

RT-230-05

IQRF Router

User's Guide



Simple way to smarter wireless solutions

Description

The RT-230-05 dedicated router is a network component of the IQRF platform intended for delivering packets to devices out of range each other especially where there is no other IQRF TR module in range which can be used as a non-dedicated router.

It is ready to use just after plugging to mains and bonding to given network. Optional configuration is available.

Functionality is completely ensured by the TR module and the firmware inside it.



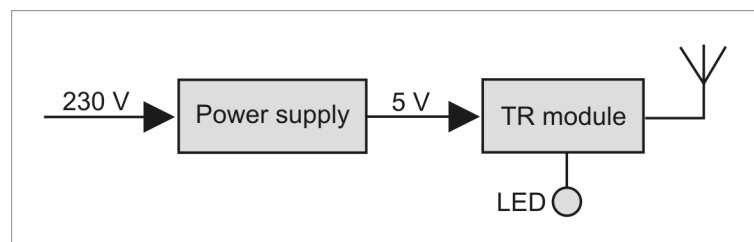
Applications

- Increasing of range in IQMESH networks
- RF signal coverage
- Robust and reliable IQMESH networks

Key features

- Supplied directly from mains
- No programming needed
- Configurable
- 1/4 wave external whip antenna

Block schematics



Electrical specifications

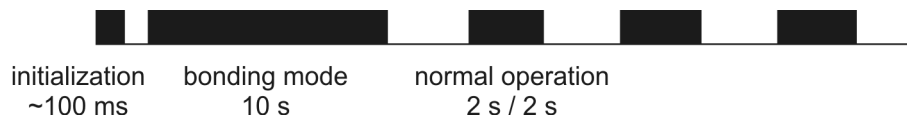
(typical values unless otherwise stated)

Power supply:	100 - 240V AC, 50-60 Hz
Temperature range:	0 °C to +70 °C
Frequency range:	868 MHz or 916 MHz (configurable)
RF output power:	according to the TR module used
TR module:	TR-52B
Antenna:	¼ wave whip
Dimensions:	70 x 60 x 25 mm (without the antenna)
Weight:	46g

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.

Storage temperature: -50 °C to +100 °C

Hardware
LED indication after reset


Note: Bonding mode indication depends on configuration.

Operation

The router needs almost no operator's handling. If there is no need to change the frequency band (from default 868 MHz), the only mandatory process is bonding. Once the router is bonded to given IQMESH network and placed at the appropriate location in range it is just able to route packets.

All functionality is completely ensured by the TR module and the firmware inside it. There is no need to program the router by the user.

Just packets belonging to given network and having the router address (RX) specified in the routing vector (RTV0 – RTV3) are routed. Refer to the IQRF OS User's guide, IQMESH specification and the Router Configurator (below) for more details.

The router is switched on by plugging to mains. Attempts to bond are in progress for the first 10 s (if configured to do so). Just during this period the router can be bonded or rebonded. Previous bonding need not be removed to rebond. If the bonding is finished or the router has already been bonded it is just switched to normal operation mode otherwise it stays in bonding mode until the bonding is successful.

To avoid bonding of improper device this operates with minimal RF output power. Thus, bonding should be done in short distance between the router and the network coordinator.

Bonding procedure

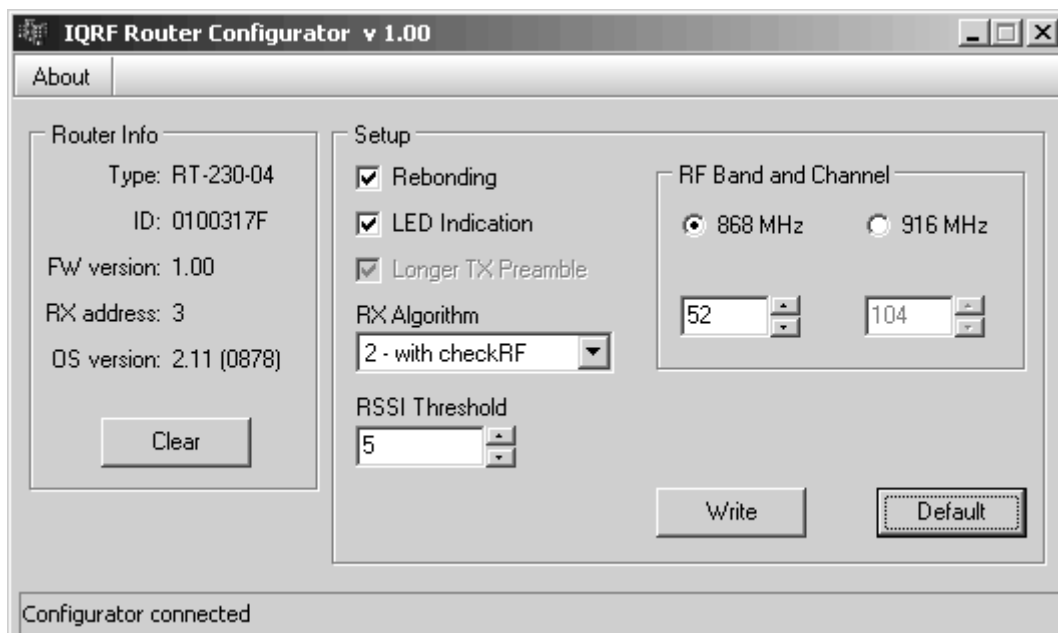
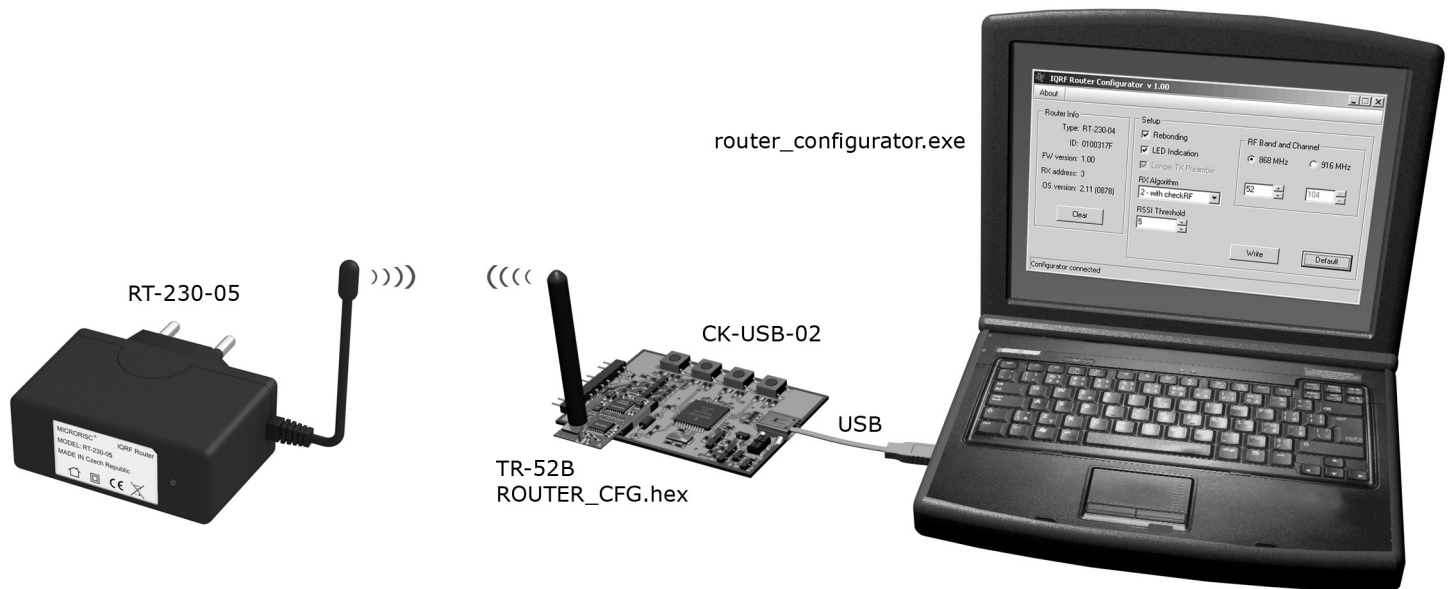
- Place the router and the coordinator in distance ~1 m between each other.
- Set the coordinator in bonding mode using the `bondNewNode()` or `rebondNode(n)` function and plug the router to mains.
- If everything is O.K. the coordinator assigns an address and network identification number to the router which means that the router is bonded.

Configuration

The router can be configured using the IQRF Router Configurator. This tool consists of two parts:

- PC program. It can be installed by simple unpacking the Router-Configurator.zip file in desired folder.
- Program ROUTER-CFG.hex for the TR-52Bx module inserted in the CK-USB-02 kit connected with PC via USB. It is a part of the ZIP above and should be uploaded into the TR module in a standard way using the IQRF IDE development environment.

Caution: No other program communicating with any IQRF device via USB (e.g. IQRF IDE) is allowed to run during the upgrade procedure.



Configurable parameters

Rebonding

(default: enabled)

- *Enabled*: The router will ask for bonding after reset.
- *Disabled*: The router will not ask for bonding after reset. It is recommended to disable after successful bonding to avoid unintentional or illegal rebonding and useless requests sent via RF for initial 10 s.

LED Indication

(default: enabled)

- *Enabled*: Normal operation mode is indicated by the LED (see the figure above)
- *Disabled*: Normal operation mode is not indicated by the LED. Initialization and bonding are indicated in any case.

Longer TX preamble

(default: enabled)

- *Enabled*: Routed packets will have prolonged preambles. This complies with the `setRFmode(0x10)` function. Refer to the IQRF OS Reference guide.
- *Disabled*: Routed packets will have standard (not prolonged) preambles. This option can not be disabled if RX Algorithm 2 is selected (see below).

RX Algorithm

(default: 2 – with checkRF)

- *1 – without checkRF*: RF packets are received via `RFRXpacket()` with `toutRF = 200`. *Longer TX preamble* can optionally be enabled. The RSSI Threshold parameter is not active (receiving is not restricted at all).
- *2 – with checkRF*: The `RFRXpacket()` function with `toutRF = 5` is invoked in dependency on result of the `checkRF(x)`. Filtering level is set by next parameter (RSSI Threshold). This selection automatically activates *Longer TX preamble* option.

RSSI Threshold

(default: 5)

- *0 to 64*: It allows to set the level for filtering poor RF packets in case of RX Algorithm = 2. This complies with the `checkRF(x)` function. Refer to the IQRF OS Reference guide.

RF Band and Channel

(default: 868 MHz, ch 52)

- *868 MHz, ch: 0 to 61*
- *916 MHz, ch: 0 - 188*

Configuration procedure

Router configuration can be read as well as written immediately after the router reset only.

Caution: To reset the router in an reliable way it is necessary to wait ~5 s after unplugging the router from mains before replugging.

Reading the configuration

- Arrange hardware according the figure above in RF range and run the Router Configurator.
- Reset the router.
- Router configuration is automatically read after the router reset. It is indicated by the LED flash.

Writing the configuration

- Arrange hardware according the figure above in RF range and run the Router Configurator.
- Set desired parameters and click the Write button.
- Router Configurator displays the "Make router reset" prompt.
- Reset the router.
- Router configuration is automatically written to the router.
- The "New setup has been sent to the router" message is issued by the Router Configurator for ~2 s.
- New configuration is read and the LED flashes for checking.

Ordering information and pack list

- RT-230-05 IQRF dedicated router supplied from mains

Document history

- 100608 First release

Sales and Service

Corporate office

MICRORISC s.r.o., Delnicka 222, 506 01 Jicin, Czech Republic, EU
Tel: +420 493 538 125, Fax: +420 493 538 126, www.microrisc.com

Partners and distribution

Please visit www.iqrf.org/partners

Quality management

ISO 9001 : 2000 certified

*Complies with ETSI directives EN 30279 V.1.2.1:99, ETS 30683:97, ETSI EN 301489-1:00,
ETSI EN 300220-1:00, ETSI EN 300390-2V.1.1.1:00*

Complies with FCC directives FCC CFR, Title 47, Part 15, Section 15.209, FCC CFR, Title 47, Part 15, Section 15.249

Complies with Directive 2002/95/EC (RoHS)



Trademarks

*The IQRF name and logo are registered trademarks of MICRORISC s.r.o.
PIC, SPI, Microchip, RFM and all other trademarks mentioned herein are property of their respective owners.*

Legal

All information contained in this publication is intended through suggestion only and may be superseded by updates without prior notice. No representation or warranty is given and no liability is assumed by MICRORISC s.r.o. with respect to the accuracy or use of such information.

Without written permission it is not allowed to copy or reproduce this information, even partially.

No licenses are conveyed, implicitly or otherwise, under any intellectual property rights.

The IQRF products utilize several patents (CZ, EU, US)

On-line support: <http://iq-esupport.com>



Simple way to smarter wireless solutions