

RAK11720 Click - SMA



PID: MIKROE-7015

RAK11720 Click - SMA is a compact add-on board that provides dual wireless connectivity through LoRaWAN and Bluetooth Low Energy, enabling long-range data transmission and short-range communication for SMA-compatible modern IoT applications. It is based on the [RAK11720-8-SM-NI](#) module from [RAKwireless](#), which integrates the Ambiq Apollo3 Blue AMA3B1KK-KBR-B0 SoC with an ARM Cortex-M4F microcontroller and the Semtech SX1262 LoRa transceiver. The board supports LoRaWAN 1.0.3 Class A, B, and C operation, LoRa Point-to-Point (P2P) communication, and multiple regional frequency bands including EU868, RU864, and IN865, offering long-range coverage exceeding 10km with an optimized antenna. This Click board™ is ideal for smart home automation, environmental monitoring, industrial sensor networks, and building management systems.

For more information about **RAK11720 Click - SMA** visit the official [product page](#).

How does it work?

RAK11720 Click - SMA is based on the RAK11720-8-SM-NI module from RAKwireless, which integrates the Ambiq Apollo3 Blue AMA3B1KK-KBR-B0 SoC powered by an ARM Cortex-M4F microcontroller with 1MB Flash and 348KB SRAM, and the Semtech SX1262 LoRa transceiver. Supporting Bluetooth 5.0 and fully compliant with LoRaWAN 1.0.3 Class A, B, and C specifications, this module also includes a LoRa Point-to-Point (P2P) mode, enabling developers to quickly build private LoRa networks or customized communication systems. It is ideal for long-range data transmissions and short-range communication in IoT applications such as smart home automation, industrial sensor networks, building control, and environmental monitoring.

Mikroe produces entire development toolchains for all major microcontroller architectures.

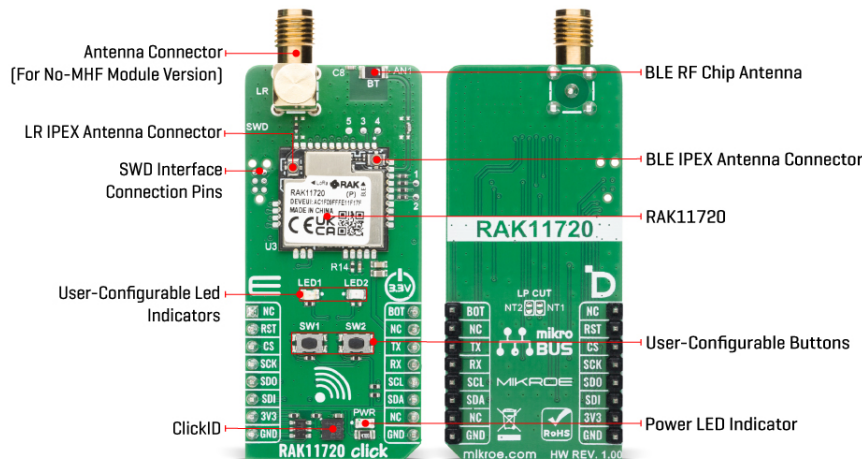
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The RAK11720-8-SM-NI supports multiple regional frequency bands including EU868/RU864/IN865 offering activation methods via OTAA or ABP, and ensuring reliable long-range performance exceeding 10km with an optimized SMA-compatible antenna. The module operates with default RUI3 firmware (RAKwireless Unified Interface), which allows it to function as a standalone MCU platform capable of hosting user-defined applications through RUI3 APIs, enabling direct sensor interfacing and peripheral control without the need for an external host.

This Click board™ establishes communication between the RAK11720-8-SM-NI module and the host MCU through a UART interface, using standard UART RX and TX pins. The default communication speed is set at 115200bps. Additionally, the board includes an SPI and I2C interface pins. Along with the communication and control pins, this Click board™ also includes a reset pin (RST) enabling easy module resetting, BOT pin as BOOT pin used for recovery, and SWD pads designed for use with MIKROE's [6-pin Needle Cable](#), providing an optional flash and debug SWD (Serial Wire Debug) interface functionality. Additionally, the board features two user-configurable buttons (SW1 and SW2) and two user-configurable LED indicators (a red LED1 and yellow LED2) for customizable user interaction and status indication.

The RAK11720 Click includes a set of easily accessible test points designed to support debugging, monitoring, and functional evaluation of the onboard module. Test points 1 and 2 are connected to the ADC pins of the RAK11720-8-SM-NI module, allowing direct access for analog signal measurements or external sensor interfacing. Test points 3 and 4 correspond to the UART2 interface pins, providing a convenient serial communication channel for data transmission, firmware debugging, or connection to an external host controller.

Test point 5 serves as a ground reference point, ensuring stable measurement conditions and reliable circuit grounding during testing. Additionally, on the back side of the board, there is a designated LP CUT section consisting of cuttable traces that connect user-configurable LEDs. By cutting these traces, the LEDs are disabled, resulting in reduced power consumption and improved energy efficiency, making the board particularly suitable for battery-powered or energy-sensitive applications.

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.

Specifications

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Type	LoRa
Applications	Ideal for smart home automation, environmental monitoring, industrial sensor networks, and building management systems
On-board modules	RAK11720-8-SM-NI - LPWAN + BLE module from RAK Wireless
Key Features	LoRaWAN 1.0.3 Class A, B, and C compliance, LoRa Point-to-Point (P2P) communication mode, integrated Ambiq Apollo3 Blue ARM Cortex-M4F MCU with 1MB Flash and 348KB SRAM, Semtech SX1262 LoRa transceiver, Bluetooth 5.0 Low Energy connectivity, support for multiple regional frequency bands, SMA-antenna-compatible, 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 RAK11720 Click - SMA 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	BOT	Boot Control
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	5V	Power Supply
Ground	GND	8	GND	GND	9	GND	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
LD2-LD3	LED1-LED2	-	User-Configurable LED Indicators
SW1-SW2	SW1-SW2	-	User-Configurable Buttons

RAK11720 Click - SMA electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V

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Frequency Range	-	868	-	MHz
LoRa Range	-	-	10	km

Software Support

[RAK11720 SMA 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 RAK11720 SMA Click board by showing the communication between two Click boards configured in P2P network mode.

Key Functions

- `rak11720sma_cfg_setup` This function initializes Click configuration structure to initial values.
- `rak11720sma_init` This function initializes all necessary pins and peripherals used for this Click board.
- `rak11720sma_cmd_run` This function sends a specified command to the Click module.
- `rak11720sma_cmd_set` This function sets a value to a specified command of the Click module.
- `rak11720sma_cmd_get` This function is used to get the value of a given command from the Click module.

Application Init

Initializes the driver and logger.

Application Task

Application task is split in few stages:

- **RAK11720SMA_POWER_UP:**
Powers up the device, performs a device factory reset and reads system information.
- **RAK11720SMA_CONFIG_EXAMPLE:**
Configures device for the LoRa P2P network mode.
- **RAK11720SMA_EXAMPLE:**
Performs a LoRa P2P example by exchanging messages with another RAK11720 SMA Click board.

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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

[RAK11720 Click - SMA 2D and 3D files v100](#)

[RAK11720 Click - SMA schematic v100](#)

[RAK11720 datasheet](#)

[RAK11720 Click - SMA example package](#)

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