

Gravity: MAX30102 PPG Heart Rate and Oximeter Sensor



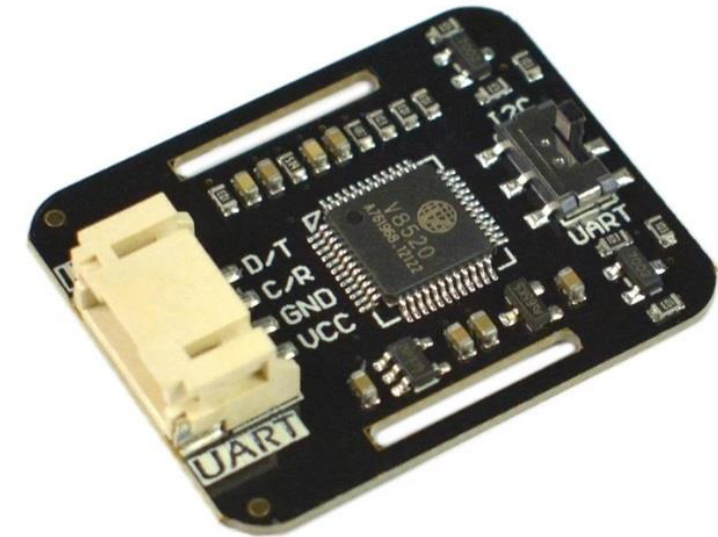
Overview

DFRobot Gravity: MAX30102 heart rate and blood oxygen sensor module integrates the Maxim MAX30102 chip and an MCU heart rate and blood oxygen algorithm.

The MAX30102 uses PPG(PhotoPlethysmoGraphy) to measure data, which will be converted into heart rate and oximetry values when processed by the MCU, then output through I2C or UART, making the sensor easy to use and greatly reducing resource occupation of main controller. Meanwhile, the corresponding upper computer is provided to allow you to conveniently read data by a PC.

Note:

- The pressure may change when the finger is directly pressed down the sensor, which will affect the data output. So please try to fix the sensor on your finger.
- Wear the sensor on your finger and there is no difference in the direction of wearing.
- This product is not a professional medical instrument and should not be used as an auxiliary accessory in diagnosis and treatment.



Order Code

Order Code	Brand	Description
E36002-001	DFRobot	Gravity: MAX30102 PPG Heart Rate and Oximeter Sensor

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Specification

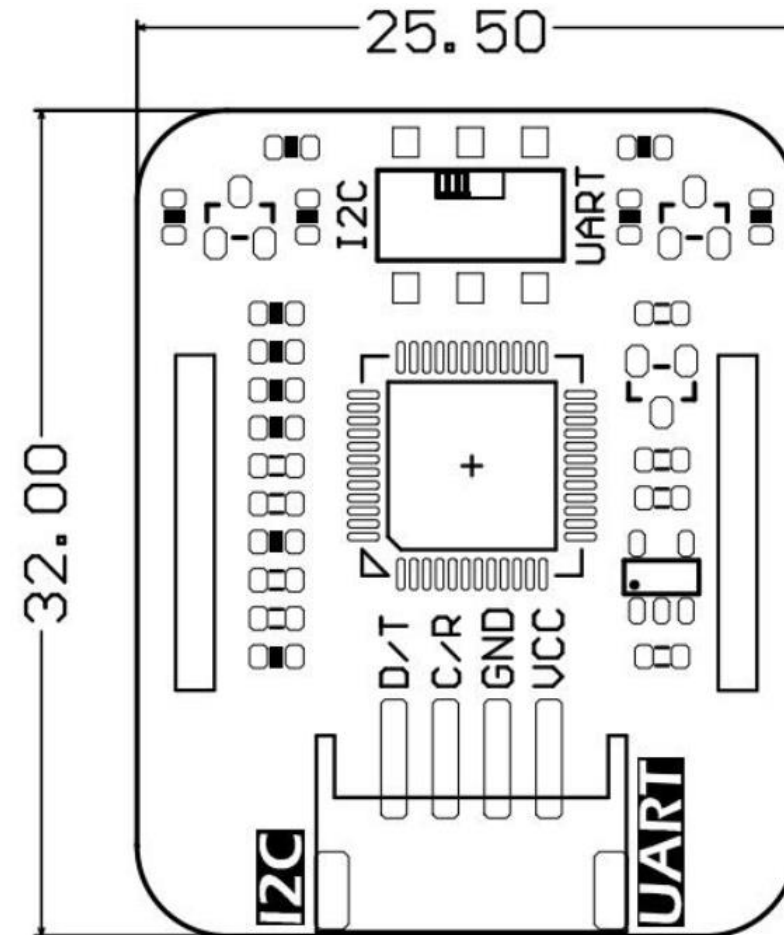
- Power Supply Voltage: 3.3V/5V
- Working Current: <15mA
- Communication Method: I2C/UART
- I2C Address: 0x57
- Serial Port Baud Rate: 9600
- Operating Temperature Range: -40°C~85°C
- Product Size: 25.5×32mm/0.98×1.26inch

Application

- Heart rate blood oxygen project
- Home heart rate oximeter
- Long-term heart rate and blood oxygen monitoring project

Feature

- Microcontroller with integrated algorithm
- Data can be read directly through the host computer



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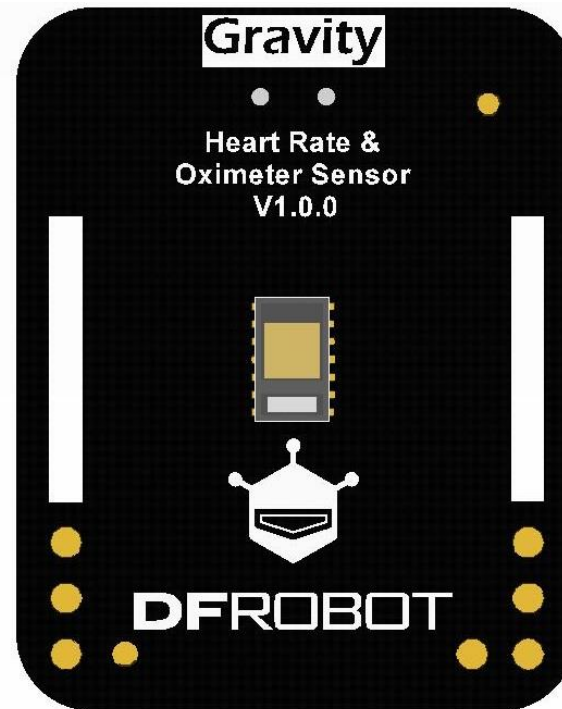
Wear Instruction



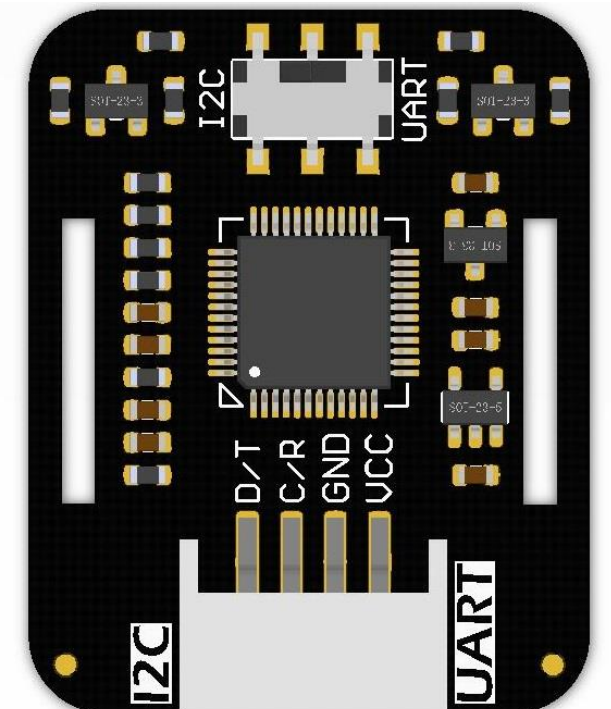
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Board Instruction

Num	Label	Description
1	D/T	I2C Data Line/TX
2	C/T	I2C Clock Line/RX
3	GND	Power -
4	VCC	Power +



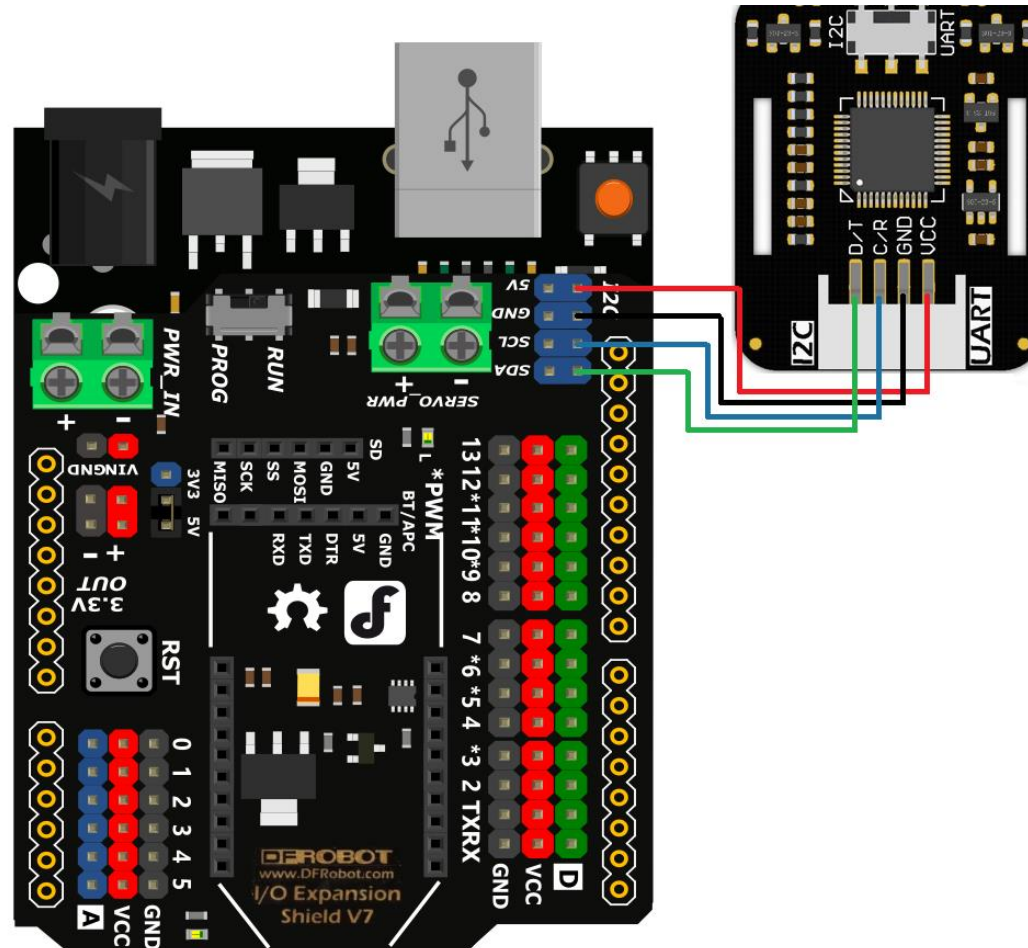
TOP



BOTTOM

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Connection Diagram



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Tutorial

Sample Code 1 - Get the Heart Rate and Blood Oxygen Data

Obtain the heart rate blood oxygen value, start measuring the heart rate when the sensor's red light is on, the heart rate data is updated every 4 seconds, the sensor data can still be obtained within 4 seconds, but the data obtained during the data update period does not change.

Please pay attention to the position of the communication switch.

[Please download the sample code](#)

Expected result

A screenshot of a serial terminal window titled 'COM55'. The window has a text input field at the top with a 'Send' button. The main area displays the following text:

```
init success!  
SPO2 is : -1%  
heart rate is : -1Times/min  
SPO2 is : 99%  
heart rate is : 90Times/min  
SPO2 is : 99%  
heart rate is : 90Times/min  
SPO2 is : 99%  
heart rate is : 89Times/min  
SPO2 is : 99%  
heart rate is : 93Times/min  
SPO2 is : 99%  
heart rate is : 93Times/min
```

 At the bottom, there are controls: a checked 'Autoscroll' checkbox, an unchecked 'Show timestamp' checkbox, a dropdown menu set to 'Both NL & CR', a dropdown menu set to '115200 baud', and a 'Clear output' button.

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API function

```
/*!
 * @brief Get heart rate and oxygen saturation and store them into the structure sHeartbeatSP02
 * @param NULL
 * @return No value returned
 */
void getHeartbeatSP02();

/*!
 * @brief Get the sensor board temp
 * @param NULL
 * @return Temp (unit: °C)
 */
float getTemperature_C();

/*!
 * @brief Sensor starts to collect data
 * @param NULL
 * @return NULL
 */
void sensorStartCollect();

/*!
 * @brief Sensor stops collecting data
 * @param NULL
 * @return NULL
 */
void sensorEndCollect();
```

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Modbus RTU protocols

Note: The communication interface uses UART

Transmit	From Adevice to Bdevice				
Functions	Bdevice Address	Function Code	Register Address	Register Number	CRC Check
Get the Heart Rate and Blood Oxygen Data	0x20	0x03/Read	0x00 0x06	0x00 0x04	CRC_h CRC_l
Get the Temperature	0x20	0x03	0x00 0x0A	0x00 0x01	CRC_h CRC_l
Receive	Response from Bdevice				
Functions	Bdevice Address	Function Code	Valid Bytes	Data	CRC Check
Get the Heart Rate and Blood Oxygen Data	0x20	0x03	0x08	SPO2(1byte) xx(1byte reseed) Heartbeat(4byte) xx(2byte reserved)	CRC_h CRC_l
Get the Temperature	0x20	0x03	0x02	Temp_h Temp_l	CRC_h CRC_l

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Modbus RTU protocols

Set the Sensor	Transmit From Adevice				
Functions	Bdevice Address	Function Code	Register Address	Register Number	CRC Check
Start to Collet Data	0x20	0x06	0x00 0x10	0x00 0x01	CRC_h CRC_l
Stop Colleting Data	0x20	0x06	0x00 0x10	0x00 0x02	CRC_h CRC_l
Set the Sensor	Response From Bdevice				
Functions	Bdevice Address	Function Code	Valid Bytes	Data	CRC Check
Start to Collet Data	0x20	0x06	0x00 0x10	0x00 0x01	CRC_h CRC_l
Stop Colleting Data	0x20	0x06	0x00 0x10	0x00 0x02	CRC_h CRC_l

Modbus RTU protocols

CRC check

```
static uint16_t calculate_CRC(uint8_t *data, uint8_t len)
{
    uint16_t crc = 0xFFFF;
    for( uint8_t pos = 0; pos < len; pos++)
    {
        crc ^= (uint16_t)data[ pos ];
        for(uint8_t i = 8; i != 0; i--)
        {
            if((crc & 0x0001) != 0){
                crc >>= 1;
                crc ^= 0xA001;
            }else{
                crc >>= 1;
            }
        }
    }
    crc = ((crc & 0x00FF) << 8) | ((crc & 0xFF00) >> 8);
    return crc;
}
```

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Documents

[MAX30102 datasheet](#)

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Revision History

Date	Revision	Change description
30/10/2025	1.0	Initial release