Environmental Sensor

NAME: I2C BME680 Environmental Sensor

https://abra-electronics.com/sensors/sensors-temperature-en/sen0248-gravity-i2c-bme680-environmental-sensor.html

https://www.dfrobot.com/wiki/index.php/Gravity: I2C_BME680_Environmental_Sensor_(VOC,_Temperature,_Humidity,_Barometer)_SKU:_SEN0248# More_Documents

General Information:

DFRobot BME680 Environmental Sensor is a low power gas, pressure, temperature & humidity sensor based on BOSCH BME680 sensor. It is a 4-in-1 multi-functional MEMS environmental sensor which integrates VOC (Volatile Organic Compounds) sensor, temperature sensor, humidity sensor and barometer.

With DFRobot Gravity BME680 Environmental Sensor, you can monitor 4 environmental parameters simultaneously at the most. It is designed for air quality monitor, and due to the MEMS technology, BME680 has a small size and low power consumption. It can be widely used in environmental monitoring, home automation and control, Internet of Things (IoT) wearable device, GPS enhancement, etc.

DFRobot Gravity BME680 environmental sensor provides a Gravity I2C connector, plug & play, easy to connect. With onboard voltage regulator IC and level translator IC, DFRobot Gravity BME680 environmental sensor shows good compatibility. It can be directly connected to 3.3V and 5V systems. Moreover, there is also a SPI connector in reserve for further expansion projects.

With the development of industrialization, air pollution is getting worse and worse. Toxic chemical odors are even common with new furniture. These invisible killers are destroying your health day by day. You do need to concern about your health as soon as possible and DFRobot Gravity BME680 environmental sensor can help make an air quality monitor. DFRobot Gravity BME680, take good care of your health!

FEATURES

- MEMS sensor, small size, low power consumption, high reliability
- Wide voltage input, compatible with 3.3V and 5V controller
- Highly integrated environmental sensor: temperature, humidity, barometer and VOC, four-in-one environmental parameter monitoring
- Gravity I2C connector, plug and play, while reserving XH2.54 SPI connector for expansion
- Small size and easy to install

APPLICATIONS

- Indoor air quality monitoring
- Weather station
- Smart home
- Internet of Things
- Wearable

SPECIFICATION

- Input Voltage: 3.3V~5.0V
- Operating Current: 5mA (25mA in VOC)
- Wiring Connector: Gravity I2C
- Connector in Reserve: SPI
- Temperature Measurement Range: -40℃~+85℃
- Temperature Measurement Precision: ±1.0℃(0~65℃)
- Humidity Measurement Range: 0-100%r.H.
- Humidity Measurement Precision: ±3%r.H.(20-80% r.H.,25℃)
- Atmospheric Pressure Measurement Range: 300-1100hPa
- Atmospheric Pressure Measurement Precision: ±0.6hPa(300-1100hPa,0~65℃)
- IAQ (Indoor Air Quality) Range: 0~500 (the larger the worse)
- Module Size: 30 × 22(mm) / 1.18 x0.87(inches)

EXTERNAL LIBRARY

DFRobot BME680 Library – Download for Arduino
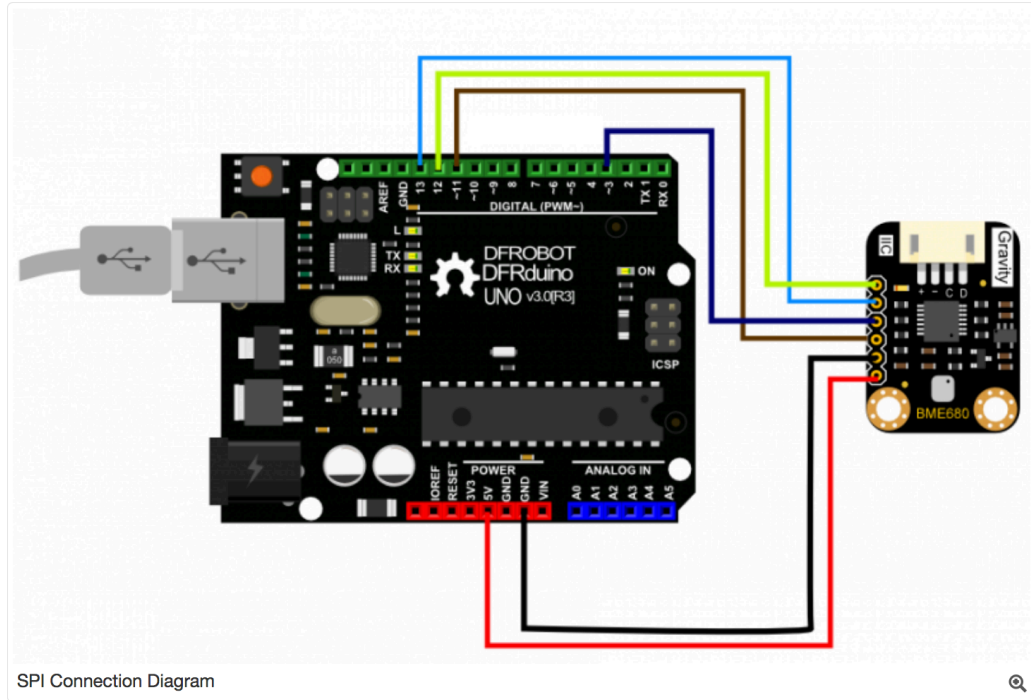
https://github.com/DFRobot/DFRobot_BME680

LAYOUT
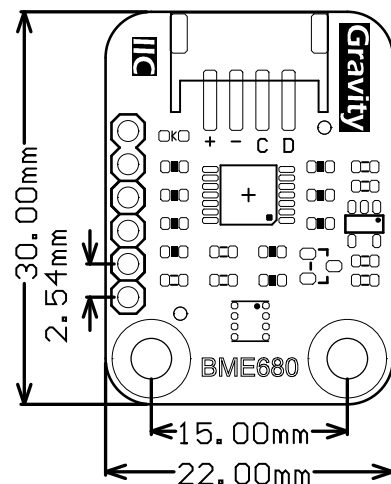
CONNECTION TO ARDUINO

SPI Connection Diagram

You must pay attention to the wiring order, VCC to Power Supply, GND to Ground.

SPI Connection Diagram

Microphone Sound Sensor

NAME: <mark>SENS-42 LM393 Microphone Sound Sensor Module For Arduino</mark>

https://abra-electronics.com/sensors/sensors-sound-en-2/sens-42-lm393-microphone-sound-sensor-module-for-arduino.html

https://sites.google.com/site/summerfuelrobots/arduino-sensor-tutorials/microphones-with-arduino

https://www.youtube.com/watch?v=aa3F4ALaEok

General Information: The microphone sound sensor module will <mark>detect any audio signals and convert them to either analog output or digital output to any microcontroller</mark> you connect it to. It uses the LM393 Chip from Texas instruments to help amplify the audio signal before sending it to your microcontroller.

One of the most recent trends in <mark>the uses for microphones is **voice control**, were users are able to use their voices to control a computer or other electronic device without having to physically interact with it.</mark>

Many "smart homes" use microphone-enabled systems to allow the user to control, for example, a lamp. Inspired by this idea, this tutorial aims to teach how to make a clap-controlled lamp with an Arduino, demonstrating the use of a microphone sensor.

SPECIFICATION

- Input Voltage VCC: <mark>4-6v</mark>
- Dimensions: 35 x 15 x 11 mm (L x W x H)
- Frequency range: <mark>100 ~ 10,000 Hz.</mark>
- Sensitivity: <mark>- 46 ± 2.0, (0 dB = 1V / Pa) at 1K Hz.</mark>
- Power supply: <mark>5V maximum</mark>
- Minimum Sensitivity to Noise Ratio: <mark>58dB</mark>

Example of Use

The Arduino board is able to analyze certain levels of sound being detected by the microphone, and, if the level is high enough, it sends a signal to the relay, allowing power to flow to the lamp.
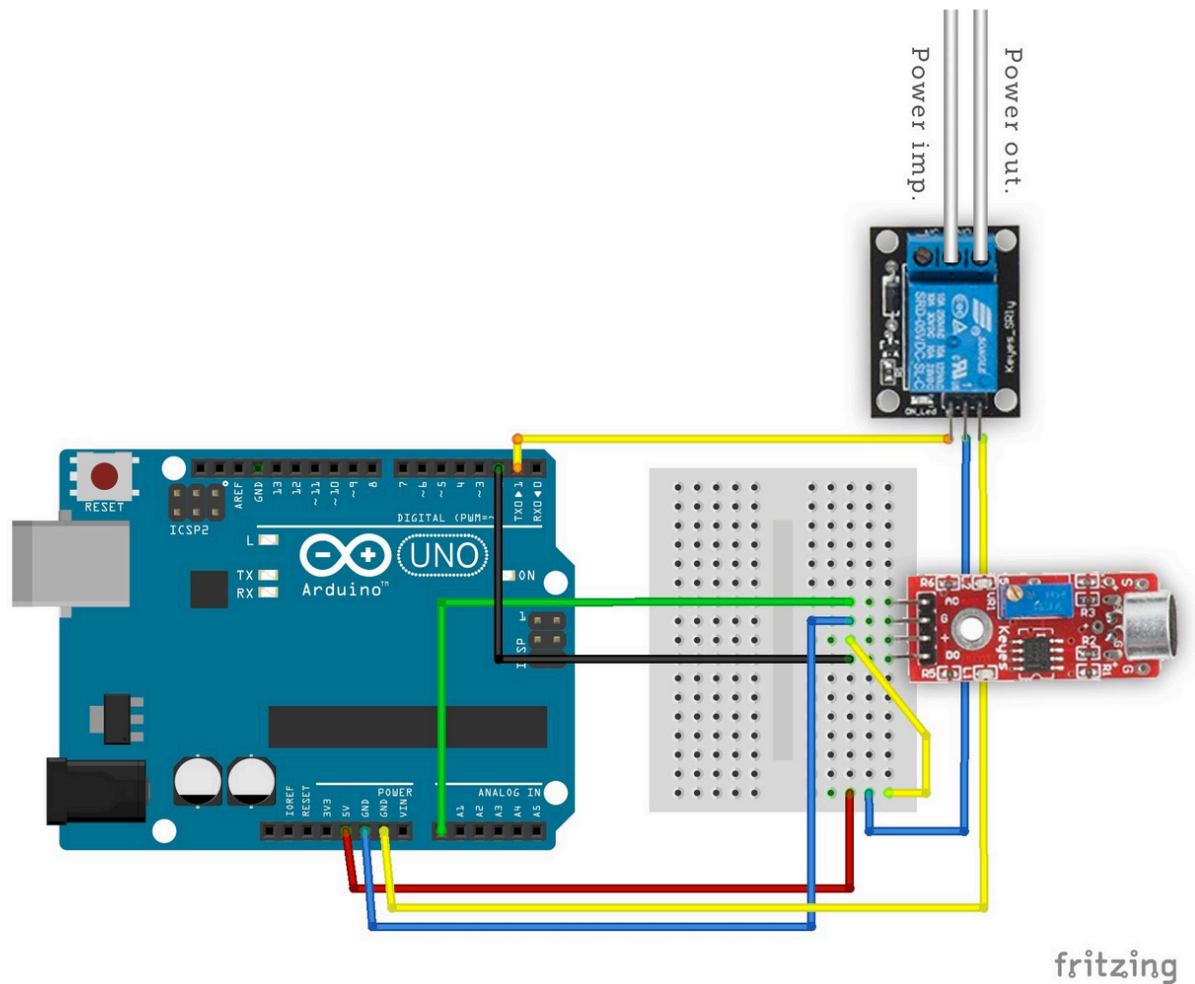
In case the microphone is not detecting your sounds properly<mark>, try changing its **sensitivity**, either in the hardware (by rotating a small screw on the blue resistor on the microphone) or in the software</mark>

CONNECTING TO ARDUINO (EXAMPLE):

https://sites.google.com/site/summerfuelrobots/arduino-sensor-tutorials/arduino-sound-sensor

Materials / Equipment

- Arduino UNO Board
- A Board of Education Shield (optional)
- 8 wires
- A KY-038 microphone (included in the 37-in-1 Sensor Module Kit for Arduino from dx.com)
- A Songle relay
- A lamp
- A extension cable

Proximity Sensor

https://abra-electronics.com/sensors/sensors-proximity-en/sens-ap3216-proximity-light-sensor-for-3.3vdc-micro-controllers.html

https://www.roboremo.com/reading-ap3216-with-arduino.html

https://www.dizmo.com/arduino-gesture-sensor-tutorial/

https://datasheetspdf.com/pdf/1016217/LITE-ON/AP3216C/1

https://abra-electronics.com/sensors/sensors-proximity-en/hc-sr04p3-5.5v-wide-voltage-rangeultrasonic-proximity-sensor.html

https://cdn.sparkfun.com/assets/b/3/0/b/a/DGCH-RED_datasheet.pdf

NAME: HC-SR04P 3-5.5VDC Wide Voltage Range Ultrasonic Proximity Sensor

The HC-SR04P Ultrasonic Sensor is the newest version of the well known HC-SR04; a very affordable proximity/distance sensor that has been used mainly for object avoidance in various robotics projects. It has also been used in turret applications, water level sensing, and even in parking sensors. It is not only capable of running on a wider voltage range coming from the MCU but also it delivers higher accuracy readings, compared to its older version at the cost of losing a tiny bit of the measuring range.
The driving voltage can be as low as 3v to accommodate all the various types of micro controllers (5V max).

The HC-SR04-P pin-outs and code are fully compatible with the old version HC-SR04. Users can be seamlessly switched with the old version HC-SR04 if wanted.

Specifications

- Wide voltage operation: 3V-5.5 VDC
- Detecting distance: 5V: 2cm - 450cm 3.3V: 2cm - 400cm
- Precision: 2mm
- Frequency: 40 KHz
- Detection angle: <15
- Operating temperature: -20 - 80 degrees Celsius

NAME: Proximity Light Sensor for 3.3VDC Micro-Controllers

It's a bird, it's a plane, well whatever it is, the object is detected by this sensor. It can record what distance it passed by and the area where it was. This sensor is often referred to as the gesture sensor, since users can write neat software for the sensor to pick up when an pass by the sensor. You can have the direction, proximity and even color of the object that passes over the sensor.

The AP3216C sensor is an integrated module that contains an ambient light sensor (ALS), proximity sensor (PS) and IR LED in a single small package. It is used in mobile phones, to measure the ambient light and adjust the screen brightness, or to detect when you hold your phone to the ear, and disable the touchscreen.

The sensor connects over I2C bus, so it can be easily interfaced with Arduino. Arduino accepts commands from the Serial Monitor.

It's a super cool all in one wonder! Thanks to the I2C protocol integrated onto this board, you have multiple devices sending signal to your microcontroller using two wires for data. All you have to do in software is address them. This board has even provided an interrupt pin.

This device runs on 3.3VDC only

SPECIFICATION

- 17x15x3mm (LxWxH)
- Operating Voltage: 3.3VDC
- Communication Protocol: I2C
- Current Draw: 200µA Active, 38µA Idle, 1µA sleep state

CONNECTING TO ARDUINO

https://www.youtube.com/watch?v=ILqh69OWJmQ

https://www.instructables.com/id/Simple-Arduino-and-HC-SR04-Example/