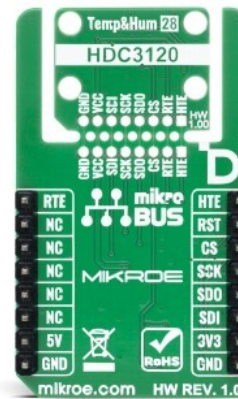
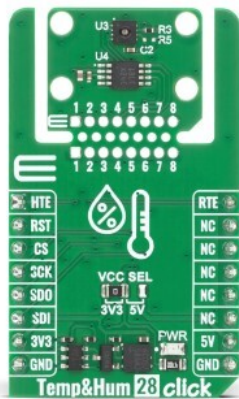


## Temp&Hum 28 Click



PID: MIKROE-6904

**Temp&Hum 28 Click** is a compact add-on board designed for relative humidity and temperature monitoring in embedded, industrial, and consumer systems. This board is based on the [HDC3120](#), a capacitive humidity and temperature sensor from [Texas Instruments](#) that provides ratiometric analog outputs for both measured parameters. The Click also integrates a 12-bit [ADC122S101](#) analog-to-digital converter with a 4-wire SPI interface, enabling high-resolution digital conversion of the sensor signals, low power operation, and consistent performance across a wide supply voltage range, while offering control features such as an on-chip heater activation pin and a reset/disable line for enhanced reliability in high-humidity or demanding operating conditions. It is ideally suited for major appliances, HVAC systems, energy infrastructure, telecom power equipment, printers, and a wide range of small home and embedded applications that depend on stable and accurate environmental monitoring.

For more information about **Temp&Hum 28 Click** visit the official [product page](#).

### How does it work?

Temp&Hum 28 Click is based on the HDC3120, a capacitive humidity and temperature sensor from Texas Instruments that represents both relative humidity and temperature measurements as ratiometric analog outputs, ensuring consistent performance across a wide supply voltage range. To make these analog signals easily accessible to a host system, the board integrates the ADC122S101, a 12-bit analog-to-digital converter from Texas Instruments, which communicates with the host MCU over a 4-wire SPI interface and provides precise digital representation of the sensor outputs for easy firmware integration and data processing. This board is well suited for major appliances, energy infrastructure systems including battery energy storage and remote power distribution automation, HVAC equipment, telecom power

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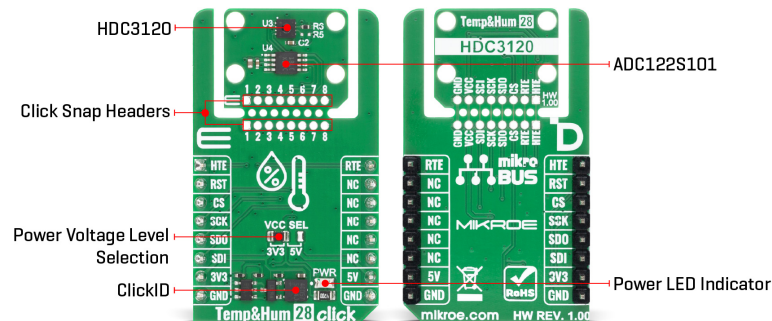


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systems, printers, and a wide range of small home and embedded applications.



The HDC3120 delivers high measurement accuracy with typical relative humidity accuracy of  $\pm 1.0\%$  in the 0 to 70% RH range and typical temperature accuracy of  $\pm 0.1^\circ\text{C}$  between  $-10^\circ\text{C}$  and  $60^\circ\text{C}$ , while supporting a full operating range of 0 to 100% RH and  $-40^\circ\text{C}$  to  $125^\circ\text{C}$ , making the board suitable for both controlled indoor environments and demanding industrial conditions. Designed for long-term reliability, the sensor features low power consumption and less than 0.19% long-term drift per year, ensuring stable performance over extended deployment periods. Both humidity and temperature sensing elements are 100% tested and calibrated in a NIST-traceable production setup and verified with equipment calibrated to ISO/IEC 17025 standards, providing confidence in measurement consistency and traceability.

This Click board™ 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/IC/module area to become movable by breaking the PCB, opening many new possibilities for implementation. Thanks to the Snap feature, the HDC3120 can operate autonomously by accessing its 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.

In addition to the standard communication and power pins, the board also uses lines like the RTE pin, which drives the HDC3120 into reset or disable mode when pulled LOW for at least  $1\mu\text{s}$ , and the HTE pin, which activates the on-chip heater when driven HIGH to help mitigate condensation and improve sensor response in high-humidity environments.

This Click board™ can operate with either 3.3V or 5V logic voltage levels selected via the VCC SEL jumper. This way, both 3.3V and 5V capable MCUs can use the communication lines properly. Also, this Click board™ comes equipped with a library containing easy-to-use functions and an 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, designed to bring greater flexibility and optimize your prototypes. By simply snapping the PCB along predefined lines, you can easily detach the main sensor/IC/module area, reducing the overall size, weight, and power consumption - ideal for the final phase of prototyping. For more details about Click Snap, visit the [official page](#) dedicated to this feature.

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## Specifications

Type	Temperature & humidity
Applications	Ideal for major appliances, HVAC systems, energy infrastructure, telecom power equipment, printers, and a wide range of small home and embedded applications that depend on stable and accurate environmental monitoring
On-board modules	HDC3120 - $\pm 1\%$ RH accurate analog-output humidity sensor from Texas Instruments
Key Features	Capacitive humidity and temperature sensing, onboard 12-bit ADC122S101 analog-to-digital conversion, wide operating range from 0 to 100% RH and $-40^{\circ}\text{C}$ to $125^{\circ}\text{C}$ , low power consumption with less than 0.19% long-term drift per year for extended stability, NIST-traceable and ISO/IEC 17025 verified factory calibration, on-chip heater activation, Click Snap format, and more
Interface	SPI
Feature	Click Snap, ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V or 5V

## Pinout diagram

This table shows how the pinout on Temp&Hum 28 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin					Pin	Notes
Heater Control	<b>HTE</b>	1	AN	PWM	16	<b>RTE</b>	Reset/Disable Control
ID SEL	<b>RST</b>	2	RST	INT	15	NC	
SPI Select / ID COMM	<b>CS</b>	3	CS	RX	14	NC	
SPI Clock	<b>SCK</b>	4	SCK	TX	13	NC	
SPI Data OUT	<b>SDO</b>	5	MISO	SCL	12	NC	
SPI Data IN	<b>SDI</b>	6	MOSI	SDA	11	NC	
Power Supply	<b>3.3V</b>	7	3.3V	5V	10	<b>5V</b>	Power Supply
Ground	<b>GND</b>	8	GND	GND	9	<b>GND</b>	Ground

## Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
JP1	VCC SEL	Left	Power Voltage Level Selection 3V3/5V: Left position 3V3, Right

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position 5V

## Temp&Hum 28 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Relative Humidity Operating Range	0	-	100	%RH
Relative Humidity Accuracy (0 to 70% RH)	-	±1.0	-	%RH
Temperature Operating Range	-40	-	85	°C
Temperature Accuracy (-10°C to 60°C)	-	±0.1	-	°C

## Software Support

[Temp&Hum 28 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 Temp&Hum 28 Click board for ambient temperature and relative humidity measurement. The application reads temperature and humidity data via the SPI interface and displays the measured values on the serial terminal.

## Key Functions

- `temphum28_cfg_setup` This function initializes Click configuration structure to initial values.
- `temphum28_init` This function initializes all necessary pins and peripherals used for this Click board.
- `temphum28_heater_enable` This function enables the internal heater by setting the heater enable pin to a high logic level.
- `temphum28_read_humidity` This function reads the averaged humidity sensor voltage and converts it to relative humidity percentage using the reference voltage.
- `temphum28_read_temperature` This function reads the averaged temperature sensor voltage and converts it to temperature value using the reference voltage.

## Application Init

Initializes the logger and Temp&Hum 28 Click driver, disables the internal heater, and enables the device for normal operation.

## Application Task

Periodically reads temperature and humidity values from the sensor and logs the results to the serial terminal.

## 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](#).

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- 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

[ADC122S101 datasheet](#)

[Temp&Hum 28 click example package](#)

[Temp&Hum 28 click 2D and 3D files v100](#)

[Temp&Hum 28 click schematic v100](#)

[HDC3120 datasheet](#)

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