

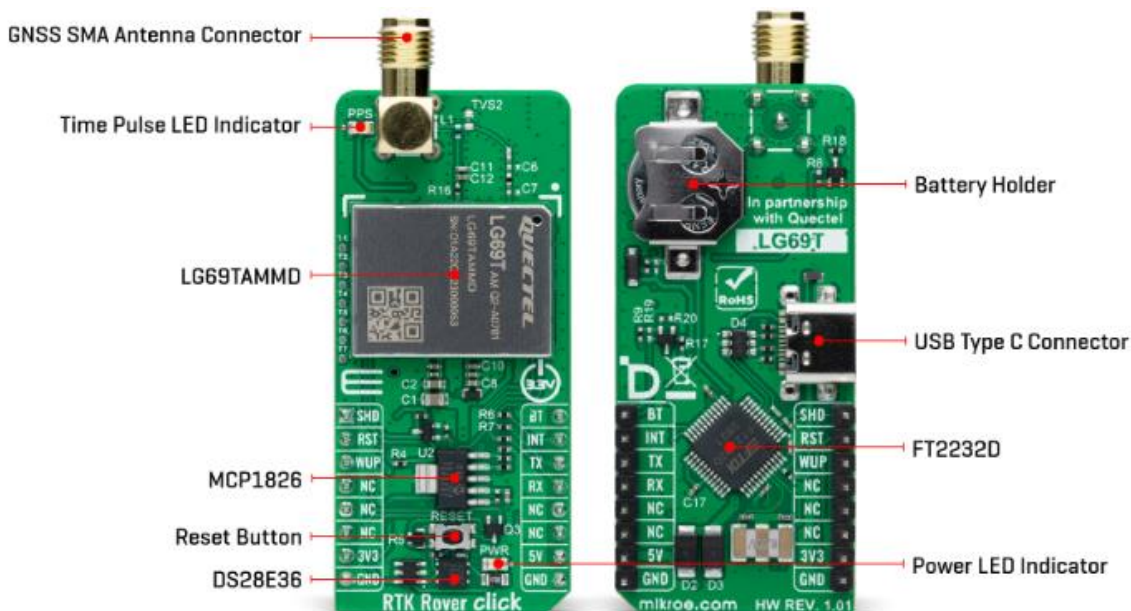
RTK Rover Click

PID: MIKROE-5440

RTK Rover Click is a compact add-on board that enhances the precision of position data derived from compatible RTK Base Stations. This board features Quectel's LG69TAMMD, a dual-band multi-constellation GNSS module featuring a high-performance and high-reliability positioning engine. This module facilitates a fast and precise GNSS positioning capability for centimeter-level accuracy, featuring STMicroelectronics®' fifth generation positioning receiver platform with 80 tracking and four fast acquisition channels. It supports up to three concurrent global constellations (GPS/QZSS, Galileo, and BDS) alongside NMEA 0183/RTCM 3.x protocol and commonly used UART interface. This Click board™ is suitable for a broad spectrum of PVT (Position, Velocity, and Time) applications such as drones, delivery robots, precision agriculture, mining/marine management, and automotive telematics.

RTK Rover Click is supported by a mikroSDK compliant library, which includes functions that simplify software development. This Click board™ comes as a fully tested product, ready to be used on a system equipped with the mikroBUS™ socket.

RTK Rover Click is based on the LG69TAMMD, a multi-constellation GNSS module featuring a high-performance and high-reliability positioning engine from Quectel Wireless Solutions, which facilitates a fast and precise GNSS positioning capability. The LG69TAMMD has a dual band supporting up to three concurrent global constellations featuring STMicroelectronics®' fifth generation positioning receiver platform with 80 tracking and four fast acquisition channels. It is characterized by a horizontal position accuracy of 1m autonomous (24h static) and 0.01m+1ppm RTK with a high performance YB0017AA mobile antenna in an open-sky environment and within 1km of the base station.



The primary function of the LG69TAMMD is PVT (RTK) which stands for Position, Velocity, and Time. Designed according to the IATF 16949:2016 standard, the LG69TAMMD comes with GPS+BDS+Galileo as a default GNSS constellation and an integrated LNA for improved sensitivity. It can receive and track GPS L1 C/A and L5 and Galileo E1 and E5a signals centered at 1575.42MHz and 1176.45MHz, and BeiDou B1I and B2a signals centered at 1561.098MHz and 1176.45MHz. The ability to receive and track BeiDou signals in conjunction with GPS results in higher coverage, improved reliability, and better accuracy.

RTK Rover Click communicates with an MCU using the UART interface, with commonly used RX and TX pins alongside one data-ready pin (INT), which informs the host MCU to receive data when the buffer transmission is full. It is also equipped with a USB type C connector, which allows the module to be powered and configured by a personal computer (PC) using FT2232D, a compact USB to a serial UART interface device designed to operate efficiently with USB host controllers.

Before supporting the RTK navigation technique, this module must receive the RTK correction messages via its UART port. In a default configuration, it will attempt to achieve the best positioning accuracy based on the correction data it receives. When the module receives an input stream of RTCM messages, it will enter RTK float mode, and once it fixes carrier phase ambiguities, it enters RTK fixed mode. It will typically take less than 60 seconds before the Rover can solve the carrier ambiguities and go from RTK float to RTK fixed mode.

In addition to the interface pins, this board uses a few additional mikroBUS™ pins. An active-low reset signal alongside an onboard RESET button, routed on the RST pin of the mikroBUS™ socket, performs a reset function of the module, WUP pin performs module wake-up, and the SHD pin routed on the AN pin of the mikroBUS™ socket offers a switch operation to turn ON/OFF the power supply to the LG69TAMMD. The module can use Boot Download Mode for firmware update via the BT pin routed on the RST pin of the mikroBUS™ socket, alongside a blue LED indicator marked as PPS for time pulse signal information and indication. The module enters Normal operating mode by keeping the BT pin on a low logic state during the Startup sequence. Otherwise, the module enters Boot Download Mode when the pin is high during Startup.

A specific addition to this Click board™ is several test points that enable the use of additional module features such as RTK positioning status indicator, Wheel tick pulse signal sampled from the wheel revolution sensors, or correction UART by default or NMEA output/raw data output.


This Click board™ can operate with both 3.3V and 5V MCUs. As its main power supply, the LG69TAMMD uses 3.3V obtained from the MCP1826 LDO but also has the possibility of using an additional backup power supply in the form of a coin-shaped battery. 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 PVT (Position, Velocity, and Time) applications such as drones, delivery robots, precision agriculture, mining/marine management, and automotive telematics
On-board modules	LG69TAMMD - multi-constellation GNSS module from Quectel Wireless Solutions
Key Features	Dual band, centimeter-level accuracy, 80 tracking channels and 4 fast acquisition channels, high-performance, high-reliability, supports up to 3 concurrent global constellations (GPS/QZSS, Galileo, and BDS), NMEA 0183/RTCM 3.x protocol, UART and USB interface, PPS indicator, and more
Interface	UART,USB
ClickID	Yes
Compatibility	mikroBUS
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V,5V

PINOUT DIAGRAM

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

Notes	Pin					Pin	Notes
Shutdown	SHD	1	AN	PWM	16	BT	Boot Download Mode
Reset	RST	2	RST	INT	15	INT	Data Ready Interrupt
Module Wake-Up	WUP	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
T1	RESET	-	Reset Button

RTK ROVER CLICK ELECTRICAL SPECIFICATIONS

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Operating Frequency	1176.45	-	1575.42	MHz
Horizontal Position Accuracy	-	1	-	cm
Operating Temperature Range	-40	+25	+85	°C

https://download.mikroe.com/documents/add-on-boards/click/rtk_rover_click/RTK_Rover_Click_v101_Schematic.PDF