1. Description

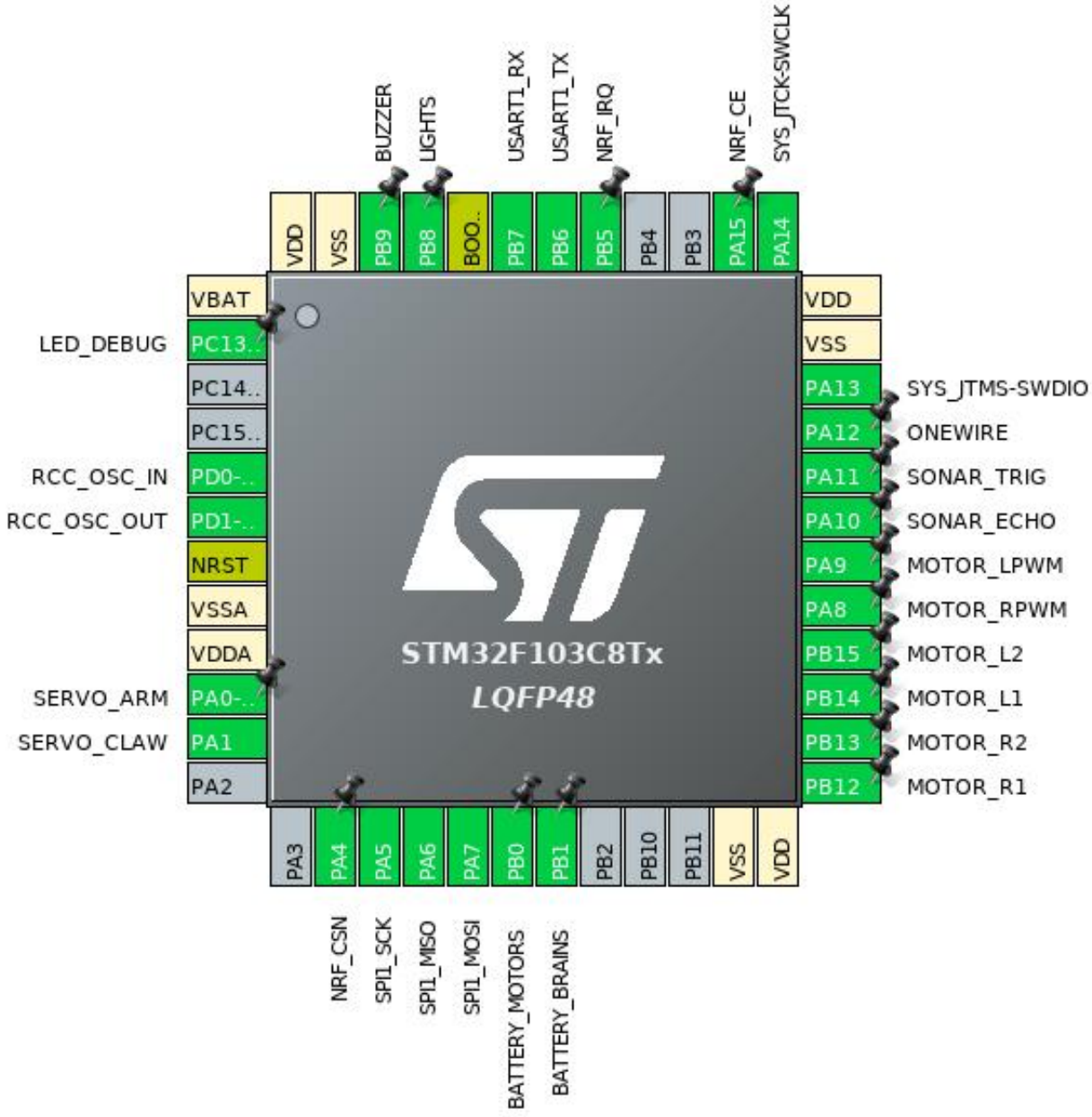
1.1. Project

Project Name	DUMRON
Board Name	custom
Generated with:	STM32CubeMX 5.4.0
Date	11/07/2019

1.2. MCU

MCU Series	STM32F1
MCU Line	STM32F103
MCU name	STM32F103C8Tx
MCU Package	LQFP48
MCU Pin number	48

2. Pinout Configuration



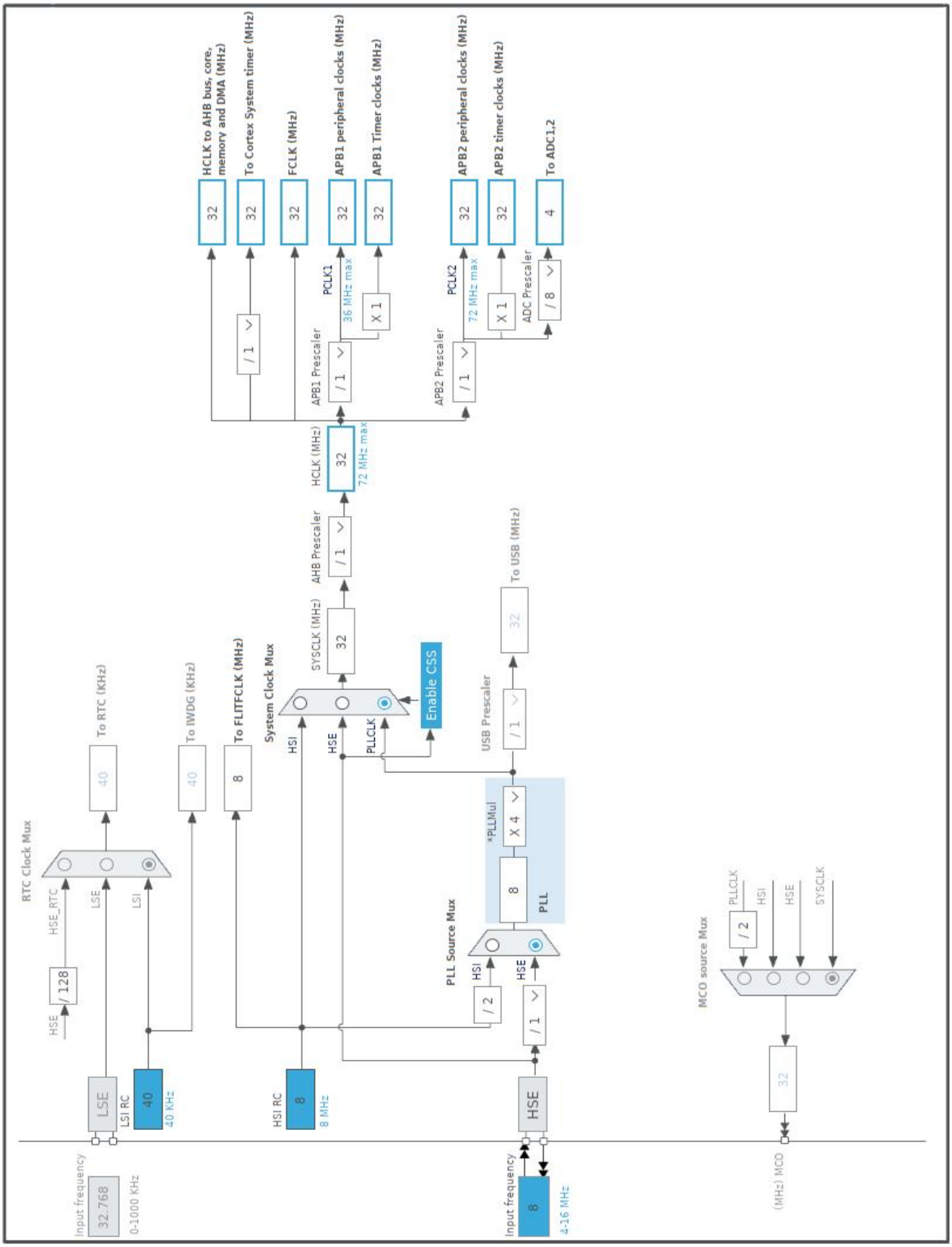
3. Pins Configuration

Pin Number LQFP48	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
2	PC13-TAMPER-RTC *	I/O	GPIO_Output	LED_DEBUG
5	PD0-OSC_IN	I/O	RCC_OSC_IN	
6	PD1-OSC_OUT	I/O	RCC_OSC_OUT	
7	NRST	Reset		
8	VSSA	Power		
9	VDDA	Power		
10	PA0-WKUP	I/O	TIM2_CH1	SERVO_ARM
11	PA1	I/O	TIM2_CH2	SERVO_CLAW
14	PA4 *	I/O	GPIO_Output	NRF_CSN
15	PA5	I/O	SPI1_SCK	
16	PA6	I/O	SPI1_MISO	
17	PA7	I/O	SPI1_MOSI	
18	PB0	I/O	ADC1_IN8	BATTERY_MOTORS
19	PB1	I/O	ADC1_IN9	BATTERY_BRAINS
23	VSS	Power		
24	VDD	Power		
25	PB12 *	I/O	GPIO_Output	MOTOR_R1
26	PB13 *	I/O	GPIO_Output	MOTOR_R2
27	PB14 *	I/O	GPIO_Output	MOTOR_L1
28	PB15 *	I/O	GPIO_Output	MOTOR_L2
29	PA8	I/O	TIM1_CH1	MOTOR_RPWM
30	PA9	I/O	TIM1_CH2	MOTOR_LPWM
31	PA10 *	I/O	GPIO_Input	SONAR_ECHO
32	PA11 *	I/O	GPIO_Output	SONAR_TRIG
33	PA12 *	I/O	GPIO_Output	ONEWIRE
34	PA13	I/O	SYS_JTMS-SWDIO	
35	VSS	Power		
36	VDD	Power		
37	PA14	I/O	SYS_JTCK-SWCLK	
38	PA15 *	I/O	GPIO_Output	NRF_CE
41	PB5	I/O	GPIO_EXTI5	NRF_IRQ
42	PB6	I/O	USART1_TX	
43	PB7	I/O	USART1_RX	
44	BOOT0	Boot		
45	PB8 *	I/O	GPIO_Output	LIGHTS

Pin Number LQFP48	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
46	PB9 *	I/O	GPIO_Output	BUZZER
47	VSS	Power		
48	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	DUMRON
Project Folder	/home/danya/Projects/DUMRON
Toolchain / IDE	STM32CubeIDE
Firmware Package Name and Version	STM32Cube FW_F1 V1.8.0

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

6. Power Consumption Calculator report

6.1. Microcontroller Selection

Series	STM32F1
Line	STM32F103
MCU	STM32F103C8Tx
Datasheet	13587_Rev17

6.2. Parameter Selection

Temperature	25
Vdd	3.3

7. IPs and Middleware Configuration

7.1. ADC1

mode: IN8

mode: IN9

7.1.1. Parameter Settings:

ADCs_Common_Settings:

Mode	Independent mode

ADC_Settings:

Data Alignment	Right alignment
Scan Conversion Mode	Disabled
Continuous Conversion Mode	Disabled
Discontinuous Conversion Mode	Disabled

ADC_Regular_ConversionMode:

Enable Regular Conversions	Enable
Number Of Conversion	1
External Trigger Conversion Source	Regular Conversion launched by software
Rank	1
Channel	Channel 8
Sampling Time	**7.5 Cycles ***

ADC_Injected_ConversionMode:

Enable Injected Conversions	Disable

WatchDog:

Enable Analog WatchDog Mode	false

7.2. GPIO

7.3. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

7.3.1. Parameter Settings:

System Parameters:

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

RCC Parameters:

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

7.4. SPI1

Mode: Full-Duplex Master

7.4.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	**64 ***
Baud Rate	**500.0 KBits/s ***
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Software

7.5. SYS

Debug: Serial Wire

Timebase Source: TIM4

7.6. TIM1

Clock Source : Internal Clock

Channel1: PWM Generation CH1

Channel2: PWM Generation CH2

7.6.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**320 ***
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**255 ***

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	Reset (UG bit from TIMx_EGR)

Break And Dead Time management - BRK Configuration:

BRK State	Disable
BRK Polarity	High

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

PWM Generation Channel 1:

Mode	PWM mode 1
Pulse (16 bits value)	0
Output compare preload	Enable
Fast Mode	Disable
CH Polarity	High
CH Idle State	Reset

PWM Generation Channel 2:

Mode	PWM mode 1
Pulse (16 bits value)	0
Output compare preload	Enable
Fast Mode	Disable
CH Polarity	High
CH Idle State	Reset

7.7. TIM2

Clock Source : Internal Clock

Channel1: PWM Generation CH1

Channel2: PWM Generation CH2

7.7.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**255 ***
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**2499 ***

Internal Clock Division (CKD)	No Division
auto-reload preload	Disable

Trigger Output (TRGO) Parameters:

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

PWM Generation Channel 1:

Mode	PWM mode 1
Pulse (16 bits value)	**272 ***
Output compare preload	Enable
Fast Mode	Disable
CH Polarity	High

PWM Generation Channel 2:

Mode	PWM mode 1
Pulse (16 bits value)	0
Output compare preload	Enable
Fast Mode	Disable
CH Polarity	High

7.8. TIM3

mode: Clock Source

7.8.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**31 ***
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**0xFFFF-1 ***
Internal Clock Division (CKD)	No Division
auto-reload preload	Disable

Trigger Output (TRGO) Parameters:

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

7.9. USART1

Mode: Asynchronous

7.9.1. Parameter Settings:

Basic Parameters:

Baud Rate	**9600 ***
Word Length	8 Bits (including Parity)
Parity	None
Stop Bits	1

Advanced Parameters:

Data Direction	Receive and Transmit
Over Sampling	16 Samples

7.10. FREERTOS

Interface: CMSIS_V1

7.10.1. Config parameters:

API:

FreeRTOS API	CMSIS v1

Versions:

FreeRTOS version	10.0.1
CMSIS-RTOS version	1.02

Kernel settings:

USE_PREEMPTION	Enabled
CPU_CLOCK_HZ	SystemCoreClock
TICK_RATE_HZ	**100 ***
MAX_PRIORITIES	**4 ***
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
RECORD_STACK_HIGH_ADDRESS	Disabled

Memory management settings:

Memory Allocation	Dynamic / Static
TOTAL_HEAP_SIZE	**4096 ***
Memory Management scheme	heap_4

Hook function related definitions:

USE_IDLE_HOOK	**Enabled ***
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	Enabled
TIMER_TASK_PRIORITY	2
TIMER_QUEUE_LENGTH	**5 ***
TIMER_TASK_STACK_DEPTH	**128 ***

Interrupt nesting behaviour configuration:

LIBRARY_LOWEST_INTERRUPT_PRIORITY	15
LIBRARY_MAX_SYSCALL_INTERRUPT_PRIORITY	5

7.10.2. Include parameters:

Include definitions:

vTaskPrioritySet	**Disabled ***
uxTaskPriorityGet	**Disabled ***
vTaskDelete	**Disabled ***
vTaskCleanUpResources	**Enabled ***
vTaskSuspend	**Disabled ***
vTaskDelayUntil	Disabled
vTaskDelay	Enabled
xTaskGetSchedulerState	**Disabled ***
xTaskResumeFromISR	Disabled
xQueueGetMutexHolder	Disabled
xSemaphoreGetMutexHolder	Disabled

pcTaskGetTaskName	Disabled
uxTaskGetStackHighWaterMark	Disabled
xTaskGetCurrentTaskHandle	Disabled
eTaskGetState	Disabled
xEventGroupSetBitFromISR	Disabled
xTimerPendFunctionCall	Disabled
xTaskAbortDelay	Disabled
xTaskGetHandle	Disabled

*** User modified value**

8. System Configuration

8.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
ADC1	PB0	ADC1_IN8	Analog mode	n/a	n/a	BATTERY_MOTORS
	PB1	ADC1_IN9	Analog mode	n/a	n/a	BATTERY_BRAINS
RCC	PD0-OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	
	PD1-OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	
SPI1	PA5	SPI1_SCK	Alternate Function Push Pull	n/a	**High ***	
	PA6	SPI1_MISO	Input mode	No pull-up and no pull-down	**n/a**	
	PA7	SPI1_MOSI	Alternate Function Push Pull	n/a	**High ***	
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
TIM1	PA8	TIM1_CH1	Alternate Function Push Pull	n/a	**High ***	MOTOR_RPWM
	PA9	TIM1_CH2	Alternate Function Push Pull	n/a	**High ***	MOTOR_LPWM
TIM2	PA0-WKUP	TIM2_CH1	Alternate Function Push Pull	n/a	**Medium ***	SERVO_ARM
	PA1	TIM2_CH2	Alternate Function Push Pull	n/a	**Medium ***	SERVO_CLAW
USART1	PB6	USART1_TX	Alternate Function Push Pull	n/a	**High ***	
	PB7	USART1_RX	Input mode	No pull-up and no pull-down	**n/a**	
GPIO	PC13-TAMPER-RTC	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LED_DEBUG
	PA4	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	NRF_CSN
	PB12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**Medium ***	MOTOR_R1
	PB13	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**Medium ***	MOTOR_R2
	PB14	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**Medium ***	MOTOR_L1
	PB15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**Medium ***	MOTOR_L2
	PA10	GPIO_Input	Input mode	No pull-up and no pull-down	**n/a**	SONAR_ECHO
	PA11	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**Medium ***	SONAR_TRIG
	PA12	GPIO_Output	**Output Open Drain ***	No pull-up and no pull-down	**Medium ***	ONEWIRE
	PA15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	NRF_CE
	PB5	GPIO_EXTI5	**External Interrupt Mode with Falling edge trigger detection**	No pull-up and no pull-down	n/a	NRF_IRQ

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PB8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LIGHTS
	PB9	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	BUZZER

8.2. DMA configuration

nothing configured in DMA service

8.3. 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
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	15	0
System tick timer	true	15	0
EXTI line[9:5] interrupts	true	5	0
TIM4 global interrupt	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
ADC1 and ADC2 global interrupts	unused		
TIM1 break interrupt	unused		
TIM1 update interrupt	unused		
TIM1 trigger and commutation interrupts	unused		
TIM1 capture compare interrupt	unused		
TIM2 global interrupt	unused		
TIM3 global interrupt	unused		
SPI1 global interrupt	unused		
USART1 global interrupt	unused		

*** User modified value**

9. Software Pack Report