

Dell Precision™ Workstation 470
and Workstation 670
Quick Reference Guide

Models WHM and WHL

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 "Glossary" in the *User's Guide*.

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

The *Quick Reference Guide*, *Drivers and Utilities* CD, and operating system media are optional and may not ship with all computers.

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Models WHM and WHL

October 2004 P/N X3152 Rev. A01

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Finding Information

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

 **NOTE:** Additional information may ship with your computer.

What Are You Looking For?	Find It Here
<ul style="list-style-type: none">• A diagnostic program for my computer• Drivers for my computer• My computer documentation• My device documentation• Desktop System Software (DSS)	<p>Drivers and Utilities CD (also known as ResourceCD)</p> <p>Documentation and drivers are already installed on your computer. You can use the CD to reinstall drivers, run the Dell Diagnostics (see page 26), or access your documentation.</p>  <p>Readme files may be included on your CD to provide last-minute updates about technical changes to your computer or advanced technical-reference material for technicians or experienced users.</p> <p>NOTE: Drivers and documentation updates can be found at support.dell.com.</p> <p>NOTE: The <i>Drivers and Utilities</i> CD is optional and may not ship with your computer.</p>
<ul style="list-style-type: none">• System board connectors• Location of system board components	<p>System Information Label</p>  <p>Located on the inside cover of your computer.</p>

What Are You Looking For?

- Warranty information
- Terms and Conditions (U.S. only)
- Safety instructions
- Regulatory information
- Ergonomics information
- End User License Agreement

Find It Here
Dell™ Product Information Guide


-
- How to remove and replace parts
 - Specifications
 - How to configure system settings
 - How to troubleshoot and solve problems

Dell Precision™ Mobile Workstation User's Guide

Microsoft® Windows® XP Help and Support Center

1 Click the **Start** button and click **Help and Support**.

2 Click **User's and system guides** and click **User's guides**.

The *User's Guide* is also available on the optional *Drivers and Utilities* CD.

-
- Service Tag and Express Service Code
 - Microsoft Windows License Label

Service Tag and Microsoft Windows License

These labels are located on your computer.

- Use the Service Tag to identify your computer when you use support.dell.com or contact technical support.



- Enter the Express Service Code to direct your call when contacting technical support.

What Are You Looking For?	Find It Here
<ul style="list-style-type: none"> • Solutions — Troubleshooting hints and tips, articles from technicians, online courses, frequently asked questions • Community — Online discussion with other Dell customers • Upgrades — Upgrade information for components, such as memory, the hard drive, and the operating system • Customer Care — Contact information, service call and order status, warranty, and repair information • Service and support — Service call status and support history, service contract, online discussions with technical support • Reference — Computer documentation, details on my computer configuration, product specifications, and white papers • Downloads — Certified drivers, patches, and software updates • Desktop System Software (DSS) — If you reinstall the operating system for your computer, you should also reinstall the DSS utility. DSS provides critical updates for your operating system and support for Dell™ 3.5-inch USB floppy drives, Intel® Pentium® M processors, optical drives, and USB devices. DSS is necessary for correct operation of your Dell computer. The software automatically detects your computer and operating system and installs the updates appropriate for your configuration. 	<p>Dell Support Website — support.dell.com</p> <p>NOTE: Select your region to view the appropriate support site.</p> <p>NOTE: Corporate, government, and education customers can also use the customized Dell Premier Support website at premier.support.dell.com. The website may not be available in all regions.</p>
<ul style="list-style-type: none"> • How to use Windows XP • Documentation for my computer • Documentation for devices (such as a modem) 	<p>Windows Help and Support Center</p> <ol style="list-style-type: none"> 1 Click the Start button and click Help and Support. 2 Type a word or phrase that describes your problem and click the arrow icon. 3 Click the topic that describes your problem. 4 Follow the instructions on the screen.

What Are You Looking For?

- How to reinstall my operating system

Find It Here**Operating System CD**

The operating system is already installed on your computer. To reinstall your operating system, use the *Operating System CD*. See your *Dell Precision User's Guide* for instructions.



After you reinstall your operating system, use the *Drivers and Utilities CD* to reinstall drivers for the devices that came with your computer.

Your operating system product key label is located on your computer.

NOTE: The color of your CD varies based on the operating system you ordered.

NOTE: The *Operating System CD* is optional and may not ship with your computer.

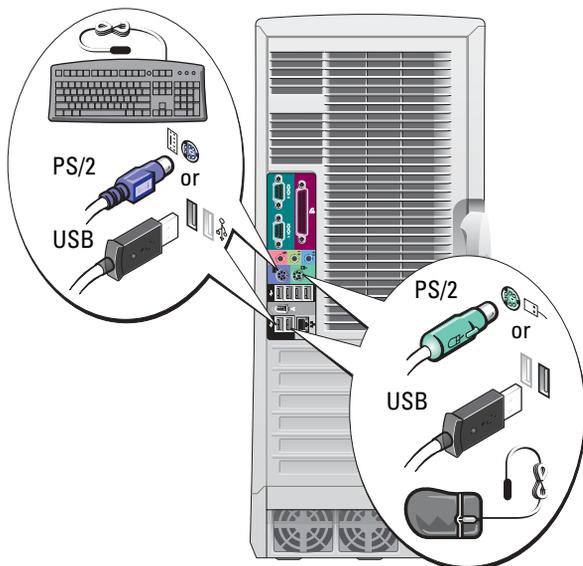
-
- How to use the Red Hat® Linux operating system
 - E-mail discussions with other users of Dell Precision™ computers and Linux
 - Additional information regarding Linux and my Dell Precision computer

Dell Supported Linux Sites

- <http://linux.dell.com>
 - <http://lists.us.dell.com/mailman/listinfo/linux-precision>
 - <http://docs.us.dell.com/docs/software/oslinux/>
-

Setting Up Your Dell Precision 670 Computer

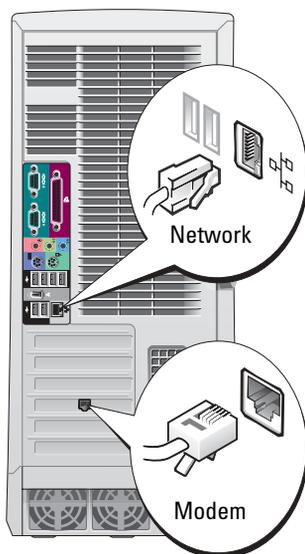
- 1 Connect the keyboard and the mouse.



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

You must complete all steps to properly set up your computer.

- 2 Connect the modem or the network cable.

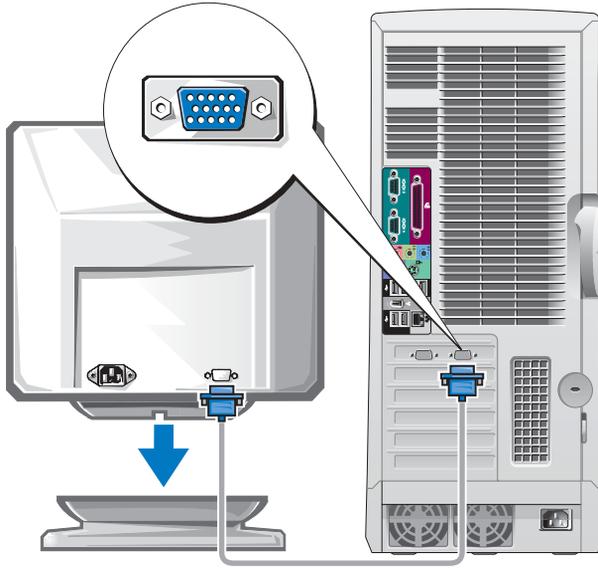


NOTE: If your computer has a network card installed, connect the network cable to the card.

NOTE: A modem is not included as a standard feature with Dell Precision workstations, but you can order a modem separately.

NOTICE: Do not connect a modem cable to the network adapter. Voltage from telephone communications can damage the network adapter.

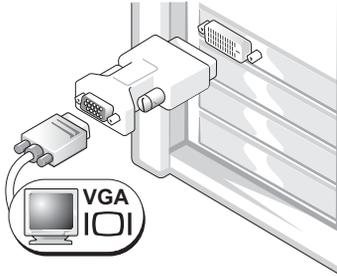
3 Connect the monitor.



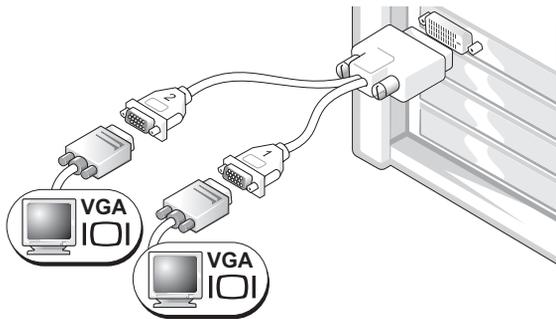
Depending on your graphics card, you can connect your monitor in various ways.

NOTICE: You may need to use the provided adapter or cable to connect your monitor to the computer.

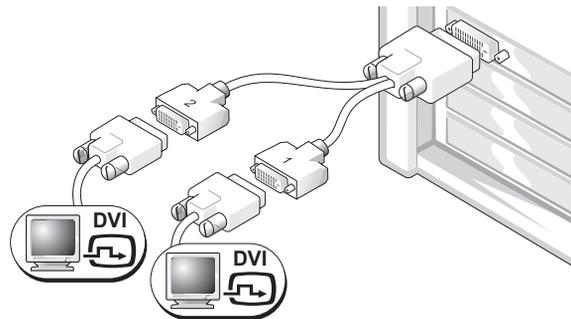
For single- and dual-monitor capable cards with a single connector

VGA Adapter

Use the VGA adapter when you have a single monitor graphics card and you want to connect a VGA monitor.

Dual VGA Y Cable Adapter

Use the appropriate Y cable when your graphics card has a single connector and you want to connect one or two VGA monitors.

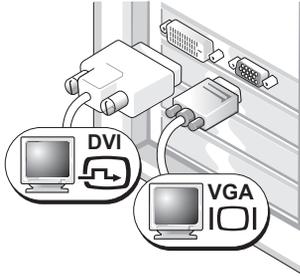
Dual DVI Y Cable Adapter

Use the appropriate Y cable when your graphics card has a single connector and you want to connect one or two DVI monitors.

The dual-monitor cable is color coded; the blue connector is for the primary monitor, and the black connector is for the secondary monitor. To enable dual-monitor support, both monitors must be attached to the computer when it starts.

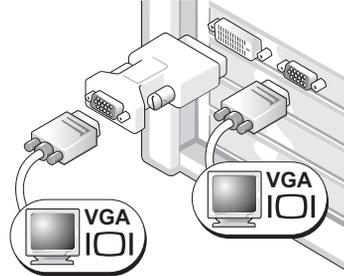
For dual-monitor capable cards with one DVI and one VGA connector

Single DVI/Single VGA



Use the appropriate connector(s) when you connect one or two monitors.

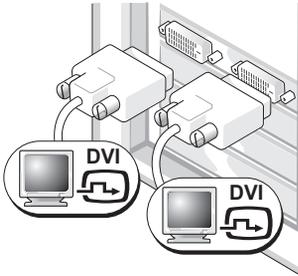
Dual VGA With VGA Adapter



Use the VGA adapter when you want to connect two VGA monitors.

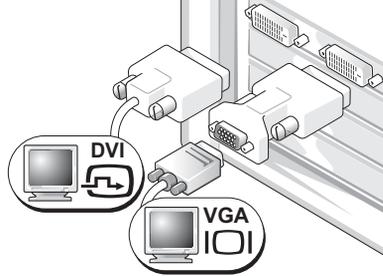
For dual-monitor capable cards with two DVI connectors

Dual DVI



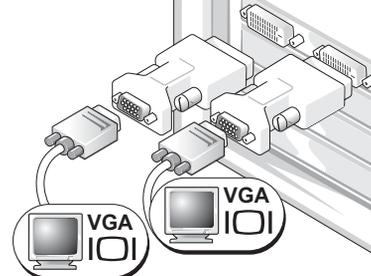
Use the DVI connectors to connect your computer to one or two DVI monitors.

Dual DVI With One VGA Adapter



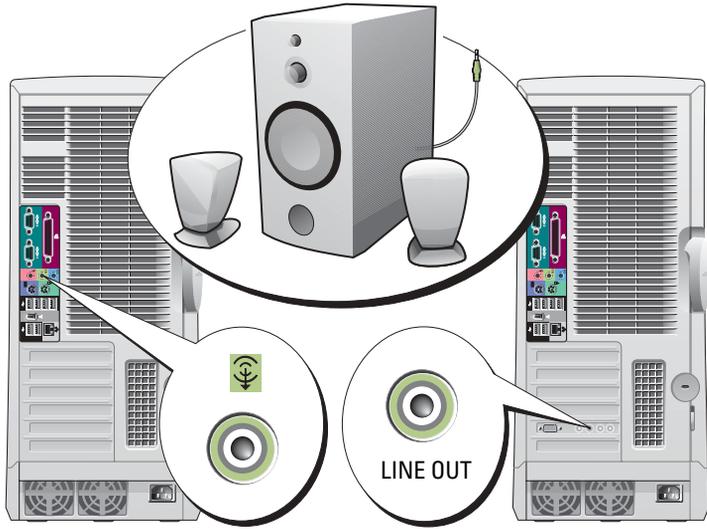
Use the VGA adapter to connect a VGA monitor to one of the DVI connectors on your computer.

Dual DVI With Two VGA Adapters



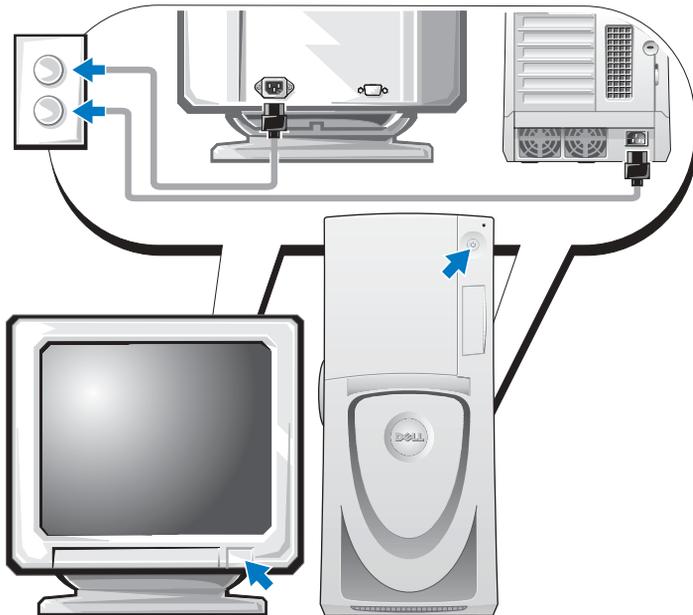
Use two VGA adapters to connect two VGA monitors to the DVI connectors on your computer.

4 Connect the speakers.



NOTE: If your computer has an audio card installed, connect the speakers to the card.

5 Connect the power cables and turn on the computer and monitor.





Install additional software or devices.

Before you install any devices or software that did not come with your computer, read the documentation that came with the software or device or contact the vendor to verify that the software or device is compatible with your computer and operating system.

Congratulations! You have completed the setup for your Dell Precision 670 computer.

To access the User's Guide from your hard drive:

Click the **Start** button and click **Help and Support**.

To access your User's Guide from the Dell Support website:

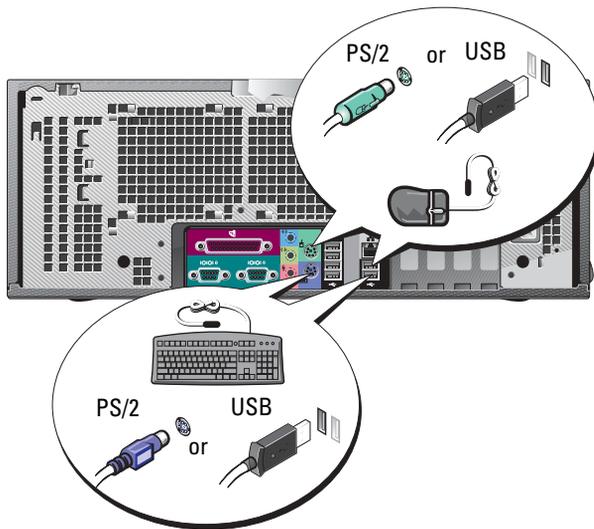
- 1 Go to support.dell.com.
- 2 Follow the prompts on the website that ask you for information specific to your computer.
- 3 At the Dell Support website home page, click the **User Guides** link under **Product Support**, click **Systems**, and then select your Dell Precision computer.

Setting Up Your Dell Precision 470 Computer

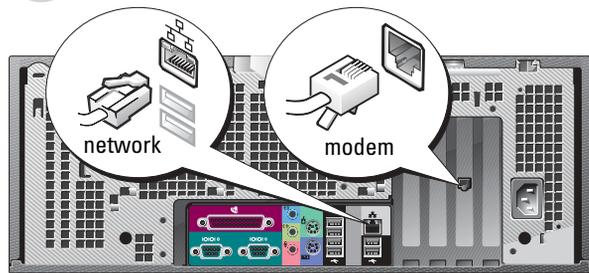
CAUTION: Before you begin any of the procedures in this section, follow the safety instructions located in the Product Information Guide.

You must complete all steps to properly set up your computer.

1 Connect the keyboard and the mouse.



2 Connect the modem or the network cable.

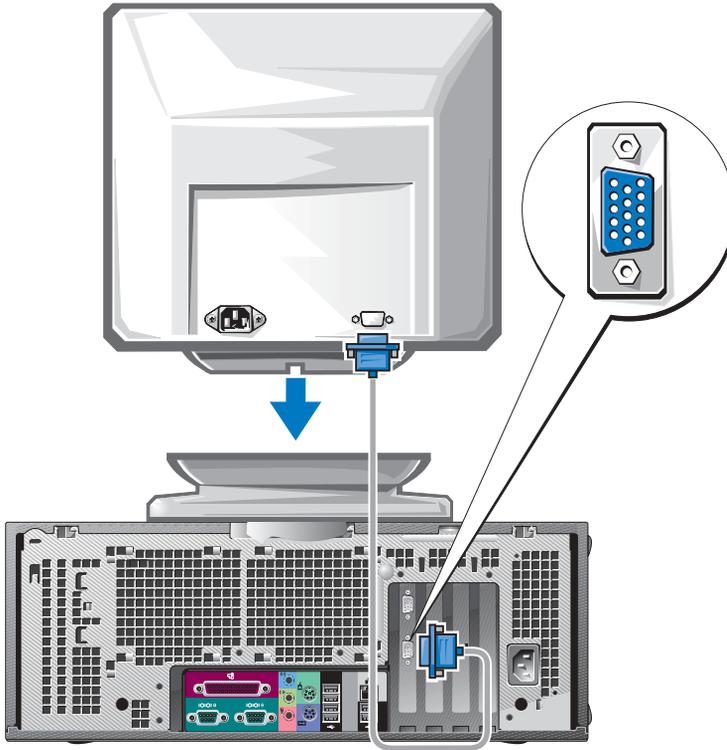


NOTE: If your computer has a network card installed, connect the network cable to the card.

NOTICE: Do not connect a modem cable to the network adapter. Voltage from telephone communications can damage the network adapter.

NOTE: A modem is not included as a standard feature with Dell Precision workstations, but you can order a modem separately.

3 Connect the monitor.

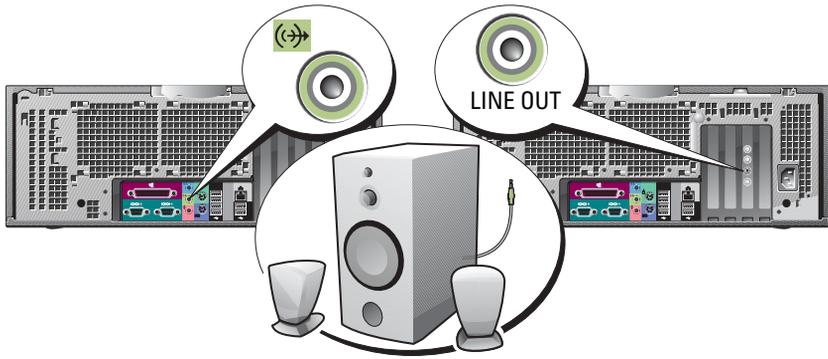


Depending on your graphics card, you can connect your monitor in various ways.

For information on the different options, see page 11 and page 12.

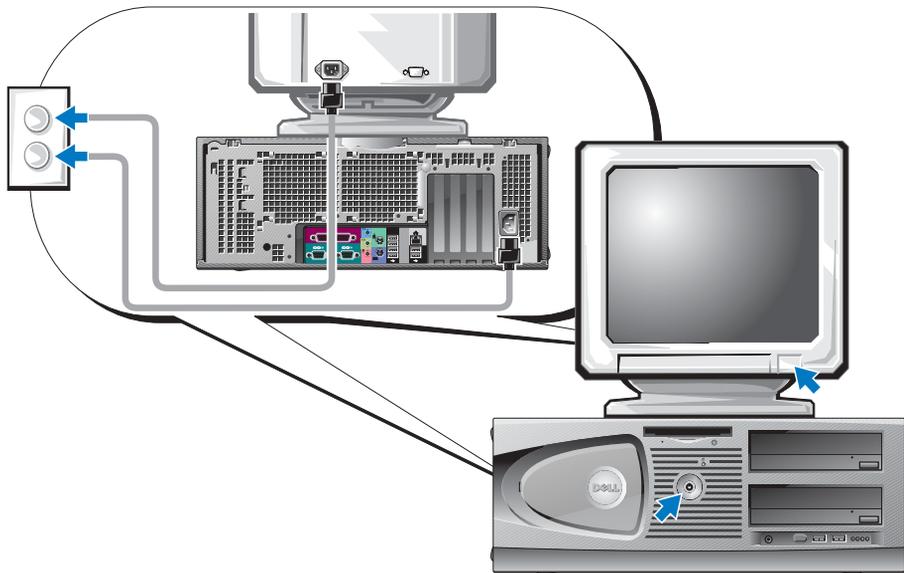
NOTICE: You may need to use the provided adapter or cable to connect your monitor to the computer.

4 Connect the speakers.



NOTE: If your computer has an audio card installed, connect the speakers to the card.

5 Connect the power cables and turn on the computer and monitor.



6 Install additional software or devices.

Before you install any devices or software that did not come with your computer, read the documentation that came with the software or device or contact the vendor to verify that the software or device is compatible with your computer and operating system.

Congratulations! You have completed the setup for your Dell Precision 470 computer.

To access the User's Guide from your hard drive:

Click the **Start** button and click **Help and Support**.

To access your User's Guide from the Dell Support website:

- 1 Go to support.dell.com.
- 2 Follow the prompts on the website that ask you for information specific to your computer.
- 3 At the Dell Support website home page, click the **User Guides** link under **Product Support**, click **Systems**, and then select your Dell Precision computer.

Opening the Computer Cover



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

- 1 Shut down the computer through the **Start** menu.
 - 2 Ensure that your computer and attached devices are turned off. If your computer and attached devices did not automatically turn off when you shut down your computer, turn them off now.
-  **NOTICE:** To disconnect a network cable, first unplug the cable from your computer and then unplug it from the network wall jack.
- 3 Disconnect any telephone or telecommunication lines from the computer.
 - 4 Disconnect your computer and all attached devices from electrical outlets, and then press the power button to ground the system board.
 - 5 If you have installed a padlock through the padlock ring on the back panel, remove the padlock.



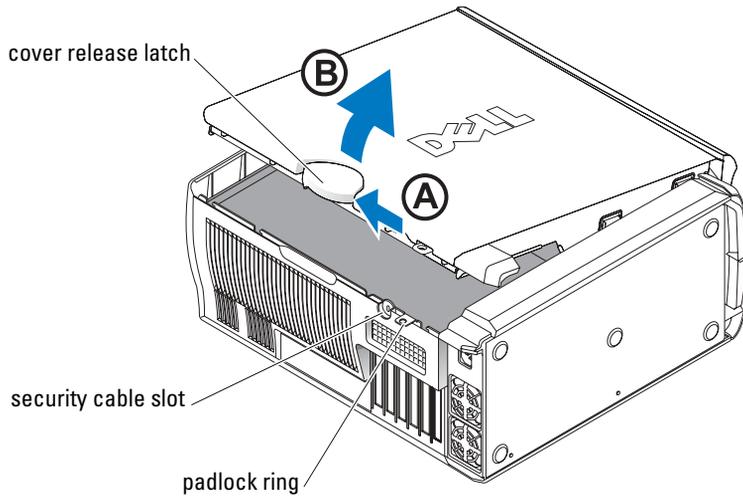
CAUTION: To guard against electrical shock, always unplug your computer from the electrical outlet before opening the cover.

- 6 Lay the computer on its side as shown in the following illustrations.
-  **NOTICE:** Ensure that sufficient space exists to support the open cover—at least 30 cm (1 ft) of desk top space.

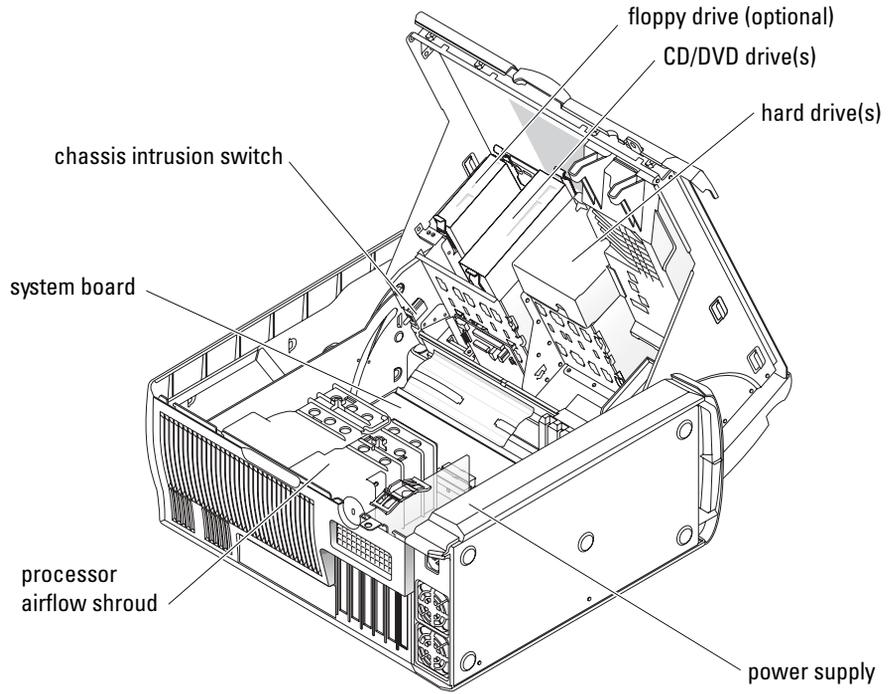
- 7 Open the computer cover:
 - a Slide the cover release latch toward the top of the computer.
 - b Raise the cover, and pivot it toward the front of the computer.
- 8 Ground yourself by touching an unpainted metal surface on the computer, such as the metal at the back of computer, before touching anything inside your computer.

While you work, periodically touch any unpainted metal surface on the computer to dissipate any static electricity that could harm internal components.

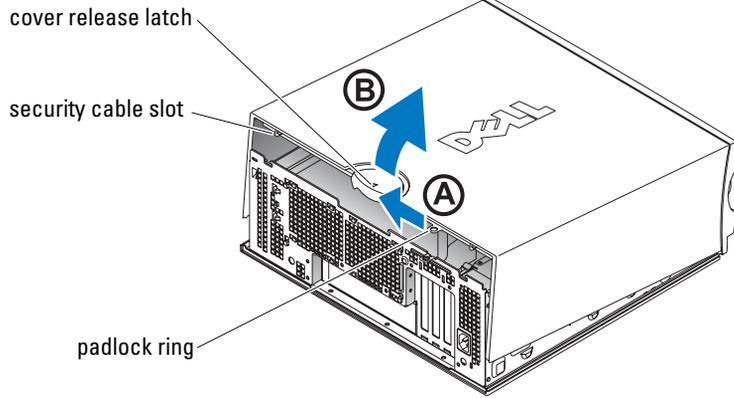
Dell Precision 670 Computer



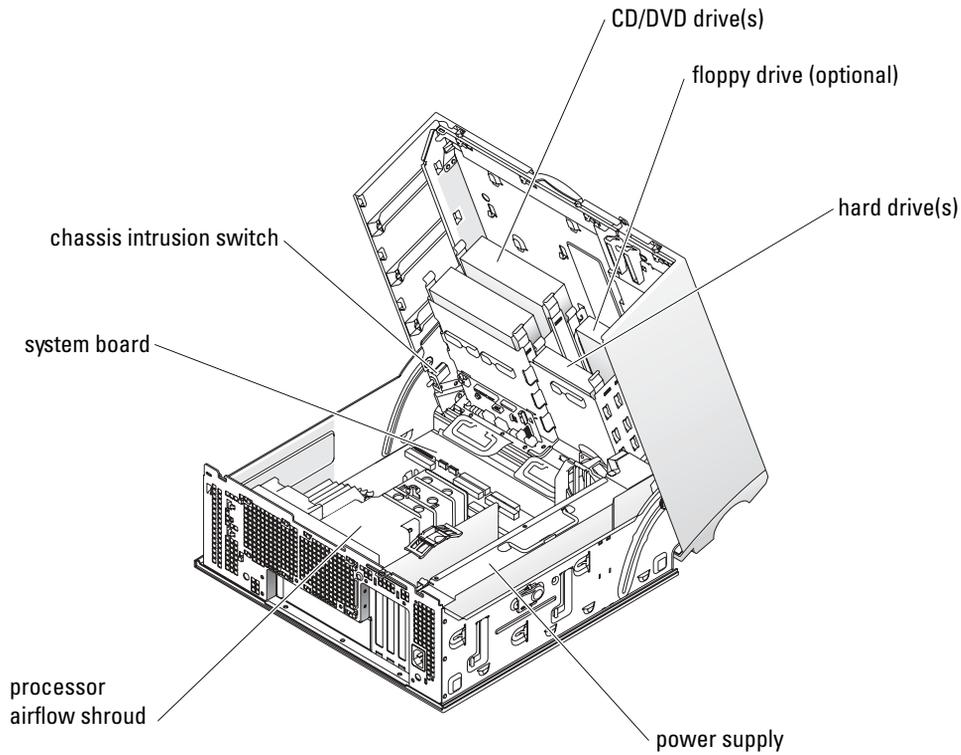
Inside the Dell Precision 670 Computer



Dell Precision 470 Computer



Inside the Dell Precision 470 Computer



Caring for Your Computer

To help maintain your computer, follow these suggestions:

- To avoid losing or corrupting data, never turn off your computer when the hard drive light is on.
- Schedule regular virus scans using anti-virus software.
- Manage hard drive space by periodically deleting unnecessary files and defragmenting the drive.
- Back up files on a regular basis.
- Periodically clean your monitor screen, mouse, and keyboard (see your *User's Guide* for more information).

Solving Problems

Follow these tips when troubleshooting your computer:

- If you added or removed a computer part before the problem started, review the installation procedures and ensure that the part is correctly installed.
- If a peripheral device does not work, ensure that the device is properly connected.
- If an error message appears on the screen, write down the exact message. This message may help technical support diagnose and fix the problem(s).
- If an error message occurs in a program, consult the program's documentation.
- If the recommended action in the troubleshooting section is to see a section in your *User's Guide*, go to support.dell.com (on another computer if necessary) to access your *User's Guide*.

Resolving Software and Hardware Incompatibilities

If a device is either not detected during the operating system setup or is detected but incorrectly configured, you can use the Hardware Troubleshooter to resolve the incompatibility.

Microsoft Windows® XP

To resolve incompatibilities using the Hardware Troubleshooter:

- 1 Click the **Start** button and click **Help and Support**.
- 2 Type `hardware troubleshooter` in the **Search** field and click the arrow to start the search.
- 3 Click **Hardware Troubleshooter** in the **Search Results** list.
- 4 In the **Hardware Troubleshooter** list, click **I need to resolve a hardware conflict on my computer**, and click **Next**.

To resolve incompatibilities using the Hardware Troubleshooter:

- 1 Click the **Start** button and click **Help**.
- 2 Click **Troubleshooting and Maintenance** on the **Contents** tab, click **Windows XP troubleshooters**, and then click **Hardware**.
- 3 In the **Hardware Troubleshooter** list, click **I need to resolve a hardware conflict on my computer** and click **Next**.

Windows 2000

To resolve incompatibilities using Device Manager:

- 1 Click the **Start** button, point to **Settings**, and then click **Control Panel**.
- 2 In the **Control Panel** window, double-click **System**.
- 3 Click the **Hardware** tab.
- 4 Click **Device Manager**.
- 5 Click **View** and click **Resources by connection**.
- 6 Double-click **Interrupt request (IRQ)**.

Incorrectly configured devices are indicated by a yellow exclamation point (!) or a red x if the device has been disabled.

- 7 Double-click any device marked with an exclamation point to display the **Properties** window. The **Device** status area in the **Properties** window reports the cards or devices that need to be reconfigured.
- 8 Reconfigure the devices or remove the devices from the Device Manager. See the documentation that came with the device for information on configuring the device.

To resolve incompatibilities using the Hardware Troubleshooter:

- 1 Click the **Start** button and click **Help**.
- 2 Click **Troubleshooting and Maintenance** on the **Contents** tab, click **Windows 2000 troubleshooters**, and then click **Hardware**.
- 3 In the **Hardware Troubleshooter** list, click **I need to resolve a hardware conflict on my computer** and click **Next**.

Using System Restore in Windows XP

The Microsoft® Windows® XP operating system provides System Restore to allow you to return your computer to an earlier operating state (without affecting data files) if changes to the hardware, software, or other system settings have left the computer in an undesirable operating state.



NOTICE: Make regular backups of your data files. System Restore does not monitor your data files or recover them.

Creating a Restore Point

- 1 Click the **Start** button and click **Help and Support**.
- 2 Click **System Restore**.
- 3 Follow the instructions on the screen.

Restoring the Computer to an Earlier Operating State



NOTICE: Before you restore the computer to an earlier operating state, save and close all open files and close all open programs. Do not alter, open, or delete any files or programs until the system restoration is complete.

- 1 Click the **Start** button, point to **All Programs**→ **Accessories**→ **System Tools**, and then click **System Restore**.
- 2 Ensure that **Restore my computer to an earlier time** is selected, and click **Next**.
- 3 Click a calendar date to which you want to restore your computer.

The **Select a Restore Point** screen provides a calendar that allows you to see and select restore points. All calendar dates with available restore points appear in bold.

- 4 Select a restore point and click **Next**.

If a calendar date has only one restore point, then that restore point is automatically selected. If two or more restore points are available, click the restore point that you prefer.

- 5 Click **Next**.

The **Restoration Complete** screen appears after System Restore finishes collecting data, and then the computer automatically restarts.

- 6 After the computer restarts, click **OK**.

To change the restore point, you can either repeat the steps using a different restore point, or you can undo the restoration.

Using Last Known Good Configuration

- 1 Restart your computer and press <F8> when the message **Please select the operating system to start** appears.
- 2 Highlight **Last Known Good Setting**, press <Enter>, press <l>, and then select your operating system when prompted.

Other Options to Help Resolve Additional Device or Software Conflicts

 **NOTICE:** The following processes erase all of the information on your hard drive.

- Reinstall your operating system using the operating system CD.

 **NOTE:** The operating system CD is optional and may not ship with every computer.

During the operating system reinstallation, you can select to delete the existing partitions and reformat your hard drive.

- Reinstall all drivers, beginning with the chipset, using the optional *Drivers and Utilities* CD.

When to Use the Dell Diagnostics

If you experience a problem with your computer, run the Dell Diagnostics before you contact Dell for technical assistance. The test results provide important information for Dell's service and support personnel.

 **NOTICE:** Only use the Dell Diagnostics to test your Dell™ computer. Using this program with other computers can cause incorrect computer responses or result in error messages.

The Dell Diagnostics allow you to:

- Perform quick checks or extensive tests on one or all devices.
- Choose how many times a test is run.
- Display or print test results or save them in a file.
- Suspend testing if an error is detected or terminate testing if a certain number of errors occur.
- Access online **Help** screens that describe the tests and how to run them.
- Read status messages that tell you whether tests completed successfully.
- Receive error messages if problems are detected.

Before You Start Testing

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

- Turn on your printer if one is attached.
- Enter system setup, review your computer's configuration information, and then enable all of your computer's components and devices, such as connectors.

Running the Dell Diagnostics

It is recommended that you print these procedures before you begin.

- 1 Open the Dell Diagnostics on your hard drive or from the *Drivers and Utilities* CD.

From your hard drive:

- a Shut down and restart the computer.
- b When **F2 = Setup** appears in the upper-right corner of the screen, press <Ctrl><Alt><F10>.

If you wait too long and the Microsoft® Windows® logo appears, continue to wait until you see the Windows desktop. Then shut down your computer and try again. After the system boots to the Dell Diagnostics, go to step 2.

From the Drivers and Utilities CD:

- a Shut down and restart the computer.
- b When **F2 = Setup** appears in the upper-right corner of the screen, press <F12>.

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

 **NOTE:** This feature changes the boot sequence for one time only. On the next start-up, the computer boots according to the devices specified in system setup.

The **Boot Device Menu** appears.

- c Insert the *Drivers and Utilities* CD.
- d Change the **Boot Sequence** to use the IDE CD-ROM device as the first device in the boot sequence.

The Dell Diagnostics Menu appears.

- e Select **Dell 32-bit Diagnostics** from the numbered list. If multiple versions are listed, select the version appropriate for your computer.

- 2 When the **Dell Diagnostics** main menu appears, select the type of test you want to perform.

System Lights

These lights on the front of the computer can indicate a computer problem.

Power Light	Hard-Drive Light	Cause	Corrective Action
Solid green	N/A	Power is on, and the computer is operating normally.	No corrective action is required.
Blinking green	Blank	The computer is in the suspended state (Windows XP).	Press the power button, move the mouse, or press a key on the keyboard to wake the computer. See "Power Management" in the <i>User's Guide</i> for more information.
Blinks green several times and then turns off	N/A	A configuration error exists.	Check the diagnostic lights to see if the specific problem is identified. See the <i>User's Guide</i> for more information.
Solid yellow	N/A	The Dell Diagnostics is running a test, or a device on the system board may be faulty or incorrectly installed.	If the Dell Diagnostics is running, allow the testing to complete. Check the diagnostic lights to see if the specific problem is identified. If the computer does not boot, contact Dell for technical assistance.
Blinking yellow	Blank	A power supply or system board failure has occurred.	Check the diagnostic lights to see if the specific problem is identified. See "Power Problems" in the <i>User's Guide</i> .
Blinking yellow	Solid green	A system board or VRM failure has occurred.	Check the diagnostic lights to see if the specific problem is identified.
Solid green and a beep code during POST	N/A	A problem was detected while the BIOS was executing.	See "Beep Codes" on page 28 for instructions on diagnosing the beep code. Also, check the diagnostic lights to see if the specific problem is identified.
Solid green power light and no beep code and no video during POST	N/A	The monitor or the graphics card may be faulty or incorrectly installed.	Check the diagnostic lights to see if the specific problem is identified. Also, see "Video Problems" in the <i>User's Guide</i> .
Solid green power light and no beep code but the computer locks up during POST	N/A	An integrated system board device may be faulty.	Check the diagnostic lights to see if the specific problem is identified. If the problem is not identified, contact Dell for technical assistance.

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.

If your computer beeps during start-up:

- 1 Write down the beep code on the Diagnostic Checklist (see your *User's Guide*).
- 2 Run the Dell Diagnostics to identify a more serious cause.
- 3 Contact Dell for technical assistance.

Code	Cause	Code	Cause
1-1-2	Microprocessor register failure	3-3-4	Video Memory Test failure
1-1-3	NVRAM read/write failure	3-4-1	Screen initialization failure
1-1-4	ROM BIOS checksum failure	3-4-2	Screen retrace failure
1-2-1	Programmable interval timer failure	3-4-3	Search for video ROM failure
1-2-2	DMA initialization failure	4-2-1	No timer tick
1-2-3	DMA page register read/write failure	4-2-2	Shutdown failure
1-3	Video Memory Test failure	4-2-3	Gate A20 failure
1-3-1 through 2-4-4	Memory not being properly identified or used	4-2-4	Unexpected interrupt in protected mode
3-1-1	Slave DMA register failure	4-3-1	Memory failure above address 0FFFFh
3-1-2	Master DMA register failure	4-3-3	Timer-chip counter 2 failure
3-1-3	Master interrupt mask register failure	4-3-4	Time-of-day clock stopped
3-1-4	Slave interrupt mask register failure	4-4-1	Serial or parallel port test failure
3-2-2	Interrupt vector loading failure	4-4-2	Failure to decompress code to shadowed memory
3-2-4	Keyboard Controller Test failure	4-4-3	Math-coprocessor test failure
3-3-1	NVRAM power loss	4-4-4	Cache test failure
3-3-2	Invalid NVRAM configuration	4-3-4	Time-of-day clock stopped

Error Messages

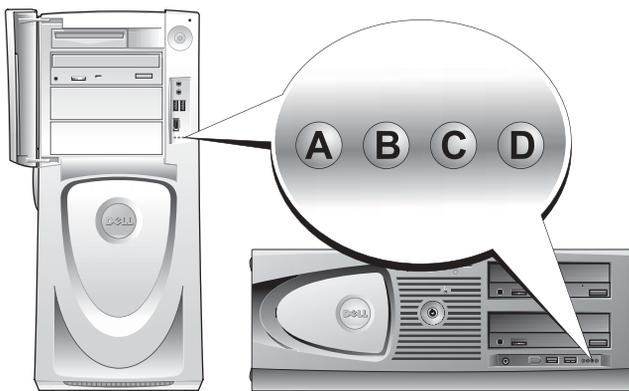
 **NOTE:** If the message is not listed, see the documentation for either the operating system or the program that was running when the message appeared.

If an error occurs during start-up, a message may be displayed on the monitor identifying the problem. See "Error Messages" in your *User's Guide* for suggestions on resolving any problems.

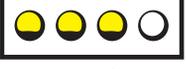
Diagnostic Lights

 **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 front panel. The lights can be yellow, green, or off. 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.



Diagnostic Light Codes Before POST

Light Pattern		Problem Description	Suggested Resolution
	off off off off	No electrical power is supplied to the computer.	Connect the computer to an electrical outlet. Ensure that the front-panel power light is on. If the power light is off, ensure that the computer is connected to a working electrical outlet and then press the power button. If the problem is still not resolved, contact Dell for technical assistance.
	yellow off off off	The computer is in a normal off condition; the computer is connected to an electrical outlet.	Press the power button to turn the computer on. If the computer does not turn on, ensure that the front-panel power light is on. If the power light is off, ensure that the computer is connected to a working electrical outlet and then press the power button. If the problem is still not resolved, contact Dell for technical assistance.
	yellow yellow off off	The computer is in a reduced power or "sleep" state.	Use one of the appropriate methods to "wake up" the computer. See "Advanced Features" in the <i>User's Guide</i> . If the problem is not resolved and you are trying to wake the computer with a USB mouse or keyboard, substitute the mouse or keyboard with a working PS/2 mouse or keyboard and then try to wake the computer.
	yellow yellow yellow off	The BIOS is not executing.	Ensure that the processor is seated correctly and restart the computer. If the problem is still not resolved, contact Dell for technical assistance.
	off yellow off off	A possible power supply or power cable failure has occurred.	Perform the procedure in "Power Problems" in the <i>User's Guide</i> . If the problem is still not resolved, contact Dell for technical assistance.
	off off yellow off	A possible system board failure has occurred.	Contact Dell for technical assistance.

 = yellow

 = green

 = off

Light Pattern	Problem Description	Suggested Resolution
 A B C D	yellow off yellow off	A processor and/or VRM mismatch exists. Perform the procedure in "Processor Problems" in the <i>User's Guide</i> .
 A B C D	green yellow yellow off	A possible VRM 0 failure has occurred. Contact Dell for technical assistance.
 A B C D	yellow green yellow green	A possible VRM 1 failure has occurred. Perform the procedure in "Processor Problems" in the <i>User's Guide</i> .
 A B C D	green green yellow off	A possible VRM 0 and VRM 1 failure has occurred. Contact Dell for technical assistance.

 = yellow

 = green

 = off

Diagnostic Light Codes During POST

Light Pattern	Problem Description	Suggested Resolution
 A B C D	yellow yellow green yellow	A possible processor failure has occurred. Reinstall the processor and restart the computer.

 = yellow

 = green

 = off

Light Pattern	Problem Description	Suggested Resolution
 <p data-bbox="311 244 372 388">yellow yellow green green</p>	Memory modules are detected, but a memory failure has occurred.	<ol style="list-style-type: none"> <li data-bbox="893 244 1283 326">1 Reseat the memory modules to ensure that your computer is successfully communicating with the memory. <li data-bbox="893 336 1119 362">2 Restart the computer. <li data-bbox="893 373 1260 487">3 If the problem still exists, remove all the memory modules and install one memory module in connector DIMM_1. <li data-bbox="893 498 1283 673">4 Restart the computer. The following message appears: Alert! Operating in Debug Mode. Please Populate Memory in Pairs for Normal Operation. <li data-bbox="893 683 1165 736">5 Press <F1> to boot to the operating system. <li data-bbox="893 746 1153 798">6 Run the Dell Diagnostics (see page 26). <li data-bbox="893 808 1283 1107">7 If the memory module passes, shut down the computer, remove the memory module, and then repeat the process with the remaining memory modules until a memory error occurs during start-up or diagnostic testing. If the first memory module tested is defective, repeat the process with the remaining modules to ensure that the remaining modules are not defective. <li data-bbox="893 1117 1268 1199">8 When the defective memory module is identified, contact Dell for a replacement. <p data-bbox="879 1209 1283 1291">NOTE: If necessary, the computer can operate in debug mode until new memory modules are installed.</p>

 = yellow

 = green

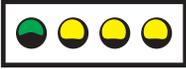
 = off

Light Pattern		Problem Description	Suggested Resolution
 A B C D	yellow green yellow yellow	A possible expansion card failure has occurred.	<ol style="list-style-type: none"> 1 Determine if a conflict exists by removing a card (not the graphics card) and then restarting the computer. 2 If the problem persists, reinstall the card that you removed, remove a different card, and then restart the computer. 3 Repeat this process for each card. If the computer starts normally, troubleshoot the last card removed from the computer for resource conflicts (see your <i>User's Guide</i>). 4 If the problem persists, contact Dell.
 A B C D	yellow green yellow green	A possible graphics card failure has occurred.	<ul style="list-style-type: none"> • If the computer has a graphics card, remove the card, reinstall it, and then restart the computer. • If the problem still exists, install a graphics card that you know works and restart the computer. • If the problem persists or the computer has integrated graphics, contact Dell.
 A B C D	yellow green green yellow	A possible floppy or hard drive failure has occurred.	Reseat all power and data cables and restart the computer.
 A B C D	yellow green green green	A possible USB failure has occurred.	Reinstall all USB devices, check cable connections, and then restart the computer.

 = yellow

 = green

 = off

Light Pattern	Problem Description	Suggested Resolution
 <p data-bbox="308 248 372 388"> green yellow yellow yellow </p>	No memory modules are detected.	<ol style="list-style-type: none"> <li data-bbox="879 248 1283 361">1 Reseat the memory modules to ensure that your computer is successfully communicating with the memory. <li data-bbox="879 369 1283 387">2 Restart the computer. <li data-bbox="879 404 1283 517">3 If the problem still exists, remove all the memory modules and install one memory module in connector DIMM_1. <li data-bbox="879 526 1283 699">4 Restart the computer. The following message appears: Alert! Operating in Debug Mode. Please Populate Memory in Pairs for Normal Operation. <li data-bbox="879 716 1283 769">5 Press <F1> to boot to the operating system. <li data-bbox="879 786 1283 803">6 Run the Dell Diagnostics. <li data-bbox="879 821 1283 1107">7 If the memory module passes, shut down the computer, remove the memory module, and then repeat the process with the remaining memory modules until a memory error occurs during start-up or diagnostic testing. If the first memory module tested is defective, repeat the process with the remaining modules to ensure that the remaining modules are not defective. <li data-bbox="879 1124 1283 1203">8 When the defective memory module is identified, contact Dell for a replacement. <p data-bbox="879 1220 1283 1293">NOTE: If necessary, the computer can operate in debug mode until new memory modules are installed.</p>

-  = yellow
-  = green
-  = off

Light Pattern		Problem Description	Suggested Resolution
 A B C D	green yellow yellow green	System board failure has occurred.	Contact Dell for technical assistance.
 A B C D	green yellow green yellow	Memory modules are detected, but a memory configuration or compatibility error exists.	<ul style="list-style-type: none"> • Ensure that no special memory module requirements exist (see "Memory Overview" in the <i>User's Guide</i>). • Verify that the memory modules that you are installing are compatible with your computer. • Reinstall the memory modules and restart the computer. • If the problem persists, contact Dell.
 A B C D	green yellow green green	A possible expansion card failure has occurred.	<ol style="list-style-type: none"> 1 Determine if a conflict exists by removing a card (not a graphics card) and restarting the computer. 2 If the problem persists, reinstall the card that you removed, remove a different card, and then restart the computer. 3 Repeat this process for each card. If the computer starts normally, troubleshoot the last card removed from the computer for resource conflicts (see your <i>User's Guide</i>). <p>If the problem persists, contact Dell.</p>
 A B C D	green green yellow yellow	A possible system board resource and/or hardware failure has occurred.	<p>Perform the procedures in your <i>User's Guide</i>.</p> <p>If the problem persists, contact Dell.</p>

 = yellow

 = green

 = off

Light Pattern	Problem Description	Suggested Resolution
 A B C D green green green yellow	Another failure has occurred.	<ul style="list-style-type: none"> Ensure that the cables are properly connected to the system board from the hard drive, CD drive, and DVD drive. If the problem persists, contact Dell.
 A B C D green green green green	The computer is in a normal operating condition after POST.	None.

 = yellow
 = green
 = off

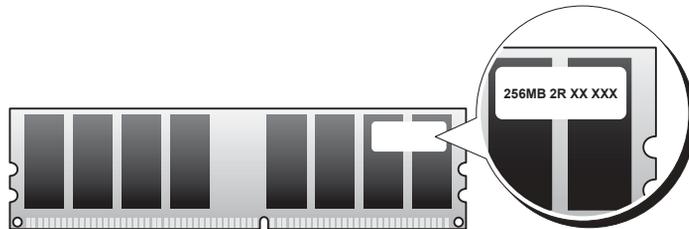
Memory Overview

 **NOTE:** Your computer supports ECC and registered memory.

- Memory modules should be installed in *pairs of matched size, speed, and rank* (1R is single rank and 2R is dual rank). See the label on the memory module to determine its size, speed rank, and organization. Be sure that your memory module labels match.

Example: 256MB 1Rx8 PC2-3200R-333-10:

- Size = 256 MB
- Speed = 3200
- Rank = 1R
- Organization = x8



- Memory modules can be single rank (1R) or dual rank (2R) and should be installed in the following order:
 - The highest rank memory module in DIMM_1 and DIMM_2
 - Equal or lower rank memory modules in DIMM_3 and DIMM_4
 - Single rank (1R) memory modules in DIMM_5 and DIMM_6
- If only two memory modules are installed, they must be installed in DIMM_1 and DIMM_2. These connectors are located on the outside edge of the board.
- Memory modules should be installed in the following order: connectors DIMM_1 and DIMM_2, DIMM_3 and DIMM_4, and then DIMM_5 and DIMM_6. If dual-rank modules are installed in DIMM_3 and DIMM_4, then DIMM_5 and DIMM_6 cannot be used.
- Dual-rank memory modules are not supported in DIMM_5 and DIMM_6.



NOTE: Memory purchased from Dell is covered under your computer warranty.



NOTICE: If you remove your original memory modules from the computer during a memory upgrade, keep them separate from any new modules that you may have, even if you purchased the new modules from Dell. If possible, *do not* pair an original memory module with a new memory module. Otherwise, your computer may not start properly. You should install your original memory modules in pairs in connectors DIMM_1 and DIMM_2, connectors DIMM_3 and DIMM_4, and then DIMM_5 and DIMM_6.



NOTICE: If you install more than 4 GB of memory, you must also install a fan to cool the computer. If you do not install a fan, you will get an error message stating that you must install a fan or remove some memory.

Frequently Asked Questions

How Do I...	Solution	Where to Find Additional Information
Set up my computer to use two monitors?	If your computer has the required graphics card to support dual-monitor setup, then look in your box for a Y-cable. The cable has a single connector on one end (plug this connector into the back panel) and branches into two connectors (plug these connectors in the monitor cables). For the Dell Precision 670 computer, see "Setting Up Your Dell Precision 670 Computer" on page 9 and for the Dell Precision 470 computer, see "Setting Up Your Dell Precision 470 Computer" on page 15.	To locate additional information about using dual monitors, see the graphics card documentation on the <i>Drivers and Utilities</i> CD.
Connect my monitor when the monitor cable connector doesn't seem to fit the connector on the back of my computer?	If your graphics card has a DVI connector but your monitor has a VGA connector, then you need to use an adapter. An adapter should be included in the box.	For the Dell Precision 670 computer, see "Connect the monitor" on page 10 and for the Dell Precision 470 computer, see "Connect the monitor" on page 16.
Connect my speakers?	If you have a sound card installed, connect the speakers to the connectors on the card. For the Dell Precision 670 computer, see "Connect the speakers" on page 13 and for the Dell Precision 470 computer, see "Connect the speakers" on page 17.	See the documentation that came with your speakers for more information.
Find the right connectors for my USB or IEEE 1394 devices?	Your Dell Precision 670 computer has two front panel and six back panel USB 2.0 compliant connectors. It also has two 6-pin serial IEEE 1394 connectors. See "Setting Up Your Dell Precision 670 Computer" on page 9. Your Dell Precision 470 computer has two front panel and six back panel USB 2.0 connectors. It is also available with an add-in PCI IEEE 1394 card. See "Setting Up Your Dell Precision 470 Computer" on page 15.	See the front and back view graphics of your computer in your <i>User's Guide</i> . For help with locating your <i>User's Guide</i> , see "Dell Precision™ Mobile Workstation User's Guide" on page 6.

How Do I...	Solution	Where to Find Additional Information
Locate information about the hardware and other technical specifications for my computer?	Your <i>User's Guide</i> has a specifications table that provides more detailed information about your computer and the hardware. To locate your <i>User's Guide</i> , see "Finding Information" on page 5.	Go to the Dell Support website at support.dell.com and use one of the following support tools: read white papers on the latest technology or communicate with other Dell users at the Dell forum chat room.
Install new memory?	Your <i>User's Guide</i> has a memory section that provides detailed information about your computer's memory. See "Memory Overview" on page 36.	For help with locating your <i>User's Guide</i> , see "Finding Information" on page 5.
Find documentation for my computer?	The following documentation is available for your computer: <ul style="list-style-type: none"> • <i>User's Guide</i> • <i>Product Information Guide</i> • System Information Label • <i>Service Manual</i> To locate these documents, see "Finding Information" on page 5.	If you lose your documentation, it is available on the Dell Support website at support.dell.com .

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