

EXTENDING THE LIFE OF YOUR LAPTOP BATTERY



The year 2006 marked a fundamental shift in PC hardware sales as laptop computers (also called “notebooks”) outsold desktop PCs for the very first time. As society becomes more mobile, laptops become ever-more powerful, portable, and affordable, and as wireless networks become ubiquitous, this trend will continue.

Obviously, the primary advantage of laptops is mobility. Naturally, however, laptops need power to run on. Even though electrical outlets are plentiful and can be found nearly everywhere, there are times when we have to resort to using the laptop’s battery – airplane trips, meetings, etc. I have also seen sudden power failures when I could have lost all my work had the laptop not had a charged battery. Despite the ongoing evolution of battery technology, there are limits to their usage, and that leads to a discussion of ways to preserve and improve battery functionality. We can start by discussing what a battery is, how it works, and the different types of batteries in use today.

What is a Battery, Anyway?

In simple terms, a battery is chemical energy stored in a container. The chemical energy is then converted to electrical form. A battery has two terminals, negative and positive, that must be connected for the current to flow. This connection is usually provided by a liquid or solid electrolyte that is a conductor; it has the ability to transfer current. Cathode and anode are two electrodes, an electrical conductor that makes contact with the metallic part of a circuit, present in a battery.



Current flows from the cathode to anode inside the cell or device.

Different Types of Batteries

In contemporary portable electronic devices, especially given environmental concerns, batteries must not only store energy in a compact form, they must be rechargeable.

Batteries are usually named based on the metal used to make either the electrodes or the electrolyte. A lithium-ion battery (“LiOn”) has a lithium anode, a zinc-carbon battery has a zinc anode, and a nickel-metal hydride battery (NiMH) or a nickel-cadmium battery (NiCD) has a hydrogen-absorbing alloy for the anode.

Early rechargeable batteries were composed of Nickel-Cadmium (or “NiCad”). NiCads were great because they were rechargeable, but early NiCads held comparatively small

charges as well as suffering from “Memory Effect” – if the battery was only partially drained and then recharged, it lost its ability to be fully recharged.

Most portable devices these days use Lithium-Ion batteries.

Lithium is the lightest metal and the one with the highest stored (“potential”) electrochemical energy. These qualities, along with the fact they do not contain poisonous metals (such as cadmium) make lithium-based batteries the most widely used to power portable devices such as laptops.

Now that we understand the basic functionality of a battery, let’s discuss ways to preserve and prolong battery life, specifically laptop computer batteries.

Life Preserver



Just as proper use and maintenance of your car will result in longer life and better performance, taking certain steps with your portable electronics’ batteries will result in longer use per charge, and a

longer overall battery life. With replacement laptop batteries ranging from anywhere between \$100.00 and \$300.00, getting all the use you can out of your battery will save you lots of aggravation and keep more money in your pocket longer.

As soon as your portable device leaves the manufacturer’s premises, its battery starts losing capacity to store a charge. In some cases, it may show more charge stored than there actually is. You may end up exhausting what’s available without knowing it and

the computer may end up shutting down causing you to lose your work. Now that is not a situation you want to find yourself in. The fact of the matter is it is unavoidable after a certain period of time as the battery goes through gradual degradation. There are, however, ways to extend your battery life.

If your device always (or usually) runs on external power, you may be inadvertently decreasing your battery life. At least once a month, let the device use up all the battery power. In other words, let the battery drain until the computer goes to sleep (“hibernate mode”) and then let it re-charge. This can help avoid capacity degradation.

Some notebooks, using a combination of specialized hardware, intelligent batteries, and special “services” (small programs running in the background) offer a “recondition” feature that will automatically prompt you to condition your battery and then attempt to do so in the background. If you are prompted by your system to condition your battery, you should probably allow it to do this.

Operating temperature is another important factor when we talk about battery life.

Extreme high temperatures can cause degradation rapidly, just as extreme low temperatures can damage batteries— don’t leave your notebook in your car for extended periods on hot days or overnight on cold nights.

It is recommended that you do not use your laptop without a battery in the bay. Doing so may cause the electrical terminals in the battery bay to become dirty or get corroded. It

should be avoided for these reasons and the fact that you may lose your work since there is no backup power supply.

Micro-Manage Your PC Power

Let's talk about power management settings on your laptop. "Power management is a



feature of some electrical appliances that turns off the power or switches the system to a low-power state after a period of inactivity"

("Power Management"). On a laptop, power management is

accomplished by a specialized chip working together with the

Operating System. Many modern battery packs are "intelligent batteries" – they contain microprocessors that continually monitor capacity and communicate this information to the Operating System. This information is used by the system in conjunction with power management settings, specifically for determining when to issue low capacity warnings and switching to hibernate mode. In order to use these settings, your computer must be Advanced Configuration and Power Interface (ACPI) compliant, which most recent computers are.

In Windows XP, you can control the power management features of your display, hard drive, shut down, stand by and hibernate, and low battery warnings.

Even though modern monitors do not consume a lot of electricity, monitors, hard drives, and the CPU are the three biggest electricity consumers on your laptop. Big, bright LCD

monitors with backlights require comparatively large amounts of electrical current, as do the spinning motors and actuators inside hard drives. It is a good idea to shut your monitor off when you are not using it.

Power management allows you to set a fixed time, and if the computer sits idle for that long, the monitor is turned off. The same can be accomplished using power management when it comes to “spinning down” (temporarily turning off) the motor of your hard drive, and even toggling the CPU into a lower power consumption “idle speed”.

You are Getting Sleepy...

Hibernate and Standby are two main energy conserving features provided by Windows XP. The standby state turns off devices such as your monitor and the hard drive and the entire computer switches to a



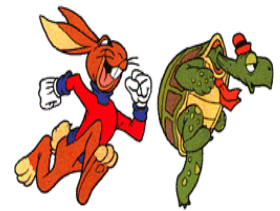
low-power state. It is easy to return where you had left off as standby leaves applications and files open on your laptop. You should only use it for short term purposes such as a short term break you may need. Keep in mind that nothing is written to the hard drive and everything is still only being stored in memory. This means that data has not been stored permanently and can be lost. Hibernate mode is another feature that can be used if you want to leave the computer overnight or even over the weekend and come back to where you left off. It writes an image of your entire laptop’s current “state” to a special file on your hard drive. It takes a little longer to hibernate than it

does to stand by as data are written to the hard drive before the system shuts off, but you can leave your computer in hibernate mode for days without any adverse effects.

Low battery warnings are provided when the charge drops to a certain level and the battery needs to be recharged. You can adjust these settings using power management features according to your needs. You should set it to allow ample time to switch to external power and save your work. 10-15% charge remaining is considered a safe setting to trigger such a warning so you can not only switch to external power but also save your work. Windows XP also allows for your laptop to automatically enter hibernation mode when your battery level reaches this pre-set threshold, thereby saving all of your open work (and maybe your job or your sanity in the process.)

Power v. Performance

To access the power management features on your laptop, simply double-click the battery icon in the lower-right corner of your screen (on the Task Bar), or go to Start > Control Panel > Power



Options. Proper power management of these devices is an extremely useful feature, and will help you to strike the ideal performance v. battery life balance.

Even though battery performance declines over time, it is possible to prolong per-charge and overall battery life by taking simple steps.

Source: <http://www.geeks.com/techtips/2007/techtips-04feb07.htm>