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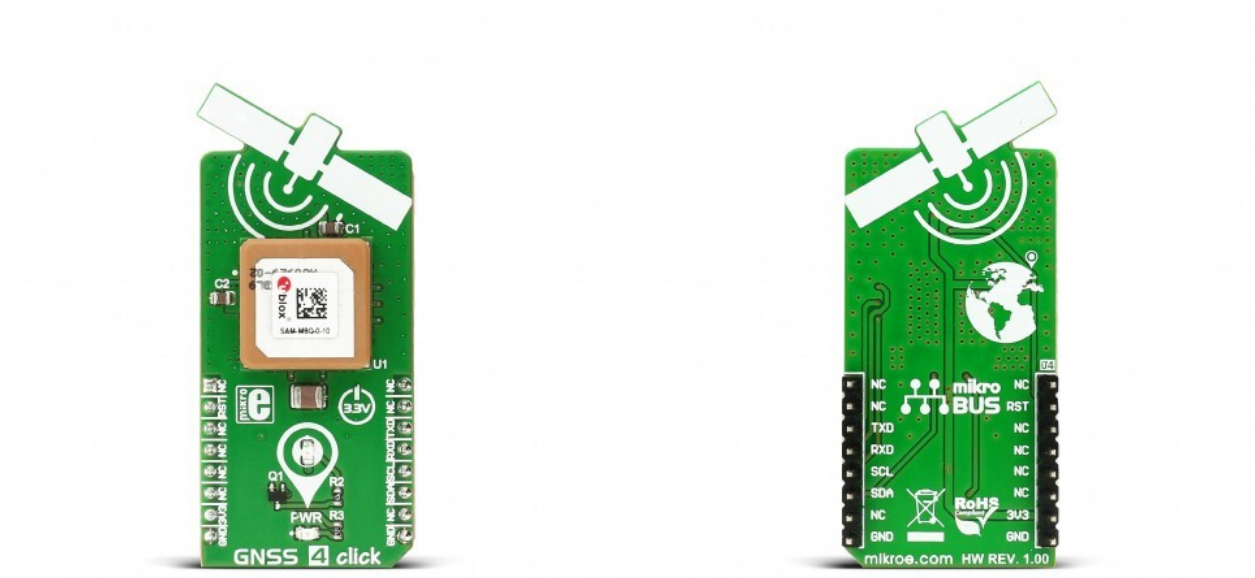
GNSS 4 Click



PID: MIKROE-2045

GNSS 4 Click is a compact add-on board that provides fast positioning capability. This board features the SAM-M8Q, a smart antenna module for easy and reliable GNSS integration from u-blox. The module utilizes a concurrent reception of up to three GNSS systems: GLONASS, Galileo, and GPS. It simultaneously recognizes multiple constellations and provides outstanding positioning accuracy in scenarios involving urban canyons or weak signals. This Click board™ makes the perfect solution for the development of applications for both acquisition and tracking and represents an ideal product for automotive, consumer, and industrial tracking applications.

GNSS 4 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 4 Click is based on the SAM-M8Q, a smart antenna module for easy and reliable GNSS integration from u-blox. The module is equipped with a 72-channel u-blox M8 engine. Besides supporting GLONASS, GPS, and Galileo for even better and faster positioning improvement, the module supports the augmentation of QZSS, GAGAN, and IMES, together with WAAS, EGNOS, and MSAS. The module also supports message integrity protection, geofencing, odometer, and spoofing detection with configurable interface settings to easily fit customer applications. In addition, it supports augmentation systems, such as satellite-based augmentation systems (SBAS), QZSS, IMES, and differential GPS (D-GPS).

The embedded omnidirectional radiation pattern GNSS patch antenna ensures maximum

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performance even in GNSS-hostile environments. It provides the best compromise between the performance of a Right Hand Circular Polarized (RHCP) antenna and its small size. The antenna has a peak gain of 3dBic; it is insensitive to surroundings and has a high tolerance against frequency shifts.

The SAM-M8Q module can also benefit from the u-blox AssistNow service in online, offline, and autonomous modes. This online service provides the GNSS broadcast parameters, such as ephemeris, almanac plus time, or rough position, to significantly reduce the receiver's time first-to-fix (TTFF) and improve acquisition sensitivity. The AssistNow Autonomous data of up to 3 days and the extended validity of AssistNow Offline data of up to 35 days provide faster acquisition after a long OFF time.

GNSS 4 Click uses a standard UART interface to communicate with the host MCU with commonly used UART RX and TX pins and supports configurable baud rates. In addition to the UART, the SAM-M8Q module has an I2C-compliant display data channel (DDC) interface available for communication with the host MCU and can be operated in slave mode only. The DDC protocol and electrical interface are fully compatible with the fast mode of the I2C interface and support a clock frequency of up to 400kHz and a maximum data rate of up to 400kbps. The SAM-M8Q module can be reset over the RST pin with an active LOW logic state. The time pulse of the module is visually presented over the 1PPS LED.

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 the development of applications for both acquisition and tracking and represents an ideal product for automotive, consumer, and industrial tracking applications
On-board modules	SAM-M8Q - smart antenna module for easy and reliable GNSS integration from u-blox
Key Features	High accuracy, I2C, and UART interfaces, concurrent reception of up to three GNSS systems (GLONASS, GPS, Galileo), support augmentation of QZSS, GAGAN, and IMES, together with WAAS, EGNOS, MSAS, support AssistNow Assistance, patch antenna, and more
Interface	I2C,UART
Feature	No ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V
Supply Voltage	3.3V

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Pinout diagram

This table shows how the pinout on GNSS 4 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	
Reset	**RST**	2	RST	INT	15	NC	
	NC	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	-	-	Timepulse LED Indicator

GNSS 4 click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Frequency Range for GPS	-	1575.42	-	MHz
Horizontal Position Accuracy	8	-	2.5	m
TTFF (Hot Start)	-	-	1	sec

Software Support

We provide a library for the GNSS4 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 GNSS4 Click driver.

Key functions

- Generic parser function.
- Generic read function.
- Wake-up module.

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Example Description

This example reads and processes data from GNSS4 clicks.

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.Gnss4

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™

Click board™ Catalog

Click Boards™

Downloads

SAM-M8Q datasheet

GNSS 4 click example on Libstock

GNSS 4 click schematic v100

GNSS 4 click 2D and 3D files v100