PCB Power Distribution Board

Team I : Lunar ROADSTER
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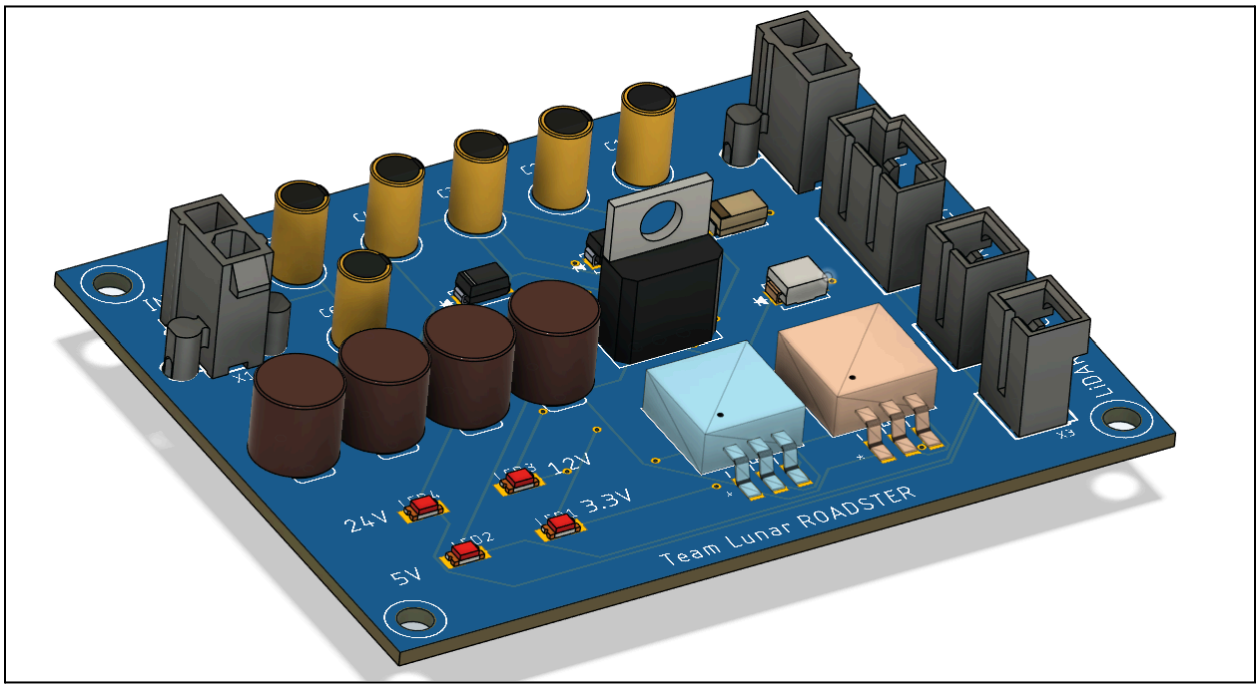


Figure 1: Isometric View of the Power Distribution Board PCB

Section 1: Design

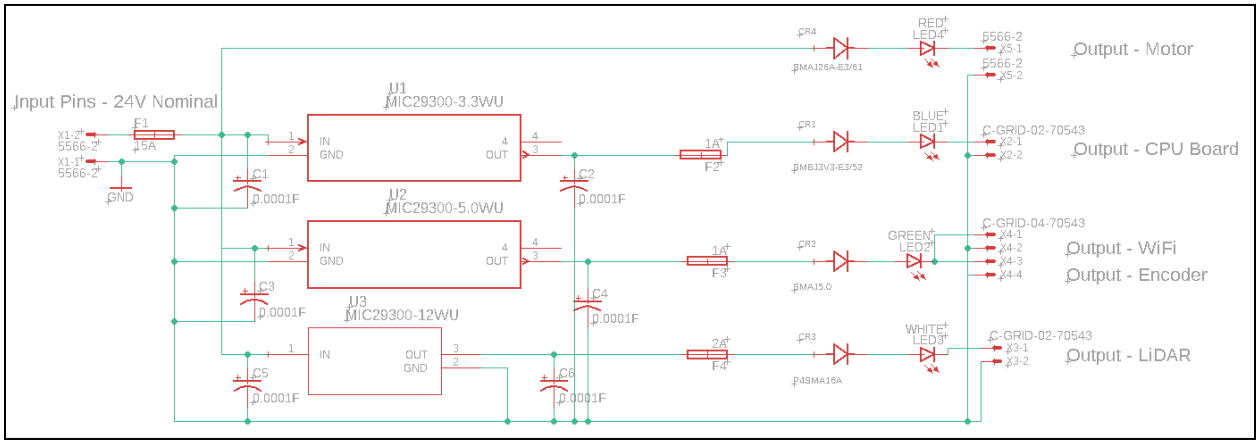


Figure 2: Schematic of the Power Distribution Board PCB

Bill of Materials

Part	Value	Device	Package	Description
C1	0.0001F	CPOL-USE2.5-6	E2,5-6	POLARIZED CAPACITOR, American symbol
C2	0.0001F	CPOL-USE2.5-6	E2,5-6	POLARIZED CAPACITOR, American symbol
C3	0.0001F	CPOL-USE2.5-6	E2,5-6	POLARIZED CAPACITOR, American symbol
C4	0.0001F	CPOL-USE2.5-6	E2,5-6	POLARIZED CAPACITOR, American symbol
C5	0.0001F	CPOL-USE2.5-6	E2,5-6	POLARIZED CAPACITOR, American symbol
C6	0.0001F	CPOL-USE2.5-6	E2,5-6	POLARIZED CAPACITOR, American symbol
CR1	SMBJ3V3-E3/52	SMBJ3V3-E3/52	CR_V3-E3/52_VIS	Diode
CR2	SMAJ5.0	SMAJ5.0	SMASERIES_LTF	Diode
CR3	P4SMA16A	P4SMA16A	P4SMASERIES_LTF	Diode
CR4	SMAJ26A-E3/61	SMAJ26A-E3/61	DIODE_DO-214AC	Diode
F1	15A	TE5	TE5	FUSE
F2	1A	TE5	TE5	FUSE
F3	1A	TE5	TE5	FUSE
F4	2A	TE5	TE5	FUSE
LED1	BLUE	LEDSMT1206	1206	LED
LED2	GREEN	LEDSMT1206	1206	LED

LED3	WHITE	LEDSMT1206	1206	LED
LED4	RED	LEDSMT1206	1206	LED
U1	MIC29300-3.3WU	MIC29300-3.3WU	TO-263-3_MCL	Voltage Regulator
U2	MIC29300-5.0WU	MIC29300-5.0WU	TO-263-3_MCL	Voltage Regulator
U3	MIC29300-12WU	MIC29300-12WU	TO220-3LD-PL-1_MCH	Voltage Regulator
X1	5566-2	5566-2	5566-2	Mini FIT connector 2 pol
X2	C-GRID-02-70543	C-GRID-02-70543	70543-02	CONNECTOR
X3	C-GRID-02-70543	C-GRID-02-70543	70543-02	CONNECTOR
X4	C-GRID-04-70543	C-GRID-04-70543	70543-04	CONNECTOR
X5	5566-2	5566-2	5566-2	Mini FIT connector 2 pol

Section 2: Layout

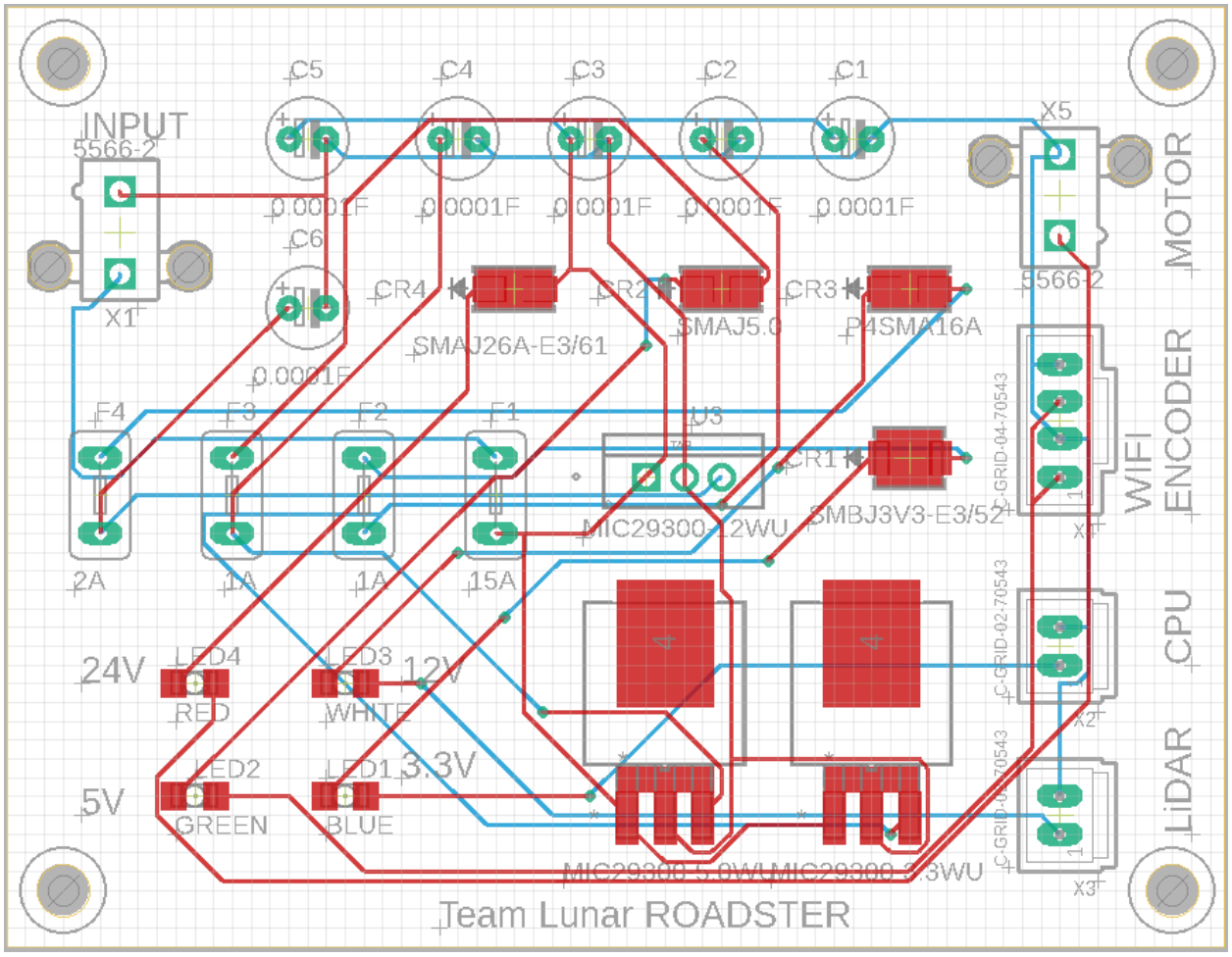


Figure 3: Board Layout of the Power Distribution Board PCB

Section 3: Analysis and Documentation

1. Linear Regulators:
The efficiency of each regulator is:
>> MIC29300-3.3WU: 1 - ((24 - 3.3) / 24) = 1 - 0.8625 = 0.138 = 13.8%
>> MIC29300-5.0WU: 1 - ((24 - 5) / 24) = 1 - 0.792 = 0.208 = 20.8%
>> MIC29300-12WU: 1 - ((24 - 12) / 24) = 1 - 0.5 = 0.5 = 50%

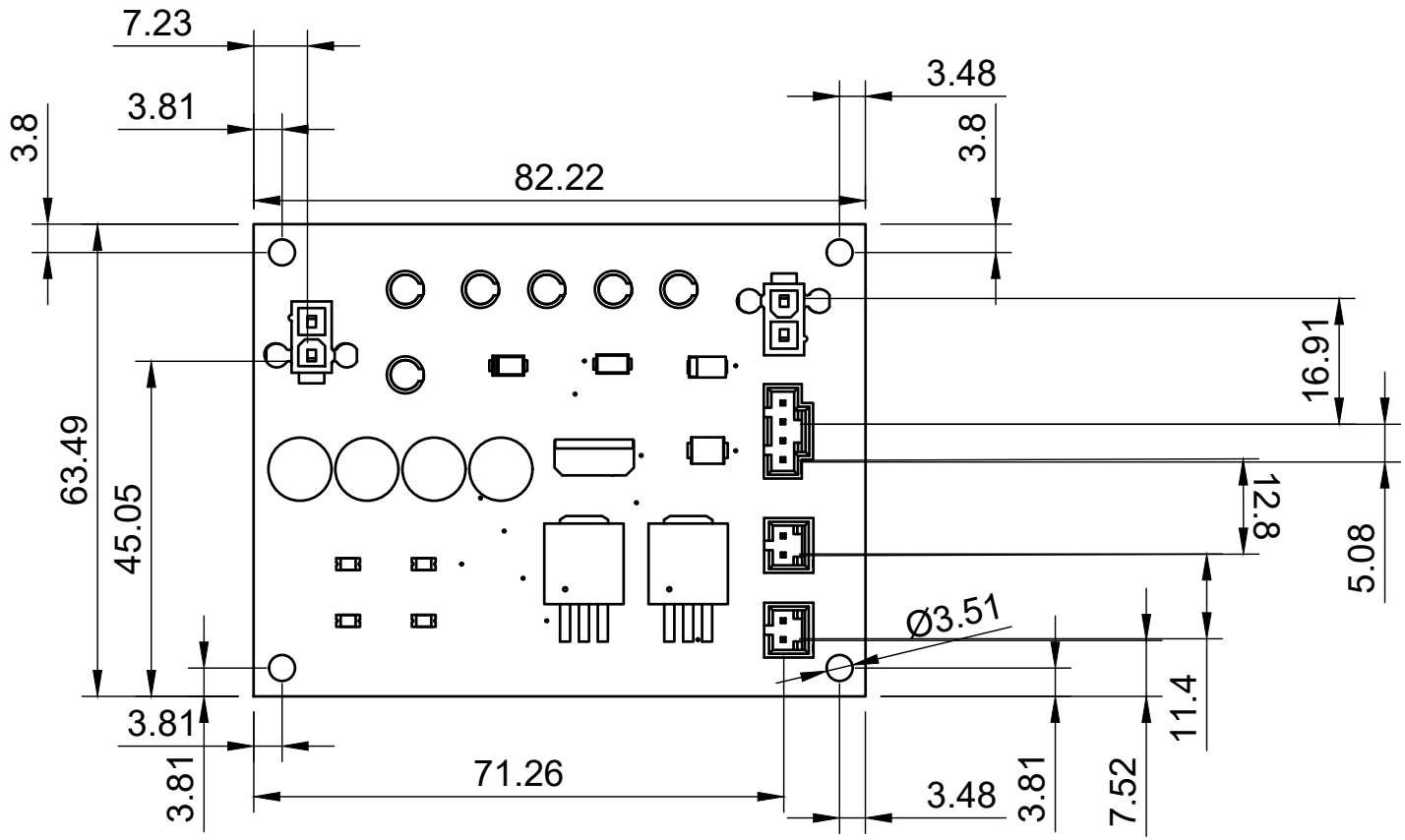
2. Subsystems:
The input power used by each subsystem is:
a) CPU board: P = 3.3 W
b) Wifi and Encoder: P = 5 W
c) LIDAR: P = 24 W
d) Motor: P = 240 W

3. Total System Efficiency

= Max. Output Power / Max. Input Power

= (3.3 + 5 + 24 + 240) / (24x14) = 272.3/336 = 81.04%

Mechanical Drawing is attached after this document.



Dept.	Technical reference	Created by	Approved by
RI		Ankit Aggarwal 14-02-2025	Team Lunar ROADSTER
		Document type: Mechanical Drawing	Document status: Finalized
		Title: PCB Assembly Power Distribution Board	DWG No.
			Rev. 1.0 / Date of issue 02/01/2024 / Sheet 1/1

Scale - 1:1
All dimensions are in mm
All connectors are dimensioned based on PIN1.