MIKROELEKTRONIKA D.O.O, Batajnički drum 23, 11000 Belgrade, Serbia
VAT: SR105917343 Registration No. 20490918
Phone: + 381 11 78 57 600 Fax: + 381 11 63 09 644 E-mail: office@mikroe.com
www.mikroe.com

Accel 4 Click

PID: MIKROE-4780

Accel 4 Click is a compact add-on board that contains an acceleration sensor. This board features the FXLS8974CF, a 12-bit three-axis accelerometer from NXP Semiconductors. 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. The FXLS8964AF supports both high-performance and low-power operating modes, allowing maximum flexibility to meet the resolution and power needs for various unique use cases. This Click board™ is suitable for a wide range of automotive (convenience and security), industrial, and medical IoT applications that require ultra-low-power Wake-Up on the motion.

Accel 4 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.

NOTE: This Click board™, alongside FXLS8974CF, also represents a reference design for the FXLS8964AF and FXLS8967AF.

How does it work?

Accel 4 Click as its foundation uses the FXLS8974CF, a highly reliable digital triaxial acceleration from NXP Semiconductors. The FXLS8974CF is highly configurable with a programmable acceleration range of ±2g, ±4g, ±8g, or ±16g, capable of measuring accelerations with selectable output data rates. It supports high-performance and low-power operating modes, allowing maximum flexibility to meet the resolution and power needs for various use cases from automotive (convenience and security) through industrial IoT to some

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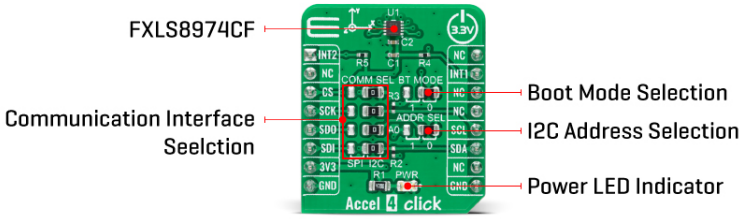
consumer devices.



This sensor includes advanced digital features such as the SDCD block for inertial event detection, auto wake-sleep, and a 32 sample FIFO/LIFO buffer. Besides, it has an embedded temperature sensor with an 8 bits resolution, sensitivity of 1°C/LSB, and measurement range from -40°C up to +105°C. Selectable ODRs (Output Data Rate) of the FXLS8974CF go up to 3200Hz, alongside Flexible Performance mode, allowing custom ODRs with a programmable decimation (resolution) and idle-time settings.

Accel 4 Click allows using both I2C and SPI interfaces with a maximum frequency of 1MHz for I2C and 4MHz for SPI communication. The selection can be made by positioning SMD jumpers labeled as 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 FXLS8974CF allows choosing the least significant bit (LSB) of its I2C slave address using the SMD jumper labeled ADDR SEL.

The FXLS8974CF also possesses two interrupts, INT1 and INT2, routed to the INT and AN 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. Also, this Click board™ provides the ability to use the boot mode of the FXLS8974CF by positioning SMD jumpers labeled as BT MODE to an appropriate position. Depending on the selected position, the device can be set in the default operating mode by setting the jumper to position 0 or in Motion Detection Mode to position 1.

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 a wide range of automotive (convenience and security), industrial, and medical IoT applications

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On-board modules	FXLS8974CF - highly reliable digital triaxial acceleration from NXP Semiconductors
Key Features	Low power consumption, high performance and resolution, selectable ODRs, flexible sensor data change detection function, integrated interrupt features, selectable serial interface, and more
Interface	I2C,SPI
Feature	No ClickID
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 4 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS™				Pin	Notes
Interrupt 2	**INT2**	1	AN	PWM	16	NC	
	NC	2	RST	INT	15	**INT1**	Interrupt
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-JP4	COMM SEL	Right	Communication Interface Selection SPI/I2C: Left position SPI, Right position I2C
JP5	ADDR SEL	Right	I2C Address Selection 1/0: Left position 1, Right position 0
JP6	BT MODE	Right	Boot Mode Selection 1/0: Left position 1, Right position 0

Accel 4 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V

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Acceleration Range	±2	-	±16	g
Acceleration Resolution	-	12	-	bits
Sensitivity (±2 ~ ±16)	128	-	1024	LSB/g
Operating Temperature Range	-40	+25	+105	°C

Software Support

We provide a library for the Accel 4 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 4 Click driver.

Key functions:

- accel4_get_int1 - Get interrupt 1 pin state.
- accel4_axes_get_resolution - Reads current resolution of output data.
- accel4_get_axes_data - Accel data reading.

Examples description

This example is a showcase of the ability of the device to read 3 axis data in varity of 3 resolutions, ability to configure 2 interrput pins for user needs etc..

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.Accel4

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. The terminal available in all MikroElektronika compilers, or any other terminal application of your choice, can be used to read the message.

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.

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For more information about mikroSDK, visit the official page.

Resources

mikroBUS™

mikroSDK

Click board™ Catalog

Click boards™

Downloads

Accel 4 click schematic

Accel 4 click 2D and 3D files

Accel 4 click example on Libstock

FXLS8974CF datasheet