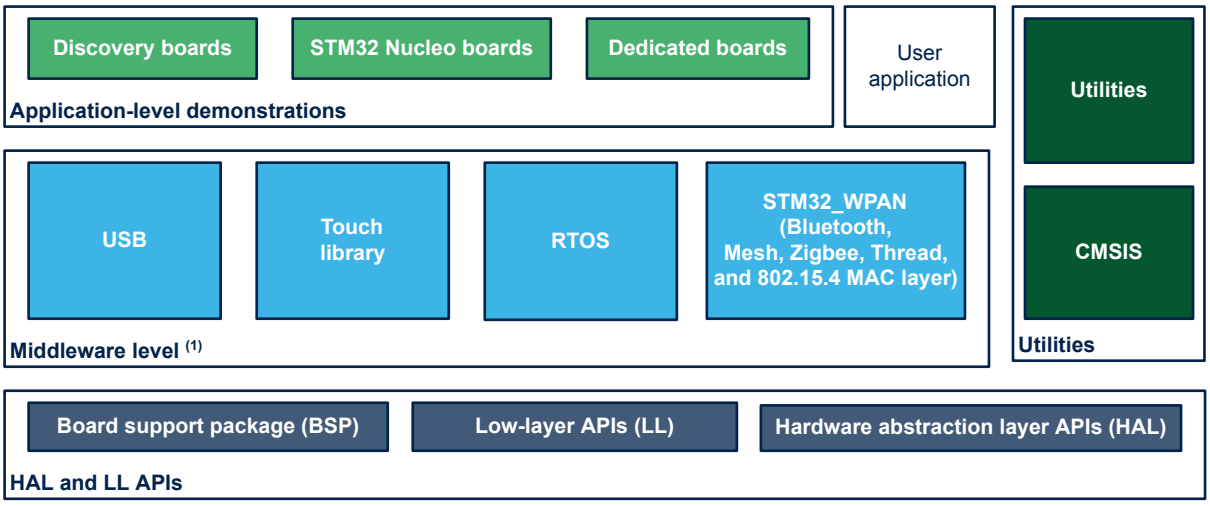
STM32Cube MCU Package examples for the STM32WB series

Introduction

The STM32CubeWB MCU Package comes with a rich set of examples running on STMicroelectronics boards. The examples are organized by board, and are provided with preconfigured projects for the main supported toolchains (see figure below).

Figure 1. STM32CubeWB firmware components



(1) The set of middleware components depends on the product series.

1 Reference documents

The reference documents are available on www.st.com/stm32cubefw:

- Latest release of STM32CubeWB firmware package
- *Getting started with STM32CubeWB for STM32WB Series* (UM2550)
- *STM32CubeWB Nucleo demonstration firmware* (UM2551)
- *Description of STM32WB HAL and low-layer drivers* (UM2442)
- *Developing applications on STM32Cube with FatFS* (UM1721)
- *Developing applications on STM32Cube with RTOS* (UM1722)
- *Building wireless applications with STM32WB Series microcontrollers* (AN5289)

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2 STM32CubeWB examples

The examples are classified depending on the STM32Cube level they apply to. They are named as follows:

- **Examples**
  The examples use only the HAL and BSP drivers (middleware components are not used). Their objective is to demonstrate the product/peripherals features and usage. They are organized per peripheral (one folder per peripheral, such as TIM). Their complexity level ranges from the basic usage of a given peripheral (as PWM generation using timer) to the integration of several peripherals (for example, how to use DAC for signal generation with synchronization from TIM6 and DMA). The usage of the board resources is reduced to the strict minimum.
- **Examples_LL**
  These examples only use the LL drivers (HAL drivers and middleware components are not used). They offer an optimum implementation of typical use cases of the peripheral features and configuration sequences. The LL examples are organized per peripheral (one folder for each peripheral), and run exclusively on the Nucleo boards.
- **Examples_MIX**
  These examples use only HAL, BSP and LL drivers (middleware components are not used). They aim at demonstrating how to use both HAL and LL APIs in the same application to combine their advantages:
  – HAL drivers offer high-level function-oriented APIs, which have a high level of portability, as they hide product/IP complexity to end-users.
  – LL drivers offer low-level APIs at register level with better optimization.

  The examples are organized per peripheral (one folder for each peripheral), and run exclusively on the Nucleo board.
- **Applications**
  The applications demonstrate the product performance and how to use the available middleware stacks. They are organized by middleware (one folder per middleware, for example USB Host) or by product feature that require high-level firmware bricks (such as Audio). The integration of applications that use several middleware stacks is also supported.
- **Demonstrations**
  The demonstrations aim at integrating and running the maximum number of peripherals and middleware stacks to showcase the product features and performance.
- **Template project**
  The template projects allow the user to quickly build a firmware application using HAL and BSP drivers on a given board.

The examples are located under *STM32Cube_FW_WB_VX.Y.Z\Projects*\. They all have the same structure:

- *Inc* folder, containing all header files.
- \Src folder, containing the sources code.
- *EWARM*, *MDK-ARM*, and *STM32CubeIDE* folders, containing the preconfigured project for each toolchain.
- readme.txt file, describing the example behavior and the environment required to run the example.

To run the example, proceed as follows:

1. Open the example using your preferred toolchain.
2. Rebuild all files and load the image into target memory.
3. Run the example by following the readme.txt instructions.

Note: Refer to "Development toolchains and compilers" and "Supported devices and evaluation boards" sections of the firmware package release notes to know more about the software/hardware environment used for the MCU Package development and validation. The correct operation of the provided examples is not guaranteed in other environments, for example when using different compiler or board versions.

The examples can be tailored to run on any compatible hardware: simply update the BSP drivers for your board, provided it has the same hardware functions (such as LED, LCD display, push-buttons). The BSP is based on a modular architecture that can be easily ported to any hardware by implementing the low-level routines.

Table 1 contains the list of examples provided with STM32CubeWB MCU Package.

Note: STM32CubeMX-generated examples are highlighted with the MX STM32CubeMX icon. TrustZone® indicates that the example is Arm® TrustZone® enabled.

Reference materials available on www.st.com/stm32cubefw.

Table 1. STM32CubeWB firmware examples

Level	Module name	Project name	Description	STM32WB5MM-DK[1]	P-NUCLEO-WB55.USBDongle[1]	P-NUCLEO-WB55.Nucleo68[1]	NUCLEO-WB15CC[1]	B-WB1M-WPAN1
Templates	-	Starter project	This projects provides a reference template that can be used to build any firmware application.	MX	-	MX	MX	X
	Total number of templates: 4			**1**	**0**	**1**	**1**	1
Templates_LL	-	Starter project	This projects provides a reference template through the LL API that can be used to build any firmware application.	MX	-	MX	MX	X
	Total number of templates_ll: 4			**1**	**0**	**1**	**1**	1
Examples	-	BSP	How to use the different BSP drivers of the external devices mounted on STM32WB5MM-DK board.	X	X	-	-	-
	ADC	ADC_AnalogWatchdog	How to use the ADC peripheral to perform conversions with an analog watchdog and out-of-window interrupts enabled.	-	-	MX	-	-
		ADC_MultiChannelSingleConversion	How to use the ADC to convert several channels using the sequencer in Discontinuous mode. Converted data are indefinitely transferred by DMA into an array (circular mode).	-	-	MX	MX	-
		ADC_Oversampling	How to use the ADC to convert a single channel but using the oversampling feature to increase resolution.	-	-	MX	-	-
		ADC_SingleConversion_TriggerSW_IT	How to use the ADC to convert a single channel at each software start. This example uses the interrupt programming model.	-	-	MX	MX	-
		ADC_SingleConversion_TriggerTimer_DMA	How to use the ADC to convert a single channel at each trigger event from a timer. Converted data are indefinitely transferred by DMA into an array (circular mode).	-	-	MX	MX	-
	BSP	BSP_Example	This example describes how to use the BSP API.	-	-	MX	MX	X
	COMP	COMP_CompareGpioVsVrefInt_IT	How to configure the COMP peripheral to compare the external voltage applied on a specific pin with the internal voltage reference.	-	-	MX	MX	-
		COMP_CompareGpioVsVrefInt_Window_IT	How to make an analog watchdog using the COMP peripheral in Window mode.	-	-	MX	-	-

Level	Module name	Project name	Description	STM32WB 5MM-DK[1]	P-NUCLEO-WB55 .USBDongle[1]	P-NUCLEO-WB55 .Nucleo68[1]	NUCLEO-WB15CC[1]	B-WB1M-WPAN1
Examples	CRC	CRC_Example	How to configure the CRC using the HAL API. The CRC (cyclic redundancy check) calculation unit computes the CRC code of a given buffer of 32-bit data words, using a fixed generator polynomial (0x4C11DB7).	-	-	MX	MX	-
		CRC_UserDefinedPolynomial	How to configure the CRC using the HAL API. The CRC (cyclic redundancy check) calculation unit computes the 8-bit CRC code for a given buffer of 32-bit data words, based on a user-defined generating polynomial.	-	-	MX	-	-
	CRYP	CRYP_AESModes	How to use the CRYP peripheral to encrypt and decrypt data using AES in chaining modes (ECB, CBC, CTR).	-	-	MX	-	-
		CRYP_DMA	How to use the AES1 peripheral to encrypt and decrypt data using AES 128 algorithm with ECB chaining mode in DMA mode.	-	-	MX	MX	-
	CORTEX	CORTEXM_MPU	This example presents the MPU feature. It configures a memory area as privileged read-only, and attempts to perform read and write operations in different modes.	-	-	MX	-	-
		CORTEXM_ModePrivilege	How to modify the Thread mode privilege access and stack. Thread mode is entered on reset or when returning from an exception.	-	-	MX	-	-
		CORTEXM_SysTick	How to use the default SysTick configuration with a 1 ms timebase to toggle LEDs.	-	-	MX	-	-
	DMA	DMA_FLASHToRAM	How to use a DMA to transfer a word data buffer from flash memory to embedded SRAM through the HAL API.	-	-	MX	MX	-
		DMA_MUXSYNC	How to use the DMA with the DMAMUX to synchronize a transfer with the LPTIM1 output signal. USART1 is used in DMA synchronized mode to send a countdown from 10 to 00, with a period of 2 seconds.	-	-	MX	MX	-
		DMA_MUX_RequestGen	How to use the DMA with the DMAMUX request generator to generate DMA transfer requests upon EXTI4 signal rising edge.	-	-	MX	MX	-
	FLASH	FLASH_EraseProgram	How to configure and use the FLASH HAL API to erase and program the internal flash memory.	-	-	MX	MX	-

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Examples	FLASH	FLASH_WriteProtection	How to configure and use the FLASH HAL API to enable and disable the write protection of the internal flash memory.	-	-	MX	MX	-
	GPIO	GPIO_EXTI	How to configure external interrupt lines.	-	-	MX	MX	-
		GPIO_IOToggle	How to configure and use GPIOs through the HAL API.	-	-	MX	MX	-
	HAL	HAL_TimeBase	How to customize the HAL using a general-purpose timer as main source of timebase, instead of the SysTick.	-	-	MX	MX	-
		HAL_TimeBase_RTC_ALARM	How to customize the HAL using RTC alarm as main source of timebase, instead of the SysTick.	-	-	MX	-	-
		HAL_TimeBase_RTC_WKUP	How to customize the HAL using RTC wakeup as main source of timebase, instead of the SysTick.	-	-	MX	MX	-
		HAL_TimeBase_TIM	How to customize the HAL using a general-purpose timer as main source of timebase instead of the SysTick.	-	-	MX	MX	-
	HSEM	HSEM_ProcessSync	How to use a hardware semaphore to synchronize two processes.	-	-	MX	-	-
		HSEM_ReadLock	How to enable, take, then release a semaphore using two different processes.	-	-	MX	-	-
	I2C	I2C_TwoBoards_AdvComIT	How to handle multiple I2C data buffer transmissions/receptions between a master and a slave device, using an interrupt.	-	-	MX	-	-
		I2C_TwoBoards_ComDMA	How to handle I2C data buffer transmission/ reception between two boards, via DMA.	-	-	MX	MX	-
		I2C_TwoBoards_ComIT	How to handle I2C data buffer transmission/ reception between two boards, using an interrupt.	-	-	MX	MX	-
		I2C_TwoBoards_ComPolling	How to handle I2C data buffer transmission/ reception between two boards in Polling mode.	-	-	MX	-	-
		I2C_TwoBoards_RestartAdvComIT	How to perform multiple I2C data buffer transmissions/receptions between two boards in Interrupt mode and with restart condition.	-	-	MX	-	-

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Examples	I2C	I2C_TwoBoards_RestartComIT	How to handle single I2C data buffer transmission/reception between two boards in Interrupt mode and with restart condition.	-	-	MX	-	-
		I2C_WakeUpFromStop	How to handle I2C data buffer transmission/ reception between two boards using an interrupt when the device is in Stop mode.	-	-	MX	-	-
		I2C_WakeUpFromStop2	How to handle I2C data buffer transmission/ reception between two boards using an interrupt when the device is in Stop 2 mode.	-	-	MX	-	-
	IWDG	IWDG_Reset	How to handle the IWDG reload counter and simulate a software fault that generates an MCU IWDG reset after a preset lap of time.	-	-	MX	-	-
		IWDG_WindowMode	How to periodically update the IWDG reload counter and simulate a software fault that generates an MCU IWDG reset after a preset lap of time.	-	-	MX	MX	-
	LCD	LCD_SegmentsDrive	How to drive an LCD glass using the STM32WBxx HAL driver.	-	-	MX	-	-
	LPTIM	LPTIM_PWMExternalClock	How to configure and use the LPTIM to generate a PWM signal at the lowest power consumption, using an external counter clock, through the HAL LPTIM API.	-	-	MX	MX	-
		LPTIM_PWM_LSE	How to configure and use the LPTIM peripheral to generate a PWM signal in low-power mode using the LSE as counter clock, through the HAL LPTIM API.	-	-	MX	-	-
		LPTIM_PulseCounter	How to configure and use the LPTIM peripheral to count pulses, through the LPTIM HAL API.	-	-	MX	MX	-
		LPTIM_Timeout	How to use the LPTIMER peripheral to implement a timeout and wake up the system from a low-power mode, through the HAL LPTIM API,	-	-	MX	-	-
	PKA	PKA_ECCscalarMultiplication	How to use the PKA peripheral to execute ECC scalar multiplication. This enables the generation of a public key from a private key.	-	-	MX	-	-
		PKA_ECCscalarMultiplication_IT	How to use the PKA peripheral to execute ECC scalar multiplication. This enables the generation of a public key from a private key in interrupt mode.	-	-	MX	-	-

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Examples	PKA	PKA_ECDSA_Sign	How to compute a signed message regarding the elliptic curve digital signature algorithm (ECDSA).	-	-	MX	MX	-
		PKA_ECDSA_Sign_IT	How to compute a signed message regarding the elliptic curve digital signature algorithm (ECDSA) in interrupt mode.	-	-	MX	-	-
		PKA_ECDSA_Verify	How to determine if a given signature is valid regarding the elliptic curve digital signature algorithm (ECDSA).	-	-	MX	-	-
		PKA_ECDSA_Verify_IT	How to determine if a given signature is valid regarding the elliptic curve digital signature algorithm (ECDSA) in interrupt mode.	-	-	MX	MX	-
		PKA_ModularExponentiation	How to use the PKA peripheral to execute modular exponentiation. This enables text ciphering/deciphering.	-	-	MX	-	-
		PKA_ModularExponentiationCRT	How to compute the chinese remainder theorem (CRT) optimization.	-	-	MX	-	-
		PKA_ModularExponentiationCRT_IT	How to compute the chinese remainder theorem (CRT) optimization in Interrupt mode.	-	-	MX	-	-
		PKA_ModularExponentiation_IT	How to use the PKA peripheral to execute modular exponentiation. This enables text ciphering/deciphering in Interrupt mode.	-	-	MX	-	-
		PKA_PointCheck	How to use the PKA peripheral to determine if a point is on a curve. This enables the validation of an external public key.	-	-	MX	-	-
		PKA_PointCheck_IT	How to use the PKA peripheral to determine if a point is on a curve. This enables the validation of an external public key.	-	-	MX	-	-
	PWR	PWR_LPRUN	How to enter and exit Low-power run mode.	-	-	MX	MX	-
		PWR_LPSLEEP	How to enter Low-power sleep mode and wake up from this mode by using an interrupt.	-	-	MX	MX	-
		PWR_PVD	How to configure the programmable voltage detector by using an external interrupt line. External DC supply must be used to supply V_{DD}.	-	-	MX	MX	-
		PWR_STANDBY_RTC	How to enter Standby mode and wake up from this mode by using an external reset or the RTC wakeup timer.	-	-	MX	MX	-

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Examples	PWR	PWR_STOP2_RTC	How to enter Stop 2 mode and wake up from this mode using an external reset or RTC wakeup timer.	-	-	MX	-	-
	QSPI	QSPI_ExecuteInPlace	How to execute a part of the code from the Quad-SPI memory. To do this, a section is created, where the function is stored.	MX	-	MX	-	-
		QSPI_MemoryMapped	How to erase part of the Quad-SPI memory, write data in DMA mode and access the Quad-SPI memory in Memory-mapped mode to check the data in a forever loop.	MX	-	MX	-	-
		QSPI_ReadWrite_DMA	How to erase part of the Quad-SPI memory, write data in DMA mode, read data in DMA mode and compare the result in a forever loop.	MX	-	MX	-	-
		QSPI_ReadWrite_IT	How to erase part of the Quad-SPI memory, write data in Interrupt mode, read data in Interrupt mode and compare the result in a forever loop.	MX	-	MX	-	-
	RCC	RCC_CRS_Synchronization_IT	How to configure the clock recovery service (CRS) in Interrupt mode, using the RCC HAL API.	-	-	MX	-	-
		RCC_CRS_Synchronization_Polling	How to configure the clock recovery service (CRS) in Polling mode, using the RCC HAL API.	-	-	MX	-	-
		RCC_ClockConfig	The main purpose of this example is to serve as a reference for clock configuration operation needed by most of the BLE applications.	MX	-	MX	MX	-
	RNG	RNG_MultiRNG	How to configure the RNG using the HAL API. This example uses the RNG to generate 32-bit long random numbers.	-	-	MX	MX	-
		RNG_MultiRNG_IT	How to configure the RNG using the HAL API. This example uses RNG interrupts to generate 32-bit long random numbers.	-	-	MX	-	-
	RTC	RTC_Alarm	How to configure and generate an RTC alarm using the RTC HAL API.	-	-	MX	MX	-
		RTC_Calendar	How to configure the calendar using the RTC HAL API.	-	-	MX	-	-
		RTC_LSI	How to use the LSI clock source auto-calibration to get a precise RTC clock.	-	-	MX	-	-
		RTC_Tamper	How to configure the RTC HAL API to write/read data to/from RTC backup registers.	-	-	MX	MX	-

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Examples	RTC	RTC_TimeStamp	How to configure the RTC HAL API to demonstrate the timestamp feature.	-	-	MX	-	-
	SAI	SAI_AudioPlay	How to use the SAI HAL API to play an audio file in DMA circular mode and handle the buffer update. Refer to Projects\STM32WB5MM-DK\Examples\BSP.	X	-	-	-	-
	SPI	SPI_FullDuplex_ComDMA_Master	Data buffer transmission/reception between two boards via SPI using DMA.	-	-	MX	MX	-
		SPI_FullDuplex_ComDMA_Slave	Data buffer transmission/reception between two boards via SPI using DMA.	-	-	MX	MX	-
		SPI_FullDuplex_ComIT_Master	Data buffer transmission/reception between two boards via SPI in Interrupt mode.	-	-	MX	-	-
		SPI_FullDuplex_ComIT_Slave	Data buffer transmission/reception between two boards via SPI in Interrupt mode.	-	-	MX	-	-
		SPI_FullDuplex_ComPolling_Master	Data buffer transmission/reception between two boards via SPI in Polling mode.	-	-	MX	-	-
		SPI_FullDuplex_ComPolling_Slave	Data buffer transmission/reception between two boards via SPI in Polling mode.	-	-	MX	-	-
	TIM	TIM_DMA	How to use the DMA with TIMER Update request to transfer data from memory to the timer capture compare register 3 (TIMx_CCR3).	-	-	MX	-	-
		TIM_DMABurst	How to update the TIMER channel 1 period and duty cycle using the TIMER DMA burst feature.	-	-	MX	-	-
		TIM_InputCapture	How to use the TIMER peripheral to measure an external signal frequency.	-	-	MX	-	-
		TIM_OCActive	How to configure the TIMER peripheral in Output compare active mode (when the counter matches the capture/compare register, the corresponding output pin is set to its active state).	-	-	MX	MX	-
		TIM_OCInactive	How to configure the TIMER peripheral in Output compare inactive mode with the corresponding Interrupt requests for each channel.	-	-	MX	-	-
		TIM_OCToggle	How to configure the TIMER peripheral to generate four different signals at four different frequencies.	-	-	MX	-	-

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Examples	TIM	TIM_OnePulse	How to use of the TIMER peripheral to generate a single pulse when an external signal rising edge is received on the timer input pin.	-	-	X	-	-
		TIM_PWMInput	How to use the TIMER peripheral to measure the frequency and duty cycle of an external signal.	-	-	MX	MX	-
		TIM_PWMOutput	How to configure the TIMER peripheral in PWM (pulse width modulation) mode.	-	-	MX	MX	-
		TIM_TimeBase	How to configure the TIMER peripheral to generate a timebase of one second with the corresponding interrupt request.	-	-	MX	-	-
	TSC	TSC_BasicAcquisition_Interrupt	How to use the TSC HAL API to perform continuous acquisitions of one channel in Interrupt mode.	-	-	X	-	-
	UART	UART_Console	UART transmission (printf/getchar) via console with user interaction.	MX	-	MX	-	-
		UART_HyperTerminal_DMA	UART transmission (transmit/receive) in DMA mode between a board and an HyperTerminal PC application.	-	-	MX	MX	-
		UART_HyperTerminal_IT	UART transmission (transmit/receive) in Interrupt mode between a board and an HyperTerminal PC application.	-	-	MX	MX	-
		UART_Printf	Re-routing of the C library printf function to the UART.	-	-	MX	MX	-
		UART_ReceptionToIdle_CircularDMA	How to use the HAL UART API for reception to IDLE event in circular DMA mode.	-	-	MX	-	-
		UART_TwoBoards_ComDMA	UART transmission (transmit/receive) in DMA mode between two boards.	-	-	MX	-	-
		UART_TwoBoards_ComIT	UART transmission (transmit/receive) in Interrupt mode between two boards.	-	-	MX	-	-
		UART_TwoBoards_ComPolling	UART transmission (transmit/receive) in Polling mode between two boards.	-	-	MX	-	-
	WWDG	WWDG_Example	How to configure the HAL API to periodically update the WWDG counter and simulate a software fault that generates an MCU WWDG reset when a predefined time period has elapsed.	-	-	MX	MX	-

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Examples	**Total number of examples: 152**			**8**	**1**	**100**	**42**	**1**
Examples_ LL	ADC	ADC_AnalogWatchdog_Init	How to use an ADC peripheral with an analog watchdog to monitor a channel and detect when the corresponding conversion data is outside the window thresholds.	-	-	MX	-	-
		ADC_ContinuousConversion_ TriggerSW	How to use an ADC peripheral to perform continuous conversions on a channel, from a software start.	-	-	X	-	-
		ADC_ContinuousConversion_ TriggerSW_Init	How to use an ADC peripheral to perform continuous conversions on a channel, from a software start.	-	-	MX	-	-
		ADC_ContinuousConversion_ TriggerSW_LowPower_Init	How to use an ADC peripheral with low-power features.	-	-	MX	-	-
		ADC_GroupsRegularInjected_I nit	How to use an ADC peripheral with both groups (regular and injected) in their intended use cases.	-	-	MX	-	-
		ADC_MultiChannelSingleConv ersion_Init	How to use an ADC peripheral to convert several channels. ADC conversions are performed successively in a scan sequence	-	-	-	MX	-
		ADC_Oversampling_Init	How to use an ADC peripheral with oversampling.	-	-	MX	-	-
		ADC_SingleConversion_Trigge rSW_DMA_Init	How to use an ADC peripheral to perform a single conversion on a channel, at each software start. This example uses the DMA programming model (for polling or interrupt programming models, refer to other examples).	-	-	MX	-	-
		ADC_SingleConversion_Trigge rSW_IT_Init	How to use an ADC peripheral to perform a single conversion on a channel, at each software start. This example uses the interrupt programming model (for polling or DMA programming models, please refer to other examples).	-	-	MX	MX	-
		ADC_SingleConversion_Trigge rSW_Init	How to use an ADC peripheral to perform a single conversion on a channel at each software start. This example uses the polling programming model (for interrupt or DMA programming models, please refer to other examples).	-	-	MX	-	-
		ADC_SingleConversion_Trigge rTimer_DMA_Init	How to use an ADC peripheral to perform a single conversion on a channel at each trigger event from a timer. Converted data are indefinitely transferred by DMA into a table (circular mode).	-	-	MX	MX	-

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Examples_ LL	ADC	ADC_TemperatureSensor	How to use an ADC peripheral to perform a single conversion on the internal temperature sensor and calculate the temperature in degrees Celsius.	-	-	X	-	-
	COMP	COMP_CompareGpioVsVrefInt_IT	How to use a comparator peripheral to compare a voltage level applied on a GPIO pin to the internal voltage reference (V_{REFINT}), in Interrupt mode. This example is based on the STM32WBxx COMP LL API. The peripheral initialization uses LL unitary service functions for optimization purposes (performance and size).	-	-	X	-	-
		COMP_CompareGpioVsVrefInt_IT_Init	How to use a comparator peripheral to compare a voltage level applied on a GPIO pin to the internal voltage reference (V_{REFINT}), in Interrupt mode. This example is based on the STM32WBxx COMP LL API. The peripheral initialization uses the LL initialization function to demonstrate LL initialization usage.	-	-	MX	-	-
		COMP_CompareGpioVsVrefInt_OutputGpio_Init	How to use a comparator peripheral to compare a voltage level applied on a GPIO pin to the internal voltage reference (V_{REFINT}). The comparator output is connected to a GPIO. This example is based on the STM32WBxx COMP LL API.	-	-	MX	-	-
		COMP_CompareGpioVsVrefInt_Window_IT_Init	How to use a pair of comparator peripherals to compare a voltage level applied on a GPIO pin to two thresholds: the internal voltage reference (V_{REFINT}) and a fraction of the internal voltage reference (V_{REFINT}/2), in interrupt mode. This example is based on the STM32WBxx COMP LL API. The peripheral initialization uses LL unitary service functions for optimization purposes (performance and size).	-	-	MX	-	-
	CORTEX	CORTEX_MPU	This example presents the MPU feature. It configures a memory area as privileged read-only, and attempts to perform read and write operations in different modes.	-	-	MX	-	-
	CRC	CRC_CalculateAndCheck	How to configure the CRC calculation unit to compute a CRC code for a given data buffer, based on a fixed generator polynomial (default value 0x4C11DB7). The peripheral initialization is done using LL unitary service functions for optimization purposes (performance and size).	-	-	MX	MX	-

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Examples_LL	CRC	CRC_UserDefinedPolynomial	How to configure and use the CRC calculation unit to compute an 8-bit CRC code for a given data buffer, based on a user-defined generating polynomial. The peripheral initialization is done using LL unitary service functions for optimization purposes (performance and size).	-	-	MX	-	-
	CRS	CRS_Synchronization_IT	How to configure the clock recovery service in Interrupt mode through the STM32WBxx CRS LL API. The peripheral initialization uses LL unitary service functions for optimization purposes (performance and size).	-	-	MX	-	-
		CRS_Synchronization_Polling	How to configure the clock recovery service in polling mode through the STM32WBxx CRS LL API. The peripheral initialization uses LL unitary service functions for optimization purposes (performance and size).	-	-	MX	-	-
	DMA	DMA_CopyFromFlashToMemory	How to use a DMA channel to transfer a word data buffer from flash memory to embedded SRAM. The peripheral initialization uses LL unitary service functions for optimization purposes (performance and size).	-	-	X	-	-
		DMA_CopyFromFlashToMemory_Init	How to use a DMA channel to transfer a word data buffer from flash memory to embedded SRAM. The peripheral initialization uses LL initialization functions to demonstrate LL initialization usage.	-	-	MX	MX	-
	EXTI	EXTI_ToggleLedOnIT	How to configure the EXTI and use GPIOs to toggle the user LEDs available on the board when a user button is pressed. It is based on the STM32WBxx LL API. The peripheral initialization uses LL unitary service functions for optimization purposes (performance and size).	-	-	X	-	-
		EXTI_ToggleLedOnIT_Init	How to configure the EXTI and use GPIOs to toggle the user LEDs available on the board when a user button is pressed. This example is based on the STM32WBxx LL API. The peripheral initialization is done using LL initialization function to demonstrate LL initialization usage.	-	-	MX	MX	-

Level	Module name	Project name	Description	STM32WB5MM-DK[1]	P-NUCLEO-WB55.USBDongle[1]	P-NUCLEO-WB55.Nucleo68[1]	NUCLEO-WB15CC[1]	B-WB1M-WPAN1
Examples_LL	GPIO	GPIO_InfiniteLedToggling	How to configure and use GPIOs to toggle the on-board user LEDs every 250 ms. This example is based on the STM32WBxx LL API. The peripheral is initialized with LL unitary service functions to optimize performance and size.	-	-	X	-	-
		GPIO_InfiniteLedToggling_Init	How to configure and use GPIOs to toggle the on-board user LEDs every 250 ms. This example is based on the STM32WBxx LL API. The peripheral is initialized with LL initialization function to demonstrate LL initialization usage.	-	-	MX	MX	-
	HSEM	HSEM_DualProcess	How to use the low-layer HSEM API to initialize, lock, and unlock hardware semaphore in the context of two processes accessing the same resource.	-	-	MX	-	-
		HSEM_DualProcess_IT	How to use the low-layer HSEM API to initialize, lock, and unlock hardware semaphore in the context of two processes accessing the same resource.	-	-	MX	MX	-
	I2C	I2C_OneBoard_AdvCommunication_DMAAndIT_Init	How to exchange data between an I2C master device in DMA mode and an I2C slave device in Interrupt mode. The peripheral is initialized with LL unitary service functions to optimize performance and size.	-	-	MX	-	-
		I2C_OneBoard_Communication_DMAAndIT_Init	How to transmit data bytes from an I2C master device using DMA mode to an I2C slave device using Interrupt mode. The peripheral is initialized with LL unitary service functions to optimize performance and size.	-	-	MX	-	-
		I2C_OneBoard_Communication_IT	How to handle the reception of one data byte from an I2C slave device by an I2C master device. Both devices operate in Interrupt mode. The peripheral is initialized with LL unitary service functions to optimize performance and size.	-	-	X	-	-
		I2C_OneBoard_Communication_IT_Init	How to handle the reception of one data byte from an I2C slave device by an I2C master device. Both devices operate in Interrupt mode. The peripheral is initialized with LL initialization function to demonstrate LL initialization usage.	-	-	MX	-	-
		I2C_OneBoard_Communication_PollingAndIT_Init	How to transmit data bytes from an I2C master device using Polling mode to an I2C slave device using Interrupt mode. The peripheral is initialized with LL unitary service functions to optimize performance and size.	-	-	MX	-	-

Level	Module name	Project name	Description	STM32WB 5MM-DK(1)	P-NUCLEO-WB55 .USBDongle(1)	P-NUCLEO-WB55 .Nucleo68(1)	NUCLEO-WB15CC(1)	B-WB1M-WPAN1
Examples_ LL	I2C	I2C_TwoBoards_MasterRx_SlaveTx_IT_Init	How to handle the reception of one data byte from an I2C slave device by an I2C master device. Both devices operate in Interrupt mode. The peripheral is initialized with LL unitary service functions to optimize performance and size.	-	-	MX	MX	-
		I2C_TwoBoards_MasterTx_SlaveRx_DMA_Init	How to transmit data bytes from an I2C master device using DMA mode to an I2C slave device using DMA mode. The peripheral is initialized with LL unitary service functions to optimize performance and size.	-	-	MX	MX	-
		I2C_TwoBoards_MasterTx_SlaveRx_Init	How to transmit data bytes from an I2C master device using Polling mode to an I2C slave device in Interrupt mode. The peripheral is initialized with LL unitary service functions to optimize performance and size.	-	-	MX	-	-
		I2C_TwoBoards_WakeUpFromStop2_IT_Init	How to handle the reception of a data byte from an I2C slave device in Stop 2 mode by an I2C master device. Both devices operate in Interrupt mode. The peripheral is initialized with LL unitary service functions to optimize performance and size.	-	-	MX	-	-
		I2C_TwoBoards_WakeUpFromStop_IT_Init	How to handle the reception of a data byte from an I2C slave device in Stop 1 mode by an I2C master device. Both devices operate in Interrupt mode. The peripheral is initialized with LL unitary service functions to optimize performance and size.	-	-	MX	-	-
	IWDG	IWDG_RefreshUntilUserEvent_Init	How to configure the IWDG peripheral to ensure periodical counter update and generate an MCU IWDG reset when a user push-button (SW1) is pressed. The peripheral is initialized with LL unitary service functions to optimize performance and size.	-	-	MX	MX	-
	LPTIM	LPTIM_PulseCounter	How to use the LPTIM peripheral in Counter mode to generate a PWM output signal and update its duty cycle. This example is based on the STM32WBxx LPTIM LL API. The peripheral is initialized with LL unitary service functions to optimize performance and size.	-	-	X	-	-

Level	Module name	Project name	Description	STM32WB5MM-DK[1]	P-NUCLEO-WB55.USBDongle[1]	P-NUCLEO-WB55.Nucleo68[1]	NUCLEO-WB15CC[1]	B-WB1M-WPAN1
Examples_LL	LPTIM	LPTIM_PulseCounter_Init	How to use the LPTIM peripheral in Counter mode to generate a PWM output signal and update its duty cycle. This example is based on the STM32WBxx LPTIM LL API. The peripheral is initialized with LL initialization function to demonstrate LL initialization usage.	-	-	MX	MX	-
	LPUART	LPUART_WakeUpFromStop2_Init	How to configure GPIO and LPUART peripherals to allow characters received on LPUART_RX pin to wake up the MCU from low-power mode. This example is based on the LPUART LL API. The peripheral initialization uses LL initialization function to demonstrate LL initialization usage.	-	-	MX	-	-
		LPUART_WakeUpFromStop_Init	How to configure GPIO and LPUART peripherals to allow characters received on LPUART_RX pin to wake up the MCU from low-power mode. This example is based on the LPUART LL API. The peripheral initialization uses LL initialization function to demonstrate LL initialization usage.	-	-	MX	MX	-
	PKA	PKA_ECDSA_Sign	How to use the low-layer PKA API to generate an ECDSA signature.	-	-	MX	MX	-
		PKA_ModularExponentiation	How to use the low-layer PKA API to execute RSA modular exponentiation.	-	-	MX	-	-
	PWR	PWR_EnterStandbyMode	How to enter Standby mode and wake up from this mode by using an external reset or a wakeup interrupt.	-	-	MX	MX	-
		PWR_EnterStopMode	How to enter Stop 2 mode.	-	-	MX	MX	-
		PWR_OptimizedRunMode	How to increase/decrease frequency and V_{CORE} and enter/exit Low-power run mode.	-	-	MX	MX	-
		PWR_SMPS_16MHZ_HSI	How to use STM32WBxx power converters (SMPS, LDO and LP-LDO) depending on V_{DD} voltage and low-power mode.	-	-	MX	-	-
		PWR_SMPS_64MHZ_MSI_PLL	How to use STM32WBxx power converters (SMPS, LDO and LP-LDO) depending on V_{DD} voltage and low-power mode.	-	-	MX	-	-
	RCC	RCC_HWAutoMSICalibration	How to use of the MSI clock source hardware auto-calibration and LSE clock (PLL mode) to obtain an accurate MSI clock.	-	-	MX	-	-

Level	Module name	Project name	Description	STM32WB5MM-DK[1]	P-NUCLEO-WB55.USBDongle[1]	P-NUCLEO-WB55.Nucleo68[1]	NUCLEO-WB15CC[1]	B-WB1M-WPAN1
Examples_LL	RCC	RCC_OutputSystemClockOnMCO	How to configure the MCO pin (PA8) to output the system clock.	-	-	MX	-	-
		RCC_UseHSEasSystemClock	How to use the RCC LL API to start the HSE and use it as system clock.	-	-	MX	-	-
		RCC_UseHSI_PLLasSystemClock	How to modify the PLL parameters in run time.	-	-	MX	MX	-
	RNG	RNG_GenerateRandomNumbers	How to configure the RNG to generate 32-bit long random numbers. The peripheral initialization uses LL unitary service functions for optimization purposes (performance and size).	-	-	MX	-	-
		RNG_GenerateRandomNumbers_IT	How to configure the RNG to generate 32-bit long random numbers using interrupts. The peripheral initialization uses LL unitary service functions for optimization purposes (performance and size).	-	-	MX	MX	-
	RTC	RTC_Alarm	How to configure the RTC LL API to configure and generate an alarm using the RTC peripheral. The peripheral initialization uses LL unitary service functions for optimization purposes (performance and size).	-	-	X	-	-
		RTC_Alarm_Init	How to configure the RTC LL API to configure and generate an alarm using the RTC peripheral. The peripheral initialization uses the LL initialization function.	-	-	MX	-	-
		RTC_Calendar_Init	How to configure the LL API to set the RTC calendar. The peripheral initialization uses LL unitary service functions for optimization purposes (performance and size).	-	-	MX	-	-
		RTC_ExitStandbyWithWakeUpTimer_Init	How to configure the RTC to wake up from Standby mode using the RTC wakeup timer. The peripheral initialization uses LL unitary service functions for optimization purposes (performance and size).	-	-	MX	-	-
		RTC_Tamper_Init	How to configure the Tamper using the RTC LL API. The peripheral initialization uses LL unitary service functions for optimization purposes (performance and size).	-	-	MX	-	-
		RTC_TimeStamp_Init	How to configure the Timestamp using the RTC LL API. The peripheral initialization uses LL unitary service functions for optimization purposes (performance and size).	-	-	MX	-	-

Level	Module name	Project name	Description	STM32WB5MM-DK(1)	P-NUCLEO-WB55.USBDongle(1)	P-NUCLEO-WB55.Nucleo68(1)	NUCLEO-WB15CC(1)	B-WB1M-WPAN1
Examples_LL	SPI	SPI_OneBoard_HalfDuplex_DMA	How to configure GPIO and SPI peripherals to transmit bytes from an SPI Master device to an SPI Slave device in DMA mode. This example is based on the STM32WBxx SPI LL API. The peripheral initialization uses LL unitary service functions for optimization purposes (performance and size).	-	-	X	-	-
		SPI_OneBoard_HalfDuplex_DMA_Init	How to configure GPIO and SPI peripherals to transmit bytes from an SPI Master device to an SPI Slave device in DMA mode. This example is based on the STM32WBxx SPI LL API. The peripheral initialization uses the LL initialization function to demonstrate LL initialization usage.	-	-	MX	-	-
		SPI_OneBoard_HalfDuplex_IT_Init	How to configure GPIO and SPI peripherals to transmit bytes from an SPI Master device to an SPI Slave device in Interrupt mode. This example is based on the STM32WBxx SPI LL API. The peripheral initialization uses LL unitary service functions for optimization purposes (performance and size).	-	-	MX	-	-
		SPI_TwoBoards_FullDuplex_DMA_Master_Init	Data buffer transmission and reception via SPI using DMA mode. This example is based on the STM32WBxx SPI LL API. The peripheral initialization uses LL unitary service functions for optimization purposes (performance and size).	-	-	MX	MX	-
		SPI_TwoBoards_FullDuplex_DMA_Slave_Init	Data buffer transmission and reception via SPI using DMA mode. This example is based on the STM32WBxx SPI LL API. The peripheral initialization uses LL unitary service functions for optimization purposes (performance and size).	-	-	MX	MX	-
		SPI_TwoBoards_FullDuplex_IT_Master_Init	Data buffer transmission and reception via SPI using Interrupt mode. This example is based on the STM32WBxx SPI LL API. The peripheral initialization uses LL unitary service functions for optimization purposes (performance and size).	-	-	MX	-	-
		SPI_TwoBoards_FullDuplex_IT_Slave_Init	Data buffer transmission and reception via SPI using Interrupt mode. This example is based on the STM32WBxx SPI LL API. The peripheral initialization uses LL unitary service functions for optimization purposes (performance and size).	-	-	MX	-	-

Level	Module name	Project name	Description	STM32WB5MM-DK[1]	P-NUCLEO-WB55.USBDongle[1]	P-NUCLEO-WB55.Nucleo68[1]	NUCLEO-WB15CC[1]	B-WB1M-WPAN1
Examples_LL	TIM	TIM_BreakAndDeadtime	How to configure the TIMER peripheral to generate three center-aligned PWM and complementary PWM signals, insert a defined dead time value, use the break feature, and lock the break and dead-time configuration.	-	-	X	-	-
		TIM_DMA_Init	How to use the DMA with a timer update request to transfer data from memory to timer capture compare register 3 (TIMx_CCR3). This example is based on the STM32WBxx TIM LL API. The peripheral initialization uses LL unitary service functions for optimization purposes (performance and size).	-	-	MX	-	-
		TIM_InputCapture_Init	How to use the TIMER peripheral to measure a periodic signal frequency provided either by an external signal generator or by another timer instance. This example is based on the STM32WBxx TIM LL API. The peripheral initialization uses LL unitary service functions for optimization purposes (performance and size).	-	-	MX	-	-
		TIM_OnePulse	How to configure the TIMER to generate a positive pulse in Output compare mode with a length of t_{PULSE} and after a delay of t_{DELAY}. This example is based on the STM32WBxx TIM LL API. The peripheral initialization uses LL unitary service functions for optimization purposes (performance and size).	-	-	X	-	-
		TIM_OutputCompare_Init	How to configure the TIMER peripheral to generate an output waveform in different Output compare modes. This example is based on the STM32WBxx TIM LL API. The peripheral initialization uses LL unitary service functions for optimization purposes (performance and size).	-	-	MX	-	-
		TIM_PWMOutput	How to use of the TIMER peripheral to generate a PWM output signal and update the PWM duty cycle. This example is based on the STM32WBxx TIM LL API. The peripheral initialization uses LL unitary service functions for optimization purposes (performance and size).	-	-	X	-	-
		TIM_PWMOutput_Init	How to use the TIMER peripheral to generate a PWM output signal and update the PWM duty cycle. This example is based on the STM32WBxx TIM LL API. The peripheral initialization uses LL initialization function to demonstrate LL initialization.	-	-	MX	-	-

Level	Module name	Project name	Description	STM32WB 5MM-DK(1)	P-NUCLEO-WB55 .USBDongle(1)	P-NUCLEO-WB55 .Nucleo68(1)	NUCLEO-WB15CC(1)	B-WB1M-WPAN1
Examples_ LL	TIM	TIM_TimeBase_Init	How to configure the TIMER peripheral to generate a timebase. This example is based on the STM32WBxx TIM LL API. The peripheral initialization uses LL unitary service functions for optimization purposes (performance and size).	-	-	MX	MX	-
	USART	USART_Communication_Rx_IT	How to configure GPIO and USART peripherals to receive characters from an HyperTerminal (PC) in Asynchronous mode using an interrupt. The peripheral initialization uses LL unitary service functions for optimization purposes (performance and size).	-	-	X	-	-
		USART_Communication_Rx_IT_Continuous_Init	How to configure GPIO and USART peripheral to continuously receive characters from HyperTerminal (PC) in Asynchronous mode using an interrupt. The peripheral initialization is done using LL unitary services functions for optimization purpose (performance and size).	-	-	MX	-	-
		USART_Communication_Rx_IT_Continuous_VCP_Init	How to configure GPIO and USART peripheral to continuously receive characters from HyperTerminal (PC) in Asynchronous mode using Interrupt mode. The peripheral initialization is done using LL unitary services functions for optimization purpose (performance and size).	-	-	MX	-	-
		USART_Communication_Rx_IT_Init	How to configure GPIO and USART peripheral to receive characters from HyperTerminal (PC) in Asynchronous mode using Interrupt mode. The peripheral initialization is done using LL initialization function to demonstrate LL initialization usage.	-	-	MX	MX	-
		USART_Communication_Rx_IT_VCP_Init	How to configure GPIO and USART peripheral to receive characters from HyperTerminal (PC) in Asynchronous mode using Interrupt mode. The peripheral initialization is done using LL initialization function to demonstrate LL initialization usage.	-	-	MX	-	-
		USART_Communication_TxRx_DMA_Init	How to configure GPIO and USART peripheral to send characters asynchronously to/from an HyperTerminal (PC) in DMA mode. This example is based on STM32WBxx USART LL API. The peripheral initialization is done using LL unitary services functions for optimization purpose (performance and size).	-	-	MX	-	-

Level	Module name	Project name	Description	STM32WB5MM-DK[1]	P-NUCLEO-WB55.USBDongle[1]	P-NUCLEO-WB55.Nucleo68[1]	NUCLEO-WB15CC[1]	B-WB1M-WPAN1
Examples_LL	USART	USART_Communication_Tx_IT_Init	How to configure GPIO and USART peripheral to send characters asynchronously to HyperTerminal (PC) in Interrupt mode. This example is based on STM32WBxx USART LL API. The peripheral initialization is done using LL unitary services functions for optimization purpose (performance and size).	-	-	MX	-	-
		USART_Communication_Tx_IT_VCP_Init	How to configure GPIO and USART peripheral to send characters asynchronously to HyperTerminal (PC) in Interrupt mode. This example is based on STM32WBxx USART LL API. The peripheral initialization is done using LL unitary services functions for optimization purpose (performance and size).	-	-	MX	-	-
		USART_Communication_Tx_Init	How to configure GPIO and USART peripherals to send characters asynchronously to an HyperTerminal (PC) in Polling mode. If the transfer cannot be completed within the allocated time, a timeout enables exiting from the sequence with a Timeout error code. This example is based on STM32WBxx USART LL API. The peripheral initialization is done using LL unitary services functions for optimization purpose (performance and size).	-	-	MX	MX	-
		USART_Communication_Tx_VCP_Init	How to configure GPIO and USART peripherals to send characters asynchronously to an HyperTerminal (PC) in Polling mode. If the transfer cannot be completed within the allocated time, a timeout enables exiting from the sequence with a Timeout error code. This example is based on STM32WBxx USART LL API. The peripheral initialization is done using LL unitary services functions for optimization purpose (performance and size).	-	-	MX	-	-
		USART_WakeUpFromStop1_Init	How to configure GPIO and USART1 peripherals to enable the characters received on USART_RX pin to wake up the MCU from low-power mode.	-	-	MX	-	-
		USART_WakeUpFromStop_Init	How to configure GPIO and USART1 peripherals to enable the characters received on USART_RX pin to wake up the MCU from low-power mode.	-	-	MX	-	-
	UTILS	UTILS_ConfigureSystemClock	How to use UTILS LL API to configure the system clock using PLL with HSI as source clock.	-	-	MX	-	-

Level	Module name	Project name	Description	STM32WB5MM-DK[1]	P-NUCLEO-WB55.USBDongle[1]	P-NUCLEO-WB55.Nucleo68[1]	NUCLEO-WB15CC[1]	B-WB1M-WPAN1
Examples_LL	UTILS	UTILS_ReadDeviceInfo	How to read the UID, Device ID and Revision ID and save them into a global information buffer.	-	-	MX	MX	-
	WWDG	WWDG_RefreshUntilUserEvent_Init	How to configure the WWDG to periodically update the counter and generate an MCU WWDG reset when a user button is pressed. The peripheral initialization uses the LL unitary service functions for optimization purposes (performance and size).	-	-	MX	MX	-
	Total number of examples_ll: 118			**0**	**0**	**92**	**26**	**0**
Examples_MIX	ADC	ADC_SingleConversion_TriggerSW_IT	How to use the ADC to perform a single ADC channel conversion at each software start. This example uses the interrupt programming model (for polling and DMA programming models, please refer to other examples). It is based on the STM32WBxx ADC HAL and LL API. The LL API is used for performance improvement.	-	-	MX	-	-
	CRC	CRC_PolynomialUpdate	How to use the CRC peripheral through the STM32WBxx CRC HAL and LL API.	-	-	MX	-	-
	DMA	DMA_FLASHToRAM	How to use a DMA to transfer a word data buffer from flash memory to embedded SRAM through the STM32WBxx DMA HAL and LL API. The LL API is used for performance improvement.	-	-	MX	MX	-
	I2C	I2C_OneBoard_ComSlave7_10bits_IT	How to perform I2C data buffer transmission/ reception between one master and two slaves with different address sizes (7-bit or 10-bit). This example uses the STM32WBxx I2C HAL and LL API (LL API usage for performance improvement) and an interrupt.	-	-	MX	-	-
	PWR	PWR_STOP1	How to enter Stop 1 mode and wake up from this mode by using external reset or wakeup interrupt (all the RCC function calls use RCC LL API for minimizing footprint and maximizing performance).	-	-	MX	MX	-
	SPI	SPI_FullDuplex_ComPolling_Master	Data buffer transmission/reception between two boards via SPI in Polling mode.	-	-	MX	-	-
		SPI_FullDuplex_ComPolling_Slave	Data buffer transmission/reception between two boards via SPI in Polling mode.	-	-	MX	-	-
		SPI_HalfDuplex_ComPollingIT_Master	Data buffer transmission/reception between two boards via SPI in Polling (LL driver) and Interrupt modes (HAL driver).	-	-	MX	MX	-

Level	Module name	Project name	Description	STM32WB5MM-DK[1]	P-NUCLEO-WB55.USBDongle[1]	P-NUCLEO-WB55.Nucleo68[1]	NUCLEO-WB15CC[1]	B-WB1M-WPAN1
Examples_MIX	SPI	SPI_HalfDuplex_ComPollingIT_Slave	Data buffer transmission/reception between two boards via SPI in Polling mode (LL driver) and Interrupt modes (HAL driver).	-	-	MX	MX	-
	TIM	TIM_PWMInput	How to use the TIMER peripheral to measure an external signal frequency and duty cycle.	-	-	MX	MX	-
	UART	UART_HyperTerminal_IT	How to use a UART to transmit/receive data between a board and an HyperTerminal PC application in Interrupt mode. This example describes how to use the USART peripheral through the STM32WBxx UART HAL and LL API, the LL API being used for performance improvement.	-	-	MX	MX	-
		UART_HyperTerminal_TxPolling_RxIT	How to use a UART to transmit/receive data between a board and an HyperTerminal PC application both in Polling and Interrupt modes. This example describes how to use the USART peripheral through the STM32WBxx UART HAL and LL API, the LL API being used for performance improvement.	-	-	MX	-	-
	Total number of examples_mix: 18			**0**	**0**	**12**	**6**	
Applications	BLE	BLE_AT_Server	How to demonstrate Point-to-Point communication using BLE component (as GATT server).	-	-	X	-	-
		BLE_Beacon	How to advertize three types of beacon (tlm, uuid, url).	-	-	MX	-	-
		BLE_BloodPressure	How to use the Blood Pressure profile as specified by the BLE SIG.	-	-	MX	-	-
		BLE_CableReplacement	How to use the point-to-point communication using BLE component.	-	-	X	-	-
		BLE_Custom	This example is to demonstrate that a BLE_Custom application can be created using STM32CubeMX.	-	-	MX	-	-
		BLE_DataThroughput	How to use data throughput via notification from server to client using BLE component.	-	-	X	X	-
		BLE_HR_p2pServer	This application includes two BLE services, the first one is a BLE_P2P_Server like, including two characteristics; the second one is a BLE_Heart_Rate like with three characteristics	-	-	-	-	MX

Level	Module name	Project name	Description	STM32WB 5MM-DK(1)	P-NUCLEO-WB55 .USBDongle(1)	P-NUCLEO-WB55 .Nucleo68(1)	NUCLEO-WB15CC(1)	B-WB1M-WPAN1
Applications	BLE	BLE_HR_p2p_Sensor	This application includes three BLE services, the first one is a BLE_P2P_Server like, including two characteristics; the second one is a BLE_Heart_Rate like with three characteristics.	-	-	-	-	MX
		BLE_HealthThermometer	How to use the Health Thermometer profile as specified by the BLE SIG.	-	-	MX	-	-
		BLE_HeartRate	How to use the Heart Rate profile as specified by the BLE SIG.	MX	X	MX	MX	-
		BLE_HeartRateFreeRTOS	How to use the Heart Rate profile as specified by the BLE SIG with FreeRTOS.	-	-	MX	-	-
		BLE_HeartRateFreeRTOS_ANCS	How to read notifications from Apple® Notification Center Service (ANCS) as specified by Apple specification, and use the Heart Rate profile as specified by the BLE SIG with FreeRTOS.	-	-	X	-	-
		BLE_HeartRateFreeRTOS_PLL	ow to use the Heart Rate profile as specified by the BLE SIG with FreeRTOS.	-	-	X	-	-
		BLE_HeartRateThreadX	How to use the Heart Rate profile as specified by the BLE SIG using ThreadX OS.	-	-	X	-	-
		BLE_HeartRate_ANCS	How to read notifications from Apple Notification Center Service (ANCS) as specified by Apple specification, and use Heart Rate profile as specified by the BLE SIG.	-	-	MX	-	-
		BLE_HeartRate_PLL	How to use the Heart Rate profile as specified by the BLE SIG.	-	-	X	-	-
		BLE_HeartRate_ota	How to use the Heart Rate profile as specified by the BLE SIG to be downloaded with BLE OTA application.	-	-	X	X	-
		BLE_Hid	How to use the Human Interface Device profile as specified by the BLE SIG.	-	-	X	-	-
		BLE_MeshLightingLPN	This is the implementation of the BLE Mesh Low Power Node profile as specified by the BLE SIG.	-	X	X	-	-
		BLE_MeshLightingPRFNode	This is the implementation of the BLE Mesh Lighting profile as specified by the BLE SIG.	-	X	X	-	-
		BLE_MeshLightingProvisioner	This is the implementation of the BLE Mesh Lighting profile as specified by the BLE SIG.	-	-	X	-	-

Level	Module name	Project name	Description	STM32WB5MM-DK[1]	P-NUCLEO-WB55.USBDongle[1]	P-NUCLEO-WB55.Nucleo68[1]	NUCLEO-WB15CC[1]	B-WB1M-WPAN1
Applications	BLE	BLE_Mesh_Model_Sensor	This is the implementation of a BLE Mesh Sensor Model (client and server) as specified by the BLE SIG.	X	-	-	-	-
		BLE_Mesh_ThermometerSensor	This is the implementation of a BLE Mesh Vendor profile as specified by the BLE SIG.	X	-	-	-	-
		BLE_Ota	OTA implementation to download a new image into the user flash memory.	-	-	X	X	-
		BLE_Peripheral_Lite	How to communicate with simple BLE peripheral with the features minimum activated.	-	-	X	-	-
		BLE_Peripheral_Lite_EventCallbacks	How to communicate with simple BLE peripheral with minimum activated features with implemented BLE API event callbacks functions.	-	-	X	-	-
		BLE_Power_Peripheral	This application is to demonstrate that a BLE_Power_Peripheral application can be created using CubeMX.	-	-	MX	-	-
		BLE_Proximity	How to use the Proximity profile as specified by the BLE SIG.	-	-	X	-	-
		BLE_RfWithFlash	How to demonstrate the capability to erase/write the flash memory while a point-to-point communication using BLE component is active.	-	-	X	-	-
		BLE_Sensor	This example demonstrates the capabilities of STM32WB5MM Discovery kit with the use of board sensors.	MX	-	-	-	-
		BLE_TransparentMode	How to communicate with the STM32CubeMonitor-RF tool using the Transparent mode.	MX	-	MX	MX	-
		BLE_TransparentModeVCP	How to communicate with the STM32CubeMonitor-RF tool using the Transparent mode.	-	X	-	-	-
		BLE_p2pClient	How to demonstrate point-to-point communication using BLE component (as GATT client).	-	X	MX	MX	-
		BLE_p2pClient_Ext	Demontrates a BLE scanner with connections from an extended and a legacy advertising Two Nucleo STM32WB55xx boards (MB1355C) are used, one acting as GATT client, and one as GATT server.	-	-	X	X	-

Level	Module name	Project name	Description	STM32WB 5MM-DK(1)	P-NUCLEO-WB55 .USBDongle(1)	P-NUCLEO-WB55 .Nucleo68(1)	NUCLEO-WB15CC(1)	B-WB1M-WPAN1
Applications	BLE	BLE_p2pRouteur	This example demonstrates Multipoint communication using BLE component.	-	X	MX	-	-
		BLE_p2pServer	How to demonstrate point-to-point communication using BLE component (as GATT server).	MX	X	MX	MX	-
		BLE_p2pServerThreadX	How to demonstrate Point-to-Point communication using BLE component (as GATT server).	-	-	X	-	-
		BLE_p2pServer_Ext	Demonstrates multiple extended advertising sets.	-	-	X	X	-
		BLE_p2pServer_ota	How to demonstrate point-to-point communication using BLE component (peripheral such as GATT server) to be downloaded with BLE OTA application.	-	-	X	X	-
	BLE_LLD	BLE_LLD_Chat	How to create a "Chat" talk between two boards using terminals.	X	-	X	X	-
		BLE_LLD_Datarate	How to send BLE LLD packets in high data rate.	-	X	X	-	-
		BLE_LLD_Lowpower	How to send BLE LLD packets in low-power mode.	-	-	X	X	-
		BLE_LLD_Pressbutton	How to control remote LEDs with BLE LLD.	-	-	X	X	-
		BLE_LLD_Proximity	How to use BLE LLD to detect nearby boards. This solution can be used in contact tracing for Covid-19, as it provides an estimation of the distance with other boards.	-	-	X	-	-
	BLE_Mac	BLE_Mac_Static	How to use BLE and 802_15_4 Mac applications in Static concurrent mode.	-	-	X	-	-
	BLE_Thread	BLE_Thread_Dyn	How to use BLE and Thread applications in Dynamic concurrent mode.	-	-	X	-	-
		BLE_Thread_Dyn_SED	How to use BLE and Thread applications (acting as sleep-end device) in Dynamic concurrent mode.	-	-	X	-	-
		Ble_Thread_Dyn_SED_FreeRTOS	How to use BLE application and Thread application (acting as sleep end device) in dynamic concurrent mode.	-	-	X	-	-

Level	Module name	Project name	Description	STM32WB 5MM-DK(1)	P-NUCLEO-WB55 .USBDongle(1)	P-NUCLEO-WB55 .Nucleo68(1)	NUCLEO-WB15CC(1)	B-WB1M-WPAN1
Applications	BLE_Thread	BLE_Thread_Static	How to use BLE and Thread applications in Static concurrent mode.	-	-	X	-	-
	BLE_Zigbee	BLE_Zigbee_Dyn	How to use BLE and Zigbee® applications (acting as router) in Dynamic concurrent mode.	-	-	X	-	-
		BLE_Zigbee_Dyn_SED	How to use BLE and Zigbee applications (acting as sleep end device) in Dynamic concurrent mode.	-	-	-	-	-
		BLE_Zigbee_Static	How to use BLE and Zigbee applications in Static concurrent mode.	-	-	X	-	-
	CKS	CKS_Crypt	How to use the CKS feature to store AES cryptographic keys in secure area.	-	-	X	-	-
	Demonstrations	Audio_BVLINKWB	This demonstration firmware is based on STM32Cube Function pack for STM32WB MCUs featuring full-duplex audio streaming over Bluetooth 5.0 using Opus codec.	X	-	-	-	-
	FreeRTOS	FreeRTOS_Mutexes	How to use mutexes with CMSIS RTOS API.	-	-	MX	MX	-
		FreeRTOS_Queues	How to use message queues with CMSIS RTOS API.	New	-	MX	-	-
		FreeRTOS_Semaphore	How to use semaphores with CMSIS RTOS API.	-	-	MX	-	-
		FreeRTOS_SemaphoreFromISR	How to use semaphore from ISR with CMSIS RTOS API.	-	-	MX	-	-
		FreeRTOS_ThreadCreation	How to implement thread creation using CMSIS RTOS API.	-	-	MX	-	-
		FreeRTOS_ThreadFlags	How to perform thread flagging using CMSIS RTOS API.	-	-	New	-	-
		FreeRTOS_ThreadFlagsFromISR	This application shows the usage of CMSIS-OS ThreadFlags API from ISR context.	-	-	New	-	-
		FreeRTOS_Timers	How to use timers of CMSIS RTOS API.	-	-	MX	-	-
	Mac_802_15_4	Mac_802_15_4_Coordinator	How to use MAC 802.15.4 Association and Data exchange.	-	-	X	-	-

Level	Module name	Project name	Description	STM32WB5MM-DK[1]	P-NUCLEO-WB55.USBDongle[1]	P-NUCLEO-WB55.Nucleo68[1]	NUCLEO-WB15CC[1]	B-WB1M-WPAN1
Applications	Mac_802_15_4	Mac_802_15_4_FFD	How to use MAC 802.15.4 Association and Data exchange.	-	-	X	-	-
		Mac_802_15_4_LPM_Periodic_Transmit	How to use MAC 802.15.4 data transmission with Stop 1 low power mode enabled.	-	-	X	-	-
		Mac_802_15_4_Node	How to use MAC 802.15.4 Association and Data exchange.	-	-	X	-	-
		Mac_802_15_4_RFD	How to use MAC 802.15.4 Association and Data exchange.	-	-	X	-	-
	Phy_802_15_4	Phy_802_15_4_Cli	How to create a "PHY_802.15.4 command line interface" application on STM32WB55xx boards using terminals.	-	-	X	-	-
	Thread	Thread_Cli_Cmd	How to control the Thread stack via Cli commands.	-	X	MX	-	-
		Thread_Coap_DataTransfer	How to transfer large blocks of data through the CoAP messaging protocol.	-	X	MX	-	-
		Thread_Coap_Generic	How to build Thread application based on CoAP messages.	X	X	MX	-	-
		Thread_Coap_Generic_Ota	How to build Thread application based on CoAP messages.	-	-	X	-	-
		Thread_Coap_Generic_ThreadX	How to build Thread application based on Coap messages. (using ThreadX) This application requires two STM32WB55xx boards.	-	-	X	-	-
		Thread_Coap_MultiBoard	How to use CoAP for sending message to multiple boards.	-	-	MX	-	-
		Thread_Coap_Secure	How to build Thread application based on CoAP Secure messages.	-	-	X	-	-
		Thread_Commissioning	How to use Thread commissioning process.	-	-	MX	-	-
		Thread_FTD_Coap_Multicast	How to exchange multicast CoAP messages.	-	X	MX	-	-
		Thread_NVM	How to configure NVM for Thread applications.	-	-	X	-	-

Level	Module name	Project name	Description	STM32WB 5MM-DK(1)	P-NUCLEO-WB55 .USBDongle(1)	P-NUCLEO-WB55 .Nucleo68(1)	NUCLEO-WB15CC(1)	B-WB1M-WPAN1
Applications	Thread	Thread_Ota	How to update over-the-air (OTA) firmware application and Copro Wireless binary using Thread.	-	-	X	-	--
		Thread_Ota_Server	How to update over-the-air (OTA) firmware application and Copro Wireless binary using Thread.	-	-	X	-	-
		Thread_RCP	This application is used to demonstrate the OpenThread Border router feature using an STM32WB device.	-	-	X	-	-
		Thread_SED_Coap_FreeRTOS	How to exchange a CoAP message using the Thread protocol.	-	-	MX	-	-
		Thread_SED_Coap_Multicast	How to exchange a CoAP message using the Thread protocol.	-	X	MX	-	-
		Thread_Udp	How to transfer data using UDP.	-	-	X	-	-
	TouchSensing	TouchSensing_1touchKey	Use of the STMTouch driver with one touchkey sensor.	-	-	X	-	-
		TouchSensing_1touchkey	Use of the STMTouch driver with one touchkey sensor.	MX	-	-	-	-
	USB_Device	CDC_Standalone	How to use USB device application based on the Device Communication Class (CDC) following the PSTN sub-protocol on the STM32WB MCUs.	-	-	MX	-	-
		DFU_Standalone	Compliant implementation of the device firmware upgrade (DFU).	-	MX	MX	-	-
		HID_Standalone	How to use of the USB device application based on the human interface (HID).	-	MX	MX	-	-
	Zigbee	Zigbee_APS_Coord	How to use the APS layer in an application with a centralized Zigbee network.	-	-	X	-	-
		Zigbee_APS_Router	How to use the APS layer in an application with a centralized Zigbee network.	-	-	X	-	-
		Zigbee_Commissioning_Client_Coord	How to use Commissioning cluster as a client on a centralized Zigbee network.	-	-	X	-	-
		Zigbee_Commissioning_Server_Router	How to use Commissioning cluster as a client on a centralized Zigbee network.	-	-	X	-	-

Level	Module name	Project name	Description	STM32WB5MM-DK(1)	P-NUCLEO-WB55.USBDongle(1)	P-NUCLEO-WB55.Nucleo68(1)	NUCLEO-WB15CC(1)	B-WB1M-WPAN1
Applications	Zigbee	Zigbee_DevTemp_Client_Router	How to use DevTemp cluster on a centralized Zigbee network with device acting as router.	-	-	X	-	-
		Zigbee_DevTemp_Server_Coord	How to use DevTemp cluster on a centralized Zigbee network with device acting as server.	-	-	X	-	-
		Zigbee_Diagnostic_Client_Router	How to use Diagnostic cluster as a client on a centralized Zigbee network.	-	-	X	-	-
		Zigbee_Diagnostic_Server_Coord	How to use Diagnostic cluster as a server on a centralized Zigbee network.	-	-	X	-	-
		Zigbee_DoorLock_Client_Router	How to use Door Lock cluster as a client on a centralized Zigbee network.	-	-	X	-	-
		Zigbee_DoorLock_Server_Coord	How to use Door Lock cluster as a client on a centralized Zigbee network.	-	-	X	-	-
		Zigbee_Find_Bind_Coord	How to use Finding and Binding on a centralized Zigbee network.	-	-	X	-	-
		Zigbee_Find_Bind_IAS_Router2	How to use Finding and Binding on a centralized Zigbee network.	-	-	X	-	-
		Zigbee_Find_Bind_OnOff_Router1	How to use Finding and Binding on a centralized Zigbee network.	-	-	X	-	-
		Zigbee_IAS_WD_Client_Router	How to use IAS WD cluster as a client on a centralized Zigbee network.	-	-	X	-	-
		Zigbee_IAS_WD_Server_Coord	How to use IAS WD cluster as a server on a centralized Zigbee network.	-	-	X	-	-
		Zigbee_MeterId_Client_Router	How to use Meter Identification cluster as a client on a centralized Zigbee network.	-	-	MX	-	-
		Zigbee_MeterId_Server_Coord	How to use Meter Identification cluster as a server on a centralized Zigbee network.	-	X	MX	-	-
		Zigbee_OTA_Client_Router	How to use the OTA cluster on multiple devices acting as a Client with Router role receiving and updating on a parallel way, the same OTA image from the ZC.	-	-	X	-	-

Level	Module name	Project name	Description	STM32WB5MM-DK[1]	P-NUCLEO-WB55.USBDongle[1]	P-NUCLEO-WB55.Nucleo68[1]	NUCLEO-WB15CC[1]	B-WB1M-WPAN1
Applications	Zigbee	Zigbee_OTA_Server_Coord	How to use the OTA cluster on one OR multiple devices. Router(s) is/are receiving and updating on a parallel way, the same OTA New image sent by the ZC.	-	-	X	-	-
		Zigbee_OnOff_ChannelsAgility_SED	How to use the OnOff cluster on a device on a Sleepy End Device (SED) acting as a Client within a Centralized Zigbee network.	-	-	X	-	-
		Zigbee_OnOff_ChannelsAgility_ZC	How to use the OnOff cluster on a device acting acting as a Server with Coordinator role within a Centralized Zigbee network.	-	-	X	-	-
		Zigbee_OnOff_ChannelsAgility_ZR	How to use the OnOff cluster on a device acting as a Client with Router role within a Centralized Zigbee network.	-	-	X	-	-
		Zigbee_OnOff_Client_Distrib	How to use the OnOff cluster on a device acting as a Client within a distributed Zigbee network.	-	-	MX	-	-
		Zigbee_OnOff_Client_ED	How to use the OnOff cluster on a End Device acting as a Client within a Centralized Zigbee network.	-	-	MX	-	-
		Zigbee_OnOff_Client_Router	How to use the OnOff cluster on a device acting as a Client with Router role within a Centralized Zigbee network.	X	X	MX	-	-
		Zigbee_OnOff_Client_Router_FreeRTOS	How to use the OnOff cluster on a device acting as a Client with Router role within a Centralized Zigbee network using FreeRTOS.	-	-	X	-	-
		Zigbee_OnOff_Client_Router_Ota	How to use an updated OnOff cluster Zigbee application previously downloaded via OTA.	-	-	X	-	-
		Zigbee_OnOff_ClientRouter_ThreadX	How to use the OnOff cluster on a device acting as a Client with Router role within a Centralized Zigbee network.	-	-	X	-	-
		Zigbee_OnOff_Client_SED	How to use OnOff cluster as a client on a centralized Zigbee network.	-	-	X	-	-
		Zigbee_OnOff_Coord_NVM	How to use OnOff cluster with persistent data on a centralized Zigbee network.	-	-	X	-	-
		Zigbee_OnOff_Router_NVM	How to use OnOff cluster with persistent data on a centralized Zigbee network.	-	-	X	-	-
		Zigbee_OnOff_Server_Coord	How to use OnOff cluster as a server on a centralized Zigbee network.	X	X	MX	-	-

Level	Module name	Project name	Description	STM32WB5MM-DK[1]	P-NUCLEO-WB55.USBDongle[1]	P-NUCLEO-WB55.Nucleo68[1]	NUCLEO-WB15CC[1]	B-WB1M-WPAN1
Applications	Zigbee	Zigbee_OnOff_Server_Coord_FreeRTOS	How to use OnOff cluster as a server on a centralized Zigbee network.	-	-	X	-	-
		Zigbee_OnOff_Server_Distrib	How to use OnOff cluster as a server on a distributed Zigbee network.	-	-	MX	-	-
		Zigbee_PollControl_Client_Coord	How to use Poll Control cluster as a client on a centralized Zigbee network.	-	-	X	-	-
		Zigbee_PollControl_Server_SED	How to use Poll Control cluster as a server on a centralized Zigbee network.	-	-	X	-	-
		Zigbee_PowerProfile_Client_Coord	How to use Power Profile cluster as a client on a centralized Zigbee network.	-	-	X	-	-
		Zigbee_PowerProfile_Server_Router	How to use Power Profile cluster as a server on a centralized Zigbee network.	-	X	X	-	-
		Zigbee_PressMeas_Client_Router	How to use Pressure Measurement cluster on a centralized Zigbee network with device acting as router.	-	-	X	-	-
		Zigbee_PressMeas_Server_Coord	How to use Pressure Measurement cluster on a centralized Zigbee network with device acting as server.	-	-	X	-	-
		Zigbee_SE_Msg_Client_Coord	How to use Smart Energy Messaging cluster on a centralized Zigbee network with device acting as coordinator (client).	-	-	X	-	-
		Zigbee_SE_Msg_Server_Router	How to use Smart Energy Messaging cluster on a centralized Zigbee network with device acting as router (server).	-	-	X	-	-
		Zigbee_TempMeas_Client_Router	How to use TempMeas as a client on a centralized Zigbee network.	X	-	-	-	-
		Zigbee_TempMeas_Server_Coord	How to use Temperature Measurement cluster as a server on a centralized Zigbee network.	X	-	-	-	-
		Zigbee_custom_ls_Client_Router	How to use the Custom long string cluster on a device acting as a Client with Router role within a centralized Zigbee network.	-	-	X	-	-
		Zigbee_custom_ls_Server_Coord	How to use the Custom long string cluster on a device acting as a server with coordinator role within a centralized Zigbee network.	-	-	X	-	-
	Total number of applications: 176			**15**	**19**	**126**	**14**	**2**

Level	Module name	Project name	Description	STM32WB5MM-DK[1]	P-NUCLEO-WB55.USBDongle[1]	P-NUCLEO-WB55.Nucleo68[1]	NUCLEO-WB15CC[1]	B-WB1M-WPAN1
Total number of projects: 472				25	20	332	90	5

1. *STM32CubeMX-generated examples are highlighted with the MX STM32CubeMX icon. Other examples are marked with x. They are specific TrustZone examples, if marked as such.*

Revision history

Table 2. **Document revision history**

Date	Version	Changes
19-Feb-2019	1	Initial release.
17-Mar-2020	2	Added Zigbee middleware in Figure 1. STM32CubeWB firmware components. Added *STM32CubeWB Nucleo demonstration firmware* (UM2251) in Section 1: Reference documents. Added \STM32CubeIDE in the list of project folders in Section 2: STM32CubeWB examples. Updated Table 1. STM32CubeWB firmware examples
09-Nov-2020	3	Updated folder hosting the examples and its structure in Section 2: STM32CubeWB examples. Table 1. STM32CubeWB firmware examples: • Suppressed NUCLEO-WB35CE board • Removed *CORTEXM_SysTick* and *I2S_Audio* examples • Added *BLE_Custom*, *BLE_HeartRateFreeRTOS_ANCS*, *BLE_HeartRate_ANCS*, *BLE_MeshLightingLPN*, *BLE_MeshLightingProvisioner,* , *BLE_RfWithFlash*, *BLE_Thread_Dyn*, *BLE_Thread_Dyn_SED*, *BLE_Zigbee_Dyn*, *BLE_Zigbee_Dyn_NVM*, *BLE_Zigbee_Dyn_SED*, LLD_BLE, Phy_802_15_4, *Thread_Upd*, *Zigbee_APS_Coord*, *Zigbee_APS_Router*, *Zigbee_Commissioning_Client_Coord* and *Zigbee_Commissioning_Client_Router*, *Zigbee_Diagnostic_Client_Router*, *Zigbee_Diagnostic_Server_Coord*, *Zigbee_DoorLock_Client_Router*, *Zigbee_DoorLock_Server_Coord*, *Zigbee_IAS_WD_Client_Router*, *Zigbee_IAS_WD_Server_Coord*, *Zigbee_OTA_Client_Router*, *Zigbee_OTA_Server_Coord*, *Zigbee_OnOff_Client_Router_Ota*, *Zigbee_OnOff_Client_SED*, *Zigbee_OnOff_Coord_NVM*, *Zigbee_OnOff_Router_NVM*, *Zigbee_PollControl_Client_Coord*, *Zigbee_PollControl_Server_SED* applications
26-Apr-2021	4	Updated Table 1. STM32CubeWB firmware examples: • Added STM32WB5MM-DK kit and associated examples. • Added CORTEX CORTEXM_SysTick, UART_Console and UART_ReceptionToIdle_CircularDMA examples. • Updated BLE applications; added Zigbee_custom_ls_Client_Router, Zigbee_custom_ls_Server_Coord, Zigbee_OnOff_Client_Router_FreeRTOS, and Zigbee_OnOff_Server_Coord_FreeRTOS.
07-Jul-2021	5	Updated Table 1. STM32CubeWB firmware examples with the support for the Nucleo-WB15CC board Updated the list of available projects: • NUCLEO-WB15CC BLE_LLD Applications: BLE_LLD_Chat, BLE_LLD_Lowpower • P-NUCLEO-WB55.Nucleo BLE_LLD Applications: BLE_LLD_Chat, BLE_LLD_Proximity • P-NUCLEO-WB55.Nucleo Thread Applications: Thread_RCP • STM32WB5MM-DK Demonstration Applications: Audio_BVLINKWB,BLE_HeartRate, BLE_Mesh_ThermometerSensor, BLE_Sensor, BLE_TransparentMode, BLE_p2pServer, BLE_LLD_Chat, Thread_Coap_Generic, Zigbee_TempMeas_Client_Router, Zigbee_TempMeas_Server_Coord, Zigbee_OnOff_Client_Router, Zigbee_OnOff_Server_Coord. Removed BLE_Zigbee_Dyn_NVM application form the supported list.
02-Dec-2021	6	Updated Table 1. STM32CubeWB firmware examples: • Added BLE_HeartRate_ota, BLE_MeshLightingLPN, BLE_MeshLightingPRFNode, BLE_Ota, BLE_p2pServer_ota, BLE_Mesh_Model_Sensor, BLE_AT_Server, BLE_LLD_Datarate, Thread_RCP_Cli_Cmd. • Added Templates_LL for NUCLEO-WB15CC. • Minor text edits across the whole table.
30-Nov-2022	7	Added support for the B-WB1M-WPAN1 board. Updated Section 1: Reference documents. Updated Table 1. STM32CubeWB firmware examples.
01-Dec-2025	8	Updated Figure 1. STM32CubeWB firmware components. Updated Table 1. STM32CubeWB firmware examples. Minor text edits across the whole document.

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