

Motion 4 Click



PID: MIKROE-4078

Motion 4 Click is a long distance PaPIR's motion sensor with plastic lense and controllable output. This Click board features [EKM1603111](#), a PIR motion sensor from [Panasonic Corporation](#) which can be used as human motion detector and is able to detect movement up to 12m with 170uA current consumption. Also featured on Motion 4 Click board is TLP241A photorelay from Toshiba that is used to provide a reinforced galvanic isolation for the external signals used to drive some external high power electronic equipment when motion is detected. It's allowing up to 40V between the SSR contacts in OFF state, and currents up to 2A while in ON state, thanks to a very low ON-state resistance.

Motion 4 Click board™ 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?

Motion 4 Click is using a PIR sensor that can detect changes in the amount of infrared radiation impinging upon it, which varies depending on the temperature and surface characteristics of the objects in front of the sensor. Detection performance of EKM1603111 at ambient temperature of 25°C with temperature difference higher than 4°C is up to 12m. Angle detection area with 92 detection zones is 102°±51° horizontal and 92°±46° vertical.

Mikroe produces entire development toolchains for all major microcontroller architectures.

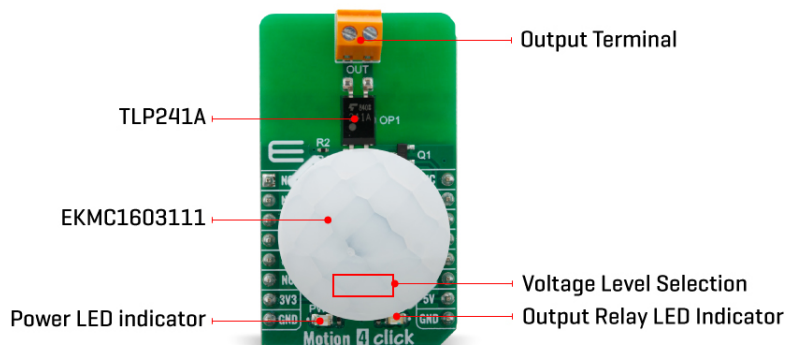
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Output from PIR sensor is feed into buffer and then photorelay allowing users to directly control with galvanic isolation from sensor and MCU electronic devices such as lights, motors, gates etc. The TLP241A photorelay is able to effectively replace traditionally used mechanical relays, bringing up the full set of inherited benefits: virtually unlimited number of cycles since there are no moving parts that would wear off, no bouncing effect on the output contacts, high resistance to mechanical shock and environmental influence, low current required for the activation, constant resistance since no carbon and rust can build up on contacts, there is no sparking or electric arc forming while operated, compact size, higher isolation voltage, and so on.

When an object, such as a person, passes in front of the background, such as a wall, the temperature at that point in the sensor's field of view will rise from room temperature to body temperature, and then back again. The sensor converts the resulting change in the incoming infrared radiation into a change in the output voltage, and this triggers the detection. Objects of similar temperature but different surface characteristics may also have a different infrared emission pattern, and thus moving them with respect to the background may trigger the detector as well. In some cases, going back and forth towards the sensor (parallel movement to the axis Z), may not be detected.

Difficulty in sensing the heat source is that glass, acrylic or similar materials standing between the target and the sensor may not allow a correct transmission of infrared rays and also non-movement or quick movements of the heat source inside the detection area.

Specifications

Type	Motion
Applications	Alarm systems, light switch controllers, automatic doors and similar systems where human presence needs to be detected.
On-board modules	EKMC1603111 the PIR motion sensor
Key Features	92 detection zones, wide detection range and area and maximum range of 12m
Interface	GPIO
ClickID	No
Compatibility	mikroBUS™

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Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

This table shows how the pinout on Motion 4 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	 mikroBUS				Pin	Notes
	NC	1	AN	PWM	16	NC	
	NC	2	RST	INT	15	INT	Interrupt
Enable	EN	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	NC	
	NC	6	MOSI	SDA	11	NC	
Power Supply	3.3V	7	3.3V	5V	10	5V	Power Supply
Ground	GND	8	GND	GND	9	GND	Ground

Onboard settings and indicators

Label	Name	Default	Description
PWR	LD1	-	Power LED Indicator
ON	LD2	-	Photorelay ON Indicator
JP1	VCC SEL	Left	Logic voltage level selection: left position 3.3V, right position 5V

Detection performance and electrical characteristics

Detection Range	Temperature Difference	Value
	8°C	up to 12m
Detection Area	Detection Angle	Value
	Horizontal	102° ± 51°
	Vertical	92° ± 46°
	Detection Zones	92
Photorelay Characteristics	Maximum Voltage	Maximum Current
	40V	2A

Software Support

We provide a library for the Motion 4 Click on our [LibStock](#) page, as well as a demo application (example), developed using MikroElektronika [compilers](#). The demo can run on all the main MikroElektronika [development boards](#).

Library Description

Library provides functions for controlling en pin, and getting int pin state.

Key functions:

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- void motion4_set_en_pin (uint8_t state) - Function that sets en pin state
- uint8_t motion4_get_int (void) - Function that gets int pin state

Examples description

The application is composed of three sections :

- System Initialization - Initialization of pins
- Application Initialization - Maps pins and enables device
- Application Task - Waiting for motion to be detected

The full application code, and ready to use projects can be found on our [LibStock](#) page.

Other mikroE Libraries used in the example:

- UART

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™](#)

[mikroSDK](#)

[Click board™ Catalog](#)

[Click Boards™](#)

Downloads

[Motion 4 click example on Libstock](#)

[Motion 4 click 2D and 3D files](#)

[EKMC1603111 datasheet](#)

[Motion 4 click schematic](#)

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