

Tutorial

Build your own hackAIR mobile sensor

This sensor is powered with a mobile power bank and uploads its measurements through Bluetooth on your phone. You can move it around and measure in multiple locations. The sensor is based on PSoC (Programmable System-on-Chip) and costs ca. 50 EUR.

Video tutorial



Next to this written tutorial, you can also check out our video tutorial at <http://www.hackair.eu/hackair-mobile>.

What you need

Make sure you have the following materials and tools available. We provide links to online retailers, including Aliexpress, at <http://www.hackair.eu/hackair-mobile>. Alternatively, visit your local electronics supplier.

Materials

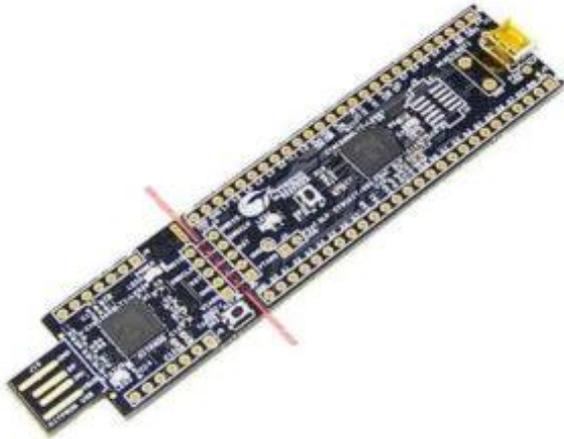
- Air quality sensor: Nova PM SDS011 (15 EUR)
- Microcontroller: PSoC BLE 5676 (8 EUR)
- Micro-USB breakout board (2 EUR for 10)
- Jumper wires: 2x M/M and 3x M/F (0,50 EUR for 40)
- Pin header: 5-pin 2.54 male (1 EUR for 80)
- USB power bank (10 EUR)

Tools

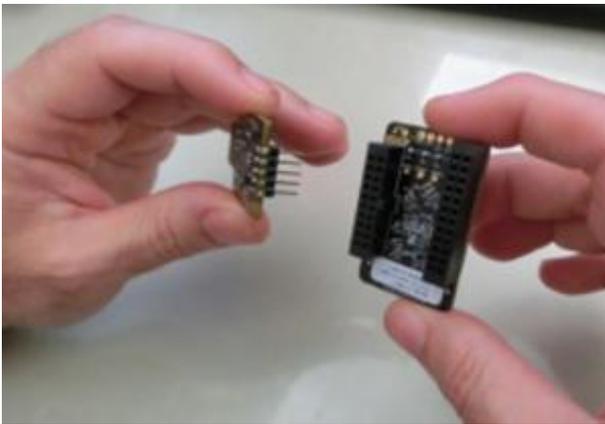
- Programming tool: CY8CKIT-059 (12 EUR)
- Soldering iron and soldering tin (from ca. 20 EUR)
- Windows computer
- Smart phone

If you need soldering instructions, check out the tutorial introduction to soldering at <http://www.hackair.eu/hackair-mobile>.

Assemble the sensor



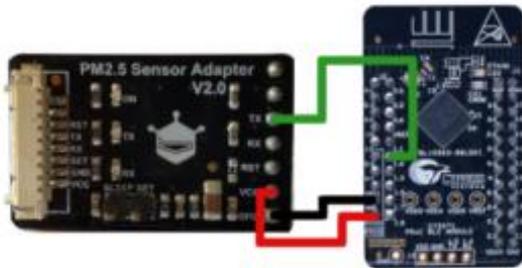
Break off the programming tool.



Solder a 5-pin header to the programming tool.



Use two M/M jumper wires to solder the USB board to the PSoC module.



Connect the sensor with three M/F jumper wires as shown:

- Sensor 5V to PSoC VDD
- Sensor GND to PSoC GND
- Sensor TXD to PSoC 1.4

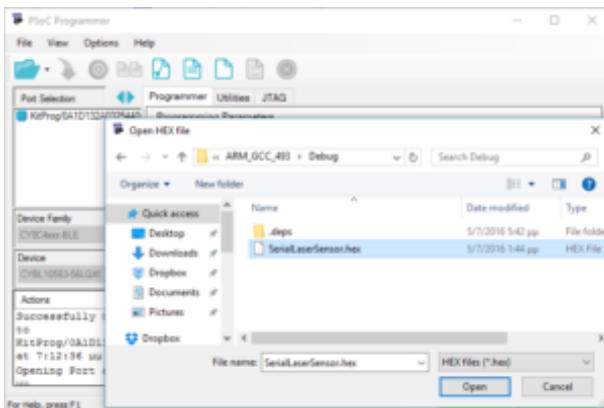
Install software

Download the following:

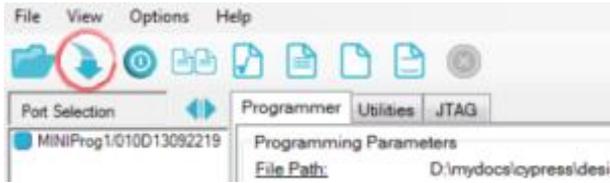
- PSoC Programmer Software from Cypress <http://www.cypress.com/products/psoc-programming-solutions>
- .hex file for your sensor from <https://github.com/hackair-project/hackAIR-PSoC>.



Connect the programming tool to the PSoC and a computer. The location is marked as PROG on the board.



Launch PSoC Programmer software: Open the .hex file.



Select the device and click 'Program'.

Disconnect and power the device using the power bank.

Measure air quality

- Install the hackAIR app to your phone: <http://www.hackair.eu/downloads>.
- Login or create an account, then go to Profile > Sensors > Add a new sensor.
- Give your sensor a name, add a location and set the sensor type to 'hackAIR mobile'. Save.
- Select the menu in the top left corner and go to 'Send hackAIR mobile measurements'. You might be prompted to switch on Bluetooth.
- Wait a moment while your sensor uploads measurements.
- You can see all your measurements when you go to your Profile > Sensors.

Troubleshooting

If you run into problems or have questions, check out the hackAIR FAQ at <http://www.hackair.eu/faq> or contact us at <http://www.hackair.eu/support>.

You can't get enough of measuring air quality?

hackAIR also has tutorials for two other sensors:

- **hackAIR cardboard** <http://www.hackair.eu/hackair-cardboard>
- **hackAIR home** <http://www.hackair.eu/hackair-home-v2>