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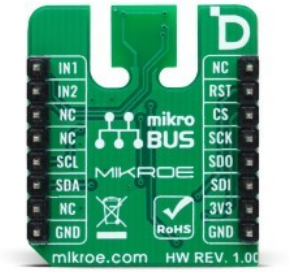
Accel 21 Click





PID: MIKROE-5530

Accel 21 Click is a compact add-on board that contains an acceleration sensor. This board features the MIS2DH, a high-performance three-axis accelerometer from STMicroelectronics. The MIS2DH allows selectable full-scale acceleration measurements in ranges of ±2g, ±4g, ±8g, or ±16g in three axes with a configurable host interface that supports both SPI and I2C serial communication. It also supports high-resolution and low-power operating modes, allowing maximum flexibility to meet various use case needs. This Click board™ is suitable for multiple applications such as motion-activated functions, posture and free-fall detection, and many more.

Accel 21 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?

Accel 21 Click is based on the MIS2DH, a highly reliable digital triaxial acceleration and temperature sensor from STMicroelectronics. The MIS2DH is highly configurable with a programmable acceleration range of ±2g, ±4g, ±8g, or ±16g, capable of measuring accelerations with output data rates from 1Hz to 5.3kHz. Multiple operating modes (high-resolution, normal, and low-power mode) with various bandwidths and output data resolutions contribute significantly to applications such as activity monitoring and posture detection.

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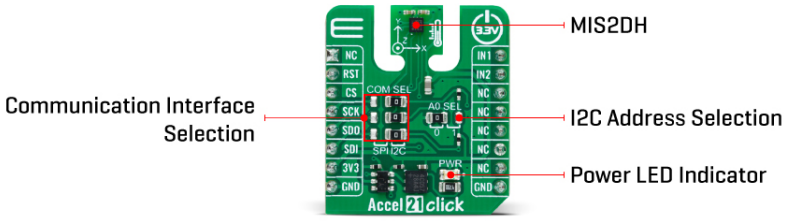

The complete measurement chain is composed of a low-noise capacitive amplifier which converts the capacitive unbalance of the MEMS sensor into an analog voltage that will be available to the user through an analog-to-digital converter. The acceleration data is accessed through I2C or SPI interface with a maximum frequency of 400kHz for I2C and 10MHz for SPI communication. The selection is made by positioning SMD jumpers labeled COMM SEL in an appropriate position. Note that all the jumpers' positions must be on the same side, or the Click board™ may become unresponsive. While the I2C interface is selected, the MIS2DH allows choosing the least significant bit (LSB) of its I2C slave address using the SMD jumper labeled ADDR SEL.

The MIS2DH also possesses two interrupts, IN1 and IN2, routed to the PWM and INT pins on the mikroBUS™ socket, entirely programmed by the user through a serial interface. They signal MCU that an event, such as inertial wake-up/free-fall or the board's position, has been sensed.

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. However, the Click board™ 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	Can be used for multiple applications such as motion-activated functions, posture and free-fall detection, and more
On-board modules	MIS2DH - digital triaxial acceleration sensor from STMicroelectronics
Key Features	High performance, MEMS sensor with on-chip signal processing, low power consumption, programmable interrupts, selectable interface, 6D/4D orientation detection, motion and free-fall detection, and more
Interface	I2C,SPI
ClickID	Yes
Compatibility	mikroBUS™

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Click board size	S (28.6 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on Accel 21 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	**IN1**	Interrupt 1
	NC	2	RST	INT	15	**IN2**	Interrupt 2
SPI Chip Select	**CS**	3	CS	RX	14	NC	
SPI Clock	**SCK**	4	SCK	TX	13	NC	
SPI Data OUT	**SDO**	5	MISO	SCL	12	**SCL**	I2C Clock
SPI Data IN	**SDI**	6	MOSI	SDA	11	**SDA**	I2C Data
Power Supply	**3.3V**	7	3.3V	5V	10	NC	
Ground	**GND**	8	GND	GND	9	**GND**	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
JP1	ADDR SEL	Left	I2C Address Selection 0/1: Left position 0, Right position 1
JP2-JP4	COMM SEL	Right	Communication Interface Selection SPI/I2C: Left position SPI, Right position I2C

Accel 21 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Acceleration Range	±2	-	±16	g
Acceleration Resolution	8	10	12	bits
Sensitivity (±2 ~ ±16)	3.91	-	188.68	mg/digit

Software Support

We provide a library for the Accel 21 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 Accel 21 Click driver.

Key functions

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- accel21_set_config Accel 21 set config function.
- accel21_get_axis Accel 21 get accel data function.
- accel21_get_temperature Accel 21 get temperature function.

Example Description

This library contains API for Accel 21 Click driver. The library initializes and defines the I2C or SPI bus drivers to write and read data from registers. The library also includes a function for reading X-axis, Y-axis, and Z-axis data.

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.Accel21

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™

ClickID

Downloads

Accel 21 click 2D and 3D files

MIS2DH datasheet

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[Accel 21 click schematic]

[Accel 21 click example on Libstock]

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