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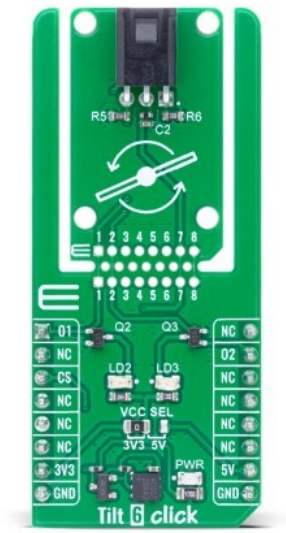
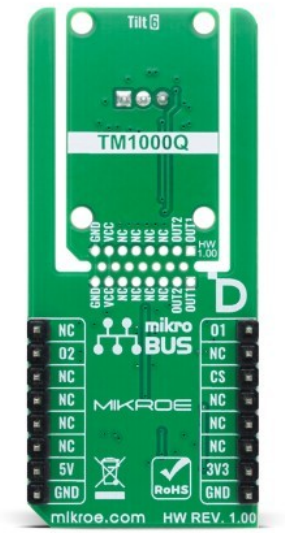
# Tilt 6 Click




PID: MIKROE-6568

**Tilt 6 Click** is a compact add-on board for precise tilt and orientation detection. This board features the TM1000Q tilt switch from E-Switch, known for its high reliability and long operational lifespan. This switch operates with SPST functionality and triggers when tilted at a 45-degree angle from the horizontal plane. The board features two orange LED indicators (LD2 and LD3) that signal left and right tilt directions, with corresponding output signals available on the O1 and O2 pins of the mikroBUS™ socket for further processing by the host MCU. Additionally, Tilt 6 Click supports the Click Snap feature, allowing the main IC area to be detached and mounted separately for flexible implementation. It is ideal for industrial equipment, safety systems, and motion-based control applications requiring accurate orientation detection.

For more information about **Tilt 6 Click** visit the official product page.

## How does it work?

Tilt 6 Click is based on the TM1000Q, a tilt switch from E-Switch designed to detect changes in orientation with high precision and reliability. This switch offers a long operational lifespan of up to 1,000,000 cycles. With a maximum contact resistance of 5Ω, minimum insulation resistance of 100MΩ at 500VDC, and dielectric strength of 500VAC for one minute, the TM1000Q ensures stable and safe operation even in demanding environments. The switch is triggered when the board is tilted at a 45-degree angle from the horizontal plane, providing accurate tilt detection for various applications.

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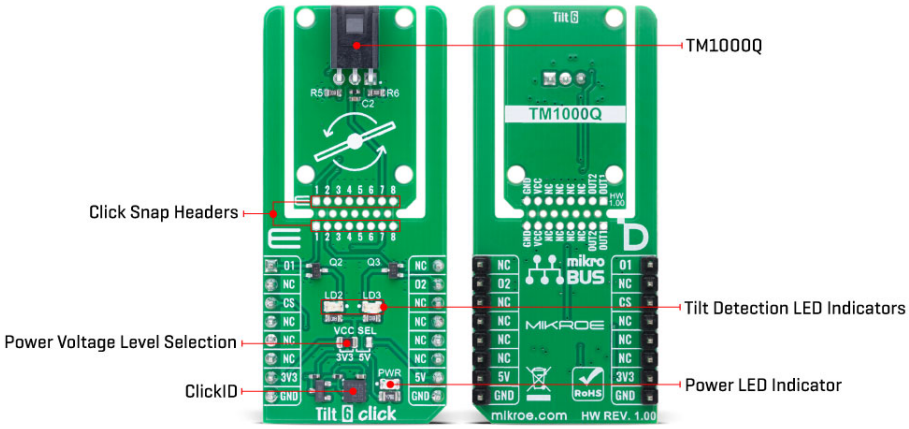


This Click board™ features two orange LED indicators, LD2 and LD3, which illuminate to signal the direction of the tilt, with LD2 indicating a tilt to the left at a 45-degree angle from the horizontal plane and LD3 indicating a tilt to the right. These LEDs correspond to the switch output signals, also available on the O1 and O2 pins of the mikroBUS™ socket, for further processing by the host MCU. This environmentally friendly switch is mercury-free and uses silver contacts for reliable electrical performance. The TM1000Q operates with a single-pole, single-throw (SPST) functionality, making Tilt 6 Click an excellent choice for applications requiring precise orientation detection, such as industrial equipment, safety systems, and motion-based controls.

Tilt 6 Click is designed in a unique format supporting the newly introduced MIKROE feature called "Click Snap." Unlike the standardized version of Click boards, this feature allows the main IC area to become movable by breaking the PCB, opening up many new possibilities for implementation. Thanks to the Snap feature, the TM1000Q can operate autonomously by accessing its signals directly on the pins marked 1-8. Additionally, the Snap part includes a specified and fixed screw hole position, enabling users to secure the Snap board in their desired location.

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.

## Click Snap

**Click Snap** is an innovative feature of our standardized Click add-on boards, introducing a new level of flexibility and ease of use. This feature allows for easy detachment of the main sensor area by simply snapping the PCB along designated lines, enabling various implementation possibilities. For detailed information about Click Snap, please visit the official page dedicated to this feature.

## Specifications

| Type | Motion |
|---|---|
| Applications | Ideal for industrial equipment, safety systems, and motion-based control applications |

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| | |
|---|---|
| | requiring accurate orientation detection |
| On-board modules | TM1000Q - tilt switch from E-Switch |
| Key Features | Tilt detection at 45-degree angle from the horizontal plane, long operational lifespan of up to 1,000,000 cycles, LED indicators for left and right tilt detection, mercury-free, environmentally friendly design with silver contacts, SPST (Single-Pole, Single-Throw) functionality, Click Snap, and more |
| Interface | GPIO |
| Feature | Click Snap,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 Tilt 6 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

| Notes | Pin | mikro BUS | | | | Pin | Notes |
|---|---|---|---|---|---|---|---|
| Tilt Switch Output 1 | **O1** | 1 | AN | PWM | 16 | NC | |
| | NC | 2 | RST | INT | 15 | **O2** | Tilt Switch Output 2 |
| ID COMM | **CS** | 3 | CS | RX | 14 | NC | |
| | NC | 4 | SCK | TX | 13 | NC | |
| | NC | 5 | MISO | SCL | 12 | NC | |
| | NC | 6 | MOSI | SDA | 11 | NC | |
| 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 |
| LD2-LD3 | LD2-LD3 | - | Tilt Detection LED Indicators |
| JP1 | VCC SEL | Left | Power Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V |

## Tilt 6 Click electrical specifications

| Description | Min | Typ | Max | Unit |
|---|---|---|---|---|
| Supply Voltage | 3.3 | - | 5 | V |
| Tilt Detection Range | 0 | - | 45 | deg |

## Software Support

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Tilt 6 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 functionality of the Tilt 6 Click board, which detects tilt motion in multiple directions. The example continuously monitors tilt movements, logging when the sensor detects a left tilt, right tilt, or remains idle.

Key Functions

- tilt6_cfg_setup This function initializes Click configuration structure to initial values.
- tilt6_init This function initializes all necessary pins and peripherals used for this Click board.
- tilt6_get_tilt_state This function returns the tilt switch state.

Application Init

Initializes the logger and configures the Tilt 6 Click board.

Application Task

Continuously reads the tilt state and logs changes. The sensor can detect three states: "RIGHT TILT", "LEFT TILT", and "IDLE" indicating no tilt.

**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

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## Downloads

Tilt 6 click example package

Tilt 6 click 2D and 3D files v100

TM1000Q datasheet

Tilt 6 click schematic v100