Diy bms for lifepo4

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The LTC6804-2 is a battery monitor IC which can monitor up to 12 series connected batteries. It has five general purpose IO pins which can be used to measure sensor values (e.g., battery temperatures) or control external relays. It also has 12 balancing control outputs for passive battery pack balancing. The LTC6804-2 can be controlled, and data registers can be read, through an 4-wire SPI interface.

The LTC6804-2 can fairly easily interface with an Adruino microcontroller board such as an Arduino Uno. I chose a stacked system with the LTC6804 PCB deisgned as an Arduino shield. The complete system comprises an Arduino Uno, a custom designed LTC6804 BMS board, a balance board and optionally an Xbee wireless mesh network shield to communicate with a monitoring station. The balance board and Xbee system will be explained in a separate Instructable.

The BMS is configured for a battery pack are composed of A123 LiFePO4 cylindrical batteries in 12S8P configuration. The A123 cells have the following characteristics:

The Arduino firmware for the BMS is on Github https://github /dcaditz/BMS_V4 and also provided inline below. You may have to tweak it a bit to deal with updates to external libraries since this project was published. There are also several optional features such as code for cell balancing or XBee communications that you may want to comment or uncomment based on your implementation.

The code poles the LTC6804 every 5 seconds and reads the battery cell voltages, pack temperature sensors and total current. If any values are out of the pre-defined safe range, the arduino opens a relay to disconnect the battery pack. The code also writes cell voltages, module temperatures, current and relay states to both to the Serial monitor and to an XBee wireless mesh network (Discussed in a separate Instructable).

The graph shows cell voltages and module current collected during charge, discharge and float testing of the BMS. Different voltage curves (Channels 2-13) represent different cells in the battery module. In this case, the cell connected to Channel 2 has lower capacity than the remaining cells. Since the cells are connected in series, Channel 2 is limiting the capacity of the entire battery pack. This shows the importance of cell balancing, which I discuss in a separate Instructable.

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