
STM32
CubeMX

1. Description

1.1. Project

Project Name	Klika
Board Name	custom
Generated with:	STM32CubeMX 6.12.1
Date	09/19/2024

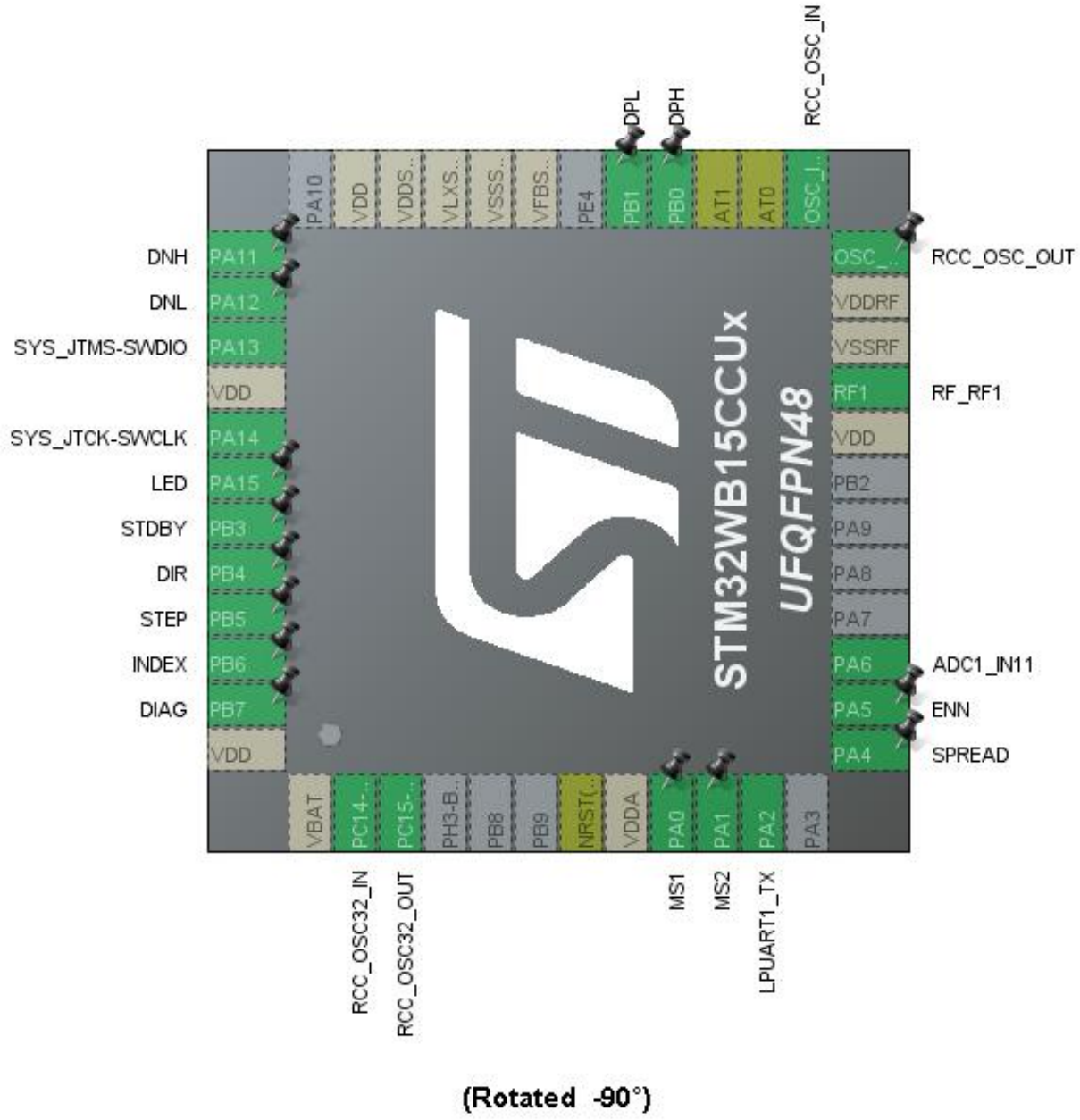
1.2. MCU

MCU Series	STM32WB
MCU Line	STM32WBx5
MCU name	STM32WB15CCUx
MCU Package	UFQFPN48
MCU Pin number	48

1.3. Core(s) information

Core(s)	ARM Cortex-M4

2. Pinout Configuration



(Rotated -90°)

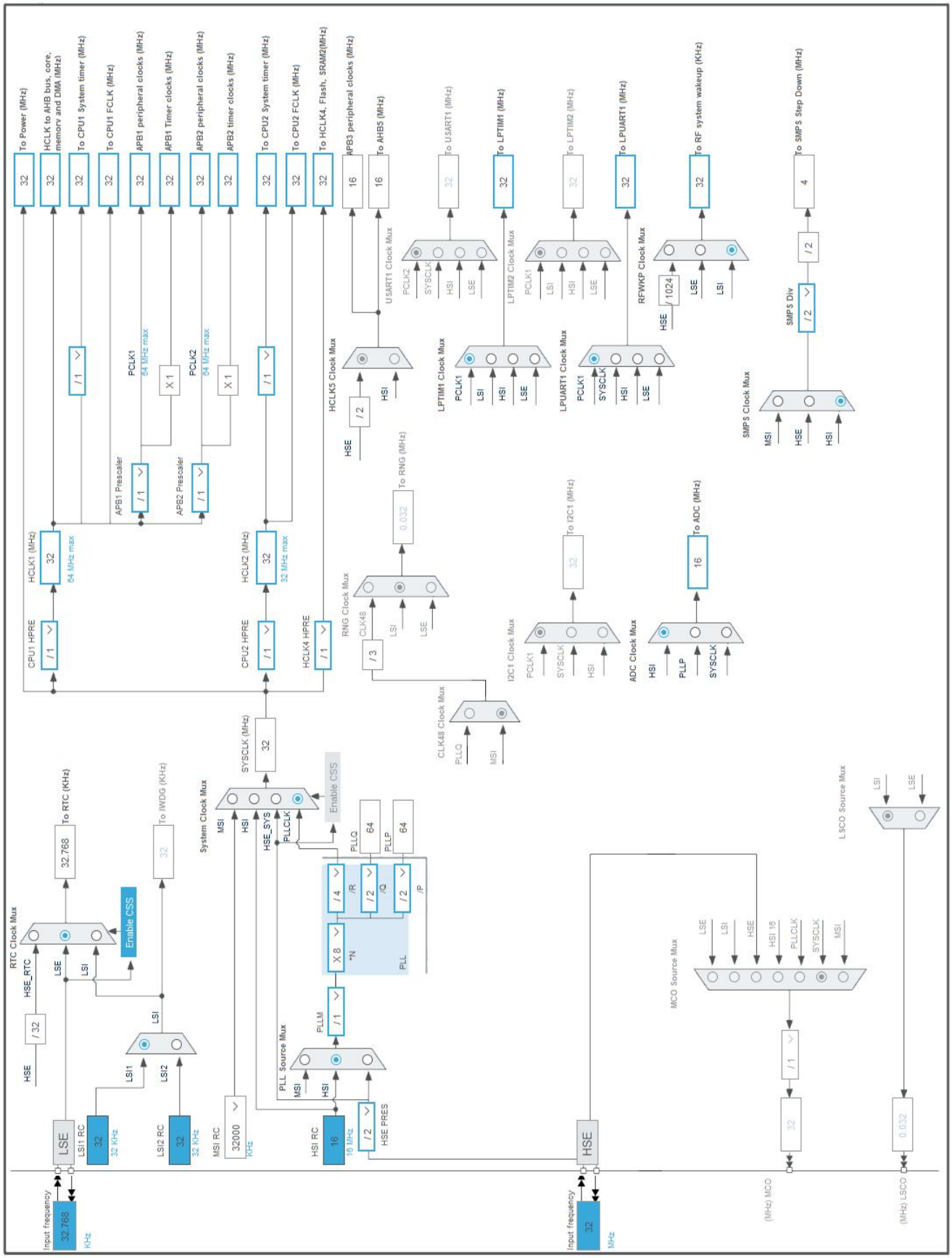
3. Pins Configuration

Pin Number UFQFPN48	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
2	PC14-OSC32_IN	I/O	RCC_OSC32_IN	
3	PC15-OSC32_OUT	I/O	RCC_OSC32_OUT	
7	NRST(PB11)	Reset		
8	VDDA	Power		
9	PA0 *	I/O	GPIO_Output	MS1
10	PA1 *	I/O	GPIO_Output	MS2
11	PA2	I/O	LPUART1_TX	
13	PA4 *	I/O	GPIO_Output	SPREAD
14	PA5 *	I/O	GPIO_Output	ENN
15	PA6	I/O	ADC1_IN11	
20	VDD	Power		
21	RF1	MonoIO	RF_RF1	
22	VSSRF	Power		
23	VDDRF	Power		
24	OSC_OUT	MonoIO	RCC_OSC_OUT	
25	OSC_IN	MonoIO	RCC_OSC_IN	
26	AT0	NC		
27	AT1	NC		
28	PB0 *	I/O	GPIO_Output	DPH
29	PB1 *	I/O	GPIO_Output	DPL
31	VFBSMPS	Power		
32	VSSSMPS	Power		
33	VLXSMPS	Power		
34	VDDSMPS	Power		
35	VDD	Power		
37	PA11 *	I/O	GPIO_Output	DNH
38	PA12 *	I/O	GPIO_Output	DNL
39	PA13	I/O	SYS_JTMS-SWDIO	
40	VDD	Power		
41	PA14	I/O	SYS_JTCK-SWCLK	
42	PA15 *	I/O	GPIO_Output	LED
43	PB3 *	I/O	GPIO_Output	STDBY
44	PB4 *	I/O	GPIO_Output	DIR
45	PB5 *	I/O	GPIO_Output	STEP
46	PB6 *	I/O	GPIO_Input	INDEX

Pin Number UFQFPN48	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
47	PB7 *	I/O	GPIO_Input	DIAG
48	VDD	Power		

* The pin is affected with an I/O function

4. Clock Tree Configuration



1. Power Consumption Calculator report

1.1. Microcontroller Selection

Series	STM32WB
Line	STM32WBx5
MCU	STM32WB15CCUx
Datasheet	DS13258_Rev0

1.2. Parameter Selection

Temperature	25
Vdd	3.0

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

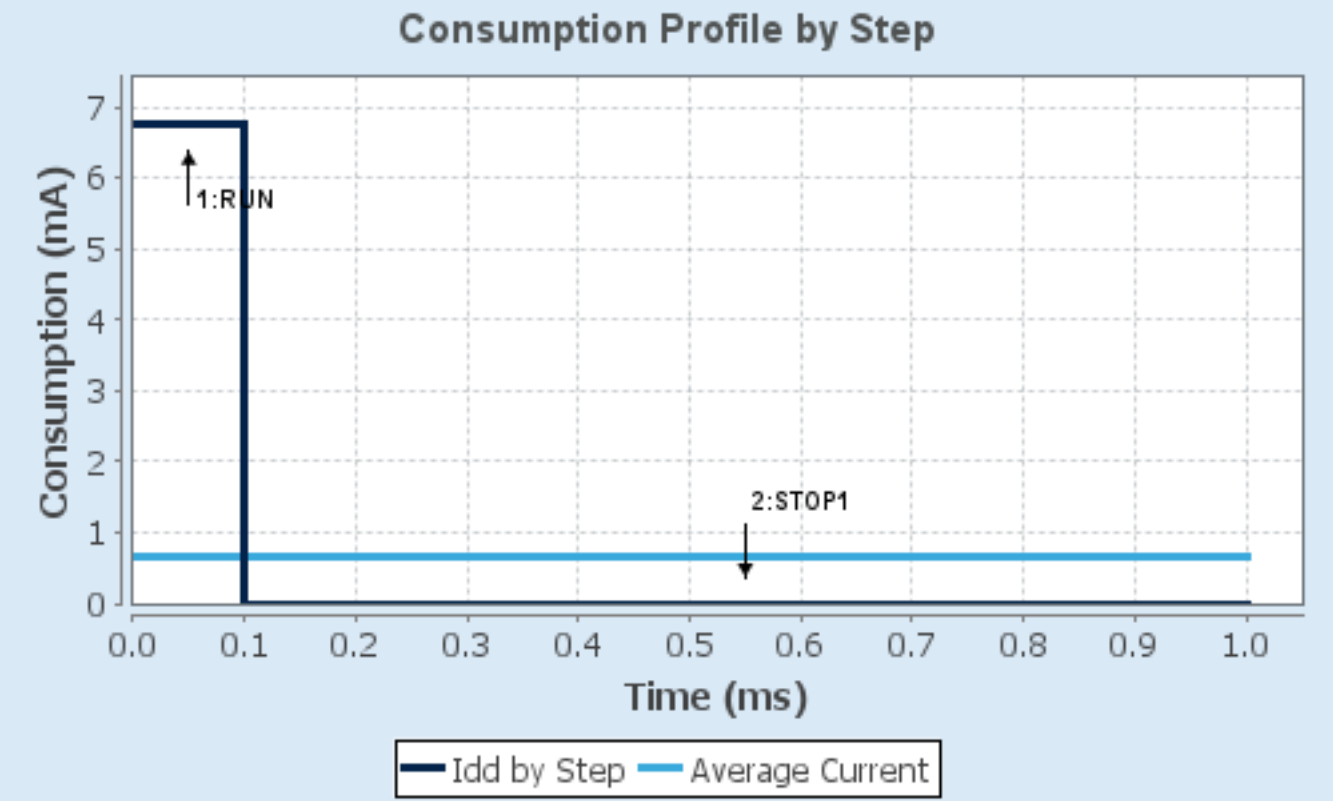
1.4. Sequence

Step	Step1	Step2
Mode	RUN	STOP1
Vdd	3.0	3.0
Voltage Source	Battery	Battery
Range	Range1-High	NoRange
Fetch Type	SRAM1/Flash-PowerDown	F_FLASH/ART/CACHE
CPU Frequency	64 MHz	16 MHz
Clock Configuration	HSI PLL	ALL_OFF
Clock Source Frequency	16 MHz	16 MHz
Peripherals		
Additional Cons.	0 mA	0 mA
Average Current	6.75 mA	3.05 µA
Duration	0.1 ms	0.9 ms
DMIPS	80.0	20.0
Ta Max	104.43	105
Category	In DS Table	In DS Table

1.5. Results

Sequence Time	1 ms	Average Current	677.74 µA
Battery Life	1 month, 12 days, 13 hours	Average DMIPS	26.0 DMIPS

1.6. Chart


Consumption Profile by Step
Consumption (mA)
7
6
5
4
3
2
1
0
1:RUN
2:STOP1
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	Klika
Project Folder	C:\STM32CubeIDE\Klika
Toolchain / IDE	STM32CubeIDE
Firmware Package Name and Version	STM32Cube FW_WB V1.20.0
Application Structure	Advanced
Generate Under Root	Yes
Do not generate the main()	No
Minimum Heap Size	0x200
Minimum Stack Size	0x400

2.2. Code Generation Settings

Name	Value
STM32Cube MCU packages and embedded software	Copy only the necessary library files
Generate peripheral initialization as a pair of '.c/.h' files	No
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	MX_ADC1_Init	ADC1
4	MX_IPCC_Init	IPCC
5	MX_LPUART1_UART_Init	LPUART1
6	MX_RTC_Init	RTC
7	APPE_Init	STM32_WPAN
8	MX_TIM1_Init	TIM1
9	MX_LPTIM1_Init	LPTIM1

3. Peripherals and Middlewares Configuration

3.1. ADC1

mode: IN11

3.1.1. Parameter Settings:

ADC_Settings:

Clock Prescaler	Asynchronous clock mode divided by 1
Resolution	ADC 12-bit resolution
Data Alignment	Right alignment
Scan Conversion Mode	Disabled
Continuous Conversion Mode	Disabled
Discontinuous Conversion Mode	Disabled
DMA Continuous Requests	Disabled
End Of Conversion Selection	End of single conversion
Overrun behaviour	Overrun data preserved
Low Power Auto Wait	Disabled
Sequencer	Sequencer set to fully configurable

ADC_Regular_ConversionMode:

Enable Regular Conversions	Enable
Number Of Conversion	1
External Trigger Conversion Source	Regular Conversion launched by software
External Trigger Conversion Edge	None
SamplingTime Common 1	1.5 Cycles
SamplingTime Common 2	1.5 Cycles
Rank	1
Channel	Channel 11
Sampling Time	Sampling time common 1

Analog Watchdog 1:

Enable Analog WatchDog1 Mode	false

3.2. HSEM

mode: Activated

3.3. IPCC

mode: Activated

3.4. LPTIM1

Mode: Counts internal clock events

3.4.1. Parameter Settings:

Clock:

Clock Prescaler	**Prescaler Div32 ***

Preload:

Update Mode	Update Immediate

Trigger:

Trigger Source	Software Trigger

3.5. LPUART1

Mode: Single Wire (Half-Duplex)

3.5.1. Parameter Settings:

Basic Parameters:

Baud Rate	**460800 ***
Word Length	8 Bits (including Parity)
Parity	None
Stop Bits	1

Advanced Parameters:

Data Direction	Receive and Transmit
Single Sample	Disable
ClockPrescaler	1
Fifo Mode	FIFO mode disable
Txfifo Threshold	1 eighth full configuration
Rxfifo Threshold	1 eighth full configuration

Advanced Features:

TX Pin Active Level Inversion	Disable
RX Pin Active Level Inversion	Disable
Data Inversion	Disable
TX and RX pins Swapping	Disable
Overrun	Enable
DMA on RX Error	Enable
MSB First	Disable

3.6. MEMORYMAP

mode: Activated

3.7. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

Low Speed Clock (LSE) : Crystal/Ceramic Resonator

3.7.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Instruction Cache	Enabled
Prefetch Buffer	Enabled
Data Cache	Enabled
Flash Latency(WS)	1 WS (2 CPU cycle)

RCC Parameters:

HSI Calibration Value	16
MSI Calibration Value	0
MSI Auto Calibration	Disabled
MSI State	Enabled
HSI State	Enabled
HSE Startup Timout Value (ms)	100
LSE Startup Timout Value (ms)	5000
LSE Drive Capability	LSE oscillator medium high drive capability

Peripherals Clock Configuration:

Generate the peripherals clock configuration	TRUE

3.8. RF

mode: Activate RF1

3.9. RTC

mode: Activate Clock Source

WakeUp: Internal WakeUp

3.9.1. Parameter Settings:

General:

Hour Format	Hourformat 24
Asynchronous Predivider value	CFG_RTC_ASYNCH_PRESCALER
Synchronous Predivider value	CFG_RTC_SYNCH_PRESCALER

Wake UP:

Wake Up Clock	RTCCLK / 16
Wake Up Counter	0

3.10. SEQUENCER
mode: Enabled

3.11. SYS
Debug: Serial Wire
Timebase Source: SysTick

3.12. TIM1
Clock Source : Internal Clock
Channel1: PWM Generation No Output

3.12.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**64000 ***
Internal Clock Division (CKD)	No Division
Repetition Counter (RCR - 8 bits value)	0
auto-reload preload	Disable

Trigger Output (TRGO) Parameters:

Master/Slave Mode (MSM bit)	Disable (Trigger input effect not delayed)
Trigger Event Selection TRGO	Reset (UG bit from TIMx_EGR)
Trigger Event Selection TRGO2	Reset (UG bit from TIMx_EGR)

Break And Dead Time management - BRK Configuration:

BRK State	Disable
BRK Polarity	High
BRK Filter (4 bits value)	0
BRK Sources Configuration	
- Digital Input	Disable
- COMP1	Disable

Break And Dead Time management - BRK2 Configuration:

BRK2 State	Disable
BRK2 Polarity	High
BRK2 Filter (4 bits value)	0
BRK2 Sources Configuration	

- Digital Input	Disable
- COMP1	Disable

Break And Dead Time management - Output Configuration:

Automatic Output State	Disable
Off State Selection for Run Mode (OSSR)	Disable
Off State Selection for Idle Mode (OSSI)	Disable
Lock Configuration	Off

Clear Input:

Clear Input Source	Disable

PWM Generation Channel 1:

Mode	PWM mode 1
Pulse (16 bits value)	**16000 ***
Output compare preload	Enable
Fast Mode	Disable
CH Polarity	High
CH Idle State	Reset

3.13. TINY_LPM

mode: Enabled

3.14. STM32_WPAN

mode: BLE

3.14.1. BLE Applications and Services:

BLE Wireless Stack:

BLE Wireless Stack	Full

BLE Application Type:

BLE Application Type	Server profile

Server Mode:

BT SIG Beacon	Disabled
BT SIG Blood Pressure Sensor	Disabled
BT SIG Health Thermometer Sensor	Disabled
BT SIG Heart Rate Sensor	Disabled
Custom P2P Server	Enabled
Custom Template	Disabled

BLE Services Configuration:

The device needs to support the Peripheral Role	1
The device needs to support the Central Role	0
BLE_CFG_SVC_MAX_NBR_CB	7

BLE_CFG_CLT_MAX_NBR_CB	0

P2P Service:

P2P_SERVER_NUMBER	P2P_SERVER1

Local Name:

LOCAL_NAME	**KLIKA ***

3.14.2. Configuration:

HW Timer Server:

CFG_HW_TS_MAX_NBR_CONCURRENT_TIMER	6
CFG_HW_TS_NVIC_RTC_WAKEUP_IT_PREEMPTPRIO	3
CFG_HW_TS_NVIC_RTC_WAKEUP_IT_SUBPRIO	0
CFG_HW_TS_USE_PRIMASK_AS_CRITICAL_SECTION	1
CFG_HW_TS_RTC_HANDLER_MAX_DELAY	(10 * (LSI_VALUE/1000))
CFG_HW_TS_RTC_WAKEUP_HANDLER_ID	RTC_WKUP_IRQn

HW UART:

CFG_HW_LPUART1_ENABLED	Disabled
CFG_HW_LPUART1_DMA_TX_SUPPORTED	Disabled
CFG_HW_USART1_ENABLED	Disabled
CFG_HW_USART1_DMA_TX_SUPPORTED	Disabled

Generic parameters:

CFG_HW_RESET_BY_FW	Disabled
CFG_USE_SMPS	Disabled
CFG_LPM_SUPPORTED	Disabled
CFG_LPM_STANDBY_SUPPORTED	Disabled
CFG_DEBUGGER_SUPPORTED	Enabled
CFG_DEBUG_BLE_TRACE	Disabled
CFG_DEBUG_APP_TRACE	Disabled
CFG_DEBUG_TRACE_LIGHT	Disabled
CFG_DEBUG_TRACE_FULL	Disabled
DBG_TRACE_USE_CIRCULAR_QUEUE	Enabled
DBG_TRACE_MSG_QUEUE_SIZE	4096
MAX_DBG_TRACE_MSG_SIZE	1024

Application parameters:

CFG_TX_POWER	**6dBm (0x1F) ***
CFG_DEBUG_TRACE_UART	You need to activate either CFG_HW_UART1 or CFG_HW_LPUART1(when available)
CFG_CONSOLE_MENU	You need to activate either CFG_HW_UART1 or CFG_HW_LPUART1(when available)
CFG_ADV_BD_ADDRESS	

	0x11aabbccddee *
CFG_IDENTITY_ADDRESS	GAP_PUBLIC_ADDR
CFG_PRIVACY	Disabled
CFG_FAST_CONN_ADV_INTERVAL_MIN	80
CFG_FAST_CONN_ADV_INTERVAL_MAX	100
CFG_LP_CONN_ADV_INTERVAL_MIN	1000
CFG_LP_CONN_ADV_INTERVAL_MAX	2500
CFG_IO_CAPABILITY	Display Yes No (0x01)
CFG_MITM_PROTECTION	MITM protection required (0x01)
L2CAP_REQUEST_NEW_CONN_PARAM	0
CFG_RTCCLK_DIVIDER_CONF	0
CFG_RTCCLK_DIV	16
CFG_RTC_WUCKSEL_DIVIDER	0
CFG_RTC_ASYNCH_PRESCALER	**0x0F ***
CFG_RTC_SYNCH_PRESCALER	**0x7FFF ***
CFG_BLE_NUM_LINK	2
CFG_BLE_NUM_GATT_SERVICES	4
CFG_BLE_NUM_GATT_ATTRIBUTES	30
CFG_BLE_MAX_ATT_MTU	156
CFG_BLE_ATT_VALUE_ARRAY_SIZE	1290
CFG_BLE_DATA_LENGTH_EXTENSION	Enabled
CFG_BLE_PERIPHERAL_SCA	500
CFG_BLE_CENTRAL_SCA	0
CFG_BLE_HSE_STARTUP_TIME	**0x148 ***
CFG_BLE_MAX_CONN_EVENT_LENGTH	**0xFFFFFFFF ***
CFG_BLE_VITERBI_MODE	Enabled
CFG_BLE_OPTIONS	BLE stack Options flags:
- CFG_BLE_OPTIONS_LL	SHCI_C2_BLE_INIT_OPTIONS_LL_HOST
- CFG_BLE_OPTIONS_SVC	SHCI_C2_BLE_INIT_OPTIONS_WITH_SVC_CHANGE_DESC
- CFG_BLE_OPTIONS_DEVICE_NAME	SHCI_C2_BLE_INIT_OPTIONS_DEVICE_NAME_RW
- CFG_BLE_OPTIONS_EXT_ADV	SHCI_C2_BLE_INIT_OPTIONS_NO_EXT_ADV
- CFG_BLE_OPTIONS_CS_ALGO	SHCI_C2_BLE_INIT_OPTIONS_NO_CS_ALGO2
- CFG_BLE_OPTIONS_GATTDB_NVM	SHCI_C2_BLE_INIT_OPTIONS_FULL_GATTDB_NVM
- CFG_BLE_OPTIONS_GATT_CACHING	SHCI_C2_BLE_INIT_OPTIONS_GATT_CACHING_NOTUSED
- CFG_BLE_OPTIONS_POWER_CLASS	**SHCI_C2_BLE_INIT_OPTIONS_POWER_CLASS_1 ***

- CFG_BLE_OPTIONS_APPEARANCE	SHCI_C2_BLE_INIT_OPTIONS_APPEARANCE_READONLY
- CFG_BLE_OPTIONS_ENHANCED_ATT	SHCI_C2_BLE_INIT_OPTIONS_ENHANCED_ATT_NOTSUPPORTED
CFG_BLE_MAX_COC_INITIATOR_NBR	32
CFG_BLE_MIN_TX_POWER	0
CFG_BLE_MAX_TX_POWER	0
CFG_BLE_RX_MODEL_CONFIG	SHCI_C2_BLE_INIT_RX_MODEL_AGC_RSSI_LEGACY
CFG_BLE_MAX_ADV_SET_NBR	2
CFG_BLE_MAX_ADV_DATA_LEN	1650
CFG_BLE_TX_PATH_COMPENS	0
CFG_BLE_RX_PATH_COMPENS	0
CFG_BLE_CORE_VERSION	SHCI_C2_BLE_INIT_BLE_CORE_5_4
CFG_TLBLE_EVT_QUEUE_LENGTH	5
CFG_TLBLE_MOST_EVENT_PAYLOAD_SIZE	255

Pairing parameters:

CFG_BONDING_MODE	No-bonding mode(0x00)
CFG_USED_FIXED_PIN	Use a fixed pin (0x00)
CFG_FIXED_PIN	111111
CFG_ENCRYPTION_KEY_SIZE_MAX	16
CFG_ENCRYPTION_KEY_SIZE_MIN	8
CFG_SC_SUPPORT	Secure Connections Paring supported but optional (0x01)
CFG_BLE_IR	12, 34, 56, 78, 9A, BC, DE, F0, 12, 34, 56, 78, 9A, BC, DE, F0
CFG_BLE_ER	FE, DC, BA, 09, 87, 65, 43, 21, FE, DC, BA, 09, 87, 65, 43, 21
CFG_KEYPRESS_NOTIFICATION_SUPPORT	Keypress notification not supported (0x00)

Debug options:

BLE_DBG_APP_EN	Disabled
BLE_DBG_P2P_STM_EN	Disabled

*** User modified value**

4. System Configuration

4.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
ADC1	PA6	ADC1_IN11	Analog mode	No pull-up and no pull-down	n/a	
LPUART1	PA2	LPUART1_TX	Alternate Function Open Drain	Pull-up	**Very High ***	
RCC	PC14-OSC32_IN	RCC_OSC32_IN	n/a	n/a	n/a	
	PC15-OSC32_OUT	RCC_OSC32_OUT	n/a	n/a	n/a	
	OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	
	OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	
RF	RF1	RF_RF1	n/a	n/a	n/a	
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
GPIO	PA0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	MS1
	PA1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	MS2
	PA4	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	SPREAD
	PA5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	ENN
	PB0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DPH
	PB1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DPL
	PA11	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DNH
	PA12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DNL
	PA15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LED
	PB3	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	STDBY
	PB4	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DIR
	PB5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	STEP
	PB6	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	INDEX
	PB7	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	DIAG

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
Memory management fault	true	0	0
Prefetch fault, memory access fault	true	0	0
Undefined instruction or illegal state	true	0	0
System service call via SWI instruction	true	0	0
Debug monitor	true	0	0
Pendable request for system service	true	0	0
System tick timer	true	15	0
RTC wake-up interrupt through EXTI line 19	true	0	0
TIM1 capture compare interrupt	true	6	0
IPCC RX occupied interrupt	true	0	0
IPCC TX free interrupt	true	0	0
HSEM global interrupt	true	0	0
PVD/PVM0/PVM2 interrupts through EXTI lines 16/31/33	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
ADC1 global interrupt	unused		
CPU2 SEV interrupt through EXTI line 40 and PWR CPU2 HOLD wake-up interrupt	unused		
TIM1 break interrupt	unused		
TIM1 Update Interrupt	unused		
TIM1 Trigger and Communication Interrupts	unused		
LPUART1 global interrupt	unused		
PWR switching on the fly interrupt, PWR end of BLE activity interrupt, PWR end of critical radio phase interrupt	unused		
LPTIM1 global interrupt	unused		
FPU global 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
Memory management fault	false	true	false
Prefetch fault, memory access fault	false	true	false

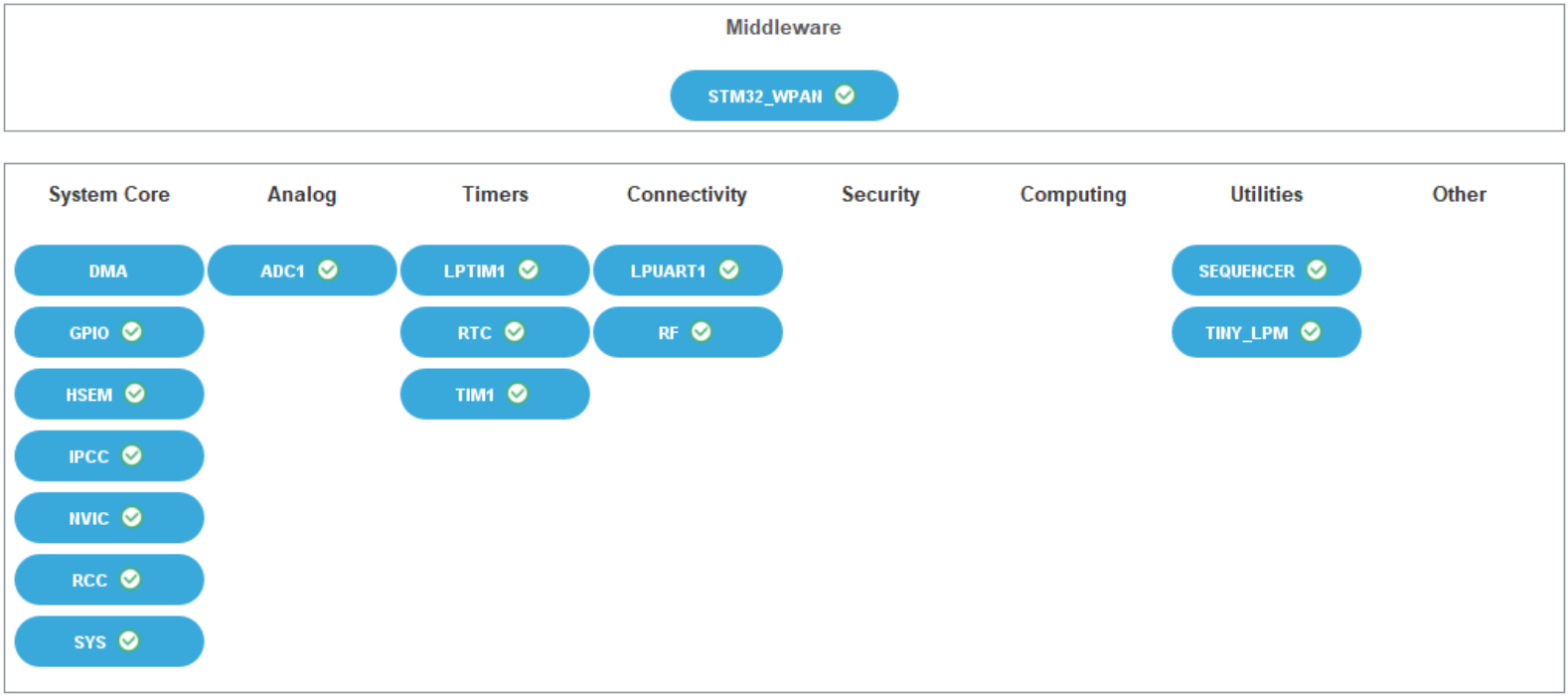
Enabled interrupt Table	Select for init sequence ordering	Generate IRQ handler	Call HAL handler
Undefined instruction or illegal state	false	true	false
System service call via SWI instruction	false	true	false
Debug monitor	false	true	false
Pendable request for system service	false	true	false
System tick timer	false	true	true
RTC wake-up interrupt through EXTI line 19	false	true	true
TIM1 capture compare interrupt	false	true	true
IPCC RX occupied interrupt	false	true	true
IPCC TX free interrupt	false	true	true
HSEM global interrupt	false	true	true

*** User modified value**

5. System Views

5.1. Category view

5.1.1. Current



6. Docs & Resources

Type	Link
BSDL files	https://www.st.com/resource/en/bsdl_model/stm32wb_bsdl.zip
IBIS models	https://www.st.com/resource/en/ibis_model/stm32wb_ibis.zip
System View Description	https://www.st.com/resource/en/svd/stm32wb_svd.zip
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_functional-safety-packages.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_stm32wbxm_wireless-modules_product_overview.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-stm32-entry-level-graphics.pdf
Flyers	https://www.st.com/resource/en/flyer/flstm32nucleo.pdf
Flyers	https://www.st.com/resource/en/flyer/flstm32wb.pdf
Flyers	https://www.st.com/resource/en/flyer/flstm32trust.pdf
Flyers	https://www.st.com/resource/en/flyer/flstm32wbvl.pdf
Flyers	https://www.st.com/resource/en/flyer/flstm32matter.pdf
Flyers	https://www.st.com/resource/en/flyer/flstm32wbxm.pdf
Flyers	https://www.st.com/resource/en/flyer/flstm32zigbee.pdf
White Papers	https://www.st.com/resource/en/white_paper/seamless-smart-home-connectivity-with-matter-whitepaper.pdf
Product	https://www.st.com/resource/en/certification_document/stm32wb_certificat

Certifications	e_thread.pdf
Product Certifications	https://www.st.com/resource/en/certification_document/stm32wb_full_certificate_thread.pdf
Product Certifications	https://www.st.com/resource/en/certification_document/stm32wb-rf-certificates.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/an3156-usb-dfu-protocol-used-in-the-stm32-bootloader-stmicroelectronics.pdf
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