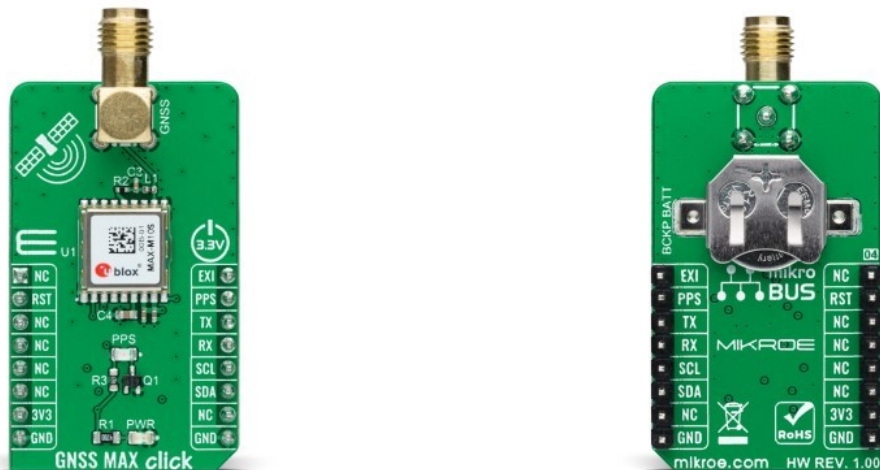


## GNSS MAX Click



PID: MIKROE-4643

GNSS MAX Click is a compact add-on board that provides fast positioning capability. This board features the MAX-M10S, an ultra-low-power GNSS receiver for high-performance asset-tracking from u-blox. The MAX-M10S supports the concurrent reception of four GNSS (GPS, GLONASS, Galileo, and BeiDou), which maximizes the position availability, particularly under challenging conditions such as in deep urban canyons. It is built on the u-blox M10 GNSS platform, which provides exceptional sensitivity and acquisition times for all L1 GNSS systems. It also comes with a configurable host interface, and advanced jamming and spoofing detection. This Click board™ is ideal for professional (industrial and consumer) applications such as asset trackers without compromising GNSS performance.

GNSS MAX 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?

GNSS MAX Click as its foundation uses the MAX-M10S (MAX-M10S-00B-01), a high-performance GNSS module from u-blox. The MAX-M10S features the u-blox M10 standard precision GNSS platform and provides exceptional sensitivity and acquisition times for all L1 GNSS signals. It also supports concurrent reception of up to four GNSS (GPS, GLONASS, Galileo, and BeiDou), maximizing position availability, particularly under challenging conditions such as in deep urban canyons. The MAX-M10S offers high sensitivity and minimal acquisition times while maintaining low system power.

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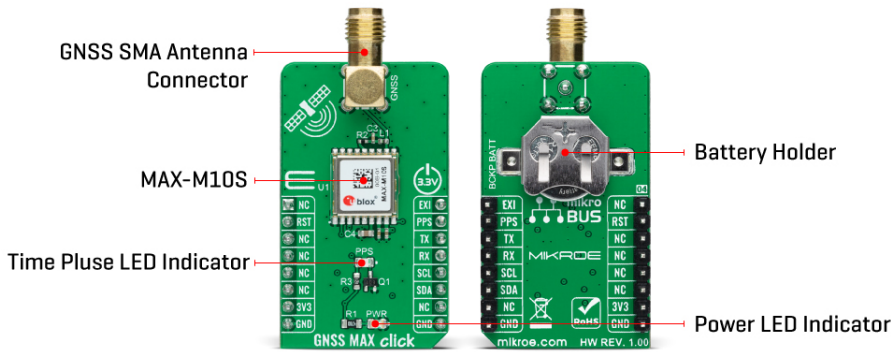
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The MAX-M10S module integrates an LNA followed by a SAW filter in the RF path for maximum sensitivity. Also, it detects jamming and spoofing attempts and reports them to the host so that the system can react to such events. Advanced filtering algorithms mitigate the impact of RF interference and jamming, thus enabling the product to operate as intended. The u-blox Super-S technology offers great RF sensitivity that improves the dynamic position accuracy by up to 25% with small antennas or in a non-line-of-sight scenario.

This Click board™ comes with a configurable host interface that allows communication with MCU using the selected interface. The MAX-M10S can communicate with MCU using the UART interface with commonly used UART RX and TX pins as its default communication protocol operating at 9600bps to transmit and exchange data with the host MCU or using the I2C interface. I2C interface is compatible with the Fast-Mode allowing a maximum bit rate of 400kbit/s.

In addition to these features, it also uses several mikroBUS™ pins. An active-low reset signal routed on the RST pin of the mikroBUS™ socket activates a hardware reset of the system, while the EXT pin routed to the PWM pin on the mikroBUS™ socket represents an external interrupt used for the module Wake-Up function. It also uses a PPS signal routed on the INT pin of the mikroBUS™ socket alongside a blue LED indicator marked as STATUS used for time pulse signal information and indication.

GNSS MAX Click possesses the SMA antenna connector on which an appropriate antenna connects that MikroE has in its [offer](#) for improved range and received signal strength. Also, in the case of the primary supply failure, the module can use a backup supply voltage from a connected battery if you need the Click board™ to be a standalone device.

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	GPS/GNSS
Applications	Can be used for professional (industrial and consumer) applications such as asset trackers

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On-board modules	MAX-M10S - standard precision GNSS module from u-blox
Key Features	Low power consumption, maximum position availability with concurrent reception of 4 GNSS, proven excellent performance, advanced jamming and spoofing detection, selectable interface, and more
Interface	I2C,UART
ClickID	No
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V

## Pinout diagram

This table shows how the pinout on GNSS MAX 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	<b>EXI</b>	Wake-Up Interrupt
Reset	<b>RST</b>	2	RST	INT	15	<b>PPS</b>	Time Pulse Signal
	NC	3	CS	RX	14	<b>TX</b>	UART TX
	NC	4	SCK	TX	13	<b>RX</b>	UART RX
	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
LD2	PPS	-	Time Pulse LED Indicator

## GNSS MAX Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Horizontal Position Accuracy	-	1.5	-	m
Tracking & Navigation Sensitivity	-	-167	-	dBm
Operating Temperature Range	-40	+25	+85	°C

## Software Support

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

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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 GNSSMAX Click driver.

Key functions:

- gnssmax\_generic\_read - GNSS MAX data reading function.
- gnssmax\_reset - GNSS MAX reset function.
- gnssmax\_get\_pps - GNSS MAX reads timestamp pin state.

## Examples description

This example showcases device ability to read data outputted from device and show it's coordinates and altitude when connected.

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.GNSSMAX

## 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™](#)

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## Downloads

[GNSS MAX click 2D and 3D files](#)

[MAX-M10S datasheet](#)

[GNSS MAX click schematic](#)

[GNSS MAX click example on Libstock](#)

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