STM32WBA WIRELESS SERIES

Multiprotocol versatility

Bluetooth® LE/Matter/Zigbee/Thread

Supporting the latest protocols, the STM32WBA series brings designers the performance, efficiency, and security required for short-range applications.

Certified for Bluetooth® LE (qualified against Bluetooth Core 5.4) and IEEE 802.15.4 (Zigbee®, Thread, and Matter) protocols, this product series allows developers to easily add wireless communication to their device, at an affordable cost.

Based on the Arm Cortex®-M33 core featuring TrustZone® technology, the STM32WBA series is an ultra-low-power platform that extends battery life and provides a high level of security to protect data and IP while complying with regulations.

The STM32WBA wireless MCU embeds up to 2 Mbytes of flash memory and up to 512 Kbytes of RAM. It supports the latest Bluetooth® LE features, including Auracast, Unicast, and AoA/AoD.

STM32WBA enabling features

From coded-phy up to 2 Mbits/sec high data rate	Ensure fast and reliable data transfer
Up to +10dBm output power	Extended communication range capabilities
Audio Auracast and Unicast support	Enables audio sharing and enhanced user experience with better efficiency

NEW FEATURES FOR EMBEDDED DEVELOPERS

- Support for latest protocols
- Enhanced security
- Low-power consumption
- High output power
- Reduce bill of materials

www.st.com/stm32wba

STM32WBA65 block diagram

System
- Power supply 1.71 V to 3.6 V (LDO/DCDC) POR/PDR/PVD/BOR
- Crystal oscillators 32 MHz (Radio and HSE) 32.768 kHz (LSE)
- Internal RC oscillators 32.768 kHz (500 ppm)
- RTC/AWU/CSS
- PLL/FLL
- SysTick timer
- 2x watchdogs (WWDG/IWDG)
- Up to 86 GPIOs
- Cyclic redundancy check (CRC)
- Voltage scaling (2 modes)

Security
- TZ, HUK, 256-bit AES, HPKA, TRNG, SHA-1/2

Arm® Cortex®-M33 FPU/DSP 100 MHz + TrustZone®
- Nested vector interrupt controller (NVIC)
- Memory protected unit (MPU)
- JTAG/SW debug

ART Accelerator™

AHB Bus Matrix

1x GPDMA

Multi-Protocol Radio
- Bluetooth® LE
- LE Coded, Ext Adv
- Direction Finding w/ AOA/AOD
- Isochronous Channels
- Qualified against Bluetooth Core 5.4
- Zigbee / Thread/ Matter
- Flexible Master / Slave setting

Total Memory
- Up to 2 Mbytes Flash
- Up to 512 Kbytes SRAM

Connectivity
- 3x USART, 3x SPI, 4x I2C, SAI (1ch), LPUART
- USB HS, Type C

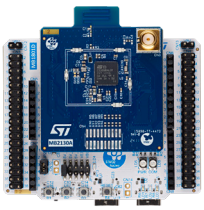
Control
- 2x 32-bit timer
- 4x 16-bit timer (1x Motor control)
- 2x 16-bit timer (ULP)

Analog
- 1x 12-bit ADC SAR 2Msps
- 2x ULP Comparators

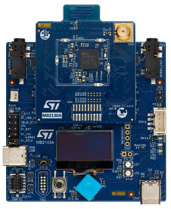
Sensing
- Capacitive touch

Legend: Side channel attack resistant

STM32WBA ecosystem



NUCLEO-WBA65RI



STM32WBA65I-DK1

B-WBA5M-WPAN

- **STM32CubeMX** is a free STM32 tool for configuration, code generation and power calculation.
- **STM32CubeWBA** is the STM32Cube MCU package the STM32WBA series (HAL and low-layer peripheral drivers, CMSIS, file system, RTOS, Bluetooth® LE, Zigbee, Thread stacks - and examples running on ST boards).
- **STM32CubeMonitor-RF** allows you to test and monitor the RF performance of your product.
- **STM32CubeProgrammer** is a programming tool.
- Easy migration from WBA5 to WBA6 by using the same ecosystem.

X-CUBE-MATTER firmware package

Discover our wiki

Security

The STM32WBA targets PSA Certified Level 3 and SESIP3 IoT security standards and is ready to address the EU Radio Equipment Directive (RED) regulations. Security is central to many applications, protecting data for safe resource monitoring and anti-hacking in medical and industrial fields.

Thanks to the Arm Cortex®-M33 core with TrustZone® technology, the STM32WBA isolates and protects code and IPs whenever required using its isolation capability and the TF-M library included in the product ecosystem. The 2.4 GHz wireless STM32WBA series provides an integrated solution to help developers streamline their design journey while addressing market requirements.

STM32WBA portfolio

Advanced features	**STM32WBA65/64** [1]Multi-protocol + audio Flash up to 2 Mbytes RAM up to 512 Kbytes SMPS/LDO	**STM32WBA55/54** [2]Multi-protocol + audio Flash up to 1 Mbyte RAM up to 128 Kbytes SMPS/LDO
Pin-to-pin compatible cross-serie	**STM32WBA63** [1]Multi-protocol + audio Flash up to 2 Mbytes RAM up to 512 Kbytes SMPS/LDO Compatible with STM32WBA55Cx (UFQFPN48)	**STM32WBA55** [2]Multi-protocol + audio Flash up to 1 Mbyte RAM up to 128 Kbytes SMPS/LDO Compatible with STM32WBA63 (UFQFPN48)
Essential features	**STM32WBA62** [3]Bluetooth® LE Flash up to 2 Mbytes RAM up to 512 Kbytes LDO	**STM32WBA52** [3]Bluetooth® LE Flash up to 1 Mbyte RAM up to 128 Kbytes LDO
Value line		**STM32WBA50** [3]Bluetooth® LE Flash 1 Mbyte RAM 64 Kbytes LDO
Module line	**STM32WBA6M** Available in Q1 2026	**STM32WBA5M** Fully certified [2]multi-protocol module Flash 1 Mbyte RAM 128 Kbytes Integrated crystals and antenna

[1]Bluetooth® LE (LE Coded, LE 2M, Extended Advertising, Direction Finding, LE Audio), IEEE 802.15.4 communication protocols, Zigbee®, Thread and Matter
[2]Bluetooth® LE (LE Coded, LE 2M, Extended Advertising, Direction Finding, LE Audio), IEEE 802.15.4 communication protocols, Zigbee® and Thread
[3]LE Coded, LE 2M, Extended Advertising, Direction Finding

Order code: FL2505STM32WBA