

# PULSE OXIMETER FOR EMERGENCY USE DURING CORONAVIRUS DISEASE (COVID-19) PANDEMIC

## GENERAL INSTRUCTIONS

CE PULSE-OXI NANO V1 - APRIL 6TH, 2020



### DISCLAIMER

*Please consider that this application, sensors and functional device are NOT tested for medical purpose and the single parts aren't calibrated and aren't certified. Please use this simple device for preventive scope and to monitorate patients only under emergency situation when no other medical deviced and Pulse-oximeters are available. Every use outside this scope will be at under own responsibility, every modification or changing will be under own responsibility.*

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## Open source as the base for fast replication and diffusion

The "base pack" of this first release are intended to produce a functional device with all the parts:

### 1 THE HARDWARE

A short list with all necessary parts, common and cheap hardware with a huge potential: Arduino Nano (next micro and others), MAX30100 pulse-oximeter sensor, OLED screen 128x32, "emergency board".

### 2 3D PRINTABLE ENCLOSURES

Thanks to the Bergamo based bicycle company "3t Cycling", a 3d printable case was developed to group all parts together. [www.3t.bike](http://www.3t.bike)

### 3 3D PRINTABLE FINGER-CLIP

An open-source and already available "finger sensor enclosure" are the fast way to share the project. Find it in thingiverse repository. Is a "Pulse Oximeter Clip" to use with MAX30100 Board designed by Peter\_Smith.

### 4 SIMPLE EMERGENCY BOARD

To electrically connect and to support all the parts a simple "baseboard" is build with a prototype circuit board (next level will be a printable circuit). In this way connect Arduino board, the sensor and the Oled screen is fast.

### 5 THE CODE

In this preliminary release a base configuration is build to have clear view of the heart rate and of the oximetry, with real time monitoring. The base configuration and the paramers was set for a general use, some simple change could be necessary for specific situation.

### 6 THE INSTRUCTIONS

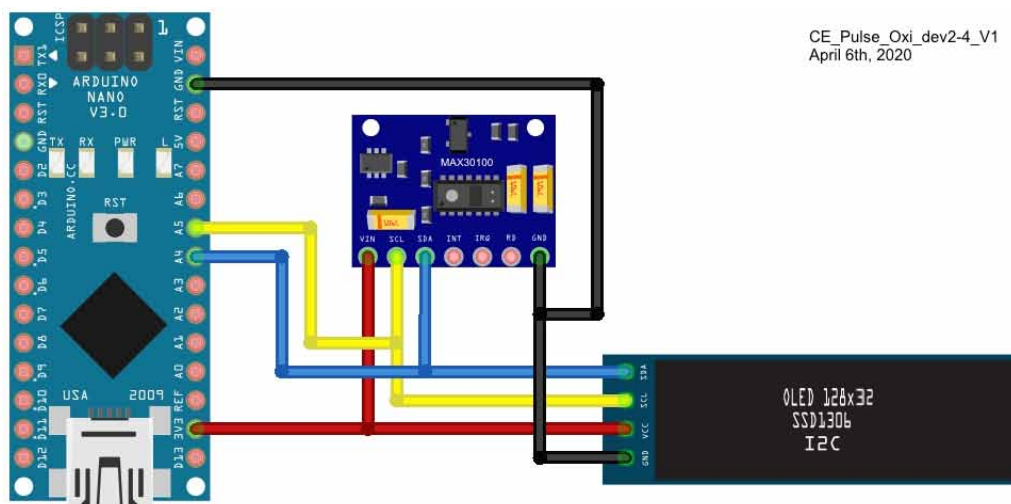
Simple Draws, a step by step instructions and base information for assembly and debug. The links for libraries download and the thingiverse repository. Nothing else is needed in this phase.

## 1 THE HARDWARE

### 1.1 BILL OF MATERIALS

#	Q.ty	Reference	note
1	1	Arduino nano	3,3v   i2c A4 (SDA) , A5 (SCL)
2	1	MAX30100 Pulseoximeter sensor	3,3v   i2c (SDA) (SCL)
3	1	Oled SSD1306 128 x 32	3,3v   i2c (SDA) (SCL)
4	2	Male headers strip	15 pin - 2,54mm
5	1	Female headers	4 pin - 2,54mm - h = 19,4mm
6	1	Double sided prototypes board	44mm x 18mm
7	1	Electric cable	(4x0.5 or 4x0.25 and 1x0.25)

### 1.2 GENERAL CONNECTIONS



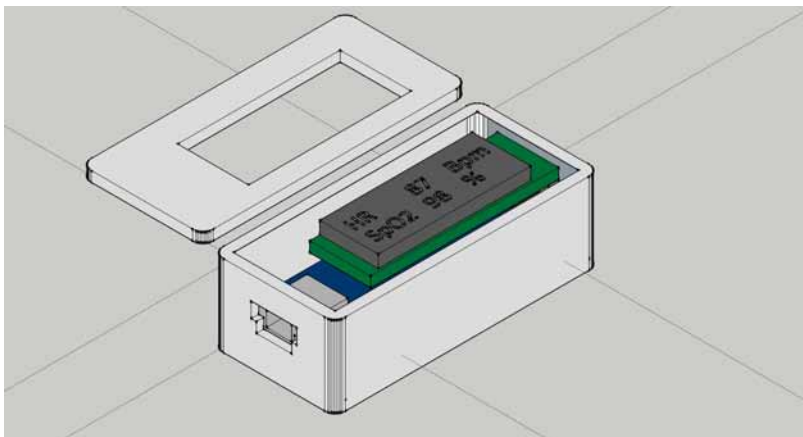
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## 3D PRINTABLE ENCLOSURES

### 2.1 ELECTRONIC CASE

A 3d printed case case was drawn to contain the main components and to enclose the oled display.  
Download the STL file and refer to the printing information for the setup and materials.

(FILE TBA)



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## 3D PRINTABLE FINGER-CLIP

### 3.1 FINGER CLIP

An open-source and already available "finger sensor enclosure" are the fast way to share the project. Find it in thingiverse repository. Is a "Pulse Oximeter Clip" to use with MAX30100 Board designed by Peter\_Smith.  
Reference page: <https://www.thingiverse.com/thing:3009859>

Please read the author page for printing setup and infos.



License



Pulse Oximeter Clip to use with MAX30100 Board by Peter\_Smith is licensed under the Creative Commons - Attribution license.

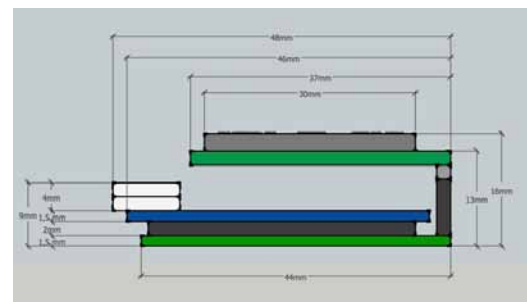
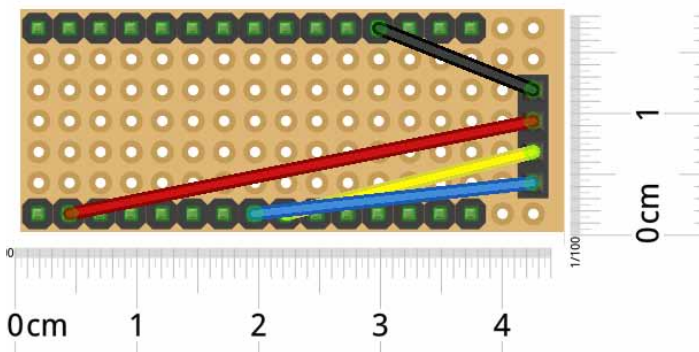
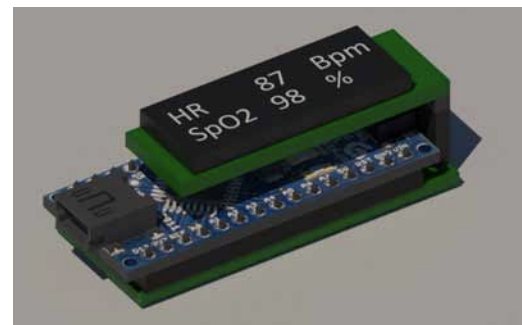
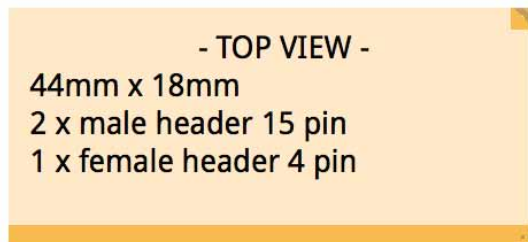
## 4 SIMPLE EMERGENCY BOARD

### 4.1 EMERGENCY BOARD ARDUINO / DISPLAY

Waiting for a printed version will be used an “emergency board” made by prototyping parts, just 12 welding point are required.

1. At the upper side place the female header (for the oled connection).
2. On the back side use simple wire (1x0.25 are ok) to connect the pin as in the reference view.
3. Weld (at least) the 4 Arduino pin as indicated, and the four pin of the ends to ensure safely to the board.
4. Weld the 4x cable to connect the “emergency board” and the MAX30100 sensor.

CE\_Pulse\_Oxi\_dev2-4\_V1  
April 6th, 2020



## 5 THE CODE

### 5.1 CODE AND COMMENTS

This section will be filled in next release

## 6 THE INSTRUCTIONS

### 6.1 RESUMING AND STEP by STEP

This section will be filled in next release

With the base information released on this version (V1.1 – April 6th, 2020) a skilled person could proceed safely and complete all the project without any difficulty.

At this moment the short time at our disposal is the main problem and in next days all the information and pictures will be implemented and refined. The fast diffusion of the virus in all the parts of the world are extremely fast and the release 1.1 is the first step to TRY to helping any people or organization that need this type of instrument.

## 7.1 PULSEOXYMETER THEORY and MAX30100 DATASHEET COMMENTS / SETUP / DEBUG

This section will be filled in next release

### Special thanks & bibliography

*Thanks in advance to all the people that could help to grow up this simple project and device.*

*Thanks to the Bergamo based company "3t cycling srl" that has drawn and printed the case prototyping, and 3d printed the first finger clip from thingiverse files.*

<https://www.3t.bike/en/>



*Thanks to Peter Smith for the finger clip project, developed on 2018 when this situation was just a remote think for some filmmaker*

[https://www.thingiverse.com/Peter\\_Smith/about](https://www.thingiverse.com/Peter_Smith/about)