STM32WB WIRELESS SERIES
Bluetooth LE 5.4 & IEEE 802.15.4

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® LE 5.4 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® LE 5.4 & IEEE 802.15.4
The STM32WB SoC offers multi-protocol stacks including Bluetooth® 5.4, OpenThread, Zigbee 3.0, proprietary protocols and concurrent mode, for best in-class RF performance.

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.

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

Note* Features availability or characteristics 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 + 1 MHz (HSE) + 48 MHz ± 1% acc. over V and T
- RTC/AWU/CSS
- PLL/PLL
- SysTick timer
- 2 watchdogs (WWDG/WDG)
- Up to 72 GPIOs
- Cyclic redundancy check
- Voltage scaling (2 modes)

**Encryption/security**
- 256-bit AES/PKA
- TRNG/PRNG
- FUS/CKS

**Multi-protocol RF stack**
- Bluetooth LE
- IEEE 802.15.4
- AES

**Timers**
- 4 x 16-bit timers
- 2 x ULP 16-bit timers

**Display**
- 8 x 40 LCD driver

**Sensing**
- 16-key capacitive touch

**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)

**Analog**
- 2 x ULP comparators
- 1 x 12-bit ADC
- SAR 4.25 Msps
- Temperature sensor

**STM32WB PORTFOLIO**

<table>
<thead>
<tr>
<th>Flash memory size</th>
<th>RAM size (bytes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1M / 128K</td>
<td></td>
</tr>
<tr>
<td>640K / 256K</td>
<td></td>
</tr>
<tr>
<td>512K / 256K</td>
<td></td>
</tr>
<tr>
<td>512K / 96K</td>
<td></td>
</tr>
<tr>
<td>320K / 96K</td>
<td></td>
</tr>
<tr>
<td>256K / 128K</td>
<td></td>
</tr>
<tr>
<td>256K / 96K</td>
<td></td>
</tr>
</tbody>
</table>

**STM32WBx0 VALUE LINE**

It 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. Nucleos are a useful tool to quickly get you started with the STM32WBx0 microcontrollers.

**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 LE 5.4, OpenThread and Zigbee 3.0 connectivity stacks. All embedded software components come with a full set of examples running on STMicroelectronics boards.

**SOFTWARE TOOLS**

- STM32CubeProgrammer
- STM32CubeIDE
- STM32CubeMonitor
- STM32CubeMX

**HARDWARE TOOLS**

This STM32 Nucleo is the most cost-effective way to quickly get started developing STM32WB-based prototypes.

**ORDER CODES**

1. NUCLEO-WB55RG
2. STM32WB55MM-DK
3. B-WB1M-WPAN1

**STANDARD PROTOCOL**

- Bluetooth
- OpenThread
- Zigbee 3.0

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