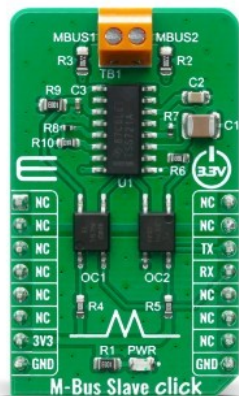


# M-Bus Slave Click



PID: MIKROE-4137

**M-Bus Slave Click** is a Click board™ equipped with the [TSS721A](#), a single chip transceiver developed by [Texas Instruments](#) for Meter-Bus applications according to EN1434-3 standard. The connection to the bus is polarity independent and serves as a slave node in the system. M-Bus Slave Click has full galvanic isolation with optocouplers to improve the reliability of the whole circuit. The circuit is supplied by the master via the bus. Therefore, this circuit offers no additional load for the slave battery. The TSS721A has a power-fail function integrated within. This solution is perfect for a plethora of applications like remote reading of gas, water, heat or electricity, or other types of consumption meters.

The M-Bus Slave 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.

## How does it work?

M-Bus is a bus system used for the remote reading of gas, water, heat, electricity, etc. It also supports various sensors and actuators. This is a cost-optimized bus for the transfer of energy consumption data since it is made for communication on only two wires. M-Bus can be used in the industry, but also, it's convenient to be used in private households. By the standard, M-Bus master can read up to 250 slave devices. They can be meters, water, electrical, or gas meters. You can also use M-bus in applications like alarm systems, flexible illumination installations, heating control, etc. It can monitor different consumption meters, and it can monitor any leakage.

Mikroe produces entire development toolchains for all major microcontroller architectures.

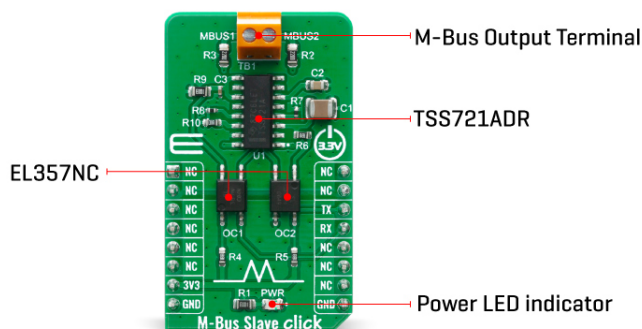
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ISO 27001: 2013 certification of informational security management system.  
ISO 14001: 2015 certification of environmental management system.  
OHSAS 18001: 2008 certification of occupational health and safety management system.



ISO 9001: 2015 certification of quality management system (QMS).



One of the biggest advantages of M-Bus are:

- All data reading is accomplished remotely.
- It is a very simple protocol – it uses only two wires, and it uses power supply from the users which are connected to the wire.
- Reading errors are minimal. Also, reading is very fast. Further processing is very easy since the received data is presented in a machine readable form.
- There are no special cables – you can use a telephone cable. With that one cable, you can attach all the meters in the housing with all the meters individually addressable. This way you can have control over each consumption meter while using only one connection cable.

M-Bus Slave Click uses the TSS721A, a single chip transceiver developed for Meter-Bus standard (EN1434-3) applications. The connection to the bus is polarity independent and serves as a slave node in the system. M-Bus Slave Click has full galvanic isolation with optocouplers to improve the reliability of the whole circuit. The circuit is supplied by the master via the bus. The benefit of the TSS721A in M-Bus slaves is the reduction of the number of components needed, and therefore the cost of slaves. Apart from the transmission and reception of data by the M-Bus specification, this IC also provides translation from and to the operating voltage of the microprocessor to which it is connected, to be able to communicate with it. The communication can take place at baudrates from 300 to 9600 Baud. Additional features include integrated protection against reversed polarity, a constant 3.3V power supply for the microprocessor, and the prompt indication of failure of the bus voltage.

## Specifications

Type	RS232
Applications	Remote sensor reading, remote control over M-Bus
On-board modules	M-Bus Slave Click uses the TSS721A IC, a single chip transceiver developed for Meter-Bus standard, from Texas Instruments
Key Features	Galvanically isolated, Slave node
Interface	UART
Feature	No ClickID

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Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V

## Pinout diagram

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

Notes	Pin					Pin	Notes
	NC	1	AN	PWM	16	NC	
	NC	2	RST	INT	15	NC	
	NC	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	NC	
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

## M-Bus Slave Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-0.3	3.3	3.5	V
M-Bus Voltage Level	-50	-	50	V
Operating Temperature Range	-55	-	85	°C

## Software Support

We provide a library for the M-Bus Click on our [LibStock](#) page, as well as a demo application (example), developed using MikroElektronika [compilers](#). The demo can run on all the main MikroElektronika [development boards](#).

## Library Description

The library covers all the necessary functions to control M-Bus Slave Click board. Library performs a standard UART interface communication.

Key functions:

- void mbus\_write\_byte ( uint8\_t input ) - Write Single Byte.
- uint8\_t mbus\_read\_byte( void ) - Read Single Byte.
- uint8\_t mbus\_byte\_ready ( void ) - Check for new byte received.

## Examples description

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The application is composed of three sections :

- System Initialization - Initializes peripherals.
- Application Initialization - Initializes UART serial interface and app mode.
- Application Task - (code snippet) This is an example that demonstrates the use of the M-BUS Click board. In this example, depending on the app mode selected, we send ( receive ) a message to ( from ) the M-BUS Master Click which is connected via cable to M-BUS Click ( slave ). Results are being sent to the Usart Terminal where you can track their changes. All data logs write on USB uart changes approximately for every 2 sec.

The full application code, and ready to use projects can be found on our [LibStock](#) page.

Other mikroE Libraries used in the example:

- UART

### 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. The terminal available in all MikroElektronika [compilers](#), or any other terminal application of your choice, can be used to read the message.

### mikroSDK

This Click board™ is supported with [mikroSDK](#) - MikroElektronika 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™](#)

### Downloads

[M-Bus Slave click example on Libstock](#)

[M-Bus Slave click 2D and 3D files](#)

[TSS721A datasheet](#)

[M-Bus Slave click schematic](#)

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