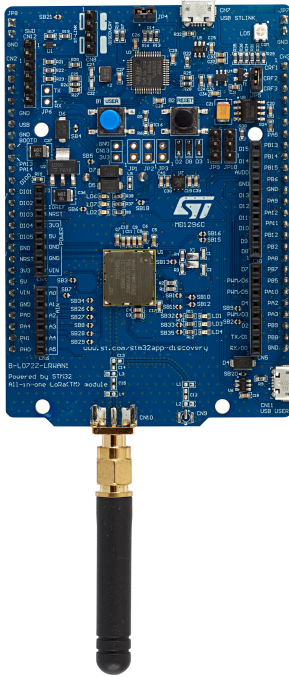


## Discovery kit for LoRaWAN™, Sigfox™, and LPWAN protocols with STM32L0



Picture is not contractual.

Product status link

[B-L072Z-LRWAN1](#)



### Features

- CMWX1ZZABZ-091 LoRa®/Sigfox™ module (Murata)
  - Embedded ultra-low-power STM32L072CZ MCU, based on Arm® Cortex®-M0+ core, with 192 Kbytes of Flash memory, 20 Kbytes of RAM, 20 Kbytes of EEPROM
  - Frequency range: 860 MHz - 930 MHz
  - USB 2.0 FS
  - 4-channel, 12-bit ADC, 2 × DAC
  - 6-bit timers, LP-UART, I<sup>2</sup>C and SPI
  - Embedded SX1276 transceiver
  - LoRa®, FSK, GFSK, MSK, GMSK, and OOK modulations (+ Sigfox™ compatibility)
  - +14 dBm or +20 dBm selectable output power
  - 157 dB maximum link budget
  - Programmable bit rate up to 300 kbit/s
  - High sensitivity: down to -137 dBm
  - Bullet-proof front end: IIP3 = -12.5 dBm
  - 89 dB blocking immunity
  - Low Rx current of 10 mA, 200 nA register retention
  - Fully integrated synthesizer with a resolution of 61 Hz
  - Built-in bit synchronizer for clock recovery
  - Sync word recognition
  - Preamble detection
  - 127 dB+ dynamic range RSSI
  - LoRaWAN™ Class A certified
- SMA and U.FL RF interface connectors
- Including 50-ohm SMA RF antenna
- 7 LEDs:
  - 4 general-purpose LEDs
  - 5 V power LED
  - ST-LINK-communication LED
  - Fault-power LED
- 1 user and 1 reset push-buttons
- On-board ST-LINK/V2-1 debugger/programmer with USB re-enumeration capability: mass storage, Virtual COM port, and debug port
- Arduino™ Uno V3 connectors
- Board power supply through the USB bus or external VIN/3.3 V supply voltage or batteries
- 3 × AAA-type battery holder for standalone operation
- Support of a wide choice of Integrated Development Environments (IDEs) including IAR™, Keil®, GCC-based IDEs, Arm® Mbed™

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## 1 Description

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The [B-L072Z-LRWAN1](#) LoRa<sup>®</sup>/Sigfox<sup>™</sup> Discovery kit is a development tool to learn and develop solutions based on LoRa<sup>®</sup>, Sigfox<sup>™</sup>, and FSK/OOK technologies. This Discovery kit features the all-in-one CMWX1ZZABZ-091 open module by Murata. The module is powered by an [STM32L072CZ](#) microcontroller and SX1276 transceiver. The transceiver features the LoRa<sup>®</sup> long-range modem, providing ultra-long-range spread-spectrum communication and high interference immunity, minimizing current consumption. Since CMWX1ZZABZ-091 is an open module, the user has access to all STM32L072CZ peripherals such as ADC, 16-bit timer, LP-UART, I<sup>2</sup>C, SPI, and USB 2.0 FS (supporting BCD and LPM).

The [B-L072Z-LRWAN1](#) Discovery kit includes an ST-LINK/V2-1 embedded debug tool interface, LEDs, push-buttons, antenna, Arduino<sup>™</sup> Uno V3 connectors and USB OTG connector in Micro-B format.

The LoRaWAN<sup>™</sup> stack supports Class A, Class B, and Class C. It is available in the [I-CUBE-LRWAN](#) firmware package. Several examples, including an AT-command stack, are available to help users set up a complete LoRaWAN<sup>™</sup> node.

The Sigfox<sup>™</sup> stack is RC1, RC2, RC3c, and RC4 compliant. It is available in the [X-CUBE-SFOX](#) Expansion Package. Several examples, including an AT-command modem, are also available to help users set up a complete Sigfox<sup>™</sup> node.

## 2 Ordering information

To order the B-L072Z-LRWAN1, refer to [Table 1](#). For a detailed description, refer to the user manual on the product web page. Additional information is available from the datasheet and reference manual of the target STM32.

**Table 1. List of available products**

Order code	Board reference	User manual	Target STM32	Additional content
B-L072Z-LRWAN1	MB1296	UM2115	STM32L072CZT6	50-ohm SMA RF antenna.

### 2.1 Product marking

Evaluation tools marked as “ES” or “E” are not yet qualified and therefore not ready to be used as reference design or in production. Any consequences deriving from such usage will not be at ST charge. In no event, ST will be liable for any customer usage of these engineering sample tools as reference design or in production.

“E” or “ES” marking examples of location:

- On the targeted STM32 that is soldered on the board (for illustration of STM32 marking, refer to the STM32 datasheet “Package information” paragraph at the [www.st.com](http://www.st.com) website).
- Next to the evaluation tool ordering part number that is stuck or silk-screen printed on the board.

### 2.2 Codification

The meaning of the codification is explained in [Table 2](#).

**Table 2. Codification explanation**

B-XXYYW-LRWAN1	Description	Example: B-L072Z-LRWAN1
XX	MCU series in STM32 32-bit Arm Cortex MCUs	STM32L0 Series
YY	Refers to the MCU product line in the series	STM32L0x2 product line
W	STM32 Flash memory size: <ul style="list-style-type: none"> <li>• Z for 192 Kbytes</li> </ul>	192 Kbytes

The order code is mentioned on a sticker placed on the top side of the board.

## 3 Development environment

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### 3.1 System requirements

- Windows® OS (7, 8 and 10), Linux® 64-bit, or macOS®
- USB Type-A to Micro-B cable

*Note:* macOS® is a trademark of Apple Inc. registered in the U.S. and other countries.

### 3.2 Development toolchains

- Keil® **free** MDK-ARM<sup>(1)</sup>
- IAR™ EWARM<sup>(1)</sup>
- GCC-based IDEs
- Arm® Mbed™<sup>(2)</sup> online (see [mbed.org](https://mbed.org))

*Note:*

1. On Windows® only.
2. Arm and Mbed are registered trademarks or trademarks of Arm Limited (or its subsidiaries) in the US and or elsewhere.

### 3.3 Demonstration software

The demonstration software, included in the [I-CUBE-LRWAN](#) firmware package, is preloaded in the STM32 Flash memory for easy demonstration of the device peripherals in standalone mode. The latest versions of the demonstration source code and associated documentation can be downloaded from [www.st.com](http://www.st.com).

## Revision history

**Table 3. Document revision history**

Date	Version	Changes
30-Jan-2017	1	Initial release.
31-Jan-2018	2	Extended the document scope to Sigfox™: updated <i>Features</i> , <i>Description</i> , and <i>System requirements</i> .
28-Jun-2018	3	Updated <i>Features</i> with frequency range.
6-Jun-2019	4	Updated <i>Features</i> with <i>LoRaWAN™ Class A certified</i> . Updated <i>Description</i> with <i>LoRaWAN™</i> stack support and Sigfox™ stack compliance. Updated <i>Ordering information</i> , <i>Codification</i> , and <i>Demonstration software</i> . Added <i>Product marking</i> .

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