STM32WBxM wireless modules

Bluetooth® Low Energy 5.4, Zigbee 3.0, and Thread
The STM32 portfolio

Five product categories

- **Wireless MCU**: Short- and long-range connectivity
- **Ultra-low-power MCU**: 32-bit general-purpose microcontrollers: from 75 to 3,224 CoreMark score
- **Mainstream MCU**: Scalable security
- **High-performance MCU**: Enabling edge AI solutions
- **Embedded MPU**: 32- and 64-bit microprocessors
Choose the STM32WB series
7 keys points that make a difference

- Open 2.4 GHz radio
  Multi-protocol

- Dual-core / Full control
  Ultra-low-power

- IoT Protection ready

- Massive integration
  Cost saving

- 1MB Flash
  3.6 V
  129-pin

- 1.7 V
  48-pin
  256KB Flash
  A large offer

- Advanced RF tool, Energy control
  with C code generation

- No matter what!

- Longevity 10 years commitment
STM32WB MCU provides a large offering

Bluetooth® Low Energy 5.4, OpenThread, Zigbee 3.0 and proprietary protocol capable
STM32WBxM module portfolio

Easy deliver BLE applications

STM32WB1MMC

320K / 48K

1M / 256K

STM32WB5MMG

Flash memory / RAM size (bytes)

Pin count

77-pin LGA
6.5 x 10 mm
0.45 mm pitch

86-pin LGA
7.3 x 11 mm
0.435 mm pitch

from 1.7 V to 3.6 V
from -40°C to +85°C

Latest product generation
Available as a module to reduce your time to market
Easy to integrate - smooth certification process for developers

Key advantages

• WLCSP100 package integrated
• Maximum of features exposed
• Low-cost PCB for the mother board
• No RF expertise

Watch the video
STM32WB5MMG multi-protocol module

Small form factor
7.3 x 11 mm
Full reference design up to antenna, crystals

Multi-protocols
Bluetooth
Zigbee
OpenThread
Matter
+ Concurrent modes & Proprietary 2.4GHz

Rich feature set
Dual core* based
1 Mbyte flash memory
256 KBytes of RAM
LCD, USB FS, ADC, COMP
Security
OTA (application, radio)

Reduce the cost
Down to 2 PCB layers
Everything inside (single cap outside)
Free of charge radio stack
Certified FCC, CE, NCC, JRF, KC, SRRC, ISED, GOST

Discovery kit

STM32 ecosystem

RPN : STM32WB5MMGH6TR

*Dual Core: One core dedicated to Radio and protocols stack and One core dedicated for application
Prototyping made as easy as 1,2,3

STM32WB5MM-DK

Hardware discovery kit

STM32CubeMX/STM32CubeWB/
STM32CubeProg & STM32CubeMonRF

Code generation
Power calculation
STM32WB5MM-DK

Top view

Bottom view
(ARDUINO connectors)

Sensors:
ToF, Temp/humidity, 3-axis motion, Mic

Module
STM32WB5MMGH6TR

OLED screen
(SPI connection)

User USB

2 user buttons

STLink

IR LED

Reset button

EXT Flash
(quad-SPI)

STMOD+

Watch the video
STM32WB1M module

Bluetooth LE Module Solution

- Dual Core
- RF Filter
- Antenna
- XTAL + passive

Flash memory / RAM size (bytes)
- 320K / 48K

77-pin LGA
- from 1.7 V to 3.6 V
- from -40°C to +85°C

Option for external antenna

RF Filter

Internal Antenna

Passives

32KHz XTAL

27 GPIOs

32MHz XTAL

STM32WB1MMC

Pin count

Control
- Power supply: 1.71 V to 3.6 V w/ DC/DC, POR/POR/PVD/BOR
- Internal 32KHz RC oscillator: 0.1 → 40 MHz
- 16 MHz (HSI)
- RTC / AWU / CSS
- SysTick timer
- 2 watchdogs (WWDG / WDGD)
- Cyclic Redundancy Check
- Voltage scaling

Analog
- 1x ULP comparator
- 1x 12-bit ADC 2.5Msps
- Temperature sensor

Sensing
- 8 keys Capacitive touch

ARM Cortex-M4 FPU/DSP
- Nested Vector Interrupt Controller (NVIC)
- Memory Protected Unit (MPU)
- JTAG / SW debug

ART Accelerator™
- AHB Bus Matrix
- 1x DMA 7 channels

Multi-Protocol Radio
- Bluetooth™ LE 5.3
- AES 256 bit

ARM Cortex-M0+ MPU
- Nested Vector Interrupt Controller (NVIC)
- SW debug

Memory
- 32Kb Flash
- 4Kb SRAM
- BOOT ROM
- Secure boot loader

Connectivity
- 1x SPI, 1x I²C
- 1x USART ISO7816, smartcard, I²C, Modem control
- 1x ULP UART

Control
- 1x 16-bit + 1x 32-bit timers
- 2x ULP 16-bit timers

Security
- AES 256 bit / PMA / TRNG
- PCROP / FUS
## STM32WB1M module

### Small form factor
- **6.5 x 10 mm**
- Everything inside (antenna, crystals…)
- Option: internal or external antenna

### Bluetooth® Low Energy protocol
- **Proprietary 2.4GHz**

### Rich feature set
- Dual core* based
- 320 Kbytes flash
- 48 Kbytes RAM
- ADC, COMP, TSC
- Security
- OTA (application, radio)

### Extended Battery life
- DCDC configuration
- Standby ultra-low-power mode while radio activities

### Reduce costs
- Down to 2 PCB layers
- Everything inside (single cap outside)
- Free radio stack
- Certifications FCC, CE, NCC, JRF, KC, SRRC, ISED

### Connectivity expansion board
- Module STM32WB1MMCH6
- SMA connector not assembled by default

### STM32 ecosystem
- STM32CubeMX
- STM32CubeIDE
- STM32CubeWB
- STM32CubeMonitor
- STM32CubeProgrammer

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*Dual Core: One core dedicated to Radio and protocols stack and One core dedicated for application*
Prototyping made as easy as 1,2,3

B-WB1M-WPAN1

Hardware connectivity expansion board

STM32CubeMX/STM32CubeWB/STM32CubeProg & STM32CubeMonitor
Code generation
Power calculation
**B-WB1M-WPAN1 expansion board**

**Power supply options:**
- From Host through STMOD+ (slave mode)
- From USB type C through STMOD+ adapter (master mode)
- From Battery LiPo type directly connected (master mode)

Boot mode through micro switch

1x User button  
1x Reset button  
1x LED Blue

**Sensors:**
- Temperature sensor  
- Accelerometer

**Connectors:**
- STMOD+  
- STDC14 receiver  
- SMA connector for external antenna connexion option (not assembled by default)

**Additional features:**
Adapter board female-female STMOD+ (B_STMOD_FEM), provided with CEB  
Power consumption measurement capability through jumper
Software tools for STM32WBxM modules

A complete design journey, from configuration to application monitoring

**STM32CubeMX**
Graphical tool for easy configuration
- Configure and generate code
- Peripherals and middleware configuration

**IDEs**
Compile and debug
- Simple, powerful solutions
  - Partners IDE (Arm® Keil®) 
  - IDE based on Eclipse
  - RTOS aware debug

**STM32 programming & monitoring tools**
- Device and memory configuration
- Program the application
- Monitor variables at runtime
Releasing your creativity

/STM32

@ST_World

community.st.com

www.st.com/STM32WB

wiki.st.com/stm32mcu

github.com/STMicroelectronics

STM32WB online training

STM32WB blog article

MOOC – STM32WB workshop
Our technology starts with You

Find out more at www.st.com/STM32WB