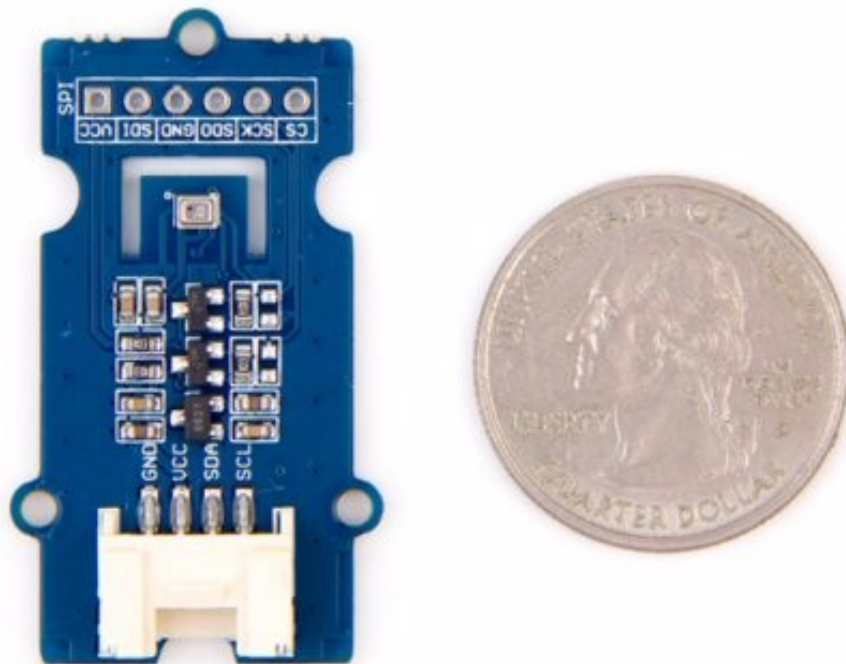# Grove - Barometer Sensor (BMP280)

Grove - Barometer Sensor (BMP280) is a breakout board for Bosch BMP280 high-precision and low-power digital barometer. This module can be used to measure **temperature** and **atmospheric pressure** accurately. As the atmospheric pressure changes with altitude, it can also measure approximate **altitude** of a place. It can

be connected to a microcontroller with I^{2}C (integrated with Grove socket) or through SPI bus. We have also provided highly abstracted library to make this product easier to use.

The BMP280 is an upgraded version of BMP180 and gets dramatic improvements from BMP180. BMP280 comes with a smaller footprint, lower power consumption, lower noise measurements, higher resolutions for pressure and temperature, lower RMS noise, newly added interface SPI, more measuring modes, higher measuring rate and newly added filter against environmental interference. Since the atmosphere pressure reading is affected by altitude and temperature, we have added compensation features in the library. Hence, Grove - Barometer Sensor (BMP280) would be more reliable on providing precise temperature, atmospheric pressure values and approximate altitude data.

[https://www.seeedstudio.com/depot/Grove-Barometer-Sensor-BMP280-p-2652.html]

Pre-reading

An introduction of **What is a Barometric Pressure Sensor** and **How does it work** is strongly recommended reading ahead if you are not familiar with it. Please visit our blog [https://www.seeedstudio.com/blog/2019/12/30/what-is-barometric-pressure-sensor-and-arduino-guide-to-get-started/] for detailed information.

Feature

- Get more precise temperature, atmospheric pressure values, and approximate altitude data

- Grove compatible and easy to use

- Highly abstracted library for building projects quicker

> 🔥 **Tip**
> More details about Grove modules please refer to Grove System [https://wiki.seeedstudio.com/Grove_System/].

Specification

Parameter	Value
Input voltage	3.3V or 5V
I/O voltage	3.3V or 5V
Operating current	0.6mA
Operating temperature	-40 - 85 ℃
Effective pressure measurement range	300 - 1100 hPa (1 hPa= one hundred Pa) with ±1.0 hPa accuracy
Temperature measurement	±1.0°C

|	
accuracy	
Measurement modes	Piezo & Temperature, forced or periodic
Chip	BMP280 (datasheet [https://files.seeedstudio.com/wiki/Grove-Barometer_Sensor-BMP280/res/Grove-Barometer_Sensor-BMP280-BMP280-DS001-12_Datasheet.pdf])
Possible sampling rate	182 Hz (typical)
Interface Bus	SPI, I^{2}C (use either one of them)
Weight	3 g (for breakout board)
Dimensions	40 (width) × 20 (depth) mm
I2C Address	0x77()default or 0x76

> ✏️ **Notes**
>
> 1. We will show/describe how to select interface bus soon.
>
> 2. The altitude is calculated by a combination of temperature and atmospheric pressure. No specialized components for altitude.

Application

- Enhancement of GPS navigation

- Outdoor/indoor navigation

- Weather forecast

- Botany management

Platforms supported

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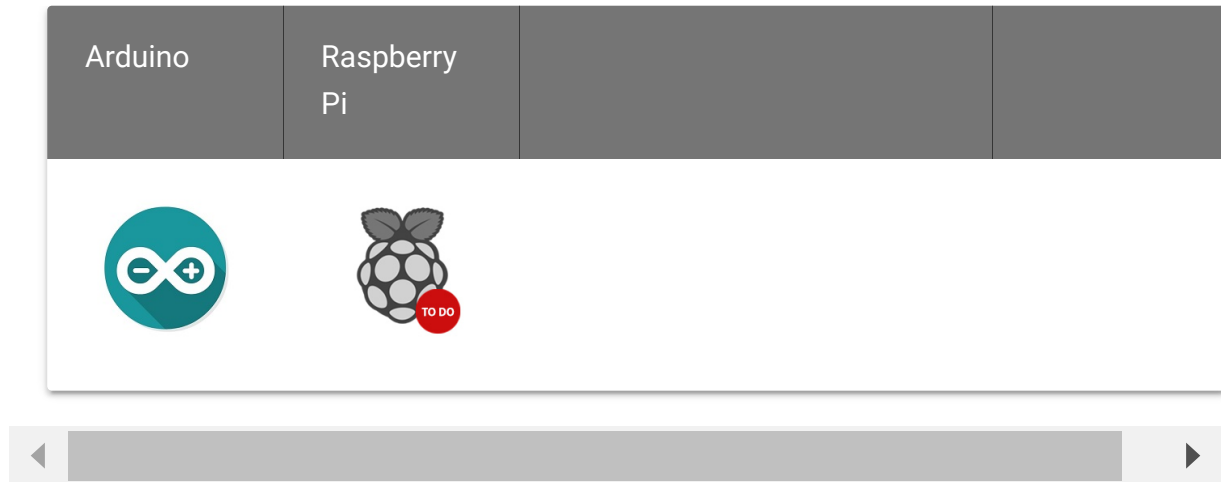
⚠ **Caution**
The platforms mentioned above as supported is/are an indication of the module's software or theoritical compatibility. We only provide software library or code examples for Arduino platform in most cases. It is not possible to provide software library / demo code for all possible MCU platforms.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

Getting Started

Play with Arduino

Materials required

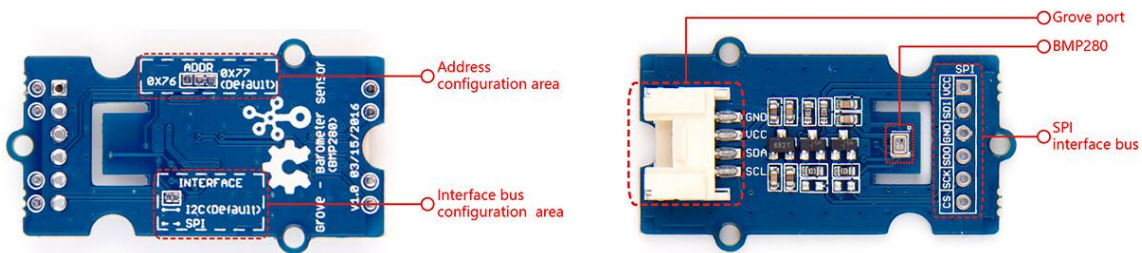| Seeeduino V4.2	Base Shield
Get One Now [https://www.seeedstudio.com/Seeeduino-V4.2-p-2517.html]	Get One Now [https://www.seeedstudio.com/Base Shield-V2-p-1378.html]

Hardware Overview

- **SPI soldering pads**, a voltage monitoring circuit.

- **Interface bus selection pads** , to select I^{2}C bus, connect the two pads by soldering (this is connected by default); to select SPI bus, cut the two pads with a sharp knife or a soldering iron.

- **Slave board address selection pads**, to select slave board address to avoid address collision.

> ✏️ **Tips**

- If you have selected I2C bus, the default address for slave board is **0x77**(right-two pads are connected). If you want to use the address **0x76**, connect only left two (disconnect right two) by soldering.

- You can disconnect pads with just a sharp knife.

- If you have selected SPI bus, the default address for slave board is **0x77**(right-two pads are connected). If you want to use the address **0x76**, disconnect all three pads.

> ✏ **Note**
>
> Do not touch or shake or let this product in vibration when it works. This will cause interference and will affect the accuracy of data collected.

Step 1. Connect Grove-Barometer_Sensor-BMP280 to port **I2C** of Grove-Base Shield.

Step 2. Plug Grove - Base Shield into Seeeduino and connect Seeeduino to PC via a USB cable.
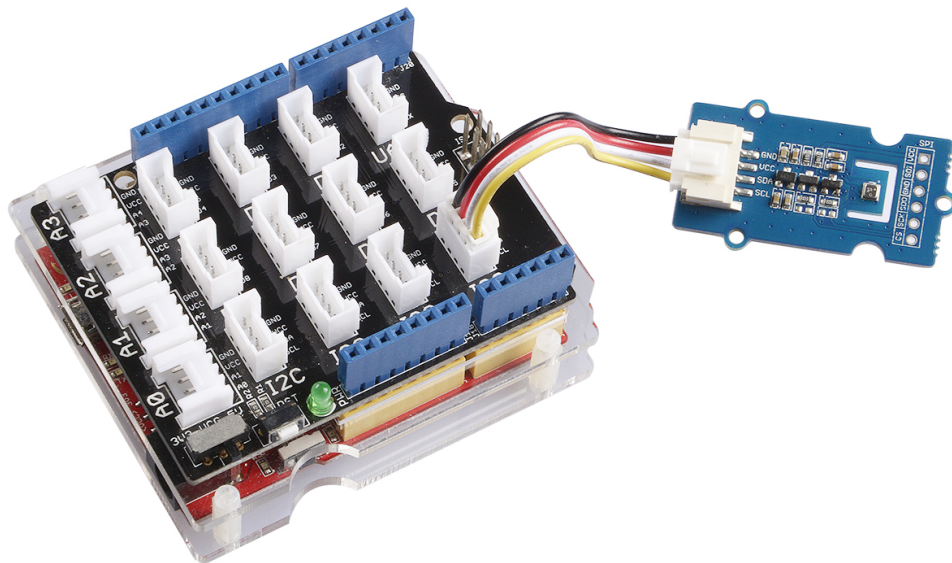
> ✏️ **Note**
> If you don't have a Grove Base Shield, you can also directly connect this module to Seeeduino [https://www.seeedstudio.com/catalogsearch/result/?q=Seeeduino] as below.

Seeeduino_v4	Grove-Barometer_Sensor-BMP280
5V	VCC
GND	GND
SDA	SDA
SCL	SCL

Software

Step 1. Download the library [https://github.com/Seeed-Studio/Grove_BMP280.git] from Github.

Step 2. Refer How to install library [https://wiki.seeedstudio.com/How_to_install_Arduino_Library] to install library for Arduino.

Step 3. Create a new Arduino sketch and paste the codes below to it or open the code directly by the path:File -> Example ->bmp280_example->bmp280_example

Here is the code:

```
1   /*
2    * bmp280_example.ino
```

```
 3    * Example sketch for BMP280
 4    *
 5    * Copyright (c) 2016 seeed technology inc.
 6    * Website    : www.seeedstudio.com
 7    * Author     : Lambor, CHN
 8    * Create Time:
 9    * Change Log :
10    *
11    * The MIT License (MIT)
12    *
13    * Permission is hereby granted, free of charge, to any
14    * of this software and associated documentation files (
15    * in the Software without restriction, including withou
16    * to use, copy, modify, merge, publish, distribute, sub
17    * copies of the Software, and to permit persons to whom
18    * furnished to do so, subject to the following conditio
19    *
20    * The above copyright notice and this permission notice
21    * all copies or substantial portions of the Software.
22    *
23    * THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF
24    * IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES
25    * FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT.
26    * AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM,
27    * LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR
28    * OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE
29    * THE SOFTWARE.
30    */
31  #include "Seeed_BMP280.h"
32  #include <Wire.h>
33
34  BMP280 bmp280;
35
36  void setup()
37  {
38    Serial.begin(9600);
39    if(!bmp280.init()){
40      Serial.println("Device error!");
41    }
42  }
43
```

```
44  void loop()
45  {
46    float pressure;
47
48    //get and print temperatures
49    Serial.print("Temp: ");
50    Serial.print(bmp280.getTemperature());
51    Serial.println("C"); // The unit for  Celsius because
52
53    //get and print atmospheric pressure data
54    Serial.print("Pressure: ");
55    Serial.print(pressure = bmp280.getPressure());
56    Serial.println("Pa");
57
58    //get and print altitude data
59    Serial.print("Altitude: ");
60    Serial.print(bmp280.calcAltitude(pressure));
61    Serial.println("m");
62
63    Serial.println("\n");//add a line between output of di
64
65    delay(1000);
66  }
```
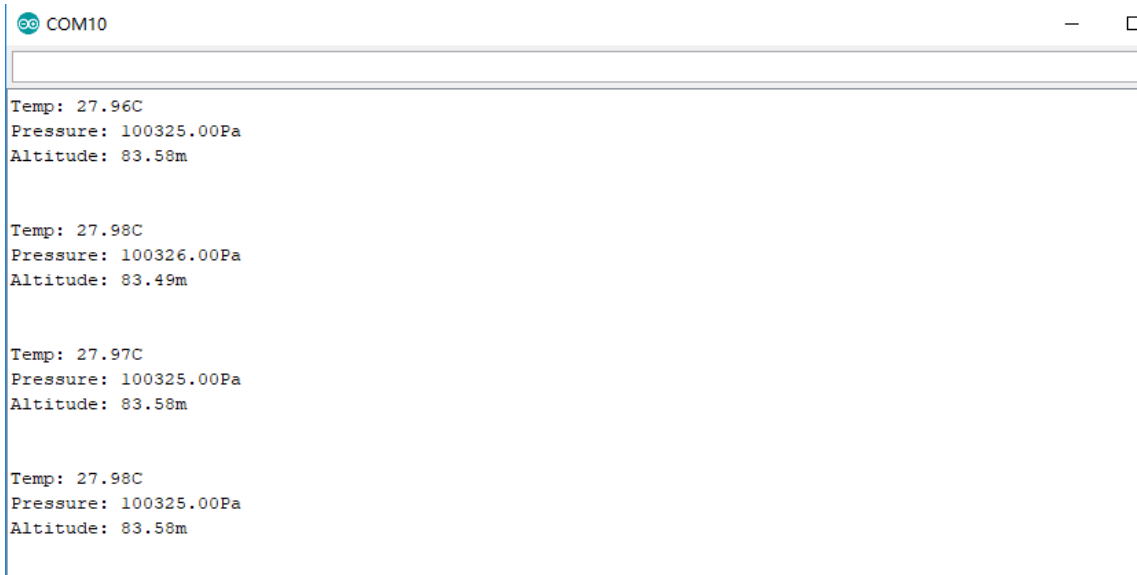
Step 4. Upload the code. If you do not know how to upload the code, please check how to upload code [https://wiki.seeedstudio.com/Upload_Code/].

Step 5. Open the serial monitor to receive the sensor's data including temperature, barometric pressure value, and altitude.

> ✓ **Success**
> The outcome will display on the **Serial Port** as following if everything goes well.

```
COM10                                                              —    □

Temp: 27.96C
Pressure: 100325.00Pa
Altitude: 83.58m


Temp: 27.98C
Pressure: 100326.00Pa
Altitude: 83.49m


Temp: 27.97C
Pressure: 100325.00Pa
Altitude: 83.58m


Temp: 27.98C
Pressure: 100325.00Pa
Altitude: 83.58m
```

Schematic Online Viewer

Resources

- **[Eagle]** Grove-Barometer Sensor BMP280 Schematic [https://files.seeedstudio.com/wiki/Grove-Barometer_Sensor-BMP280/res/Grove%20-%20Barometer%20Sensor_BMP280_Schematic.zip]

- **[Datasheet]** BMP280 Datasheet [https://files.seeedstudio.com/wiki/Grove-Barometer_Sensor-

BMP280/res/Grove-Barometer_Sensor-BMP280-BMP280-
DS001-12_Datasheet.pdf]

- **[References]** I^{2}C how-to for Arduino
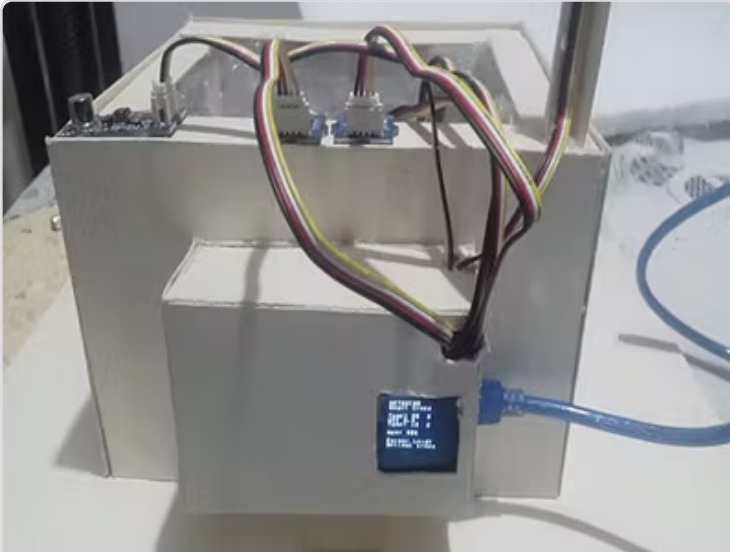 [https://www.arduino.cc/en/Reference/Wire]

Project

Intelligent alarm system made with BBG (IoT)

(https://www.hackster.io/kevin-
lee2/intelligent-alarm-system-made-
with-bbg-iot-5fdccd)

Monitoring System for Smart Crops Design and build a system to
monitor the status of your crops using the Netduino 3 WiFi.

(https://www.hackster.io/gabogiraldo/mo
system-for-smart-crops-dfa4bd)

**Monitoring System for Smart Crops
(https://www.hackster.io/gabogiraldo/monito**

Tech Support

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

[https://www.seeedstudio.com/act-4.html?
utm_source=wiki&utm_medium=wikibanner&utm_campaign=newpr
oducts]