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GNSS MAX 2 Click

PID: MIKROE-6353

GNSS MAX 2 Click is a compact add-on board designed for precise positioning in urban environments. This board features the MAX-F10S, a professional-grade L1/L5 dual-band GNSS receiver from u-blox. This receiver uses dual-band GNSS technology to provide meter-level accuracy, even in challenging urban areas, by mitigating multipath effects. It supports concurrent GPS, Galileo, and BeiDou constellation tracking, offering robust performance with integrated filters and a low-noise amplifier for protection against RF interference. GNSS MAX 2 Click is ideal for vehicle tracking, fleet management, and micromobility solutions, even with small antennas.

How does it work?

GNSS MAX 2 Click is based on the MAX-F10S, a professional-grade L1/L5 dual-band GNSS receiver from u-blox, designed for achieving meter-level accuracy even in challenging urban environments. This board is built on the u-blox F10 GNSS technology, leveraging both L1 and L5 GNSS bands for enhanced precision. The dual-band capability allows the MAX-F10S to mitigate multipath effects, using signals from both L1 and L5 bands to deliver significantly better positional accuracy than single-band receivers. This Click board™ is ideal for various applications requiring reliable and accurate positioning in urban settings, offering significant benefits for vehicle tracking, fleet management, micromobility solutions, and more, even when used with small antennas.

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As a concurrent GNSS receiver, the MAX-F10S can track multiple GNSS constellations simultaneously, including GPS, Galileo, and BeiDou systems with SBAS enabled, ensuring robust and reliable performance in complex urban areas. Its RF front-end architecture is designed to receive dual-frequency signals concurrently, providing high sensitivity and improved accuracy. To further enhance its reliability, the module includes two internal SAW filters and a low-noise amplifier (LNA), protecting the receiver from RF interference caused by nearby cellular modems. Its efficient power management system also allows the receiver to use only a subset of GNSS constellations, reducing power consumption while maintaining high accuracy.

The GNSS MAX 2 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 9600bps, ensuring efficient data exchange. It also provides an I2C interface for communication with a host MCU in the I2C Fast mode. Still, it must be noted that the I2C interface can only be operated in the peripheral mode.

Besides interface pins, this Click board™ also incorporates a reset pin (RST) for direct module resetting and an external interrupt signal (EXI) that can be programmed for various functions, such as waking up the module. Furthermore, GNSS 17 Click includes a red PPS LED indicator, which emits a synchronized pulse signal from the MAX-F10S once per second. The PPS function is enabled by default, and the module will output the PPS signal once a 3D fix is achieved.

This Click board™ also features the SMA antenna connector with an impedance of 50Ω, compatible with various antennas available from MIKROE, like the Active GPS Antenna, to enhance its connectivity. 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. Also, it 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	Ideal for vehicle tracking, fleet management,

![MIKROE - Time-saving embedded tools]

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	and micromobility solutions
On-board modules	MAX-F10S - professional-grade L1/L5 dual-band GNSS receiver from u-blox
Key Features	Dual-band GNSS receiver, high-position accuracy, concurrent constellations tracking, multipath mitigation, RF interference protection, UART and I2C interfaces, backup power support, low power consmption, PPS indicator, and more
Interface	I2C,UART
Feature	ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V,External

Pinout diagram

This table shows how the pinout on GNSS MAX 2 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikro™ BUS			Pin	Notes
	NC	1	AN	PWM	16	**EXI**	External Interrupt
Reset	**RST**	2	RST	INT	15	**PPS**	Time Pulse Signal
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
LD1	PWR	-	Power LED Indicator
LD2	PPS	-	Time Pulse LED Indicator

GNSS MAX 2 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Frequency Range (L1/L5)	1575.42 / 1176.450			MHz
Horizontal Position Accuracy	-	1	-	m
Acquisition (Cold Start)	-	28	-	sec
Sensitivity (Tracking/Navigation)	-	-167	-	dBm

Software Support

We provide a library for the GNSS MAX 2 Click as well as a demo application (example),

developed using MIKROE compilers. The demo can run on all the main MIKROE development boards.

Package can be downloaded/installed directly from NECTO Studio Package Manager (recommended), downloaded from our LibStock™ or found on MIKROE github account.

Library Description

This library contains API for GNSS MAX 2 Click driver.

Key functions

- gnssmax2_generic_read This function reads a desired number of data bytes by using UART or I2C serial interface.

- gnssmax2_parse_gga This function parses the GGA data from the read response buffer.

- gnssmax2_reset_device This function resets the device by toggling the RST pin.

Example Description

This example demonstrates the use of GNSS MAX 2 Click by reading and displaying the GNSS coordinates.

The full application code, and ready to use projects can be installed directly from NECTO Studio Package Manager (recommended), downloaded from our LibStock™ or found on MIKROE github account.

Other MIKROE Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.GNSSMAX2

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 MIKROE compilers.
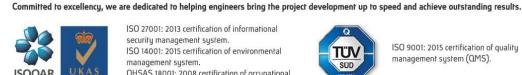
mikroSDK

This Click board™ is supported with mikroSDK - MIKROE 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™

Mikroe produces entire development toolchains for all major microcontroller architectures.
Committed to excellency, we are dedicated to helping engineers bring the project development up to speed and achieve outstanding results.

ISO 27001: 2013 certification of informational security management system.
ISO 14001: 2015 certification of environmental management system.
OHSAS 18001: 2008 certification of occupational health and safety management system.

ISO 9001: 2015 certification of quality management system (QMS).

mikroSDK

Click board™ Catalog

Click boards™

ClickID

Downloads

GNSS MAX 2 click example on Libstock

GNSS MAX 2 click 2D and 3D files v100

MAX-F10S datasheet

GNSS MAX 2 click schematic v100

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