

---

# **BME280 Documentation**

***Release 0.2.2***

**Richard Hull**

**Jun 12, 2018**



---

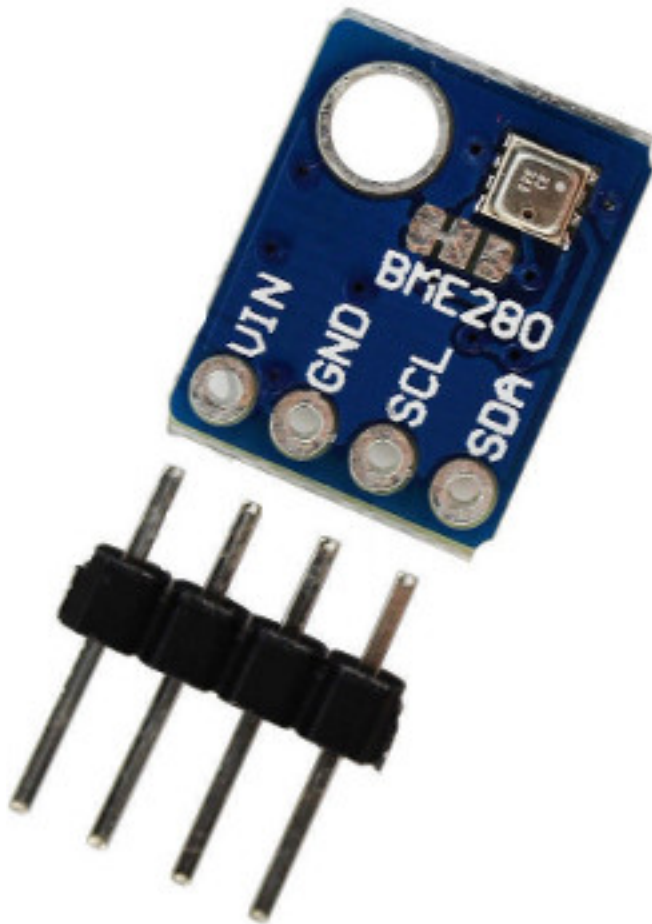
## Contents

---

<b>1</b>	<b>GPIO pin-outs</b>	<b>3</b>
1.1	P1 Header . . . . .	3
<b>2</b>	<b>Pre-requisites</b>	<b>5</b>
<b>3</b>	<b>Installing the Python Package</b>	<b>7</b>
3.1	Cheeseshop install . . . . .	7
<b>4</b>	<b>Software Driver - Example Usage</b>	<b>9</b>
<b>5</b>	<b>References</b>	<b>11</b>
<b>6</b>	<b>License</b>	<b>13</b>
<b>7</b>	<b>Indices and tables</b>	<b>15</b>



Interfacing a Bosch BME280 digital sensor module (capable of sensing temperature, humidity and pressure) in Python 2 or 3 using I2C on the Raspberry Pi. The particular kit I bought can be acquired for a few pounds from [eBay](#). Further technical details for the BME280 sensor can be found in the [datasheet](#) [PDF].





The BME280 is an I2C device, so connecting to the RPi is very straightforward:

### 1.1 P1 Header

For prototyping, the P1 header pins should be connected as follows:

Board Pin	Name	Remarks	RPi Pin	RPi Function
1	VIN	+3.3V Power	P01-1	3V3
2	GND	Ground	P01-6	GND
3	SCL	Clock	P01-5	GPIO 3 (SCL)
4	SDA	Data	P01-3	GPIO 2 (SDA)





## CHAPTER 2

---

### Pre-requisites

---

Ensure that the I2C kernel driver is enabled:

```
$ dmesg | grep i2c
[ 4.925554] bcm2708_i2c 20804000.i2c: BSC1 Controller at 0x20804000 (irq 79)
→(baudrate 100000)
[ 4.929325] i2c /dev entries driver
```

or:

```
$ lsmod | grep i2c
i2c_dev                5769  0
i2c_bcm2708            4943  0
regmap_i2c             1661  3 snd_soc_pcm512x,snd_soc_wm8804,snd_soc_core
```

If you have no kernel modules listed and nothing is showing using `dmesg` then this implies the kernel I2C driver is not loaded. Enable the I2C as follows:

1. Run `sudo raspi-config`
2. Use the down arrow to select 9 Advanced Options
3. Arrow down to A7 I2C
4. Select **yes** when it asks you to enable I2C
5. Also select **yes** when it asks about automatically loading the kernel module
6. Use the right arrow to select the **<Finish>** button
7. Select **yes** when it asks to reboot

After rebooting re-check that the `dmesg | grep i2c` command shows whether I2C driver is loaded before proceeding.

Optionally, to improve performance, increase the I2C baudrate from the default of 100KHz to 400KHz by altering `/boot/config.txt` to include:

```
dtparam=i2c_arm=on,i2c_baudrate=400000
```

Then reboot.

Then add your user to the i2c group:

```
$ sudo adduser pi i2c
```

Install some packages:

```
$ sudo apt-get install i2c-tools python-pip
```

Next check that the device is communicating properly (if using a rev.1 board, use 0 for the bus not 1):

```
$ i2cdetect -y 1
   0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
10:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
20:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
30:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
40:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
50:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
60:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
70:  --  --  --  --  --  --  76  --
```

---

### Installing the Python Package

---

For python2, from the bash prompt, enter:

```
$ sudo python setup.py install
```

This will install the Python files in `/usr/local/lib/python2.7` making them ready for use in other programs.

Alternatively for python3, type:

```
$ sudo python3 setup.py install
```

### 3.1 Cheeseshop install

Alternatively, a version on PyPi is available, just do:

```
$ sudo pip install RPi.bme280
```



## CHAPTER 4

---

### Software Driver - Example Usage

---

Once installed, confirm the I2C address (see prerequisites, it will most likely be 0x76 or 0x77) and port.

Then in a python script or REPL:

```
import smbus2
import bme280

port = 1
address = 0x76
bus = smbus2.SMBus(port)

calibration_params = bme280.load_calibration_params(bus, address)

# the sample method will take a single reading and return a
# compensated_reading object
data = bme280.sample(bus, address, calibration_params)

# the compensated_reading class has the following attributes
print(data.id)
print(data.timestamp)
print(data.temperature)
print(data.pressure)
print(data.humidity)

# there is a handy string representation too
print(data)
```

This then should print something like:

```
ee50df9c-3aa3-4772-8767-73b6bb74f30f
2016-11-18 17:33:28.937863
20.563
980.91
48.41
compensated_reading(id=ee50df9c-3aa3-4772-8767-73b6bb74f30f,
```

(continues on next page)

(continued from previous page)

```
timestamp=2016-11-18 17:33:28.937863, temp=20.563 °C,  
pressure=980.91 hPa, humidity=48.41 % rH)
```

For a data-logger like application, periodically call `bme2.sample(bus, address, calibration_params)` to get time-based readings.

See the [weatherstation project](#) for a more complete example usage.

## CHAPTER 5

---

### References

---

> TODO





## CHAPTER 6

---

### License

---

The MIT License (MIT)

Copyright (c) 2016 Richard Hull

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the “Software”), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED “AS IS”, WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.



## CHAPTER 7

---

### Indices and tables

---

- `genindex`
- `modindex`
- `search`