

How we created the Chemotron v1 IoT device.

The Chemotron V1 is a simple IoT sensing device that senses the (Carbon dioxide) CO_2 and Co (Carbon Monoxide) concentration in the atmosphere. It uses two sensors, MG811 (CO_2) and MQ9(Co) sensor. This doc is a quick rundown of how we built it, and how you can replicate it.

What we used (components and devices):

- 1) A Computer to program the microcontroller (windows o.s)
any intel CPU can conveniently perform the task.
- 2) ESP8266 NodeMcu LUA Wifi development board:



Cost: ₦2,700.00

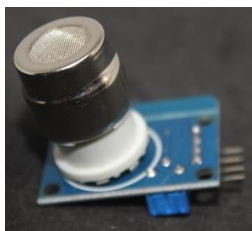
Link to where we purchased product on hub360 in Lagos:

<https://hub360.com.ng/product/nodemcu-ch340/>

NodeMCU is built based on the mature ESP8266 technology to take advantage of the abundant resources available on the web.

NodeMCU has ESP-12 based serial WiFi integrated on board to provide GPIO, PWM, ADC, I2C and 1-WIRE resources at your finger tips, built-in USB-TTL serial with super reliable industrial strength CH340 for superior stability on all supported platforms

- 3) The MG811 sensor.



Cost: ₦20,000.00

Link to where we purchased product on hub360 in Lagos:

<https://hub360.com.ng/product/mg811-co2-carbondioxide-sensor-module/>

Carbon dioxide detection sensor module (with analog signal output, TTL level signal, temperature compensation output).

4) The MQ9 sensor.



Cost: ₦1,500.00

Link to where we purchased product on hub360 in Lagos:

<https://hub360.com.ng/product/mq9-carbon-monoxide-gas-sensor-module/>

The MQ-9 gas sensor has high sensitivity to Carbon Monoxide, Methane, and LPG. The sensor could be used to detect different gases contains CO and combustible gases, it is with low cost and suitable for different applications.

5) Jumper cables



Cost x 6: ₦120.00

Link to where we purchased product on hub360 in Lagos:

<https://hub360.com.ng/product/male-male-jumper-wire-single/>

This is a single piece male-male jumper wires, each piece was sold ₦20 we bought 6.

6) Breadboard.



Cost: ₦600.00

Link to where we purchased product on hub360 in Lagos:

<https://hub360.com.ng/product/breadboard-mb102/>

This is a construction base for prototyping of electronics before transferring to a permanent board.

Steps.

1) Connecting the Hardware:

- a) Connecting the hardware via Jumper cables is quite easy, **The MG811** sensor has 4 pins; VCC, GND, A0 and D0.

Vcc pin is connected to **v** pin on the Esp board.

Gnd is connected to any **Gnd** pin on the ESP board

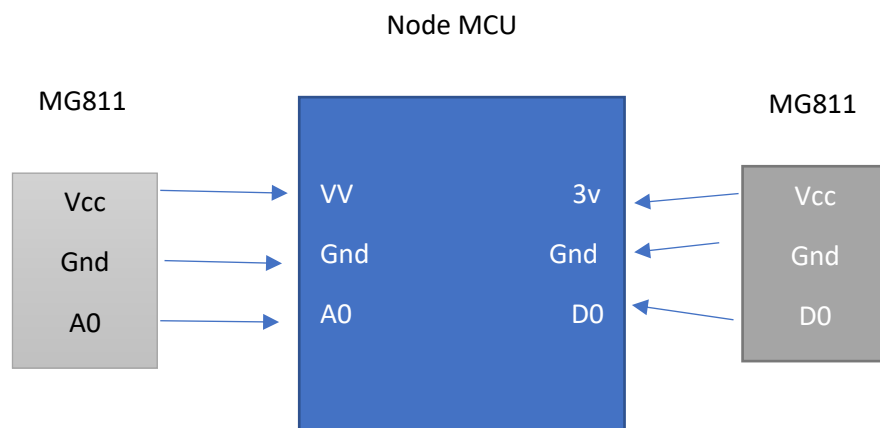
A0 is connected to the **A0** pin on the ESP board such that you can read the analog values of the sensor.

- b) For the **MQ9** Sensor, we connect such that:

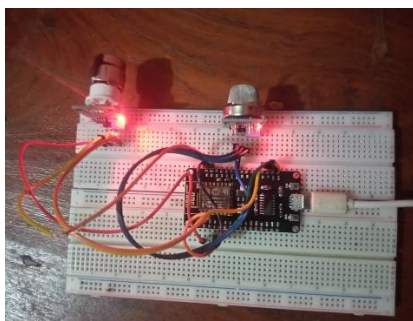
Vcc pin is connected to **3v** pin on the Esp board, the MQ9 sensor uses 3v.

Gnd is connected to any **Gnd** pin on the ESP board

D0 is connected to the **D0** pin on the ESP board. The ESP board has only one analog pin, and several digital pins.



What it looked like on the prototyping board:



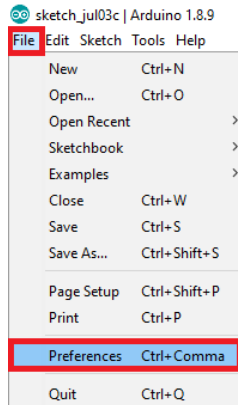
2) Setting up Arduino.

Arduino IDE is the most suitable to program the board. First, download and install the Arduino ide software; this software is used to read from and write(program) to the microcontroller. You can download here <https://www.arduino.cc/en/software>

After downloading the software, you'll need to install the ESP8266 Add-on.

To do this:

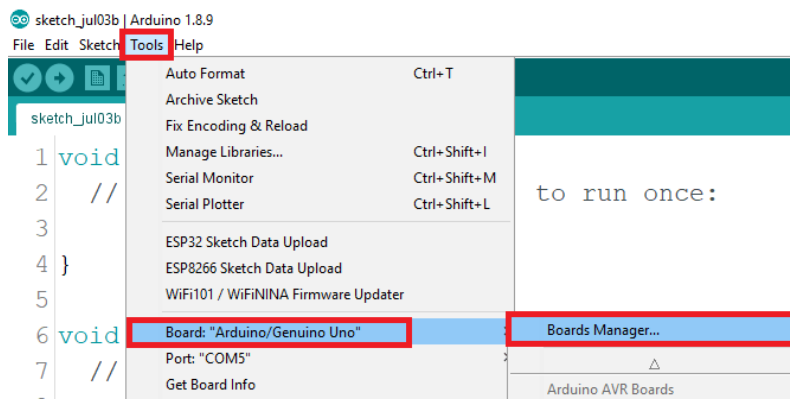
1. In your Arduino IDE, go to **File > Preferences**



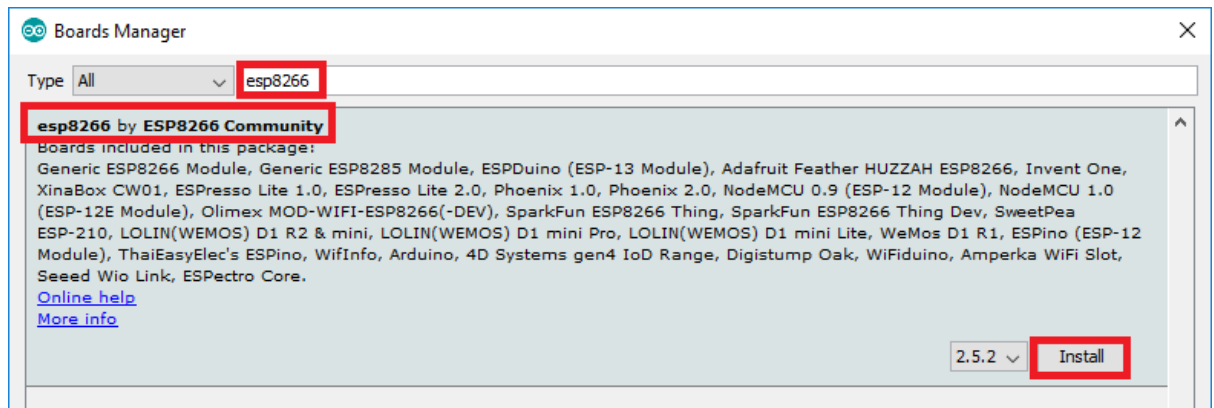
2. Enter http://arduino.esp8266.com/stable/package_esp8266com_index.json into the "Additional Boards Manager URLs" field as shown in the figure below. Then, click the "OK" button:



3. Open the Boards Manager. Go to **Tools > Board > Boards Manager...**



4. Search for **ESP8266** and press install button for the "ESP8266 by ESP8266 Community":

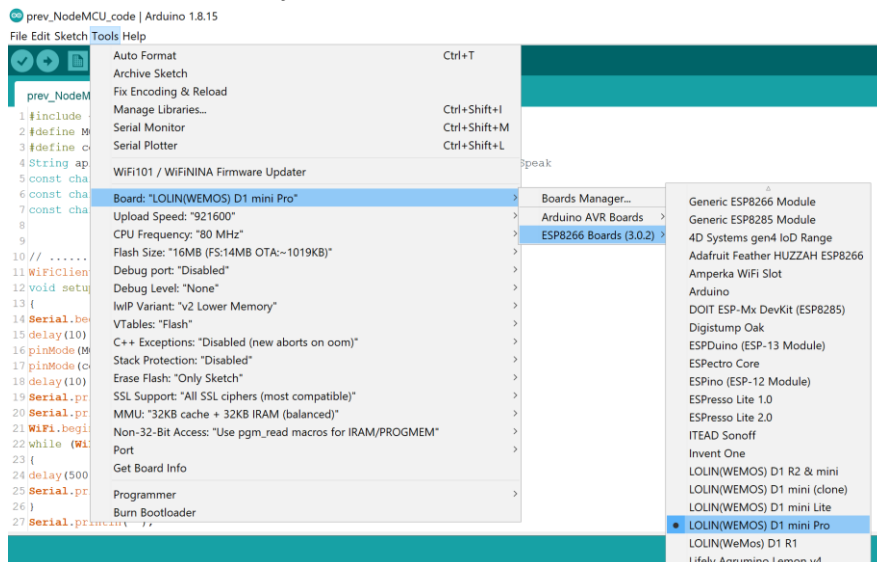


5. That's all we've now installed the board.

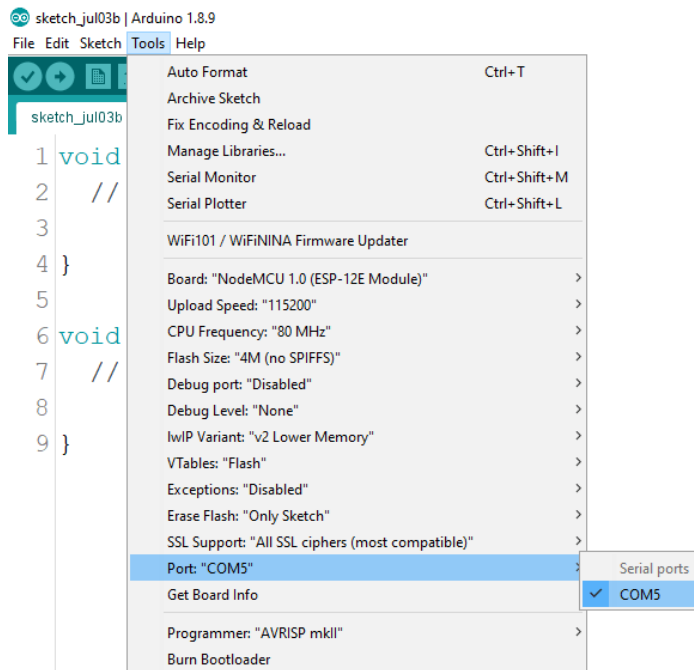
3) Uploading the Code:

The Code needed to run this is in the hardware section of the [GitHub repository](#). The code itself has been well explained line by line using comments.

1. Download the code and open with the Arduino IDE, be sure to edit your WiFi name and Password, and also the API key when you've completed the last section.
2. Select the board: We selected one of the NodeMCU boards available, for Us, any generic ESP board would work just fine:



3. Then also select the port where you insert the USB device:':



4. Next, you upload the code to the board:



4) Creating the dashboard to view on thingspeak.com.

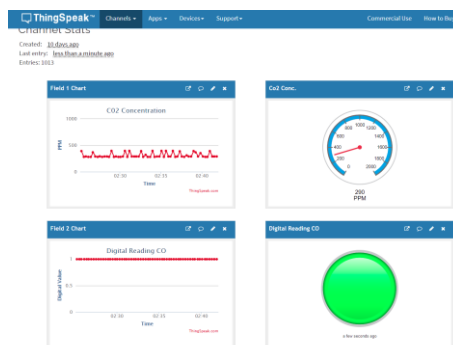
Thingspeak.com manages your read and write for your IoT device.

1. create an account on <http://thingspeak.com/>
2. Go to the Channels tab and create a new channel.

My Channels

[New Channel](#)

3. Fill in the necessary details, For this project, we made use of 2 fields:
4. Design the Dashboard to your taste:



The End. I hope you found this useful!
Feel free to reach out to me on [LinkedIn](#).