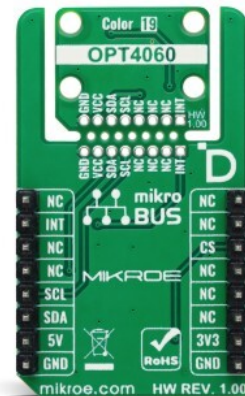
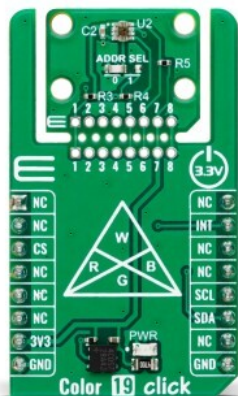


# Color 19 Click



PID: MIKROE-6415

**Color 19 Click** is a compact add-on board for precise color and light intensity measurement. This board features the [OPT4060](#), a high-speed, high-sensitivity RGBW color sensor from [Texas Instruments](#). The OPT4060 features four channels with optimized spectral responses, including red, green, blue, and wide-band (white), ensuring accurate light intensity (lux) and color analysis across various lighting conditions. With flexible configuration options, including programmable light conversion times and impressive sensitivity down to 2.15mlux, this board adapts to diverse application requirements. The innovative Click Snap feature allows the sensor area to be detached and used autonomously for enhanced implementation flexibility. Color 19 Click is ideal for smart lighting, display color adjustment, ambient light sensing, and environmental monitoring applications.

For more information about **Color 19 Click** visit the official [product page](#).

## How does it work?

Color 19 Click is based on the OPT4060, a high-speed, high-sensitivity RGBW color sensor from Texas Instruments, designed to measure color and light intensity with exceptional precision. This single-chip sensor is engineered for advanced color detection and can measure four channels: red, green, blue, and a wide-band (white) channel. Each channel features an optimized spectral response, enabling accurate color and light intensity analysis across various lighting conditions. This Click board™ delivers accurate light intensity (lux) and color data, making it suitable for smart lighting, display color adjustment, ambient light sensing, and environmental monitoring applications.

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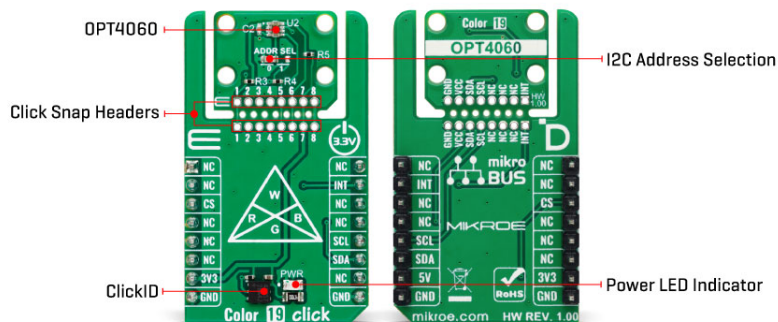
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The OPT4060 incorporates specialized optical filters with finely tuned spectral responses for the RGB channels. This ensures strong rejection of wavelengths outside their target range, particularly in the near-infrared (NIR) spectrum at 850 and 940nm. This ensures reliable measurements in environments where NIR interference is prevalent. Additionally, its wide-band channel provides comprehensive light intensity data, allowing for precise lux calculations and color characterization.

The OPT4060 also provides flexible configuration options, with light conversion times ranging from 600µs to 800ms across 12 programmable steps per channel. This adaptability allows the sensor to meet various application requirements, balancing speed and resolution based on the user's needs. The sensor achieves impressive sensitivity and can detect light levels as low as 2.15mlux, making it ideal for applications requiring precise light-level monitoring in both low and high-illumination environments.

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 area to become movable by breaking the PCB, opening up many new possibilities for implementation. Thanks to the Snap feature, the OPT4060 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.

Color 19 Click uses an I2C interface with clock speeds of up to 2.6MHz, ensuring fast communication with the host MCU. The I2C address can be easily configured via onboard jumper ADDR SEL in the Snap area, allowing multiple devices to coexist on the same bus. Beyond communication pins, this board is also equipped with an interrupt (INT) pin that enables the host to MCU to sleep or ignore the sensor results until a user-defined event occurs (whether the light is above or below interest levels).

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. It also comes equipped with a library containing functions and 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, introducing a new

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level of flexibility and ease of use. This feature allows for easy detachment of the main sensor area by simply snapping the PCB along designated lines, enabling various implementation possibilities. For detailed information about Click Snap, please visit the [official page](#) dedicated to this feature.

## Specifications

Type	Color Sensing,Optical
Applications	Ideal for smart lighting, display color adjustment, ambient light sensing, and environmental monitoring applications
On-board modules	OPT4060 - RGBW color sensor from Texas Instruments
Key Features	High speed, high sensitivity, Red, Green, Blue, and Wide-band channels with optimized spectral responses, infrared rejection, configurable light conversion times, I2C interface, Click Snap, interrupt, and more
Interface	I2C
Feature	Click Snap,ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V

## Pinout diagram

This table shows how the pinout on Color 19 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	<b>INT</b>	Interrupt
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	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 0/1: Left position 0, Right position 1

## Color 19 Click electrical specifications

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Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Peak Spectral Responsivity (R/G/B/W)	605/555/450/500			nm
ADC Resolution	9	-	20	bits

## Software Support

[Color 19 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 Color 19 Click by reading and displaying the color measurement from RGBW channels and the light intensity level in lux.

### Key Functions

- `color19_cfg_setup` Config Object Initialization function.
- `color19_init` Initialization function.
- `color19_default_cfg` Click Default Configuration function.
- `color19_get_int_pin` This function returns the INT pin logic state.
- `color19_read_data` This function reads the color data measurement of all channels and calculates the light intensity in lux.
- `color19_check_communication` This function checks the communication by reading and verifying the device ID.

### Application Init

Initializes the driver and performs the Click default configuration.

### Application Task

Waits for a data ready interrupt then reads the color measurement from RGBW channels and the light intensity level in lux and displays the results on the USB UART every 200ms approximately.

## 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.

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## Resources

[mikroBUS™](#)

[mikroSDK](#)

[Click board™ Catalog](#)

[Click boards™](#)

[ClickID](#)

## Downloads

[Color 19 click example package](#)

[Color 19 click 2D and 3D files v100](#)

[OPT4060 datasheet](#)

[Color 19 click schematic v100](#)

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