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<u>Thermo 14 Click</u>





PID: MIKROE-4132

Thermo 14 Click uses the STTS22H digital temperature sensor and thermal watchdog, which can measure temperature measurements between -40°C and +125°C so that the temperature measurement data can be processed by the host MCU. Thermo 14 Click provides an accuracy of ± 0.5 °C in the range from -10°C to 60°C. The sensor used on this Click board[™] has a great combination of features that make it a perfect choice for any temperature measurement application: low temperature drift, low power consumption, programmable alert engine, compact sensor size, critical temperature warnings, and more. The sensor itself requires almost no external components, which simplifies the design, reducing the cost and cutting the time to market.

Thermo 14 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?

The active temperature sensing component on Thermo 14 Click is the STTS22H, a high accuracy temperature sensor IC with the 2-Wire interface, from STMicroelectronics. The sensor operating mode is user-configurable and allows selecting between different ODRs (down to 1 Hz) or the one-shot mode for battery saving. In one-shot mode, the sensor current consumption falls to 1.75 μ A.

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ISO 27001: 2013 certification of informational security management system. ISO 14001: 2015 certification of environmental management system. OHSAS 18001: 2008 certification of occupational health and safety management system.



ISO 9001: 2015 certification of quality management system (QMS).





The Click board[™] itself has a reasonably small number of components because most of the measurement circuitry is already integrated on the STTS22H sensor. The I2C / SMBus 3.0 compatible serial interface lines, along with the INT pin, which also works in the open drain configuration, are pulled up by the onboard resistors. The 2-Wire lines are routed to the respective I2C lines of the mikroBUS[™] (SCK and SDA), while the INT pin is routed to the INT pin of the mikroBUS[™].

The STTS22H INT pin is asserted (low) whenever the temperature is equal to or exceeds the high limit or is below the low limit. Once asserted, the output will remain asserted until the STTS22H receives an SMBus Alert Response Address (ARA) from the host and acknowledges with its slave address.

The I2C address can be selected with the ADDR SEL onboard SMD jumper. The I2C address can be changed by this jumper, allowing for more than one of these click boards to be used on a system, each with the different I2C address.

This Click Board[™] is designed to be operated only with 3.3V logic level. A proper logic voltage level conversion should be performed before the Click board[™] is used with MCUs with logic levels of 5V.

Туре	Temperature & humidity
Applications	can be used for a rapid development and testing of various applications based on wereable devices, smart home automation, smartphones, HVAC, refrigerators, white goods, thermostats
On-board modules	Thermo 14 Click uses the STTS22H IC, a high accuracy temperature sensor, from STMicroelectronics.
Key Features	Low temperature drift, low power consumption, programmable alert engine, compact sensor size, critical temperature warnings
Interface	I2C
Feature	No ClickID
Compatibility	mikroBUS™
Click board size	S (28.6 x 25.4 mm)

Specifications

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Input Voltage 3.3V

Pinout diagram

This table shows how the pinout on Thermo 14 Click corresponds to the pinout on the mikroBUS[™] socket (the latter shown in the two middle columns).

Notes	Pin	● ● mikro™ ● ● ● BUS			TM-	Pin	Notes
	NC	1	AN	PWM	16	NC	
	NC	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
JP1	ADDR SEL	Left	Communication interface selection: left position 0, right position 1

Software Support

We provide a library for the Thermo 14 Click on our <u>LibStock</u> page, as well as a demo application (example), developed using MikroElektronika compilers. The demo can run on all the main MikroElektronika development boards.

Library Description

The library covers all the necessary functions that enables the usage of the Thermno 14 Click board. It holds functions that allow full control of the device to the user. User can calibrate the device, read temperature or read raw values if necessary.

Key functions:

- float thermo14 get temperature (); Function is used to get the temperature.
- float thermo14 raw to celsius (int16 t temp raw); Function is used to perform necessary calculacion in order to get temperature freom raw data.
- int16_t thermo14_temp_raw_get (); Function is used to get the raw value.

Examples description

The application is composed of three sections :

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- System Initialization Initializes GPIO, SPI and LOG structures.
- Application Initialization Initalizes SPI driver, sets up the device and makes an initial log.
- Application Task (code snippet) This example shows capabilities of Thermo 14 click by measuring temperature every 3 seconds and displaying temperature in degrres Celsius via USART terminal.

Additional Functions :

• void log display(float value) - Function displays readings as floating point value with two decimal places

The full application code, and ready to use projects can be found on our <u>LibStock</u> page.

Other mikroE Libraries used in the example:

- I2C
- UART
- Conversions

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. The terminal available in all MikroElektronika compilers, or any other terminal application of your choice, can be used to read the message.

mikroSDK

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

For more information about mikroSDK, visit the official page.

Resources

mikroBUS™

mikroSDK

Click board[™] Catalog

Click Boards[™]

Downloads

Thermo 14 click 2D and 3D files

STTS22H datasheet

Thermo 14 click schematic

Thermo 14 click example on Libstock Mikroe produces entire development toolchains for all major microcontroller architectures.

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