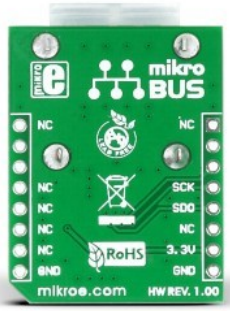
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THERMO Click





PID: MIKROE-1197

THERMO Click is a compact add-on board that provides accurate temperature measurements. This board features the MAX31855K, a thermocouple-to-digital converter from Analog Devices, as well as a PCC-SMP connector for K-type thermocouple probe. Combination of MAX31855K and PCC-SMP connector results in high-accuracy temperature measurement in a temperature range between -270 and 1372°C with a sensitivity of about 41µV/°C. The device also contains cold-junction compensation sensing and correction providing temperature data to the host controller over an SPI interface (read-only). This Click board™ is suitable for thermostatic, process-control, monitoring applications, and many more.

THERMO 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?

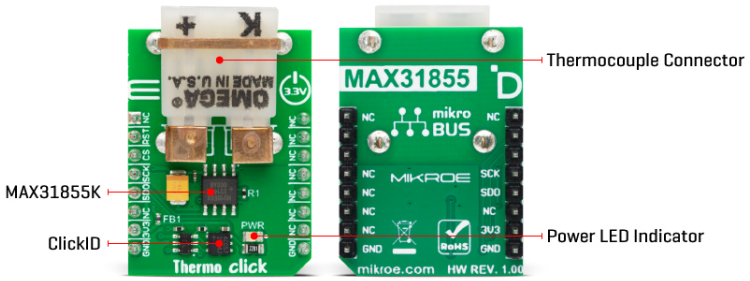
THERMO Click uses the MAX31855K, a sophisticated thermocouple-to-digital converter with a built-in 14-bit analog-to-digital converter (ADC) from Analog Devices. The thermocouple type is indicated in the suffix of the part number, which is why this Click board™ corresponds to the appropriate K-type thermocouple probe. The MAX31855K and PCC-SMP connector combination supports high-accuracy temperature measurement ideal for thermostatic, process-control, and monitoring applications.

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Committed to excellency, we are dedicated to helping engineers bring the project development up to speed and achieve outstanding results.

ISO 27001: 2013 certification of informational security management system.
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The function of the thermocouple is to sense a difference in temperature between two ends of the thermocouple wires. The thermocouple's "hot" junction can be read across the operating temperature range, which for the MAX31855K is between -270 and 1372°C with a sensitivity of about 41µV/°C. It also features cold-junction compensation sensing and correction, a digital controller, and associated control logic. The reference junction, or "cold" end (which should be at the same temperature as the board on which the device is mounted), can range from -55°C to +125°C. While the temperature at the cold end fluctuates, the device accurately senses the temperature difference at the opposite end. It provides temperature data to the host controller over an SPI interface (read-only).

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. However, the Click board™ comes equipped with a library containing functions and an example code that can be used, as a reference, for further development.

Specifications

Type	Temperature & humidity
Applications	Can be used for thermostatic, process-control, monitoring applications, and more
On-board modules	MAX31855K - thermocouple-to-digital converter from Analog Devices
Key Features	Cold-junction compensation, 14-bit - 0.25°C resolution, detects thermocouple shorts to GND or VCC, on-board PCC-SMP connector for K-type thermocouple probes, high accuracy, low power consumption, and more
Interface	SPI
ClickID	Manifest,No
Compatibility	mikroBUS™
Click board size	S (28.6 x 25.4 mm)
Input Voltage	3.3V

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Pinout diagram

This table shows how the pinout on THERMO 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	
ID SEL	**RST**	2	RST	INT	15	NC	
SPI Select / ID COMM	**CS**	3	CS	RX	14	NC	
SPI Clock	**SCK**	4	SCK	TX	13	NC	
SPI Data OUT	**SDO**	5	MISO	SCL	12	NC	
	NC	6	MOSI	SDA	11	NC	
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

THERMO Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Thermocouple Operating Temperature Range	-270	-	+1350	°C
Sensitivity	-	41.276	-	µV/°C
TDC Resolution	-	14	-	bit

Software Support

We provide a library for the THERMO Click as well as a demo application (example), developed using MIKROE compilers. The demo can run on all the main MIKROE development boards.

Package can be downloaded/installed directly from NECTO Studio Package Manager (recommended), downloaded from our LibStock™ or found on Mikroe github account.

Library Description

This library contains API for THERMO Click driver.

Key functions

- Function gets thermocouple temperature data.
- Function checks fault states of MAX31855 sensor on Thermo click board.
- Function reads the 32-bit of data from the sensor.

Example Description

This example measures temperature and then logs the results.

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The full application code, and ready to use projects can be installed directly from NECTO Studio Package Manager (recommended), downloaded from our LibStock™ or found on Mikroe github account.

Other Mikroe Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.Thermo

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 MIKROEcompilers.

mikroSDK

This Click board™ is supported with mikroSDK - MIKROE 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™

Click board™ Catalog

Click Boards™

Downloads

THERMO click example on Libstock

MAX31855K datasheet

THERMO click 2D and 3D files

THERMO click schematic

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