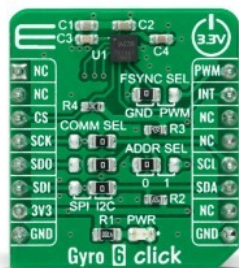


# Gyro 6 Click



PID: MIKROE-4827

Gyro 6 Click is a compact add-on board that contains a high-performance gyroscope. This board features the IAM-20380, a 3-axis, digital-output X-, Y-, and Z-axis angular rate sensor (gyroscope) from TDK InvenSense. It has a full-scale programmable range of  $\pm 250\text{DPS}$ ,  $\pm 500\text{DPS}$ ,  $\pm 1000\text{DPS}$ , and  $\pm 2000\text{DPS}$  with a factory-calibrated initial sensitivity and configurable host interface that supports both SPI and I2C serial communication. It also features a 512-byte FIFO that can lower the traffic on the serial bus interface and reduce power consumption by allowing the host to burst-read sensor data and then go into a low-power mode. This Click board™ is suitable for various applications such as angular velocity sensing, angle sensing and control mechanisms, automotive, industrial and navigational systems, telematics, and many more.

Gyro 6 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?

Gyro 6 Click as its foundation uses the IAM-20380, a high-performance 3-axis gyroscope from TDK InvenSense. The IAM-20380 is highly configurable with a full-scale programmable range of  $\pm 250\text{dps}$ ,  $\pm 500\text{dps}$ ,  $\pm 1000\text{dps}$ , and  $\pm 2000\text{dps}$ . It also features a 512-byte FIFO that can lower the traffic on the selected serial bus interface and reduce power consumption by allowing the system processor to burst read sensor data and then go into a low-power mode. With its 3-axis integration, this Click board™ guarantees customers' optimal motion performance, allowing them to design it into a wide range of industrial applications.

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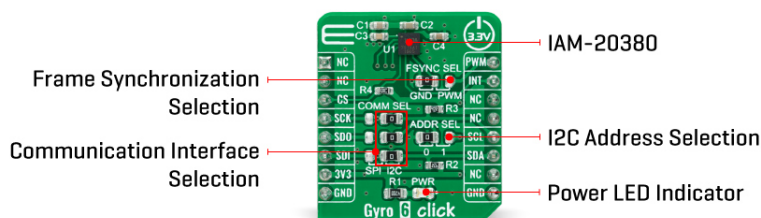
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Other industry-leading features of the IAM-20380 include on-chip 16-bit ADCs to sample each axis, an embedded temperature sensor, and programmable interrupts. The ADC sample rate is programmable from 8,000 samples per second down to 3.9, and user-selectable low-pass filters enable a wide range of cut-off frequencies. It also comes with a factory-calibrated initial sensitivity and provides high robustness by supporting 10,000g shock reliability.

Gyro 6 Click allows using both I2C and SPI interfaces with a maximum frequency of 400kHz for I2C and 8MHz 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 IAM-20380 allows choosing the least significant bit (LSB) of its I2C slave address using the SMD jumper labeled as ADDR SEL to an appropriate position marked as 0 and 1.

An additional option made available for the user is the Frame Synchronization Selection jumper labeled as FSYNC SEL. In this case, this feature is not used, so it's connected to the ground by default. Otherwise, by placing the jumper at the position marked with PWM, an external sync signal from the PWM pin of the mikroBUS™ socket can be used as an optional frame synchronization signal to allow precise timing to be achieved.

This Click board™ can be operated only with a 3.3V logic voltage level. The board must perform appropriate logic voltage level conversion before use with 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	Gyroscope, Motion
Applications	Can be used for various applications such as angular velocity sensing, angle sensing and control mechanisms, automotive, industrial and navigational systems, telematics, and many more
On-board modules	IAM-20380 - high-performance 3-axis gyroscope from TDK InvenSense
Key Features	Low power consumption, full-scale programmable range up to $\pm 2000$ dps,

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	integrated 16-bit ADCs, user-programmable digital filters, embedded temperature sensor, programmable interrupts, high performance, reliability, and more
Interface	I2C,PWM,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 Gyro 6 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikro™ BUS				Pin	Notes
	NC	1	AN	PWM	16	<b>PWM</b>	Frame Sync Signal
	NC	2	RST	INT	15	<b>INT</b>	Interrupt
SPI Chip Select	<b>CS</b>	3	CS	RX	14	NC	
SPI Clock	<b>SCK</b>	4	SCK	TX	13	NC	
SPI Data OUT	<b>SDO</b>	5	MISO	SCL	12	<b>SCL</b>	I2C Clock
SPI Data IN	<b>SDI</b>	6	MOSI	SDA	11	<b>SDA</b>	I2C Data
Power Supply	<b>3.3V</b>	7	3.3V	5V	10	NC	
Ground	<b>GND</b>	8	GND	GND	9	<b>GND</b>	Ground

## Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
JP1-JP3	COMM SEL	Right	Communication Interface Selection SPI/I2C: Left position SPI, Right position I2C
JP4	ADDR SEL	Left	I2C Address Selection 0/1: Left position 0, Right position 1
JP5	FSYNC SEL	Left	Frame Synchronization Selection GND/PWM: Left position GND, Right position PWM

## Gyro 6 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Full-Scale Range	±250	-	±2000	dps
Sensitivity	16.4	-	131	LSB/dps
Operating Temperature Range	-40	+25	+85	°C

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## Software Support

We provide a library for the Gyro 6 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 Gyro 6 Click driver.

Key functions:

- gyro6\_get\_axis - This function reads the gyroscope values for all three axis.
- gyro6\_read\_die\_temperature - This function reads the chip internal temperature.
- gyro6\_set\_low\_power\_mode - This function enables low power mode and sets the sample rate and average sample data.

## Examples description

This example demonstrates the use of Gyro 6 Click board™.

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.Gyro6

## 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.

For more information about mikroSDK, visit the [official page](#).

## Resources

[mikroBUS™](#)

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[mikroSDK](#)

[Click board™ Catalog](#)

[Click Boards™](#)

## Downloads

[Gyro 6 click 2D and 3D files](#)

[Gyro 6 click schematic](#)

[Gyro 6 click example on Libstock](#)

[IAM-20380 datasheet](#)

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