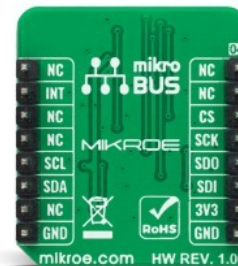
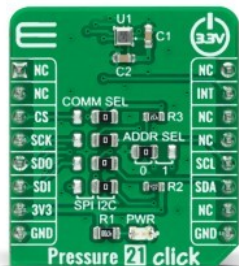


## Pressure 21 Click



PID: MIKROE-5274

**Pressure 21 Click** is a compact add-on board that contains a board-mount pressure sensor. This board features the [BMP581](#), an absolute barometric pressure sensor from [Bosch Sensortec](#). The BMP581 provides a relative accuracy of  $\pm 6\text{Pa}$  and typical absolute accuracy of  $\pm 30\text{Pa}$  with ultra-low noise, low power consumption, and temperature stability alongside programmable output: temperature-only or both pressure and temperature (pressure-only is not supported). It converts output data into a 24-bit digital value and sends the information via a configurable host interface that supports SPI and I2C serial communications. It measures pressure from 30kPa up to 125kPa over a wide operating temperature range. This Click board™ is suited for various pressure-based applications, industrial, consumer, weather stations, and more.

Pressure 21 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?

Pressure 21 Click as its foundation uses the BMP581, a high accuracy, low power, barometric pressure, and temperature sensor solution from Bosch Sensortec. The BMP581 provides proper absolute pressure and temperature measurements, due to on-chip linearization and temperature compensation, from 30kPa to 125kPa over a wide operating temperature range from  $-40$  to  $+85^{\circ}\text{C}$ . It also provides a relative accuracy of  $\pm 6\text{Pa}$  and typical absolute accuracy of  $\pm 30\text{Pa}$  with ultra-low noise, low power consumption, and temperature stability alongside programmable output: temperature-only or both pressure and temperature (pressure-only is not supported).

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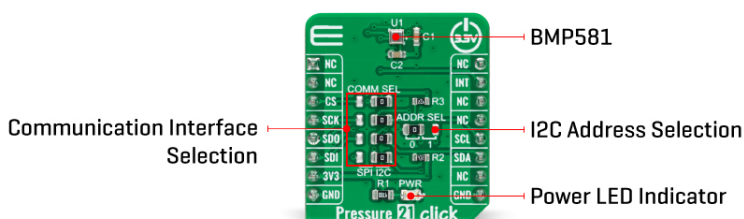
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The BMP581 operates in three power modes: Sleep, Normal, and Forced Mode. The Normal Mode comprises automated perpetual cycling between an active measurement period and an inactive Standby period. In Sleep Mode, no measurements are being performed, while in Forced Mode, a single measurement performs. When a measurement is finished, the BMP581 returns to Sleep Mode. Also, a set of oversampling settings are available, ranging from ultra-low power to highest resolution setting to adapt the Click board™ to the target application.

Pressure 21 Click allows using both I2C and SPI interfaces with a maximum frequency of 1MHz for I2C and 10MHz for SPI communication. The selection can be made by positioning SMD jumpers labeled as COMM SEL in an appropriate position. Note that all the jumpers' positions must be on the same side, or the Click board™ may become unresponsive. While the I2C interface is selected, the BMP581 allows choosing the least significant bit (LSB) of its I2C slave address using the SMD jumper labeled ADDR SEL. This Click board™ also possesses an additional interrupt pin, routed to the INT pin on the mikroBUS™ socket, indicating when a specific interrupt event occurs, such as FIFO overflow, the threshold over/underrun, data-ready, and more.

This Click board™ can be operated only with a 3.3V logic voltage level. The board must perform appropriate logic voltage level conversion before using MCUs with different logic levels. However, the Click board™ comes equipped with a library containing 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, industrial, consumer, weather stations, and more  |
| On-board modules | BMP581 - digital barometric pressure and temperature sensor from Bosch Sensortec   |
| Key Features     | Low power consumption, high performance, improved temperature stability, programmable output and noise performance, programmable interrupt, selectable interface, and more |
| Interface        | I2C, SPI   |

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|                  |                    |
|------------------|--------------------|
| Feature          | No ClickID         |
| Compatibility    | mikroBUS™          |
| Click board size | S (28.6 x 25.4 mm) |
| Input Voltage    | 3.3V               |

## Pinout diagram

This table shows how the pinout on Pressure 21 click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

| Notes           | Pin         |  |      |     |    | Pin        | Notes     |
|-----------------|-------------|---|------|-----|----|------------|-----------|
|                 | NC          | 1   | AN   | PWM | 16 | NC         |           |
|                 | NC          | 2   | RST  | INT | 15 | <b>INT</b> | Interrupt |
| SPI Chip Select | <b>CS</b>   | 3   | CS   | RX  | 14 | NC         |           |
| SPI Clock       | <b>SCK</b>  | 4   | SCK  | TX  | 13 | NC         |           |
| SPI Data OUT    | <b>SDO</b>  | 5   | MISO | SCL | 12 | <b>SCL</b> | I2C Clock |
| SPI Data IN     | <b>SDI</b>  | 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     | PWR      | -       | Power LED Indicator   |
| JP1     | ADDR SEL | Left    | I2C Address Selection<br>0/1: Left position 0,<br>Right position 1                        |
| JP2-JP5 | COMM SEL | Right   | Communication<br>Interface Selection<br>SPI/I2C: Left position<br>SPI, Right position I2C |

## Pressure 21 Click electrical specifications

| Description                 | Min | Typ | Max | Unit |
|-----------------------------|-----|-----|-----|------|
| Supply Voltage              | -   | 3.3 | -   | V    |
| Pressure Measurement Range  | 30  | -   | 125 | kPa  |
| Relative Pressure Accuracy  | -   | ±6  | -   | Pa   |
| Absolute Pressure Accuracy  | -   | ±30 | -   | Pa   |
| Resolution                  | -   | 24  | -   | bit  |
| Operating Temperature Range | -40 | +25 | +85 | °C   |

## Software Support

We provide a library for the Pressure 21 Click as well as a demo application (example), developed using MikroElektronika [compilers](#). The demo can run on all the main MikroElektronika [development boards](#).

Package can be downloaded/installed directly from NECTO Studio Package

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Manager(recommended way), downloaded from our [LibStock™](#) or found on [Mikroe github account](#).

## Library Description

This library contains API for Pressure 21 Click driver.

Key functions

- `pressure21_get_int_pin` This function returns the INT pin logic state.
- `pressure21_get_sensor_data` This function reads the sensor measurements data: pressure in Pascals and temperature in Celsius.
- `pressure21_write_register` This function writes a desired data to the selected register.

## Example Description

This example demonstrates the use of Pressure 21 Click board™ by reading and displaying the pressure and temperature measurements.

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 Mikroe Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.Pressure21

## 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](#)

[Click board™ Catalog](#)

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[Click boards™](#)

## Downloads

[Pressure 21 click example on Libstock](#)

[BMP581 datasheet](#)

[Pressure 21 click 2D and 3D files](#)

[Pressure 21 click schematic](#)

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