Hardware Guide

HP Compaq Notebook Series

Document Part Number: 333644-001

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

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Notebook Features

Pointing Device Components

TouchPad Model

TouchPad component descriptions

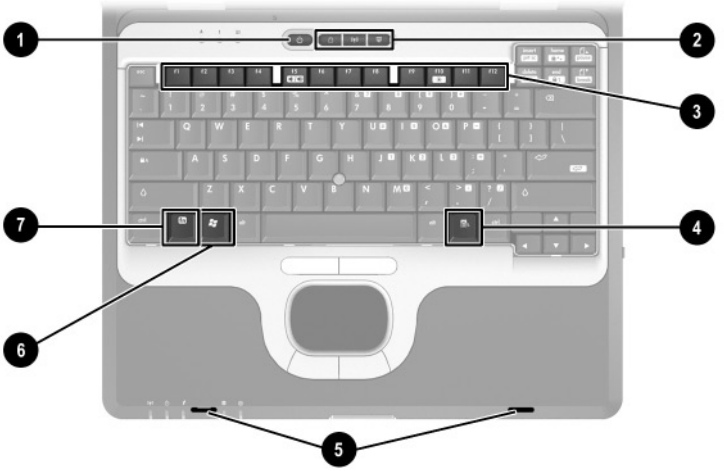
Item	Component	Description
❶	TouchPad	Moves the pointer and selects or activates items on the screen. Can be set to perform other mouse functions, such as scrolling, selecting, and double-clicking.
❷	Left and right TouchPad buttons	Function like the left and right buttons on an external mouse.

Dual Pointing Device Model

Dual pointing device component descriptions

Item	Component	Description
❶	Pointing stick	Moves the pointer and selects or activates items on the screen.
❷	Left and right pointing stick buttons	Function like the left and right mouse buttons on an external mouse.
❸	TouchPad	Moves the pointer and selects or activates items on the screen. Can be set to perform other mouse functions, such as scrolling, selecting, and double-clicking.
❹	Left and right TouchPad buttons	Function like the left and right buttons on an external mouse.

Top Components



Top component descriptions

Item	Component	Description
❶	Power button*	When the notebook is: ■ Off, press and release to turn on the notebook. ■ In Standby, press and release to exit Standby. ■ In Hibernation, press and release to exit Hibernation. If the system has stopped responding and Windows shutdown procedures cannot be used, press and hold for 5 seconds to turn off the notebook.

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

Top component descriptions *(Continued)*

Item	Component	Description
❷	Quick Launch buttons (3)	Enable you to access common functions with a single keystroke. ■ QuickLock button (left)—Disables the keyboard and pointing device and clears the display. ■ Wireless ON/OFF button (center)—Enables and disables the integrated wireless device(s) on the notebook. ■ Presentation Mode button (right)—Alternates between presentation modes. ✎ When using the Wireless On/Off button to enable integrated 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 on the *Documentation Library* CD to "Using Quick Launch Buttons" in Chapter 2 of the *Hardware Guide.*
❸	Function keys	Execute frequently used system functions when pressed in combination with the **fn** key.
❹	Applications key	Displays shortcut menu for items beneath the pointer.
❺	Display release latch recesses	Secure the display when it is closed.
❻	Microsoft logo key	Displays the Windows Start menu.

Top component descriptions *(Continued)*

Item	Component	Description
❼	**fn** key	Executes frequently used system functions when pressed in combination with a function key or the **esc** key.
Not shown	Memory compartment (not shown; located under the keyboard)	Contains one primary memory slot (populated) and one expansion slot.

Lights

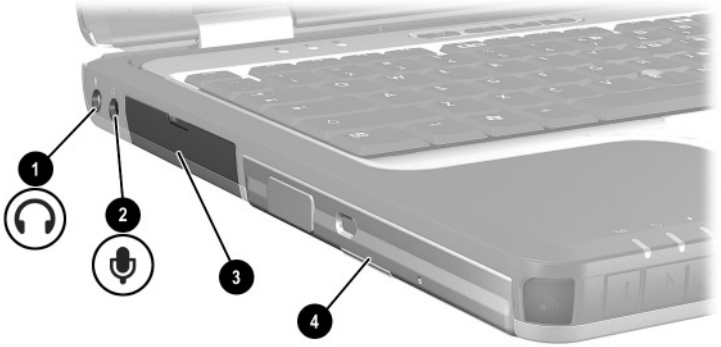
Light descriptions

Item	Component	Description
❶	Num lock	On: Num lock is on or the embedded numeric keypad is enabled.
❷	Caps lock	On: Caps lock is on.
❸	Scroll lock	On: Scroll lock is on.
❹	Wireless On/Off	On: An integrated wireless device has been enabled.
❺	Power/standby	On: Power is turned on. Blinking: Notebook is in Standby. ✎ The power/standby light also blinks when a battery pack that is the only available power source reaches a critical low-battery condition. The light turns off when the system enters Hibernation or shuts down.

Light descriptions *(Continued)*

Item	Component	Description
❻	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.
❼	Primary hard drive	On: Hard drive in the hard drive bay is being accessed.
❽	MultiBay	On: A device in the MultiBay is being accessed.

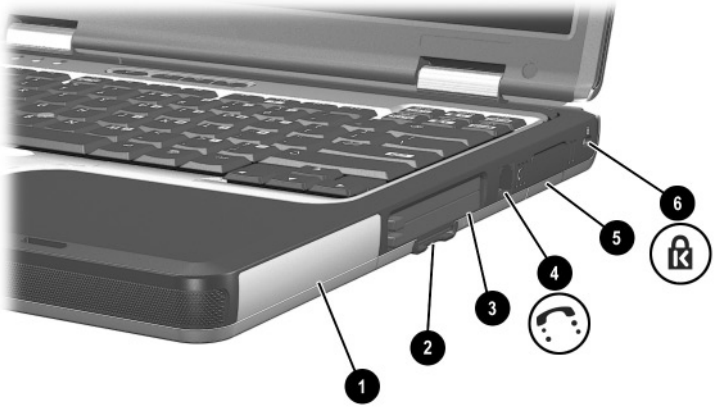
Left Side Components



Left side component descriptions

Item	Component	Description
❶	Audio line-out jack	Produces system sound when connected to optional powered stereo speakers, headphones, headset, or television audio.
❷	Microphone jack	Connects an optional monaural microphone.
❸	Hard drive bay	Holds the primary hard drive.
❹	MultiBay device slot	Holds a MultiBay device.

Right Side Components



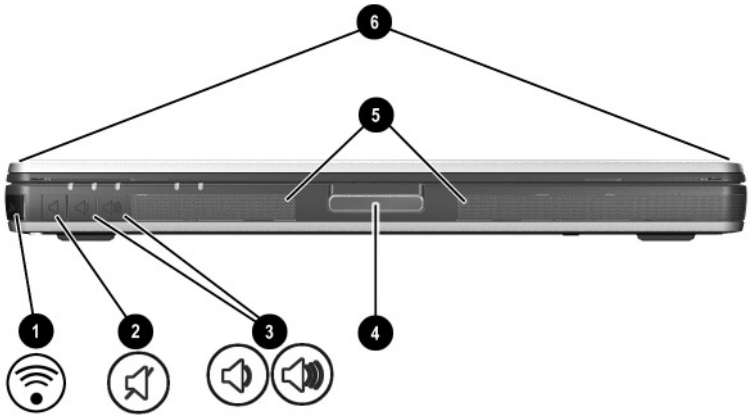
Right side component descriptions

Item	Component	Description
❶	Battery slot	Holds the primary battery.
❷	Secure Digital (SD) slot	Accepts SD memory cards.
❸	PC Card slots (2)	Support optional Type I, Type II, or Type III 32-bit (CardBus) or 16-bit PC Cards. ✎ In select notebooks, one of the PC Card slots may be replaced with a factory-installed Smart Card Reader.
❹	RJ-11 telephone jack	Connects a modem cable.

Right side component descriptions *(Continued)*

Item	Component	Description
❺	Bluetooth compartment	Holds a wireless Bluetooth device. ✎ Bluetooth is not supported in all countries.
❻	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 View Components



Front view component descriptions

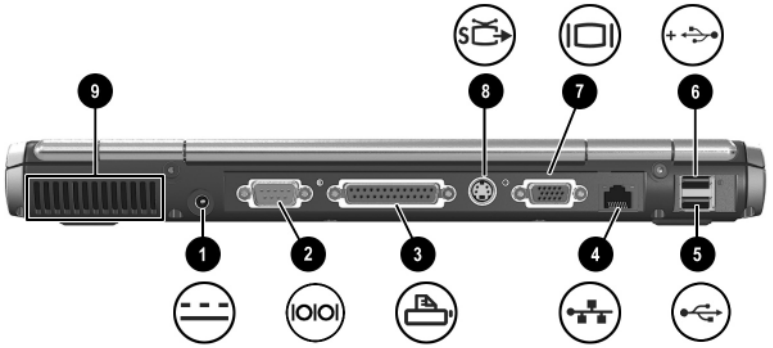
Item	Component	Description
❶	Infrared port	Provides wireless communication between the notebook and an optional IrDA-compliant device.
❷	Mute button	On: Mutes the system volume. A light comes on when the button is pushed in and the sound is muted.
❸	Volume control buttons	Increase and decrease system volume. Press the volume up button to increase sound. Press the volume down button to decrease sound.
❹	Display release latch	Opens the notebook.

Front view component descriptions *(Continued)*

Item	Component	Description
❺	Speakers (2)	Produces system sound.
❻	Wireless antenna (2)	Transmits wireless data (not shown, located on either side of the display).

⚠ **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 minimzed. 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 View Components



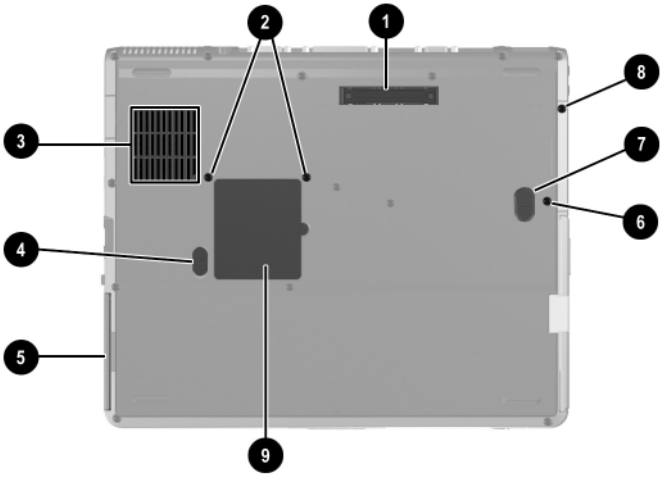
Rear view component descriptions

Item	Component	Description
❶	Power connector	Connects an AC adapter or an optional Automobile Power Adapter/Charger, or Aircraft Power Adapter.
❷	Serial connector	Connects an optional serial device.
❸	Parallel connector	Connects an optional parallel device, such as an external diskette drive bay or a printer.
❹	RJ-45 network jack	Connects a network cable.
❺	USB connector	Connects USB 1.1- and 2.0-compliant devices to the notebook using a standard USB cable.
❻	Self-powered USB connector	Connects USB 1.1- and 2.0-compliant devices to the notebook using a standard USB cable, or connects an optional External MultiBay to the notebook using the External MultiBay-powered USB cable.
❼	External monitor connector	Connects an optional external monitor or overhead projector.

Rear view component descriptions *(Continued)*

Item	Component	Description
❽	S-Video jack	Connects an optional S-Video device, such as a television, VCR, camcorder, overhead projector, or video capture card.
❾	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 may block airflow.

Bottom Components



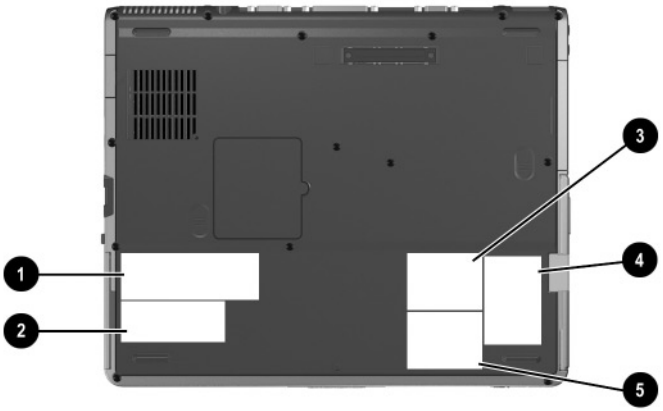
Bottom component descriptions

Item	Component	Description
❶	Docking connector	Connects the notebook to an optional Port Replicator or an Advanced Port Replicator.
❷	Keyboard access screws (2)	Allow you to remove the keyboard in order to access system memory.
❸	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 may block airflow.
❹	Battery release latch	Releases the primary battery pack from the battery bay.
❺	Battery bay	Holds the primary battery pack.
❻	Hard drive security screw	Secures the hard drive.

Bottom component descriptions *(Continued)*

Item	Component	Description
❼	MultiBay release latch	Releases the MultiBay device.
❽	Hard drive retaining screw	Retains the hard drive.
❾	MiniPCI compartment	Holds an optional wireless LAN or ISDN device. △ The FCC does not allow unauthorized MiniPCI devices to be used in this notebook. Installing an unsupported MiniPCI device can prevent your notebook from operating properly and may result in a warning message. To resume proper notebook operation, remove the unauthorized device. Contact your HP Customer Care Center if a warning message about your MiniPCI device displays in error.

Labels



Label descriptions

Item	Component	Description
❶	System label	Provides regulatory information about the notebook. ✎ The serial number, which is included on the system label, identifies the notebook. You may need this number if you call customer support.
❷	COA (Certificate of Authenticity) label	Contains your Product Key number, which you will need to update or troubleshoot your operating system.
❸	WLAN label	Provides regulatory information about the wireless LAN device(s) that are available on some notebook models. ✎ You will need this information to use the WLAN device while traveling internationally.

Label descriptions *(Continued)*

Item	Component	Description
❹	Modem label	Lists the countries in which the modem has been approved for use. ✎ You will need this information to use the modem while traveling internationally.
❺	Bluetooth label	Provides regulatory information about the Bluetooth device that is available on some notebook models. ✎ You will need this information to use the Bluetooth device while traveling internationally. ✎ Bluetooth is not supported in all countries.

2

Pointing Devices and Keyboard

Using a Pointing Device

By default, the pointing stick and TouchPad components can be used interchangeably.

Pointing device components

Item	Component	Description
❶	Pointing stick	Moves the pointer and selects or activates items on the screen.
❷	Left and right pointing stick buttons	Function like the left and right buttons on an external mouse.

Pointing device components *(Continued)*

Item	Component	Description
❸	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.
❹	Left and right TouchPad buttons	Function like the left and right buttons on an external mouse.

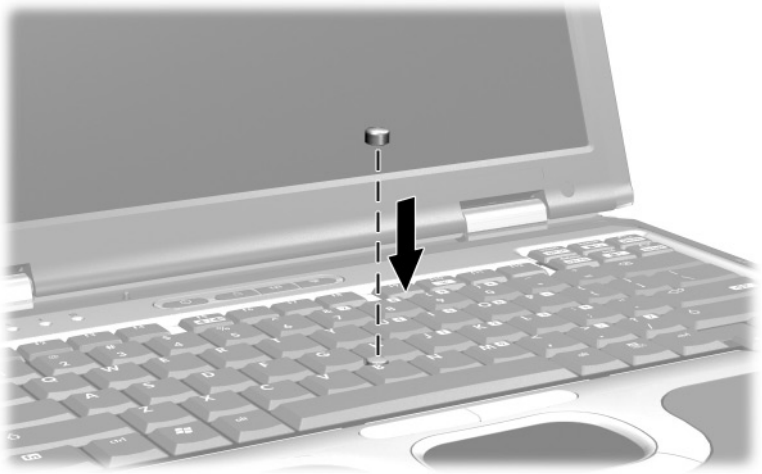
Using the Pointing Stick

To move the pointer, press the pointing stick in the direction you want to move the pointer. Use the left and right pointing stick buttons as you would the left and right buttons on an external mouse.

To change the pointing stick cap:

1. Turn off the notebook.
2. Gently pull off the used pointing stick cap.
3. Push a replacement cap into place.

Replacement caps are not included with the notebook.



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

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

Using Hotkeys and Shortcut Keys

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

Identifying fn and Function Keys

Item	Component
❶	**fn** key
❷	Function keys

- 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	**fn+f3**	Power button
Switch between notebook display and external display	**fn+f4**	**fn+f4**
View battery information	**fn+f8**	**fn+f8**
Decrease screen brightness	**fn+f9**	N/A
Increase screen brightness	**fn+f10**	N/A
Display system information	**fn+esc**	**fn+esc**

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 random access 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.

The function of the **fn+f3** hotkey, called the "sleep button" in Windows, can be changed. For example, the **fn+f3** hotkey 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 on the *Documentation Library* CD to the *Software Guide,* "Power" chapter.

Switching Displays (fn+f4)

The **fn+f4** hotkey switches the image among display devices connected to the external monitor connector or the S-Video 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, the external monitor display, and a simultaneous display on both the notebook and the monitor.

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

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 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 may display in a decimal format, such as 10/19/2002 F.07.

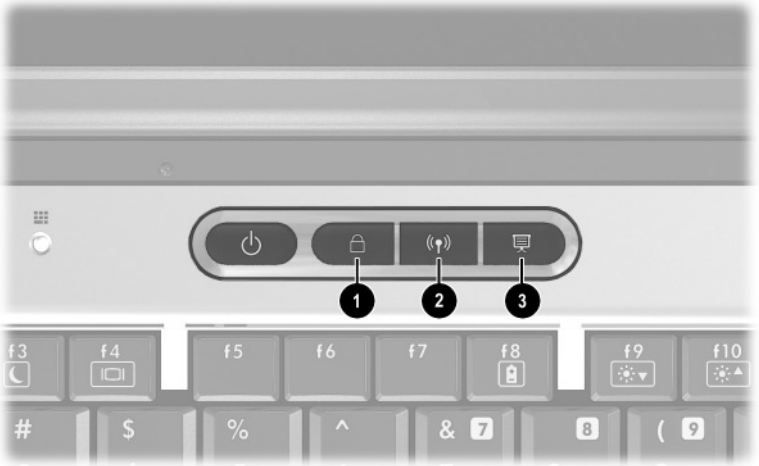
Using Hotkeys and Shortcut Keys with External Keyboards

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

Notebook keys	External keyboard keys
fn+esc	scroll lock+scroll lock+esc
fn+f8	scroll lock+scroll lock+f8

Using Quick Launch Buttons

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



Quick Launch buttons

Item	Component	Description
❶	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 on the *Documentation Library* CD to the *Software Guide,* "Security" chapter.
❷	Wireless On/Off button	Turns the wireless LAN and optional Bluetooth device on and off when these devices are enabled in the software utilities.
❸	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 on a external device connected either to the notebook or 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.

Embedded numeric keypad components

Item	Component
❶	Num lock light
❷	**num lk** key
❸	Embedded numeric keypad
❹	**fn** key

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 num lock 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 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 on the *Documentation Library* CD to the *Software Guide,* "Computer Setup" chapter.

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 field:
   - ❏ 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.

3

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 on the *Documentation Library* CD to the *Software Guide,* "Power" chapter.

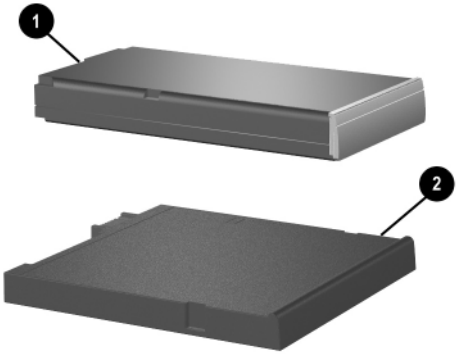
Only compatible AC adapters and battery packs should be used with the notebook. For additional information, visit the HP Web site at http://www.hp.com or use the *Worldwide Telephone Numbers* booklet, included with your notebook, to contact an HP authorized dealer.

Identifying Battery Packs

The notebook supports up to 2 battery packs:

- The *primary* battery pack ❶ is an 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 ❷ 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.

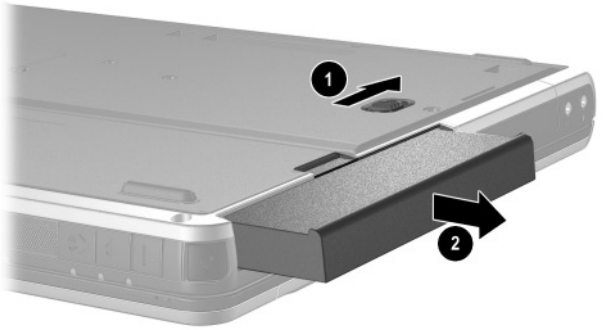
To remove a battery pack, turn the notebook upside down. Then slide and hold the battery release latch ❶ as you pull the battery pack ❷ from the battery bay.

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.

To insert a 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 ❶ as you pull the battery pack ❷ 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.

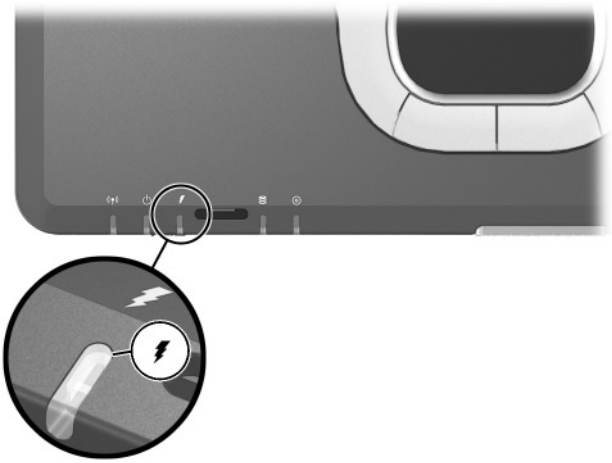
Charging a Battery Pack

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 may 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 may 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.
- 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 displays.

Accessing Charge Displays

To access information about the status of any battery pack in the notebook:

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

Interpreting Charge Displays

Most charge displays report 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.

Most charge displays identify battery packs by location:

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

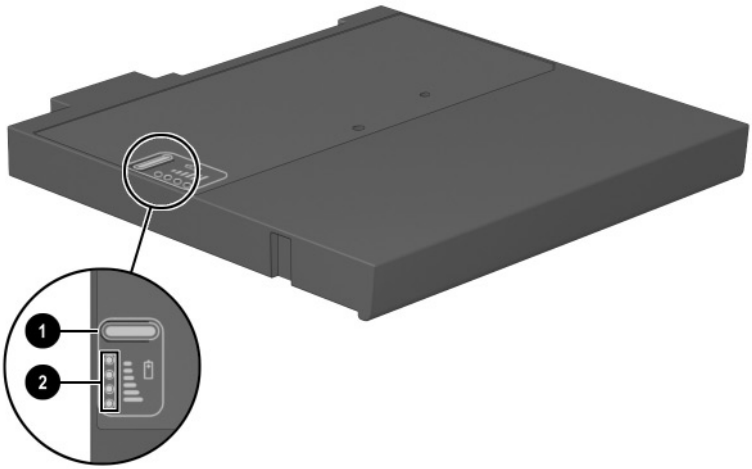
On some displays, a lightning bolt icon may be displayed on the charge display beside a battery pack location. The icon indicates that the battery pack in that location is charging.

Displaying Charge Information on a MultiBay Battery Pack

You can determine the percent 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 percent of a full charge remaining in a MultiBay battery pack, press the Quick Check button ❶ on the MultiBay battery pack.

The Quick Check lights ❷ 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 needs to 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 2000,** select Start > Settings > Control Panel. Double-click Power Options.
- **In Windows XP,** select Start > Control Panel > Performance and Maintenance > 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.

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 one 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 2000,** select Start > Settings > Control Panel > Performance and Maintenance > Power Options > Hibernate tab.
   - ❏ **In Windows XP,** select Start > 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 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 2000,** select Start > Settings > Control Panel > Power Management icon > Power Schemes tab.
   - ❑ **In Windows XP,** select Start > Control Panel > Performance and Maintenance > Power Options 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 when the battery pack is fully charged and the battery light turns off.

3. Access the Power Schemes tab:
   - ❑ **In Windows 2000,** select Start > Settings > Control Panel > Power Management icon > Power Schemes tab.
   - ❑ **In Windows XP,** select Start > Control Panel > Performance and Maintenance > Power Options icon > Power Schemes tab.
4. Refer to the settings you recorded earlier. Reenter the settings that you recorded for the items in the Plugged In column and the Running on Batteries column.
5. Select the OK button.

CAUTION: After calibrating the battery pack, reenable Hibernation. Failure to reenable Hibernation may result in a complete battery drain and potential data loss.

To reenable Hibernation, select Start > Settings > Control Panel > Performance and Maintenance > Power Options > Hibernate tab. Select the Enable Hibernation check box.

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 local area network (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 PC Cards" in Chapter 8.
- 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 jack by using the **fn+f4** hotkey or 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 2000,** select Start > Settings > Control Panel > Display > Screen Saver tab.
  - **In Windows XP,** select Start > Control Panel > Appearance and Themes > Display icon > Screen Saver tab.
- Select a Power Scheme with low-power-use settings through the operating system. Refer on the *Documentation Library* CD to the *Software Guide,* "Power" chapter.
- Select Battery Optimized or Maximum Battery Mode in Intel SpeedStep (Windows 2000 only). Refer on the *Documentation Library* CD to the *Software Guide,* "Power" chapter.

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°–140°	46°–60°	Less than 1 month
79°–113°	26°–45°	No more than 3 months
32°–77°	0°–25°	1 year

Disposing of a Used Battery Pack

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.

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

- In North America, you can dispose of battery packs by using the HP battery recycling program. This program provides you with a postage-paid battery pack mailer preaddressed to a reclamation facility where the metals are recycled. For more information, call the telephone number listed for your location in the *Worldwide Telephone Numbers* booklet, included with the notebook.
- 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 on the *Documentation Library* CD to the *Regulatory and Safety Notices* guide.

Finding More Power Information

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