Heart Rate Monitor Sensor SKU: SEN0213

Contents

(https://www.dfrobot.com/product-1510.html)

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Introduction

The **DFRobot Heart Rate Monitor Sensor** is used to measure the electrical activity of the heart. This electrical activity can be charted as an ECG (https://en.wikipedia.org/wiki/Electrocardiography) and output as an analog reading. An ECG signal can be extremely noisy so we have included an AD8232 chip on the PCB which will provide a clear signal from the PR and QT Intervals. Using the Arduino IDE "Serial Plotter" feature you are also able to view plotted ECG output on your PC!

(/wiki/index.php/File:Warning_yellow.png)

Please Note: This product is NOT a medical device and is not intended to be used as such or as an accessory to such nor diagnose or treat any conditions.

Specification

- Input Voltage: 3.3 - 6V (5V recommended)
- Output Voltage: 0 - 3.3V
- Operating current: <10mA
- Dimension: 35 x 22(mm), 1.378" x 0.866"(in)
- Interface Type: PH2.0-3P

Board Overview

3.5mm Jack for Biomedical Pad Connection

GND
VCC
Anglog Out

(/wiki/index.php/File:Heart_rate_SEN0213_overall.png)

Tutorial

Requirements

- **Hardware**
  - DFRduino UNO (https://www.dfrobot.com/product-838.html) (or similar) x 1
  - Heart Rate Monitor Sensor (https://www.dfrobot.com/product-1540.html) x 1
  - Sensor cable - Electrode Pads (3 connectors) x 1
  - Biomedical Sensor Pad x 1
  - Jumper wires
- **Software**
  - Arduino IDE V1.6.6 or above, Click to Download Arduino IDE from Arduino® (https://www.arduino.cc/en/Main/Software)

Connection Diagram
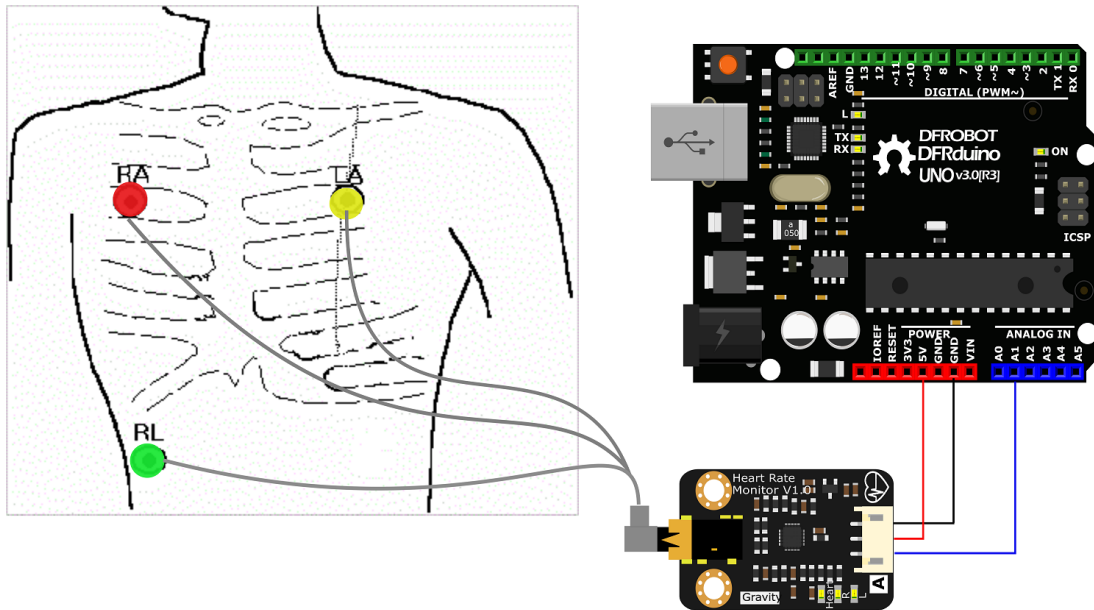
(/wiki/index.php/File:Heart_Rate_Sen0213_dia.png)

NOTE: An ECG signal can be quite noisy because of muscle activity. The further sensor pads are from the heart, the more muscle noise you will see. To improve the signal quality, follow these simple tips:

- Keep sensor pads as close to the heart as you can
- Make sure the RA and LA sensor pads are on correct sides of the heart
- Try not to move too much while taking a measurement
- Try to use fresh pads for each measurement. The pads loose the ability to pass signals with multiple applications
- Prepare and clean the area you plan to stick pads. This will help make a good connection (hair is not a good conductor)
- You may have to adjust sensor placement for different individuals

Sample Code1

```
1  /*!
2   * @file HeartRateMonitor.ino
3   * @brief HeartRateMonitor.ino  Sampling and ECG output
4   *
5   *   Real-time sampling and ECG output
6   *
7   * @author linfeng(490289303@qq.com)
8   * @version  V1.0
9   * @date  2016-4-5
10  */
11  const int heartPin = A1;
12  void setup() {
13    Serial.begin(115200);
14  }
15  void loop() {
16  int heartValue = analogRead(heartPin);
17  Serial.println(heartValue);
18  delay(5);
19  }
```

Expected Result

1. Open the Arduino IDE 1.6.6 (or above) "Serial Plotter";

(/wiki/index.php/File:Arduino_Serial_Plotter.png)

Open "Serial Plotter"
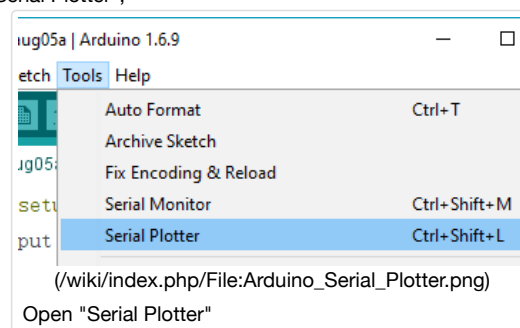
2. Then you could see the output signal from the microcontroller - A1 port, the ECG.

(/wiki/index.php/File:Heart_Rate_SEN0213_checking.png)

Sample output of this sensor
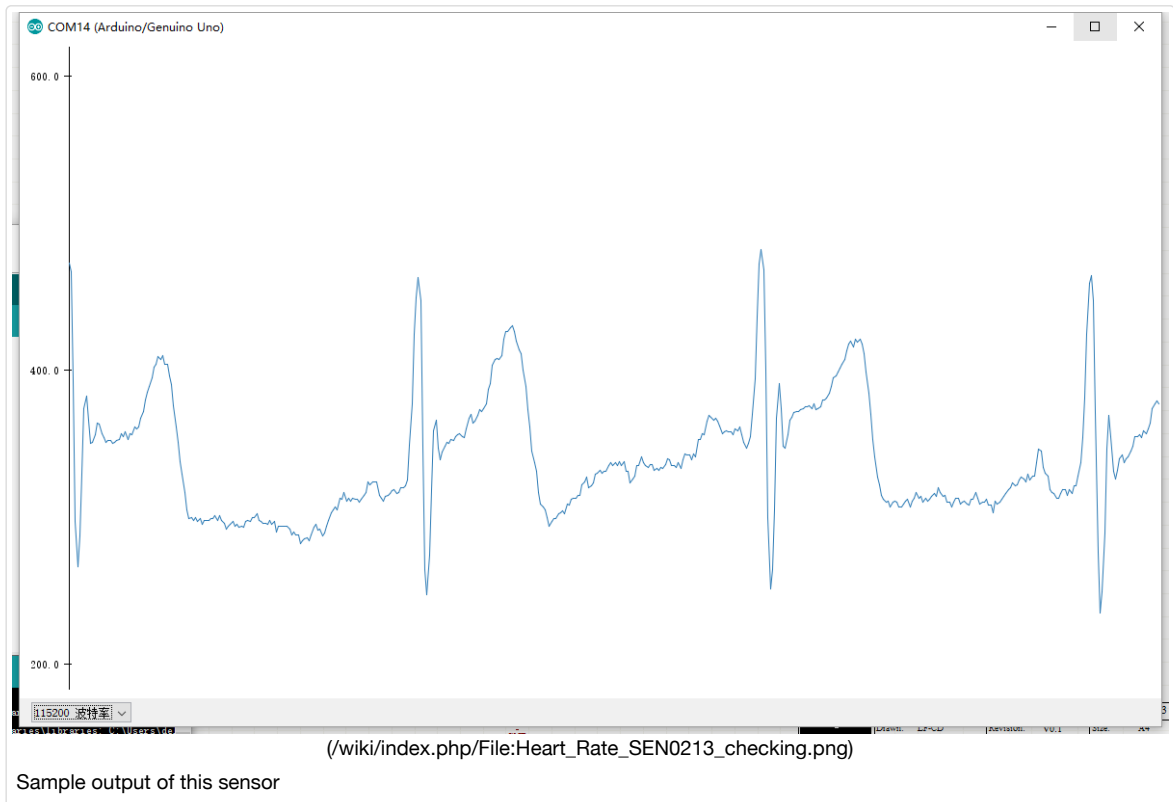
NOTE: If you found there was a lot of jamming waveforms, they may come from the body's static electricity. Touch something metal to discharge any static electricity. More read on WikiHow. (http://www.wikihow.com/Remove-Static-Electricity)

Sample Code2

click to download the head file HeartSpeed (https://github.com/lfwag/HeartSpeed)

```
1  /*!
2   * @file heart_test.ino
3   * @copyright   [DFRobot](http://www.dfrobot.com), 2016
4   * @copyright   GNU Lesser General Public License
5   * @author [jianghao](hao.jiang@dfrobot.com)
6   * @version  V1.0
7   * @date  20160-07-8
8   */
9
10 /*!
11  * @brief Library for DFRobot's IR Position RAW_DATA
12  * @author [jianghao](hao.jiang@dfrobot.com)
13  */
14 #include "HeartSpeed.h"
15
16 HeartSpeed heartspeed(A1);                  ///<The serial port for at observe pulse.
17 //HeartSpeed heartspeed(A1,RAW_DATA);         ///<The serial port mapper, observation of ECG diagram.
18
19 /* Print the position result */
20 void mycb(uint8_t rawData, int value)
21 {
22   if(rawData){
23     Serial.println(value);
24   }else{
25     Serial.print("HeartRate Value = "); Serial.println(value);
26   }
27 }
28 void setup() {
29   Serial.begin(115200);
30   heartspeed.setCB(mycb);     ///Callback function.
31   heartspeed.begin();///The pulse test.
32 }
33
34 void loop() {
35
36 }
37
38 /******************************************************************************
39   Copyright (C) <2016>  <jianghao>
40   This program is free software: you can redistribute it and/or modify
41   it under the terms of the GNU General Public License as published by
42   the Free Software Foundation, either version 3 of the License, or
43   (at your option) any later version.
44   This program is distributed in the hope that it will be useful,
45   but WITHOUT ANY WARRANTY; without even the implied warranty of
46   MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
47   GNU General Public License for more details.
48   You should have received a copy of the GNU General Public License
49   along with this program.  If not, see <http://www.gnu.org/licenses/>.
50   Contact: hao.jiang@dfrobot.com
51   ******************************************************************************/
```
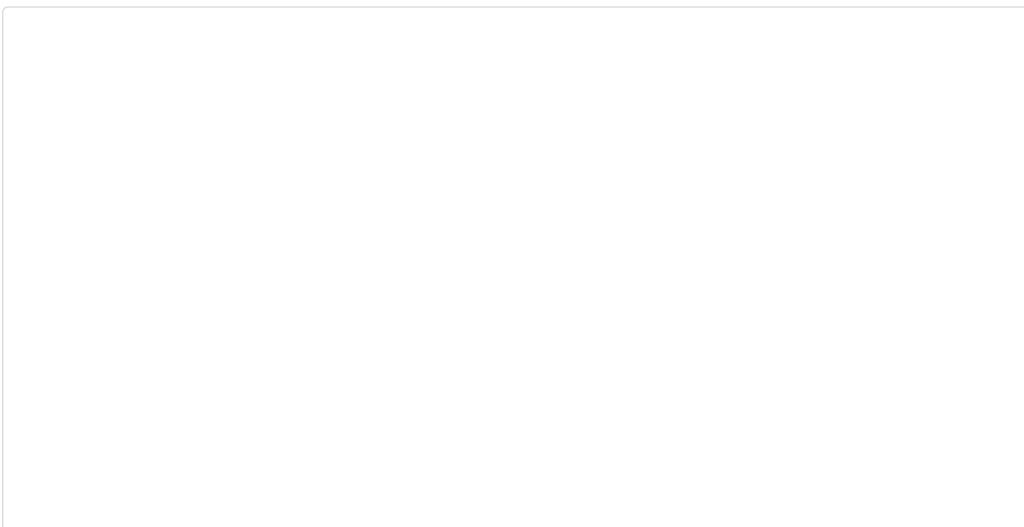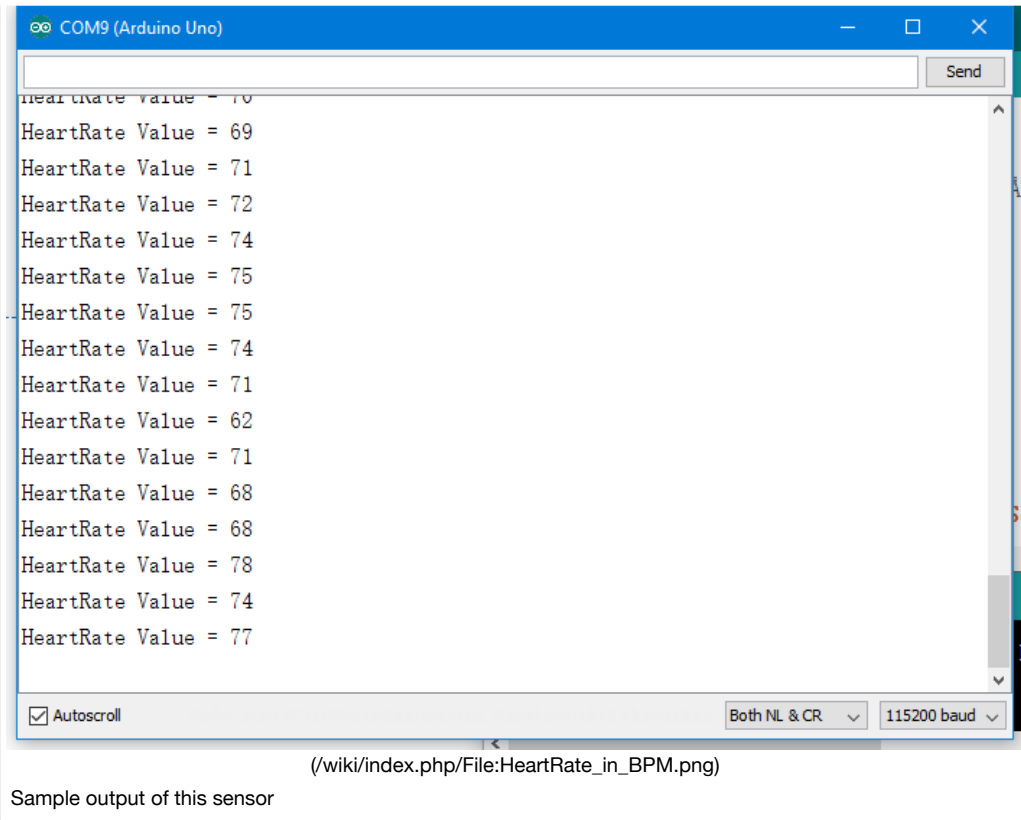
Expected Result

1. Open the Arduino IDE 1.6.6 (or above) "Serial Port";
2. Then you could see the output signal in BPM.

(/wiki/index.php/File:HeartRate_in_BPM.png)

Sample output of this sensor

FAQ

Q1. Some general Arduino Problems/ FAQ/ Tips, very good to know.

A1. Click the topic link (http://www.dfrobot.com/forum/viewtopic.php?f=8&t=1869&p=8624#p8624) on DFRobot Forum.

For any questions, advice or cool ideas to share, please visit **DFRobot Forum** (http://www.dfrobot.com/forum/).

More

- Schematic (https://github.com/Arduinolibrary/DFRobot_Heart_Rate_Monitor_Sensor/raw/master/SEN0213%20Heart%20Rate%20Monitor%20Schematic.pdf)
- AD8232 datasheet (https://github.com/Arduinolibrary/DFRobot_Heart_Rate_Monitor_Sensor/raw/master/AD8232_en.pdf)

(http://www.dfrobot.com/) Shopping from Gravity: Analog Heart Rate Monitor Sensor (ECG) For Arduino (https://www.dfrobot.com/product-1510.html) or **DFRobot Distributor**. (http://www.dfrobot.com/index.php?route=information/distributorslogo)

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