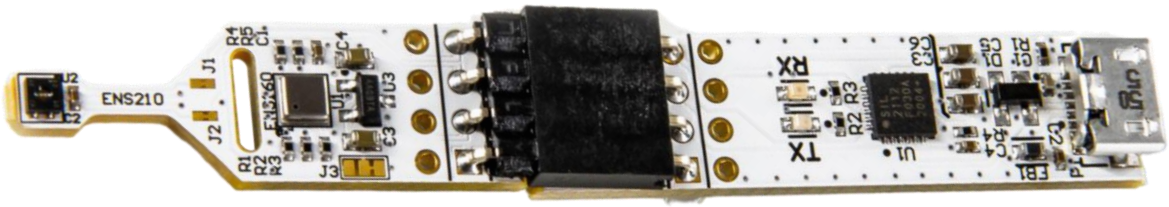
ScioSense



ENS160/ENS161

Evaluation board

ENS16x evaluation board

Version: 0.7

Release Date: 2025-01-20

ENS16x is a range of digital multi-gas metal oxide (MOX) sensors, specifically designed for indoor air quality monitoring, offering an unrivalled wealth of fully-processed outputs including low-power operating modes.

The evaluation board provides access to all relevant sensor pins through solder pads or pre-soldered pin headers. It can be connected directly or used with the included USB-I²C bridge for easy computer access.

EVKit key features & benefits

- ✓ Provides all air quality parameters (eCO2, eTVOC, AQI-U, AQI-S[1]) plus environmental parameters (RH, T)
- ✓ Quick and easy access off all ENS16x sensor pins
- ✓ Already integrated humidity & temperature sensor for automatic compensation
- ✓ Selectable I²C or SPI interface
- ✓ I²C address selectable
- ✓ Kit includes already USB-I²C-bridge for easy access via computer
- ✓ Ready-to-use evaluation software

Sensor board properties

- ✓ Single 3.3V supply
- ✓ I²C interface voltage level up to 3.3V
- ✓ Supply via USB once bridge is used

Table of Contents

1 Air quality sensor ENS16x

1.1 Sensor

ENS16x is a range of digital multi-gas metal oxide (MOX) sensors , the latest one is ENS161. With its innovative TrueVOC® technology, the ENS16x combines detection of a wide range of gases including volatile organic compounds (VOCs) and oxidizing gases with intelligent on-chip algorithms.

It calculates a range of fully processed outputs, including CO_2-equivalents, TVOC-equivalents, a 5-step Air Quality Index (AQI) as per the German Environment Agency (UBA), and a 500-step relative AQI according to ScioSense[1]. Additionally, the ENS16x provides full humidity compensation and supports low-power operating modes for power-constrained designs.

1.2 EVKit delivery

The hardware kit consists out of

- USB cable (USB-A to Micro-USB)
- USB-to-I²C bridge
- Evaluation board, fully populated with ENS16x plus ENS210 for automatic RHT compensations, full break out pins and pin headers for easy access

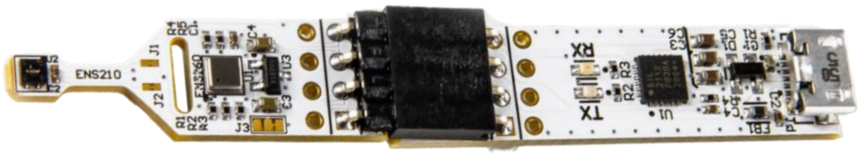


Figure 1: Evaluation board with connected USB bridge

The evaluation board can be used either with the USB-to-I²C bridge or as standalone along with a µC at voltage levels from 1.8V or 3.3V for I²C or SPI interface (LDO on board).

The following documentation will focus on the sensor board itself as the USB-to-I²C bridge is acting as interface only.

[1] ENS161 based version only

2 Board

2.1 Electrical parameters

Table 1: maximum electrical settings

Symbol	Parameter	Min	Max	Units	Comments
V_{1V8}[2]	DC voltage (in) at V_{1V8} pin	1.71	1.98	V	If LDO output not used
V_{3V3}	DC voltage at V_{3V3} pin	1.8	3.6	V	
V_{IO1}	MOSI/SDA, SCLK/SCL		V_{3V3}+0.3	V	
V_{IO2}	MISO/ADDR, nINT, nCS		V_{3V3}+0.3	V	

2.2 Schematic

The sensor board primarily comprises the ENS16x gas sensor (U1), the ENS210 RH/T sensor (U2), a linear voltage regulator (U3)[2], and jumper bridges for configuration (refer to section 2.4 for details).

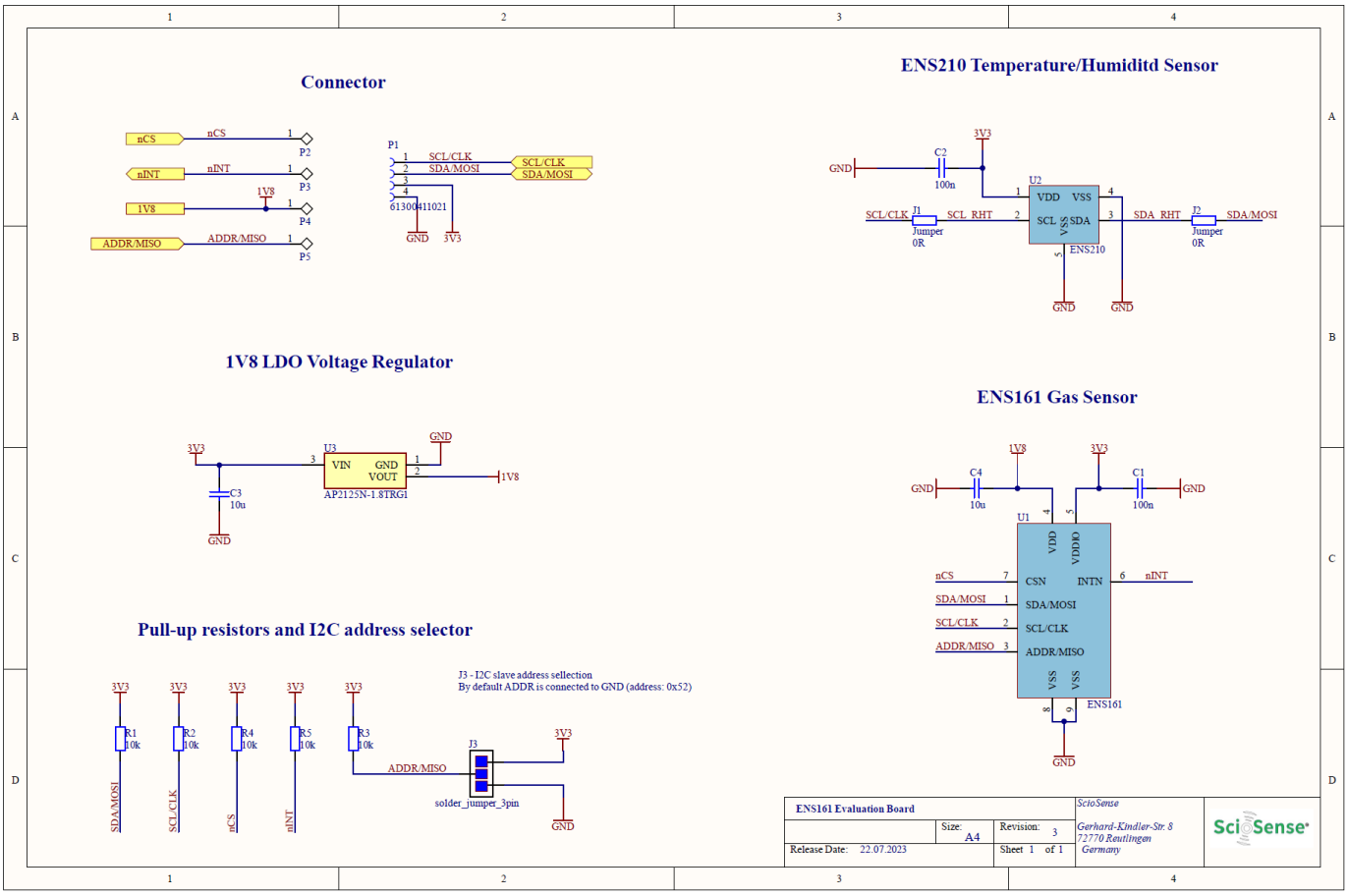


Figure 2: Schematic sensor board

[2] Please see also 2.5.3 Alternative power supply

2.3 Sensor board

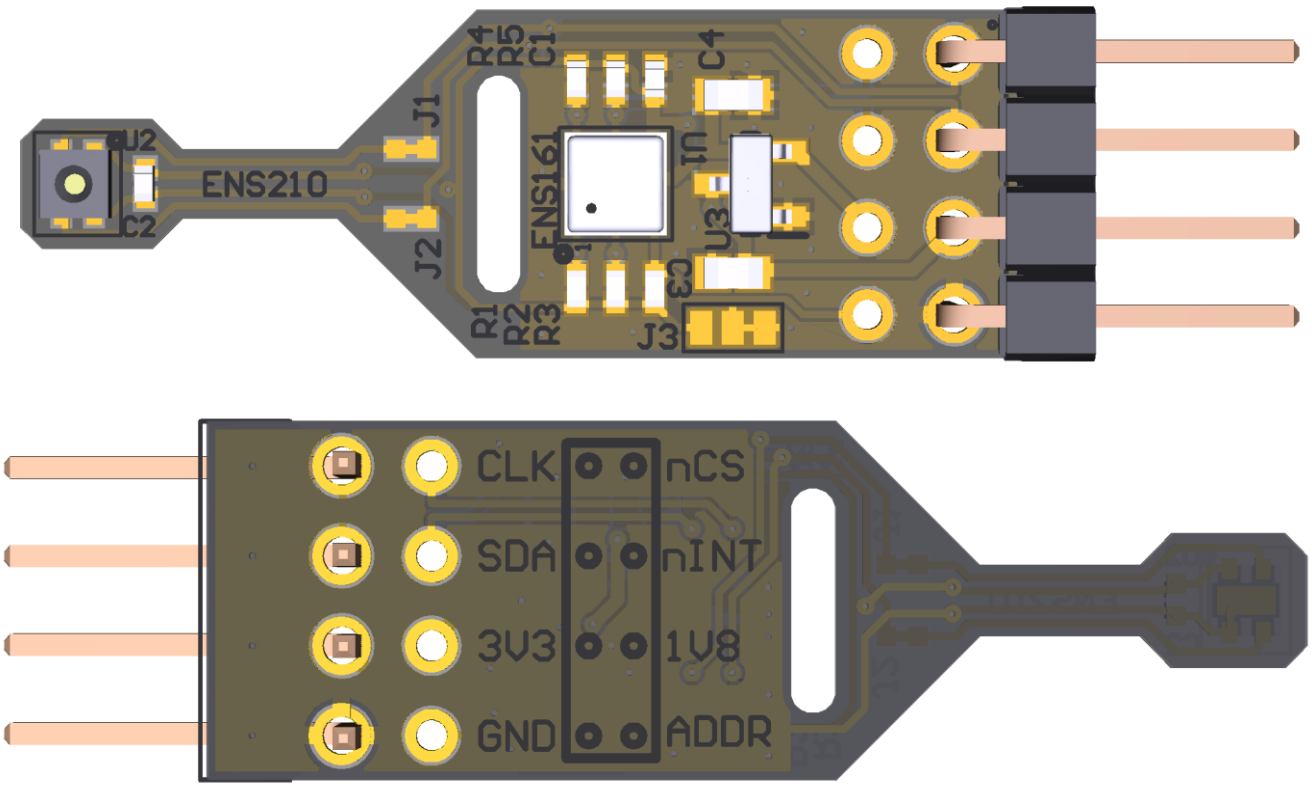


Figure 3: Sensor board top and bottom view

2.4 Dimensions

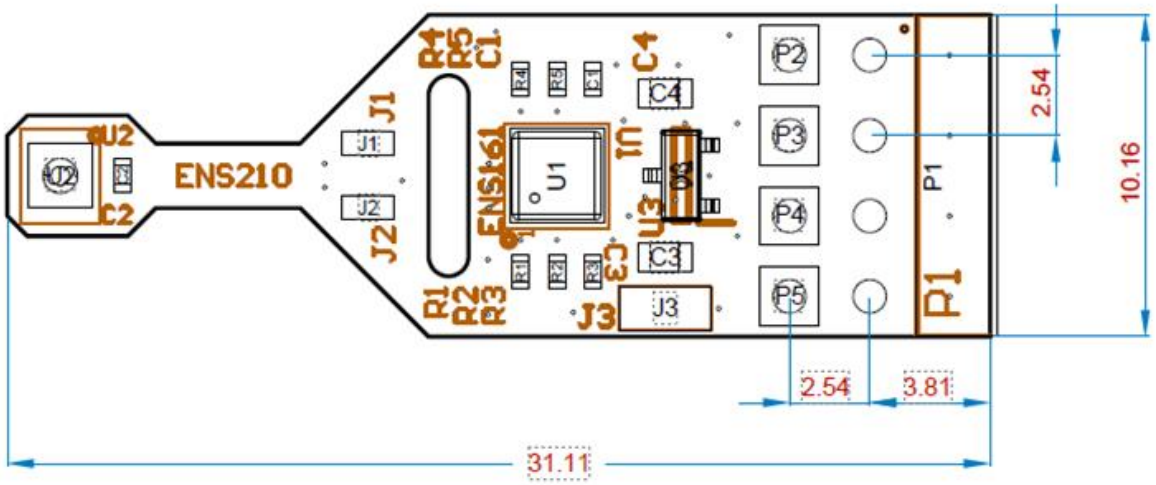


Figure 4: Mechanical dimensions

2.5 Configuration

2.5.1 Disabling ENS210 RHT Sensor

J1 and J2 are normally closed, so I²C bus is connected to ENS210. However, if not needed or SPI has been selected, it is recommended to open (cut) the copper wire on both jumpers.

2.5.2 Selection I²C / SPI and I²C address

Jumper J3 provides the option to connect ENS16x pin 3 (ADDR/MISO) either to GND, 3.3V or keep open. This setting has direct impact on bus interface configuration.

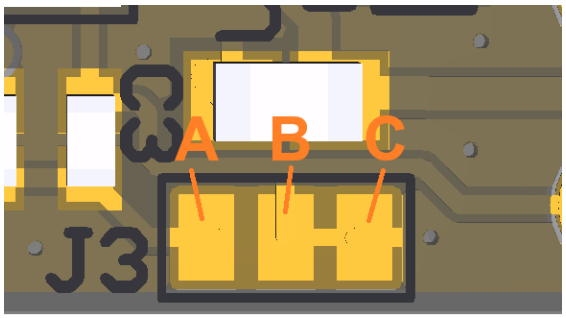


Figure 5: Jumper J3 function

By default, GND is connected to ADDR/MISO pin so the ENS16x operates in I²C mode with address 0x52. Available options are

Table 2: configuration address and bus type

Pad: A (3.3V)	B (ADDR/MISO)	C (GND)		function
				I²C active, address 0x53
			default	I²C active, address 0x52
				SPI activated

Under no circumstances should pad A and pad C be connected, as this will short the supply voltage to GND and may cause damage to the board

2.5.3 Alternative power supply

A linear voltage regulator is populated to generate 1.8V out of voltage applied on pin 3V3.

Although pin 1V8 can be used to supply voltage directly from an external source, pin 3V3 must also be powered. Please consult the ENS16x datasheet for the correct voltage levels.

2.5.4 Breakout access

All relevant signals are accessible via pads, with their functions clearly marked on the PCB. In the default configuration, pin headers are installed to straightaway access I²C functionality. This can be achieved using the USB-to-I²C bridge or directly, for example, with a microcontroller

3 Software

Windows based dashboard is available on our download section for quick access and testing of all sensor features

Download dashboard ↓

Drivers and samples are available at out GitHub page for easy implementation. This includes Arduino libraries as well as other platforms

4 More documentation

For more information on the sensor please find on our website http://www.sciosense.com

ENS160 Datasheet ↓

ENS161 Datasheet ↓

5 Ordering information

Ordering number (see also section “Ordering information” within the datasheet)

Table 3: Ordering information ENS16x evaluation kit

Ordering Code	Material ID	Delivery quantity
ENS160-LG_EK_ST V1	507870028	1 box
ENS161-LG_EK_ST V1	507890004	1 box

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7 Revision information

Table 4: Revision history

Revision	Date	Comment	Page
0.7	2024-05-13	Initial Preliminary Version	All

Note(s) and/or Footnote(s):

1. Page and figure numbers for the previous version may differ from page and figure numbers in the current revision.
2. Correction of typographical errors is not explicitly mentioned.

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