



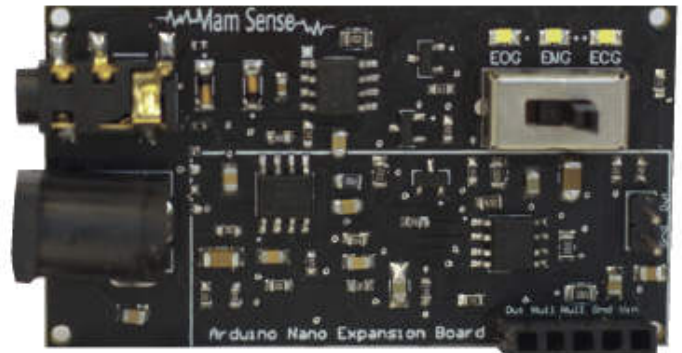
# All in one Sensor MaM Sense

## MaM Sense

## Data Sheet

### Features

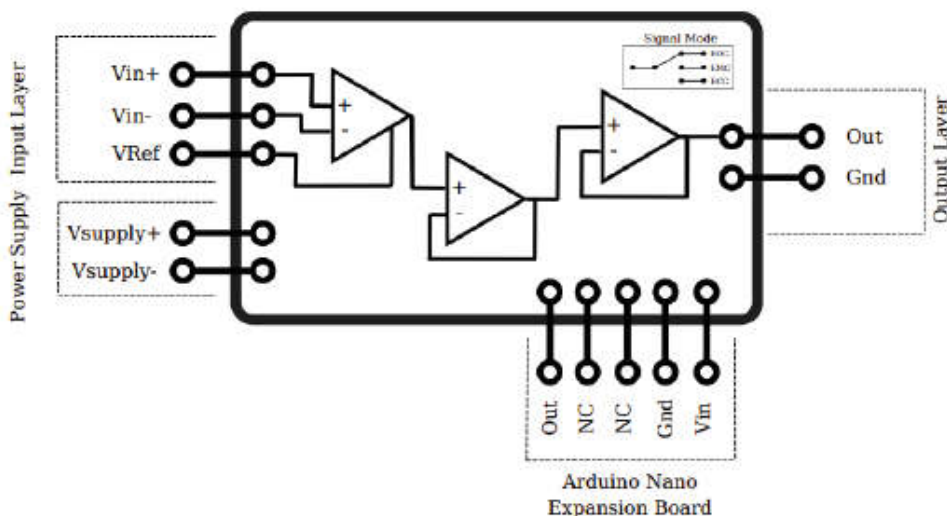
- Acquisition of EOG-EMG-ECG in a single circuit
- Can be used as an Arduino Nano Shield
- Powerful Noise Rejection
- Resistance to high input voltage
- Compatible with other microcontrollers



### What is MaM Sensor?

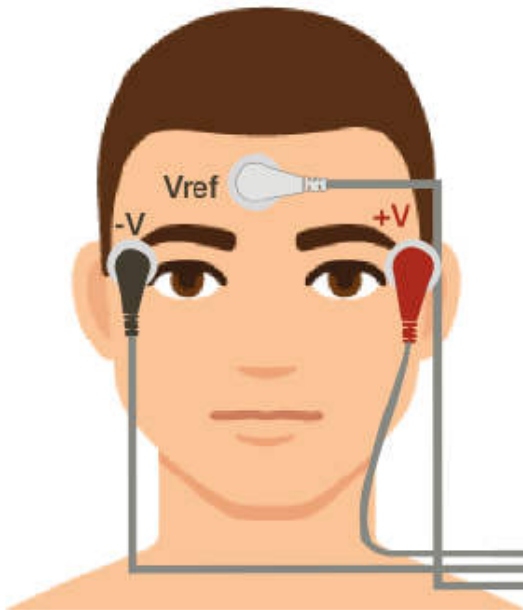
MaM Sense allows makers and developers to process 3 different kinds of signals with a single board, namely EOG, ECG and EMG. Each three signals are measured as the desired mode for the signal is selected by a three-way switch. Then, the board can be connected to analog to digital converter to obtain output and make Digital Signal Processing. The sensor can also be used as Arduino Nano Expansion Board as Arduino Nano is plugged on top of the sensor and it gives output signal to the A7 port of Arduino while it powers both itself and the Arduino Nano via a common DC jack. Also arduino codes has been shared by our engineers to help developers.

### Sensor Layout



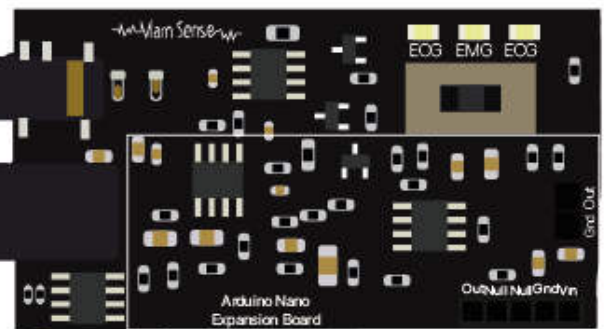
Input Layer	
Vin+	Positive electrode connected
Vin-	Negative electrode connected
VRef	Reference electrode
Output Layer	
Out	Output signal (Ranges between 0 to Vsupply/2)
Gnd	Ground for common grounding
Power Supply	
Vsupply+	Positive pole of the supply voltage
Vsupply-	Negative pole of the supply voltage
Arduino Nano Expansion Board	
Vin	Voltage to feed Microcontroller (Vsupply/2)
Gnd	Ground for common grounding
Out	Output signal (Ranges between 0 to Vsupply/2)
Nc	Not Connected

## EOG

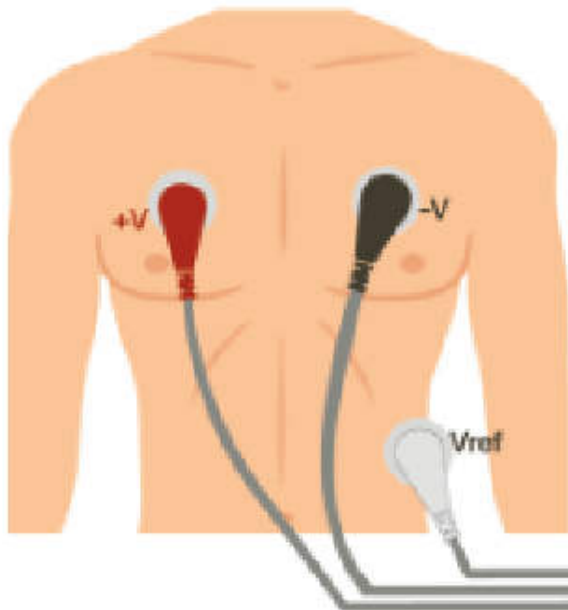


TRACK YOUR EYE  
WITH

MaM Sense

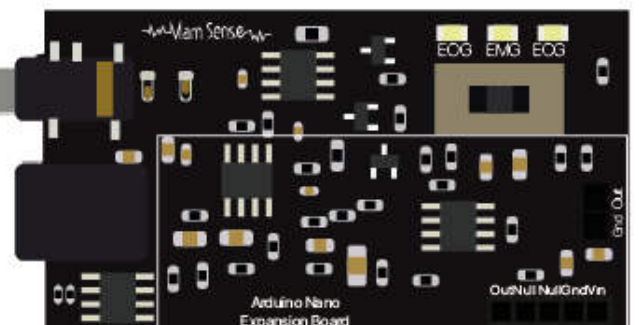


## ECG

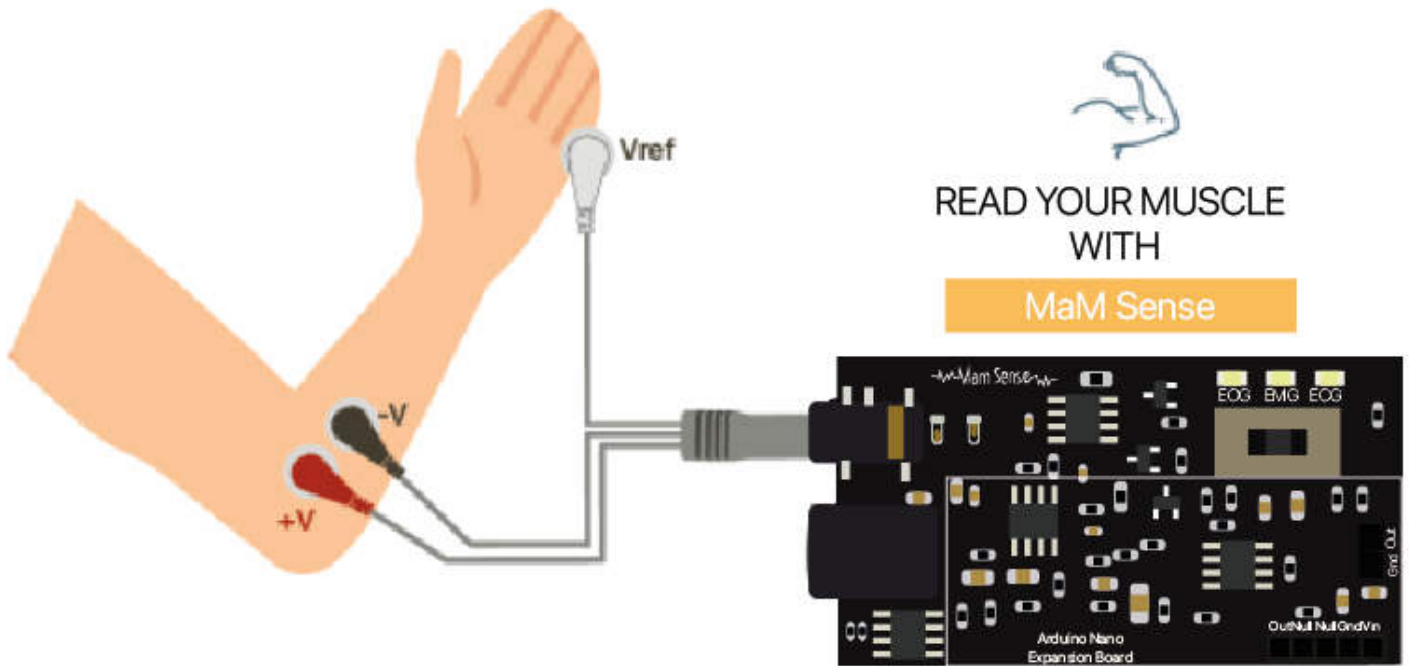


MONITOR YOUR HEARTBEAT  
WITH

MaM Sense



# EMG

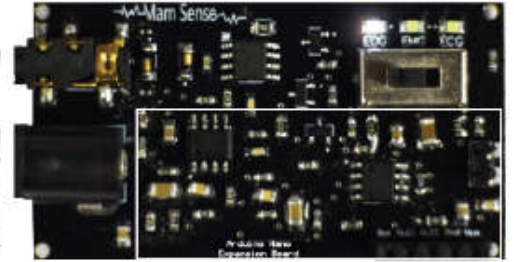
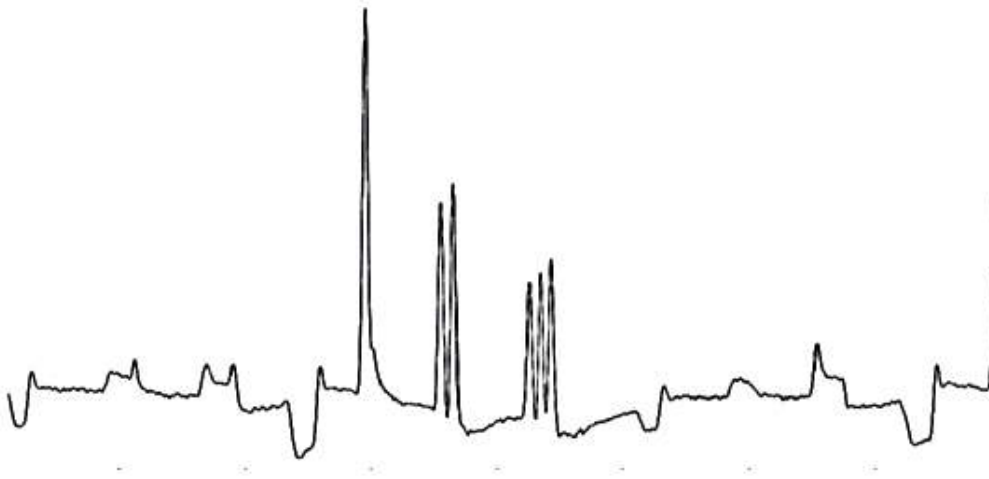


## Setup Configurations

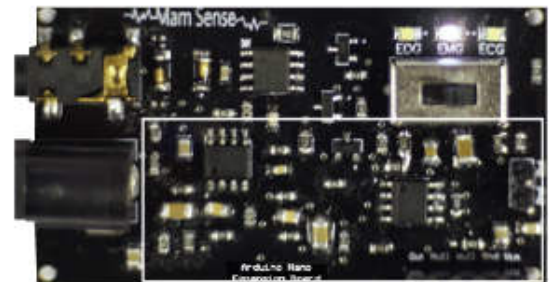
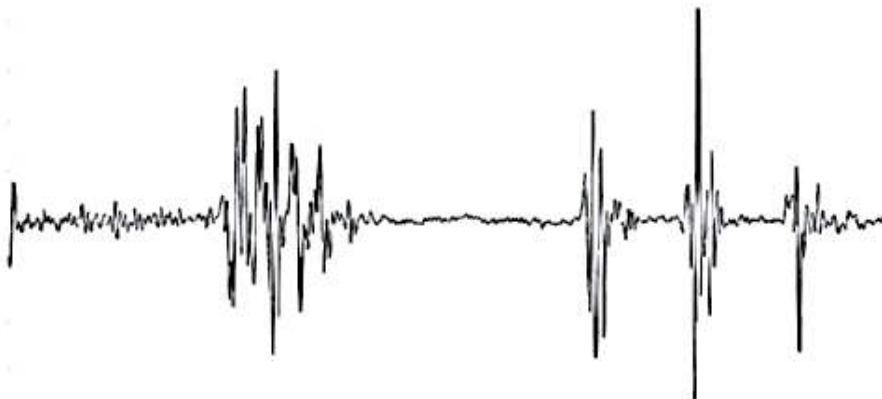
- 1- Place the electrodes as shown in the figures in electrode placement section. (You can also place the electrodes with the other placement methods as in literature)
- 2- Connect electrode cables to the electrodes and electrode jack.
- 3- Select the signal mode that you want to obtain.
- 4- Supply 9V power by DC Jack
- 5- Obtain the output signals from output using oscilloscope or a development board. (Do not forget to connect grounds of the sensor and the development board)



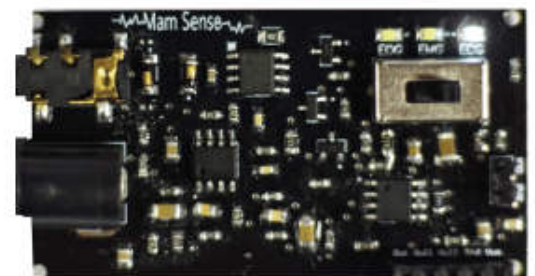
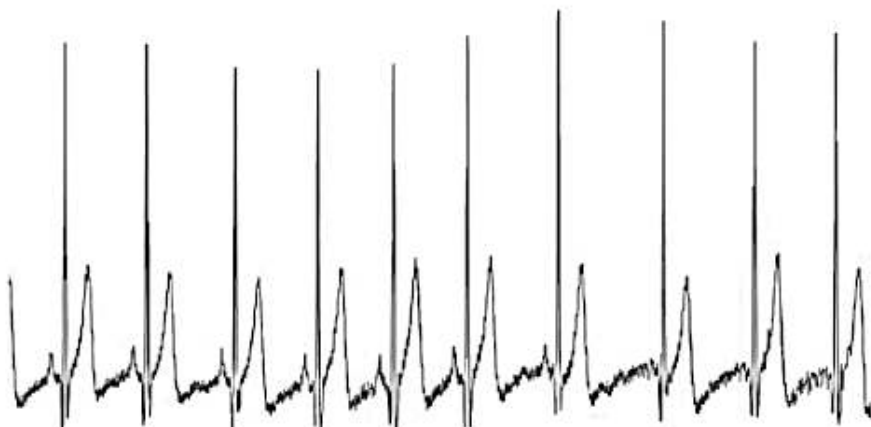
## EOG



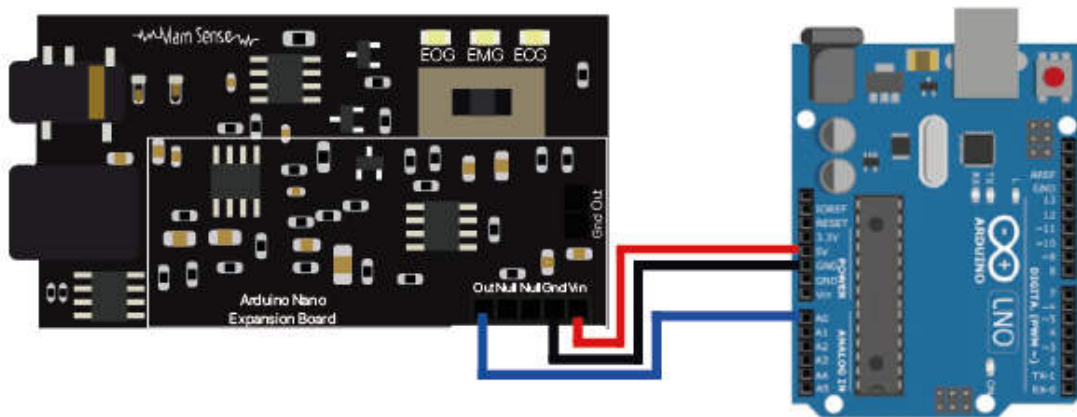
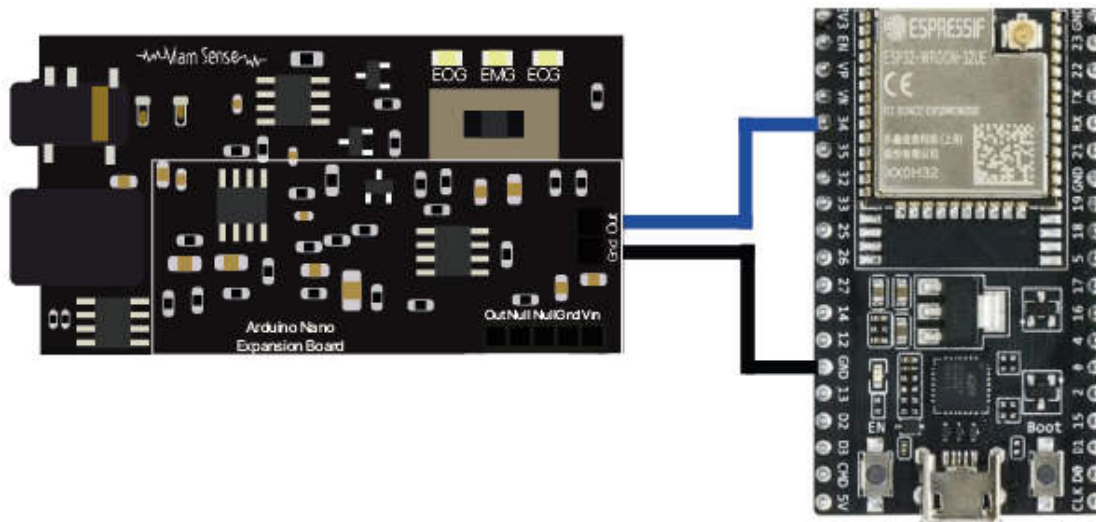
## EMG



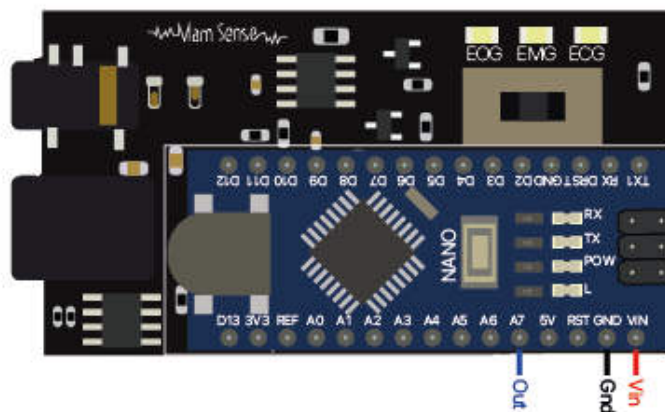
## ECG



# Connection to the microcontrollers

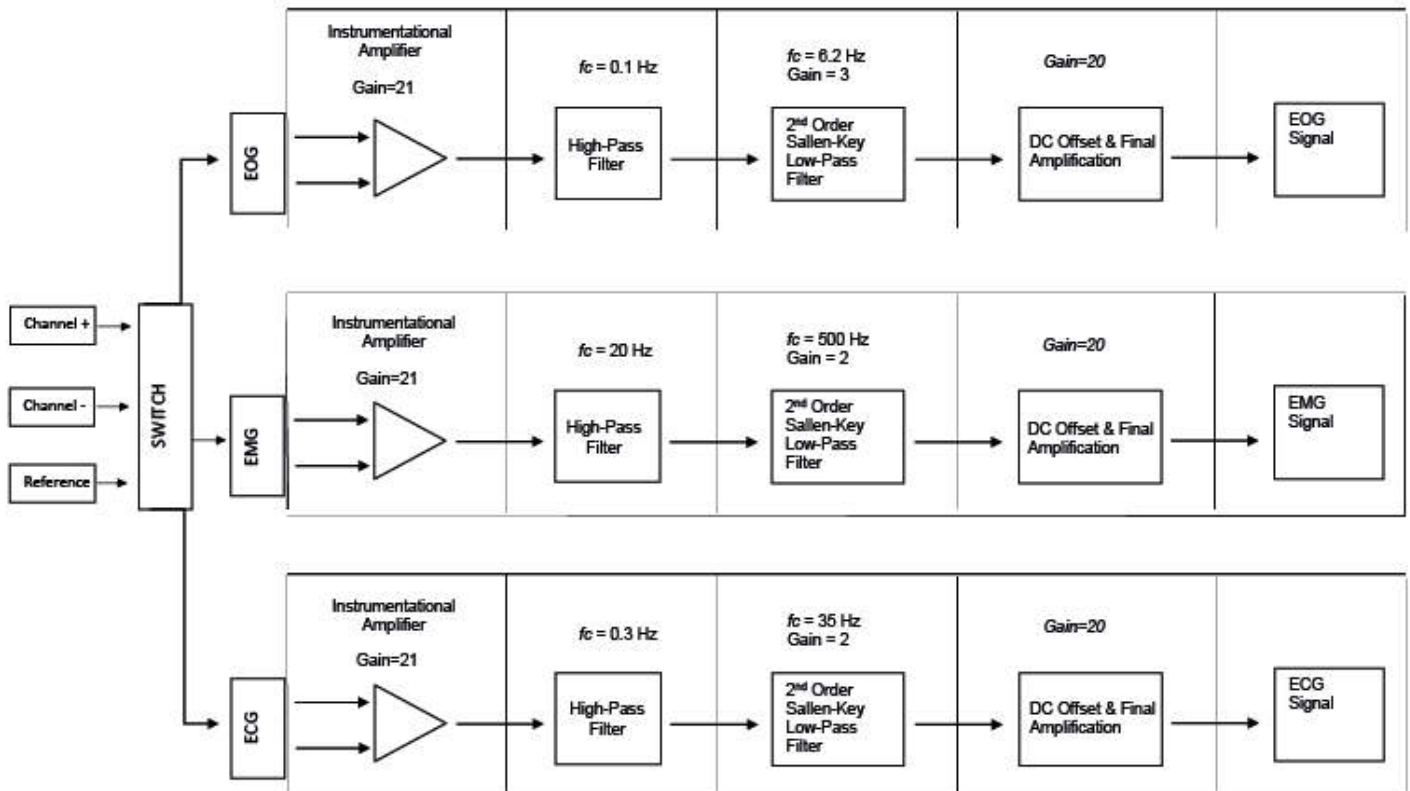


Arduino Nano Plug in to the Expansion Board



Do not forget to supply Mam Sense before connecting with the Arduino Nano

# Block Diagram



## Mode of operation

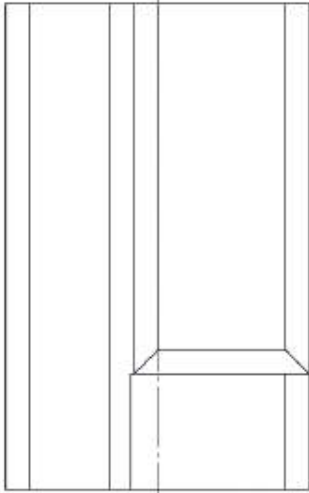
Supply Current	EOG	EMG	ECG
Without Arduino Nano	3.70 mA	3.66 mA	3.68 mA
With Arduino Nano Supplied (minimum supplied current)	16.7 mA	16.3 mA	16.4 mA
Supply Voltage	Min	ideal	Max
Without Arduino Nano	8V	9V	12V
With Arduino Nano Supplied (minimum supplied current)	8V	9V	10V
Output Signal Voltage	EOG	EMG	ECG
	2V	4V	1.6V



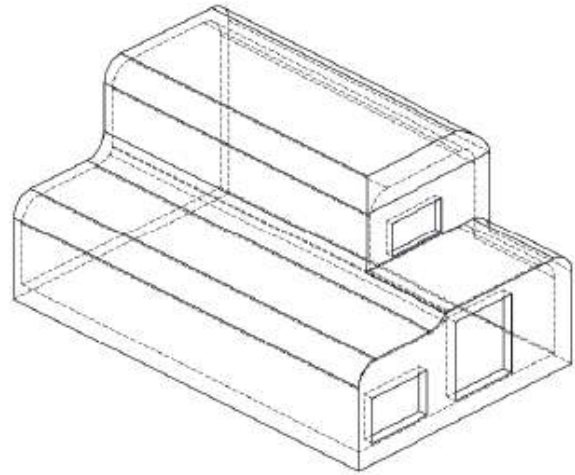
# The case for the Sensor

## MAM High Tech PCB case (Suitable for 3D Printing)

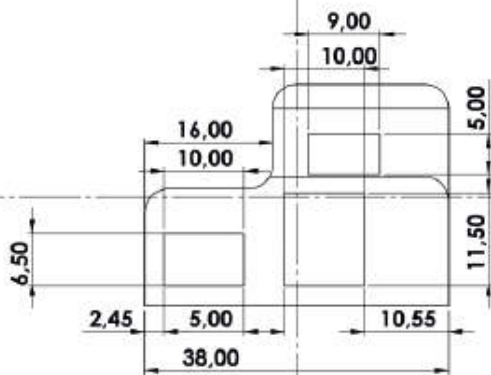
TOP VIEW



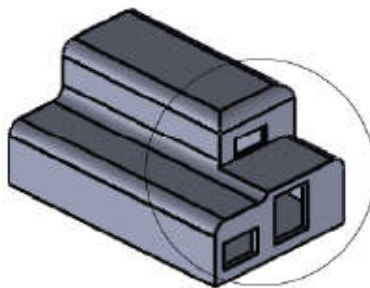
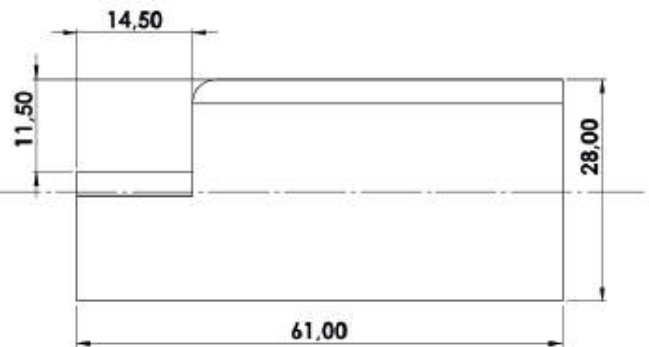
TRIMETRIK VIEW



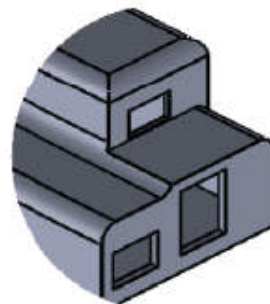
FRONT VIEW



RIGHT VIEW



Detail  
Scale 1.5: 1



The Holes are drilled for the lead wires