

Air quality 8 Click



PID: MIKROE-4904

Air quality 8 Click is a compact add-on board containing a best-in-class air-quality sensing solution. This board features the [ZMOD4510](#), a fully calibrated digital sensor solution that detects air quality in various indoor and outdoor applications from [Renesas](#). The ZMOD4510 comes with selective ozone measurement capabilities, offering visibility into the air quality in users' environments for a personalized experience. This Click board™ is an I2C configurable and characterized by outstanding long-term stability and lifetime. Many additional features such as low power consumption, wide NO₂ and O₃ detection range, and high sensitivity make this Click board™ an excellent choice for detecting unhealthy conditions in outdoor air, such as personal air-quality monitor, HVAC, and other various air quality-related applications.

Air quality 8 Click is supported by a [mikroSDK](#) compliant library, which includes functions that simplify software development. This [Click board™](#) comes as a fully tested product, ready to be used on a system equipped with the [mikroBUS™](#) socket.

How does it work?

Air quality 8 Click as its foundation uses the ZMOD4510, a pre-calibrated digital sensor designed for reliable indoor and outdoor air quality detection from Renesas. This sensor comes with selective ozone measurement capabilities (NO₂ and O₃) and allows improved energy efficiency with less than 23mW of power consumption in continuous operation without compromising air quality. It also features electrical and gas calibration, proven MO_x material, digital interface, siloxane resistance, and high-sensitivity and long-term stability allowing ppb detection limits. It covers extended operating humidity and temperature ranges from 5 to 90%RH and from -20°C to 50°C with ozone and nitrogen dioxide measurement ranges from 20 up to 500ppb.

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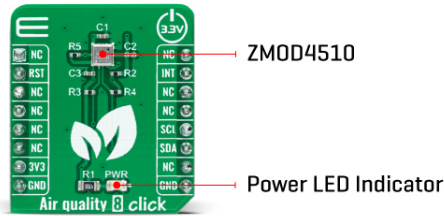
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The ZMOD4510 has a gas-sense element, consisting of a heater element on a silicon-based MEMS structure, a metal-oxide (MOx) chemiresistor, and a CMOS signal conditioning IC that controls the sensor temperature and measures the MOx resistance, which is a function of the gas concentration. It has two operational modes. The first mode of operation allows a general measurement of Air Quality, including the non-selective measurement of nitrogen dioxide (NO₂) and ozone (O₃). The second mode of operation allows the selective measurement of ozone (O₃) featuring Ultra-Low Power with an average consumption of 0.2mW during its fast sample rate of 2 seconds.

It detects typical gases based on studies and international standards for outdoor air quality and uses a sequence of applied temperatures to sample the air and report an Air Quality Index (AQI). The sensor does not require an active or direct airflow onto the sensor module because diffusion of ambient gas does not limit the sensor response time. The ZMOD4510 can also detect safety-relevant gases; however, the sensor module is not designed to detect these interferants reliably. Therefore, it is not approved for use in any safety-critical or life-protecting applications.

Air quality 8 Click communicates with MCU using the standard I2C 2-Wire interface to read data and configure settings, supporting Standard Mode operation with a clock frequency of 100kHz and Fast Mode up to 400kHz. In addition, it also possesses other features such as reset pin routed to the RST pin on the mikroBUS™ socket, which with a low logic level puts the module into a Reset state, an additional interrupt signal, routed on the INT pin of the mikroBUS™ socket labeled as INT, indicating the status of measurement process itself.

This Click board™ can be operated only with a 3.3V logic voltage level. The board must perform appropriate logic voltage level conversion before use with MCUs with different logic levels. However, the Click board™ comes equipped with a library containing functions and an example code that can be used, as a reference, for further development.

Specifications

Type	Air Quality ,Gas
Applications	Can be used for detecting unhealthy conditions in outdoor air, such as personal air-quality monitor, HVAC, and other various air quality-related applications

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On-board modules	ZMOD4510 - pre-calibrated digital sensor designed for reliable indoor and outdoor air quality detection from Renesas
Key Features	Pre-calibrated, reliable for outdoor and indoor air quality detection, low power consumption, MOx material, digital I2C output, siloxane resistance, high-sensitivity, long term stability, and more
Interface	I2C
ClickID	No
Compatibility	mikroBUS™
Click board size	S (28.6 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on Air quality 8 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikro™ BUS				Pin	Notes
	NC	1	AN	PWM	16	NC	
Reset	RST	2	RST	INT	15	INT	Interrupt
	NC	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	SCL	I2C Clock
	NC	6	MOSI	SDA	11	SDA	I2C Data
Power Supply	3.3V	7	3.3V	5V	10	NC	
Ground	GND	8	GND	GND	9	GND	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator

Air quality 8 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Measurement Range	20	-	500	ppb
Humidity Range	5	-	90	&RH
Operating Temperature Range	-20	+25	+50	°C

Software Support

We provide a library for the Air Quality 8 Click as well as a demo application (example), developed using MikroElektronika [compilers](#). The demo can run on all the main MikroElektronika [development boards](#).

Package can be downloaded/installed directly from NECTO Studio Package

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Manager(recommended way), downloaded from our [LibStock™](#) or found on [Mikroe github account](#).

Library Description

This library contains API for Air Quality 8 Click driver.

Key functions

- `airquality8_calc_oaq` Air Quality 8 calculates AQI function.
- `airquality8_read_rmoX` Air Quality 8 calculate rmoX resistance function.
- `airquality8_start_measurement` Air Quality 8 start measurement function.

Example Description

This library contains API for Air Quality 8 Click driver. The library initializes and defines the I2C bus drivers to write and read data from registers. The library also includes a function for configuring sensor and measurement, read and calculate mox resistance (RMOX) and air quality index (AQI), etc.

The full application code, and ready to use projects can be installed directly from NECTO Studio Package Manager(recommended way), downloaded from our [LibStock™](#) or found on [Mikroe github account](#).

Other Mikroe Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.AirQuality8

Additional notes and informations

Depending on the development board you are using, you may need [USB UART click](#), [USB UART 2 Click](#) or [RS232 Click](#) to connect to your PC, for development systems with no UART to USB interface available on the board. UART terminal is available in all MikroElektronika [compilers](#).

mikroSDK

This Click board™ is supported with [mikroSDK](#) - MikroElektronika Software Development Kit. To ensure proper operation of mikroSDK compliant Click board™ demo applications, mikroSDK should be downloaded from the [LibStock](#) and installed for the compiler you are using.

For more information about mikroSDK, visit the [official page](#).

Resources

[mikroBUS™](#)

[mikroSDK](#)

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[Click board™ Catalog](#)

[Click Boards™](#)

Downloads

[ZMOD4510 datasheet](#)

[Air quality 8 click 2D and 3D files](#)

[Air quality 8 click schematic](#)

[Air quality 8 click example on Libstock](#)

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