Dell™ Dimension™ 8400 Service Manual

Before You Begin
Opening the Computer Cover
Technical Overview
Specifications
Advanced Troubleshooting
System Setup
Removing and Installing Parts
Closing the Computer Cover

Notes, Notices, and Cautions

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

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

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

Abbreviations and Acronyms

For a complete list of abbreviations and acronyms, see the Dell Dimension Owner’s Manual.

If you purchased a Dell™ n Series computer, any references in this document to Microsoft® Windows® operating systems are not applicable.

NOTE: Some features or services may not be available for your computer or in certain countries.

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Model DHM
November 2004   Rev. A00
Power Lights

⚠️ CAUTION: Before you begin any of the procedures in this section, follow the safety instructions in the Product Information Guide.

The power button light located on the front of the computer illuminates and blinks or remains solid to indicate different states:

- If the power light is green and the computer is not responding, see "Diagnostic Lights."
- If the power light is blinking green, the computer is in standby mode. Press a key on the keyboard, move the mouse, or press the power button to resume normal operation.
- If the power light is off, the computer is either turned off or is not receiving power.
  - Reseat the power cable into both the power connector on the back of the computer and the electrical outlet.
  - If the computer is plugged into a power strip, ensure that the power strip is plugged into an electrical outlet and that the power strip is turned on. Also bypass power protection devices, power strips, and power extension cables to verify that the computer turns on properly.
  - Ensure that the electrical outlet is working by testing it with another device, such as a lamp.
  - Ensure that the main power cable and front panel cable are securely connected to the system board.
- If the power light is blinking, the computer is receiving electrical power, but an internal power problem might exist.
  - Ensure that the voltage selection switch is set to match the AC power at your location (if applicable).
  - Ensure that the processor power cable is securely connected to the system board.
- If the power light is steady amber, a device might be malfunctioning or incorrectly installed.
  - Remove and then reinstall the memory modules.
  - Remove and then reinstall any cards.
  - Remove and then reinstall the graphics card, if applicable.
- Eliminate interference. Some possible causes of interference are:
  - Power, keyboard, and mouse extension cables
  - Too many devices on a power strip
  - Multiple power strips connected to the same electrical outlet

Diagnostic Lights

⚠️ CAUTION: Before you begin any of the procedures in this section, follow the safety instructions located in the Product Information Guide.

To help you troubleshoot a problem, your computer has four lights labeled "A," "B," "C," and "D" on the back panel. The lights can be yellow or green. When the computer starts normally, the lights flash. After the computer starts, all four lights display solid green. If the computer malfunctions, the color and sequence of the lights identify the problem.

<table>
<thead>
<tr>
<th>Light Pattern</th>
<th>Problem Description</th>
<th>Suggested Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>A B C D</td>
<td>The computer is in a normal off condition or a possible pre-BIOS failure has occurred.</td>
<td>Plug the computer into a working electrical outlet and press the power button.</td>
</tr>
<tr>
<td>A B C D</td>
<td>A possible processor failure has occurred.</td>
<td>Contact Dell.</td>
</tr>
</tbody>
</table>
Beep Codes

Your computer might emit a series of beeps during start-up if the monitor cannot display errors or problems. This series of beeps, called a beep code, identifies a problem. One possible beep code (code 1-3-1) consists of one beep, a burst of three beeps, and then one beep. This beep code tells you that the computer encountered a memory problem.

Reseating the memory modules may fix the beep code errors in the following table. If the problem persists, see "Contacting Dell" in your Owner's Manual for instructions on obtaining technical assistance.

<table>
<thead>
<tr>
<th>Code</th>
<th>Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3-1</td>
<td>Memory modules are detected, but a memory failure has occurred.</td>
</tr>
<tr>
<td>2-4-4</td>
<td>Memory not being properly identified or used</td>
</tr>
<tr>
<td>4-3-1</td>
<td>Memory failure above address 0FFFFh</td>
</tr>
</tbody>
</table>

If you hear one of the following beep codes, see "Contacting Dell" in your Owner's Manual for instructions on obtaining technical assistance.
<table>
<thead>
<tr>
<th>Code</th>
<th>Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1-2</td>
<td>Microprocessor register failure</td>
</tr>
<tr>
<td>1-1-3</td>
<td>NVRAM</td>
</tr>
<tr>
<td>1-1-4</td>
<td>ROM BIOS checksum failure</td>
</tr>
<tr>
<td>1-2-1</td>
<td>Programmable interval timer</td>
</tr>
<tr>
<td>1-2-2</td>
<td>DMA initialization failure</td>
</tr>
<tr>
<td>1-2-3</td>
<td>DMA page register read/write failure</td>
</tr>
<tr>
<td>3-1-1</td>
<td>Slave DMA register failure</td>
</tr>
<tr>
<td>3-1-2</td>
<td>Master DMA register failure</td>
</tr>
<tr>
<td>3-1-3</td>
<td>Master interrupt mask register failure</td>
</tr>
<tr>
<td>3-1-4</td>
<td>Slave interrupt mask register failure</td>
</tr>
<tr>
<td>3-2-1</td>
<td>Interrupt vector loading failure</td>
</tr>
<tr>
<td>3-2-4</td>
<td>Keyboard Controller Test failure</td>
</tr>
<tr>
<td>3-3-1</td>
<td>NVRAM power loss</td>
</tr>
<tr>
<td>3-3-2</td>
<td>NVRAM configuration</td>
</tr>
<tr>
<td>3-3-4</td>
<td>Video Memory Test failure</td>
</tr>
<tr>
<td>3-4-1</td>
<td>Screen initialization failure</td>
</tr>
<tr>
<td>3-4-2</td>
<td>Screen retrace failure</td>
</tr>
<tr>
<td>3-4-3</td>
<td>Search for video ROM failure</td>
</tr>
<tr>
<td>4-2-1</td>
<td>No time tick</td>
</tr>
<tr>
<td>4-2-2</td>
<td>Shutdown failure</td>
</tr>
<tr>
<td>4-2-3</td>
<td>Gate A20 failure</td>
</tr>
<tr>
<td>4-2-4</td>
<td>Unexpected interrupt in protected mode</td>
</tr>
<tr>
<td>4-3-1</td>
<td>Timer-chip counter 2 failure</td>
</tr>
<tr>
<td>4-3-2</td>
<td>Time-of-day clock stopped</td>
</tr>
<tr>
<td>4-4-1</td>
<td>Serial or parallel port test failure</td>
</tr>
<tr>
<td>4-4-2</td>
<td>Cache test failure</td>
</tr>
</tbody>
</table>

### System Messages

**NOTE:** If the message you received is not listed in the table, see the documentation for either the operating system or the program that was running when the message appeared.

<table>
<thead>
<tr>
<th>Message</th>
<th>Possible Cause</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>8042 Gate-A20 error</td>
<td>The keyboard controller failed its test.</td>
<td>If you receive this message after you make changes in the system setup program, enter the system setup program and restore the original value (s).</td>
</tr>
<tr>
<td>Address Line Short!</td>
<td>An error in the address decoding circuitry in the memory has occurred.</td>
<td>Reset the memory modules.</td>
</tr>
<tr>
<td>Ci Drive Error</td>
<td>The hard drive is not working or is not configured correctly.</td>
<td>Ensure that the drive is installed correctly in the computer and defined correctly in the system setup program.</td>
</tr>
<tr>
<td>Ci Drive Failure</td>
<td>The cache memory is not operating.</td>
<td>See “Contacting Dell” in your Owner’s Manual for instructions on obtaining technical assistance.</td>
</tr>
<tr>
<td>Cache Memory Bad, Do Not Enable Cache</td>
<td>An error is occurring on the timer on the system board.</td>
<td>See “Contacting Dell” in your Owner’s Manual for instructions on obtaining technical assistance.</td>
</tr>
<tr>
<td>CMOS Battery State Low</td>
<td>The system configuration information in the system setup program is incorrect or the battery charge may be low.</td>
<td>Enter the system setup program, verify the system configuration, and then restart the computer.</td>
</tr>
<tr>
<td>Issue</td>
<td>Description</td>
<td>Resolution</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>CMOS Time and Date Not Set</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diskette Boot Failure</td>
<td>Drive A or B is present but has failed the BIOS POST.</td>
<td>Ensure that the drive is installed correctly in the computer and defined correctly in the system setup program. Check the interface cable at both ends.</td>
</tr>
<tr>
<td>DMA Error</td>
<td>Error in the DMA controller on the system board.</td>
<td>The keyboard or system board may need to be replaced.</td>
</tr>
<tr>
<td>DMA 1 Error</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DMA 2 Error</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FDD Controller Failure</td>
<td>The BIOS cannot communicate with the floppy drive or hard drive controller.</td>
<td>Ensure that the floppy drive or the hard drive is installed correctly in the computer and defined correctly in the system setup program. Check the interface cable at both ends.</td>
</tr>
<tr>
<td>HDD Controller Failure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTR1 Error</td>
<td>An interrupt channel on the system board failed to POST.</td>
<td>The keyboard or system board may need to be replaced.</td>
</tr>
<tr>
<td>INTR2 Error</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Invalid Boot Diskette</td>
<td>The operating system cannot be located on drive A or drive C.</td>
<td>Enter the system setup program and confirm that drive A or drive C is properly identified.</td>
</tr>
<tr>
<td>Keyboard Error</td>
<td>The BIOS has detected a stuck key.</td>
<td>Ensure that nothing is resting on the keyboard; if a key appears to be stuck, carefully pry it up. If the problem persists, you may need to replace the keyboard.</td>
</tr>
<tr>
<td>KB/Interface Error</td>
<td>An error occurred with the keyboard connector.</td>
<td>Ensure that nothing is resting on the keyboard; if a key appears to be stuck, carefully pry it up. If the problem persists, you may need to replace the keyboard.</td>
</tr>
<tr>
<td>No ROM Basic</td>
<td>The operating system cannot be located on drive A or drive C.</td>
<td>Enter the system setup program and confirm that drive A or drive C is properly identified.</td>
</tr>
</tbody>
</table>
Getting Started

This section provides procedures for removing and installing the components in your computer. Unless otherwise noted, each procedure assumes that the following conditions exist:

- You have performed the steps in "Turning Off Your Computer" and "Before Working Inside Your Computer."
- You have read the safety information in your Dell™ Product Information Guide.
- A component can be replaced by performing the removal procedure in reverse order.

Recommended Tools

The procedures in this document may require the following tools:

- Small flat-blade screwdriver
- Phillips screwdriver
- Flash BIOS update program floppy or CD

Turning Off Your Computer

To avoid losing data, save and close any open files and exit any open programs before you turn off your computer.

1. Shut down the operating system:
   a. Save and close any open files, exit any open programs, click the Start button, and then click Turn Off Computer.
   b. In the Turn off computer window, click Turn off.
      The computer turns off after the operating system shutdown process finishes.

2. Ensure that the computer and any attached devices are turned off. If your computer and attached devices did not automatically turn off when you shut down your operating system, press and hold the power button for 4 seconds.

Before Working Inside Your Computer

Use the following safety guidelines to help protect your computer from potential damage and to help ensure your own personal safety.

WARNING: Before you begin any of the procedures in this section, follow the safety instructions located in the Product Information Guide.

WARNING: Handle components and cards with care. Do not touch the components or contacts on a card. Hold a card by its edges or by its metal mounting bracket. Hold a component such as a processor by its edges, not by its pins.

NOTICE: Only a certified service technician should perform repairs on your computer. Damage due to servicing that is not authorized by Dell is not covered by your warranty.

NOTICE: When you disconnect a cable, pull on its connector or on its strain-relief loop, not on the cable itself. Some cables have a connector with locking tabs; if you are disconnecting this type of cable, press in on the locking tabs before you disconnect the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before you connect a cable, ensure that both connectors are correctly oriented and aligned.

NOTICE: To avoid damaging the computer, perform the following steps before you begin working inside the computer.

1. Turn off your computer.
2. Disconnect any telephone or telecommunication lines from the computer.

3. Disconnect your computer and all attached devices from their electrical outlets, and then press the power button to ground the system board.

4. Open the computer cover.

**NOTICE:** To disconnect a network cable, first unplug the cable from your computer and then unplug it from the network device.

**CAUTION:** To guard against electrical shock, always unplug your computer from the electrical outlet before opening the cover.

**NOTICE:** Before touching anything inside your computer, ground yourself by touching an unpainted metal surface, such as the metal at the back of the computer. While you work, periodically touch an unpainted metal surface to dissipate any static electricity that could harm internal components.
**Opening the Computer Cover**

*Dell™ Dimension™ 8400 Service Manual*

⚠️ **CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions located in the *Product Information Guide*.

⚠️ **CAUTION:** To guard against electrical shock, always unplug your computer from the electrical outlet before opening the cover.

1. Follow the procedures in "Before You Begin."

⚠️ **NOTICE:** Ensure that sufficient space exists to support the open cover—at least 30 cm (1 ft) of desk top space.

2. Lay the computer on its side so that the arrow on the bottom of the computer points up.

3. Open the cover:
   a. Facing the back of the computer, press the release button on the right side of the computer with one hand while pulling up on the top of the cover with the other hand.
   b. Press the release button on the left side of the computer with one hand while pulling up on the top of the cover with the other hand.
   c. Hold the bottom of the computer with one hand, and then pull open the cover with the other hand.
CAUTION: Before you begin any of the procedures in this section, follow the safety instructions located in the Product Information Guide.

1. Ensure that all cables are connected, and fold cables out of the way.
   Gently pull the power cables toward you so that they do not get caught underneath the drives.

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

3. Close the cover:
   a. Pivot the cover down.
   b. Press down on the right side of the cover until it closes.
   c. Press down on the left side of the cover until it closes.
   d. Ensure that both sides of the cover are locked. If not, repeat all of step 3.

NOTICE: To connect a network cable, first plug the cable into the network device and then plug it into the computer.

4. Connect your computer and devices to electrical outlets, and turn them on.
**Memory**

You can increase your computer memory by installing memory modules on the system board.

Your computer supports DDR2 memory. For additional information on the type of memory supported by your computer, see "Memory".

**DDR2 Memory Overview**

DDR2 memory modules should be installed in pairs of matched memory size, speed, and technology. If the DDR2 memory modules are not installed in matched pairs, the computer will continue to operate, but with a slight reduction in performance. See the label on the upper-right corner of the module to determine the module's capacity.

![DDR2 Memory Module](image)

**NOTE:** Always install DDR2 memory modules in the order indicated on the system board.

The recommended memory configurations are:

- A pair of matched memory modules installed in DIMM connectors 1 and 2

  or

- A pair of matched memory modules installed in DIMM connectors 1 and 2 and another matched pair installed in DIMM connectors 3 and 4

**NOTICE:** Do not install ECC memory modules.

- If you install mixed pairs of DDR2 400-MHz (PC2-3200) and DDR2 533-MHz (PC2-4200) memory, the modules function at the slowest speed installed. Similarly, if you install memory modules with mixed CAS Latency (CL) rates, the modules function at the speed and CAS latency capabilities of the slowest DIMM.
- Be sure to install a single memory module in DIMM connector 1, the connector closest to the processor, before you install modules in the other connectors.
Addressing Memory With 4-GB Configurations

Your computer supports a maximum of 4 GB of memory when you use four 1-GB DIMMs. Current operating systems, such as Microsoft® Windows® XP, can only use a maximum of 4 GB of address space; however, the amount of memory available to the operating system is less than 4 GB. Certain components within the computer require address space in the 4-GB range. Any address space reserved for these components cannot be used by computer memory.

Installing Memory

CAUTION: Before you begin any of the procedures in this section, follow the safety instructions located in the Product Information Guide.

NOTICE: To prevent static damage to components inside your computer, discharge static electricity from your body before you touch any of your computer’s electronic components. You can do so by touching an unpainted metal surface on the computer chassis.

1. Follow the procedures in "Before You Begin."

2. Lay the computer on its side so that the system board is on the bottom of the inside of the computer.

3. Press out the securing clip at each end of the memory module connector.

4. Align the notch on the bottom of the module with the crossbar in the connector.
5. Insert the module into the connector until the module snaps into position.
   If you insert the module correctly, the securing clips snap into the cutouts at each end of the module.

6. Close the computer cover.

7. Connect your computer and devices to electrical outlets, and turn them on.

8. Right-click the My Computer icon and click Properties.

9. Click the General tab.

10. To verify that the memory is installed correctly, check the amount of memory (RAM) listed.

**Removing Memory**

**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions located in the Product Information Guide.

**NOTICE:** To avoid damage to the memory module, press the module straight down into the connector while you apply equal force to each end of the module.

1. Follow the procedures in "Before You Begin."

2. Press out the securing clip at each end of the memory module connector.

3. Grasp the module and pull up.
   If the module is difficult to remove, gently ease the module back and forth to remove it from the connector.

**Cards**

**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions located in the Product Information Guide.

**NOTICE:** To prevent static damage to components inside your computer, discharge static electricity from your body before you touch any of your computer’s electronic components. You can do so by touching an unpainted metal surface on the computer chassis.

Your Dell™ computer provides the following slots for PCI and PCI Express cards:

- Three PCI card slots
- One PCI Express x16 card slot
- One PCI Express x1 card slot

**PCI Cards**
If you are installing or replacing a card, follow the procedures in the next section. If you are removing but not replacing a PCI card, see "Removing a PCI Card."

If you are replacing a card, remove the current driver for the card from the operating system.

If you are installing or replacing a PCI Express card, see "Installing a PCI Express Card."

**Installing a PCI Card**

1. Follow the procedures in "Before You Begin."
2. Press the lever on the card retention arm and raise the retention arm.
3. If you are installing a new card, remove the filler bracket to create a card-slot opening. Then continue with step 5.
4. If you are replacing a card that is already installed in the computer, remove the card.
   
   If necessary, disconnect any cables connected to the card. Grasp the card by its top corners, and ease it out of its connector.
5. Prepare the card for installation.
   
   See the documentation that came with the card for information on configuring the card, making internal connections, or otherwise customizing it for your computer.

   **CAUTION:** Some network adapters automatically start the computer when they are connected to a network. To guard against electrical shock, be sure to unplug your computer from its electrical outlet before installing any cards.

6. Place the card in the connector and press down firmly. Ensure that the card is fully seated in the slot.
7. Before you lower the retention arm, ensure that:
   - The tops of all cards and filler brackets are flush with the alignment bar.
   - The notch in the top of the card or filler bracket fits around the alignment guide.

8. Press the retention arm into place, securing the card(s) in the computer.

9. Connect any cables that should be attached to the card.

   See the documentation for the card for information about the card's cable connections.

10. If you installed a sound card:
    a. Enter system setup, select Audio Controller, and then change the setting to Off.
    b. Connect external audio devices to the sound card's connectors. Do not connect external audio devices to the microphone, speaker/ headphone, or line-in connectors on the back panel.

11. If you installed an add-in network adapter and want to disable the integrated network adapter:
    a. Enter system setup, select Network Controller, and then change the setting to Off.
    b. Connect the network cable to the add-in network adapter's connectors. Do not connect the network cable to the integrated connector on the back panel.

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

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

   NOTICE: To connect a network cable, first plug the cable into the network device and then plug it into the computer.
Removing a PCI Card

1. Follow the procedures in "Before You Begin."

2. Press the lever on the card retention arm and raise the retention arm.

3. If necessary, disconnect any cables connected to the card.

4. Grasp the card by its top corners, and ease it out of its connector.

5. If you are removing the card permanently, install a filler bracket in the empty card-slot opening.
   If you need a filler bracket, contact Dell.

   **NOTE:** Installing filler brackets over empty card-slot openings is necessary to maintain FCC certification of the computer. The brackets also keep dust and dirt out of your computer.

6. Lower the retention arm and press it into place, securing the card(s) in the computer.

   **NOTICE:** To connect a network cable, first plug the cable into the network device and then plug it into the computer.

7. Close the computer cover, reconnect the computer and devices to electrical outlets, and then turn them on.

8. Remove the card’s driver from the operating system.

9. If you removed a sound card:
   a. Enter system setup, select Audio Controller, and then change the setting to On.
   b. Connect external audio devices to the audio connectors on the back panel of the computer.

10. If you removed an add-in network connector:
    a. Enter system setup, select Network Controller, and then change the setting to On.
    b. Connect the network cable to the integrated connector on the back panel of the computer.

**PCI Express Cards**

Your computer supports one PCI Express x16 card and one PCI Express x1 card.

**NOTICE:** PCI Express graphics cards that run higher than 75 W may require an additional cooling fan. Otherwise, your card could overheat and damage your computer.

If a card fan is not present in your computer and you are installing a graphics card that runs at 75 W or higher, contact Dell to find out how to purchase a card fan.

If you are installing or replacing a PCI Express card, follow the procedures in the next section. If you are removing but not replacing a card, see "Removing a PCI Express Card."

If you are replacing a card, remove the current driver for the card from the operating system.

If you are installing or replacing a PCI card, see "Installing a PCI Card."

**Installing a PCI Express Card**

1. Follow the procedures in "Before You Begin."
2. Press the lever on the card retention arm and raise the retention arm.

3. If you are installing a new card, remove the filler bracket to create a card-slot opening. Then continue with step 5.

4. If you are replacing a card that is already installed in the computer, remove the card. If necessary, disconnect any cables connected to the card. If your card includes a retention mechanism, remove the top of the retention mechanism by pressing the tab and pulling up on the top. Gently pull the securing tab, grasp the card by its top corners, and then ease it out of its connector.

5. Prepare the card for installation.

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

   **CAUTION:** Some network adapters automatically start the computer when they are connected to a network. To guard against electrical shock, be sure to unplug your computer from its electrical outlet before installing any cards.

6. If you are installing the card into the x16 card connector, position the card so the securing slot is aligned with the securing tab, and gently pull the securing tab.

7. Place the card in the connector and press down firmly. Ensure that the card is fully seated in the slot.
8. If you replaced a card that was already installed in the computer and you removed the top of the retention mechanism, you may reinstall the top.

9. Before you lower the retention arm, ensure that:
   - The tops of all cards and filler brackets are flush with the alignment bar.
   - The notch in the top of the card or filler bracket fits around the alignment guide.

10. Press the retention arm into place, securing the card(s) in the computer.

11. If a card fan is not present in your computer and you are installing a graphics card that runs higher than 75 W, contact Dell to find out how to purchase a card fan.

12. If you installed a PCI Express graphics card that runs at 75 W or higher, install the card fan. Contact Dell to find out how to purchase a card fan.

13. Connect any cables that should be attached to the card.
   - See the documentation that came with the card for information about the card’s cable connections.

14. If you installed a sound card:
   a. Enter system setup, select Audio Controller, and then change the setting to Off.
   b. Connect external audio devices to the sound card’s connectors. Do not connect external audio devices to the microphone, speaker/headphone, or line-in connectors on the back panel.

15. If you installed an add-in network adapter and want to disable the integrated network adapter:
   a. Enter system setup, select Network Controller, and then change the setting to Off.
b. Connect the network cable to the add-in network adapter’s connectors. Do not connect the network cable to the integrated connector on the back panel.

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

Removing a PCI Express Card

1. Follow the procedures in "Before You Begin."

2. Press the lever on the card retention arm and raise the retention arm.

3. If necessary, disconnect any cables connected to the card.

4. If your card includes a retention mechanism, remove the top of the retention mechanism by pressing the tab and pulling up on the top.

5. Gently pull back the securing tab, grasp the card by its top corners, and then ease it out of its connector.

6. If you are removing the card permanently, install a filler bracket in the empty card-slot opening.
   If you need a filler bracket, contact Dell.

   **NOTE:** Installing filler brackets over empty card-slot openings is necessary to maintain FCC certification of the computer. The brackets also keep dust and dirt out of your computer.

7. Lower the retention arm and press it into place, securing the card(s) in the computer.

   **NOTICE:** To connect a network cable, first plug the cable into the network device and then plug it into the computer.

8. Close the computer cover, reconnect the computer and devices to electrical outlets, and then turn them on.

9. Remove the card’s driver from the operating system.

10. If you removed a sound card:
   a. Enter system setup, select Audio Controller, and then change the setting to On.
   b. Connect external audio devices to the audio connectors on the back panel of the computer.

11. If you removed an add-in network connector:
   a. Enter system setup, select Network Controller, and then change the setting to On.
   b. Connect the network cable to the integrated connector on the back panel of the computer.

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

---

**Drives**

Your computer supports a combination of these devices:

- Up to two hard drives
- One optional floppy drive
- Up to two CD or DVD drives

---

**General Installation Guidelines**

Connect serial ATA hard drives and serial CD/DVD drives to the system board connectors labeled SATA-0, SATA-1, SATA-2, or SATA-3. Connect IDE CD/DVD drives to the connector labeled PRI IDE.

When you connect two IDE devices to a single IDE interface cable and configure them for the cable select setting, the device attached to the last connector on the interface cable is the primary or the boot device (drive 0), and the device attached to the middle connector on the interface cable is the secondary device (drive 1). See the drive documentation in your upgrade kit for information on configuring devices for the cable select setting.

**Connecting Drive Cables**
When you install a drive, you connect two cables—a DC power cable and a data cable—to the back of the drive and to the system board. Some drives may also have an audio connector; one end of the audio cable attaches to the drive connector and the other end attaches to the system board.

**Drive Interface Connectors**

**Serial ATA Connector**

Most interface connectors are keyed for correct insertion; that is, a notch or a missing pin on one connector matches a tab or a filled-in hole on the other connector.

When you connect an IDE cable, ensure that you align the colored stripe with the pin 1 connector. When you disconnect an IDE cable, grasp the colored pull tab and pull until the connector detaches.

When you connect and disconnect a serial ATA cable, hold the cable by the connector at each end.

**NOTE:** The system board serial ATA connector may have an attached cover or shroud.

**Power Cable Connector**

Hard Drive

**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions located in the Product Information Guide.

**CAUTION:** To guard against electrical shock, always unplug your computer from the electrical outlet before opening the cover.

**NOTICE:** To avoid damage to the drive, do not set it on a hard surface. Instead, set the drive on a surface, such as a foam pad, that will sufficiently cushion it.

1. If you are replacing a hard drive that contains data you want to keep, back up your files before you begin to remove the hard drive.

2. Follow the procedures in "Before You Begin."

**Removing a Hard Drive**

1. Disconnect the power and data cable from the drive and from the system board.
2. Press in on the tabs on each side of the drive and slide the drive up and out.

Installing a Hard Drive

1. Unpack the replacement hard drive, and prepare it for installation.

2. Check the documentation for the drive to verify that it is configured for your computer.

3. If your replacement hard drive does not have the bracket rails attached, remove the rails from the old drive by removing the two screws that secure each rail to the drive. Attach the bracket rails to the new drive by aligning the screw holes on the drive with the screw holes on the bracket rails and then inserting and tightening all four screws (two screws on each rail).

4. Install the hard drive into the computer by gently sliding the drive into place until you hear it securely click.

5. Connect the power and data cable to the drive and to the system board.
6. Check all connectors to be certain that they are properly cabled and firmly seated.

7. Close the computer cover.

**NOTICE:** To connect a network cable, first plug the cable into the network device and then plug it into the computer.

8. Connect your computer and devices to electrical outlets, and turn them on.

   See the documentation that came with the drive for instructions on installing any software required for drive operation.

9. If the drive you just installed is the primary drive, insert a bootable floppy disk into drive A.

10. Turn on the computer.

11. **Enter system setup**, and update the appropriate **Drive** option.

12. Exit system setup, and restart the computer.

13. Partition and logically format your drive before you proceed to the next step.

   See the documentation for your operating system for instructions.

14. Test the hard drive by running the Dell Diagnostics.

15. If the drive you just installed is the primary drive, install your operating system on the hard drive.

### Adding a Second Hard Drive

**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions located in the *Product Information Guide*.

**CAUTION:** To guard against electrical shock, always unplug your computer from the electrical outlet before opening the cover.

**NOTICE:** To avoid damage to the drive, do not set it on a hard surface. Instead, set the drive on a surface, such as a foam pad, that will sufficiently cushion it.

1. Check the documentation for the drive to verify that it is configured for your computer.

2. Follow the procedures in "Before You Begin."

3. Remove the two plastic rails from the inside of the hard-drive bay by gently pulling the rails up and out of the bay.

4. Attach the rails to the hard drive using the two screws attached to the rails.

   Ensure that the rail tabs are positioned at the back of the hard drive.

**NOTICE:** Do not install any drive into the lower hard-drive bay until you have removed the green drive rails from the inside of the hard-drive bay.

5. Remove the first hard drive from the upper bay and install it in the lower bay:
a. Disconnect the power and the data cable from the back of the first hard drive.

b. Press in the two rail tabs and pull the first hard drive out of the upper bay.

c. Gently slide the first hard drive into the lower bay until you hear a click.

d. Reconnect the power and data cable to the back of the first hard drive.

6. Gently slide the new hard drive into the upper bay until you hear a click.

7. Connect a power cable to the drive.

8. Connect the data cable to the drive and to the system board.

9. Close the computer cover.

   **NOTICE:** To connect a network cable, first plug the cable into the network device and then plug it into the computer.

10. Connect your computer and devices to their electrical outlets, and turn them on.

    See the documentation that came with the drive for instructions on installing any software required for drive operation.

---

**Front-Panel Inserts**

If you are installing a new floppy or CD/DVD drive instead of replacing a drive, remove the front-panel inserts.

1. Open the cover to a 90-degree angle.

2. Locate the insert that is in front of the drive bay that you want to use.

3. From inside the computer, press in the release tab of the insert.
4. From the outside of the computer, pull the insert away from the computer's front panel.

5. Remove the insert from the insert frame by pressing on the four tabs.

6. Reattach the empty insert frame over the front of the drive bay.
   The insert frame fits only one way.
   a. Face the front of the computer and slip the left side of the insert in to the left side of the drive bay opening.
   b. Slightly press the right-side insert release tab and gently push in the insert.

If you are adding a floppy drive and you purchased the drive from Dell, you received a front panel insert in your floppy drive kit. Attach this insert over the front of the drive bay.

If you are adding a floppy drive that was not purchased from Dell, reattach the empty insert frame over the front of the drive bay.

---

**Floppy Drive**

⚠️ **CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions located in the *Product Information Guide*.

⚠️ **CAUTION:** To guard against electrical shock, always unplug your computer from the electrical outlet before opening the cover.

Follow the procedures in "Before You Begin."

⚠️ **NOTE:** If you are adding a floppy drive, see "Installing a Floppy Drive."

### Removing a Floppy Drive

1. Disconnect the power and data cables from the back of the floppy drive.

2. Disconnect the other end of the data cable from the system board.
3. Press inward on the two tabs on the sides of the drive, slide the drive upward, and then remove it from the floppy-drive bay.

Installing a Floppy Drive

1. If you are replacing a drive and the new drive does not have the bracket rails attached, remove the rails from the old drive by removing the two screws that secure each rail to the drive. Attach the bracket to the new drive by aligning the screw holes on the drive with the screw holes on the bracket rails and then inserting and tightening all four screws (two screws on each rail).

2. Gently slide the drive into place until the tabs securely click into position.

3. Attach the power and data cables to the floppy drive.

4. Connect the other end of the data cable to the connector labeled FLOPPY on the system board.

5. If you are installing a new floppy drive rather than replacing a drive, remove the front-panel inserts.

6. Check all cable connections, and fold cables out of the way to provide airflow for the fan and cooling vents.

7. Close the computer cover.
8. Connect your computer and devices to their electrical outlets, and turn them on. See the documentation that came with the drive for instructions on installing any software required for drive operation.

9. Enter system setup and select the appropriate Diskette Drive option.

10. Verify that your computer works correctly by running the Dell Diagnostics.

---

**CD/DVD Drive**

⚠️ **CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions located in the *Product Information Guide.*

⚠️ **CAUTION:** To guard against electrical shock, always unplug your computer from the electrical outlet before opening the cover.

**Removing a CD/DVD Drive**

1. Follow the procedures in "Before You Begin."

2. Disconnect the power and data cables from the back of the drive.

3. Press inward on the two tabs on the sides of the drive, and then slide the drive upward and remove it from the drive bay.
Installing a CD/DVD Drive

1. If you are installing a new drive, unpack the drive and prepare it for installation.

   Check the documentation that accompanied the drive to verify that the drive is configured for your computer. If you are installing an IDE drive, configure the drive for the cable select setting.

2. Connect the new drive to the set of rails that are attached to the inside of the cover. If a set of rails is not attached inside the cover, contact Dell.

3. If you are installing a replacement drive and the new drive does not have the bracket rails attached, remove the rails from the old drive by removing the two screws that secure each rail to the drive. Attach the bracket to the new drive by aligning the screw holes on the drive with the screw holes on the bracket rails and then inserting and tightening all four screws (two screws on each rail).

4. Gently slide the drive into place until the tabs securely click into position.

5. Connect the power and data cables to the drive.

6. If you are installing a new CD/DVD drive rather than replacing a drive, remove the front-panel inserts.

7. Check all cable connections, and fold cables out of the way to provide airflow for the fan and cooling vents.

8. Close the computer cover.

   **NOTICE:** To connect a network cable, first plug the cable into the network device and then plug it into the computer.

9. Connect your computer and devices to their electrical outlets, and turn them on.

   See the documentation that came with the drive for instructions on installing any software required for drive operation.

10. Enter system setup and select the appropriate Drive option.

11. Verify that your computer works correctly by running the Dell Diagnostics.
Airflow Shroud

Removing the Airflow Shroud

⚠️ **CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions in the *Product Information Guide*.

1. Follow the procedures in "Before You Begin."
2. Disconnect the cooling fan power cable from the fan connector on the system board.
3. Disconnect the power cable from the power connector on the system board.
4. Lift up the airflow shroud.

---

Processor

⚠️ **CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions in the *Product Information Guide*.

**NOTICE:**

1. Follow the procedures in "Before You Begin."

⚠️ **CAUTION:** The heat sink can get very hot during normal operation. Be sure that the heat sink has had sufficient time to cool before you touch it.

2. Remove the heat sink:
   a. Remove the retention module clips. Press the tabs toward the center of the clip and lift up.
b. On the retention base locate the tab opposite the power supply. Press on the retention base tab until the heat sink pops up slightly.

c. Press out on the second retention tab while lifting the heat sink up and out of the retention base.

**NOTICE:** Lay the heat sink down on its side. Do not touch or remove the thermal grease on the bottom of the heat sink.

3. Push down and out on the socket release lever.

4. Open the processor cover.

**NOTICE:** If you are installing a processor upgrade kit from Dell, discard the original heat sink. If you are not installing a processor upgrade kit from Dell, reuse the original heat sink and blower when you install your new processor.
5. To remove the processor from the socket, lift the processor vertically in one motion. Leave the release lever extended in the release position so that the socket is ready for the new processor.

Installing the Processor

**NOTICE:** Ground yourself by touching an unpainted metal surface on the back of the computer.

1. Unpack the new processor.

**NOTICE:** You must position the processor correctly in the socket to avoid permanent damage to the processor and the computer when you turn on the computer.

2. If the release lever on the socket is not fully extended, move it to that position.

3. Align the pin-1 corners of the processor and socket.

**NOTICE:** To avoid damage, ensure that the processor aligns properly with the socket, and do not use excessive force when you install the processor.

**NOTICE:** Be careful not to touch or bend the pins on the system board.

4. Set the processor lightly in the socket and ensure that the processor is level in the socket. When the processor is positioned correctly, press it with minimal pressure to seat it.

5. When the processor is fully seated in the socket, close the processor cover.

Ensure that the tab on the processor cover is positioned underneath the center cover latch on the socket.
6. Pivot the socket release lever back toward the socket and snap it into place to secure the processor.

- **NOTICE:** If you are not installing a processor upgrade kit from Dell, reuse the original heat sink assembly when you replace the processor.

   If you installed a processor replacement kit from Dell, return the original heat sink assembly and processor to Dell in the same package in which your replacement kit was sent.

7. Install the heat sink:
   a. Slide one end of the heat sink under the retention tab.
   b. Pull out the other retention tab and lower the heat sink until it fits securely in the base.

- **NOTICE:** Ensure the heat sink is correctly seated and secure.

8. Reinstall the retention module clips.

9. Lower the airflow shroud over the heat sink.

10. Reconnect the cooling fan power cable to the fan connector on the system board.

11. Reconnect the power cable to the power connector on the system board.

12. Close the computer cover.

- **NOTICE:** To connect a network cable, first plug the cable into the network wall jack and then plug it into the computer.

13. Connect your computer and devices to electrical outlets, and turn them on.

---

### System Board

- **CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions located in the Product Information Guide.

- **CAUTION:** To prevent static damage to components inside your computer, discharge static electricity from your body before you touch any of your computer’s electronic components. You can do so by touching an unpainted metal surface on the computer chassis.

- **NOTICE:** The system board and metal tray are connected and are removed as one piece.

### Removing the System Board

1. Follow the procedures in "Before You Begin."
2. Open the computer cover.

3. Remove any components that restrict access to the system board.

4. Disconnect all cables from the system board.

5. Before you remove the existing system board assembly, visually compare the replacement system board to the existing system board to make sure that you have the correct part.

6. Remove the system board screw.

7. Pull up on the two tabs, slide the system board assembly toward the front of the computer, and then lift the assembly up and away.

8. Place the system board assembly that you just removed next to the replacement system board.

Replacing the System Board

1. Transfer components from the existing system board to the replacement system board:
   a. Remove the memory modules and install them on the replacement board.
   b. Install them on the replacement board.
   c. Remove the heat-sink assembly and processor from the existing system board and transfer them to the replacement system board.

   **CAUTION:** The processor package and heat-sink assembly can get hot. To avoid burns, ensure that the package and assembly have had sufficient time to cool before you touch them.

2. Configure the settings of the replacement system board.

3. Set the jumpers on the replacement system board so they are identical to the ones on the existing board.

   **NOTE:** Some components and connectors on the replacement system board may be in different locations than the corresponding connectors on the existing system board.

4. Orient the replacement board by aligning the notches on the bottom of the board with the tabs on the computer.

5. Slide the system board assembly toward the back of the computer until the assembly clicks into position.

6. Replace any components and cables that you removed from the system board.

7. Reconnect all cables to their connectors at the back of the computer.

8. Close the computer cover.

   **NOTICE:** To connect a network cable, first plug the cable into the network wall jack and then plug it into the computer.
9. Connect your computer and devices to electrical outlets, and turn them on.

---

**Power Supply**

**Removing the Power Supply**

평가 **NOTICE:** To prevent static damage to components inside your computer, discharge static electricity from your body before you touch any of your computer's electronic components. You can do so by touching an unpainted metal surface on the computer chassis.

평가 **CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions located in the Product Information Guide.

1. Follow the procedures in "Before You Begin."

2. Disconnect the DC power cables from the system board and the drives.
   
   Note the routing of the DC power cables underneath the tabs in the computer frame as you remove them from the system board and drives. You must route these cables properly when you replace them to prevent their being pinched or cramped.

3. Remove the two screws that attach the power supply to the back of the computer frame.

4. Press the release button located on the floor of the computer frame.

5. Slide the power supply toward the front of the computer approximately 1 inch.

6. Lift the power supply up and out of the computer.

**Replacing the Power Supply**

평가 **CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions located in the Product Information Guide.

1. Slide the power supply into place.

2. Replace the two screws that secure the power supply to the back of the computer frame.

3. Reconnect the DC power cables.

4. Connect the AC power cable to the connector.

5. Run the cables underneath the clips, and press the clips to close them over the cables.

6. Close the computer cover.

평가 **NOTICE:** To connect a network cable, first plug the cable into the network wall jack and then plug it into the computer.
Battery

Replacing the Battery

⚠️ **CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions located in the Product Information Guide.

⚠️ **NOTICE:** To prevent static damage to components inside your computer, discharge static electricity from your body before you touch any of your computer's electronic components. You can do so by touching an unpainted metal surface on the computer chassis.

A coin-cell battery maintains computer configuration, date, and time information. The battery can last several years.

If you have to repeatedly reset time and date information after turning on the computer, replace the battery.

⚠️ **CAUTION:** A new battery can explode if it is incorrectly installed. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer’s instructions.

To replace the battery:

1. Record all the screens in system setup so that you can restore the correct settings in step 8.
2. Follow the procedures in "Before You Begin."
3. Locate the battery socket on the system board.
4. Remove the battery by pressing on the tab, which will release the battery from the battery socket.
5. Insert the new battery into the socket with the side labeled “+” facing up, and snap the battery into place.

6. Close the computer cover.

⚠️ **NOTICE:** To connect a network cable, first plug the cable into the network device and then plug it into the computer.

7. Connect your computer and devices to electrical outlets, and turn them on.
8. **Enter system setup** and restore the settings you recorded in step 1.
### Specifications

**Processor**

<table>
<thead>
<tr>
<th>Processor type</th>
<th>Intel® Pentium® 4 with HT Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1 (L1) cache</td>
<td>16 KB</td>
</tr>
<tr>
<td>Level 2 (L2 or L3) cache</td>
<td>512 KB, 1 MB, or 2 MB (depending on your computer configuration) pipelined-burst, eight-way set associative, write-back SRAM</td>
</tr>
</tbody>
</table>

**NOTE:** Not all Pentium 4 processors support Hyper-Threading technology.

**Memory**

<table>
<thead>
<tr>
<th>Type</th>
<th>400- and 533-MHz DDR2 unbuffered SDRAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory connectors</td>
<td>Four</td>
</tr>
<tr>
<td>Memory capacities</td>
<td>128-, 256-, 512-, or 1-GB non-ECC</td>
</tr>
<tr>
<td>Maximum memory</td>
<td>4 GB</td>
</tr>
</tbody>
</table>

**NOTE:** See "Addressing Memory With 4-GB Configurations" to verify the amount of memory available to the operating system.

| BIOS address | F0000h |

**Computer Information**

<table>
<thead>
<tr>
<th>Chipset</th>
<th>Intel 925X Express or Intel 925XE Express</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMA channels</td>
<td>eight</td>
</tr>
<tr>
<td>Interrupt levels</td>
<td>24</td>
</tr>
<tr>
<td>BIOS chip (NVRAM)</td>
<td>4-Mb</td>
</tr>
<tr>
<td>NIC</td>
<td>Integrated network interface capable of 10/100/1000 communication.</td>
</tr>
<tr>
<td>System clock</td>
<td>800- or 1066-MHz data rate (depending on your processor)</td>
</tr>
</tbody>
</table>

**Video**

| Type                  | PCI Express |

**Audio**

| Type                  | ADI 1980 AC97 Codec |

**NOTE:** This audio type is present only on computers with integrated sound capabilities.

**Expansion Bus**

<table>
<thead>
<tr>
<th>Bus type</th>
<th>PCI 2.3, PCI Express x1 and x16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus speed</td>
<td>PCI: 33 MHz</td>
</tr>
<tr>
<td></td>
<td>PCI Express: x1 slot bidirectional speed — 500 MB/s</td>
</tr>
</tbody>
</table>
PCI
- connector: three
- connector size: 120 pins
- connector data width (maximum): 32 bits

PCI Express
- connector: one x1
- connector size: 36 pins
- connector data width (maximum): 1 PCI Express lane

PCI Express
- connectors: one x16
- connector size: 164 pins
- connector data width (maximum): 16 PCI Express lanes

Drives
- Externally accessible:
  - two 3.5-inch drive bays
  - two 5.25-inch drive bays
- Internally accessible: two bays for 1-inch high hard drives

Connectors
- External connectors:
  - Serial: 9-pin connector; 16550C-compatible
  - Parallel: 25-hole connector (bidirectional)
  - Video: 15-hole connector
  - Network adapter: RJ45 connector
  - PS/2 (keyboard and mouse): two 6-pin mini-DIN connectors
  - USB: two front-panel and six back-panel USB 2.0-compliant connectors
  - Audio: five connectors for line-in, line-out, microphone, surround, and center/Low Frequency Effects (LFE) channel; one front-panel connector for headphones
- System board connectors:
  - Primary IDE drive: 40-pin connector on PCI local bus
  - Serial ATA: four 7-pin connectors
  - Floppy drive: 34-pin connector
  - Fan: two 5-pin connectors
  - PCI 2.3: 120-pin connector
  - PCI Express x1: 36-pin connector
  - PCI Express x16: 164-pin connector
  - Telephony (TAPI): 4-pin connector

Controls and Lights
- Power control: push button
- Power light: green light — Blinking green in sleep state; solid green for power-on state. Amber light — Blinking amber indicates a problem with an installed device; solid amber indicates an internal power problem (see "Power Lights").
- Hard-drive access light: green
- Link integrity light (on integrated network adapter): green light — A good connection exists between a 10-Mbps network and the computer.
### Power

<table>
<thead>
<tr>
<th>DC power supply:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wattage</td>
<td>350 W</td>
</tr>
<tr>
<td>Heat dissipation</td>
<td>460.7 BTU/hr</td>
</tr>
<tr>
<td>Voltage (see the safety instructions located in the Product Information Guide for important voltage setting information)</td>
<td></td>
</tr>
<tr>
<td>Fixed-voltage power supply — 110 V at 50/60 Hz</td>
<td></td>
</tr>
<tr>
<td>Manual selection and auto-sensing power supplies — 90 to 135 V at 50/60 Hz; 180 to 265 V at 50/60 Hz; 100 V at 50/60 Hz for Japanese computers</td>
<td></td>
</tr>
<tr>
<td>Backup battery</td>
<td>3-V CR2032 lithium coin cell</td>
</tr>
</tbody>
</table>

### Physical

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>42.5 cm (16.7 inches)</td>
</tr>
<tr>
<td>Width</td>
<td>18.1 cm (7.1 inches)</td>
</tr>
<tr>
<td>Depth</td>
<td>44.7 cm (17.6 inches)</td>
</tr>
<tr>
<td>Weight</td>
<td>12.7 kg (28 lb)</td>
</tr>
</tbody>
</table>

### Environmental

<table>
<thead>
<tr>
<th>Temperature:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating</td>
<td>10° to 35°C (50° to 95°F)</td>
</tr>
<tr>
<td>Storage</td>
<td>-40° to 65°C (-40° to 149°F)</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>20% to 80% (noncondensing)</td>
</tr>
<tr>
<td>Maximum vibration:</td>
<td></td>
</tr>
<tr>
<td>Operating</td>
<td>0.25 G at 3 to 200 Hz at 0.5 octave/min</td>
</tr>
<tr>
<td>Storage</td>
<td>0.5 G at 3 to 200 Hz at 1 octave/min</td>
</tr>
<tr>
<td>Maximum shock:</td>
<td></td>
</tr>
<tr>
<td>Operating</td>
<td>Bottom half-sine pulse with a change in velocity of 20 inches/sec (50.8 cm/sec)</td>
</tr>
<tr>
<td>Storage</td>
<td>27-G faired square wave with a velocity change of 200 inches/sec (508 cm/sec)</td>
</tr>
<tr>
<td>Altitude:</td>
<td></td>
</tr>
<tr>
<td>Operating</td>
<td>-15.2 to 3048 m (-50 to 10,000 ft)</td>
</tr>
<tr>
<td>Storage</td>
<td>-15.2 to 10,668 m (-50 to 35,000 ft)</td>
</tr>
</tbody>
</table>
System Setup
Dell™ Dimension™ 8400 Service Manual

Overview
Use system setup as follows:

1. To change the system configuration information after you add, change, or remove any hardware in your computer
2. To set or change a user-selectable option such as the user password
3. To read the current amount of memory or set the type of hard drive installed

Before you use system setup, it is recommended that you write down the system setup screen information for future reference.

NOTICE: Unless you are an expert computer user, do not change the settings for this program. Certain changes can make your computer work incorrectly.

Entering System Setup

1. Turn on (or restart) your computer.
2. When the blue DELL™ logo appears, press <F2> immediately.
3. If you wait too long and the operating system logo appears, continue to wait until you see the Microsoft® Windows® desktop. Turn off your computer and try again.

System Setup Screens

The system setup screen displays current or changeable configuration information for your computer. Information on the screen is divided into three areas: the options list, active options field, and key functions.

System Setup Options

NOTE: Depending on your computer and installed devices, the items listed in this section may not appear, or may not appear exactly as listed.

<table>
<thead>
<tr>
<th>System</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Info</td>
<td>Identifies whether the computer’s processor supports Hyper-Threading and lists the processor bus speed, processor ID, clock speed, and L2 cache.</td>
</tr>
<tr>
<td>Memory Info</td>
<td>Indicates amount of installed memory, memory speed, channel mode (dual or single), and type of memory installed.</td>
</tr>
<tr>
<td>Date/Time</td>
<td>Displays current date and time settings.</td>
</tr>
<tr>
<td>Boot Sequence</td>
<td>The computer attempts to boot from the sequence of devices specified in this list.</td>
</tr>
<tr>
<td>Drives</td>
<td></td>
</tr>
<tr>
<td>-----------------</td>
<td></td>
</tr>
<tr>
<td><strong>Diskette Drive</strong></td>
<td></td>
</tr>
<tr>
<td>Identifies and defines the floppy drive attached to the FLOPPY connector on the system board as <strong>Off, USB, Internal, or Read Only</strong>.</td>
<td></td>
</tr>
<tr>
<td><strong>Drives S through 5</strong></td>
<td></td>
</tr>
<tr>
<td>Identifies the drives attached to the SATA or PRI IDE connectors on the system board, and lists the capacity for hard drives.</td>
<td></td>
</tr>
<tr>
<td><strong>Drive Controller</strong></td>
<td></td>
</tr>
<tr>
<td>Identifies and defines the ATA controller settings for RAID. You can set the ATA controller to <strong>RAID Autodetect/ATA, RAID Autodetect/RAID, or RAID On</strong>.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Onboard Devices</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NIC Controller</strong></td>
</tr>
<tr>
<td>You can set the NIC to <strong>On (default), Off, or On w/ PXE</strong>. When the <strong>On w/ PXE setting is active</strong> (available only for the future boot process), the computer prompts the user to press &lt;Ctrl&gt;&lt;Alt&gt;&lt;b&gt;. Pressing this key combination causes a menu to display that allows you to select a method for booting from a network server. If a boot routine is not available from the network server, the computer attempts to boot from the next device in the boot sequence list.</td>
</tr>
<tr>
<td><strong>Audio Controller</strong></td>
</tr>
<tr>
<td>Enables or disables the onboard audio controller.</td>
</tr>
<tr>
<td><strong>USB</strong></td>
</tr>
<tr>
<td>Set to <strong>On (default)</strong> so that USB devices will be detected and supported in the operating system.</td>
</tr>
<tr>
<td><strong>Mouse Port</strong></td>
</tr>
<tr>
<td>Enables or disables the onboard PS/2-compatible mouse controller.</td>
</tr>
<tr>
<td><strong>LPT Port Mode</strong></td>
</tr>
<tr>
<td>Identifies and defines the parallel port settings. You can set the parallel port to <strong>Off, AT, PS/2, EPP, or ECP</strong>.</td>
</tr>
<tr>
<td><strong>LPT Port Address</strong></td>
</tr>
<tr>
<td>Identifies the address for the parallel port.</td>
</tr>
<tr>
<td><strong>LPT Port DMA</strong></td>
</tr>
<tr>
<td>Identifies and defines the parallel port DMA settings. You can set the parallel port DMA to <strong>Off, DMA1, or DMA3</strong>.</td>
</tr>
<tr>
<td><strong>Serial Port #1</strong></td>
</tr>
<tr>
<td>Identifies and defines the serial port settings. <strong>Auto</strong>, the default setting, automatically configures a connector to a particular designation (COM1 or COM3).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Video</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary Video</strong></td>
</tr>
<tr>
<td>This setting specifies which video controller is primary when two video controllers are present on the computer.</td>
</tr>
<tr>
<td><strong>Performance</strong></td>
</tr>
<tr>
<td><strong>HyperThreading</strong></td>
</tr>
<tr>
<td>If your computer’s processor supports Hyper-Threading, this option appears in the Options List.</td>
</tr>
<tr>
<td><strong>Performance</strong></td>
</tr>
<tr>
<td><strong>NOTE</strong>: Switching to performance mode may cause the drive to be noisier, but its performance is not affected.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Security</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Admin Password</strong></td>
</tr>
<tr>
<td>This option provides restricted access to the computer’s system setup program in the same way that access to the system can be restricted with the <strong>System Password</strong> option.</td>
</tr>
<tr>
<td><strong>System Password</strong></td>
</tr>
<tr>
<td>Displays the current status of the system’s password security feature and allows a new system password to be assigned and verified.</td>
</tr>
<tr>
<td><strong>Password Status</strong></td>
</tr>
<tr>
<td>This option locks the system password field with the setup password. When the field is locked, you can no longer disable password security by pressing &lt;Ctrl&gt;&lt;Enter&gt; when the computer starts.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AC Recovery</strong></td>
</tr>
<tr>
<td>Determines what happens when AC power is restored to the computer.</td>
</tr>
<tr>
<td><strong>Auto Power On</strong></td>
</tr>
<tr>
<td>Sets the computer to automatically turn on. Choices are every day or every Monday through Friday.</td>
</tr>
<tr>
<td>The default setting is <strong>Off</strong>.</td>
</tr>
<tr>
<td>This feature does not work if you turn off your computer using a power strip or surge protector.</td>
</tr>
<tr>
<td><strong>Auto Power Time</strong></td>
</tr>
<tr>
<td>Sets time to automatically turn on the computer.</td>
</tr>
<tr>
<td>Time is kept in a 24-hour format (hours:minutes). Change the start-up time by pressing the right- or left-arrow key to increase or decrease the numbers, or type numbers in both the date and time fields.</td>
</tr>
<tr>
<td>This feature does not work if you turn off your computer using a power strip or surge protector.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Low Power Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low Power Mode</strong></td>
</tr>
<tr>
<td>When <strong>Low Power Mode</strong> is selected, remote wakeup events no longer power up from <strong>Hibernate</strong> or <strong>Off</strong>.</td>
</tr>
<tr>
<td><strong>Remote Wake Up</strong></td>
</tr>
<tr>
<td>This option allows the computer to power up when a NIC or Remote Wakeup-capable modem receives a wake up signal.</td>
</tr>
<tr>
<td><strong>On</strong> is the default setting. <strong>Off w/ Boot to NIC</strong> allows the computer to attempt to boot from a network prior to using the boot sequence.</td>
</tr>
<tr>
<td><strong>NOTE</strong>: Normally, the system can be powered up remotely from suspend mode, hibernate mode, or when powered off. When <strong>Low Power Mode</strong> (in the Power Management menu) is enabled, the computer can only be powered up remotely from Suspend.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Suspend Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>The options are <strong>$1</strong>, a suspend state where the computer is running in a low-power mode, and <strong>$3</strong>, a standby state where the power is reduced or turned off for most components, however, system memory remains active.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CMOS Defaults</strong></td>
</tr>
<tr>
<td>This setting restores the computer’s factory-installed default settings.</td>
</tr>
</tbody>
</table>

**NOTE**: If you insert a boot device and restart the computer, this option appears in the system setup menu. To boot from a USB memory device, select the USB device and move it so it becomes the first device in the list.

**NOTE**: If you insert a boot device and restart the computer, this option appears in the system setup menu. To boot from a USB memory device, select the USB device and move it so it becomes the first device in the list.

- **Low Power Mode**:
  - **Hibernate**: The computer enters a low-power state where the hard drive is powered off. The system retains all data in memory.
  - **Off**: The computer is powered off.

- **Auto Power Time**:
  - **Every day**: The computer starts automatically every day.
  - **Every Monday through Friday**: The computer starts automatically from Monday to Friday.

- **AC Recovery**:
  - **Off**: The computer does not start automatically when AC power is restored.
  - **On**: The computer starts automatically when AC power is restored.

- **Auto Power On**:
  - **Off**: The computer does not start automatically.
  - **Every day**: The computer starts automatically every day.
  - **Every Monday through Friday**: The computer starts automatically from Monday to Friday.

- **Auto Power Time**: The computer starts automatically at a specific time each day. The time is set in a 24-hour format (hours:minutes).

- **Low Power Mode**:
  - **Hibernate**: The computer enters a low-power state where the hard drive is powered off. The system retains all data in memory.
  - **Off**: The computer is powered off.

- **Suspend Mode**:
  - **$1**: A suspend state where the computer is running in a low-power mode.
  - **$3**: A standby state where the power is reduced or turned off for most components, but system memory remains active.

- **Remote Wake Up**:
  - **On**: The computer attempts to boot from the next device in the boot sequence list.
  - **Off w/ PXE**: The computer prompts the user to press <Ctrl><Alt><b> to enter the boot sequence.

**NOTE**: If your computer’s processor supports Hyper-Threading, this option appears in the Options List.

- **Bypass**: The computer does not test or change the current acoustics mode setting.
- **Quiet (default)**: The hard drive operates at its most quiet setting.
- **Suggested**: The hard drive operates at the level suggested by the drive manufacturer.
- **Performance**: The hard drive operates at its maximum speed.

**NOTE**: Changing the acoustics setting does not alter your hard drive image.

**NOTE**: Switching to performance mode may cause the drive to be noisier, but its performance is not affected.
This feature allows you to change the boot sequence for devices.

**Option Settings**

1. **Diskette Drive** — The computer attempts to boot from the floppy drive. If the floppy disk in the drive is not bootable, if no floppy disk is in the drive, or if there is no floppy drive installed in the computer, the computer generates an error message.
2. **Hard Drive** — The computer attempts to boot from the primary hard drive. If no operating system is on the drive, the computer generates an error message.
3. **CD Drive** — The computer attempts to boot from the CD drive. If no CD is in the drive, or if the CD has no operating system, the computer generates an error message.
4. **USB Flash Device** — Insert the memory device into a USB port and restart the computer. When F12 = Boot Menu appears in the upper-right corner of the screen, press <F12>. The BIOS detects the device and adds the USB flash option to the boot menu.

**NOTE:** To boot to a USB device, the device must be bootable. To make sure that your device is bootable, check the device documentation.

**Changing Boot Sequence for the Current Boot**

You can use this feature, for example, to tell the computer to restart your computer to a USB device such as a floppy drive, memory key, or CD-RW drive.

**NOTE:** If you are booting to a USB floppy drive, you must first set the floppy drive to OFF in system setup.

1. If you are booting to a USB device, connect the USB device to a USB connector.
2. Turn on (or restart) your computer.
3. When F2 = Setup, F12 = Boot Menu appears in the upper-right corner of the screen, press <F12>.

   If you wait too long and the operating system logo appears, continue to wait until you see the Microsoft Windows desktop. Then shut down your computer and try again.

   The Boot Device Menu appears, listing all available boot devices. Each device has a number next to it.

4. At the bottom of the menu, enter the number of the device that is to be used for the current boot only.

   For example, if you are booting to a USB memory key, highlight USB Flash Device and press <Enter>.

   **NOTE:** To boot to a USB device, the device must be bootable. To make sure your device is bootable, check the device documentation.

**Changing Boot Sequence for Future Boots**

1. Enter system setup.
2. Use the arrow keys to highlight the Boot Sequence menu option and press <Enter> to access the menu.

   **NOTE:** Write down your current boot sequence in case you want to restore it.
3. Press the up- and down-arrow keys to move through the list of devices.
4. Press the spacebar to enable or disable a device (enabled devices have a checkmark).

5. Press plus (+) or minus (−) to move a selected device up or down the list.

---

### Clearing Forgotten Passwords

⚠️ **CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions located in the *Product Information Guide*.

1. Follow the procedures in "Before You Begin."

2. Locate the 3-pin password jumper (PASS) on the *system board*, and attach the jumper plug to pins 2 and 3 to clear the password.

   **NOTE:** When you receive your computer, the jumper plug is attached to pins 1 and 2.

3. Close the computer cover.

4. Connect your computer and monitor to electrical outlets, and turn them on.

5. After the Microsoft® Windows® desktop appears on your computer, shut down the computer.

6. Turn off the monitor and disconnect it from the electrical outlet.

7. Disconnect the computer power cable from the electrical outlet, and press the power button to ground the system board.

8. Open the computer cover.

9. Locate the 3-pin password jumper (PASS) on the *system board* and attach the jumper to pins 1 and 2 to re-enable the password feature.

10. Close the computer cover.

   **NOTICE:** To connect a network cable, first plug the cable into the network device and then plug it into the computer.

11. Connect your computer and devices to electrical outlets, and turn them on.

---

### Clearing CMOS Settings

⚠️ **CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions located in the *Product Information Guide*.

1. Follow the procedures in "Before You Begin."

2. Reset the current CMOS settings:
a. Locate the 3-pin CMOS jumper (CLR CMOS) on the system board.
b. Remove the jumper plug from pins 2 and 3.
c. Place the jumper plug on pins 1 and 2 and wait approximately 5 seconds.
d. Replace the jumper plug on pins 2 and 3.

3. Close the computer cover.

⚠️ NOTICE: To connect a network cable, first plug the cable into the network wall jack and then plug it into the computer.

4. Connect your computer and devices to electrical outlets, and turn them on.
Inside Your Computer

**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions located in the Product Information Guide.

Follow the procedures in "Before You Begin."

---

System Board Components
Power Supply DC Connector Pin Assignments

DC Power Connector P1
<table>
<thead>
<tr>
<th>Pin Number</th>
<th>Signal name</th>
<th>Color</th>
<th>Wire Gauge</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+3.3 VDC</td>
<td>Orange</td>
<td>16-AWG</td>
</tr>
<tr>
<td>2</td>
<td>+3.3 VDC</td>
<td>Orange</td>
<td>16-AWG</td>
</tr>
<tr>
<td>3</td>
<td>COM</td>
<td>Black</td>
<td>18-AWG</td>
</tr>
<tr>
<td>4</td>
<td>+5 VDC</td>
<td>Red</td>
<td>18-AWG</td>
</tr>
<tr>
<td>5</td>
<td>COM</td>
<td>Black</td>
<td>18-AWG</td>
</tr>
<tr>
<td>6</td>
<td>+5 BDC</td>
<td>Red</td>
<td>18-AWG</td>
</tr>
<tr>
<td>7</td>
<td>COM</td>
<td>Black</td>
<td>18-AWG</td>
</tr>
<tr>
<td>8</td>
<td>PDK</td>
<td>Gray</td>
<td>18-AWG</td>
</tr>
<tr>
<td>9</td>
<td>+5 VFP</td>
<td>Purple</td>
<td>18-AWG</td>
</tr>
<tr>
<td>10</td>
<td>+12 VB DC</td>
<td>White</td>
<td>18-AWG</td>
</tr>
<tr>
<td>11</td>
<td>+12 VB DC</td>
<td>White</td>
<td>18-AWG</td>
</tr>
<tr>
<td>12</td>
<td>+3.3 VDC</td>
<td>Orange</td>
<td>16-AWG</td>
</tr>
<tr>
<td>13</td>
<td>+3.3 VDC</td>
<td>Orange</td>
<td>16-AWG</td>
</tr>
<tr>
<td>14</td>
<td>-12 VDC</td>
<td>Blue</td>
<td>18-AWG</td>
</tr>
<tr>
<td>15</td>
<td>COM</td>
<td>Black</td>
<td>18-AWG</td>
</tr>
<tr>
<td>16</td>
<td>PS-ON</td>
<td>Green</td>
<td>18-AWG</td>
</tr>
<tr>
<td>17</td>
<td>COM</td>
<td>Black</td>
<td>18-AWG</td>
</tr>
<tr>
<td>18</td>
<td>COM</td>
<td>Black</td>
<td>18-AWG</td>
</tr>
<tr>
<td>19</td>
<td>COM</td>
<td>Black</td>
<td>18-AWG</td>
</tr>
<tr>
<td>20</td>
<td>N/C</td>
<td>N/C</td>
<td>18-AWG</td>
</tr>
<tr>
<td>21</td>
<td>+5 VDC</td>
<td>Red</td>
<td>18-AWG</td>
</tr>
<tr>
<td>22</td>
<td>+5 VDC</td>
<td>Red</td>
<td>18-AWG</td>
</tr>
<tr>
<td>23</td>
<td>+5 VDC</td>
<td>Red</td>
<td>18-AWG</td>
</tr>
<tr>
<td>24</td>
<td>COM</td>
<td>Black</td>
<td>18-AWG</td>
</tr>
</tbody>
</table>

DC Power Connector P2

<table>
<thead>
<tr>
<th>Pin Number</th>
<th>Signal Name</th>
<th>18-AWG Wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>COM</td>
<td>Black</td>
</tr>
<tr>
<td>2</td>
<td>COM</td>
<td>Black</td>
</tr>
<tr>
<td>3</td>
<td>+12 VA DC</td>
<td>Yellow</td>
</tr>
<tr>
<td>4</td>
<td>+12 VA DC</td>
<td>Yellow</td>
</tr>
</tbody>
</table>

DC Power Connectors, P3 and P5

<table>
<thead>
<tr>
<th>Pin Number</th>
<th>Signal Name</th>
<th>18-AWG Wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+3.3 VDC</td>
<td>Orange</td>
</tr>
</tbody>
</table>
DC Power Connector P4

<table>
<thead>
<tr>
<th>Pin Number</th>
<th>Signal Name</th>
<th>18-AWG Wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N/C</td>
<td>N/C</td>
</tr>
<tr>
<td>2</td>
<td>COM</td>
<td>Black</td>
</tr>
<tr>
<td>3</td>
<td>COM</td>
<td>Black</td>
</tr>
<tr>
<td>4</td>
<td>+3.3 VDC</td>
<td>Orange</td>
</tr>
<tr>
<td>5</td>
<td>+5 VDC</td>
<td>Red</td>
</tr>
<tr>
<td>6</td>
<td>+12B VDC</td>
<td>White</td>
</tr>
</tbody>
</table>

DC Power Connector P6

<table>
<thead>
<tr>
<th>Pin Number</th>
<th>Signal Name</th>
<th>18-AWG Wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+12 VB DC</td>
<td>Yellow</td>
</tr>
<tr>
<td>2</td>
<td>COM</td>
<td>Black</td>
</tr>
<tr>
<td>3</td>
<td>COM</td>
<td>Black</td>
</tr>
<tr>
<td>4</td>
<td>+5 VDC</td>
<td>Red</td>
</tr>
</tbody>
</table>

DC Power Connector P7

<table>
<thead>
<tr>
<th>Pin Number</th>
<th>Signal Name</th>
<th>18-AWG Wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+5 VDC</td>
<td>Red</td>
</tr>
<tr>
<td>2</td>
<td>COM</td>
<td>Black</td>
</tr>
<tr>
<td>3</td>
<td>COM</td>
<td>Black</td>
</tr>
<tr>
<td>4</td>
<td>+12 A VDC</td>
<td>Yellow</td>
</tr>
</tbody>
</table>

DC Power Connectors, P8 and P9
1 +12 VB DC White
2 COM Black
3 COM Black
4 +5V DC Red

DC Power Connector P10

1 +12 VB DC White
2 +12 VB DC White
3 +12 VB DC White
4 COM Black
5 COM Black
6 COM Black

NOTE: The P10 connector is intended for use with PCI Express graphics cards that have power requirements exceeding 75 watts.
Notes, Notices, and Cautions

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

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

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

Abbreviations and Acronyms

For a complete list of abbreviations and acronyms, see the *Dell Dimension Owner’s Manual*.

If you purchased a Dell™ n Series computer, any references in this document to Microsoft® Windows® operating systems are not applicable.