1. Description

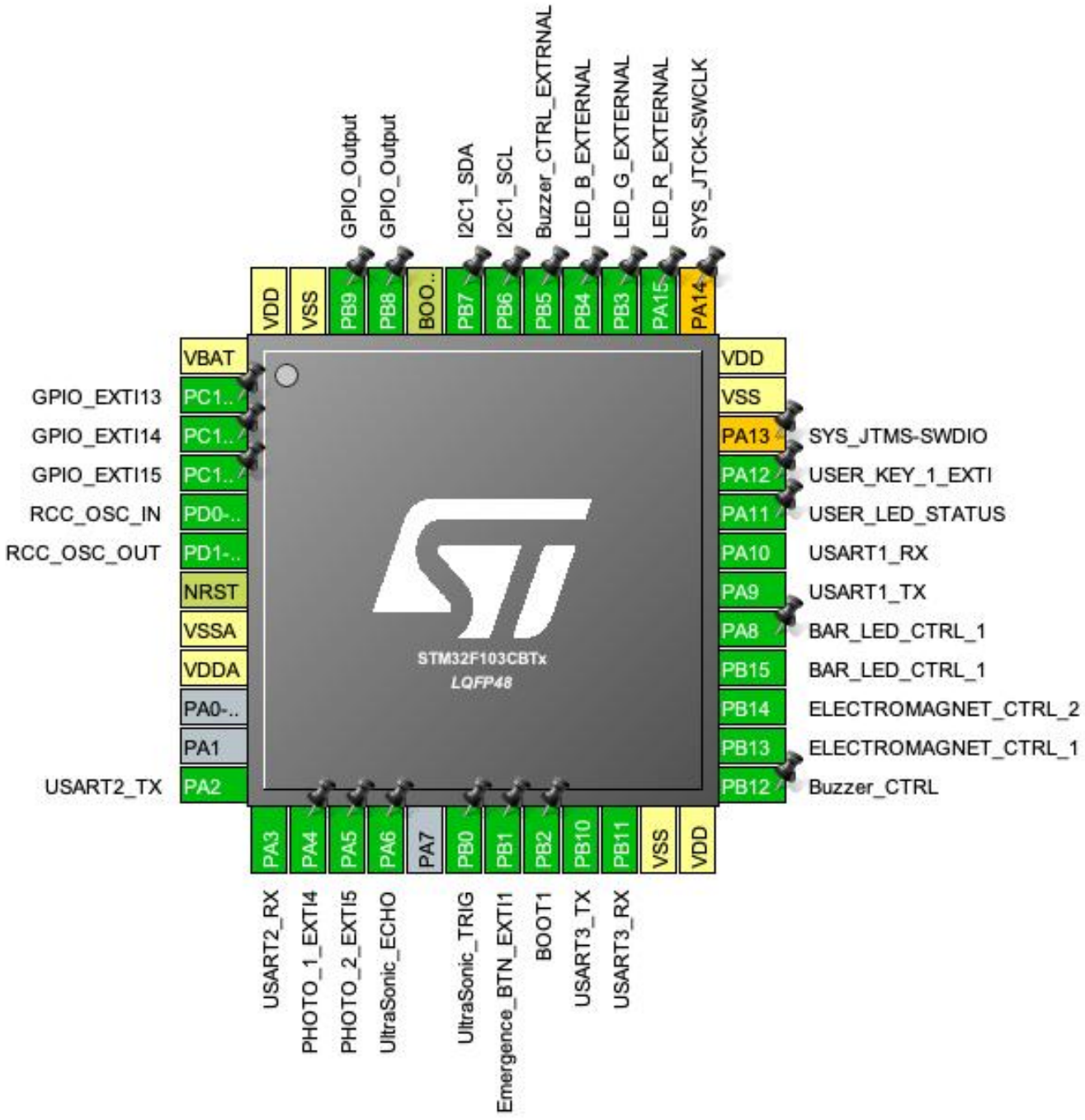
1.1. Project

Project Name	BabyBox_Project
Board Name	custom
Generated with:	STM32CubeMX 5.0.0
Date	12/14/2018

1.2. MCU

MCU Series	STM32F1
MCU Line	STM32F103
MCU name	STM32F103CBTx
MCU Package	LQFP48
MCU Pin number	48

2. Pinout Configuration



3. Pins Configuration

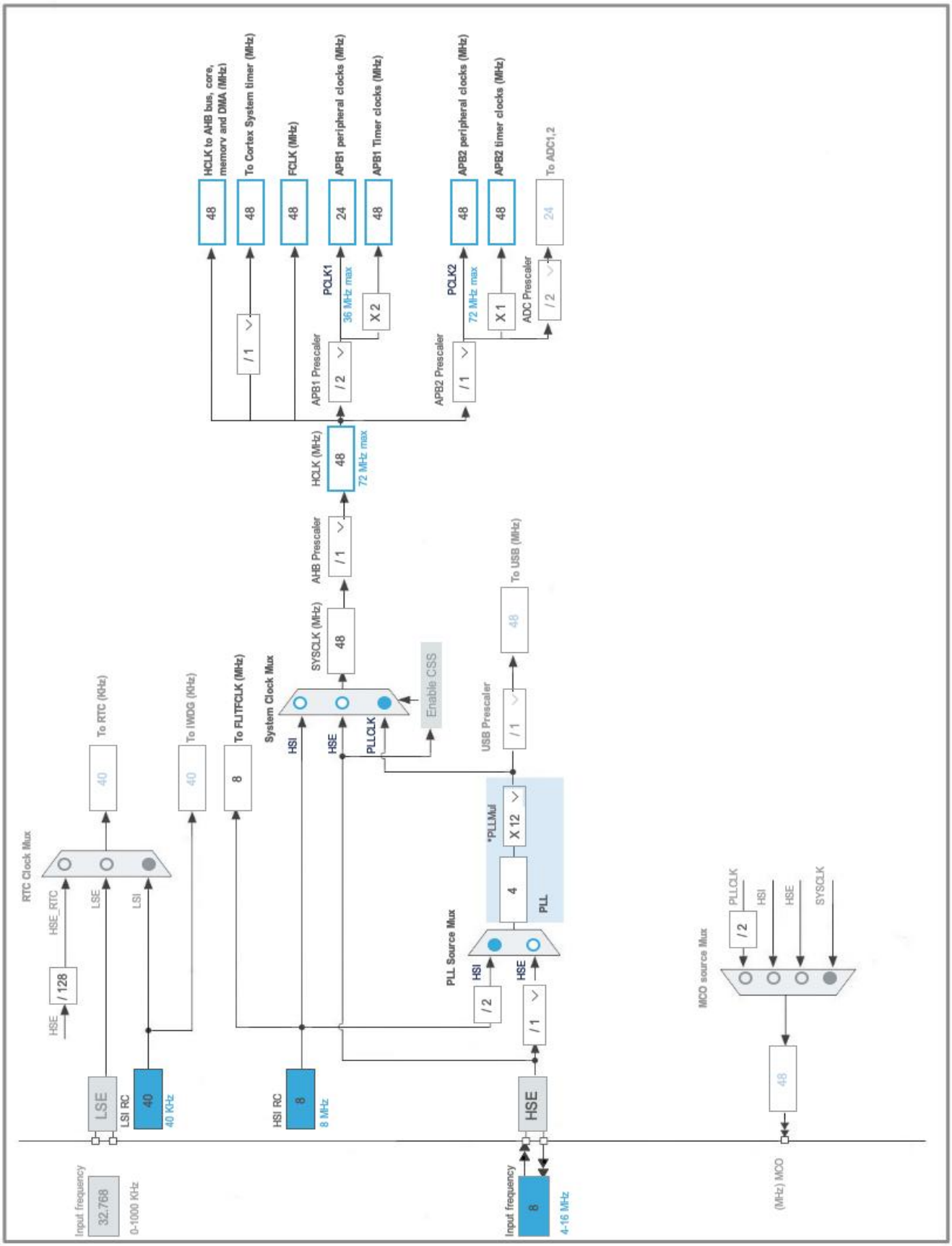
Pin Number LQFP48	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
2	PC13-TAMPER-RTC	I/O	GPIO_EXTI13	
3	PC14-OSC32_IN	I/O	GPIO_EXTI14	
4	PC15-OSC32_OUT	I/O	GPIO_EXTI15	
5	PD0-OSC_IN	I/O	RCC_OSC_IN	
6	PD1-OSC_OUT	I/O	RCC_OSC_OUT	
7	NRST	Reset		
8	VSSA	Power		
9	VDDA	Power		
12	PA2	I/O	USART2_TX	
13	PA3	I/O	USART2_RX	
14	PA4	I/O	GPIO_EXTI4	PHOTO_1_EXTI4
15	PA5	I/O	GPIO_EXTI5	PHOTO_2_EXTI5
16	PA6	I/O	TIM3_CH1	UltraSonic_ECHO
18	PB0 *	I/O	GPIO_Output	UltraSonic_TRIG
19	PB1	I/O	GPIO_EXTI1	Emergence_BTN_EXTI1
20	PB2 *	I/O	GPIO_Input	BOOT1
21	PB10	I/O	USART3_TX	
22	PB11	I/O	USART3_RX	
23	VSS	Power		
24	VDD	Power		
25	PB12 *	I/O	GPIO_Output	Buzzer_CTRL
26	PB13 *	I/O	GPIO_Output	ELECTROMAGNET_CTRL_1
27	PB14 *	I/O	GPIO_Output	ELECTROMAGNET_CTRL_2
28	PB15 *	I/O	GPIO_Output	BAR_LED_CTRL_1
29	PA8 *	I/O	GPIO_Output	BAR_LED_CTRL_1
30	PA9	I/O	USART1_TX	
31	PA10	I/O	USART1_RX	
32	PA11 *	I/O	GPIO_Output	USER_LED_STATUS
33	PA12	I/O	GPIO_EXTI12	USER_KEY_1_EXTI
34	PA13 **	I/O	SYS_JTMS-SWDIO	
35	VSS	Power		
36	VDD	Power		
37	PA14 **	I/O	SYS_JTCK-SWCLK	

Pin Number LQFP48	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
38	PA15 *	I/O	GPIO_Output	LED_R_EXTERNAL
39	PB3 *	I/O	GPIO_Output	LED_G_EXTERNAL
40	PB4 *	I/O	GPIO_Output	LED_B_EXTERNAL
41	PB5 *	I/O	GPIO_Output	Buzzer_CTRL_EXTRNAL
42	PB6	I/O	I2C1_SCL	
43	PB7	I/O	I2C1_SDA	
44	BOOT0	Boot		
45	PB8 *	I/O	GPIO_Output	
46	PB9 *	I/O	GPIO_Output	
47	VSS	Power		
48	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. Software Project

5.1. Project Settings

Name	Value
Project Name	BabyBox_Project
Project Folder	/Users/leejh/CoM/1_Code/BabyBox_project/BabyBox_Project
Toolchain / IDE	SW4STM32
Firmware Package Name and Version	STM32Cube FW_F1 V1.7.0

5.2. Code Generation Settings

Name	Value
STM32Cube Firmware Library Package	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	STM32F103CBTx
Datasheet	13587_Rev17

6.2. Parameter Selection

Temperature	25
Vdd	3.3

7. IPs and Middleware Configuration

7.1. I2C1

I2C: I2C

7.1.1. Parameter Settings:

Master Features:

I2C Speed Mode	Standard Mode
I2C Clock Speed (Hz)	100000

Slave Features:

Clock No Stretch Mode	Disabled
Primary Address Length selection	7-bit
Dual Address Acknowledged	Disabled
Primary slave address	0
General Call address detection	Disabled

7.2. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

7.2.1. 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

7.3. SYS

Debug: No Debug

Timebase Source: SysTick

7.4. TIM1

Clock Source : Internal Clock

Channel1: Output Compare No Output

7.4.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**48-1 ***
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**10 ***
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

Output Compare No Output Channel 1:

Mode	Frozen (used for Timing base)
Pulse (16 bits value)	0
CH Polarity	High
CH Idle State	Reset

7.5. TIM3

mode: Clock Source

Channel1: Input Capture direct mode

Channel2: Input Capture indirect mode

7.5.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**48-1 ***
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	

	65534 *
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)

Input Capture Channel 1:

Polarity Selection	Rising Edge
IC Selection	Direct
Prescaler Division Ratio	No division
Input Filter (4 bits value)	0

Input Capture Channel 2:

Polarity Selection	**Falling Edge ***
IC Selection	Indirect
Prescaler Division Ratio	No division

7.6. USART1

Mode: Asynchronous

7.6.1. Parameter Settings:

Basic Parameters:

Baud Rate	115200
Word Length	8 Bits (including Parity)
Parity	None
Stop Bits	1

Advanced Parameters:

Data Direction	Receive and Transmit
Over Sampling	16 Samples

7.7. USART2

Mode: Asynchronous

7.7.1. Parameter Settings:

Basic Parameters:

Baud Rate	115200
Word Length	8 Bits (including Parity)
Parity	None

Stop Bits	1

Advanced Parameters:

Data Direction	Receive and Transmit
Over Sampling	16 Samples

7.8. USART3

Mode: Asynchronous

7.8.1. Parameter Settings:

Basic Parameters:

Baud Rate	115200
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**

8. System Configuration

8.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
I2C1	PB6	I2C1_SCL	Alternate Function Open Drain	n/a	**High ***	
	PB7	I2C1_SDA	Alternate Function Open Drain	n/a	**High ***	
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	
TIM3	PA6	TIM3_CH1	Input mode	No pull-up and no pull-down	n/a	UltraSonic_ECHO
USART1	PA9	USART1_TX	Alternate Function Push Pull	n/a	**High ***	
	PA10	USART1_RX	Input mode	No pull-up and no pull-down	**n/a**	
USART2	PA2	USART2_TX	Alternate Function Push Pull	n/a	**High ***	
	PA3	USART2_RX	Input mode	No pull-up and no pull-down	**n/a**	
USART3	PB10	USART3_TX	Alternate Function Push Pull	n/a	**High ***	
	PB11	USART3_RX	Input mode	No pull-up and no pull-down	**n/a**	
Single Mapped Signals	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
GPIO	PC13-TAMPER-RTC	GPIO_EXTI13	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	
	PC14-OSC32_IN	GPIO_EXTI14	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	
	PC15-OSC32_OUT	GPIO_EXTI15	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	
	PA4	GPIO_EXTI4	**External Interrupt Mode with Rising/Falling edge**	**Pull-up ***	n/a	PHOTO_1_EXTI4
	PA5	GPIO_EXTI5	**External Interrupt Mode with Rising/Falling edge**	**Pull-up ***	n/a	PHOTO_2_EXTI5
	PB0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	UltraSonic_TRIG
	PB1	GPIO_EXTI1	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	Emergence_BTN_EXTI1
	PB2	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	BOOT1

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PB12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	Buzzer_CTRL
	PB13	GPIO_Output	Output Push Pull	**Pull-down ***	Low	ELECTROMAGNET_CTRL_1
	PB14	GPIO_Output	Output Push Pull	**Pull-down ***	Low	ELECTROMAGNET_CTRL_2
	PB15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	BAR_LED_CTRL_1
	PA8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	BAR_LED_CTRL_1
	PA11	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	USER_LED_STATUS
	PA12	GPIO_EXTI12	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	USER_KEY_1_EXTI
	PA15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LED_R_EXTERNAL
	PB3	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LED_G_EXTERNAL
	PB4	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LED_B_EXTERNAL
	PB5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	Buzzer_CTRL_EXTRNAL
	PB8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PB9	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	

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	0	0
System tick timer	true	0	0
EXTI line1 interrupt	true	3	0
EXTI line4 interrupt	true	4	0
EXTI line[9:5] interrupts	true	1	0
TIM1 break interrupt	true	0	0
TIM1 update interrupt	true	0	0
TIM3 global interrupt	true	2	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
TIM1 trigger and commutation interrupts	unused		
TIM1 capture compare interrupt	unused		
I2C1 event interrupt	unused		
I2C1 error interrupt	unused		
USART1 global interrupt	unused		
USART2 global interrupt	unused		
USART3 global interrupt	unused		
EXTI line[15:10] interrupts	unused		

*** User modified value**

9. Software Pack Report