



## 1. Description

### 1.1. Project

Project Name	OS-LED
Board Name	custom
Generated with:	STM32CubeMX 6.2.0
Date	03/23/2021

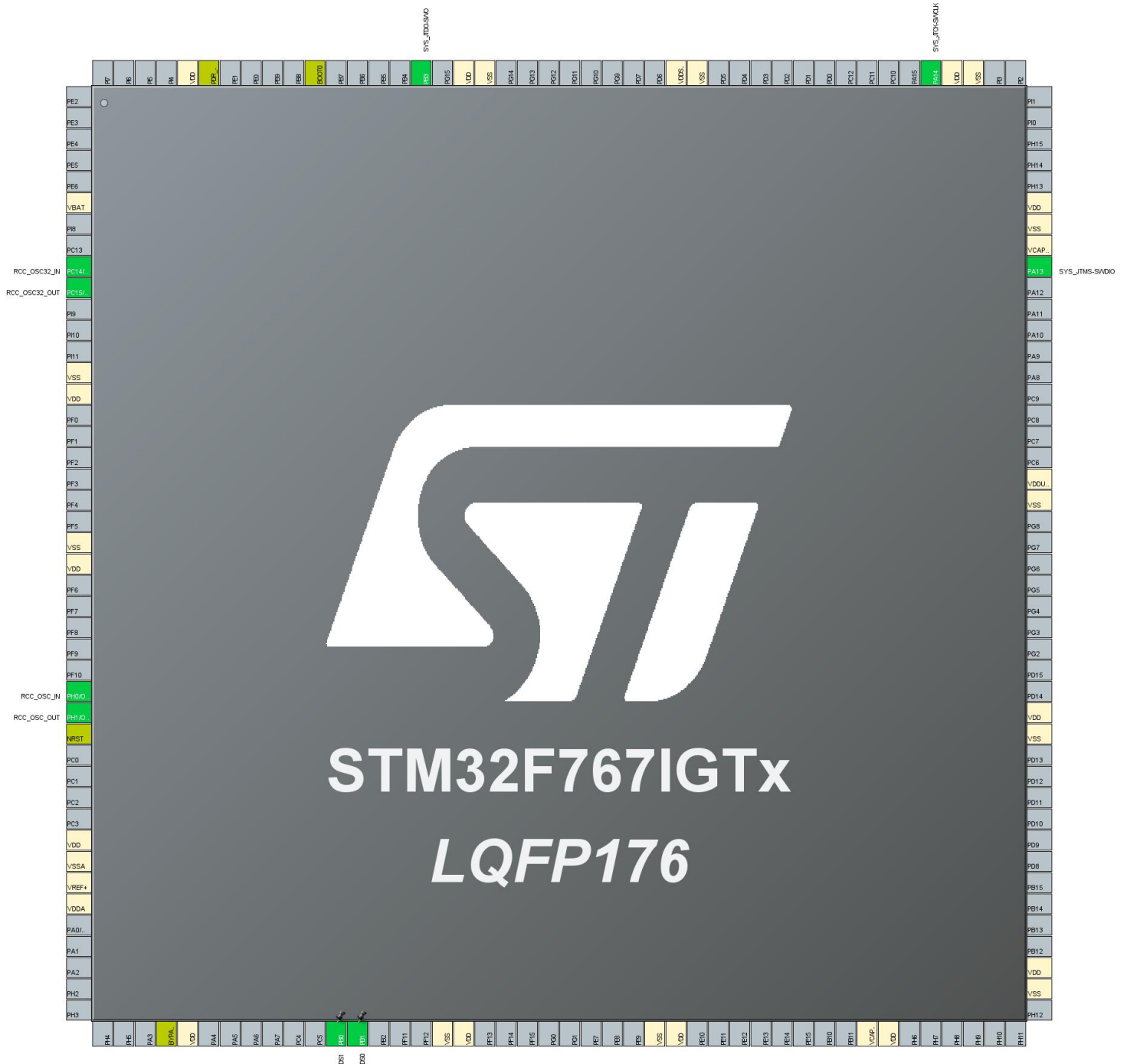
### 1.2. MCU

MCU Series	STM32F7
MCU Line	STM32F7x7
MCU name	STM32F767IGTx
MCU Package	LQFP176
MCU Pin number	176

### 1.3. Core(s) information

Core(s)	Arm Cortex-M7
---------	---------------

## 2. Pinout Configuration



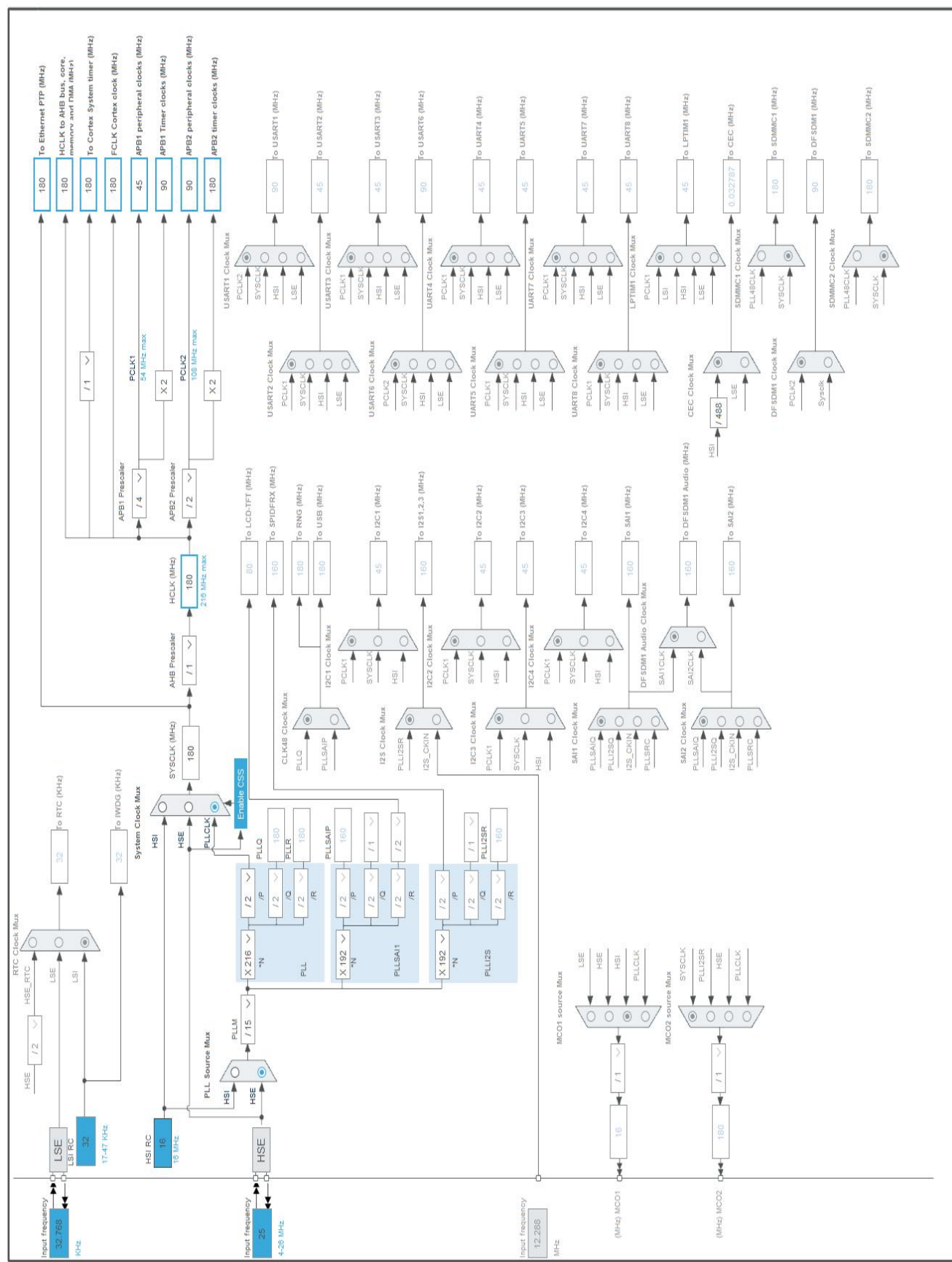
### 3. Pins Configuration

Pin Number LQFP176	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
6	VBAT	Power		
9	PC14/OSC32_IN	I/O	RCC_OSC32_IN	
10	PC15/OSC32_OUT	I/O	RCC_OSC32_OUT	
14	VSS	Power		
15	VDD	Power		
22	VSS	Power		
23	VDD	Power		
29	PH0/OSC_IN	I/O	RCC_OSC_IN	
30	PH1/OSC_OUT	I/O	RCC_OSC_OUT	
31	NRST	Reset		
36	VDD	Power		
37	VSSA	Power		
38	VREF+	Power		
39	VDDA	Power		
48	BYPASS_REG	Reset		
49	VDD	Power		
56	PB0 *	I/O	GPIO_Output	DS1
57	PB1 *	I/O	GPIO_Output	DS0
61	VSS	Power		
62	VDD	Power		
71	VSS	Power		
72	VDD	Power		
81	VCAP_1	Power		
82	VDD	Power		
90	VSS	Power		
91	VDD	Power		
102	VSS	Power		
103	VDD	Power		
113	VSS	Power		
114	VDDUSB	Power		
124	PA13	I/O	SYS_JTMS-SWDIO	
125	VCAP_2	Power		
126	VSS	Power		
127	VDD	Power		
135	VSS	Power		
136	VDD	Power		

Pin Number LQFP176	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
137	PA14	I/O	SYS_JTCK-SWCLK	
148	VSS	Power		
149	VDDSDMMC	Power		
158	VSS	Power		
159	VDD	Power		
161	PB3	I/O	SYS_JTDO-SWO	
166	BOOT0	Boot		
171	PDR_ON	Reset		
172	VDD	Power		

\* The pin is affected with an I/O function

## 4. Clock Tree Configuration



## 5. Software Project

### 5.1. Project Settings

Name	Value
Project Name	OS-LED
Project Folder	D:\GitRepository\Practice\FreeRTOS\MyApp-ZhengDian\OS-LED
Toolchain / IDE	STM32CubeIDE
Firmware Package Name and Version	STM32Cube FW_F7 V1.16.1
Application Structure	Advanced
Generate Under Root	Yes
Do not generate the main()	No
Minimum Heap Size	0x200
Minimum Stack Size	0x400

### 5.2. 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	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

### 5.3. Advanced Settings - Generated Function Calls

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

## 6. Power Consumption Calculator report

### 6.1. Microcontroller Selection

Series	STM32F7
Line	STM32F7x7
MCU	STM32F767IGTx
Datasheet	DS11532_Rev4

### 6.2. Parameter Selection

Temperature	25
Vdd	3.3

### 6.3. Battery Selection

Battery	Alkaline(9V)
Capacity	625.0 mAh
Self Discharge	0.3 %/month
Nominal Voltage	9.0 V
Max Cont Current	200.0 mA
Max Pulse Current	0.0 mA
Cells in series	1
Cells in parallel	1



#### 6.4. Sequence

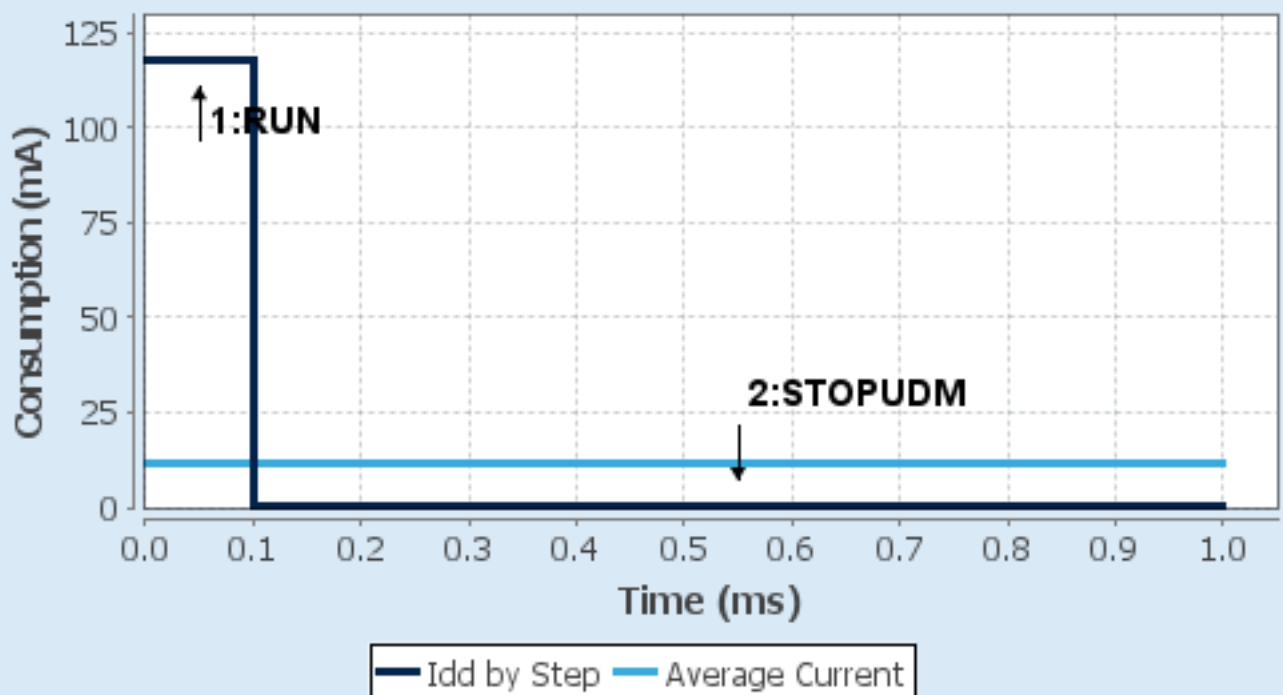
<b>Step</b>	Step1	Step2
<b>Mode</b>	RUN	STOP UDM (Under Drive)
<b>Vdd</b>	3.3	3.3
<b>Voltage Source</b>	Battery	Battery
<b>Range</b>	Scale1-High	No Scale
<b>Fetch Type</b>	ICTM FLASH-SingleBank REGON	n/a
<b>CPU Frequency</b>	216 MHz	0 Hz
<b>Clock Configuration</b>	HSE PLL	Regulator LP Flash-PwrDwn
<b>Clock Source Frequency</b>	4 MHz	0 Hz
<b>Peripherals</b>		
<b>Additional Cons.</b>	0 mA	0 mA
<b>Average Current</b>	118 mA	130 $\mu$ A
<b>Duration</b>	0.1 ms	0.9 ms
<b>DMIPS</b>	462.0	0.0
<b>Ta Max</b>	90.2	104.98
<b>Category</b>	In DS Table	In DS Table

#### 6.5. Results

Sequence Time	1 ms	Average Current	11.92 mA
Battery Life	2 days, 4 hours	Average DMIPS	462.24005 DMIPS

#### 6.6. Chart

## Consumption Profile by Step



## 7. *Peripherals and Middlewares Configuration*

### 7.1. RCC

**High Speed Clock (HSE): Crystal/Ceramic Resonator**

**Low Speed Clock (LSE) : Crystal/Ceramic Resonator**

#### 7.1.1. Parameter Settings:

##### **System Parameters:**

VDD voltage (V)	3.3
Flash Latency(WS)	5 WS (6 CPU cycle)

##### **RCC Parameters:**

HSI Calibration Value	16
TIM Prescaler Selection	Disabled
HSE Startup Timeout Value (ms)	100
LSE Startup Timeout Value (ms)	5000

##### **Power Parameters:**

Power Over Drive	Disabled
Power Regulator Voltage Scale	Power Regulator Voltage Scale 1

### 7.2. SYS

**Debug: Trace Asynchronous Sw**

**Timebase Source: TIM1**

### 7.3. FREERTOS

**Interface: CMSIS\_V2**

#### 7.3.1. Config parameters:

##### **API:**

FreeRTOS API	CMSIS v2
--------------	----------

##### **Versions:**

FreeRTOS version	10.2.1
CMSIS-RTOS version	2.00

##### **MPU/FPU:**

ENABLE_MPU	Disabled
ENABLE_FPU	Disabled

##### **Kernel settings:**

USE_PREEMPTION	Enabled
CPU_CLOCK_HZ	SystemCoreClock

TICK_RATE_HZ	1000
MAX_PRIORITIES	56
MINIMAL_STACK_SIZE	128
MAX_TASK_NAME_LEN	16
USE_16_BIT_TICKS	Disabled
IDLE_SHOULD_YIELD	Enabled
USE_MUTEXES	Enabled
USE_RECURSIVE_MUTEXES	Enabled
USE_COUNTING_SEMAPHORES	Enabled
QUEUE_REGISTRY_SIZE	8
USE_APPLICATION_TASK_TAG	Disabled
ENABLE_BACKWARD_COMPATIBILITY	Enabled
USE_PORT_OPTIMISED_TASK_SELECTION	Disabled
USE_TICKLESS_IDLE	Disabled
USE_TASK_NOTIFICATIONS	Enabled
RECORD_STACK_HIGH_ADDRESS	Disabled

**Memory management settings:**

Memory Allocation	Dynamic / Static
TOTAL_HEAP_SIZE	15360
Memory Management scheme	heap_4

**Hook function related definitions:**

USE_IDLE_HOOK	Disabled
USE_TICK_HOOK	Disabled
USE_MALLOC_FAILED_HOOK	Disabled
USE_DAEMON_TASK_STARTUP_HOOK	Disabled
CHECK_FOR_STACK_OVERFLOW	Disabled

**Run time and task stats gathering related definitions:**

GENERATE_RUN_TIME_STATS	Disabled
USE_TRACE_FACILITY	Enabled
USE_STATS_FORMATTING_FUNCTIONS	Disabled

**Co-routine related definitions:**

USE_CO_ROUTINES	Disabled
MAX_CO_ROUTINE_PRIORITIES	2

**Software timer definitions:**

USE_TIMERS	Enabled
TIMER_TASK_PRIORITY	2
TIMER_QUEUE_LENGTH	10
TIMER_TASK_STACK_DEPTH	256

**Interrupt nesting behaviour configuration:**

LIBRARY_LOWEST_INTERRUPT_PRIORITY	15
LIBRARY_MAX_SYSCALL_INTERRUPT_PRIORITY	5

**Added with 10.2.1 support:**

MESSAGE_BUFFER_LENGTH_TYPE	size_t
USE_POSIX_ERRNO	Disabled

### 7.3.2. Include parameters:

#### **Include definitions:**

vTaskPrioritySet	Enabled
uxTaskPriorityGet	Enabled
vTaskDelete	Enabled
vTaskCleanUpResources	Disabled
vTaskSuspend	Enabled
vTaskDelayUntil	Enabled
vTaskDelay	Enabled
xTaskGetSchedulerState	Enabled
xTaskResumeFromISR	Enabled
xQueueGetMutexHolder	Enabled
xSemaphoreGetMutexHolder	Disabled
pcTaskGetTaskName	Disabled
uxTaskGetStackHighWaterMark	Enabled
xTaskGetCurrentTaskHandle	Disabled
eTaskGetState	Enabled
xEventGroupSetBitFromISR	Disabled
xTimerPendFunctionCall	Enabled
xTaskAbortDelay	Disabled
xTaskGetHandle	Disabled
uxTaskGetStackHighWaterMark2	Disabled

### 7.3.3. Advanced settings:

#### **Newlib settings (see parameter description first):**

USE_NEWLIB_REENTRANT	Disabled
----------------------	----------

#### **Project settings (see parameter description first):**

Use FW pack heap file	Enabled
-----------------------	---------

\* User modified value

## 8. System Configuration

### 8.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
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	
	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_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
	PB3	SYS_JTDO-SWO	n/a	n/a	n/a	
GPIO	PB0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DS1
	PB1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DS0

### 8.2. DMA configuration

nothing configured in DMA service

### 8.3. NVIC configuration

#### 8.3.1. 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
Pre-fetch 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	15	0
System tick timer	true	15	0
TIM1 update interrupt and TIM10 global interrupt	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
FPU global interrupt	unused		

#### 8.3.2. 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
Pre-fetch fault, memory access fault	false	true	false
Undefined instruction or illegal state	false	true	false
System service call via SWI instruction	false	false	false
Debug monitor	false	true	false
Pendable request for system service	false	false	false
System tick timer	false	false	true
TIM1 update interrupt and TIM10 global interrupt	false	true	true

\* User modified value

## 9. System Views

### 9.1. Category view

#### 9.1.1. Current

Middleware

FREERTOS 

System Core

Analog

Timers

Connectivity

Multimedia

Security

Computing

CORTEX\_M7 

DMA

GPIO 

NVIC 

RCC 

SYS 



## 10. Docs & Resources

Type	Link
Datasheet	<a href="http://www.st.com/resource/en/datasheet/DM00273119.pdf">http://www.st.com/resource/en/datasheet/DM00273119.pdf</a>
Reference manual	<a href="http://www.st.com/resource/en/reference_manual/DM00224583.pdf">http://www.st.com/resource/en/reference_manual/DM00224583.pdf</a>
Programming manual	<a href="http://www.st.com/resource/en/programming_manual/DM00237416.pdf">http://www.st.com/resource/en/programming_manual/DM00237416.pdf</a>
Errata sheet	<a href="http://www.st.com/resource/en/errata_sheet/DM00257543.pdf">http://www.st.com/resource/en/errata_sheet/DM00257543.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/CD00167594.pdf">http://www.st.com/resource/en/application_note/CD00167594.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/CD00211314.pdf">http://www.st.com/resource/en/application_note/CD00211314.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/CD00259245.pdf">http://www.st.com/resource/en/application_note/CD00259245.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/CD00264321.pdf">http://www.st.com/resource/en/application_note/CD00264321.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/CD00264342.pdf">http://www.st.com/resource/en/application_note/CD00264342.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/CD00264379.pdf">http://www.st.com/resource/en/application_note/CD00264379.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/DM00042534.pdf">http://www.st.com/resource/en/application_note/DM00042534.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/DM00046011.pdf">http://www.st.com/resource/en/application_note/DM00046011.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/DM00072315.pdf">http://www.st.com/resource/en/application_note/DM00072315.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/DM00073742.pdf">http://www.st.com/resource/en/application_note/DM00073742.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/DM00073853.pdf">http://www.st.com/resource/en/application_note/DM00073853.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/DM00080497.pdf">http://www.st.com/resource/en/application_note/DM00080497.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/DM00081379.pdf">http://www.st.com/resource/en/application_note/DM00081379.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/DM00129215.pdf">http://www.st.com/resource/en/application_note/DM00129215.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/DM00160482.pdf">http://www.st.com/resource/en/application_note/DM00160482.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/DM00164538.pdf">http://www.st.com/resource/en/application_note/DM00164538.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/DM00164549.pdf">http://www.st.com/resource/en/application_note/DM00164549.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/DM00173083.pdf">http://www.st.com/resource/en/application_note/DM00173083.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/DM00210367.pdf">http://www.st.com/resource/en/application_note/DM00210367.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/DM00220769.pdf">http://www.st.com/resource/en/application_note/DM00220769.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/DM00227538.pdf">http://www.st.com/resource/en/application_note/DM00227538.pdf</a>

Application note [http://www.st.com/resource/en/application\\_note/DM00257177.pdf](http://www.st.com/resource/en/application_note/DM00257177.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00272912.pdf](http://www.st.com/resource/en/application_note/DM00272912.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00272913.pdf](http://www.st.com/resource/en/application_note/DM00272913.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00226326.pdf](http://www.st.com/resource/en/application_note/DM00226326.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00236305.pdf](http://www.st.com/resource/en/application_note/DM00236305.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00281138.pdf](http://www.st.com/resource/en/application_note/DM00281138.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00296349.pdf](http://www.st.com/resource/en/application_note/DM00296349.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00327191.pdf](http://www.st.com/resource/en/application_note/DM00327191.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00287603.pdf](http://www.st.com/resource/en/application_note/DM00287603.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00337702.pdf](http://www.st.com/resource/en/application_note/DM00337702.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00354244.pdf](http://www.st.com/resource/en/application_note/DM00354244.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00373474.pdf](http://www.st.com/resource/en/application_note/DM00373474.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00315319.pdf](http://www.st.com/resource/en/application_note/DM00315319.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00380469.pdf](http://www.st.com/resource/en/application_note/DM00380469.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00354333.pdf](http://www.st.com/resource/en/application_note/DM00354333.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00395696.pdf](http://www.st.com/resource/en/application_note/DM00395696.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00431633.pdf](http://www.st.com/resource/en/application_note/DM00431633.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00493651.pdf](http://www.st.com/resource/en/application_note/DM00493651.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00536349.pdf](http://www.st.com/resource/en/application_note/DM00536349.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00600614.pdf](http://www.st.com/resource/en/application_note/DM00600614.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00725181.pdf](http://www.st.com/resource/en/application_note/DM00725181.pdf)