Arduino based Pulse Oximeter

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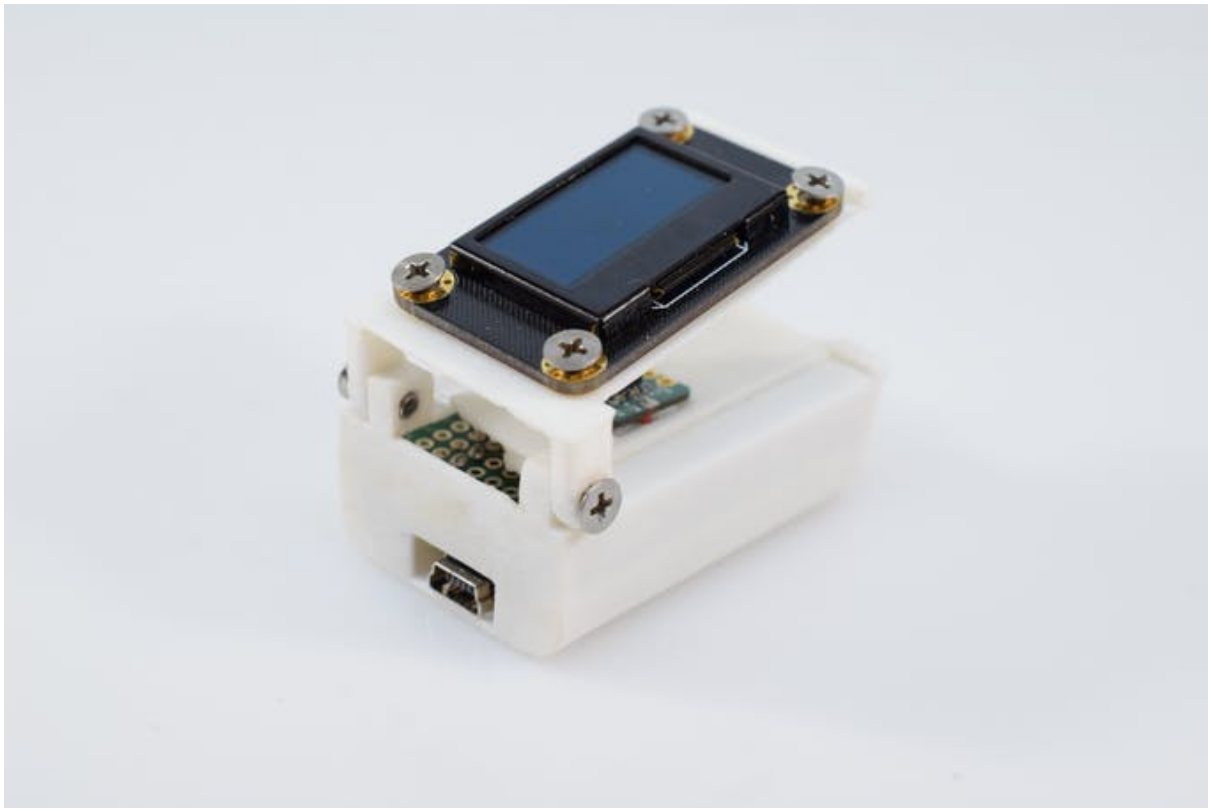
1 Project description

To DOWNLOAD all files CLICK HERE

To visit our repo CLICK HERE

1.1 The Challenges of COVID-19

COVID-19 is a disease caused by the SARS-CoV-2 virus that primarily attacks a person's respiratory system. Some milder symptoms can include fever, aches, and chills, but it can also lead to more serious conditions such as pneumonia. A person who has pneumonia or even slight shortness of breath might not know when to go to a hospital, especially as they start to get even more overwhelmed. This is why I created this open source pulse oximeter, which can assist in getting people the help they need and get accurate information about their current condition.



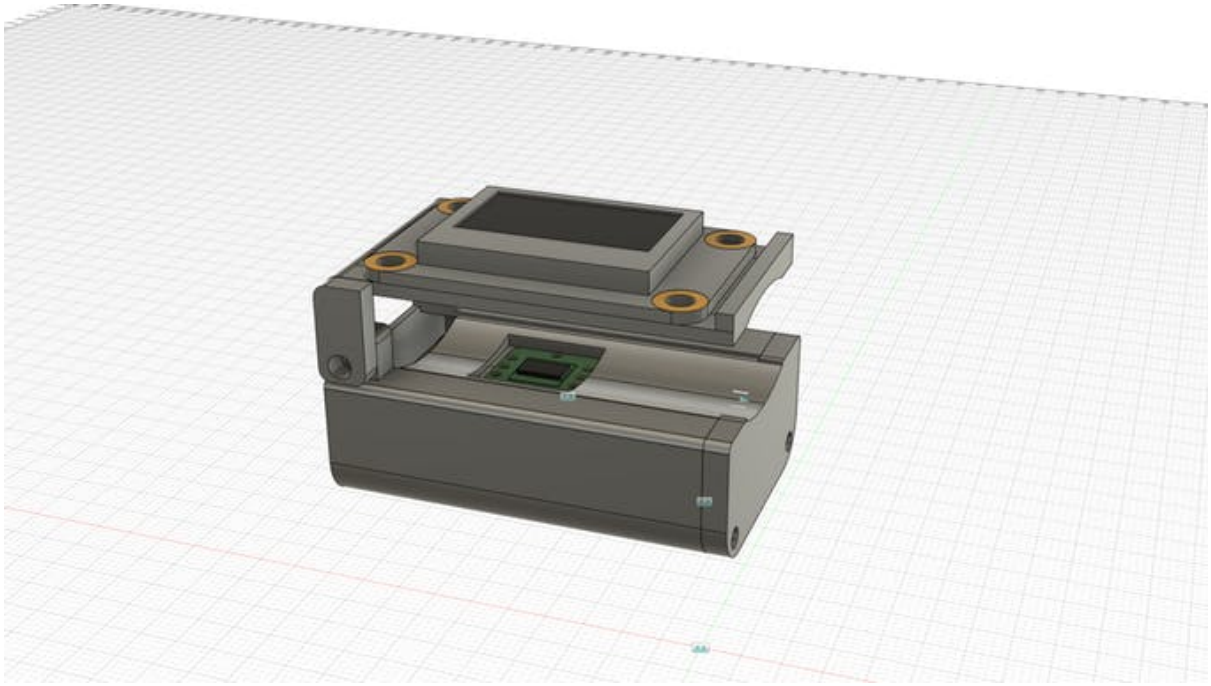
1.2 A Bit of a Disclaimer

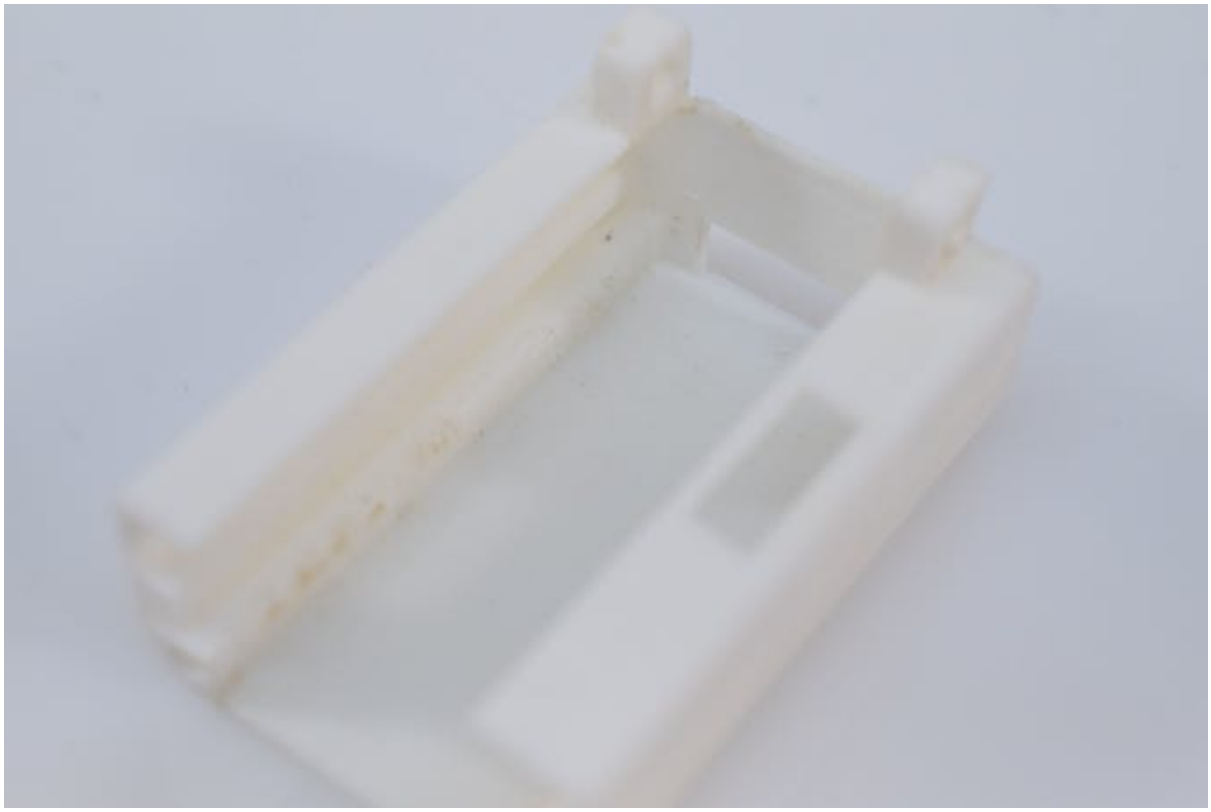
This device/project is not to be used as an accurate medical diagnostic tool!

2 Steps to build the device

2.1 Print Out and Clean Parts

- Begin by downloading each piece from the attachment section on this project and loading it into your slicer of choice.
- I used an infill of around 70-80% and medium supports, all with PLA.
- After they were done printing, I removed the supports and did some light sanding to ensure they all fit together nicely.

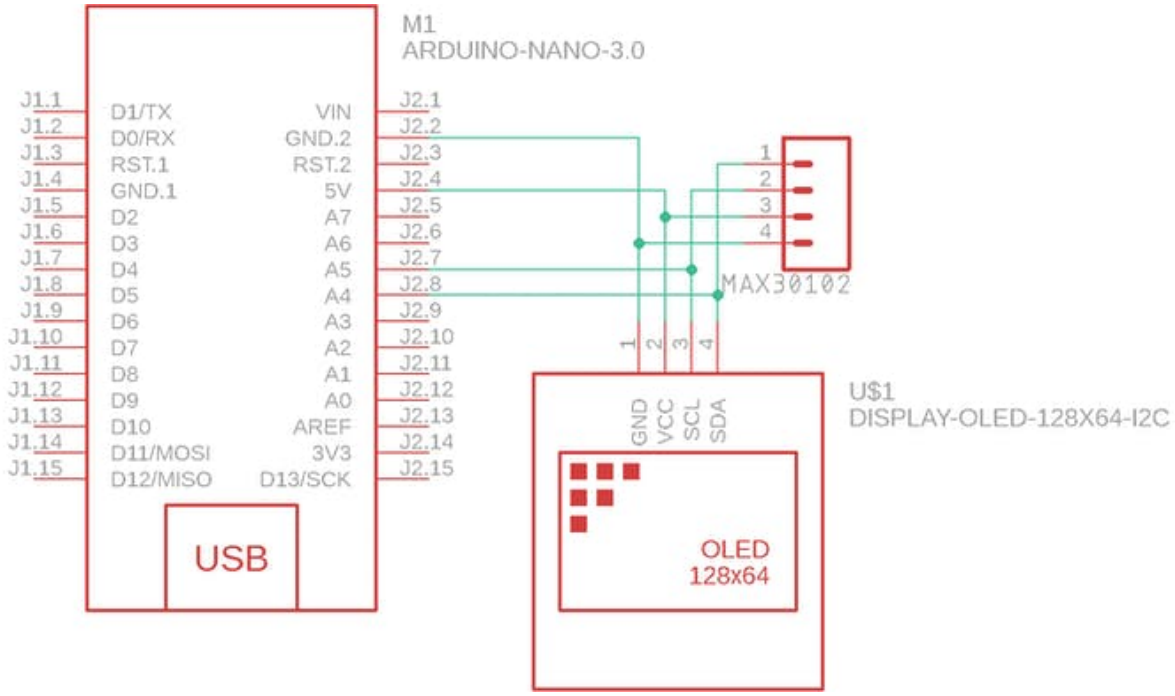




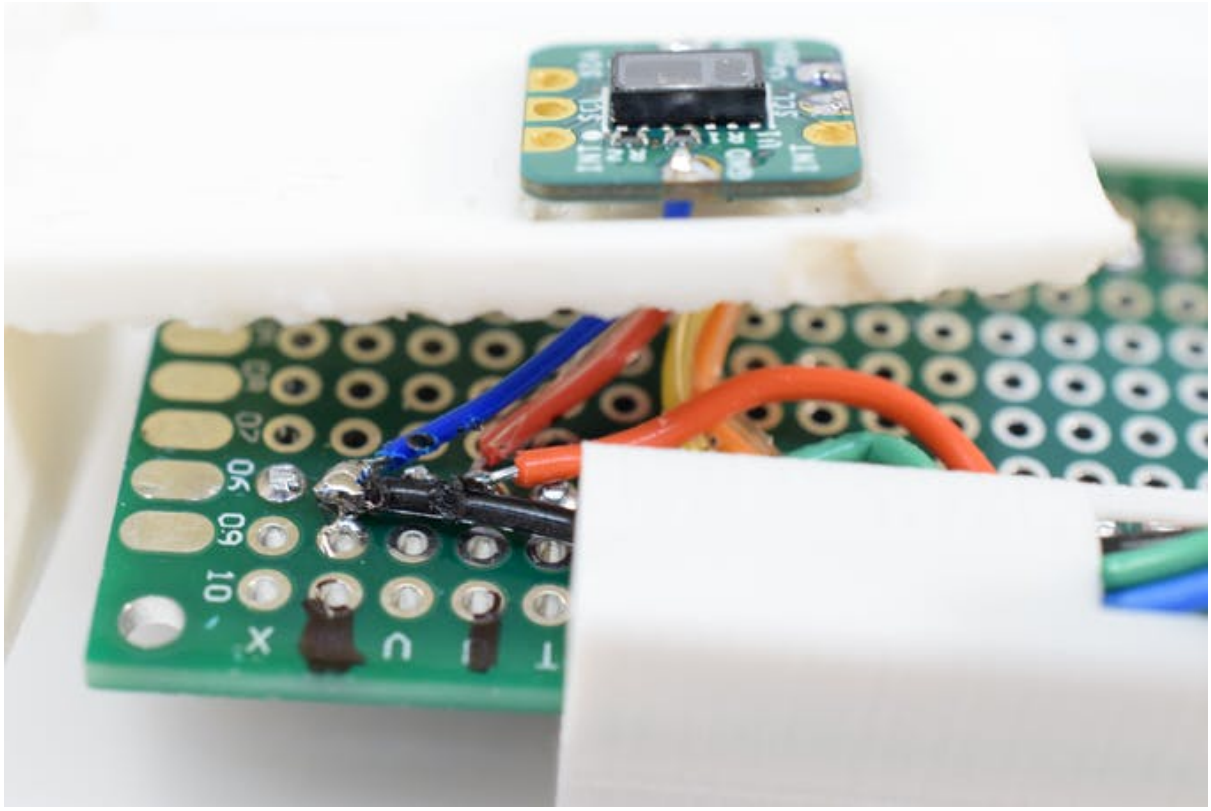
2.2 Solder the Electronics

- The entire device is designed around an Arduino Nano that is mounted on a piece of 44mm by 30mm perfboard.

- First, wires get soldered to the VIN, GND, SDA, and SCL pins of the sensor and then run underneath the bed piece to the Arduino Nano.



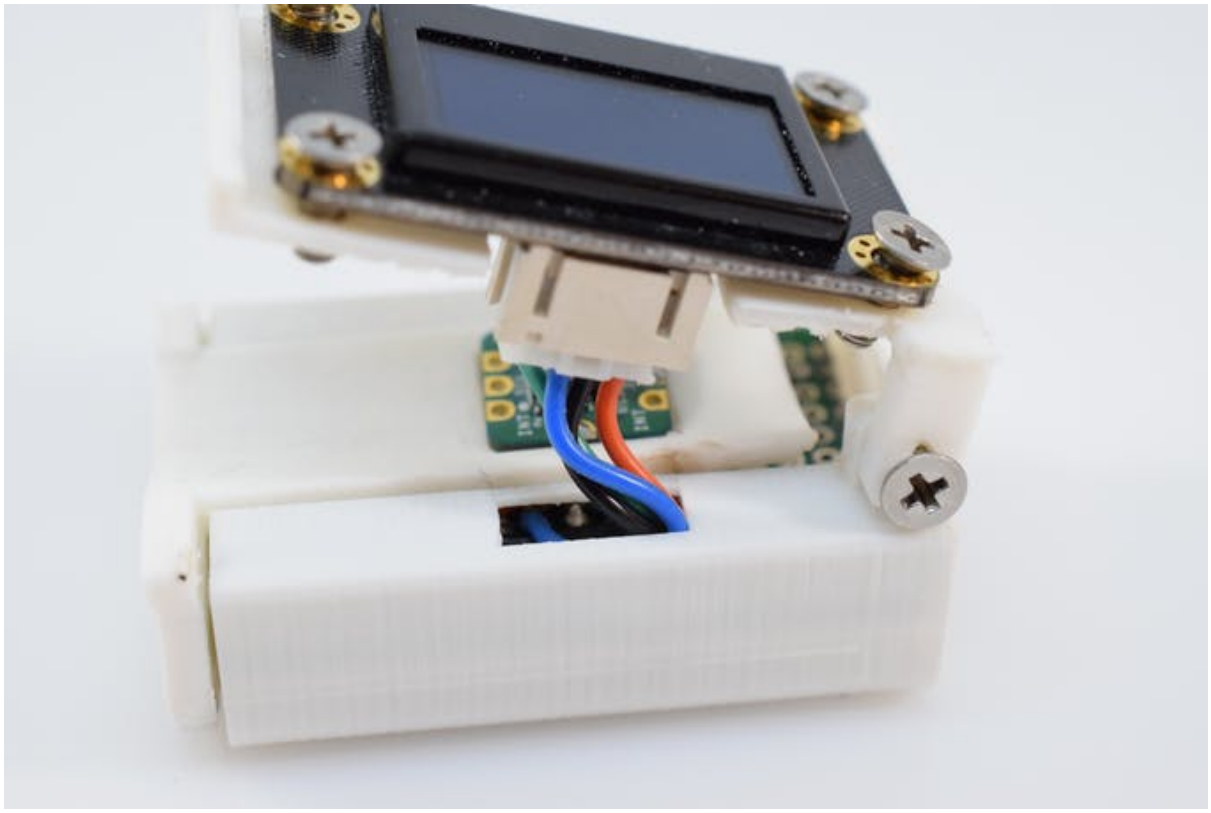
- Next, the connector for the OLED is attached to the Nano and then run up to the display itself.

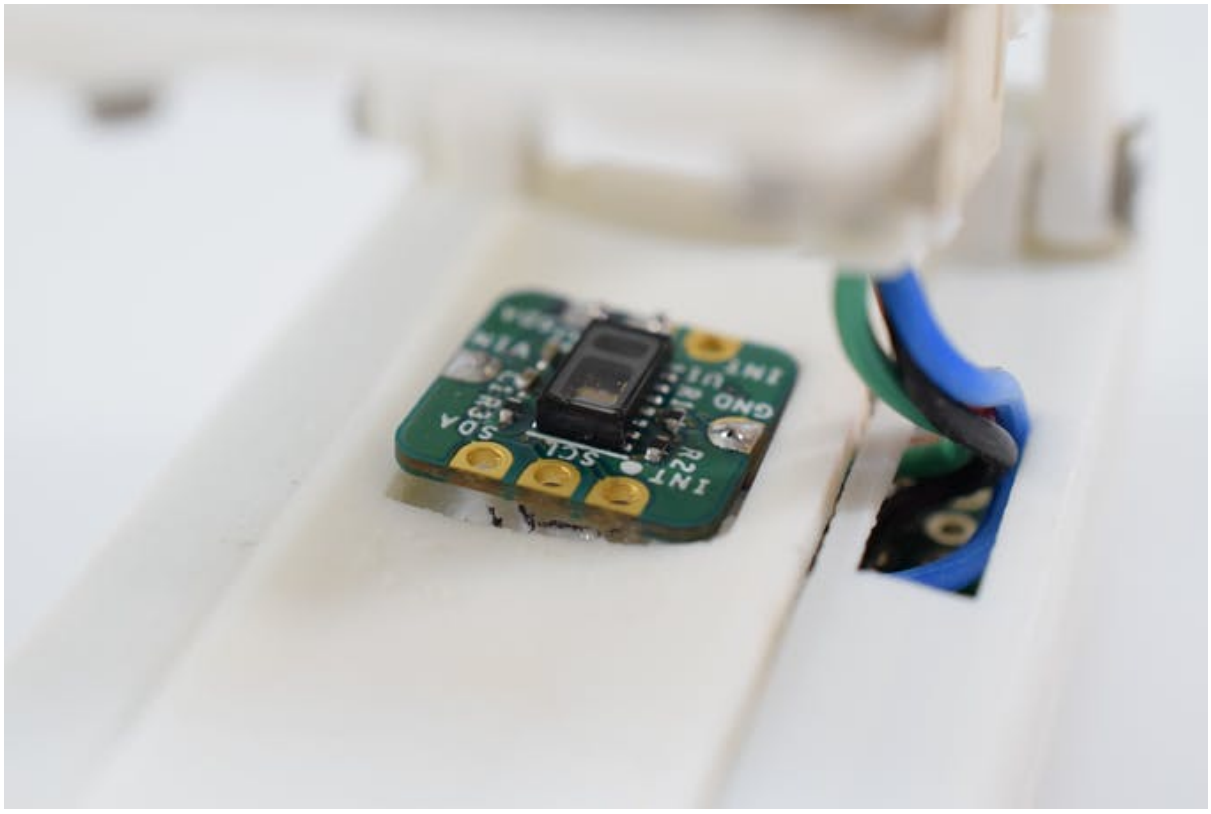


- And finally, the entire electronics assembly is slid into the housing and secured with a couple of 3mm screws.

2.3 Assemble the Device

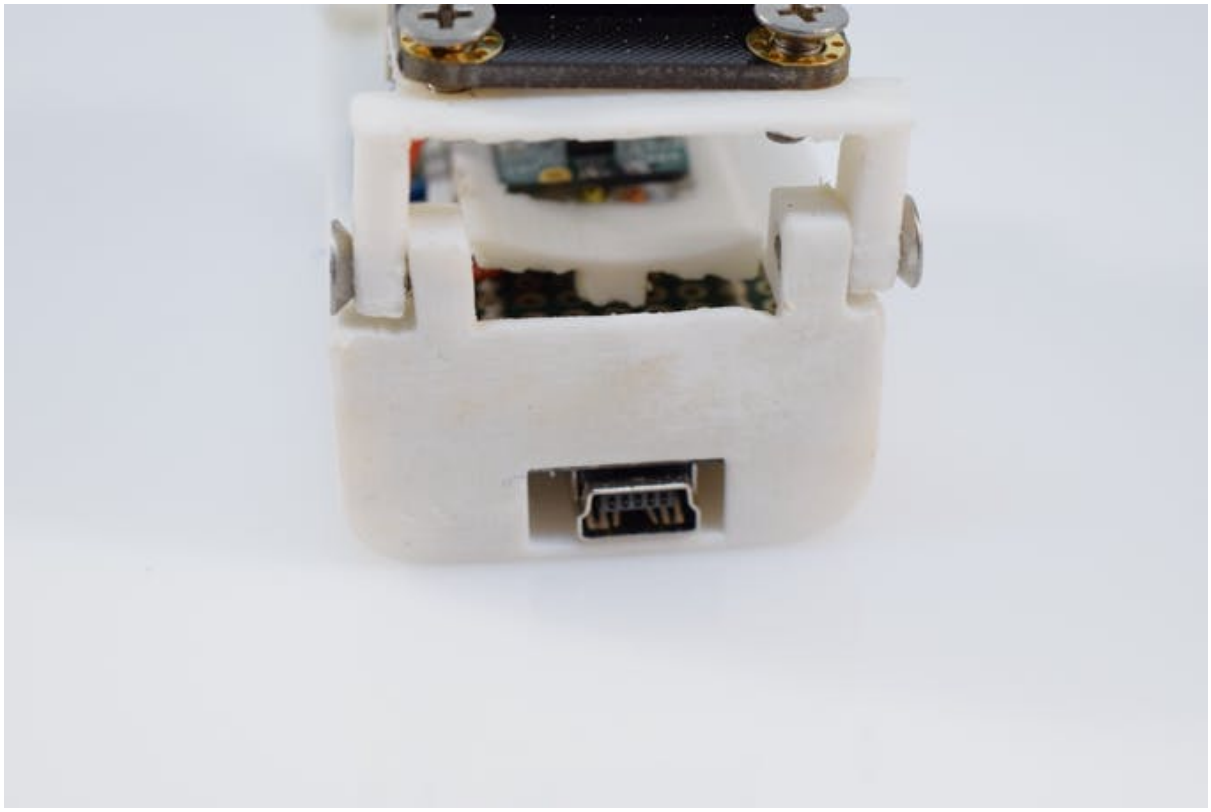
- After the electronics have been inserted, simply attach the OLED screen to the top piece and secure it to the rest of the chassis with a couple of 3mm screws.
- You can test its motion by gently articulating the lid up and down.





2.4 Uploading the Sketch

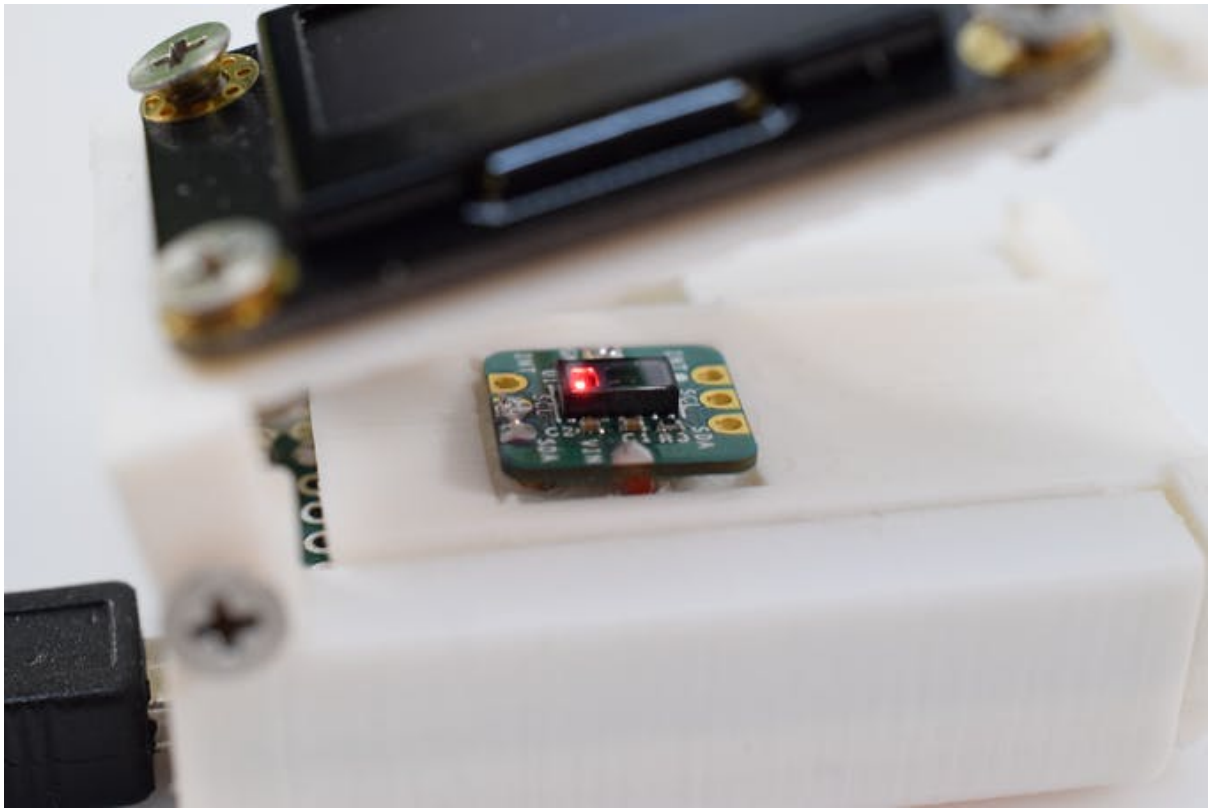
- The included sketch performs a couple of actions to display the user's current heartrate and oxygen saturation.
- To upload it, simply install the required libraries and select Arduino Nano from the board list in the Tools menu and click Upload.

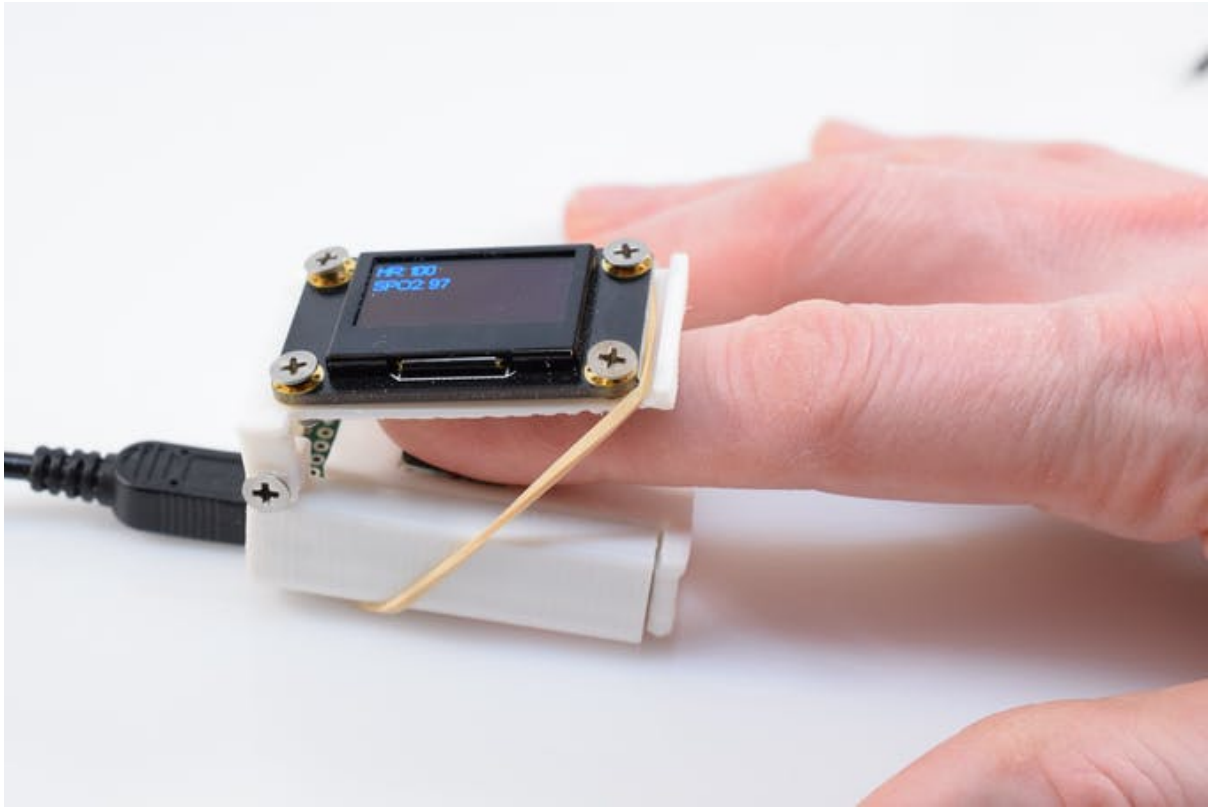


- As for the sketch itself, it first initializes the OLED and MAX30102, whilst reporting any errors that might arise. See the code here
- Next, it reads in 100 values to calibrate the sensor and begins displaying them. The device then enters a loop where it reads in 25 new values and computes a moving average with them.
- Finally, it checks if the values are valid and prints them to the screen if they are.

2.5 Using It

- To use the pulse oximeter, place your fingertip over the sensor and gently close the top lid.
- Then plug in a power source and simply wait until you see data being displayed.




HR 100
SPO2 97

3 Items

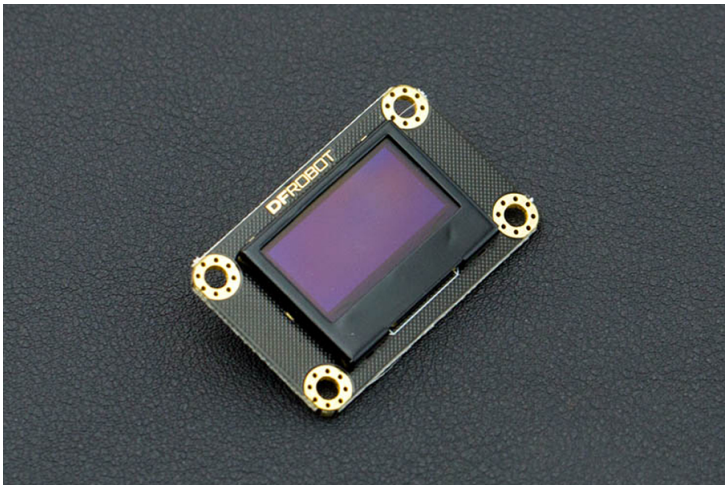
- Development Board, Arduino Nano, ATmega328 MCU, 14 3.3V I/O, 6 PWM Outputs, USB Mini B
  - Image:

  - Amount: 1
  - Reference to buy it : https://www.newark.com/arduino/a000005/dev-board-atmega328-arduino-nano/dp/13T9275?COM=ref_hackster
- Reference Design Board, Pulse Oximeter & Heart Rate Monitor, MAX30102, MAX14595, MAX1921

  - Image:

  - Amount : 1
  - Reference to buy it : https://www.newark.com/maxim-integrated-products/maxrefdes117/ref-des-brd-heart-rate-pulse-oximeter/dp/96Y9339

- Gravity I2C OLED-128x64 Display
  - Image :



  - Amount : 1
  - Reference to buy it : https://www.dfrobot.com/product-1576.html

3.1 Necessary tools and machines

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- A generic 3D printer
- A generic soldering iron
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3.2 Apps and Online Services

- Arduino Software
- Autodesk Fusion 360