STM32WL3x LINES

Wireless MCUs for efficient long-range communications

Low-power sub-GHz wireless MCU for long-range IoT connectivity

Based on the Arm® Cortex®-M0+ core, up to 64 MHz, the STM32WL3x lines integrate a sub-GHz dual radio for high flexibility and reduced BoM costs.

Offering 256 Kbytes of flash memory, the STM32WL3x lines come in compact packages down to 5 x 5 mm. It includes two radios, analog sensing peripherals, and an LCD driver.

With low-power consumption and a dedicated wake-up radio, the STM32WL3x lines ensure extended battery life for IoT devices.

KEY FEATURES AND BENEFITS

Lower design complexity

One single die in packages down to 5 x 5 mm integrating:

- 2 radios: sub-GHz multi-modulation radio & wide band wake-up radio
- LCD driver and LC sensor control for flow metering measurement

Flexibility

Simple and ultra flexible platform with multiple modulation support:

- 4-(G)FSK up to 600 Kbps, 2-(G)FSK, (G)MSK, DBPSK, DSSS, OOK, ASK
- IQ interface to develop your own modulation for even more flexibility
- Flexible radio packet handler

Low power dual radio for long range connectivity

- The main radio provides long range connectivity with an RX sensitivity up to -132dBm and a programmable TX power up to +20dBm
- Frequency coverage from 159-185 MHz, 413-479 MHz and 826-958 MHz
- Low-power consumption radio down to 5.6 mA (Rx) and 10 mA (Tx at 10 dBm full SoC current consumption)
- Additional dedicated wake-up on radio with 4.2 µA always-on receiver for system wake-up
- Supports wide frequency bands from 100 MHz to 2.4 GHz

Two radios, one single chip

Single Silicon Die

STM32 Cortex-M0+

256 Kbytes FLASH
32 Kbytes SRAM

+

Multi-Modulation Radio
2/4(G)FSK, MSK,
OOK, ASK, BPSK,
DSSS + IQ I/F

Dedicated Wake-up On radio

Sensing Peripherals

Segment LCD Driver

Control
- Power supply from 1.7 to 3.6v with DCDC
- Crystal oscillators 48 MHz (Radio + HSE) 32.768 KHz (LSE) Internal 32 KHz RCO

Analog
- 12-bit ADC SAR 1Msps
- Analog comparator + DAC
- 3 LC-sensor channels
- Temperature sensor

Peripherals
- 2 x SPI, 2 x I2C, I2S, USART, LPUART
- LCD driver 12x8 16x4
- Up to 32 GPIOs

Arm® Cortex®-M0+ Up to 64 MHz
- Nested vector interrupt controller (NVIC)
- Memory protected unit (MPU)
- SWD interface
- Flash up to 256 KB
- RAM up to 32 KB
- 1 KB OTP
- AHB Bus Matrix Direct radio register access
- DMA 8 channels

Low-power Radio
- 8 mA @ +10 dBm Tx 4 mA Rx
- 2-(G)FSK, 4-(G)FSK, (G)MSK, OOK, ASK, DSSS, DBPSK
- Up to +20 dBm Tx power -132 dBm Rx sensitivity
- 413-479 MHz, 826-958 MHz, 169 MHz*
- 16-bit IQ access

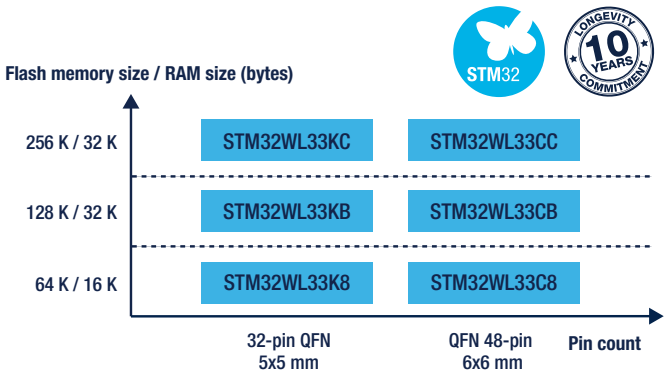
Low power Wakeup Radio Receiver
- RX OOK @ -50dBm
- 100 MHz – 2.4 GHz
- Down to 4 µA Always-on autonomous mode

Timers
- 2 16-bit GP timers + 16-bit prescalers, SysTick, RTC, PWMs
- Watchdog

Legend: Low-power radio, Memory, Internal buses

* Available on dedicated P/N (STM32WL3xxxxxA)

STM32WL3x portfolio



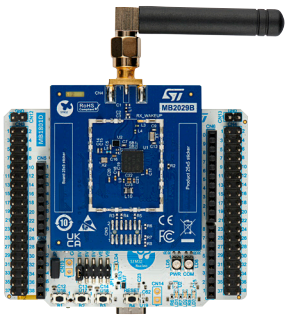
STM32WL3x comprehensive ecosystem

WISE Studio
The **STM32CubeWISEre** is a graphical user interface to interact with the STM32WL3x line devices and evaluate their radio capabilities.
The **STM32CubeWISEcg** is a PC application that can be used to build a flowgraph which defines the radio actions to execute under specific conditions, using the sequencer driver.

MLPF-WL-0xD3 RF IPDs
The STM32WL3's IPD portfolio, helps in reducing PCB footprint and achieving optimal RF performance by integrating the RF BoM of harmonic filters and impedance matching into a tiny footprint. This integration allows for a more compact design and speeds up RF design and time-to-market.

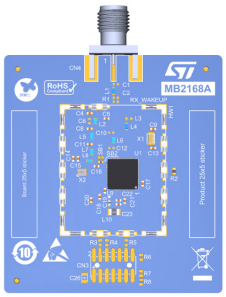
Start developing now!
More than 1 million developers have chosen STM32Cube, making it the reference in the industry.

Nucleo boards



NUCLEO-WL33CC1
High band: 826-958 MHz
& **NUCLEO-WL33CC2**
Low band: 413-479 MHz

Reference designs



STDES-WL3xxxxx
Resources to get you started: schematics, layout, BoM, and firmware examples

Standard protocols

M-Bus wireless, sigfox 0G Technology, Wi SUN, LoWPAN, mioty