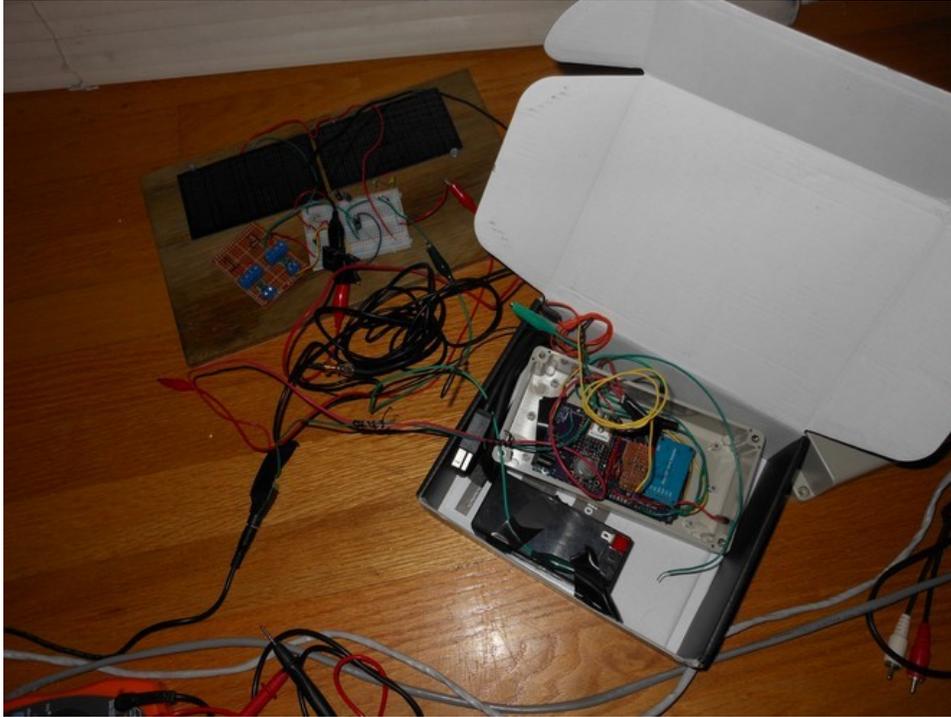


Solar Home Battery Project

Objective: Test out a KISS battery and solar panel, having the panel charge the battery. Log.



Windmill Data Logger was used with a 12V 1Ah battery. The Regulator used is a somewhat low power AP2204K-ADJTRG1, set to 13.7 or 13.8V (a float voltage for Lead Acid batteries I believe).

General Build:

There are two solar panels in series, to make about 14 to 16 volts in direct sunlight. They go to a 150mA adjustable voltage regulator (AP2204K-ADJTRG1) on a piece of perfboard which sets the output voltage to be 13.7 or 13.8 volts on a breadboard. There is a diode outputting into the lead battery to prevent any backflow. There is an LED on the output of the Vreg to signal that power is live. The externally power Arduino Mega and custom Windmill shield tap into the V+ of the battery, and have an ACS712 5A current meter in series with the current output. SD card logs data at about 1 per second. GPS keeps time (see windmill docs for detail on troubleshooting GPS).

Battery used:

A battery made in China with the Duracell brand tacked on. The side of it says distributed by Ascent Battery Supply, LLC from Wisconsin. See photo of the front. It's fairly small. Cost was ~\$20-25.00 I need to find the data sheet for this battery to see how much current I can pull from it.

Diode:

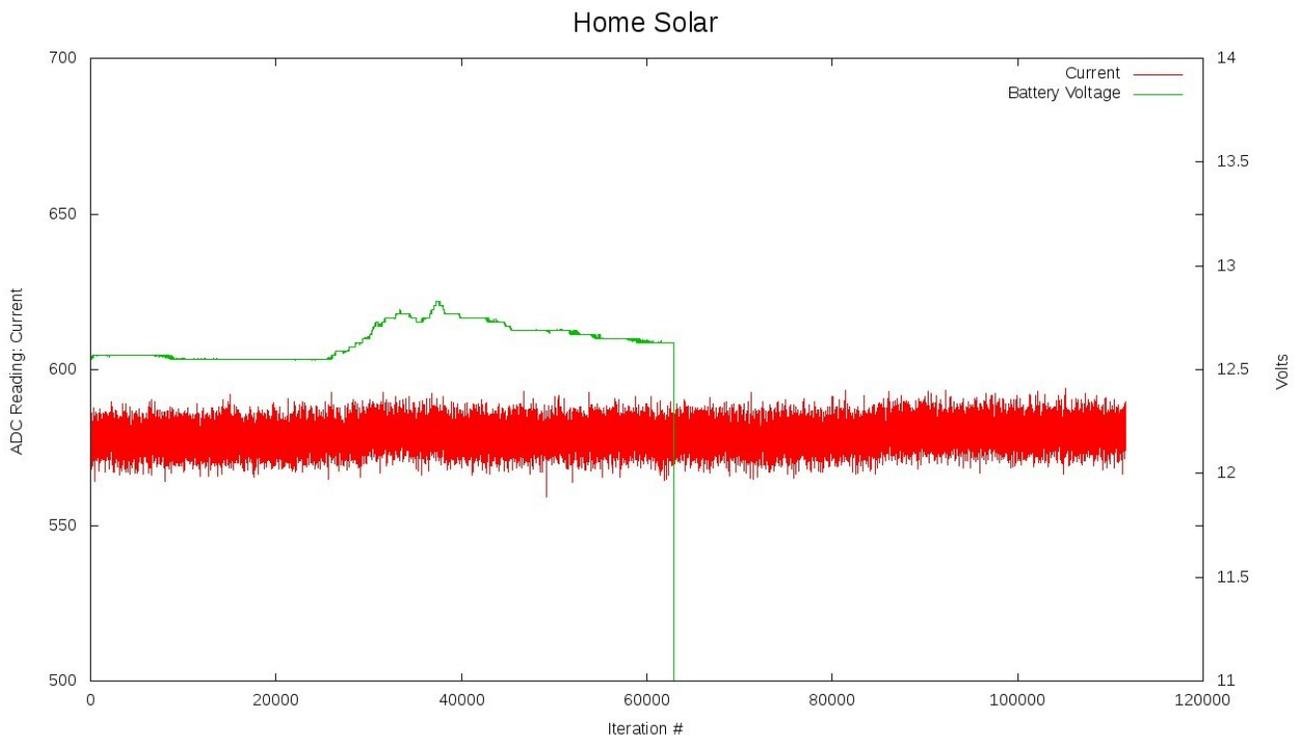
There is some additional drop across the diode. I have to test other regulators that can go higher than the AP2204K which seems to have a limit around 13.7, in my setup.

Findings:

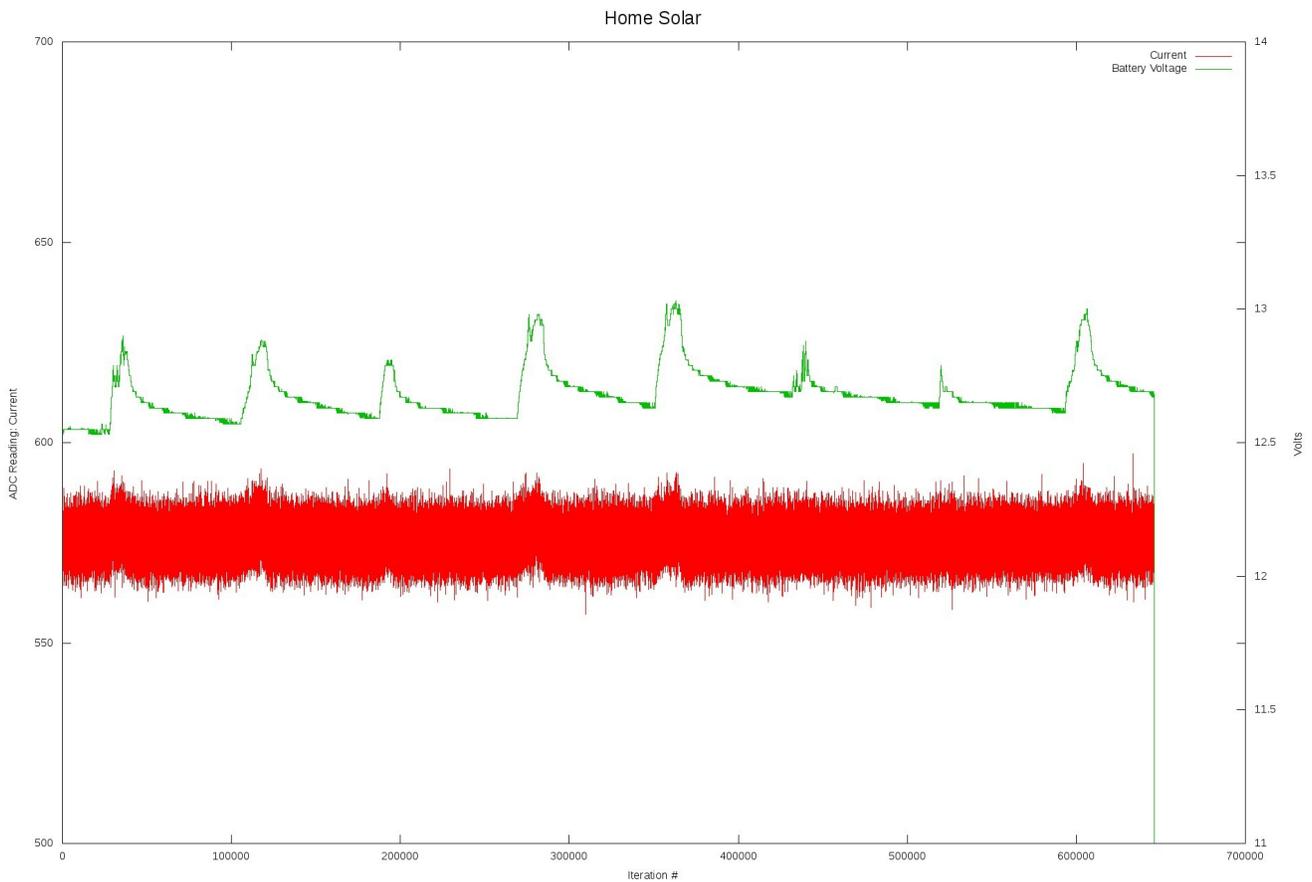
See the below graph. Although the data cuts out (I knocked out by accident, the adc line into +) you can see a steady self discharge. The current meter used here is not sensitive enough to register the max of 10mA that is charging the battery (used a sparkfun breakout for an ACS712, of 5A current meter) but it may show a slight increase when the battery is increasing. How much self discharge do lead batteries have? We are going to test this particular battery and find out exactly how it performs.



Battery is made in China somewhere (where???), and distributed by Ascent Battery Supply, LLC in Wisconsin.



As sun only shines during morning hours on my east facing Window, there is a rise, then a drop off, where self discharge begins. The Sharp dropoff can be ignored. This data is from 062818.



Data from 07-01 to 07-08-18 Note that a few cloudy days, cause the battery to discharge, (overall) with this setup. The current readings, do show a slight increase, though still in the noise. We need more panels.

Work Log 08/2018

I've put everything on one piece of 1/8th inch plywood, and will begin logging again. I may want to have the battery covered up, so sunlight doesn't heat it up. We are heading into fall now, so I expect sunlight to diminish as we head towards December. See photo. I've added fuses to the battery and to the Logger PSU connector. The additional two panels wired in parallel should give us additional current, and hopefully show greater peaks and troughs in the readings.



