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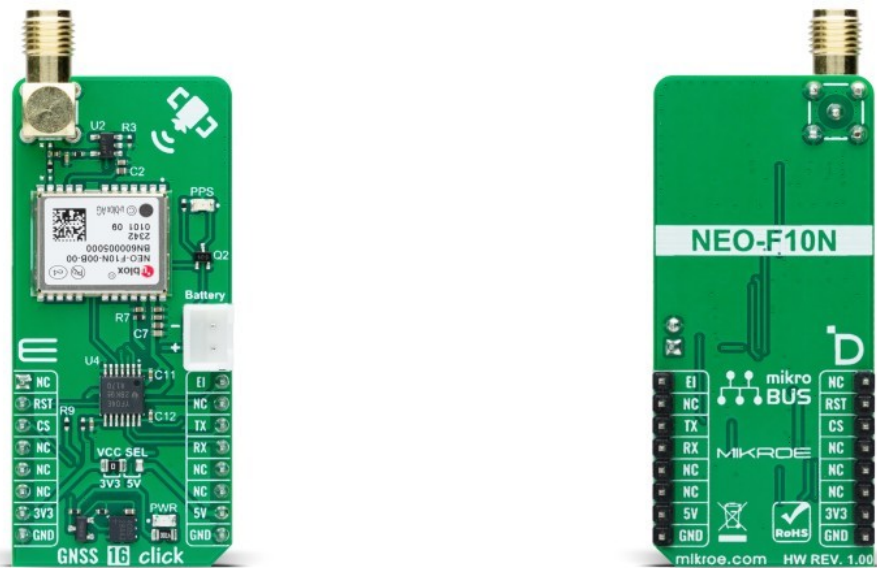www.mikroe.com

GNSS 16 Click

PID: MIKROE-6129

GNSS 16 Click is a compact add-on board that delivers meter-level accuracy in urban environments. This Click board™ features the NEO-F10N-00B, a professional-grade L1/L5 dual-band GNSS receiver from u-blox. It features dual-band multipath mitigation technology to ensure robust signal reception and supports multiple GNSS systems, including GPS, Galileo, and BeiDou. Configurable for specific constellations, it optimizes power consumption while maintaining high performance. It communicates via a UART interface, including a backup supply option for uninterrupted functionality. Suitable for applications such as vehicle tracking and micromobility, GNSS 16 Click is ideal for developers needing reliable geolocation capabilities.

GNSS 16 Click is fully compatible with the mikroBUS™ socket and can be used on any host system supporting the mikroBUS™ standard. It comes with the mikroSDK open-source libraries, offering unparalleled flexibility for evaluation and customization. What sets this Click board™ apart is the groundbreaking ClickID feature, enabling your host system to seamlessly and automatically detect and identify this add-on board.

How does it work?

GNSS 16 Click is based on the NEO-F10N-00B, a professional-grade L1/L5 dual-band GNSS receiver from u-blox, designed for precise navigation within urban environments. Using u-blox's proprietary F10 technology, the NEO-F10N-00B operates on both L1 and L5 signals. Its dual-band multipath mitigation technology significantly enhances signal reception from these bands, ensuring reliable meter-level accuracy. As a multi-constellation receiver, the NEO-F10N-00B supports various GNSS systems, making it ideal for vehicle tracking and micro-mobility solutions.
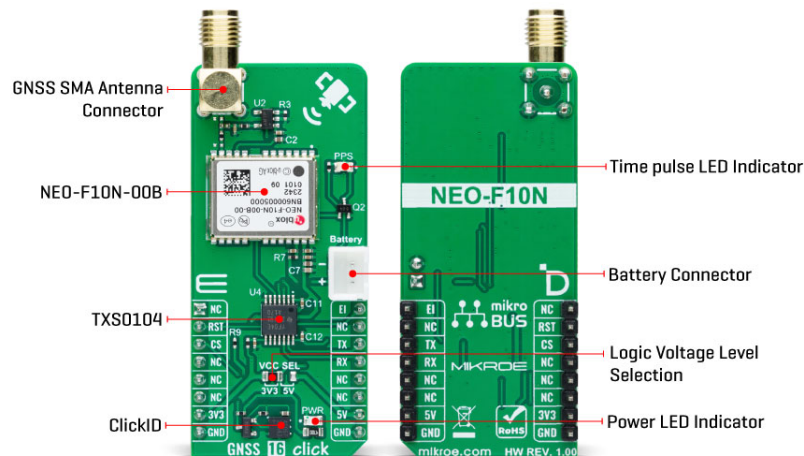
The NEO-F10N-00B's dual-band RF front end allows it to simultaneously handle multiple dual-frequency GNSS constellations. The user can configure the receiver to focus on specific constellations, optimizing power consumption. The NEO-F10N-00B comes pre-configured to concurrently receive signals from GPS, Galileo, and BeiDou, with SBAS enhancement. Individual constellations can also be enabled or disabled, except for QZSS, which depends on GPS availability. The receiver's firmware is also upgradeable, offering adaptability for various application needs.

Communication between the NEO-F10N-00B and the host MCU is made through a UART interface using the standard UART RX and TX pins. The module communicates at 115200bps by default, allowing efficient data exchange. This Click board™ also incorporates a reset pin (RST) for direct module resetting and an external interrupt signal (EI) that can be programmed for various functions, such as waking up the module. It also features an orange PPS LED indicator that signals the pulse per second, adjustable to different conditions.

This Click board™ also has the possibility of a backup supply from a connected battery. The receiver enters the hardware backup mode if the main power supply is interrupted and a backup supply is present. In this mode, the RTC time and the GNSS orbit data in the battery-backed RAM (BBR) are maintained. Valid time and GNSS orbit data at startup improve positioning performance by enabling hot starts, warm starts, and AssistNow Autonomous. This ensures faster TTFF when the main power is resupplied. The NEO-F10N-00B also offers a single antenna input. So, via an SMA antenna connector with an impedance of 50Ω, this board is compatible with various antennas available from MIKROE, like the GNSS Active External Antenna, to enhance its connectivity.

This Click board™ can operate with both 3.3V and 5V logic voltage levels selected via the VCC SEL jumper. Given that the NEO-F10N-00B module operates at 3.3V, a logic-level translator, TXS0106, is also used for proper operation and an accurate signal-level translation. This way, both 3.3V and 5V capable MCUs can use the communication lines properly. Also, this Click board™ comes equipped with a library containing easy-to-use functions and an example code that can be used as a reference for further development.

Specifications

Type	GPS/GNSS
Applications	Ideal for applications such as vehicle tracking and micromobility

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On-board modules	NEO-F10N-00B - professional-grade L1/L5 dual-band GNSS receiver from u-blox
Key Features	Professional-grade L1/L5 dual-band GNSS receiver, dual-band multipath mitigation technology for reliable signal reception, receives and tracks multiple GNSS systems like GPS, Galileo, and BeiDou, configurable to focus on specific GNSS constellations to optimize power consumption, UART interface, time pulse LED indicator for pulse per second signaling, allows for firmware upgrades to adapt to new application needs, and more
Interface	UART
Feature	ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

This table shows how the pinout on GNSS 16 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	**EI**	External Interrupt
Reset	**RST**	2	RST	INT	15	NC	
ID COMM	**CS**	3	CS	RX	14	**TX**	UART TX
	NC	4	SCK	TX	13	**RX**	UART RX
	NC	5	MISO	SCL	12	NC	
	NC	6	MOSI	SDA	11	NC	
Power Supply	**3.3V**	7	3.3V	5V	10	**5V**	Power Supply
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
JP1	VCC SEL	Left	Logic Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V

GNSS 16 Click electrical specifications

Description	Min	Typ	Max	Unit

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Supply Voltage	3.3	-	5	V
Frequency Range	1176.45 / 1575.42			MHz
Time To First Fix (TTFF) - Cold start	-	28	-	sec
Sensitivity - Tracking / Navigation	-	-167	-	dBm

Software Support

We provide a library for the GNSS 16 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 16 Click driver.

Key functions

- gnss16_parse_gngga This function parses the GNGGA data from the read response buffer.

- gnss16_reset_device This function resets the device by toggling the RST pin.

Example Description

This example demonstrates the use of GNSS 16 click board by processing the incoming data and displaying them on the USB UART.

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.GNSS16

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™](#)

[mikroSDK](#)

[Click board™ Catalog](#)

[Click Boards™](#)

Downloads

[GNSS 16 click 2D and 3D files v100](#)

[GNSS 16 click schematic v100](#)

[NEO-F10N-00B datasheet](#)

[TXS0104 datasheet](#)

[GNSS 16 click example on Libstock](#)

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