OKdo Air Quality IoT Starter Kit v1.1

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1. Introduction

The Air Quality IoT (Internet of Things) Starter Kit is a perfect tool for collecting and visualizing data by connecting to a Cloud, sharing and comparing collated information in a community setting. There is a lot more to explore because the IoT Kit is your gateway to unlimited possibilities. It all begins with the OKdo Cloud.

The Air Quality Kit consists of a Wio Link board, a gas sensor and a temperature/humidity sensor. Wio Link is an ESP8266 based open-source Wi-Fi board designed to simplify IoT developments by offering plug-n-play modules through Grove connectors. The Grove connectors on the Wio Link board allows for porting of many other sensors available in the range, collecting appropriate data. Check out our other IoT sensors at www.OKdo.com/Do-IoTaccessories. Set-up and programming of this board can be done using the Arduino IDE with the support libraries from OKdo to send the sensor data to the OKdo Cloud. For more info on how to get connected to the OKdo Cloud for free, follow the instructions at https://www.okdo.com/do-iot/

2. Getting Started

How to connect your Air Quality IoT Starter Kit to the OKdo IoT Cloud

Inside this starter kit you will find the tools we have carefully selected and tested for you to build and share your data with the Air Quality community. We are convinced that you will appreciate the functionality of this starter kit and the IoT Cloud as a first step in discovering the value of collecting and sharing Air Quality data.

STEP 01 Sign up at https://OKdo.allthingstalk.com with your email address and a chosen username and password.

Note: The OKdo IoT Cloud organises members and devices into Grounds, a better way to manage things and data access. The OKdo IoT Cloud automatically creates a first Ground, called Playground after signing up.

STEP 02 To add your kit into your Playground, select **Playground** and add new device.

STEP 03 Select Air Quality IoT Starter Kit and continue with device creation.

STEP 04 Verify you have now created a digital representative of your physical Air Quality device.

STEP 05 Now follow Read docs in the Settings menu under the devices tab for your created device and finalise the configuration.

STEP 06 You are now all set and ready to start experiencing your Starter Kit and the OKdo Air Quality community.

OKdo
DESIGN THE WORLD

3. Product Overview

The OKdo Air Quality Kit consists of a Wio Link board,a temperature (https://en.wikipedia.org/wiki/Temperature) and humidity (https://en.wikipedia.org/wiki/Humidity), and a multi pixel gas sensor for indoor air quality (https://en.wikipedia.org/wiki/Indoor_air_quality), providing TVOC (Total Volatile Organic Compounds, https://en.wikipedia.org/wiki/Volatile_organic_compound) and CO2eq (https://en.wikipedia.org/wiki/Carbon_dioxide_equivalent) output.
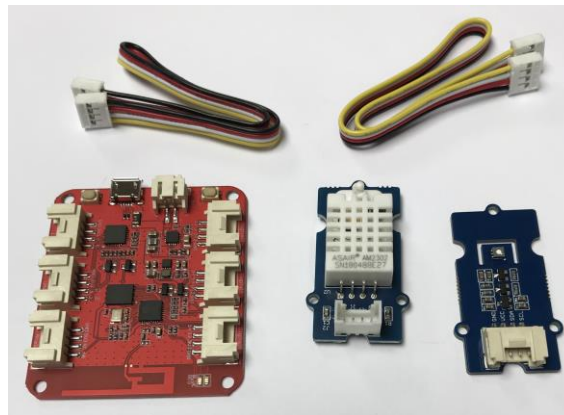
4. Product Highlights

- Seeed Studio initiated Wio Link on KickStarter and defined a new way of developing IoT applications. Wio Link is an ESP8266 SoC based open-source Wi-Fi development board and makes use of Grove connectors, this means that there will be no hardware programming, no breadboard, no jumper wires, and no soldering.

- The Grove Temperature and Humidity Pro Sensor (DHT22) based on the AM2302 provides an extremely fast response time for fast and context awareness and resolution. The integrated temperature sensor has been optimized for lowest noise and highest resolution. Its output is used to compensate the humidity sensor and can also be used for estimation of the ambient temperature. The Temperature & Humidity Sensor (DHT22) is a high accuracy sensor used in indoor applications. The detecting range of this sensor is 5% RH – 99% RH, temperature range from -40°C to 80°C and its accuracy reaches up to 2% RH and 0.5°C respectively.

- The Grove VOC and eCO2 Gas Sensor (SGP30) is an air quality detection sensor. This Grove module, based on SGP30 and Sensirion's CMOSens®technology offers a complete sensor system on a single chip featuring a digital I2C interface, a temperature controlled micro hotplate, and two preprocessed indoor air quality signals. As the first metal-oxide gas sensor featuring multiple sensing elements on one chip, the SGP30 provides more detailed information about the air quality. The SGP30 is a digital multi-pixel gas sensor that can detect harmful gases through TVOC and CO2eq.

5. Applications

- Indoor Air Quality cfr: https://en.wikipedia.org/wiki/Sick_building_syndrome
- Intelligent Environmental Monitoring
- Ventilation, Air Purification monitoring and automation
- Home automation

6. Specifications

A. Wio Link board:

General	Value	Power Management	Value
Size	55mm * 48mm	**DC Current Per I/O Pin**	12mA
Crystal	26MHz	**Input Voltage (Micro USB)**	5V
Flash Memory	4MBytes (W25Q32B)	**Input Voltage (Battery holder)**	3.4~4.2V
Wi-Fi Network Protocol	802.11b/g/n	**Output DC Current**	1000mA MAX
Wi-Fi Encryption Technology	WEP/TKIP/AES	**Operating Voltage**	3.3V
Grove Connectors	6	**Charge Current**	500mA MAX
Flash	4MB (W25Q32B)		

B. Grove Temperature and Humidity sensor Pro:

Item	Min	Norm	Max	Unit
Input voltage (VCC)	3.3	-	6	V
I/O Logic Level	-	based on VCC	-	V
Measuring Current Supply	1	-	1.5	mA
Standby Current Supply	40	-	50	uA
Measuring range (**Humidity**)	5%	-	99%	RH
Measuring range (**Temperature**)	-40	-	80	°C
Accuracy (**Humidity**)	-	-	±2%	RH
Accuracy (**Temperature**)	-	-	±0.5	°C
Resolution (**Humidity**)	-	-	0.1%	RH
Resolution (**Temperature**)	-	-	0.1	°C
Repeatability (**Humidity**)	-	-	±0.3%	RH
Repeatability (**Temperature**)	-	-	±0.2	°C
Long-term Stability	-	-	±0.5%	RH/year
Signal Collecting Period	-	2	-	S
Respond Time 1/e(63%)	6	-	20	S
Signal pin mode	-	Digital	-	-

C. Grove VOC and eCO2 sensor:

Parameter	Signal	Values
Working Voltage	3.3V/5V	
Output range	TVOC	0 ppb to 60000ppb
	CO_2eq	400 ppm to 60000 ppm
Sampling rate	TVOC	1HZ
	CO_2eq	1HZ
Resolution	TVOC	0 - 2008 ppb / 1 ppb
		2008 - 11110 ppb / 6 ppb
		11110 - 60000 ppb / 32 ppb
	CO_2eq	400 - 1479 ppm / 1 ppm
		1479 -5144 ppm / 3 ppm
		5144 - 17597 ppm / 9 ppm
		17597 - 60000 ppm / 31 ppm
Default I2C address		0X58

7. External links:

- Wio Link: http://wiki.seeedstudio.com/Wio_Link/
- Grove Temperature and Humidity sensor Pro: http://wiki.seeedstudio.com/Grove-Temperature_and_Humidity_Sensor_Pro/#platforms-supported
- Grove VoC and eCO2 Gas Sensor: http://wiki.seeedstudio.com/Grove-VOC_and_eCO2_Gas_Sensor-SGP30/
- AM2302: https://github.com/SeeedDocument/Grove-Temperature_and_Humidity_Sensor_Pro/raw/master/res/AM2302-EN.pdf
- SGP30: https://github.com/SeeedDocument/Grove-VOC_and_eCO2_Gas_Sensor-SGP30/raw/master/res/Sensirion_Gas_Sensors_SGP30_Datasheet_EN.pdf