Build Tutorial

In this tutorial I will tell you step by step how to make this line tracking vehicle.

Step 1: Components

First of all you need to buy all the components listed below:

1. ESP-32
2. 1 5xTCRT5000 IR sensor with Limit Switch
3. 2 5V DC-Motor with corresponding wheels
4. 1 L293d Motor Driver
5. 1 LM 1117 T5,0 Voltage Regulator
6. 2 9V Batteries
7. 1 Switch
8. 1 DC-female jack
9. 1 RGB-led
10. 1 MCP23016 I/O Expander
11. 1 HC-SR04 Ultrasone Sensor
12. 4 leds (green, orange, red, blue)
13. 1 Button
14. 1 Buzzer
15. 1 Castor Wheel
16. Wires

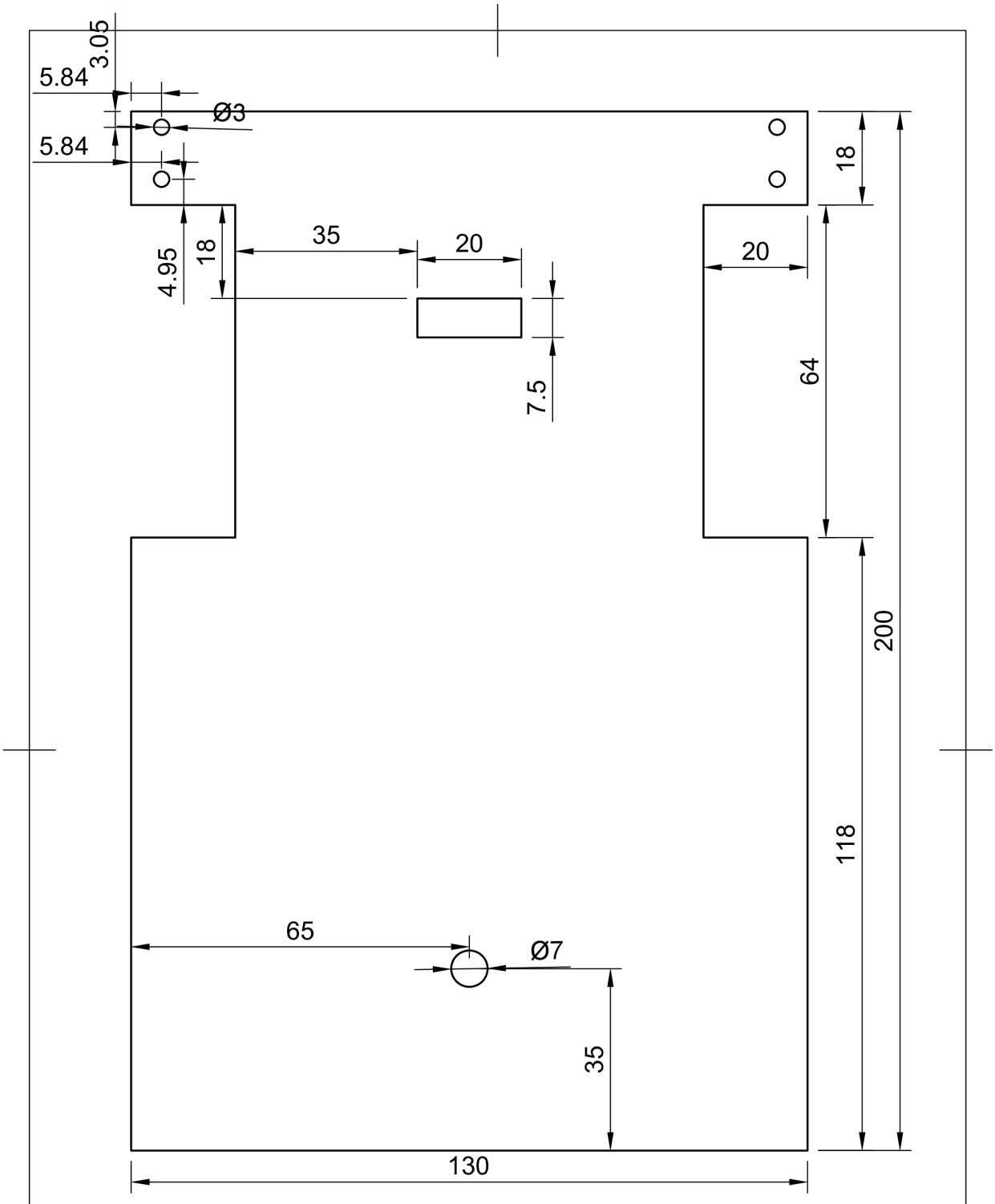
Depending on your preferences you can also buy the pcb or you can use a perfboard on which you attach everything.

Step 2: Soldering

In this step you have to solder all components either to the pcb or to the perfboard. I would suggest that you use header pins for the esp-32, the l293d motor driver IC and the MCP23016 I/O Expander as to not damage them when soldering and for easy removal and replacement.

Step 3: Body plate

You can make this out of your material of choice. I've made a simple diagram for how you should cut it, for the castorwheel I just put 1 hole which should be the turning point of the castorwheel.



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The original file can be found here.

Step 4: Combining

In this step you are going to build up the car.

- First start by attaching the castor wheel and the motors with their wheels.
- After that you want to attach the TCRT sensor which has to be placed almost on the ground, but not touching the ground.
- After that we can attach the HC-SR04 module who's connectors should fit snuggly inside of the premade hole.
- Then we need to secure the pcb or perfboard to the bodyplate.
- Lastly we need to run the cables through the hole also prescribed in the drawing.

Step 5: Code

You can either download and upload my code using the arduino IDE. In which case I would recommend for you to first test the individual pieces who's code can be found here afterwhich you can upload the full final sketch. If you decide that you want to develop your own code which I highly recommend, then you should have a look at my code explanation here for inspiration.