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# **BME280 Documentation**

*Release 0.2.2*

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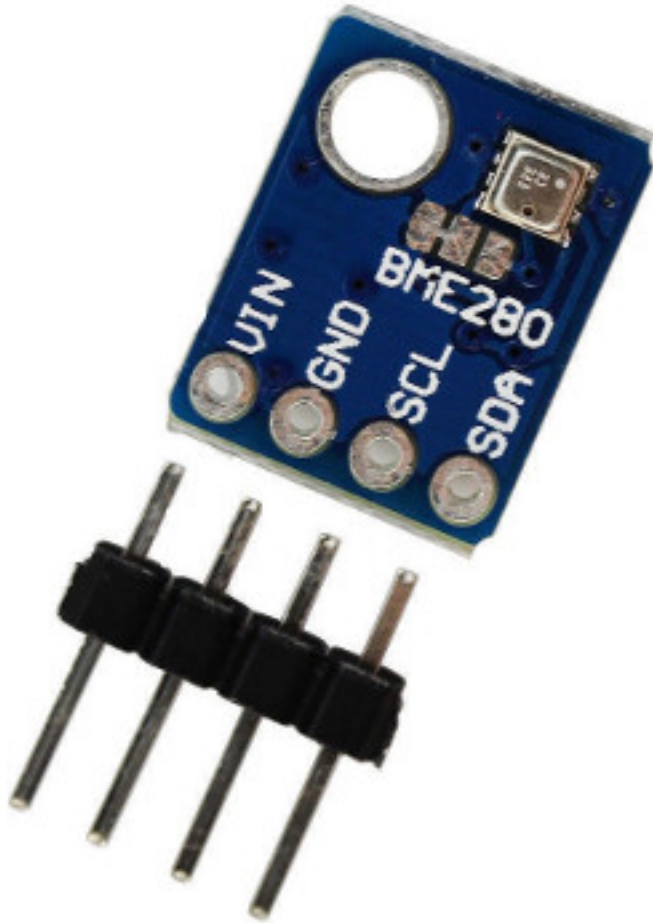
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Interfacing a Bosch BME280 digital sensor module (capable of sensing temperature, humidity and pressure) in Python 2 or 3 using I2C on the Raspberry Pi. The particular kit I bought can be acquired for a few pounds from [eBay](#). Further technical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

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### Pre-requisites

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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  --
```

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## Installing the Python Package

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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
```



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## Software Driver - Example Usage

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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,
```

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```
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

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### References

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> TODO





## CHAPTER 6

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### License

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## CHAPTER 7

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### Indices and tables

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- `modindex`
- `search`