

M-BUS RF 5 Click



PID: MIKROE-6763

M-BUS RF 5 Click is a compact add-on board that provides long-range wireless data communication between smart meters and gateways using the Wireless M-Bus standard. It is based on the Metis-E Wireless M-Bus module ([2609051183000](#)) from [Würth Elektronik](#), operating in the 868.3 to 869.525MHz frequency range for stable and interference-resistant transmission. The module supports multiple operation modes, including Idle, Receiving, Transmitting, and Standby/Shutdown, as well as wM-Bus communication modes S, T, and C defined by the OMS specification. With a line-of-sight range of up to 1500 meters, output power of 14dBm, and receiver sensitivity of -107dBm, it ensures robust and energy-efficient performance. It is ideal for smart metering, smart building systems, Advanced Metering Infrastructure (AMI), and environmental monitoring applications.

For more information about **M-BUS RF 5 Click** visit the official [product page](#).

How does it work?

M-BUS RF 5 Click is based on the Metis-E Wireless M-Bus module (2609051183000) from Würth Elektronik, which enables reliable long-range communication between smart meters and gateways according to the Wireless M-BUS EN13757-4:2013 standard, widely adopted across Europe for wireless meter reading. Operating in the 868.3 to 869.525MHz frequency range, the Metis-E module ensures stable and interference-resistant transmission using a [right-angle 868MHz rubber antenna](#) provided by MIKROE. This board is ideally suited for use in smart metering, smart building systems, Advanced Metering Infrastructure (AMI), and environmental monitoring applications, where stable and compliant wireless data exchange between multiple devices is essential.

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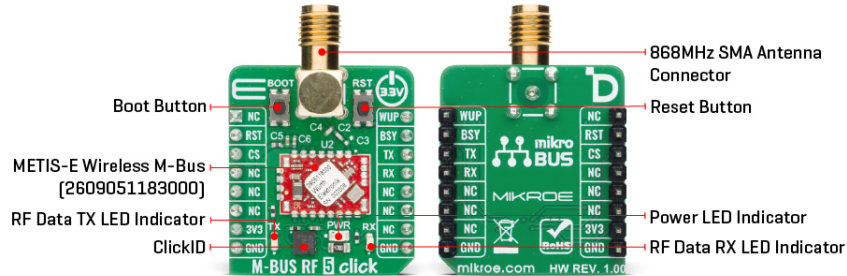
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The module supports multiple operation modes including Idle, Receiving, Transmitting, and Standby/Shutdown, allowing flexible power management and efficient data transfer depending on system requirements. It implements the wM-Bus communication modes S, T, and C as defined by the OMS (Open Metering System) specification, ensuring compatibility across diverse smart metering ecosystems. The S mode is suitable for stationary meters transmitting data only a few times per day, T mode is used for more frequent transmissions, while C mode supports high data rate communication scenarios.

With a line-of-sight range of up to 1500 meters, an output power of 14dBm, and a maximum receiver sensitivity of -107dBm, M-BUS RF 5 Click ensures energy-efficient wireless communication for both industrial and residential environments. The integrated Metis-E module offloads the host MCU from complex radio-related tasks such as checksum calculation and data coding/decoding in the selected wM-Bus mode, simplifying application development and improving reliability.

This Click board™ 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. Along with the communication and control pins, this Click board™ also includes a reset pin (RST) and a RST button, enabling easy module resetting, WUP pin used to wake up the module from shutdown or standby mode, and a set of data LEDs, yellow TX and blue RX, for successful data transmission and reception.

The board also features one additional button, BOOT, used to select the desired boot mode: by default, the module starts with the pre-loaded application firmware, while by pressing the button it enables the UART bootloader mode, which is used for performing firmware updates. The board also features a BSY (Busy) pin, which serves as a status indicator signaling when the Metis-E module is actively processing data or transmitting, allowing the host MCU to monitor the module's operational state and prevent command conflicts during ongoing communication.

This Click board™ can be operated only with a 3.3V logic voltage level. The board must perform appropriate logic voltage level conversion before using MCUs with different logic levels. It also comes equipped with a library containing functions and example code that can be used as a reference for further development.

Specifications

Type	Sub-1 GHz Transceivers
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Applications	Ideal for smart metering, smart building systems, Advanced Metering Infrastructure (AMI), and environmental monitoring applications
On-board modules	Metis-E Wireless M-Bus (2609051183000) - Metis-e 868MHz radio module from Würth Elektronik
Key Features	Compliance with Wireless M-BUS EN13757-4:2013 and OMS specification, integrated checksum calculation and data coding/decoding, various operation modes, boot and reset control buttons, wake-up functionality, busy status indication, TX and RX data indicator LEDs, and more
Interface	UART
Feature	ClickID
Compatibility	mikroBUS™
Click board size	S (28.6 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on M-BUS RF 5 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
	NC	1	AN	PWM	16	WUP	Module Wake-Up
Reset	RST	2	RST	INT	15	BSY	Module Busy Indicator
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	NC	
Ground	GND	8	GND	GND	9	GND	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
LD2	TX	-	RF Data TX LED Indicator
LD3	RX	-	RF Data RX LED Indicator
T1	RST	-	Reset Button
T2	BOOT	-	Boot Button

M-BUS RF 5 Click electrical specifications

Description	Min	Typ	Max	Unit
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Supply Voltage	-	3.3	-	V
Frequency Range	868.3	-	869.525	MHz
Line-of-Sight Range	-	1500	-	m
Output Power	-	14	-	dBm
Receiver Sensitivity	-	-	-107	dBm

Software Support

[M-BUS RF 5 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 the M-BUS RF 5 Click board in both transmitter and receiver modes. The transmitter sends a predefined text message, while the receiver listens and parses incoming data packets.

Key Functions

- `mbusrf5_cfg_setup` This function initializes Click configuration structure to initial values.
- `mbusrf5_init` This function initializes all necessary pins and peripherals used for this Click board.
- `mbusrf5_send_cmd` This function sends a desired command packet from the Click context object.
- `mbusrf5_read_event` This function reads an event packet from the ring buffer and stores it in the Click context object.
- `mbusrf5_set_user_setting_ram` This function writes data to a desired user settings option in RAM.

Application Init

Initializes the logger, the M-BUS RF 5 Click driver, resets the device, retrieves the firmware version, and configures the device role and settings depending on the selected mode (transmitter or receiver).

Application Task

In transmitter mode, sends a demo message repeatedly and waits for confirmation events. In receiver mode, continuously listens for incoming messages, parses, and logs the received data.

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

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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

[M-BUS RF 5 click example package](#)

[M-BUS RF 5 click 2D and 3D files v100](#)

[M-BUS RF 5 click schematic v100](#)

[2609051183000 datasheet](#)

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