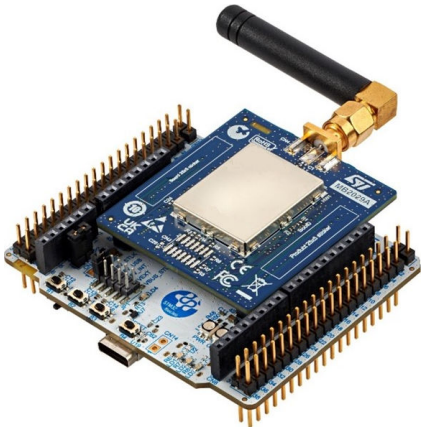
NUCLEO-WL33CCx NUCLEO-WL3RKBx

Data brief

STM32WL3x Nucleo-64 boards



NUCLEO-WL3xxxx global view.
Picture is not contractual.

Product status
NUCLEO-WL33CCx
NUCLEO-WL33CC1
NUCLEO-WL33CC2
NUCLEO-WL3RKBx
NUCLEO-WL3RKB1
NUCLEO-WL3RKB2

Features

- Ultralow-power wireless STM32WL3x series microcontroller based on the Arm® Cortex®-M0+ core:
  - 128 Kbytes of flash memory and 16 Kbytes of SRAM in a VFQFPN32 package for NUCLEO-WL3Rxxx (remote control line)
  - 256 Kbytes of flash memory and 32 Kbytes of SRAM in a VFQFPN48 package for NUCLEO-WL33xxx (metering line)
  - Sub-GHz transceiver with IPD front end optimized for 413-479 MHz or 826-958 MHz frequency bands, supporting OOK, ASK, 2(G)FSK, 4(G)FSK, D-BPSK, and DSSS modulations
  - Compatible with proprietary and standardized wireless protocols such as WM-Bus, Sigfox™, mioty, KNX-RF, and IEEE 802.15.4g
- Delivered with SMA antenna
- Three user LEDs
- Three user and one reset push-buttons
- Board connectors:
  - USB Type-C®
  - ARDUINO® Uno V3 expansion connector
  - ST morpho extension pin headers for full access to all MCU I/Os
- Flexible power-supply options: ST-LINK USB V_{BUS} or external sources
- On-board STLINK-V3EC debugger/programmer with USB re-enumeration capability: mass storage, Virtual COM port, and debug port
- Comprehensive free software libraries and examples available with the STM32CubeWL3 MCU Package
- Dedicated software tool to control and test radio transceiver
- Support of a wide choice of Integrated Development Environments (IDEs) including IAR Embedded Workbench®, MDK-ARM, and STM32CubeIDE

Description

The STM32WL3x Nucleo-64 boards are based on the MB1801 mezzanine board and:

- The MB2029 MCU RF board for the NUCLEO-WL33xxx boards, featuring the STM32WL33CCV6 sub-GHz application processor (metering line; NUCLEO-WL33CC1 and NUCLEO-WL33CC2 order codes)
- The MB2339 MCU RF board for the NUCLEO-WL3Rxxx boards, featuring the STM32WL3RKBV6 sub-GHz application processor (remote control line; NUCLEO-WL3RKB1 and NUCLEO-WL3RKB2 order codes).

The high-performance and low-power application processors can operate in 433, 868, and 915 MHz bands. The ARDUINO® Uno V3 connectivity support and the ST morpho headers provide an easy means of expanding the functionality of the STM32 Nucleo open development platform with a wide choice of specialized shields.

The NUCLEO-WL33xxx and NUCLEO-WL3Rxxx Nucleo-64 boards are supplied with a dedicated software package, HAL library, and various packaged software examples available with the STM32CubeWL3 MCU Package. They exist in two product variants with dedicated front ends tuned for specific frequency bands.

1 Ordering information

To order an STM32WL3x Nucleo-64 board board, 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 microcontroller.

Table 1. List of available products

Order code	Board reference	User manual	Target STM32	Differentiating feature
NUCLEO-WL33CC1	• MB1801(1) • MB2029-Highband(2)	UM3418	STM32WL33CCV6 (metering line)	Front end optimized for 826-958 MHz high band at 16 dBm
NUCLEO-WL33CC2	• MB1801(1) • MB2029-Lowband(2)			Front end optimized for 413-479 MHz low band at 16 dBm
NUCLEO-WL3RKB1	• MB1801(1) • MB2339-Highband(2)	UM3580	STM32WL3RKBV6 (remote control line)	Front end optimized for 826-958 MHz high band at 16 dBm
NUCLEO-WL3RKB2	• MB1801(1) • MB2339-Lowband(2)			Front end optimized for 413-479 MHz low band at 16 dBm

1. *Mezzanine board*
2. *MCU RF board*

1.1 Product marking

The product and each board composing the product are identified with one or several stickers. The stickers, located on the top or bottom side of each PCB, provide product information:

- Main board featuring the target device: product order code, product identification, serial number, and board reference with revision.

  Single-sticker example:

  Product order code
  Product identification
  syywwxxxxx
  MBxxxx-Variant-yzz

  Dual-sticker example:

  Product order code
  Product identification

  and

  MBxxxx-Variant-yzz
  syywwxxxxx

- Other boards if any: board reference with revision and serial number.

  Examples:

  syywwxxxxx
  MBxxxx-Variant-yzz

  or

  MBxxxx-Variant-yzz
  syywwxxxxx

  or

  or

On the main board sticker, the first line provides the product order code, and the second line the product identification.

On all board stickers, the line formatted as *"MBxxxx-Variant-yzz"* shows the board reference *"MBxxxx"*, the mounting variant *"Variant"* when several exist (optional), the PCB revision *"y"*, and the assembly revision *"zz"*, for example B01. The other line shows the board serial number used for traceability.

Products and parts labeled as *"ES"* or *"E"* are not yet qualified or feature devices that are not yet qualified. STMicroelectronics disclaims any responsibility for consequences arising from their use. Under no circumstances will STMicroelectronics be liable for the customer's use of these engineering samples. Before deciding to use these engineering samples for qualification activities, contact STMicroelectronics' quality department.

"ES" or *"E"* marking examples of location:

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

Some boards feature a specific STM32 device version, which allows the operation of any bundled commercial stack/library available. This STM32 device shows a *"U"* marking option at the end of the standard part number and is not available for sales.

To use the same commercial stack in their applications, the developers might need to purchase a part number specific to this stack/library. The price of those part numbers includes the stack/library royalties.

1.2 Codification

The meaning of the codification is explained in Table 2.

Table 2. Codification explanation

NUCLEO-XXYYZTN	Description	Example: NUCLEO-WL3RKB1
XX	MCU series in STM32 32-bit Arm Cortex MCUs	STM32WL series
YY	MCU product line in the series	STM32WL3x product line
Z	STM32 package pin count: • C for 48 pins • K for 32 pins	32 pins
T	STM32 flash memory size: • B for 128 Kbytes • C for 256 Kbytes	128 Kbytes
N	Frequency band: • 1: 826-958 MHz high-frequency band • 2: 413-479 MHz low-frequency band	High-frequency band

2 Development environment

STM32 32-bit microcontrollers are based on the Arm® Cortex®-M processor.

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2.1 System requirements

- Multi-OS support: Windows® 10 or 11, Linux® 64-bit, or macOS®
- USB Type-A or USB Type-C® to USB Type-C® cable

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

Linux® is a registered trademark of Linus Torvalds.

Windows is a trademark of the Microsoft group of companies.

2.2 Development toolchains

- IAR Systems® - IAR Embedded Workbench®(1)
- Keil® - MDK-ARM(1)
- STMicroelectronics - STM32CubeIDE

1. *On Windows® only.*

2.3 Demonstration software

The demonstration software, included in the STM32Cube MCU Package corresponding to the on-board microcontroller, 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*.

2.4 EDA resources

All board design resources, including schematics, EDA databases, manufacturing files, and the bill of materials, are available from the corresponding product page at *www.st.com*.

Revision history

Table 3. **Document revision history**

Date	Revision	Changes
04-Oct-2024	1	Initial release.
20-Nov-2024	2	Updated band frequency ranges.
05-Feb-2026	3	Updated the document with product info for NUCLEO-WL3RKBx boards.