MIKROELEKTRONIKA D.O.O, Batajnički drum 23, 11000 Belgrade, Serbia
VAT: SR105917343 Registration No. 20490918
Phone: + 381 11 78 57 600 Fax: + 381 11 63 09 644 E-mail: office@mikroe.com
www.mikroe.com

Thermo 24 Click

PID: MIKROE-5110

Thermo 24 Click is a compact add-on board that contains the 4th generation temperature sensing solution from Sensirion. This board features the STS40-AD1B, a high-accuracy ultra-low-power temperature sensor. The STS40-AD1B integrates a digital temperature sensor with a 16-bit analog-to-digital converter (ADC), a data processing circuit, and serial interface logic functions in one package. Characterized by its high accuracy (up to ±0.2°C typical) and high resolution of 0.01°C, this temperature sensor provides temperature data to the host controller with a configurable I2C interface. This Click board™ is appropriate for thermal management and protection of various consumer, industrial, and environmental applications.

Thermo 24 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?

Thermo 24 Click as its foundation uses the STS40-AD1B, a high-accuracy ultra-low-power 16-bit temperature sensor from Sensirion. This temperature sensor is characterized by high accuracy; temperature range of -40°C to +120°C provides typical ±0.2°C accuracy. It integrates a digital temperature sensor with a 16-bit analog-to-digital converter (ADC), a data processing circuit, and serial interface logic functions in one package. The voltage is digitized and converted to a 16-bit temperature result in degrees Celsius, with a resolution of 0.01°C. The STS40-AD1B achieves the most significant cost efficiency among comparable sensors.

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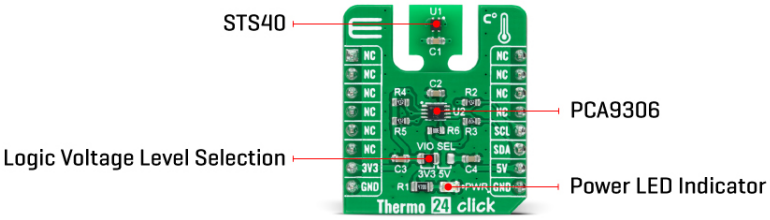

The STS40-AD1B communicates with MCU using a standard I2C 2-Wire interface. Given that this chip can be found in multiple versions with its own unique I2C slave address, this version, specifically the STS40-AD1B, comes with the slave address of 0x44. Since the sensor for operation requires a 3.3V logic voltage level only, this Click board™ also features the PCA9306 voltage-level translator from Texas Instruments. The I2C interface bus lines are routed to the dual bidirectional voltage-level translator, allowing this Click board™ to work with both 3.3V and 5V MCUs properly.

This Click board™ can operate with both 3.3V and 5V logic voltage levels selected via the VIO SEL jumper. This way, it is allowed for both 3.3V and 5V capable MCUs to use the communication lines properly. However, the Click board™ comes equipped with a library that contains easy-to-use functions and an example code that can be used, as a reference, for further development.

Specifications

Type	Temperature & humidity
Applications	Can be used for thermal management and protection of various consumer, industrial, and environmental applications
On-board modules	STS40-AD1B - high-accuracy ultra-low-power temperature sensor from Sensirion
Key Features	Low power consumption, high precision, high accuracy, 16-bit temperature-to-digital converter, 0.01°C temperature resolution, I2C compatible serial interface, and more
Interface	I2C
Feature	No ClickID
Compatibility	mikroBUS™
Click board size	S (28.6 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

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This table shows how the pinout on Thermo 24 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	
	NC	2	RST	INT	15	NC	
	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	**5V**	Power Supply
Ground	**GND**	8	GND	GND	9	**GND**	Ground

Onboard settings and indicators

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

Thermo 24 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Accuracy	-	±0.2	-	°C
Resolution	-	16	-	bit
Operating Temperature Range	-40	+25	+120	°C

Software Support

We provide a library for the Thermo 24 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 Manager(recommended way), downloaded from our LibStock™ or found on Mikroe github account.

Library Description

This library contains API for Thermo 24 Click driver.

Key functions

- thermo24_soft_reset This function performs the software reset by sending the soft reset command by using I2C serial interface.
- thermo24_read_serial This function reads the 4-byte chip serial number by using I2C serial interface.

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- thermo24_read_temperature This function reads the temperature in Celsius with the specified measurement precision.

Example Description

This example demonstrates the use of Thermo 24 Click board™ by reading and displaying the temperature measurements.

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.Thermo24

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

Click board™ Catalog

Click boards™

Downloads

Thermo 24 click 2D and 3D files

STS40-AD1B datasheet

PCA9306 datasheet

Thermo 24 click schematic

Thermo 24 click example on Libstock

MIKROE

Time-saving embedded tools

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