

## GNSS 22 Click



PID: MIKROE-6794

**GNSS 22 Click** is a compact add-on board that provides satellite-based positioning for a wide range of navigation and tracking applications. It is based on the [L96-M33](#), a single GNSS receiver module from [Quectel](#), which integrates an external antenna interface for enhanced signal flexibility. The module supports concurrent reception of GPS, GLONASS, and Galileo systems, featuring 33 tracking, 99 acquisition, and 210 PRN channels for superior accuracy and fast time-to-first-fix. It incorporates EASY, LOCUS, and AlwaysLocate technologies for optimized performance and low power consumption, while the built-in LNA, dual SAW filters, and balloon mode ensure high sensitivity and stable operation even in weak signal conditions. GNSS 22 Click is ideal for portable devices, asset tracking, fleet management, and industrial navigation systems.

For more information about **GNSS 22 Click** visit the official [product page](#).

### How does it work?

GNSS 22 Click is based on the L96-M33, a single GNSS receiver module from Quectel that integrates an external antenna interface for optimal signal flexibility. Featuring 33 tracking channels, 99 acquisition channels, and 210 PRN channels, the module supports concurrent reception of up to three GNSS systems (GPS, GLONASS, and Galileo), significantly reducing time-to-first-fix and enhancing navigation accuracy even in challenging environments such as urban canyons. The L96-M33 integrates advanced technologies such as EASY (Embedded Assist System), LOCUS (internal position logger), and AlwaysLocate for superior positioning performance with minimal power consumption. The GNSS 22 Click is ideal for portable devices, asset tracking, navigation systems, and various consumer and industrial positioning

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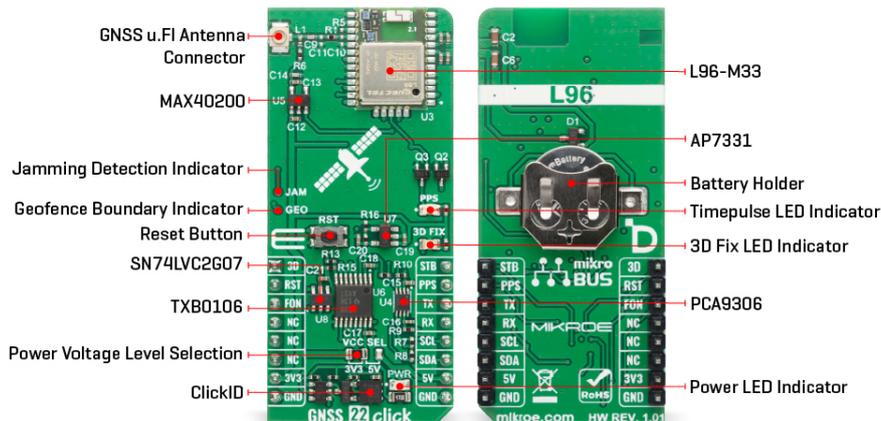


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applications that demand satellite-based location data.



EASY technology enables the module to automatically calculate and predict satellite orbits for up to three days using ephemeris data stored in RAM, providing faster fixes even under weak signal conditions. LOCUS allows the device to log position data to internal flash memory at default 15-second intervals, storing more than 16 hours of location history without additional hardware or cost. AlwaysLocate intelligently adjusts the module's active and standby cycles to maintain a balance between positioning accuracy and power efficiency depending on environmental and motion conditions.

The L96-M33 achieves a tracking sensitivity of -165dBm and an acquisition sensitivity of -148dBm, ensuring excellent performance even in low-signal areas. It also includes dual SAW filters that effectively suppress RF noise and improve signal integrity, as well as a built-in low noise amplifier (LNA) that further enhances weak signal reception. Additionally, the module supports a special balloon mode that enables reliable operation at altitudes up to 80km. In addition to its primary power supply configuration, GNSS 22 Click supports standalone operation through a dedicated backup power circuit. A coin-cell battery mounted on the back side of the board allows the module to retain critical timing and satellite data even when the main power supply is removed.

The GNSS 22 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 115200bps, ensuring efficient data exchange. It also provides an I2C interface for communication with a host MCU in the I2C Fast speed mode (400kHz). Still, it must be noted that the I2C interface can only be operated in the peripheral mode.

Along with the communication and control pins, this Click board™ also includes a reset pin (RST) and a RESET button, enabling easy module resetting, an orange PPS LED indicator, which in combination with the PPS pin, detects a synchronized pulse signal from the L96-M33 once per second, and a blue 3D FIX LED indicator, which in combination with the 3D pin, that indicates successful positioning. Besides embedded chip antenna on the module, the board also features one u.FI connector for external GNSS antenna that MIKROE offers, like the [Active GPS Antenna](#) in a combination with [IPEX-SMA cable](#), for flexible and efficient connectivity options.

The board also includes a STB pin, which allows the user to place the L96-M33 module into Standby mode or wake it up from that state, providing a way to manage power consumption

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during periods of inactivity. The FON pin serves as a wake-up control from Backup mode, where a logic HIGH signal forces the module to resume normal operation, ensuring quick responsiveness when navigation data is required after low-power states. To support diagnostic and security functions, the board also provides a JAM test point, which acts as a jamming detection indicator and enables users to identify potential sources of interference that could affect the module's GNSS signal reception or overall performance. Additionally, a GEO test point is available for geo-fence functionality, providing a boundary indication signal that allows the system to determine whether a device has entered or exited a predefined geographic area.

This Click board™ can operate with both 3.3V and 5V logic voltage levels selected via the VCC SEL jumper. Since the L96-M33 module operates at 3.3V, 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 as a reference for further development.

## Specifications

Type	GPS/GNSS
Applications	Ideal for portable devices, asset tracking, fleet management, and industrial navigation systems
On-board modules	L96-M33 - single GNSS receiver module from Quectel
Key Features	High-precision multi-constellation positioning, 33 tracking channels, 99 acquisition channels, 210 PRN channels, external antenna interface, EASY orbit prediction system, LOCUS internal position logger, AlwaysLocate power-saving mode, high sensitivity, built-in LNA and dual SAW filters for noise reduction, balloon mode operation up to 80km altitude, and more
Interface	I2C,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 22 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikro™ BUS				Pin	Notes
3D Position Indicator	<b>3D</b>	1	AN	PWM	16	<b>STB</b>	Standby Mode Control
Reset / ID SEL	<b>RST</b>	2	RST	INT	15	<b>PPS</b>	Timepulse Indicator
Backup Mode Wake Control / ID COMM	<b>FON</b>	3	CS	RX	14	<b>TX</b>	UART TX

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	NC	4	SCK	TX	13	<b>RX</b>	UART RX
	NC	5	MISO	SCL	12	<b>SCL</b>	I2C Clock
	NC	6	MOSI	SDA	11	<b>SDA</b>	I2C Data
Power Supply	<b>3.3V</b>	7	3.3V	5V	10	<b>5V</b>	Power Supply
Ground	<b>GND</b>	8	GND	GND	9	<b>GND</b>	Ground

## Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
LD2	PPS	-	Timepulse LED Indicator
LD3	3D FIX	-	3D Fix LED Indicator
JP1	VCC SEL	Left	Power Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V
T1	RST	-	Reset Button

## GNSS 22 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Frequency Range	1559	-	1609	MHz
Tracking Sensitivity	-	-165	-	dBm
Acquisition Sensitivity	-	-148	-	dBm
Time-to-First-Fix (Cold Start)	-	35	-	sec

## Software Support

[GNSS 22 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 22 Click by reading and displaying the GNSS coordinates.

### Key Functions

- `gnss22_cfg_setup` This function initializes Click configuration structure to initial values.
- `gnss22_init` This function initializes all necessary pins and peripherals used for this Click board.
- `gnss22_reset_device` This function resets the device by toggling the RST, STB, and FON pins.
- `gnss22_generic_read` This function reads a desired number of data bytes by using the selected serial interface.
- `gnss22_parse_gga` This function parses the GGA data from the read response buffer.

### Application Init

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Initializes the driver and logger.

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](#). 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 22 click example package](#)

[L96 datasheet](#)

[GNSS 22 click schematic v101](#)

[GNSS 22 click 2D and 3D files v101](#)

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