**Power Supply Test Plan for: Team Panama City Beach**

*To: Dr. Simoni*

*From: Aliya Gosdin, Abel Keeley, Isabel Wilson, Logan Bryant*

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*Email:* [*gosdinas@rose-hulman.edu*](mailto:gosdinas@rose-hulman.edu)*,* [*keeleya@rose-hulman.edu*](mailto:keeleya@rose-hulman.edu)*,* [*wilsonic@rose-hulman.edu*](mailto:wilsonic@rose-hulman.edu)*,* [*bryantlj@rose-hulman.edu*](mailto:bryantlj@rose-hulman.edu)

*Submitted and verified by:*

**Introduction:**

**Diagram, schematic

Description automatically generated**  
**Figure 1. Schematic for Power Supply**

**[Insert here PCB design with important nodes labeled (possibly a couple pictures for the nodes)]**

|  |  |  |  |
| --- | --- | --- | --- |
| ID | Definition | Verified By | Associated Feature |
| FP1.0 | The power supply shall supply enough power for a 2-minute run around either track | Observation & Demonstration | Functional |
| FP1.1 | The power supply shall sustain a 1A continuous draw for the duration in FP1.0 | Experimentation & Observation | Functional |
| FP1.2 | The power supply shall provide a voltage between 12V max and 6V min to the vehicle for the duration in FP1.0 | Experimentation & Observational | Functional |
| FP1.3 | The power supply shall be able to source peak currents up to 2A for 5s without damage | Experimentation | Functional |
| FP2.0 | The power supply will charge from 0V to [Max V here] in 3 minutes or less using the wired charger | Experiment | Functional & Rechargeable |
| FP2.1 | The power supply will charge from 0V to [Max V here] in 7 minutes or less using the wireless charger | Experiment | Functional & Rechargeable |
| FP2.2 | The power supply shall be charged wirelessly from a transmitter and receiver that adhere to the Qi standard | Observational | Functional & Rechargeable |
| FP2.3 | The power supply shall be charged by a 120V AC to 12V DC power supply from the parts room | Observational | Functional & Rechargeable |
| S1 | The power supply shall prevent reverse polarization of capacitors within specified capacitance tolerance | Simulation | Safety |
| S2 | The power supply shall securely attach to the vehicle chassis without permanent modification to the chassis (glue, new holes, etc) | Observational | Safety |
| S3 | The power supply will supply no more than 3A to the vehicle | Simulation & Experimentation | Safety |
| V1 | The RGB indicator shall turn Green when [green voltage] is reached | Experimentation & Observation | Valuable |
| V2 | The RGB indicator shall turn Red when [red low voltage] is reached | Experimentation & Observation | Valuable |

**Procedures:**

|  |  |
| --- | --- |
| ID | Procedure Description |
| FP 1.0 | Record the vehicle performing a 2-minute run around the oval and figure 8 track with power data sent successfully and staying on the track. |
| FP 1.1 | Plot the current draw for a successful 2-minute run around both tracks and calculate the average current to ensure it is 1A. |
| FP 1.2 | Plot the load voltage supplied by the power source for a successful 2-minute run around both tracks and ensure the max voltage to the load is below 12 V and the minimum voltage to the load is 6V. |
| FP 1.3 | Using a DMM or the INA, record the load pulling between 1.8-2A of current for 5 seconds by applying slight pressure to the front wheels attached to the steering servo while sweeping the servo back and forth. Pressure will not be applied to completely stop the servo and cause a malfunction of the servo. |
| FP 2.0 | Begin with a fully discharged power supply at 0V. Using a DMM and timer, record the time it takes to charge the power supply to [Vmax] using a 120V AC to 12V DC wired connection from an outlet. |
| FP 2.1 | Begin with a fully discharged power supply at 0V. Using a DMM and a timer, record the time it takes to charge the power supply to [Vmax] using the provided wireless charger. |
| FP 2.2 | Using a DMM, connect the power supply using a receiver to a wireless power transmitter, with both receiver and transmitter applying to Qi standards, and verify that the voltage in the capacitors rises when connected |
| FP 2.3 | Using a DMM, plug in the power supply to the 120V AC to 12V DC converter supplied by the parts room and verify that the voltage in the capacitors rises when connected. |
| S1 |  |
| S2 | Secure the power supply with screws through the mounting holes in the PCB and the vehicle. Give the PCB pressure upward and downward and wiggle the vehicle to verify the PCB does not wiggle or become unmounted from the vehicle. |
| S3 |  |
| V1 | Using a DMM, measure the voltage while the power supply is charging. Record the voltage of the supply when the RGB LED turns green and compare the value to Vmax. |
| V2 | Using a DMM, discharge power from the power supply and record the voltage the RGB LED turns red and compare the value to [red low voltage]. |

**Expectations of Results:**

|  |
| --- |
| FP 1.0: |
| FP 1.1: |
| FP 1.2: |
| FP 1.3: |
| FP 2.0: |
| FP 2.1: |
| FP 2.2: |
| FP 2.3: |
| S1: |
| S2: |
| S3: |
| V1: |
| V2: |