POWER DISTRIBUTION BOARD

1. Introduction

The Power Distribution Board (PDB) is designed to supply power to various components of the university rover developed by TEAM VYADH. This board ensures that different voltage levels are properly regulated and distributed to all critical parts of the rover, including motors, cameras, antennas, and battery systems.

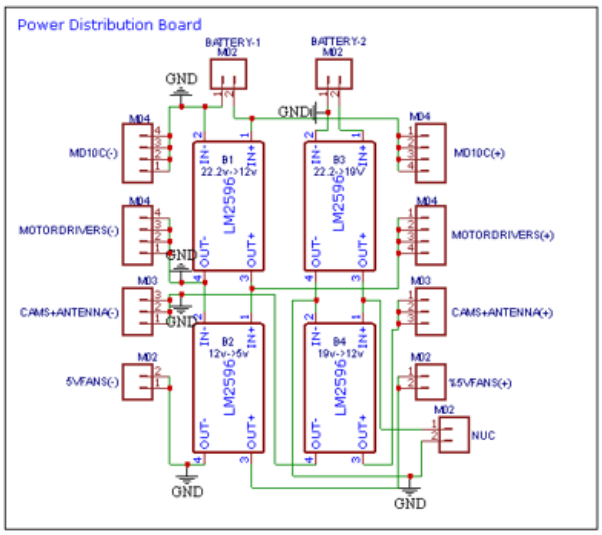
2. Components List

The components used in the Power Distribution Board are listed below:

Name	Designator	Description
M02	5VFANS(-), 5VFANS(+), NUC	Connectors and Fans
22.2v->12v	B1	Voltage Regulator (22.2V to 12V)
12v->5v	B2	Voltage Regulator (12V to 5V)
22.2->19V	B3	Voltage Regulator (22.2V to 19V)
19v->12v	B4	Voltage Regulator (19V to 12V)
M02	BATTERY-1, BATTERY-2	Battery Connectors
M03	CAMS+ANTENNA(+), CAMS+ANTENNA(-)	Camera and Antenna Connectors
M04	MD10C(+), MD10C(-), MOTORDRIVERS(+), MOTORDRIVERS(-)	Motor Driver Connectors

3. Schematic Diagram

The schematic diagram of the Power Distribution Board is shown below:



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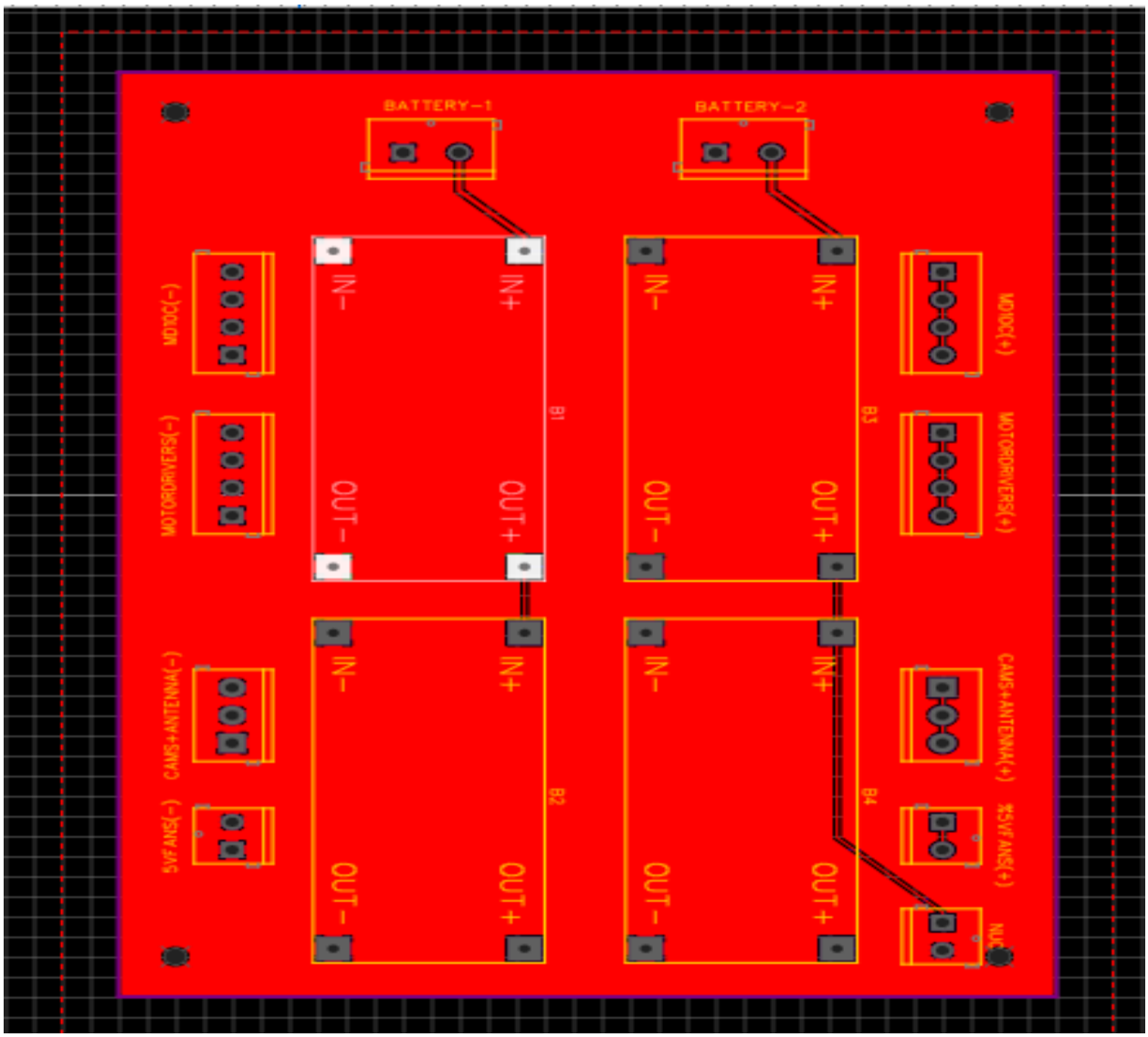
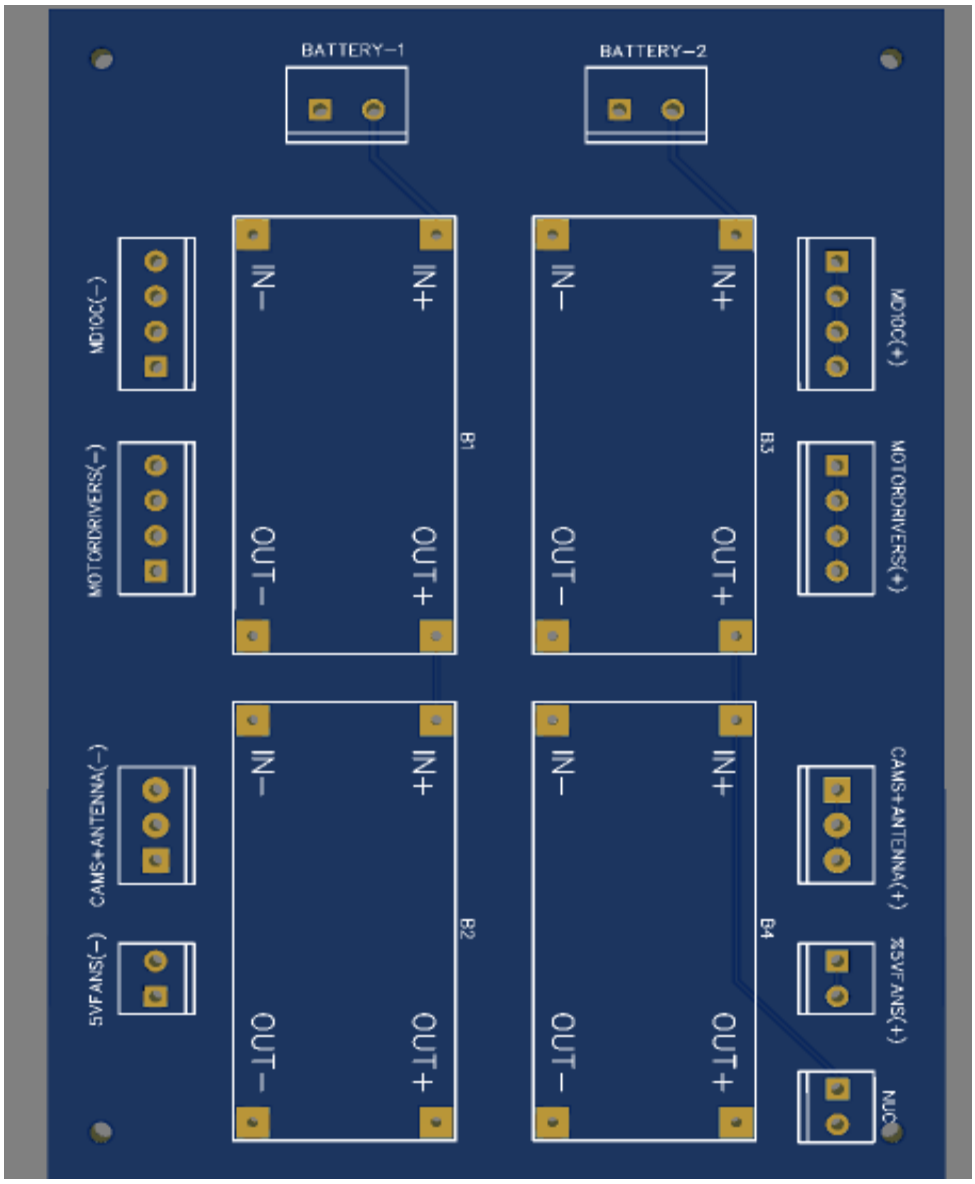
	Date: 2023-12-21 Drawn By: ansuraj	


BATTERY-1
BATTERY-2
MOTOR(-)
MOTORDRIVERS(-)
CAMS+ANTENNA(-)
5VFANS(-)
MOTOR(+)
MOTORDRIVERS(+)
CAMS+ANTENNA(+)
5VFANS(+)
NU
IN-
IN+
OUT-
OUT+
B1
B2
B3
B4



4. Circuit Description

The Power Distribution Board is designed to manage and distribute power from the rover's main battery to various components. The circuit includes several voltage regulators to provide different voltage levels required by various components.

- **Voltage Regulators:**
  - **B1 (22.2V to 12V):** Converts the main battery voltage (22.2V) to a stable 12V output.
  - **B2 (12V to 5V):** Converts the 12V output from B1 to a stable 5V output for components that require 5V.

    - **B3 (22.2V to 19V):** Converts the main battery voltage (22.2V) to 19V.
    - **B4 (19V to 12V):** Converts 19V to a stable 12V output.
- **Connectors:**
    - **M02 (BATTERY-1, BATTERY-2):** Connects the main battery and other auxiliary batteries.
    - **M03 (CAMS+ANTENNA(+), CAMS+ANTENNA(-)):** Provides connections for cameras and antennas.
    - **M04 (MD10C(+), MD10C(-), MOTORDRIVERS(+), MOTORDRIVERS(-)):** Connects to motor drivers for controlling the rover's motors.

5. Working Principle

1. **Power Conversion:**
    - The main battery provides a high voltage (22.2V) which is converted to various required voltages by the onboard voltage regulators.
    - **B1** converts 22.2V to 12V, which is further used by **B4** to get a secondary 12V supply.
    - **B2** takes the 12V output from **B1** and steps it down to 5V for components requiring a 5V supply.
    - **B3** provides a stable 19V output from the 22.2V input, which can be used for components that need 19V.
2. **Power Distribution:**
    - The regulated voltages are distributed through various connectors to different components of the rover.
    - **M02** handles battery connections, ensuring power is supplied to the entire system.
    - **M03** connects cameras and antennas, enabling their operation.
    - **M04** supplies power to the motor drivers, allowing control of the rover's motors.

6. Applications

- **Rover Power Management:** Efficiently distributes power to various subsystems of the rover.
- **Component Integration:** Ensures that different components receive the correct voltage for their operation.

7. Advantages

- **Efficient Power Management:** Centralized distribution of power with multiple voltage levels.
- **Component Protection:** Voltage regulation prevents damage to sensitive components by providing stable power.
- **Simplified Wiring:** Reduces complexity in wiring by centralizing power distribution.

8. Conclusion

The Power Distribution Board is a critical component for the rover developed by TEAM VYADH, providing a stable and regulated power supply to various electronic and electrical components. Its design ensures that all components receive the correct voltage, enhancing the reliability and functionality of the rover.