

MQ gas and air quality sensors

**EXAMPLE SETUP SUITABLE FOR:
SNS-MQ2, SNS-MQ3, SNS-MQ7, SNS-MQ135**

This guide is suitable for MQ sensors

Revision A, January 2015

1. Goal of the guide:

Read the values of a MQ sensor

2. Requirements

2.1 Hardware

1 x Gas or air quality sensor
1 x Arduino or Arduino-like board
3 x Male-female jumper wires
1 x Mini USB cable
1 x Personal computer

2.2 Software

1 x Arduino IDE

2.3 Our setup

1 x SNS-MQ2
1 x OLIMEXINO-328
3 x Male-female jumper wires
1 x Mini USB cable
1 x Personal computer
1 x Arduino IDE version 1.0.6

3. Assembling the hardware setup

3.1 Selecting a sensor

In order to read the data that an MQ sensor acquires we first need an MQ sensor. The hardware and software setup of each of them is identical. The power consumption also. However, each of them is suitable for the detection of a different set of substances in the air. Each of the sensors has own its web page.

SNS-MQ2 is a sensor that detects LPG, propane and hydrogen in the air. It can be also be used to detect methane and other combustible substances. Link to web page:

<https://www.olimex.com/Products/Components/Sensors/SNS-MQ2/>

SNS-MQ3 is air detector suitable for detecting alcohol and benzin.

<https://www.olimex.com/Products/Components/Sensors/SNS-MQ3/>

SNS-MQ7 is a highly sensitive detector of carbon monoxide in the air.

<https://www.olimex.com/Products/Components/Sensors/SNS-MQ7/>

SNS-MQ135 is an air sensor that detects NH₃, NO_x, alcohol, benzene, smoke, CO₂, etc.

<https://www.olimex.com/Products/Components/Sensors/SNS-MQ135/>

Each of the sensors has a datasheet with more detailed information. The datasheet is located in the “DOCUMENTS” section of the sensor's web page.

Now we have to pick a sensor depending on what we want to detect – do we want to detect the carbon monoxide in our car or we want to build an alcohol breathalyzer? Or maybe we have to detect eventual leak of combustible gas and sound the alarm?

3.2 Selecting a host board

At this point you have a sensor. In this example, we would use SNS-MQ2.

Yet, a sensor alone can't provide us with any information about the air. The sensors described in the previous chapter would not work in stand-alone mode. They lack a general-purpose microcontroller. They need a host board to send data to. The host board would also provide power to the sensors.

How to chose a board suitable for the sensor?

The sensors need proper powering over a 5V voltage source and a ground line; and they send data over an analog data line or over a digital data line.

It would be easiest to use an Arduino or Arduino-like board. Using such a board would lead to easier hardware connection and fewer lines of code. The three signals required are available at the typical Arduino connectors.

We would use OLIMEX OLIMEXINO-328 for this example – it is an Arduino-like board with ATmega328p.

3.3 Connecting the hardware together

At this point we have selected a sensor and a main board. They need to be physically connected to be able to interact. In order to establish all the necessary connections we would need three jumper wires (with male-female connectors at each end), a mini USB cable and a personal computer.

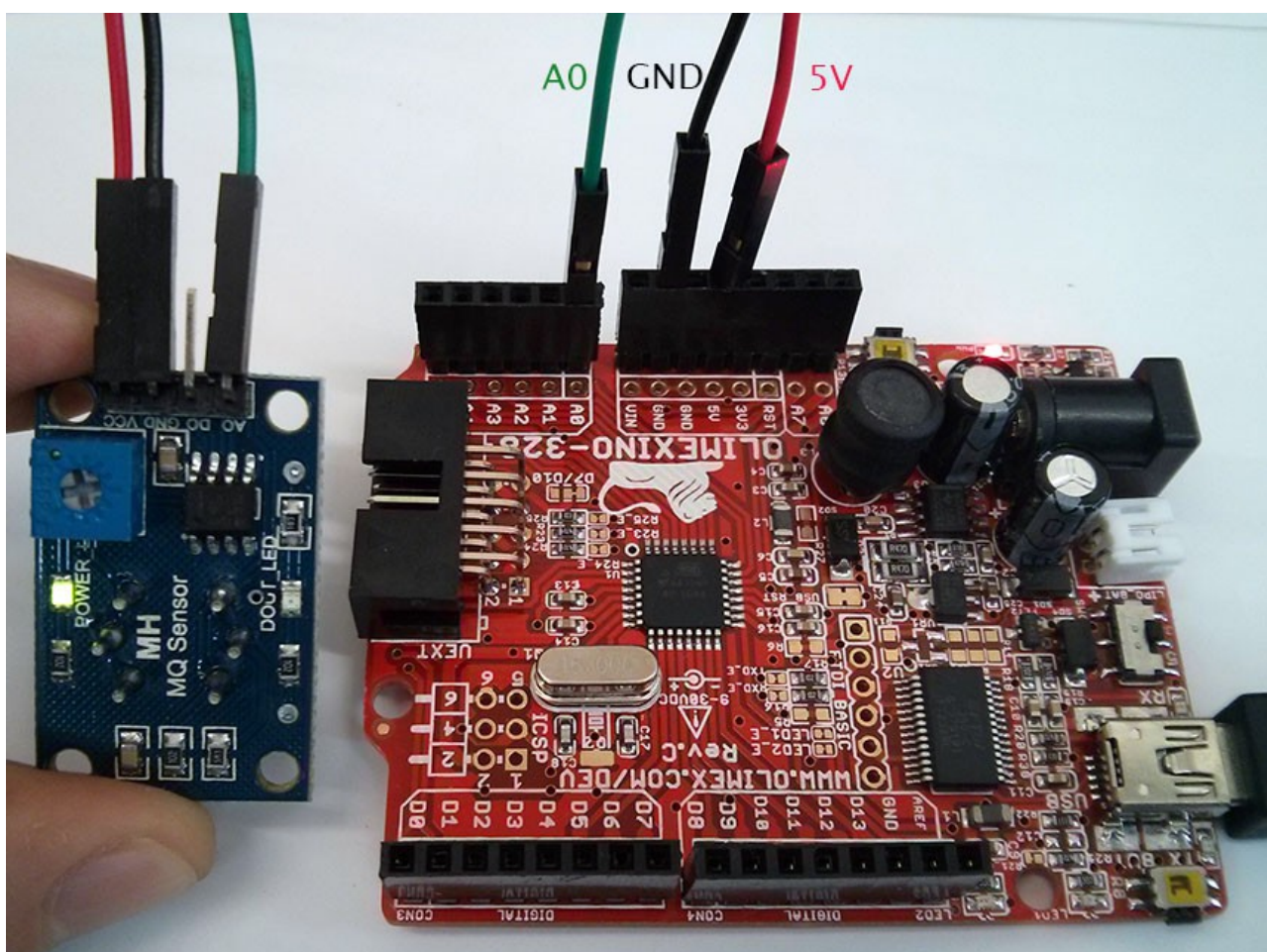
The mini USB cable would establish a connection between OLIMEXINO-328 and the personal computer. The three jumper wires would connect the OLIMEXINO-328 with the MQ sensor. The connection would like this:

PC ↔ mini USB ↔ OLIMEXINO-328 ↔ jumper wires ↔ MQ sensor

The connection of the PC, mini USB and OLIMEXINO-328 is pretty self-explanatory. The jumper wires get connected in the following way:

- AO (Analog Output) pin of SNS-MQ2 gets connected to A0 pinhole of the shield connector of OLIMEXINO-328
- GND (Ground) pin of SNS-MQ2 gets connected to GND pinhole of the shield connector of OLIMEXINO-328
- VCC (Voltage from power supply pin of SNS-MQ2 gets connected to 5V pinhole of the shield connector of OLIMEXINO-328

The hardware connection of the jumper wires looks like this:



4. Running the software

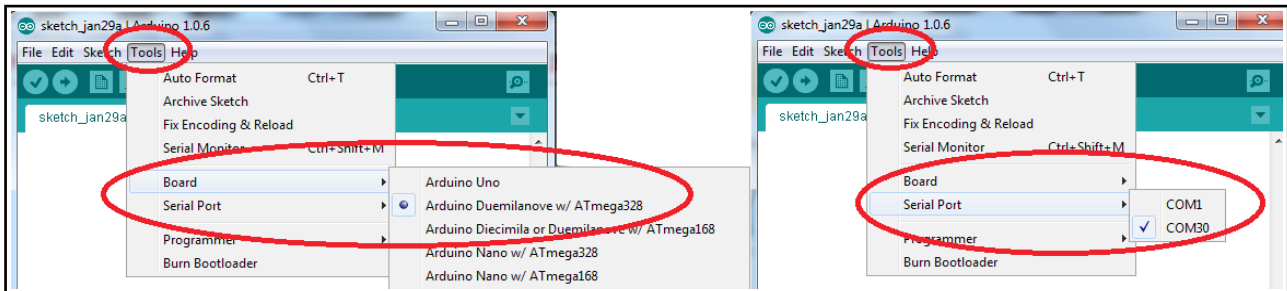
4.1 Installing and configuring Arduino IDE

The Arduino IDE can be downloaded from the official web-site. There is nothing extra we would use.

The best practice would be to visit Arduino web-site and download the version of the software suitable for your operating system.

After installation, we launch Arduino IDE and select the proper board and the COM port it gets associated with. These are selected from “Tools” → “Board” and “Tools” → “Serial Port”. The board we use OLIMEXINO-328 is not present in the list so we select “Arduino Duemilanove w/ ATmega328”. The COM port that shows up in “Windows Device Manager” when we connect the OLIMEXINO-328 to our PC is COM30.

As you can also see we use Arduino 1.0.6:



At this point we can upload programs to OLIMEXINO-328 using the upload button of Arduino IDE.

4.2 Arduino code to read analog input

The code is supposed to read values from an air quality sensor connected to the analog input pin 0. The value read from the sensor is proportional to the air quality measured by the sensor. The value read is printed to the serial monitor of Arduino IDE.

The code is pretty simple:

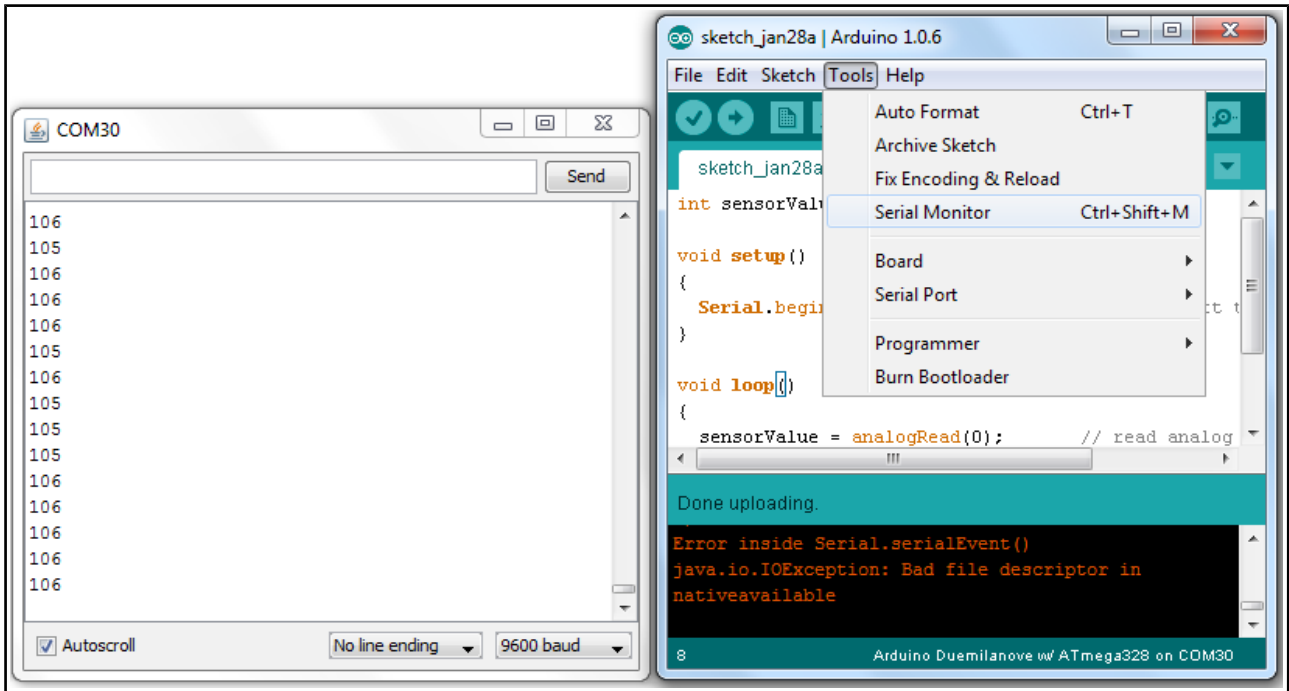
```
int sensorValue;

void setup()
{
  Serial.begin(9600);    // sets the serial port to 9600
}

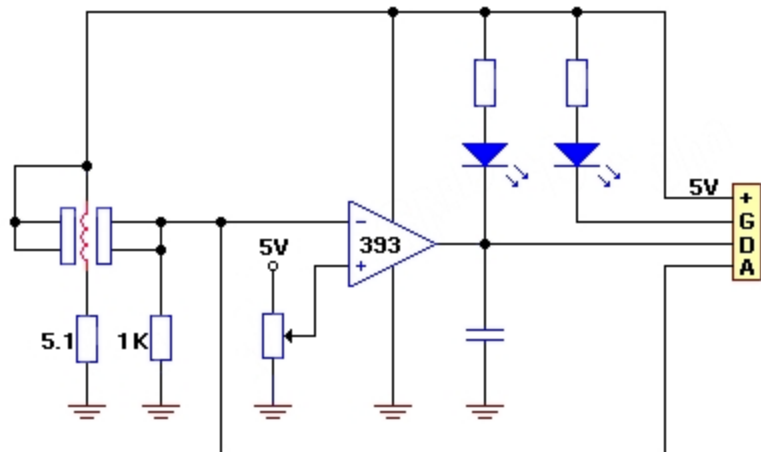
void loop()
{
  sensorValue = analogRead(0);    // reads analog input pin 0
  Serial.println(sensorValue, DEC); // prints the value read
  delay(100);                    // waits 100ms before the next read
}
```

Place the code in a sketch, compile and upload the code to your board.

On the next page you can see the output displayed in the “Serial Monitor” after the code gets compiled and uploaded to the OLIMEXINO-328:



Voila. Now we can safely determine if something is in the air tonight.



FC-22 Gas Sensor Module