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MICRF TX Click

PID: MIKROE-6016

MICRF TX Click is a compact add-on board designed as a powerful RF transmitter for data transmission over the 315MHz frequency band. This board features the MICRF112, a high-performance RF transmitter IC from Microchip, renowned for its efficiency in operation. This Click board™ stands out for its ease of use, requiring only a simple crystal oscillator to set the frequency, and supports both ASK and FSK modulation types with a Phase-Locked Loop (PLL) for stable frequency. With an operating voltage of 3.3V from the mikroBUS™ power supply, it delivers a +10dBm output power and features an energy-efficient shutdown mode, drawing a mere 50nA, ideal for battery-powered applications. The MICRF TX Click is ideally suited for various applications, including remote keyless entry systems, remote controls, security systems, and more.

MICRF TX 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 TX Click is based on the MICRF112, an RF transmitter IC from Microchip. This high-

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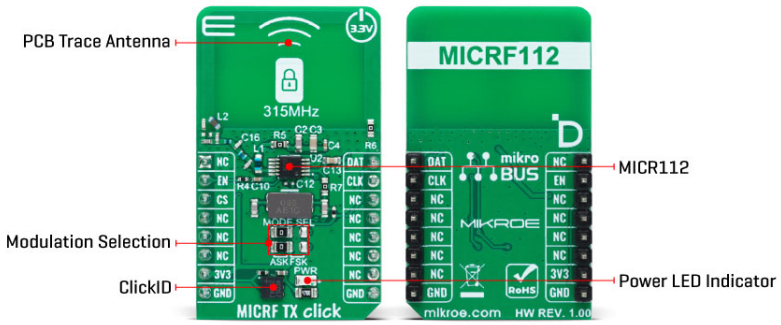
performance IC is designed for simplicity in operation, functioning on a “Data-In, RF-Out” basis. It supports both Amplitude Shift Keying (ASK) and Frequency Shift Keying (FSK) modulation types and incorporates a Phase-Locked Loop (PLL) for reliable frequency stabilization. Specifically made for the 315MHz band, the MICRF112 requires only a basic crystal oscillator - such as the onboard 9.84375MHz crystal - to accurately establish its operating frequency alongside minimal external components to match the power amplifier's output with the antenna. It is ideally used in various applications like Remote Keyless Entry (RKE) systems, various remote controls (for set-top boxes, HVAC systems, and appliances), Garage Door Openers (GDO), Tire Pressure Monitoring Systems (TPMS), outdoor weather stations, and systems for security, alarm, lighting and fan control, doorbells, irrigation, and more.



Concerning the board's connectivity with an MCU, this board uses several pins on the mikroBUS™ socket. The EN pin functions as a chip enable function for toggling the device ON or OFF state. The DAT pin accepts modulation data input (either ASK or FSK, determined by the MODE SEL jumper's setting) directly. In case of FSK modulation, an additional capacitor like C12 is required between the XTLOUT and XTAL_MOD pins of the MICRF112 (C12 not populated by default). If the user desires a different frequency instead of the onboard oscillator, they should desolder the R7 resistor on the board, thereby disconnecting the onboard oscillator. Then, a 1nF capacitor should be soldered in place of C13 capacitor, and the CLK pin is then used as the reference oscillator input.

Operating with a 3.3V input from the mikroBUS™ power supply, the MICRF112 can generate a continuous wave (CW) output power of +10dBm into a 50Ω antenna load. It also boasts an energy-efficient shutdown mode, drawing a mere 50nA, making it highly suitable for battery-dependent devices.

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 (RKE) systems, various remote controls (for set-top boxes, HVAC systems, and appliances), Garage Door

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	Openers (GDO), Tire Pressure Monitoring Systems (TPMS), outdoor weather stations, and systems for security, alarm, lighting and fan control, doorbells, irrigation, and more
On-board modules	MICRF112 - high-performance RF transmitter IC from Microchip
Key Features	Designed for 315MHz, support both ASK and FSK modulation, PLL for accurate frequency stabilization, 10dBm output power, low-power shutdown mode, chip enable control, and more
Interface	GPIO
ClickID	Yes
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

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

Notes	Pin	mikroBUS				Pin	Notes
	NC	1	AN	PWM	16	**DAT**	Modulation Data
Chip Enable	**EN**	2	RST	INT	15	**CLK**	External Reference Oscillator Input
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	MODE SEL	Left	Modulation Selection ASK/FSK: Left position ASK, Right position FSK

MICRF TX Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Transmitter Frequency Range	-	315	-	MHz
Output Power	-	+10	-	dBm

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Software Support

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

Key functions

- micrftx_send_data This function builds and sends a packet of data. The packet format is as follows (MSB first, manchester IEEE 802.3): MICRFTX_TRAINING_BYTES, PREABMLE, LEN, DATA_IN, CRC16 (calculated from whole packet excluding training bytes).

Example Description

This example demonstrates the use of MICRF TX click board by sending a predefined message to the receiver.

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.MICRFTX

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™

mikroSDK

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MICRF TX click example on Libstock

MICRF TX click 2D and 3D files v100

MICRF TX click schematic v100

MICRF112 datasheet