

GW-USB-06-WMB

FW v1.04 (Main MCU) and v2.21 (TR)

Communication Device for Wireless M-Bus

User's Guide

Preliminary



Description

GW-USB-06-WMB is an IQRF transceiver with USB connectivity intended for Wireless M-Bus. It operates in the 868 MHz license free ISM (Industry, Scientific and Medical) frequency band. It is designed in compact USB-stick style.



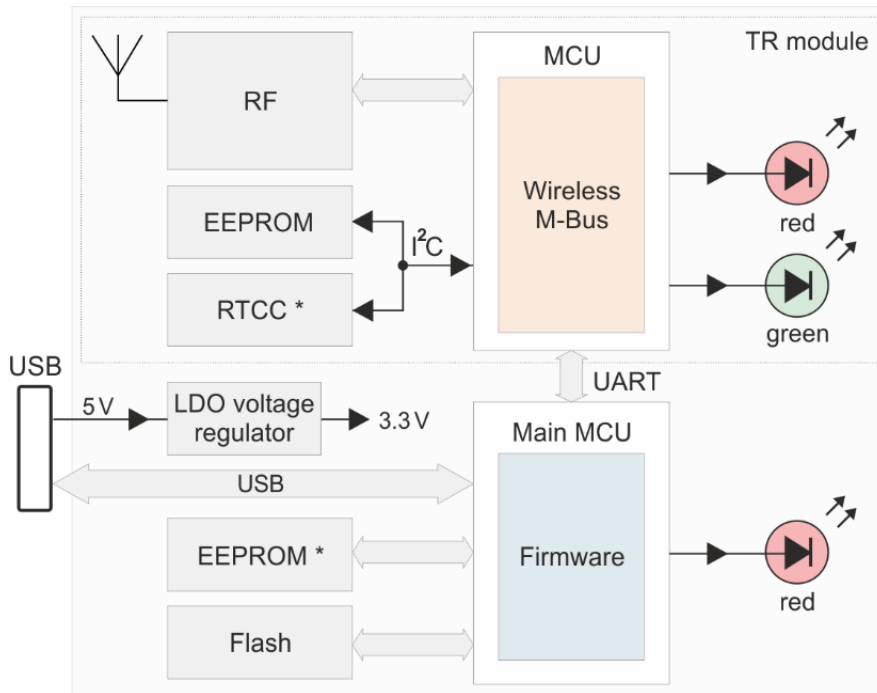
Key features

- Embedded Wireless M-Bus protocol, without operating system
- Wireless M-Bus EN 13757-4:2005 modes S1, T1, S2 and T2
- PC connectivity via USB interface, CDC UART mode
- TR transceiver and internal antenna
- RF band 868 MHz, FSK modulation, RF output power 12.5 mW
- RTCC (real-time clock/calendar) *
- 3 LEDs
- Compact USB-stick style
- Low power consumption

Applications

- Wireless M-Bus
- Telemetry
- Automated meter reading (AMR)
- Heat, electricity, gas and water meters

Block diagram



* RTCC is not implemented in current FW and SW version

Information contained in this publication regarding device applications and the like is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications.

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Electrical specifications	Typical values unless otherwise stated
Supply voltage	5.0 V supplied from USB
USB	V2.0 Compliant SIE
TR transceiver	TR-72D compatible, without temperature sensor
Antenna	Built in PCB
Supply current (TR in Sleep mode)	About 15 mA (TR not transmitting), 50 mA max. (TR transmitting)
Nominal frequency	868.30 and 868.95 MHz
RF data modulation	FSK (Frequency Shift Keying)
RF data transmission bit rate	32.768 kb/s (mode S) or 100 kb/s (mode T)
RFIC RF sensitivity	104.3 dBm (mode T), 104.5 dBm (mode S)
RFIC RF output power	Up to 9.1 dBm (mode T), 11.3 dBm (mode S), programmable in 8 steps
RF range ¹	Up to 320 m (mode T), 365 m (mode S)
UART interface	Bit rate 19200 Bd, Data bits: 8, Parity: none, Stop bit: 1, Flow control: none
Operating temperature ²	0 °C to +70 °C
Dimensions	59.3 mm x 23.5 mm x 12.3 mm (including the cover)
Weight	12 g (including the cover)

Note 1: RF range strongly depends on transceiver orientation and surroundings.

Note 2: RF range may change with lower temperature. Frost, condensation or humidity over 85% may disable transceiver functionality. Transceiver suitability should be tested in final application before volume use.

Caution: Electrostatic sensitive device. Observe appropriate precautions for handling.

Absolute maximum ratings

Stresses above listed maximum values may cause permanent damage to the device and affect device reliability. Functional operation at these or any other conditions beyond those specified is not supported.

Supply voltage (V _{CC})	5.5 V
Storage temperature	-20 °C to +70 °C

Hardware

GW-USB-06-WMB consists of main MCU, memories and the TR-72D compatible circuitry with RTCC added.

Power supply

GW-USB-06-WMB is intended to be supplied from a host via USB connector. LDO voltage regulator converts 5 V from USB to 3.3 V for all internal circuitry.

Reset

Reset can be invoked by connecting a disconnected GW-USB-06-WMB to USB.

USB

GW-USB-06-WMB supports USB CDC UART mode. Proper USB driver must be installed in the host device. Refer to the *IQRF USB drivers Installation guide* if needed.

TR transceiver

Wireless IQRF transceiver compatible with TR-72D-WMB, without temperature sensor. Refer to the TR-72D-WMB datasheet for details.

Antenna

PCB antenna on GW-USB-06-WMB board.

RTCC

Real-time clock/calendar MCP7940NT by Microchip shares the I2C serial bus with serial EEPROM. It can be controlled from TR transceiver. Decoupling capacitors ensure RTCC backup for 30 s after disconnecting power supply which allows to quickly replug the device from one host USB to another while keeping the RTCC running.

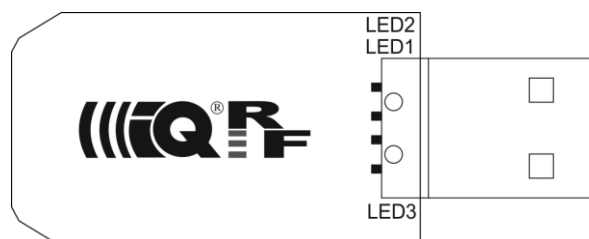
RTCC is not supported at all in current firmware version.

Serial Flash memory

8 Mb Flash memory SST25VF080B-80-4I (by SST) with serial SPI interface is connected to main MCU. It is not supported in current firmware version, reserved for future use and optional on request.

LEDs

LED1 (red) and LED2 (green) are dedicated to TR transceiver (compatible with LEDs on discrete TR transceivers). LED3 indicates USB modes and other status information.



Basic components

IC	Type	Manufacturer	Note
Main MCU	PIC18F26J50-I/ML	Microchip	
Flash	SST25VF080B-80-4I	SST	8 Mb, SPI
EEPROM	24AA16-I/MC	Microchip	16 Kb, I2C, connected to main MCU
TR MCU	PIC16LF1938-I/MV	Microchip	
RF IC	SPIRIT1	STMicroelectronics	
RF balun	BALF-SPI-01D3	STMicroelectronics	
EEPROM	24AA256-I/CS16K	Microchip	256 Kb, I2C, connected to TR MCU
RTCC	MCP7940NT-I/MNY	Microchip	I2C
LDO voltage regulator	MCP1700T-3002E/TT	Microchip	3.3 V

For more information refer to datasheets of ICs used.

Application

Main MCU

Firmware of the main MCU is fixed.

TR transceiver

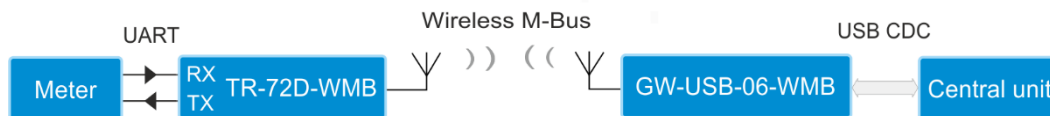
Firmware of the MCU inside internal TR transceiver can be upgraded at the user through the PC utility (see below) by the FW possibly released by the factory.

Typical usage

Refer to *Wireless M-Bus Implementation in TR-7xD-WMB User's guide*.

MUC

The wM-Bus MUC is a communication device collecting data from Meters. Current implementation only allows to test bidirectional communication with the Meter.



Sniffer

The wM-Bus Sniffer allows to monitor wM-Bus communication.



PC software

To configure parameters and control wM-Bus devices in all Meter, MUC and Sniffer modes from PC, the `WMBUS-Utility_XXXXXX.exe` software utility is provided. It is also intended for device configuration, wM-Bus communication testing and upgrade of FW inside the TR-76Dx-WMB transceiver.

Product information

FW release notes

Main MCU

- v1.04 First release

MCU inside TR transceiver

- v2.21 First release

Pack list

- GW-USB-06-WMB Communication device for Wireless M-Bus.

Ordering code

- GW-USB-06-WMB

Document history

- 161128 First release. Preliminary.

Sales and Service

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