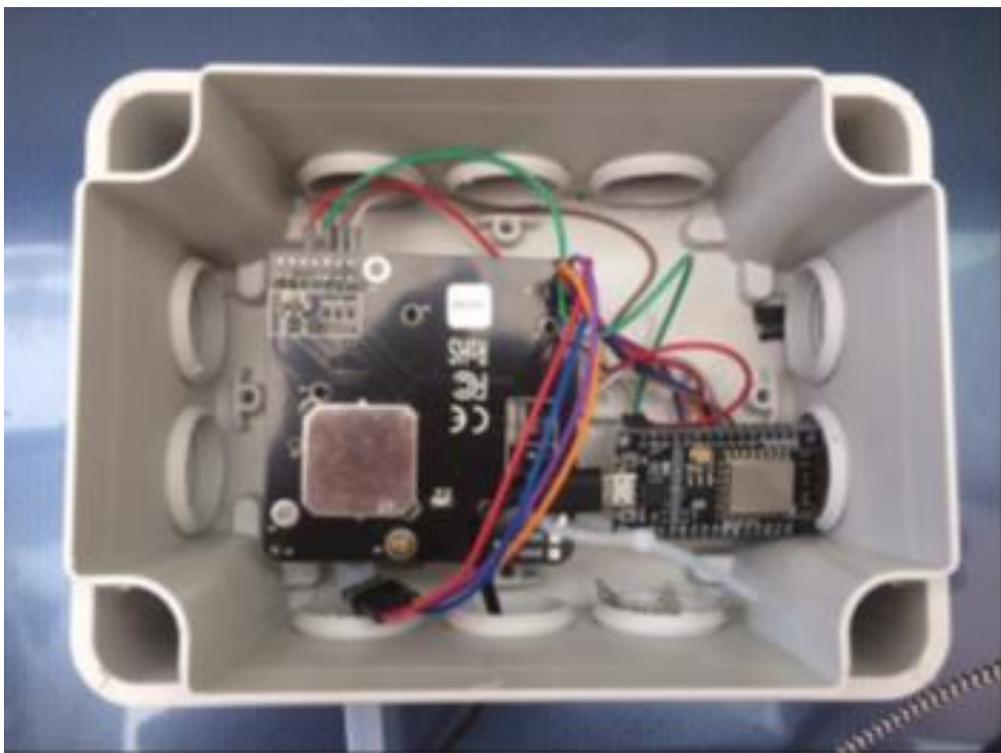


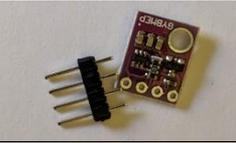
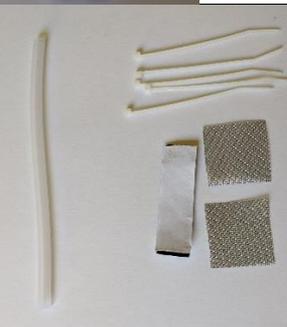
AIR QUALITY MONITOR – Help Sheet- Nuffield

To build the Air Quality Monitor we need to connect three electronic components together and mount it in the grey box provided. All the components you need are supplied in your kit box. All cutting and soldering has already been done. You will need a screw driver and a pair of scissors.



Components

The kit comes with the following components

<p>Components</p>	
<p>ESP8266 v2 Arduino NodeMCU with Wifi</p>	
<p>BME280 Temperature, Pressure and Humidity Sensor</p>	
<p>SDS011 Laser Particle Counter</p>	
<p>Connecting Cables</p>	
<p>Weatherproof Box</p>	
<p>Ties, Velcro and Metal Grid, and plastic tube</p>	
<p>Micro USB and power supply</p>	

Note:- The USB Connector with the SDS011 is surplus and is not used in this build

Build Guidelines

Introduction

There are only three electrical components needed for this sensor which are shown below. The NodeMCU is the component that has been pre-programmed and detects and transmits the data via wifi which is logged on the luftdaten website. The SD011 is the particle sensor which can measure the particle size via laser diffraction. It can take readings for particles less than 10 microns (PM10) and less than 2.5 microns (PM2.5). The smaller particles are those which are particularly hazardous for health. The BME280 measures temperature and humidity.



ESP8266v2

NodeMCU - Arduino compatible with WiFi



BME280

Temperature, Humidity and Pressure Sensor



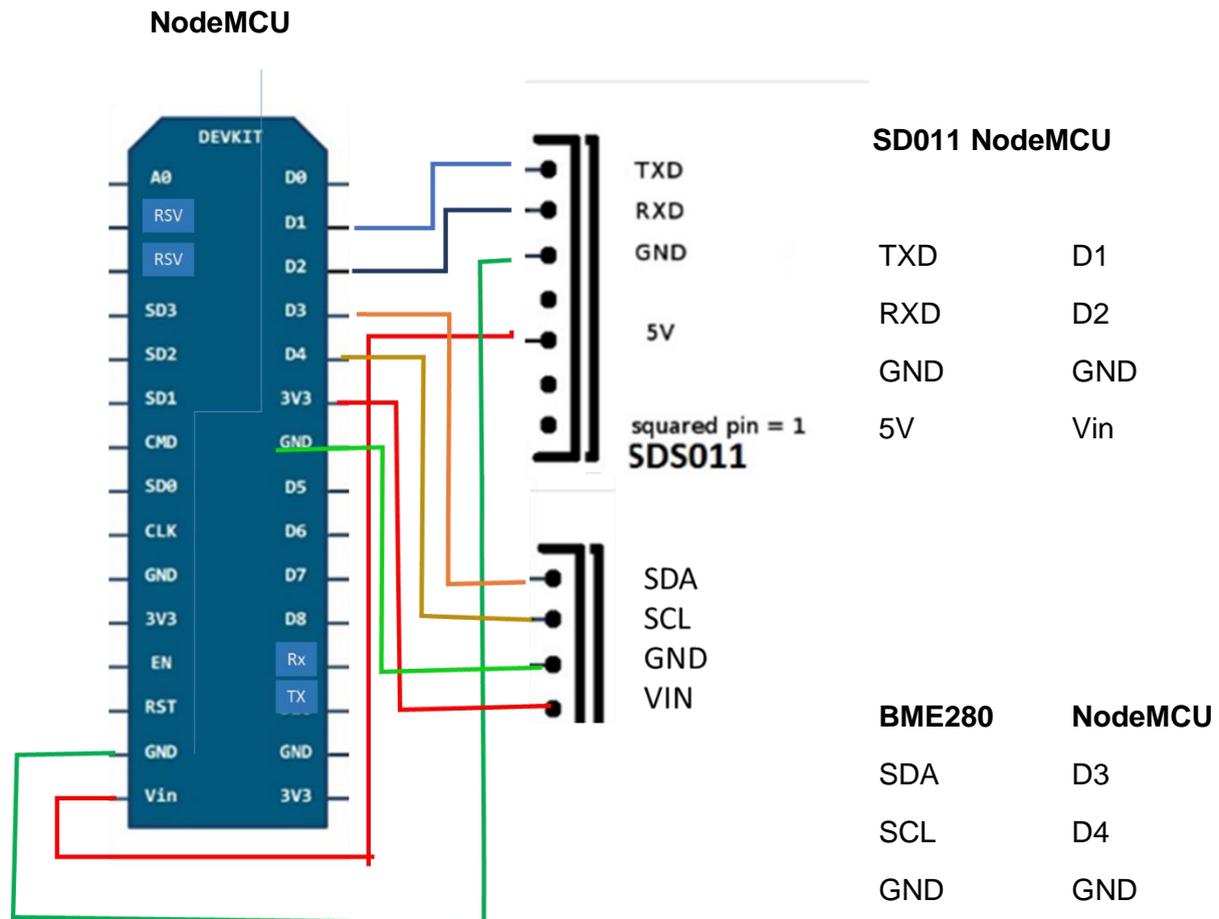
SDS011

Laser Particle Counter

The sensor is housed in a junction box housing. The appropriate holes for the air intake tube, ventilation and the power supply have been cut for you. It is worth building and testing the sensor is working before putting it in the housing. The temperature and humidity sensor should be close to the air intake. The sensor fits snugly and can be held with the Velcro tape. The NodeMCU can be cable-tied to the SDS011 ensuring the wifi transmitter is pointing away from the SDS011. Metal grid material can be cut to stop insects entering the detector. Once you have tested your sensor indoors you may find a suitable location outside where a power source can be provided.

Connecting the electronic components

The pin layout for the 3 components is shown below. You only need to connect 8 wires to the pin labels shown below. You can connect the electronic components together and see if it works before mounting it in its box. (The colour of the wires does not matter but it can be easier to follow the colours shown)



Before mounting in the box it is now worth powering it up and seeing if we can connect it to your home wifi. You will need your wifi code.

Plug in your phone charger supplied into the mains and connect it to the NodeMCU...you should see it flash...you know it has power 😊

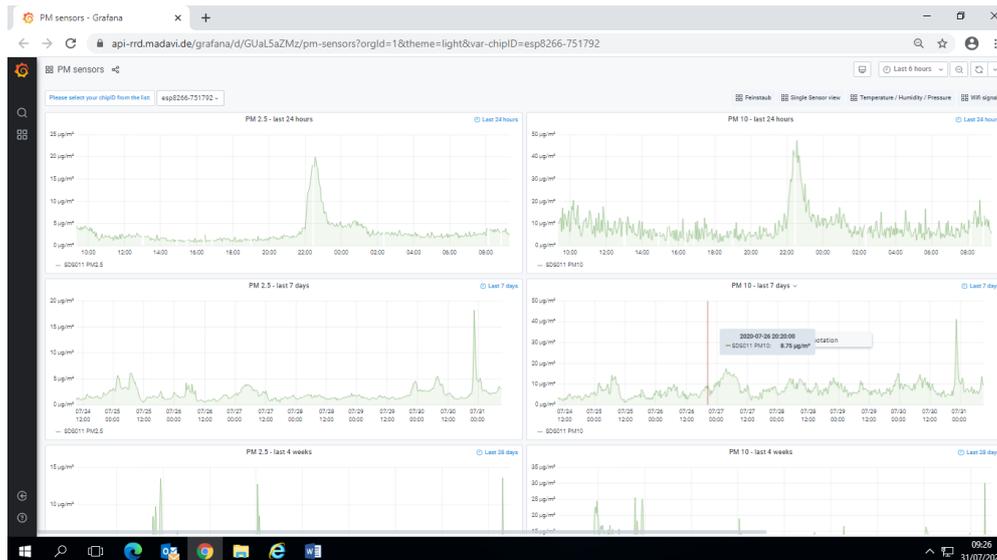
You can now use your phone to see if it connects. Go to settings on your phone and you will see an available network called airRohr followed by the number given with your chip. Connect to it... this may take a few times. Once it connects a log in screen is seen whereby it asks you to connect to an available wifi. Choose your home wifi and enter the wifi password. The screen should disappear and hopefully it is now connected. You can use a free app called FING to scan for devices to check it is there.

Check if it is working!!

If your sensor has connected to the wifi we can now check if it is working. It is worth waiting 15 minutes before doing this. Click on the links below and select the sensor with the number given to you on your chip. You can type this in in the drop-down menu.

Particle counter:

<http://www.madavi.de/sensor/graph.php?sensor=esp8266-751792-sds011>



Temperature and Humidity:

<http://www.madavi.de/sensor/graph.php?sensor=esp8266-751792-bme280>

Signal Strength:

<https://www.madavi.de/sensor/signal.php?sensor=esp8266-751792>

Humidity is important because as the humidity goes above 80% the particle counter gets less accurate. Eventually, this data will be processed by the University of Sheffield and they might apply a correction factor based on humidity and temperature to make the results more like a reference sensor. You can also access the on-board web site of your sensor but to do this you will have to figure out the IP address using FING and then enter that number into your browser. This will let you see the latest readings.

Registering your sensor

Your chips are already registered on the Luftdaten sensor community website.

<https://sensor.community/en/>. Once your sensor is working we can give it a location and see it appear on the map. It will be given another number.