

THE COMPUTER CORNER

No. 108. The Dead Battery

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No, this is not about your car. It is about, however, a minor catastrophe in the making concerning your computer. It happened to me yesterday, but fortunately, I had taken steps to make it fairly painless.

Inside every modern computer is a "wrist watch" – a small battery-powered clock. When you shut your computer off today, it will know what time and date it is tomorrow when you fire it up again, because the little wristwatch in its belly is ticking along, keeping track of the time and date. More important, the battery also powers a little bank of memory that, when you boot up, tells the computer several vital settings it should make. Those settings, contained in a memory cache called the CMOS Setup, are very important to the proper operation of the computer. The CMOS settings are changeable by the human user, and remain set that way until the human user alters them again, so long as the battery does not go dead. If it does go dead, the CMOS settings revert to a default condition which may not be at all optimal for your computer.

A few years ago, those settings held information on the number of cylinders, heads and sectors per track on the hard drive. When a battery went dead in those years, not only was the date and time wrong, but also all the data on the hard drive was inaccessible, and the machine would not boot from the hard drive! Fortunately, the CMOS setup designers and the hard drive designers got together and solved that problem. In all modern machines, the following conversation takes place between the computer and the hard drive, every time it is booted:

Computer: Is there a hard drive residing in my belly?

Hard Drive: Yes! I am here!

Computer: Who are you?

Hard Drive: A Maxtor Model 98196H8, and my operating parameters are ...

The computer then registers the data (actually more than what is suggested above – a total of 512 bytes of data, including even the unique serial number of the drive) in the CMOS memory, and booting is successful because the proper boot records can now be found on the hard drive. That happens today, even when the battery is dead. A Good Thing, indeed!

However, other things might not work properly. Just to mention a few: The second floppy drive, if present, may not be recognized. A PS/2 mouse may no longer work. The expensive VGA card you installed may not work (so the monitor will not work!). An Infrared port may not work. A USB port may not work. The machine may operate at only half speed. And so on.

That happened to me yesterday. My secondary machine, an 800 MHz Pentium III, booted up with the wrong date, and claimed that it was a 400 MHz computer! I knew immediately that the CMOS battery was dead. I popped off the cover, removed the battery, and measured its voltage. Sure enough, the #2032, 3-volt lithium cell (about the size of a quarter) measured 1.3 volts, way too low to maintain the CMOS data. I put in a new battery, closed up the machine and rebooted. Then I pressed the DEL key during boot to enter the CMOS setup.

Now what? I was in the CMOS setup, but what should I change? I had tweaked the machine's CMOS settings two years ago until I had it working at peak performance, but what were all those settings I altered? Aha! After my past tweaking, I had printed out a copy of the CMOS settings. All I had to do was to pull that paper report out of the file in my desk, and compare the settings with what was shown on the screen. In about 5 minutes, I had my computer restored to peak performance, without having to go through a lengthy trial-and-error process all over again. At least a couple of weeks worth of trial-and-error tweaking were saved.

What about you? Even if you ordered your machine ready-built from Dell or Gateway, someone had to tweak those CMOS settings for optimal performance. Typically, the CMOS setting has a menu option that claims to "Load Best Performance Settings", but I can assure you that this may not restore the machine so that it works properly. The answer is to print out the settings **NOW**, when everything is working properly, so that you can compare the settings in the future, as I was able to do. Here is how you can do that.

During the boot process, press the **DEL**(ete) key to enter the CMOS setup. The key for your particular machine may be different (**F10**, **ESC**(ape), or others), but it will either tell you on screen what the magic key is or it will be in your machine's documentation manual. Once you do that, you will typically see about seven different sub-menus other than Load Optimal Settings or Load Best Performance Settings, or the like. Select the first one, typically **Standard CMOS Settings**. A screen will appear showing the settings for a number of different items. Make sure your printer is on. Press the **Print Screen** key. Nothing will happen, but typically your printer will start flashing an LED. Press the form feed button on the printer. The printing of the current screen should start. If your printer is a model that works only in Windows, you are out of luck. Manually record what you see, neatly, on paper. Yes, it is a pain to do it manually, but take my word for it, the effort is worth it.

Now select the second sub-menu, typically **Advanced Setup**. Again, go through the Print Screen sequence to copy what you see (or record it manually). Repeat with the **Power Management**, **PCI Plug-n-Play**, **Features**, **CPU Plug-n-Play**, and whatever other menus you find. Do it in screen order, and staple the sheets together in that order. When all done, press the **ESC** key or whatever lets you **Exit Without Saving**. You don't really want to alter the setup since your purpose here is focused on documenting what is now working fine.

That's all there is to it. If you have a good printer that recorded the screens, your first sheet will even have the date and time on it, so you need record nothing more. Now you have a way to get back to normal, even when the battery goes dead. *It will, you know!* Somewhere between one and three or four years from the time it was installed, depending upon its capacity. I have had lithium coin cells go flat in under a year. That is how I learned to do this, so that I would not have to tear out my (remaining) hair while spending weeks re-tweaking my computer! Now, you know how to do it, too. Happy computing!