

Task 7.3 - Power Distribution System PCB

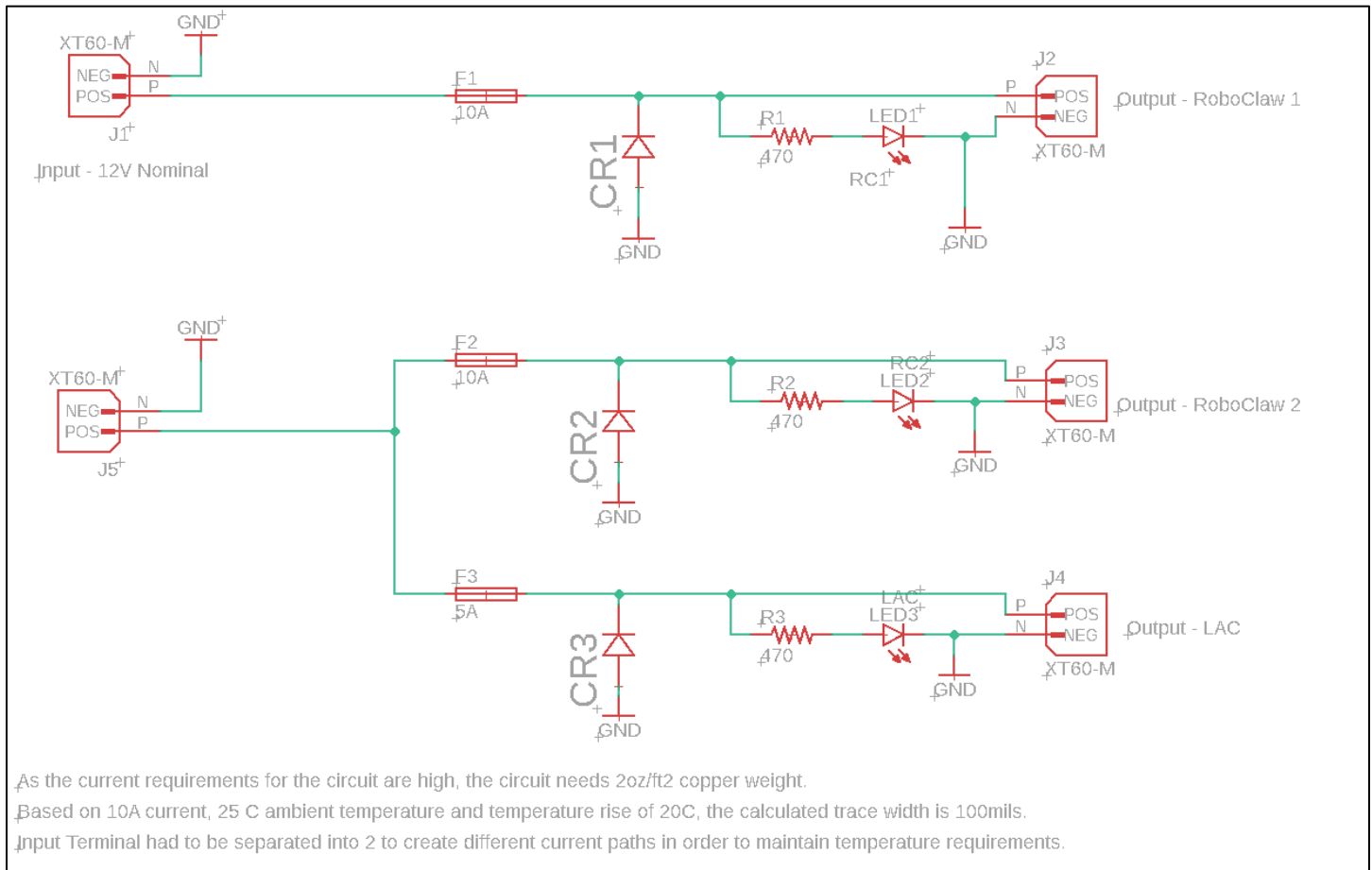
Draft Layout & BOM

Team I – Lunar ROADSTER

Ankit Aggarwal, Bhaswanth Ayapilla, Deepam America, Simson D' Souza, Boxiang Fu

Schematic Corrections

Based on the feedback from the schematic, we have corrected the circuit, as shown below:



Board Design

To accommodate the high current requirements for the circuit, we shifted to two different inputs. This allows us to create 2 independent circuits with a common ground.

Trace Width Calculation Parameters:

Current – 10A

Ambient Temperature – 25°C

Temperature Rise – 20°C

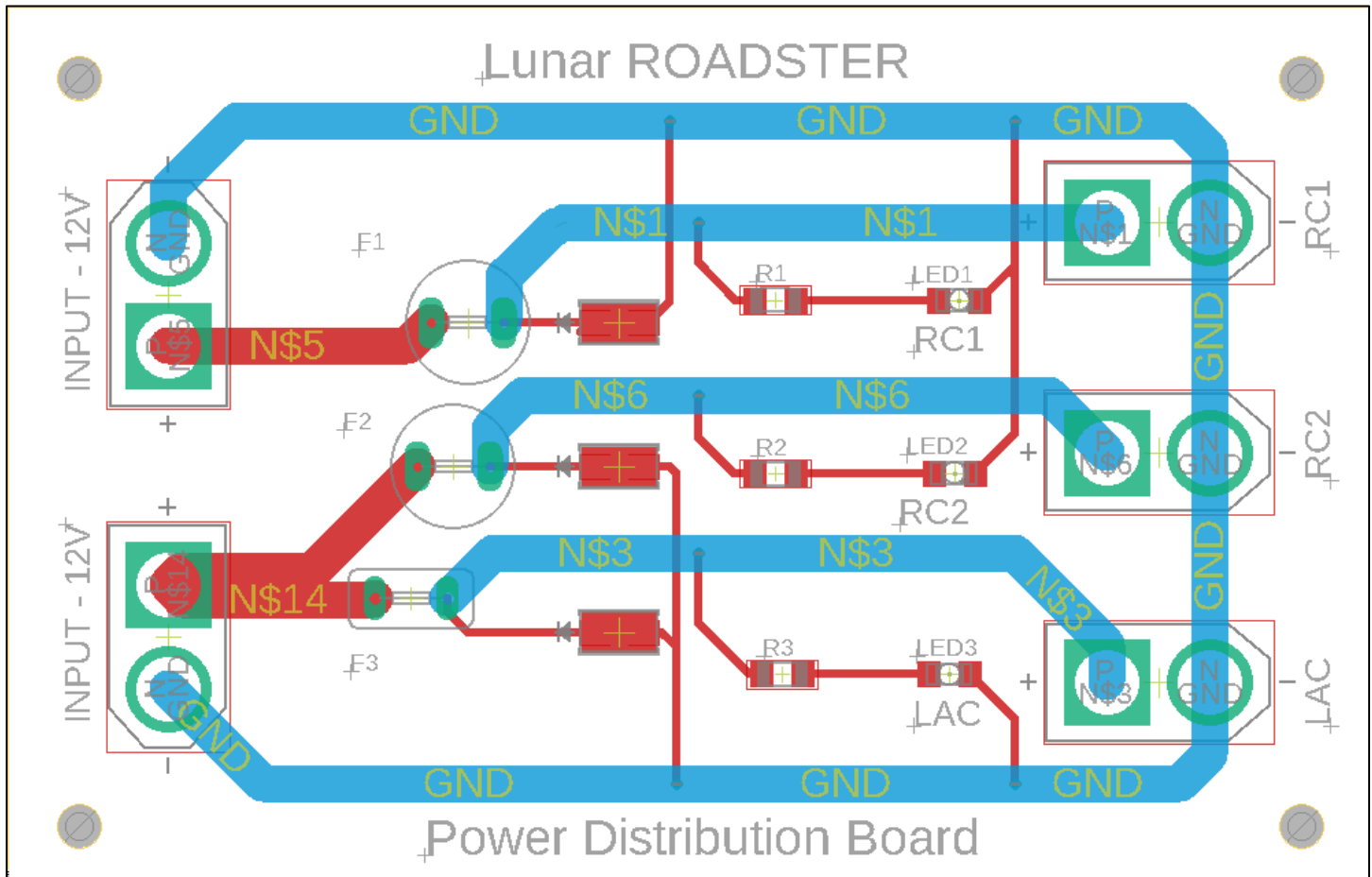
Thickness – 2oz/ft²

This gave us a minimum trace width of **93mils**.

Tool Used - <https://www.advancedpcb.com/en-us/tools/trace-width-calculator/>

Hence, the high current trace widths are 100mils and the low current widths are 20mils.

Board Design



Bill of Materials

The bill of materials (including spares) for the PDB is shown below:

Qty	Value	Part Designator	Part Number	Vendor Link	Cost per part (\$)	Description
4	P4SMA16A	CR1, CR2, CR3	P4SMA16A	P4SMA16A	0.43	Diode
6	10A	F1, F2	TR5 - 37321000000	37321000000	1.29	Fuse
3	5A	F3	TE5 - 39515000440	39515000440	1.57	Fuse
6	XT60-M	J1, J2, J3, J4, J5	XT60-M	XT60	0.89	Connector
5	LED 1206	LED1, LED2, LED3	1206 SMD	1206 SMD	0.04	LED
5	470 Ω	R1, R2, R3	CR1206-FX-4700ELF	CR1206-FX-4700ELF	0.1	Resistor

Mounting Method

The board contains 4 M3 mounting holes at the corners. On our rover, we have designed an electronic box that will have custom mounting holes matching the board. An initial iteration of the design is shown below.

Once the PDB design is finalized, the placeholder (blue part on the bottom face) will be replaced, and holes will be made accordingly.

All power outputs from the PCB will be connected to components inside the box. The input comes from the batteries mounted behind the box.

