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Battery Power Monitoring for an Electric Scooter

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ABSTRACT

Battery power management (BPM) is a primary learning design for electrical engineering objective for portable systems. Traditionally, BPM has been implemented mainly by reducing average power consumption of system components. A careful analysis of charge and discharge characteristics and the adoption of accurate high-level battery models system-level design open new opportunities for battery life-time extension. In this paper, I introduce Sealed Lead Acid battery (SLAB) power management systems for an electric scooter. In the case of advanced SLAB, special features like safety management are necessary. Battery driven electric scooters strive to enhance life-time of the battery by automatically adapting discharge rate and current profiles to battery state-of-charge. The distinctive feature of these policies is the control of system operation based on the observation of battery output voltage. The effectiveness of the proposed policies and more generally, of the idea of accounting for battery behavior during system design, is proved by the experiments carried out on a realistic case study, namely on an electric scooter.

Current sensing resistors are the newest and fastest growing resistive product in the industry today. As with most passive products, the majority of new designs are surface mounted; these resistors are used to monitor the current in a circuit and translate the amount of current in that circuit into a voltage that can be easily measured and monitored. In this project I am using a 5mΩ sensor resistor with the power rating of 3W; I am able to measure 17As from a DC motor of 400W.

The other important component I used was Hall Effect sensor; I chose to use ACS752SCA-050. The current sensor was supplied with 5 Volts DC from an on board regulator. I can see that when there is no current flowing through the large red wire, the sensor simply divides its supply voltage in half (5V divided by 2 = 2.5Volts output).

Executive Summary

Recently there has been high demand on battery power management (BPM) technologies in the electric vehicle, and solar energy technology. The battery is a fantastic but greatly misunderstood source of portable power. It is an electrical power accumulator that stores a specific amount of electrical energy, the amount being dependent on its electrical size, or capacity. The battery delivers a certain amount of amperes for a period of time depending on its size. This is called the ampare-hour (A.H.) capacity of a battery. So, my idea for this project is to effectively charge the batteries within a purely electric scooter. The initial system is designed to manage the Sealed Lead Acid Battery in the scooter; once the circuit for the battery is complete and functional, I will design the SLAB circuit and control the output information for the batteries, including voltage, current and time.