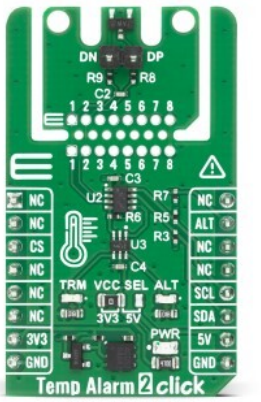
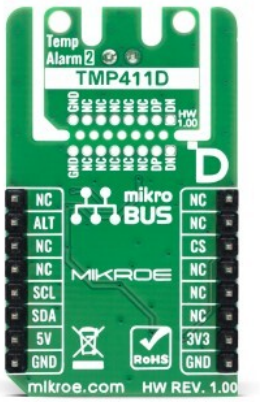
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Temp Alarm 2 Click





PID: MIKROE-6947

Temp Alarm 2 Click is a compact add-on board designed for local and remote temperature monitoring, thermal alarm detection, and embedded protection. This board is based on the TMP411DBDDFR, a digital remote and local temperature sensor from Texas Instruments. It features ±0.8°C accuracy, 12-bit resolution, DP/DN diode sensing, programmable limits, diode fault detection, series resistance cancellation, offset correction, and ALT interrupt output. The board supports I2C communication, selectable 3.3V or 5V operation, ClickID, and PWR, TRM, and ALT indicators. Temp Alarm 2 Click is suitable for IoT devices, embedded controllers, processor and FPGA monitoring, communication equipment, and overheating protection systems.

For more information about **Temp Alarm 2 Click** visit the official product page.

How does it work?

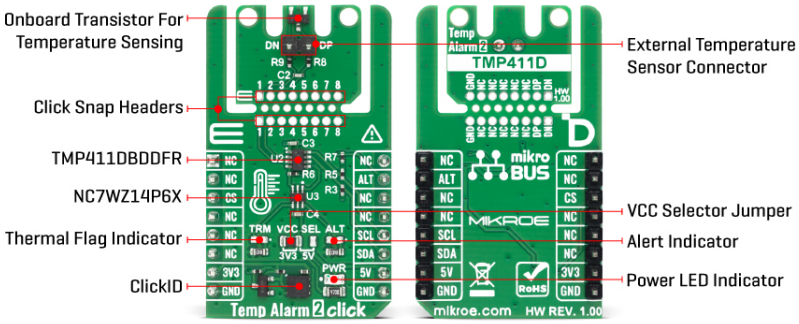
Temp Alarm 2 Click is based on the TMP411DBDDFR from Texas Instruments, a digital remote and local temperature sensor designed for thermal monitoring in embedded systems. The device integrates a local temperature sensor for measuring the temperature at the Click board location and a remote temperature sensing channel that can be connected to a diode-connected transistor or to a thermal diode integrated inside a processor, microcontroller, ASIC, or FPGA. This makes the Click board suitable for designs where the board temperature and a critical external thermal point must be monitored at the same time, especially in systems where overheating must be detected before it affects performance or reliability. The TMP411D variant offers ±0.8°C local and remote channel accuracy, programmable resolution up to 12 bits, and operation across the −40°C to +125°C temperature range.

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The TMP411DBDDFR includes several functions that improve remote temperature measurement accuracy and system-level protection. Series resistance cancellation helps reduce errors caused by resistance in the remote sensor path, while programmable non-ideality factor correction and offset registers allow the measurement to be adapted to different external diode characteristics. The device also includes programmable temperature limits, minimum and maximum temperature registers, diode fault detection, and alert functionality, allowing the host system to react when a monitored point crosses a configured thermal threshold. These features make Temp Alarm 2 Click a practical solution for thermal supervision in IoT devices, embedded control systems, processing modules, communication equipment, and other applications where local and remote temperature information must be available to the MCU.

Temp Alarm 2 Click communicates with the host MCU through the I2C interface, using the mikroBUS™ SCL and SDA lines for clock and data communication. Through this interface, the MCU can configure the device, read local and remote temperature data, set temperature limits, check status registers, and handle thermal alarm events. The ALT signal from the TMP411DBDDFR alert output is routed to the mikroBUS™ INT pin, allowing the host MCU to detect alarm conditions without constantly polling the device. The CS pin is used for ClickID communication, while the remaining mikroBUS™ pins are not used by the temperature sensor function. The remote sensing input is available through the DP and DN signal path, connected to the dedicated signal connector, enabling remote thermal-point measurement through an external diode-connected transistor or compatible thermal diode connection.

Additional onboard elements support easier integration, configuration, and status monitoring during development. The board includes a PWR LED indicator for power presence, a VCC SEL jumper for selecting the operating voltage level between 3.3V and 5V, and a DP/DN signal connector for the remote temperature sensing input. There are dedicated TRM and ALT indicators, which provide visual feedback for thermal and alert-related outputs during testing. Temp Alarm 2 Click also includes ClickID support, allowing compatible host systems to identify the board automatically, and follows the standard mikroBUS™ add-on board layout for straightforward use with MIKROE development platforms.

This Click board™ can operate with either 3.3V or 5V power rails, selected through the onboard VCC SEL jumper, making it compatible with both 3.3V and 5V mikroBUS™ host systems. The TMP411DBDDFR itself communicates through the I2C-compatible serial interface, while the board-level design provides the required mikroBUS™ connections, power selection, alert routing, and remote sensor access. Temp Alarm 2 Click comes with a ready-to-use code

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example that simplifies software development by demonstrating initialization, temperature reading, and alarm monitoring, and the example can be downloaded and used as a starting point for integration into a system equipped with a mikroBUS™ socket.

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.

Specifications

Type	Temperature & humidity
Applications	Ideal for IoT devices, embedded controllers, processor and FPGA temperature monitoring, communication equipment, thermal protection systems, overheating alarms, and temperature-supervised automation
On-board modules	TMP411DBDDFR - digital remote and local temperature sensor with alert function from Texas Instruments
Key Features	Local and remote temperature sensing, thermal alarm detection, ±0.8°C temperature accuracy, 12-bit temperature resolution, DP/DN remote diode sensing, support for diode-connected transistors and processor thermal diodes, programmable temperature limits, ALT interrupt output for alarm events, diode fault detection, series resistance cancellation, offset correction, and more
Interface	I2C
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 Alarm 2 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	**ALT**	Alert
ID COMM	**CS**	3	CS	RX	14	NC	

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	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	VCC SEL	Left	Power/Logic Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V
J1	-	-	DP and DN Signal Connector

Temp Alarm 2 Click electrical specifications

Description	Min	Typ	Max	Unit
VCC	-	3.3, 5	-	V
Resolution	-	12	-	bit
Accuracy	-0.8	-	0.8	°C
Sensing Temperature	-40	-	125	°C

Software Support

Temp Alarm 2 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 Temp Alarm 2 Click board by reading and displaying the temperature measurements from the local sensor and the remote channel sensor, and monitoring the ALERT and THERM temperature alarm states.

Key Functions

- tempalarm2_cfg_setup This function initializes Click configuration structure to initial values.
- tempalarm2_init This function initializes all necessary pins and peripherals used for this Click board.
- tempalarm2_default_cfg This function executes a default configuration of Temp Alarm 2 Click board.
- tempalarm2_read_local_temp This function reads the local sensor temperature in degrees Celsius.
- tempalarm2_read_remote_temp This function reads the remote sensor temperature in degrees Celsius.
- tempalarm2_clear_alert This function performs the SMBus Alert Response Address (ARA) command to reset the ALERT pin.

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Application Init

Initializes the driver and performs the Click default configuration.

Application Task

Reads the temperature measurements in degrees Celsius from both the local sensor and the remote channel, and displays the results on the USB UART approximately once per second. Also monitors and reports the ALERT and THERM alarm states via the ALT pin and the status register.

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.
- 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

Temp Alarm 2 click example package

Temp Alarm 2 click 2D and 3D files v100

Temp Alarm 2 click schematic v100

TMP411DBDDFR datasheet

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