

## CAP SLIDER 2 CLICK

PID: MIKROE-3204

Weight: 25 g

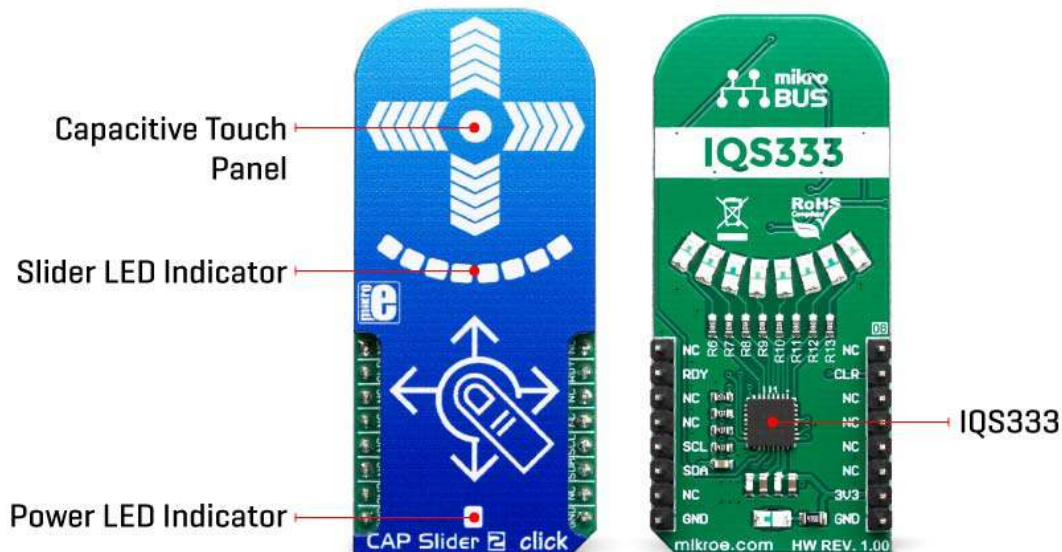
**CAP Slider 2 Click** is a capacitive touch sensor with XY cross shaped electrodes integrated on a Click board™. This click can sense touch even through plastic, wood, or other dielectric materials, which can be used to protect the surface of the PCB and the sensor pad trace itself. Therefore, this Click board™ comes with overlay, made of plexiglass. Unlike the mechanical button, the capacitive touch button lasts much longer, it is not prone to damage and wear over time and it is very reliable. This Click board feature QS333 sensor which contains a ProxSense® module that uses patented technology to provide detection of proximity and touch conditions on numerous sensing lines.

Cap Slider 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.

Capacitive sensors are a very popular method of controlling various devices. Besides the aforementioned benefits, having a touch sensitive button on a device allows for a compact design, opens possibilities for various kinds of human-machine interface and - it looks good and modern, especially if 8 LEDs array that CAP Slider 2 click has onboard is taken into account. CAP Slider 2 click can find its place among many applications - for touch activated lighting controls, process control, touch activated control panels, toys and any other applications that need a switch or a joystick.

## HOW DOES IT WORK?

Although it looks simple at first glance, capacitive touch sensing is not an easy task. There are many parameters that need to be sampled, filtered, compared and processed before positive touch detection and its position are confirmed. To make this possible, Cap Touch click utilizes the [IQS333](#), ProxSense® IC, a 9-channel projected (or 7-channel self) capacitive proximity and touch controller from [Azoteq](#). This IC has some advanced features such as the auto drift compensation, Long proximity range, Automatic adjustment for optimal performance (ATI), two Configurable 11-bit sliders/scroll Slider 2s and more. These features enable CAP Slider 2 click exhibit very reliable and accurate touch detection.



Capacitive touch sensing is based on detecting a change in capacitance, due to the influence of a foreign object. Basically, the capacitance of the sensor, also known as the

antenna, is measured and monitored and if a significant change occurs, after processing by the detection integrator, a touch event is acknowledged. To maximize performance, many routing requirements need to be met in the sensing electrodes design. The relation between the sensing elements in position and size is crucial. CAP Slider 2 click is designed with these requirements in mind and electrodes are „Projected XY-cross slider“ shaped.

CAP Slider 2 click also contains 8 LEDs whose function can be user-defined. LEDs are connected to PWM LED driver pins on IQS333 which means that the user can turn LEDs on or off and control illumination, using the dimming modes that IQS333 supports.

The IQS333 IC interfaces to a master controller via a 3-wire (SDA, SCL, and RDY) serial interface bus that is I2C™ compatible, with a maximum communication speed of 400kbit/s. The host MCU has the capability to force a communication at any time, by pulling the RDY line low. The communication will start directly following the current conversion cycle. If the event is terminated by the watchdog timer, the device will reset.

After every power on cycle, the device will recalibrate itself. It will take some time, so it should be taken into consideration when building custom applications. MikroElektronika provides libraries and the demo application, that can be used as a reference for any future designs.

As mentioned before, this Click board™ is I2C™ compatible and uses SCL, SDA and RDY pins for communication which are routed to SCL, SDA and INT pin on mikroBUS™ respectively. Besides that, CLR pin is available on board which is routed to RST pin on mikroBUS™ and used to master reset the IC.

## SPECIFICATIONS

<b>Type</b>	Capacitive
<b>Applications</b>	It can be used for touch activated lighting controls, process control, touch activated control panels, toys and any other applications that need a switch or a joystick.
<b>On-board modules</b>	IQS333, ProxSense® IC, a 9-channel projected (or 7-channel self) capacitive proximity and touch controller from Azoteq.
<b>Key Features</b>	Auto drift compensation, Long proximity range, Automatic adjustment for optimal performance (ATI), 2 Configurable 11-bit sliders/scroll wheels and more.

<b>Interface</b>	GPIO,I2C
<b>Input Voltage</b>	3.3V
<b>Click board size</b>	L (57.15 x 25.4 mm)

## PINOUT DIAGRAM

This table shows how the pinout on Cap slider 2 click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin					Pin	Notes
		1	AN	PWM	16		
	NC	1	AN	PWM	16	NC	
Master Clear	<b>CLR</b>	2	RST	INT	15	<b>RDY</b>	Ready Output
	NC	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	<b>SCL</b>	I2C Clock
	NC	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-LD8	-	-	User configurable LED indicator
LD9	PWR	-	Power LED Indicator

## SOFTWARE SUPPORT

We provide a library for the Cap Slider 2 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

Key functions:

- `uint8_t capsldr2_writeReg( uint8_t register_address, uint8_t *dataIn, uint8_t nBytes )` - Function writes the determined number of bytes to the register.
- `uint8_t capsldr2_readReg( uint8_t register_address, uint8_t *dataOut, uint8_t nBytes )` - Function reads the determined number of bytes from the register.
- `void capsldr2_getData( uint16_t *wheelData1, uint16_t *wheelData2 )` - Function sets output LEDs depending on the input wheel data value on the way which is determined with outputMode parameter.

### Examples description

The application is composed of the three sections :

- System Initialization - Initializes peripherals and pins.
- Application Initialization - Initializes I2C interface, performs the device reset and configurations and sets the desired threshold value which determines sensor sensitivity. Note : User should wait for a 4 seconds about to device be stabilized.
- Application Task - (code snippet) - Reads sense values from capacitance cross (both wheels) when data was ready for reading, converts these values to 8 step resolution and selects on which way the LEDs be activated, depending in the which way finger (object) is pulled over the cross sensor. Results will be sent to the uart terminal.

```
void applicationTask()
{
    readyCheck = capsldr2_checkDataReady();
```

```

if (readyCheck == _CAPSLDR2_DATA_READY)
{
    capsldr2_getData( &dataWheel1, &dataWheel2 );

    wheelAvrg1 += dataWheel1;
    wheelAvrg2 += dataWheel2;
    cnt++;
}

if (cnt == 1)
{
    if ((wheelAvrg2 / cnt) > 1800)
    {
        horizontalCheck();
        capsldr2_setOutput( outVal, outMode );
    }
    else if (((wheelAvrg2 / cnt) < 1650) && ((wheelAvrg2 / cnt) > 1000))
    {
        verticalCheck();
        capsldr2_setOutput( outVal, outMode );
    }

    wheelAvrg1 = 0;
    wheelAvrg2 = 0;
    cnt = 0;
}
}

```

#### Additional Functions :

- horizontalCheck - Checks is finger pulled over the cross to the left or right side.
- verticalCheck - Checks is finger pulled over the cross to up or to down.

#### Other mikroE Libraries used in the example:

- [I2C](#)



## 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](#).



<https://www.mikroe.com/thermo-11-click/6-28-19>