

# IR Gesture 2 Click



PID: MIKROE-5146

IR Gesture 2 Click is a compact add-on board that provides contactless gesture recognition. This board features the MAX25405, a data-acquisition system for the gesture and proximity sensing from Analog Devices. Detection distance is improved by integrating a complete optical system with a lens, aperture, visible light filter, and a 6x10 photodetector array. The proximity, hand detection, and gesture recognition functions of the MAX25405 operate by detecting the light reflected from the controlled IR-LED light sources driven directly from the MAX25405. It can also detect these gestures even when exposed to bright ambient light and process data from the sensor through an SPI interface. This Click board™ is suitable for various gesture sensing applications, from hand swipe gestures (left, right, up, down, wave), air click, and flicks to multizone proximity detection.

IR Gesture 2 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?

IR Gesture 2 Click as its foundation uses the MAX25405, a data-acquisition system for gesture and proximity sensing from Analog Devices. This Click board™ represents an infrared-based dynamic optical solution that can sense a broader range of motions at extended distances. The MAX25405 detects broader movement proximity and doubles the sensing range to 40cm compared to earlier generations. It recognizes the following independent gestures: hand swipe gestures (left, right, up, down, wave), air click and flicks, finger and hand rotation (clockwise and counter-clockwise), and multizone proximity detection.

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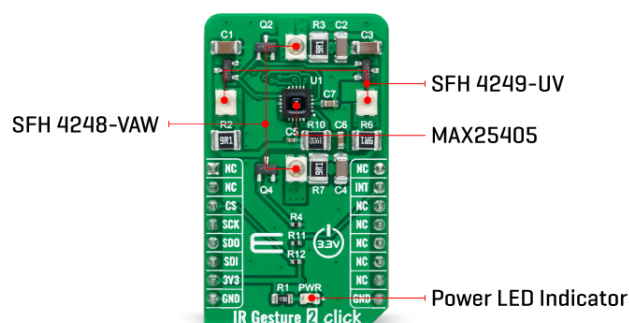
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Along with integrated optics and a 6x10 infrared sensor array, the MAX25405 also includes a glass lens which increases sensitivity and improves the signal-to-noise ratio. The proximity, hand detection, and gesture recognition functions of the MAX25405 operate by detecting the light reflected from the controlled IR-LED light sources ([SFH 4248-VAW](#) and [SFH 4249-UV](#)) driven directly from the MAX25405. It can also detect these gestures even when exposed to bright ambient light and process data from the sensor through a serial interface. The light source PWM duty cycle is programmable from 1/16 to 16/16, where LEDs are pulsed on one or more times in a programmable sequence repeated for every sample.

IR Gesture 2 Click communicates with MCU using the 12-bit SPI serial interface compatible with standard SPI, QSPI™, MICROWIRE™, and digital signal processors (DSPs), with a maximum frequency of 6MHz. This Click board™ also possesses an additional interrupt pin, routed to the INT pin on the mikroBUS™ socket, indicating when a specific interrupt event occurs, such as the end of a conversation sample sequence.

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 gesture sensing applications, from hand swipe gestures (left, right, up, down, wave), air click, and flicks to multizone proximity detection                               |
| On-board modules | MAX25405 - data-acquisition system for gesture and proximity sensing from Analog Devices                                                                                                           |
| Key Features     | Flexible gesture-sensing solution, low power consumption, supports swipe, rotation, and proximity gestures, highly integrated, detect gestures even when exposed to bright ambient light, and more |
| Interface        | SPI                                                                                                                                                                                                |

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|                  |                    |
|------------------|--------------------|
| Feature          | No ClickID         |
| Compatibility    | mikroBUS™          |
| Click board size | M (42.9 x 25.4 mm) |
| Input Voltage    | 3.3V               |

## Pinout diagram

This table shows how the pinout on IR Gesture 2 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 | NC         |           |
|                 | 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 | NC         |           |
| SPI Data IN     | <b>SDI</b>  | 6                                                                                 | MOSI | SDA | 11 | NC         |           |
| 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             |
| LD6&LD8 | -    | -       | Infrared Emitter (SFH 4249-UV)  |
| LD7&LD9 | -    | -       | Infrared Emitter (SFH 4248-VAW) |

## IR Gesture 2 Click electrical specifications

| Description                 | Min | Typ | Max | Unit |
|-----------------------------|-----|-----|-----|------|
| Supply Voltage              | -   | 3.3 | -   | V    |
| IR LED Wavelength           | -   | 940 | -   | nm   |
| Field of View               | -   | ±30 | -   | Deg  |
| Resolution                  | -   | 12  | -   | bits |
| Operating Temperature Range | -40 | +25 | +85 | °C   |

## Software Support

We provide a library for the IR Gesture 2 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

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This library contains API for IR Gesture 2 Click driver.

#### Key functions

- `irgesture2_get_int_pin` This function returns the INT pin logic state.
- `irgesture2_read_pixels` This function reads the raw ADC values of entire 60-pixel IR photodiode array.
- `irgesture2_write_register` This function writes a data byte to the selected register by using SPI serial interface.

#### Example Description

This example demonstrates the use of IR Gesture 2 Click board™ by reading and displaying the raw ADC values of entire 60-pixel IR photodiode array.

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.IRGesture2

#### 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

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[IR Gesture 2 click example on Libstock](#)

[IR Gesture 2 click schematic](#)

[IR Gesture 2 click 2D and 3D files](#)

[SFH 4249-UV datasheet](#)

[MAX25405 datasheet](#)

[SFH 4248-VAW datasheet](#)

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