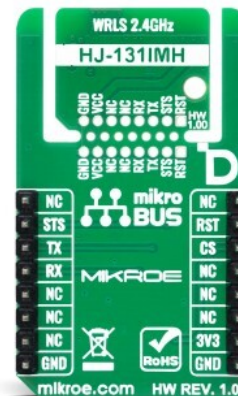


WRLS 2.4GHz Click



PID: MIKROE-6915

WRLS 2.4GHz Click is a compact add-on board designed for Bluetooth Low Energy wireless connectivity in applications requiring short-range data exchange. It is based on the [HJ-1311MH_UART](#), an ultra-low-power Bluetooth 5.1 module from HJSIP. This module supports BLE 5.1 with integrated host-peripheral functionality, built-in GATT service support, configurable module control through standard firmware instructions, UART communication, and Click Snap functionality that enables the module area to be detached and used independently, with selectable supply voltage for high- and low-voltage operating modes. This Click is ideal for consumer electronics, smart devices, portable equipment, wireless sensors, and other embedded systems requiring low-power BLE connectivity.

For more information about **WRLS 2.4GHz Click** visit the official [product page](#).

How does it work?

WRLS 2.4GHz Click is based on the HJ-1311MH_UART, an ultra-low-power Bluetooth 5.1 module from HJSIP, which integrates a low energy Bluetooth protocol stack together with GATT service support, making it suitable for a wide range of wireless control, monitoring, and data transfer tasks. This module supports BLE 5.1 operation with host-peripheral integration, allowing simultaneous host and peripheral functionality without mutual interference, including configurations with one peripheral and one host working together or up to three peripheral connections, which gives the board added versatility in more complex wireless topologies. The built-in standard firmware supports single-peripheral operation and enables module configuration through multiple instructions, simplifying setup and adaptation to different application requirements. This board is ideal for consumer electronics, smart devices, portable equipment, and other embedded systems requiring BLE connectivity.

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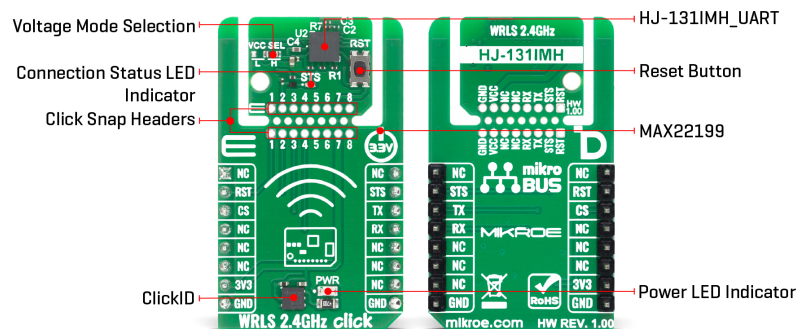
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In terms of memory resources, the module includes 32KB of OTP, 48KB of RAM, and 4KB of EEPROM. Operating in the 2.4GHz ISM band, the module provides transmitting power from -19.5dBm up to +2.5dBm and receiver sensitivity of -94dBm, ensuring stable low-power wireless performance. By using the integrated antenna in open-area conditions, the wireless signal can typically reach distances greater than 5 meters and less than 10 meters.

This Click board™ is designed in a unique format supporting the newly introduced MIKROE feature called "Click Snap." Unlike the standardized version of Click boards, this feature allows the main sensor/IC/module area to become movable by breaking the PCB, opening many new possibilities for implementation. Thanks to the Snap feature, the HJ-131IMH_UART can operate autonomously by accessing its signals directly on the pins marked 1-8. Additionally, the Snap part includes a specified and fixed screw hole position, enabling users to secure the Snap board in their desired location.

The HJ-131IMH_UART communicates with the host MCU through a UART interface. In addition to the communication pins, the board also uses an RST pin for hardware reset of the module, while the same reset function can also be triggered manually through the onboard RST button. The board further includes an STS pin used as a connection status indicator, allowing the current link state of the module to be monitored directly by the host system. This status signal is also visually represented by the yellow STS LED on the board, enabling quick and clear indication of connection activity during operation. Within the Click Snap section, the board also provides a VCC SEL jumper used to define the supply voltage range of the module. The H position selects High Voltage Mode, supporting an operating range from 1.8V to 3.6V, while the L position enables Low Voltage Mode for a range from 1.05V to 1.7V.

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. It also comes equipped with a library containing functions and example code that can be used as a reference for further development.

Click Snap

Click Snap is an innovative feature of our standardized Click add-on boards, designed to bring greater flexibility and optimize your prototypes. By simply snapping the PCB along predefined lines, you can easily detach the main sensor/IC/module area, reducing the overall size, weight, and power consumption - ideal for the final phase of prototyping. For more details about Click Snap, visit the [official page](#) dedicated to this feature.

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Specifications

Type	BT/BLE
Applications	Ideal for consumer electronics, smart devices, portable equipment, wireless sensors, and other embedded systems requiring low-power BLE connectivity
On-board modules	HJ-131IMH_UART - ultra-low-power Bluetooth 5.1 module from HJSIP
Key Features	Bluetooth 5.1 low energy connectivity, integrated host-peripheral operation, simultaneous host and peripheral functionality without interference, support for one host and up to three peripheral connections, embedded Bluetooth protocol stack with GATT service support, built-in standard firmware with configurable instruction set, UART interface, integrated antenna, Click Snap support, and more
Interface	UART
Feature	Click Snap, ClickID
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 WRLS 2.4GHz Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin					Pin	Notes
	NC	1	AN	PWM	16	NC	
Reset	RST	2	RST	INT	15	STS	Status Connection
ID COMM	CS	3	CS	RX	14	TX	UART TX
	NC	4	SCK	TX	13	RX	UART RX
	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	VCC SEL	Right	Voltage Mode Selection L/H: Left position L, Right position H

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T1	RST	-	Reset Button
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WRLS 2.4GHz Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Frequency Range	2.402	-	2.480	GHz
RX Sensitivity	-	-94	-95	dBm
Power Output	-	-	+2.5	dBm
Air Speed	-	1	-	Mbps

Software Support

[WRLS 2.4GHz Click](#) demo application is developed using the [NECTO Studio](#), ensuring compatibility with [mikroSDK](#)'s open-source libraries and tools. Designed for plug-and-play implementation and testing, the demo is fully compatible with all development, starter, and mikromedia boards featuring a [mikroBUS™](#) socket.

Example Description

This example demonstrates the use of WRLS 2.4GHz Click board by processing data from a connected BLE device.

Key Functions

- `wrls24ghz_cfg_setup` This function initializes Click configuration structure to initial values.
- `wrls24ghz_init` This function initializes all necessary pins and peripherals used for this Click board.
- `wrls24ghz_reset_device` This function resets the device by toggling the RST pin state.
- `wrls24ghz_get_status_pin` This function returns the connection active status (STATUS) pin logic state.
- `wrls24ghz_send_cmd` This function sends a specified command to the Click module.
- `wrls24ghz_generic_read` This function reads a desired number of data bytes by using UART serial interface.

Application Init

Initializes the driver and logger.

Application Task

Application task is split in few stages:

- `WRLS24GHZ_POWER_UP`:

Powers up the device, reads software version, and restores factory settings.

- `WRLS24GHZ_CONFIG_EXAMPLE`:

Sets sleep timeout and BT device name, and reads the BT address.

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- WRLS24GHZ_EXAMPLE:

Performs a BT terminal example by processing all data from a connected BLE device and sending back an adequate response messages.

Application Output

This Click board can be interfaced and monitored in two ways:

- Application Output - Use the "Application Output" window in Debug mode for real-time data monitoring. Set it up properly by following [this tutorial](#).
- UART Terminal - Monitor data via the UART Terminal using a [USB to UART converter](#). For detailed instructions, check out [this tutorial](#).

Additional Notes and Information

The complete application code and a ready-to-use project are available through the NECTO Studio Package Manager for direct installation in the [NECTO Studio](#). The application code can also be found on the MIKROE [GitHub](#) account.

Resources

[mikroBUS™](#)

[mikroSDK](#)

[Click board™ Catalog](#)

[Click boards™](#)

[ClickID](#)

Downloads

[WRLS 2.4GHz click example package](#)

[WRLS 2.4GHz click 2D and 3D files v100](#)

[WRLS 2.4GHz click schematic v100](#)

[HJ-131IMH datasheet](#)

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