DC 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~~ power supply 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 Arduino Uno 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

Electrical Characteristic	Symbol	Value	Unit
DC input voltage	V_{in}	12±1	VDC
Regulated output voltage to LEDs	V_{LED}	10.0 ± 0.5	VDC
Regulated output voltage to Arduino	V_{mc}	7.0 ± 0.1	VDC
Maximum output power	$P_{O,max}$	67	W

Reference:

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

Commented [JDF1]: Put your name and the date on your homework assignments.

Commented [JDF2]: These two power sources should really be defined separately.

Commented [JDF3]: Current regulated? Voltage regulated? Other?

Commented [JDF4]: Insert a non-breaking space between a number and its units. Do not use an ordinary space here.
CORRECT: 12 VDC ; 12<NBSP>VDC
INCORRECT: 12VDC

Make this correction throughout the paper.

Commented [JDF5]: Modulated how? What modulation function or scheme is to be used?

Commented [JDF6]: 10.0 VDC ± 0.5 VDC

Commented [JDF7]: 7.0 VDC ± 0.1 VDC
Note the use of non-breaking spaces around the ± symbol.

Commented [JDF8]: If 7 VDC is the minimum allowed input voltage at the Arduino UNO’s power jack, 6.9 VDC is not allowed. Your power supply’s output voltage is specified as 6.9 VDC – 7.1 VDC.

Commented [JDF9]: A number whose magnitude is less than one requires a leading zero digit to the left of the decimal point:
CORRECT: 0.5
INCORREC: .5

Make this correction throughout

Commented [JDF10]: What is the maximum output current at the power supply’s 7 VDC output? **Power** is voltage AND current, not voltage alone.

Commented [JDF11]: What is the maximum output current at the power supply’s 10 VDC output? **Power** is voltage and current, not voltage alone.

Commented [JDF12]: Remove the colon ‘:’ from the end of the heading. (This is a bad habit of mine, too…)