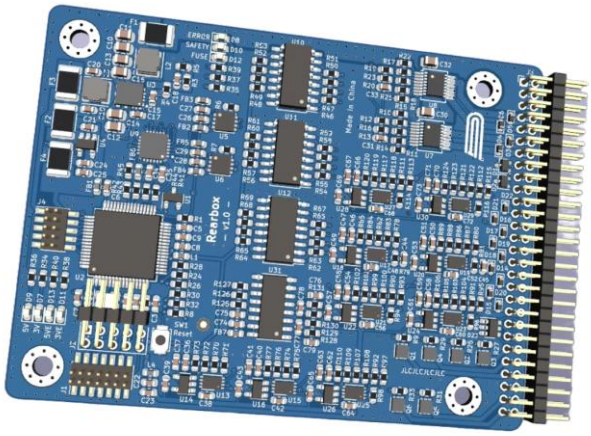
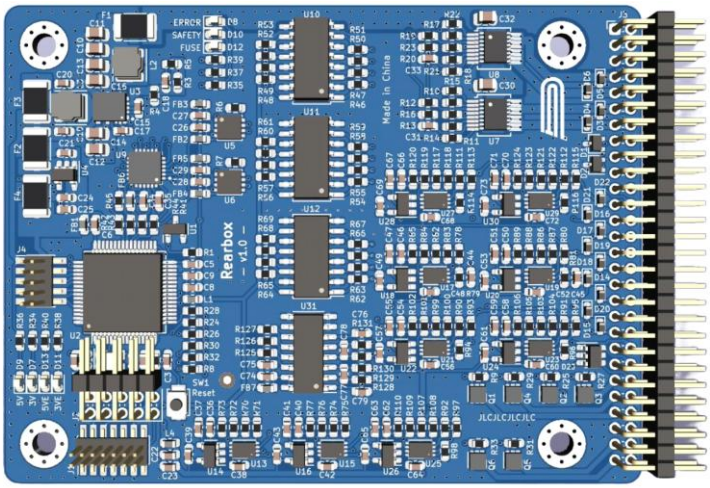
Rear Box PCB





Introduction

PUT Motorsport, headquartered in Poland, is engaged in an international racing competition known as Formula Student, wherein engineering teams from across Europe vie to construct the finest racing vehicle. Presently, we are in the process of crafting our new generation fully electric racing car. The integration of electric propulsion necessitates a plethora of bespoke electronic systems for effective control. While some of these components may seem rudimentary, they are indispensable as they serve as dependencies for other crucial elements. One such example is the Rear Box, developed by PUT Motorsport.

Features

Communication:

- 2 CAN transceivers
- UART (internal only)
- SPI (internal only)
- I2C (internal only)

Outputs:

- 2 fan drivers
- 2 pump drivers
- ASSI driver
- RTDS driver
- brake light driver

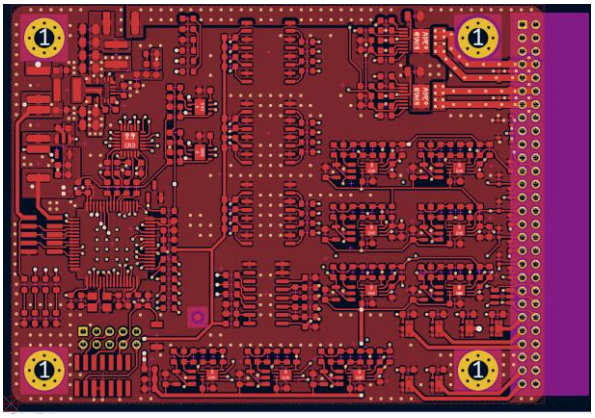
Inputs:

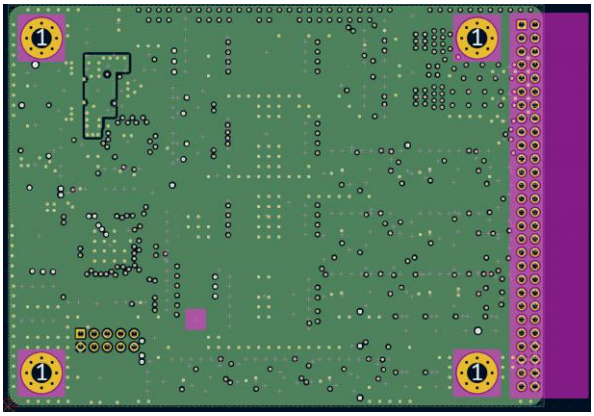
- 12 digital safety inputs
- 2 suspension load cell sensors
- 2 suspension potentiometer sensors
- 2 water pressure sensors
- 2 water temperature sensors
- monocoque temperature sensors

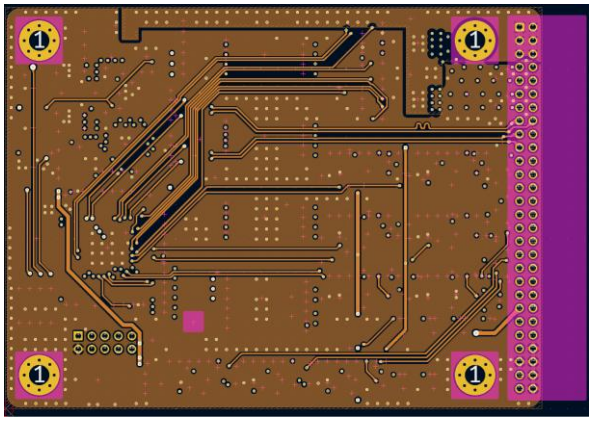
Challenges during design phase:

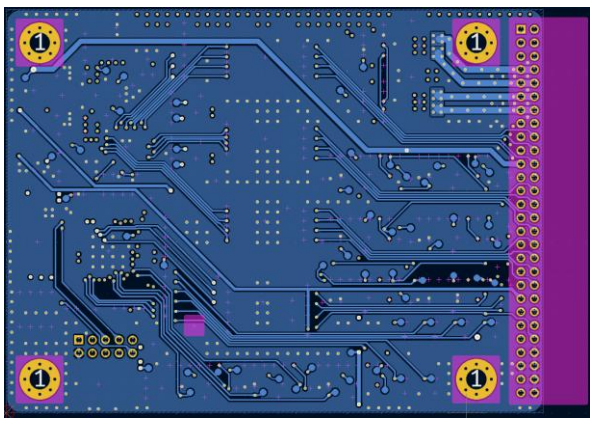
- Accuracy of analogue measurements
- Packaging constraints

The PCB consists of these layers shown below:







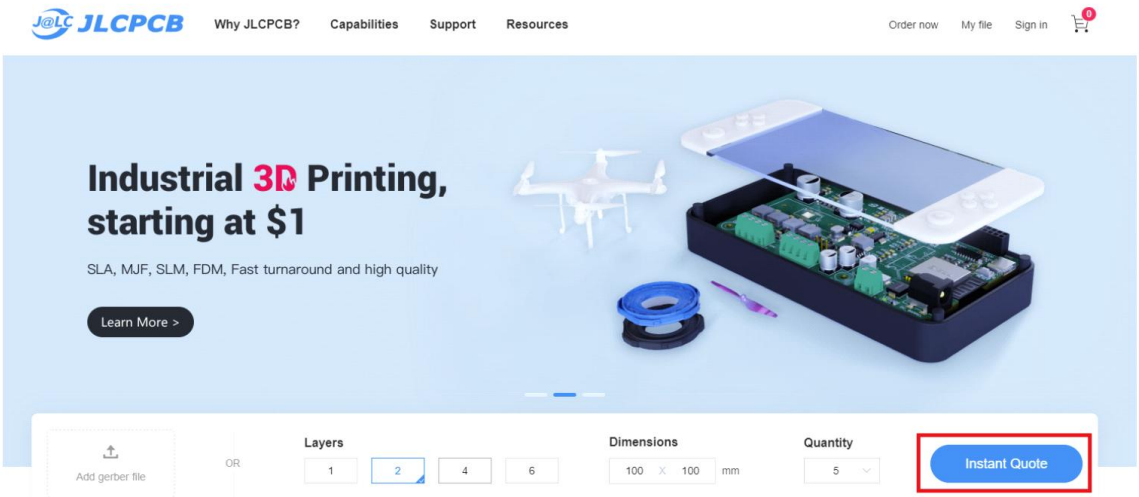


The whole project including both the hardware, and the firmware is open source. The repository is available at:

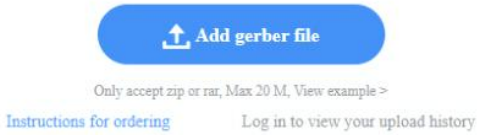
https://github.com/PUT-Motorsport/PUTM_EV_REARBOX_2023

Manufacturing

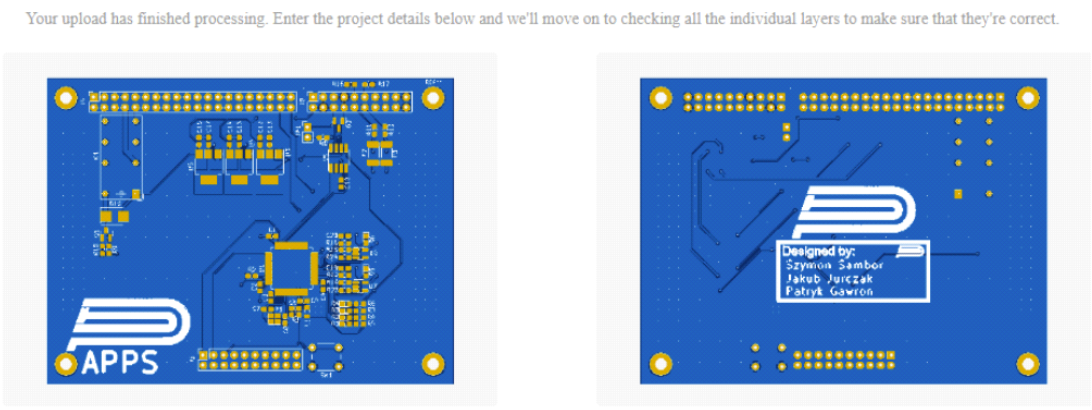
PCBs designed by our team are manufactured by JLCPCB - a hardware production company that specializes in batch PCB production. You can create PCBs with up to six layers, and order a batch size that fits your needs. Batch production is beneficial since during PCB assembly, many things could go wrong and the board could get damaged, that's where excess copies come in handy. If unlike us you don't enjoy assembling PCBs, JLCPCB has got you covered as PCB assembly is also a part of their offer! To order a PCB of your design, simply go to https://jlcpcb.com/HAR and click the "Instant quote" button.



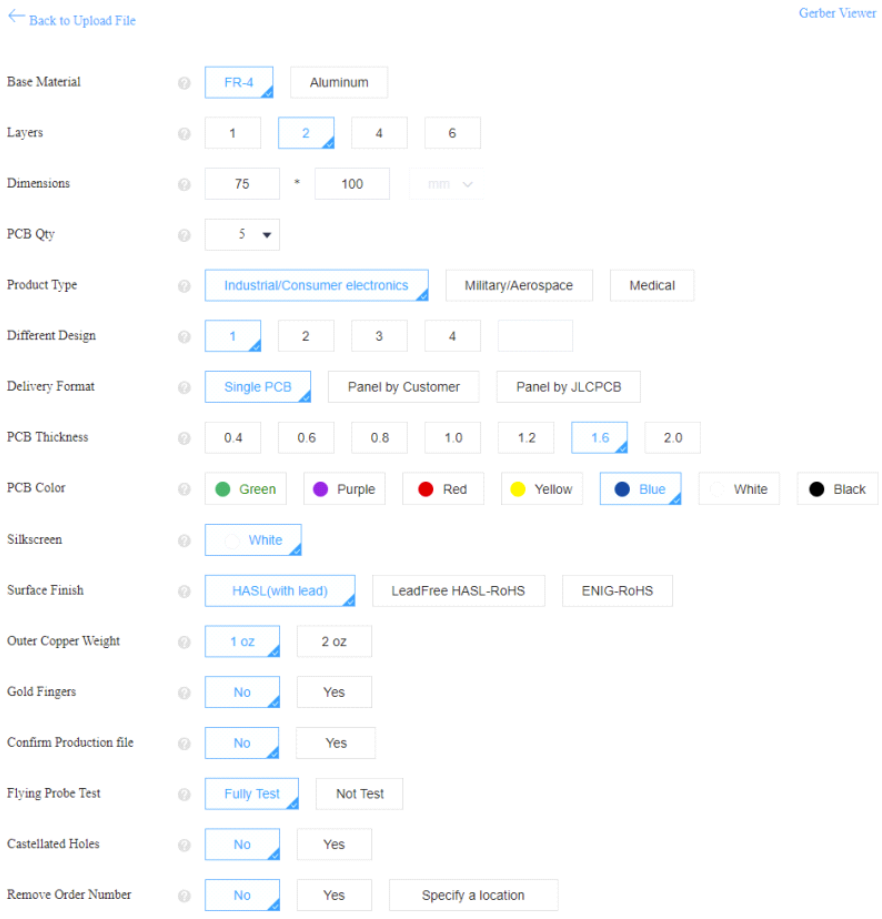
You will be forwarded to the order editor where you'll find plenty of options to customize your batch of PCB to fully meet your needs. Firstly you'll need to upload your gerber files archived into .zip or .rar format



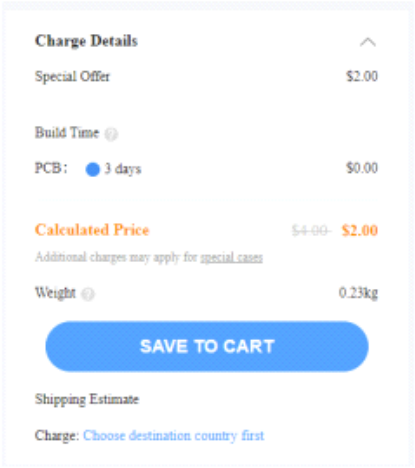
After the files have been uploaded successfully, you'll see a board preview.



The preview as well as the summary view will change accordingly to options you have chosen. Some of the options (like dimensions or layer number) will be pulled from the gerber files you have uploaded.



After you've customized the board, you can proceed to the checkout located at the right side of the editor.



Each and every board we've received from JLCPCB is of highest quality and we've always enjoyed working with them!

Made By Wiktor Krakowski for PUT Motorsport