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Thermostat 5 Click

PID: MIKROE-6102

Thermostat 5 Click is a compact add-on board designed for precise temperature monitoring and control of external devices. This board features the MCP6022 operational amplifier and MCP3221 A/D converter, both from Microchip, ensuring accurate signal processing. The board features an NTC connector for temperature sensing, a dual-mode signal processing option (analog or digital) selectable via the V SEL jumper, and a high-current J1031C3VDC.15S SPDT relay for external load control. The relay supports up to 2A loads, with an orange LED indicating its active status, while the board operates with 3.3V or 5V logic levels. Thermostat 5 Click is ideal for industrial automation, HVAC systems, and other temperature-sensitive applications requiring reliable and flexible control solutions.

How does it work?

Thermostat 5 Click is an add-on board designed to monitor temperature and control external devices efficiently. At its core, it features an NTC connector, enabling the integration of an NTC thermistor to measure temperature variations. The signal generated by the thermistor is first processed by the MCP6022, a rail-to-rail input/output operational amplifier from Microchip that amplifies the thermistor's signal, ensuring high precision and reliability in temperature monitoring. Depending on the selected processing mode, the amplified signal is then directed to the host MCU for further analysis. Thermostat 5 Click is an ideal choice for applications that require precise temperature monitoring and responsive control of external devices. Whether used in industrial automation, HVAC systems, or any other temperature-sensitive environments, this board offers reliable performance and versatile integration options.

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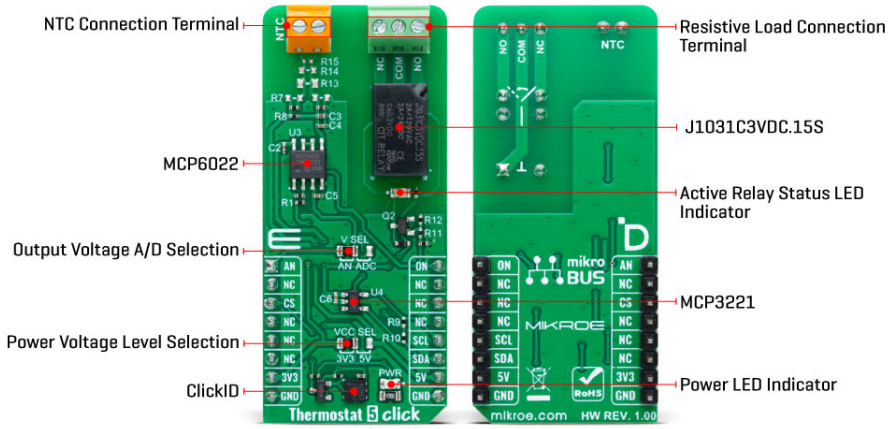

As mentioned, one of the key features of Thermostat 5 Click is its dual signal processing capability, giving users the flexibility to choose between analog and digital output. This selection is made using the onboard V SEL jumper, which determines whether the signal will be processed in analog or digital form. When the jumper is set to the AN position, the amplified signal is routed to the AN pin of the mikroBUS™ socket, allowing the host MCU to process it as an analog input. On the other hand, when the jumper is set to ADC, the signal is digitized by the MCP3221 A/D converter. This 12-bit resolution converter from Microchip provides accurate digital output, which is transmitted to the host MCU via an I2C-compatible interface.

The board also includes a reliable and durable relay for controlling external resistive loads based on the detected temperature. The J1031C3VDC.15S SPDT relay from CIT Relay and Switch can handle loads of up to 2A and is highly sensitive, ensuring efficient switching with minimal power consumption. The relay's SPDT configuration allows it to switch between normally open (NO) and normally closed (NC) positions, providing flexibility in controlling connected devices. The activation of the relay is controlled via the ON pin of the mikroBUS™ socket, and its status is visually indicated by an orange LED on the board. This design ensures clear feedback and easy monitoring of the relay's operational state.

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.

Specifications

Type	Temperature & humidity
Applications	Ideal for industrial automation, HVAC systems, and other temperature-sensitive applications
On-board modules	MCP6022 - rail-to-rail operational amplifier from Microchip
Key Features	Easy integration of an NTC thermistor, rail-to-rail input/output amplifier for signal amplification, dual signal processing, high-current relay for controlling external loads, orange LED for easy monitoring of relay activation state, and more

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Interface	Analog,I2C
Feature	ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

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

Notes	Pin	mikroBUS				Pin	Notes
Analog Output	**AN**	1	AN	PWM	16	**ON**	Relay Control
	NC	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	**5V**	Power Supply
Ground	**GND**	8	GND	GND	9	**GND**	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
LD1	-	-	Active Relay Status LED Indicator
JP1	VCC SEL	Left	Power Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V
JP2	V SEL	Left	Output Voltage A/D Selection AN/ADC: Left position AN, Right position ADC

Thermostat 5 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Relay Current Rating	-	-	2	A

Software Support

We provide a library for the Thermostat 5 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.

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Library Description

This library contains API for Thermostat 5 Click driver.

Key functions

- thermostat5_set_relay This function controls the relay by setting the state of the ON (PWM) pin.
- thermostat5_get_temperature This function reads and calculates temperature in degrees Celsius [degC] using NTC thermistors.
- thermostat5_read_voltage This function sets the voltage reference for Thermostat 5 click driver.

Example Description

This library contains API for the Thermostat 5 Click driver for temperature measurement and relay control.

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.Thermostat5

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 MIKROE compilers.

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™

mikroSDK

Click board™ Catalog

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Click boards™

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Downloads

MCP3221 datasheet

MCP6022 datasheet

J1031C3VDC datasheet

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