

William Dorney
 Date of test: 3/30/12

Objective: To determine if the solar panel can produce adequate amounts of power and if the "Solar Panel -> MPPT -> Battery" system operates as planned.

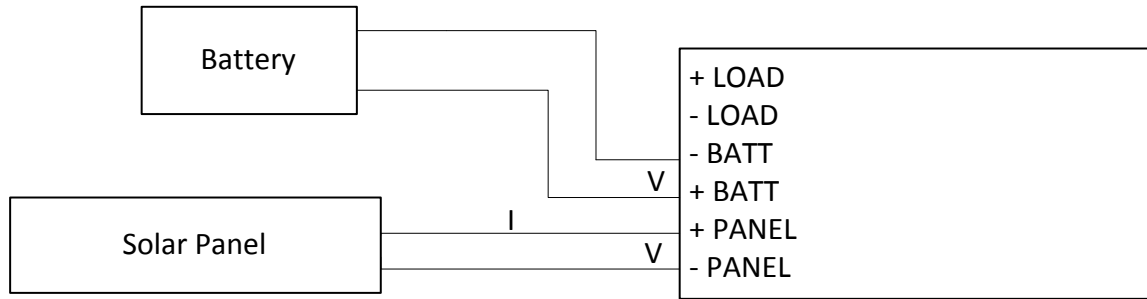


Figure 1: Block diagram of test points.

Time	Solar Panel Voltage (V)	Solar Panel Current (A)	Solar Panel Power (W)	*Battery Voltage (V)
12:52PM	17.8	1.093	19.4554	11.58
1:02PM	17.9	1.09	19.511	11.59
1:12PM	17.8	1.101	19.5978	11.61
1:22PM	17.7	1.097	19.4169	11.64

Table 1: Recorded values for preliminary test.

* **Note:** Measured battery voltage is skewed due to incoming voltage from MPPT.

Observations:

The preliminary test proved to be a success. Expected power capture in Rochester NY during equinox at 1:00pm is 18.12W. Recorded power during testing at this time and location was approximately 19.5W as shown in Table 1. Also, the solar panel was tilted towards the sun in order to determine its potential maximum output. In direct sunlight the voltage and current were 17.7V and 1.41A respectively, leading to a power of 24.96W. This surpassed the specifications maximum power of 24W.

Battery voltage increased throughout testing. Despite the fact that these specific voltage values are skewed, the important point is that they are rising.

Completely blocking the solar panel by flipping it over caused the MPPT to shut down. Once the panels were flipped back and exposed to sun light, the MPPT automatically began charging the battery again after a slight delay.

Solar panel performance in partial shade was simulated by blocking sunlight to portions of the solar panel with the help of Mike and Jake acting as clouds. Power did decrease but did not cut out completely. Measurements for this type of scenario will take place in future experiments.

This preliminary test proved a few key points. Extended tests over longer periods of time and with resistive loads representing the payload are to be conducted soon.

