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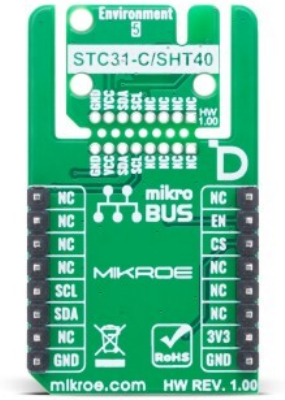
Environment 5 Click



PID: MIKROE-6573

Environment 5 Click is a compact add-on board designed to measure temperature, humidity, and CO_2 levels with high precision. It is based on two high-performance sensors from Sensirion: the SHT40-BD1B for humidity and temperature, and the STC31-C for carbon dioxide concentration. Featuring a low power design, wide operating ranges, and excellent long-term stability, this Click board ensures reliable data acquisition even in battery-powered or space-constrained applications. It supports I2C communication and introduces the innovative Click Snap feature for flexible sensor placement. Ideal for smart buildings, HVAC systems, and indoor air quality monitoring, Environment 5 Click delivers accurate and efficient environmental sensing in a compact form factor.

For more information about **Environment 5 Click** visit the official product page.

How does it work?

Environment 5 Click combines two high-performance sensors from Sensirion: the SHT40-BD1B digital humidity and temperature sensor and the STC31-C carbon dioxide (CO_2) sensor. Together, these components deliver a reliable platform for monitoring environmental conditions in a wide range of applications, especially those that demand low power consumption, high precision, and long-term stability. Together, the SHT40-BD1B and STC31-C form a cohesive and powerful solution on the Environment 5 Click board, enabling precise monitoring of temperature, humidity, and CO_2 levels in a compact form factor. This makes it an ideal choice for smart building systems, HVAC control, air quality monitoring, and various portable or embedded solutions that demand accurate environmental sensing with minimal power requirements.

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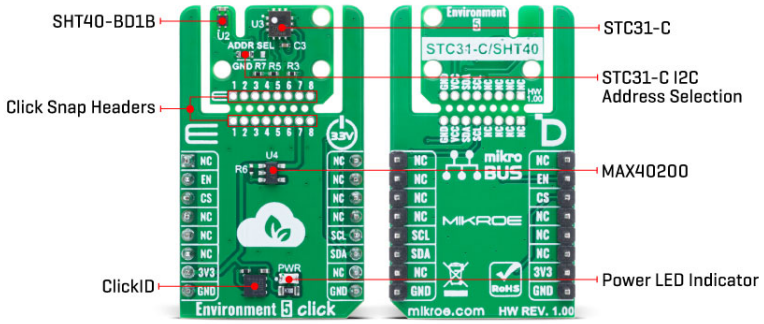

The SHT40-BD1B is the latest generation of humidity and temperature sensors from Sensirion, built on a completely new and optimized CMOSens® chip. It features low energy consumption while maintaining excellent accuracy, and supports a full operating humidity range from 0 to 100% RH, with a typical accuracy of 1.8% RH. For temperature measurement, it offers a wide operating range from -40 to +125°C, with a typical accuracy of 0.2°C. The sensor is also compliant with industry standards such as JEDEC JESD47 and certified for healthy building standards like RESET® and the WELL Building Standard™, ensuring its reliability in health-oriented and indoor environmental applications.

Complementing the temperature and humidity sensing is the STC31-C, a compact, chip-sized CO_2 sensor designed for high-range and high-accuracy gas concentration measurement. The sensor integrates the sensing element, signal processing, and digital calibration within a single CMOS chip using Sensirion’s patented CMOSens® Technology, making it a powerful solution for battery-powered and OEM applications that require dependable and efficient gas monitoring. Based on Sensirion’s advanced thermal conductivity measurement principle, this sensor stands out for its exceptional repeatability and long-term stability. It is capable of measuring CO_2 concentrations in the 0 to 100 vol% range, with an impressive accuracy of ±0.2 vol% ±2.0 % of the measured value. Additionally, it maintains outstanding temperature stability with a drift of just 0.02 vol% per degree Celsius.

Environment 5 Click is designed in a unique format supporting the newly introduced MIKROE feature called "Click Snap." Unlike the standardized version of Click boards, this feature allows the main sensor area to become movable by breaking the PCB, opening up many new possibilities for implementation. Thanks to the Snap feature, the SHT40-BD1B and STC31-C can operate autonomously by accessing their signals directly on the pins marked 1-8. Additionally, the Snap part includes a specified and fixed screw hole position, enabling users to secure the Snap board in their desired location.

This Click board™ uses an I2C interface with clock speeds of up to 1MHz, ensuring fast communication with the host MCU. The I2C address of the CO_2 sensor can be easily configured via onboard jumper ADDR SEL in the Snap area, allowing multiple devices to coexist on the same bus. In addition to the I2C interface pins, Environment 5 Click features an EN pin used to control the MAX40200 ideal diode, which in this design acts as a power switch. When the EN pin is activated, it enables the MAX40200 to supply power to both sensors on the board. This setup allows power management by enabling or disabling the sensors as needed, making it especially useful for low-power and battery-operated applications.

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

Click Snap

Click Snap is an innovative feature of our standardized Click add-on boards, introducing a new level of flexibility and ease of use. This feature allows for easy detachment of the main sensor area by simply snapping the PCB along designated lines, enabling various implementation possibilities. For detailed information about Click Snap, please visit the official page dedicated to this feature.

Specifications

Type	CO2,Environmental,Temperature & humidity
Applications	Ideal for smart buildings, HVAC systems, and indoor air quality monitoring
On-board modules	SHT40-BD1B digital humidity and temperature sensor from Sensirion | STC31-C CO2 sensor both from Sensirion
Key Features	Humidity, temperature, and CO_2 measurement, low power consumption, high accuracy and long-term stability, I2C interface with selectable address, Click Snap feature with detachable sensor section, wide operating ranges, and more
Interface	I2C
Feature	Click Snap,ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on Environment 5 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
	NC	1	AN	PWM	16	NC	
Device Enable	**EN**	2	RST	INT	15	NC	
ID COMM	**CS**	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

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Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
JP1	ADDR SEL	Left	STC31-C I2C Address Selection 0/1: Left position 0, Right position 1

Environment 5 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Relative Humidity Range	0	-	100	%RH
Typical Relative Humidity Accuracy	-	1.8	-	%RH
Temperature Range	-40	-	+125	°C
Typical Temperature Accuracy	-	0.2	-	°C
CO_2 Measurement Range	0	-	100	vol%

Software Support

Environment 5 Click demo application is developed using the NECTO Studio, ensuring compatibility with mikroSDK's open-source libraries and tools. Designed for plug-and-play implementation and testing, the demo is fully compatible with all development, starter, and mikromedia boards featuring a mikroBUS™ socket.

Example Description

This example demonstrates the use of the Environment 5 Click board, which provides temperature, humidity, and CO2 concentration measurements. The example initializes the device, reads sensor IDs, and continuously logs environmental data.

Key Functions

- environment5_cfg_setup This function initializes Click configuration structure to initial values.
- environment5_init This function initializes all necessary pins and peripherals used for this Click board.
- environment5_default_cfg This function executes a default configuration of Environment 5 Click board.
- environment5_sht_read_meas_hp This function reads the temperature and humidity measurements with high precision from SHT40 device.
- environment5_stc_set_hum This function sets the relative humidity compensation value on the STC31-C device.
- environment5_stc_read_meas This function reads gas concentration and temperature data from the STC31-C device.

Application Init

Initializes the logger and configures the Environment 5 Click board. It also retrieves and logs the product and serial numbers of the onboard sensors.

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Application Task

Continuously reads and logs temperature (degC) and humidity (%RH), and CO2 concentration (vol%) from sensors.

Application Output

This Click board can be interfaced and monitored in two ways:

- Application Output - Use the "Application Output" window in Debug mode for real-time data monitoring. Set it up properly by following this tutorial.
- UART Terminal - Monitor data via the UART Terminal using a USB to UART converter. For detailed instructions, check out this tutorial.

Additional Notes and Information

The complete application code and a ready-to-use project are available through the NECTO Studio Package Manager for direct installation in the NECTO Studio. The application code can also be found on the MIKROE GitHub account.

Resources

mikroBUS™

mikroSDK

Click board™ Catalog

Click boards™

ClickID

Downloads

Environment 5 click example package

Environment 5 click 2D and 3D files v100

SHT4xA datasheet

STC31-C datasheet

Environment 5 click schematic v100