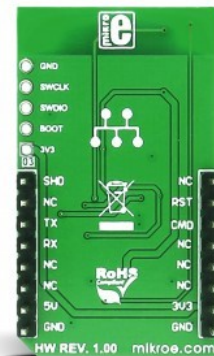


SPIRIT Click



PID: MIKROE-2568

SPIRIT Click is a compact add-on board that contains a Sub-GHz receiver. This board features the SP1ML, a Spirit1 868MHz low-power RF module with an integrated microcontroller from STMicroelectronics. Over the ISM frequency range of 863 to 870MHz, it can achieve up to 500kbps of data rate transmission. The module uses an integrated STM32L1 microcontroller to bridge the Spirit1 transceiver and the host MCU. This Click board™ makes the perfect solution for the development of home and building automation systems, wireless sensor networks, data acquisition equipment, security systems, mobile health and medical equipment, and more.

SPIRIT Click is supported by a [mikroSDK](#) compliant library, which includes functions that simplify software development. This [Click board™](#) comes as a fully tested product, ready to be used on a system equipped with the [mikroBUS™](#) socket.

Note: SPIRIT click is intended and certified to be used in Europe (Region 1), for America (Region 2) you can use [SPIRIT 2 click](#).

How does it work?

SPIRIT Click is based on the SP1ML, a Spirit1 868MHz low-power RF module with an integrated microcontroller from STMicroelectronics. Besides the STM32L1 MCU, the module integrates a filter/balun and a chip antenna. Over the chip antenna, the SP1ML achieves output power up to +11.6dBm and uses modulation schemes 2-FSK, GFSK, GMSK, OOK, and ASK. Its compact size, integrated design, all necessary FCC modular approvals, and CE compliance reduce time-to-market, making it an ideal choice for wireless applications. The data rates depend on the used modulation.

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ISO 9001: 2015 certification of quality management system (QMS).

The UART host interface allows simple connection to an external microcontroller with standard firmware, allowing AT commands to facilitate RF configuration, data transmission, and reception using simple point-to-point communication. It can also switch the module between the command and operating modes. In addition, the serial wire debug interface (SWD) is also available, as the SPIRIT Click and the SP1ML module itself support custom module firmware. The 5-pin header, aside from the module, can also be used for debugging purposes. Additional RXTX LED status indicator shows when the data is sent or received.

The command mode allows module configuration and status interrogation using an extended AT-style command set. The module serves its primary purpose in operating mode as a wireless transceiver. Following power-up or reset, the module starts in operating mode with the current configuration loaded from EEPROM. In operating mode, data received from the host on the UART interface will be wirelessly transmitted by the Spirit1 radio using the current configuration settings for frequency, data rate, modulation, and output power. Conversely, any data received by Spirit1 that meets the configured filtering criteria will be output to the UART interface. The module will accept commands in command mode to configure module settings and interrogate module status.

SPIRIT Click uses a standard UART interface to communicate with the host MCU, supporting baud rates from 9600 up to 250000bps, while 38400bps is the default value. You can reset the Spirit Click over the RST pin and shut it down over the SHD pin. The CMD pin is used to change the operating mode.

This Click board™ can operate with either 3.3V or 5V logic voltage levels selected via the LOGIC SEL jumper. This way, both 3.3V and 5V capable MCUs can use the communication lines properly. However, the Click board™ comes equipped with a library containing easy-to-use functions and an example code that can be used as a reference for further development.

Specifications

Type	Sub-1 GHz Transceivers
Applications	Can be used for the development of home and building automation systems, wireless sensor networks, data acquisition equipment, security systems, mobile health and medical equipment, and more
On-board modules	SP1ML - Spirit1 868MHz low-power RF module with an integrated microcontroller from STMicroelectronics
Radio Region	Europe
Key Features	The low data rate, low power sub-GHz transceiver, integrated STM32L1 microcontroller, integrated filter/balun, chip antenna, AT commands support, 2-FSK, GFSK, GMSK, OOK, and ASK modulation schemes, compact size, and more
Interface	GPIO, UART
Feature	No ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)

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Input Voltage	3.3V or 5V
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Pinout diagram

This table shows how the pinout on SPIRIT 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	SHD	Shutdown
Reset	RST	2	RST	INT	15	NC	
Command Mode	CMD	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	5V	Power Supply
Ground	GND	8	GND	GND	9	GND	Ground

Onboard settings and indicators

Label	Name	Default	Description
-	PWR	-	Power LED Indicator
-	RXTX	-	Data Receive and Transmit LED Indicator
J1A	LOGIC SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V

SPIRIT Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Operating Frequency Range	863	-	870	MHz
Data Rates	-	-	500	kbps

Software Support

We provide a library for the SPIRIT 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 SPIRIT Click driver.

Key functions

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- spirit_power_module Function for power mode of SPIRIT click.
- spirit_reset Function for resetting SPIRIT click.
- spirit_set_mode Function for setting mode of SPIRIT click.

Example Description

This example reads and processes data from SPIRIT clicks.

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.SPIRIT

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™](#)

[Click board™ Catalog](#)

[Click Boards™](#)

Downloads

[SP1ML datasheet](#)

[SPIRIT click example on Libstock](#)

[SPIRIT click schematic v100](#)

[SPIRIT click 2D and 3D files v100](#)

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