnect the system from the power source.

16 Open the system. See "Opening the System" on page 79.

17 If a diagnostic test or error message indicates a specific memory module as faulty, swap or replace the module.

18 To troubleshoot an unspecified faulty memory module, replace the memory module in the first DIMM socket with a module of the same type and capacity. See "Installing Memory Modules" on page 100.

19 Close the system. See "Closing the System" on page 80.

20 Reconnect the system to its electrical outlet, and turn on the system and attached peripherals.

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

22 If the memory problem is still indicated, repeat step 15 through step 21 for each memory module installed.

If the problem persists after all memory modules have been checked, see "Getting Help" on page 157.

Troubleshooting an Internal USB Key

⚠ **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 Enter the System Setup program and ensure that the SD card port is enabled. See "Integrated Devices Screen" on page 58.

2 Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.

3 Open the system. See "Opening the System" on page 79

4 Locate the USB key and reseat it. See "Chassis Intrusion Switch" on page 118.

5 Close the system. See "Closing the System" on page 80.

6 Turn on the system and attached peripherals and check if the USB key is functioning.

7 If the problem is not resolved, repeat step 2 and step 3.

8 Insert a different USB key that you know works properly.

9 Close the system. See "Closing the System" on page 80.

10 Turn on the system and attached peripherals and check if the USB key is functioning.

11 Reconnect the system to the electrical outlet, and turn on the system and attached peripherals.

If the problem is not resolved, see "Getting Help" on page 157.

Troubleshooting an Optical Drive

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

1 Try using a different DVD.

2 Enter the System Setup program and ensure that the integrated SATA controller and the drive's SATA port are enabled. See "Using the System Setup Program and UEFI Boot Manager" on page 51.

3 Run the appropriate online diagnostic test. See "Using Online Diagnostics" on page 147.

4 Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.

5 Open the system. See "Opening the System" on page 79.

6 Ensure that the interface cable is securely connected to the optical drive and to the controller.

7 Ensure that a power cable is properly connected to the drive.

8 Close the system. See "Closing the System" on page 80.

9 Place the system upright.

10 Reconnect the system to the electrical outlet, and turn on the system and attached peripherals.

If the problem is not resolved, see "Getting Help" on page 157.

Troubleshooting a Hard Drive

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

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

1 Run the appropriate online diagnostics test. See "Using Online Diagnostics" on page 147.

   Depending on the results of the diagnostics test, proceed as needed through the following steps.

2 If your system has a RAID controller and your hard drives are configured in a RAID array, perform the following steps.

   a Restart the system and enter the host adapter configuration utility program by pressing <Ctrl><R>.

      See the documentation supplied with the host adapter for information about the configuration utility.

   b Ensure that the hard drive(s) have been configured correctly for the RAID array.

   c Take the hard drive offline and reseat the drive. See "Removing a Hot-Swap Hard Drive" on page 85.

   d Exit the configuration utility and allow the system to boot to the operating system.

3 Ensure that the required device drivers for your controller card are installed and are configured correctly. See the operating system documentation for more information.

4 Restart the system, enter the System Setup program, and verify that the controller is enabled and the drives appear in the System Setup program. See "Using the System Setup Program and UEFI Boot Manager" on page 51.

Troubleshooting the PERC S300 Controller

✍ **NOTE:** When troubleshooting a PERC S300 controller, also see the documentation for your operating system and the controller.

1   Run the appropriate online diagnostic test. See "Using Online Diagnostics" on page 147.

2   Enter the System Setup program and ensure that the PERC S300 controller is enabled. See "Using the System Setup Program and UEFI Boot Manager" on page 51.

3   Restart the system and press the applicable key sequence to enter the configuration utility program: <Ctrl><R> for PERC S300 controller

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

4   Check the configuration settings, make any necessary corrections, and restart the system.

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

5   Turn off the system and attached peripherals, and disconnect the system from its electrical outlet.

6   Open the system. See "Opening the System" on page 79.

7   Remove the cooling shroud. See "Removing the Cooling Shroud" on page 82.

8   Ensure that the controller card is firmly seated into the system board connector. See "Installing an Expansion Card" on page 104

9 If you have a SATA backplane, verify that the cable connections between the SATA backplane and the SATA controller are correct. Ensure that the cables are firmly connected to the SATA controller and the SATA backplane board.

10 Close the system. See "Closing the System" on page 80.

11 Reconnect the system to its electrical outlet, and turn on the system and attached peripherals.

If the problem persists, see "Getting Help" on page 157.

Troubleshooting Expansion Cards

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

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

1 Run the appropriate online diagnostic test. See "Using Online Diagnostics" on page 147.

2 Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.

3 Open the system. See "Opening the System" on page 79.

4 Verify that the installed expansion cards are compliant with the expansion card installation guidelines. See "Expansion Card Installation Guidelines" on page 103.

5 Ensure that each expansion card is firmly seated in its connector. See "Installing an Expansion Card" on page 104.

6 Close the system. See "Closing the System" on page 80.

7 Reconnect the system to the electrical outlet, and turn on the system and attached peripherals.

8 If the problem is not resolved, turn off the system and attached peripherals, and disconnect the system from the electrical outlet.

9 Open the system. See "Opening the System" on page 79.

10 Remove all expansion cards installed in the system. See "Removing an Expansion Card" on page 107.

11 Close the system. See "Closing the System" on page 80.

12 Reconnect the system to the electrical outlet, and turn on the system and attached peripherals.

13 Run the appropriate online diagnostic test.

If the tests fail, see "Getting Help" on page 157.

14 For each expansion card you removed in step 10, perform the following steps:

> **a** Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
>
> **b** Open the system. See "Opening the System" on page 79.
>
> **c** Reinstall one of the expansion cards.
>
> **d** Close the system. See "Closing the System" on page 80.
>
> **e** Run the appropriate diagnostic test.
>
> If the tests fail, see "Getting Help" on page 157.

Troubleshooting the Processor

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

1 Run the appropriate online diagnostics test. See "Using Online Diagnostics" on page 147.

2 Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.

3 Open the system. See "Opening the System" on page 79.

4 Remove the cooling shroud. See "Removing the Cooling Shroud" on page 82.

5 Ensure that each processor and heat sink are properly installed. See "Installing a Processor" on page 115.

6 Replace the cooling shroud. See "Installing the Cooling Shroud" on page 83.

7 Close the system. See "Closing the System" on page 80.

8 Reconnect the system to the electrical outlet, and turn on the system and attached peripherals.

9 Run the appropriate online diagnostic test.

If a problem is still indicated, see "Getting Help" on page 157.

5

Running the System Diagnostics

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

Using Online Diagnostics

To assess a system problem, first use the online diagnostics. Online Diagnostics is a suite of diagnostic programs, or test modules, that include diagnostic tests on chassis and storage components such as hard drives, physical memory, communications and printer ports, NICs, CMOS, and more. If you are unable to identify the problem using the online diagnostics, then use the embedded system diagnostics.

The files required to run the online diagnostics for systems running supported Microsoft Windows and Linux operating systems are available at **support.dell.com** and on the CDs that came with your system. For information about using diagnostics, see the *Dell Online Diagnostics User's Guide*.

Embedded System Diagnostics Features

The system diagnostics provides a series of menus and options for particular device groups or devices. The system diagnostics menus and options allow you to:

- Run tests individually or collectively
- Control the sequence of tests
- Repeat tests

- Display, print, or save test results
- Temporarily suspend testing if an error is detected or terminate testing when a user-defined error limit is reached
- View help messages that briefly describe each test and its parameters
- 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, component failure may be indicated. As long as the microprocessor and the system's input/output devices are functioning, you can use the embedded system diagnostics to help identify the problem.

Running the Embedded System Diagnostics

The embedded system diagnostics program is run from the Unified Server Configurator (USC) screen.

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

1 As the system boots, press <F10>.

2 Click **Diagnostics** in the left pane and click **Launch Diagnostics** in the right pane.

The **Diagnostics** menu allows you to run all or specific diagnostics tests or to exit.

System Diagnostics Testing Options

Click the testing option in the **Main Menu** window.

Testing Option	Function
Express Test	Performs a quick check of the system. This option runs device tests that do not require user interaction.
Extended Test	Performs a more thorough check of the system. This test can take an hour or longer.
Custom Test	Tests a particular device.
Information	Displays test results.

Using the Custom Test Options

When you select **Custom Test** in the **Main Menu** window, the **Customize** window allows you to select the device(s) to be tested, select specific options for testing, and view the test results.

Selecting Devices for Testing

The left side of the **Customize** window lists devices that can be tested. Click the (+) next to a device or module to view its components. Click (+) on any component to view the tests that are available. Clicking a device, rather than its components, selects all of the components of the device for testing.

NOTE: After you select all the devices and components that you want to test, highlight **All Devices** and then click **Run Tests**.

Selecting Diagnostics Options

From the **Diagnostics Options** area, select the test(s) you want to run on a device.

- **Non-Interactive Tests Only** — Runs only tests that require no user intervention.

- **Quick Tests Only** — Runs only the quick tests on the device.

- **Show Ending Timestamp** — Time stamps the test log.
- **Test Iterations** — Selects the number of times the test is run.
- **Log output file pathname** — Enables you to specify the diskette drive or USB memory key where the test log file is saved. You cannot save the file to a hard drive.

Viewing Information and Results

The following tabs in the **Customize** window provide information about the test and the test results.

- **Results** — Displays the test that ran and the result.
- **Errors** — Displays any errors that occurred during the test.
- **Help** — Displays information about the currently selected device, component, or test.
- **Configuration** — Displays basic configuration information about the currently selected device.
- **Parameters** — Displays parameters that you can set for the test.

6

Jumpers and Connectors

⚠️ **WARNING: Only trained service technicians are authorized to remove the system cover and access any of the components inside the system. Before you begin this procedure, review the safety instructions that came with the system.**

System Board Jumpers

For information on resetting the password jumper to disable a password, see "Disabling a Forgotten Password" on page 156.

Table 6-1. System Board Jumper Settings

Jumper	Setting	Description
PWRD_EN	(default)	The password feature is enabled (pins 2-4)
		The password feature is disabled, and iDRAC6 local access is unlocked at the next AC power cycle (pins 4-6)
NVRAM_CLR	(default)	The configuration settings are retained at system boot (pins 3-5)
		The configuration settings are cleared at the next system boot (pins 1-3)

System Board Connectors

Figure 6-1.   System Board Jumpers and Connectors
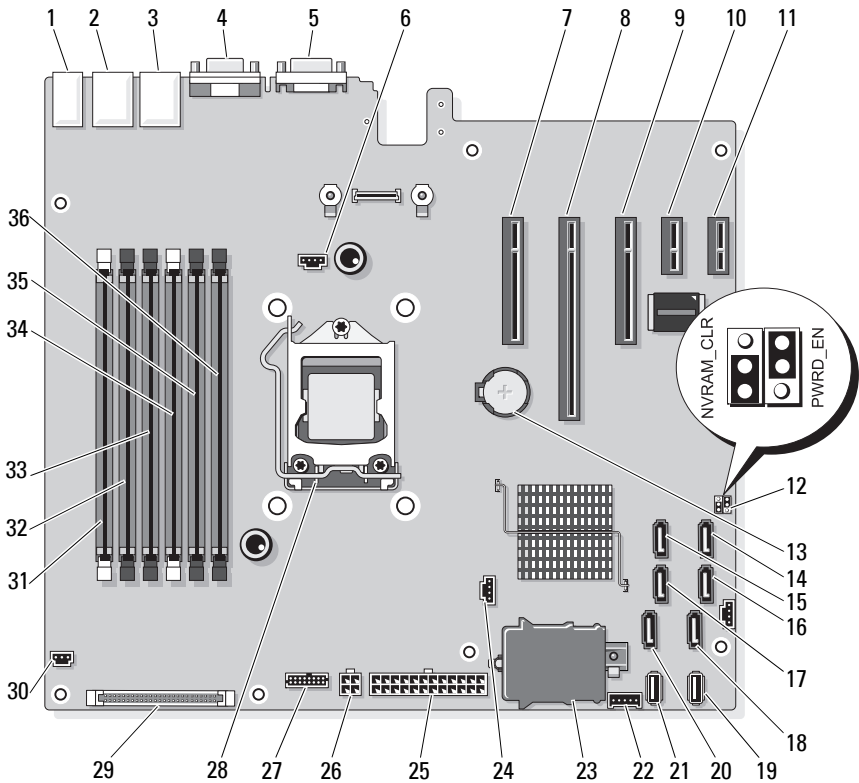
Table 6-2. System Board Jumpers and Connectors

Item	Connector	Description
1	USB1	External USB connector 1
	USB2	External USB connector 2
	USB3	External USB connector 3
	USB4	External USB connector 4
2	NIC1	External NIC connector 1
3	NIC2	External NIC connector 1
4	VGA	External Video connector
5	COM	External Serial connector
6	FAN	Fan connector
7	PCIE_X8	PCIe connector x8 (slot 1)
8	PCIE_X16	PCIe connector x16 (slot 2)
9	PCIE_X8	PCIe connector x8 (slot 3)
10	PCIE_X1	PCIe connector x1 (slot 4)
11	PCIE_X1	PCIe connector x1 (slot 5)
12	PWRD_EN	Password enable jumper
	NVRM_CLR	NVRAM clear jumper
13	BATTERY	System battery
14	SATA_D	SATA connector D
15	SATA_C	SATA connector C
16	SATA_B	SATA connector B
17	SATA_A	SATA connector A
18	SATA_F	SATA connector F
19	INT_USB 2	Internal USB module connector 2
20	SATA_E	SATA connector E
21	INT_USB 1	Internal USB module connector 1
22	BP_I2C	Backplane I2C connector

Table 6-2.   System Board Jumpers and Connectors

Item	Connector	Description
23	iDRAC6 Express	iDRAC6 Express card connector
24	HD_ACT_CARD	Hard drive activity connector
25	PWR_CONN	24 pin power connector
26	12V	4 pin power connector
27	PDB_CONN	Power distribution board power connector
28	CPU	Processor
29	CTRL_PNL	Control panel connector
30	INTRUSION	Chassis intrusion switch connector
31	2	Memory module slot B1 (white release lever)
32	4	Memory module slot B2
33	6	Memory module slot B3
34	1	Memory module slot A1 (white release lever)
35	3	Memory module slot A2
36	5	Memory module slot A3

SATA Backplane Board Connectors

Figure 6-2.   SATA Backplane Board Connectors

front
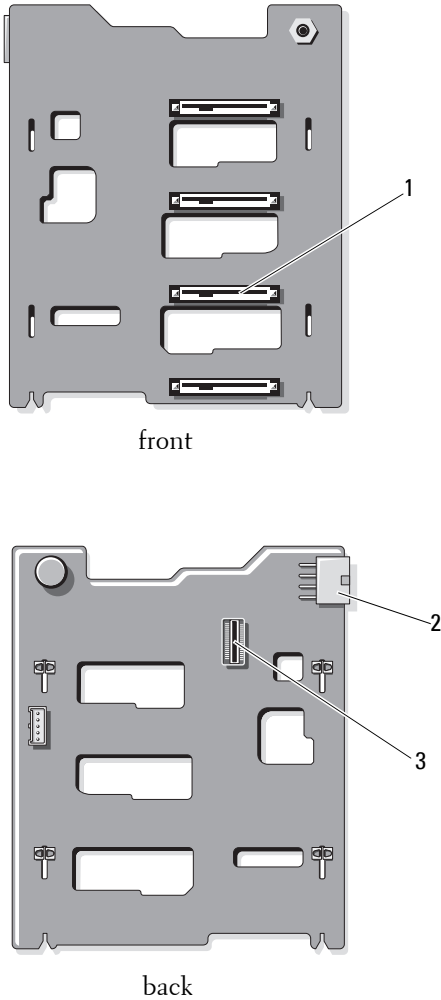
back

1	hard drive connectors 0–3	2	backplane power (BKPLN)
3	SATA A connector		

Disabling a Forgotten Password

The system's software security features include a system password and a setup password, which are discussed in detail in "Using the System Setup Program." The password jumper enables these password features or disables them and clears any password(s) currently in use.

⚠ **CAUTION: See "Protecting Against Electrostatic Discharge" in the safety instructions that came with the system.**

1 Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

2 Open the system. See "Opening and Closing the System."

3 Remove the jumper plug from the password jumper.

   See Figure 6-1 to locate the password jumper (labeled "PWRD_EN") on the system board.

4 Close the system.

5 Reconnect your system and peripherals to their electrical outlets, and turn on the system.

   The existing passwords are not disabled (erased) until the system boots with the password jumper plug removed. However, before you assign a new system and/or setup password, you must install the jumper plug.

   📝 **NOTE:** If you assign a new system and/or setup password with the jumper plug still removed, the system disables the new password(s) the next time it boots.

6 Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

7 Open the system. See "Opening and Closing the System."

8 Install the jumper plug on the password jumper.

9 Lower the memory module shroud.

10 Close the system.

11 Reconnect your system and peripherals to their electrical outlets, and turn on the system.

12 Assign a new system and/or setup password.

   To assign a new password using the System Setup program, see "Assigning a System Password."

7

Getting Help

Contacting Dell

For customers in the United States, call 800-WWW-DELL (800-999-3355).

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

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

1 Visit **support.dell.com**.

2 Verify your country or region in the **Choose A Country/Region** drop-down menu at the bottom of the page.

3 Click **Contact Us** on the left side of the page.

4 Select the appropriate service or support link based on your need.

5 Choose the method of contacting Dell that is convenient for you.

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