

# **RT-230-05**

## **IQRF Router**

**for TR-52B(A) and IQRF OS v3.00**

## **User's Guide**



## 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 a given network. Optional configuration is available.

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

This router is intended to route packets in IQMESH networks based on IQRF OS v3.00 working in the STD RX mode only.



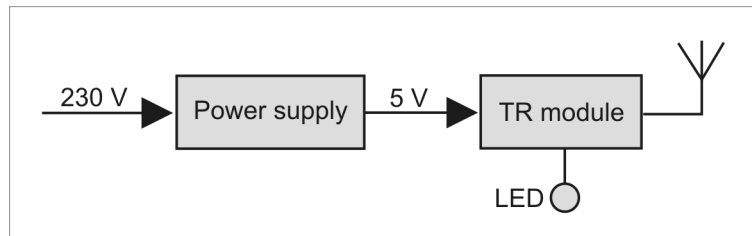
## Applications

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

## Key features

- Supplied directly from mains
- No programming needed
- Configurable
- Internal antenna

## Block schematics



## Electrical specifications

(typical values unless otherwise stated)

Power supply	Mains 230 V AC, 50 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-52BA or TR-52B
Antenna	Built-in TR-52BA (standard) AN-D01 (on request, for TR-52B)
Dimensions	72 x 60 x 26 mm
Weight	46 g

## 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
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## Hardware

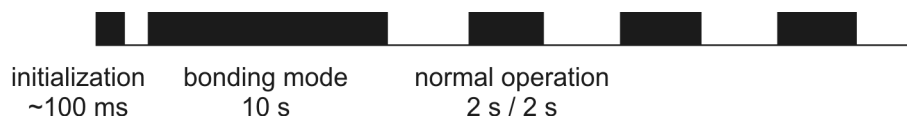
### Antenna polarization

RF signal spreading partly depends on antenna orientation. There are two possibilities:

- PCB antenna built-in TR-52BA: x and y directions preferred
- PCB antenna AN-D01 soldered to TR-52B: x and z directions preferred



### 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 working in STD mode 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

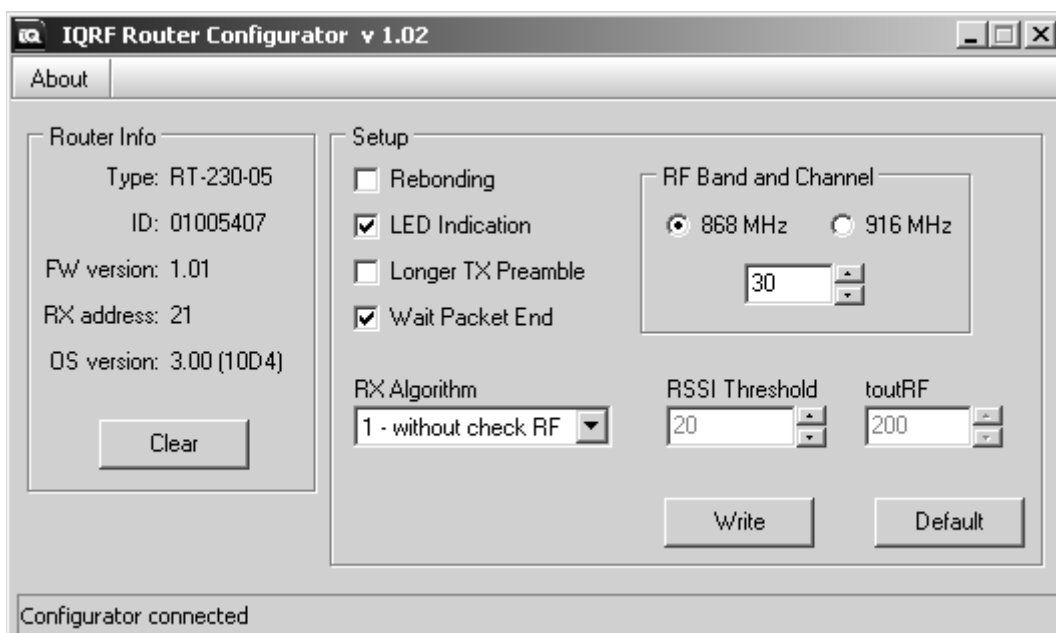
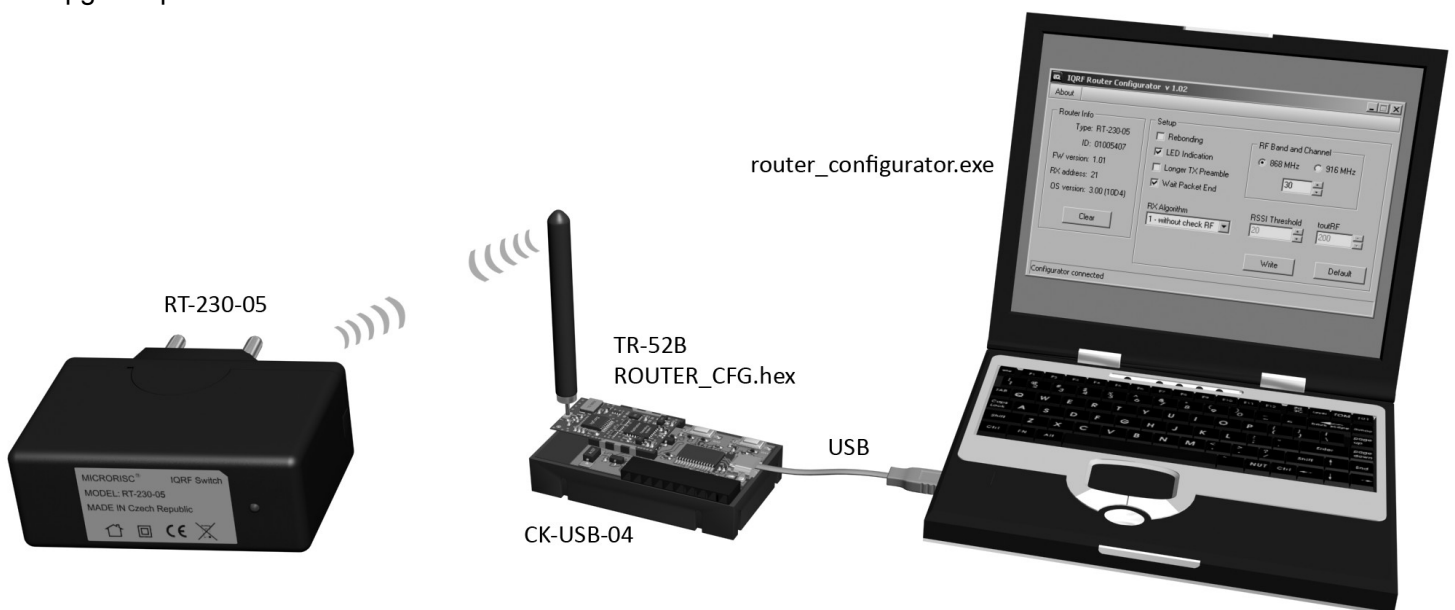
- Place the router and the coordinator in distance ~1 m between each other.
- Set the coordinator in bonding mode using the `bondNewNode(x)` function (see IQRF OS Reference Guide) and plug the router to mains.
- If everything is O.K. the coordinator assigns an address and network identification to the 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-04 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.

### Wait Packet End

(default: enabled)

- **Enabled:** The `RFRXpacket()` function waits for finishing packet receipt (if the receipt started before `toutRF` timeout). This complies with the `setRFmode(0x40)` function. Refer to the IQRF OS Reference guide.
- **Disabled:** The `RFRXpacket()` function is terminated after `touRF` timeout.

### RX Algorithm

(default: 2 – with checkRF)

- **1 – without checkRF:** RF packets are received via `RFRXpacket()` with `toutRF` = 200. The RSSI Threshold parameter is not active (receiving is not restricted at all). The `toutRF` parameter is fixed to 200.
- **2 – with checkRF:** The `RFRXpacket()` function with variable `toutRF` is invoked in dependency on result of the `checkRF(x)`. Filtering level is set by next parameter (RSSI Threshold).

### 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.

### toutRF

(default: 5)

- **1 to 255:** Allows to specify `toutRF`. This should be setup according to `DLEN` to be slightly longer than the packet itself. It is valid for RX Algorithm = 2 only.

### 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.

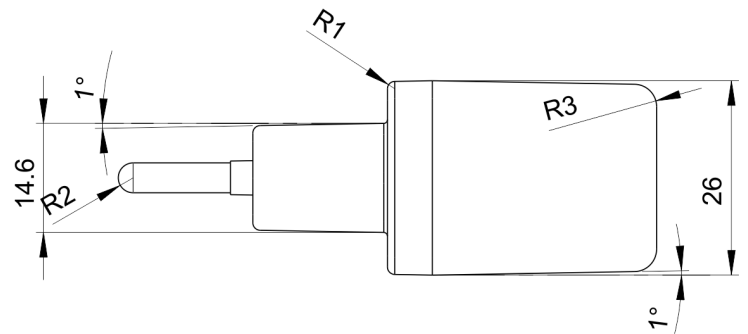
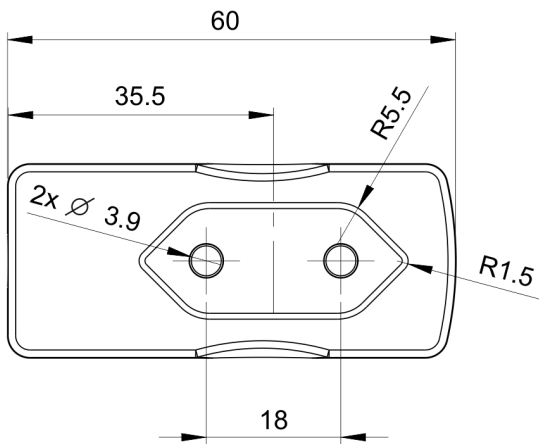
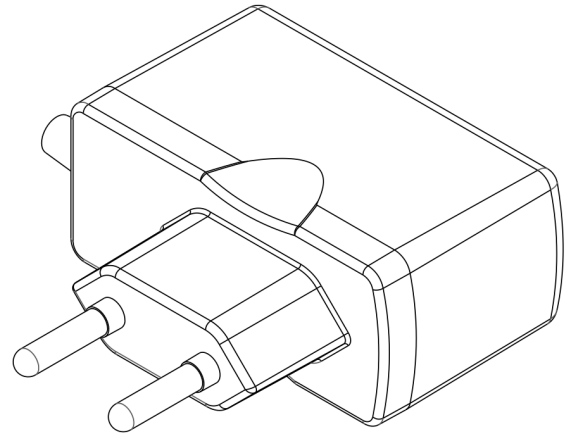
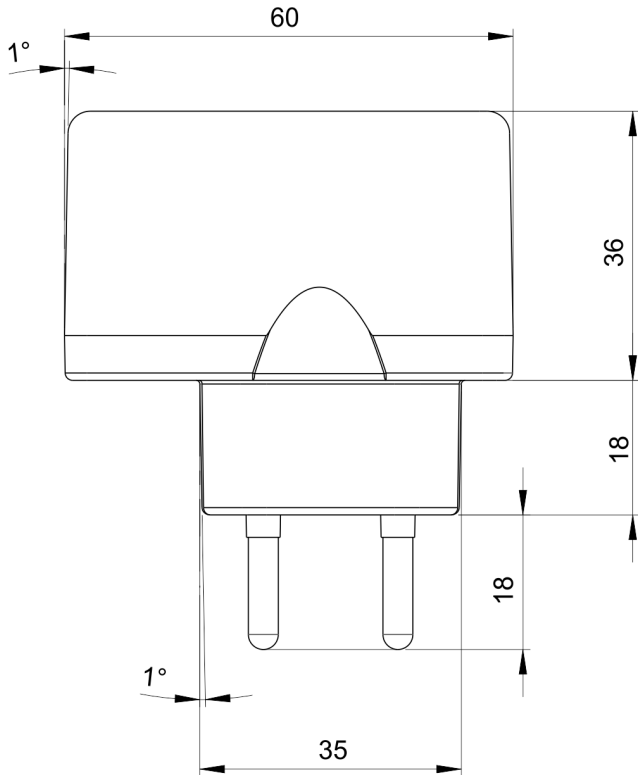
**Caution:** To reset the router in an reliable way it is necessary to wait ~5 s after unplugging the router from mains before replugging.

### 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.

**Mechanical drawing**


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**Product information**

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**Pack list**

- RT-230-05 IQRF router

**Ordering information**

- RT-230-05 IQRF router

**Document history**

- 150817 Bug in power supply specification fixed
- 130220 Mechanical drawing added
- 101206 HW innovated, internal antenna, more configurable parameters
- 100608 First release

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# Sales and Service

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## Corporate office

MICRORISC s.r.o., Prumyslova 1275, 506 01 Jicin, Czech Republic, EU  
Tel: +420 493 538 125, Fax: +420 493 538 126, [www.microrisc.com](http://www.microrisc.com)

## Partners and distribution

Please visit [www.iqrf.org/partners](http://www.iqrf.org/partners)

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## Quality management

*ISO 9001 : 2009 certified*

*Complies with Directive 2002/95/EC (RoHS)*



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