Accel 19 Click

PID: MIKROE-4949

Accel 19 Click is a compact add-on board that contains an acceleration sensor. This board features the LIS2DTW12, an ultra-low-power high-performance three-axis accelerometer from STMicroelectronics. It 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. Alongside an embedded 0.8°C accuracy temperature sensor with ODRs ranging from 50 to 1.6Hz and resolution from 8 to 12 bits, it has a dedicated internal engine to process motion and acceleration detection. This Click board™ is suitable for various applications such as motion-activated functions and user interfaces, tap-double-tap recognition, free-fall detection, tracking, and many more.

Accel 19 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 19 Click as its foundation uses the LIS2DTW12, a highly reliable digital triaxial acceleration and temperature sensor from STMicroelectronics. The LIS2DTW12 is highly configurable with a programmable acceleration range of ±2g, ±4g, ±8g, or ±16g capable of measuring accelerations with output data rates from 1.6 to 1600Hz. Multiple operating modes with various bandwidths, low noise, very stable sensitivity, together with the capability of working over a wide temperature range, makes this device particularly suitable for vibration monitoring in industrial applications.
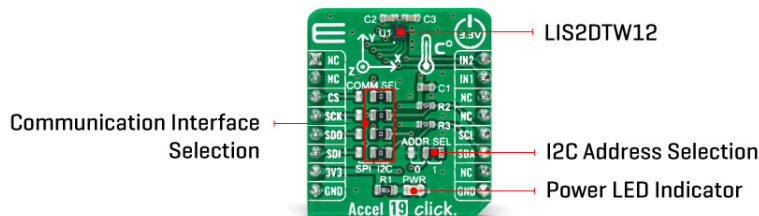
The LIS2DTW12 has an embedded temperature sensor with a typical accuracy of 0.8°C, ODRs ranging from 50 to 1.6Hz, and 8 to 12 bits resolution. Besides, it has an integrated 32-level first-in, first-out (FIFO) buffer allowing the user to store data to limit intervention by the host processor. Alongside these features, the LIS2DTW12 has a dedicated internal engine to process motion and acceleration detection, including free-fall, wakeup, highly configurable single/double-tap recognition, activity/inactivity, stationary/motion detection, portrait/landscape detection, and 6D/4D orientation.

Accel 19 Click allows using both I2C and SPI interfaces with a maximum frequency of 3.4MHz for I2C and 10MHz for SPI communication. The selection can be made by positioning SMD jumpers labeled as COMM SEL to 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 LIS2DTW12 allows choosing the least significant bit (LSB) of its I2C slave address using the SMD jumper labeled ADDR SEL. The Accel 19 also possesses two interrupts, IN1 and IN2, routed to the INT and PWM pins on the mikroBUS™ socket used to signal MCU that an event has been sensed entirely programmed by the user through the I2C/SPI interface.

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 various applications such as motion-activated functions and user interfaces, tap-double-tap recognition, free-fall detection, tracking, and many more
On-board modules	LIS2DTW12 - highly reliable digital triaxial acceleration and temperature sensor from STMicroelectronics
Key Features	Low power consumption, high performance and resolution, high reliability, dedicated internal engine to process motion and

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	acceleration detection, integrated interrupt features, selectable serial interface, and more
Interface	I2C,SPI
ClickID	No
Compatibility	mikroBUS™
Click board size	S (28.6 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on Accel 19 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**	Interrupt 2
	NC	2	RST	INT	15	**IN1**	Interrupt 1
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	Right	I2C Address Selection 0/1: Left position 0, Right position 1
JP2-JP5	COMM SEL	Right	Communication Interface Selection SPI/I2C: Left position SPI, Right position I2C

Accel 19 click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Acceleration Range	±2	-	±16	g
Sensitivity	4098	-	512	LSB/g
Bandwidth	0.8	-	800	Hz
Resolution	-	16	-	bit
Operating Temperature Range	-40	+25	+85	°C

Software Support

We provide a library for the Accel 19 Click as well as a demo application (example), developed

using MikroElektronika compilers. The demo can run on all the main MikroElektronika development boards.

Package can be downloaded/installed directly from NECTO Studio Package Manager(recommended way), downloaded from our LibStock™ or found on Mikroe github account.

Library Description

This library contains API for Accel 19 Click driver.

Key functions

- accel19_get_axis_data Accel 19 get accelerometer axis function.

- accel19_data_ready Accel 19 data ready function.

- accel19_set_control Accel 19 set control function.

Example Description

This library contains API for Accel 19 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 way), downloaded from our LibStock™ or found on Mikroe github account.

Other Mikroe Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.Accel19

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 MikroElektronika compilers.

mikroSDK

This Click board™ is supported with mikroSDK - MikroElektronika 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™

Downloads

LIS2DTW12 datasheet

Accel 19 click schematic

Accel 19 click 2D and 3D files

Accel 19 click example on Libstock