1. Description

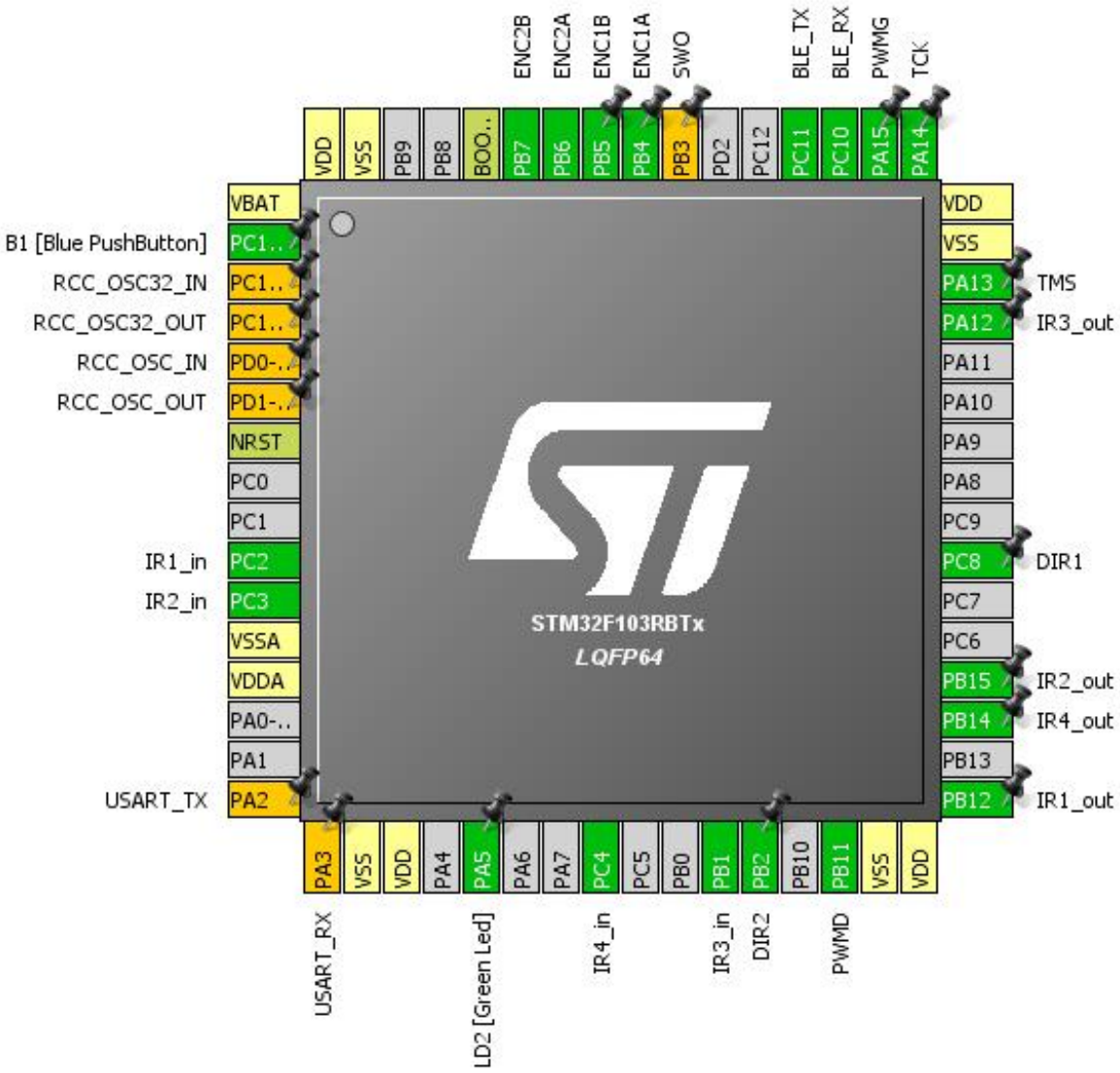
1.1. Project

Project Name	Robot3_F103RB_origin
Board Name	NUCLEO-F103RB
Generated with:	STM32CubeMX 4.24.0
Date	12/17/2019

1.2. MCU

MCU Series	STM32F1
MCU Line	STM32F103
MCU name	STM32F103RBTx
MCU Package	LQFP64
MCU Pin number	64

2. Pinout Configuration



3. Pins Configuration

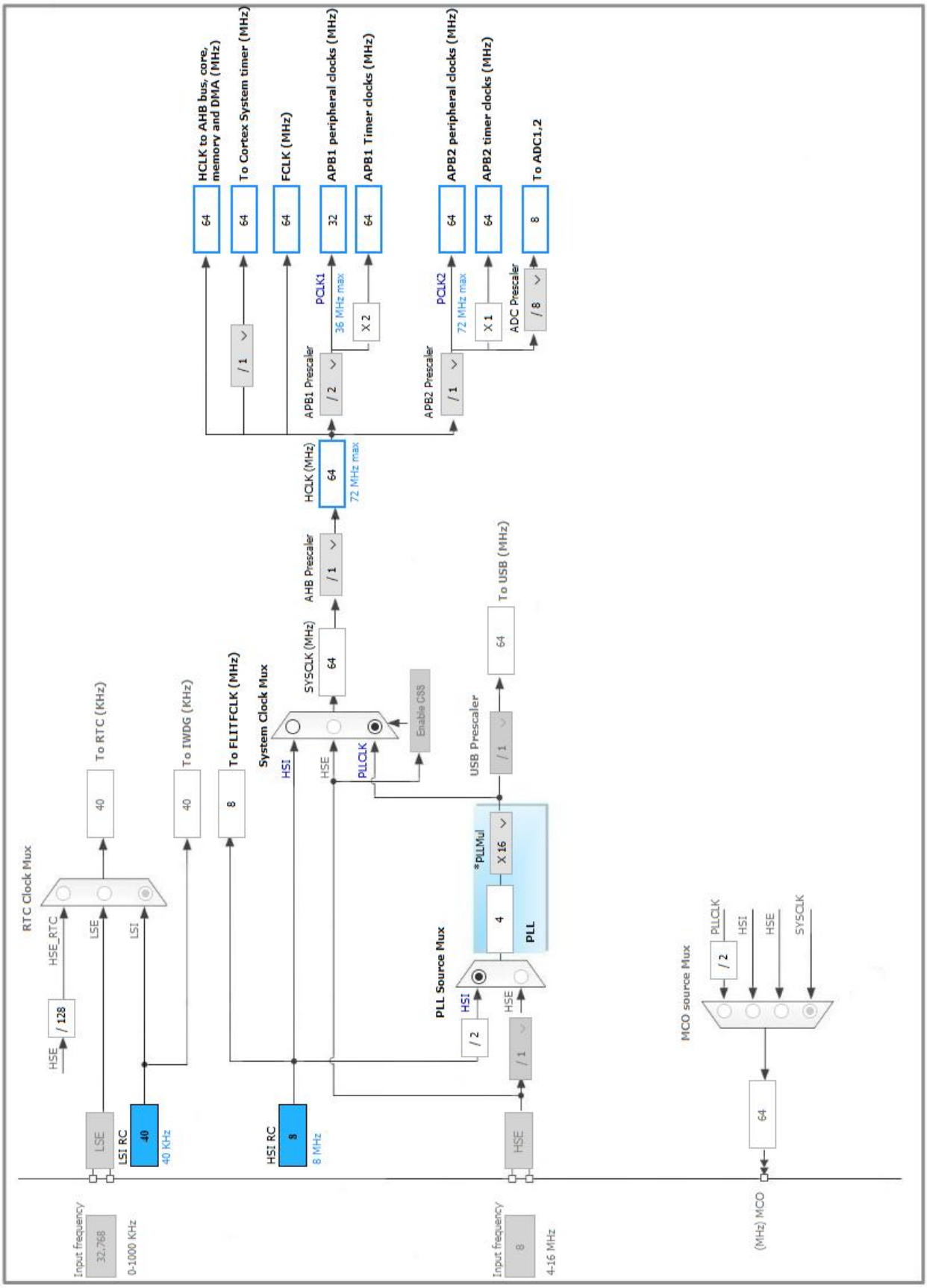
Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
2	PC13-TAMPER-RTC	I/O	GPIO_EXTI13	B1 [Blue PushButton]
3	PC14-OSC32_IN *	I/O	RCC_OSC32_IN	
4	PC15-OSC32_OUT *	I/O	RCC_OSC32_OUT	
5	PD0-OSC_IN *	I/O	RCC_OSC_IN	
6	PD1-OSC_OUT *	I/O	RCC_OSC_OUT	
7	NRST	Reset		
10	PC2	I/O	ADC1_IN12	IR1_in
11	PC3	I/O	ADC1_IN13	IR2_in
12	VSSA	Power		
13	VDDA	Power		
16	PA2 *	I/O	USART2_TX	USART_TX
17	PA3 *	I/O	USART2_RX	USART_RX
18	VSS	Power		
19	VDD	Power		
21	PA5 **	I/O	GPIO_Output	LD2 [Green Led]
24	PC4	I/O	ADC1_IN14	IR4_in
27	PB1	I/O	ADC1_IN9	IR3_in
28	PB2 **	I/O	GPIO_Output	DIR2
30	PB11	I/O	TIM2_CH4	PWMD
31	VSS	Power		
32	VDD	Power		
33	PB12 **	I/O	GPIO_Output	IR1_out
35	PB14 **	I/O	GPIO_Output	IR4_out
36	PB15 **	I/O	GPIO_Output	IR2_out
39	PC8 **	I/O	GPIO_Output	DIR1
45	PA12 **	I/O	GPIO_Output	IR3_out
46	PA13	I/O	SYS_JTMS-SWDIO	TMS
47	VSS	Power		
48	VDD	Power		
49	PA14	I/O	SYS_JTCK-SWCLK	TCK
50	PA15	I/O	TIM2_CH1	PWMG
51	PC10	I/O	USART3_TX	BLE_RX
52	PC11	I/O	USART3_RX	BLE_TX
55	PB3 *	I/O	SYS_JTDO-TRACESWO	SWO
56	PB4	I/O	TIM3_CH1	ENC1A

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
57	PB5	I/O	TIM3_CH2	ENC1B
58	PB6	I/O	TIM4_CH1	ENC2A
59	PB7	I/O	TIM4_CH2	ENC2B
60	BOOT0	Boot		
63	VSS	Power		
64	VDD	Power		

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

* The pin is affected with a peripheral function but no peripheral mode is activated

4. Clock Tree Configuration



5. IPs and Middleware Configuration

5.1. ADC1

mode: IN9

mode: IN12

mode: IN13

mode: IN14

5.1.1. Parameter Settings:

ADCs_Common_Settings:	
Mode	Independent mode
ADC_Settings:	
Data Alignment	Right alignment
Scan Conversion Mode	Enabled
Continuous Conversion Mode	Disabled
Discontinuous Conversion Mode	Disabled
ADC_Regular_ConversionMode:	
Enable Regular Conversions	Enable
Number Of Conversion	**4 ***
External Trigger Conversion Source	Regular Conversion launched by software
Rank	1
Channel	Channel 9
Sampling Time	**239.5 Cycles ***
Rank	**2 ***
Channel	**Channel 12 ***
Sampling Time	**239.5 Cycles ***
Rank	**3 ***
Channel	**Channel 13 ***
Sampling Time	**239.5 Cycles ***
Rank	**4 ***
Channel	**Channel 14 ***
Sampling Time	**239.5 Cycles ***
ADC_Injected_ConversionMode:	
Number Of Conversions	0
WatchDog:	

Enable Analog WatchDog Mode	false

5.2. SYS

Debug: Serial Wire

Timebase Source: SysTick

5.3. TIM2

Clock Source : Internal Clock

Channel1: PWM Generation CH1

Channel4: PWM Generation CH4

5.3.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**1 ***
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**64000 ***
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)	0
Fast Mode	Disable
CH Polarity	High

PWM Generation Channel 4:

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

5.4. TIM3

Combined Channels: Encoder Mode

5.4.1. Parameter Settings:

Counter Settings:

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

Trigger Output (TRGO) Parameters:

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

Encoder:

Encoder Mode	**Encoder Mode TI1 and TI2 ***
____ Parameters for Channel 1 ____	
Polarity	Rising Edge
IC Selection	Direct
Prescaler Division Ratio	No division
Input Filter	**8 ***
____ Parameters for Channel 2 ____	
Polarity	Rising Edge
IC Selection	Direct
Prescaler Division Ratio	No division
Input Filter	**8 ***

5.5. TIM4

Combined Channels: Encoder Mode

5.5.1. Parameter Settings:

Counter Settings:

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

Trigger Output (TRGO) Parameters:

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

Encoder:

Encoder Mode	**Encoder Mode TI1 and TI2 ***
____ Parameters for Channel 1 ____	
Polarity	Rising Edge
IC Selection	Direct
Prescaler Division Ratio	No division
Input Filter	**8 ***
____ Parameters for Channel 2 ____	
Polarity	Rising Edge
IC Selection	Direct
Prescaler Division Ratio	No division
Input Filter	**8 ***

5.6. USART3

Mode: Asynchronous

5.6.1. 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

*** User modified value**

6. System Configuration

6.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
ADC1	PC2	ADC1_IN12	Analog mode	n/a	n/a	IR1_in
	PC3	ADC1_IN13	Analog mode	n/a	n/a	IR2_in
	PC4	ADC1_IN14	Analog mode	n/a	n/a	IR4_in
	PB1	ADC1_IN9	Analog mode	n/a	n/a	IR3_in
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	TMS
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	TCK
TIM2	PB11	TIM2_CH4	Alternate Function Push Pull	n/a	Low	PWMD
	PA15	TIM2_CH1	Alternate Function Push Pull	n/a	Low	PWMG
TIM3	PB4	TIM3_CH1	Input mode	No pull-up and no pull-down	n/a	ENC1A
	PB5	TIM3_CH2	Input mode	No pull-up and no pull-down	n/a	ENC1B
TIM4	PB6	TIM4_CH1	Input mode	No pull-up and no pull-down	n/a	ENC2A
	PB7	TIM4_CH2	Input mode	No pull-up and no pull-down	n/a	ENC2B
USART3	PC10	USART3_TX	Alternate Function Push Pull	n/a	**High ***	BLE_RX
	PC11	USART3_RX	Input mode	No pull-up and no pull-down	**n/a**	BLE_TX
Single Mapped Signals	PC14-OSC32_IN	RCC_OSC32_IN	n/a	n/a	n/a	
	PC15-OSC32_OUT	RCC_OSC32_OUT	n/a	n/a	n/a	
	PD0-OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	
	PD1-OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	
	PA2	USART2_TX	Alternate Function Push Pull	n/a	Low	USART_TX
	PA3	USART2_RX	*	No pull-up and no pull-down	n/a	USART_RX
	PB3	SYS_JTDO-TRACESWO	**n/a**	n/a	n/a	SWO
GPIO	PC13-TAMPER-RTC	GPIO_EXTI13	**External Interrupt Mode with Falling edge trigger detection**	No pull-up and no pull-down	n/a	B1 [Blue PushButton]
	PA5	GPIO_Output	Output Push Pull	n/a	Low	LD2 [Green Led]
	PB2	GPIO_Output	Output Push Pull	n/a	Low	DIR2
	PB12	GPIO_Output	Output Push Pull	n/a	Low	IR1_out

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PB14	GPIO_Output	Output Push Pull	n/a	Low	IR4_out
	PB15	GPIO_Output	Output Push Pull	n/a	Low	IR2_out
	PC8	GPIO_Output	Output Push Pull	n/a	Low	DIR1
	PA12	GPIO_Output	Output Push Pull	n/a	Low	IR3_out

6.2. DMA configuration

DMA request	Stream	Direction	Priority
ADC1	DMA1_Channel1	Peripheral To Memory	Low

ADC1: DMA1_Channel1 DMA request Settings:

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

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
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	0	0
System tick timer	true	0	0
DMA1 channel1 global interrupt	true	0	0
TIM2 global interrupt	true	0	0
USART3 global interrupt	true	0	0
EXTI line[15:10] interrupts	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
ADC1 and ADC2 global interrupts	unused		
TIM3 global interrupt	unused		
TIM4 global interrupt	unused		

*** User modified value**

7. Power Consumption Calculator report

7.1. Microcontroller Selection

Series	STM32F1
Line	STM32F103
MCU	STM32F103RBTx
Datasheet	13587_Rev17

7.2. Parameter Selection

Temperature	25
Vdd	3.3

8. Software Project

8.1. Project Settings

Name	Value
Project Name	Robot3_F103RB_origin
Project Folder	C:\EMSE\2A\Projet robot\Rover_5_F103RB_Origin\Rover_5_F103RB_Origin
Toolchain / IDE	TrueSTUDIO
Firmware Package Name and Version	STM32Cube FW_F1 V1.6.1

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	Yes
Delete previously generated files when not re-generated	Yes
Set all free pins as analog (to optimize the power consumption)	Yes

9. Software Pack Report