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GNSS 24 Click

PID: MIKROE-6551

GNSS 24 Click is a compact add-on board designed for precise and reliable global positioning. This board features the [RYS8833](#), a multi-GNSS module from [REYAX](#), powered by the high-performance SONY CXD5605AGF engine. Supporting GPS, GLONASS, Galileo, BeiDou, SBAS, and QZSS systems, it delivers outstanding sensitivity down to -167dBm and operates on 1.561GHz, 1.575GHz, and 1.602GHz frequencies. The module includes integrated digital noise filters, spectrum analyzer, SAW filter, LNA, TCXO, and communicates via UART. It also supports MIKROE's Click Snap format for flexible integration. GNSS 24 Click is ideal for navigation, asset tracking, and other location-based applications requiring accurate and efficient GNSS data.

For more information about **GNSS 24 Click** visit the official [product page](#).

How does it work?

GNSS 24 Click is based on the RYS8833, a multi-GNSS module with high sensitivity from REYAX designed to provide accurate and reliable location data. This advanced multi-GNSS solution is powered by the high-performance SONY CXD5605AGF engine, offering support for a wide range of satellite systems, including GPS (L1 C/A), GLONASS (L1 OF), SBAS (L1 C/A), QZSS (L1 C/A), Galileo (E1 CBOC), and BeiDou (B1). The RYS8833 module operates on frequencies of 1.561GHz, 1.575GHz, and 1.602GHz and achieves impressive positioning sensitivity down to -167dBm, ensuring exceptional performance even in challenging environments. The module features an integrated SAW filter, low-noise amplifier (LNA), and temperature-compensated crystal oscillator (TCXO), further enhancing signal integrity and stability. Additionally, embedded digital noise filters and an onboard spectrum analyzer contribute to improved signal processing and reliability. Communication with the host system is made via a standard UART interface, making GNSS 24 Click an ideal solution for navigation, asset tracking, and other

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applications requiring precise global positioning capabilities.
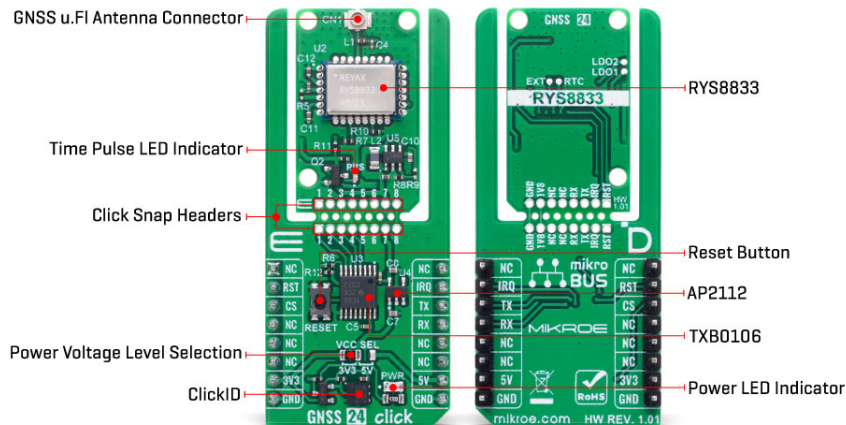
GNSS 24 Click is designed in a unique format supporting the newly introduced MIKROE feature called "Click Snap." Unlike the standardized version of Click boards, this feature allows the main module area to become movable by breaking the PCB, opening up many new possibilities for implementation. Thanks to the Snap feature, the RYS8833 can operate autonomously by accessing their signals directly on the pins marked 1-8. Additionally, the Snap part includes a specified and fixed screw hole position, enabling users to secure the Snap board in their desired location.

Communication between the RYS8833 and the host MCU is made through a UART interface, using standard UART RX and TX pins for data transfer. The module defaults to a communication speed of 115200bps. In addition to its interface pins, GNSS 24 Click also uses an IRQ pin that serves as an interrupt signal line, allowing the host MCU to respond promptly to specific module events. On the back side of the board, several test points are available for advanced functionality and system integration.

The EXT test point allows for the input of a timing signal, typically provided by an LTE module, enabling synchronization in time-critical applications. The RTC test point is designed for the input of a 32.768KHz real-time clock signal, ensuring precise timekeeping and enhanced power management. Additionally, the board features two low dropout regulator outputs, labeled LDO1 and LDO2, which provide power to the memory core blocks, supporting stable and efficient operation across different system configurations.

The board feature one u.Fl connectors for GNSS antenna that MIKROE offers, like the Active GPS antenna combined with an IPEX-SMA cable for flexible and efficient connectivity options. The GNSS 24 Click includes several additional functionalities that enhance its usability and control like the RESET button to provide a quick way to reset the module, and the timepulse signal indicator (PPS), offering precise time synchronization for applications that require it. The Reset functions can also be controlled digitally via the mikroBUS™ RST pin, offering greater flexibility.

This Click board™ can operate with both 3.3V and 5V logic voltage levels selected via the VCC SEL jumper. Since the RYS8833 module operates at 1.8V, logic-level translator, the TXB0106, 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

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as a reference for further development.

Click Snap

Click Snap is an innovative feature of our standardized Click add-on boards, introducing a new level of flexibility and ease of use. This feature allows for easy detachment of the main sensor area by simply snapping the PCB along designated lines, enabling various implementation possibilities. For detailed information about Click Snap, please visit the official page dedicated to this feature.

Specifications

Type	GPS/GNSS
Applications	Ideal for navigation, asset tracking, and other location-based applications requiring accurate GNSS data
On-board modules	RYS8833 - multi-GNSS module from REYAX
Key Features	Multi-GNSS support, high-sensitivity GNSS reception, UART interface, integrated SAW filter, LNA, and TCXO, embedded digital noise filters and spectrum analyzer, interrupt, test points for timing signal, RTC input, and LDO outputs, Click Snap, timepulse signal output, and more
Interface	UART
Feature	Click Snap,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 24 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	NC	
Reset	**RST**	2	RST	INT	15	**IRQ**	Interrupt
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

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LD1	PWR	-	Power LED Indicator
LD2	PPS	-	Time Pulse LED Indicator
JP1	VCC SEL	Left	Power Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V

GNSS 24 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Frequency Range	1561/1575/1602			MHz
Sensitivity	-	-167	-	dBm

Software Support

GNSS 24 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 24 Click by reading and displaying the GNSS coordinates.

Key Functions

- gnss24_cfg_setup This function initializes Click configuration structure to initial values.
- gnss24_init This function initializes all necessary pins and peripherals used for this Click board.
- gnss24_reset_device This function resets the device by toggling the RST pin.
- gnss24_cmd_run This function sends a specified command to the Click module.
- gnss24_parse_gga This function parses the GGA data from the read response buffer.

Application Init

Initializes the driver, resets the Click board, reads the module version, enables 1PPS output, and starts positioning.

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.

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For detailed instructions, check out this tutorial.

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 24 click example package

GNSS 24 click 2D and 3D files v101

GNSS 24 click schematic v101

RYS8833 datasheet