

# Barometer 4 Click



PID: MIKROE-4868

**Barometer 4 Click** is a compact add-on board used to measure air pressure in a specific environment. This board features the [ICP-10111](#), a high accuracy low power barometric and temperature sensor from [TDK InvenSense](#). The ICP-10111 is based on MEMS capacitive technology providing ultra-low noise at the lowest power, enabling industry-leading relative accuracy, sensor throughput, and temperature stability. It comes with a configurable host interface that supports I2C serial communication and measures pressure in a range from 30kPa up to 110kPa with an accuracy of  $\pm 1\text{Pa}$  over a wide operating temperature range. This Click board™ is suited for various pressure-based applications, especially when low power consumption is required, home appliances such as airflow control in HVAC, water level detection, vertical velocity monitoring, weather forecasting, and many more.

Barometer 4 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?

Barometer 4 Click as its foundation uses the ICP-10111, an ultra-low power, low noise, digital output barometric pressure, and temperature sensor from TDK InvenSense. It is based on an innovative MEMS capacitive pressure sensor technology that can measure pressure in a range from 30kPa up to 110kPa with an accuracy of  $\pm 1\text{Pa}$  over a wide operating temperature range at the industry's lowest power. This high accuracy MEMS capacitive pressure sensor can also measure altitude differentials down to 8.5cm without the penalty of increased power consumption or reduced sensor throughput.

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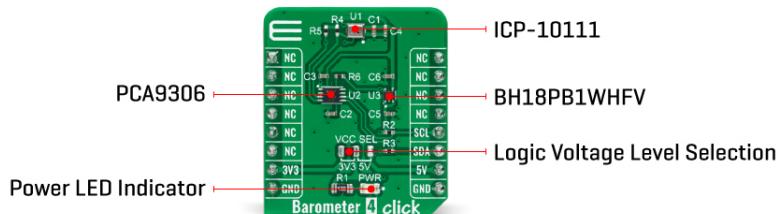
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The ICP-10111 also offers industry-leading temperature stability of the pressure sensor with a temperature coefficient offset of  $\pm 0.5\text{Pa}/^\circ\text{C}$ . The high accuracy, temperature stability, and low power consumption offered by ICP-10111 make it ideally suited for applications such as drone flight control and stabilization, indoor/outdoor navigation, sports and fitness activity monitoring, and battery-powered IoT.

The ICP-10111 also requires a supply voltage of 1.8V to work regularly. Therefore, a small LDO regulator, [BH18PB1WHFV](#) from [Rohm Semiconductor](#), provides 1.8V out of mikroBUS™ power rails. This LDO cut power consumption by lowering its current consumption to approximately 2 $\mu\text{A}$  when the application is operating in the Standby state.

Barometer 4 Click communicates with MCU using a standard I2C 2-Wire interface that supports 400kHz Fast Mode operation. Since the sensor for operation requires a 1.8V logic voltage level only, this Click board™ also features the [PCA9306](#) voltage-level translator from [Texas Instruments](#). The I2C interface bus lines are routed to the dual bidirectional voltage-level translator, allowing this Click board™ to work with both 3.3V and 5V MCUs properly.

This Click board™ can operate with both 3.3V and 5V logic voltage levels selected via the VCC SEL jumper. This way, it is allowed for both 3.3V and 5V capable MCUs to use the I2C communication lines properly. However, the Click board™ comes equipped with a library that contains easy-to-use functions and an example code that can be used, as a reference, for further development.

## Specifications

Type	Pressure
Applications	Can be used for various pressure-based applications, especially when low power consumption is required, home appliances such as airflow control in HVAC, water level detection, vertical velocity monitoring, weather forecasting, and many more
On-board modules	ICP-10111 - an ultra-low power, low noise, digital output barometric pressure, and temperature sensor from TDK InvenSense
Key Features	Low power consumption, high precision,

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	embedded temperature sensor, ultra-low noise, temperature stability, accuracy of $\pm 1\text{Pa}$ over a wide operating temperature range, also measure altitude differentials down to 8.5cm, and more
Interface	I2C
ClickID	No
Compatibility	mikroBUS™
Click board size	S (28.6 x 25.4 mm)
Input Voltage	3.3V or 5V

## Pinout diagram

This table shows how the pinout on Barometer 4 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	NC	
	NC	2	RST	INT	15	NC	
	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	<b>5V</b>	Power Supply
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	VCC SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V

## Barometer 4 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Operating Pressure Range	30	-	110	kPa
Accuracy	-	$\pm 1$	-	Pa
Resolution	-	0.01	-	Pa
Operating Temperature Range	-40	+25	+85	°C

## Software Support

We provide a library for the Barometer 4 Click as well as a demo application (example), developed using MikroElektronika [compilers](#). The demo can run on all the main MikroElektronika [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 Barometer 4 Click driver.

### Key functions

- `barometer4_get_pressure_and_temperature` Barometer 4 get pressure and temperature function.
- `barometer4_get_raw_data` Barometer 4 get RAW data function.
- `barometer4_soft_reset` Barometer 4 software reset function.

## Example Description

This library contains API for the Barometer 4 Click driver. The library initializes and defines the I2C bus drivers to write and read data from registers. This demo application shows an example of atmospheric pressure and temperature measurement.

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 Mikro Libraries used in the example:

- `MikroSDK.Board`
- `MikroSDK.Log`
- `Click.Barometer4`

## 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](#)

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[Click board™ Catalog](#)[Click Boards™](#)

## Downloads

[Barometer 4 click example on Libstock](#)[PCA9306 datasheet](#)[Barometer 4 click 2D and 3D files](#)[ICP-10111 datasheet](#)[BH18PB1WHFV datasheet](#)[Barometer 4 click schematic](#)

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