

Thumbstick 2 Click



PID: MIKROE-6655

Thumbstick 2 Click is a compact add-on board that provides precise two-axis joystick control with an integrated push button and haptic feedback. It is based on the [THB001P](#), a high-quality two-axis joystick from C&K Components, designed for reliable and smooth motion detection. Angular displacement and position are digitized through the [MCP3202](#), a 12-bit A/D converter that communicates via SPI, while the integrated push button enables discrete input and also controls the onboard [VZ43FC1B5640007L](#) vibration motor. This motor delivers strong tactile feedback controlled via PWM for adjustable intensity and duration. Typical applications include human-machine interfaces, handheld control units, gaming controllers, assistive devices, and industrial equipment requiring precise positioning and haptic confirmation.

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

How does it work?

Thumbstick 2 Click is based on the THB001P, a high-quality two-axis joystick with an integrated push button from C&K Components, combined with additional circuitry to deliver advanced input and haptic feedback capabilities for embedded applications. The joystick provides smooth and precise motion control across both the X and Y axes, while its angular displacement and positional data are converted into digital form through the MCP3202, a 12-bit A/D converter from Microchip that communicates via an SPI serial interface. This allows reliable acquisition of raw analog values that represent the joystick's movements, ensuring accurate control in a wide range of applications including human-machine interfaces, handheld control units, industrial equipment, assistive devices, and gaming controllers where precise positioning and tactile confirmation are essential.

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).



In addition to directional input, the built-in push button expands the input functionality by enabling discrete command execution when pressed, and this button is also linked to control the onboard vibration motor. The vibration motor used on the back of the board, the VZ43FC1B5640007L, delivers strong tactile feedback with a force of 0.91G and operates at a rated speed of 10,000 rpm, creating a responsive haptic signal that can be used to enhance user interaction in real time. Its operation is managed through the VB pin using PWM control, making it possible to fine-tune vibration intensity and duration according to application requirements.

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	Pushbutton/Switches
Applications	Ideal for human-machine interfaces, handheld control units, gaming controllers, assistive devices, and industrial equipment requiring precise positioning and haptic confirmation
On-board modules	THB001P - 2-axis joystick from C&K Components
Key Features	High-quality two-axis joystick with an integrated push button, precise angular displacement and position measurement through 12-bit A/D converter with SPI interface, an onboard VZ43FC1B5640007L vibration motor, and more
Interface	PWM, SPI
Feature	ClickID
Compatibility	mikroBUS™
Click board size	S (28.6 x 25.4 mm)
Input Voltage	3.3V or 5V

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).

Pinout diagram

This table shows how the pinout on Thumbstick 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	VB	Vibro Motor Control
ID SEL	RST	2	RST	INT	15	SW	Push-Button Status
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	
SPI Data IN	SDI	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
JP1	VCC SEL	Left	Power Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V

Thumbstick 2 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
ADC Resolution	-	12	-	bit
Vibro Motor Force	-	-	0.91	G

Software Support

[Thumbstick 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 the Thumbstick 2 Click board which features a 2-axis joystick with push button and vibration feedback. The joystick's angle and position are calculated based on raw ADC values, while the push button status controls the vibration motor through PWM output.

Key Functions

- thumbstick2_cfg_setup This function initializes Click configuration structure to initial values.
- thumbstick2_init This function initializes all necessary pins and peripherals used for this Click board.
- thumbstick2_read_raw_adc This function reads the raw ADC for X and Y axis by using

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).

SPI serial interface.

- thumbstick2_get_angle This function calculates and returns joystick angle in degrees from raw ADC values for X and Y axis.
- thumbstick2_get_position This function calculates and returns joystick position flag from raw ADC values for X and Y axis.

Application Init

Initializes the logger and the Click driver.

Application Task

Continuously reads the raw ADC values from the joystick axes, calculates the joystick's position and angle, and logs the results. It also checks the state of the joystick push button and activates vibration feedback accordingly.

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

[MCP3202 datasheet](#)

[VZ43FC1B5640007L datasheet](#)

[Thumbstick 2 click example package](#)

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

[THB001P datasheet](#)

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).

[Thumbstick 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).