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MICRF RX Click

PID: MIKROE-6014

MICRF RX Click is a compact add-on board for high-sensitivity applications, including remote keyless entry, tire pressure monitoring systems, and remote actuation systems. This board features the MICRF220, an ASK/OOK 315MHz receiver with RSSI and squelch capabilities from Microchip to offer top-notch RF performance. This super-heterodyne, image-reject RF receiver provides a -110dBm sensitivity at 1kbps and a 0.1% Bit Error Rate (BER), supporting adjustable demodulator filter bandwidths for bit rates up to 14.4kbps. It operates on a 3.3V supply, features a low-power shutdown mode to minimize energy consumption, and offers selectable antenna configurations through an onboard PCB antenna or an external SMA connector. The MICRF RX Click is an ideal solution for developers incorporating reliable RF receivers in low-power, cost-sensitive applications.

MICRF RX Click is fully compatible with the mikroBUS™ socket and can be used on any host system supporting the mikroBUS™ standard. It comes with the mikroSDK open-source libraries, offering unparalleled flexibility for evaluation and customization. What sets this Click board™ apart is the groundbreaking ClickID feature, enabling your host system to seamlessly and automatically detect and identify this add-on board.

NOTE: Pair the MICRF TX Click with the MICRF RX Click for optimal performance, as both boards are designed to work on the 315MHz frequency. Perfect for developers looking for compatible transmitter and receiver units. Find both Click boards™ available for purchase at the MIKROE shop.

How does it work?

MICRF RX Click is based on the MICRF220, an ASK/OOK receiver with RSSI and squelch from

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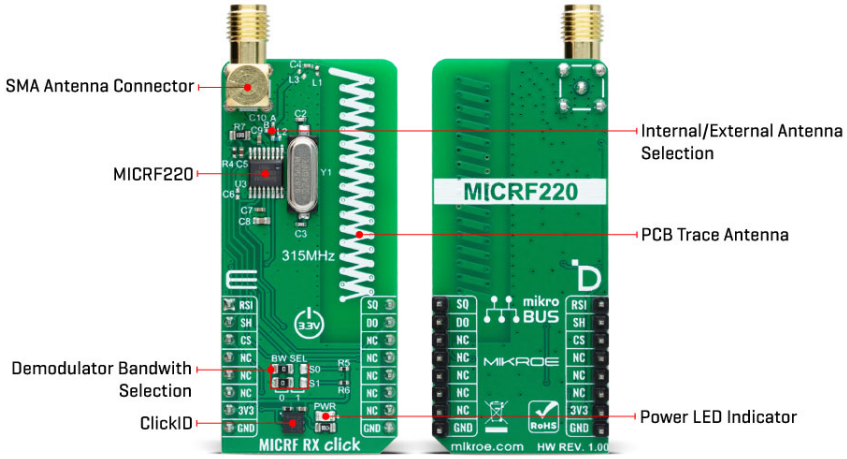
Microchip. This super-heterodyne, image-reject RF receiver is engineered to require only a crystal, in this case, an onboard 9.81563MHz, and a minimal set of external components for operation. Its suitability spans across a variety of applications, such as low-power Remote Keyless Entry (RKE), Tire Pressure Monitoring Systems (TPMS), and remote actuation systems.



In terms of performance, the MICRF220 distinguishes itself with a sensitivity of -110dBm at 1kbps and a 0.1% Bit Error Rate (BER), complemented by four selectable demodulator filter bandwidths ranging from 1170Hz to 9400Hz. Filter bandwidth can be selected by placing BW SEL jumpers in a corresponding position, 0 or 1, choosing the corresponding frequency based on the truth table from the attached MICRF220 datasheet (Table 2.). This feature permits the device to accommodate bit rates as high as 14.4kbps (from 1.8kbps up to 14.4kbps). Operating on a 3.3V supply from the mikroBUS™ power rail, it is optimized for 315MHz operation, drawing a typical supply current of 4.3mA.

Additionally, the MICRF220 also has a low-power shutdown mode controllable through the SH pin, reducing the supply current to an impressive 0.1µA, alongside a squelch function accessed via the SQ pin that minimizes data output activity on the DO pin until valid bits are detected, without compromising receiver sensitivity. The board also incorporates an RSI pin to indicate received signal strength.

For antenna configurations, the board allows for the use of an onboard PCB antenna specifically tuned to 315MHz or an external antenna via an SMA connector, with the selection made possible by adjusting the capacitor from position A to B near the SMA connector.

This Click board™ can be operated only with a 3.3V logic voltage level. The board must perform appropriate logic voltage level conversion before using MCUs with different logic levels. Also, it comes equipped with a library containing functions and an example code that can be used as a reference for further development.

Specifications

Type	Sub-1 GHz Transceievers
Applications	Ideal for remote keyless entry, tire pressure monitoring systems, and remote actuation systems
On-board modules	MICRF220 - ASK/OOK receiver with RSSI and

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	squelch from Microchip
Key Features	High performance RF receiver, ASK/OOK modulation, optimized for 315MHz, high sensitivity, adjustable demodulator filter bandwidth, low-power shutdown mode, squelch function minimizing unnecessary data output activity, internal/external antenna selection, received signal strength indicator, and more
Interface	GPIO
ClickID	Yes
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on MICRF RX Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
Received Signal Strength Monitor	**RSI**	1	AN	PWM	16	**SQ**	Squelch Function
Shutdown	**SH**	2	RST	INT	15	**DO**	Receiver Data Output
ID COMM	**CS**	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	NC	
	NC	6	MOSI	SDA	11	NC	
Power Supply	**3.3V**	7	3.3V	5V	10	NC	
Ground	**GND**	8	GND	GND	9	**GND**	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
JP1-JP2	BW SEL	Left	Demodulation Bandwidth Selection 0/1: Left position 0, Right position 1

MICRF RX Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Receiver Frequency Range	-	315	-	MHz

Software Support

We provide a library for the MICRF RX Click as well as a demo application (example), developed

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using MIKROE compilers. The demo can run on all the main MIKROE development boards.

Package can be downloaded/installed directly from NECTO Studio Package Manager(recommended), downloaded from our LibStock™ or found on Mikroe github account.

Library Description

This library contains API for MICRF RX Click driver.

Key functions

- micrfrx_enable_device This function enables device by setting the SHD pin to low logic state.
- micrfrx_wait_ready This function waits for all training bytes to arrive which indicates data ready.
- micrfrx_read_packet This function reads data packet and stores it in a packet_buf only if the MICRFRX_PREAMBLE bytes are received successfully.

Example Description

This example demonstrates the use of MICRF RX click board by reading and parsing packet messages received from the transmitter.

The full application code, and ready to use projects can be installed directly from NECTO Studio Package Manager(recommended), downloaded from our LibStock™ or found on Mikroe github account.

Other Mikroe Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.MICRFRX

Additional notes and informations

Depending on the development board you are using, you may need USB UART click, USB UART 2 Click or RS232 Click to connect to your PC, for development systems with no UART to USB interface available on the board. UART terminal is available in all MIKROE compilers.

mikroSDK

This Click board™ is supported with mikroSDK - MIKROE Software Development Kit. To ensure proper operation of mikroSDK compliant Click board™ demo applications, mikroSDK should be downloaded from the LibStock and installed for the compiler you are using.

For more information about mikroSDK, visit the official page.

Resources

mikroBUS™

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mikroSDK

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MICRF RX click 2D and 3D files v100

MICRF RX click schematic v100

MICRF220 datasheet