

Mac Laptop/Notebook Battery Maintenance

This tutorial will step you through the troubleshooting and maintenance of your Mac notebook **BEFORE** you determine that you need to contact Apple and get the battery replaced.

A few things to keep in mind:

1. Batteries sometimes fail prematurely for any number of reasons. Sometimes the cells within the battery short out or present other problems due to manufacturing defects.
2. Modern laptop and notebook batteries are "smart" in that they contain circuitry that communicates with the computer's operating system to relay battery status and health information; sometimes the battery information that the computer has is "out-of-synch" with the battery, and you need to intervene to reset things back to normal,
3. Sometimes, manufacturers (yes, Apple, too!) will produce defective batches of batteries and will replace them free of charge, and
4. Batteries do not last forever! Certainly, their longevity is nowhere near the longevity of the computer itself. Battery charge capacity diminishes over time. Of course, there are many variables that affect battery longevity, but on average, you can expect to replace a battery every 3-4 years.

Examine Your Battery!

You should periodically check that your battery is in sound physical condition by first shutting down your Mac, then remove the battery. It should separate easily from the computer. Check for damage. If the battery appears bloated or cracked, or if it will not easily come out, call your AppleCare support number to discuss your options with the support technician.

Are You Seeing These Problems: the battery doesn't seem to hold it's charge, it runs down fast, or shuts down (or sleeps) your notebook without warning?

Under normal circumstances, you should enjoy a few hours of battery life. About 3 to 5 hours is typical. You should see a battery charge indicator on the right side of the menu bar at the top of your screen. If you are viewing the remaining charge as a percentage, once your battery reaches about 5%, your Mac will present a warning telling you that you have very little time left on your battery charge.

Modern-day notebook and laptop batteries are "smart" batteries in that they contain circuitry which communicates directly with your computer operating system. The battery relays its health status, and amount of charge remaining. Sometimes, the information between battery and computer is "out of sync"

and needs to be reset. You should **recalibrate the battery** first to see if this works. This is detailed below.

If this doesn't work, you need to reset some circuitry inside the notebook. This procedure is called "**Resetting the PMU (Power Management Unit)**" for older PowerBooks and iBooks or "**Resetting the SMC (System Management Controller)**" for the new Intel processor MacBook Pro MacBook. and MacBook Air notebook models. This is something that you can do yourself fairly easily.

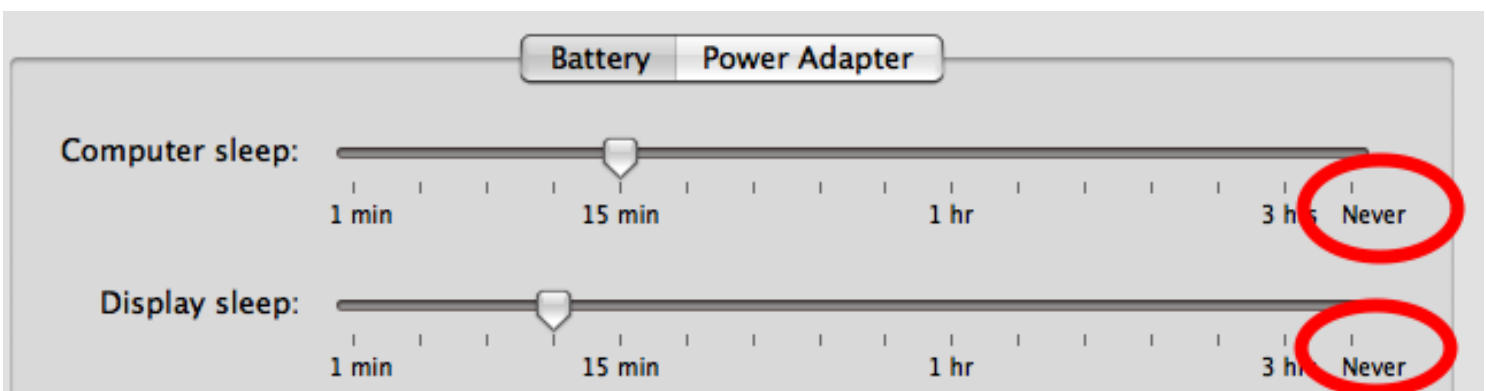
This procedure will help you avoid an unnecessary trip to the Apple Genius Bar, and will save time, in case you need to call in to AppleCare. In many cases, *this procedure WILL FIX the problem completely.*

Let's examine how to recalibrate your battery; **you should always do this first.** Apple also recommends that you do this at least once every one to three months to maximize the health and behavior of your battery.

RECALIBRATING YOUR BATTERY - DO THIS FIRST!

This procedure alone may fix the problem, so do this first. Then, if this doesn't seem to fix the battery issue, proceed to the procedure outlined in the section called "RESETTING YOUR COMPUTER'S POWER MANAGEMENT FUNCTION."

A: Discharge the battery completely



1. Unplug your Mac from the AC adapter and run it on battery. The goal here is to discharge the battery completely first. To help things along, make sure that your Mac *does not go to sleep*. You can temporarily turn sleep off via your **Energy Saver** preferences located in **System Preferences**. You get to the System Preferences via the Apple menu. When in System Preferences, select the Energy Saver

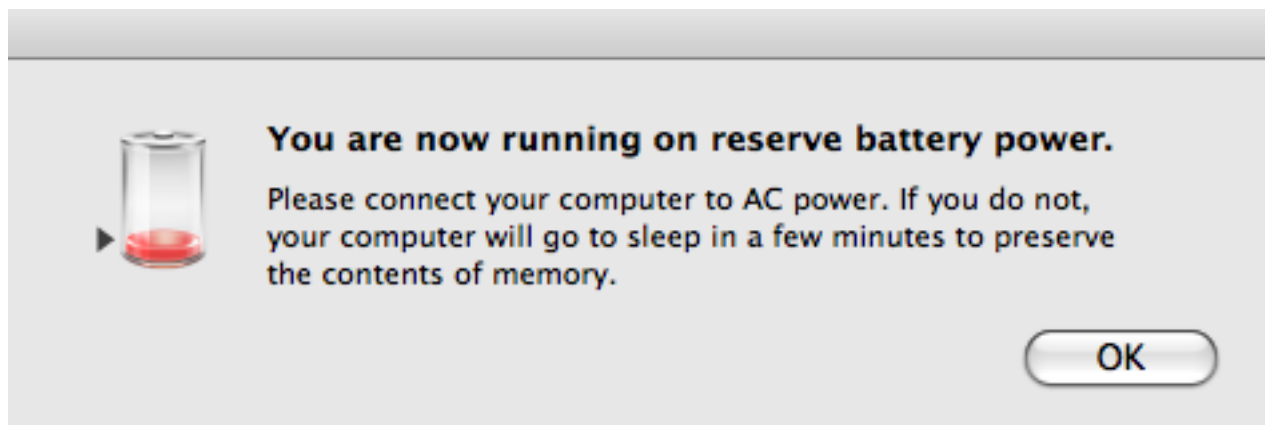
Preferences.

2. In your Energy Saver preference pane (yours may differ slightly), move the two sliders all the way to the right to the "Never" mark.

Don't forget to reset this later when you are finished with this entire procedure!

3. You can resume working at your Mac now. However, be vigilant of the "charge remaining" indicator up in the menu bar. If your Mac has been shutting down or sleeping prematurely, it would be best NOT to do any work on it. There is a danger of losing data. Just let the Mac stay on to drain the battery all the way. You might also help it along by increasing the screen brightness level to maximum.

B: Watch for the low-battery warning



Under normal circumstances, your Mac will display a warning when your battery is about to run out of juice. This generally happens when there is approximately 5% remaining. Remember, though, that if the battery is misbehaving, your Mac may be shutting down abruptly *BEFORE* this warning comes up.

If the low-battery warning does come up, go ahead and dismiss it (click OK), and *keep the Mac running under battery power*. Confirm now that you have closed and saved any open files! You should cease doing important work on your Mac now because it may shut down when you least expect it to.

Let your Mac go ahead and get to the point where it shuts down or sleeps at the point that the battery simply can't power it any more.

C: Charge the battery back up to 100%

Now that the battery is supposedly completely discharged, and your Mac is either sleeping (which is the normal condition), or shutdown (which may indicate a battery malfunction), you can complete the battery reset procedure by plugging the Mac back to AC current.

Allow your Mac to charge up *completely* (100%). If it did shut down, you may now restart it. You can do normal work on your Mac now.

Monitor the battery level indicated on the menubar. Verify that it goes all the way to 100% charge.

DID THE RECALIBRATION FIX YOUR BATTERY PROBLEM?

At this point, you need to run a test to see if the problem you noted earlier has been resolved. The way to do this is to run your Mac on battery again.

Now, answer these questions:

1. Did your Mac's battery charge successfully return to 100% charge?
2. Is your Mac now running on battery as long as you'd expect it would? (ie; back to normal operation?)
3. Are you successfully observing the low-battery warning around 5%, particularly if you were not seeing the warning before, and the laptop would prematurely shut down?
4. Is your Mac going all the way down to 0% or 1% battery and then going to sleep mode? (***The laptop should not just shut down completely!***)

Tip: You know your Mac is in sleep mode when you see the gentle pulsing white light in the front edge of the case.

If you answered NO to any of these three questions, you need to move on to the next step ... "Resetting Your PMU/SMC"

APPLE HAS RELEASED BATTERY SOFTWARE UPDATES (Firmware) FOR MACBOOK PRO AND MACBOOK MODELS

If you own a MacBook or MacBook pro, you should check to see if Apple has issued firmware updates for your battery. Occasionally, Apple determines that there are performance issues with certain batteries. At the Apple website, there are resources that help you determine if your battery is affected, and if so, provide instructions on downloading and updating the battery software.

Battery Update 1.2 >> http://www.apple.com/support/macbook_macbookpro/batteryupdate/

Battery Update 1.3 >> http://support.apple.com/downloads/Battery_Update_1_3

Battery Update 1.4 >> http://support.apple.com/downloads/Battery_Update_1_4

RESETTING YOUR MAC'S POWER MANAGEMENT FUNCTION

This procedure will reset the circuitry in your Mac which, among other things, keeps power information in sync with your battery. The procedure varies, depending on model of laptop you use. Older G4 PowerBooks and iBooks have a PMU chip (Power Management Unit) that you will reset with this procedure. All newer Intel-based MacBook Pro, MacBook and MacBook Air models have a SMC chip (System Management Controller).

A: MacBook Pro, MacBook, MacBook Air

The System Management Controller (SMC) is an integrated circuit (computer chip) that is on the logic board of the computer. It is responsible for power management of the computer. It controls backlighting, hard disk spin down, sleep and wake, **some charging aspects**, trackpad control, and some input/output as it relates to the computer sleeping.

Over time, the settings in the SMC may become unusable, which can result in operational anomalies with the computer. Examples include not turning on, not waking from sleep, **not charging the battery**, or not recognizing the AC Adapter, among others.

Warning: Use this procedure sparingly *and only* when observing the anomalies listed above. Resetting the SMC is not intended for resolution of a stall or situation in which the computer is unresponsive.

MacBook, MacBook Pro:

1. If the computer is on, turn it off (via Shut Down).
2. Disconnect the AC Adapter and remove the computer's battery.
3. Press and hold down the power button for 5 seconds and then release the button.
4. Reconnect the battery and AC Adapter.
5. Press the Power button to restart the computer.

MacBook Air:

1. If the MacBook Air is on, turn it off (via Shut Down).
2. Connect the power adaptor to a working power source.
3. On the MacBook Air keyboard, press (left) Shift-Control-Option along with the power button once.
Note: You must use the keys on the left side of the MacBook Air keyboard.
4. Wait 5 seconds and press the power button to start the MacBook Air.

Apple recommends only performing an SMC reset when the MacBook Air has been properly shutdown. This prevents issues from occurring to the file system. While the power adaptor does not need to be connected to reset the SMC, it may be necessary in situations where the battery needs charging, or the MacBook Air has been without power for an extended period of time.

B: PowerBook and iBook

The Power Management Unit (PMU) is an integrated circuit (computer chip) that is on the logic board of the computer. As the name implies, it is responsible for power management of the computer. It controls backlighting, hard disk spin down, sleep and wake, **some charging aspects**, trackpad control, and some input/output as it relates to the computer sleeping.

Over time, the settings in the PMU may become unusable, which can result in operational anomalies with the computer. Examples include not turning on, not waking from sleep, **not charging the battery**, or not recognizing the AC Adapter, among others.

Warning: Use this procedure sparingly *and only* when observing the anomalies listed above. Resetting the PMU is not intended for resolution of a stall or situation in which the computer is unresponsive.

There are too many different procedures for setting the PMU in PowerBooks and iBooks due to the many different models over the years. Please refer to the following Apple Knowledgebase article #HT1431 located at support.apple.com/kb/HT1431

WHEN ALL ELSE FAILS



You should always go through the above procedures. If you were to contact Apple about your battery issues, *they will have you go through the above procedures* before determining that a battery replacement is necessary. In most cases, the above procedures will resolve the battery problem.

If the above procedure do not fix the problem, the battery is most likely defective. This does happen!

In the past, Apple has recognized that certain "batches" of battery production produced defective units. *Apple will replace these batteries free-of-charge.* If you it is determined that you have a defective battery *that was not on the Recall list* Apple will charge you for replacement if your standard warranty or AppleCare warranty has expired.

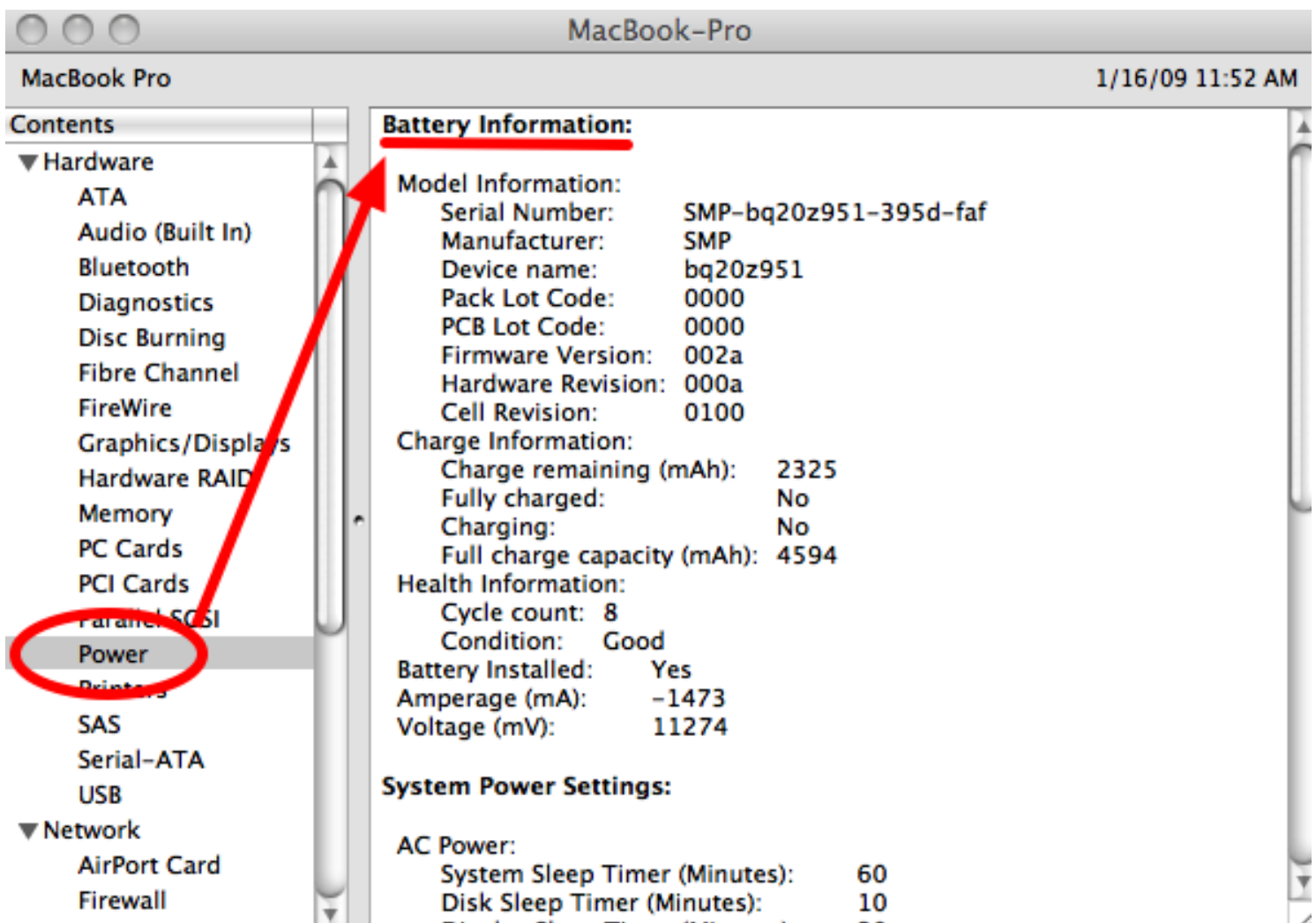
When you call AppleCare (whether or not you have an AppleCare extended warranty), the representative will ask you for some basic information. He will ask you to access your Mac's battery specifications via a little program called **System Profiler**. This program provides all the technical

information relevant to your particular Mac, and is critical to solving this and other problems.

You can easily access the information provided in the *System Profiler* program via the Apple menu. Select **About This Mac**. [See figure above]. By itself, this pane gives you and the Apple tech some basic information about your Mac: the model, processor, amount of RAM, and OS version.

See that "**More Info...**" button? Clicking it will bring up the **System Profiler** application. [Next figure]

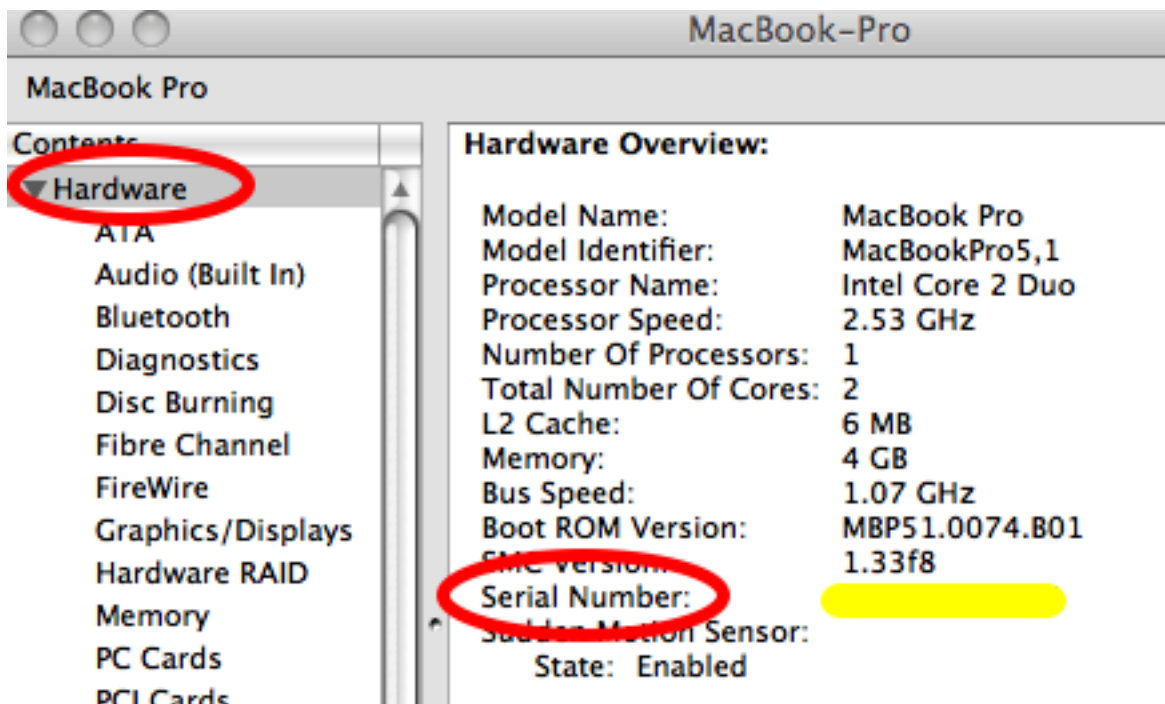
The System Profiler



The *System Profiler* window provides a long list of specifications for you to examine. Your AppleCare tech will ask you to read out the **Power** specs, and specifically the **Battery Information**. If you ever run out of things to read ... check out your System Profiler... it's a fascinating read for all geeks!

TIP: If you ever need to locate your Mac's serial number, you can find it in System Profiler by clicking the "Hardware" item line. [next figure]

Find your Mac's serial number here ... as well as tons of other useful information about your Mac.



This is the System Profiler application accessible via the Apple Menu:About This Mac, and clicking on More Info...

FINAL NOTES

Apple has useful information about your Mac battery and how to properly use your portable Mac under battery power. You can find a very useful document, "Apple Portables: Tips for Maximizing Your Battery Charge" (Article #HT1446) on Apple's support knowledge base. Go to support.apple.com/kb/HT1446