

## GNSS 17 Click



PID: MIKROE-6176

**GNSS 17 Click** is a compact add-on board for precise and reliable global navigation and positioning. This board features the M20071, an integrated full-function GNSS receiver module from Antenova, which features the MediaTek AG3335MN flash chip. This module can concurrently track multiple GNSS constellations, including GPS, GLONASS, GALILEO, BEIDOU, and QZSS, ensuring accurate positioning even in dense urban environments. It includes advanced features like multi-path algorithms for enhanced accuracy, a high-performance onboard LNA for weak-signal environments, and power-saving modes to optimize energy consumption. Additional features like EPO, EASY, and AIC improve performance, offering fast fixes and interference cancellations. This Click board™ is ideal for various applications, including asset tracking, wearable devices, navigation systems, and personal safety.

### How does it work?

GNSS 17 Click is based on the M20071, an integrated full-function GNSS receiver module from Antenova. This module includes the MediaTek AG3335MN flash chip, enabling concurrently tracking multiple GNSS constellations, such as GPS, GLONASS, GALILEO, BEIDOU, and QZSS. The M20071's advanced multi-path algorithms enhance position accuracy, especially in dense urban environments. Additionally, the onboard LNA ensures excellent performance in weak-signal scenarios, making it ideal for wearable devices. This Click board™ is perfect for various applications, including portable devices, asset tracking, personal safety, sports electronics, and navigation systems, providing reliable and precise location services.

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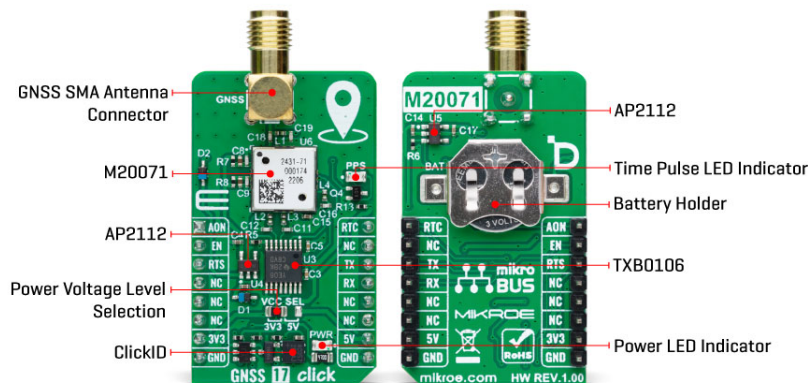
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The M20071 also carries several significant features that enhance this board's functionality. The EPO (Extended Prediction Orbit) fast fix capability allows the module to use up to 30-day orbit predictions, enabling an instant fix solution. The EASY (Self-Generated Orbit Prediction) feature also accelerates the TTFF (time-to-first-fix) performance by providing up to 3 days of GPS orbit predictions without needing an internet connection or software on a host processor. Furthermore, the AIC (Active Interference Cancellation) feature offers effective narrow-band interference cancellation, ensuring reliable and accurate GNSS performance even in challenging environments.

The M20071 also offers three power-saving modes: OFF, RTC, and periodic. In OFF mode, controlled via the EN pin of the mikroBUS™ socket, the module only keeps the power management logic active, with all other logic powered down when the EN pin is in a LOW logic state. RTC mode, a low-power state managed through the RTC pin of the mikroBUS™ socket, shuts down the system core. The module cannot send commands or provide position-related information in this mode, but it saves navigation data to RTC-RAM. Upon waking, the module uses this saved data to regain a position fix quickly. The periodic mode is a user-configurable state where the module alternates between running and sleeping, reducing current consumption while maintaining updated data. This flexibility allows users to tailor the module's operation according to specific power and performance needs.

The M20071 module and the host MCU are communicated through a UART interface using the standard UART RX and TX pins. The default communication speed is set at 115200bps, ensuring efficient data exchange. In addition to the UART TX and RX pins, the board uses an RTS pin for handshaking with the host MCU to prevent missed commands. Furthermore, GNSS 17 Click includes a green PPS LED indicator, which emits a synchronized pulse signal from the M20071 once per second. This pulse signal has a default width of 100 ms but can be configured between 50 ms and 999 ms. The PPS function is enabled by default, and the module will output the PPS signal once a 3D fix is achieved.

The M20071 does not require a specific power-up sequence, but it does need a voltage of 1.8V for its system core to function correctly. To achieve this, two small [AP2112](#) LDO regulators provide the necessary 1.8V voltage from the mikroBUS™ power rails, supplying power to both the M20071 and its GNSS antenna supply. Besides mikroBUS™ power rails, this board also supports a backup supply from an attached coin battery at the back of the board. The regulator responsible for the GNSS antenna supply can be activated via the AON pin of the mikroBUS™ socket.

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This Click board™ can operate with both 3.3V and 5V logic voltage levels selected via the VCC SEL jumper. Given that the M20071 module operates at 1.8V, a 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 asset tracking, wearable devices, navigation systems, and personal safety                                                                                                                                                               |
| On-board modules | M20071 - integrated full-function GNSS receiver module from Antenova                                                                                                                                                                              |
| Key Features     | Integrated GNSS receiver, multi-constellation tracking, advanced multi-path algorithms, high-performance LNA, power-saving modes, EPO fast-fix, EASY orbit prediction, AIC for interference cancellation, UART interface, PPS indicator, and more |
| Interface        | UART                                                                                                                                                                                                                                              |
| Feature          | ClickID                                                                                                                                                                                                                                           |
| Compatibility    | mikroBUS™                                                                                                                                                                                                                                         |
| Click board size | M (42.9 x 25.4 mm)                                                                                                                                                                                                                                |
| Input Voltage    | 3.3V or 5V                                                                                                                                                                                                                                        |

## Pinout diagram

This table shows how the pinout on GNSS 17 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

| Notes                         | Pin         |  |      |     |    | Pin        | Notes        |
|-------------------------------|-------------|-------------------------------------------------------------------------------------|------|-----|----|------------|--------------|
| GNSS Antenna Regulator Enable | <b>AON</b>  | 1                                                                                   | AN   | PWM | 16 | <b>RTC</b> | RTC Mode     |
| Device Enable / ID SEL        | <b>EN</b>   | 2                                                                                   | RST  | INT | 15 | NC         |              |
| UART RTS / ID COMM            | <b>RTS</b>  | 3                                                                                   | CS   | RX  | 14 | <b>TX</b>  | UART TX      |
|                               | NC          | 4                                                                                   | SCK  | TX  | 13 | <b>RX</b>  | UART RX      |
|                               | NC          | 5                                                                                   | MISO | SCL | 12 | NC         |              |
|                               | NC          | 6                                                                                   | MOSI | SDA | 11 | NC         |              |
| 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 |

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

## GNSS 17 Click electrical specifications

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

## Software Support

We provide a library for the GNSS 17 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 17 Click driver.

Key functions

- `gnss17_generic_read` This function reads a desired number of data bytes by using UART serial interface.
- `gnss17_parse_gga` This function parses the GGA data from the read response buffer.
- `gnss17_reset_device` This function resets the device by toggling the EN and AON pins.

## Example Description

This example demonstrates the use of GNSS 17 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.GNSS17

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## 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™](#)

[ClickID](#)

## Downloads

[GNSS 17 Click example on Libstock](#)

[GNSS 17 click 2D and 3D files v100](#)

[M20071 datasheet](#)

[GNSS 17 Click click schematic v100](#)

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