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[303]   284.0979 [GENERAL]
443.0048

2008.07.28   LiPower v1

1   Overview Lithium Polymer Battery Controller

The SparkFun LiPower v1 Battery Controller Unit exploits the full features of the rechargeable Lithium Polymer battery. This multi-function board digitally controls three 3.3V outputs from a single battery input. It includes a protected auto-cutoff charge circuit for easy battery charging from a 5V source. It also implements six digital inputs, UART, and SPI breakouts for integration into larger systems and full user control.
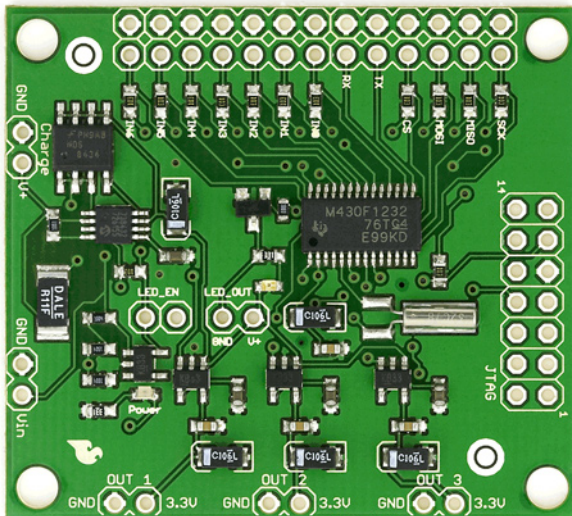
2   Hardware Description

· Texas Instruments MSP430F1232 low-power microcontroller for current draw on the order of microamps in sleep mode
· 3 digitally-controlled 3.3V regulated outputs
· 5V charge input with auto-cutoff charge circuit
· 7 digital 3.3V inputs
· SPI input for user control
· TX and RX breakouts for user control
· Status output breakout for external indicator (e.g. power LED, status signal)
· JTAG programming interface for easy firmware changes

3   Functional Description (Standard Firmware)

The standard firmware on the LiPower exports nine functions and is controlled by SPI (slave mode). The functions are shown in the table below.

Command	Function
0x00	Get general info. Returns General Info Byte, see Section 4
0x01	Get power status. Returns Power Status Byte, see Section 5
0x02	Turn output 1 on. Returns 0x02
0x03	Turn output 1 off. Returns 0x03
0x04	Turn output 2 on. Returns 0x04
0x05	Turn output 2 off. Returns 0x05
0x06	Turn output 3 on. Returns 0x06
0x07	Turn output 3 off. Returns 0x07
0x08	Reset MSP430. Returns 0x08

4   General Info Byte:

When 0x00 is sent via SPI, the MSP returns a byte containing info about the battery voltage level and the charge status.

Bit [7]: Undefined

Bit [6..5]:

00 = 0-5% Battery, charge needed

01 = 5-33% Battery

10 = 33-66% Battery

11 = 66-100% Battery

Bit [4]:

0 = Not Charging

1 = Charging

Bit [3..0]: Undefined

5   Power Status Byte:

When 0x01 is sent via SPI, the MSP returns a byte containing info about the three 3.3V outputs.

Bit [7..3]: Undefined

Bit [2]:

0 = Out 3 off

0 = Out 3 on

Bit [1]:

      0 = Out 2 off

      1 = Out 2 on

Bit [0]:

      0 = Out 1 off

      1 = Out 1 on

6   Other Features

In order to exploit the very-low-power capability of the MSP430F1232, the on/off status LED is connected to a 0.1 inch standard jumper so that it can be easily disabled. The LiPower board also includes a breakout for the LED so that it can be wired as a simple status signal to another board. The LiPower is ideal for controlling the power for multi-board applications, especially multi-chip applications, and is great for systems that require a sleep mode rather than a full power-down.