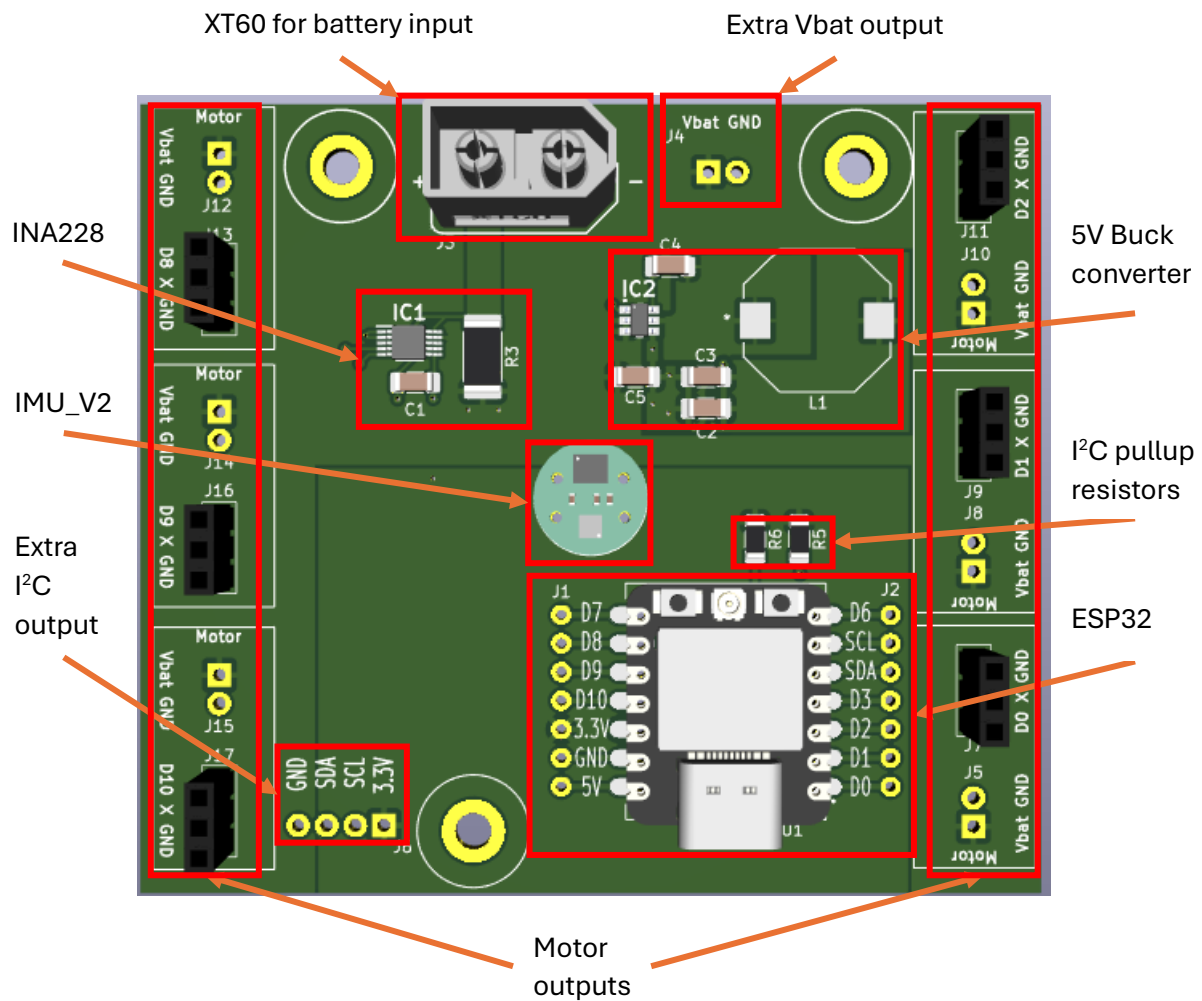# Main power PCB

Contents of the PCB

The PCB is composed of a battery input (LiPo 3S) using an XT60 connector, an ESP32, an IMU_V2, a INA228 for power measurement, a DCDC converter and 6 motor outputs each connected to a pin of the ESP32 for motor control (designed for this motor).


I²C addresses

The INA228 has both pins A0 and A1 connected to GND. This means it's I²C address is 0x40.

The IMU_V2 can have two addresses. If the pads in the back remain unsoldered the I²C addresses are as follows:

- LSM6DSOX (3 DoF Accelerometer and 3 DoF Gyroscope) – 0x6A
- LIS3MDL (3 DoF Magnetometer) – 0x1C

If the pads in the back are soldered, the I²C addresses become:

- LSM6DSOX – 0x6B
- LIS3MDL – 0x1E
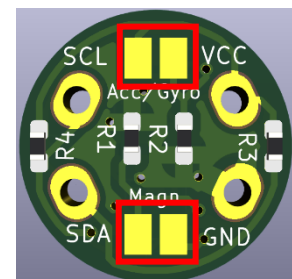
Electronic characteristics

The PCB is designed to withstand up to 10A.

The INA228 is connected with a 15mΩ shunt resistor. This is the same as Adafruit's INA228 board, making all the information on their webpage also accurate for this PCB. The PCB is designed to measure the power on the high side, so Vin+ and VBUS are connected to the battery and Vin- is connected to the rest of the PCB.

All I^2C communication must be done in 3.3V or the ESP32 might be destroyed! Do not connect this to a chip that sends 5V signals.

There are two I^2C pullup resistors (R5 & R6). These are not necessary as the ESP32 has internal pullups but soldering them can help get a better I^2C signal. They are currently used with 10kΩ pullups, but this value can be modified if a faster I^2C bus is needed. (Check section 7.1 to determine how to choose the best pullup resistor value. In general, values between 4.7kΩ - 10kΩ are used.)

Dimensions

The .step file can be found on github.

The dimensions of the PCBs are as follows:
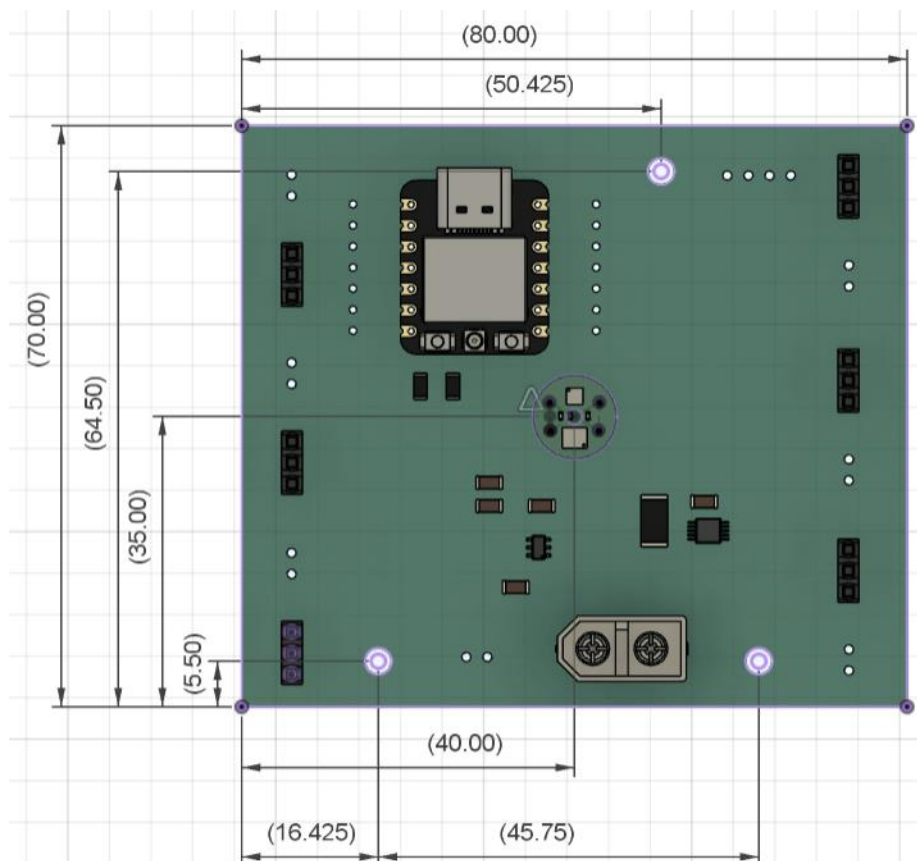
BOM

Components	Number needed per PCB
AP63205WU-7	1
INA228	1
10kΩ 1206	2
15mΩ 2512 shunt resistor	1
22uF 1206	2
10uF 1206	1
0.1uF 1206	1
7x1 female header	4
4.7 µH	1
2 pin screw terminal	7
4 pin screw terminal	1
3 pin male header pins	6