

6DOF IMU 22 Click

PID: MIKROE-6024

6DOF IMU 22 Click is a compact add-on board for advanced motion tracking. This board features the ICM-42670-P, a high-performance 6-axis MEMS MotionTracking IMU from [TDK InvenSense](#). The ICM-42670-P integrates a 3-axis gyroscope and accelerometer, offering exceptional precision in motion detection. It supports both I2C and SPI interfaces for communication, features a substantial 2.25Kbytes FIFO, and includes two programmable interrupts that enhance power efficiency through a wake-on-motion feature. The IMU's gyro and accel are adjustable across a range of full-scale settings, accommodating a variety of usage scenarios. With its low noise levels, high stability under various conditions, and an on-board APEX Motion Processing engine for gesture and step recognition, this Click board™ is an ideal choice for developing wearable technology, smart home devices, robotics, and AR/VR applications.

6DOF IMU 22 Click is fully compatible with the mikroBUS™ socket and can be used on any host system supporting the [mikroBUS™](#) standard. It comes with the [mikroSDK](#) open-source libraries, offering unparalleled flexibility for evaluation and customization. What sets this [Click board™](#) apart is the groundbreaking [ClickID](#) feature, enabling your host system to seamlessly and automatically detect and identify this add-on board.

How does it work?

6DOF IMU 22 Click is based on the ICM-42670-P, a state-of-the-art 6-axis MEMS MotionTracking IMU from TDK InvenSense. This central component incorporates both a 3-axis gyroscope and a 3-axis accelerometer, making it an exceptional tool for precise motion tracking. It has a versatile host interface compatible with I2C and SPI serial communication protocols, a sizeable 2.25Kbytes FIFO, and two customizable interrupts supporting a wake-on-motion feature to reduce power consumption significantly. The gyroscope and accelerometer offer a range of programmable full-scale range settings, ensuring flexibility across various applications. The gyroscope supports four programmable full-scale range settings from $\pm 250\text{dps}$ to $\pm 2000\text{dps}$, and the accelerometer supports four programmable full-scale range settings from $\pm 2\text{g}$ to $\pm 16\text{g}$.

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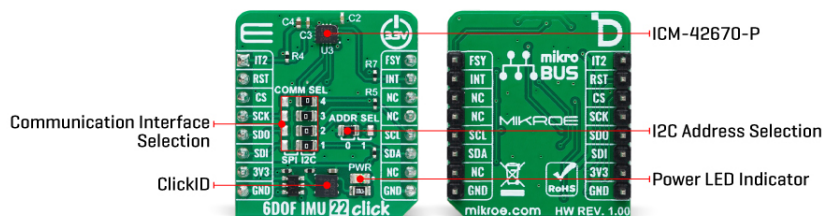
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The ICM-42670-P stands out in its class for having the lowest noise levels and unparalleled stability under temperature fluctuations, physical shocks, or offsets caused by soldering or bending. It also offers protection against noise from vibrations outside its frequency band. Adding to its impressive feature set are an on-board APEX Motion Processing engine for advanced gesture and step recognition, programmable digital filters, and an integrated temperature sensor, making it ideally suited for creating wearables, smart home devices, robotics, and immersive AR/VR experiences.

6DOF IMU 22 Click supports both I2C and SPI interfaces, enabling communication at speeds up to 1MHz and 24MHz, respectively. Users can select the desired communication protocol by placing SMD jumpers on the COMM SEL section, ensuring all jumpers align on the same side to avoid potential issues. For I2C usage, the device allows the adjustment of its I2C slave address's least significant bit via an SMD jumper marked as ADDR SEL. Additionally, the board features a data frame sync input pin routed to the FSX pin on the mikroBUS™ socket and two interrupt pins linked to the INT and IT2 pins, enabling the host MCU to detect user-specified events 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. 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 developing wearable technology, smart home devices, robotics, and AR/VR applications
On-board modules	ICM-42670-P - state-of-the-art 6-axis MEMS MotionTracking IMU from TDK InvenSense
Key Features	Ultra-low power with wake-on-motion support, lowest noise levels in class, high stability against temperature, shock, and offset, on-chip APEX Motion Processing engine for gesture and pedometer, programmable full-scale range, programmable digital filters, and

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Interface	I2C,I3C,SPI
Feature	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 6DOF IMU 22 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin					Pin	Notes
Interrupt 2	IT2	1	AN	PWM	16	FSY	Frame Sync Input
ID SEL	RST	2	RST	INT	15	INT	Interrupt 1
SPI Select / ID COMM	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	Left	I2C Address Selection 0/1: Left position 0, Right position 1

6DOF IMU 22 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Gyroscope Full-Scale Range	±250	-	±2000	dps
Accelerometer Full-Scale Range	±2	-	±16	g
Gyroscope Sensitivity	16.4	-	131	LSB/dps
Accelerometer Sensitivity	2.048	-	16.384	LSB/g

Software Support

We provide a library for the 6DOF IMU 22 Click as well as a demo application (example), developed using MIKROE [compilers](#). The demo can run on all the main MIKROE [development boards](#).

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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 6DOF IMU 22 Click driver.

Key functions

- `c6dofimu22_read_data` This function reads the accelerometer, gyroscope, and temperature measurement data.
- `c6dofimu22_get_int1_pin` This function returns the INT1 pin logic state.
- `c6dofimu22_clear_data_ready` This function clears the data ready interrupt by reading the INT_STATUS_DRDY register.

Example Description

This example demonstrates the use of 6DOF IMU 22 click board by reading and displaying the accelerometer and gyroscope data (X, Y, and Z axis) as well as a temperature measurement in degrees Celsius.

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.6DOFIMU22

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™](#)

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[mikroSDK](#)

[Click board™ Catalog](#)

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Downloads

[6DOF IMU 22 click example on Libstock](#)

[6DOF IMU 22 click 2D and 3D files](#)

[6DOF IMU 22 click schematic](#)

[ICM-42670-P datasheet](#)

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