# **Power Supply Regulation to Assemblies**

The solar power system (Unit 1) provides regulated output power from the battery to the Arduino Controller (2U5) and separately to the LED strip (2U1) due to the 6 Amp current requirements to run a 5 m strip of LEDs. The Arduino cannot support the maximum current for full brightness. The 12VDC output signal from the power system will be split and modulated to provide 10VDC to the LEDs and 7VDC to the Arduino. Maximum output power based on device specifications will be 67 Watts. The Arduino has a maximum current draw of 1 Amp. The range for the LED output voltage of 10±0.5 V is to limit unwanted variance in the light intensity when not being changed by the controller. The Arduino ouput voltage range of 7±0.1 V is based on a website [1] stating that going below 7 V can result in the actual voltage to the board being too low after passing through the internal voltage regulator. Maximum Power is calculated as maximum current in LEDs times the output voltage to the LEDs, plus maximum current draw from the Arduino times output voltage to the Arduino.

Table 1. Performance requirements for the power supply regulation to assemblies

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| --- | --- | --- | --- |
| **Electrical Characteristic** | **Symbol** | **Value** | **Unit** |
| DC input voltage | Vin | 12±1 | VDC |
| Regulated output voltage to LEDs | VLED | 10±.5 | VDC |
| Regulated output voltage to Arduino | Vmc | 7±.1 | VDC |
| Maximum output power | PO,max | 67 | W |

Reference:

[1] Author Unknown. “Arduino Uno R3.” Cactus.io. <http://cactus.io/platform/arduino/arduino-uno> (Accessed: 11/4/2020)