Satellite Charging System

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Solar Charging

A solar charger employs solar energy to supply electricity to devices or charge batteries.

Figure 1. Solar Cell Charging System

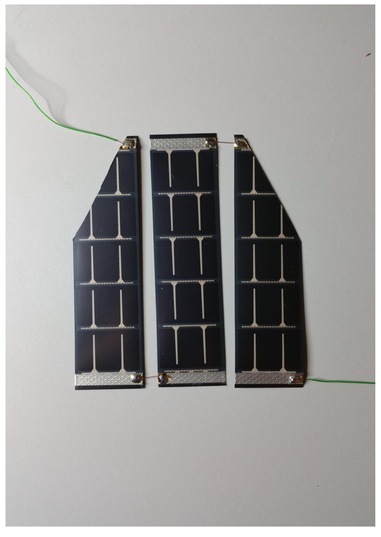

Figure 2. Solar Panel Group

Voltage Regulated Circuit

A solar panel can produce a range of charging voltages depending on sun light intensity, so a voltage regulator must be included in the charging circuit to prevent overcharging a device.

As seen in Figure 5, the voltage stays at the max charging power as long as one group of panels stays above 7 volts. Anything over 8 volts will not make the output voltage increase so that overcharging is prevented.

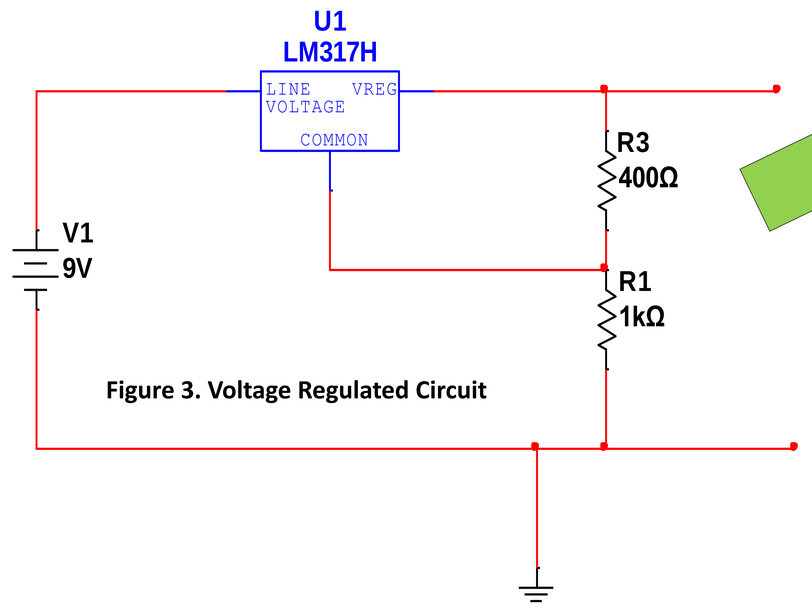

Figure 3. Voltage Regulated Circuit

Solar Cell Grouping

The solar cells are wired in groups of 3 in series to create a 9 volt power supply. The solar cells that are in groups of 3 will be connected in parallel 8 times. The reasoning for grouping the solar cells in series/parallel is in case of a connection failure there will still be an output voltage to the regulated circuit.

Rechargeable Batteries

The voltage regulated circuit will provide the rechargeable lithium batteries with a steady voltage as long as the solar cells receive sun.

The lithium batteries have a small loss of charge when not in use so that the satellite will keep having power to keep functioning properly.

Figure 4. Rechargeable Lithium Batteries

Regulated Output Voltages

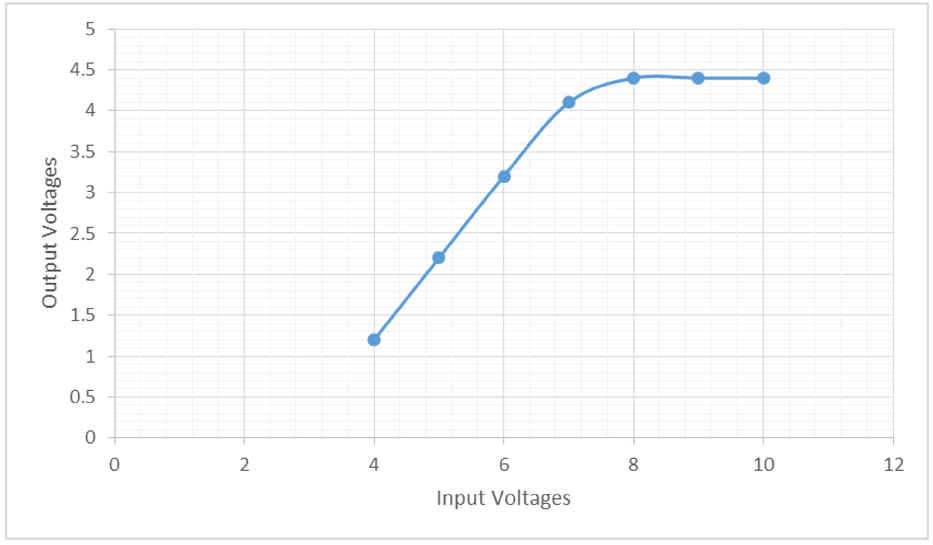

Figure 5. Voltage Regulation Graph

Acknowledgments

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