

GNSS 12 Click



PID: MIKROE-5527

GNSS 12 Click is a compact add-on board that provides fast positioning capability. This board features the CAM-M8C, a professional-grade GNSS module built on the high-performing M8 GNSS engine from u-blox. This module utilizes concurrent reception of up to three GNSS systems (GPS/Galileo together with either BeiDou or GLONASS), offering high sensitivity and strong signal levels. Besides internal, the CAM-M8C can use an optional external active antenna. It has a configurable host interface, advanced jamming/spoofing detection, and provides outstanding positioning accuracy even in GNSS-hostile environments. This Click board™ is suitable for industrial and consumer applications that require concurrent GPS/Galileo and GLONASS or GPS/Galileo and BeiDou reception.

How does it work?

GNSS 12 Click is based on the CAM-M8C, a concurrent GNSS chip antenna module from u-blox. The CAM-M8C is built on the high-performing M8 GNSS engine and utilizes simultaneous reception of up to three GNSS systems (GPS/Galileo together with BeiDou or GLONASS). It offers high sensitivity and minimal acquisition times while maintaining low power consumption and provides outstanding positioning accuracy even in GNSS-hostile environments. It also supports message integrity protection, geofencing, and spoofing detection with configurable interface settings to fit applications, such as industrial and automotive easily.

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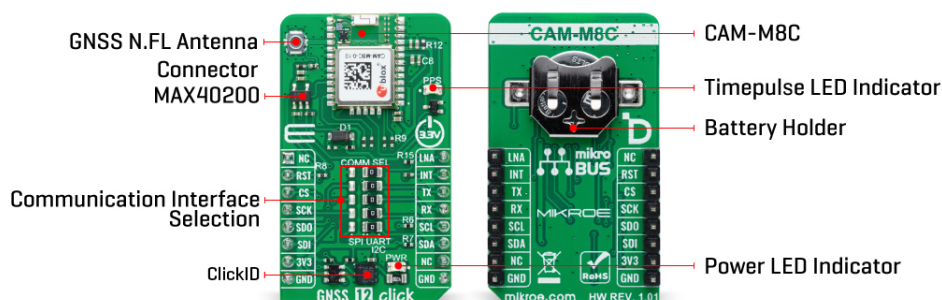
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The CAM-M8C communicates with the host MCU using the UART interface at 115200bps as its default communication protocol but also has other interfaces, such as SPI and I2C. The interface is selected by positioning SMD jumpers labeled COMM SEL in an appropriate position. Note that all the jumpers' positions must be on the same side, or the Click board™ may become unresponsive. In addition, this board also uses several mikroBUS™ pins. The reset pin routed on the RST pin of the mikroBUS™ socket provides the general reset ability, while the INT pin of the mikroBUS™ socket represents an external interrupt. An interrupt feature can be used for wake-up functions in the power save mode and aiding.

In the case of the primary supply failure, this Click board™ can use a backup supply voltage from a connected battery to help the internal RTC to still runs, providing a timing reference for the receiver. Backup voltage also supplies battery-backed RAM allowing all relevant data to be saved in the backup RAM to allow a hot or warm start later. The module performs a cold start during a Power-Up sequence if the backup battery is not connected. In addition to precise positioning, the GNSS 12 Click also has an accurate timing signal indicated through an orange LED indicator marked as PPS.

Besides an integrated omni-directional GNSS chip antenna, the GNSS 12 Click possesses the N.FL antenna connector for connecting the appropriate [active antenna](#) offered by MikroE for improved range and received signal strength. Thanks to the LNA pin, routed to the PWM pin of the mikroBUS™ socket, it is possible to control the use of the external antenna through the MAX40200, and thus the power consumption in the power save mode. Also, for the simplest possible implementation of SMA antennas on these types of connectors, the [MMCX-SMA Cable](#) from our offer is recommended.

This Click board™ can only be operated from a 3.3V logic voltage level. Therefore, 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 industrial and consumer applications that require concurrent GPS/Galileo and GLONASS or GPS/Galileo and BeiDou reception

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On-board modules	CAM-M8C - concurrent GNSS chip antenna module from u-blox
Key Features	Low power consumption, concurrent reception of up to 3 GNSS (GPS/Galileo, GLONASS, BeiDou), high sensitivity, omnidirectional and wideband antenna (optional external), selectable interface, advanced jamming and spoofing detection, and more
Interface	I2C,SPI,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 12 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	LNA	External Antenna Activation
Reset / ID SEL	RST	2	RST	INT	15	INT	Interrupt
SPI Select / ID COMM	CS	3	CS	RX	14	TX	UART TX
SPI Clock	SCK	4	SCK	TX	13	RX	UART RX
SPI Data OUT	SDO	5	MISO	SCL	12	SCL	I2C Clock
SPI Data IN	SDI	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	-	Timepulse LED Indicator
JP1-JP5	COMM SEL	Right	Communication Interface Selection SPI/UART,I2C: Left position SPI, Right position UART,I2C

GNSS 12 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3,3	-	V
Frequency Range	-	1,575	-	GHz

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Sensitivity	-164	-	-154	dBm
TTF - Cold Start	26	-	57	sec

Software Support

We provide a library for the GNSS 12 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 12 Click driver.

Key functions

- `gnss12_reset_device` This function resets the device by toggling the RST pin.
- `gnss12_generic_read` This function reads a desired number of data bytes from the module.
- `gnss12_parse_gngga` This function parses the GNGGA data from the read response buffer.

Example Description

This example demonstrates the use of GNSS 12 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.GNSS12

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.

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For more information about mikroSDK, visit the [official page](#).

Resources

[mikroBUS™](#)

[mikroSDK](#)

[Click board™ Catalog](#)

[Click Boards™](#)

[ClickID](#)

Downloads

[GNSS 12 click example on Libstock](#)

[GNSS 12 click 2D and 3D files v101](#)

[MAX40200 datasheet](#)

[CAM-M8C datasheet](#)

[GNSS 12 click schematic v101](#)

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