

# Piezo Accel 2 Click - 50g



PID: MIKROE-6407

Piezo Accel 2 Click is a compact add-on board for precise vibration and motion monitoring in condition-based maintenance applications. This board features the 830M1-0025, a triaxial piezoelectric accelerometer from TE Connectivity, capable of detecting motion and acceleration along all three axes (X, Y, Z). The 830M1-0050 offers a  $\pm 50g$  range with a sensitivity of 25mV/g, providing reliable and accurate analog voltage outputs. It integrates a built-in RTD temperature sensor for simultaneous vibration and temperature monitoring, and the onboard MCP3562R 24-bit ADC converts these signals into high-resolution digital data. Communication is made through an SPI interface with additional interrupt and clock functionality for easy integration with a host MCU. Piezo Accel 2 Click is ideal for machine health monitoring, predictive maintenance, impact and shock detection, and embedded vibration monitoring, ensuring reliable performance in demanding environments.

## How does it work?

Piezo Accel 2 Click - 50g is based on the 830M1-0050, a triaxial piezoelectric accelerometer from TE Connectivity, capable of detecting motion and acceleration along all three orthogonal axes (X, Y, Z). The 830M1-0050 provides accurate and stable motion and acceleration measurements. It offers analog voltage outputs proportional to the magnitude of acceleration along the X, Y, and Z axes, with a range of  $\pm 50g$  and a sensitivity of 25mV/g. This sensor leverages proven piezoelectric technology for exceptional resolution, dynamic range, and bandwidth, outperforming traditional MEMS devices in demanding environments. Additionally, it features an integrated RTD temperature sensor, enabling simultaneous vibration and temperature data acquisition for comprehensive condition monitoring. Its high sensitivity, reliable performance, and compatibility with embedded systems make it ideal for applications like machine health monitoring, predictive maintenance, impact and shock monitoring, and

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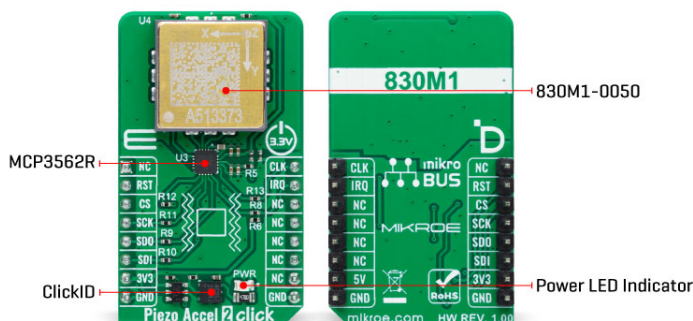


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security systems.



Piezo Accel 2 Click communicates with a host MCU through the onboard [MCP3562R](#), a 24-bit low-noise delta-sigma Analog-to-Digital Converter (ADC). This ADC digitizes the analog outputs from the 830M1-0050 sensor, providing high-resolution data with a programmable data rate of up to 153.6kSPS. The MCP3562R features an internal voltage reference, oscillator, temperature sensor, and burnout sensor detection, further enhancing its functionality. Communication with the host MCU is made via the SPI interface, operating at a maximum frequency of 20MHz.

In addition to the SPI communication pins, the MCP3562R also uses CLK and IRQ pins. The CLK pin functions as either a master clock input or an analog master clock output, depending on the configuration of the ADC's CONFIG register. This clock is distinct from the SPI clock and is essential for continuous ADC operation during signal conversion. The IRQ pin serves as an interrupt output for various ADC events, such as conversion start, data readiness, power-on reset (POR), and CRC errors in the register map configuration. Furthermore, this pin can also function as a modulator data output, providing synchronized output with the analog master clock.

This Click board™ can be operated only with a 3.3V logic voltage level. The board must perform appropriate logic voltage level conversion before using MCUs with different logic levels. Also, it comes equipped with a library containing functions and an example code that can be used as a reference for further development.

## Specifications

Type	Motion
Applications	Ideal for applications like machine health monitoring, predictive maintenance, impact and shock monitoring, and security systems
On-board modules	830M1-0050 - triaxial piezoelectric accelerometer from TE Connectivity
Key Features	±50g with a sensitivity of 25mV/g, integrated RTD temperature sensor for simultaneous vibration and temperature monitoring, ADC converter with SPI interface for connection with the host MCU, pin for master clock

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	input/output and interrupt/modulator data output, and more
Interface	SPI
Feature	ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V

## Pinout diagram

This table shows how the pinout on Piezo Accel 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	<b>CLK</b>	Master Clock Input / Analog Master Clock Output
ID SEL	<b>RST</b>	2	RST	INT	15	<b>IRQ</b>	Interrupt / Modulator Data Output
SPI Select / ID COMM	<b>CS</b>	3	CS	RX	14	NC	
SPI Clock	<b>SCK</b>	4	SCK	TX	13	NC	
SPI Data OUT	<b>SDO</b>	5	MISO	SCL	12	NC	
SPI Data IN	<b>SDI</b>	6	MOSI	SDA	11	NC	
Power Supply	<b>3.3V</b>	7	3.3V	5V	10	NC	
Ground	<b>GND</b>	8	GND	GND	9	<b>GND</b>	Ground

## Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator

## Piezo Accel 2 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Measurement Range	-50	-	+50	g
Sensitivity	-	25	-	mV/g

## Software Support

We provide a library for the Piezo Accel 2 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](#).

## Library Description

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This library contains API for Piezo Accel 2 Click driver.

#### Key functions

- `piezoaccel2_read_adc_data` This function reads raw ADC values of X, Y, and Z axis, and the internal temperature sensor measurements.
- `piezoaccel2_fast_cmd_write` This function writes the selected fast command by using SPI serial interface.
- `piezoaccel2_reg_read_multi` This function reads a desired number of data bytes starting from the selected register by using SPI serial interface.

#### Example Description

This example demonstrates the use of Piezo Accel 2 Click by reading and displaying the ADC values of X, Y, and Z axis, and the internal temperature sensor measurements. Those data can be visualized on the SerialPlot application.

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.PiezoAccel2

#### 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](#)

[Click boards™](#)

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[ClickID](#)

## Downloads

[830M1 datasheet](#)

[MCP3562R datasheet](#)

[Piezo Accel 2 Click - 50g 2D and 3D files v100](#)

[Piezo Accel 2 Click - 50g schematic v100](#)

[Piezo Accel 2 Click - 50g example on Libstock](#)

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