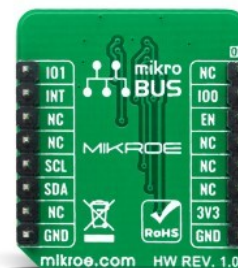
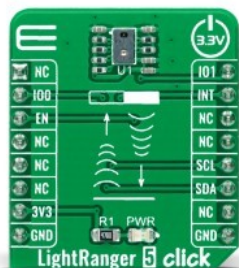


LightRanger 5 Click



PID: MIKROE-4592

LightRanger 5 Click is a compact add-on board that contains a ranging sensor with multi-target detection. This board features the TMF8801, a dToF (direct time of flight) optical distance sensor achieving up to 2500mm target detection distance from AMS-TAOS. It offers highly accurate depth accuracy detection through a sub-nanosecond light pulse and an anti-aliasing "stop-watch" method to measure the round-trip time of the pulse. It makes precise distance measurements up to a 2500mm distance range, and it is capable of operation in dark environments and the presence of sunlight. This Click board™ is suitable for presence (object) detection, distance measurement, industrial ranging, inventory control, optical switch, and many other applications.

LightRanger 5 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?

LightRanger 5 Click as its foundation uses the TMF8801, an actual direct time-of-flight (ToF) sensor system in a single modular package from AMS-TAOS. It offers highly accurate depth accuracy detection through a sub-nanosecond light pulse and an anti-aliasing "stop-watch" method to measure the round-trip time of the pulse. It comes with an integrated microprocessor (Cortex M0) featured with all algorithms included on-chip with no need for external optics and an emitter that offers high dynamic range and detection sensing measurements from 20 to 2500 mm distances. Alongside these features, it also provides single-zone detection of an object irrespective of color, reflectivity, and texture.

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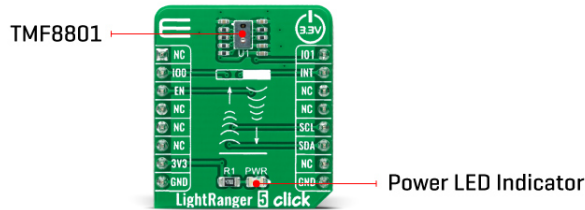
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The TMF8801 utilizes highly sensitive Single-Photon Avalanche Diode (SPAD) detection with fast, compact time-to-digital converters to make highly accurate distance measurements within $\pm 5\%$. It is capable of operation in dark environments and the presence of sunlight. A built-in histogram is featured to detect cover glass and report object distances, operating with the highest Signal-to-Noise Ratio (SNR) while compensating for dirt and smudges contaminants on a product cover glass to produce artifact-free measurement. The histogram delivers dynamic cover glass calibration, and crosstalk compensation and background light noise are minimized through on-chip sunlight rejection filters.

LightRanger 5 Click communicates with MCU using the standard I2C 2-Wire interface supporting Fast Mode operation with a clock frequency up to 1MHz. Also, it provides the possibility of the device Power-Up feature (Enable) routed to the CS pin of the mikroBUS™ socket, interrupt feature on the INT pin of the mikroBUS™ to optimize ranging operation, and two pins on the RST and PWM pins of the mikroBUS™ socket used as a general GPIO output signal.

This Click board™ can be operated only with a 3.3V logic voltage level. The board must perform appropriate logic voltage level conversion before use with 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	Optical
Applications	Can be used for presence (object) detection, distance measurement, industrial ranging, inventory control, optical switch, and many other applications.
On-board modules	TMF8801 - dToF (direct time of flight) optical distance sensor achieving up to 2500mm target detection distance from AMS-TAOS
Key Features	Direct ToF technology with high sensitivity SPAD detection, fast Time-to-Digital Converter (TDC) architecture, enables dark and sunlight environment distance measurement within $\pm 5\%$, 20mm to 2500mm distance sensing, and

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	more.
Interface	I2C
ClickID	No
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 LightRanger 5 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	IO1	General Purpose I/O
General Purpose I/O	IO0	2	RST	INT	15	INT	Interrupt
Enable/Shutdown	EN	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	NC	
Ground	GND	8	GND	GND	9	GND	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator

LightRanger 5 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Distance Measurement Range	2	-	2500	mm
Wavelength	-	940	-	nm
Operating Temperature Range	-30	+25	+70	°C

Software Support

We provide a library for the LightRanger 5 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 Manager (recommended way), downloaded from our [LibStock™](#) or found on [mikroE github account](#).

Library Description

This library contains API for LightRanger 5 Click driver.

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Key functions:

- lightranger5_cfg_setup - Config Object Initialization function.
- lightranger5_init - Initialization function.
- lightranger5_default_cfg - Click Default Configuration function.

Examples description

This is an example that demonstrates the use of the LightRanger 5 click board. This demo application shows an example of distance measurement.

The application is composed of three sections :

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.LightRanger5

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

[LightRanger 5 click 2D and 3D files](#)

[TMF8801 datasheet](#)

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[LightRanger 5 click schematic](#)

[LightRanger 5 click example on Libstock](#)

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