

# Ambient 18 Click



PID: MIKROE-4943

Ambient 18 Click is a compact add-on board used to sense the amount of the present ambient light. This board features the BH1680FVC, an analog current-output ambient light sensor from Rohm Semiconductor. The BH1680FVC can detect a wide range of illuminance up to 10klx and provides excellent responsivity close to the human eyes' response. Besides, it is also characterized by low sensitivity variation across various light sources, a built-in shutdown function, and the ability to process the output signal in analog or digital form. This Click board™ is the most suitable for obtaining ambient light data for adjusting brightness in applications that require power saving and better visibility.

Ambient 18 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?

Ambient 18 Click as its foundation uses the BH1680FVC, an analog current-output ambient light sensor from Rohm Semiconductor. It is composed of photodiodes, amplifiers, and current mirror circuits and can detect a wide range of illuminance up to 10klx, providing excellent responsivity close to the human eyes' response. It has stable performance over a wide temperature, voltage range, and a built-in shutdown function. It is characterized by good output linearity across a wide illumination range and low sensitivity variation across various light sources suitable to sense the amount of the present ambient light.

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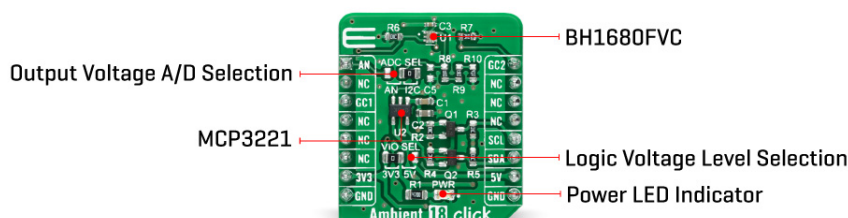
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It also has four configurable modes of operation, shutdown mode associated with three gain modes: high-gain mode, medium-gain mode, and low-gain mode. The desired gain mode is selected through CS and PWM pins of the mikroBUS™ socket labeled as GC1 and GC2.

The output of the BH1680FVC can be converted to a digital value using MCP3221, a successive approximation A/D converter with a 12-bit resolution from Microchip, using a 2-wire I2C compatible interface, or can be sent directly to an analog pin of the mikroBUS™ socket labeled as AN. Selection can be performed by onboard SMD jumper labeled as ADC SEL to an appropriate position marked as AN and I2C.

The MCP3221 provides one single-ended input with low power consumption, a low maximum conversion current, and a Standby current of 250µA and 1µA, respectively. Data can be transferred at rates of up to 100kbit/s in the Standard and 400kbit/s in the Fast Mode. Also, maximum sample rates of 22.3kSPS with the MCP3221 are possible in a Continuous-Conversion Mode with a clock rate of 400kHz.

This Click board™ can operate with both 3.3V and 5V logic voltage levels selected via the VIO SEL jumper. This way, it is allowed for both 3.3V and 5V capable MCUs to use the communication lines properly. However, the 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.

## Specifications

Type	Optical
Applications	Can be used for obtaining ambient light data for adjusting brightness in applications that require power saving and better visibility
On-board modules	BH1680FVC - analog current-output ambient light sensor from Rohm Semiconductor
Key Features	Low power consumption, close responsivity to the human eye, good output linearity across wide illumination range, low sensitivity variation across various light sources, stable performance over temperature and voltage, possibility of signal processing in analog and

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	digital form, and more
Interface	Analog,GPIO,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 Ambient 18 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin					Pin	Notes
Analog Signal	<b>AN</b>	1	AN	PWM	16	<b>GC1</b>	Gain Mode Control Signal 2
	NC	2	RST	INT	15	NC	
Gain Mode Control Signal 1	<b>GC1</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	VIO SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V
JP2	ADC SEL	Right	Output Voltage A/D Selection AN/I2C: Left position AN, Right position I2C

## Ambient 18 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Maximum Output Current	-	-	7.5	mA
Peak Wavelength	-	530	-	nm
Operating Temperature Range	-40	+25	+85	°C

## Software Support

We provide a library for the Ambient 18 Click as well as a demo application (example), developed using MikroElektronika [compilers](#). The demo can run on all the main

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MikroElektronika [development boards](#).

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 Ambient 18 Click driver.

Key functions

- `ambient18_set_gain_mode` This function sets the gain mode.
- `ambient18_read_voltage` This function reads raw ADC value and converts it to proportional voltage level.
- `ambient18_voltage_to_lux` This function calculates illuminance (lux) based on the voltage input.

## Example Description

This example demonstrates the use of Ambient 18 Click board™ by measuring and displaying the illuminance value in Lux.

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.Ambient18

## 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™](#)

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[mikroSDK](#)

[Click board™ Catalog](#)

[Click Boards™](#)

## Downloads

[Ambient 18 click 2D and 3D files](#)

[BH1680FVC datasheet](#)

[Ambient 18 click schematic](#)

[Ambient 18 click example on Libstock](#)

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