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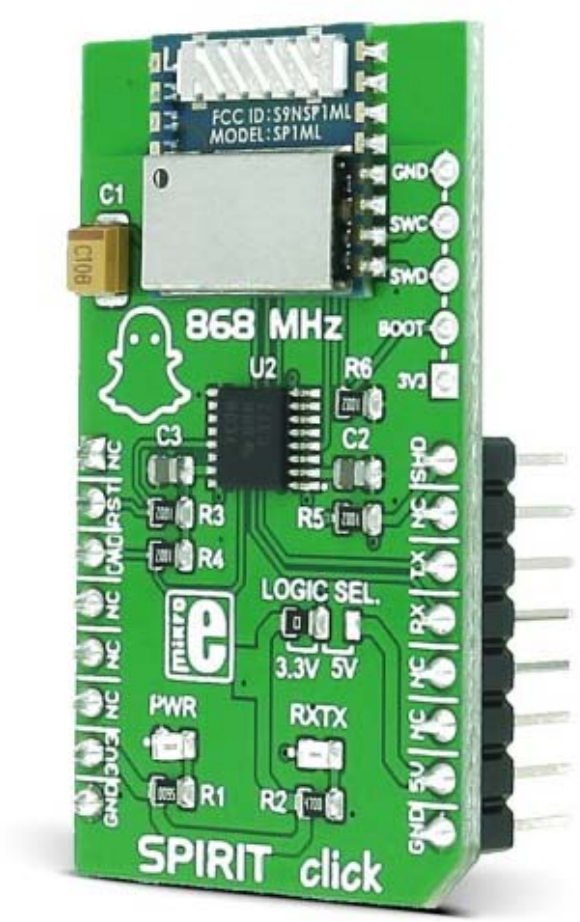
SPIRIT click

PID: MIKROE-2568



SPIRIT click carries the SP1ML 868MHz ultra low-power RF module. The board is designed to use 3.3V power supply and 3.3V or 5V I/O voltage levels. It communicates with the target MCU over UART interface, with additional functionality provided by the following pins on the mikroBUS™ line: PWM, RST, CS.

It can be used to wirelessly send and receive UART data.

SP1ML 868MHz RF module features

SP1ML is based on the SPIRIT1 RF sub-GHz transceiver (with integrated SMPS), STM32L1 microcontroller, integrated filter/balun, and chip antenna.

There are two operational modes, *command mode* and *operating mode*. The command mode allows module configuration and status interrogation using an extended 'AT' style command set. In operating mode the module serves its primary purpose as a wireless transceiver.

In operating mode the module uses only 13.5mA, 2.2mA in command mode, and even lower in stanby with just **1.4µA**. This kind of power consumption makes it ideal for smart devices that send small amounts of data.

The module has an integrated antenna and crystal.

Key features

- SP1ML 868MHz RF module
  - Low data rate, low power sub-GHz transceiver
  - STM32L1 Ultra low power microcontroller at 32 MHz (16 kB RAM and 128 kB Flash)
  - Integrated antenna and crystal
  - Output power up to +11.6 dBm
- UART interface
- 3.3V power supply

Specification

Product Type	RF Sub 1GHz
Applications	Security systems, mobile health and medicine applications, IoT, wireless metering, etc.
MCU	SP1ML 868MHz ultra low-power RF module
MCU Memory	16 kB RAM and 128 kB Flash
Key Features	Low data rate, low power sub-GHz transceiver
Interface	UART
Power Supply	3.3V
Compatibility	mikroBUS
Click board size	M (42.9 x 25.4 mm)

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		mikroBUS™			Pin	Notes
Not connected	NC	1	AN	PWM	16	SHDN	Shutdown
Reset input, active low	RST	2	RST	INT	15	NC	Not connected
Command mode	CMD	3	CS	TX	14	TXD	UART transmit data
Not connected	NC	4	SCK	RX	13	RXD	UART receive data
Not connected	NC	5	MISO	SCL	12	NC	Not connected
Not connected	NC	6	MOSI	SDA	11	NC	Not connected
Power supply	+3.3V	7	3.3V	5V	10	+5V	Power supply
Ground	GND	8	GND	GND	9	GND	Ground

Jumpers and settings

LOGIC SEL - used to select 3.3 or 5V logical level for UART communication (J1A in the schematic).

Programming

Code examples for SPIRIT click, written for MikroElektronika hardware and compilers are available on Libstock.

General description

The library implements communication protocol between the MCU host and SPIRIT click module. It can work in two modes, command mode and operating mode. The command mode allows module configuration and status interrogation using an extended ‘AT’ style command set. In operating mode the module serves its primary purpose as a wireless transceiver. It uses asynchronous approach to issue commands and receive responses via callback functions.

Code snippet

The code snippet shows an example callback function for the ATO command. It checks if the response is OK to change from library state to operating mode.

```
01 static bool on_ato(char* response)
02 {
03     if(strcmp(response, "OK") == 0)
04     {
05         LOG_INFO("Entered operating mode.");
06
07         spirit_mode(SPIRIT_OPERATING_MODE);
08     }
09     else
10     {
11         LOG_ERROR("Failed to enter to operation mode...");
12     }
13
14     return true;
15 }
```

Features

- Configurable command buffer size.
- Ring buffer for receiving data via UART
- Supported mikroC compilers for ARM, PIC32, PIC, FT90.
- Asynchronous command issuing.