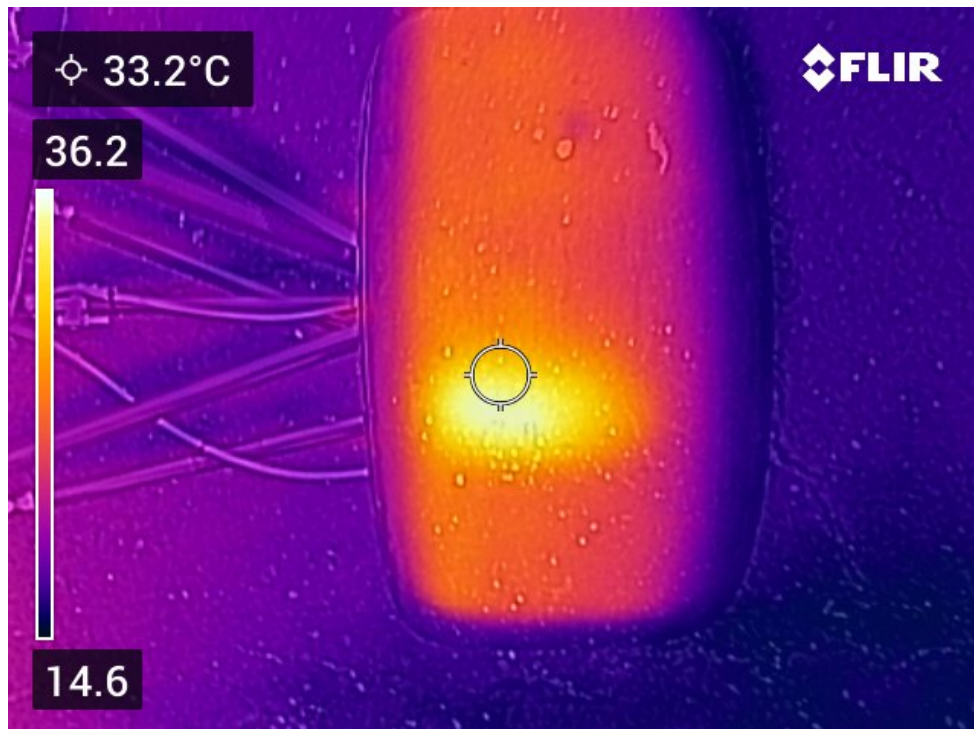


## Introduction

**TTS** (Tire Temperature Sensor) is a PCB designed to measure the temperature quickly, at a distance, and without the need to touch the wheels. The 4x16 pixel IR camera is used to obtain the data. It communicates with the STM microprocessor via the I2C protocol. Data is then averaged out to a 1x8 array of unsigned ints and sent with the CAN Transceiver to the car's CAN network. This array can be then read off of the telemetry system implemented in the PM-08 racing car.



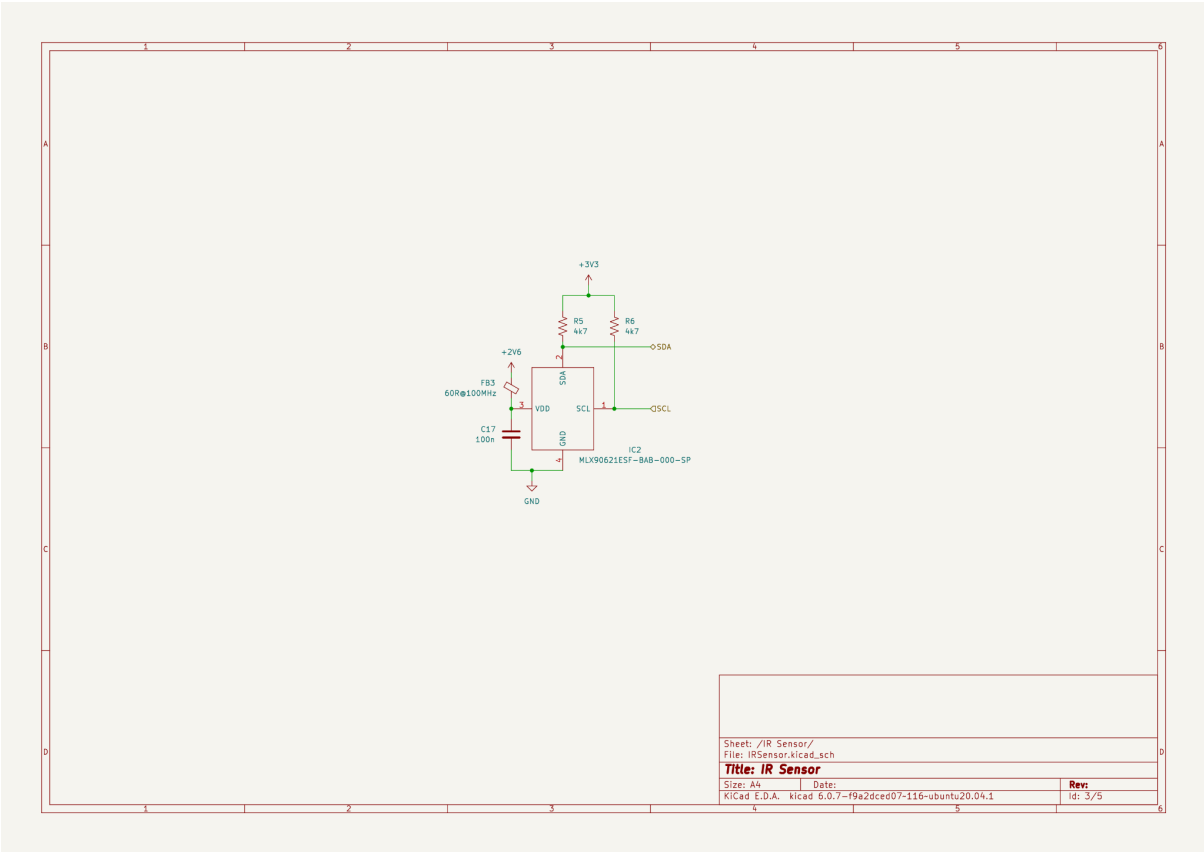
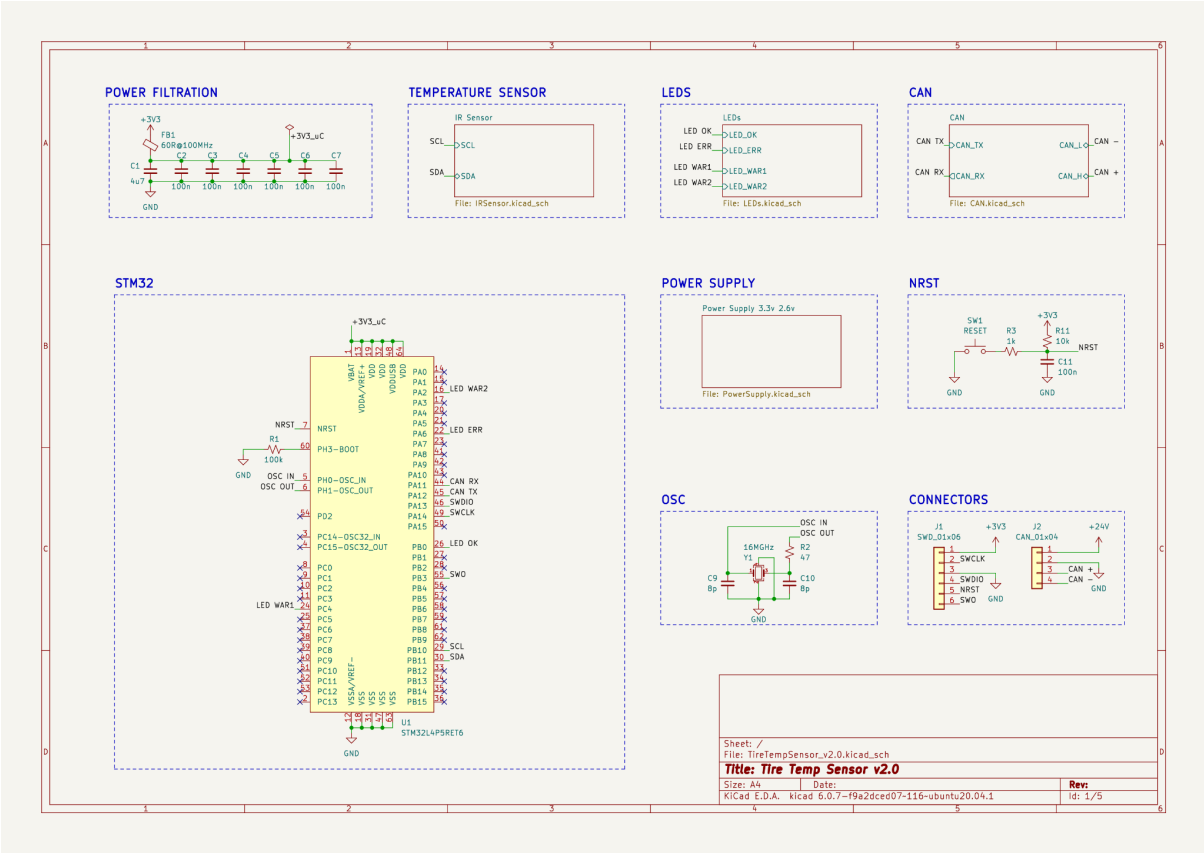
## Applications

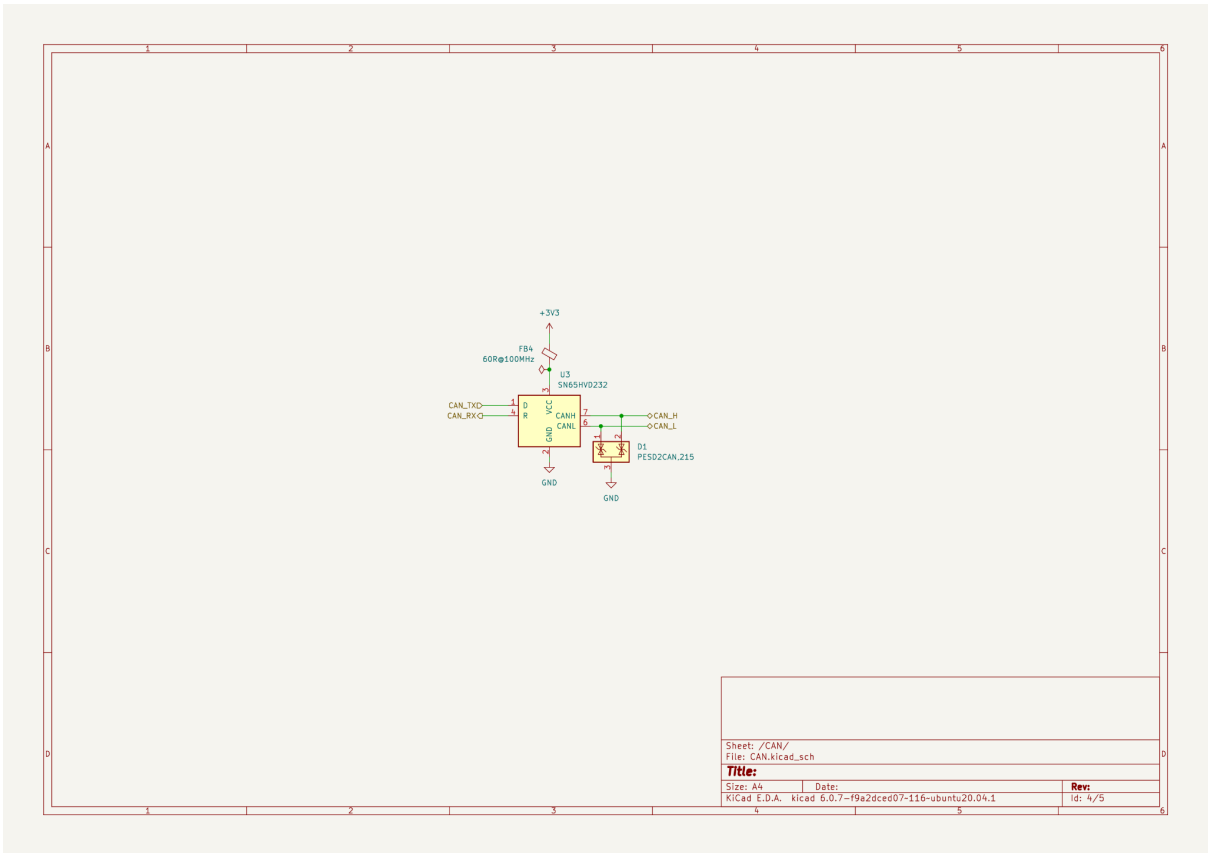
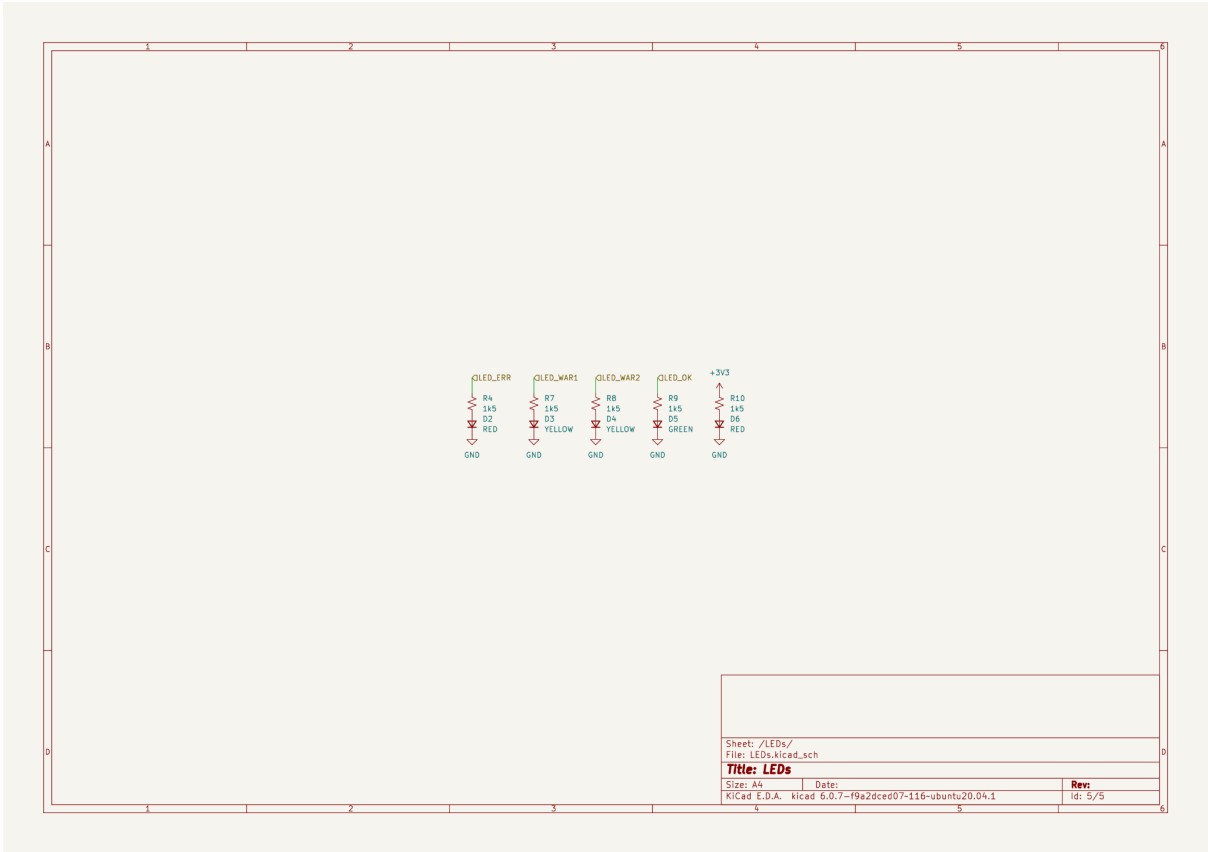
While driving, a tire heats up. Heat dissipates differently across its surface and its rate changes depending on many factors (E.g. weather conditions or reoccurring acceleration). As a tire has its maximal temperature, exceeding this value may weaken its structural strength and cause its destruction in the worst-case scenario. This IR Camera PCB makes it possible to monitor a tire across its whole surface and prevent any damage associated with the temperature. As TTS monitors every wheel out of 4, our crew can easily detect if tires wear unevenly or excessively. Tire temperature patterns inform whether the car is properly calibrated, as the out-of-tune suspension causes tires to heat up significantly faster. This may result in grip loss in these areas.

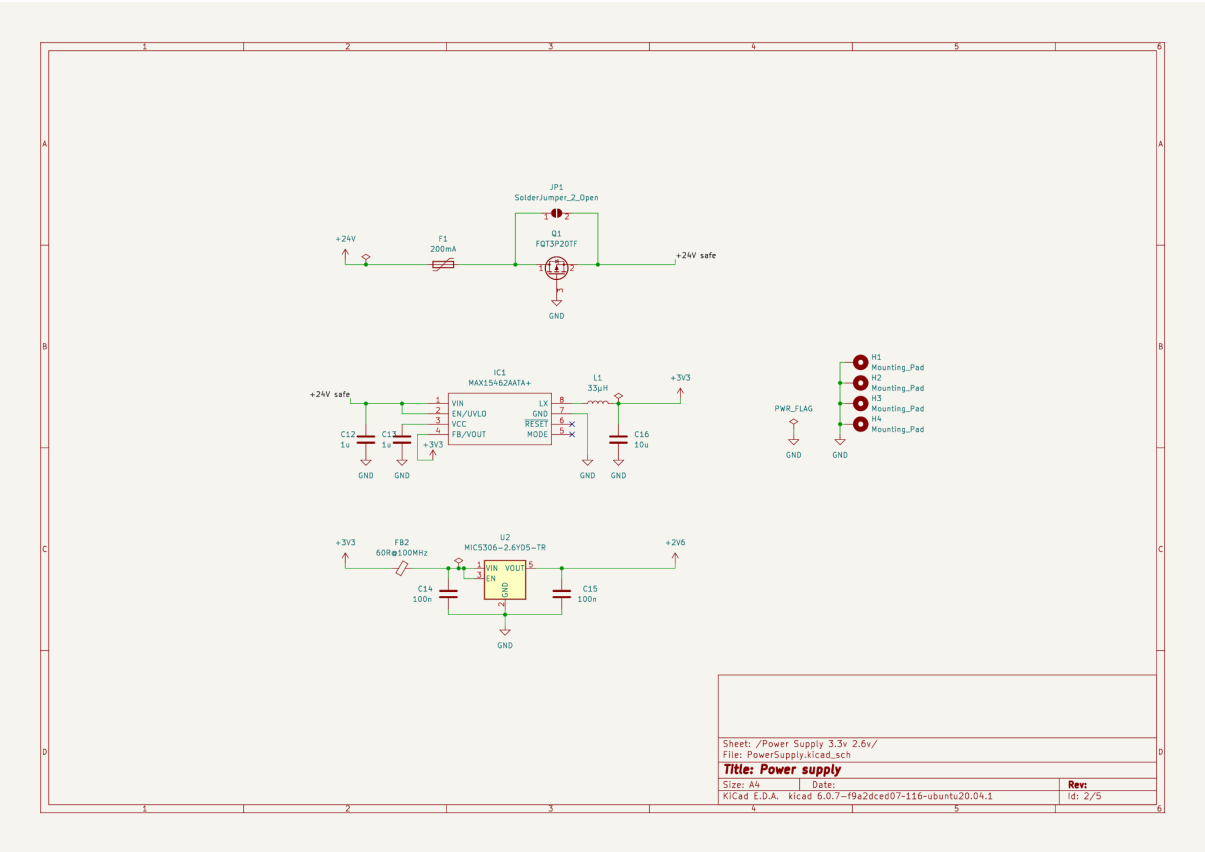
## Core features

- 4x16 pixel MLX90621 thermal camera
- STM32L4P5RET6
- 24V to 3.3V buck converter
- 3.3V to 2.6V LDO
- 3.3V CAN transceiver
- Overcurrent and reverse polarity protection
- Status LEDs

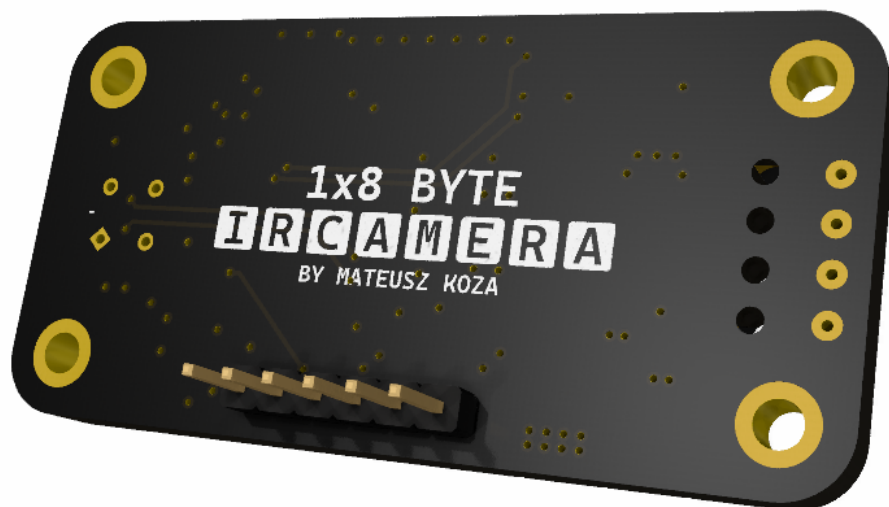
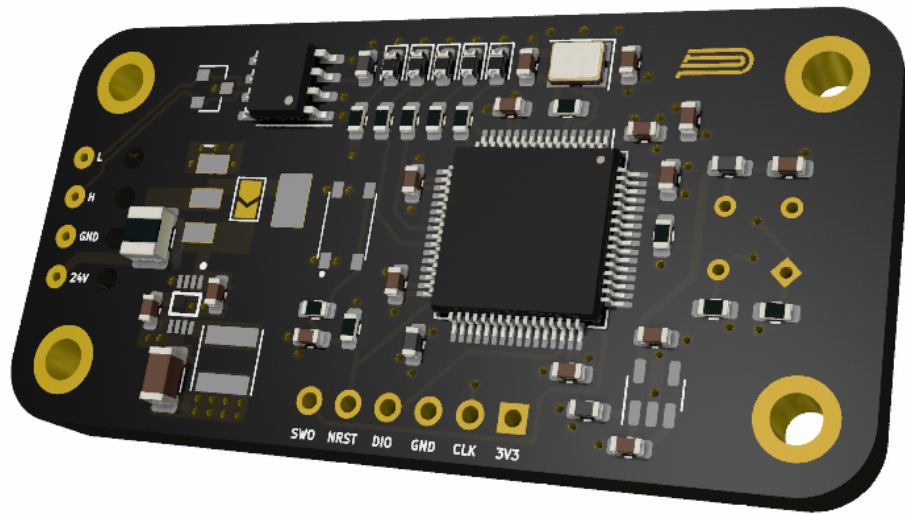
# Schematics







## 3D Model



## Manufacturing

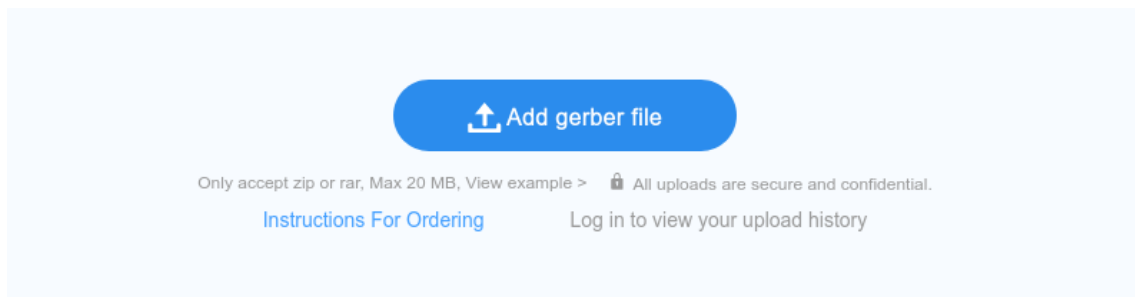
PCBs designed by our team are manufactured by JLCPCB - a hardware production company that specializes in batch PCB production. You can create PCBs with up to six layers, and order a batch size that fits your needs. Batch production is beneficial since during the PCB assembly many things may go wrong and the board could get damaged. JLC can assemble your PCB as well.

To order a PCB, go to [jlcpcb.com](https://jlcpcb.com) and click the “instant quote” button.



The image shows a screenshot of the JLCPCB website. At the top, there's a banner with the text "Standard PCBA SPECIAL OFFER" and "Free Assembly for your PCB". Below this, it says "\$2 for 1-4 layers PCBs, \$0 for PCB assembly" and "Especially for the purple PCB, double-sided placement, small-board, and cut panel." There are two "Learn More >" buttons. To the right, there's a 3D rendering of a blue PCB with various components labeled (R1, R4, C5, C6, C7, LED1, U1, U3, U4, RN1, RN2, RN3, RN4, CH0, CH1, CH2, CH3, 24Mhz 8CH). Below the banner, there's a form with fields for "Add gerber file", "Layers" (1, 2, 4, 6), "Dimensions" (100 x 100 mm), and "Quantity" (5). An "Instant Quote" button is on the right.

First, upload your gerber files.



The image shows a screenshot of the JLCPCB website's upload section. It features a large blue button with an upload icon and the text "Add gerber file". Below the button, there's a note: "Only accept zip or rar, Max 20 MB, View example >". To the right of this note, it says "All uploads are secure and confidential." Below the note, there's a link "Instructions For Ordering" and a link "Log in to view your upload history".

You'll be forwarded to the order editor where you'll find plenty of options to customize your PCB. Tweak it depending on your needs.

Base Material	<input type="radio"/> FR-4	<input type="radio"/> Aluminum		
Layers	<input type="radio"/> 1	<input checked="" type="radio"/> 2	<input type="radio"/> 4	<input type="radio"/> 6
Dimensions	<input type="text" value="100"/>	*	<input type="text" value="100"/>	<input type="text" value="mm"/>
PCB Qty	<input type="text" value="5"/>			
Product Type	<input checked="" type="radio"/> Industrial/Consumer electronics			<input type="radio"/> Aerospace
	<input type="radio"/> Medical			
Different Design	<input checked="" type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4
	<input type="radio"/>			
Delivery Format	<input checked="" type="radio"/> Single PCB			<input type="radio"/> Panel by Customer
	<input type="radio"/> Panel by JLCPCB			
PCB Thickness	<input type="radio"/> 0.4	<input type="radio"/> 0.6	<input type="radio"/> 0.8	<input type="radio"/> 1.0
	<input type="radio"/> 1.2	<input checked="" type="radio"/> 1.6	<input type="radio"/> 2.0	
PCB Color	<input checked="" type="radio"/> Green	<input type="radio"/> Purple	<input type="radio"/> Red	<input type="radio"/> Yellow
	<input type="radio"/> Blue	<input type="radio"/> White	<input type="radio"/> Black	
Silkscreen	<input checked="" type="radio"/> White			
Silkscreen Technology	<input checked="" type="radio"/> Ink-jet/Screen Printing Silkscreen			<input type="radio"/> High-definition Exposure Silkscreen
Surface Finish	<input checked="" type="radio"/> HASL(with lead)			<input type="radio"/> LeadFree HASL-RoHS
	<input type="radio"/> ENIG-RoHS			
Outer Copper Weight	<input checked="" type="radio"/> 1 oz	<input type="radio"/> 2 oz		
Gold Fingers	<input checked="" type="radio"/> No	<input type="radio"/> Yes		
Confirm Production file	<input checked="" type="radio"/> No	<input type="radio"/> Yes		
Flying Probe Test	<input checked="" type="radio"/> Fully Test	<input type="radio"/> Not Test		
Castellated Holes	<input checked="" type="radio"/> No	<input type="radio"/> Yes		
Remove Order Number	<input checked="" type="radio"/> No	<input type="radio"/> Yes	<input type="text" value="Specify a location"/>	

Advanced Options

PCB Remark

After the process of customization, you can proceed to the checkout section located on the right side of the editor.



### Charge Details



Special Offer

\$2.00

Build Time 

PCB: ☒ 1-2 days

\$0.00

**Calculated Price**

~~\$4.00~~ **\$2.00**

Additional charges may apply for [special cases](#)

Weight 

0.28kg

SAVE TO CART

Shipping Estimate

Charge: [Choose destination country first](#)

The PCBs quality received from JLCPCB is always stunning and we've never been disappointed!