



# **Hardware Guide**

## HP Compaq Notebook Series

Document Part Number: 345582-001

December 2003

This guide explains how to identify and use notebook hardware features, including connectors for external devices. It also includes power and environmental specifications, which can be helpful when traveling with the notebook.

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**Hardware Guide**

**HP Compaq Notebook Series**

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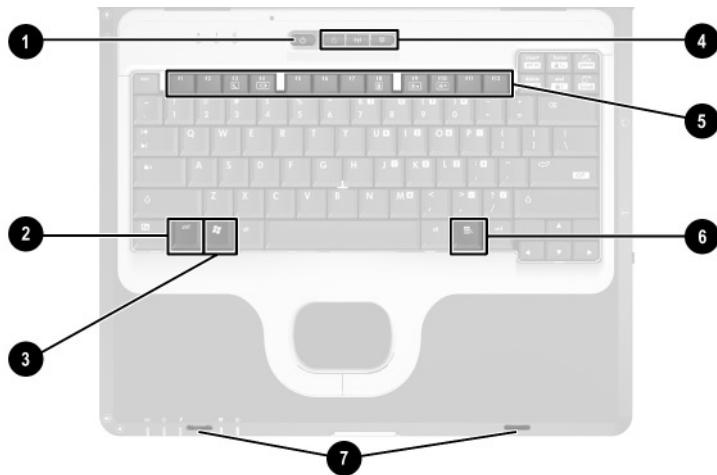
# Notebook Features

## TouchPad Components



Component	Description
① TouchPad	Moves the pointer and selects or activates items on the screen. Can be set to perform other mouse functions, such as scrolling and double-clicking.
② Left and right TouchPad buttons	Function like the left and right buttons on an external mouse.

# Top Components



Component	Description
① Power button*	<p>When the notebook is:</p> <ul style="list-style-type: none"> <li>■ Off, press and release to turn on the notebook.</li> <li>■ In Standby, press and release to exit Standby.</li> <li>■ In Hibernation, press and release to exit Hibernation.</li> </ul> <p>If the system has stopped responding and Microsoft Windows shutdown procedures cannot be used, press and hold for 5 seconds to turn off the notebook.</p>

\*This table describes default settings. For information about changing the functions of the power button and about using Standby and Hibernation, refer to the "Power" chapter in the *Software Guide* on the *Documentation CD*.

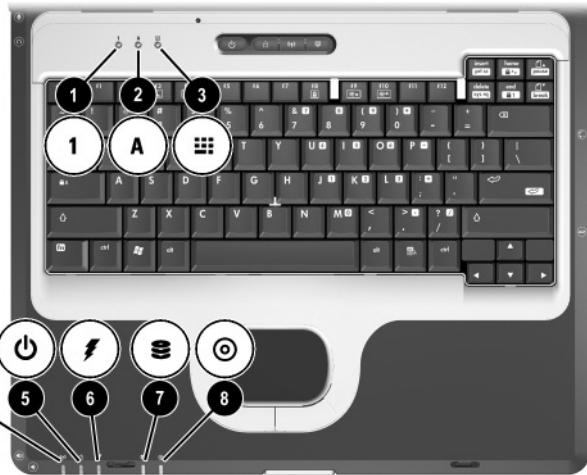
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Component	Description
② <b>fn</b> key	Executes frequently used system functions when pressed in combination with a function key or the <b>esc</b> key.
③ Microsoft logo key	Displays the Windows Start menu.
④ Quick Launch buttons (3)	<p>Enable you to access common functions with a single keystroke.</p> <ul style="list-style-type: none"> <li>■ QuickLock button (left)—Disables the keyboard and pointing device and clears the display.</li> <li>■ Wireless On/Off button (center)—Enables and disables the optional integrated wireless device(s) on the notebook.</li> <li>■ Presentation Mode buttons (right)—Alternates between presentation modes.</li> </ul>
⑤ Function keys (5)	 When using the Wireless On/Off button to enable integrated wireless LAN (WLAN) or Bluetooth, first ensure that WLAN or Bluetooth has been enabled in the software and that the Wireless On/Off light is on before attempting to make a connection.  For more information, refer in this guide to the “ <a href="#">Pointing Devices and Keyboard</a> ” chapter.

*(Continued)*

Component	Description
⑥ Applications key	Displays shortcut menu for items beneath the pointer.
⑦ Display release latch recesses (2)	Secure the display when it is closed.
Memory compartment (not shown; located under the keyboard)	Contains one primary memory slot and one expansion slot.
	 One or both of the memory slots may be populated at the factory, depending on the amount of preinstalled memory on the notebook.

# Lights



Component	Description
① Num lock	On: Num lock is on or the embedded numeric keypad is enabled.
② Caps lock	On: Caps lock is on.
③ Scroll lock	On: Scroll lock is on.
④ Wireless On/Off	On: An optional integrated wireless device has been enabled.
⑤ Power/Standby	On: Power is turned on. Blinking: Notebook is in Standby.
	 The light turns off when the system enters Hibernation or shuts down.

*(Continued)*

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<b>Component</b>	<b>Description</b>
⑥ Battery	On: A battery pack is charging. Blinking: A battery pack that is the only available power source has reached a low-battery condition. When the battery reaches a critical low-battery condition, the battery light begins blinking more quickly. Off: AC power is applied with battery pack either fully charged or not installed, or no AC power is applied.
⑦ Primary hard drive	On: Hard drive in the hard drive bay is being accessed.
⑧ MultiBay	On: A device in the MultiBay is being accessed.

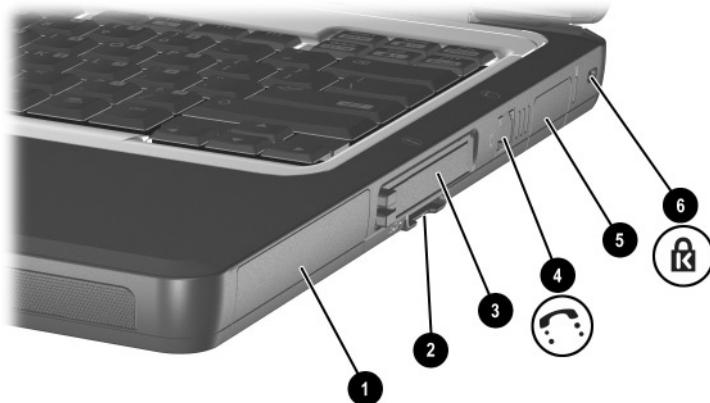
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## Left-Side Components



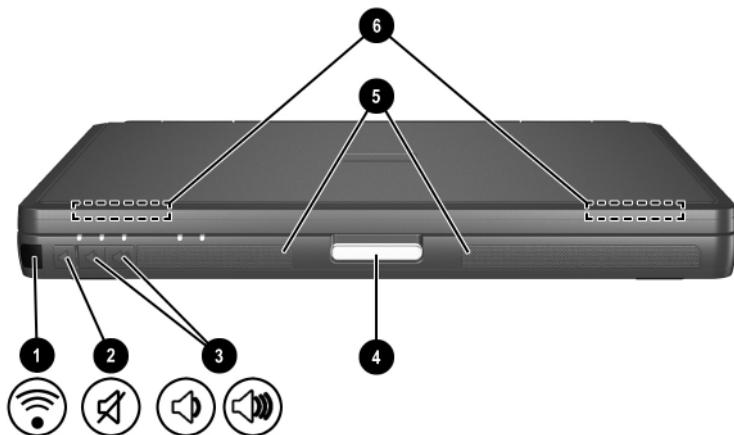
Component	Description
① Audio line-out jack	Produces system sound when connected to optional powered stereo speakers, headphones, headset, or television audio.
② Microphone jack	Connects optional external monaural or stereo microphones.
③ Hard drive bay	Holds the primary hard drive.
④ MultiBay	Holds a MultiBay device.

## Right-Side Components



Component	Description
① Battery bay	Holds the primary battery pack.
② Secure Digital (SD) slot	Accepts SD Memory Cards.
③ PC Card slots (2)	Support optional Type I, Type II, or Type III 32-bit (CardBus) or 16-bit PC Cards.
④ RJ-11 telephone jack	Connects a modem cable.
⑤ Bluetooth compartment	Holds an optional wireless Bluetooth device.  Bluetooth is not supported in all countries.
⑥ Security cable slot	Attaches an optional security cable to the notebook.  The purpose of security solutions is to act as a deterrent. These solutions do not prevent the product from being mishandled or stolen.

## Front Components



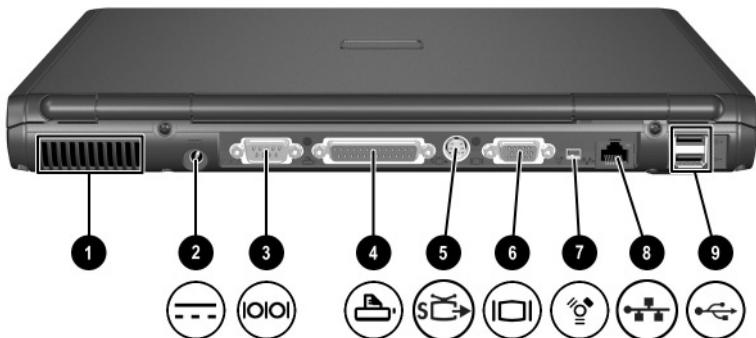
Component	Description
① Infrared port	Provides wireless communication between the notebook and an optional Infrared Data Association (IrDA)-compliant device.
② Mute button	Mutes the system volume when pressed. The button lights up when volume is muted.
③ Volume control buttons	Increase and decrease system volume. Press the volume up button (on right) to increase sound. Press the volume down button (on left) to decrease sound.
④ Display release latch	Opens the notebook.

*(Continued)*

Component	Description
⑤ Speakers (2)	Produce system sound.
⑥ Wireless antennae (2)	Transmit wireless data.

**⚠ WARNING: Exposure to Radio Frequency Radiation**  
The radiated output power of this device is below the FCC radio frequency exposure limits. Nevertheless, the device should be used in such a manner that the potential for human contact during normal operation is minimized. To avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna should not be less than 20 cm (8 inches) during normal operation, including when the notebook display is closed.

## Rear Components



Component	Description
① Exhaust vent	Enables airflow to cool internal components.  ⚠ To prevent overheating, do not obstruct vents. Using the notebook on a soft surface such as a pillow, blanket, rug, or thick clothing can block airflow.
② AC power connector	Connects an AC adapter or an optional Automobile Power Adapter/Charger or Aircraft Power Adapter.
③ Serial connector	Connects an optional serial device.
④ Parallel connector	Connects an optional parallel device, such as an external printer.

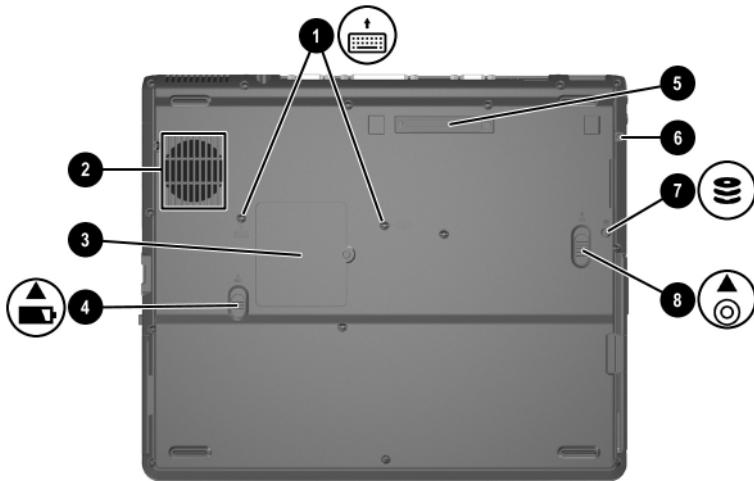
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<b>Component</b>	<b>Description</b>
⑤ S-Video-out jack	Connects an optional S-Video device, such as a television or an overhead projector.
⑥ External monitor connector	Connects an optional external monitor or an overhead projector.
⑦ 1394 connector	Connects a device that requires high bandwidth, such as an optional digital camera or other video or audio device.
⑧ RJ-45 network jack	Connects a network cable.
⑨ USB connectors (2)	Connects USB 1.1- and 2.0-compliant devices to the notebook, using a standard USB cable.

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## Bottom Components



Component	Description
① Keyboard access screws (2)	Enable you to remove the keyboard to access system memory.
② Intake vent	Enables airflow to cool internal components.  ⚠ To prevent overheating, do not obstruct vents. Using the notebook on a soft surface such as a pillow, blanket, rug, or thick clothing can block airflow.

*(Continued)*

Component	Description
③ Mini PCI compartment	Holds an optional wireless LAN device.
	 The FCC does not allow unauthorized Mini PCI devices to be used in this notebook. Installing an unsupported MiniPCI device can prevent your notebook from operating properly and can result in a warning message. To resume proper notebook operation, remove the unauthorized device. Contact your Customer Care Center if a warning message about your MiniPCI device displays in error.
④ Battery bay release latch	Releases the primary battery pack from the battery bay.
⑤ Docking connector	Connects the notebook to an optional Port Replicator or an Advanced Port Replicator.
⑥ Hard drive door retaining screw	Retains the hard drive door.
⑦ Hard drive security screw	Secures the hard drive.
⑧ MultiBay release latch	Releases the MultiBay device.

## Labels

The labels affixed to the bottom of the notebook and to the inside of the battery compartment provide information you may need when you troubleshoot system problems or travel abroad with the notebook.

- The Service Tag label affixed to the bottom of the notebook contains the product name, product number (P/N), and serial number (S/N). You will need the notebook serial number and product number if you call customer support.
- The Microsoft Certificate of Authenticity label affixed to the bottom of the notebook contains the Product Key number. You may need this number to update or troubleshoot problems with the operating system.
- The System label affixed to the bottom of the notebook provides regulatory information about the notebook.
- The Modem approval label affixed to the bottom of the notebook provides regulatory information and lists the agency markings required by some of the countries in which the modem has been approved for use. You may need to use the wireless device information in order to operate the wireless device while traveling internationally.
- The WLAN label affixed to the bottom of the notebook provides regulatory information and lists the agency markings required by some of the countries in which the optional wireless devices have been approved for use. You may need to use the wireless device information in order to operate the wireless device while traveling.
- The Bluetooth label affixed to the bottom of the notebook provides regulatory information and lists the agency markings required by some of the countries in which the optional device has been approved for use. You may need to use the wireless device information in order to operate the wireless device while traveling internationally. Bluetooth is not supported in all countries.

# Pointing Devices and Keyboard

## Using a Pointing Device



Component	Description
① TouchPad	Moves the pointer and selects or activates items on the screen. Can be set to perform other mouse functions, such as scrolling and double-clicking.
② Left and right TouchPad buttons	Function like the left and right buttons on an external mouse.

## **Using the TouchPad**

To move the pointer, slide your finger across the TouchPad surface in the direction you want the pointer to go. Use the left and right TouchPad buttons as you would the left and right buttons on an external mouse.

## **Using an External Mouse**

An external USB mouse can be connected to the notebook using one of the connectors on the back panel. An external PS/2 or USB mouse can be connected to the system using the connectors on an optional Advanced Port Replicator.

## **Setting Pointing Device Preferences**

The Mouse Properties window in Microsoft Windows operating systems enables you to customize settings for pointing devices, including:

- Enabling or disabling a pointing device (enabled by default).
- TouchPad tapping, which enables you to tap the TouchPad once to select an object or twice to double-click an object (disabled by default).
- Edge motion, which enables you to continue to scroll even though your finger has reached the edge of the TouchPad (disabled by default).
- Palm Check, which helps prevent moving the pointer unintentionally if your palms contact the TouchPad as you type (disabled by default).

Other features, such as mouse speed preferences and mouse trails, are also found in the Mouse Properties window.

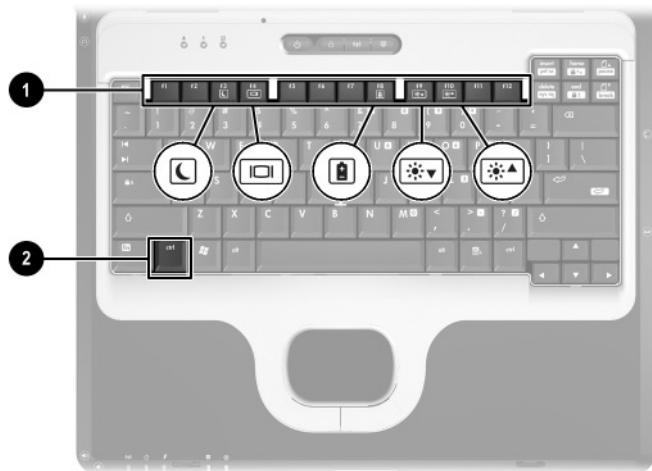
To access Mouse Properties:

- **In Windows XP**, select Start > Control Panel > Printers and Other Hardware > Mouse icon.
- **In Windows 2000**, select Start > Settings > Control Panel > Mouse icon.

# Using Hotkeys and Shortcut Keys

Hotkeys and shortcut keys, which are preset combinations of the **fn** key and another key, execute frequently used system functions.

## Identifying **fn** and Function Keys



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### Component

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**①** Function keys (5)

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**②** **fn** key

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- A *hotkey* is a combination of the **fn** key and one of the function keys. The icons on the function keys represent the hotkey functions available on your notebook.
- A *shortcut key* is a combination of the **fn** key and a key other than a function key.

## Hotkey and Shortcut Key Quick Reference

Function	Key Combination to Activate Function	Key Combination to Deactivate Function
Initiate Standby	<b>fn+f3</b>	Power button
Switch between notebook display and external display	<b>fn+f4</b>	<b>fn+f4</b>
View battery information	<b>fn+f8</b>	<b>fn+f8</b>
Decrease screen brightness	<b>fn+f9</b>	N/A
Increase screen brightness	<b>fn+f10</b>	N/A
Display system information	<b>fn+esc</b>	<b>fn+esc</b>

### Initiating Standby (fn+f3)

- When the notebook is on, press the **fn+f3** hotkey to initiate Standby. When Standby is initiated, your work is saved in memory (RAM), the screen is cleared, and power is conserved. While the notebook is in Standby, the power/standby light blinks.
- To exit Standby, briefly press the power button.

The **fn+f3** hotkey is set at the factory to initiate Standby.



Windows Help refers to the **fn+f3** function as the “sleep button.”

You can change the function of the **fn+f3** hotkey. For example, it can be set to initiate Hibernation instead of Standby. For more information about Standby, Hibernation, and changing the function of the **fn+f3** hotkey, refer to the “Power” chapter in the *Software Guide* on the *Documentation CD*.

## Switching Displays (fn+f4)

The **fn+f4** hotkey switches the image among display devices connected to the external monitor connector or the S-Video-out jack on the notebook. For example, if an external monitor is connected to the notebook, pressing the **fn+f4** hotkey multiple times will toggle the image between the notebook display and an external display. The Intel Extreme Graphics 2 for Mobile display utility offers additional configurations. To access the Intel Extreme Graphics 2 for Mobile display utility:

- **In Windows XP**, select Start > Control Panel > Appearance and Themes > Display > Settings > Advanced > Intel Extreme Graphics 2 for Mobile.
- **In Windows 2000**, select Start > Settings > Control Panel > Display > Settings > Advanced > Intel Extreme Graphics 2 for Mobile.

Most external monitors receive video information from the notebook using the external VGA video standard. The **fn+f4** hotkey can also toggle images among other devices receiving video information from the notebook.

The following five video transmission types, with examples of devices that use them, are supported by the **fn+f4** hotkey:

- LCD (notebook display)
- External VGA (most external monitors)
- S-Video (televisions, camcorders, VCRs, and video capture boards with S-Video-in jacks)
- Composite video (televisions, camcorders, VCRs, and video capture boards with composite video-in jacks)
- DVI-D (external monitors that support the DVI-D interface)



Composite video and DVI-D devices can be connected to the notebook only when it is docked in an optional Advanced Port Replicator.

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## Viewing Battery Charge Information (fn+f8)

Press **fn+f8** to display charge information for all installed battery packs. The display indicates which battery packs are charging and reports the amount of charge remaining in each battery pack.

Battery pack locations are indicated by number:

- Location 1 is the primary battery pack.
- Location 2 is the optional MultiBay battery pack.

## Decreasing Screen Brightness (fn+f9)

Press **fn+f9** to decrease screen brightness. Hold down the hotkey to change the brightness level incrementally.

## Increasing Screen Brightness (fn+f10)

Press **fn+f10** to increase screen brightness. Hold down the hotkey to change the brightness level incrementally.

## Displaying System Information (fn+esc)

Press **fn+esc** to display information about system hardware components and software version numbers. Press **fn+esc** a second time to remove the system information from the screen.



The system BIOS date is the version number of the system ROM. The BIOS date might display in a decimal format, such as 10/19/2002 F.07.

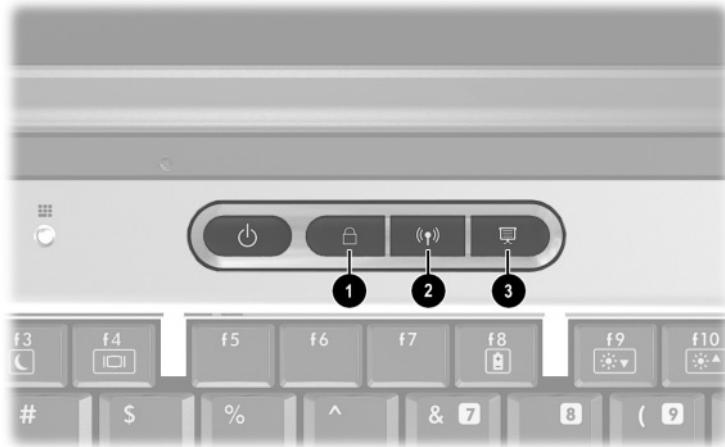
## Using Hotkeys and Shortcut Keys with External Keyboards

The following table describes how certain hotkeys and shortcut keys are used on external keyboards:

Notebook Keys	External Keyboard Keys
<b>fn+esc</b>	scroll lock+scroll lock+esc
<b>fn+f8</b>	scroll lock+scroll lock+f8

# Using Quick Launch Buttons

The 3 Quick Launch buttons enable you to perform common functions with a single keystroke.



Component	Description
① QuickLock button	Disables the keyboard and pointing device and clears the display. Before you can use QuickLock, you must set a password and select preferences. For more information, refer to the “Security” chapter in the <i>Software Guide</i> on the <i>Documentation CD</i> .
② Wireless On/Off button	Turns the wireless LAN or optional Bluetooth device on and off when these devices are enabled in the software utilities.
③ Presentation Mode button	Sets the notebook to presentation mode, which opens a user-defined application, folder, file, or Web site. The image simultaneously displays on the notebook screen and an external device connected to the notebook or to an optional port replicator.

## Using Keypads

The notebook has an embedded numeric keypad and also supports an optional external keypad or an optional external keyboard that includes a numeric keypad.

## Using the Embedded Numeric Keypad

The 15 keys of the embedded numeric keypad can be used like the keys on an external keypad. When the embedded numeric keypad is turned on, each key on the keypad performs the functions indicated by the icon in the upper right corner of the key.



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### Component

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- ① Num lock light
- ② fn key
- ③ num lk key
- ④ Embedded numeric keypad

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## Enabling and Disabling the Embedded Numeric Keypad

Press **fn+num lk** to enable the embedded numeric keypad. The num lock light turns on. Press **fn+num lk** again to return the keys to their standard keyboard functions.



The embedded numeric keypad does not work while an external keyboard or keypad is connected to the notebook or to an optional port replicator.

## Switching Key Functions on the Embedded Numeric Keypad

You can temporarily switch the functions of keys on the embedded numeric keypad between their standard keyboard functions and their keypad functions by using the **fn** key or the **fn+shift** key combination.

- To change the function of a keypad key to keypad functions while the keypad is off, press and hold the **fn** key while pressing the keypad key.
- To use the keypad keys temporarily as standard keys while the keypad is on:
  - Press and hold the **fn** key to type in lowercase.
  - Press and hold **fn+shift** to type in uppercase.

## Using an External Keypad

Most keys on most external keypads function differently, according to whether num lock mode is on or off. For example:

- When num lock is on, most keypad keys type numbers.
- When num lock is off, most keypad keys function like the arrow, page up, or page down keys.

When the num lock mode on an external keypad is turned on, the num lock light on the notebook turns on. When num lock on an external keypad is turned off, the num lock light on the notebook turns off.

If the external keypad is connected, the embedded numeric keypad cannot be turned on.

## Enabling or Disabling Num Lock Mode As You Work

To turn num lock mode on or off on an external keypad as you work, press the **num lk** key on the external keypad, not on the notebook.

## Enabling or Disabling Num Lock Mode at Startup

To configure the notebook to start up with a connected external keypad in num lock mode, you must set this preference in Computer Setup. For more information about using Computer Setup, refer to the “Computer Setup” chapter in the *Software Guide* on the *Documentation* CD.

To set the notebook to start up with the external keypad enabled:

1. Turn on or restart the notebook.
2. Press **f10** while the F10 = ROM Based Setup message is displayed in the lower left corner of the screen.
  - ❑ To change the language, press **f2**.
  - ❑ For navigation instructions, press **f1**.
3. Select Advanced > Device Options, then press **enter**.

4. Select or clear the Num Lock State at Boot check box:

- To enable num lock mode on an external keypad, select the field.
- To disable num lock mode on an external keypad, clear the field.

5. Press **f10**.

6. To save your preference and exit Computer Setup, select File > Save Changes and Exit, then follow the instructions on the screen.

Your preference is set when you exit Computer Setup and takes effect when the notebook restarts.

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## Battery Packs

### Running the Notebook on Battery Power

When the notebook is connected to external AC power, the notebook runs on AC power.

When a charged battery pack is in the notebook and the notebook is not connected to external power, the notebook runs on battery power.

The notebook switches between AC power and battery power according to the availability of an external AC power source. For example, if the notebook contains a charged battery pack and is running on external AC power supplied through the AC adapter, the notebook will switch to battery power if the AC adapter is disconnected from the notebook.

You can leave a battery pack in the notebook or in storage, depending on how you work. Keeping a battery pack in the notebook enables the battery pack to charge whenever the notebook is connected to external AC power and also protects your work in case of a power outage.

On the other hand, battery packs in the notebook slowly discharge when the notebook is turned off. For this reason, the primary battery pack is not shipped inside the notebook and must be inserted before the notebook can run on battery power.

If you will not be using the notebook for 2 weeks or more, remove the battery pack and store it as described in “[Storing a Battery Pack](#)” (later in this chapter) to prolong its life. For more information about leaving your work, refer to the “Power” chapter in the *Software Guide* on the *Documentation CD*.



Only compatible AC adapters and battery packs should be used with the notebook. For additional information, visit the HP Web site at <http://www.hp.com> or use the *Worldwide Telephone Numbers* booklet, included with your notebook, to contact an HP authorized dealer.

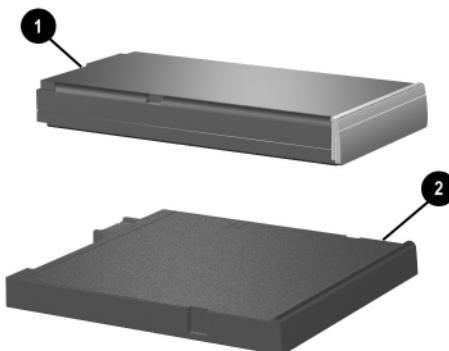
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## Identifying Battery Packs

The notebook supports up to 2 battery packs:

- The *primary* battery pack **1** is a 6- or 8-cell lithium ion battery pack that can be used only in the battery bay. One primary battery pack is included with the notebook.
- The *MultiBay* battery pack **2** is an optional 8-cell prismatic lithium ion battery pack that can be used only in the MultiBay.

For information about the lights and button on the MultiBay battery pack, refer to “[Monitoring the Charge in a Battery Pack](#)” later in this chapter.



# Inserting or Removing a Primary Battery Pack



**CAUTION:** To prevent loss of work when removing a battery pack that is the sole power source, initiate Hibernation or turn off the notebook before removing the battery pack.

To insert a battery pack, turn the notebook upside down, then slide the battery pack into the battery bay until it is seated.



To remove a battery pack, turn the notebook upside down. Then slide and hold the battery release latch **1** as you pull the battery pack **2** from the battery bay.



## **Inserting or Removing a MultiBay Battery Pack**



**CAUTION:** To prevent loss of work when removing a battery pack that is the sole power source, initiate Hibernation or turn off the notebook before removing the battery pack.

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To insert an optional MultiBay battery pack, turn the notebook upside down, then slide the battery pack into the MultiBay until it is seated.



To remove a MultiBay battery pack, turn the notebook upside down. Then slide and hold the MultiBay release latch ① as you pull the battery pack ② from the MultiBay.



**CAUTION:** To prevent damage to the MultiBay when no device is in the MultiBay, insert the weight saver to protect the bay opening. The weight saver can be inserted or removed while the notebook is on, off, in Standby, or in Hibernation.

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## Charging a Battery Pack

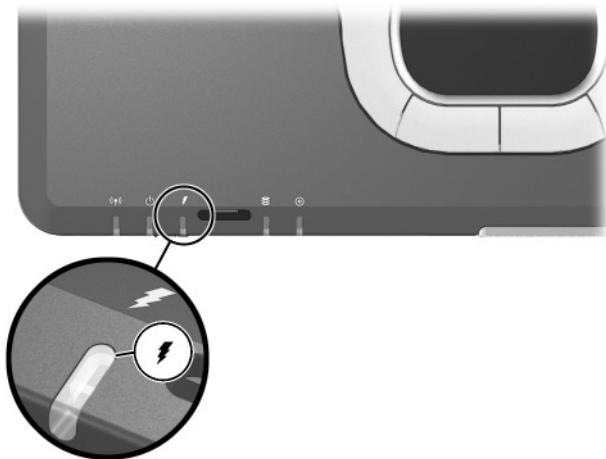
All battery packs inserted into the notebook charge whenever the notebook is connected to external power through an AC adapter or an optional Automobile Power Adapter/Charger.



An optional Aircraft Power Adapter can be used to run the notebook, but it cannot be used to charge a battery pack.

A battery pack can charge whether the notebook is off or in use, but it will charge faster when the notebook is off. Charging might be delayed if a battery pack is new, has not been used for 2 weeks or more, or is much warmer or cooler than room temperature.

When a battery pack is charging, the battery light on the notebook is on. The light turns off when all battery packs in the system are fully charged.



## **Charging a New Battery Pack**

Fully charge the battery pack while the notebook is connected to external power through the AC adapter.

A new battery pack that has been partially but not fully charged can run the notebook, but the battery charge indicators might be inaccurate.

## **Charging an In-Use Battery Pack**

To prolong battery life and increase the accuracy of battery charge indicators:

- Allow a battery pack to discharge to 10 percent of a full charge through normal use before charging it.
- When you charge a battery pack, charge it fully.

## **Charging a Primary and MultiBay Battery Pack**

If a primary battery pack is in the battery bay and a MultiBay battery pack is in the MultiBay, the primary battery pack is the first to charge and the MultiBay battery pack is the first to discharge.

# **Monitoring the Charge in a Battery Pack**

This section explains several ways you can determine the amount of charge in your battery pack.

## **Obtaining Accurate Charge Information**

To increase the accuracy of all battery charge displays:

- Allow a battery pack to discharge to about 10 percent of a full charge through normal use before charging it. See “[Accessing Charge Information](#)” later in this chapter.
- When you charge a battery pack, charge it fully.
- If a battery pack has not been used for 1 month or more, calibrate the battery pack instead of simply charging it. For calibration instructions, refer to “[Calibrating a Battery Pack](#)” later in this chapter.

## **Displaying Charge Information on the Screen**

This section explains how to access and interpret battery charge information on the screen.

## Accessing Charge Information

To access information about the status of any battery pack in the notebook, do one of the following:

- Select the Power icon on the taskbar.
- Press **fn+f8**.
- Access the Power Meter tab:
  - **In Windows XP**, select Start > Control Panel > Performance and Maintenance > Power Options icon > Power Meter tab.
  - **In Windows 2000**, select Start > Settings > Control Panel > Power Options icon > Power Meter tab.

## Interpreting Charge Information

Most charge information reports battery status as both a percentage and the number of minutes of charge remaining.

- The percent indicates the amount of charge remaining in the battery pack.
- The time indicates the approximate running time remaining on the battery pack *if the battery pack continues to provide power at the current level*. For example, the time remaining will decrease when you start playing a DVD and will increase when you stop playing a DVD.

Charge information identifies battery packs by location:

- Location 1 is the primary battery bay.
- Location 2 is the MultiBay.

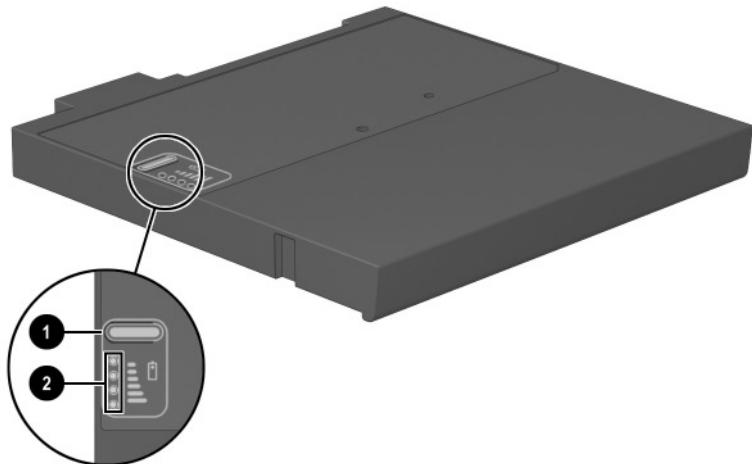
In some charge information, a lightning bolt icon might be displayed beside a battery pack location. The icon indicates that the battery pack in that location is charging.

## Displaying Charge Information on a MultiBay Battery Pack

You can determine the percentage of a full charge remaining in a battery pack that is not inserted into the MultiBay by using the battery Quick Check feature. MultiBay battery packs have battery Quick Check. Primary battery packs do not.

To display the percentage of a full charge remaining in a MultiBay battery pack, press the Quick Check button ① on the MultiBay battery pack.

The Quick Check lights ② indicate the amount of charge remaining in the battery pack. The greater the charge, the more lights that turn on when you press the Quick Check button. When all of the lights are on, the battery pack has a great deal of charge. When only one light is on or blinking, the battery must be charged.



# Managing Low-Battery Conditions

Some low-battery condition alerts and system responses can be changed in the Power Options window of the operating system. The information in this section describes the alerts and system responses set at the factory. Preferences set in the Power Options window do not affect lights.

## Identifying Low-Battery Conditions

This section explains how to identify low and critical low-battery conditions.

### Low-Battery Condition

When a battery pack that is the sole power source for the notebook reaches a low-battery condition, the battery light blinks.

### Critical Low-Battery Condition

If a low-battery condition is not resolved, the notebook enters a critical low-battery condition.

In a critical low-battery condition:

- If Hibernation is enabled and the notebook is on or in Standby, the notebook initiates Hibernation.
- If Hibernation is disabled and the notebook is on or in Standby, the notebook remains briefly in Standby, then shuts down and loses your unsaved work.

To verify that Hibernation is enabled, be sure that the Enable Hibernate Support check box on the Hibernate tab is selected. To access the tab:

- **In Windows XP**, select Start > Control Panel > Performance and Maintenance > Power Options icon.
- **In Windows 2000**, select Start > Settings > Control Panel > Power Options icon.

## Resolving Low-Battery Conditions



**CAUTION:** If the notebook has reached a critical low-battery condition and has initiated Hibernation, do not restore power until the Power/Standby light turns off.

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### When External Power Is Available

To resolve a low-battery condition when external power is available, do one of the following:

- Connect the AC adapter.
- Plug an optional Automobile Power Adapter/Charger into the notebook and into a vehicle cigarette lighter receptacle.
- Plug an optional Aircraft Power Adapter into the notebook and into the in-seat power supply available on some commercial aircraft. (An optional Aircraft Power Adapter can run the notebook but cannot charge a battery pack.)

### When a Charged Battery Pack Is Available

To resolve a low-battery condition when a charged battery pack is available, turn off the notebook or initiate Hibernation, insert a charged battery pack, then turn on the notebook.

### When No Power Source Is Available

To resolve a low-battery condition when no power source is available, initiate Hibernation, or save your work and shut down the notebook.

### When the Notebook Cannot Exit Hibernation

To resolve a low-battery condition when the notebook lacks the power to exit Hibernation:

1. Insert a charged battery pack or connect external power.
2. Exit Hibernation by briefly pressing the power button.

# **Calibrating a Battery Pack**

This section describes when and how to calibrate a battery pack.

## **When to Calibrate**

Even if a battery pack is heavily used, it should not be necessary to calibrate it more than once a month. It is not necessary to calibrate a new battery pack before first use. Calibrate the battery pack under the following conditions:

- When battery charge displays seem inaccurate.
- When you observe a significant change in battery run time.
- When the battery pack has not been used for 1 month or more.

## **How to Calibrate**

To calibrate a battery pack, you must fully charge, fully discharge, then fully recharge the battery pack.

## **Charging the Battery Pack**

A battery pack can charge whether the notebook is off or in use, but it will charge faster when the notebook is off.

To charge the battery pack:

1. Insert the battery pack into the notebook.
2. Connect the notebook to an AC outlet or an optional Automobile Power Adapter/Charger. The battery light on the notebook turns on.
3. Leave the notebook connected to external power until the battery pack is fully charged. The battery light on the notebook turns off.

## Discharging the Battery Pack

Before you begin a full discharge, disable Hibernation. To disable Hibernation:

1. Open the Power Options window:
  - In Windows XP**, select Start > Control Panel > Performance and Maintenance > Power Options > Hibernate tab.
  - In Windows 2000**, select Start > Settings > Control Panel > Performance and Maintenance > Power Options > Hibernate tab.
2. Clear the Enable Hibernation check box.

The notebook must remain on while the battery pack is being discharged. The battery pack can discharge whether or not you are using the notebook, but it will discharge faster while the notebook is in use.

- If you plan to leave the notebook unattended during the discharge, save your work before beginning the discharge procedure.
- If you use the notebook occasionally during the discharge procedure and have set energy-saving timeouts, expect the following performance from your system during the discharge process:
  - The monitor will not turn off automatically.
  - Hard drive speed will not decrease automatically while the notebook is idle.
  - System-initiated Standby will not occur.

To fully discharge a battery pack:

1. Select the Power icon on the taskbar, or access the Power Schemes tab:
  - In Windows XP**, select Start > Control Panel > Performance and Maintenance > Power Options icon > Power Schemes tab.
  - In Windows 2000**, select Start > Settings > Control Panel > Power Management icon > Power Schemes tab.
2. Make a note of the 2 settings in the Plugged In column and the 2 settings in the Running on Batteries column so that you can reset them after the calibration.
3. Use the drop-down lists to set the 4 options (2 in each column) to Never.
4. Select the OK button.
5. Disconnect the notebook from the external power source, but do not turn off the notebook.
6. Run the notebook on battery power until the battery pack is fully discharged. The battery light begins to blink when the battery pack has discharged to a low-battery condition. When the battery pack is fully discharged, the battery light turns off and the notebook shuts down.

## **Recharging the Battery Pack**

1. Connect the notebook to external power and maintain the connection until the battery pack is fully recharged. The battery light on the notebook turns off.

You can use the notebook while the battery pack is recharging but the battery pack will charge faster if the notebook is off.

2. If the notebook is off, turn it on after the battery pack is fully charged and the battery light turns off.

3. Access the Power Schemes tab:

- ❑ **In Windows XP**, select Start > Control Panel > Performance and Maintenance > Power Options icon > Power Schemes tab.
- ❑ **In Windows 2000**, select Start > Settings > Control Panel > Power Management icon > Power Schemes tab.

4. Refer to the settings you recorded earlier. Re-enter the settings that you recorded for the items in the Plugged In column and the Running on Batteries column.

5. Click the OK button.



**CAUTION:** After calibrating the battery pack, re-enable Hibernation. Failure to re-enable Hibernation can result in a complete battery drain and potential data loss.

To re-enable Hibernation:

- **In Windows XP**, select Start > Control Panel > Performance and Maintenance > Power Options icon > Hibernate tab. Select the Enable Hibernation check box.
- **In Windows 2000**, select Start > Settings > Control Panel > Performance and Maintenance > Power Options > Hibernate tab. Select the Enable Hibernation check box.

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# **Battery Conservation Procedures and Settings**

Using the battery conservation procedures and settings described below extends the time that a battery pack can run the notebook from a single charge.

## **Conserving Power as You Work**

To conserve power as you use the notebook:

- Turn off wireless and LAN connections and exit modem applications when you are not using them.
- Disconnect external devices you are not using that are not connected to an external power source.
- Stop or remove a PC Card you are not using. For more information, see [“Using Optional PC Cards”](#) in Chapter 8 of this guide.
- Remove a CD or DVD you are not using.
- Use the **fn+f9** and **fn+f10** hotkeys to adjust screen brightness as you need it.
- Use optional powered speakers instead of the internal speakers, or use the volume buttons to adjust system volume as you need it.
- Turn off a device connected to the S-Video-out jack by turning off support for the device in Windows.
- Run the notebook on external power while formatting a diskette.
- If you leave your work, initiate Standby or Hibernation or shut down the notebook.

## Selecting Power Conservation Settings

To set the notebook to conserve power:

- Select a short wait for the screen saver and select a screen saver with minimal graphics and motion. To access screen saver settings:
  - In Windows XP**, select Start > Control Panel > Appearance and Themes > Display icon > Screen Saver tab.
  - In Windows 2000**, select Start > Settings > Control Panel > Display > Screen Saver tab.
- Select a Power Scheme with low-power-use settings through the operating system. Refer to the “Power” chapter in the *Software Guide* on the *Documentation CD*.
- Select Battery Optimized or Maximum Battery Mode in Intel SpeedStep (Windows 2000 only). Refer to the “Power” chapter in the *Software Guide* on the *Documentation CD*.

## Storing a Battery Pack

If a notebook will be unused and unplugged for more than 2 weeks, remove any battery packs and store them separately.



**CAUTION:** To prevent damage to a battery pack, do not expose it to high temperatures for extended periods of time.

High temperatures accelerate the self-discharge rate of a stored battery pack. To prolong the charge of a stored battery pack, place it in a cool, dry place.

Use the following table to estimate how long you can safely store a battery pack. The storage times provided are based on a battery pack that contains 50 percent of a full charge. A fully charged battery pack can be safely stored for longer times; a battery pack containing a lower charge can be safely stored for less time.

Calibrate a battery pack that has been stored for 1 month or more before using it.

Temperature Range (°F)	Temperature Range (°C)	Safe Storage Time
115° to 140°	46° to 60°	Less than 1 month
79° to 113°	26° to 45°	No more than 3 months
32° to 77°	0° to 25°	1 year

## Disposing of a Used Battery Pack

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**WARNING:** There is a risk of fire and chemical burn if a battery pack is handled improperly. Do not disassemble, crush, or puncture a battery pack or short the contacts on a battery pack. Do not expose a battery pack to temperatures higher than 60°C (140°F) or dispose of a battery pack in water or fire.

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When a battery pack has reached the end of its useful life, do not dispose of it in general household waste.

- In Europe, dispose of or recycle battery packs by using the public collection system or by returning them to HP, your authorized HP partners, or their agents.
- In other regions, refer to the *Worldwide Telephone Numbers* booklet, included with the notebook, to contact an HP authorized dealer, reseller, or service provider and request information about battery pack disposal.

For more information about battery pack precautions and disposal and the complete text of governmental agency notices, refer to the *Regulatory and Safety Notices* guide on the *Documentation CD*.

## Finding More Power Information

For more information about using Standby and Hibernation, conserving power, setting power preferences, and using other power management features, refer to the “Power” chapter in the *Software Guide* on the *Documentation CD*.

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## Drives

### Caring for Drives

Drives are fragile notebook components that must be handled with care. The following cautions apply to all drives. Additional cautions are included in the procedures to which they apply.



**CAUTION:** To prevent loss or damage to the notebook or a drive:

- Handle a drive carefully. Do not drop it.
- Excessive force can damage drive connectors. When you insert a drive, use only enough force to seat the drive.
- Do not spray a drive with cleaning fluid or other liquid or expose it to temperature extremes.
- Do not remove the primary hard drive (the hard drive in the hard drive bay) except for repair or replacement.
- Electrostatic discharge can damage electronic components. To prevent electrostatic damage to the notebook or a drive:
  - Before handling a drive, discharge yourself from static electricity by touching a grounded metal object.
  - Avoid touching the connectors on a drive.
  - Refer to the *Regulatory and Safety Notices* on the *Documentation* CD.
- Avoid exposing a drive or a diskette to devices with magnetic fields. Security devices with magnetic fields include airport walk-through devices and security wands. The airport security devices that check carry-on luggage, usually while it is placed on a conveyor belt, use x-rays instead of magnetism and will not damage a drive or a diskette.
- If you mail a drive, ship it in packaging that protects it from shock, vibration, temperature, and high humidity. Label the package "FRAGILE."

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## Adding a Drive to the System

Removable drives enable you to store and access data.

- A standard drive can be added to the system by inserting the drive into the notebook MultiBay or optional Advanced Port Replicator.
- A diskette drive can also be added.
- A USB drive can be added by connecting the drive to a USB connector on the notebook or optional Port Replicator.

For information about connecting a USB drive, see the “[External Devices](#)” chapter in this guide.

The notebook has 2 drive bays:

- The hard drive bay supports only a hard drive. The hard drive in the hard drive bay is the primary hard drive.
- The MultiBay supports any optional MultiBay device, including the following:
  - Hard drive (inserted into a MultiBay hard drive adapter)
  - CD-ROM or CD-RW drive
  - DVD-ROM or DVD/CD-RW or DVD+RW
  - Diskette drive
  - MultiBay battery pack