# Temperature, Pressure and Humidity Monitoring with Raspberry Pi

Hardware

Besides a Raspberry Pi - in use is the Raspberry Pi 2 Model B V1.1, the datatransfer takes place over a ethernetcable, the Raspberry Pi 3 is the first one which has a build-in wireless chip - two sensors are needed. In use are the sensors AM2302 for humidity and temperature and BMP280 for pressure and temperature. The only difference between AM2302 and DHT22 is that one has an integrated 5,1 K Pullup-Resistor and attached cables and the other one has pins and needs an external Pullup-Resistor (around 10 K) between the dataconnection and the VCC-Pin, both cases are covered below.

First, you need to connect the sensors as following.
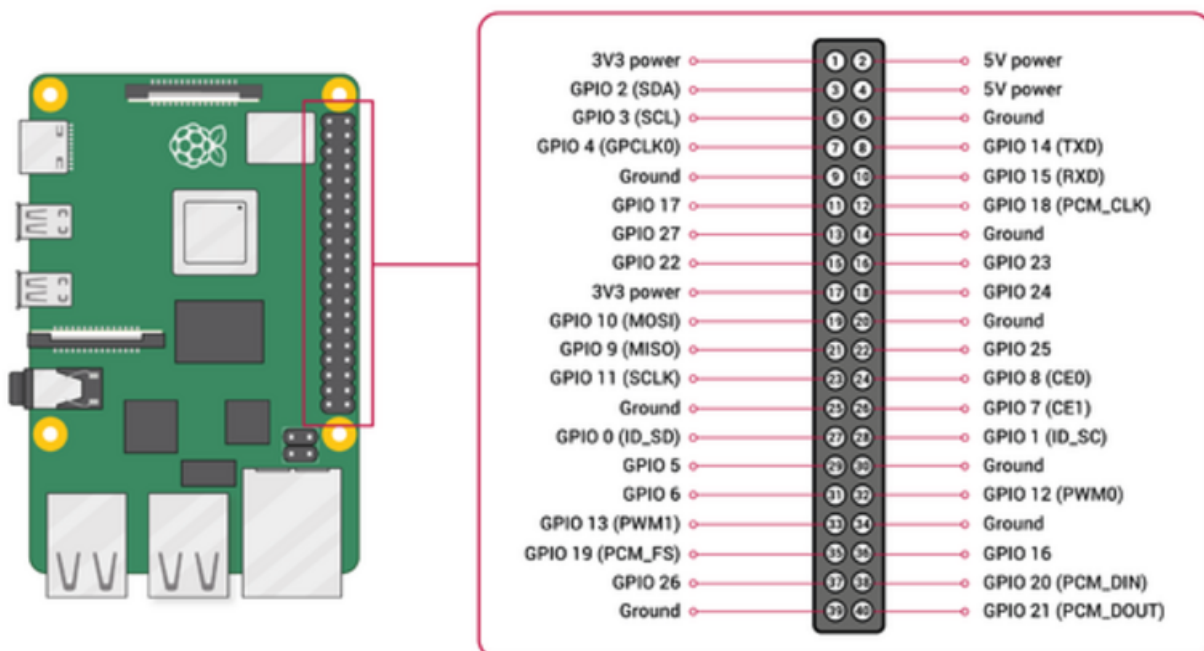
Raspberry Pi	BMP280
3,3 V	1 VCC
Ground	2 GND
SCL (GPIO 3)	3 SCL
SDA (GPIO 2)	4 SDA
NC	5 CSB
NC	6 SD0

Raspberry Pi	AM2302	DHT22
3,3 V	Red	1 VCC
Ground	Black	4 Ground
some GPIO Pin	Yellow	2 Data

This sensor works with 5 V supply voltage, too, but the sensor uses the same voltage on it's dataconnection and the Raspberry Pi can only take 3,3 V on it's GPIO pins, which is why we run the sensor with 3,3 V supply voltage. If you work with an Arduino, consider using 5 V supply voltage instead.

Software

The communication with the sensors is written in C, but there are Python-packages from Adafruit to easily integrate the communication in personal codes and applications. Here's a short overview on how to read out the sensors:

After setting up the Raspberry Pi you need to enable I2C and 1-Wire connection. Enter the command `raspi-config` and go to Interfacing Options or Advanced Options (depends on your model) and enable I2C and 1-Wire. Reboot afterwards. Next you need to install some packages using the following commands:

`sudo apt install -y python3-smbus i2c-tools`

`sudo apt-get install build-essential python-dev python-openssl git-core`

Go to your home directory with `cd ~` and clone the branch of the AM2302 python project with the following command.

`git clone` https://github.com/adafruit/Adafruit_Python_DHT.git

Then change into the directory you just downloaded:

`cd Adafruit_Python_DHT`

And compile the code you downloaded, so that it fits your board.

`sudo python setup.py install`

From now on you can manually read out humidity and temperatur by entering the following command in any directory. The first number is the argument for the sensormodel you use (11,22, or 2302), the second argument is the GPIO pin number (not the physical pin number!) you attached your dataconnection to. If the sensor is connected to

`./Adafruit_Python_DHT/examples/AdafruitDHT.py 2302 18`