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LR 10 Click

PID: MIKROE-5986

LR 10 Click is a compact add-on board designed for the Internet of Things (IoT) applications requiring low power consumption and long-range connectivity. This board features the Wio-E5, a LoRa wireless module from Seeed Technology. The Wio-E5 integrates the STM32WLE5JC system-level chip and the SX126X LoRa® chip alongside an Arm® Cortex® M4 MCU, ensuring ultra-low power usage and high performance. It supports multi-mode operations, including (G)FSK and LoRa®, and can operate across a frequency range of 868 to 928MHz with robust signal strength and sensitivity. These characteristics make the LR 10 Click ideal for various IoT scenarios, such as wireless sensor networks, remote meter readings, and other applications with crucial low-power, wide-area network connectivity.

LR 10 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.

How does it work?

LR 10 Click is based on the Wio-E5, a LoRa wireless module from Seeed Technology, renowned for its minimal power draw and compactness. This powerhouse module incorporates the STM32WLE5JC system-level package chip and the SX126X LoRa® chip for stellar performance alongside an Arm® Cortex® M4 MCU that ensures ultra-low power consumption. Designed primarily for IoT applications requiring minimal power and extended range—such as wireless sensor networks, remote meter reading, and other low-power, wide-area network scenarios - the Wio-E5 stands out as a versatile solution for many IoT needs.
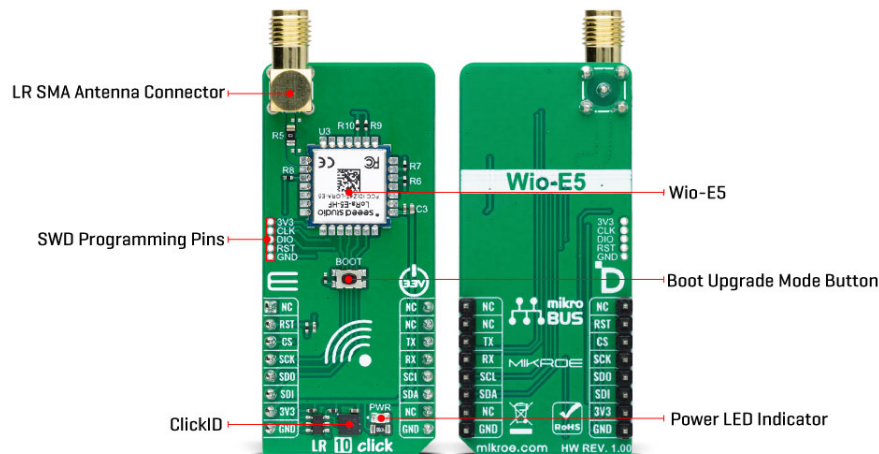
As mentioned, the Wio-E5 module integrates the STM32WLE5JC. This chip excels in various IoT applications thanks to its support for multi-mode operations, including (G)FSK and LoRa®, with bandwidth options ranging from 62.5kHz to 500kHz in LoRa® mode. It is characterized by a maximum RF input power of +10dBm, ensuring robust signal strength. The device operates seamlessly across a broad frequency range of 868 to 928MHz, accommodating a wide spectrum of wireless communication needs. With an ability to deliver an output power of up to 22dBm, it ensures extensive coverage and reliable transmission across its operational frequency range. Furthermore, the board achieves a peak sensitivity of -137.5dBm, guaranteeing consistent and dependable communication capabilities, even under demanding environmental conditions.

This Click board offers a rich selection of available interfaces to communicate with the host MCU, such as UART, I2C, and SPI, catering to diverse application needs. It simplifies the design of LoRaWAN® nodes through embedded global LoRaWAN® protocol support and an AT command set achieved by UART and reset RST pin integration. Firmware upgrades are also possible via the UART interface in a Boot mode, triggered by the BOOT button, allowing for easy programming and software development leveraging the onboard MCU's capabilities through the SWD interface pins on the board's side.

LR 10 Click also features the SMA antenna connector with an impedance of 50Ω, compatible with various antennas available from MIKROE, like the Rubber Antenna 868MHz, to enhance its connectivity.

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	LoRa,Sub-1 GHz Transceievers
Applications	Ideal for various IoT scenarios, such as wireless sensor networks, remote meter readings, and other applications with crucial low-power, wide-area network connectivity
On-board modules	Wio-E5 - LoRa® wireless module from Seeed

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	Technology
Key Features	Long-range communication, broad frequency range, strong signal transmission, reliable reception even in challenging conditions, supports (G)FSK and LoRa® modes, embedded global LoRaWAN® protocol support and an AT command set, Boot mode button, SWD programming, and more
Interface	I2C,SPI,UART
Feature	ClickID
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 LR 10 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikro™ BUS		Pin	Notes
	NC	1	AN	PWM	16	NC	
Reset / ID SEL	RST	2	RST	INT	15	NC	
SPI Select / ID COMM	CS	3	CS	RX	14	TX	UART TX
SPI Clock	SCK	4	SCK	TX	13	RX	UART RX
SPI Data OUT	SDO	5	MISO	SCL	12	SCL	I2C Clock
SPI Data IN	SDI	6	MOSI	SDA	11	SDA	I2C Data
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
T1	BOOT	-	Boot Upgrade Mode Button

LR 10 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Operating Frequency Range	868	-	928	MHz
RF Input Power	-	-	+10	dBm
Output Power	-	-	22	dBm
Sensitivity	-	-	-137.5	dBm

Software Support

We provide a library for the LR 10 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 LR 10 Click driver.

Key functions

- lr10_write_cmd This function writes a desired command by using UART serial interface.

- lr10_write_cmd_sub_param This function writes a desired command, subcommands and parameter by using UART serial interface.

Example Description

This example demonstrates the use of LR 10 Click board™ by processing the incoming data and displaying them on the USB UART.

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.LR10

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

Click board™ Catalog

Click boards™

Downloads

[LR 10 click example on Libstock](#)

[LR 10 click schematic](#)

[Wio-E5 datasheet](#)

[Wio-E5 AT Commands](#)

[LR 10 Click 2D and 3D files](#)