GW-USB-05

FW v1.03

IQRF USB Gateway

User's Guide

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Description

GW-USB-05 is an IQRF gateway with USB connectivity. It is intended as an interface between IQRF network and PC or similar devices with USB.

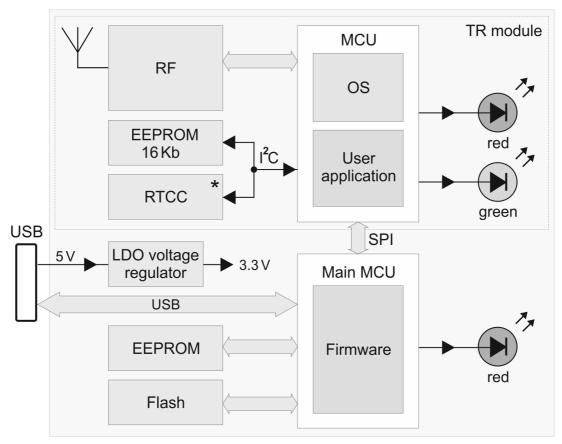The user can realize specific functionality by software for internal TR module.

Applications

• IQRF – PC interface

• IQRF gateway

• Diagnostic tool

• Wireless programmer (RFPGM) for TR modules

Key features

• PC connectivity via USB interface

• 2 USB classes (Custom device and CDC)

• TR module and internal antenna, bidirectional RF

• TR module programming via USB and IQRF IDE

• RTCC (real-time clock/calendar) *

• 3 LEDs

• Compact USB-stick style

• Bootloader for firmware upgrade

Block diagram

* *Not implemented in current FW and SW version*

Electrical specifications   *(**typical values** unless otherwise stated)*

Power supply	5.0 V supplied from USB
USB	V2.0 Compliant SIE
Supply current (TR in Sleep mode)	14 mA
Aditional supply current due to TR module	1 mA (TR in Run mode) up to 24 mA (TX mode, max. output power)
Temperature range	0 °C to +70 °C
TR module	TR-52D compatible, without temperature sensor
Antenna	Built-in PCB
Frequency band	868 MHz / 916 MHz, SW selectable
RF output power	Up to 3.5 mW, programmable
Dimensions	59.3 mm x 23.5 mm x 12.3 mm (including the cover)
Weight	12 g (including the cover)

Absolute maximum ratings

Stresses above those values may cause permanent damage to the device. Exposure to maximum rating conditions for extended periods may affect device reliability.

Supply voltage (VCC)	5.5 V
Storage temperature	-40 °C to +85 °C

Hardware

GW-USB-05 consists of main MCU, memories and the TR-52D compatible circuitry with RTCC added. Firmware of the main MCU is fixed. Specific functionality of the device can be implemented by user software for the TR module. Application for TR module inside (except of RTCC usage) can also be developed using the CK-USB-04 development kit. For detailed information refer to CK-USB-04 User's guide.

Power supply

GW-USB-05 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. RTCC has a temporary backup by decoupling capacitors, see below.

Reset

Reset can be invoked by connecting a disconnected GW-USB-05 to USB or by the *Reset USB Device* command in CDC mode. Actual reset is executed ~5 s after the command is issued. This delay allows to disconnect USB communication on host side in time. See the user's guide *CDC Implementation in IQRF USB devices*.

USB

The device supports two USB modes:

- Custom Device mode
  Full communication with the IQRF IDE is enabled in this mode. The GW uses identical USB driver like e.g. CK-USB-04. It is possible to upload the application into internal TR module, display data received from SPI interface of the TR in IQRF IDE Terminal etc. The user can easily create his own PC program using the `mpusbapi.dll` library. See USB Custom Device Example on IQRF website.

- CDC mode
  After connecting to PC a virtual serial port is created in this mode. The user can create his own PC program and communicate via this port using the protocol described in document *CDC implementation in IQRF platform*.

Switching between the modes:

- From Custom Device to CDC:
  Using IQRF IDE 4 or higher:
  Tools → USB Classes → Switch to CDC mode.

- From CDC to Custom Device:
  Using IQRF IDE 4 or higher:
  Tools → USB Classes → Switch to Custom Device mode.

  Using the *Switch to USB Custom Class* command in CDC protocol.

Current mode indication see chapter LED. The last selected mode is restored after start-up or reset.

Tip

For testing a communication in CDC mode various SW terminals operating with PC serial ports are available. Select a terminal enabling to issue direct byte commands and data. Refer to the communication protocol described in CDC Implementation in IQRF USB devices User's guide.

Recommended terminal: Docklight, **www.docklight.de**. There is a project containing all supported commands for this terminal available at **www.iqrf.org/218**. It is necessary just to select the COM port used.

Unsuitable terminal: Windows Hyperterminal, Tera Term.

TR module

Wireless IQRF transceiver module compatible with TR-52D, without temperature sensor. Refer to the TR-52D datasheet for details.

Antenna

PCB antenna on GW-USB-05 board.

RTCC

Real-time clock / calendar MCP7940NT by Microchip has the I2C serial bus shared with the EEPROM. It can be controlled from TR module. 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 keeping the RTCC running.

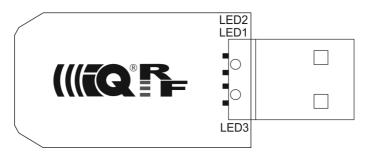RTCC is not supported at all in current version of firmware and demo user software.

Serial Flash memory

Flash memory 8 Mb 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

Three LEDs inside the case are mainly intended for debug and service purposes.

- LED3 dedicated to the main MCU – red
  - LED3 flashes for 500 ms after reset.
  - LED3 flashing in 1 s period means CDC mode (Custom Device mode is without flashing).
  - LED3 flashes 3x after clicking the *Check USB Device* (*F11*) in respective IQRF IDE (to identify the device among other IQRF USB devices in case of multiple IQRF IDE instances).
  - LED3 flashing in 300 ms period means missing firmware (see Software below).

- LEDs dedicated to TR module – LED1 (red) and LED2 (green).

Software

Firmware for the main MCU is fixed but can be upgraded by the user using the code provided by IQRF manufacturer. Refer to IQRF Application note *AN008 – Firmware upgrade* for details.

TR module functionality is fully user programmable. Factory default is E03-TR (one of basic IQRF examples). Programming and uploading the code is similar to the CK-USB-04 development kit.

Product information

Pack list

- GW-USB-05   USB gateway, with E03-TR example uploaded in TR module.

Ordering code

- GW-USB-05   USB gateway (serial Flash memory included).

Document history

- 130220   Serial Flash memory is a standard for GW-USB-05 but not an option.
- 130125   First release.

Sales and Service

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