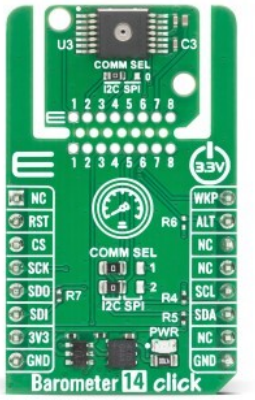
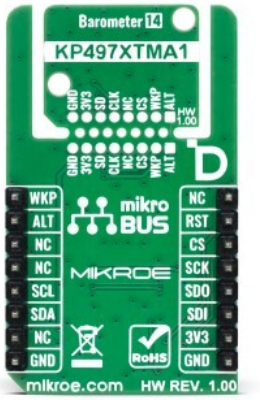
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Barometer 14 Click





PID: MIKROE-7000

Barometer 14 Click is a smart barometric pressure and condition-monitoring board for automotive, industrial, and environmental systems. It features the KP497XTMA1 XENSIV™ sensor from Infineon Technologies, measuring 20kPa to 250kPa absolute pressure while also providing z-axis acceleration, temperature, and supply-voltage data. I2C and 3-wire SPI communication enable measurement control, autonomous threshold monitoring, event alerts, acceleration recording, diagnostics, and access to 3kB of Flash memory. ClickID, Click Snap, a detachable sensing section, COMM SEL jumpers, and a PWR indicator simplify integration and remote placement. It is suitable for battery management, thermal runaway detection, shock monitoring, industrial control, weather stations, and altimeters.

For more information about **Barometer 14 Click** visit the official product page.

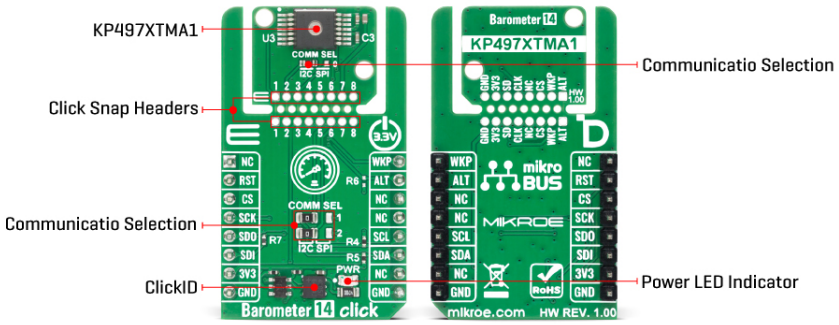
How does it work?

Barometer 14 Click is based on the KP497XTMA1, a XENSIV™ smart barometric pressure sensor from Infineon Technologies designed for pressure-based monitoring in automotive, industrial, and environmental systems. Its sensing architecture combines an absolute pressure sensor, a z-axis accelerometer, a temperature sensor, and a supply-voltage sensor with integrated signal processing, timing circuitry, and non-volatile memory. The pressure channel covers a range from 20kPa to 250kPa and provides a 16-bit measurement value with a resolution of 0.0625kPa/LSB, specified absolute pressure accuracy of ±2kPa, and relative pressure accuracy of ±1kPa under the defined measurement conditions. The acceleration channel measures from -100g to +100g with a resolution of 0.0625g/LSB and an accuracy of ±2g, enabling shock and impact detection, while the temperature channel operates from -40°C to +105°C. These capabilities make the board suitable for weather stations, altimeters, industrial control, battery

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management, thermal runaway detection, pressure-change monitoring, and battery shock recording.



The KP497XTMA1 can operate in Reset, On, Sleep, Autonomous, and Acceleration Recording states. In the On state, the host controller can initiate measurements, retrieve recorded data, configure autonomous operation, access the internal memory, and perform diagnostic checks. Its low-power Autonomous state can independently monitor pressure, acceleration, or both at programmable intervals ranging from less than 10ms to more than 10 minutes. Measurement results can be evaluated against absolute thresholds, changes relative to a reference measurement, or rate-of-change limits, while multiple configurations allow the monitoring behavior to change in stages. A threshold violation can return the device to the On state, activate an alert, load another monitoring configuration, or start acceleration recording. Dedicated ring buffers retain recent pressure and acceleration results, while the recording mode determines minimum and maximum acceleration values and generates a measurement histogram. The device also provides 3kB of customer-accessible Flash memory divided into three independently lockable 1kB sections. Integrated undervoltage, brownout, watchdog, memory, signal-path, ADC, clock, calibration, and sensor connection checks support reliable operation in safety-oriented systems. The KP497 is qualified according to AEC-Q100 Grade 1 and designed as an ISO 26262 Safety Element out of Context for requirements up to ASIL A.

Barometer 14 Click communicates with the host MCU through either an I2C or a 3-wire half-duplex SPI peripheral interface, selected using the three COMM SEL jumpers. All COMM SEL jumpers must be placed in the same position before powering the board, with I2C selected by default. In I2C mode, the board uses the SCL and SDA lines of the mikroBUS™ socket, supports data rates up to 1Mbit/s, and operates at the fixed 7-bit peripheral address of 0x36. In SPI mode, it uses the SCK, SDO, SDI, and CS pins, supports data rates up to 250kbit/s, and operates exclusively in SPI mode 3. The KP497 uses one bidirectional DATA line for SPI communication, which the board adapts to the separate SDO and SDI lines of the mikroBUS™ socket through the communication-selection circuitry and a 10kΩ series resistor. The active-low chip-select signal is routed through the CS pin, while the ALT output is routed to the INT pin and alerts the host when a threshold, wake-up, status, or diagnostic event requires attention. The multifunction WKP signal is available on the PWM pin and allows the host to wake the sensor from Sleep or Autonomous state by pulling the line low. The RST pin serves as the ClickID selection signal, while the AN, RX, and TX pins remain unconnected.

The board includes a green PWR LED that indicates the presence of the 3.3V supply and three COMM SEL jumpers that configure the shared clock, data, and CS/WKP signal paths for the

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selected interface. It also incorporates ClickID circuitry based on the DS28E36BQ and a 74LVC1G3157 analog switch, allowing compatible host systems to detect and identify the board automatically. Barometer 14 Click is designed in the Click Snap format, with predefined break-off lines that allow the KP497 sensing section to be separated from the main mikroBUS™ section. Duplicated eight-pin connection pads provide direct access to power, ground, clock, data, chip-select, wake-up, and alert signals, while the mounting holes simplify installation of the detached section at the required sensing location. This is useful when pressure must be measured away from the host board, near an enclosure opening, or inside a space-constrained part of the final system.

Barometer 14 Click operates exclusively from the 3.3V mikroBUS™ power rail, which also defines the logic level of all communication and control signals, while the 5V rail is not used. Appropriate external level conversion must therefore be provided when the board is connected to a host operating with different logic levels. Onboard decoupling capacitors stabilize the sensor supply and its internally regulated voltage domain. Barometer 14 Click comes with a mikroSDK-compliant library containing easy-to-use functions and a ready-to-use code example that can be downloaded and used as a reference for board initialization, interface configuration, measurement acquisition, and further application 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 battery management systems, thermal runaway detection, battery shock monitoring, industrial control, weather stations, and altimeters
On-board modules	KP497XTMA1 - XENSIV™ smart barometric pressure sensor with integrated z-axis accelerometer from Infineon Technologies
Key Features	Smart pressure sensing from 20kPa to 250kPa, integrated z-axis acceleration and temperature monitoring, low-power autonomous threshold detection, external wake-up and alert functions, acceleration recording, 3kB Flash memory, I2C and 3-wire SPI interfaces, ClickID, Click Snap, and more
Interface	I2C,SPI
Feature	Click Snap,ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V

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Pinout diagram

This table shows how the pinout on Barometer 14 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	**WKP**	External Wake-Up
ID SEL	**RST**	2	RST	INT	15	**INT**	Alert
Device Enable / ID COMM	**CS**	3	CS	RX	14	NC	
SPI SCK	**SCK**	4	SCK	TX	13	NC	
SPI SDI	**SDI**	5	MISO	SCL	12	**SCL**	I2C Clock
SPI SDO	**SDO**	6	MOSI	SDA	11	**SDA**	I2C Data
Power Supply	**3.3V**	7	3.3V	5V	10	NC	
Ground	**GND**	8	GND	GND	9	**GND**	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
JP1	VCC SEL	Left	Power/Logic Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V
JP2	COMM SEL 1	Left	I2C/SPI Communication Selection: Left position I2C, Right position SPI
JP3	COMM SEL 2	Left	I2C/SPI Communication Selection: Left position I2C, Right position SPI

Barometer 14 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Pressure Operating Range	20	-	250	kPa
Temperature Operating Range	-40	-	105	°C
Absolute Pressure Accuracy	-2	-	2	kPa

Software Support

Barometer 14 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 Barometer 14 Click board by reading and displaying the pressure, temperature and acceleration measurements.

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Key Functions

- barometer14_cfg_setup This function initializes Click configuration structure to initial values.
- barometer14_init This function initializes all necessary pins and peripherals used for this Click board.
- barometer14_default_cfg This function executes a default configuration of Barometer 14 Click board.
- barometer14_measure_pressure This function triggers a single pressure measurement and reads the result from Barometer 14 Click board.
- barometer14_measure_accel This function triggers a single acceleration measurement and reads the result from Barometer 14 Click board.
- barometer14_measure_temp This function triggers a single temperature measurement and reads the result from Barometer 14 Click board.

Application Init

Initializes the driver, performs the Click default configuration and displays sensor ID and product code on the USB UART.

Application Task

Reads the pressure [kPa], temperature [degC] and acceleration [g] measurements and displays the results on the USB UART 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

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Barometer 14 Click example package

Barometer 14 Click 2D and 3D files v100

Barometer 14 Click schematic v100

KP497XTMA1 datasheet

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