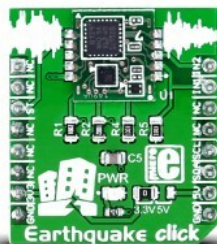


Earthquake Click



PID: MIKROE-2561

Earthquake Click is a compact add-on board that detects seismic activities. This board features the D7S, the world's smallest class-size high-precision seismic sensor from OMRON. It uses a three-axis acceleration sensor and Omron's unique SI value calculation algorithm to determine the seismic intensity scale. The sensor is IoT-friendly because of its small size and, above all, low power consumption, which makes it ideal for prolonged operation on battery power. This Click board™ makes the perfect solution for the development of vibration sensors, fire prevention systems, electricity meters, gas meters, applications for chemical plants, bridges, tunnels, and more.

Earthquake Click is supported by a [mikroSDK](#) compliant library, which includes functions that simplify software development. This [Click board™](#) comes as a fully tested product, ready to be used on a system equipped with the [mikroBUS™](#) socket.

How does it work?

Earthquake Click is based on the D7S, the world's smallest class-size high-precision seismic sensor from OMRON. It uses the SI (spectral intensity) value, which has a high correlation with the seismic intensity scale that indicates the magnitude of an earthquake and provides higher-precision judgment of seismic intensity scales. When an earthquake occurs with a seismic intensity equivalent to 5 Upper or higher on the JMA (Japan Meteorological Agency) Seismic Intensity Scale, the D7S will activate the shutoff output to notify the user of an earthquake.

JMA, or Japan Meteorological Agency intensity scale, is used in Japan and Taiwan to measure the intensity of earthquakes. The scale goes from 0 to 7. The level 5 on this scale indicates when objects inside a house start falling down, like books from the shelf, dishes in a cupboard,

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cracks formed on walls, and more.

Earthquake Click uses a standard 2-Wire I2C interface to communicate with the host MCU. The shutoff terminal on IN1 will go active (ON) when the shutoff judgment condition and collapse detection condition are met. The processing notification output IN2 will go active (ON) during the earthquake calculations, offset acquisition, and self-diagnostic processing. The initial setting input ST changes the sensor from Normal mode to Initial Installation mode for input from an external device.

This Click board™ can operate with either 3.3V or 5V logic voltage levels selected via the 3.3V 5V jumper. This way, both 3.3V and 5V capable MCUs can use the communication lines properly. However, the 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	Motion,Vibration
Applications	Can be used for the development of vibration sensors, fire prevention systems, electricity meters, gas meters, applications for chemical plants, bridges, tunnels, and more
On-board modules	D7S - high-precision seismic sensor from OMRON
Key Features	Small size, low power consumption, shutoff output at seismic intensity SI level 5 or higher, wide acceleration range, three-axis acceleration sensor, and Omron's unique SI value calculation algorithm to determine the seismic intensity scale, and more
Interface	I2C
Feature	No ClickID
Compatibility	mikroBUS™
Click board size	S (28.6 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

This table shows how the pinout on Earthquake 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	IN2	Processing Notification
	NC	2	RST	INT	15	IN1	Shutoff
Initial Setting Input	ST	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	SCL	I2C Clock

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	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	3.3V 5V	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V

Earthquake click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Acceleration Detection Range	-2000	-	2000	gal

Software Support

We provide a library for the Earthquake 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

This library contains API for Earthquake Click driver.

Key functions

- earthquake_proc_notify Shutoff output function.
- earthquake_read_status Read status function.
- earthquake_read_si Read SI function.

Example Description

Intializes I2C module, LOG and GPIO structure, sets INT and PWM pins as input and sets CS pin as output.

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

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- MikroSDK.Log
- Click.Earthquake

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™](#)

[Click board™ Catalog](#)

[Click Boards™](#)

Downloads

[D7S datasheet](#)

[Earthquake click example on Libstock](#)

[Earthquake click schematic v100](#)

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

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