MCP73833 Battery Charger Design Documentation

Table of Contents

Goals for Design....2
  Other desired features....2
Analysis of Primary Components....2
  Battery charger....2
    MCP73833....2
Analysis of Secondary Components....2
LED driver....2
    CL2N8-G....2
Revision A (initial release)....3
  Design challenges....3
    Implementing variable charge current....3
    Powering status LEDs....3
  Schematic....3
    Extra power connections....4
  PCB Design....4
    PCB Layout....4
    PCB Render....6
  Bill of Materials....7

[Image of DEVICE here]

MCP73833 Battery Charger Design Documentation

Goals for Design

- Adjustable charge current

Other desired features

- Status LEDs
- Breadboard compatible

Analysis of Primary Components

Battery charger

MCP73833

- + Up to 1A battery charge current
- + Simple to use
- + Multiple status LEDs
- - Never used before

Analysis of Secondary Components

LED driver

CL2N8-G

- + Low cost
- + Simple
- + Small package
- - Only 20mA output

MCP73833 Battery Charger Design Documentation

Revision A (initial release)

Design challenges

Implementing variable charge current

It is important to have some control over the charge current of this device, especially for small lithium batteries where 1A is too much current. In order to solve this, a jumper will be used to toggle between 500mA output and 1A output.

Powering status LEDs

Although a resistor could be used to regulate the current through the status LEDs (since they should be powered by the 5V input), to be safe against higher voltages, a LED driver will be used. However, since only one LED should be on at one time, both LEDs will be connected through the same driver. This lowers the cost of the device and requires a smaller PCB.

Schematic

A schematic for the first revision (Revision A) of this device can be seen in Figure 1.

MCP73833 Battery Charger Design Documentation

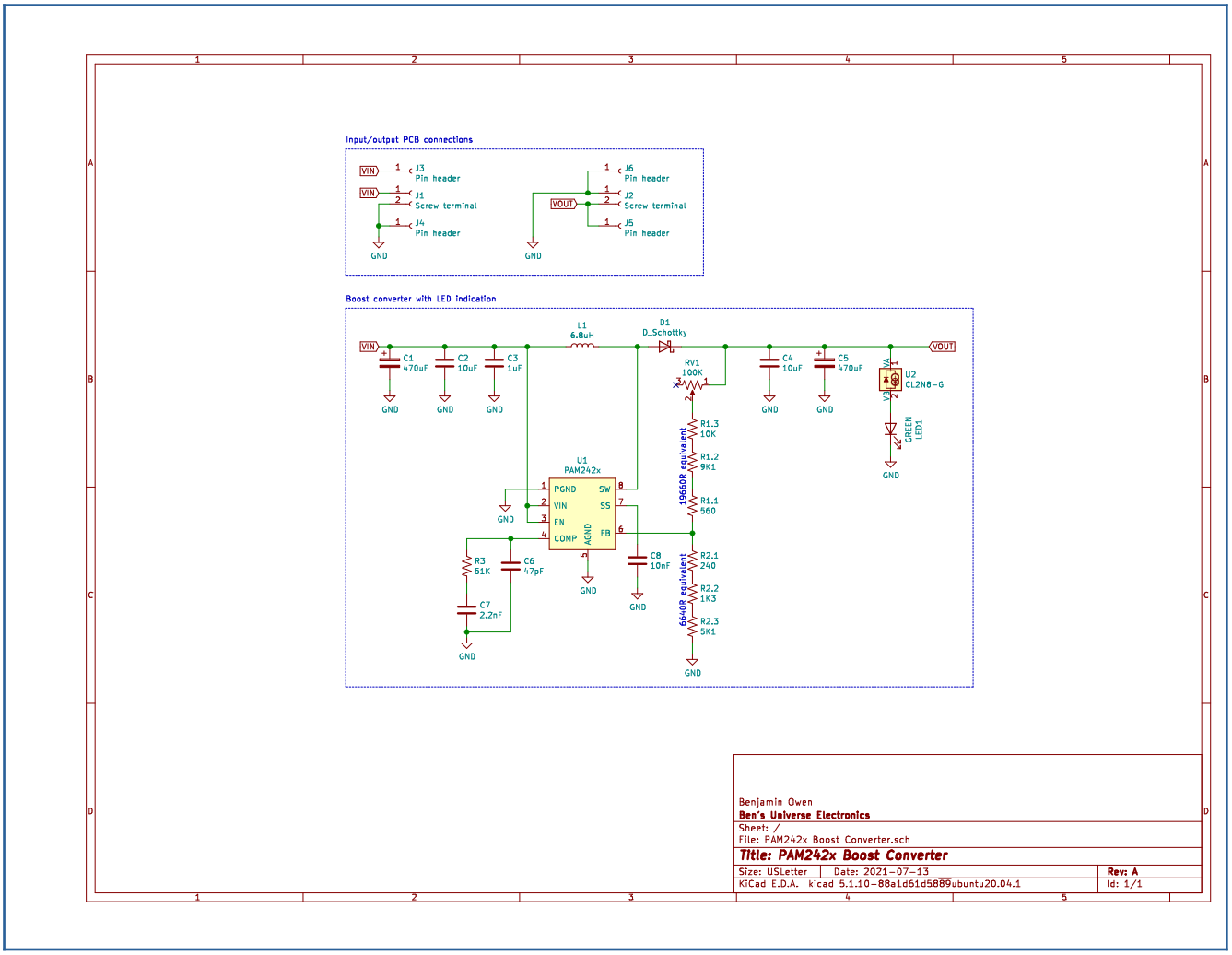

Figure 1: Schematic

Extra power connections

As seen in Figure 1, there are multiple connections for VIN, GND, and VOUT. This is so the PCB can use screw terminals as well as solder points (or breadboard pin headers), giving an end user more options for power delivery.

PCB Design

PCB Layout

The PCB layout design can be seen in Figure 2 and Figure 3.

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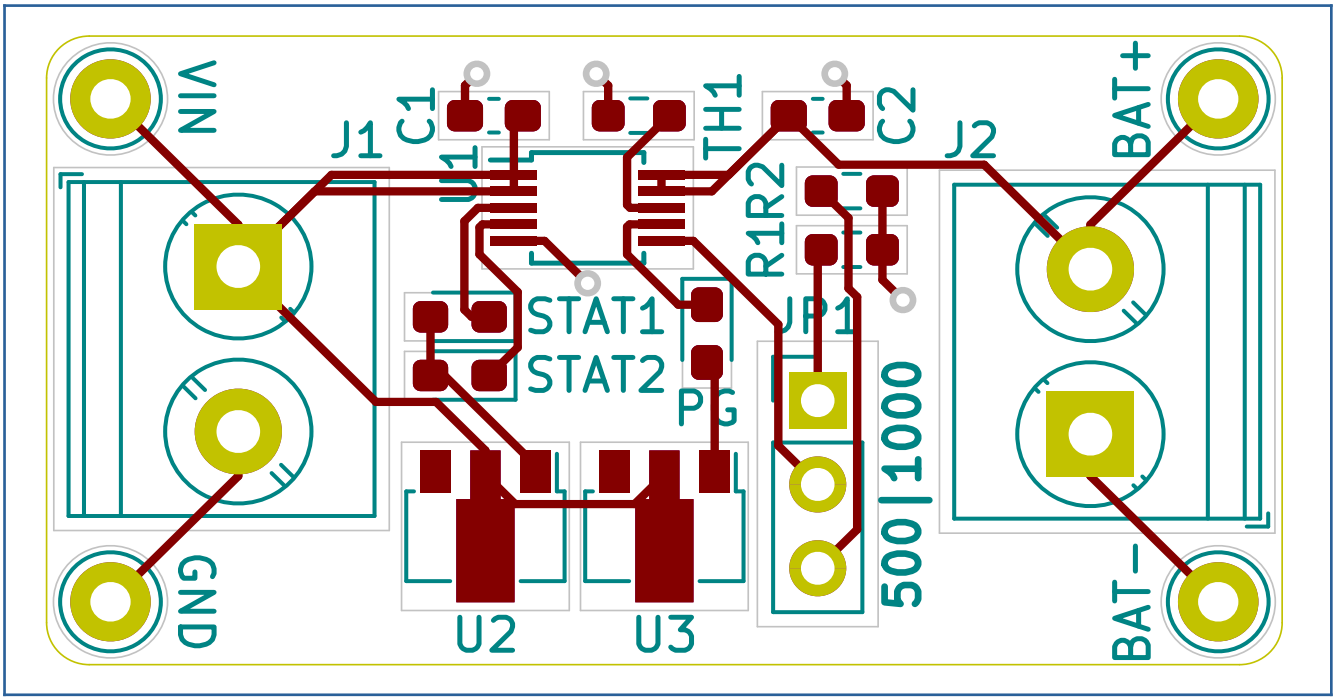

Figure 2: PCB layout (top view)

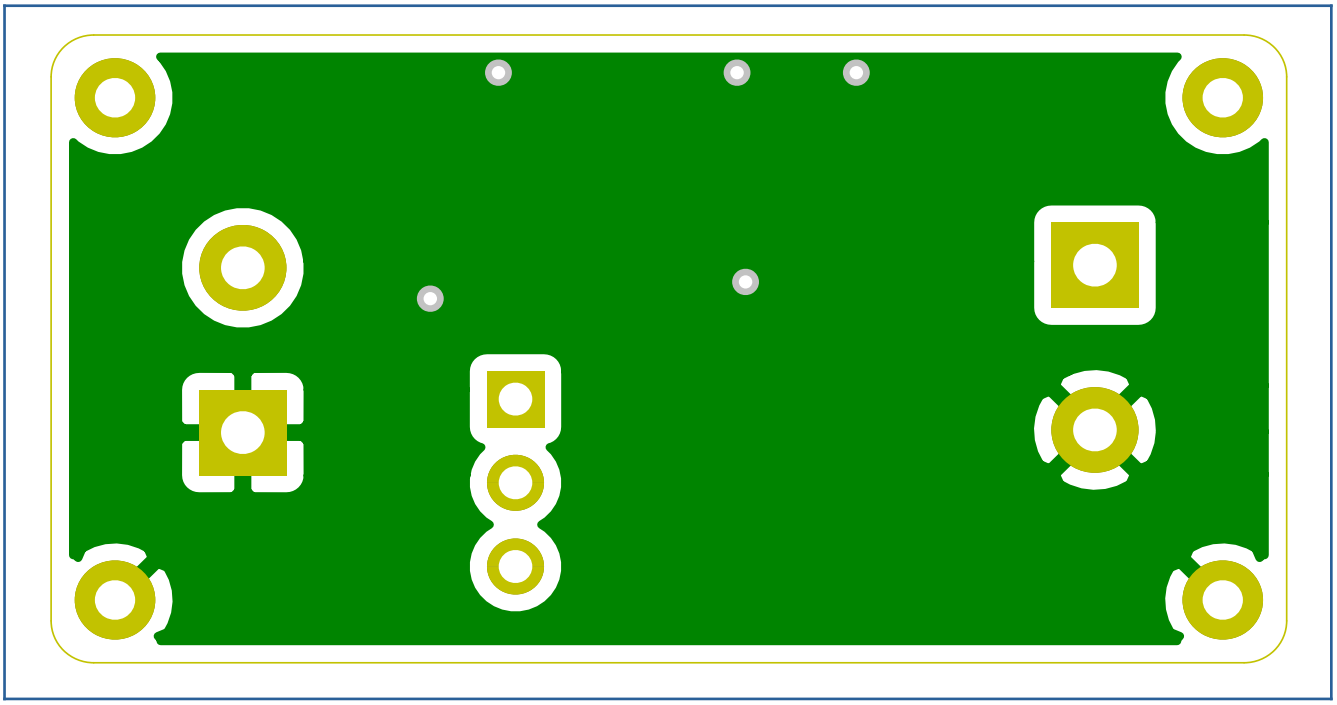

Figure 3: PCB layout (bottom view)

The bottom layer consists of a ground pour with no other traces.

MCP73833 Battery Charger Design Documentation

PCB Render

3D renders for the PCB can be seen in Figure 4 and Figure 5.

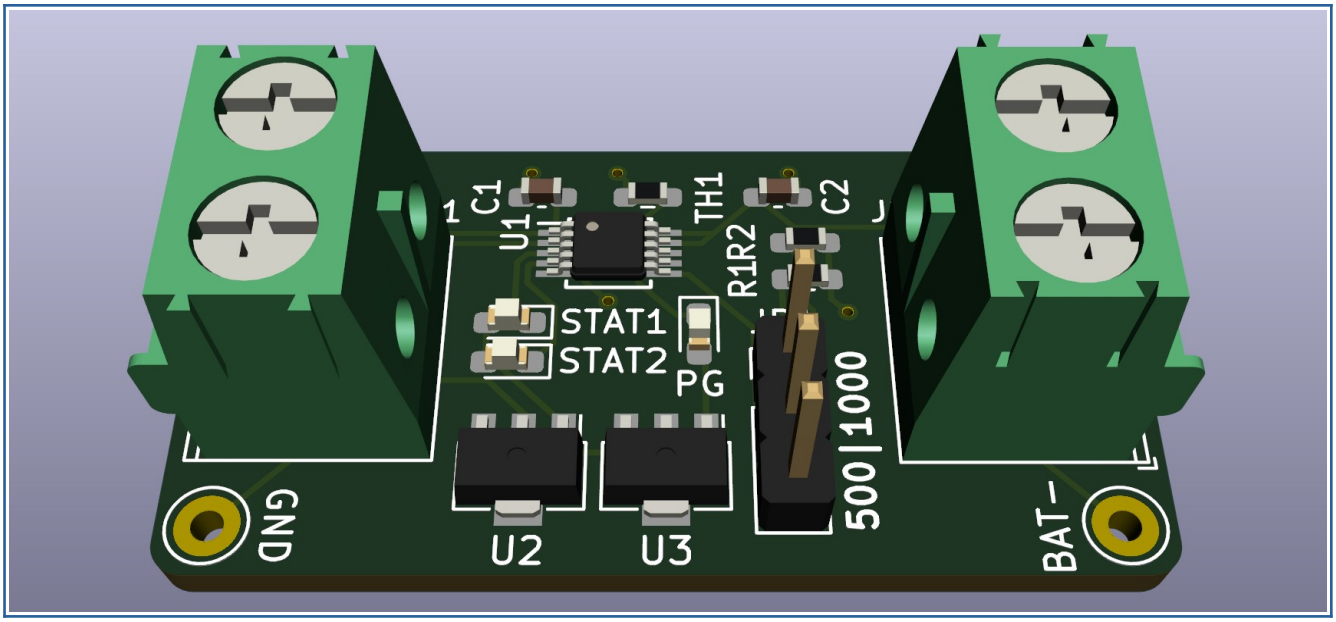

Figure 4: PCB 3D render (top view)

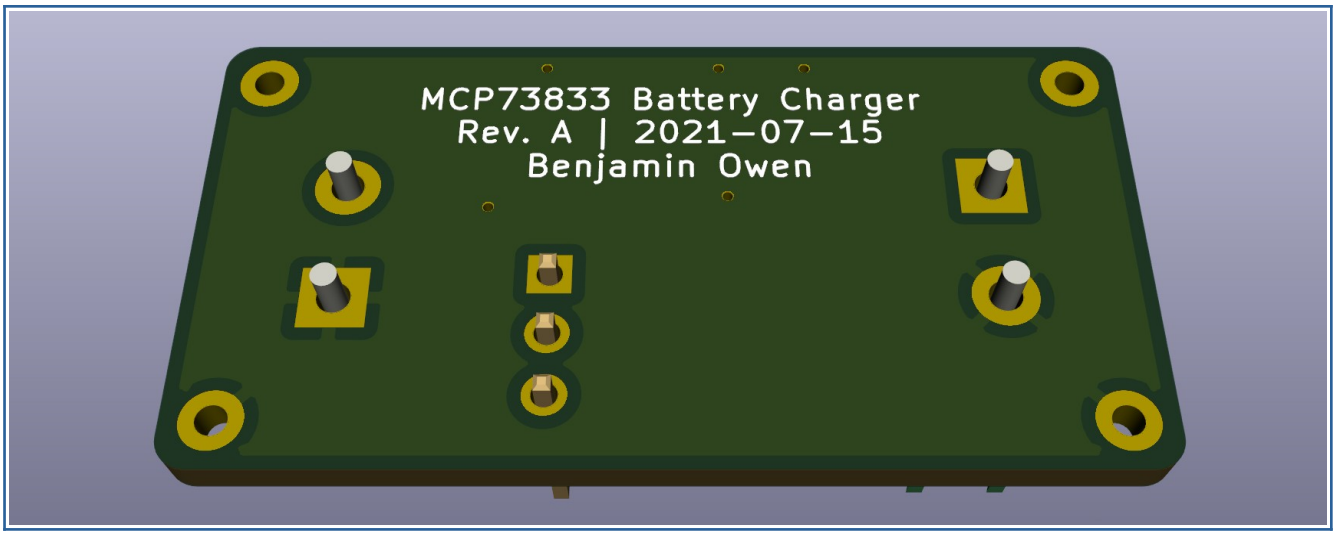

Figure 5: PCB 3D render (bottom view)

MCP73833 Battery Charger Design Documentation

Bill of Materials

A bill of materials can be found in Figure 6.