1. Description

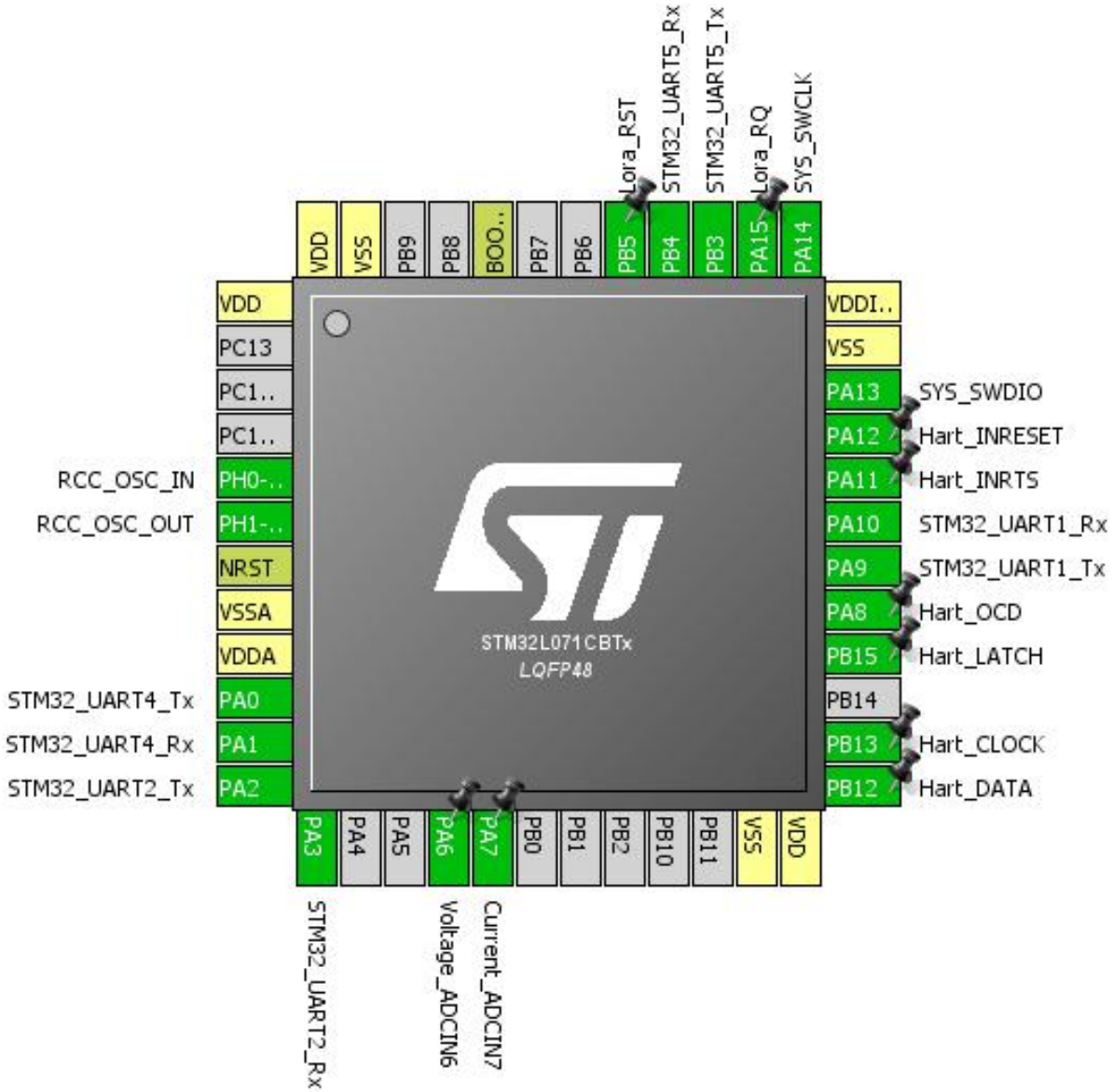
1.1. Project

Project Name	STM32L071xx_FreeRtos_LoraHw3_Verx.x
Board Name	STM32L071xx_FreeRtos_LoraHw3_Verx.x.x
Generated with:	STM32CubeMX 4.18.0
Date	11/13/2017

1.2. MCU

MCU Series	STM32L0
MCU Line	STM32L0x1
MCU name	STM32L071CBTx
MCU Package	LQFP48
MCU Pin number	48

2. Pinout Configuration

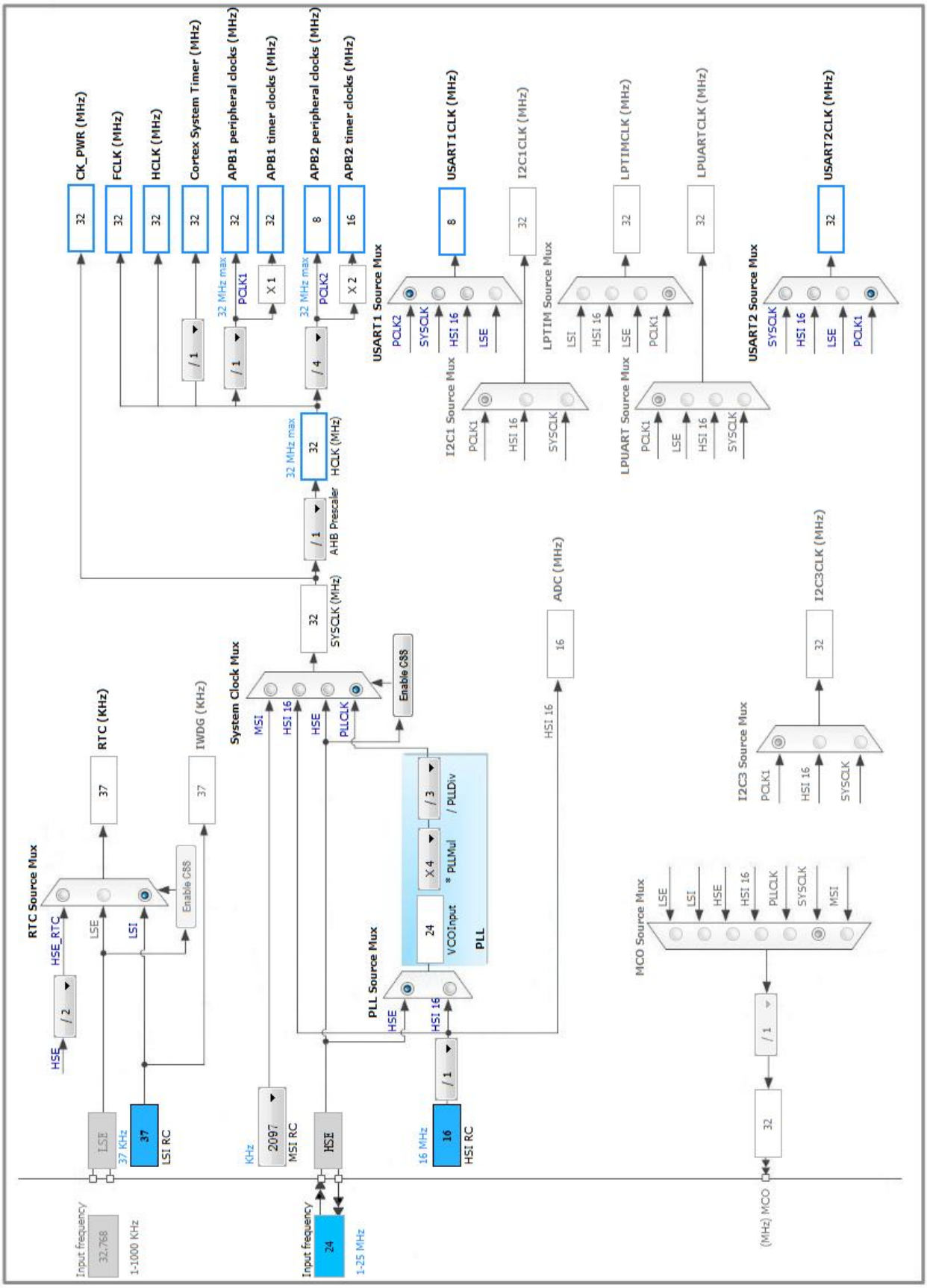


3. Pins Configuration

Pin Number LQFP48	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VDD	Power		
5	PH0-OSC_IN	I/O	RCC_OSC_IN	
6	PH1-OSC_OUT	I/O	RCC_OSC_OUT	
7	NRST	Reset		
8	VSSA	Power		
9	VDDA	Power		
10	PA0	I/O	USART4_TX	STM32_UART4_Tx
11	PA1	I/O	USART4_RX	STM32_UART4_Rx
12	PA2	I/O	USART2_TX	STM32_UART2_Tx
13	PA3	I/O	USART2_RX	STM32_UART2_Rx
16	PA6	I/O	ADC_IN6	Voltage_ADCIN6
17	PA7	I/O	ADC_IN7	Current_ADCIN7
23	VSS	Power		
24	VDD	Power		
25	PB12 *	I/O	GPIO_Output	Hart_DATA
26	PB13 *	I/O	GPIO_Output	Hart_CLOCK
28	PB15 *	I/O	GPIO_Output	Hart_LATCH
29	PA8 *	I/O	GPIO_Input	Hart_OCD
30	PA9	I/O	USART1_TX	STM32_UART1_Tx
31	PA10	I/O	USART1_RX	STM32_UART1_Rx
32	PA11 *	I/O	GPIO_Output	Hart_INRTS
33	PA12 *	I/O	GPIO_Output	Hart_INRESET
34	PA13	I/O	SYS_SWDIO	
35	VSS	Power		
36	VDDIO2	Power		
37	PA14	I/O	SYS_SWCLK	
38	PA15 *	I/O	GPIO_Output	Lora_RQ
39	PB3	I/O	USART5_TX	STM32_UART5_Tx
40	PB4	I/O	USART5_RX	STM32_UART5_Rx
41	PB5 *	I/O	GPIO_Output	Lora_RST
44	BOOT0	Boot		
47	VSS	Power		
48	VDD	Power		

* The pin is affected with an I/O function

4. Clock Tree Configuration



5. IPs and Middleware Configuration

5.1. ADC

mode: IN6

mode: IN7

5.1.1. Parameter Settings:

ADC_Settings:

Clock Prescaler	**Synchronous clock mode divided by 4 ***
Resolution	ADC 12-bit resolution
Data Alignment	Right alignment
Scan Direction	Forward
Continuous Conversion Mode	**Enabled ***
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
Low Frequency Mode	Disabled
Auto Off	Disabled
Oversampling Mode	Disabled

ADC_Regular_ConversionMode:

Sampling Time	**7.5 Cycles ***
External Trigger Conversion Source	Regular Conversion launched by software
External Trigger Conversion Edge	None

WatchDog:

Enable Analog WatchDog Mode	false

5.2. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

5.2.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3

Buffer Cache	Enabled
Prefetch	Disabled
Preread	Enabled
Flash Latency(WS)	1 WS (2 CPU cycle)

RCC Parameters:

HSI Calibration Value	16
MSI Calibration Value	0
HSE Startup Timout Value (ms)	100
LSE Startup Timout Value (ms)	5000

Power Parameters:

Power Regulator Voltage Scale	Power Regulator Voltage Scale 1

5.3. RTC

mode: Activate Clock Source

mode: Activate Calendar

Alarm A: Internal Alarm A

Alarm B: Internal Alarm B

5.3.1. Parameter Settings:

General:

Hour Format	Hourformat 24
Asynchronous Predivider value	127
Synchronous Predivider value	255

Calendar Time:

Data Format	BCD data format
Hours	0
Minutes	0
Seconds	0
Day Light Saving: value of hour adjustment	Daylightsaving None
Store Operation	Storeoperation Reset

Calendar Date:

Week Day	Monday
Month	January
Date	1
Year	0

Alarm A:

Hours	0
Minutes	0

Seconds	0
Sub Seconds	0
Alarm Mask Date Week day	Disable
Alarm Mask Hours	Disable
Alarm Mask Minutes	Disable
Alarm Mask Seconds	**Enable ***
Alarm Sub Second Mask	All Alarm SS fields are masked.
Alarm Date Week Day Sel	Date
Alarm Date	1

Alarm B:

Hours	0
Minutes	0
Seconds	0
Sub Seconds	0
Alarm Mask Date Week day	Disable
Alarm Mask Hours	Disable
Alarm Mask Minutes	Disable
Alarm Mask Seconds	**Enable ***
Alarm Sub Second Mask	All Alarm SS fields are masked.
Alarm Date Week Day Sel	Date
Alarm Date	1

5.4. SYS

mode: Debug Serial Wire

Timebase Source: TIM2

5.5. USART1

Mode: Asynchronous

5.5.1. Parameter Settings:

Basic Parameters:

Baud Rate	**1200 ***
Word Length	**9 Bits (including Parity) ***
Parity	None
Stop Bits	1

Advanced Parameters:

Data Direction	Receive and Transmit

Over Sampling	16 Samples
Single Sample	Disable

Advanced Features:

Auto Baudrate	Disable
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

5.6. USART2

Mode: Asynchronous

5.6.1. Parameter Settings:

Basic Parameters:

Baud Rate	115200
Word Length	**8 Bits (including Parity) ***
Parity	None
Stop Bits	1

Advanced Parameters:

Data Direction	Receive and Transmit
Over Sampling	16 Samples
Single Sample	Disable

Advanced Features:

Auto Baudrate	Disable
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

5.7. USART4

Mode: Asynchronous

5.7.1. Parameter Settings:

Basic Parameters:

Baud Rate	115200
Word Length	**8 Bits (including Parity) ***
Parity	None
Stop Bits	1

Advanced Parameters:

Data Direction	Receive and Transmit
Over Sampling	16 Samples
Single Sample	Disable

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

5.8. USART5

Mode: Asynchronous

5.8.1. Parameter Settings:

Basic Parameters:

Baud Rate	115200
Word Length	**8 Bits (including Parity) ***
Parity	None
Stop Bits	1

Advanced Parameters:

Data Direction	Receive and Transmit
Over Sampling	16 Samples
Single Sample	Disable

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

5.9. FREERTOS

mode: Enabled

5.9.1. Config parameters:

Versions:

CMSIS-RTOS version	1.02
FreeRTOS version	8.2.3

Kernel settings:

USE_PREEMPTION	Enabled
CPU_CLOCK_HZ	SystemCoreClock
TICK_RATE_HZ	1000
MAX_PRIORITIES	7
MINIMAL_STACK_SIZE	128
MAX_TASK_NAME_LEN	16
USE_16_BIT_TICKS	Disabled
IDLE_SHOULD_YIELD	Enabled
USE_MUTEXES	Enabled
USE_RECURSIVE_MUTEXES	Disabled
USE_COUNTING_SEMAPHORES	Disabled
QUEUE_REGISTRY_SIZE	8
USE_APPLICATION_TASK_TAG	Disabled
TOTAL_HEAP_SIZE	**6144 ***
Memory Management scheme	heap_4
USE_ALTERNATIVE_API	Disabled
ENABLE_BACKWARD_COMPATIBILITY	Enabled
USE_PORT_OPTIMISED_TASK_SELECTION	Disabled
USE_TICKLESS_IDLE	Disabled
USE_TASK_NOTIFICATIONS	Enabled

Hook function related definitions:

USE_IDLE_HOOK	Disabled
USE_TICK_HOOK	Disabled

USE_MALLOC_FAILED_HOOK	Disabled
CHECK_FOR_STACK_OVERFLOW	Disabled

Run time and task stats gathering related definitions:

USE_TRACE_FACILITY	Enabled
GENERATE_RUN_TIME_STATS	Disabled

Co-routine related definitions:

USE_CO_ROUTINES	Disabled
MAX_CO_ROUTINE_PRIORITIES	2

Software timer definitions:

USE_TIMERS	Disabled
TIMER_TASK_PRIORITY	2
TIMER_QUEUE_LENGTH	10
TIMER_TASK_STACK_DEPTH	256

Interrupt nesting behaviour configuration:

LIBRARY_LOWEST_INTERRUPT_PRIORITY	3
LIBRARY_MAX_SYSCALL_INTERRUPT_PRIORITY	3

5.9.2. Include parameters:

Include definitions:

vTaskPrioritySet	Enabled
uxTaskPriorityGet	Enabled
vTaskDelete	Enabled
vTaskCleanUpResources	**Enabled ***
vTaskSuspend	Enabled
vTaskDelayUntil	Disabled
vTaskDelay	Enabled
xTaskGetSchedulerState	Enabled
xTaskResumeFromISR	Enabled
xQueueGetMutexHolder	Disabled
xSemaphoreGetMutexHolder	Disabled
pcTaskGetTaskName	**Enabled ***
uxTaskGetStackHighWaterMark	Disabled
xTaskGetCurrentTaskHandle	Disabled
eTaskGetState	**Enabled ***
xEventGroupSetBitFromISR	Disabled
xTimerPendFunctionCall	Disabled

*** User modified value**

6. System Configuration

6.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
ADC	PA6	ADC_IN6	Analog mode	No pull-up and no pull-down	n/a	Voltage_ADCIN6
	PA7	ADC_IN7	Analog mode	No pull-up and no pull-down	n/a	Current_ADCIN7
RCC	PH0-OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	
	PH1-OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	
SYS	PA13	SYS_SWDIO	n/a	n/a	n/a	
	PA14	SYS_SWCLK	n/a	n/a	n/a	
USART1	PA9	USART1_TX	Alternate Function Push Pull	Pull-up	**Very High ***	STM32_UART1_Tx
	PA10	USART1_RX	Alternate Function Push Pull	Pull-up	**High ***	STM32_UART1_Rx
USART2	PA2	USART2_TX	Alternate Function Push Pull	Pull-up	**High ***	STM32_UART2_Tx
	PA3	USART2_RX	Alternate Function Push Pull	Pull-up	**High ***	STM32_UART2_Rx
USART4	PA0	USART4_TX	Alternate Function Push Pull	Pull-up	**Very High ***	STM32_UART4_Tx
	PA1	USART4_RX	Alternate Function Push Pull	Pull-up	**Very High ***	STM32_UART4_Rx
USART5	PB3	USART5_TX	Alternate Function Push Pull	Pull-up	**Very High ***	STM32_UART5_Tx
	PB4	USART5_RX	Alternate Function Push Pull	Pull-up	**Very High ***	STM32_UART5_Rx
GPIO	PB12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	Hart_DATA
	PB13	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	Hart_CLOCK
	PB15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	Hart_LATCH
	PA8	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	Hart_OCD
	PA11	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	Hart_INRTS
	PA12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	Hart_INRESET
	PA15	GPIO_Output	Output Push Pull	**Pull-up ***	**High ***	Lora_RQ
	PB5	GPIO_Output	Output Push Pull	**Pull-up ***	**High ***	Lora_RST

6.2. DMA configuration

DMA request	Stream	Direction	Priority
ADC	DMA1_Channel1	Peripheral To Memory	**High ***

ADC: DMA1_Channel1 DMA request Settings:

Mode:	**Circular ***
Peripheral Increment:	Disable
Memory Increment:	**Enable ***
Peripheral Data Width:	**Word ***
Memory Data Width:	**Word ***

6.3. NVIC configuration

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	3	0
System tick timer	true	3	0
RTC global interrupt through EXTI lines 17, 19 and 20 and LSE CSS interrupt through EXTI line 19	true	3	0
DMA1 channel 1 interrupt	true	3	0
USART4 and USART5 interrupt	true	3	0
TIM2 global interrupt	true	0	0
USART1 global interrupt / USART1 wake-up interrupt through EXTI line 25	true	3	0
USART2 global interrupt / USART2 wake-up interrupt through EXTI line 26	true	3	0
PVD interrupt through EXTI line 16	unused		
Flash and EEPROM global interrupt	unused		
RCC global interrupt	unused		
ADC1, COMP1 and COMP2 interrupts (COMP interrupts through EXTI lines 21 and 22)	unused		

*** User modified value**

7. Power Consumption Calculator report

7.1. Microcontroller Selection

Series	STM32L0
Line	STM32L0x1
MCU	STM32L071CBTx
Datasheet	027101_Rev2

7.2. Parameter Selection

Temperature	25
Vdd	3.0

8. Software Project

8.1. Project Settings

Name	Value
Project Name	STM32L071xx_FreeRtos_LoraHw3_Verx.x.x
Project Folder	C:\Users\lvchunhao\Desktop\STM32L071xx_FreeRtos_LoraHw3_Ver1.0.0
Toolchain / IDE	MDK-ARM V5
Firmware Package Name and Version	STM32Cube FW_L0 V1.7.0

8.2. Code Generation Settings

Name	Value
STM32Cube Firmware Library Package	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
Delete previously generated files when not re-generated	Yes
Set all free pins as analog (to optimize the power consumption)	No