# 1. Description

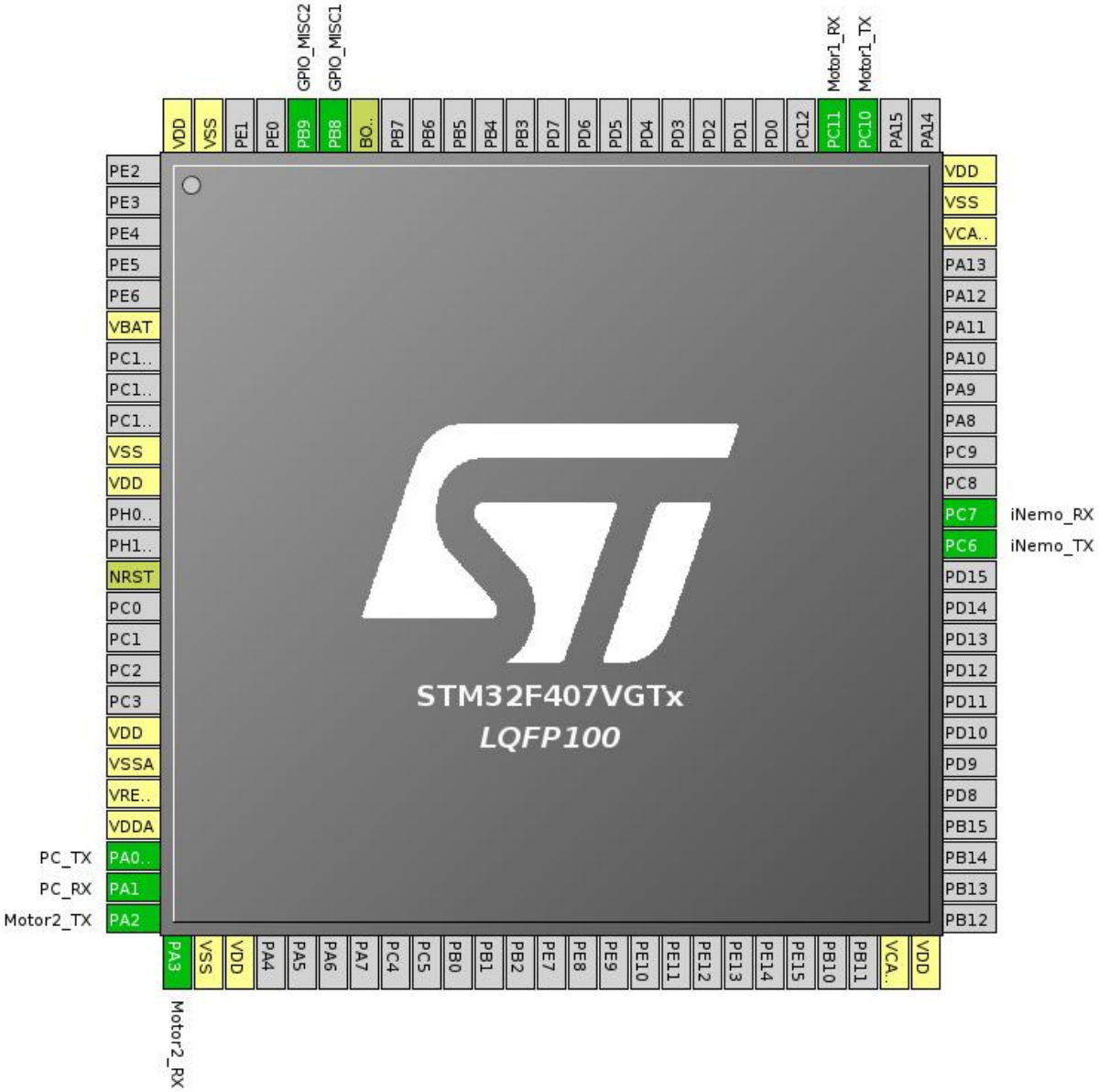
## 1.1. Project

| | |
|---|---|
| Project Name | Baleka |
| Board Name | Baleka |
| Generated with: | STM32CubeMX 4.16.0 |
| Date | 10/20/2016 |

## 1.2. MCU

| | |
|---|---|
| MCU Series | STM32F4 |
| MCU Line | STM32F407/417 |
| MCU name | STM32F407VGTx |
| MCU Package | LQFP100 |
| MCU Pin number | 100 |

# 2. Pinout Configuration

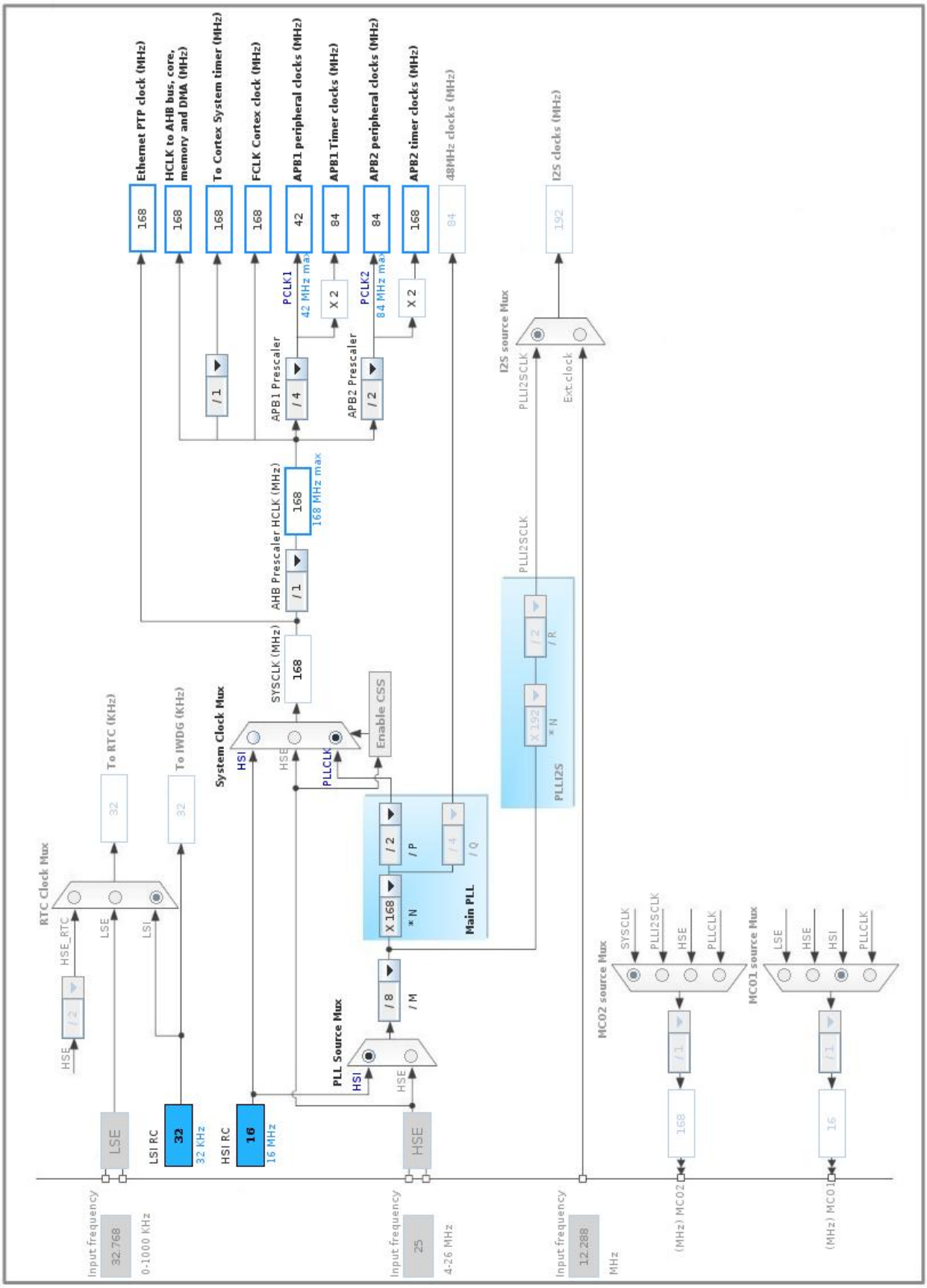


# 3. Pins Configuration

| Pin Number LQFP100 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|---|---|---|---|---|
| 6 | VBAT | Power | | |
| 10 | VSS | Power | | |
| 11 | VDD | Power | | |
| 14 | NRST | Reset | | |
| 19 | VDD | Power | | |
| 20 | VSSA | Power | | |
| 21 | VREF+ | Power | | |
| 22 | VDDA | Power | | |
| 23 | PA0-WKUP | I/O | UART4_TX | PC_TX |
| 24 | PA1 | I/O | UART4_RX | PC_RX |
| 25 | PA2 | I/O | USART2_TX | Motor2_TX |
| 26 | PA3 | I/O | USART2_RX | Motor2_RX |
| 27 | VSS | Power | | |
| 28 | VDD | Power | | |
| 49 | VCAP_1 | Power | | |
| 50 | VDD | Power | | |
| 63 | PC6 | I/O | USART6_TX | iNemo_TX |
| 64 | PC7 | I/O | USART6_RX | iNemo_RX |
| 73 | VCAP_2 | Power | | |
| 74 | VSS | Power | | |
| 75 | VDD | Power | | |
| 78 | PC10 | I/O | USART3_TX | Motor1_TX |
| 79 | PC11 | I/O | USART3_RX | Motor1_RX |
| 94 | BOOT0 | Boot | | |
| 95 | PB8 * | I/O | GPIO_Output | GPIO_MISC1 |
| 96 | PB9 * | I/O | GPIO_Output | GPIO_MISC2 |
| 99 | VSS | Power | | |
| 100 | VDD | Power | | |

* The pin is affected with an I/O function

# 4. Clock Tree Configuration



# 5. IPs and Middleware Configuration

## 5.1. SYS

**Timebase Source: TIM2**

## 5.2. UART4

**Mode: Asynchronous**

### 5.2.1. Parameter Settings:

**Basic Parameters:**

| | |
|---|---|
| Baud Rate | **500000 *** |
| Word Length | 8 Bits (including Parity) |
| Parity | None |
| Stop Bits | 1 |

**Advanced Parameters:**

| | |
|---|---|
| Data Direction | Receive and Transmit |
| Over Sampling | 16 Samples |

## 5.3. USART2

**Mode: Asynchronous**

### 5.3.1. 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 |

## 5.4. USART3

**Mode: Asynchronous**

### 5.4.1. 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 |

## 5.5. USART6

**Mode: Asynchronous**

### 5.5.1. Parameter Settings:

**Basic Parameters:**

| | |
|---|---|
| Baud Rate | **500000 *** |
| Word Length | 8 Bits (including Parity) |
| Parity | None |
| Stop Bits | 1 |

**Advanced Parameters:**

| | |
|---|---|
| Data Direction | Receive and Transmit |
| Over Sampling | 16 Samples |

## 5.6. FREERTOS

**mode: Enabled**

### 5.6.1. 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 | 15360 |
| 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 | **Option2 *** |

### 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 | 15 |
| LIBRARY_MAX_SYSCALL_INTERRUPT_PRIORITY | 5 |

### 5.6.2. 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 |

*** User modified value**

# 6. System Configuration

## 6.1. GPIO configuration

| IP | Pin | Signal | GPIO mode | GPIO pull/up pull down | Max Speed | User Label |
|---|---|---|---|---|---|---|
| UART4 | PA0-WKUP | UART4_TX | Alternate Function Push Pull | Pull-up | **Very High** * | PC_TX |
| | PA1 | UART4_RX | Alternate Function Push Pull | Pull-up | **Very High** * | PC_RX |
| USART2 | PA2 | USART2_TX | Alternate Function Push Pull | Pull-up | **Very High** * | Motor2_TX |
| | PA3 | USART2_RX | Alternate Function Push Pull | Pull-up | **Very High** * | Motor2_RX |
| USART3 | PC10 | USART3_TX | Alternate Function Push Pull | Pull-up | **Very High** * | Motor1_TX |
| | PC11 | USART3_RX | Alternate Function Push Pull | Pull-up | **Very High** * | Motor1_RX |
| USART6 | PC6 | USART6_TX | Alternate Function Push Pull | Pull-up | **Very High** * | iNemo_TX |
| | PC7 | USART6_RX | Alternate Function Push Pull | Pull-up | **Very High** * | iNemo_RX |
| GPIO | PB8 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | GPIO_MISC1 |
| | PB9 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | GPIO_MISC2 |

## 6.2. DMA configuration

| DMA request | Stream | Direction | Priority |
|---|---|---|---|
| USART3_RX | DMA1_Stream1 | Peripheral To Memory | **Very High *** |
| USART3_TX | DMA1_Stream3 | Memory To Peripheral | **Very High *** |
| USART2_RX | DMA1_Stream5 | Peripheral To Memory | **Very High *** |
| USART2_TX | DMA1_Stream6 | Memory To Peripheral | **Very High *** |
| UART4_RX | DMA1_Stream2 | Peripheral To Memory | **Very High *** |
| UART4_TX | DMA1_Stream4 | Memory To Peripheral | **Very High *** |
| USART6_RX | DMA2_Stream1 | Peripheral To Memory | Low |
| USART6_TX | DMA2_Stream6 | Memory To Peripheral | Low |

### *USART3_RX: DMA1_Stream1 DMA request Settings:*

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

### *USART3_TX: DMA1_Stream3 DMA request Settings:*

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

### *USART2_RX: DMA1_Stream5 DMA request Settings:*

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

*USART2_TX: DMA1_Stream6 DMA request Settings:*

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

*UART4_RX: DMA1_Stream2 DMA request Settings:*

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

*UART4_TX: DMA1_Stream4 DMA request Settings:*

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

*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 |
| DMA1 stream1 global interrupt | true | 5 | 0 |
| DMA1 stream2 global interrupt | true | 5 | 0 |
| DMA1 stream3 global interrupt | true | 5 | 0 |
| DMA1 stream4 global interrupt | true | 5 | 0 |
| DMA1 stream5 global interrupt | true | 5 | 0 |
| DMA1 stream6 global interrupt | true | 5 | 0 |
| TIM2 global interrupt | true | 0 | 0 |
| USART2 global interrupt | true | 5 | 0 |
| USART3 global interrupt | true | 5 | 0 |
| UART4 global interrupt | true | 5 | 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 | STM32F407/417 |
| MCU | STM32F407VGTx |
| Datasheet | 022152_Rev7 |

## 7.2. Parameter Selection

| | |
|---|---|
| Temperature | 25 |
| Vdd | 3.3 |

# 8. Software Project

## 8.1. Project Settings

| Name | Value |
|---|---|
| Project Name | Baleka |
| Project Folder | /home/bscholtz/workspace/workspace-stm32cubemx/baleka-stm32f4-code |
| Toolchain / IDE | TrueSTUDIO |
| Firmware Package Name and Version | STM32Cube FW_F4 V1.13.0 |

## 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 | Yes |
| Delete previously generated files when not re-generated | Yes |
| Set all free pins as analog (to optimize the power consumption) | No |