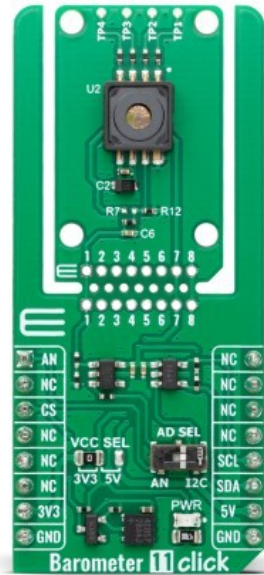


## Barometer 11 Click



PID: MIKROE-6636

**Barometer 11 Click** is a compact add-on board that provides precise absolute pressure measurement for automotive, industrial, and consumer applications. It is based on the [KP226E3408](#), an analog absolute pressure sensor from [Infineon](#), which uses a capacitive measurement principle and BiCMOS signal conditioning to deliver a calibrated output voltage corresponding to pressures from 15kPa to 400kPa. The board features high-accuracy sensing with  $\pm 3.8$ kPa precision, extended temperature operation, and flexible output configuration for either direct analog output or digital conversion through the MCP3221 ADC over I2C. Additional design elements include the LMV321 op-amp for signal conditioning, four accessible test points for diagnostics and programming, and the Click Snap format allowing the sensor section to be detached and repositioned. This Click board is ideal for applications such as automotive manifold absolute pressure measurement, environmental monitoring, industrial process control, and other scenarios requiring stable, accurate pressure data.

For more information about **Barometer 11 Click** visit the official [product page](#).

### How does it work?

Barometer 11 Click is based on the KP226E3408, an analog absolute pressure sensor from Infineon, which operates on a capacitive measurement principle and integrates a monolithic signal conditioning circuit using BiCMOS technology. The device converts applied pressure directly into a highly precise analog voltage output, with a calibrated transfer function that maps pressures from 15kPa to 400kPa into a corresponding output range of 0.35V to 4.65V. With a high-accuracy pressure measurement capability of  $\pm 3.8$ kPa and excellent sensitivity, the sensor ensures reliable performance in applications requiring precise environmental or

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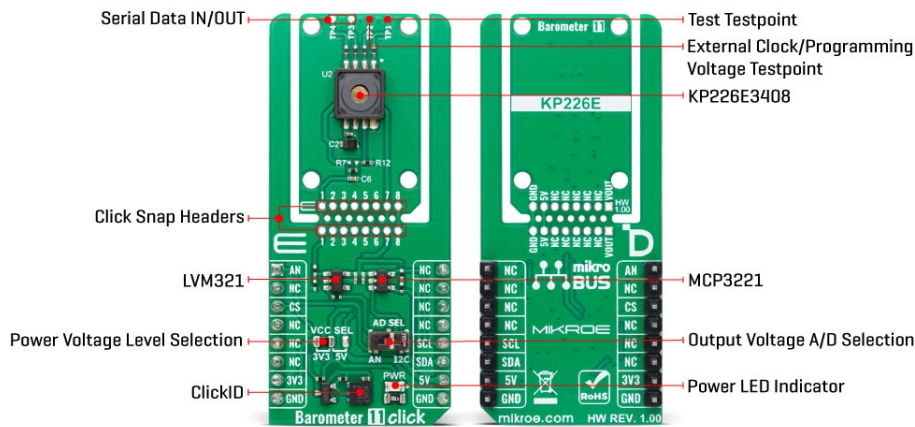


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process monitoring.



Designed to function in harsh conditions, it supports an extended operating temperature range from  $-40^{\circ}\text{C}$  to  $140^{\circ}\text{C}$ , enabling use in diverse environments. While primarily intended for automotive manifold absolute pressure measurement, its versatile performance characteristics make it equally suitable for various industrial automation, environmental sensing, and consumer product implementations where stable, accurate pressure data is essential.

This Click board™ is designed in a unique format supporting the newly introduced MIKROE feature called "Click Snap." Unlike the standardized version of Click boards, this feature allows the main sensor/IC/module area to become movable by breaking the PCB, opening up many new possibilities for implementation. Thanks to the Snap feature, the BQ25188 can operate autonomously by accessing its signals directly on the pins marked 1-8. Additionally, the Snap part includes a specified and fixed screw hole position, enabling users to secure the Snap board in their desired location.

The signal conditioning and amplification for the KP226E3408 sensor are handled by the LMV321, a low-voltage rail-to-rail operational amplifier from Texas Instruments, ensuring precise and stable amplification of the sensor's low-level output signal. After amplification, the conditioned signal is routed to the AD SEL switch, providing the user with the flexibility to choose between analog and digital output modes depending on the specific requirements of their application. When analog output is selected, the amplified signal is made available directly on the AN pin of the mikroBUS™ socket, allowing for straightforward integration with analog signal processing circuits.

For digital signal acquisition, the board incorporates the MCP3221 from Microchip, a 12-bit resolution analog-to-digital converter that enables high-accuracy digital conversion and communicates via the standard 2-wire I2C interface, ensuring compatibility with a wide range of MCUs and digital systems. The output mode selection is easily configured through the onboard surface-mount device (SMD) switch labeled AD SEL, which allows users to toggle between the analog (AN) position and the digital (I2C) position to accommodate diverse application scenarios and design preferences.

At the very top of the Snap section, four test points are positioned to provide direct access for measurement, communication, and programming operations with the onboard sensor. TP1 carries the sensor's test signal, enabling verification and diagnostics of its operational performance. TP2 provides the external clock input used for communication or delivers the

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programming voltage signal required during sensor configuration and calibration. TP3 and TP4 serve as the serial data input and output pins of the sensor, forming the core of its test and programming interface. This layout allows engineers to easily connect diagnostic tools, external programmers, or development equipment to monitor signals, apply configuration parameters, and conduct functional testing without interfering with the standard operational circuitry.

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

## Click Snap

**Click Snap** is an innovative feature of our standardized Click add-on boards, designed to bring greater flexibility and optimize your prototypes. By simply snapping the PCB along predefined lines, you can easily detach the main sensor/IC/module area, reducing the overall size, weight, and power consumption - ideal for the final phase of prototyping. For more details about Click Snap, visit the [official page](#) dedicated to this feature.

## Specifications

Type	Pressure
Applications	Ideal for applications such as automotive manifold absolute pressure measurement, environmental monitoring, industrial process control, and other scenarios requiring stable, accurate pressure data
On-board modules	KP226E3408 - analog absolute pressure sensor from Infineon
Key Features	High-accuracy absolute pressure measurement, calibrated analog voltage output, extended operating temperature range, capacitive measurement principle with BiCMOS signal conditioning, LMV321 low-voltage rail-to-rail operational amplifier for signal conditioning, selectable output mode via AD SEL switch for analog or digital output, Click Snap feature, and more
Interface	Analog, I2C
Feature	Click Snap, ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V or 5V

## Pinout diagram

This table shows how the pinout on Barometer 11 Click corresponds to the pinout on the

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mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
Analog Output	<b>AN</b>	1	AN	PWM	16	NC	
	NC	2	RST	INT	15	NC	
ID COMM	<b>CS</b>	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	Power Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V
SW1	AD SEL	Right	Output Voltage A/D Selection AN/I2C: Left position AN, Right position I2C

## Barometer 11 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Pressure Measurement Range	15	-	400	kPa
Pressure Accuracy	-	±3.8	-	kPa

## Software Support

[Barometer 11 Click](#) demo application is developed using the [NECTO Studio](#), ensuring compatibility with [mikroSDK](#)'s open-source libraries and tools. Designed for plug-and-play implementation and testing, the demo is fully compatible with all development, starter, and mikromedia boards featuring a [mikroBUS™](#) socket.

## Example Description

This example demonstrates the use of the Barometer 11 Click board by initializing the device and reading the barometric pressure data in millibar units. The pressure value is periodically logged to the USB UART every second.

## Key Functions

- `barometer11_cfg_setup` This function initializes Click configuration structure to initial values.
- `barometer11_init` This function initializes all necessary pins and peripherals used for this Click board.
- `barometer11_read_voltage_avg` This function reads a desired number of ADC samples

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and calculates the average voltage level.

- `barometer11_read_pressure` This function reads the pressure level [mBar].

## Application Init

Initializes the logger and the Barometer 11 Click driver.

## Application Task

Reads and displays the pressure data every second.

## Application Output

This Click board can be interfaced and monitored in two ways:

- Application Output - Use the "Application Output" window in Debug mode for real-time data monitoring. Set it up properly by following [this tutorial](#).
- UART Terminal - Monitor data via the UART Terminal using a [USB to UART converter](#). For detailed instructions, check out [this tutorial](#).

## Additional Notes and Information

The complete application code and a ready-to-use project are available through the NECTO Studio Package Manager for direct installation in the [NECTO Studio](#). The application code can also be found on the MIKROE [GitHub](#) account.

## Resources

[mikroBUS™](#)

[mikroSDK](#)

[Click board™ Catalog](#)

[Click boards™](#)

[ClickID](#)

## Downloads

[LMV321 datasheet](#)

[MCP3221 datasheet](#)

[Barometer 11 click example package](#)

[Barometer 11 click 2D and 3D files v100](#)

[KP226E3408 datasheet](#)

[Barometer 11 click schematic v100](#)

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