All Saints': Pi Top Telemetry System

ALL SAINTS' SOLAR CAR

Usage

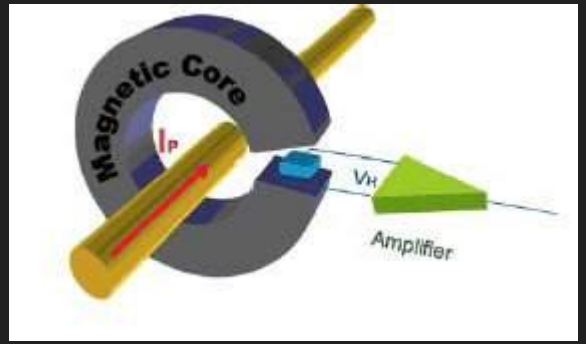
- The Telemetry system is used to measure the input and output of the battery systems.
- Using sensors to measure the current, our drivers are able to see how efficiently the motor runs and at what rate. This allows a comparison between the battery being charged and the one in use.
- Bad Battery monitor

Power Supply

- Aux Power supply using terminal bus.
    - The ports are easily connected, negative to negative and positive to positive.
- Why run it off the Aux?
    - Testing found that the battery system used minimal power, and battery conservation is key.
    - It would have been possible to run the Arduino off the propulsion system but special converters would be needed to decrease the current to ensure no damage to the electronics.
    - Also it is possible to get a third battery solely for the telemetry.

Current Readings

- Used a Hall effect sensor and a converter that was given to us.
  - Hall effect sensors give voltage readings which are directly proportional to the magnetic field going through the sensor, induced by the current flowing in the wire.
  - The converter was a 3 digit LED display that was programmed to show current, instead of voltage, readings when hooked up to the Hall effect sensor.
- How is it attached?
  - Hall effect sensor is attached to any part of a 4 gauge wire used in the propulsion battery system.
  - Attach 2 wires from the Hall effect sensor to the converter and the other 2 wires to the ADC input.



Boards

- The whole system is composed of 3 boards
  - An arduino code ran on both boards, a python code which takes the data from the chase card board, and transfers it to the third code which the second one calls upon to display the dashboard.
  - The board on the car collects data from adc connections (aux, main, and current voltages). In addition, it collects data from the GPS module and sends these data points out via its LoRa Antenna.
  - The chase card board receives the the data over its radio antena, and is plugged into the rasberry pi of the pi-top. It transmits its data over using the same code into the computer.

Possible projects

- Current indicator
  - An idea for 3 LEDs to be put on the dashboard with the colors green, blue and red.
  - When the car is being run in the perfect or close to perfect current level the blue light comes on indicating that you are getting the most from the batteries.
  - If the car is running too much current a red light will come on and too little then a green light will come on.

- Battery monitor system
  - A system that not only measures the remaining battery in all of your batteries but in specific ones so you know if they are faulty or not.
  - Noted that you might need a different board to run it on because the Arduino may not have enough ADC inputs.

Q & A

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