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Power

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Understanding Standby, Hibernation and Shutdown

This section describes Standby, Hibernation, and shutdown and explains when to implement them. Standby, Hibernation, and shutdown procedures are provided later in the chapter. Standby and Hibernation are energy-saving features that can be initiated by you or by the system.

Standby

Standby reduces power to system components that are not in use. When Standby is initiated, your work is saved in random access memory (RAM) and the screen is cleared.

■ Saving your work before initiating Standby is not usually necessary, but is a recommended precaution.

■ When the notebook is in Standby, the power/standby light flashes.

When you resume from Standby, your work returns to the screen where you left off.

Hibernation

Hibernation saves system memory to the hard drive, takes a snapshot of the notebook image, then shuts down the notebook. When you resume from Hibernation, your work returns to the screen exactly as you left it.

The following information may be useful as you manage Hibernation:

■ Saving your work before initiating Hibernation is not usually necessary, but is a recommended precaution.

- To determine whether the notebook is in Hibernation or turned off, press the power button:

  ❏ If the notebook is in Hibernation, your work returns to the screen.

  ❏ If the notebook is off, Windows loads.

- Hibernation is enabled by default, but can be disabled. To prevent loss of work during a critical low-battery condition, disable Hibernation only during a battery pack calibration.

  To verify that Hibernation is enabled, select Start > Control Panel > Performance and Maintenance > Power Options icon > Hibernate tab. If Hibernation is enabled, the Enable Hibernation check box is selected.

$\bigwedge$ **CAUTION:** If the configuration of the notebook system is changed during Hibernation, it may not be possible to resume from Hibernation. When the notebook is in Hibernation:

- Do not add or remove a memory module.
- Do not connect or disconnect an external device.
- Do not insert or remove a CD, DVD, PC Card, SD Card, or MMC.

Shutdown

Shutdown procedures turn off the notebook. Whether to leave a battery pack in the notebook or in storage depends on how you work:

- Leaving the battery pack in the notebook enables the battery pack to charge whenever the notebook is connected to external power and also protects your work during a power outage.

- A battery pack in the notebook discharges more quickly, even when the notebook is turned off, than a battery pack that has been removed from the notebook and stored in a cool, dry location.

Choosing Standby, Hibernation or Shutdown

If you plan to resume shortly: Initiate Standby for shorter times and Hibernation for longer times or power conservation.

The amount of time a battery pack can support Standby or Hibernation or hold a charge varies by notebook configuration and the condition of the battery pack.

■   Initiating Standby clears the screen, uses less power than leaving the notebook on, and your work returns quickly to the screen when you resume from Standby. A fully charged new battery pack can typically support Standby for up to 48 hours.

■   Initiating Hibernation clears the screen and uses much less power than Standby. Returning to work saved in Hibernation takes longer than returning to work saved in Standby, but is faster than returning to your place manually after restarting the notebook. A fully charged new battery pack can typically support Hibernation for several weeks.

If you plan to resume within 2 weeks: Shut down the notebook. If possible, connect the notebook to external power to keep an inserted battery pack fully charged.

If the notebook will be disconnected from external power for more than 2 weeks: To extend the life of an inserted battery pack, shut down the notebook. Remove the battery pack and store it in a cool, dry location.

If an external power supply is uncertain, for example because of an electrical storm, save your work, then initiate Hibernation or shut down the notebook.

Using Standby, Hibernation and Shutdown Procedures

This section explains the default Standby, Hibernation, and shutdown procedures and includes information about turning the display on or off.

Identifying Power Controls and Indicators

Standby, Hibernation, shutdown, and display procedures use the following controls and indicators:

- ❶ Power button
- ❸ **Fn+F5** hotkeys (to initiate Standby)
- ❷ Display switch
- ❹ Power/standby light

Identifying Standby, Hibernation, shutdown, and display controls and indicators

Turning the Notebook or Display On or Off

Task	Procedure	Results
Turn on the notebook.	Press the power button. ✎ Pressing the power button turns on the notebook from Standby, Hibernation, or shutdown.	■ Power/standby light turns on. ■ Operating system loads.
Shut down the notebook.*	Select Start > Turn Off Computer > Turn Off.	■ Power/standby light turns off. ■ Operating system shuts down. ■ Notebook turns off.
Turn off the display when the notebook is closed.	Close the notebook.	When the notebook is closed, the display presses the display switch, which then turns off the display.

*If the system is unresponsive, and you are unable to shut down the notebook with this procedure, see "Using Emergency Shutdown Procedures" next in this section.

Using Emergency Shutdown Procedures

If the notebook does not respond to the Windows shutdown procedure (Start > Turn Off Computer > Turn Off), try the following emergency shutdown procedures in the sequence provided:

■ If the notebook is running Windows XP Professional: Press **ctrl+alt+delete.** Select the Shut Down button, then select Shut down from the drop down list.

■ Press and hold down the power button for at least 4 seconds.

■ Unplug the notebook from external power and remove the battery pack. For battery pack removal instructions see the "Replacing a Battery Pack" section, later in this chapter.

Initiating or Resuming from Standby

Task	Procedure	Result
User-initiated Standby	With the notebook on, use either of the following procedures: ■ Press the **Fn+F5** hotkeys. ■ Select Start > Turn off Computer > Stand by.	■ Power/standby light flashes. ■ Screen clears.
System-initiated Standby	If the notebook is running on external power, the system does not initiate Standby.	
	If the notebook is running on battery power, the system initiates Standby after 10 minutes of notebook inactivity.	■ Power/standby light flashes. ■ Screen clears.
Resume from user-initiated or system-initiated Standby.	■ Briefly press the power button, or move (or click any button on) an optional external USB mouse. ■ If the display was closed while the notebook was in Standby, open the display.	■ Power/standby light turns on. ■ Your work returns to the screen.

Initiating or Restoring from Hibernation

Task	Procedure	Result
User-initiated Hibernation	With the notebook on, use either of the following procedures: ■ Briefly press the power button. ■ Select Start > Shut Down > Hibernate. (If the Hibernate option is not displayed, press and hold **shift.**) ✎ If the notebook is in Standby, you must resume from Standby before you can initiate Hibernation.	■ Power/standby light turns off. ■ Screen clears.
System-initiated Hibernation	If the notebook is running on external power, the system does not initiate Hibernation.	
	If the notebook is running on battery power, the system initiates Hibernation: ■ After 30 minutes of notebook inactivity, or ■ When an inserted battery pack reaches a critical low-battery condition (1 percent of a full charge remaining).	■ Power/standby light turns off. ■ Screen clears.
Restore from user-initiated or system-initiated Hibernation.	Press the power button. ✎ If the system initiated Hibernation because of a critical low-battery condition, connect external power or insert a charged battery pack before you press the power button.	■ Power/standby light turns on. ■ Your work returns to the screen.

Setting Power Control Preferences

By default, when the notebook is on:

■ Briefly pressing the power button initiates Hibernation.

■ Pressing the **Fn+F5** hotkeys, called the "sleep button" in the operating system, initiates Standby.

■ The display switch turns off the display. The display switch is activated by closing the display. (At default and all custom settings, the display switch also turns on the notebook if the display is opened while the notebook is in Standby.)

To change the function of the power button, the **Fn+F5** hotkeys, or the display switch:

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

   ❑ To change the power button function, select a function from the drop-down list for When I Press The Power Button On My Computer.

   ❑ To change the function of the **Fn+F5** hotkeys, select a function from the drop-down list for When I Press The Sleep Button On My Computer.

   ❑ To change the display switch function, select a function from the drop-down list for When I Close The Lid Of My Portable Computer.

2. Select the OK button.

The Hibernate function is available in the power button, sleep button, and display switch drop-down lists only if Hibernation is enabled.

Using a Battery Pack

Identifying the Battery and Power/Standby Lights

Battery pack procedures refer to the:

❶ Power/standby light

❷ Battery light

Identifying the battery and power/standby lights

Switching Between Battery and External Power

The notebook switches between external power and battery power according to the availability of external power. To conserve the charge in an inserted battery pack, the notebook runs on external power whenever external power is available. External power can be supplied from an electrical outlet through an AC adapter or an optional DC cable.

If the notebook contains a charged battery pack and is running on external power, the notebook switches to battery power only if the AC adapter or DC cable is disconnected from the notebook.

The Power Meter icon in the system tray changes shape whenever the power source changes between battery power and external power.

Charging a Battery Pack

The battery pack charges whenever the notebook is connected to external power through an AC adapter or an optional DC cable.

The battery pack charges whether the notebook is turned off or turned on, but charges most quickly when the notebook is turned off. When the notebook is turned on, charging times are longer and vary with system activity.

The battery light displays charge status:

■ On and amber: the battery pack is charging.

■ On and green: the battery pack is fully charged.

■ Flashing: the battery pack is malfunctioning and may need to be replaced.

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Monitoring the Charge in a Battery Pack

Obtaining Accurate Charge Information

To increase the accuracy of all battery charge displays:

■ Allow the battery pack to discharge to less than 10 percent of a full charge through normal use before charging it.

■ Charge the battery pack fully. Even a new battery pack can display charge information inaccurately if it has not been fully charged.

■ If a battery pack has not been used for one month or more, the battery pack may need to be calibrated.

Displaying Charge Information

To display battery charge information on the screen, use the operating system Power Meter feature. To access Power Meter displays, select Start > Control Panel > Performance and Maintenance icon > Power Options icon > Power Meter tab.

Power Meter displays 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.

Managing Low-Battery Conditions

The information in this section describes default alerts and system responses.

Identifying Low-Battery Conditions

When the battery pack is the only power source for the notebook and drops to 10 percent of a full charge, the notebook has reached a *low-battery condition*. A text warning message appears on the screen.

If a low-battery condition is not resolved and the amount of charge remaining in the battery pack continues to drop, the notebook eventually enters a *critical low-battery condition.* Then, if the notebook is on or in Standby:

■ If Hibernation is enabled, the system initiates Hibernation. Unsaved work may be lost.

■ If Hibernation is disabled, the notebook remains briefly in Standby, then shuts down. The power/standby light turns off, and the notebook cannot save system memory to the hard drive.

Resolving Low-Battery Conditions

Ä **CAUTION:** If the notebook has reached a critical low-battery condition and has begun to initiate Hibernation, do not restore power until Hibernation is complete. When Hibernation is complete, the power/standby light turns off.

If external power is available, connect the notebook to the external power source.

If a charged battery pack is available, shut down the notebook or initiate Hibernation. Insert a charged battery pack, then turn on the notebook.

If no power source is available, save your work. Then initiate Hibernation or shut down the notebook.

Calibrating 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

Charge the battery pack while the notebook is in use. To charge the battery pack:

1. Insert the battery pack into the notebook. For instructions, see "Replacing a Battery Pack" later in this chapter.

2. Connect the notebook to external power. (The battery light is on and amber as the battery pack charges.)

3. Leave the notebook connected to external power until the battery pack is fully charged. (The battery light turns green.)

Discharging the Battery Pack

Before you begin the full discharge, disable Hibernation. To disable Hibernation, select Start > Control Panel > Performance and Maintenance > Power Options > Hibernate tab. Then clear the Enable Hibernation check box.

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.

Ⓒ **CAUTION:** If you plan to leave the notebook unattended during discharge, save your work before starting the discharge procedure.

To fully discharge the battery pack:

1. Select the power icon on the taskbar or select Start > Control Panel > Performance and Maintenance icon > Power Options icon > Power Schemes tab.

2. Record all settings in the Plugged In column and all settings in the Running On Batteries column, so you can reset them after calibration.

3. Use the drop-down lists to set each item in both columns 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. 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 keep the notebook connected until the battery pack is fully recharged and the battery light turns green.

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

2. Select the Power icon on the taskbar or select Start > Control Panel > Performance and Maintenance icon > Power Options icon > Power Schemes tab.

3. Reenter the settings you recorded for the items in the Plugged In column and the Running on Batteries column.

4. Select the OK button.

△ **CAUTION:** After calibrating the battery pack, reenable Hibernation: select Start > Control Panel > Performance and Maintenance > Power Options > Hibernate tab, then select the Enable Hibernation check box.

Storing a Battery Pack

If the notebook will be unused and unplugged 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 extended periods of time.

High temperatures, which may be present in parked cars or some workplaces, accelerate the self-discharge rate of a stored battery pack. To prolong the charge of a stored battery pack, place it in a location that is cool and dry.

To maintain the accuracy of battery charge displays, calibrate a battery pack that has been stored for one month or more before using it.

Battery Conservation Settings and Procedures

Using the following battery conservation settings and procedures extends the run time of a battery pack.

■ Turn off wireless and local area network (LAN) connections and exit modem applications when you are not using them.

■ Disconnect from the notebook any external devices that use power from the notebook. Battery run time is not affected by external devices that are plugged into an external power source.

■ Stop or remove a PC Card you are not using.

■ Disable or remove an SD (Secure Digital) Card or MMC (multimedia card) you are not using.

■ Lower screen brightness. Screen brightness can be lowered by pressing the **Fn+F7** hotkeys.

■ Lower system volume. Volume can be lowered with the decrease volume button.

■ Turn off a device connected to the S-Video connector. A device connected to the S-Video connector can be turned off by using the **Fn+F4** hotkeys to switch the image from the S-Video device to the notebook display.

■ If you leave your work, initiate Standby or Hibernation or shut down the notebook.

■ Select a short wait time, 5 minutes or less, for the monitor timeout. To change monitor timeout settings, select Start > Control Panel > Performance and Maintenance icon > Power Options icon > Power Meter tab. Select a short wait time from the Turn Off Monitor drop-down list, then select OK.

Replacing a Battery Pack

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

To replace the battery pack:

1. Turn the notebook underside up.

   ❏ To remove a battery pack, slide the battery release latch ❶. (The battery pack tilts upward.) Then pull the battery pack out of the battery bay ❷.
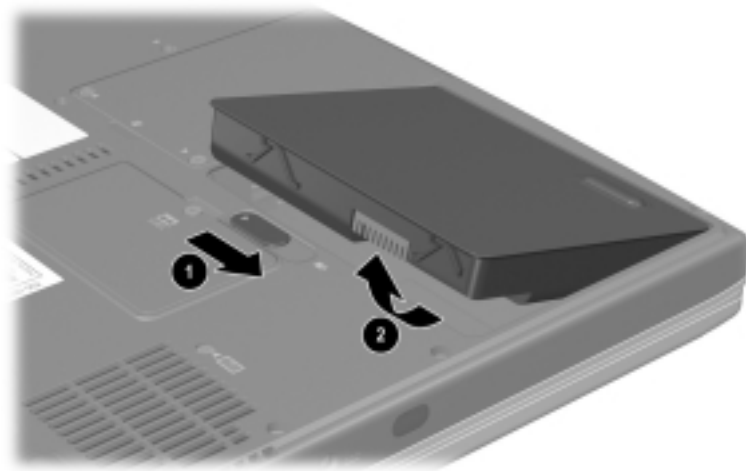
Removing a battery pack

❏ To insert a battery pack, insert the alignment tab on the battery pack into the alignment slot on the notebook ❶, then tilt the battery pack downward until it snaps into place ❷.
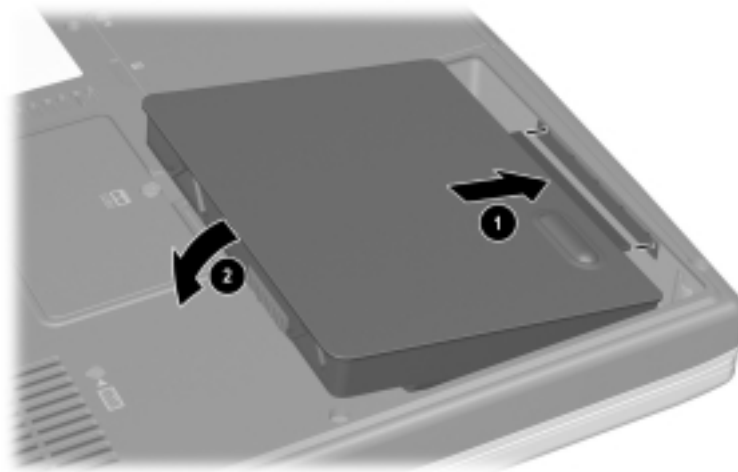
Inserting a battery pack

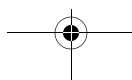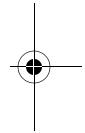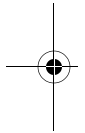2. To restore from Hibernation or to turn on the notebook, press the power button.

Recycling or Disposing of a Used Battery Pack

For information about recycling or disposing of a used battery pack, refer on the *Documentation Library* CD to the *Regulatory and Safety Notices* guide, "Battery Notice" section.

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Drives and Drive Media

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Understanding Drive and Drive Media Terms

Hard drives are for the permanent storage of data files and of software such as system files, applications, and drivers. A hard drive is sometimes called a *hard disk drive* or *HDD.*

Diskette drives support *diskettes*, which are used to store or transport data. The notebook can read or write to any diskette. A diskette drive is sometimes called a *floppy disk drive,* or *FDD.*

Optical drives include CD and DVD drives. Optical drives support CDs and DVDs, often called *discs,* which are used to store or transport data and to play music and movies. DVDs have higher capacities than CDs. The notebook can read or write to optical drives as described in the following table.

Optical Drive	Read	Write
CD-ROM drive	Yes	No
DVD-ROM drive	Yes	No
CD-RW drive	Yes	Yes
DVD/CD-RW drive	Yes	Yes

A *drive designation* is a letter of the alphabet that the notebook uses to identify the drive. To display the drive designation of every drive in the system, select Start > My Computer.

A *diskette* or *disc* that can be inserted or removed from a drive is referred to as a *drive medium.* For example, the term *drive media* includes diskettes, CDs, and DVDs.

Caring for Drives and Drive Media

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

- Do not remove the internal hard drive except for repair or replacement. For instructions, see the "Replacing the Internal Hard Drive" section later in this chapter.
- Electrostatic discharge can damage electronic components. To prevent electrostatic damage to the notebook or a drive, follow these 2 precautions: (1) Discharge yourself from static electricity before handling a drive by touching a grounded metal object and (2) Avoid touching the connectors on a drive. For more information about preventing electrostatic damage, refer on the *Documentation Library* CD to the *Regulatory and Safety Notices* guide, "Electrostatic Discharge" section.
- Excessive force can damage drive connectors. When you insert a drive, use only enough force to seat the drive.
- Handle a drive carefully. Do not drop it.
- Avoid exposing a hard drive or a diskette to devices with magnetic fields. Products with magnetic fields include video and audio tape erasure products, monitors, and speakers. Security devices with magnetic fields include airport walk-through devices and security wands. The airport security devices that check carry-on luggage, usually while it is placed on a conveyor belt, use x-rays instead of magnetism and will not damage a hard drive or a diskette.
- Do not spray a drive with cleaners.
- Avoid exposing a drive to liquids or temperature extremes.
- If you mail a drive, ship it in packaging that protects it from shock, vibration, extreme temperatures, and high humidity. Label the package "FRAGILE."

△ **CAUTION:** To prevent damage to drive media:

- Do not open the metal shutter of a diskette or touch the disk within the diskette case.
- Do not expose a diskette to a strong magnetic field, such as the security field used by a walk-through security device or a handheld security wand.
- Clean a CD or DVD only with a disc cleaning kit, available from most electronics retailers.

Adding a Drive to the System

The internal hard drive and optical drive are standard features of the notebook. The type of optical drive varies by notebook model.

An optional drive can be added to the system by connecting it, as instructed in the drive documentation, to one of the USB (Universal Serial Bus) connectors or to the 1394 connector. Hard drive capacity can also be added with a microdrive PC Card. An SD Card or MMC (multimedia card) can provide additional data storage.

Using the IDE Drive Light

The IDE (Integrated Drive Electronics) light turns on when the internal hard drive or optical drive is being accessed.
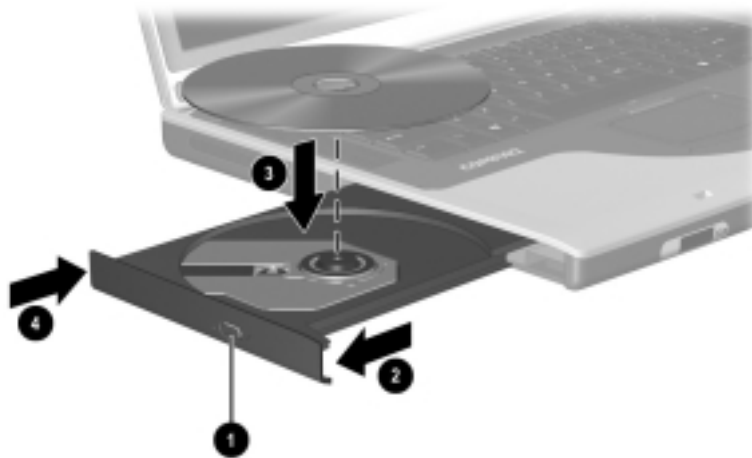
Identifying the IDE drive light

Inserting or Removing a Disc

Inserting a Disc

1. Turn on the notebook.

2. Press the release button ❶ on the drive bezel to release the media tray, then pull the tray outward until it is fully extended ❷.

3. Position a CD or one-sided DVD over the tray, label side up.

4. Gently press the center of the disc onto the tray spindle ❸ until the disc snaps into place. Handle the disc by the edges, not the flat surfaces. (If the media tray is not fully extended, tilt the disc to position it over the tray spindle, then press it downward into position.)

5. Close the media tray ❹.

Inserting a disc into the optical drive

Removing a Disc (With Power)

1. Turn on the notebook.

2. Press the release button ❶ on the drive bezel to release the media tray, then pull the tray outward until it is fully extended ❷.

3. Remove the disc from the tray by gently pushing down on the spindle while pulling up on the outer edges of the disc ❸. Handle the disc by the edges, not the flat surfaces. If the media tray is not fully extended, tilt the disc as you remove it.

4. Close the media tray ❹.

5. Place the disc in a protective case.
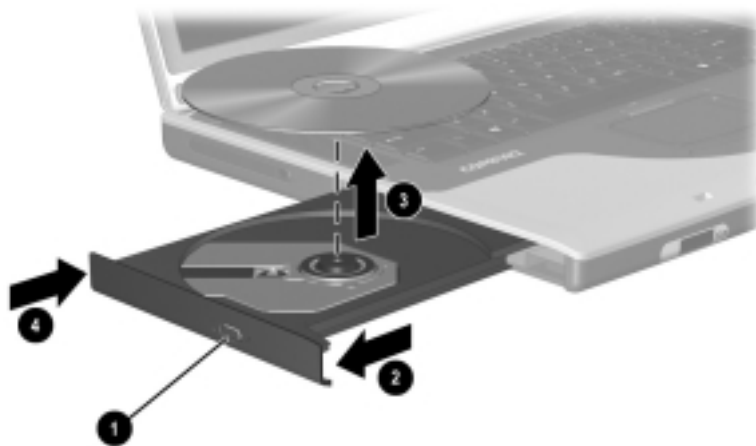
Removing a disc from the optical drive when power is available

Removing a Disc (Without Power)

If the notebook is turned off or if no power is available, the release button on the optical drive will not work. To remove a disc from an optical drive without using the release button:

1. Insert the end of a small object like a paper clip into the release access ❶ in the front bezel of the drive.

2. Press gently on the paper clip until the media tray is released, then pull the tray outward until it is fully extended ❷.

3. Remove the disc from the tray by gently pushing down on the spindle while pulling up on the outer edges of the disc ❸. Handle the disc by the edges, not the flat surfaces. If the media tray is not fully extended, tilt the disc as you remove it.

4. Close the media tray ❹.

5. Place the disc in a protective case.
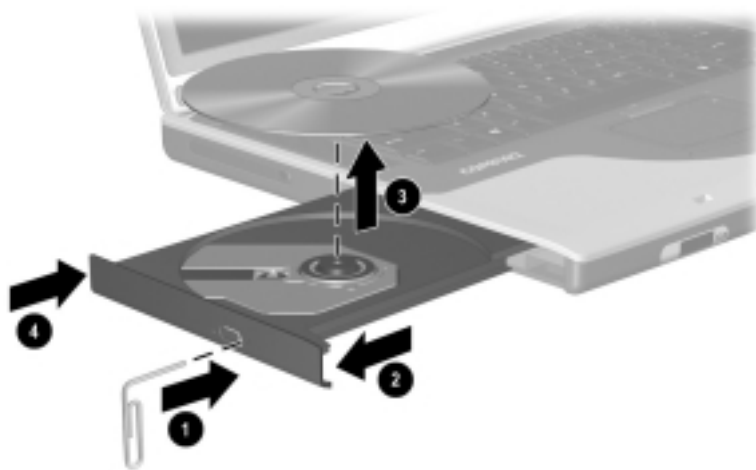
Removing a disc from the optical drive when power is not available

Playing a Disc

You can play a CD in a CD drive or a DVD drive. You can play a DVD only in a DVD drive.

The information in this section applies to most optical drives and most disc software. For information about specific disc software, including Windows Media Player, WinDVD, and Easy CD Creator, see the "Using Multimedia Software" section in Chapter 6.

Displaying Media Contents

When you insert a CD or DVD into the system, the notebook can play the medium, display its contents, take no action, or display a response prompt on the screen. You can choose how the notebook responds to the insertion of a medium by using the operating system AutoPlay feature.

The notebook responds to the following procedures at most AutoPlay settings:

■ To prevent an audio CD from opening when AutoPlay is enabled on the drive containing it, press the **shift** key as you insert the CD.

■ To display the contents of a drive medium when the contents are not displayed by AutoPlay:

1.Insert the medium into the drive.

2. Select Start > Run, then type:

explorer x:

(where X = the drive designation of the drive containing the medium).

3. Select the OK button.

Protecting Playback

⚠ **CAUTION:** Inserting or removing any device while running any multimedia application may pause or stop the play.

⚠ **CAUTION:** Initiating Standby or Hibernation while playing a drive medium may stop the play or diminish the quality of the play.

If Standby or Hibernation is accidentally initiated during playback:

■ If you see the warning message "Putting the computer into Hibernation or Standby may stop the playback. Do you want to continue?" select No. (Audio and video may resume or you may need to restart the drive medium.)

■ If Standby or Hibernation initiates and no warning message is displayed, resume from Hibernation or Standby by briefly pressing the power button, then restart the medium.

Observing the Copyright Warning

It is a criminal offense, under applicable copyright laws, to make unauthorized copies of copyright-protected material, including computer programs, films, broadcasts, and sound recordings. This notebook should not be used for such purposes.

Drives and Drive Media

Setting the Boot Order

By default, the notebook starts up from the internal hard drive. You can set the notebook to start up from any bootable CD or DVD in the optical drive. A bootable CD or DVD contains files needed by the notebook to start up and operate properly. On some models, you can also start up from a drive connected to the notebook by USB.

Startup preferences are set in the Setup utility. The Setup utility is not a Windows utility and does not support the TouchPad. For information about using the Setup utility, see the "Using the Setup Utility" section in Chapter 9.

Replacing the Internal Hard Drive

The hard drive in the hard drive bay is the internal hard drive. Remove the internal hard drive only for repair or replacement.

$\triangle$ **CAUTION:** To prevent an unresponsive system and loss of work, do not begin this procedure until you have:
■ Saved your work, closed all open applications, and shut down the notebook.
■ Disconnected the notebook from external power and remove the battery pack.

1. Save your work and close all open applications.

2. Shut down the notebook and close the display.

3. Disconnect the notebook from external power.

4. Remove the battery pack.

5. Turn the notebook underside up.

6. Remove the 2 hard drive retaining screws.
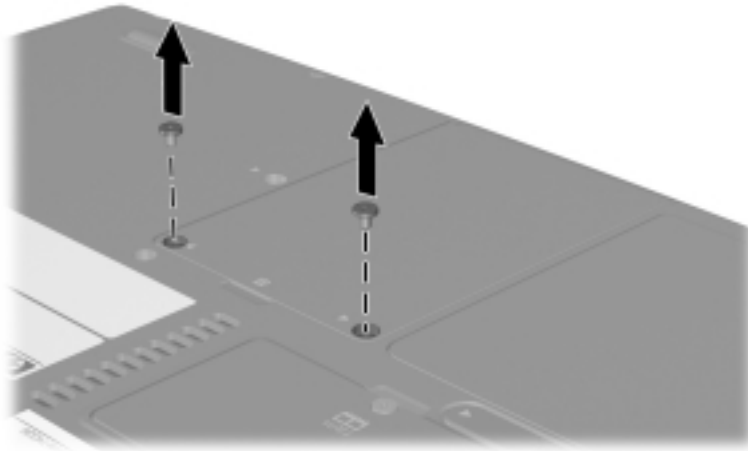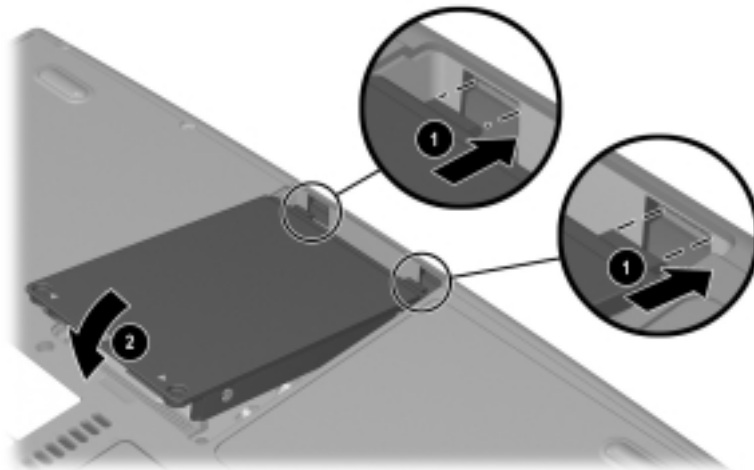
Removing the hard drive retaining screws

7. To remove a hard drive, grasp the hard drive assembly (the hard drive, the hard drive cover, and the hard drive bracket) using the hard drive recess ❶. Tilt the hard drive assembly upward ❷, then pull the assembly from the hard drive bay ❸.
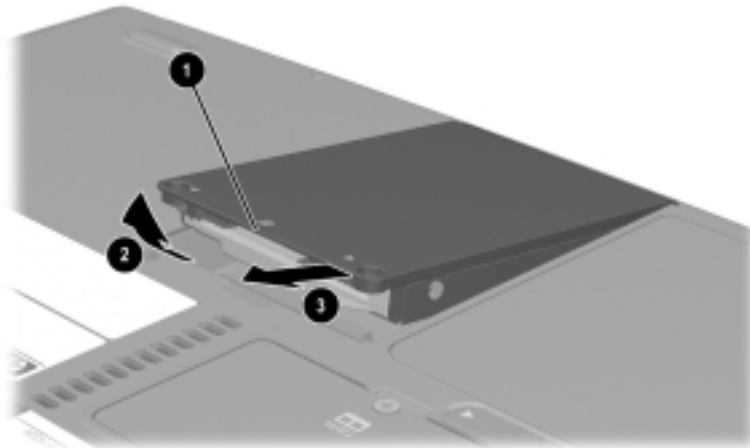
Removing an internal hard drive from the hard drive bay

8. To insert a hard drive, insert the 2 alignment tabs on the hard drive cover into the 2 alignment slots on the hard drive bay ❶, then tilt the hard drive assembly downward into the hard drive bay until it is seated ❷.

Inserting an internal hard drive into the hard drive bay

9. If you have inserted a hard drive, reinsert the 2 hard drive retaining screws. (If you removed but did not replace a hard drive, put the retaining screws in a safe place.)
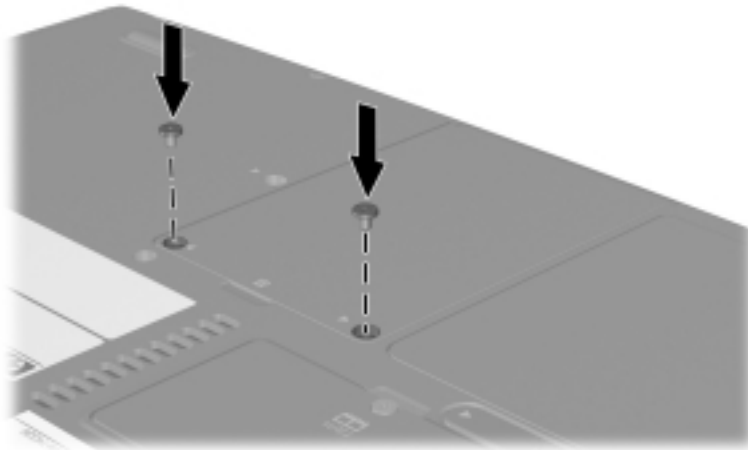
Replacing the hard drive retaining screw.