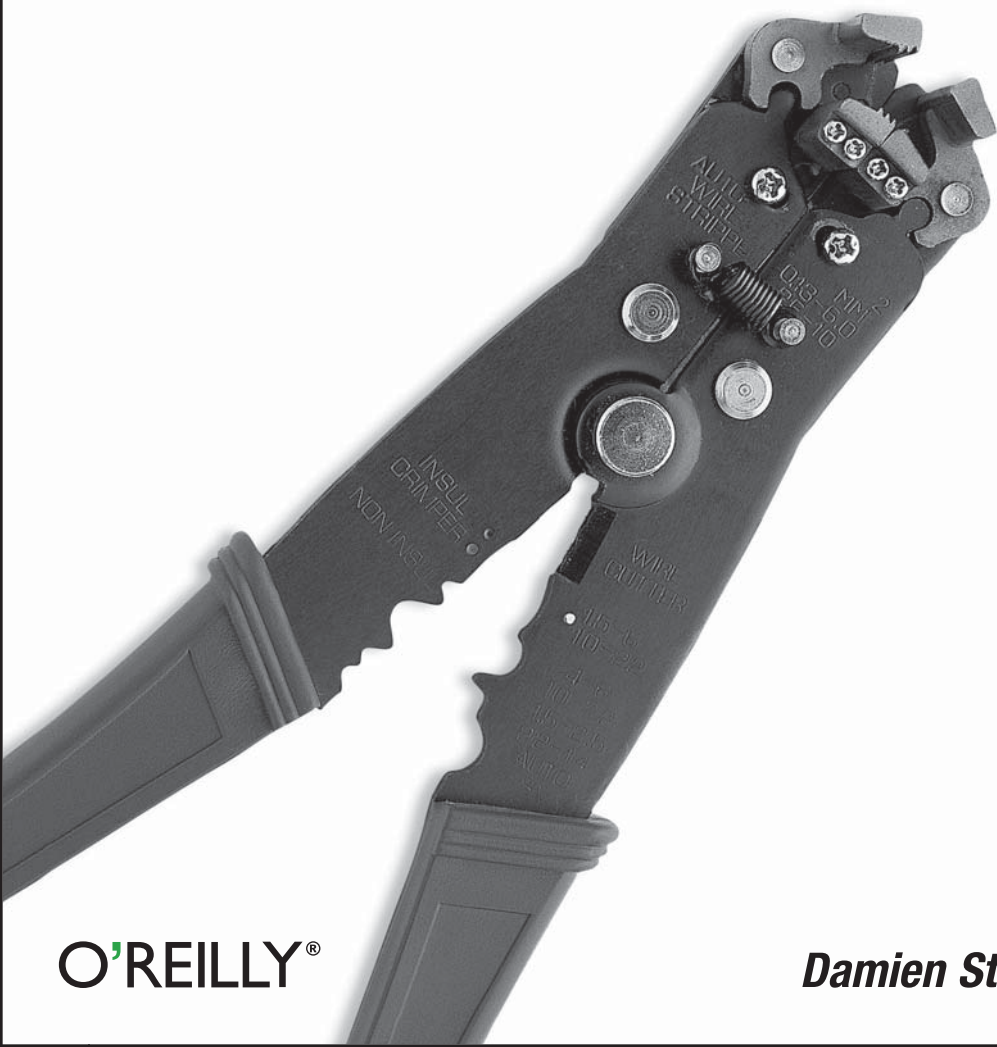


CAR PC HACKS™

Tips & Tools to Geek Your Ride



O'REILLY®

Damien Stolarz

HACK
#45

Keep Your Computer on During Engine Cranking

An already booted car PC will reboot whenever you start the car, unless you install the right hardware.

The primary reason cars have large batteries is to turn the starter engine and start the car. When you crank the engine to start the car, the voltage drops—from the normal 12–14V, it can drop all the way to 7V or lower. As soon as the car is started, the voltage goes back up, but in the meantime, your unprotected car PC will hang or reboot.

In many cars, the turning of the ignition switch temporarily cuts power to the radio, the headlights, and the A/C—turn your car on to see if it does this. If so, the other problem that occurs is that the 12V line going to your computer is *completely* cut off during engine cranking, and your computer shuts down immediately.

After you've made sure that [the 12V line to your car PC \[Hack #11\]](#) doesn't get switched off when cranking the engine, you then have to figure out how to stabilize it.

Stabilizing the Voltage

There are a couple of ways to solve this problem, but they all boil down to keeping the voltage to the computer level while the car's voltage fluctuates. Normal voltage regulators are designed to level out small fluctuations in the input voltage, not massive brownouts like those caused by engine cranking. To survive it, you need devices that can maintain 12V for as long as it takes to start the engine.

Adding a second battery. “Add a Second Car Battery” [\[Hack #10\]](#) provides the technical instructions you need on how to set up a car with two different batteries. [Figure 4-12](#) shows how you can run your car PC off the second battery, turning it on either with its own power switch or with a power sequencer connected to the car's ignition. Doing this ensures that your car PC is unmolested by the power fluctuations in the primary battery.

Adding a small 12V battery. Another, less drastic approach is to get a small 12V battery, rated at around 1–2 Ah, and use it as a voltage stabilizer, as shown in [Figure 4-13](#). You can find these batteries at an electronic surplus store or any larger electronic hobbyist store. Make sure the battery you purchase is *deep cycle*, so that you can completely discharge it without killing it.

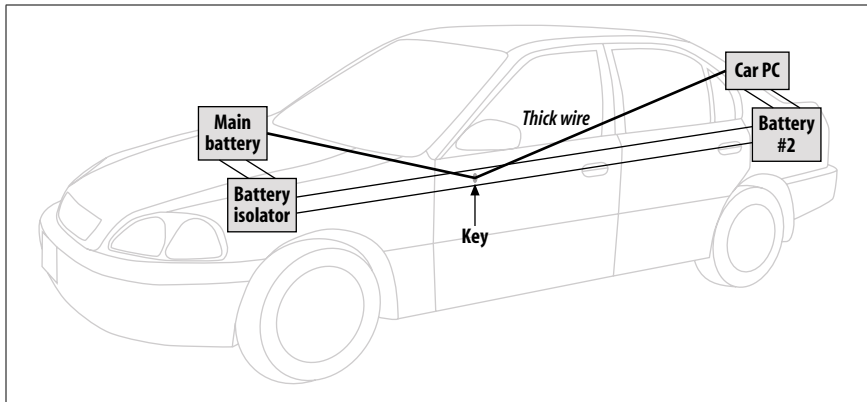


Figure 4-12. Wiring of a second battery

You need to put a *diode* (a device that only lets current go one way) in between the car’s 12V line and the 12V line of the battery, so that if your car is off, the little battery doesn’t try to power your accessories. The trickle current passing through it on the way to the device will charge the battery, and this may slowly drain the main battery over time. So, if you’re not driving the car frequently (which recharges the main battery), you’ll want to make sure the 12V line to this battery and to your computer is switched off when the car is off.

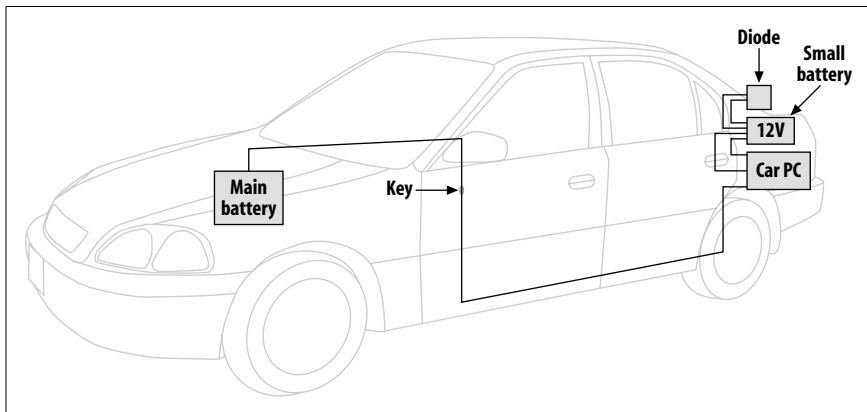


Figure 4-13. Using a smaller 12V battery

Using a crank-proof power supply. Opus Solutions, Mpegbox, and Mini-box all make power supplies that can survive engine cranking. Each of these power supplies has its own power range, and they are getting better all the time.

Opus Solutions's (<http://www.opussolutions.com>) 150W power supply, which leads the bunch, can deal with input voltages ranging from 7.5V to 18V. Mpegbox (<http://www.mpegbox.net>) makes a 70W power supply that can regulate to 12V voltages from 8V to 15V. Mini-box (<http://www.mini-box.com>) has recently released the M1-ATX, a 90W ATX power supply that is the smallest and, at \$80, the cheapest fully crank-proof power supply.

Carnetix (<http://www.carnetix.com>) don't make a power supply, but they make an external power regulator and [startup controller \[Hack #43\]](#) to supply crank-proof 12V to any non-crank-proof power supply. It takes a battery input of +7.5VDC to +18VDC and provides a regulated +12VDC output at up to 5A. It's designed to be used with the common ITX cases (such as the Casetronic C-134 case) with their own internal power supplies (which require regulated 12V input) and to replace the external conventional AC/DC power brick with one that's DC/DC.

Although Morex (<http://www.morexintl.com>) manufactures 60W and 80W power supplies rated to survive voltages from 9–16V, they are *not* crank-proof. Their “Car Power Kit” power supplies are intended for automotive applications, but they have not worked in my extensive testing, and I do not recommend them.

For a full rundown on the power supplies, check out “Power Your Car PC” [\[Hack #42\]](#).

Using a big capacitor. “Use a Huge Capacitor to Sustain Power” [\[Hack #8\]](#) describes how a large capacitor can help deliver consistent high-amperage output to bass speakers. Capacitors are designed to keep the car lights from dimming when your amplifiers are pumping out sound. If you're already installing a large farad capacitor for your audio system, check if it lets your computer stay on when you start the car. You have to ensure, however, that the input to the capacitor doesn't turn off when the car is cranking (i.e., that the car's battery connects directly to the capacitor).