

## 1. Description

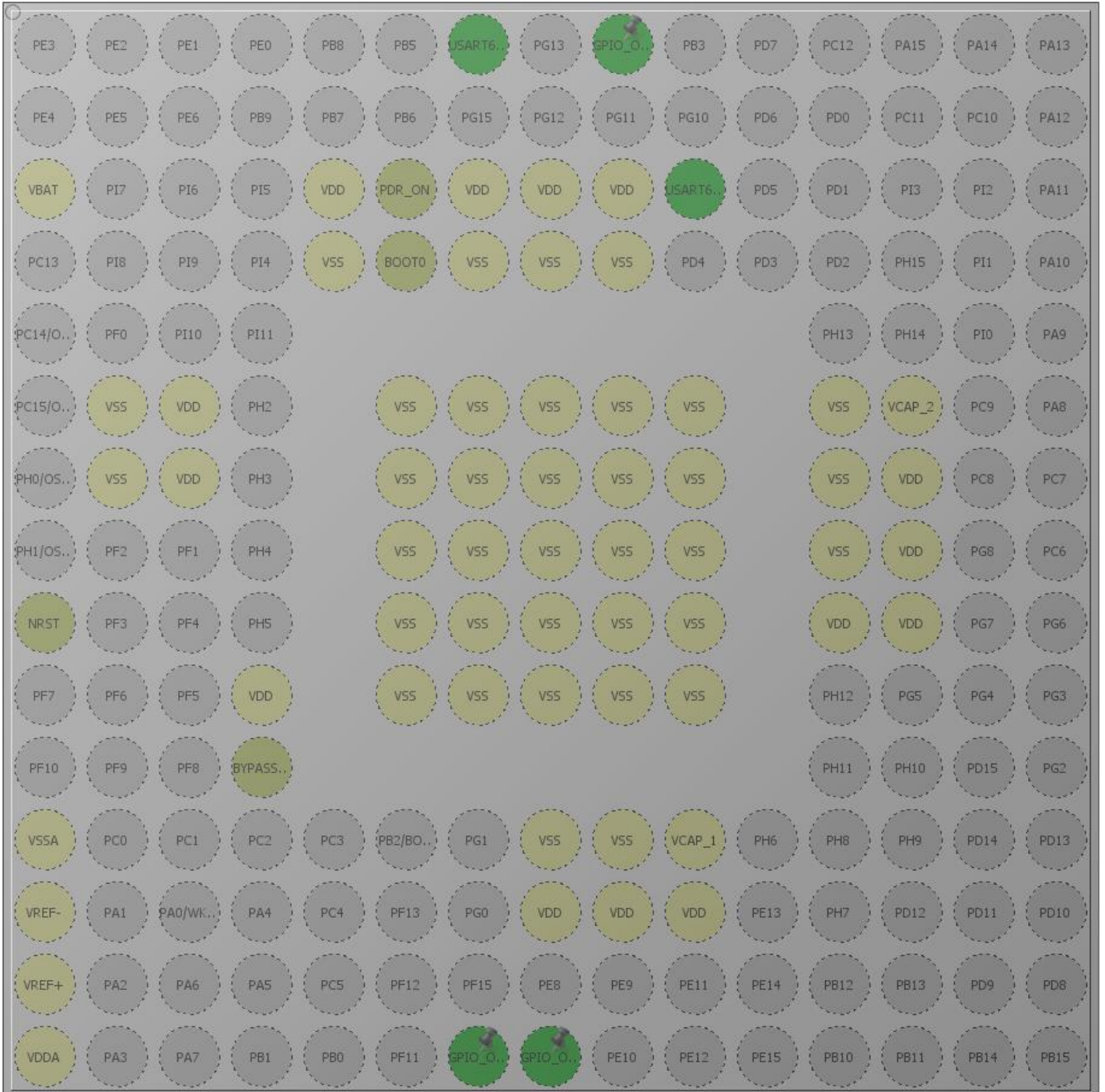
### 1.1. Project

|                 |                    |
|-----------------|--------------------|
| Project Name    | LED                |
| Board Name      | LED                |
| Generated with: | STM32CubeMX 4.24.0 |
| Date            | 02/04/2018         |

### 1.2. MCU

|                |               |
|----------------|---------------|
| MCU Series     | STM32F4       |
| MCU Line       | STM32F427/437 |
| MCU name       | STM32F427IIHx |
| MCU Package    | UFBGA176      |
| MCU Pin number | 201           |

## 2. Pinout Configuration



STM32F427IIHx  
UFBGA176 +25 (Top view)

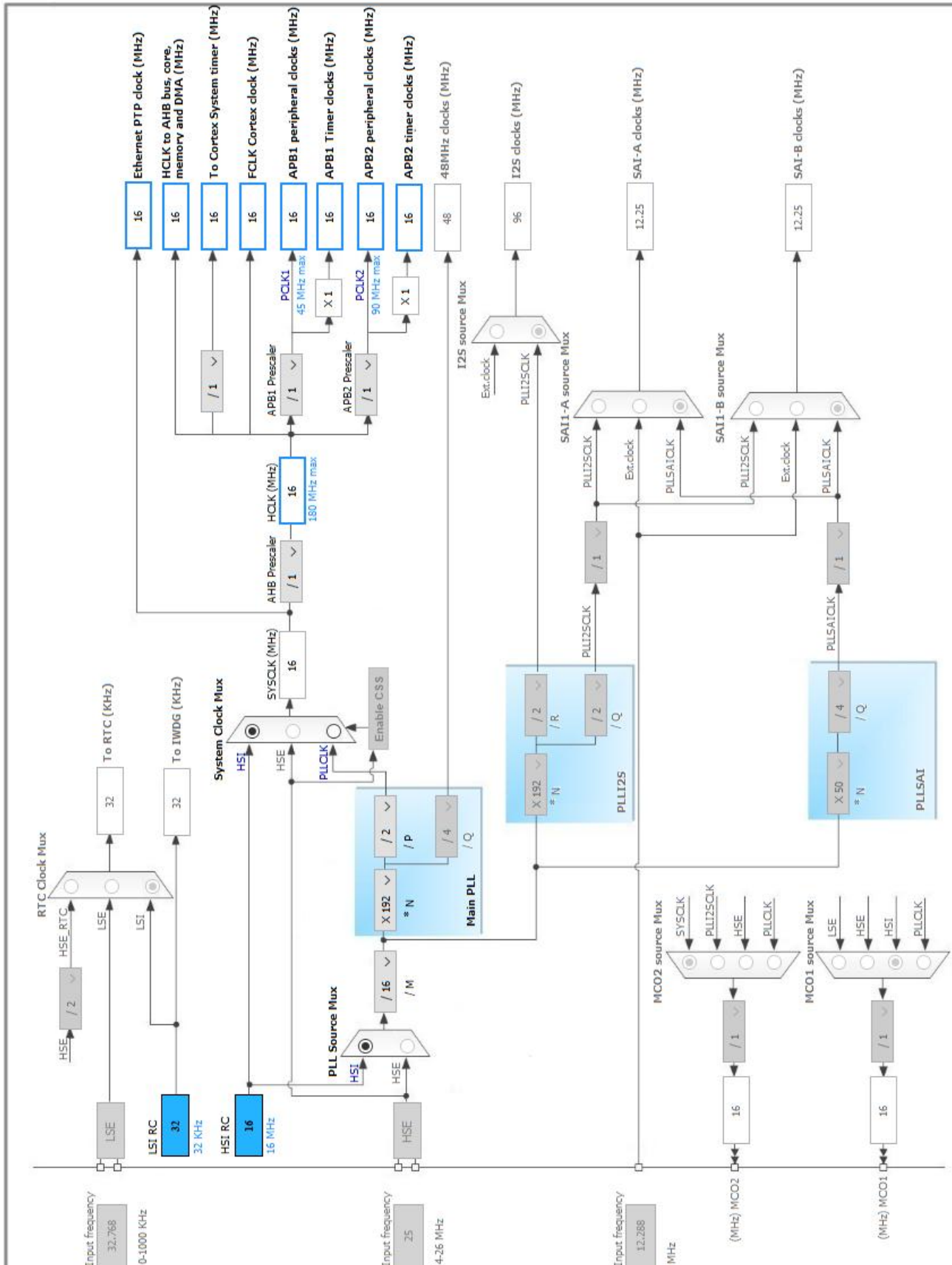
### 3. Pins Configuration

| Pin Number<br>UFBGA176 | Pin Name<br>(function after<br>reset) | Pin Type | Alternate<br>Function(s) | Label |
|------------------------|---------------------------------------|----------|--------------------------|-------|
| A7                     | PG14                                  | I/O      | USART6_TX                |       |
| A9                     | PB4 *                                 | I/O      | GPIO_Output              |       |
| C1                     | VBAT                                  | Power    |                          |       |
| C5                     | VDD                                   | Power    |                          |       |
| C6                     | PDR_ON                                | Reset    |                          |       |
| C7                     | VDD                                   | Power    |                          |       |
| C8                     | VDD                                   | Power    |                          |       |
| C9                     | VDD                                   | Power    |                          |       |
| C10                    | PG9                                   | I/O      | USART6_RX                |       |
| D5                     | VSS                                   | Power    |                          |       |
| D6                     | BOOT0                                 | Boot     |                          |       |
| D7                     | VSS                                   | Power    |                          |       |
| D8                     | VSS                                   | Power    |                          |       |
| D9                     | VSS                                   | Power    |                          |       |
| F2                     | VSS                                   | Power    |                          |       |
| F3                     | VDD                                   | Power    |                          |       |
| F6                     | VSS                                   | Power    |                          |       |
| F7                     | VSS                                   | Power    |                          |       |
| F8                     | VSS                                   | Power    |                          |       |
| F9                     | VSS                                   | Power    |                          |       |
| F10                    | VSS                                   | Power    |                          |       |
| F12                    | VSS                                   | Power    |                          |       |
| F13                    | VCAP_2                                | Power    |                          |       |
| G2                     | VSS                                   | Power    |                          |       |
| G3                     | VDD                                   | Power    |                          |       |
| G6                     | VSS                                   | Power    |                          |       |
| G7                     | VSS                                   | Power    |                          |       |
| G8                     | VSS                                   | Power    |                          |       |
| G9                     | VSS                                   | Power    |                          |       |
| G10                    | VSS                                   | Power    |                          |       |
| G12                    | VSS                                   | Power    |                          |       |
| G13                    | VDD                                   | Power    |                          |       |
| H6                     | VSS                                   | Power    |                          |       |
| H7                     | VSS                                   | Power    |                          |       |
| H8                     | VSS                                   | Power    |                          |       |
| H9                     | VSS                                   | Power    |                          |       |

| Pin Number<br>UFBGA176 | Pin Name<br>(function after<br>reset) | Pin Type | Alternate<br>Function(s) | Label |
|------------------------|---------------------------------------|----------|--------------------------|-------|
| H10                    | VSS                                   | Power    |                          |       |
| H12                    | VSS                                   | Power    |                          |       |
| H13                    | VDD                                   | Power    |                          |       |
| J1                     | NRST                                  | Reset    |                          |       |
| J6                     | VSS                                   | Power    |                          |       |
| J7                     | VSS                                   | Power    |                          |       |
| J8                     | VSS                                   | Power    |                          |       |
| J9                     | VSS                                   | Power    |                          |       |
| J10                    | VSS                                   | Power    |                          |       |
| J12                    | VDD                                   | Power    |                          |       |
| J13                    | VDD                                   | Power    |                          |       |
| K4                     | VDD                                   | Power    |                          |       |
| K6                     | VSS                                   | Power    |                          |       |
| K7                     | VSS                                   | Power    |                          |       |
| K8                     | VSS                                   | Power    |                          |       |
| K9                     | VSS                                   | Power    |                          |       |
| K10                    | VSS                                   | Power    |                          |       |
| L4                     | BYPASS_REG                            | Reset    |                          |       |
| M1                     | VSSA                                  | Power    |                          |       |
| M8                     | VSS                                   | Power    |                          |       |
| M9                     | VSS                                   | Power    |                          |       |
| M10                    | VCAP_1                                | Power    |                          |       |
| N1                     | VREF-                                 | Power    |                          |       |
| N8                     | VDD                                   | Power    |                          |       |
| N9                     | VDD                                   | Power    |                          |       |
| N10                    | VDD                                   | Power    |                          |       |
| P1                     | VREF+                                 | Power    |                          |       |
| R1                     | VDDA                                  | Power    |                          |       |
| R7                     | PF14 *                                | I/O      | GPIO_Output              |       |
| R8                     | PE7 *                                 | I/O      | GPIO_Output              |       |

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

## 4. Clock Tree Configuration



## 5. IPs and Middleware Configuration

### 5.1. SYS

Timebase Source: TIM1

### 5.2. USART6

Mode: Multiprocessor Communication

#### 5.2.1. Parameter Settings:

##### Basic Parameters:

|             |                           |
|-------------|---------------------------|
| Baud Rate   | 921600 *                  |
| Word Length | 8 Bits (including Parity) |
| Parity      | None                      |
| Stop Bits   | 1                         |

##### Advanced Parameters:

|                |                      |
|----------------|----------------------|
| Data Direction | Receive and Transmit |
| Over Sampling  | 16 Samples           |
| Wake-Up Method | Idle Line            |

### 5.3. FREERTOS

mode: Enabled

#### 5.3.1. Config parameters:

##### Versions:

|                    |       |
|--------------------|-------|
| FreeRTOS version   | 9.0.0 |
| CMSIS-RTOS version | 1.02  |

##### 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 |
| ENABLE_BACKWARD_COMPATIBILITY     | Enabled  |
| USE_PORT_OPTIMISED_TASK_SELECTION | Enabled  |
| USE_TICKLESS_IDLE                 | Disabled |
| USE_TASK_NOTIFICATIONS            | Enabled  |

#### Memory management settings:

|                          |         |
|--------------------------|---------|
| Memory Allocation        | Dynamic |
| 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             | Disabled |
| USE_STATS_FORMATTING_FUNCTIONS | Disabled |

#### Co-routine related definitions:

|                           |          |
|---------------------------|----------|
| USE_CO_ROUTINES           | Disabled |
| MAX_CO_ROUTINE_PRIORITIES | 2        |

#### Software timer definitions:

|            |          |
|------------|----------|
| USE_TIMERS | Disabled |
|------------|----------|

#### Interrupt nesting behaviour configuration:

|  |    |
|--|----|
| LIBRARY_LOWEST_INTERRUPT_PRIORITY      | 15 |
| LIBRARY_MAX_SYSCALL_INTERRUPT_PRIORITY | 5  |

### 5.3.2. Include parameters:

#### Include definitions:

|                       |          |
|-----------------------|----------|
| vTaskPrioritySet      | Enabled  |
| uxTaskPriorityGet     | Enabled  |
| vTaskDelete           | Enabled  |
| vTaskCleanUpResources | Disabled |
| vTaskSuspend          | Enabled  |

|                             |          |
|-----------------------------|----------|
| vTaskDelayUntil             | Disabled |
| vTaskDelay                  | Enabled  |
| xTaskGetSchedulerState      | Enabled  |
| xTaskResumeFromISR          | Enabled  |
| xQueueGetMutexHolder        | Disabled |
| xSemaphoreGetMutexHolder    | Disabled |
| pcTaskGetTaskName           | Disabled |
| uxTaskGetStackHighWaterMark | Disabled |
| xTaskGetCurrentTaskHandle   | Disabled |
| eTaskGetState               | Disabled |
| xEventGroupSetBitFromISR    | Disabled |
| xTimerPendFunctionCall      | Disabled |
| xTaskAbortDelay             | Disabled |
| xTaskGetHandle              | 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 |
|--------|------|-------------|------------------------------|-----------------------------|-----------------------|------------|
| USART6 | PG14 | USART6_TX   | Alternate Function Push Pull | No pull-up and no pull-down | <b>Very High</b><br>* |            |
|        | PG9  | USART6_RX   | Alternate Function Push Pull | No pull-up and no pull-down | <b>Very High</b><br>* |            |
| GPIO   | PB4  | GPIO_Output | Output Push Pull             | No pull-up and no pull-down | Low                   |            |
|        | PF14 | GPIO_Output | Output Push Pull             | No pull-up and no pull-down | Low                   |            |
|        | PE7  | GPIO_Output | Output Push Pull             | No pull-up and no pull-down | Low                   |            |

## 6.2. DMA configuration

| DMA request | Stream       | Direction            | Priority |
|-------------|--------------|----------------------|----------|
| USART6_RX   | DMA2_Stream1 | Peripheral To Memory | Low      |
| USART6_TX   | DMA2_Stream6 | Memory To Peripheral | Low      |

### USART6\_RX: DMA2\_Stream1 DMA request Settings:

Mode: Normal  
 Use fifo: Disable  
 Peripheral Increment: Disable  
 Memory Increment: **Enable \***  
 Peripheral Data Width: Byte  
 Memory Data Width: Byte

### USART6\_TX: DMA2\_Stream6 DMA request Settings:

Mode: Normal  
 Use fifo: Disable  
 Peripheral Increment: Disable  
 Memory Increment: **Enable \***  
 Peripheral Data Width: Byte  
 Memory Data Width: Byte

### 6.3. NVIC configuration

| 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           |
| DMA2 stream1 global interrupt                    | true   | 5                    | 0           |
| DMA2 stream6 global interrupt                    | true   | 5                    | 0           |
| USART6 global interrupt                          | true   | 5                    | 0           |
| PVD interrupt through EXTI line 16               | unused |                      |             |
| Flash global interrupt                           | unused |                      |             |
| RCC global interrupt                             | unused |                      |             |
| FPU global interrupt                             | unused |                      |             |

\* User modified value

## ***7. Power Consumption Calculator report***

### 7.1. Microcontroller Selection

|           |               |
|-----------|---------------|
| Series    | STM32F4       |
| Line      | STM32F427/437 |
| MCU       | STM32F427IIHx |
| Datasheet | 024030_Rev9   |

### 7.2. Parameter Selection

|             |      |
|-------------|------|
| Temperature | 25   |
| Vdd         | null |

## 8. Software Project

### 8.1. Project Settings

| Name                              | Value                        |
|-----------------------------------|------------------------------|
| Project Name                      | LED                          |
| Project Folder                    | F:\Unlocking\STM32\First\LED |
| Toolchain / IDE                   | MDK-ARM V5                   |
| Firmware Package Name and Version | STM32Cube FW_F4 V1.19.0      |

### 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   | No  |
| 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  |

## ***9. Software Pack Report***