# **Dual Output DC Power Supply**

The solar power system (Unit 1) provides voltage regulated output power from the battery to the Arduino Controller (2U5) and separately to the LED strip (2U1) due to the 20 Amp current requirements to run a 5-meter strip of LEDs. The Arduino cannot support the maximum current for full brightness since its maximum current draw is 1 Amp. The 12 VDC output signal from the maximum power point controller (MPPT) will be split to provide 5 VDC to the LEDs and 7.1 VDC to the Arduino with variable currents. Maximum output power based on device specifications will be 112.1 Watts. The range for the LED output voltage of (5.0 ± 0.25) V is to limit unwanted variance in the light intensity when not being modified by the controller. The Arduino output voltage range of (7.1 ± 0.1) VDC is based on a website [1] stating that going below 7 VDC can result in the actual voltage to the board being too low after passing through the internal voltage regulator. Using the lowest optimal voltage will help reduce power usage from the battery. 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 lists the performance requirements for the power supply.

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

|  |  |  |  |
| --- | --- | --- | --- |
| **Description** | **Symbol** | **Value** | **Units** |
| DC input voltage | Vin | 12 ± 1 | VDC |
| Regulated output voltage to LEDs | VLED | 5.0 ± 0.25 | VDC |
| Output current range for LEDs | ILED | 0.0-20.0 | A |
| Regulated output voltage to Arduino | Vmc | 7.1 ± 0.1 | VDC |
| Output current range for Arduino | Imc | 0.0-1.0 | A |
| Maximum total output power | PO,max | 112.1 | W |

# Reference

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