

The Volt Vette Project

Chapter 31

The Devil in the DC

In this project, I have tried to buy American, as much as possible. The car, the motor, the controller, and the batteries were all made in the US of A.

But I could not find an American made DC-to-DC converter. So I had to settle for a Chinese made model.

(Note: I always work on more than one problem at a time. In this case, I worked on the problems described in chapters 29, 30, and 31 at the same time switching from one project to another.)

As you remember from Chapter 21, this DC-DC converts some of the 156-volt electricity to 12 volts to run car stuff like the radio, the headlights, and the heater fan. It's really just a step-down transformer, not even close to rocket science.

In checking around, I was happy to see that many other electric cars were using this same 45 amp DC-DC converter I was using.



This photo shows the unit in place, inside the waterproof Zilla box. Arrows point to the fuses that were designed to protect the converter from power surges.

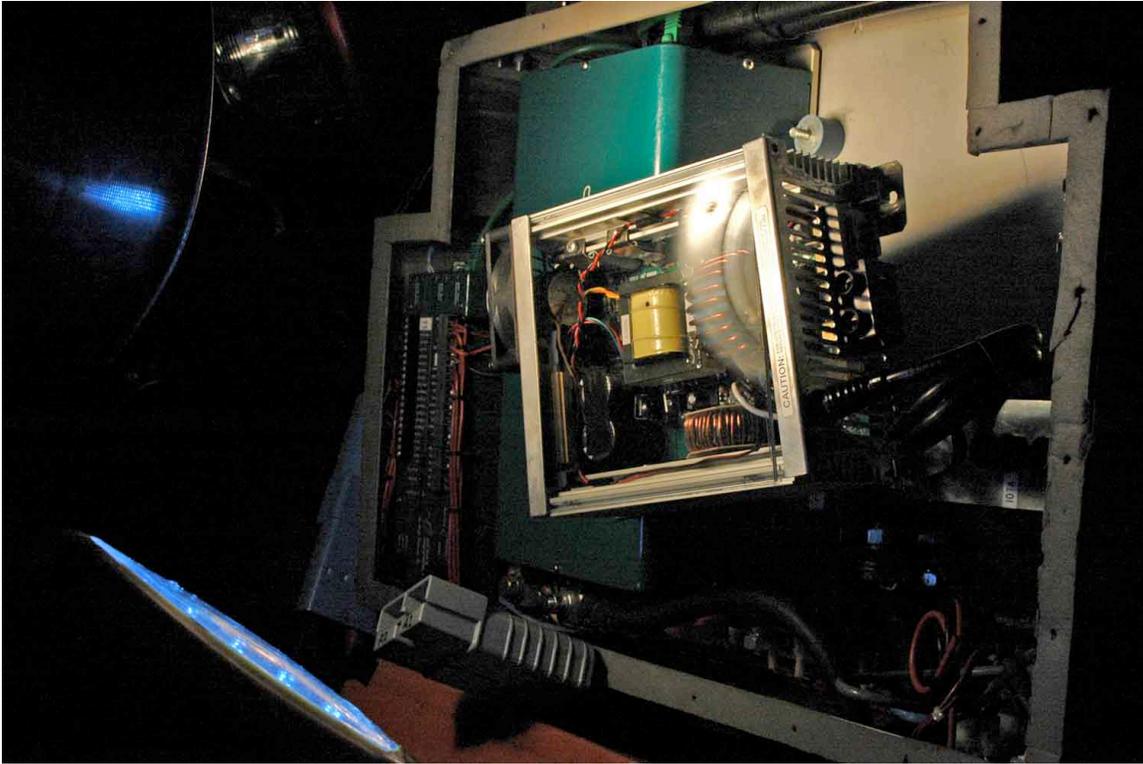
The unit seemed to work fine for a number of months. But, one night, as I worked on the charger, I noticed that the Zilla box looked like someone had stuffed it full of cotton balls!



I didn't want to believe what my eyes were seeing. (This is a fake digital recreation of what I saw.) Something had exploded, filling the sealed box with thick toxic smoke! Nothing could be seen until I unsealed the box, and let the smoke out.

The smell was awful! Joyce and I removed the whole Zilla box, with everything in it, and took it to Tim and Lee. They discovered that two 200-volt capacitors inside the converter had exploded.

Lee carefully cleaned every thing to remove the toxic residues and replaced the 200-volt capacitors with bigger 250 volt ones.



I replaced the metal cover with a clear plastic one, so I could keep an eye on the insides of the converter.

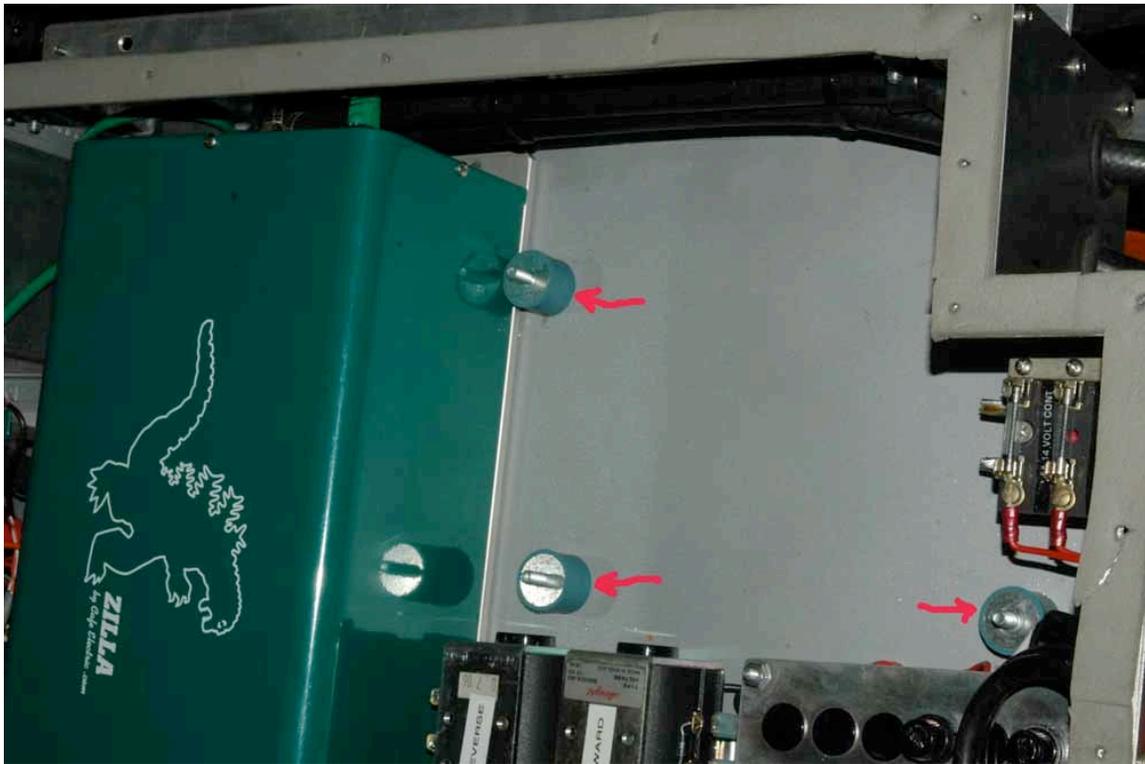
In short order, one of the new capacitors blew its top.



In the photo, I have circled the dead capacitor. The arrows point to the “in-rush limiters” that failed to protect the capacitor. At least it didn’t explode again.

Dave P. replaced the 250-volt capacitors with 350 volt ones.

To keep things from shaking loose, he mounted the converter on rubber shock absorbers.



Minneapolis St. Paul Magazine wants to do a photo shoot for a story on the Volt Vette.



I suggest they photograph the car having its batteries charged by solar panels at a friend's garage. They like the idea and we do the shoot. But as I drive home the car dies! Great unhappiness! Open the hood. Test, test, test. The back-up 12v battery is dead. I fear that means the DC-DC converter has failed again. I walk home, drive back, and recharge the 12v battery. Once I get the car back in my garage, my tests show the converter is indeed dead, and the battery is almost dead. It will not hold a charge for more than a few hours.

Maybe this converter would only be good as a doorstop!

Time for extreme measures, like using my brain to think through the problem.

1. This problem started after the power steering unit went in.
2. The electric steering unit draws around 60 amps when it's working hard.
3. The converter can put out only 45 amps.

4. Could it be that 60 minus 45 = a dead converter?
5. Could it be that I should have considered this BEFORE putting in the power steering?

When the converter fails, my accessory 12-volt battery jumps in to keep things going, but I don't have a voltmeter keeping watch on that battery.

This means that battery gets overworked and quickly dies.

With the 12 volt system down, the controller loses its thinking cap and shuts down the 156 volt system.

Bottom line, I have to walk home.



Buy a 12v voltmeter.
It tells me the battery is mostly dead.



I buy a bigger, more powerful battery and squeeze it into the car's original battery tray and lock it down.

Dave P. attacks the DC-DC converter, once more.

The new plan is to have the new battery do the heavy lifting. The converter is regulated to simply keeping that battery charged up.

(Note to the reader: if you do not have excellent electrical engineers on your speed dial, consider converting a car with manual steering!)

I start driving the Volt Vette every day and after 450 miles the reformed system seems to be holding up.

Next chapter: The Incredible Shrinking Driveshaft!

