



Hardware Guide

hp compaq notebook series

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April 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 may be helpful when traveling with the notebook.

Enhanced for accessibility

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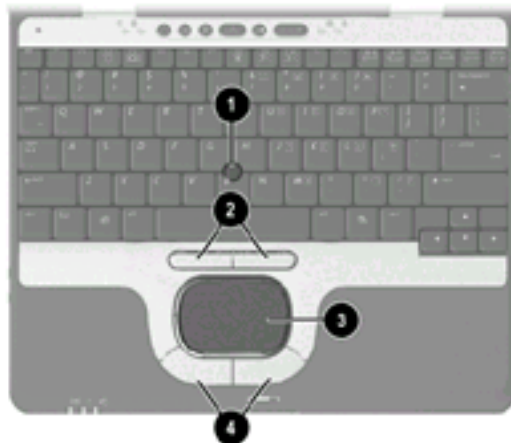
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Notebook Features

Pointing Device Components



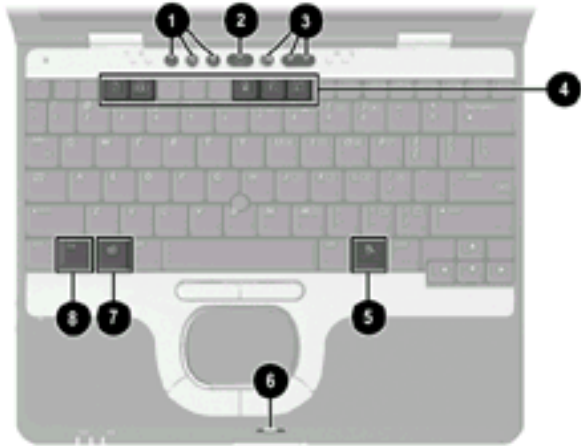
Pointing Device Components

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
③	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.
④	Left and right TouchPad buttons	Function like the left and right buttons on an external mouse.

Top Components



Top Components

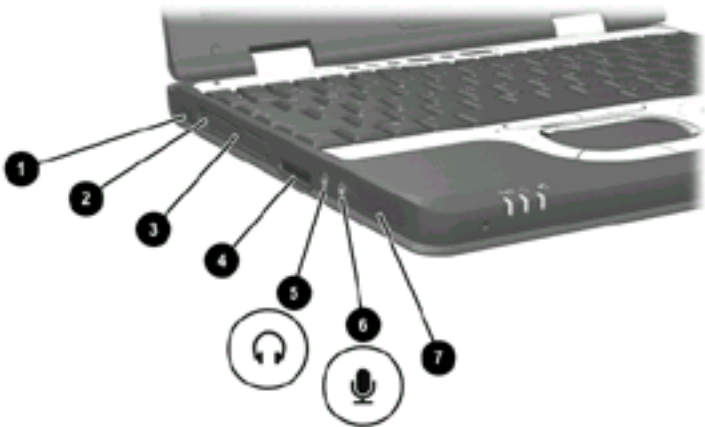
Item	Component	Description
❶	Quick Launch buttons (3)	Enable you to access common functions with a single keystroke.
❷	Power button	<p>When the notebook is*</p> <p>Off, press and release to turn on the notebook.</p> <p>In Standby, press and release to exit Standby.</p> <p>In Hibernation, press and release to exit Hibernation.</p> <p>If the system has stopped responding and Windows shut down 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 on this CD to the *Software Guide*, "Power" chapter.

Top Components (*Continued*)

Item	Component	Description
③	Volume control buttons	Increase, decrease, and mute the system volume.
④	Function keys	Execute frequently used system functions when pressed in combination with the Fn key.
⑤	Applications key	Displays shortcut menu for items beneath the pointer.
⑥	Display release latch recess	Secures the display when it is closed.
⑦	Microsoft logo key	Displays the Windows Start menu.
⑧	Fn key	Executes frequently used system functions when pressed in combination with another key.
Not shown	Primary memory compartment (not shown, located under the keyboard)	Contains the primary memory slot.

Left Side Components



Left Side Components

Item	Component	Description
①	Infrared port	Links another IrDA-compliant device for wireless communication.
②	PC Card eject button	Ejects an optional PC Card from the PC Card slot.
③	PC Card slot	Supports optional Type I or Type II 32-bit (CardBus) or 16-bit PC Cards.
④	Secure Digital (SD) slot	Accepts SD memory cards used as removable storage devices.
⑤	Audio line-out jack	Connects optional powered stereo speakers, headphones, headset, or television audio.
⑥	Microphone input jack	Connects an optional monaural microphone.
⑦	Speaker	Produces system sound.

Right Side Components



Right Side Components

Item	Component	Description
❶	Security cable slot	Attaches an optional security cable to the notebook.
❷	Hard drive bay	Holds the primary hard drive.
❸	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.

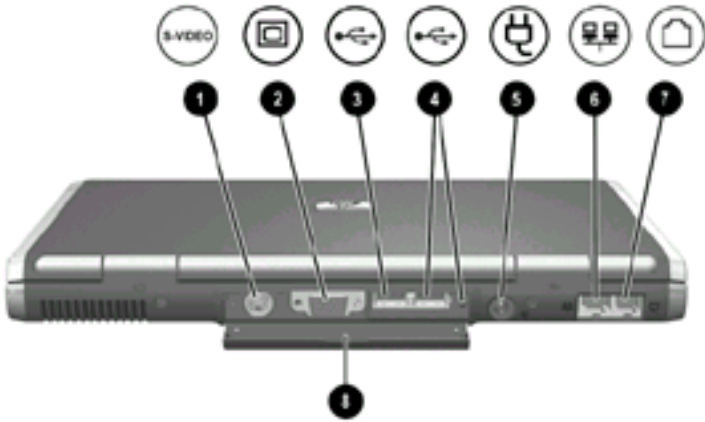
Front View Components



Front View Components

Item	Component	Description
❶	Antenna (2)	<p>Send and receive wireless Local Area Network (LAN) signals.</p> <p> The antenna covers are not removeable. Removing the covers can cause damage to the antenna.</p>
❷	Display release latch	Opens the notebook.
❸	Microphone	Inputs single-channel sound.

Rear Panel Components



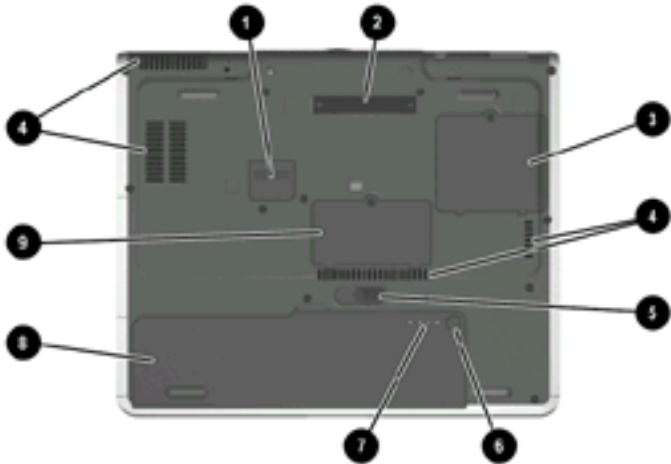
Rear Panel Components

Item	Component	Description
❶	S-Video out jack	Connects an optional S-Video device, such as a television, VCR, camcorder, overhead projector, or video capture card.
❷	External monitor connector	Connects an optional external monitor or overhead projector.
❸	USB connector	Connects USB 1.1- and 2.0-compliant devices to the notebook using a standard USB cable.
❹	Self-powered USB connector	Connects USB 1.1- and 2.0-compliant devices to the notebook using a standard USB cable, or an optional External MultiBay to the notebook using the External MultiBay-Powered USB cable.


Rear Panel Components (Continued)

Item	Component	Description
⑤	DC power connector	Connects an AC Adapter or an optional Automobile Power Adapter/Charger, Aircraft Power Adapter, or DC cable.
⑥	RJ-45 jack	Connects a network cable.
⑦	RJ-11 jack	Connects a modem cable.
⑧	Rear panel connector cover	Closes to cover the connectors. This cover can be removed by removing the screws that secure it to the notebook.

Bottom Components



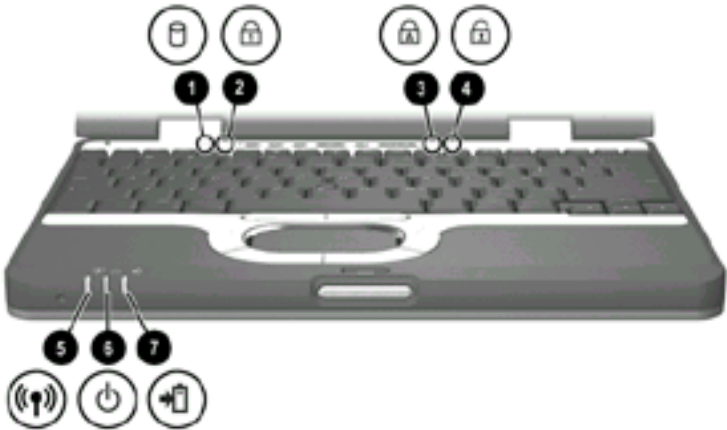
Bottom Components

Item	Component	Description
1	Travel battery connector	Connects the optional travel battery bay. The travel battery connector has a plastic cover that must be opened before connecting the travel battery bay.
2	Docking connector	Connects the notebook to an optional Port Replicator.
3	Mini PCI compartment	Contains the mini PCI wireless card.
4	Intake vents	Enable 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 (Continued)

Item	Component	Description
5	Battery release latch	Releases the primary battery pack from the battery bay.
6	Quick Check button	Displays the percentage of a full charge remaining on a battery pack using the Quick Check lights.
7	Battery power gauge	Indicates the charge remaining on a battery pack.
8	Battery bay	Holds the primary battery pack.
9	Memory expansion compartment	Contains 1 memory expansion slot for optional memory expansion boards.

Lights



Lights

Item	Component	Description
1	Hard drive activity	On: The hard drive is being accessed.
2	Num lock	On: Num lock is on or the embedded numeric keypad is enabled.
3	Caps lock	On: Caps lock is on.
4	Scroll lock	On: Scroll lock is on.
5	Wireless on/off	On: The wireless mini PCI card and/or Bluetooth are on. Off: The wireless mini PCI card and Bluetooth are off.

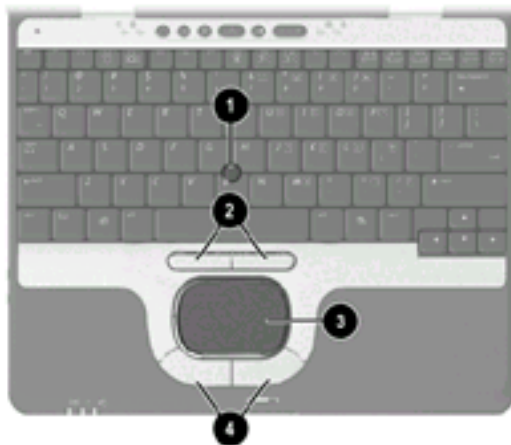
Lights (Continued)

Item	Component	Description
⑥	Power/Standby	On: Power is turned on. Blinking: Notebook is in Standby.
⑦	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.

Pointing Devices and Keyboard

Using a Pointing Device

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



Pointing device components

Pointing Device Components

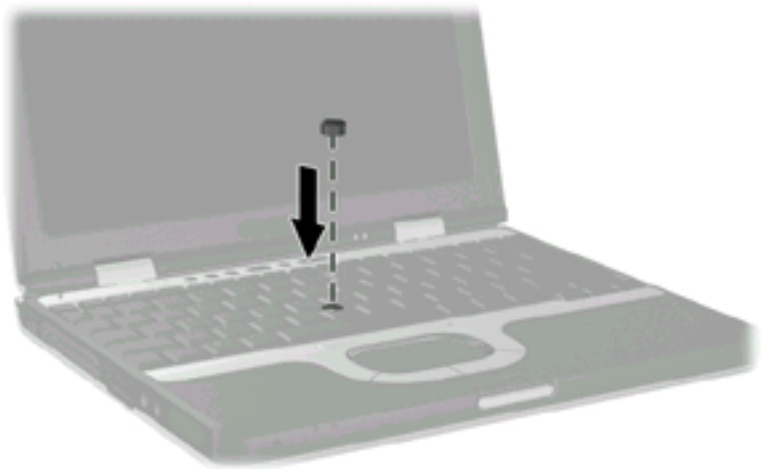
Item	Component	Description
①	Pointing stick	Moves the pointer and selects or activates items on the screen.
②	Left and right pointing stick button	Functions like the left and right buttons on an external mouse.
③	TouchPad	Moves the pointer and selects or activates items on the screen. Can be set to perform other mouse functions, such as scrolling, selecting, and double-clicking.
④	Left and right TouchPad buttons	Functions 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, included with the notebook, into place.



Replacing the pointing stick cap

Using the TouchPad

To move the pointer, slide your finger across the TouchPad surface in the direction you want to move the pointer. 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 USB connectors on the back panel. An external PS/2 or USB mouse can be connected to the system using the connectors on an optional Port Replicator

Setting Pointing Device Preferences

Mouse Properties in Windows enables you to change custom settings for pointing devices, including:

Enabling or disabling a pointing device.

TouchPad tapping, which enables you to tap the TouchPad once to select an object or twice to double-click an object.

Edge motion, which enables you to continue to scroll even though your finger has reached the edge of the TouchPad.

Palm Check, which helps prevent moving the pointer unintentionally if your palms contact the TouchPad as you type.

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

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

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

Fn and Function Keys



Fn and function keys

Item	Component
①	Fn key
②	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 DeactivateFunction
Initiate Standby	Fn+F3	Power button
Switch display and image	Fn+F4	Fn+F4
View battery information	Fn+F8	Fn+F8
Adjust the screen brightness to a lower level	Fn+F9	N/A
Adjust the screen brightness to a higherlevel	Fn+F10	N/A
Display system information	Fn+esc	Fn+esc

Initiating Standby (Fn+F3)

The **Fn+F3** hotkeys are set at the factory to initiate Standby.

When the notebook is on, press the **Fn+F3** hotkeys to initiate Standby. When Standby is limited, 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 function of the **Fn+F3** hotkeys, called the “sleep button” in Windows, can be changed. For example, the **Fn+F3** hotkeys can be set to initiate Hibernation instead of Standby. For more information about Standby, Hibernation, and changing the function of the **Fn+F3** hotkeys, refer on this CD to the *Software Guide*, “Power” section.

Switching Display and Image (Fn+F4)

The **Fn+F4** hotkeys switch the image between the display and an external display device connected to the notebook. Pressing **Fn+F4** switches the image among the notebook display, the external display device, and a simultaneous display on the notebook and the external device.

The following video transmission types are supported by the **Fn+F4** hotkeys:

LCD (notebook display)

External VGA (most external monitors and projectors)

S-video (televisions, camcorders, VCRs, and video capture cards with S-video in jacks)

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 travel battery pack.

Adjusting the Screen Brightness (Fn+F9 and Fn+F10)

Pressing the **Fn+F9** and the **Fn+F10** hotkeys respectively increases and decreases the display brightness to several levels of brightness. Press **Fn+F9** to lower the brightness level, and press **Fn+F10** to increase the brightness level. Holding down the hotkeys changes 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, for example, 10/19/2002 F.07.

Using Hotkeys and Shortcut Keys with External Keyboards

The following hotkeys and shortcut keys can be used as described with external keyboards:

Fn+esc

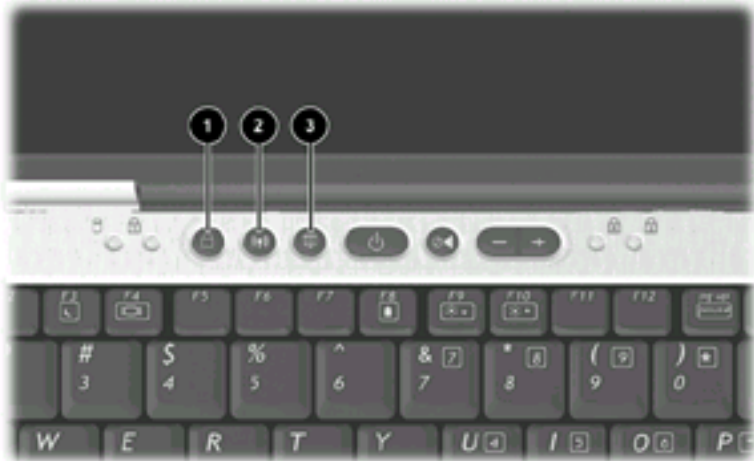
Fn+F8

To use hotkeys or shortcut keys on an external keyboard, press the scroll lock key twice, then the other key of the hotkey combination. For example, to use the **Fn+F8** hotkeys, press **scroll lock+scroll lock+F8**.

Hotkeys and shortcut keys may not function on an external keyboard connected through a USB connector if Quick Launch Buttons software is not loaded. You can download the appropriate software and drivers for your system at www.hp.com. For more information on software updates, refer on this CD to the *Software Guide*, “Software Updates and Restorations” chapter. For more information about Quick Launch buttons, refer to “Using Quick Launch Buttons” later in this chapter.

Using Quick Launch Buttons

The 6 Quick Launch buttons enable you to access 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 this CD to the <i>Software Guide</i> , "Security" chapter.
❷	Wireless On/Off button	Turns the wireless LAN or Bluetooth device on and off.
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 an external device connected to the external monitor connector or S-Video out jack on the rear panel or to connectors on an optional Port Replicator.

Keypads

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

Using the Internal Keypad

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



Embedded numeric keypad components

Item	Component
①	Num lock light
②	num lk key
③	Numeric keypad keys
④	Fn key

Enabling and Disabling the Internal 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 numeric keypad cannot be enabled while an optional external keyboard or keypad is connected to the notebook or to an optional Port Replicator.

Switching Key Functions on the Internal Keypad

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

To change the functions 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 the **Fn+shift** to type in uppercase.

Using an External Keypad

Most keys on most external keypads function differently when num lock mode is on than when num lock mode is off. For example:

When num lock mode is on, most keyboard keys type numbers.

When num lock mode is off, most keypad keys function like arrow, page up, or page down keys.

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

If the external keypad is connected, the internal 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 set the notebook to start up with a connected external keypad in num lock mode, set your preference in Computer Setup. For more information about using Computer Setup, refer on this 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 start up an external keypad with num lock mode turned on, select the field.

To start up an external keypad with num lock mode turned off, 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 as you exit Computer Setup and is in effect when the notebook restarts.

Battery Packs

This notebook supports up to 2 lithium ion battery packs, the primary battery and an optional travel battery. The same type of battery pack can be used in the notebook battery bay and the optional travel battery.



Battery pack

Inserting or Removing the Primary Battery Pack

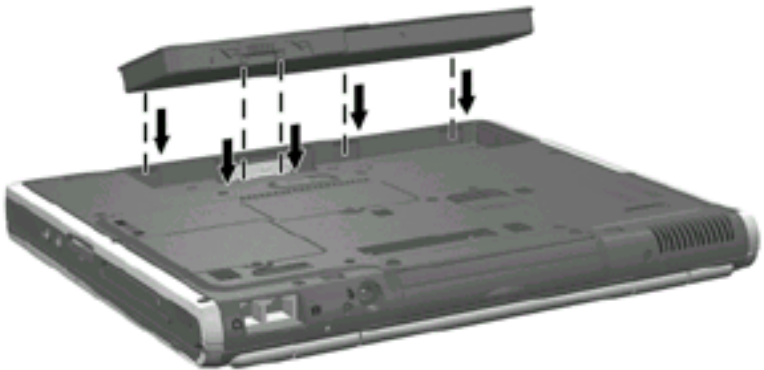
The notebook battery bay holds the primary battery pack.



CAUTION: To prevent the loss of information when removing a battery pack, when it is the only power source available to the system, initiate Hibernation or shut down the notebook before removing the battery pack.

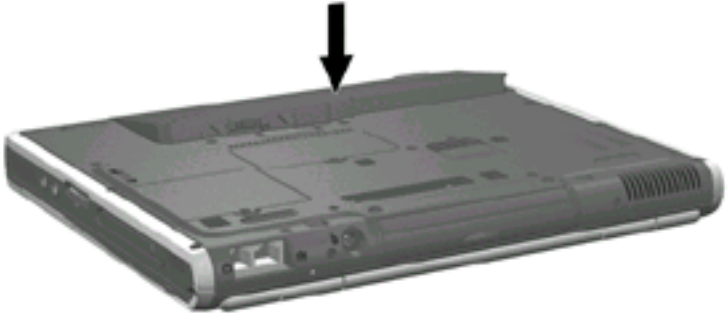
To insert the primary battery pack:

1. Align the battery pack with the notebook battery bay.
2. Insert the battery pack tabs into the battery bay recesses.



Inserting the battery pack tabs into the battery bay recesses

3. Snap the battery pack into place.

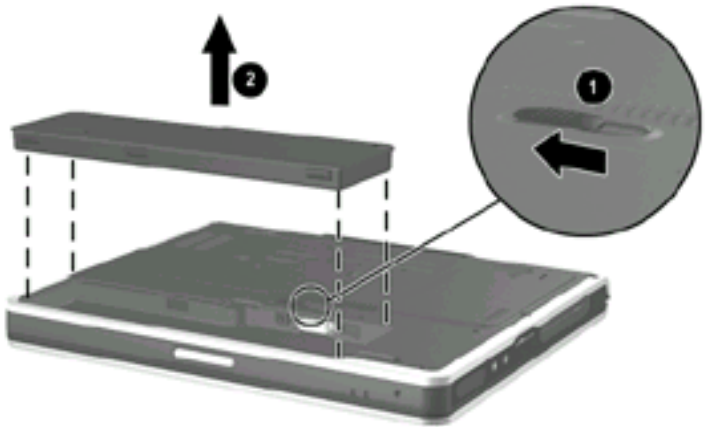


Inserting the primary battery pack

4. Turn the notebook over and open the display. If the notebook is in Hibernation, press the power button to resume operation.

To remove the primary battery pack:

1. Close the display and turn the notebook bottom-side up.
2. Slide the battery release latch ❶.
3. After the battery pack tilts upward, remove it from the battery bay ❷.



Removing the primary battery pack

Using the Optional Travel Battery

The optional travel battery attaches to the bottom of the notebook. The optional travel battery kit includes the following items:

Travel battery caddy

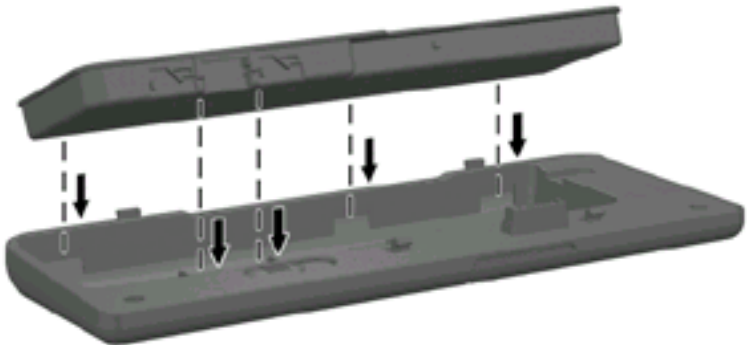
Battery pack

Documentation

Inserting or Removing the Battery Pack

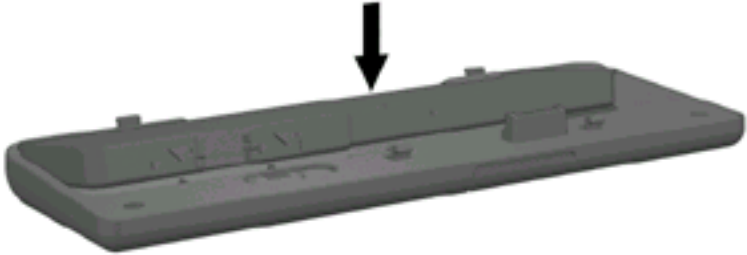
To insert the battery pack into the travel battery caddy:

1. Align the battery pack with the travel battery caddy.
2. Insert the battery pack tabs into the travel battery caddy recesses.



Inserting the battery pack tabs into the travel battery caddy recesses

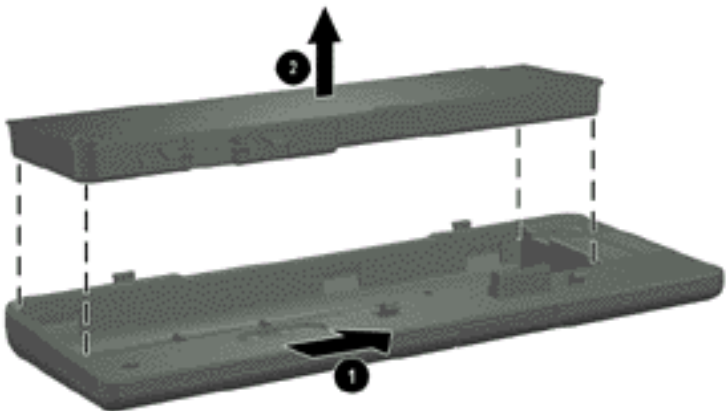
3. Snap the battery pack into place.



Inserting the battery pack into the travel battery caddy

To remove the battery pack from the travel battery caddy:

1. Eject the battery pack from the travel battery caddy by sliding the battery release latch ❶.
2. When the battery pack tilts upward, remove it from the travel battery caddy ❷.

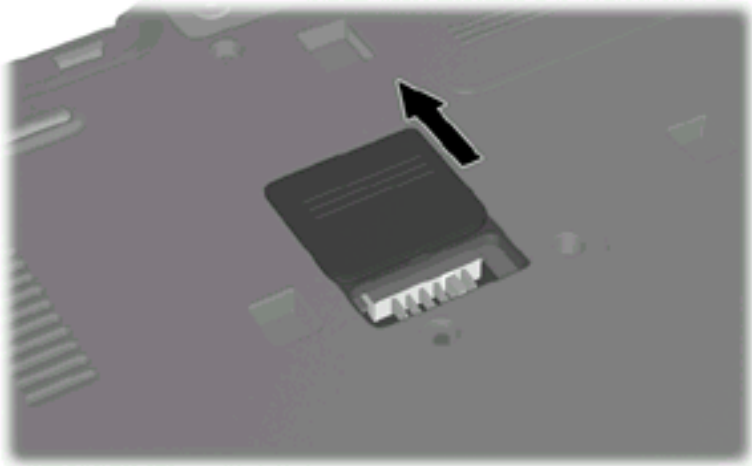


Removing a battery pack from the travel battery caddy

Attaching or Detaching the Travel Battery

To attach the optional travel battery to the notebook:

1. Open the travel battery connector on the bottom of the notebook by sliding the cover toward the rear panel of the notebook.



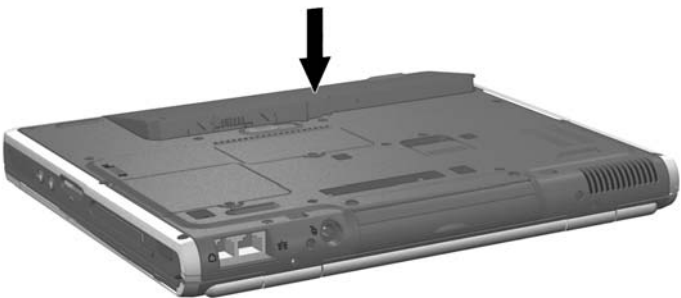
Opening the optional travel battery connector

2. Insert the tabs on the travel battery caddy into the recesses on the bottom of the notebook.



Inserting the travel battery caddy tabs into the notebook recesses

3. Press the travel battery caddy onto the notebook until it snaps into place.



Attaching the optional travel battery

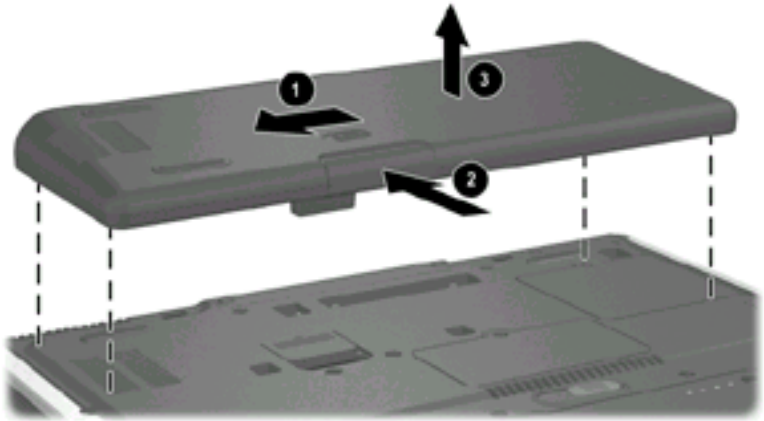
4. Lock the travel battery onto the notebook by sliding the locking switch.



Locking the optional travel battery onto the notebook

To detach an optional travel battery from the notebook:

1. Unlock the travel battery from the notebook by sliding the locking switch ❶.
2. Press the release latch ❷.
3. Lift the travel battery up and away from the notebook ❸.



Detaching the travel battery from the notebook

Charging a Battery Pack

Multiple battery packs in the system charge and discharge in a preset sequence:

Charge sequence

1. Notebook battery bay
2. Travel battery

Discharge sequence

1. Travel battery
2. Notebook battery bay

The primary battery pack charges when it is inserted into the notebook and the notebook is connected to external power. External power can be supplied through an AC Adapter, the optional Port Replicator, or an optional Automobile Power Adapter/Charger.

The battery pack in the travel battery charges when it is attached to the notebook and the notebook is connected to external power. External power can be supplied through an AC Adapter or an optional Automobile Power Adapter/Charger. Because the travel battery covers the docking connector, the travel battery cannot be used or charged with a Port Replicator.

Battery packs can also be charged in the optional Universal Charger. The optional Aircraft Power Adapter can be used to run the notebook, but cannot be used to charge a battery pack.

While the battery pack is charging, the battery light on the notebook is on. The light turns off when the battery pack is fully charged.



Battery light

To charge the primary battery pack:

1. Insert the battery pack into the notebook.
2. Connect the notebook to AC power. (The battery light turns on.)
3. Leave the notebook connected to AC power until the battery light turns off, signaling that the battery pack is fully charged.

To charge the battery pack in the travel battery:

1. Insert the battery pack into the travel battery caddy.
2. Attach the travel battery to the notebook.
3. Connect the notebook to AC power. (The battery light turns on.)
4. Leave the notebook connected to AC power until the battery light turns off, signaling that the battery pack is fully charged.

Monitoring the Charge of a Battery Pack

To increase the accuracy of all battery charge displays:

Allow a battery pack to discharge to less than 5 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 one 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

To display battery charge information on the screen, use the Power meter feature of the operating system:

Select Start > Control Panel > Performance and Maintenance icon > Power Options icon > Power Meter tab.

or

Select the Power meter icon in the system tray.

To display the Power meter icon in the system tray:

1. Select Start > Control Panel > Performance and Maintenance icon > Power Options icon > Advanced tab.
2. Select the Always Show Icon On The Taskbar check box.
3. Select the OK button.

Most charge displays report battery status in both percent and time:

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 if you start playing a DVD and will increase if you stop playing a DVD.

Most charge displays identify battery packs by location:

Location 1 is the notebook battery bay.

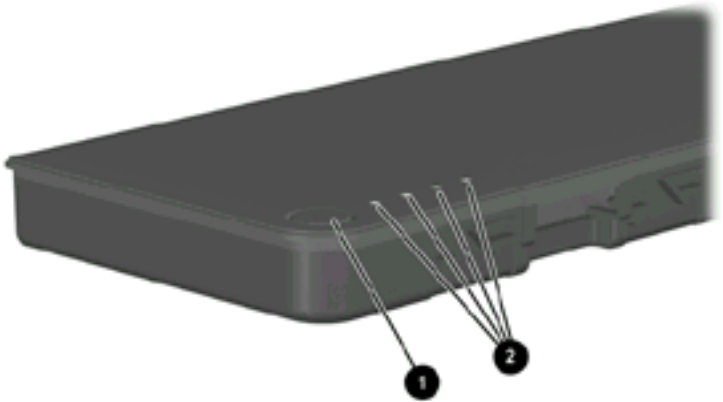
Location 2 is the optional travel battery.

In some displays, a lightening bolt icon may be displayed beside a battery pack location. This icon indicates that the battery pack is being charged.

Displaying Charge Information on a Battery Pack

The battery Quick Check feature enables you to check the battery pack charge information without having to turn on the notebook. You do not have to remove a battery pack from the notebook battery bay or the travel battery to check the charge information; however, you must detach the travel battery from the notebook to check the charge of the travel bay battery pack.

To display the percentage of a full charge remaining on a battery pack, press the Quick Check button ❶ on the battery pack. The Quick Check lights ❷ on the battery pack indicate the charge remaining, as shown in the following table.



Battery pack Quick Check button and lights

Battery Pack Quick Check Indications

Indication	Percent of a Full Charge Remaining
4 lights on	76 to 100%
3 lights on	51 to 75%
2 lights on	26 to 50%
1 light on	11 to 25%
1 light blinking	1 to 10%

Managing Low-Battery Conditions

Some low-battery condition alerts and system responses can be changed in the Power Options Properties window of the operating system. The information in this chapter describes the alerts and system responses set at the factory. For information about setting preferences in the Power Options Properties window, refer on this CD to the *Software Guide*, “Power” chapter, “Setting Power Preferences” section.

Identifying Low-Battery Conditions

The notebook has alerts for 2 types of low-battery conditions: a low-battery condition and a critical low-battery condition.

Low-Battery Condition

When a battery pack that is the only power source available reaches a low-battery condition (10 percent of a full charge), the battery light flashes.

Critical Low-Battery Condition

If a low-battery condition is not resolved, the notebook enters a critical low-battery condition (one percent of a full charge). 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 in Standby until there is no power, then shuts down and loses your unsaved work.

For more information about Hibernation and Standby, refer on this CD to the *Software Guide*, “Power” chapter.

Resolving Low-Battery Conditions



CAUTION: If the notebook has reached a critical low-battery condition and has initiated Hibernation, do not press the power button until Hibernation is complete. Hibernation is complete when the power light turns off.

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 External Power Is Available

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

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. (The optional Aircraft Power Adapter can run the notebook but cannot charge a battery power.)

Dock the notebook in an optional Port Replicator.

When No Power Source Is Available

To resolve a low-battery condition when no power source is available, select one of the following options:

Initiate Hibernation.

In Windows 2000 Professional, select Start > Shut down > Hibernate, then select the OK button.

In Windows XP, select Start > Turn Off the Computer > Hibernate. (If the Hibernate option is not displayed, press the **shift** key).

Save your work and shut down the notebook.

When the Notebook Cannot Exit Hibernation

To resolve a low-battery condition if 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

To calibrate a battery pack manually, follow the instructions in the following sections. To initiate an unattended calibration in an optional Universal Charger, follow the instructions included with the device.

When to Calibrate

Calibrate an in-use battery pack whenever battery status displays seem inaccurate or whenever the battery pack has not been used for one month or more. It should not be necessary to calibrate any battery pack, even if it is heavily used, more than once a month, unless usage patterns change significantly. It is not necessary to calibrate a new battery pack before first use.

How to Calibrate

To manually calibrate a battery pack:

1. Fully charge the battery pack.
2. Fully discharge the battery pack.



While discharging the battery pack, be sure that your power settings are not configured to initiate Hibernation. For more information on power settings, refer on this CD to the *Software Guide*, “Power” chapter.

3. Fully recharge the battery pack.

Conserving Battery Power

Using the following battery conservation procedures and settings 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 or SD card that you are not using.

Use the **Fn+F9** and the **FN+F10** hotkeys to quickly lower and raise screen brightness as you need it.

Use optional powered speakers instead of the internal speakers, or use the volume buttons to quickly raise and lower system volume as needed.

Turn off a device connected to the S-Video connector by using the **Fn+F9** hotkeys or by turning off support for the device in Windows.

Run the notebook on external power while formatting a diskette.

If you leave 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. Access screen saver setting by selecting Start > Control Panel > Appearance and Themes > Display icon > Screen Saver tab.

Follow the instruction on this CD in the *Software Guide*, “Power” section, to:

In the operating system, select a Power Scheme with low power-use settings.

In SpeedStep, select the Battery Optimized mode or Maximum Battery Mode (Windows XP Professional only).

Storing a Battery Pack

If a notebook will be unused and not connected to external power for more than 2 weeks, remove and store the battery pack.



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

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

Battery Storage Temperature Ranges

Storage Time	Temperature Range °C	Temperature Range °F
Less than 1 month	0°–50°	32°–122°
No more than 3 months	0°40°	32°104°
No more than 6 months	0°30°	32°86°

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. For more information about battery pack precautions and disposal, and the complete text of governmental agency notices, refer on this 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 this CD to the *Software Guide*, “Power” chapter.

Hard Drive

Caring for Drives

Hard drives are fragile notebook components that must be handled with care. Read carefully the following general caution notices. Caution notices specific to individual procedures are provided throughout this chapter with the procedures to which they apply.



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

Handle the drive carefully.

Do not drop the drive.

Keep in mind that excessive force can damage drive connectors. When you insert the drive, use only enough pressure to seat the drive.

Do not spray the drive with a cleaner or other liquid or expose it to extreme temperatures.

Do not remove the primary hard drive (the hard drive in the hard drive bay) except for repair or replacement.

Avoid exposing a hard drive to devices with a magnetic field, such as airport walk-through metal detectors and security wands.

If you mail the drive, ship it in packaging that protects it from shock, vibration, temperature, and humidity. Label the package "FRAGILE".



CAUTION: To prevent electrostatic damage to the notebook or a drive:

Discharge yourself from static electricity before handling a drive by touching a grounded metal object.

Avoid touching the connectors on a drive. For more information about preventing electrostatic damage, refer on this CD to the *Regulatory and Safety Notices*.



Airport security devices that check carry-on luggage placed on a conveyor belt use X-rays instead of magnetics and do not damage hard drives.

Hard Drive Activity Light

The hard drive activity light turns on when the hard drive is being accessed.



Hard drive activity light

Replacing the Primary Hard Drive

The hard drive in the hard drive bay is the primary hard drive.



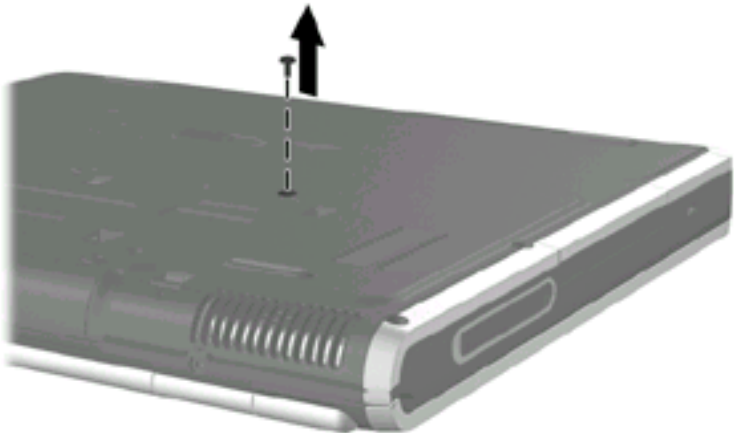
CAUTION: To prevent system lockup and loss of information:

Shut down the notebook before removing the hard drive from the hard drive bay. Do not remove the hard drive while the notebook is on, in Standby, or in Hibernation.

If you are not sure whether the notebook is in Hibernation, turn on the notebook and then shut it down.

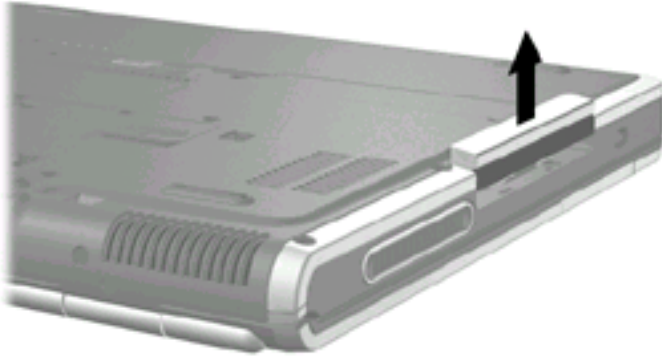
To replace the primary hard drive:

1. Save your work.
2. Shut down the notebook and close the display.
3. Turn the notebook bottom-side up.
4. Remove the hard drive retaining screw.



Removing the hard drive retaining screw

5. Slide the bottom half of the front bezel upward to create a handle.



Extending the front bezel to create a handle

6. Pull the drive out of the bay.



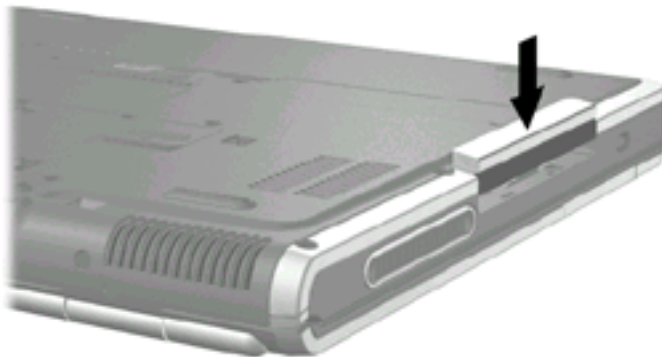
Removing the hard drive from the hard drive bay

7. Insert a hard drive by sliding the hard drive into the bay until the drive is seated.



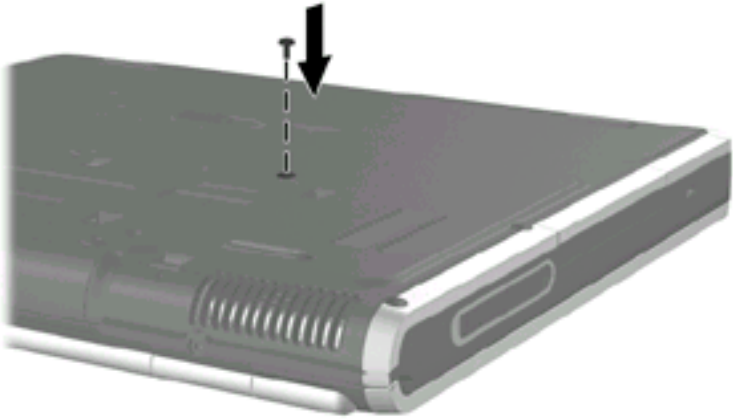
Inserting the hard drive into the hard drive bay

8. Close the front bezel of the hard drive.



Closing the hard drive bezel

9. Reinsert the hard drive retaining screw. (If you removed but did not replace a hard drive, put the retaining screw in a safe place.)

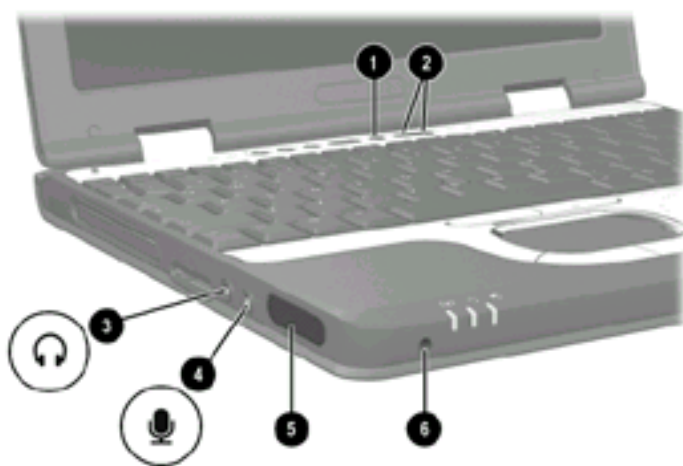


Replacing the hard drive retaining screw

Audio and Video

Using Audio Features

The notebook includes the following audio components:



Audio components

Audio Components

Item	Component	Description
❶	Mute button	Mutes system volume.
❷	Volume buttons (2)	Adjust the system volume.
❸	Audio line-out jack	Connects optional, powered stereo speakers, headphones, headset, or television audio.

Audio Components (*Continued*)

Item	Component	Description
④	Microphone input jack	Connects an optional monaural microphone.
⑤	Speaker	Produces system sound.
⑥	Microphone	Inputs single-channel sound.

Adjusting the Volume

To adjust the volume, use any of the following controls:

Notebook volume buttons

To mute or restore volume, press Quick Launch mute button. You can also mute or restore volume by pressing the volume – and volume + buttons simultaneously.

To decrease the volume, press the left button.

To increase the volume, press the right button.

Windows Volume Control



Volume can also be adjusted within some applications.

Using the Microphone Input Jack

When an external microphone is connected to the notebook, the notebook microphone is disabled.

When connecting a microphone to the microphone input jack, use a monaural microphone with a 3.5-mm plug.

Using the Audio Line-Out Jack



WARNING: To reduce the risk of personal injury, adjust the volume before putting on headphones or a headset.



CAUTION: To prevent possible damage to an external device, do not plug a single-sound channel (monaural) connector into the audio line-out jack.

When connecting a device to the audio line-out jack, use only a 3.5-mm stereo plug. For best sound quality, use 24-ohm to 32-ohm headphones.

When an external audio device is connected to the audio-out jack, the notebook stereo speaker is disabled.

Using Video Features

The notebook features an S-Video out jack. An S-Video cable attaches the notebook to an optional S-Video device, such as a television, VCR, camcorder, overhead projector, or video capture card. The notebook supports one S-Video device connected to the S-Video out jack while simultaneously supporting an image on the notebook display and on any other supported external display.

To transmit video signals through the S-Video out jack, you need an S-Video cable available from most electronic retailers. If you are combining audio and video functions, such as playing a movie from a DVD in an optional MultiBay drive to a television, you also need a standard audio cable available from most electronics retailers.

Connecting a Device to the S-Video Out Jack

To connect a video device to the S-Video out jack:

1. Plug either end of the S-Video cable into the S-Video out jack on the notebook ❶.
2. Connect the other end of the cable to the video device as instructed in the documentation included with the device ❷.



Connecting a device to the S-Video out jack



If the S-Video out jack on the notebook is not accessible while the notebook is docked, you can connect the device to the S-Video out jack on the optional Port Replicator.

Changing the Video Mode

The default color television standard mode of the notebook is NTSC. Color television standard modes vary even within regions. However, NTSC is common in North America; PAL is common in Europe, China, Africa, and the Middle East; NTSC-J is common in Japan; and PAL-M is common in Brazil. Other South and Central American regions may use NTSC, PAL, or PAL-M.

To change the color television standard mode from NTSC:

1. Access the ATI Display tab:

In Windows 2000, select Start > Settings > Control Panel. Double-click the Display icon, select the Settings tab, select the Advanced button, then elect the ATI Display tab.

In Windows XP, Start > Control Panel. Double-click the Display icon, select the Settings tab, select the Advanced button, then elect the ATI Display tab.

2. Enable the TV by selecting the Enable button, indicated by a red triangle.
3. Select the TV Header, then select the Format tab.
4. Select a television format either by name or by Country/Region:

To select a format by name, select Format, select a format in the drop-down list, then select the OK button.

To select the default format for a region or country, select Country/Region, select a location in the drop-down list, then select the OK button.

5. Select the Close button to close all opened dialog boxes.
6. At the prompt, restart the notebook.

Communication Devices

Connecting a Modem Cable

A modem cable, which has a 6-pin RJ-11 connector at each end, must be connected to an analog telephone line. Jacks for digital PBX systems may resemble analog telephone jacks, but are not compatible with the modem.



WARNING: Connecting the notebook to a digital line can permanently damage the modem. Immediately disconnect your modem cable if accidentally connected to a digital line.

If the modem cable contains noise suppression circuitry, which prevents interference from TV and radio reception, orient the circuitry end of the cable toward the notebook.



RJ-11 modem cable with noise suppression circuitry

Using the RJ-11 Cable

To connect an RJ-11 modem cable:

1. Plug the modem cable into the RJ-11 jack on the notebook ❶.



WARNING: To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug a telephone cable into the RJ-45 network jack.

2. Plug the modem cable into the RJ-11 telephone jack ❷.



Connecting the RJ-11 modem cable

For more information about using the modem or about using AT commands and dial modifiers, refer on this CD to the *Modem and Networking* guide or the *Modem Command Guidelines (Advanced Users Only)* guide.

Using a Country-Specific Adapter Cable

Telephone jacks vary by country. To use the modem and the RJ-11 cable outside the country in which you purchased the notebook, you must obtain a country-specific modem adapter. Refer on this CD to the *Modem and Networking* guide for more details about using your notebook internationally.

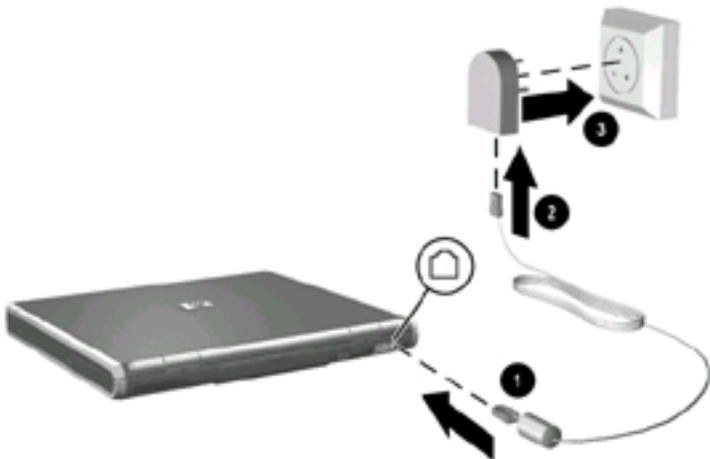
To connect the modem to an analog telephone line that does not have an RJ-11 telephone jack:

1. Plug the modem cable into the RJ-11 jack on the notebook ❶.



WARNING: To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug a telephone cable into the RJ-45 network jack.

2. Plug the modem cable into the country-specific modem adapter ❷.
3. Plug the country-specific modem adapter into the telephone jack ❸.



Connecting a modem cable using a modem adapter

Connecting a Network Cable

A network cable has an 8-pin RJ-45 connector at each end. If the network cable contains noise suppression circuitry, which prevents interference from TV and radio reception, orient the circuitry end of the cable toward the notebook.



RJ-45 network cable with noise suppression circuitry

To connect the network cable:

1. Plug the network cable into the RJ-45 jack on the notebook ❶.
2. Plug the other end of the cable into a network jack ❷.



Connecting a network cable

3. Start or restart the notebook.
4. Connect to the network.

Linking to an Infrared Device

The notebook is IrDA-compliant—4 megabits per second (Mbps) standard—and can communicate with another infrared-equipped device that is also IrDA-compliant.

Infrared signals are sent through an invisible beam of infrared light and require an unobstructed line of sight path.



Linking to an infrared device

The infrared port supports both low-speed connections of up to 115 kilobits per second (Kbps) and high-speed connections of up to 4 Mbps. Infrared performance may vary depending on the performance of infrared peripherals, distance between infrared devices, and applications used.

Setting Up an Infrared Transmission

For information about using infrared software, refer to your operating system Help file.

To set up infrared devices for optimal transmission:

Prepare the infrared ports on both devices for transmission.

Position the devices so that their infrared ports face one another at a distance no greater than 1 meter (3.3 feet).

Position the ports so that they face one another directly. Because the maximum capture angle is 30 degrees, the ports must be aligned no more than 15 degrees off-center.

Shield ports from direct sunlight, flashing incandescent light, and energy-saving fluorescent light.

Be sure that no signals from remote control or other wireless devices, such as headphones or audio devices, aim at a port.

During the transmission, do not move either device and do not allow objects or movement to disrupt the beam.

Using Standby with Infrared

Standby is not compatible with infrared transmission. If the notebook is in Standby, an infrared transmission cannot be initiated. If Standby is initiated during an infrared transmission, the transmission stops. To resume from Standby, press the power button. The transmission resumes when the notebook resumes from Standby. However, any program that was using the infrared transmission when Standby was initiated may not continue at the point it was stopped. For example, if a program was printing when Standby was initiated, the program resumes transmission after the notebook resumes, but the print job may not resume.

Using Wireless LAN

The notebook provides internal wireless LAN supported through an optional mini PCI device. For more information on using your internal wireless LAN, refer to the wireless LAN documentation that ships with the notebook.

Using Bluetooth

The notebook provides internal wireless Bluetooth connectivity supported through an optional integrated module. For more information on using your internal Bluetooth module, refer to the wireless Bluetooth documentation that ships with the notebook.

External Devices

The jacks and connectors described in this guide support standard external devices.

For information about which jack or connector to use, refer to the documentation included with the device.

For information about installing or loading any software, such as drivers, required by the device, refer to the documentation included with the device.

To connect a standard external device to the notebook:

1. Turn off the notebook.
2. If you are connecting a powered device, turn off the device.
3. Connect the device to the connector on the notebook.
4. If you are connecting a powered device, plug the device power cord into a grounded electrical outlet.
5. Turn on the device.
6. Turn on the notebook.

To disconnect a standard external device from the notebook, turn off the device, then disconnect the device from the notebook.

Connecting a Monitor or Projector

To connect an external monitor or projector to the notebook, insert the monitor cable into the external monitor connector on the back of the notebook.



If a properly connected external monitor or projector does not display an image, try pressing the **Fn+F4** hotkeys to switch the image to the monitor.

Using a USB Device

Universal serial bus (USB) is a hardware interface that can be used to connect external devices, such as a USB keyboard, mouse, drive, printer, scanner, or hub, to the notebook. The notebook has a USB connector ❶ and a USB connector that also connects an optional powered external MultiBay ❷. The USB connectors support USB 2.0 and USB 1.1 devices.



USB connectors on the rear panel

USB hubs can be connected to a USB connector on the notebook or on an optional Port Replicator, or to other USB devices. Hubs support varying numbers of USB devices and are used to increase the number of USB devices in the system. Powered hubs must be connected to external power. Unpowered hubs must be connected either to a USB connector on the notebook or to a port on a powered hub.

Using a USB Device

A USB device functions in the same way as a comparable non-USB device, with one exception. By default, USB devices do not function unless an operating system that supports USB is loaded.

Some USB devices may require additional support software, which is usually included with the device. For more information and software installation instructions, refer to the documentation included with the device.

Enabling USB Legacy Support

You must enable USB legacy support to:

Use a USB keyboard, mouse, or hub connected to a USB connector on the notebook during startup or in a non-Windows application or utility.

Boot from an optional external MultiBay.

To enable USB legacy support:

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**.

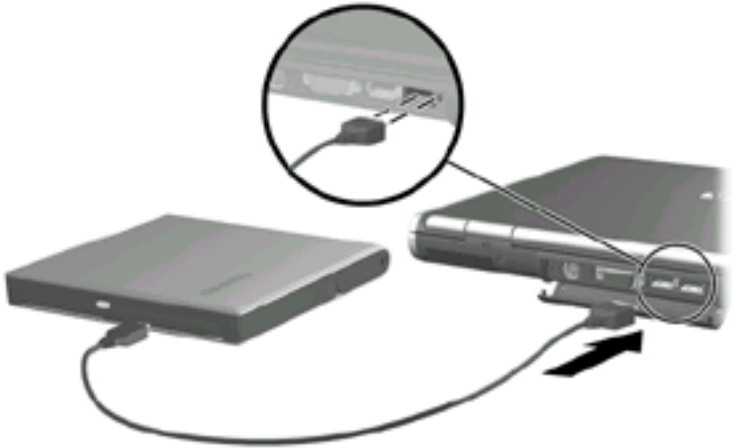
For navigation instructions, press **F1**.

3. Select Advanced menu > Device Options.

4. Select Enable USB legacy support.
5. To save your preference and exit Computer Setup, select File > Save Changes and Exit, then follow the instructions on the screen.

Using an Optional External MultiBay

An external MultiBay connects to the notebook by way of the self-powered USB connector and enables you to use MultiBay drives. For more information about the external MultiBay, refer to the documentation that is included with the device.



Connecting an external MultiBay

Connecting an Optional Cable Lock

To install a security cable:

1. Loop the security cable around a secured object.
2. Pull the security cable lock through the cable loop and insert the cable ❶ into the security cable slot on the notebook.
3. If the cable has a key ❷, use it to lock and unlock the cable.



Connecting a security cable

Hardware Upgrades

To order hardware or learn more about upgrades and accessories, visit the HP Web site at <http://www.hp.com> or contact an authorized dealer, reseller, or service provider. For information about obtaining and installing software updates and upgrades, refer on this CD to the *Software Guide*, “Software Updates and Restorations” chapter.

Using PC Cards

A PC Card is a credit card-sized accessory designed to conform to the standard specifications of the Personal Computer Memory Card International Association (PCMCIA). The notebook supports both 32-bit CardBus and 16-bit PC Cards, and it supports Type I and Type II cards. Zoomed video PC Cards are not supported.



CAUTION: If you install all of the software or any of the enablers provided by a PC Card manufacturer, you may not be able to use other PC Cards. If you are instructed by the documentation included with your PC Card to install device drivers:

Install only the device drivers for your operating system.

Do not install other software, such as card services, socket services, or enablers, that may also be supplied by the PC Card manufacturer.

Inserting a PC Card

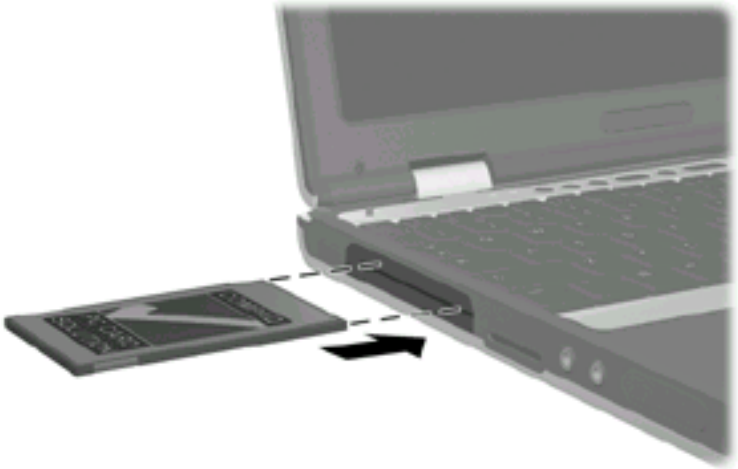


CAUTION: To prevent damage to the connectors:

Use minimal pressure when inserting a PC Card into a PC Card slot.
Do not move or transport the notebook while a PC Card is inserted.

To insert a PC Card:

1. Hold the PC Card label-side up with the connector facing the notebook.
2. Gently push the card into the slot until the card is seated.



Inserting a PC Card into the PC Card slot

Removing a PC Card



CAUTION: To prevent loss of work or system lockup, stop the PC Card, according to the instructions that follow, before removing it.

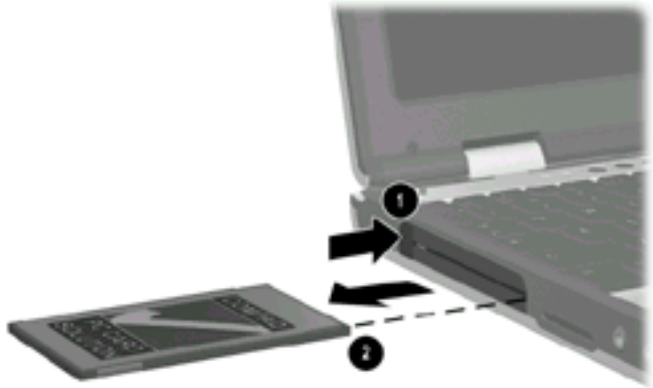
To remove a PC Card:

1. Stop the PC Card:

In Windows 2000, select the Safety Remove Hardware icon in the taskbar, then stop the card you plan to remove. (When the card can be safely removed, a message is displayed.)

In Windows XP, select the Safety Remove Hardware icon in the taskbar, then select the PC Card. (To display the Safety Remove Hardware icon, select Show Hidden Icons in the taskbar.)

2. Press the PC Card eject button ❶.
3. Gently pull out the card ❷.



Removing a PC Card



An inserted PC Card uses power even when not in use. To conserve power, stop or remove a PC Card when you are not using it.

Using SD Cards

Secure Digital (SD) cards are removeable postage stamp-sized compact flash storage devices that provide a convenient method of storing data and sharing it with other devices such as PDAs, cameras, and other SD equipped PCs.



Inserting an SD Card

CAUTION: To prevent damage to the connectors:

Use minimal pressure when inserting an SD card into an SD card slot.

Do not move or transport the notebook while an SD card is inserted,

To insert an SD card:

1. Insert the SD card into the SD slot.
2. Push the card firmly into the slot until it clicks into place.



Inserting an SD card into the SD slot

Removing an SD Card



CAUTION: To prevent loss of work or system lockup, stop the SD card before removing it.

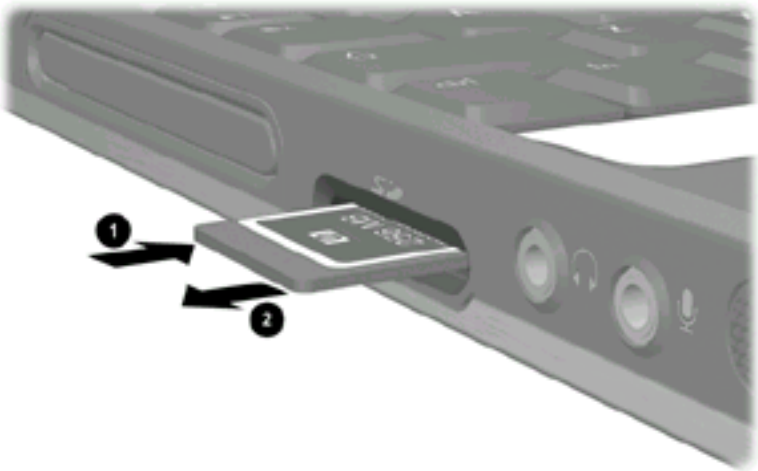
To remove an SD card: {xe "SD (Secure Digital) card:removing"}

1. Close all files and applications using the SD card.
2. Stop the SD card.

In Windows 2000, select the Unplug or Eject icon in the task bar, then stop the card you plan to remove. (When the card can be safely removed, a message is displayed.)

In Windows XP, select the Safely Remove Hardware icon in the taskbar, then select the PC Card. (To display the Safely Remove Hardware icon, select Show Hidden Icons in the taskbar.)

3. Gently press in on the SD card to unlock it ❶.
4. Pull the SD card from the slot ❷.



Ejecting an SD card from the SD slot

Adding and Upgrading Memory Modules



WARNING: The memory compartments are the only user-accessible internal compartments on the notebook. All other areas that require a tool to access should be opened only by an authorized service provider.



WARNING: Failure to unplug the power cord and remove all battery packs before installing a memory expansion board can damage the equipment and expose you to the risk of electrical shock.



CAUTION: Electrostatic discharge (ESD) can damage electronic components. Before beginning any procedure, ensure that you are discharged of static electricity by touching a grounded metal object. For more information, refer on this CD to the *Regulatory and Safety Notices* guide.

The notebook has 2 memory slots. The primary memory slot is located under the keyboard. The primary memory slot is populated at the factory. The memory expansion slot is located on the bottom of the notebook. {xe "memory:primary slot" }

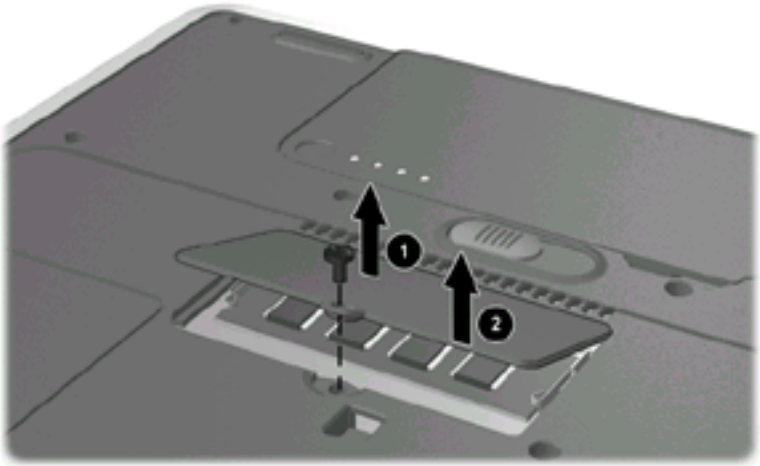
The memory capacity of the notebook can be upgraded first by adding a memory module to the expansion slot and then by upgrading the memory module in the primary memory slot.

Adding a Memory Expansion Module

To add a memory expansion module:

1. Shut down the notebook. (If you are not sure whether the notebook is off or in Hibernation, turn the notebook on by pressing the power button. Then shut down the notebook through the operating system.)
2. Disconnect all external devices connected to the notebook.
3. Disconnect the power cord.

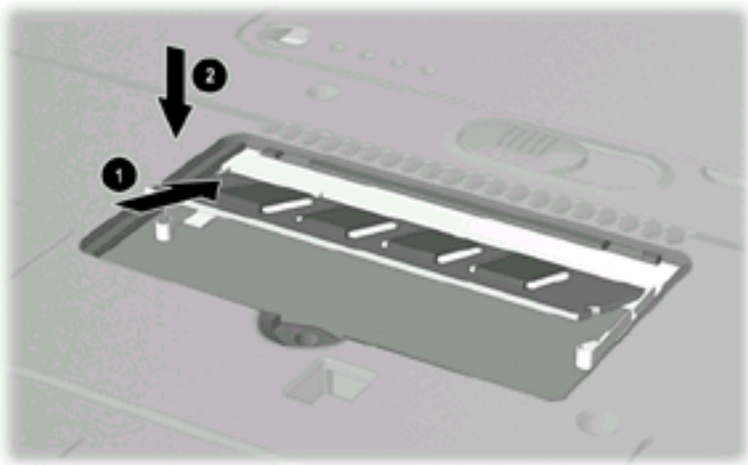
4. Turn the notebook bottom-side up.
5. Remove any battery packs from the notebook.
6. Remove the screw from the memory expansion slot cover ❶.
7. Tilt the expansion slot cover away from the notebook ❷.



Removing the expansion slot cover

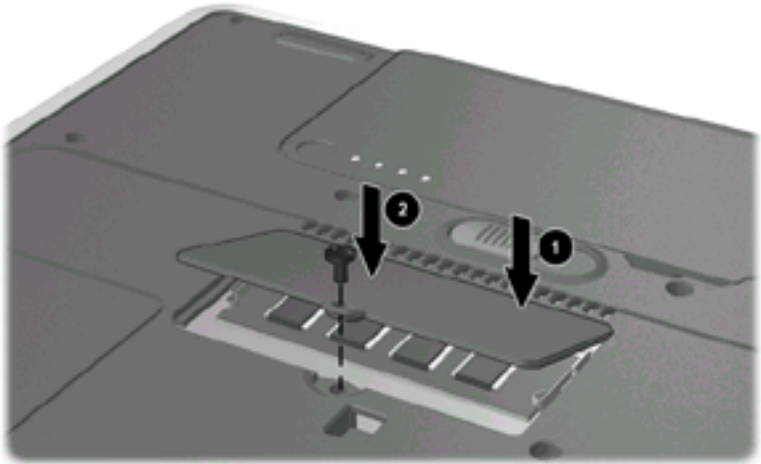
8. Remove the memory expansion slot cover.

9. Insert the memory expansion module:
 - a. Align the keyed (notched) edge of the module with the keyed area in the expansion slot ❶.
 - b. Press the module into the slot from a 45-degree angle until it is seated, then push the board downward until the retention clips snap into place ❷.



Inserting a memory expansion module

10. Insert the tabs on the expansion slot cover into the recesses in the expansion slot ❶.
11. Replace the expansion slot cover over the expansion module compartment.
12. Replace the expansion slot cover screw ❷.



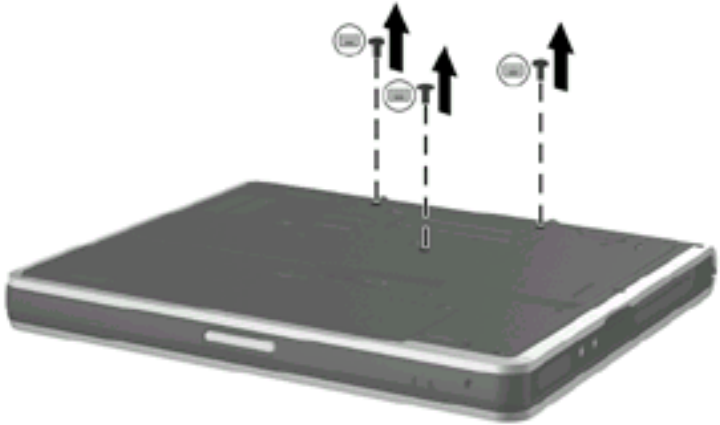
13. Replace the battery packs.
14. Reconnect AC power and external devices.
15. Restart the notebook.

Upgrading the Memory Module in the Primary Memory Slot

To upgrade the memory module in the primary memory slot:

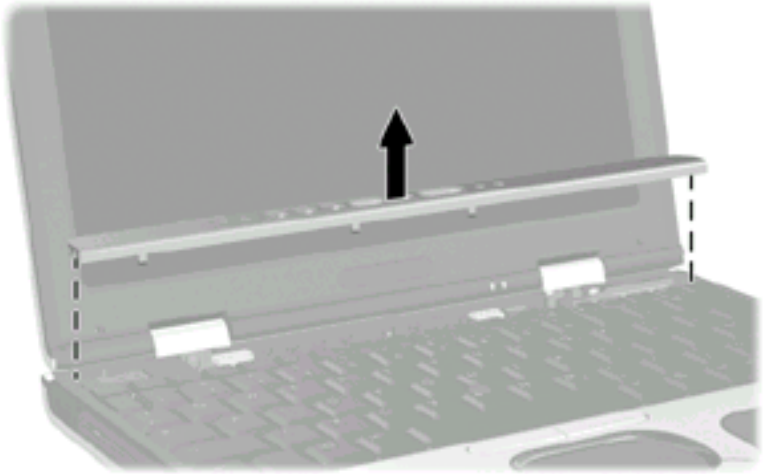
1. Shut down the notebook. (If you are not sure whether the notebook is off or in Hibernation, turn the notebook on by pressing the power button. Then shut down the notebook through the operating system.)
2. Disconnect all external devices connected to the notebook.

3. Disconnect the power cord.
4. Remove any battery packs from the notebook.
5. Remove the 3 keyboard screws from the bottom of the notebook. A keyboard icon is located next to the keyboard screws.



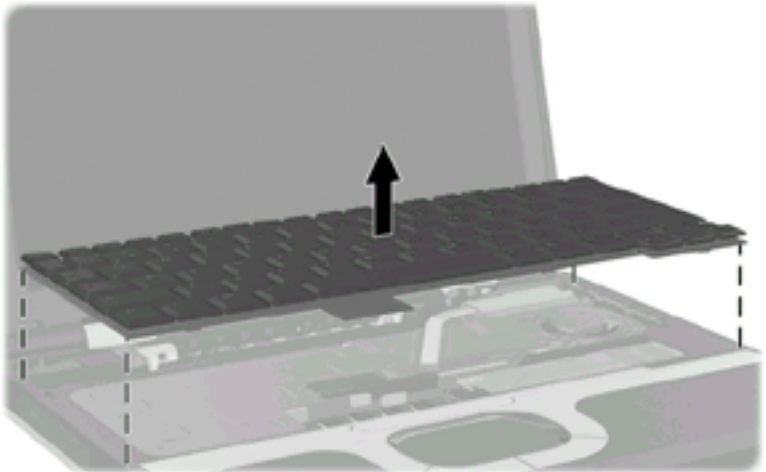
Removing the keyboard screws

6. Using a fingernail or small flat tool, remove the Quick Launch button bezel located above the keyboard.



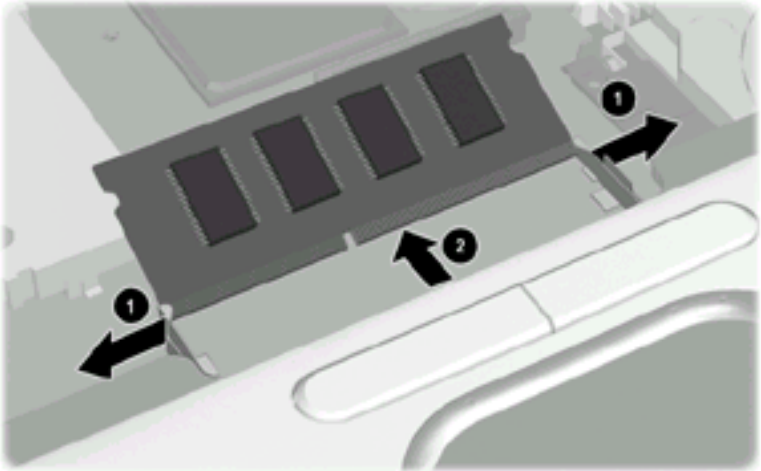
Removing the Quick Launch button bezel

7. Remove the keyboard.



Removing the keyboard

8. Remove the existing memory module:
 - a. Pull away the retention clips on each side of the module ❶. (The module tilts upward.)
 - b. Lift the edge of the memory expansion module, then gently pull it out of the slot ❷.

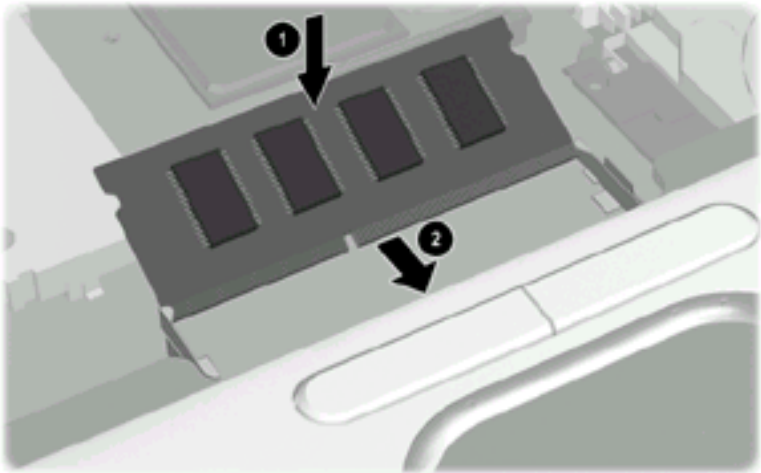


Removing the existing memory module



To protect a memory module after it has been removed, place it in an static-safe container.

9. Insert the new memory module:
 - a. Align the keyed (notched) edge of the module with the keyed area in the expansion slot ❶.
 - b. Press the module into the slot from a 45-degree angle until it is seated, then push the module downward until the retention clips snap into place ❷.



Inserting the new memory module

10. Replace the keyboard.
11. Replace the Quick Launch button bezel.
12. Replace the keyboard screws located on the bottom of the notebook.
13. Replace the battery packs.
14. Reconnect AC power and external devices.
15. Restart the notebook.

Increasing RAM

You can increase the random access memory (RAM) of the notebook with optional memory expansion modules. When RAM increases, the operating system increases the hard drive space reserved for the hibernation file.

If you experience problems with Hibernation after increasing RAM, verify that your hard drive has enough free space for the larger hibernation file.

To display the amount of RAM in the system:

In Windows 2000, select Start > Settings > Control Panel > System > General tab.

In Windows XP, select Start > Control Panel > Performance and Maintenance > System > General tab.

In Windows 2000 or Windows XP, press **Fn+esc**.

To display the amount of free space on your hard drive:

Double-click the My Computer icon on the desktop, then select your hard drive. Information about the space on the drive is displayed in a status bar at the bottom of the window.

To display the amount of space required by the hibernation file:

In Windows 2000, select Start > Settings > Control Panel > HP Power > Hibernation tab.

In Windows XP, select Start > Control Panel > Performance and Maintenance > Power Options icon > Hibernate tab.

Specifications

Notebook Dimensions


Dimension	Metric	U.S.
Height	2.79 cm	1.1 inches
Width	27.94 cm	11 inches
Depth	23.37 cm	9.2 inches

Operating Environment

Factor	Metric	U.S.
Temperature		
Operating	10° to 35° C	50° to 95° F
Nonoperating	10° to 60° C	14° to 140° F
Relative humidity (noncondensing)		
Operating	10 to 90%	10 to 90%
Nonoperating	5 to 95%	5 to 90%
Maximum altitude (unpressurized)		
Operating	3,048 m	10,000 ft
Nonoperating	9,144 m	30,000 ft

Rated Input Power

Input Power	Rating
Operating voltage	100120/220240 VAC RMS
Operating current	1.6/0.8 A RMS
Operating frequency range	5060 Hz AC
When powered by a DC source	18.5V MAX

 This product is designed for IT power systems in Norway with phase-to-phase voltage not exceeding 240 Vrms.

Modem Specifications

Factor	Specification
Temperature	
Operating	0° to 75° C (32° to 167° F)
Storage	40° to 75° C (40° to 167° F)
Relative humidity (noncondensing)	
Operating	10 to 90%
Nonoperating	5 to 95% @ 39° C (5 to 95% @ 102° F)
Interfaces	Communications connector Standard RJ-11 connector
Power Requirements	+3.3 volts ±5%, +5 volts ±5%

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