

# Grove - Ear-clip Heart Rate Sensor



The Heart Rate Ear clip kit contains a ear clip and a receiver module. The heart rate measure kit can be used to monitor heart rate of patient and athlete. The result can be displayed on a screen via the serial port and can be saved for analysis. The entire system is a high sensitivity, low power consumption and portable.

Get One Now 

[<https://www.seeedstudio.com/Grove-Ear-clip-Heart-Rate-Sensor-p-1116.html>]

## Features

- Low power consumption
- Convenient to use
- High sensitivity
- Fully RoHS compliant



### Tip

More details about Grove modules please refer to [Grove System](#)

[[https://wiki.seeedstudio.com/Grove\\_System/](https://wiki.seeedstudio.com/Grove_System/)]

## Specifications


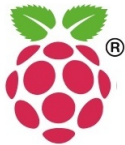
Item	Min	Typical	Max	Unit
Voltage	3.0	5.0	5.25	V
Work Current	6.5			mA
Length of ear clip wire	120			cm
Measures Range	≥30/min			-



## Application Ideas

- Heart rate monitor.

## Platforms Supported

Arduino	Raspberry Pi		
			





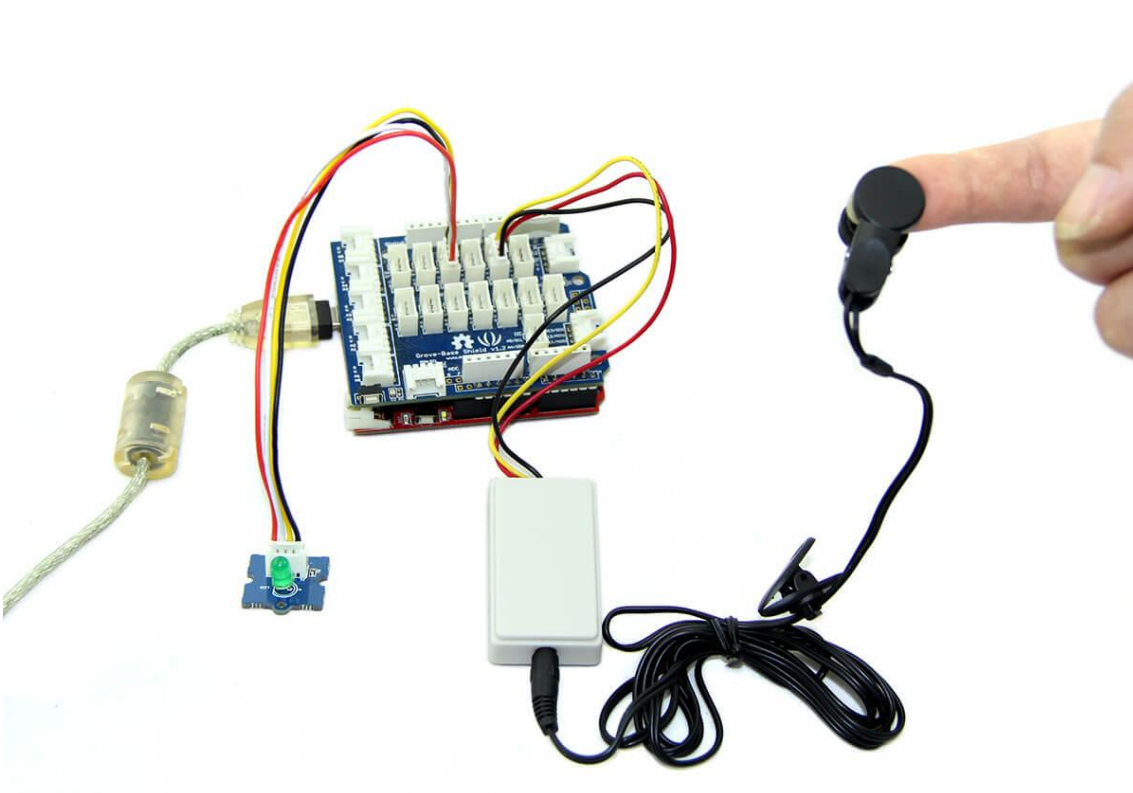
### Caution

The platforms mentioned above as supported is/are an indication of the module's software or theoretical compatibility. We only provide software library or code examples for Arduino platform in most cases. It is not possible to provide software library / demo code for all possible MCU platforms. Hence, users have to write their own software library.

## Usage

The following sketch demonstrates a simple application of using the Ear-clip Heart Rate Sensor to measure heart rate.

- Connect this module to the digital port D2 on **Grove-Base shield** [<https://www.seeedstudio.com/depot/grove-base-shield-p-754.html?cPath=132>]. And connect Grove-LED to Digital port 4.
- Plug the Base Shield into Arduino/Seeeduino.



- Copy and paste code below to a new Arduino sketch.

```

1 // Function: This program can be used to measure heart rate.
2 //           Use an external interrupt to measure it.
3 // Hardware: Grove - Ear-clip Heart Rate Sensor, Grove
4 // Arduino IDE: Arduino-1.0
5 // Author: FrankieChu
6 // Date: Jan 22, 2013
7 // Version: v1.0
8 // by www.seeedstudio.com
9 #define LED 4//indicator, Grove - LED is connected with
10 boolean led_state = LOW;//state of LED, each time an
11 //will change the state
12 unsigned char counter;
13 unsigned long temp[21];
14 unsigned long sub;
15 bool data_effect=true;
16 unsigned int heart_rate;//the measurement result of heart rate
17
18 const int max_heartpluse_duty = 2000;//you can change
19 //2000 meams 2 seconds. System
20 //if the duty overtrip 2 seconds
21 void setup()
22 {
23     pinMode(LED, OUTPUT);
24     Serial.begin(9600);
25     Serial.println("Please ready your chest belt.");
26     delay(5000);
27     arrayInit();
28     Serial.println("Heart rate test begin.");
29     attachInterrupt(0, interrupt, RISING);//set interrupt
30 }
31 void loop()
32 {
33     digitalWrite(LED, led_state);//Update the state of LED
34 }
35 /*Function: calculate the heart rate*/
36 void sum()
37 {
38     if(data_effect)

```

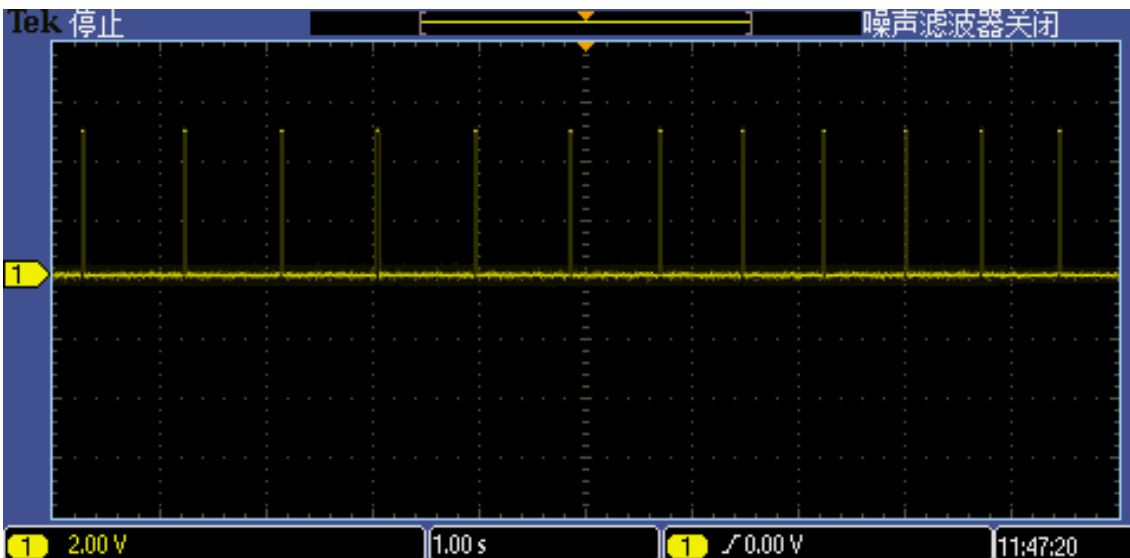
```

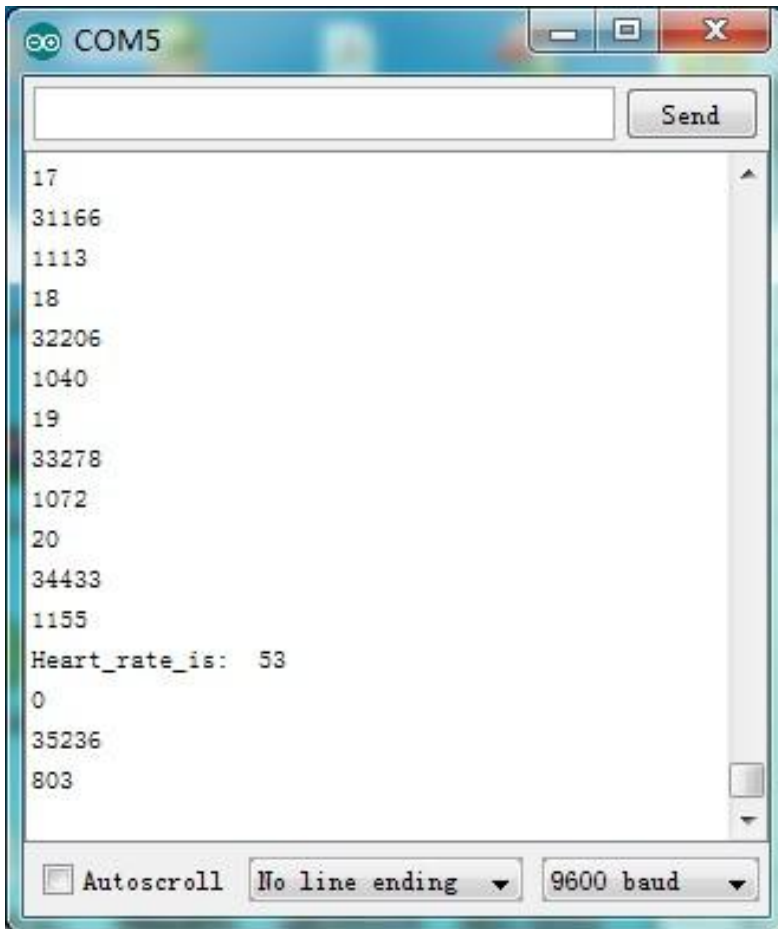
39     {
40         heart_rate=1200000/(temp[20]-temp[0]); //60*20*
41         Serial.print("Heart_rate_is:\t");
42         Serial.println(heart_rate);
43     }
44     data_effect=1; //sign bit
45 }
46 /*Function: Interrupt service routine. Get the signal ;
47 void interrupt()
48 {
49     temp[counter]=millis();
50     Serial.println(counter, DEC);
51     Serial.println(temp[counter]);
52     switch(counter)
53     {
54         case 0:
55             sub=temp[counter]-temp[20];
56             Serial.println(sub);
57             break;
58         default:
59             sub=temp[counter]-temp[counter-1];
60             Serial.println(sub);
61             break;
62     }
63     if(sub>max_heartpluse_duty) //set 2 seconds as ma.
64     {
65         data_effect=0; //sign bit
66         counter=0;
67         Serial.println("Heart rate measure error, tes
68         arrayInit());
69     }
70     if (counter==20&&data_effect)
71     {
72         counter=0;
73         sum();
74     }
75     else if(counter!=20&&data_effect)
76     counter++;
77     else
78     {
79         counter=0;

```

```
80     data_effect=1;
81     }
82
83     }
84     /*Function: Initialization for the array(temp)*/
85     void arrayInit()
86     {
87         for(unsigned char i=0;i < 20;i ++){
88             {
89                 temp[i]=0;
90             }
91             temp[20]=millis();
92         }
```

- Upload the code.
- Make sure the sensor contacts your ear skin. This is the signal when we are measuring the heart rate:





In the first of the figures, which is a waveform diagram of the detected heartbeat, a high pulse comes when beating.



#### Note

If the serial monitor return an error message, please change the position of the sensor.

## Resources

- [Grove - Ear-clip Heart Rate Sensor Demo code](https://files.seeedstudio.com/wiki/Grove-Ear-clip_Heart_Rate_Sensor/res/Grove-Heart_rate_chest_belt_V1.0.zip)  
[[https://files.seeedstudio.com/wiki/Grove-Ear-clip\\_Heart\\_Rate\\_Sensor/res/Grove-Heart\\_rate\\_chest\\_belt\\_V1.0.zip](https://files.seeedstudio.com/wiki/Grove-Ear-clip_Heart_Rate_Sensor/res/Grove-Heart_rate_chest_belt_V1.0.zip)]



- [PPG Sensor System](https://files.seeedstudio.com/wiki/Grove-Ear-clip_Heart_Rate_Sensor/res/PPG%20Sensor%20System.pdf) [https://files.seeedstudio.com/wiki/Grove-Ear-clip\_Heart\_Rate\_Sensor/res/PPG%20Sensor%20System.pdf]

## Projects

**Transportation data visualization with Google Map:** We use the Wio LTE cat.1 to monitor transportation GPS and other info. For cold chain, we can monitor the GPS location together with temperature and humidity. For the bicycling, we can monitor the GPS location together with the hear rate.



## Tech Support

Please submit any technical issue into our [forum](https://forum.seeedstudio.com/) [https://forum.seeedstudio.com/].



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