1. Description

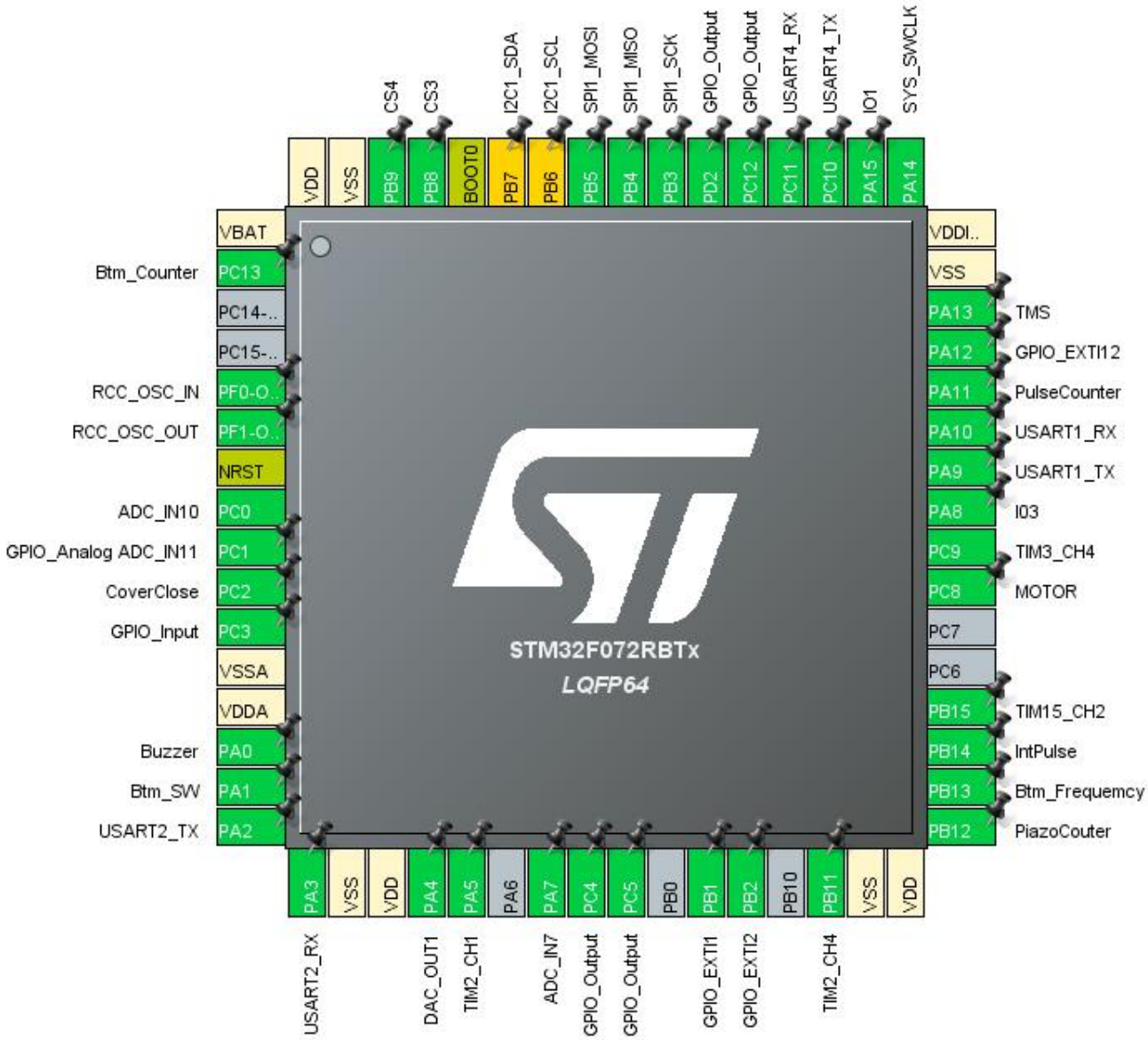
1.1. Project

Project Name	V6-1
Board Name	32F072BDISCOVERY
Generated with:	STM32CubeMX 5.2.1
Date	06/30/2019

1.2. MCU

MCU Series	STM32F0
MCU Line	STM32F0x2
MCU name	STM32F072RBTx
MCU Package	LQFP64
MCU Pin number	64

2. Pinout Configuration



3. Pins Configuration

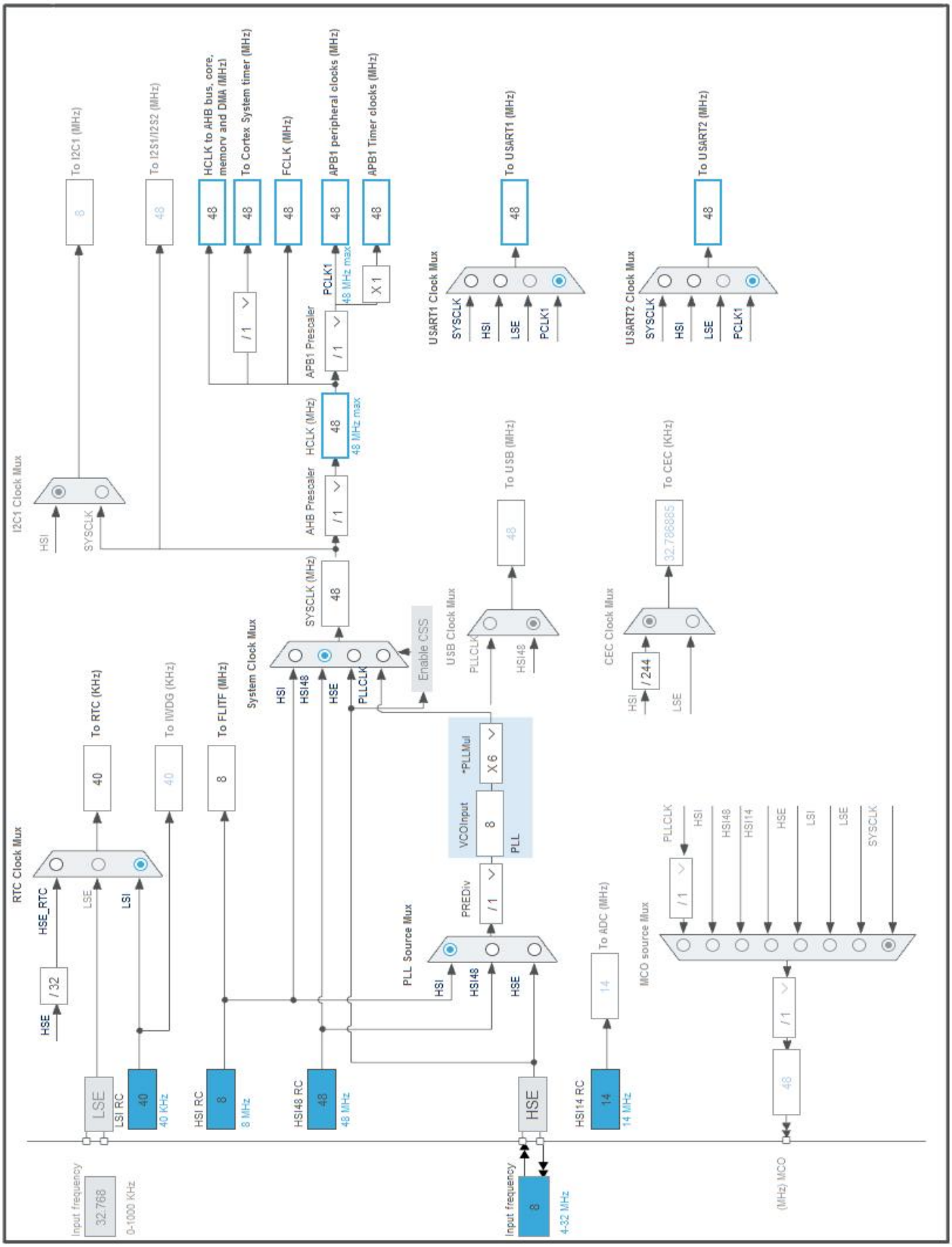
Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
2	PC13 *	I/O	GPIO_Input	Btm_Counter
5	PF0-OSC_IN	I/O	RCC_OSC_IN	
6	PF1-OSC_OUT	I/O	RCC_OSC_OUT	
7	NRST	Reset		
8	PC0	I/O	ADC_IN10	
9	PC1	I/O	GPIO_Analog, ADC_IN11	
10	PC2 *	I/O	GPIO_Input	CoverClose
11	PC3 *	I/O	GPIO_Input	
12	VSSA	Power		
13	VDDA	Power		
14	PA0 *	I/O	GPIO_Output	Buzzer
15	PA1 *	I/O	GPIO_Input	Btm_SW
16	PA2	I/O	USART2_TX	
17	PA3	I/O	USART2_RX	
18	VSS	Power		
19	VDD	Power		
20	PA4	I/O	DAC_OUT1	
21	PA5	I/O	TIM2_CH1	
23	PA7 *	I/O	GPIO_Analog	ADC_IN7
24	PC4 *	I/O	GPIO_Output	
25	PC5 *	I/O	GPIO_Output	
27	PB1	I/O	GPIO_EXTI1	
28	PB2	I/O	GPIO_EXTI2	
30	PB11	I/O	TIM2_CH4	
31	VSS	Power		
32	VDD	Power		
33	PB12 *	I/O	EVENTOUT	PiazoCouter
34	PB13 *	I/O	GPIO_Input	Btm_Frequemcy
35	PB14	I/O	GPIO_EXTI14	IntPulse
36	PB15	I/O	TIM15_CH2	
39	PC8	I/O	TIM3_CH3	MOTOR
40	PC9	I/O	TIM3_CH4	
41	PA8 *	I/O	GPIO_Output	I03
42	PA9	I/O	USART1_TX	
43	PA10	I/O	USART1_RX	

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
44	PA11	I/O	GPIO_EXTI11	PulseCounter
45	PA12	I/O	GPIO_EXTI12	
46	PA13	I/O	SYS_SWDIO	TMS
47	VSS	Power		
48	VDDIO2	Power		
49	PA14	I/O	SYS_SWCLK	
50	PA15 *	I/O	GPIO_Output	IO1
51	PC10	I/O	USART4_TX	
52	PC11	I/O	USART4_RX	
53	PC12 *	I/O	GPIO_Output	
54	PD2 *	I/O	GPIO_Output	
55	PB3	I/O	SPI1_SCK	
56	PB4	I/O	SPI1_MISO	
57	PB5	I/O	SPI1_MOSI	
58	PB6 **	I/O	I2C1_SCL	
59	PB7 **	I/O	I2C1_SDA	
60	BOOT0	Boot		
61	PB8 *	I/O	GPIO_Output	CS3
62	PB9 *	I/O	GPIO_Output	CS4
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. Software Project

5.1. Project Settings

Name	Value
Project Name	V6-1
Project Folder	C:\project6\Armenta\V6-1
Toolchain / IDE	MDK-ARM V5
Firmware Package Name and Version	STM32Cube FW_F0 V1.10.1

5.2. 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

6. Power Consumption Calculator report

6.1. Microcontroller Selection

Series	STM32F0
Line	STM32F0x2
MCU	STM32F072RBTx
Datasheet	025004_Rev5

6.2. Parameter Selection

Temperature	25
Vdd	3.6

7. IPs and Middleware Configuration

7.1. ADC

mode: IN10

mode: IN11

7.1.1. Parameter Settings:

ADC_Settings:

Clock Prescaler	**Synchronous clock mode divided by 4 ***
Resolution	**ADC 10-bit resolution ***
Data Alignment	Right alignment
Scan Conversion Mode	Forward
Continuous Conversion Mode	Disabled
Discontinuous Conversion Mode	Disabled
DMA Continuous Requests	Disabled
End Of Conversion Selection	End of single conversion
Overrun behaviour	Overrun data preserved
Low Power Auto Wait	Disabled
Low Power Auto Power Off	Disabled

ADC_Regular_ConversionMode:

Sampling Time	1.5 Cycles
External Trigger Conversion Source	Regular Conversion launched by software
External Trigger Conversion Edge	None

WatchDog:

Enable Analog WatchDog Mode	false

7.2. DAC

mode: OUT1 Configuration

7.2.1. Parameter Settings:

DAC Out1 Settings:

Output Buffer	Enable
Trigger	None

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:

HSE Startup Timout Value (ms)	100
LSE Startup Timout Value (ms)	5000

7.4. RTC

mode: Activate Clock Source

7.4.1. Parameter Settings:

General:

Hour Format	Hourformat 24
Asynchronous Predivider value	127
Synchronous Predivider value	255

7.5. SPI1

Mode: Full-Duplex Master

7.5.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	**8 Bits ***
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	**8 ***
Baud Rate	**6.0 MBits/s ***
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSSP Mode	Enabled

NSS Signal Type	Software

7.6. SYS

mode: Debug Serial Wire

Timebase Source: SysTick

7.7. TIM2

Clock Source : Internal Clock

Channel1: PWM Generation CH1

Channel4: PWM Generation CH4

7.7.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 32 bits value)	0
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)

Clear Input:

Clear Input Source	Disable

PWM Generation Channel 1:

Mode	PWM mode 1
Pulse (32 bits value)	0
Fast Mode	Disable
CH Polarity	High

PWM Generation Channel 4:

Mode	PWM mode 1
Pulse (32 bits value)	0
Fast Mode	Disable
CH Polarity	High

7.8. TIM3

Clock Source : Internal Clock
Channel3: PWM Generation CH3
Channel4: PWM Generation CH4
7.8.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	0
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)

Clear Input:

Clear Input Source	Disable

PWM Generation Channel 3:

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

7.9. TIM15

mode: Clock Source
Combined Channels: PWM Input on CH2
7.9.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	0
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)

PWM Input CH2:

Input Trigger	TI2FP2
Slave Mode Controller	Reset Mode
____ Parameters for Channel 1 ____	
Polarity Selection	Rising Edge
IC Selection	Indirect
Prescaler Division Ratio	No division
Input Filter (4 bits value)	0
____ Parameters for Channel 2 ____	
Polarity Selection (opposite CH1)	Falling Edge
IC Selection	Direct
Prescaler Division Ratio	No division
Input Filter (4 bits value)	0

7.10. USART1

Mode: Asynchronous

7.10.1. 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
Single Sample	Disable

Advanced Features:

Auto Baudrate	Disable
TX Pin Active Level Inversion	Disable
RX Pin Active Level Inversion	Disable
Data Inversion	Disable
TX and RX Pins Swapping	Disable
Overrun	Enable
DMA on RX Error	Enable

MSB First	Disable

7.11. USART2

Mode: Asynchronous

7.11.1. 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
Single Sample	Disable

Advanced Features:

Auto Baudrate	Disable
TX Pin Active Level Inversion	Disable
RX Pin Active Level Inversion	Disable
Data Inversion	Disable
TX and RX Pins Swapping	Disable
Overrun	Enable
DMA on RX Error	Enable
MSB First	Disable

7.12. USART4

Mode: Asynchronous

7.12.1. 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

Single Sample	Disable

Advanced Features:

TX Pin Active Level Inversion	Disable
RX Pin Active Level Inversion	Disable
Data Inversion	Disable
TX and RX Pins Swapping	Disable
Overrun	Enable
DMA on RX Error	Enable
MSB First	Disable

*** User modified value**

8. System Configuration

8.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
ADC	PC0	ADC_IN10	Analog mode	No pull-up and no pull-down	n/a	
	PC1	ADC_IN11	Analog mode	No pull-up and no pull-down	n/a	
DAC	PA4	DAC_OUT1	Analog mode	No pull-up and no pull-down	n/a	
RCC	PF0-OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	
	PF1-OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	
SPI1	PB3	SPI1_SCK	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PB4	SPI1_MISO	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PB5	SPI1_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
SYS	PA13	SYS_SWDIO	n/a	n/a	n/a	TMS
	PA14	SYS_SWCLK	n/a	n/a	n/a	
TIM2	PA5	TIM2_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PB11	TIM2_CH4	Alternate Function Push Pull	No pull-up and no pull-down	Low	
TIM3	PC8	TIM3_CH3	Alternate Function Push Pull	No pull-up and no pull-down	Low	MOTOR
	PC9	TIM3_CH4	Alternate Function Push Pull	No pull-up and no pull-down	Low	
TIM15	PB15	TIM15_CH2	Alternate Function Push Pull	No pull-up and no pull-down	Low	
USART1	PA9	USART1_TX	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PA10	USART1_RX	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
USART2	PA2	USART2_TX	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PA3	USART2_RX	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
USART4	PC10	USART4_TX	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PC11	USART4_RX	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
Single Mapped Signals	PB6	I2C1_SCL	Alternate Function Open Drain	Pull-up	**High ***	
	PB7	I2C1_SDA	Alternate Function Open Drain	Pull-up	**High ***	
GPIO	PC13	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	Btm_Counter
	PC1	GPIO_Analog	Analog mode	No pull-up and no pull-down	n/a	
	PC2	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	CoverClose
	PC3	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PA0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	Buzzer
	PA1	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	Btm_SW
	PA7	GPIO_Analog	Analog mode	No pull-up and no pull-down	n/a	ADC_IN7
	PC4	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PC5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PB1	GPIO_EXTI1	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	
	PB2	GPIO_EXTI2	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	
	PB12	EVENTOUT	Alternate Function Push Pull	No pull-up and no pull-down	Low	PiazoCouter
	PB13	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	Btm_Frequemcy
	PB14	GPIO_EXTI14	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	IntPulse
	PA8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	I03
	PA11	GPIO_EXTI11	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	PulseCounter
	PA12	GPIO_EXTI12	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	
	PA15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	IO1
	PC12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PD2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PB8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	CS3
	PB9	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	CS4

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
System service call via SWI instruction	true	0	0
Pendable request for system service	true	0	0
System tick timer	true	0	0
EXTI line 0 and 1 interrupts	true	0	0
EXTI line 2 and 3 interrupts	true	0	0
EXTI line 4 to 15 interrupts	true	0	0
USART1 global interrupt / USART1 wake-up interrupt through EXTI line 25	true	0	0
USART2 global interrupt / USART2 wake-up interrupt through EXTI line 26	true	0	0
USART3 and USART4 global interrupts	true	0	0
PVD and VDDIO2 supply comparator interrupts through EXTI lines 16 and 31	unused		
Flash global interrupt	unused		
RCC and CRS global interrupts	unused		
ADC and COMP interrupts (COMP interrupts through EXTI lines 21 and 22)	unused		
TIM2 global interrupt	unused		
TIM3 global interrupt	unused		
TIM6 global and DAC channel underrun error interrupts	unused		
TIM15 global interrupt	unused		
SPI1 global interrupt	unused		

*** User modified value**

9. Software Pack Report