

Chapter 3

Power

The notebook operates on AC or battery power. This chapter contains the information you need to know to operate the notebook on battery power. It also includes information about the power management system.

3.1 Battery Pack

The notebook uses a battery pack that gives you longer use between charges.

3.1.1 Battery Pack Characteristics

The battery pack has the following characteristics:

- *Employs Current Battery Technology Standards* The notebook uses either a Lithium-Ion or Nickel Metal-Hydride (NiMH) battery pack. These battery types do not have the memory effect problem of Nickel Cadmium (NiCd). NiMH and especially Li-Ion batteries consistently provide the longest battery life, best-suited for road warriors.
- *Battery-low Warning* When the battery charge level becomes low, the notebook gives off warning beeps and the status indicator flashes at regular intervals. This tells the user that the battery power is critically low. You can correct this situation by recharging the battery pack.

Whenever possible, use the AC adapter. The battery will come in handy when you travel or during a power failure. It is advisable to have an extra fully-charged battery pack available for backup.

Currently, there is no defined standard for measuring battery life. Several factors have made it almost impossible to compare the battery life of different notebooks based on specifications alone. These factors include different implementations of power saving/management systems, applications in use, the user's "usage pattern", hard disk capacity and access frequency, LCD size and brightness, system form factor and weight.



If the system is to be stored for more than two weeks, we suggest that you remove the battery pack. Battery power (from a fully charged battery pack) depletes in roughly ten hours with the notebook in standby mode. When power is off, battery power depletes in one month.



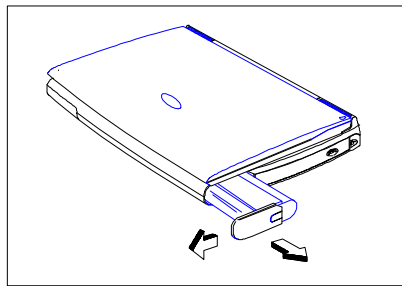
Do not expose battery packs to temperatures below 0°C (32°F) or above 60°C (140°F). This may adversely affect the battery pack.

3.1.2 Removing and Installing the Battery Pack

Removing the Battery Pack

Before removing the battery pack, make sure that you have an AC adapter connected to the notebook; otherwise turn off the notebook. The following figures illustrate how to remove the battery pack.

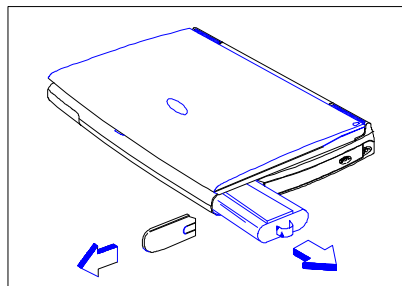
Lithium-Ion



Press the battery compartment cover release button and slide out the cover.

Then pull out the battery pack.

Nickel-Metal Hydride



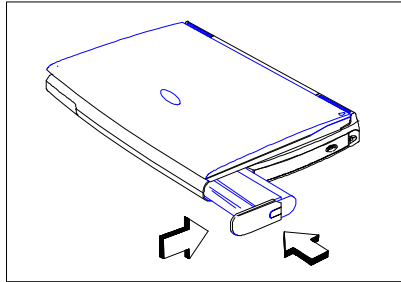
Press the battery compartment cover release button and slide out the cover.

Pull on the loop connected to the battery pack and remove the battery pack.

Installing the Battery Pack

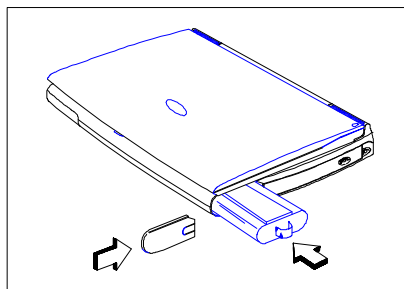
The following figure shows how to install the battery pack.

Lithium-Ion



Insert the battery pack into the battery compartment and slide in the battery compartment cover.

Nickel-Metal Hydride



Insert the battery pack into the battery compartment. Then slide in the battery compartment cover.

3.1.3 Charging the Battery

To charge the battery, place the battery pack inside the battery compartment and plug the AC adapter into the notebook and an electrical outlet. You can also purchase an optional external battery charger to charge the battery pack (see section 4.8.3 for details).

Charging Modes

The adapter has three charging modes:

- Rapid mode

The notebook uses rapid charging when power is turned off and a powered AC adapter is connected to it. In rapid mode, a fully depleted battery gets fully charged in approximately two hours.

- Charge-in-use mode

When the notebook is in use with the AC adapter plugged in, the notebook also charges the battery pack if installed. This mode will take longer to fully charge a battery than rapid mode. In charge-in-use mode, a fully depleted battery gets fully charged in approximately six to eight hours.

- Trickle mode

When the battery is fully charged, the adapter changes to trickle mode to maintain the battery charge level. This prevents the battery from draining while the notebook is in use.



We suggest that you charge the battery pack before retiring, letting it charge overnight before traveling. This ensures a fully charged battery for use the next day.

3.1.4 Checking the Battery Level

The notebook features battery-low warning signals that are both audible and visible. When the battery pack is low, the notebook emits warning beeps and the battery indicator flashes at regular intervals. Also, you can check the battery charge level using the onscreen battery gauge.

Using the Onscreen Battery Gauge



To access the onscreen battery gauge, press **Fn-F4**. The battery level icon displays onscreen.

The onscreen battery gauge indicates the present battery level.

3.1.5 Optimizing Battery Life

This section helps you get the most out of battery operation. Optimizing battery life prolongs the charge/recharge cycle and improves recharge efficiency. Follow these suggestions to optimize and maximize battery power:

- Purchase an extra battery pack.
- Use the Sleep Manager utility to reserve hard disk space for the hibernation function. See section 5.2.
- Use the AC adapter whenever possible so that the battery is reserved for on-the-go computing.
- Keep the battery pack in the notebook powered by the AC adapter. The constant trickle charge maintains the battery level to eliminate the battery self-discharge effect. The charge-in-use function also charges the battery pack.
- Disable the parallel and serial ports if no devices are connected to these ports. You can do this through Setup. See sections 6.4.5. and 6.4.6.

- Eject the PC card from the card slot when not in use, since the PC card draws extra power.
- Store the battery pack in a cool, dry place. The recommended storage temperature for battery packs ranges from 10 to 30 degrees C. The higher the storage temperature, the faster the battery pack self-discharges.
- The batteries can be recharged about 500 times when used as directed. Excess recharging decreases battery life.
- Take care of your battery pack and AC adapter. See sections 1.2.2 and 1.2.3 for details.

3.1.6 Battery-low Warning

You never have to worry about battery power as long as you are using the AC adapter. However, when you operate the notebook on battery power, pay extra attention to the warning beeps and the indicator light on the display panel. The indicator flashes when the battery power is low.

The following signals indicate a battery-low condition:

- The buzzer generates four short beeps every minute, if you enabled the Battery-low Warning Beep parameter in Setup
- The status indicator flashes at regular intervals until battery power is depleted

When you receive a battery-low warning, you have around three minutes to save your work. If you do not connect the AC adapter within this period, the notebook enters hibernation mode if the Sleep Upon Battery-low parameter in Setup is enabled and the following conditions exist:

- There is enough battery power left to save system information onto the hard disk.
- The reserved disk space for saving these data is larger than the combined system and video memory size (Sleep Manager).

Otherwise, the notebook enters standby mode.



Connect the AC adapter or insert a charged battery pack into the notebook as soon as possible. Data is lost when notebook power is cut off during standby mode.

Table 3-1 lists the recommended course of action when you encounter a battery-low condition.

Table 3-1 Course of Action for Battery-low Condition

Situation	Recommended Action
AC adapter and power outlet available	<ol style="list-style-type: none">1. Connect the AC adapter to the system.2. Save all necessary files.3. Resume work. <p>Power off the notebook if you wish to recharge the battery rapidly.</p>
An extra fully-charged battery pack available	<ol style="list-style-type: none">1. Save all necessary files.2. Exit the application.3. Power off the notebook.4. Replace the battery pack.5. Power on the notebook and resume work. <p>or</p> <ol style="list-style-type: none">1. Save all necessary files.2. Enter hibernation mode.3. Install the extra battery pack.4. Resume from hibernation mode.
AC adapter or power outlet not available	<ol style="list-style-type: none">1. Save all necessary files.2. Exit the application.3. Power off the notebook. <p>or</p> <ol style="list-style-type: none">1. Save all necessary files.2. Enter hibernation mode.

3.2 Power Management

This notebook has a built-in power management unit that monitors system activity. System activity refers to any activity involving one or more of the following devices: keyboard, mouse, floppy drive, hard disk, peripherals connected to the serial and parallel ports, and video memory. If no activity is detected for a specified period of time (called an inactivity time-out), the system switches to one of the power-saving modes to conserve energy. These power-saving modes are display standby mode, hard disk standby, and two sleep modes (standby and hibernation).



The Setup utility allows you to specify the inactivity time-out.

The power management function may not work when the cursor is emulated by software such as Chinese system (ET v3.1), Japanese system (DOS/V), Word for Windows, etc.

3.2.1 Power Management Modes

Display Standby Mode

Screen activity is determined by the keyboard, the built-in touchpad, and an external PS/2 pointing device. If these devices are idle for the period specified by the Display Standby Timer, the display shuts off until you press a key or move the touchpad or external mouse.



We strongly recommend you to enable the Display Standby Timer with a shorter time interval to prolong your battery life.

“Automatic Dim” Feature

The notebook has a unique “automatic dim” power saving feature. When the notebook is using AC power and you disconnect the AC adapter from the notebook, the system “decides” whether or not to automatically dim the LCD backlight to save power.

If the LCD backlight is too bright, the system automatically adjusts it to a manageable level; otherwise, the level stays the same. If you want a brighter picture, you can then adjust the brightness and contrast level using hotkeys (**Fn-F2**¹).

If you reconnect AC power to the system, the system automatically adjusts the LCD backlight to its original level — the brightness and contrast level before disconnecting the AC adapter. If you adjusted the brightness and contrast level after disconnecting AC power, the level stays the same after you reconnect the AC adapter.

Hard Disk Standby Mode

The hard disk enters standby mode when there are no disk read/write operations within the period of time specified by the Hard Disk Standby Timer. In the standby state, the power supplied to the hard disk is reduced to a minimum. The hard disk returns to normal once the system accesses it.

Hibernation Mode

In hibernation mode (also known as zero-volt suspend-to-disk mode), power shuts off. The notebook saves all system information onto the hard disk before it enters hibernation mode. Once you turn on the power, the notebook restores this information and resumes where you left off upon leaving hibernation mode.

A necessary condition for the notebook to enter hibernation mode is that the reserved space (created by the Sleep Manager utility) for saving system information on the hard disk must be larger than the combined system and video memory size. Under such conditions, the sleep hot key acts as the hibernation hot key. See section 5.2 for information on the Sleep Manager.

¹ After pressing this key combination, press **Fn→** and **Fn←** to increase and decrease the current setting. Press **Fn-Esc** to close the pop-up.


In this situation, there are four ways to enter hibernation mode:

- Press the sleep hot key **Fn-F7** (**Z**) with System Sleep Mode set to [Hibernate].
- Set a value for the System Sleep Timer in Setup with System Sleep Mode set to [Hibernate]. If the waiting time specified by this time elapses without any system activity, the system goes into hibernation mode
- Enable the Sleep Upon Battery-low parameter in Setup. If a battery-low condition takes place, the notebook enters hibernation mode in about five minutes. See section 3.1.6.
- Invoked by the operating system power saving modes



If the notebook beeps but does not enter hibernation mode after pressing the sleep hot key, it means the operating system does not allow the notebook to enter the power saving mode.

When the notebook enters hibernation mode, the whole system does not consume any power. This is why hibernation mode is also called zero-volt suspend.

To exit hibernation mode, press the power switch (). The notebook also resumes from hibernation mode if the resume timer is set and matched.



Do not change any system devices when the notebook is in hibernation mode.



If the notebook detects a PC I/O card installed in the PC card slots, the notebook can only enter standby mode, and not hibernation mode.

Standby Mode

The notebook consumes very low power in standby mode. Data remain intact in the system memory until battery is drained.

There are four ways to enter standby mode:

- Press the sleep hot key **Fn-F7 (Z¹)** with System Sleep State set to [Standby].
- System Sleep Mode set to [Hibernate] but the reserved area made by Sleep Manager is insufficient. See section 5.2 for details.
- Set a value for the System Sleep Timer in Setup with System Sleep Mode set to [Standby]. If the waiting time specified by this timer elapses without any system activity, the notebook goes into standby mode.
- Invoked by the operating system power saving modes with System Sleep Mode set to [Standby].
- Closing the display cover.



If the notebook beeps but does not enter standby mode after pressing the sleep hot key, it means the operating system does not allow the notebook to enter the power saving mode.

The following signals indicate that the notebook is in standby mode:

- The buzzer beeps (when you press the standby/suspend hot key)
- The indicator light flashes



Unstored data is lost when you turn off the notebook power in standby mode or when the battery is drained.

To leave standby mode and return to normal mode:

- Press any key
- Move the active pointing device (internal or external, PS/2 or serial)
- Resume Timer is set and matched
- Opening the display cover
- If an incoming PC card modem event occurs and the Modem Ring Resume On Indicator is enabled, the notebook returns to normal mode.



If the notebook detects a PC I/O card (e.g., modem card, ZV card) installed in the PC card slots, the notebook can only enter standby mode, and not hibernation mode.

3.2.2 Advanced Power Management (APM)

This notebook supports the APM standard designed to further reduce system power consumption. APM is a power-management approach defined jointly by Microsoft and Intel. An increasing number of software supports APM to take advantage of power saving features and allows greater system availability without degrading performance.

DOS

You can use the APM feature under the DOS environment by including the POWER.EXE command in the CONFIG.SYS file. See the MS-DOS manual for instructions on how to edit the CONFIG.SYS file. For more information about APM, type the following at the DOS prompt:

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HELP POWER.EXE e
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Windows 3.x

To enable APM under the Windows environment, run Windows Setup and select MS-DOS System with APM as your computer type in the System Information menu. Refer to the Windows user's guide for details.

Windows 95

To enable APM under Windows 95, follow these steps:

1. Select the Start button, then Settings, then Control Panel.
2. Double-click on the System icon in the Control Panel window.
3. Select the Device Manager tab and double-click on System devices.
4. Double-click on Advanced Power Management support.

If the device is not working properly, select the Settings tab and verify if the check box for enabling power management support is selected.

Refer to the Windows 95 user's guide for details.



1. *If you enable the Power Management Mode parameter in Setup without installing the APM under DOS, Windows or Windows 95, the system time and date do not display the correct settings after the notebook returns to normal operation from standby or hibernation mode. To update the time and date, reboot the notebook. Enable APM to avoid this problem.*
2. *You can not change any power management parameter in the Setup screen after APM is enabled because it is controlled by APM.*



Advanced Power Management greatly prolongs battery life. Use APM whenever possible.

