# Dell PowerVault NX3500 Systems

# Hardware Owner's Manual

**Regulatory Model: E07S Series, DELL500WLV, and DELL500WHV**
**Regulatory Type: E07S002**

# 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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**January 2011 Rev. A00**

# Contents

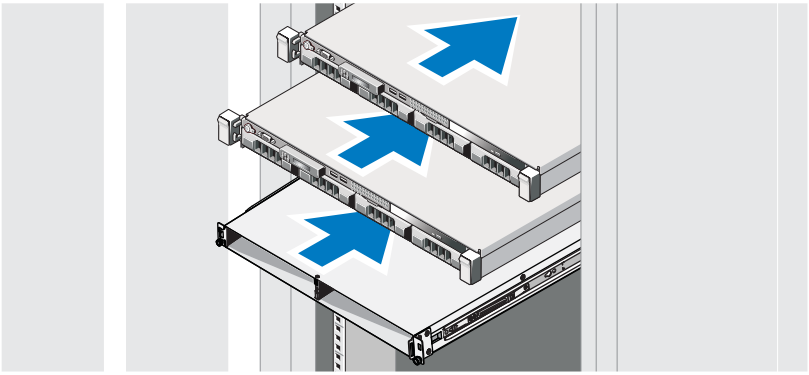
# 1

# About Your Solution

## Overview

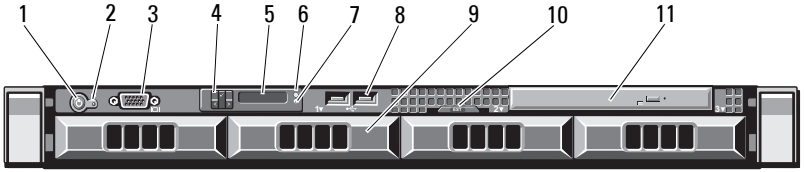
The solution consists of two Dell PowerVault NX3500 systems and one Dell backup power supply (BPS). The two PowerVault NX3500 systems are also referred to as controller 0 and controller 1. The information in this document applies to both the PowerVault NX3500 systems and the BPS.

**Figure 1-1. Solution Overview**



# Dell PowerVault NX3500 Front-Panel Features and Indicators

**Figure 1-2. Front-Panel Features and Indicators**




| Item | Indicator, Button, or Connector | Icon | Description |
|---|---|---|---|
| 1 | Power-on indicator, power button | | The power-on indicator lights when the system power is on.<br>The power button controls the DC power supply output to the system. When the system bezel is installed, the power button is not accessible.<br>**NOTE:** When powering on the system, the video monitor can take from several seconds to over 2 minutes to display an image, depending on the amount of memory installed in the system.<br>**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.<br>**NOTE:** To force an ungraceful shutdown during an emergency, always use the user interface. Shut down controller 0 and wait for 15 minutes. After 15 minutes, shut down controller 1. |
| 2 | Video connector | | Connects a monitor to the system. |
| 3 | Hard-drive activity indicator | | Lights up when the hard drive is in use. |

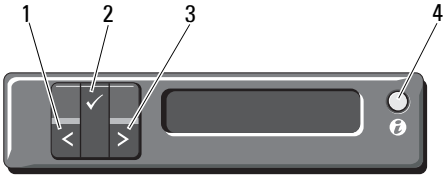
| Item | Indicator, Button, or Connector | Icon | Description |
|---|---|---|---|
| 4 | LCD panel | | Provides system ID, status information, and system error messages.<br>For more information on the LCD panel, see "LCD Panel Features" on page 12.<br>**NOTE:** If the system is connected to AC power and an error has been detected, the LCD lights amber regardless of whether the system has been powered on. |
| 5 | system identification button |  | Turns the system ID modes on and off.<br>The identification buttons on the front and back panels can be used to locate a particular system within a rack. When one of these buttons is pushed, the LCD panel on the front and the system status indicator on the chassis back panel light blue until one of the buttons is pushed again. |
| 6 | System status indicator | | Lights blue during normal system operation. Lights amber when the system needs attention due to a problem. |
| 7 | USB connectors (2) |  | Connect USB devices to the system. The ports are USB 2.0-compliant. |
| 8 | Hard drives (2) | | Two 3.5-inch hot-swappable SATA drives. |
| 9 | System identification panel | | A slide-out panel for system information including the Express Service tag, embedded NIC MAC address, and iDRAC6 Enterprise card MAC address. |
| 10 | Optical drive | | One slim-line SATA DVD-ROM drive or DVD+/-RW drive.<br>**NOTE:** DVD devices are data only. |

## 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 22 for information on 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 switches off after five minutes of inactivity, 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 1-3. 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 | Right | Moves the cursor forward in one-step increments.<br>During message scrolling:<br>• Press once to increase scrolling speed.<br>• Press again to stop.<br>• Press again to return to default scrolling.<br>• Press again to repeat the cycle. |
| 4 | System ID | Turns the system ID mode on (LCD panel flashes blue) and off.<br>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. |

### 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 turns 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.

### Setup Menu

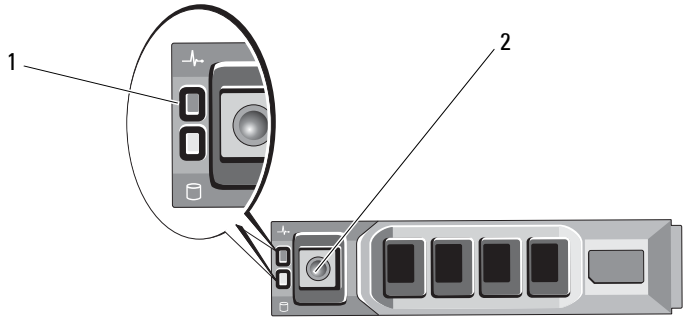
| Option | Description |
|---|---|
| DRAC | Select **DHCP** or **Static IP** to configure the network mode. If **Static IP** is selected, the available fields are **IP**, Subnet (**Sub**), and Gateway (**Gtw**). Select **Setup DNS** to enable DNS and to view domain addresses. Two separate DNS entries are available. |
| | **NOTE:** It is recommended that you always use the default settings. Do not change the settings unless directed by a Dell customer representative or a service technician. |
| 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 more user-friendly description. See "LCD Panel Features" on page 12 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 15 to see the options and option items that can be selected to display by default on the Home screen. |

## View Menu

| Option | Description |
|---|---|
| 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). |
| MAC | Displays the MAC addresses for **DRAC**, **iSCSI***n*, or **NET***n*.<br>**NOTE:** If the iDRAC6 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 14. |
| 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 14. |

# Hard-Drive Status Indicators

**Figure 1-4. Hard-Drive Indicators**



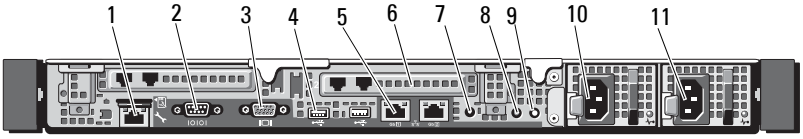

1 drive-status indicator (green and amber)

2 drive-activity indicator (green)

| 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<br>**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 |
| 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 |

# PowerVault NX3500 Back-Panel Features and Indicators

**Figure 1-5. Back-Panel Features and Indicators**

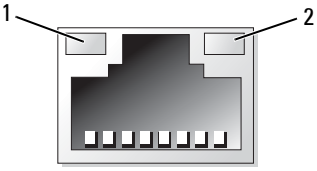



| Item | Indicator, Button, or Connector | Icon | Description |
|---|---|---|---|
| 1 | iDRAC6 Enterprise port | | Dedicated management port for the iDRAC6 Enterprise card. |
| 2 | Serial connector | | Connects a serial device to the system. |
| 3 | Video connector | | Connects a VGA display to the system. |
| 4 | USB connectors (2) | | Connect USB devices to the system. The ports are USB 2.0-compliant. |
| 5 | Ethernet connectors (2) | | Embedded 10/100/1000 NIC connectors. |
| 6 | Dual NIC ports (2) | | PCI Express (generation 2) expansion slot (full-height, half-length). |
| 7 | Active ID CMA connector | | Connector for attaching a system indicator extension cable that is used on a cable management arm. |

| Item | Indicator, Button, or Connector | Icon | Description |
|---|---|---|---|
| 8 | System status indicator | | Lights blue during normal system operation.<br>Both the systems management software and the identification buttons located on the front and back of the system can cause the indicator to flash blue to identify a particular system.<br>Lights amber when the system needs attention due to a problem. |
| 9 | System identification button | | Turns the system ID modes on and off.<br>The identification buttons on the front and back panels can be used to locate a particular system within a rack. When one of these buttons is pushed, the LCD panel on the front and the system status indicator on the chassis back panel light blue until one of the buttons is pushed again. |
| 10 | Power supply 1 (PS1) | | 400 W |
| 11 | Power supply 2 (PS2) | | 400 W |

# NIC Indicator Codes

**Figure 1-6. NIC Indicator Codes**




1 link indicator 2 activity indicator

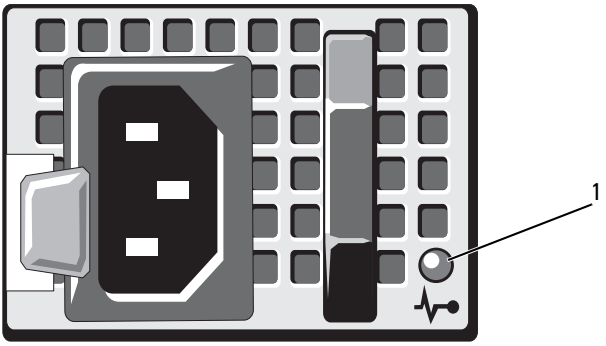
| Indicator | Indicator Code |
|---|---|
| Link and activity indicators are off | The NIC is not connected to the network. |
| Link indicator is green | The NIC is connected to a valid network link at 1000 Mbps. |
| Link indicator is amber | The NIC is connected to a valid network link at 10/100 Mbps.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

# Power Indicator Codes

The power supplies have an indicator that shows whether power is present or whether a power fault has occurred.

- Not lit—AC power is not connected.
- Green—In standby mode, indicates that a valid AC source is connected to the power supply, and that the power supply is operational. When the system is on, it also indicates that the power supply is providing DC power to the system.
- Amber—Indicates a problem with the power supply.
- Alternating green and amber—When hot-adding a power supply, this indicates that the power supply is mismatched with the other power supply (a high output power supply and an Energy Smart power supply are installed in the same system). Replace the power supply that has the flashing indicator with a power supply that matches the capacity of the other installed power supply.

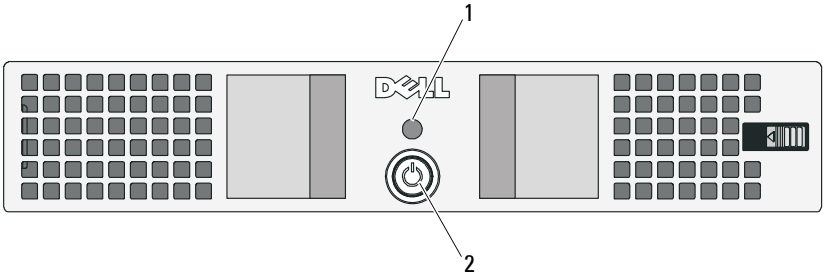
**Figure 1-7. Power Supply Status Indicator**




1 Power supply status LED

# Dell Backup Power Supply Front-Panel Features

**Figure 1-8. Front-Panel Features**




1 LED

2 power button

# Backup Power Supply Indicators

Table 1-1 and Table 1-2 describes the possible visual and audible operating state indicators at start-up.

**Table 1-1. Visual Operating State Indicators**

| LED Color and Pattern* | Condition |
|---|---|
| No LED display | BPS power module off, grid power can be either present or not |
| Solid green | Grid power present, BPS power module on |
| Blinking green | No grid power, unit supporting load on battery (before battery low condition) |
| Solid amber | Active alarm |
| Blinking amber and green | Flash upgrade in progress or BPS is in bootloader mode |

* The LED colors and patterns apply to the LEDs located on the front and back of the BPS.

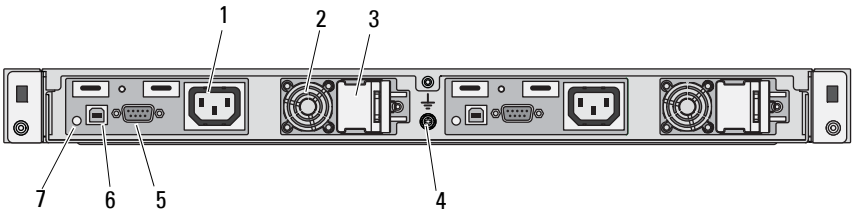
**Table 1-2. Audible Operating State Indicators**

| Audible Beeping or Buzzer | Condition |
|---|---|
| Silent | No Active alarms or active notices, the On/Off button has not been pressed to start up the BPS, or an active alarm has been muted* |
| Continuous buzzer | Shutdown imminent or hardware failure |
| Steady beeping | Alarm active (beeping rhythm 0.5 seconds On, 0.5 seconds Off) |
| Slow intermittent beeping | Notice active (beeping rhythm 0.5 seconds On, 4.5 seconds Off) |

*Audible beeping due to alarms can be temporarily silenced by pressing the On/Off button 0.5 seconds until the beeping is silenced. If a new alarm is generated, the audible beeping becomes active again.

# Backup Power Supply Back-Panel Features

**Figure 1-9. Back-Panel Features**




| | | | |
|---|---|---|---|
| 1 | IEC 320 C-13 output receptacles (2) | 2 | fans (2) |
| 3 | interlock cover for C-14 input connectors (2) | 4 | grounding port |
| 5 | RS-232 ports (2) | 6 | USB ports (2) |
| 7 | LEDs (2) | | |

# LCD Status Messages

The system's control panel LCD provides status messages to signify when the system is operating correctly or when the system needs attention.

The LCD lights blue to indicate a normal operating condition, and lights amber to indicate an error condition. The LCD scrolls a message that includes a status code followed by descriptive text. The table that follows provides a listing of LCD status messages and the probable cause for each message. The LCD messages 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 113.

**Table 1-3. 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.<br>If the problem persists, see "Getting Help" on page 113. |
| E1114 | Ambient Temp exceeds allowed range. | Ambient temperature has reached a point outside of the allowed range. | See "Troubleshooting System Cooling Problems" on page 96. |
| 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.<br>See "Troubleshooting System Cooling Problems" on page 96. If the problem persists, see "Getting Help" on page 113. |
| 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 95. |
| E1211 | RAID Controller battery failure. Check battery. | RAID battery is either missing, bad, or unable to recharge due to thermal issues. | Reseat the RAID battery connector. See "Troubleshooting System Cooling Problems" on page 96. |
| E1216 | 3.3V Regulator failure. Reseat PCIe cards. | 3.3 V voltage regulator has failed. | Remove and reseat the PCIe expansion cards. If the problem persists, see "Troubleshooting an Expansion Card" on page 101. |

**Table 1-3. 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 102.<br>If the problem persists, see "Getting Help" on page 113. |
| E122A | CPU # VTT Regulator failure. Reseat CPU. | Specified processor VTT voltage regulator has failed. | Reseat the processor. See "Troubleshooting the Processor" on page 102.<br>If the problem persists, see "Getting Help" on page 113. |
| 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.<br>If the problem persists, see "Getting Help" on page 113. |
| E122D | Memory Regulator # Failed. Reseat DIMMs. | One of the memory regulators has failed. | Reseat the memory modules. See "Troubleshooting System Memory" on page 97. |
| 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.<br>If the problem persists, see "Getting Help" on page 113. |
| E1310 | Fan ## RPM exceeding range. Check fan. | RPM of specified fan is outside of the intended operating range. | See "Troubleshooting System Cooling Problems" on page 96. |

**Table 1-3. LCD Status Messages *(continued)***

| Code | Text | Causes | Corrective Actions |
|---|---|---|---|
| E1311 | Fan module ## RPM exceeding range. Check fan. | RPM of specified fan in specified module is outside of intended operating range. | See "Troubleshooting System Cooling Problems" on page 96. |
| E1313 | Fan redundancy lost. Check fans. | The system is no longer fan redundant. Another fan failure would put the system at risk of over-heating. | Check LCD for additional scrolling messages. See "Troubleshooting a Fan" on page 97. |
| E1410 | Internal Error detected. Check "FRU X". | Specified processor has an internal error. The error may or may not have been caused by the processor. | Remove AC power to the system for 10 seconds and restart the system.<br>If the problem persists, see "Getting Help" on page 113. |
| E1414 | CPU # temp exceeding range. Check CPU heatsink. | Specified processor is out of acceptable temperature range. | Ensure that the processor heat sink is properly installed. See "Troubleshooting the Processor" on page 102 and "Troubleshooting System Cooling Problems" on page 96. |
| E1418 | CPU # not detected. Check CPU is seated properly. | Specified processor is missing or bad, and the system is in an unsupported configuration. | Ensure that the specified microprocessor is properly installed. See "Troubleshooting the Processor" on page 102. |
| 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*. |

**Table 1-3. LCD Status Messages *(continued)***

| Code | Text | Causes | Corrective Actions |
|---|---|---|---|
| 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.<br>If the problem persists, see "Getting Help" on page 113. |
| 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.<br>If the problem persists, see "Getting Help" on page 113. |
| 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.<br>If the problem persists, see "Getting Help" on page 113. |
| E1610 | Power Supply # (### W) missing. Check power supply. | Specified power supply was removed or is missing from the system. | See "Troubleshooting Power Supply" on page 96. |
| E1614 | Power Supply # (### W) error. Check power supply. | Specified power supply has failed. | See "Troubleshooting Power Supply" on page 96. |
| E1618 | Predictive failure on Power Supply # (### W). Check PSU. | An over-temperature condition or power supply communication error has caused the predictive warning of an impending power supply failure. | See "Troubleshooting Power Supply" on page 96. |

**Table 1-3. LCD Status Messages *(continued)***

| Code | Text | Causes | Corrective Actions |
|---|---|---|---|
| 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 Power Supply" on page 96. |
| 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 Power Supply" on page 96. |
| E1624 | Lost power supply redundancy. Check PSU cables. | The power supply subsystem is no longer redundant. If the remaining power supply fails, the system will shut down. | See "Troubleshooting Power Supply" on page 96. |
| E1626 | Power Supply Mismatch. PSU1 = ### W, PSU2 = ### W. | The power supplies in the system are not the same wattage. | Ensure that power supplies with matching wattage are installed. See the Technical Specifications outlined in your system's *Getting Started Guide*. |
| E1629 | Power required > PSU wattage. Check PSU and config. | The system configuration requires more power than the power supplies can provide, even with throttling. | Turn off power to the system, reduce the hardware configuration or install higher-wattage power supplies, and then restart the system. |

**Table 1-3. LCD Status Messages *(continued)***

| Code | Text | Causes | Corrective Actions |
|---|---|---|---|
| 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.<br>If the problem persists, see "Getting Help" on page 113. |
| 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 an Expansion Card" on page 101. |
| | 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 an Expansion Card" on page 101. |
| 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 an Expansion Card" on page 101. |

**Table 1-3. LCD Status Messages *(continued)***

| Code | Text | Causes | Corrective Actions |
|---|---|---|---|
| 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.<br>If the problem persists, see "Getting Help" on page 113. |
| 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 an Expansion Card" on page 101. |
| E1810 | Hard drive ## fault. Review & clear SEL. | The specified hard drive has experienced a fault. | See "Troubleshooting a Hard Drive" on page 100. |
| E1812 | Hard drive ## removed. Check drive. | The specified hard drive has been removed from the system. | Information only. |
| E1920 | iDRAC6 Upgrade Failed. | iDRAC6 upgrade has failed. | See "Getting Help" on page 113. |
| E1A14 | SAS cable A failure. Check connection. | SAS cable A is missing or bad. | Reseat the cable. If the problem persists, replace cable.<br>If the problem persists, see "Getting Help" on page 113. |

**Table 1-3. LCD Status Messages *(continued)***

| Code | Text | Causes | Corrective Actions |
|---|---|---|---|
| E1A15 | SAS cable B failure. Check connection. | SAS cable B is missing or bad. | Reseat the cable. If the problem persists, replace cable.<br>If the problem persists, see "Getting Help" on page 113. |
| 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.<br>If the problem persists, see "Getting Help" on page 113. |
| E2010 | Memory not detected. Inspect DIMMs. | No memory was detected in the system. | Install memory or reseat memory modules. See "Troubleshooting System Memory" on page 97. |
| E2011 | Memory configuration failure. Check DIMMs. | Memory detected, but is not configurable. Error detected during memory configuration. | See "Troubleshooting System Memory" on page 97. |
| E2012 | Memory configured but unusable. Check DIMMs. | Memory configured, but is unusable. | See "Troubleshooting System Memory" on page 97. |
| 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 97. |
| 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.<br>If the problem persists, see "Getting Help" on page 113. |

**Table 1-3. LCD Status Messages *(continued)***

| Code | Text | Causes | Corrective Actions |
|---|---|---|---|
| E2015 | DMA Controller failure. Power cycle AC. | DMA controller failure. | Remove AC power to the system for 10 seconds and restart the system.<br>If the problem persists, see "Getting Help" on page 113. |
| E2016 | Interrupt Controller failure. Power cycle AC. | Interrupt controller failure. | Remove AC power to the system for 10 seconds and restart the system.<br>If the problem persists, see "Getting Help" on page 113. |
| E2017 | Timer refresh failure. Power cycle AC. | Timer refresh failure. | Remove AC power to the system for 10 seconds and restart the system.<br>If the problem persists, see "Getting Help" on page 113. |
| E2018 | Programmable Timer error. Power cycle AC. | Programmable interval timer error. | Remove AC power to the system for 10 seconds and restart the system.<br>If the problem persists, see "Getting Help" on page 113. |
| E2019 | Parity error. Power cycle AC. | Parity error. | Remove AC power to the system for 10 seconds and restart the system.<br>If the problem persists, see "Getting Help" on page 113. |

**Table 1-3. LCD Status Messages *(continued)***

| Code | Text | Causes | Corrective Actions |
|---|---|---|---|
| E201A | SuperIO failure. Power cycle AC. | SIO failure. | Remove AC power to the system for 10 seconds and restart the system.<br>If the problem persists, see "Getting Help" on page 113. |
| 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 113. |
| E201C | SMI initialization failure. Power cycle AC. | System management interrupt (SMI) initialization failure. | Remove AC power to the system for 10 seconds and restart the system.<br>If the problem persists, see "Getting Help" on page 113. |
| E201D | Shutdown test failure. Power cycle AC. | BIOS shutdown test failure. | Remove AC power to the system for 10 seconds and restart the system.<br>If the problem persists, see "Getting Help" on page 113. |
| E201E | POST memory test failure. Check DIMMs. | BIOS POST memory test failure. | See "Troubleshooting System Memory" on page 97.<br>If the problem persists, see "Getting Help" on page 113. |
| E2020 | CPU configuration failure. Check screen message. | Processor configuration failure. | Check screen for specific error messages. See "Troubleshooting the Processor" on page 102. |

**Table 1-3. LCD Status Messages *(continued)***

| Code | Text | Causes | Corrective Actions |
|---|---|---|---|
| E2021 | Incorrect memory configuration. | Incorrect memory configuration. | Check screen for specific error messages. See "Troubleshooting System Memory" on page 97. |
| E2022 | General failure during POST. Check screen message. | General failure after video. | Check screen for specific error messages. |
| 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 97. |
| E2111 | SBE log disabled on DIMM ##. Reseat DIMM. | The system BIOS has disabled memory single-bit error (SBE) logging and will not log anymore 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.<br>If the problem persists, see "Troubleshooting System Memory" on page 97. |
| I1910 | Intrusion detected. Check chassis cover. | System cover has been removed. | Information only. |
| I1911 | LCD Log Full. Check SEL to review all Errors. | LCD overflow message. A maximum of ten error messages can display 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.<br>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 details on the events, then clear the SEL. |

**Table 1-3. LCD Status Messages *(continued)***

| Code | Text | Causes | Corrective Actions |
|---|---|---|---|
| I1920 | iDRAC6 Upgrade Successful. | iDRAC6 has been upgraded successfully. | Information only. |
| W1228 | RAID Controller battery capacity < 24hr. | Warns predictively that the RAID battery has less than 24 hours of charge left. | Allow RAID battery to charge to greater than 24 hours of sustained charge.<br>If problem persists, replace RAID battery. See "Getting Help" on page 113. |
| 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 supplies, and then restart the system. |
| W1628 | Performance degraded. Check PSU and system configuration. | 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 supplies, 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**.

## Solving Problems Described by LCD Status Messages

The code and text on the LCD can often specify a very precise fault condition that is easily corrected. For example, if the code `E1418 CPU_1_Presence` appears, you know that a microprocessor is not installed in socket 1.

In contrast, you might be able to determine the problem if multiple related errors occur. For example, if you receive a series of messages indicating multiple voltage faults, you might determine that the problem is a failing power supply.

### 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 example, if temperature for a component goes out of range, the LCD displays the fault; when the temperature returns to the acceptable range, the message is removed from the LCD. 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 approximately ten seconds, reconnect the power cable, and restart the system.

Any of these actions will remove fault messages, and return the status indicators and LCD colors to the normal state. Messages will reappear under the following conditions:

- The sensor returns to a normal state but fails again, resulting in a new SEL entry.
- The system is reset and new error events are detected.
- A failure is recorded from another source that maps to the same display entry.

## 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 1-4. 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.`<br>`Alert! Continuing system boot accepts the risk that system may power down without warning.` | The iDRAC6 has hung.<br>The iDRAC6 was remotely reset while system was booting.<br>After AC recovery, the iDRAC6 takes longer than normal to boot. | Remove AC power to the system for 10 seconds and restart the system. |
| `Alert! Power required exceeds PSU wattage. Check PSU and system configuration.`<br>`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 supplies. | 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. If Energy Smart power supplies are installed, replace them with High Output power supplies to use the components. See "Power Supplies" on page 77. |

**Table 1-4. System Messages *(continued)***

| Message | Causes | Corrective Actions |
|---|---|---|
| `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 113. |
| `Caution! NVRAM_CLR jumper is installed on system board. Please run SETUP.` | 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 5-1 for jumper location. |
| `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. |

**Table 1-4. System Messages *(continued)***

| Message | Causes | Corrective Actions |
|---|---|---|
| `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. |
| `Embedded NIC`*`x`* `and NIC`*`y`*`: 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 93. |
| `Gate A20 failure.` | Faulty keyboard controller; faulty system board. | See "Getting Help" on page 113. |
| `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. |
| `Invalid PCIe card found in the Internal_Storage slot!` | The system halted because an invalid PCIe expansion card is installed in the dedicated storage controller slot. | Remove the PCIe expansion card and install the integrated storage controller in the dedicated slot. See "Getting Help" on page 113. |
| `Keyboard fuse has failed.` | Overcurrent detected at the keyboard connector. | See "Getting Help" on page 113. |

**Table 1-4. System Messages *(continued)***

| Message | Causes | Corrective Actions |
|---|---|---|
| `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). |
| `Manufacturing mode detected.` | System is in manufacturing mode. | Reboot to take the system out of manufacturing mode. |
| `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 67. |
| `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 67. |
| `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 67. |

**Table 1-4. System Messages *(continued)***

| Message | Causes | Corrective Actions |
|---|---|---|
| `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. Mismatched memory modules are installed. | Ensure that the memory modules are installed in a valid configuration. See "General Memory Module Installation Guidelines" on page 67. |
| `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, optical drive, or hard drive. If the problem persists, see "Troubleshooting an Optical Drive" on page 99, and "Troubleshooting a Hard Drive" on page 100. |
| `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. 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 113. |
| `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 an Expansion Card" on page 101. If the problem persists, see "Getting Help" on page 113. |

**Table 1-4. System Messages *(continued)***

| Message | Causes | Corrective Actions |
|---|---|---|
| `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 5-1 for jumper location. If the problem persists, see "Troubleshooting an Expansion Card" on page 101. |
| `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 67. |
| `Read fault.`<br>`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 USB device. Ensure that the USB cables, SAS/SATA backplane cables, or optical drive cables are properly connected. See "Troubleshooting an Optical Drive" on page 99, or "Troubleshooting a Hard Drive" on page 100 for the appropriate drive(s) installed in your system. |
| `SATA Port x device not found.` | There is no device connected to the specified SATA port. | Information only. |

**Table 1-4. System Messages *(continued)***

| Message | Causes | Corrective Actions |
|---|---|---|
| `Sector not found.`<br>`Seek error.`<br>`Seek operation failed.` | Faulty hard drive. | Replace the hard drive. Ensure that the SAS backplane cables are properly connected. See "Troubleshooting a Hard Drive" on page 100 for the appropriate drive(s) installed in your system. |
| `Shutdown failure.` | General system error. | See "Getting Help" on page 113. |
| `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 97. |

**Table 1-4. System Messages *(continued)***

| Message | Causes | Corrective Actions |
|---|---|---|
| The following DIMMs should match in geometry: *x,x,...*<br>The following DIMMs should match in rank count: *x,x,...*<br>The following DIMMs should match in size: *x,x,...*<br>The following DIMMs should match in size and geometry: *x,x,...*<br>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 67. |
| 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 "System Memory" on page 66. |
| Time-of-day clock stopped. | Faulty battery or faulty chip. | See "Troubleshooting the System Battery" on page 95. |
| Time-of-day not set - please run SETUP program. | Incorrect Time or Date settings; faulty system battery. | Check the Time and Date settings. If the problem persists, replace the system battery. See "System Battery" on page 79. |
| Timer chip counter 2 failed. | Faulty system board. | See "Getting Help" on page 113. |

**Table 1-4. System Messages *(continued)***

| Message | Causes | Corrective Actions |
|---|---|---|
| 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.<br>WARNING: Modifying could prevent security. | This message displays 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 113. |
| 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.<br>The iDRAC6 Enterprise card flash memory or BMC SPI flash may be corrupted. | Restart the system and update the Unified Server Configurator repository to the latest software to restore full functionality. See the Unified Server Configuration user documentation for more information.<br>Restore the flash memory using the latest version on **support.dell.com**. See the iDRAC 6 User Guide for instructions on performing a field replacement of the flash memory. |

**Table 1-4. System Messages *(continued)***

| Message | Causes | Corrective Actions |
|---|---|---|
| `Unexpected interrupt in protected mode.` | Improperly seated memory modules or faulty keyboard or mouse controller chip. | Reseat the memory modules. See "Troubleshooting System Memory" on page 97. If the problem persists, see "Getting Help" on page 113. |
| `Unsupported CPU combination.`<br>`Unsupported CPU stepping detected.` | Processor is not supported by the system. | Install a supported processor. See "Processor" on page 73. |
| `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 67. |
| `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 67. |
| `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 93 for any faulty components specified in the SEL. |

**Table 1-4. System Messages *(continued)***

| Message | Causes | Corrective Actions |
|---|---|---|
| `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 81. |
| `Warning! No micro code update loaded for processor n.` | Micro code update failed. | Update the BIOS firmware. See "Getting Help" on page 113. |
| `Warning! Power required exceeds PSU wattage. Check PSU and system configuration.`<br>`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 supplies. | 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. If Energy Smart power supplies are installed, replace them with the High Output power supplies to use the components. See "Power Supplies" on page 77. |
| `Warning! PSU mismatch. PSU redundancy lost. Check PSU.` | A High Output power supply and an Energy Smart power supply are installed in the system at the same time. | Install two High Output or two Energy Smart power supplies in the system.<br>You can also run the system on one power supply until you can obtain two power supplies of the same type. See "Troubleshooting Power Supply" on page 96. |

**Table 1-4. 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 67. If the problem persists, see "Troubleshooting System Memory" on page 97. |
| `Write fault.`<br>`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, SAS backplane, or SATA cables are properly connected. See "Troubleshooting an Optical Drive" on page 99, and "Troubleshooting a Hard Drive" on page 100. |

**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 to a possible problem and prompts you to respond before the system continues a task. 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 105 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 at **support.dell.com/manuals**.

## 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 rack documentation included with your rack solution describes how to install your system into a rack.
- The *Getting Started Guide* provides an overview of system features, setting up your system, and technical specifications.
- Dell systems management application documentation at **support.dell.com/manuals** provides information about installing and using the systems management software.
- 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.

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

# 2

# Installing System Components

**WARNING: While moving or transferring the system, it is recommended that you use the packaging material that shipped with the system and/or take care to avoid any damage due to shock or vibration.**

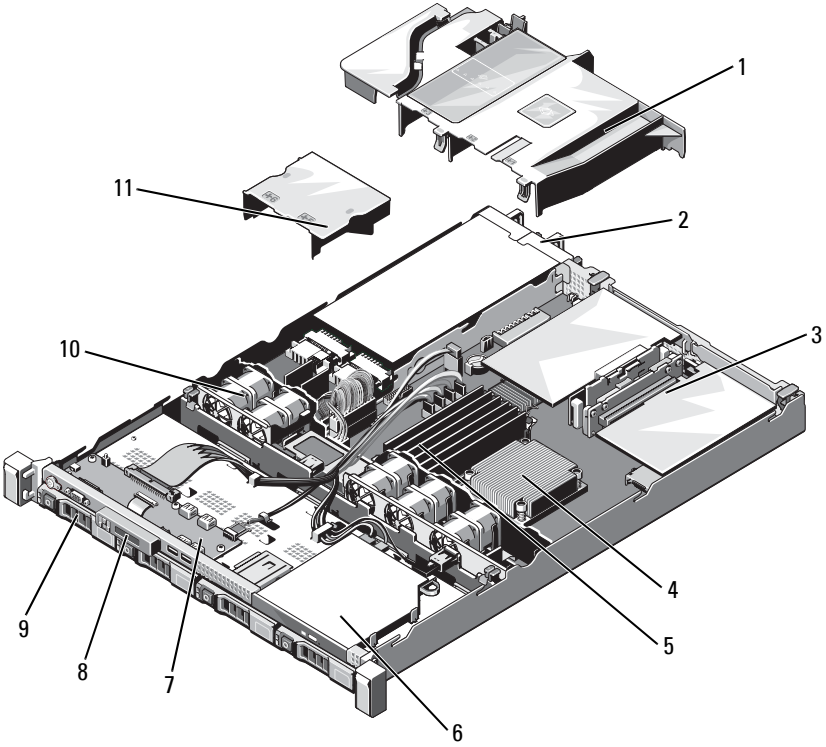
## Recommended Tools

- 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 2-1. Inside the System**

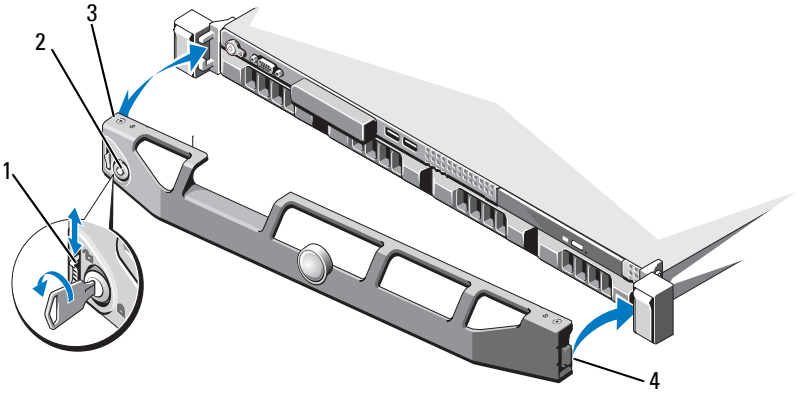



| | | | |
|---|---|---|---|
| 1 | cooling shroud | 2 | power supply bays (2) |
| 3 | expansion-card riser | 4 | heat sink/processor |
| 5 | memory modules (6) | 6 | optical drive |
| 7 | control panel board | 8 | display module |
| 9 | hard drives (2) | 10 | system cooling fans (5) |
| 11 | power supply shroud | | |

# Front Bezel

1. Unlock the keylock at the left end of the bezel.
2. Lift up the release latch next to the key lock.
3. Rotate the left end of the bezel away from the front panel.
4. Unhook the right end of the bezel and pull the bezel away from the system.

**Figure 2-2. Removing and Installing the Front Bezel**




| | | | |
|---|---|---|---|
| 1 | release latch | 2 | keylock |
| 3 | front bezel | 4 | hinge tab |

To replace the bezel, hook the right end of the bezel onto the chassis, then fit the free end of the bezel onto the system. Secure the bezel with the keylock. See Figure 2-2.

# Opening and Closing the System

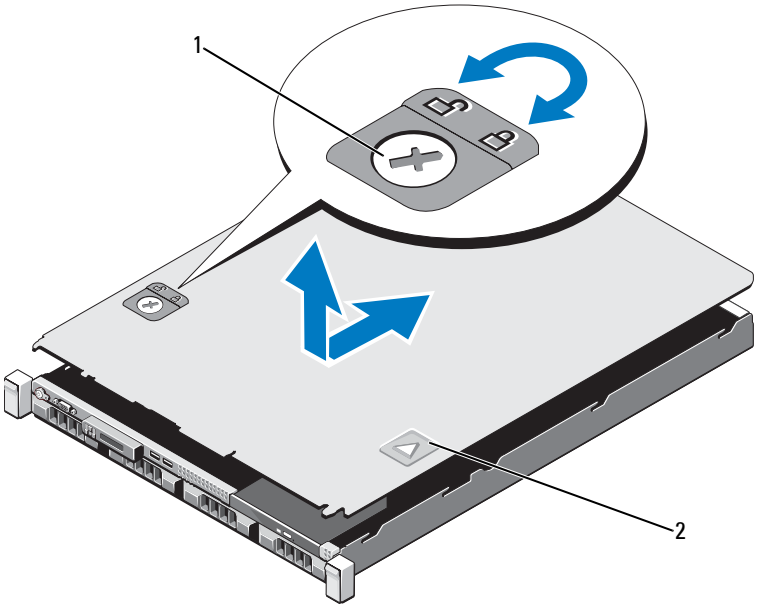
**WARNING: Whenever you need to lift the system, get others to assist you. To avoid injury, do not attempt to lift the system by yourself.**

**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, and disconnect the system from the electrical outlet and peripherals.
2. Rotate the latch release lock counter clockwise to the unlocked position. See Figure 2-3.
3. Grasp the cover on both sides while pressing your thumbs on the latch release lock and the indent. Carefully slide the cover toward the back of the system, and lift it away from the system. See Figure 2-3.

**Figure 2-3. Opening and Closing the System**




1 latch release lock 2 indent

## Closing the System

1. Place the cover onto the chassis and offset it slightly toward the back of the system, so that the two pins on the back edge of the cover fit over the corresponding slots on the back edge of the chassis. See Figure 2-3.
2. Slide the cover towards the front of the chassis till it snaps in position.
3. Rotate the latch release lock in a clockwise direction to secure the cover.

# Optical Drive

A slimline DVD+/-RW optical drive slides into the front panel and connects to the SATA controller on the system board.

**NOTE:** DVD devices are data only.

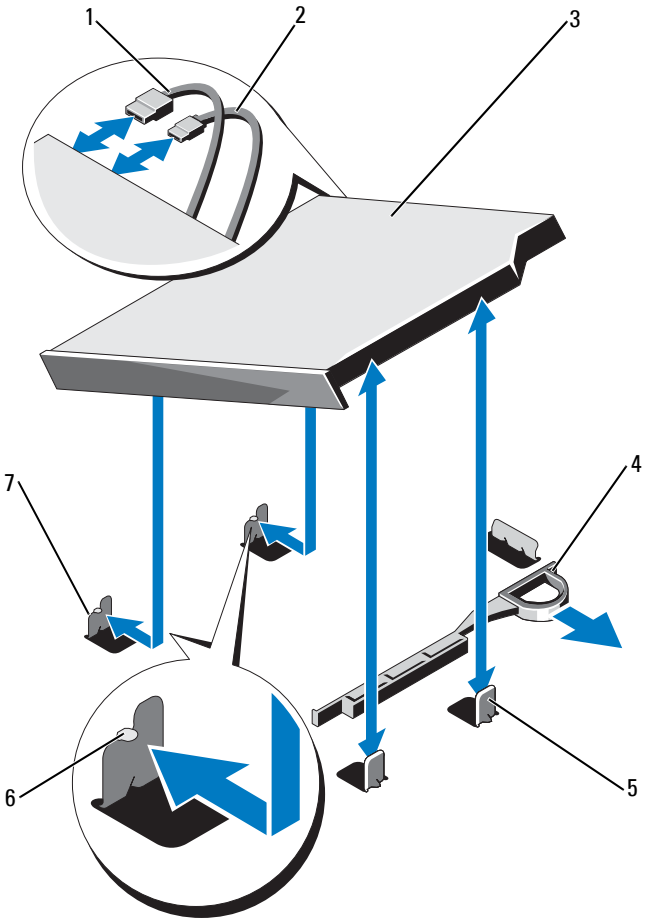
## Removing an Optical Drive

**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. Open the system. See "Opening the System" on page 52.
3. Disconnect the power and data cable from the back of the drive.

   **NOTE:** Note the routing of the power and data cables underneath the tabs on the chassis as you remove them from the system board and drive. You must route these cables properly when you replace them to prevent them from being pinched or crimped.
4. Pull the release latch to the unlock position. Lift the drive to release it from the notch on the metal standoffs.
5. Lift the drive out of the chassis. See Figure 2-4.
6. Close the system. See "Closing the System" on page 53.

**Figure 2-4. Removing and Installing the Optical Drive**




| | | | |
|---|---|---|---|
| 1 | data cable | 2 | power cable |
| 3 | optical drive | 4 | release latch |
| 5 | metal standoffs (2) | 6 | notches (2) |
| 7 | metal standoffs with notches (2) | | |

## 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. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.
2. Open the system. See "Opening the System" on page 52.
3. Align the two notches on the metal standoffs with the slots on the side of the drive.
4. Slide the drive into the notches until it is seated firmly and the release latch snaps into place. See Figure 2-4.
5. Connect the power cable.
6. Connect the data cable to the back of the drive and to the SATA connector on the system board.

   **NOTE:** Route these cables properly underneath the tab on the system chassis to prevent them from being pinched or crimped.
7. Close the system. See "Closing the System" on page 53.
8. Reconnect the system and peripherals to their electrical outlets.

# Hard Drives

Your system supports two 3.5-inch SATA hard drives in 3.5-inch hot-swap hard-drive carriers. The hard drives are connected to a SAS backplane through hard-drive carriers and are hot-swappable.

## Removing a Hard-Drive Carrier

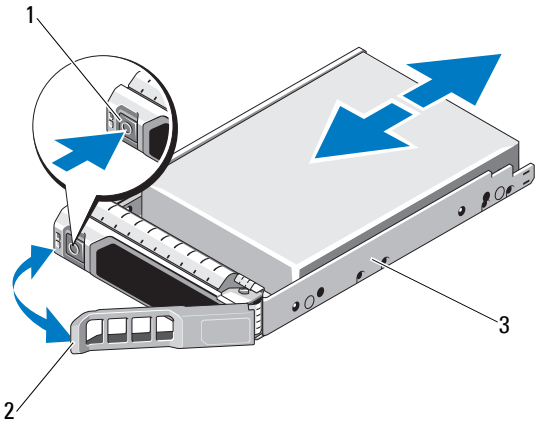
**CAUTION: Ensure that your operating system supports hot-swap drive installation. See the documentation supplied with the operating system.**

1. If applicable, remove the front bezel. See "Front Bezel" on page 51.
2. Using the RAID management software, prepare the hard drive for removal. Wait until the hard-drive indicators on the hard-drive carrier signal that the drive can be removed safely. See your storage controller documentation for information about hot-swap hard drive removal.

   If the hard drive has been online, the green activity/fault indicator flashes as the hard drive is powered down. When the hard-drive indicators are off, the hard drive is ready for removal. See Figure 1-4.
3. Press the release button and open the hard-drive carrier release handle to release the hard-drive carrier. See Figure 2-5.
4. Slide the hard-drive carrier out of the hard-drive bay.

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

**Figure 2-5. Removing and Installing a Hard-Drive Carrier**




| | | | |
|---|---|---|---|
| 1 | release button | 2 | hard-drive carrier handle |
| 3 | hard-drive carrier | | |

## Installing a Hard-Drive Carrier

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

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

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

1. If applicable, remove the front bezel. See "Front Bezel" on page 51.
2. Press the release button on the front of the hard-drive carrier and open the handle.
3. With the lever on the hard-drive carrier open, slide the hard-drive carrier into the hard-drive bay until it contacts the backplane.
4. Close the hard-drive carrier handle to lock the hard drive in place.

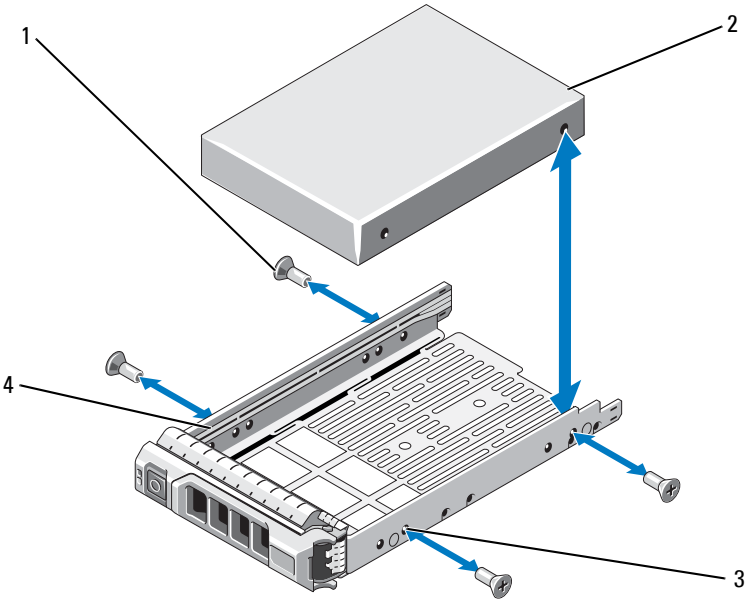
## Removing a Hard Drive From a Hard-Drive Carrier

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

Remove the screws from the slide rails on the hard-drive carrier and separate the hard drive from the carrier. See Figure 2-6.

**Figure 2-6. Removing and Installing a Hard Drive**




| | | | |
|---|---|---|---|
| 1 | screws (4) | 2 | hard drive |
| 3 | SAS/SATA screw hole | 4 | hard-drive carrier |

### Installing a Hard Drive Into a Hard-Drive Carrier

1. Insert the hard drive into the hard-drive carrier with the connector end of the drive at the back. See Figure 2-6.
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 four screws to secure the hard drive to the hard-drive carrier.

## Expansion NIC Card

Your system supports two PCIe Generation dual-port NICs. The NICs are not hot-swappable.

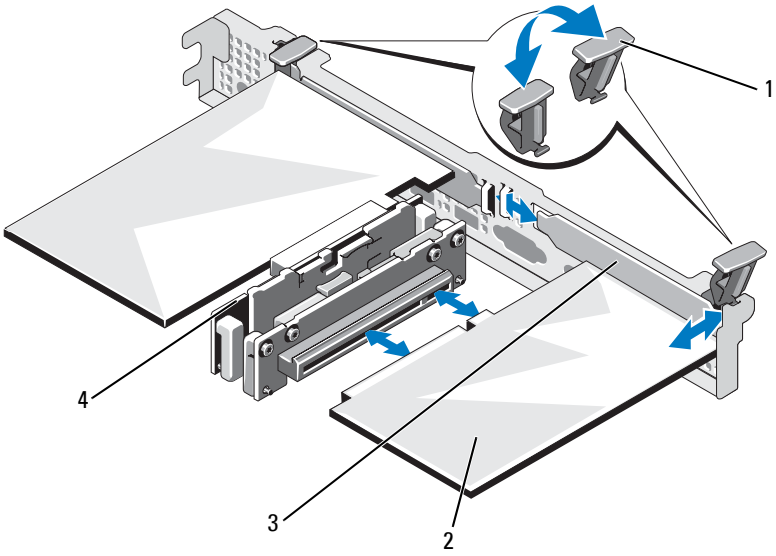
**CAUTION: To ensure proper cooling, only one of the two expansion cards can have a power consumption of greater than 15 W (up to 25 W maximum).**

### Replacing an Expansion NIC 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 52.
3. Disconnect all cables from the card.
4. Lift the expansion-card latch. See Figure 2-7.
5. Grasp the expansion NIC card by its edges and carefully remove it from the connector on the expansion-card riser.

**Figure 2-7. Replacing an Expansion NIC Card**




| | | | |
|---|---|---|---|
| 1 | expansion-card latch | 2 | expansion NIC card |
| 3 | filler bracket | 4 | expansion-card riser |

6. Unpack the new NIC card and prepare it for installation.

   For instructions, see the documentation accompanying the card.

7. Holding the expansion NIC card by its edges, position the card so that the card-edge connector aligns with the expansion-card connector on the expansion-card riser. See Figure 2-7.
8. Insert the card-edge connector firmly into the expansion-card connector until the card is fully seated.
9. Replace the expansion-card latch. See Figure 2-7.
10. Connect any cables to the expansion NIC card.

11 Close the system. See "Closing the System" on page 53.

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

# Cooling Shroud

The system board shroud covers the processor, heat sink, and memory modules, and provides air flow to these components. Airflow is facilitated by the cooling fan modules, which are positioned directly beneath the cooling shroud. The power distribution board shroud covers the power distribution board behind the power supply bay.

## Removing the Cooling Shroud

**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 it.**

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

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

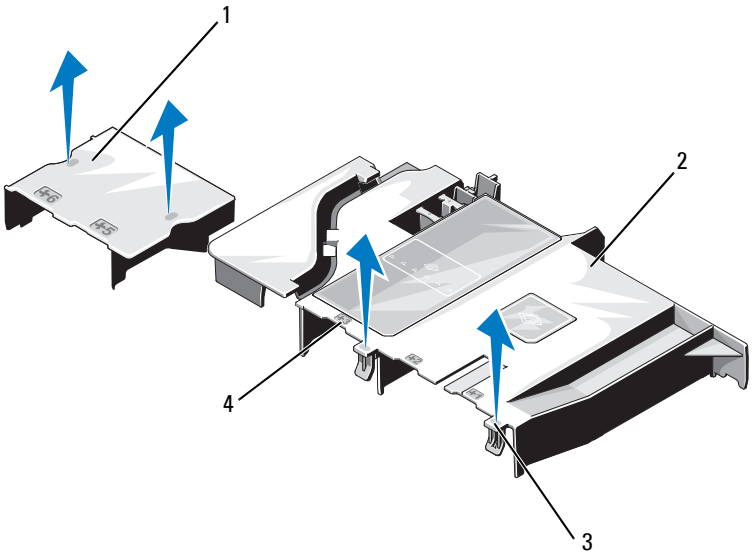
1 Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

2 Open the system. See "Opening and Closing the System" on page 52.

3 Remove the SAS backplane cables routed over the shroud from the system board.

4 Hold the touch points and gently lift the shroud straight up and away from the system board. See Figure 2-8.

**Figure 2-8. Removing and Installing the Cooling Shroud**




| | | | |
|---|---|---|---|
| 1 | power distribution board shroud | 2 | system board shroud |
| 3 | tabs (2) | 4 | fan bay numbers |

## Installing the Cooling Shroud

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

1. Orient the cooling shroud with the numbered fan bays as a guide.
2. Align the cooling shroud posts with the slots on the system board.
3. Push the cooling shroud down until all edges are secured to the system board.
4. Close the system. See "Opening and Closing the System" on page 52.

# Integrated Storage Controller Card

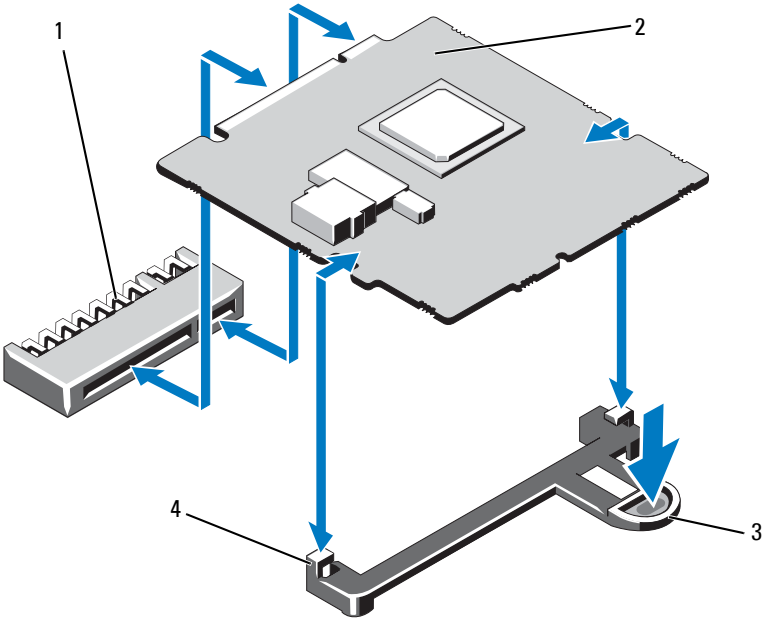
Your system uses a dedicated expansion-card slot on the riser for an integrated SAS controller card that provides the integrated storage subsystem for your system's internal hard drives. The controller uses SATA hard drives in RAID configurations.

## Removing the Integrated Storage Controller Card

**CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized 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 52.
3. Remove the expansion NIC card. See "Replacing an Expansion NIC Card" on page 60.
4. Press down on the card retention tab (marked with a blue dot) and pull the blue release tab.
5. Remove the card from the storage controller card slot. See Figure 2-9.

**Figure 2-9. Removing and Installing the Integrated Storage Controller Card**




| | | | |
|---|---|---|---|
| 1 | integrated storage controller card connector | 2 | integrated storage controller card |
| 3 | release tab | 4 | alignment guides (2) |

### Installing the Integrated Storage Controller Card

**CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized 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 52.
3. Remove the expansion NIC card. See "Replacing an Expansion NIC Card" on page 60.
4. Hold the card by its edges and align the card with the alignment guides.
5. Insert the card-edge connector firmly into the connector until the card is fully seated.
6. Close the system. See "Opening and Closing the System" on page 52.
7. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.

## System Memory

Your system supports 1333 MHz DDR3 unbuffered ECC DIMMs (UDIMMs).

The system contains six memory sockets organized into two DDR3 channels. The first socket of each channel is marked with white release levers.

## 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.

- Except for memory channels that are unused, all populated memory channels must have identical configurations.
- Memory modules are installed in the numeric order of the sockets beginning with 1 to 6.

## Replacing Memory Modules

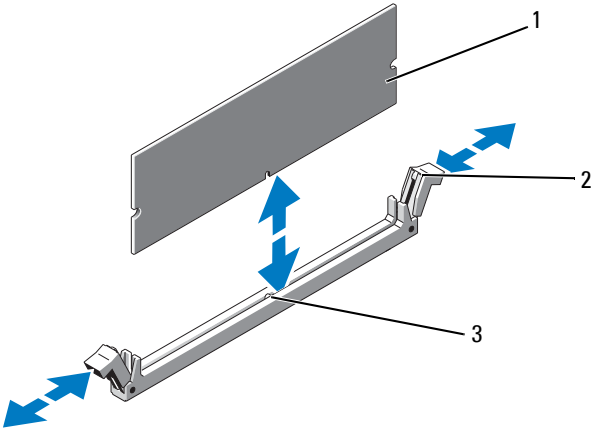
**WARNING: The memory modules are hot to touch for some time after the system has been powered down. Allow time for the memory modules to cool before handling them. Handle the memory modules by the card edges and avoid touching the components on the memory module.**

**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.**

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 52.
3. Remove the cooling shroud. See "Removing the Cooling Shroud" on page 62.
4. Locate the memory module sockets. See Figure 5-1.
5. Press down and out on the ejectors on each end of the socket until the memory module pops out of the socket. See Figure 2-10.

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

**Figure 2-10. Replacing a Memory Module**




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

6 Align the new 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.

7 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.

8 Repeat step 5 through step 8 of this procedure to install the remaining memory modules.

9 Replace the cooling shroud. See "Installing the Cooling Shroud" on page 63.

10 Close the system. See "Closing the System" on page 53.

11 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.

12 If the value is incorrect, one or more of the memory modules may not be installed properly. Repeat step 2 through step 12 of this procedure, checking to ensure that the memory modules are firmly seated in their sockets.

Run the system memory test in the system diagnostics. See "Running the System Diagnostics" on page 105.

# Cooling Fans

Your system contains five single-motor fans and provides cooling for the processor, expansion NIC card, power supplies, and memory modules.

**NOTE:** Hot-swap removal or installation of the fans is not supported.

**NOTE:** In the event of a problem with a particular fan, the fan number is referenced by the system's management software, allowing you to easily identify and replace the proper fan by noting the fan numbers on the fan assembly.

## Removing a Cooling Fan

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

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

**NOTE:** The procedure for removing each individual fan module is the same.

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

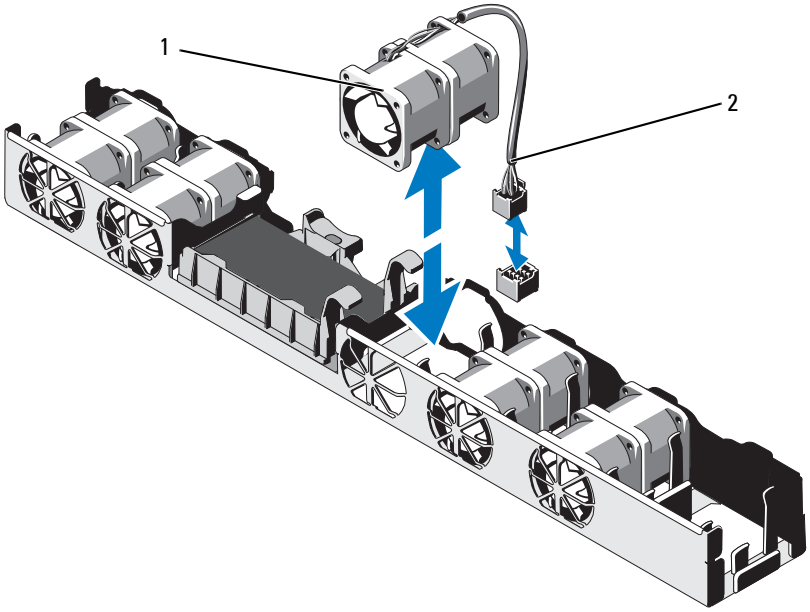
2 Open the system. See "Opening the System" on page 52.

3 Remove the cooling shroud or power distribution board shroud as applicable. See "Cooling Shroud" on page 62.

4 Disconnect the fan's power cable from the system board. See Figure 2-11.

5 Grasp the fan and slide it away from the fan assembly. See Figure 2-11.

**Figure 2-11. Removing and Installing a Fan**




1 fan

2 power cable

### Installing a Cooling 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. Ensure that the fan is oriented correctly.

   Orient the fan module so that the side with the power cable faces toward the back of the system.

2. Lower the fan into the fan assembly until the fan is fully seated. See Figure 2-11.
3. Connect the fan's power cable to the power connector on the system board.
4. Replace the cooling shroud or power distribution board shroud as applicable. See "Installing the Cooling Shroud" on page 63.
5. Close the system. See "Closing the System" on page 53.
6. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.

## iDRAC6 Enterprise Card

### Replacing an iDRAC6 Enterprise 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. If present, disconnect the Ethernet cable from the iDRAC6 Enterprise card connector on the system back panel. See Figure 1-5.
3. Open the system. See "Opening the System" on page 52.

4 Remove the expansion NIC card from the expansion-card slot. See "Replacing an Expansion NIC Card" on page 60.

5 Pull back slightly on the two tabs at the front edge of the card and gently lift the front edge of the card off of the retention standoffs.

As the card releases from the standoffs, the connector under the card disengages from the system board connector.

6 Slide the card away from the back of the system until the RJ-45 connector is clear of the back panel.

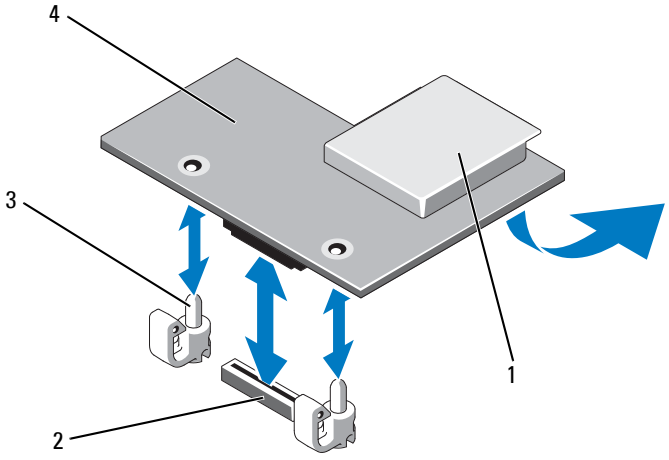
Lift the card out of the system.

7 Angle the new card so that the RJ-45 connector fits through the back-panel opening. See Figure 2-12.

8 Align the front edge of the card with the two front plastic retention standoffs next to the iDRAC6 connector on the system board, and lower the card into place. See Figure 2-12.

When the front of the card is fully seated, the plastic standoffs snap over the edge of the card.

**Figure 2-12. Replacing an iDRAC6 Enterprise Card**




| | | | |
|---|---|---|---|
| 1 | VFlash media slot | 2 | iDRAC6 Enterprise card connector |
| 3 | retention standoff posts (2) | 4 | iDRAC6 Enterprise card |

9 If applicable, replace the expansion NIC card. See "Replacing an Expansion NIC Card" on page 60.

10 Close the system. See "Closing the System" on page 53.

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

# 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 on **support.dell.com**.

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

3 Open the system. See "Opening the System" on page 52.

4 Remove the cooling shroud. See "Removing the Cooling Shroud" on page 62.

**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.**

5 Using a #2 Phillips screwdriver, loosen one of the heat-sink retention screws. See Figure 2-13.

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

7 Loosen the other heat-sink retention screws.

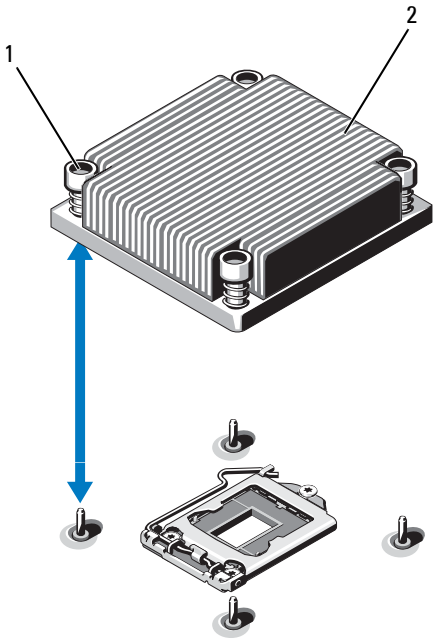
8 Gently lift the heat sink off of the processor and set the heat sink aside with the thermal grease side facing up.

**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.**

9 Position your thumb firmly over the processor socket-release lever and release the lever from the locked position.

10 Rotate the lever 90 degrees upward until the processor is released from the socket. See Figure 2-14.

**Figure 2-13. Removing and Installing the Heat Sink**



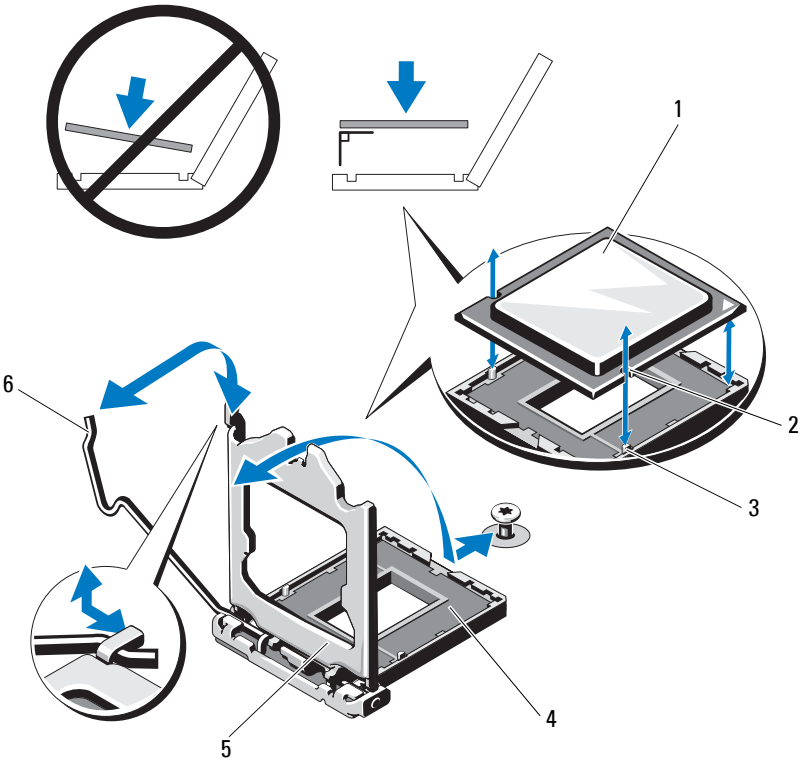

1 heat-sink retention screws (4) 2 heat sink

11 Rotate the processor shield upward and out of the way. See Figure 2-14.

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

**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.**

**Figure 2-14. Removing and Installing a Processor**




| | | | |
|---|---|---|---|
| 1 | processor | 2 | notch in processor |
| 3 | socket key | 4 | ZIF socket |
| 5 | processor shield | 6 | socket-release lever |

## Installing a Processor

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

1. If you are upgrading your processor, prior to upgrading your system, download and install the latest system BIOS version from **support.dell.com**. Follow the instructions included in the file download to install the update on your system.
2. Unpack the processor if it has not been used previously.

   If the processor has already been used, remove any thermal grease from the top of the processor using a lint-free cloth.
3. Align the processor with the socket keys on the ZIF socket. See Figure 2-14.

**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 center of the top of the new processor.

**CAUTION: Using excess thermal grease can cause grease to contact the processor shield, which can cause contamination of the processor socket.**

9. Place the heat sink on the processor. See Figure 2-13.
10. Using a #2 Phillips screwdriver, tighten the heat-sink retention screws. See Figure 2-13.

11 Replace the cooling shroud. See "Installing the Cooling Shroud" on page 63.

12 Close the system. See "Closing the System" on page 53.

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

14 Press <F2> to enter the System Setup program, and check that the processor information matches the new system configuration.

15 Run the system diagnostics to verify that the new processor operates correctly.

See "Running the System Diagnostics" on page 105 for information about running the diagnostics.

# Power Supplies

Your system supports 400 W power supply modules.

The second power supply provides hot-swappable, power redundancy in your system. In redundant mode, the system distributes the power load across both power supplies to maximize efficiency. When a power supply is removed with the system powered on, the full power load is picked up by the remaining power supply.

## Removing a Power Supply

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

**CAUTION: The system requires one power supply for normal operation. On power-redundant systems, remove and replace only one power supply at a time in a system that is powered on.**

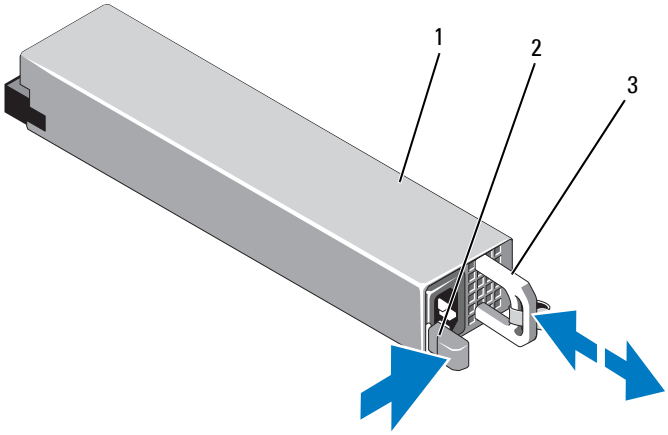
1 Disconnect the power cable from the power source.

2 Disconnect the power cable from the power supply and remove the Velcro straps that bundle and secure the system cables.

**NOTE:** You may have to unlatch and lift the optional cable management arm if it interferes with power-supply removal. For information about the cable management arm, see the system's rack documentation.

3 Press the release latch and pull the power supply straight out to release it from the power distribution board and clear the chassis.

**Figure 2-15. Removing and Installing a Power Supply**




1 power supply
2 release latch
3 power supply handle

### Installing a Power Supply

1. Verify that both power supplies are the same type and have the same maximum output power.

   **NOTE:** The maximum output power (shown in watts) is listed on the power supply label.

2. Slide the new power supply into the chassis until the power supply is fully seated and the release latch snaps into place. See Figure 2-15.

   **NOTE:** If you unlatched the cable management arm in step 2 of the previous procedure, relatch it. For information about the cable management arm, see the system's rack documentation.

3. Connect the power cable to the power supply and plug the cable into a power outlet.

**CAUTION: When connecting the power cable, secure the cable with the Velcro strap.**

**NOTE:** When installing, hot-swapping, or hot-adding a new power supply in a system with two power supplies, allow several seconds for the system to recognize the power supply and determine its status. The power-supply status indicator turns green to signify that the power supply is functioning properly. See Figure 1-7.

## System Battery

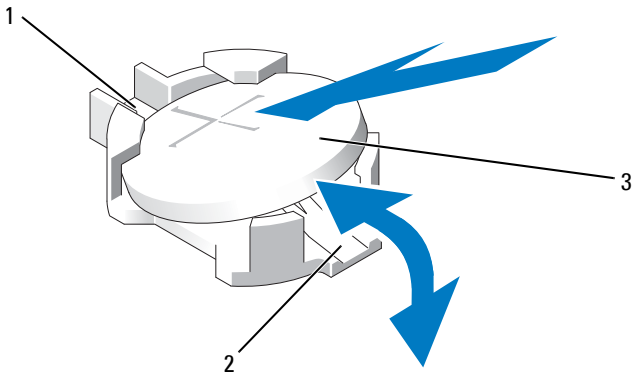
### Replacing the System Battery

**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 52.

**Figure 2-16. Replacing the System Battery**




| | | | |
|---|---|---|---|
| 1 | positive side of battery connector | 2 | negative side of battery connector |
| 3 | system battery | | |

**3** Locate the battery socket. See Figure 5-1.

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

**4** To remove the battery, push the metal tab away from the battery until the battery pops out. See Figure 2-16.

**5** To install the new system battery, hold the battery with the "+" facing up, and aligned to the metal tab on the socket.

**6** Press the battery straight down into the socket until it snaps into place.

**7** Close the system. See "Closing the System" on page 53.

**8** Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.

**9** Enter the System Setup program to confirm that the battery is operating properly.

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

**11** Exit the System Setup program.

# Control Panel Assembly

**NOTE:** The LCD control panel assembly consists of two separate modules—the display module and the control panel circuit board. Use the following instructions to remove and install either module.

## Removing the Control Panel Board Assembly and the Control Panel Display 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.**

1. If installed, remove the front bezel. See "Front Bezel" on page 51.
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 52.
4. Disconnect the control panel cable at the back of the control panel board. See Figure 2-17.

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

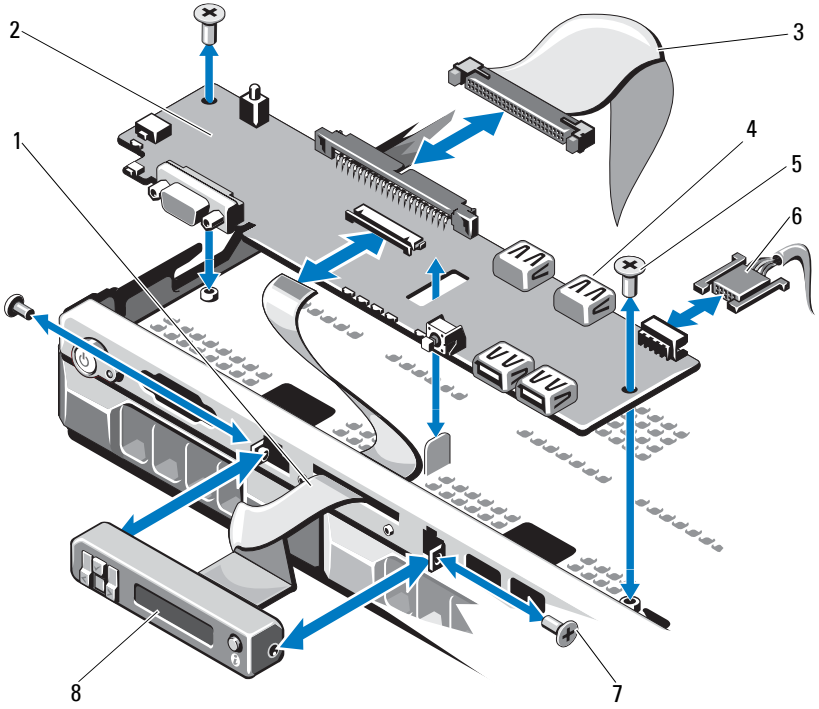
   a. Press the metal tabs on the ends of the cable connector.
   b. Gently work the connector out of the socket.
   c. Remove the USB connector cable, the display module cable and the power cable.

5. Remove the two screws that secure the control panel board to the system chassis and remove the board.

   This completes the removal procedure for the LED control panel.

6. Remove the two screws that secure the display module to the system chassis and remove the display module from the chassis cutout.

**Figure 2-17. Removing and Installing the Control Panel Assembly**




| | | | |
|---|---|---|---|
| 1 | display module cable | 2 | control panel board |
| 3 | control panel data cable | 4 | internal USB Connector |
| 5 | mounting screws | 6 | power cable |
| 7 | front panel screw (2) | 8 | LCD display module |

### Installing the Control Panel Board Assembly and the Control Panel Display 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.**

1. Affix the replacement panel to the front of the display module.
2. Align the slot in the control panel board with the standoff on the system chassis and secure with the two screws. See Figure 2-17. For LED control panel, skip step 4.
3. Connect the display module cable to the control panel board.
4. Connect the USB and control panel cables to the control panel board.
5. Close the system. See "Closing the System" on page 53.
6. If applicable, replace the front bezel. See "Front Bezel" on page 51.
7. Reconnect the system to the power source and turn on the system and attached peripherals.

## SAS Backplane

### Removing the SAS 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.**

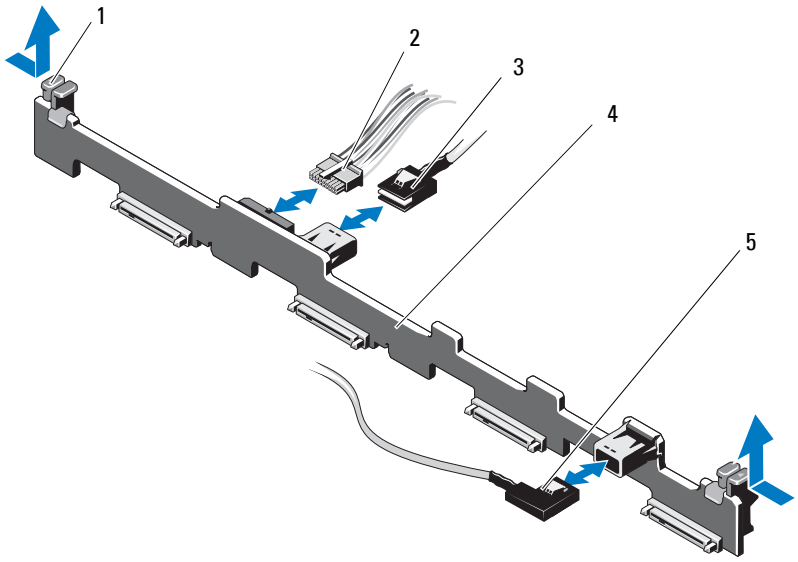
1. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
2. Open the system. See "Opening the System" on page 52.

**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.**

3. Remove all hard drives. See "Removing a Hard-Drive Carrier" on page 57.
4. Disconnect the power cable from the SAS backplane.
5. Disconnect the SAS data cables from the backplane. See Figure 2-18.
6. Remove the optical drive cable, control panel cable, power cable, data cables, and USB cables.
7. Press the two blue retention latches at either ends of the SAS backplane and lift it upwards and out of the retention hooks. Be careful to avoid damaging the other components on the face of the board. See Figure 2-18.
8. Place the SAS backplane face down on a work surface.

**Figure 2-18. Removing and Installing a SAS Backplane**




| | | | |
|---|---|---|---|
| 1 | backplane retention latches (2) | 2 | SAS backplane power cable |
| 3 | SAS A cable | 4 | SAS backplane |
| 5 | SAS B cable | | |

## Installing the SAS 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. Lower the backplane into the system, being careful to avoid damaging components on the face of the board.
2. Align the two blue retention latches on either ends with the guide posts on the system board. See Figure 2-18.
3. Slide the backplane downward until the two blue retention latches snap into place.
4. Connect the SAS data and power cables to the SAS backplane.
5. Reconnect the other device cables that you may have removed to uninstall the SAS backplane.
6. Install the hard drives in their original locations.
7. Close the system. See "Closing the System" on page 53.
8. Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.

# Power Distribution Board

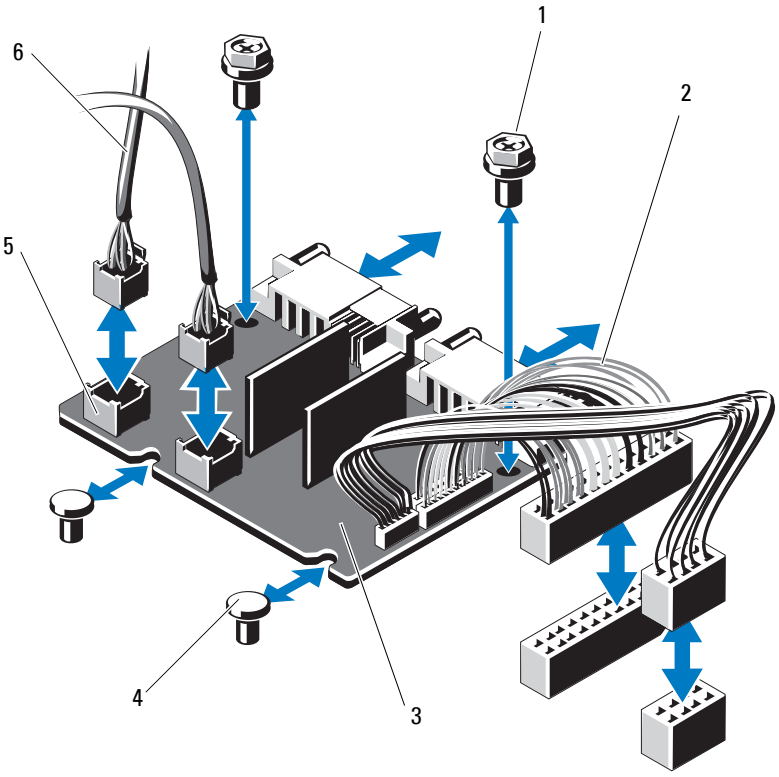
The power distribution board is located in your system directly behind the power supply fan modules. This feature provides additional cooling to the power supplies through the power distribution shroud that routes airflow to the power supplies. See Figure 2-19.

## Removing the Power Distribution Board

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

1. Remove the power supplies from the system. See "Removing a Power Supply" on page 77.
2. Locate the power distribution board shroud cover and lift it out. See "Removing the Cooling Shroud" on page 62.
3. Disconnect the power distribution cables from the system board (see "System Board" on page 89) and disconnect the fan cable connectors.
4. Remove the two screws securing the power distribution board to the chassis and then lift the board out. See Figure 2-19.

**Figure 2-19. Removing and Installing the Power Distribution Board**




| | | | |
|---|---|---|---|
| 1 | screws (2) | 2 | power supply cables (2) |
| 3 | power-distribution board | 4 | standoffs (2) |
| 5 | fan module cable connectors (2) | 6 | fan module power cables (2) |

## Installing the Power Distribution Board

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

1. Unpack the new power distribution board assembly.
2. Align the power distribution board with the standoffs on the chassis. See Figure 2-19.
3. Install the two screws that secure the power distribution board to the chassis. See Figure 2-19.
4. Connect the power distribution cables to the system board (see "System Board" on page 89) and fan cable connectors to the power distribution board as shown in Figure 2-19.
5. Locate the hinged interior catches on either side of the shroud and align and seat the power distribution board shroud, rotating it down and over the shroud. See "Installing the Cooling Shroud" on page 63.
6. Orient the power distribution board with the fan markings on the cover aligned to the fan modules and replace the shroud. See "Installing the Cooling Shroud" on page 63.
7. Close the system. See "Closing the System" on page 53.
8. Reconnect the system to its electrical outlet and turn the system on, including any 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 and attached peripherals, and disconnect the system from the electrical outlet.
2. Open the system. See "Opening the System" on page 52.
3. Remove the cooling shroud. See "Removing the Cooling Shroud" on page 62.
4. Remove the expansion NIC cards. See "Replacing an Expansion NIC Card" on page 60.
5. Remove the heat sink and the processor. See "Removing a Processor" on page 73.

**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.**

6. Remove the system battery. See "Replacing the System Battery" on page 79.
7. Remove the iDRAC6 Enterprise card. See "Replacing an iDRAC6 Enterprise Card" on page 71.
8. Disconnect all cables from the system board.

9 Remove all the memory modules. See "Replacing Memory Modules" on page 67.

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

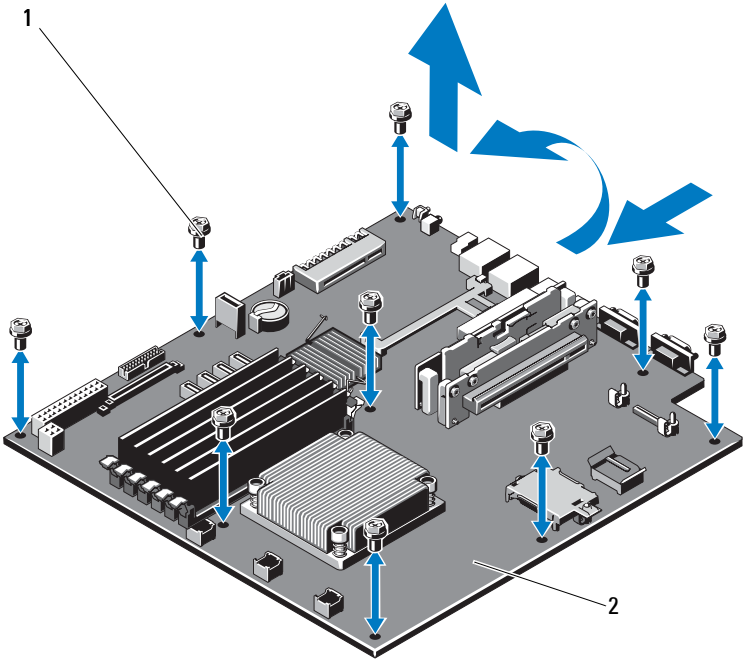
10 Carefully route any loose cables away from the edges of the system board.

11 Remove the nine screws securing the system board to the chassis and then slide the system board assembly toward the front of the chassis.

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

12 Grasp the system board assembly by its edges and lift the assembly away from the chassis. See Figure 2-20.

**Figure 2-20. Removing and Installing the System Board**




1 screws (9) 2 system board assembly

## 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.
2. Remove the labels from the processor shield and affix them to the system identification panel on the front of the system. See Figure 1-2.
3. Holding the system board by its edges, lower it into the chassis.

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

4. Slightly lift up the front of the system board and maneuver the system board to the bottom of the chassis until it lays completely flat.
5. Push the system board toward the back of the chassis until the board is in place.
6. Tighten the ten screws that secure the system board to the chassis. See Figure 2-20.
7. Transfer the processor and the heat sink to the new system board. See "Removing a Processor" on page 73 and "Installing a Processor" on page 76.
8. Replace all the memory modules. See "Replacing Memory Modules" on page 67.
9. Connect the cables in the order listed below (see Figure 5-1 for the locations of the connectors on the system board):
   - SATA interface cable, if applicable
   - Control panel interface cable
   - Optical drive power cable
   - Control panel USB interface cable
   - System board power cables
10. Install the expansion NIC card. See "Replacing an Expansion NIC Card" on page 60.

11 Replace the system battery. See "Replacing the System Battery" on page 79.

12 Reinstall the iDRAC6 Enterprise card. See "Replacing an Expansion NIC Card" on page 60.

13 Replace the cooling shroud. See "Installing the Cooling Shroud" on page 63.

14 Close the system. See "Closing the System" on page 53.

15 Reconnect the system to its electrical outlet and turn the system on, including any attached peripherals.

# 3

# 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 output, especially after installing an operating system or reconfiguring your system's hardware, check the memory configurations. Invalid memory configurations could cause the system to halt at startup without any video output. See "System Memory" on page 66.

For all other startup issues, note the system messages that appear onscreen. See "System Messages" on page 35 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 1-2 and Figure 1-5 for the front-panel and back-panel connectors on your system.

## Troubleshooting a NIC

1. Run the appropriate online diagnostic test. See "Running the System Diagnostics" on page 105.
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 18.

- 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.

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

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 113.

# 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 Open the system. See "Opening the System" on page 52.

2 Ensure that the following components are properly installed:

- Expansion card and expansion-card riser
- Power supply

- Fans
- Processor and heat sink
- Memory modules
- Hard-drive brackets
- Cooling shroud

3 Ensure that all cables are properly connected.

4 Close the system. See "Closing the System" on page 53.

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

6 Run the system board tests in the system diagnostics. See "Running the System Diagnostics" on page 105.

If the tests fail, see "Getting Help" on page 113.

# Troubleshooting the System Battery

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

1 Re-enter the time and date through the System Setup program.

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 79.

If the problem is not resolved by replacing the battery, see "Getting Help" on page 113.

**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.

# Troubleshooting Power Supply

**CAUTION: At least one power supply must be installed for the system to operate. Operating the system with only one power supply installed for extended periods of time can cause the system to overheat.**

1. Reseat the power supply by removing and reinstalling it. See "Power Supplies" on page 77.

   **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.

2. If the problem persists, replace the faulty power supply.
   If the problem is not resolved by replacing the power supply, see "Getting Help" on page 113.

# 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, power-supply blank, or back filler bracket is removed.
- Ambient temperature is too high.
- External airflow is obstructed.
- An individual cooling fan is removed or has failed. See "Troubleshooting a Fan" on page 97.

# 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. Locate the faulty fan indicated by the diagnostic software.
2. Turn off the system and all attached peripherals.
3. Open the system. See "Opening the System" on page 52.
4. Reseat the fan's power cable.
5. Reconnect the system to the electrical outlet, and turn on the system and attached peripherals.

   If the fan functions properly, close the system. See "Closing the System" on page 53.
6. If the fan does not function, turn off the system and install a new fan. See "Cooling Fans" on page 69.
7. Restart the system.

   If the problem is resolved, close the system. See "Closing the System" on page 53.

   If the replacement fan does not operate, see "Getting Help" on page 113.

# 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 67 and verify that your memory configuration complies with all applicable guidelines.

1. If the system is operational, run the appropriate online diagnostic test. See "Running the System Diagnostics" on page 105.

   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 12 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. 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 12.

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 52.
7. Check the memory channels and ensure that they are populated correctly. See "General Memory Module Installation Guidelines" on page 67.
8. Reseat the memory modules in their sockets. See "Replacing Memory Modules" on page 67.
9. Close the system. See "Closing the System" on page 53.
10. Reconnect the system to its electrical outlet, and turn on the system and attached peripherals.
11. Enter the System Setup program and check the system memory setting.

    If the problem is not resolved, proceed with the next step.

12. Turn off the system and attached peripherals, and disconnect the system from the power source.
13. Open the system. See "Opening the System" on page 52.
14. If a diagnostic test or error message indicates a specific memory module as faulty, swap or replace the module.

15 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 "Replacing Memory Modules" on page 67.

16 Close the system. See "Closing the System" on page 53.

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

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

19 If the memory problem is still indicated, repeat step 12 through step 18 for each memory module installed.

If the problem persists after all memory modules have been checked, see "Getting Help" on page 113.

## 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 CD or DVD.

2 Enter the System Setup program and ensure that the drive's controller is enabled.

3 Run the appropriate online diagnostic test. See "Running the System Diagnostics" on page 105.

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 52.

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 53.

If the problem is not resolved, see "Getting Help" on page 113.

# 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 "Running the System Diagnostics" on page 105.

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

2. If your system has a RAID controller card 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> for a PERC controller or <Ctrl><C> for a SAS controller.

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

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

   c. Take the hard drive offline and reseat the drive.

   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 drives appear in the System Setup program.

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

1. Run the appropriate online diagnostic test. See "Running the System Diagnostics" on page 105.
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 52.
4. Ensure that the expansion card is firmly seated in its connector. See "Replacing an Expansion NIC Card" on page 60.
5. Close the system. See "Closing the System" on page 53.
6. Reconnect the system to the electrical outlet, and turn on the system and attached peripherals.
7. If the problem is not resolved, turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
8. Open the system. See "Opening the System" on page 52.
9. Remove the expansion card. See "Replacing an Expansion NIC Card" on page 60.
10. Close the system. See "Closing the System" on page 53.
11. Reconnect the system to the electrical outlet, and turn on the system and attached peripherals.
12. Run the appropriate online diagnostic test.

    If the tests fail, see "Getting Help" on page 113.

# 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 "Embedded System Diagnostics Features" on page 105.
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 52.
4. Remove the cooling shroud. See "Removing the Cooling Shroud" on page 62.
5. Ensure that the processor and heat sink are properly installed. See "Processor" on page 73.
6. Close the system. See "Closing the System" on page 53.
7. Reconnect the system to the electrical outlet, and turn on the system and attached peripherals.
8. Run the appropriate online diagnostic test.

   If a problem is still indicated, see "Getting Help" on page 113.

# 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 52.

3 Remove the following components from the system. See "Installing System Components" on page 49.
   - Hard drives
   - USB memory key
   - NIC hardware key
   - VFlash media
   - Expansion card and expansion-card riser
   - iDRAC6 Enterprise card
   - Power supply
   - Fans
   - Processor and heat sink
   - Memory modules
   - System Battery
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 53.
7 Reconnect the system to the electrical outlet and turn on the system.

   If the system does not start properly, see "Getting Help" on page 113.
8 If the system starts properly, shut down the system and reinstall the expansion card that you removed. See "Replacing an Expansion NIC Card" on page 60.
9 Restart the system.
10 Run the appropriate online diagnostic test. See "Running the System Diagnostics" on page 105.

   If the tests fail, see "Getting Help" on page 113.

# 4

# 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.

## 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 processor and the system's input/output devices are functioning, you can use the embedded system diagnostics to help identify the problem.

# 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.

# 5

# Jumpers and Connectors

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

## System Board Jumpers

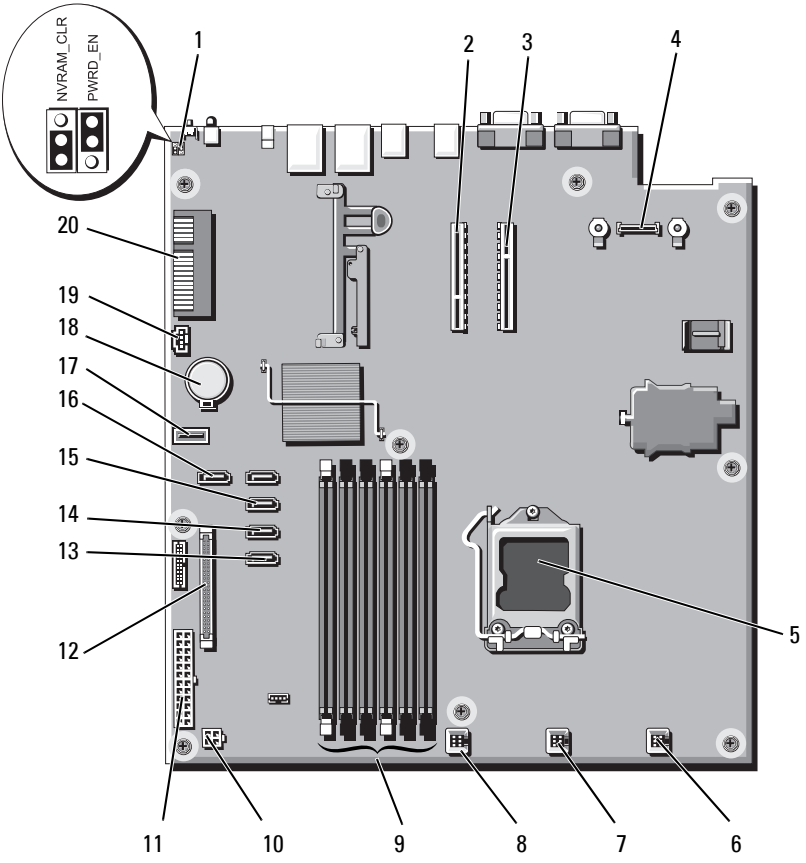
Figure 5-1 shows the location of the configuration jumpers on the system board. Table 5-1 lists the jumper settings.

**Table 5-1. System Board Jumper Settings**

| Jumper | Setting | | Description |
|---|---|---|---|
| PWRD_EN |  | (default) | The password feature is enabled (pins 2–4) |
| |  | | The password feature is disabled (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 5-1. System Board Connectors**



| Item | Connector | Description |
|---|---|---|
| 1 | PWRD_EN | Password enable jumper |
| | NVRAM_CLR | NVRAM clear jumper |
| 2 | RISER2 | Expansion-card riser connector |
| 3 | RISER1 | Expansion-card riser connector |
| 4 | iDRAC6 Enterprise | iDRAC6 Enterprise card connector |
| 5 | CPU | Processor socket |
| 6 | FAN1 | System fan 1 connector |
| 7 | FAN2 | System fan 2 connector |
| 8 | FAN3 | System fan 3 connector |
| 9 | 5 | Memory module slot 5 |
| | 3 | Memory module slot 3 |
| | 1 | Memory module slot 1 (white release lever) |
| | 6 | Memory module slot 6 |
| | 4 | Memory module slot 4 |
| | 2 | Memory module slot 2 (white release lever) |
| 10 | 12 V | 4-pin power connector |
| 11 | PWR_CONN | 24-pin power connector |
| 12 | CTRL_PNL | Control panel connector |
| 13 | SATA_A | SATA connector A |
| 14 | SATA_B | SATA connector B |
| 15 | SATA_C | SATA connector C |
| 16 | SATA_D | SATA connector D |
| 17 | USB_CONN | Internal USB connector |
| 18 | BATTERY | Battery socket |
| 19 | HD_ACT_CARD | Expansion-card cable connector |
| 20 | PCIE-G2-X4 | Internal storage controller card connector |

# Disabling a Forgotten Password

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

**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 the System" on page 52.
3. Remove the jumper plug from the password jumper.

   See Figure 5-1 to locate the password jumper (labeled "PWRD_EN") on the system board.
4. Close the system. See "Closing the System" on page 53.
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 the System" on page 52.
8. Install the jumper plug on the password jumper.
9. Close the system. See "Closing the System" on page 53.
10. Reconnect your system and peripherals to their electrical outlets, and turn on the system.
11. Assign a new system and/or setup password.

# 6

# 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 top 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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