
STM32
CubeMX

1. Description

1.1. Project

Project Name	NUCLEO-WB09KE_cubemx
Board Name	NUCLEO-WB09KE
Generated with:	STM32CubeMX 6.13.0
Date	02/08/2025

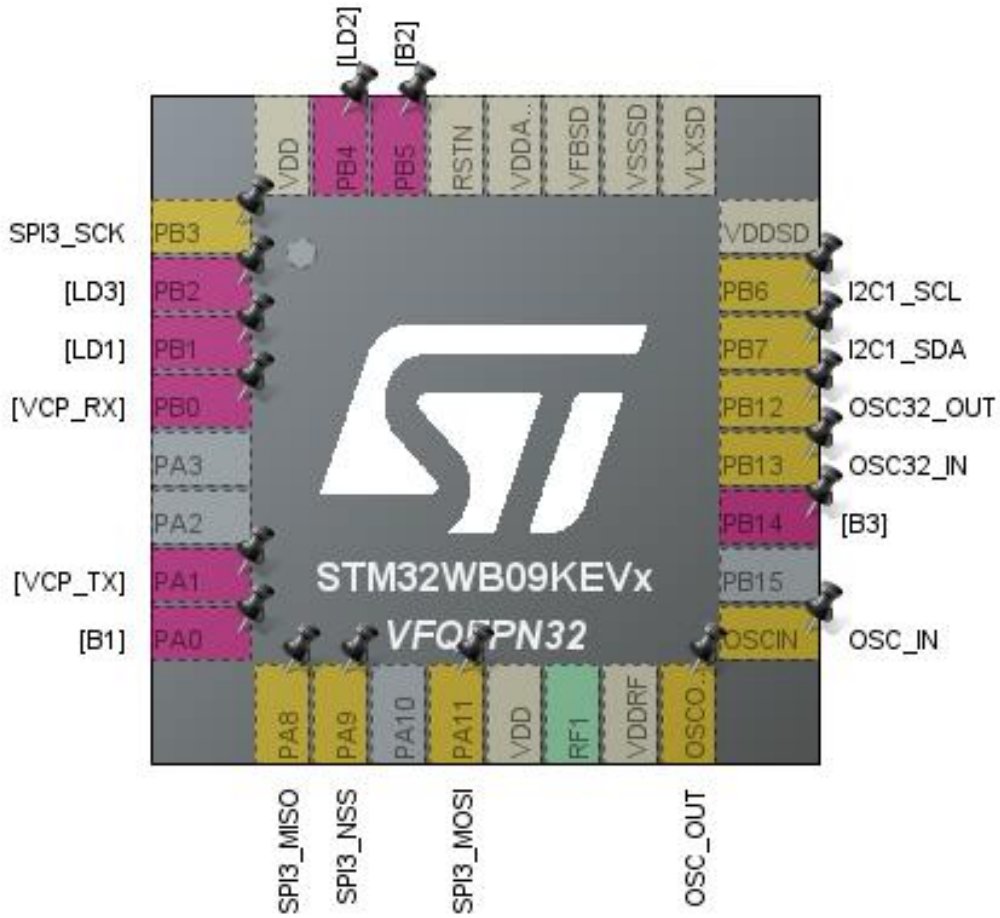
1.2. MCU

MCU Series	STM32WB0
MCU Line	STM32WBx9
MCU name	STM32WB09KEVx
MCU Package	VFQFPN32
MCU Pin number	32

1.3. Core(s) information

Core(s)	ARM Cortex-M0+

2. Pinout Configuration

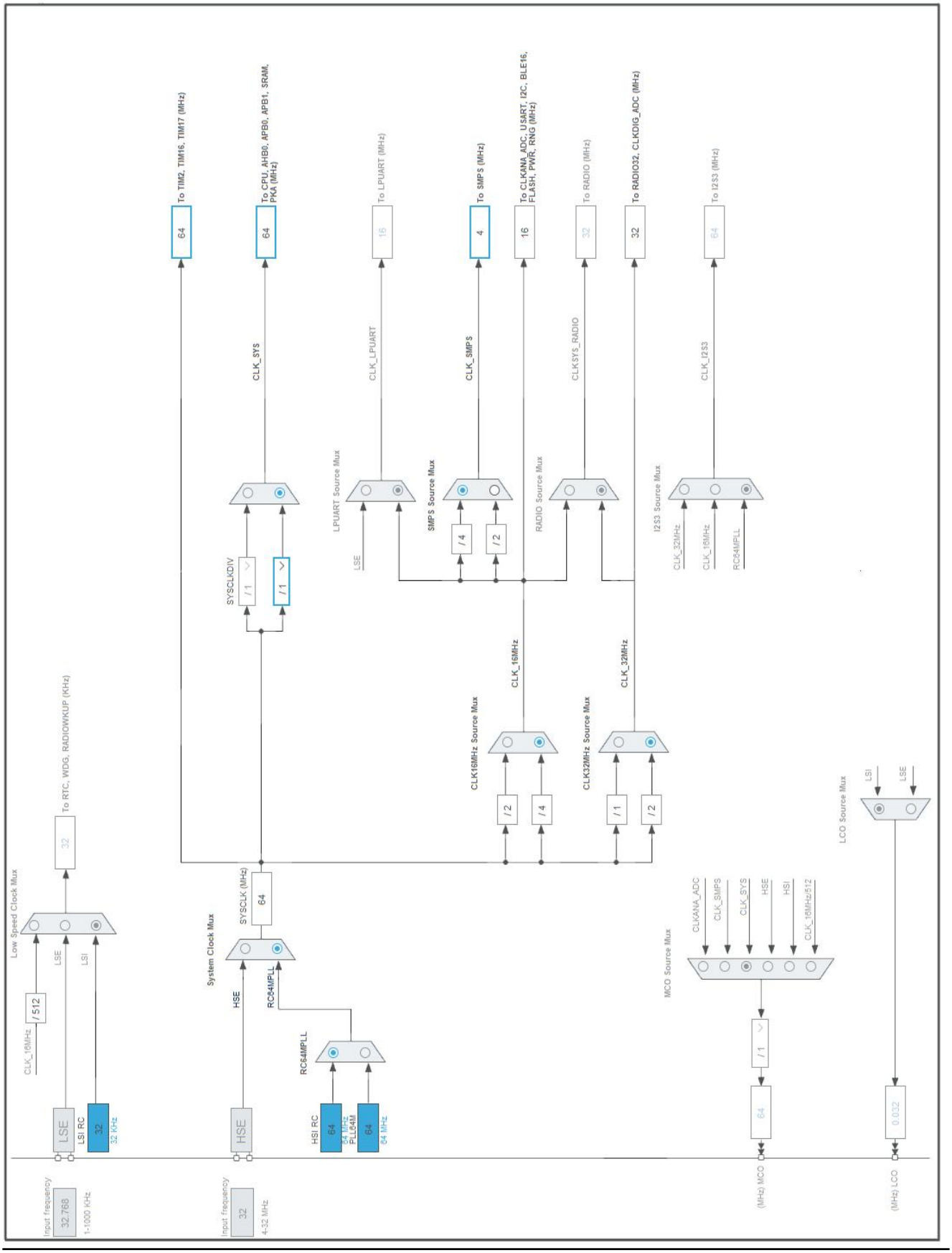


3. Pins Configuration

Pin Number VFQFPN32	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	PB3 *	I/O	SPI3_SCK	SPI3_SCK
2	PB2	I/O		
3	PB1	I/O		
4	PB0	I/O		
7	PA1	I/O		
8	PA0	I/O		
9	PA8 *	I/O	SPI3_MISO	SPI3_MISO
10	PA9 *	I/O	SPI3_NSS	SPI3_NSS
12	PA11 *	I/O	SPI3_MOSI	SPI3_MOSI
13	VDD	Power		
15	VDDRF	Power		
16	OSCOUT *	MonoIO	RCC_OSC_OUT	OSC_OUT
17	OSCIN *	MonoIO	RCC_OSC_IN	OSC_IN
19	PB14	I/O		
20	PB13 *	I/O	RCC_OSC32_IN	OSC32_IN
21	PB12 *	I/O	RCC_OSC32_OUT	OSC32_OUT
22	PB7 *	I/O	I2C1_SDA	I2C1_SDA
23	PB6 *	I/O	I2C1_SCL	I2C1_SCL
24	VDDSD	Power		
25	VLXSD	Power		
26	VSSSD	Power		
27	VFBSD	Power		
28	VDDA_VCAP	Power		
29	RSTN	Power		
30	PB5	I/O		
31	PB4	I/O		
32	VDD	Power		

* The pin is affected with a peripheral function but no peripheral mode is activated

4. Clock Tree Configuration



1. Power Consumption Calculator report

1.1. Microcontroller Selection

Series	STM32WB0
Line	STM32WBx9
MCU	STM32WB09KEVx
Datasheet	DS000000_Rev1

1.2. Parameter Selection

Temperature	25
Vdd	3.3

1.3. Battery Selection

Battery	Li-SOCL2(AAA700)
Capacity	700.0 mAh
Self Discharge	0.08 %/month
Nominal Voltage	3.6 V
Max Cont Current	10.0 mA
Max Pulse Current	30.0 mA
Cells in series	1
Cells in parallel	1

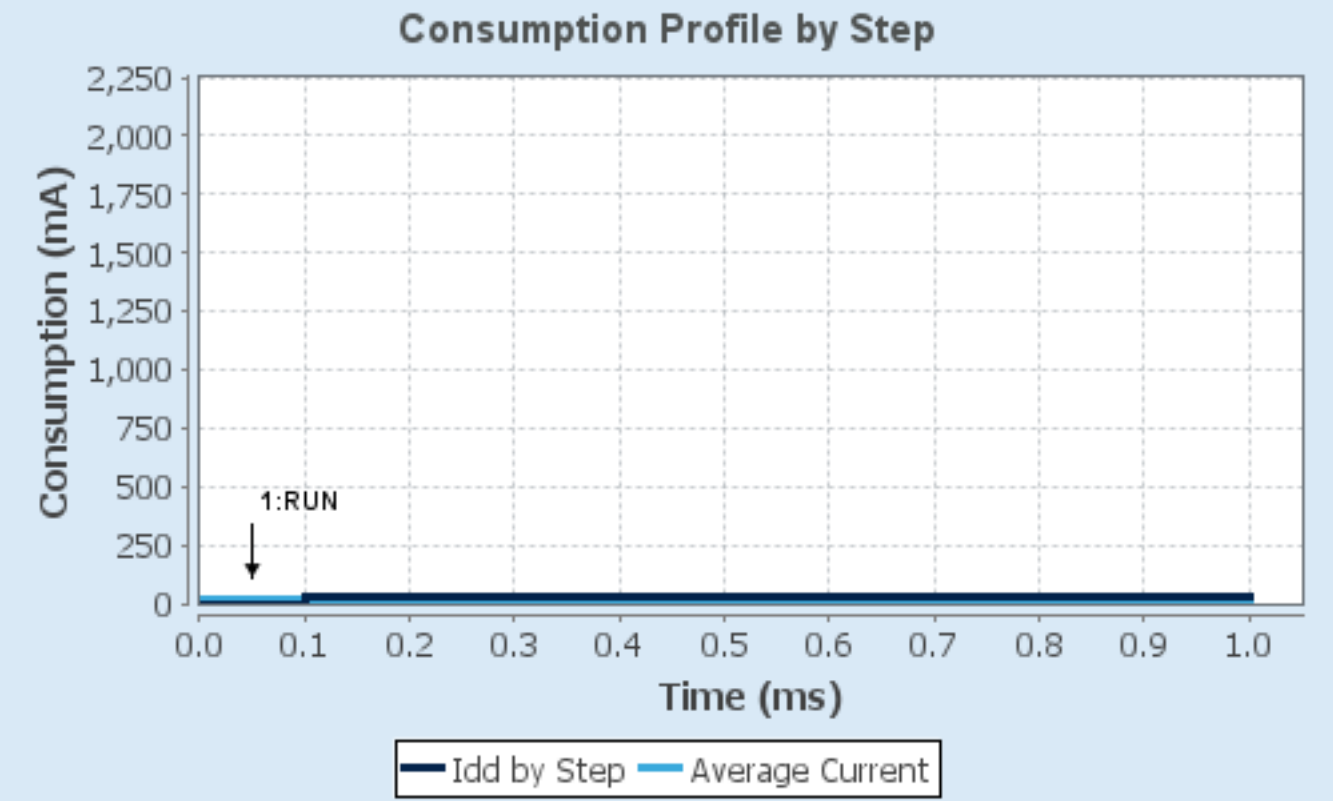
1.4. Sequence

Step	Step1	Step2
Mode	RUN	SHUTDOWN
Vdd	3.3	3.3
Voltage Source	Battery	Battery
Range	NaN/SMPS	NaN
Fetch Type	FLASH	FLASH
CPU Frequency	64 Hz	0 Hz
Clock Configuration	RC64MPLL ALL_RAM_RETENTION	ALL_OFF
Clock Source Frequency	32 Hz	32 Hz
Peripherals		
Additional Cons.	0 mA	0 mA
Average Current	1 nA	25 mA
Duration	0.1 ms	0.9 ms
DMIPS	0.0	0.0
Ta Max	125	125
Category	In DS Table	In DS Table

1.5. Results

Sequence Time	1 ms	Average Current	22.5 mA
Battery Life	1 day, 7 hours	Average DMIPS	8.0E-6 DMIPS

1.6. Chart


Consumption Profile by Step
Consumption (mA)
2,250
2,000
1,750
1,500
1,250
1,000
750
500
250
0
1:RUN
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (ms)
Idd by Step
Average Current

2. Software Project

2.1. Project Settings

Name	Value
Project Name	NUCLEO-WB09KE_cubemx
Project Folder	D:\TEMP\temp
Toolchain / IDE	MDK-ARM V5.39
Firmware Package Name and Version	STM32Cube FW_WB0 V1.1.0
Application Structure	Advanced
Generate Under Root	No
Do not generate the main()	No
Minimum Heap Size	0x000
Minimum Stack Size	0xC00

2.2. Code Generation Settings

Name	Value
STM32Cube MCU packages and embedded software	Copy all used libraries into the project folder
Generate peripheral initialization as a pair of '.c/.h' files	Yes
Backup previously generated files when re-generating	No
Keep User Code when re-generating	Yes
Delete previously generated files when not re-generated	Yes
Set all free pins as analog (to optimize the power consumption)	No
Enable Full Assert	No

2.3. Advanced Settings - Generated Function Calls

Rank	Function Name	Peripheral Instance Name
1	SystemClock_Config	RCC
2	MX_GPIO_Init	GPIO

3. Peripherals and Middlewares Configuration

3.1. NUCLEO-WB09KE

mode: Human Machine Interface

3.1.1. Human Machine Interface:

Led:	
USER LED BLUE (LD1)	**true ***
USER LED GREEN (LD2)	**true ***
USER LED RED (LD3)	**true ***
Button:	
USER B1	**Mode EXTI ***
USER B2	**Mode EXTI ***
USER B3	**Mode EXTI ***
VCOM:	
Virtual Com Port	**true ***
Demonstration code:	
Generate demonstration code	Disabled

3.2. NUCLEO-WB09KE

mode: Human Machine Interface

3.2.1. Human Machine Interface:

Led:	
USER LED BLUE (LD1)	**true ***
USER LED GREEN (LD2)	**true ***
USER LED RED (LD3)	**true ***
Button:	
USER B1	**Mode EXTI ***
USER B2	**Mode EXTI ***
USER B3	**Mode EXTI ***
VCOM:	
Virtual Com Port	**true ***
Demonstration code:	
Generate demonstration code	Disabled

3.3. RCC

3.3.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Instruction Cache	Enabled
Prefetch Buffer	Enabled
Data Cache	Enabled

RCC Parameters:

HSI Calibration Value	16
HSE Startup Timout Value (ms)	100
LSE Startup Timout Value (ms)	**100 ***

3.4. SYS

Timebase Source: SysTick

*** User modified value**

4. System Configuration

4.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
Single Mapped Signals	PB3	SPI3_SCK	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	SPI3_SCK
	PA8	SPI3_MISO	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	SPI3_MISO
	PA9	SPI3_NSS	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	SPI3_NSS
	PA11	SPI3_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	SPI3_MOSI
	OSCOUT	RCC_OSC_OUT	n/a	n/a	**n/a**	OSC_OUT
	OSCIN	RCC_OSC_IN	n/a	n/a	**n/a**	OSC_IN
	PB13	RCC_OSC32_IN	n/a	n/a	**n/a**	OSC32_IN
	PB12	RCC_OSC32_OUT	n/a	n/a	**n/a**	OSC32_OUT
	PB7	I2C1_SDA	Alternate Function Open Drain	No pull-up and no pull-down	**Very High ***	I2C1_SDA
	PB6	I2C1_SCL	Alternate Function Open Drain	No pull-up and no pull-down	**Very High ***	I2C1_SCL

4.2. DMA configuration

nothing configured in DMA service

4.3. NVIC configuration

4.3.1. NVIC

Interrupt Table	Enable	Preenmption Priority	SubPriority
Non maskable interrupt	true	0	0
Hard fault interrupt	true	0	0
System service call via SWI instruction	true	0	0
Pendable request for system service	true	0	0
System tick timer	true	3	0
GPIOA interrupt	true	0	0
GPIOB interrupt	true	0	0
FLASH (CFI) global Interrupt	unused		
RCC interrupt	unused		

4.3.2. NVIC Code generation

Enabled interrupt Table	Select for init sequence ordering	Generate IRQ handler	Call HAL handler
Non maskable interrupt	false	true	false
Hard fault interrupt	false	true	false
System service call via SWI instruction	false	true	false
Pendable request for system service	false	true	false
System tick timer	false	true	true
GPIOA interrupt	false	true	true
GPIOB interrupt	false	true	true

*** User modified value**

5. System Views

5.1. Category view

5.1.1. Current

6. Docs & Resources

Type	Link
Presentations	https://www.st.com/resource/en/product_presentation/stm32-stm8_embedded_software_solutions.pdf
Presentations	https://www.st.com/resource/en/product_presentation/stm32_eval-tools_portfolio.pdf
Presentations	https://www.st.com/resource/en/product_presentation/stm32-stm8_software_development_tools.pdf
Presentations	https://www.st.com/resource/en/product_presentation/microcontrollers-stm32-family-overview.pdf
Presentations	https://www.st.com/resource/en/product_presentation/microcontrollers-stm32wb0-series-product-overview.pdf
Flyers	https://www.st.com/resource/en/flyer/flstm32nucleo.pdf
Flyers	https://www.st.com/resource/en/flyer/fl2407stm32wb0.pdf
Application Notes	https://www.st.com/resource/en/application_note/an1709-emc-design-guide-for-stm8-stm32-and-legacy-mcus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an2606-stm32-microcontroller-system-memory-boot-mode-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an2639-soldering-recommendations-and-package-information-for-leadfree-ecopack-mcus-and-mpus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an3126-audio-and-waveform-generation-using-the-dac-in-stm32-products-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an3155-usart-protocol-used-in-the-stm32-bootloader-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4655-virtually-increasing-the-number-of-serial-communication-peripherals-in-stm32-applications-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4750-handling-of-soft-errors-in-stm32-applications-stmicroelectronics.pdf

Application Notes	https://www.st.com/resource/en/application_note/an4776-generalpurpose-timer-cookbook-for-stm32-microcontrollers-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4803-highspeed-si-simulations-using-ibis-and-boardlevel-simulations-using-hyperlynx-si-on-stm32-mcus-and-mpus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an5027-interfacing-pdm-digital-microphones-using-stm32-mcus-and-mpus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4899-stm32-microcontroller-gpio-hardware-settings-and-lowpower-consumption-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an5612-esd-protection-of-stm32-mcus-and-mpus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4838-introduction-to-memory-protection-unit-management-on-stm32-mcus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an5225-introduction-to-usb-typec-power-delivery-for-stm32-mcus-and-mpus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an2834-how-to-optimize-the-adc-accuracy-in-the-stm32-mcus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an5886-guidelines-for-design-and-board-assembly-of-land-grid-array-packages-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an5036-guidelines-for-thermal-management-on-stm32-applications-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an2867-guidelines-for-oscillator-design-on-stm8afals-and-stm32-mcusmpus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4013-introduction-to-timers-for-stm32-mcus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4759-introduction-to-using-the-hardware-realtime-clock-rtc-and-the-tamper-management-unit-tamp-with-stm32-mcus-stmicroelectronics.pdf

Application Notes	https://www.st.com/resource/en/application_note/an4908-getting-started-with-usart-automatic-baud-rater-detection-for-stm32-mcus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an5156-introduction-to-security-for-stm32-mcus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an5129-guidelines-for-meander-design-using-lowcost-pcb-antennae-with-24-ghz-radio-for-stm32wbwb0-mcus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an5543-guidelines-for-enhanced-spi-communication-on-stm32-mcus-and-mpus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an5503-guidelines-for-bringing-up-on-bluenrglp-bluenrglps-devices-and-stm32wb0-series-mcus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an5526-guidelines-for-pcb-design-on-bluenrglpbluenrglpsstm32wb0-mcus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an5574-guidelines-for-external-rf-frontend-on-bluenrglpbluenrglpsstm32wb0-mcus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an5976-introduction-to-stm32cube-mcu-package-examples-for-stm32wb0-mcus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an5977-how-to-build-a-bluetooth-low-energy-application-with-stm32wb0-mcus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an6140-how-to-use-the-secure-bootloader-on-stm32wb0-mcus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an6141-migrating-from-bluetooth-low-energy-stack-v3x-to-v4x-on-stm32wb0-mcus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an6142-introduction-to-stm32wb0-bluetooth-low-energy-wireless-interface-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an6146-introduction-to-certification-of-customer-products-using-stm32wb0-series-mcus-

	stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an5469-getting-started-with-bluenrglpbluenrglpsstm32wb0-mcus-radio-timer-module-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an1202_freertos_guide-freertos-guide-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an1602_semihosting_in_truestudio-how-to-do-semihosting-in-truestudio-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an1801_stm32cubeprogrammer_in_truestudio-installing-stm32cubeprogrammer-in-truestudio-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/atollic_editing_keyboard_shortcuts-atollic-editing-keyboard-shortcuts-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/iar_to_atollic_truestudio_migration_guide-truestudio-for-arm-migration-guide-iar-embedded-workbench-to-truestudio-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/stm32cubemx_installation_in_truestudio-stm32cubemx-installation-in-truestudio-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an4657-stm32-inapplication-programming-iap-using-the-usart-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an4841-digital-signal-processing-for-stm32-microcontrollers-using-cmsis-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an5360-getting-started-with-projects-based-on-the-stm32mp1-series-in-stm32cubeide-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an5361-getting-started-with-projects-based-on-dualcore-stm32h7-microcontrollers-in-stm32cubeide-stmicroelectronics.pdf

Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an5394-getting-started-with-projects-based-on-the-stm32l5-series-in-stm32cubeide-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an5418-how-to-build-a-simple-usbpd-sink-application-with-stm32cubemx-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an5426-migrating-graphics-middleware-projects-from-stm32cubemx-540-to-stm32cubemx-550-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an5564-getting-started-with-projects-based-on-dualcore-stm32wl-microcontrollers-in-stm32cubeide-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an5731-stm32cubemx-and-stm32cubeide-threadsafe-solution-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an4502-stm32-smbuspmbus-expansion-package-for-stm32cube-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an5952-how-to-use-cmake-in-stm32cubeide-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an5054-how-to-perform-secure-programming-using-stm32cubeprogrammer-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an5976-introduction-to-stm32cube-mcu-package-examples-for-stm32wb0-mcus-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an5977-how-to-build-a-bluetooth-low-energy-application-with-stm32wb0-mcus-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an6141-migrating-from-bluetooth-low-energy-stack-v3x-to-v4x-on-stm32wb0-mcus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an6142-introduction-to-

for related Tools & Software	stm32wb0-bluetooth-low-energy-wireless-interface-stmicroelectronics.pdf
Errata Sheets	https://www.st.com/resource/en/errata_sheet/es0584-stm32wb09xe-device-limitations-stmicroelectronics.pdf
Datasheet	https://www.st.com/resource/en/datasheet/dm00941531.pdf
Programming Manuals	https://www.st.com/resource/en/programming_manual/pm0223-stm32-cortexm0-mcus-programming-manual-stmicroelectronics.pdf
Programming Manuals	https://www.st.com/resource/en/programming_manual/pm0274-bluetooth-low-energy-stack-v4x-programming-guidelines-stmicroelectronics.pdf
Reference Manuals	https://www.st.com/resource/en/reference_manual/rm0505-stm32wb09xe-ultralow-power-wireless-32bit-mcu-armbased-cortexm0-with-bluetooth-low-energy-and-24-ghz-radio-solution-stmicroelectronics.pdf
Technical Notes & Articles	https://www.st.com/resource/en/technical_note/tn1163-description-of-wlcsp-for-microcontrollers-and-recommendations-for-its-use-stmicroelectronics.pdf
Technical Notes & Articles	https://www.st.com/resource/en/technical_note/tn1204-tape-and-reel-shipping-media-for-stm32-microcontrollers-in-bga-packages-stmicroelectronics.pdf
Technical Notes & Articles	https://www.st.com/resource/en/technical_note/tn1205-tape-and-reel-shipping-media-for-stm8-and-stm32-microcontrollers-in-fpn-packages-stmicroelectronics.pdf
Technical Notes & Articles	https://www.st.com/resource/en/technical_note/tn1206-tape-and-reel-shipping-media-for-stm8-and-stm32-microcontrollers-in-qfp-packages-stmicroelectronics.pdf
Technical Notes & Articles	https://www.st.com/resource/en/technical_note/tn1207-tape-and-reel-shipping-media-for-stm8-and-stm32-microcontrollers-in-so-packages-stmicroelectronics.pdf
Technical Notes & Articles	https://www.st.com/resource/en/technical_note/tn1208-tape-and-reel-shipping-media-for-stm8-and-stm32-microcontrollers-in-tssop-and-ssop-packages-stmicroelectronics.pdf
Technical Notes & Articles	https://www.st.com/resource/en/technical_note/tn1433-reference-device-marking-schematics-for-stm32-microcontrollers-and-microprocessors-stmicroelectronics.pdf

Technical Notes & Articles	https://www.st.com/resource/en/technical_note/tn1489-security-bulletin-tn1489stpsirt-physical-attacks-on-stm32-and-stm32cube-firmware-stmicroelectronics.pdf
User Manuals	https://www.st.com/resource/en/user_manual/um2726-bluenrglp-bluenrglps-and-stm32wb0-series-24-ghz-radio-proprietary-drivers-stmicroelectronics.pdf
User Manuals	https://www.st.com/resource/en/user_manual/um3363-description-of-stm32wb0-hal-and-lowlayer-drivers-stmicroelectronics.pdf