KON-RASP-01

IQRF Shield for Raspberry Pi

User's guide


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Description

KON-RASP-01 is an IQRF shield for Raspberry Pi boards. It is an adapter enabling to connect an IQRF wireless transceiver to Raspberry Pi (via GPIO connector).

The shield contains SIM connector, so any SIM card compatible (DC)TR transceivers, e.g. (DC)TR-72D or (DC)TR-52D can be used.

IQRF transceiver is intended to be controlled via SPI bus. However, any other interface implemented in user application is also possible.
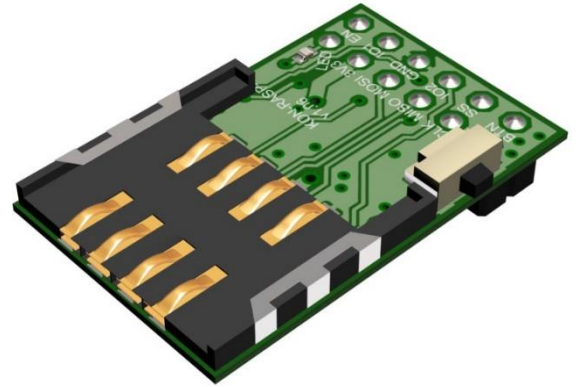
Features

- Connectable to all Raspberry Pi versions
- For any SIM card compatible (DC)TR transceivers, e.g. (DC)TR-72D or (DC)TR-52D
- (DC)TR connected typically as SPI slave
- An LED and a pushbutton for user applications
- I/O pins protected by controllable analog switch
- (DC)TR power supply controlled from Raspberry Pi
- SIM connector with metallic holder
- Supported by IQRF SDK (Software Development Kit)

Applications

- Any user applications utilizing IQRF wireless connectivity and Raspberry Pi performance
- Mesh networks based on IQRF DPA framework for wireless without programming

Simplified schematic
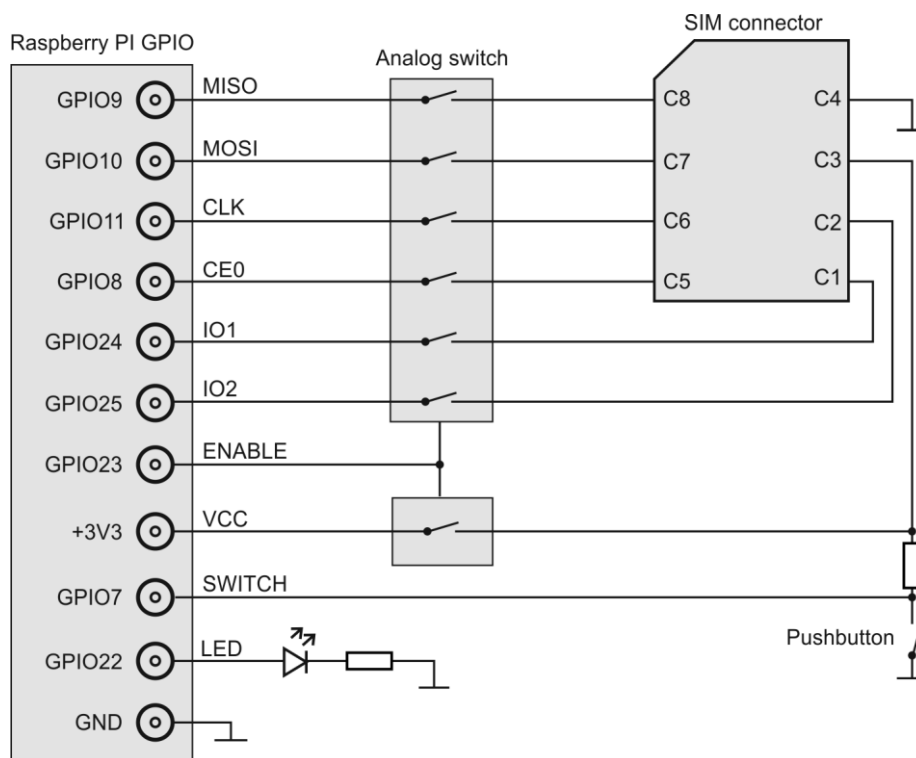
Electrical specifications   *Typical values **unless otherwise stated***

Power supply V_{CC}	3.1 V to 3.4 V
Voltage on GPIO pins	-0.3 V to V_{CC}
Size	17.0 mm x 26.4 mm
Weight	2 g
Operating temperature	-40 °C to +85 °C
Storage temperature	-40 °C to +85 °C, +10 °C to +25 °C recommended

Hardware

Power supply

KON-RASP-01 and (DC)TR transceiver inside are intended to be supplied from Raspberry Pi 3.3 V power source available on GPIO connector. Refer to the datasheet of (DC)TR used.

Power supply is connected when signal ENABLE is in log. 1. This signal is controlled from Raspberry Pi,default disabled by internal pull-down resistor and shared with the GPIOs protection (see *Analog switch* below).

SIM connector

SIM connector is intended for (DC)TR transceiver.

Caution: The (DC)TR transceiver can be plugged / unplugged into / from the SIM connector while powered off only.
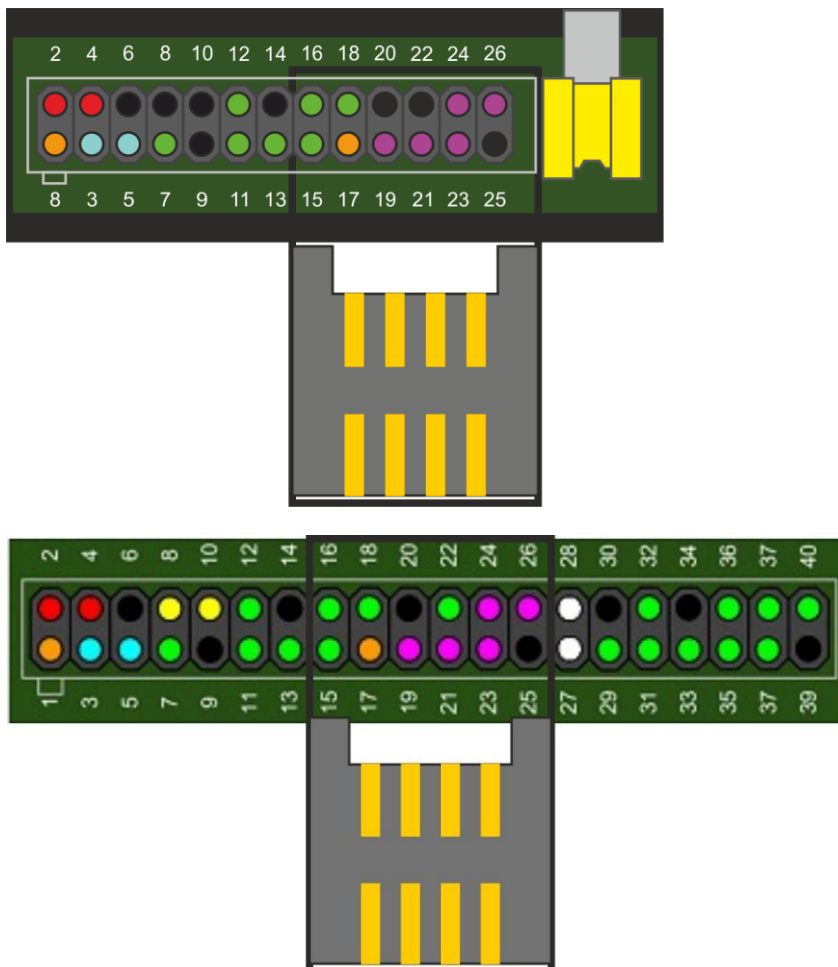
Interface connector

Raspberry Pi is equipped with universal double row connector to provide GPIO pins and power supply for external peripherals according to specific needs. KON-RASP-01 occupies 12 pins (15 to 26) of this connector.

Various Raspberry Pi types may differ in GPIO connectors. KON-RASP-01 must always be plugged in proper pins with respect to pinout described on the silkscreen on the DK-RASP-01 board and must correspond to simplified schematic above.

Caution: The KON-RASP-01 shield can be connected to Raspberry PI board while the board is powered off only.

Examples:

Analog switch

To protect Raspberry Pi GPIO pins, connection to SIM connector is enabled (by the 74HC4066BQ ICs) when signal ENABLE is in log. 1. It is the same control signal as for power supply connection. It allows interconnection to (DC)TR not until the Raspberry Pi is properly initialized.

LED

Indication LED is connected to Raspberry Pi GPIO22 pin and is completely under control of the Raspberry Pi application software.

Pushbutton

The pushbutton is connected to Raspberry Pi GPIO7 pin and is completely under control of the Raspberry Pi application software.

(DC)TR transceiver

Supported (DC)TR transceivers are all types in SIM card format with 8 pins, e.g. (DC)TR-72D or (DC)TR-52D.

Types intended for SMT mounting (i.e. with more than 8 pins, e.g. (DC)-TR-76D or (DC)TR-56D) must not be used.

The functionality of the (DC)TR depends on application software inside the transceiver. For networks it is highly recommended to utilize ready to use hardware profiles under the DPA framework which enables wireless networking with no programming needed.

Raspberry Pi

All verisions of Raspberry Pi up to the time of release of this document (versions A, B and B+) are supported.

Raspberry Pi is intedned as a superordinate device controlling the (DC)TR transceiver, not only enabling (DC)TR power supply and GPIO interconnection but also operating as an SPI master in most applications.

Example: Raspberry Pi (version B) with KON-RASP-01 plugged and DCTR-72DA transceiver inside.

Software

IQRF SDK

IQRF Software Development Kit (SDK) is a platform enabling simple development of application software for devices programmable in Java or C(++) used with IQRF wireless transceivers.

IQRF SDK supports Raspberry Pi with libraries for Java and C enabling an access to Raspberry Pi GPIOs and SPI interface. The library implements the SPI master for communication with the (DC)TR transceiver. Examples included in the library illustrate the access to GPIOs and SPI communication under the DPA framework. The libraries and examples are plug and play when used with KON-RASP-01 kit.

Refer to https://github.com/MICRORISC/iqrfsdk/tree/develop/libs/raspberry for Raspberry Pi support in IQRF SDK.

Product information

Ordering codes

KON-RASP-01   IQRF Raspberry Pi shield

Document history

- 151120   IC type specified in the *Analog* switch chapter. Caution added in the *Interface connector* chapter.
- 150507   First release

Sales and Service

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Partners and distribution

Please visit www.iqrf.org/partners.

Quality management

ISO 9001 : 2009 certified

Complies with directives 2011/65/EU (RoHS) and 2012/19/EU (WEEE).

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