

## CJMCU-6814 adapter board with MICS-6814 CO/NH3/NO2-sensor

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**feu****May 2020 post #9**

Hi there,

Things I learned about the MICS-6814 and CJMCU-6814 (please note that I'm no expert and I may be wrong):

- MICS-6814 can measure up to 10 different gases, but the CJMCU-6814 (purple board that includes MICS-6814) only allows 3 gases to be detected, each one directly in a different analog output - which means NOT using I2C;
- there are other boards which include the MICS-6814 which use I2C and thus allow support for the 10 gases, but it's not the case with the purple CJMCU-6814;
- the datasheet (link below) states that this sensor is not meant to get exact values for the gases proportions in the air (ppm), it's meant only for relative use. Examples: now the air has 10% more CO than 10 minutes ago; Yesterday there was 20% less CO in the air;
- in order to be able to relatively detect the changes, you must calibrate the sensor by using a certain amount of resistance, which you will have to find out in your own environment (it will be different on the top of a mountain, by the beach or in a big polluted city) - and that for each analog output or gas; It really doesn't make much sense to use it without calibrating, reason below;
- the datasheet states that you should measure voltage between the sensor and ground - but like others, I couldn't make it work that way. You need to pull it up. By pulling it up (adding a resistor between the analog output of the sensor and Vcc), you get the opposite values of what the datasheet describes: in the datasheet, it says the more gas, the lesser resistance and thus, greater voltage. However, by pulling it up, it inverts that and you start having voltage drop when you detect an increase of the gas concentration;

- the sensor must warm up, in the datasheet the example shows that even after 120 minutes the sensor was still heating up;
- and which resistor value should I use, then? the datasheet says that the best resolution is achieved by using the midrange voltage. So as the sensor uses 5V, midrange is 2.5V, So, you pull up the analog output, and measure its value. You must increase or decrease the resistor value until you get the midrange voltage (2.5V). THAT'S WHY in the datasheet it is suggested to use a 820 ohm resistor in series with a potentiometer (I'm using a Trimmer pot for each gas);
- the datasheet suggests a 820 ohm resistor so that even if the potentiometer (trimpot) is zeroed, you would still have a small resistor, thus not damaging your sensor; however, I believe it only gets damaged if it stays in use without resistors for a long time;
- for CO, I'm using a 1M ohm resistor in series with a 1M trimmer pot;
- for NH3, I'm using a 1K ohm resistor in series with a 500K trimmer pot;
- for NO2, I'm using a 1K ohm resistor in series with a 100K trimmer pot;
- that way I was able to calibrate it to 2.5V each;
- after "calibrated", you'll get the variations quite quickly (that's a good thing about it, it reacts quite fast). So, if you were at 2.5V (and using a pull up), and voltage went down to 2.0V, then you have 20% more of that gas;
- in the code sample below, I initialized it using pinMode(SENSOR\_PIN, INPUT), which means I didn't use INPUT\_PULLUP;
- the readings fluctuate quite a lot, so you better make an average of the last X readings;

Hope this is correct and help others trying to use this board.

Cheers,  
Feu.

datasheet:

[load%20resistance%20for%20mics%20sensors%20measurements.pdf](#)

103.62 KB

other interesting documents:

[adafruit-mics5524-gas-sensor-breakout.pdf](#)

778.13 KB

[MiCS-5524.pdf](#)

427.26 KB

```
#include <Arduino.h>

const float max_volts = 5.0;
const float max_analog_steps = 1023.0;

void setup() {
  Serial.begin(9600);
  delay(1000);
  Serial.println("Setup initializing");
```

```

pinMode(A0, INPUT);
pinMode(A1, INPUT);
pinMode(A2, INPUT);
}

void loop() {
  int a0_read = analogRead(A0);
  int a1_read = analogRead(A1);
  int a2_read = analogRead(A2);

  Serial.print("Latest reading in volts, C0 (a0): ");
  Serial.print(a0_read * (max_volts / max_analog_steps));
  Serial.print(" NH3 (a1): ");
  Serial.print(a1_read * (max_volts / max_analog_steps));
  Serial.print(" NO2 (a2): ");
  Serial.print(a2_read * (max_volts / max_analog_steps));
  Serial.println("");

  delay(200);
}

```

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```

13 void loop() {
14   int a0_read = analogRead(A0);
15   int a1_read = analogRead(A1);
16   int a2_read = analogRead(A2);
17
18   float max_volts = 5.0;
19   float max_analog_steps = 1023.0;
20
21   Serial.print("Latest reading in volts, C0 (a0): ");
22   Serial.print(a0_read * (max_volts / max_analog_steps));
23   Serial.print(" NH3 (a1): ");
24   Serial.print(a1_read * (max_volts / max_analog_steps));
25   Serial.print(" NO2 (a2): ");
26   Serial.print(a2_read * [max_volts / max_analog_steps]);
27   Serial.println("");

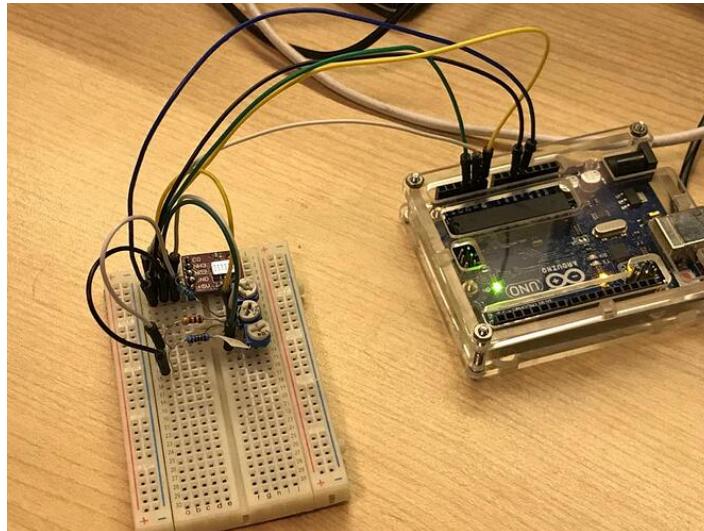
```

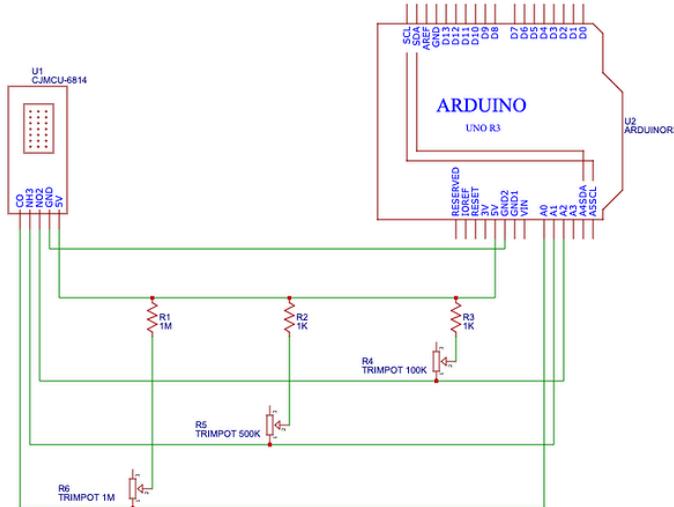
PROBLEMS    OUTPUT    TERMINAL    ...    3: Task - Monitor    +

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Latest reading in volts, C0 (a0): 2.52 NH3 (a1): 2.52 NO2 (a2): 2.52
Latest reading in volts, C0 (a0): 2.52 NH3 (a1): 2.52 NO2 (a2): 2.52
Latest reading in volts, C0 (a0): 2.51 NH3 (a1): 2.52 NO2 (a2): 2.52
Latest reading in volts, C0 (a0): 2.52 NH3 (a1): 2.52 NO2 (a2): 2.52
Latest reading in volts, C0 (a0): 2.52 NH3 (a1): 2.52 NO2 (a2): 2.52
Latest reading in volts, C0 (a0): 2.51 NH3 (a1): 2.52 NO2 (a2): 2.53
Latest reading in volts, C0 (a0): 2.52 NH3 (a1): 2.52 NO2 (a2): 2.53
Latest reading in volts, C0 (a0): 2.52 NH3 (a1): 2.52 NO2 (a2): 2.53
Latest reading in volts, C0 (a0): 2.51 NH3 (a1): 2.52 NO2 (a2): 2.53
Latest reading in volts, C0 (a0): 2.53 NH3 (a1): 2.52 NO2 (a2): 2.53

```





- ② MiCS-6814 / CJMCU-6814 gas sensor reading conversion
  - ② Plan to Calibrate CJMCU MICS 6814 Gas Sensor

calvinf76

Jun 2020 post #10

Feu,

Thanks for your update. Very useful info...

anyway know how to convert the voltage received to ppm?

Thanks in advance.

feu

Jul 2020 post #11

Hi Calvinf76,

Unfortunately that's not possible using only this sensor.

From the datasheet:

SGX semiconductor gas sensors are well suited for leak detection and applications requiring limited accuracy. Their use for absolute gas concentration detection is more complicated because they typically require temperature compensation, calibration, and sometimes as well, humidity compensation.

Cheers,

Feu

oldblackcrow

Jul 2020 post #12

Hi y'all! I just purchased this sensor as well and found the support lacking horribly from anywhere, except here. So, thank you very much for the information y'all provided!

Anyway... I'm building a TOS Tricorder with a Raspberry Pi Zero W in the main body and the Adafruit ItsyBitsy nRF52840 Express with Bluetooth LE in the hand-held part that will *hopefully* connect with the MICS 6814.

I'm a bit disappointed that the sensor info states it can read 8 gases, but the breakout only has 3 outputs.

My question is, would the ItsyBitsy nRF52840 have enough power (it does have a 5v pin) for both the sensor and the bluetooth that it needs to communicate with the Pi? Also, how sensitive is the resistance? I have 50k resistors... would that affect the accuracy?

Again, thanks so much everyone!

**oldblackcrow**

Jul 2020 post #13

I connected everything up minus the trim pots and did get data on my ItsyBitsy board. Very nice! Then I removed the 1M ohm and the two 100k ohm resistors and the data numbers increased significantly.

Again, I need to minimize hardware since the handheld case is so small.

Just wondering how that affects the data.

**draxter**

Nov 2020 post #14

Anyone launched a sensors MICS-6814 (CJMCU-6814 purple board) and working correctly? I found repository for launch raw sensor MICS-6814 (without I2C interface like **Grove Module**).

**GitHub - noorkhokhar99/MICS6814**

Contribute to noorkhokhar99/MICS6814 development by creating an account on GitHub.

<https://www.youtube.com/watch?v=ByzoAjvoX58>

Author probably do not use any pull-up resistors. This is correct way?

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