STM32WB WIRELESS SERIES

Bluetooth 5.0 & IEEE 802.15.4

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Deliver best-in class IoT solutions with built-in key storage, OTA firmware updates and protocol concurrency control

A wireless dual-core brain

The STM32WB series is a dual-core, multi-protocol and ultra-low-power 2.4 GHz MCU system-on-chip.
It supports Bluetooth® 5.0 as well as IEEE 802.15.4 protocols (in Single and Concurrent modes) covering a wide spectrum of IoT application needs.
Based on ST's best-in-class, ultra-low-power MCU with wide peripheral set, the STM32WB series reduces development time, BOM cost, and extends application battery life.
STM32WB inspires innovation.

Bluetooth® 5.0 & IEEE 802.15.4

The STM32WB SoC offers multi-protocol stacks including Bluetooth® 5.0, OpenThread and ZigBee® 3.0 as well as standardized IEEE 802.15.4 protocols in Concurrent mode for best-in-class RF performance and dedicated core to radio activity provides SW flexibility and better user experience.
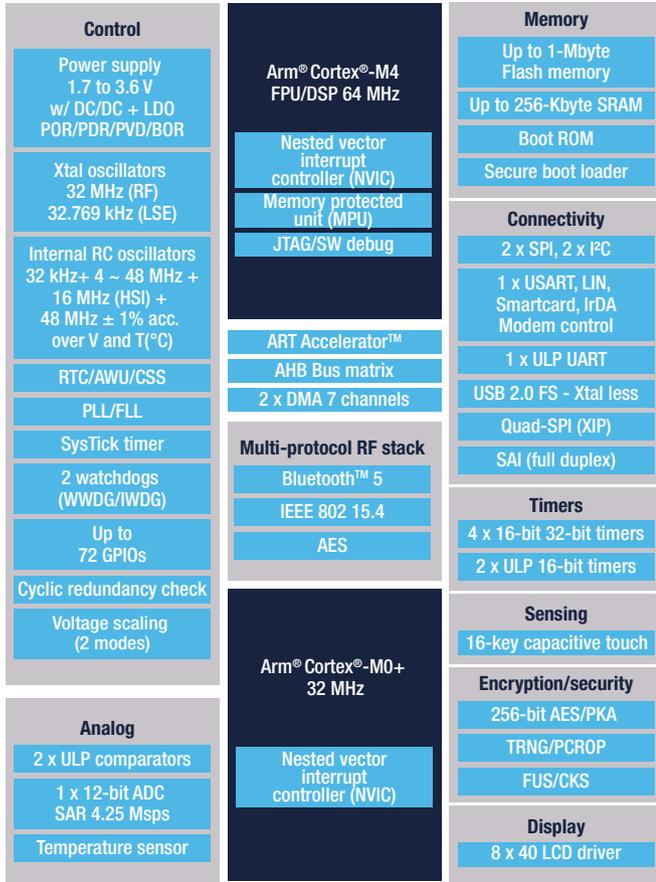
IP Protection

STM32WB devices offer device integrity and industrial IP protection features to meet manufacturers' increasing demand for brand protection.

| Features	Benefits
Dual-core solution in a single die	Dual-core solution with independent clock trees ensures real-time RF execution and optimized PCB and BOM
TX: 5.2 mA, RX: 4.5 mA BLE: −96 dBm, 802.15.4: −100 dBm	Extended battery life time. Perfect fit for coin cell battery Comfortable and robust operating distance of connection
Integrated balun, USB 2.0 crystal-less, LCD driver	Reduces BOM cost and PCB footprint
OTA firmware updates, customer key storage	Easy fleet maintenance, brand and IP protection

Note* Features availability or caracteristics depend on STM32WB reference

www.st.com/stm32wb

STM32WB55 BLOCK DIAGRAM

Control

Power supply
1.7 to 3.6 V
w/ DC/DC + LDO
POR/PDR/PVD/BOR

Xtal oscillators
32 MHz (RF)
32.769 kHz (LSE)

Internal RC oscillators
32 kHz+ 4 ~ 48 MHz +
16 MHz (HSI) +
48 MHz ± 1% acc.
over V and T(°C)

RTC/AWU/CSS

PLL/FLL

SysTick timer

2 watchdogs
(WWDG/IWDG)

Up to
72 GPIOs

Cyclic redundancy check

Voltage scaling
(2 modes)

Analog

2 x ULP comparators

1 x 12-bit ADC
SAR 4.25 Msps

Temperature sensor

Arm® Cortex®-M4
FPU/DSP 64 MHz

Nested vector
interrupt
controller (NVIC)

Memory protected
unit (MPU)

JTAG/SW debug

ART Accelerator™

AHB Bus matrix

2 x DMA 7 channels

Multi-protocol RF stack

Bluetooth™ 5

IEEE 802 15.4

AES

Arm® Cortex®-M0+
32 MHz

Nested vector
interrupt
controller (NVIC)

Memory

Up to 1-Mbyte
Flash memory

Up to 256-Kbyte SRAM

Boot ROM

Secure boot loader

Connectivity

2 x SPI, 2 x I²C

1 x USART, LIN,
Smartcard, IrDA
Modem control

1 x ULP UART

USB 2.0 FS - Xtal less

Quad-SPI (XIP)

SAI (full duplex)

Timers

4 x 16-bit 32-bit timers

2 x ULP 16-bit timers

Sensing

16-key capacitive touch

Encryption/security

256-bit AES/PKA

TRNG/PCROP

FUS/CKS

Display

8 x 40 LCD driver

STANDARD PROTOCOL

OPENTHREAD
released by Google

Bluetooth™ 5

Zigbee 3.0

STM32WB PORTFOLIO

Flash memory / RAM size (bytes)

Flash / RAM	48-pin UQFN (0.5 mm pitch)	68-pin VQFN (0.4 mm pitch)	100-pin WLCSP (0.4 mm pitch)	129-pin UFBGA (0.5 mm pitch)
1 M / 256 K	STM32WB55CG	STM32WB55RG	STM32WB55VG	
1 M / 128 K	STM32WB50CG			
512 K / 256 K	STM32WB55CE	STM32WB55RE	STM32WB55VE	
256 K / 128 K	STM32WB55CC	STM32WB55RC	STM32WB55VC	

Pin count

Legend: ■ STM32WBx5 line   ■ STM32WBx0 Value line pin-to-pin compatible with STM32WBx5

Companion chip
STMicroelectronics' integrated matching RF components are tailored for STM32WB packages :
MLPF-WB55-0xE3, QFN: x-0, WLCSP100 : x =2.

HARDWARE TOOLS

This STM32 Nucleo pack is the most cost-effective way to quickly get started developing STM32WB-based prototypes.
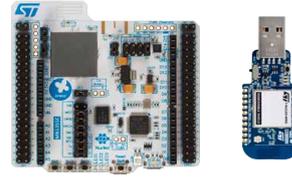
Order code: P-NUCLEO-WB55

EMBEDDED SOFTWARE

The STM32CubeWB package includes the STM32Cube hardware abstraction layer (HAL) and low-layer (LL) APIs peripheral drivers, a consistent set of middleware components (RTOS, USB, FatFS and STM32 touch sensing), as well as Bluetooth 5.0, OpenThread and ZigBee 3.0 connectivity stacks. All embedded software components come with a full set of examples running on STMicroelectronics boards.

SOFTWARE TOOLS

STM32CubeMX

Enables faster development thanks to its MCU pinout and clock configurator, power consumption calculator and code generation tools.

STM32 CubeMX

STM32CubeIDE

Is an Eclipse-based IDE which integrates the features of the STM32CubeMX configuration tool.

STM32 CubeIDE

STM32CubeMonRF

Is a development tool dedicated to wireless connectivity which helps reduce time-to-market by enabling radio testing and beaconing.
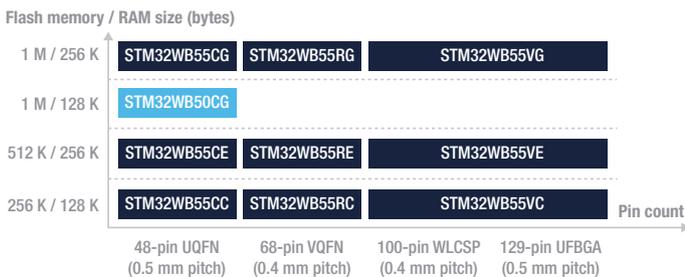
STM32 CubeMonitor-RF

STM32CubeProg

Is an all-in-one software tool for programming STM32 devices which can be easily used to interact with the memory of the STM32WB, including secure programming of the RF stacks.

STM32 CubeProgrammer

STM32WBx0 VALUE LINE

Extending our portfolio, the STM32WB50 Value Line focuses on the essentials and offers a feature-optimized solution to help developers meet the design requirements of cost-sensitive industrial and consumer IoT applications.
The STM32WB55 Nucleo pack is a useful tool to quickly get you started with the STM32WB50 microcontrollers.

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