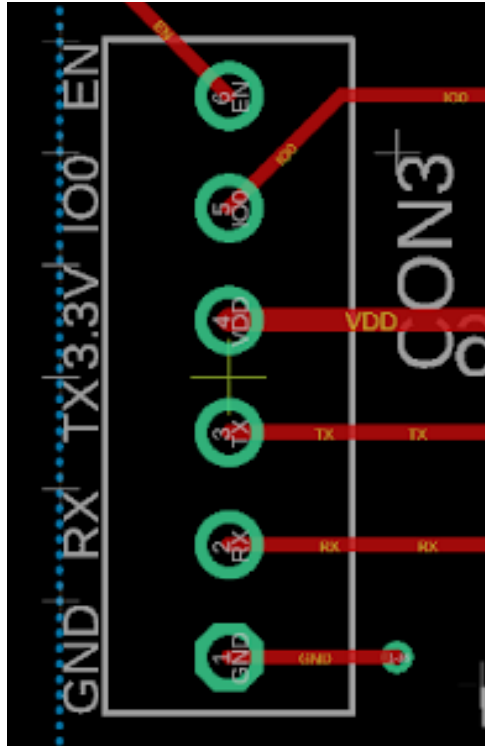


## **At Home ECG Users Manual/Installation Manual**

### *How to install*

In order to set up the product from a new board which has not had the program downloaded, one must first download the project library from our team's website ([http://seniordesign.ee.nd.edu/2023/DesignTeams/eegalarm/top\\_page.html](http://seniordesign.ee.nd.edu/2023/DesignTeams/eegalarm/top_page.html)). From there, use the Visual Studio Code application with PlatformIO installed to open up the project. Since PlatformIO does not have a board file for the ESP32-S3-WROOM-1-N8R8, one must ensure that the folder called "boards" is in the project directory which includes a json file titled "esp32s3dev.json" that was created to match the memory specifications of the ESP32 being used.

Using a USB to UART converter, connect the USB to one's personal computer and the 6 pins on the UART converter to the main board as shown below in Figure 1. Note that while using the programmer, no batteries need to be connected to the board as the power is being supplied from the USB to UART converter.



**Figure 1** Header pins for programming. From top to bottom the pins are “Enable”, “GPIO0”, “3.3V”, “TX”, “RX”, and “GND”

After the connections are all made correctly, one must simply press the “Upload” button on the Visual Studio Code user interface. From there, the software installation is complete. Note that if this were an actual product, the software would be uploaded to the ESP32 before being sold to the user.

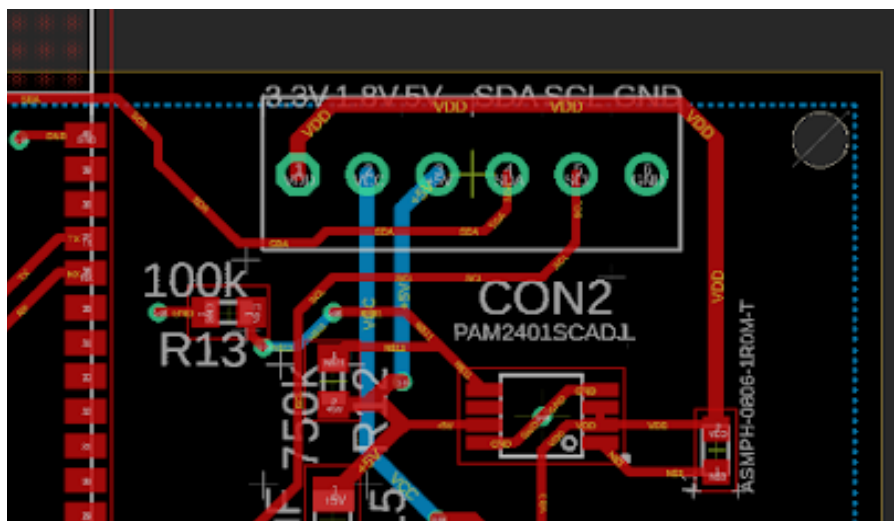
### *How to setup your ECG*

Assuming that the software installation has gone smoothly, one can now move on to powering up the product and making the essential connections between the main board and the second, smaller board which contains the MAX30101 sensor. To connect the main board to the secondary board, there will be 6 wires with each end connected to a 6-pin female Molex connector such as the one shown in Figure 2. The headers are designed such that they can only

clip in one direction, so one must not need to worry about making sure the direction is correct. After connecting the two boards from the 6-pin connector on the main board in Figure 3, one can move on to powering up the product.

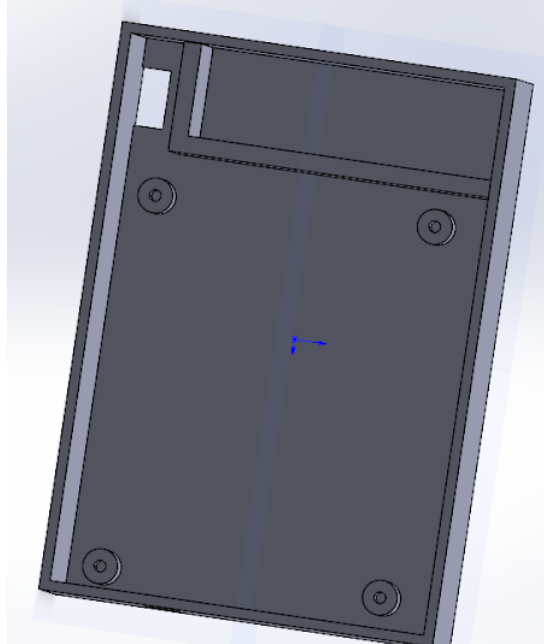


**Figure 2.** Example Molex connector

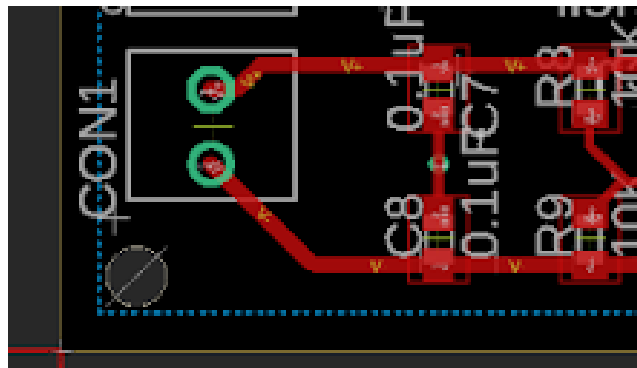


**Figure 3.** Header pins to connect to the MAX30101 sensor board

All of the ECG circuitry is supplied by a 9V battery as mentioned in Section 3.3, so the 9V battery should be the first of the two batteries to be connected as it will not power up the ESP32. Place the 9V battery in the smaller rectangular space in the 3D-printed housing on the top right of Figure 4. Using a two-pin Molex connector, attach the battery in the configuration mentioned in the caption of Figure 5 .



**Figure 4. Inside of housing for product**



**Figure 5. Connection for the 9V battery on the main board. Note that the positive terminal of the battery connects to the header pin on the top of the figure while the negative terminal of the battery connects to the bottom pin in the figure.**