Air Quality Extender Kit

April 2016

SwitchDoc Labs

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What is in the Air Quality Extender Kit?

The Air Quality Extender for the OurWeather Weather Kit has a total of six parts:

- Air Quality Sensor
- High Resolution Analog to Digital Converter
- I2C Hub
- Grove Cables (3)

How does this Kit work?

The Air Quality Extender Kit works by measuring a wide scope of harmful gasses such as carbon monoxide, alcohol, acetone, thinner, formaldehyde and so on as well as being sensitive to particulate count. Due to the method used to measure the contaminants, this Air Quality sensor cannot output specific data to describe target gasses' concentrations quantitatively. But it is still good enough to be used to describe qualitative air quality.

The Air Quality sensor requires a warm-up time of about two (2) minutes after power on before it will be reporting good data.

The Air Quality sensor is based on a Winsen MP503 Air-Quality Gas Sensor. The complete specification for the MP503 is on the OurWeather Product Page on www.switchdoc.com.

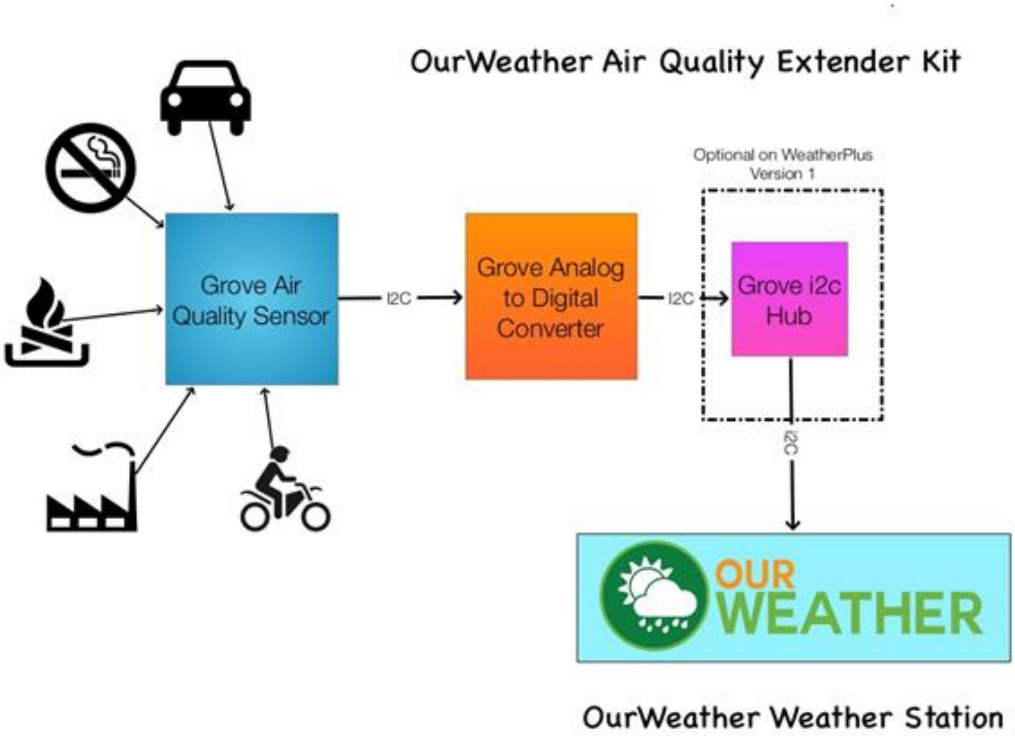
Do not use any silicon-based spray or lubricant products around the Air Quality sensor. Use of those products will rapidly reduce the sensitivity of the sensor.

This unit requires relativity clean air conditions when starting up.

When testing the sensor by using the cardboard box and hairspray test setup, do not spray the hairspray directly on the sensor. Spray it in the air around the sensor. It does not take much hairspray!

The analog voltage from the Air Quality sensor is converted by the SwitchDoc Labs Analog to Digital Converter into a 16-bit value that is read by OurWeather and converted into a qualitative gauge of the air quality. See these values below.

Sensor Value	Interpretation
0 – 3199	Fresh Air
3200 – 4799	Low Pollution
4800 – 6399	Medium Pollution
6400 – 11199	High pollution
11200 and up	Very High Pollution



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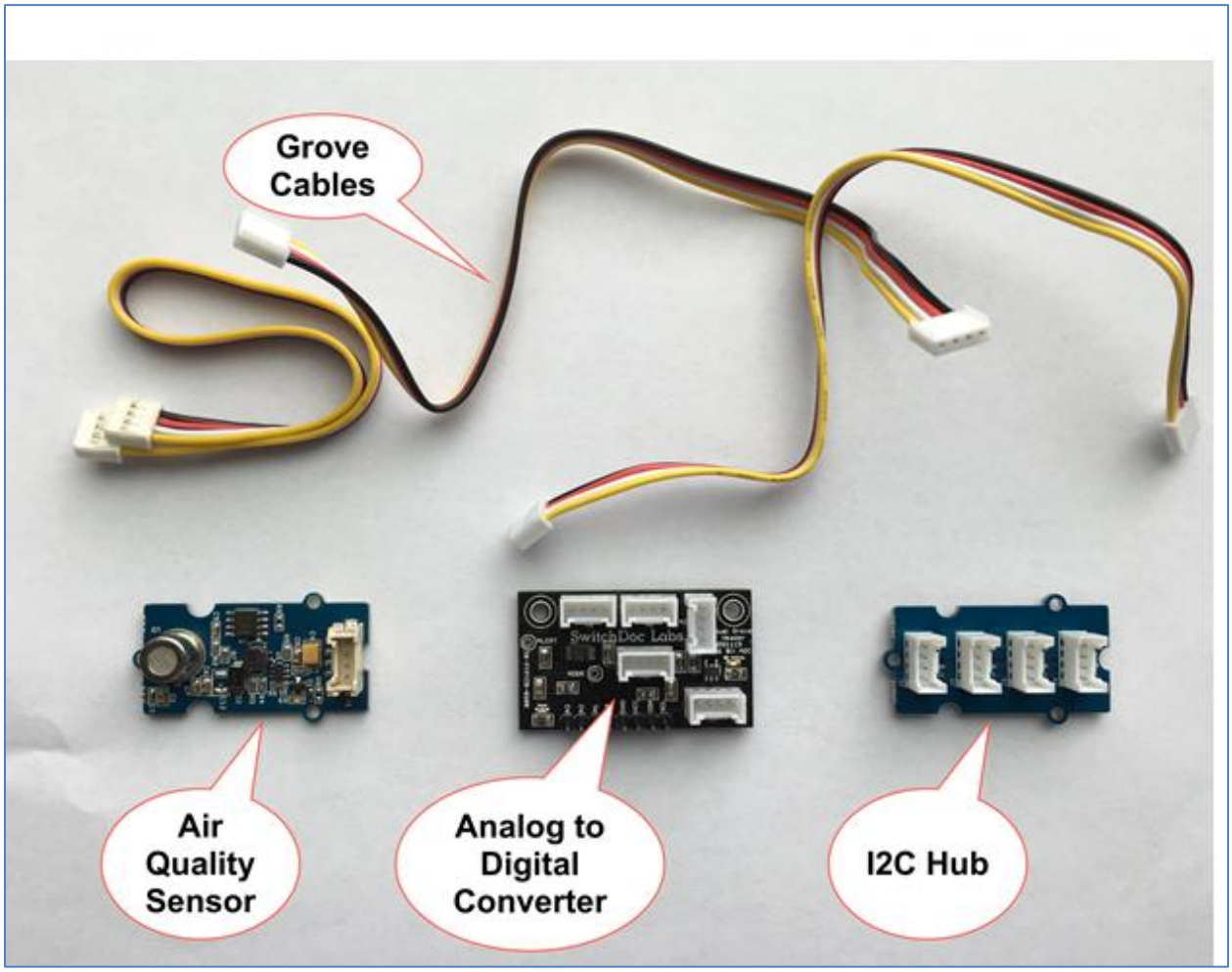
Inventory of the Kit

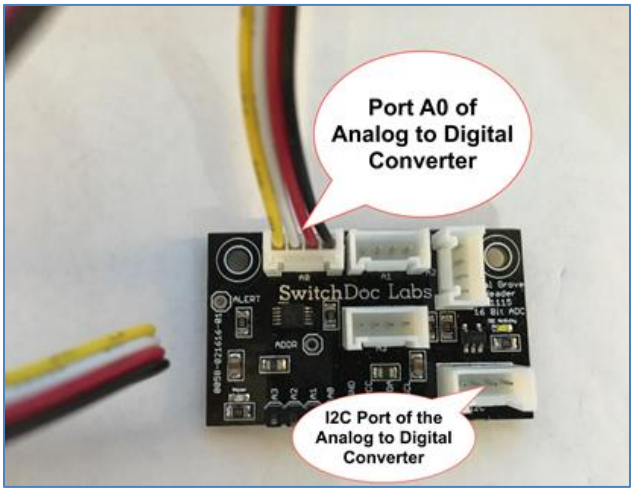


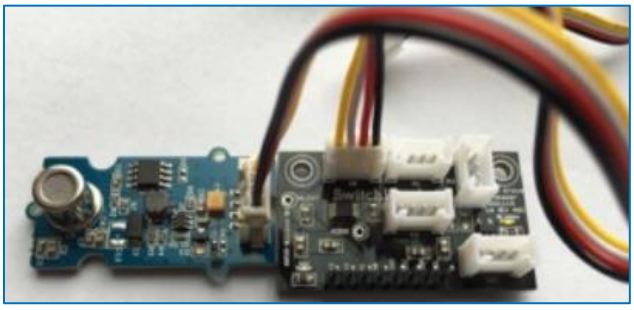
Step by Step Assembly

Step 1 Unplug all power to your OurWeather Weather Kit

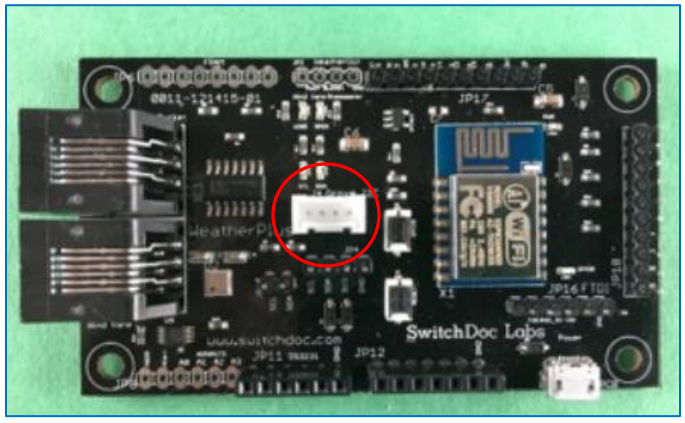
Step 2 Connect a Grove Cable to the Air Quality Sensor

Step 3 Plug the other end of the Grove Cable in Step 2 into the “A0” port on the Analog to Digital Converter

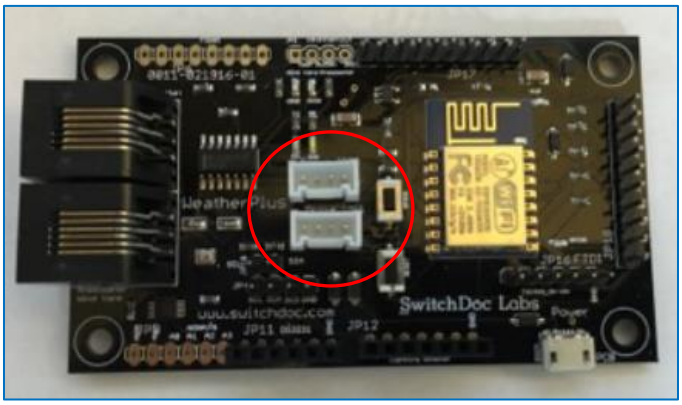




Step 4 Determine which Version of WeatherPlus you have. If you have Version 1 (Photo left - one Grove Connector), skip to Step 9. If you have Version 2 (photo, right), then continue on to step 5.

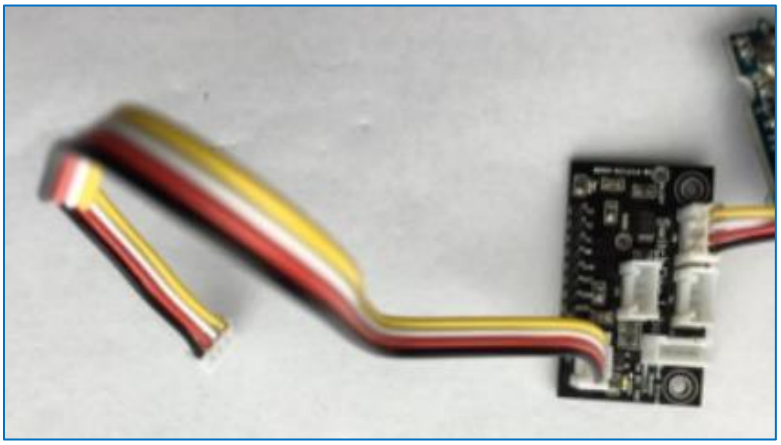


Version 1 with one Grove Connector. If this is the board you are working with, **skip to Step 9**.

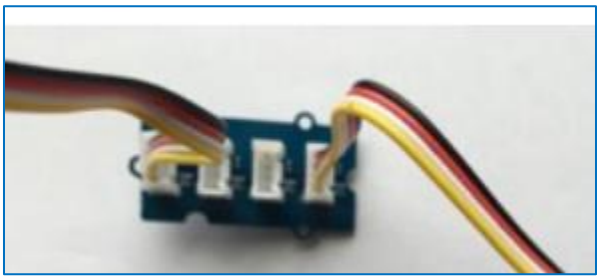


Version 2 with two Grove Connectors. If this is the board you are working with, continue to **Step 5.**

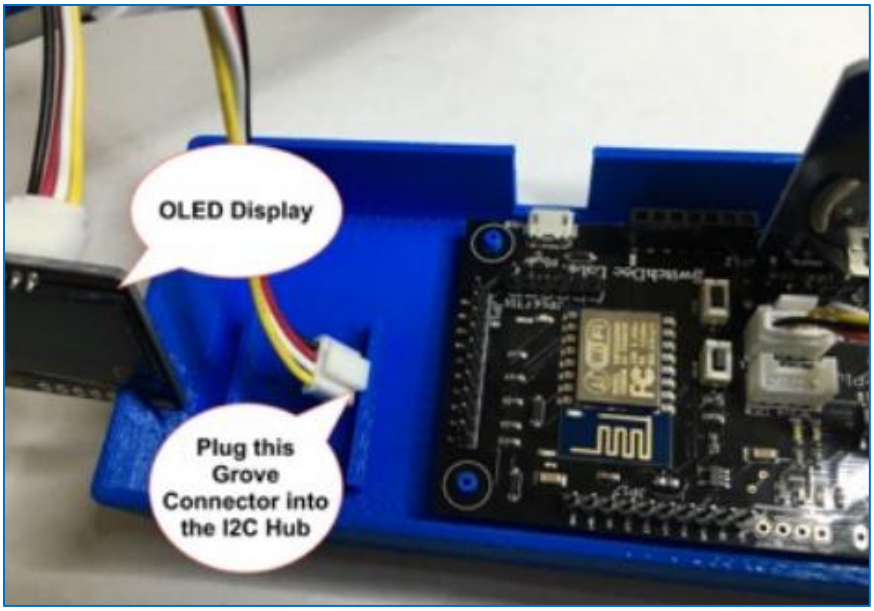
Step 5 Plug a Grove Cable into the I2C port of the Analog to Digital Converter.



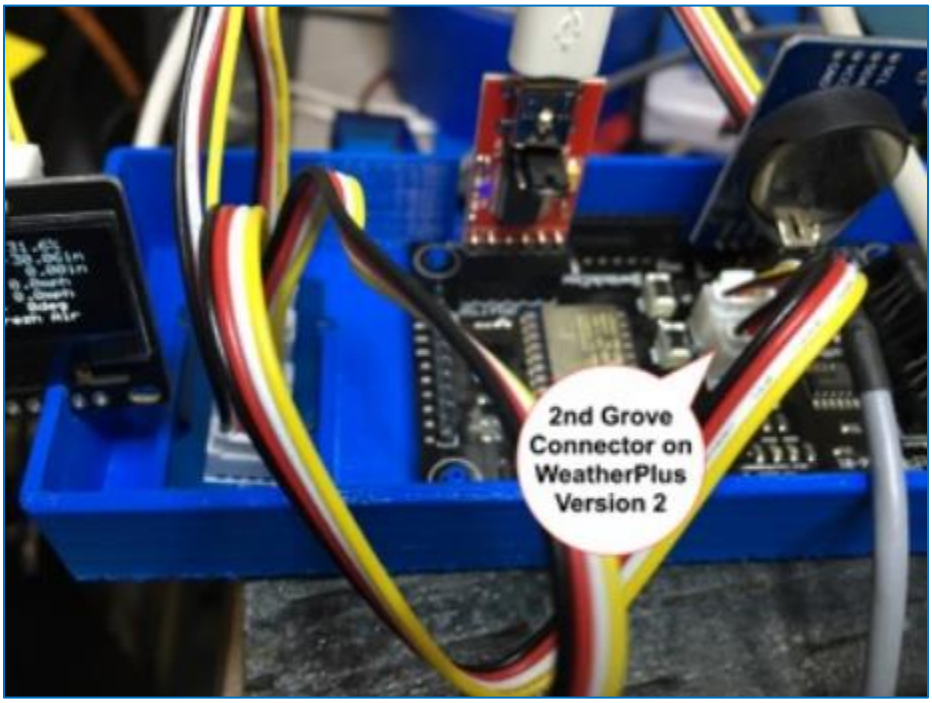
Step 6 Plug the other end of the Grove Cable (from Step 5) into the I2C Hub. Plug in another Grove Cable in the other end of the i2C Hub.



Step 7 Remove the Grove Cable coming from the OLED display (plugged into the WeatherPlus Version 2 Board) and plug it into the I2C Hub – any connection will do.



Step 8 Plug the Grove Connector from the I2C Hub into the 2nd Grove Connector on your Version 2 WeatherPlus Board.



You are now finished and can go to the next chapter.

Step 9 If you have Version 1 WeatherPlus Board, plug the Grove Connector from the Analog to Digital Converter into the existing I2C Hub.

You are now finished and can go to the next chapter.

Testing – What is on the OurWeather Display?

Step 1 Plug the Power back into the OurWeather Weather Kit

Step 2 When the OLED display cycles around to show the weather information, you should see one of these two displays depending on how you have set up OurWeather. If you continue to see “NP”, go back and check your wiring very carefully. The Air Quality sensor is not being detected.

What Does the Air Quality Sensor Report?

The Air Quality sensor reports a single analog voltage describing the overall air quality. We take this analog value and convert it to a digital reading (from 0 to about 65000). The OurWeather software then interprets this number and reports the qualitative air quality.

The following is a digital reading and the qualitative interpretation:

Sensor Value	Interpretation
0 – 3199	Fresh Air
3200 – 4799	Low Pollution
4800 – 6399	Medium Pollution
6400 – 11199	High pollution
11200 and up	Very High Pollution

If you would like to read the sensor value directly, type the following into your browser:

http://<OurWeather IP Number>/AirQualitySensor

Where <OurWeather IP Number> is the IP number of your OurWeather unit. For example, if your IP address of the OurWeather unit (viewable when the OurWeather unit boots up – See OurWeather Assembly and Operations Manual), is 192.168.1.141, then you would type:

http://192.168.1.141/AirQualitySensor

OurWeather returns the following to your browser:

{“AirQualitySensor”: 3416, “id”: “1”, “name”: “OurWeather”, “connected”: true}

The value of the AirQualitySensor is 3416, which means there is some gas and particulates in the air, or Low Pollution.

A Simple Air Quality Sensor Test

A simple way of testing the response of your Air Quality Sensor is to put the sensor in a medium size cardboard box and spray hairspray into the box, **not directly at the sensor**.

Here is a link to a video of an early test:

https://www.youtube.com/watch?v=PyuQul7OCSQ

You will see the pollution level spike all the way up and then slowly come down.

This is a great way to demonstrate the sensor.