Power Management
User Guide

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First Edition: April 2009

Document Part Number: 536506-001

Product notice

This user guide describes features that are common to most models. Some features may not be available on your computer.

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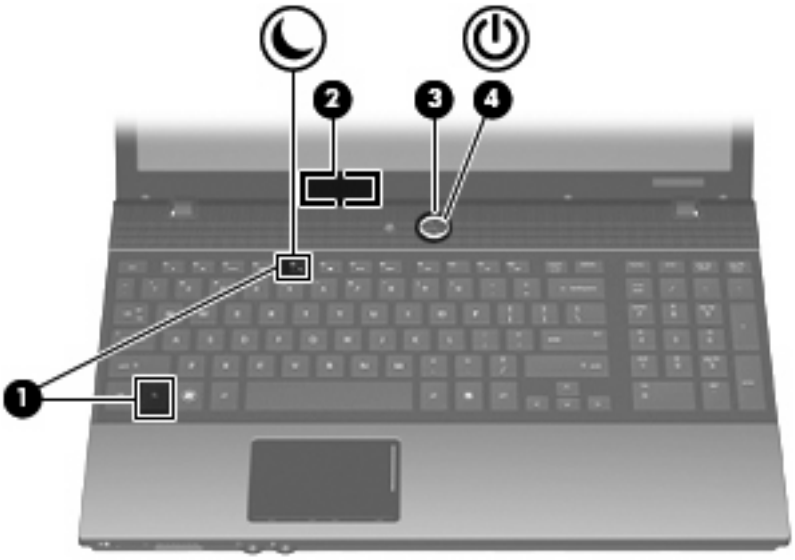
1 Power control and light locations

The following illustration and table identify and describe the power control and light locations.



	Component	Description
(1)	fn+f5	Initiates Suspend.
(2)	Internal display switch	Turns off the display if the display is closed while the power is on.

	Component	Description
(3)	Power button	• When the computer is off, press the button to turn on the computer. • When the computer is on, press the button to shut down the system. • When the computer is in the Suspend state, press the button briefly to exit Suspend. • When the computer is in Hibernation, press the button briefly to exit Hibernation. If the computer has stopped responding and the operating system shutdown procedures are ineffective, press and hold the power button for at least 5 seconds to turn off the computer. To learn more about your power settings and how to change them, select **Computer > Control Center > System > Power Management**.
(4)	Power light	• On: The computer is on. • Blinking: The computer is in the Suspend state. • Off: The computer is off or in Hibernation.

2 Setting power options

Using power-saving states

The computer has two power-saving states enabled at the factory: Suspend and Hibernation.

When Suspend is initiated, the power light blinks and the screen clears. Your work is saved to memory, letting you exit Suspend faster than exiting Hibernation. If the computer is in the Suspend state for an extended period or if the battery reaches a critical battery level while in the Suspend state, the computer initiates Hibernation.

When Hibernation is initiated, your work is saved to a hibernation file on the hard drive and the computer turns off.

△ **CAUTION:** To prevent possible audio and video degradation, loss of audio or video playback functionality, or loss of information, do not initiate Suspend or Hibernation while reading from or writing to a disc or an external media card.

NOTE: You cannot initiate any type of networking connection or perform any computer functions while the computer is in the Suspend state or in Hibernation.

Initiating and exiting Suspend

The system is set at the factory to initiate Suspend after 15 minutes of inactivity when running on battery power and 30 minutes of inactivity when running on external power.

Power settings and timeouts can be changed using Power Management in Control Center.

With the computer on, you can initiate Suspend in any of the following ways:

- Press fn+f5.
- Click **Computer**, click **Shutdown**, and then click **Suspend**.

▲ To exit Suspend, briefly press the power button.

When the computer exits Suspend, the power light turns on and your work returns to the screen where you stopped working.

Initiating and exiting Hibernation

Power settings and timeouts can be changed using Power Management in Control Center.

With the computer on, you can initiate Hibernation in any of the following ways:

- Briefly press the power button.
- Click **Computer**, click **Shutdown**, and then click **Hibernation**.
- Click the **Power** icon located on the far right of the task bar, and then click **Hibernation**.

▲ To exit Hibernation:

Briefly press the power button.

The power light turns on and your work returns to the screen where you stopped working.

Using the Power icon

The Power icon is located in the notification area, at the far right of the taskbar. The Power icon allows you to quickly access power settings, view remaining battery charge, and select a different power plan.

- To display the percentage of remaining battery charge, click the **Power** icon, and then click **Information**.
- To access Power Management Preferences, click the **Power** icon, and then click **Preferences**.

Using power management

Power management is a collection of system settings that manages how the computer uses power. Power management can help you conserve power or maximize performance.

You can customize power management settings.

Viewing the current power management settings

▲ Click the **Power** icon, located on the far right of the taskbar, and then click **Preferences**.

Changing the current power management settings

1. Click the **Power** icon, located on the far right of the taskbar, and then click **Preferences**.
2. Change the **Running on AC**, **Running on Battery**, and **General** settings, as needed.

3 Using external AC power

External AC power is supplied through one of the following devices:

⚠ **WARNING!** To reduce potential safety issues, use only the AC adapter provided with the computer, a replacement AC adapter provided by HP, or a compatible AC adapter purchased from HP.

- Approved AC adapter
- Optional docking device or expansion product

Connect the computer to external AC power under any of the following conditions:

⚠ **WARNING!** Do not charge the computer battery while you are onboard aircraft.

- When you are charging or calibrating a battery
- When you are installing or modifying system software
- When you are writing information to a CD or DVD

When you connect the computer to external AC power, the following events occur:

- The battery begins to charge.
- If the computer is turned on, the battery meter icon in the notification area changes appearance.

When you disconnect external AC power, the following events occur:

- The computer switches to battery power.
- The display brightness is automatically decreased to save battery life. To increase display brightness, press the fn+f8 hotkey or reconnect the AC adapter.

Connecting the AC adapter

⚠ **WARNING!** To reduce the risk of electric shock or damage to the equipment:

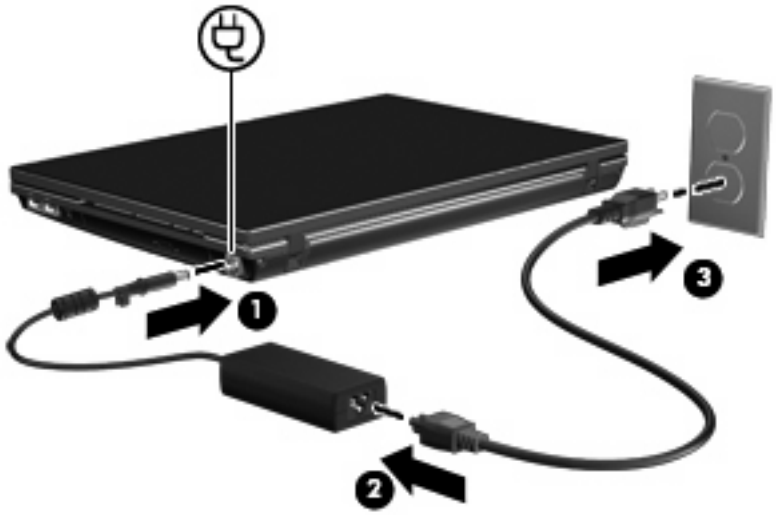
Plug the power cord into an AC outlet that is easily accessible at all times.

Disconnect power from the computer by unplugging the power cord from the AC outlet (not by unplugging the power cord from the computer).

If provided with a 3-pin attachment plug on the power cord, plug the cord into a grounded (earthed) 3-pin outlet. Do not disable the power cord grounding pin, for example, by attaching a 2-pin adapter. The grounding pin is an important safety feature.

To connect the computer to external AC power:

1. Plug the AC adapter into the power connector **(1)** on the computer.
2. Plug the power cord into the AC adapter **(2)**.
3. Plug the other end of the power cord into an AC outlet **(3)**.



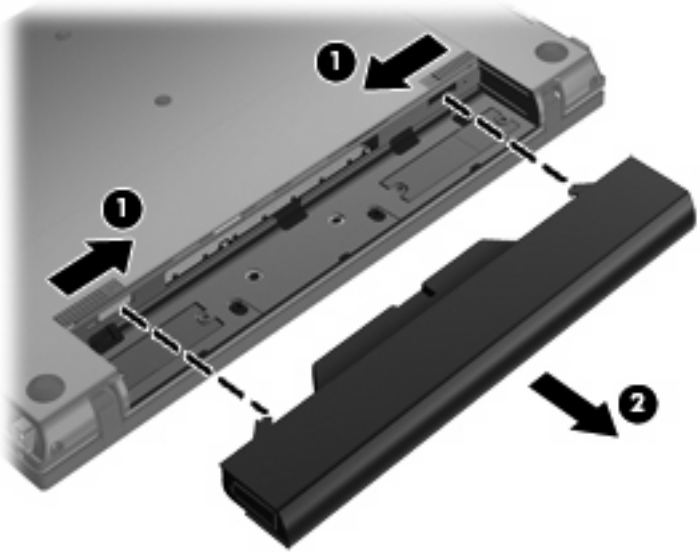
Testing an AC adapter

Test the AC adapter if the computer exhibits any of the following symptoms when it is connected to AC power:

- The computer will not turn on.
- The display does not turn on.
- The power light is off.

To test the AC adapter:

1. Remove the battery from the computer.
   a. Turn the computer upside down on a flat surface, with the battery bay toward you.
   b. Slide the left and right battery release latches **(1)** inward.
   c. Remove the battery **(2)**.



2. Connect the AC adapter to the computer, and then plug it into an AC outlet.
3. Turn on the computer.
   - If the power light turns on, the AC adapter is functioning properly.
   - If the power light remains off, the AC adapter is not functioning and should be replaced.

4 Using battery power

When a charged battery is in the computer and the computer is not plugged into external power, the computer runs on battery power. When the computer is plugged into external AC power, the computer runs on AC power.

If the computer contains a charged battery and is running on external AC power supplied through the AC adapter, the computer switches to battery power if the AC adapter is disconnected from the computer.

NOTE: The display brightness is decreased to save battery life when you disconnect AC power. To increase display brightness, use the fn+f8 hotkey or reconnect the AC adapter.

You can keep a battery in the computer or in storage, depending on how you work. Keeping the battery in the computer whenever the computer is plugged into AC power charges the battery and also protects your work in case of a power outage. However, a battery in the computer slowly discharges when the computer is off and unplugged from external power.

WARNING! To reduce potential safety issues, use only the battery provided with the computer, a replacement battery provided by HP, or a compatible battery purchased from HP.

Computer battery life varies, depending on power management settings, programs running on the computer, display brightness, external devices connected to the computer, and other factors.

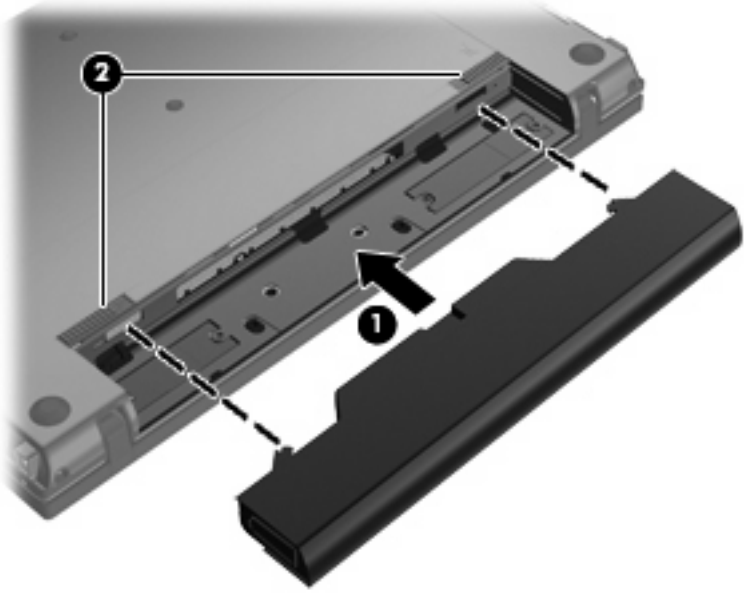
Inserting or removing the battery

CAUTION: Removing a battery that is the sole power source can cause loss of information. To prevent loss of information, initiate Hibernation or shut down the computer before removing the battery.

To insert the battery:

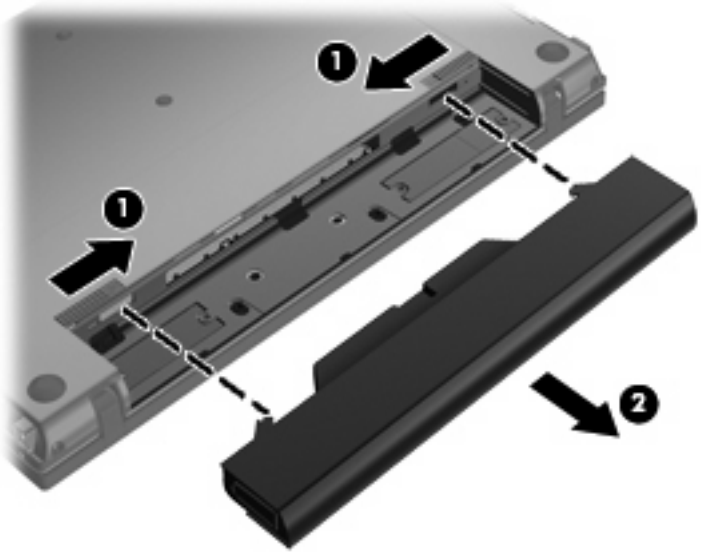
1. Turn the computer upside down on a flat surface, with the battery bay toward you.

2. Slide the battery into the battery bay **(1)** until the battery latches **(2)** automatically lock the battery into place.



To remove the battery:

1. Turn the computer upside down on a flat surface, with the battery bay toward you.
2. Slide the left and right battery release latches **(1)** inward.
3. Remove the battery **(2)**.



Charging a battery

⚠ **WARNING!** Do not charge the computer battery while you are onboard aircraft.

The battery charges whenever the computer is plugged into external power through an AC adapter, an optional power adapter, or an optional expansion product.

The battery charges whether the computer is off or in use, but it charges faster when the computer is off.

Charging may take longer if a battery is new, has been unused for 2 weeks or more, or is much warmer or cooler than room temperature.

To prolong battery life and optimize the accuracy of battery charge displays, follow these recommendations:

- If you are charging a new battery, charge it fully before turning on the computer.
- Charge the battery until the battery light turns off.

NOTE: If the computer is on while the battery is charging, the battery meter in the notification area may show 100 percent charge before the battery is fully charged.

- Allow the battery to discharge below 5 percent of a full charge through normal use before charging it.
- If the battery has been unused for one month or more, calibrate the battery instead of simply charging it.

The battery light displays charge status:

- On: The battery is charging.
- Blinking: A battery that is the only available power source has reached a low battery level. When the battery reaches a critical battery level, the battery light begins blinking rapidly.
- Off: The battery is fully charged, in use, or not installed.

Maximizing battery discharge time

Battery discharge time varies, depending on the features you use while on battery power. Maximum discharge time gradually shortens as the battery storage capacity naturally degrades.

Tips for maximizing battery discharge time:

- Lower the brightness on the display.
- Remove the battery from the computer when it is not being used or charged.
- Store the battery in a cool, dry location.
- Select the Powersave setting in Power Management.

To select the Powersave setting in Power Management:

1. Click **Computer**, click **Control Center**, and then click **Power Management**.
2. Under the **General** tab, click **System Settings**.
3. Under **Battery Powered**, select **Powersave**.
4. Click **Finish**.

Managing low battery levels

The information in this section describes the alerts and system responses set at the factory. Some low-battery alerts and system responses can be changed using Power Management in Control Center. Preferences set using Power Management do not affect lights.

Identifying low battery levels

When a battery that is the sole power source for the computer reaches a low battery level, the battery light blinks.

If a low battery level is not resolved, the computer enters a critical battery level, and the battery light continues to blink.

The computer takes the following actions for a critical battery level:

- If Hibernation is enabled and the computer is on or in the Suspend state, the computer initiates Hibernation.
- If Hibernation is disabled and the computer is on or in the Suspend state, the computer remains briefly in the Suspend state, and then shuts down and loses any unsaved information.

Resolving a low battery level

△ **CAUTION:** To reduce the risk of losing information when the computer reaches a critical battery level and has initiated Hibernation, do not restore power until the power lights turn off.

Resolving a low battery level when external power is available

▲ Connect one of the following devices:

- AC adapter
- Optional expansion product or docking device
- Optional power adapter

Resolving a low battery level when a charged battery is available

1. Turn off the computer or initiate Hibernation.
2. Remove the discharged battery, and then insert a charged battery.
3. Turn on the computer.

Resolving a low battery level when no power source is available

▲ Initiate Hibernation.

– or –

Save your work and shut down the computer.

Resolving a low battery level when the computer cannot exit Hibernation

When the computer lacks sufficient power to exit Hibernation, follow these steps:

1. Insert a charged battery or plug the computer into external power.
2. Exit Hibernation by pressing the power button.

Calibrating a battery

Calibrate a battery under the following conditions:

- When battery charge displays seem inaccurate
- When you observe a significant change in battery run time.

Even if a battery is heavily used, it should not need to be calibrated more than once a month. It also is not necessary to calibrate a new battery.

Step 1: Fully charge the battery

⚠ **WARNING!** Do not charge the computer battery while you are onboard aircraft.

NOTE: The battery charges whether the computer is off or in use, but it charges faster when the computer is off.

To fully charge the battery:

1. Insert the battery into the computer.
2. Connect the computer to an AC adapter, optional power adapter, optional expansion product, or optional docking device, and then plug the adapter or device into external power.

   The battery light on the computer turns on.
3. Leave the computer plugged into external power until the battery is fully charged.

   The battery light on the computer turns off.

Step 2: Disable Hibernation and Suspend

1. Click the **Power** icon, located on the far right of the taskbar, and then click **Preferences**.
2. Under the **Running on AC** and **Running on Battery** tabs, record the current values for the following settings:
   - **Put the display to Suspend when the computer is inactive for:**
   - **Put the computer to Suspend when it is inactive for:**
3. Change all 4 settings to **Never**.
4. Click **Close**.

Step 3: Discharge the battery

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

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

To discharge the battery:

1. Unplug the computer from its external power source, but do *not* turn off the computer.
2. Run the computer on battery power until the battery is discharged. The battery light begins to blink when the battery has discharged to a low battery level. When the battery is discharged, the battery light turns off and the computer shuts down.

Step 4: Fully recharge the battery

To recharge the battery:

1. Plug the computer into external power and maintain external power until the battery is fully recharged. When the battery is recharged, the battery light on the computer turns off.

   You can use the computer while the battery is recharging, but the battery will charge faster if the computer is off.
2. If the computer is off, turn it on when the battery is fully charged and the battery light has turned off.

Step 5: Reenable Hibernation and Suspend

△ **CAUTION:** Failure to reenable Hibernation after calibration may result in a full battery discharge and information loss if the computer reaches a critical battery level.

1. Click the **Power** icon, located on the far right of the taskbar, and then click **Preferences**.
2. Under the **Running on AC** and **Running on Battery** tabs, reset the previously recorded values for the following settings:
   - **Put the display to Suspend when the computer is inactive for:**
   - **Put the computer to Suspend when it is inactive for:**
3. Click **Close**.

Conserving battery power

- Select Powersave in Power Management under System Settings.
- Turn off wireless and local area network (LAN) connections and exit modem programs when you are not using them.
- Disconnect external devices that are not plugged into an external power source, when you are not using them.
- Stop, disable, or remove any external media cards that you are not using.
- Use the fn+f7 and fn+f8 hotkeys to adjust screen brightness as needed.
- If you leave your work, initiate Suspend or Hibernation, or shut down the computer.
- Remove the battery from the computer when it is not being used or charged.
- Purchase another battery to extend overall battery operating time.
- Store the battery in a cool, dry location.

Storing a battery

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

If a computer will be unused and unplugged from external power for more than 2 weeks, remove the battery and store it separately.

To prolong the charge of a stored battery, place it in a cool, dry place.

NOTE: A stored battery should be checked every 6 months. If the capacity is less than 50 percent, recharge the battery before returning it to storage.

Calibrate a battery before using it if it has been stored for one month or more.

Disposing of a used battery

⚠ **WARNING!** To reduce the risk of fire or burns, do not disassemble, crush, or puncture; do not short external contacts; do not dispose of in fire or water.

Refer to the *Regulatory, Safety and Environmental Notices* for battery disposal information.

Replacing the battery

Computer battery life varies, depending on the power management settings, programs running on the computer, display brightness, external devices connected to the computer, and other factors.

Battery Check notifies you to replace the battery when an internal cell is not charging properly, or when the battery storage capacity has reached a “weak” condition. A message refers you to the HP Web site for more information about ordering a replacement battery. If the battery is possibly covered by an HP warranty, instructions include a warranty ID.

NOTE: To ensure that you always have battery power when you need it, HP recommends purchasing a new battery when the storage capacity indicator turns green-yellow.

5 Shutting down the computer

△ **CAUTION:** Unsaved information will be lost when the computer is shut down.

The Shutdown command closes all open programs, including the operating system, and then turns off the display and computer.

Shut down the computer under any of the following conditions:

- When you need to replace the battery or access components inside the computer
- When you are connecting an external hardware device that does not connect to a USB port
- When the computer will be unused and disconnected from external power for an extended period of time

To shut down the computer, follow these steps:

NOTE: If the computer is in the Suspend state or in Hibernation, you must first exit Suspend or Hibernation before shutdown is possible.

1. Save your work and close all open programs.
2. Click **Computer**, click **Shutdown**, and then click **Shutdown**.

If the computer is unresponsive and you are unable to use the preceding shutdown procedures, try the following emergency procedures in the sequence provided:

- Press and hold the power button for at least 5 seconds.
- Disconnect the computer from external power and remove the battery.

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