STM32WL WIRELESS SERIES

LoRa®, (G)FSK, (G)MSK, BPSK

STM32WL series: the STM32 pioneer in Sub-GHz wireless connectivity. Easy-to-use, reliable and tailored for a wide range of RF applications.

The world's first LoRa-enabled Sytem-on-Chip

The STM32WL series supports multi-modulation and delivers outstanding ultra-low-power performance. This makes it an ideal choice for LPWAN and IoT developments.

Embedding an Arm® Cortex®-M4 core and a Sub-GHz transceiver in one single chip, the STM32WL series ensures wireless application flexibility with LoRaWAN® and is compatible with other protocols in a fully open way.

Wireless connectivity

Designed for Sub-GHz LPWANs, the STM32WL series comes with a LoRaWAN® stack, available on demand.

Thanks to a deep integration, the innovative and open architecture is optimized for flexible resource use, power management and helps lower BOM cost while offering a better user experience.

Developed using the same technology as the one implemented in our ultra-low-power STM32L4 microcontrollers, the STM32WL series, with its integrated Sub-GHz transceiver, provides similar digital and analog peripherals for basic or complex application use cases requiring an extended battery life and a long RF range.
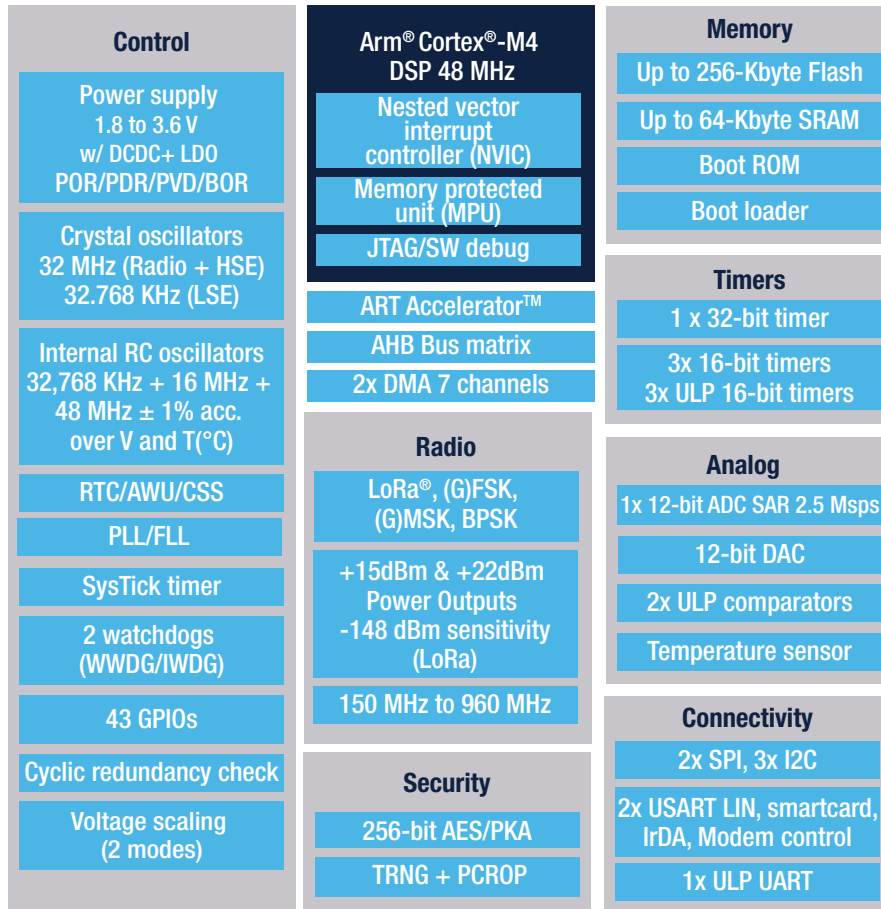
System periperals

- Modulations: LoRa®, (G)FSK, (G)MSK, BPSK

- Linear Frequency Range: 150 to 960 MHz

- Dual-power Outputs: up to 22 dBm and up to 15 dBm (Embedded PAs)

- Up to 43 GPIOs

- Embedded SMPS and LDO

- Multiple low-power modes to maximize battery life.

Security & ID

In addition to its wireless and ultra-low-power features, STM32WL microcontrollers include embedded security hardware functions such as 128- / 256-bit AES hardware encryption, PCROP read / write protection, and public-key cryptography with an elliptic curve encryption engine

STM32WL block diagram

Control

Power supply
1.8 to 3.6 V
w/ DCDC+ LDO
POR/PDR/PVD/BOR

Crystal oscillators
32 MHz (Radio + HSE)
32.768 KHz (LSE)

Internal RC oscillators
32,768 KHz + 16 MHz +
48 MHz ± 1% acc.
over V and T(°C)

RTC/AWU/CSS

PLL/FLL

SysTick timer

2 watchdogs
(WWDG/IWDG)

43 GPIOs

Cyclic redundancy check

Voltage scaling
(2 modes)

Arm® Cortex®-M4 DSP 48 MHz

Nested vector interrupt controller (NVIC)

Memory protected unit (MPU)

JTAG/SW debug

ART Accelerator™

AHB Bus matrix

2x DMA 7 channels

Radio

LoRa®, (G)FSK, (G)MSK, BPSK

+15dBm & +22dBm
Power Outputs
-148 dBm sensitivity
(LoRa)

150 MHz to 960 MHz

Security

256-bit AES/PKA

TRNG + PCROP

Memory

Up to 256-Kbyte Flash

Up to 64-Kbyte SRAM

Boot ROM

Boot loader

Timers

1 x 32-bit timer

3x 16-bit timers
3x ULP 16-bit timers

Analog

1x 12-bit ADC SAR 2.5 Msps

12-bit DAC

2x ULP comparators

Temperature sensor

Connectivity

2x SPI, 3x I2C

2x USART LIN, smartcard, IrDA, Modem control

1x ULP UART

Standard protocol

LoRaWAN   sigfox *

* Coming soon

Ecosystem

Taking advantage of the rich STM32 ecosystem, the STM32WL series comes with a Nucleo evaluation board and is fully integrated into the comprehensive STM32Cube Software development framework. STM32WL series comes with a LoRaWAN® stack certified for all regions, in source code format.
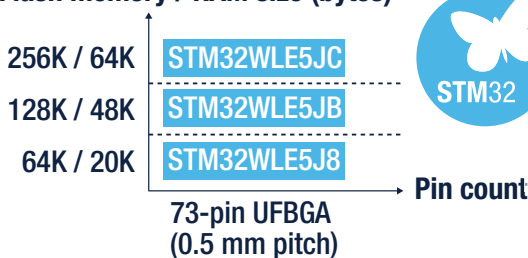
order code: NUCLEO-WL55JC

For more information about availability for OEM customers, please contact your nearest ST sales office.

STM32WL portfolio

Flash memory / RAM size (bytes)

256K / 64K   STM32WLE5JC

128K / 48K   STM32WLE5JB

64K / 20K   STM32WLE5J8

→ Pin count

73-pin UFBGA
(0.5 mm pitch)

Legend: ▢ In production

STM32WLE5 microcontrollers provide designers with flexibility in terms of memory size.
Four ECOPACK2®-compliant packages, featuring three different memory sizes, are available to address different levels of complexity to ensure a cost-efficient fit for application requirements.

life.augmented