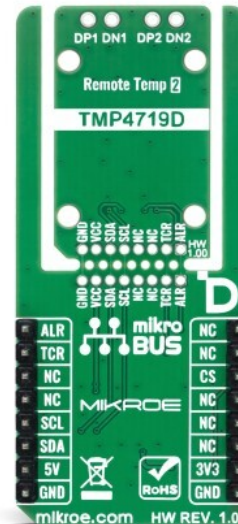
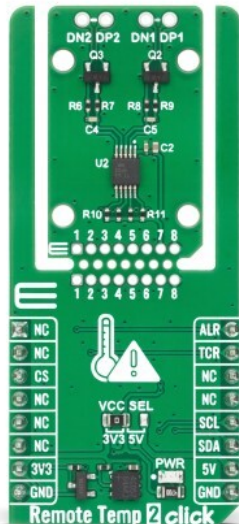


# Remote Temp 2 Click



PID: MIKROE-6996

**Remote Temp 2 Click** is an add-on board designed for multi-point monitoring in embedded systems where local and remote feedback is required. This board is based on the [TMP4719DGSR](#), a three-channel temperature sensor from [Texas Instruments](#). It combines one local sensor with two remote sensing channels for diode-connected transistors or on-chip thermal diodes, supporting  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$  operation, up to  $\pm 0.8^{\circ}\text{C}$  remote accuracy, 12-bit remote resolution, I2C communication, ALERT and T\_CRIT outputs, series resistance cancellation,  $\eta$ -factor correction, digital filtering, and diode fault detection. It is suitable for server motherboards, smart NICs, base stations, BBUs, software-defined radios, and FPGA thermal monitoring.

For more information about **Remote Temp 2 Click** visit the official [product page](#).

## How does it work?

Remote Temp 2 Click is based on the TMP4719DGSR from Texas Instruments, a digital temperature sensor designed for multi-point thermal monitoring in embedded systems. The device integrates one local temperature sensor and two remote temperature sensing channels, allowing the board to monitor temperature both at the Click board location and at two external thermal points. The remote channels can be connected to diode-connected transistors or to thermal diodes integrated inside processors, microcontrollers, ASICs, and FPGAs, making the Click suitable for designs where internal IC temperature must be tracked without placing a separate sensor directly on the monitored component. The TMP4719 provides remote temperature measurement with up to  $\pm 0.8^{\circ}\text{C}$  accuracy and 12-bit resolution, while the local channel provides  $\pm 1^{\circ}\text{C}$  accuracy with 8-bit resolution, covering thermal monitoring needs across the  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$  operating range.

Mikroe produces entire development toolchains for all major microcontroller architectures.

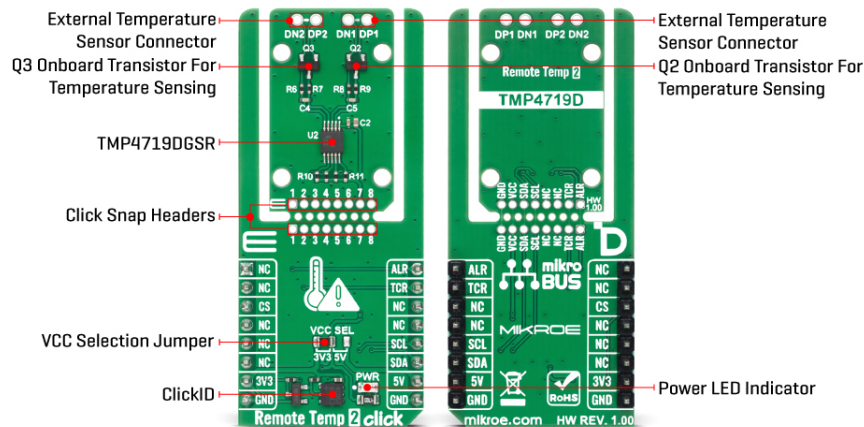
Committed to excellency, we are dedicated to helping engineers bring the project development up to speed and achieve outstanding results.



ISO 27001: 2013 certification of informational security management system.  
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 TMP4719 includes several functions that improve measurement reliability in demanding thermal environments. Series resistance cancellation helps reduce errors caused by routing resistance between the sensor and the remote diode, while programmable  $\eta$ -factor correction allows the measurement path to be adjusted for different diode characteristics. A programmable digital filter improves noise immunity, which is useful when remote sensing traces are routed near switching circuits or high-speed signals. The device also supports configurable temperature limits and remote diode fault detection, so the host system can detect abnormal thermal conditions or connection problems and react before the monitored hardware reaches a critical operating point.

Remote Temp 2 Click communicates with the host MCU through the I2C interface, using the mikroBUS™ SCL and SDA pins for clock and data lines. Through this interface, the host can read local and remote temperature values, configure conversion and filtering options, set temperature limits, and monitor status registers. In addition to the I2C lines, the Click uses the PWM pin as the ALERT output and the INT pin as the T\_CRIT output. Both signals are open-drain temperature warning outputs that can be used to indicate programmable alert events or critical temperature conditions directly to the host MCU. The CS pin is used for ClickID communication, allowing compatible systems to identify the board automatically. The board includes two onboard MMBT3904 diode-connected transistors, marked as Q2 and Q3, which serve as remote temperature sensing elements for evaluating both remote channels of the TMP4719. The remote diode connections are also routed to dedicated DP1/DN1 and DP2/DN2 connection points, allowing the user to connect external thermal diodes or place the sensing points closer to the monitored hardware.

The remote sensing paths include series resistors and filtering capacitors to support stable measurements and improve noise behavior on the diode lines. Remote Temp 2 Click also features a Click Snap layout for separating the sensing section when temperature must be measured away from the mikroBUS™ host area, a PWR LED indicator for visual confirmation of the selected supply, and a VCC SEL jumper for choosing the operating voltage level.

Remote Temp 2 Click can operate with either 3.3V or 5V power rails selected through the VCC SEL jumper, making it suitable for development systems that use different mikroBUS™ logic levels. The selected rail powers the onboard circuitry and defines the board's logic voltage for communication with the host MCU. This Click board™ comes with a ready-to-use code example and supporting software library, allowing users to download the example, initialize the device, read local and remote temperature channels, configure alert limits, and quickly integrate thermal monitoring into their application.

Mikroe produces entire development toolchains for all major microcontroller architectures.

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.  
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).

## 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 server motherboards and smart NICs, base stations and BBUs, software-defined radios, heavy-load processing hardware, and FPGA thermal monitoring                                                                                                                                                                         |
| On-board modules | TMP4719DGSR - high-accuracy digital temperature sensor from Texas Instruments                                                                                                                                                                                                                                                      |
| Key Features     | One local and two remote temperature sensing channels, remote sensing, up to $\pm 0.8^{\circ}\text{C}$ remote temperature accuracy with 12-bit resolution, ALERT and T_CRIT open-drain temperature warning outputs, series resistance cancellation, programmable $\eta$ -factor correction, remote diode fault detection, and more |
| Interface        | GPIO,I2C                                                                                                                                                                                                                                                                                                                           |
| Feature          | Click Snap,ClickID                                                                                                                                                                                                                                                                                                                 |
| Compatibility    | mikroBUS™                                                                                                                                                                                                                                                                                                                          |
| Click board size | L (57.15 x 25.4 mm)                                                                                                                                                                                                                                                                                                                |
| Input Voltage    | 3.3V,5V                                                                                                                                                                                                                                                                                                                            |

## Pinout diagram

This table shows how the pinout on Remote Temp 2 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

| Notes        | Pin         |  |      |     |    | Pin        | Notes        |
|--------------|-------------|-------------------------------------------------------------------------------------|------|-----|----|------------|--------------|
|              | NC          | 1                                                                                   | AN   | PWM | 16 | <b>ALR</b> | ALERT Output |
|              | NC          | 2                                                                                   | RST  | INT | 15 | <b>TCR</b> | TCRIT Output |
| ClickID      | <b>CS</b>   | 3                                                                                   | CS   | RX  | 14 | NC         |              |
|              | NC          | 4                                                                                   | SCK  | TX  | 13 | NC         |              |
|              | NC          | 5                                                                                   | MISO | SCL | 12 | <b>SCL</b> | I2C Clock    |
|              | NC          | 6                                                                                   | MOSI | SDA | 11 | <b>SDA</b> | I2C Data     |
| Power Supply | <b>3.3V</b> | 7                                                                                   | 3.3V | 5V  | 10 | <b>5V</b>  | Power Supply |
| Ground       | <b>GND</b>  | 8                                                                                   | GND  | GND | 9  | <b>GND</b> | Ground       |

## Onboard settings and indicators

Mikroe produces entire development toolchains for all major microcontroller architectures.

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.  
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).

| Label | Name    | Default | Description                                                                              |
|-------|---------|---------|------------------------------------------------------------------------------------------|
| LD1   | PWR     | -       | Power LED indicator showing the presence of the selected board supply                    |
| JP1   | VCC SEL | Left    | Power/logic voltage level selection<br>3.3V/5V: left position<br>3.3V, right position 5V |
| J1    | J1      | -       | External temperature sensor connector                                                    |
| J2    | J2      | -       | External temperature sensor connector                                                    |
| Q2    | Q2      | -       | Onboard transistor for temperature sensing                                               |
| Q3    | Q3      | -       | Onboard transistor for temperature sensing                                               |

## Remote Temp 2 Click electrical specifications

| Description           | Min  | Typ | Max | Unit |
|-----------------------|------|-----|-----|------|
| Supply Voltage        | 1.62 | -   | 5.5 | V    |
| Operating temperature | -40  | -   | 125 | °C   |
| I2C standard mode     | 1    | -   | 100 | kHz  |
| I2C fast mode         | 1    | -   | 400 | kHz  |

## Software Support

[Remote Temp 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 Remote Temp 2 Click board by reading and displaying the temperature measurements from the local sensor and both remote channel sensors (CH1 and CH2), and monitoring the alert and critical temperature states.

### Key Functions

- remotetemp2\_cfg\_setup This function initializes Click configuration structure to initial values.
- remotetemp2\_init This function initializes all necessary pins and peripherals used for this Click board.
- remotetemp2\_default\_cfg This function executes a default configuration of Remote Temp 2 Click board.
- remotetemp2\_read\_local\_temp This function reads the local sensor temperature in degrees Celsius.
- remotetemp2\_read\_temp\_ch1 This function reads the remote channel 1 temperature in degrees Celsius.
- remotetemp2\_read\_temp\_ch2 This function reads the remote channel 2 temperature in degrees Celsius.

Mikroe produces entire development toolchains for all major microcontroller architectures.

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.  
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).

## Application Init

Initializes the driver and performs the Click default configuration.

## Application Task

Reads the temperature measurements in degrees Celsius from the local sensor and both remote channels, and displays the results on the USB UART approximately once per second. Also monitors and reports the alert and critical temperature states via the ALR and TCR pins.

## 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

[Remote Temp 2 click example package](#)

[Remote Temp 2 click 2D and 3D files v100](#)

[TMP4719DGSR datasheet](#)

[Remote Temp 2 click schematic v100](#)

Mikroe produces entire development toolchains for all major microcontroller architectures.

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.  
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).