

GNSS MAX 4 Click



PID: MIKROE-6994

GNSS MAX 4 Click is a compact add-on board designed for professional-grade, standard-precision GNSS positioning. This board is based on the [MAX-M10M-20B](#), an ultra-low-power GNSS module from [u-blox](#). Key features include concurrent reception of multiple GNSS constellations, including GPS, GLONASS, Galileo, and BeiDou, -165dBm tracking and navigation sensitivity, fast acquisition, integrated LNA and SAW filter for high RF sensitivity, u-blox Super-Signal technology, advanced spoofing and jamming detection, and configurable constellation selection for balancing positioning performance and power consumption. The board communicates with the host MCU through a UART interface and includes a backup coin-cell battery circuit for RTC, memory, configuration, and satellite data retention. It is suitable for asset tracking, portable devices, industrial monitoring, logistics systems, consumer positioning devices, and other applications.

For more information about **GNSS MAX 4 Click** visit the official [product page](#).

How does it work?

GNSS MAX 4 Click is based on the MAX-M10M-20B, an ultra-low-power GNSS module from u-blox built on the advanced u-blox M10 GNSS platform. The MAX-M10M-20B supports concurrent reception of multiple GNSS constellations, including GPS, GLONASS, Galileo, and BeiDou, allowing positioning performance across a wide range of global navigation scenarios. By receiving signals from several satellite systems at the same time, the module improves satellite availability, shortens acquisition time, and helps maintain positioning performance in challenging environments. Its tracking and navigation sensitivity of -165dBm provides excellent signal reception capability, making GNSS MAX 4 Click suitable for applications like industrial, consumer, and asset-tracking applications.

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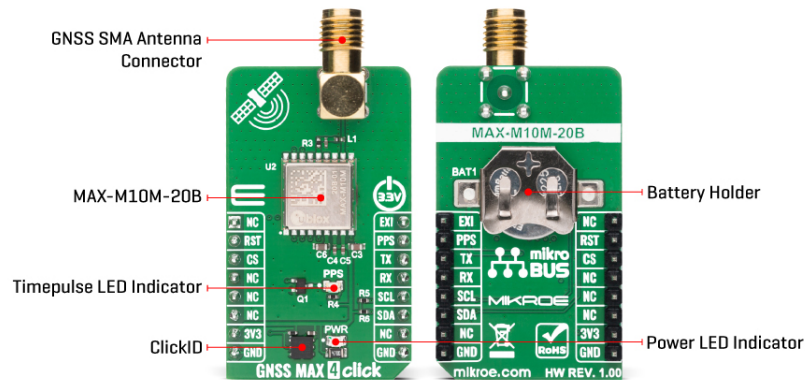
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The MAX-M10M-20B integrates a low-noise amplifier followed by a SAW filter in the RF path, ensuring high RF sensitivity that improves reception quality. The module also benefits from u-blox Super-Signal technology, which enhances RF sensitivity and can improve dynamic position accuracy when using small antennas or operating in non-line-of-sight conditions. For additional flexibility, the MAX-M10M-20B can be configured to receive a selected subset of GNSS constellations, allowing designers to optimize the balance between positioning performance and power consumption. In its default configuration, the module supports concurrent reception of GPS, Galileo, and BeiDou B1I, with QZSS and SBAS enabled, providing a practical setup for many global positioning applications.

In addition to accurate positioning, GNSS MAX 4 Click also supports advanced spoofing and jamming detection. The MAX-M10M-20B can detect interference and spoofing attempts and report these events to the host system, allowing the application to react appropriately and improve positioning integrity. This feature is especially valuable in industrial, logistics, tracking, and monitoring systems where GNSS reliability and signal trustworthiness are important.

The GNSS MAX 4 Click communicates with the host MCU through a UART interface using the standard UART RX and TX pins. The default communication speed is set at 115200bps. It also provides an I2C interface for communication with a host MCU. Still, it must be noted that I2C interface can only be operated in the peripheral mode. In addition to its standard power supply configuration, this module also has a dedicated backup power circuit that enables standalone operation and data retention. A coin-cell battery mounted on the back side of the board provides continuous power to the module's internal real-time clock (RTC) and memory, allowing it to preserve essential timing, configuration, and satellite ephemeris data even when the main supply is disconnected.

Alongside its primary communication interface pins, GNSS MAX 4 Click uses several additional control and monitoring pins that enhance module management and operational reliability. The RST pin is used to perform a hardware reset of the module, and a red PPS LED indicator, which, in combination with the PPS pin, detects a synchronized pulse signal from the MAX-M10M-20B once per second. The EXI pin (External Interrupt) serve as an external interrupt signal that can be programmed for various functions, such as waking up the module. The board also features one SMA connector for GNSS antenna that MIKROE offers, like the Active GPS Antenna for flexible connectivity options.

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

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levels. It also comes equipped with a library containing functions and example code that can be used as a reference for further development.

Specifications

Type	GPS/GNSS
Applications	Ideal for asset tracking, portable devices, industrial monitoring, logistics systems, consumer positioning devices, and other applications
On-board modules	MAX-M10M-20B - standard-precision professional-grade GNSS from u-blox
Key Features	Ultra-low-power GNSS positioning, u-blox M10 GNSS platform, concurrent reception of GPS, GLONASS, Galileo, and BeiDou constellations, fast acquisition times, integrated LNA and SAW filter in the RF path, high RF sensitivity for improved reception quality, u-blox Super-Signal technology, configurable GNSS constellation selection for power optimization, advanced spoofing detection, advanced jamming detection, and more
Interface	I2C,UART
Feature	ClickID
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 4 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin					Pin	Notes
	NC	1	AN	PWM	16	EXI	External Interrupt
Reset	RST	2	RST	INT	15	PPS	Timepulse Indicator
ID COMM	CS	3	CS	RX	14	TX	UART TX
	NC	4	SCK	TX	13	RX	UART RX
	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
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LD1	PWR	-	Power LED Indicator
LD2	PPS	-	Timepulse LED Indicator

GNSS MAX 4 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Frequency Range	1561.09 8	-	1605.37 5	MHz
Sensitivity	-	-165	-	dBm

Software Support

[GNSS MAX 4 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 GNSS MAX 4 Click by reading and displaying the GNSS coordinates.

Key Functions

- `gnssmax4_cfg_setup` This function initializes Click configuration structure to initial values.
- `gnssmax4_init` This function initializes all necessary pins and peripherals used for this Click board.
- `gnssmax4_get_pps_pin` This function returns the pulse per second (PPS) pin logic state.
- `gnssmax4_set_exti_pin` This function sets the EXI (EXTINT) pin logic state.
- `gnssmax4_reset_device` This function resets the device by toggling the RST pin.
- `gnssmax4_parse_gga` This function parses the GGA data from the read response buffer.

Application Init

Initializes the driver and logger.

Application Task

Reads the received data, parses the NMEA GGA info from it, and once it receives the position fix it will start displaying the coordinates on the USB UART.

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](#).

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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.

Resources

[mikroBUS™](#)

[mikroSDK](#)

[Click board™ Catalog](#)

[Click boards™](#)

[ClickID](#)

Downloads

[GNSS MAX 4 Click example package](#)

[GNSS MAX 4 Click 2D and 3D files v100](#)

[GNSS MAX 4 Click schematic v100](#)

[MAX-M10M-20B datasheet](#)

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