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PHT Click

PID: MIKROE-4348

PHT Click is a compact add-on board that contains a PHT combo sensor. This board features the MS8607, a digital combination sensor providing 3 environmental measurements all-in-one: pressure, humidity, and temperature from TE Connectivity. This sensor is based on leading MEMS technologies, provides factory-calibrated PHT data available over an I2C serial interface. The standout feature of the MS8607, alongside its very respectable low power consumption at as low as 0.78 µA, is also ultra-low power consumption and high PHT accuracy. This Click board™ is appropriate for environmental monitoring, as well as PHT applications such as HVAC and weather stations.

PHT 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?

PHT Click is based on the MS8607, a digital combination sensor providing 3 environmental measurements all-in-one: pressure, humidity, and temperature from TE Connectivity. The MS8607 includes two sensors based on the MEMS technologies used to measure pressure, humidity, and temperature. The first is a piezo-resistive sensor providing pressure and temperature measurements, and the second sensor is a capacitive type humidity sensor providing relative humidity measurement. Each sensor is interfaced to a ΔΣ ADC integrated circuit for the digital conversion. The MS8607 converts both analog output voltages to a 24-bit digital value for the pressure and temperature measurements and a 12-bit digital value for the relative humidity measurement.

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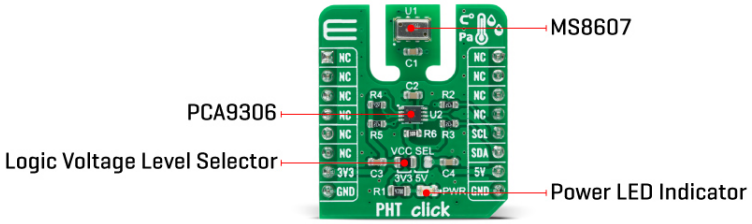

Pressure measurement accuracy comes in at +/- 2 mbar, relative humidity at +/- 3% RH, and the temperature within 1°C. One standout feature of the MS8607 is it's very respectable low power consumption at as low as 0.78 µA. Perfect for sensing general weather conditions, the MS8607 really shines for high altitude low-pressure applications. Capable of sensing down to 10mbar, the MS8607 is simple to use and gives the user some powerful readings with very little power and conversion time.

PHT Click communicates with MCU using the standard I2C 2-Wire interface with a maximum clock frequency of 400kHz. Since the sensor is supplied with 3.3V logic voltage level only, also featured on this Click board™ is a PCA9306 voltage-level translator from Texas Instruments. The I2C interface bus lines are routed to the dual bidirectional voltage-level translator that allows this Click board™ to be interfaced with both 3.3V and 5V MCUs.

This Click board™ is designed to be operated with both 3.3V and 5V logic voltage levels that can be selected via VCC SEL jumper. This allows 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	Environmental
Applications	Can be used for environmental monitoring, as well as PHT applications such as HVAC and weather stations.
On-board modules	PHT Click is based on the MS8607, a digital combination sensor providing 3 environmental measurements all-in-one: pressure, humidity, and temperature from TE Connectivity.
Key Features	Ultra-low power consumption, integrated pressure, humidity and temperature sensor, fully factory calibrated, high-resolution, and more.
Interface	I2C
Feature	No ClickID

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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 PHT 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	NC	
	NC	2	RST	INT	15	NC	
	NC	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	**SCL**	I2C Clock
	NC	6	MOSI	SDA	11	**SDA**	I2C Data
Power Supply	**3.3V**	7	3.3V	5V	10	**5V**	Power Supply
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 Supply Voltage Selection 3V3/5V: Left position 3V3, Right position 5V

PHT Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-0.3	3.3	3.6	V
Operating Pressure Range	300	-	1200	mbar
Operating Relative Humidity Range	0	-	100	%RH
Operating Temperature Range	-40	-	+85	°C

Software Support

We provide a library for the PHT 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

The library covers all the necessary functions to control PHT Click board™. Library performs a standard I2C interface communication.

Key functions:

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- (float *pressure) - Get temperature and pressure function.
- void pht_get_relative_humidity (float *humidity) - Get humidity function.
- (uint8_t press_ratio) - Set Ratio function.

Examples description

The application is composed of three sections :

- System Initialization - Initializes I2C and start to write log.
- Application Initialization - Initialization driver enables - I2C, performs the device reset and determines the oversampling ratio, also write log.
- Application Task - (code snippet) This is an example that demonstrates the use of the PHT Click board™. PHT Click board™ can be used to measure Pressure, Temperature and Relative Humidity. All data logs write on USB uart changes every 3 sec.

The full application code, and ready to use projects can be found on our LibStock page.

Other mikroE Libraries used in the example:

- I2C
- UART
- Conversions

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.

Resources

mikroBUS™

mikroSDK

Click board™ Catalog

Click boards™

Downloads

PHT click example on Libstock

PHT click 2D and 3D files

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PHT click schematic

PCA9306 datasheet

MS8607 datasheet

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