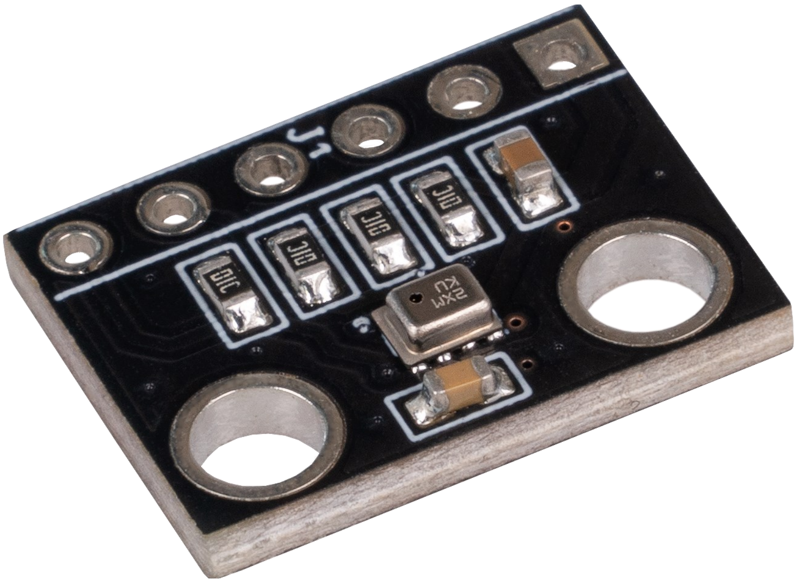
TEMPERATURE AND AIR PRESSURE SENSOR

SEN-KY052



1. GENERAL INFORMATION

Dear customer,

Thank you very much for choosing our product. In the following we will show you what has to be observed during commissioning and use.

Should you encounter any unexpected problems during use, please feel free to contact us.

2. USAGE WITH THE RASPBERRY PI

This guide was written under Raspberry Pi OS Bookworm for the Raspberry Pi 4 and 5. It has not been checked with newer operating systems or hardware.

2.1 Installation

First you need to install **pip3** on your Raspberry Pi, this is done with the following command:

```
sudo apt-get install python3-pip -y
```

The next step is to set up the virtual environment. To do this, enter the following commands:

```
mkdir your_project
```

```
cd your_project
```

```
python -m venv --system-site-packages env
```

```
source env/bin/activate
```

Now you can download and install the required librarys for the sensor as follows:

```
pip3 install adafruit-circuitpython-bmp280
```

```
pip3 install adafruit-circuitpython-lis3dh
```

2.1.1 Installation SPI

To use the sensor with SPI, you must first activate the SPI interface.

To do this, enter the following command:

```
sudo raspi-config
```

Now navigate to **3 Interfacing Options** -> **I3 SPI** and enable the SPI interface.

2.1.2 Installation I2C

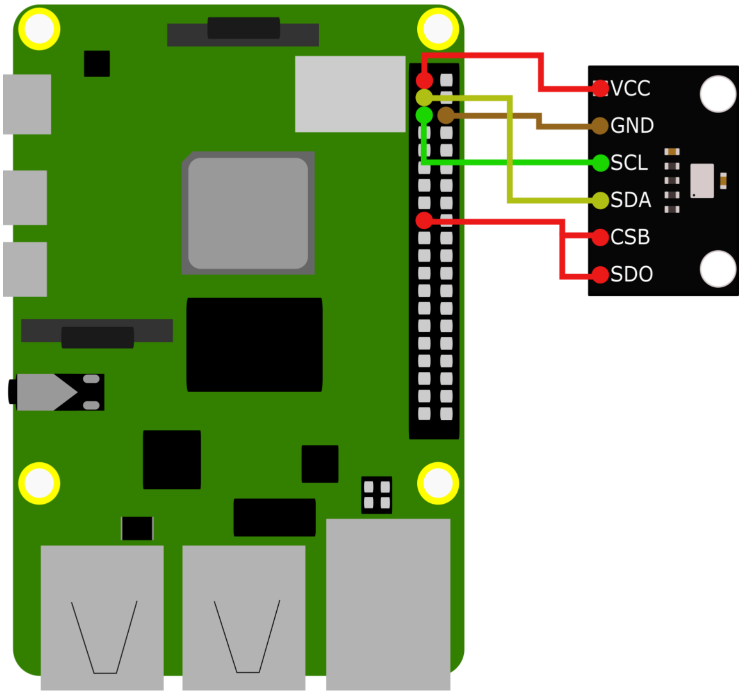
To use the sensor with I2C, you must first activate the I2C interface.

Open the configuration of the Raspberry Pi and activate I2C as follows:

```
sudo raspi-config
```

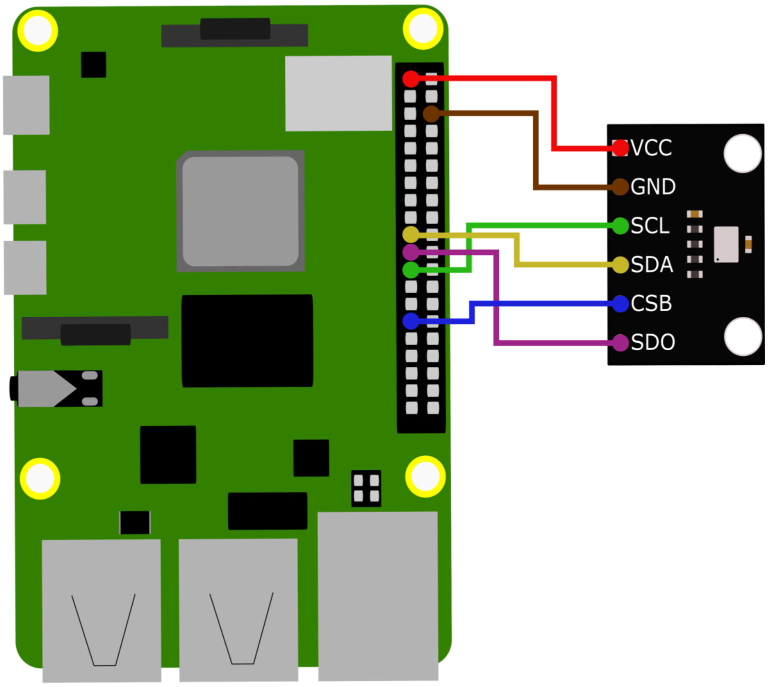
Now navigate to **3 Interface Options** -> **I4 I2C** and enable the I2C interface.

2.2.1 Wiring I2C



Raspberry Pi	KY052
3.3 V (Pin 1, Pin 17)	VCC, SDO, CSB
GND (Pin 6)	GND
SCL (Pin 5)	SCL
SDA (Pin 3)	SDA

2.2.2 Wiring SPI



Raspberry Pi	KY052
3.3 V (Pin 1, Pin 17)	VCC
GND (Pin 6)	GND
SCLK (Pin 23)	SCL
MOSI (Pin 19)	SDA
Pin 29	CSB
MISO (Pin 21)	SDO

2.3 Programming example

In the following programme example, the temperature, the air pressure and the calculated altitude are shown.

In order for the altitude to be calculated correctly, the following line in the programme example must be adjusted:

```
sensor.sea_level_pressure = 1013.25
```

Replace the 1013.25 with the QNH pressure in hPa (the pressure at sea level) at your location. Weather services can give you information on this.

2.3.1 I2C example

Now test your BMP280 with the following sample code.
First create a file with:

```
sudo nano bmp280.py
```

An empty window will now open in which you can enter the following example code.

```
import board
import busio
import adafruit_bmp280

# i2c initialisation
i2c = busio.I2C(board.SCL, board.SDA)
sensor = adafruit_bmp280.Adafruit_BMP280_I2C(i2c)

# Replace the 1013.25 with the QNH pressure in hPa (the pressure at sea level)
# at your location. Weather services can give you information on this.
sensor.sea_level_pressure = 1013.25

# output sensor data
print("\nTemperature: %0.1f *C" % sensor.temperature)
print("Air pressure: %0.1f hPa" % sensor.pressure)
print("Altitude: %0.2f m" % sensor.altitude)
```

2.3.1 SPI example

```
import board
import busio
import adafruit_bmp280
import digitalio

#spi initialisation
spi = board.SPI()
bmp_cs = digitalio.DigitalInOut(board.D5)
sensor = adafruit_bmp280.Adafruit_BMP280_SPI(spi, bmp_cs)

# Replace the 1013.25 with the QNH pressure in hPa (the pressure at sea level)
# at your location. Weather services can give you information on this.
sensor.sea_level_pressure = 1013.25

# output sensor data
print("\nTemperature: %0.1f *C" % sensor.temperature)
print("Air pressure: %0.1f hPa" % sensor.pressure)
print("Altitude: %0.2f m" % sensor.altitude)
```

Save the source code with the key combination **CTRL + O** and confirm with **Enter**. Exit the editor with **CTRL + X**.

You execute the programme example with the following command:

```
sudo python3 bmp280.py
```

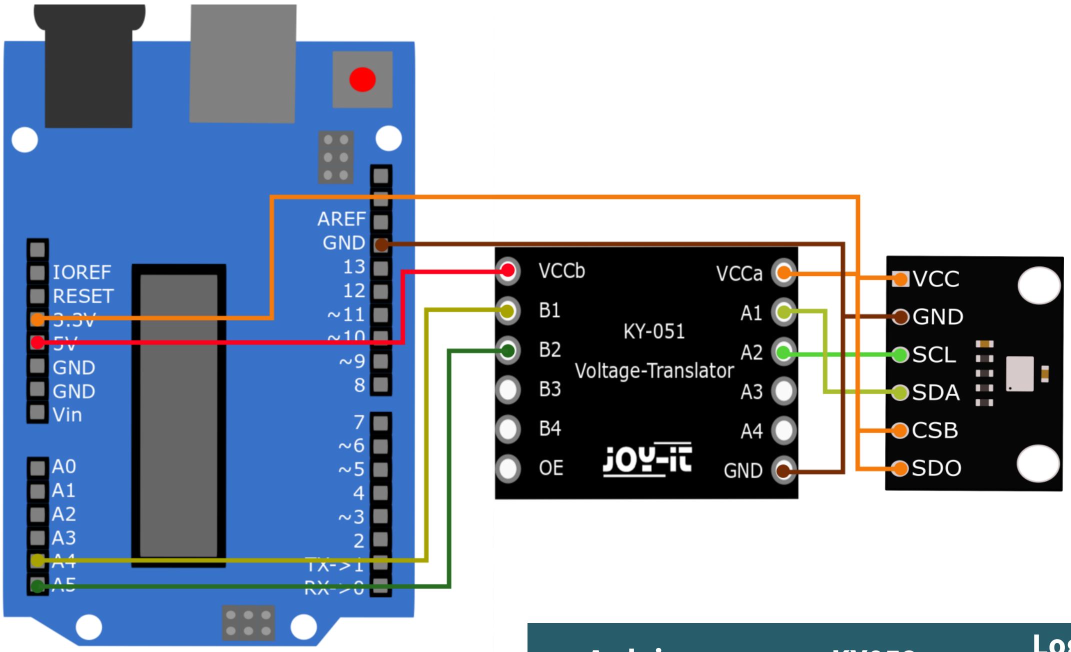
3. USAGE WITH THE ARDUINO

3.1 Installation

In order to use the sensor with the Arduino, you must first download the required library here. Unzip the folder and save it in your Libraries folder. This is usually located under Documents → Arduino → Libraries.

3.2.1 Wiring I2C

Since the sensor operates with a logic level of 3.3 V and the Arduino UNO with 5 V, you need a logic level converter to use it. In this example, the COM-KY051VT from Joy-IT is used.

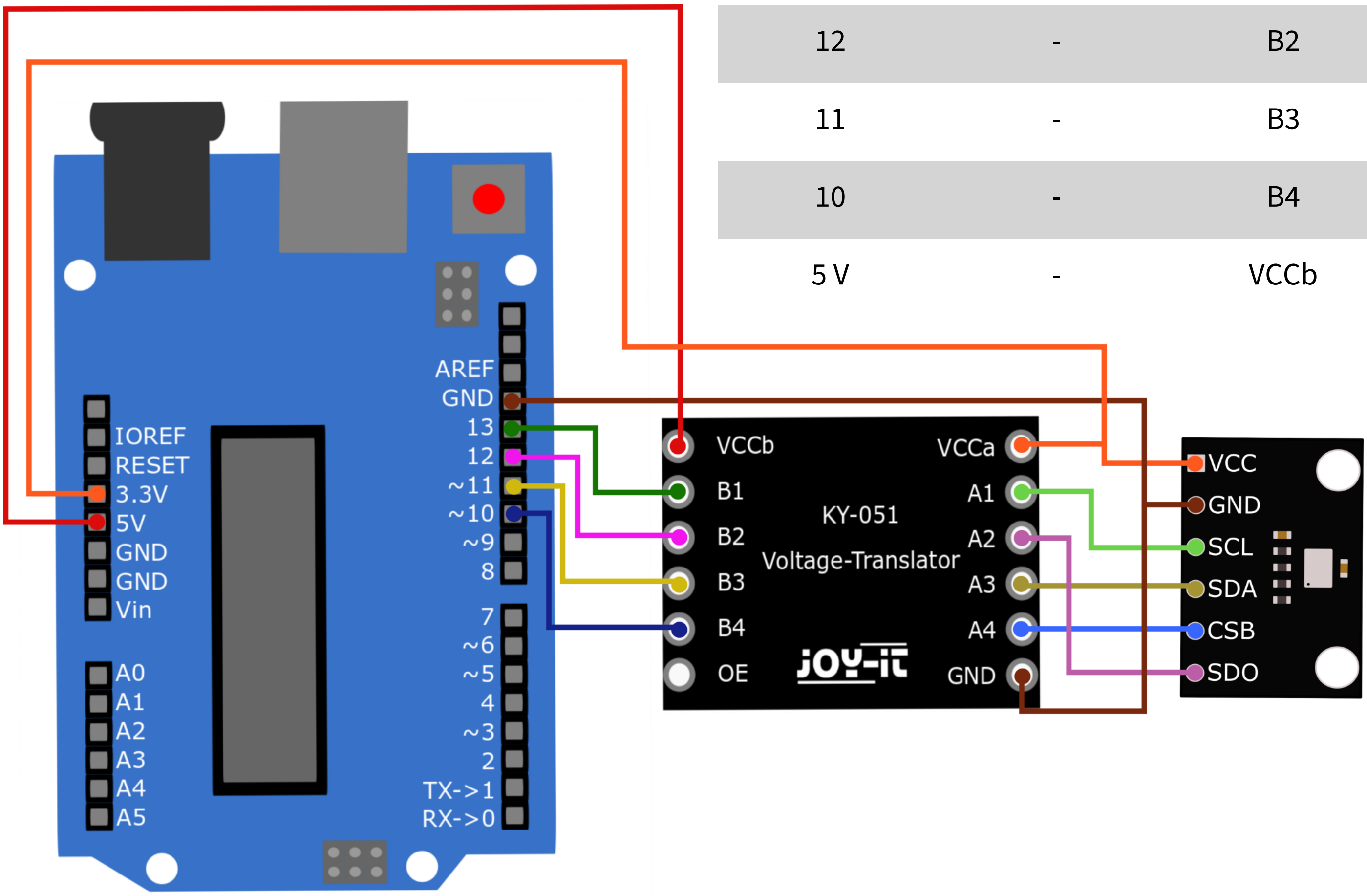


Arduino	KY052	Logic level converter
3.3 V	VCC, SDO, CSB	VCCa
GND	GND	GND
-	SDA	A1
-	SCL	A2
A4	-	B1
A5	-	B2
5 V	-	VCCb

3.2.2 Wiring SPI

Since the sensor operates with a logic level of 3.3 V and the Arduino UNO with 5 V, you need a logic level converter to use it. In this example, the COM-KY051VT from Joy-IT is used.

Arduino	KY052	Logic level converter
3.3 V	VCC, SDO, CSB	VCCa
GND	GND	GND
-	SCL	A1
-	SDO	A2
-	SDA	A3
-	CSB	A4
13	-	B1
12	-	B2
11	-	B3
10	-	B4
5 V	-	VCCb



3.3 Programming example

In the following programme example, the temperature, the air pressure and the calculated altitude are regularly displayed in the serial console.

In order for the altitude to be calculated correctly, the following line in the programming example must be adjusted:

```
#define localQNH 1013.25
```

Replace the 1013.25 with the QNH pressure in hPa (the pressure at sea level) at your location. Weather services can give you information on this.

3.3.1 I2C example

```
/**************************************************************************
  This is a library for the BMP280 humidity, temperature & pressure sensor

  Designed specifically to work with the Adafruit BMEP280 Breakout
  ----> http://www.adafruit.com/products/2651

  These sensors use I2C or SPI to communicate, 2 or 4 pins are required
  to interface.

  Adafruit invests time and resources providing this open source code,
  please support Adafruit andopen-source hardware by purchasing products
  from Adafruit!

  Written by Limor Fried & Kevin Townsend for Adafruit Industries.
  BSD license, all text above must be included in any redistribution
 **************************************************************************/

#include <Wire.h>
#include <Adafruit_BMP280.h>

#define localQNH 1013.25

Adafruit_BMP280 bmp; // I2C

void setup() {
  Serial.begin(9600);
  Serial.println(F("BMP280 test"));

  if (!bmp.begin()) {
    Serial.println(F("Could not find a valid BMP280 sensor, check wiring!"));
    while (1);
  }
}

void loop() {
    Serial.print(F("Temperature = "));
    Serial.print(bmp.readTemperature());
    Serial.println(" *C");

    Serial.print(F("Pressure = "));
    Serial.print(bmp.readPressure());
    Serial.println(" Pa");

    Serial.print(F("Approx altitude = "));
    Serial.print(bmp.readAltitude(localQNH));
    Serial.println(" m");

    Serial.println();
    delay(2000);
}
```

3.3.2 SPI example

```
/***************************************************************************
  This is a library for the BMP280 humidity, temperature & pressure sensor

  Designed specifically to work with the Adafruit BMEP280 Breakout
  ----> http://www.adafruit.com/products/2651

  These sensors use I2C or SPI to communicate, 2 or 4 pins are required
  to interface.

  Adafruit invests time and resources providing this open source code,
  please support Adafruit andopen-source hardware by purchasing products
  from Adafruit!

  Written by Limor Fried & Kevin Townsend for Adafruit Industries.
  BSD license, all text above must be included in any redistribution
 ***************************************************************************/
#include <Wire.h>
#include <SPI.h>
#include <Adafruit_BMP280.h>

#define BMP_SCK 13
#define BMP_MISO 12
#define BMP_MOSI 11
#define BMP_CS 10

Adafruit_BMP280 bmp(BMP_CS, BMP_MOSI, BMP_MISO,  BMP_SCK);

void setup() {
  Serial.begin(9600);
  Serial.println(F("BMP280 test"));

  if (!bmp.begin()) {
    Serial.println(F("Could not find a valid BMP280 sensor, check wiring!"));
    while (1);
  }
}

void loop() {
    Serial.print(F("Temperature = "));
    Serial.print(bmp.readTemperature());
    Serial.println(" *C");

    Serial.print(F("Pressure = "));
    Serial.print(bmp.readPressure());
    Serial.println(" Pa");

    Serial.print(F("Approx altitude = "));
    Serial.print(bmp.readAltitude(1013.25)); // this should be adjusted to your local forcase
    Serial.println(" m");

    Serial.println();
    delay(2000);
}
```

4. OTHER INFORMATION

Our Information and Take-back Obligations according to the Electrical and Electronic Equipment Act (ElektroG)

Symbol on Electrial and Electronic Products:
This crossed-out bin means that electrical and electronic products do not belong into the household waste. You must hand over your old appliance to a registration place. Before you can hand over the old appliance, you must remove used batteries and replacement batteries which are not enclosed by the device.

Return Options:
As the end user, you can hand over your old appliance (which has essentially the same functions as the new one bought with us) free of charge for disposal with the purchase of a new device.
Small devices, which do not have outer dimensions bigger than 25 cm can be handed in for disposal independently of the
purchase of a new product in normal household quantities.

1. Possibility of return at our company location during our opening hours
SIMAC Electronics GmbH, Pascalstr. 8, D-47506 Neukirchen-Vluyn

2. Possibility of return nearby
We will send you a parcel stamp with which you can send us your old appliance free of charge. For this possibility, please contact us via email at service@joy-it.net or via telephone.

Information about Package:
Please package your old appliance safe for transport. Should you not have suitable packaging material or you do not want to use your own material, you can contact us and we will send you an appropriate package.

5. SUPPORT

If any questions remained open or problems may arise after your purchase, we are available by email, telephone and ticket support system to answer these.

Email: service@joy-it.net
Ticket-system: https://support.joy-it.net
Telephone: +49 (0)2845 9360 – 50 (Mon - Thur: 09:00 - 17:00 o'clock,
Fri: 09:00 - 14:30 o'clock)

For further information visit our website:
www.joy-it.net

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