

1. Description

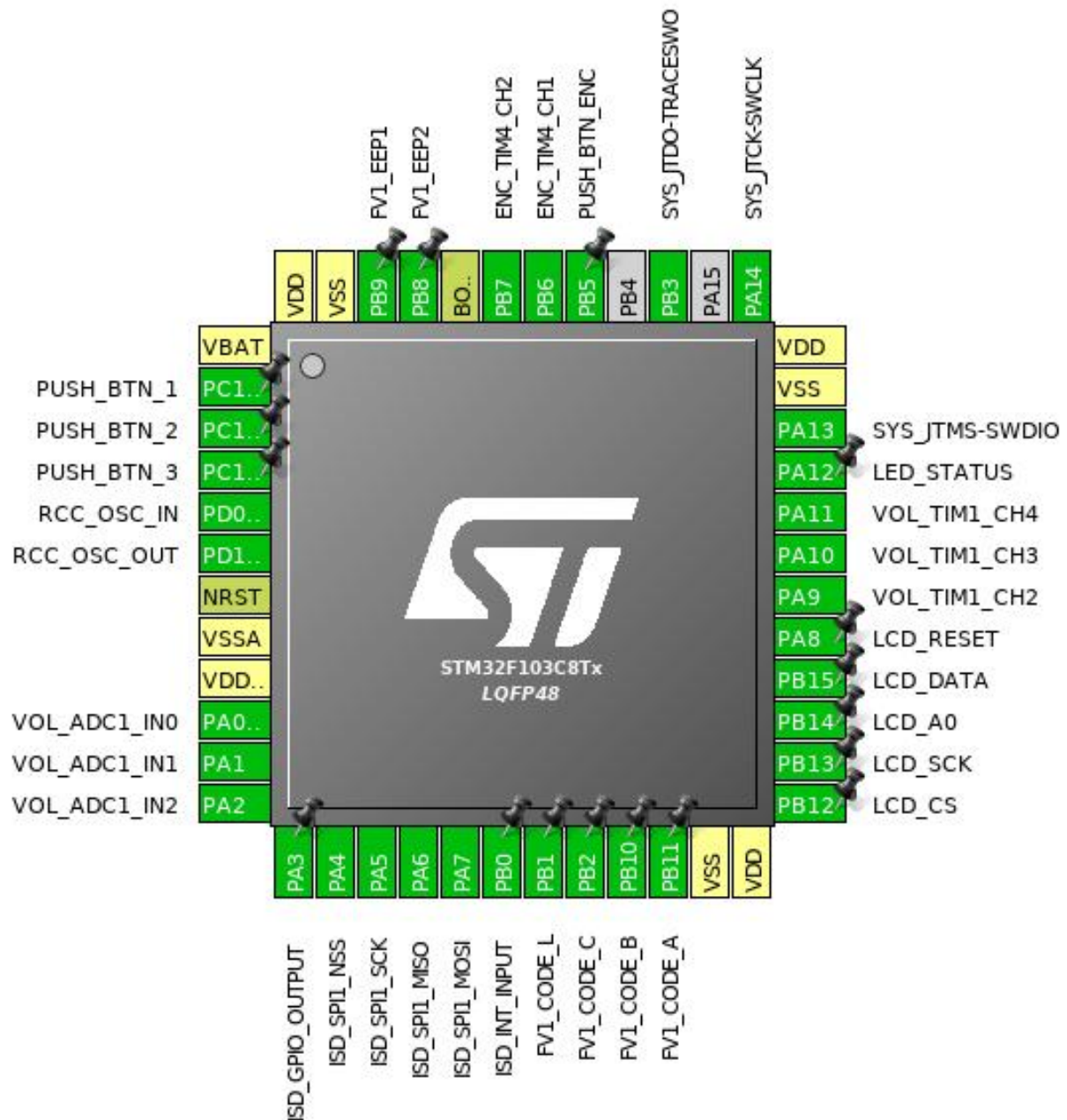
1.1. Project

Project Name	mus_proj
Board Name	mus_proj
Generated with:	STM32CubeMX 4.26.1
Date	10/07/2018

1.2. MCU

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

2. Pinout Configuration



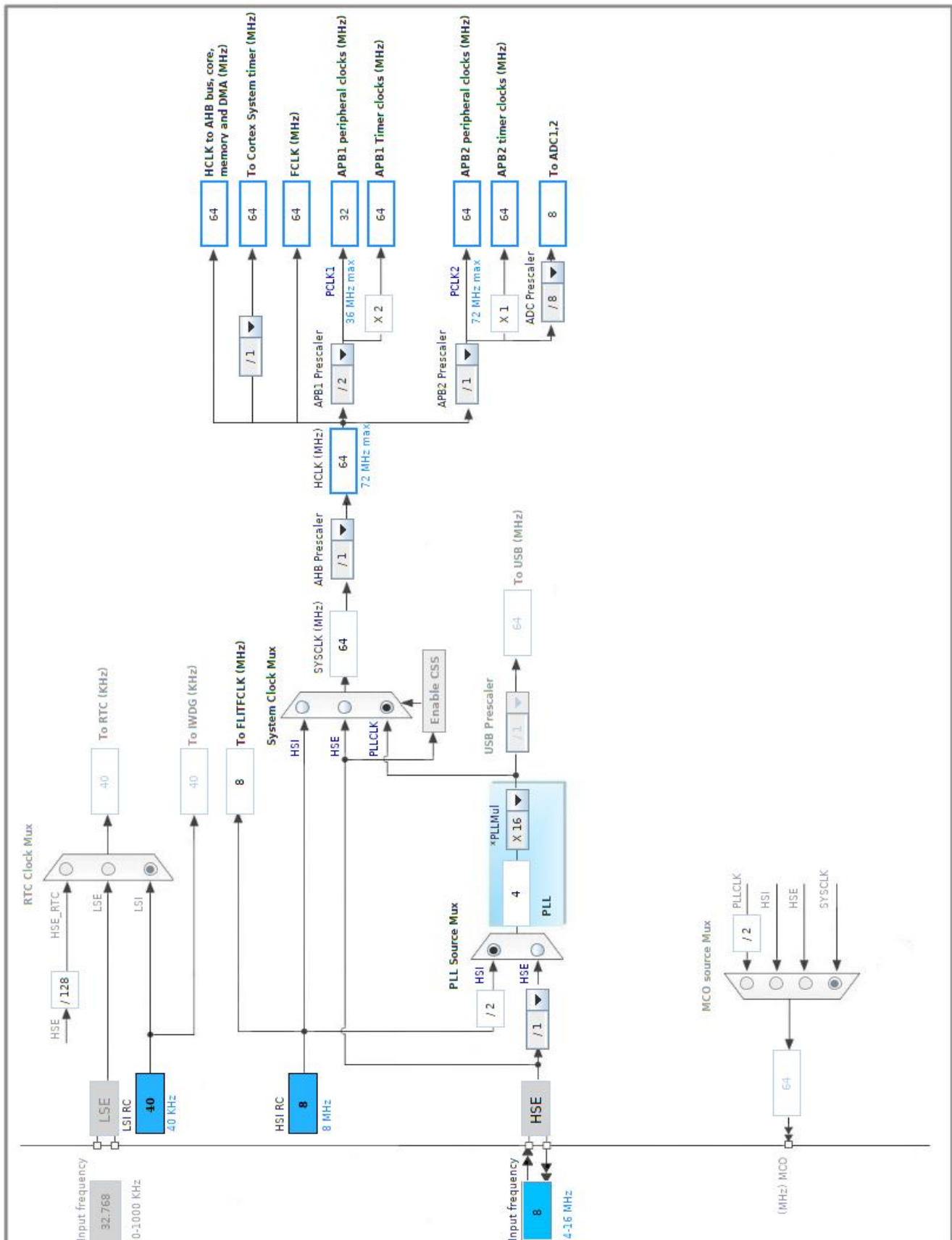
3. Pins Configuration

Pin Number LQFP48	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
2	PC13-TAMPER-RTC *	I/O	GPIO_Input	PUSH_BTN_1
3	PC14-OSC32_IN *	I/O	GPIO_Input	PUSH_BTN_2
4	PC15-OSC32_OUT *	I/O	GPIO_Input	PUSH_BTN_3
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	ADC1_IN0	VOL_ADC1_IN0
11	PA1	I/O	ADC1_IN1	VOL_ADC1_IN1
12	PA2	I/O	ADC1_IN2	VOL_ADC1_IN2
13	PA3 *	I/O	GPIO_Output	ISD_GPIO_OUTPUT
14	PA4	I/O	SPI1_NSS	ISD_SPI1_NSS
15	PA5	I/O	SPI1_SCK	ISD_SPI1_SCK
16	PA6	I/O	SPI1_MISO	ISD_SPI1_MISO
17	PA7	I/O	SPI1_MOSI	ISD_SPI1_MOSI
18	PB0 *	I/O	GPIO_Input	ISD_INT_INPUT
19	PB1 *	I/O	GPIO_Output	FV1_CODE_L
20	PB2 *	I/O	GPIO_Output	FV1_CODE_C
21	PB10 *	I/O	GPIO_Output	FV1_CODE_B
22	PB11 *	I/O	GPIO_Output	FV1_CODE_A
23	VSS	Power		
24	VDD	Power		
25	PB12 *	I/O	GPIO_Output	LCD_CS
26	PB13 *	I/O	GPIO_Output	LCD_SCK
27	PB14 *	I/O	GPIO_Output	LCD_A0
28	PB15 *	I/O	GPIO_Output	LCD_DATA
29	PA8 *	I/O	GPIO_Output	LCD_RESET
30	PA9	I/O	TIM1_CH2	VOL_TIM1_CH2
31	PA10	I/O	TIM1_CH3	VOL_TIM1_CH3
32	PA11	I/O	TIM1_CH4	VOL_TIM1_CH4
33	PA12 *	I/O	GPIO_Output	LED_STATUS
34	PA13	I/O	SYS_JTMS-SWDIO	
35	VSS	Power		
36	VDD	Power		

Pin Number LQFP48	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
37	PA14	I/O	SYS_JTCK-SWCLK	
39	PB3	I/O	SYS_JTDO-TRACESWO	
41	PB5 *	I/O	GPIO_Input	PUSH_BTN_ENC
42	PB6	I/O	TIM4_CH1	ENC_TIM4_CH1
43	PB7	I/O	TIM4_CH2	ENC_TIM4_CH2
44	BOOT0	Boot		
45	PB8 *	I/O	GPIO_Output	FV1_EEP2
46	PB9 *	I/O	GPIO_Output	FV1_EEP1
47	VSS	Power		
48	VDD	Power		

* The pin is affected with an I/O function

4. Clock Tree Configuration



5. IPs and Middleware Configuration

5.1. ADC1

mode: IN0

mode: IN1

mode: IN2

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 **3 ***

External Trigger Conversion Source Regular Conversion launched by software

Rank 1

Channel Channel 0

Sampling Time 1.5 Cycles

Rank **2 ***

Channel **Channel 1 ***

Sampling Time 1.5 Cycles

Rank **3 ***

Channel **Channel 2 ***

Sampling Time 1.5 Cycles

ADC_Injected_ConversionMode:

Number Of Conversions 0

WatchDog:

Enable Analog WatchDog Mode false

5.2. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

5.2.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Prefetch Buffer	Enabled
Flash Latency(WS)	2 WS (3 CPU cycle)

RCC Parameters:

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

5.3. SPI1

Mode: Full-Duplex Master

Hardware NSS Signal: Hardware NSS Input Signal

5.3.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	16 *
Baud Rate	4.0 MBits/s *
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Input Hardware

5.4. SYS

Debug: Trace Asynchronous Sw

Timebase Source: SysTick

5.5. TIM1

Channel2: PWM Generation CH2

Channel3: PWM Generation CH3

Channel4: PWM Generation CH4

5.5.1. 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)

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 2:

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

PWM Generation Channel 3:

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

PWM Generation Channel 4:

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

5.6. TIM2

Clock Source : Internal Clock

5.6.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	63 *
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	1000 *
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)

5.7. TIM4

Combined Channels: Encoder Mode

5.7.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	4 *
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	20 *
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)

Encoder:

Encoder Mode	Encoder Mode T11
____ Parameters for Channel 1 ____	
Polarity	Falling Edge *
IC Selection	Direct
Prescaler Division Ratio	No division
Input Filter	0
____ Parameters for Channel 2 ____	

Polarity	Rising Edge
IC Selection	Direct
Prescaler Division Ratio	No division
Input Filter	0

*** 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	PA0-WKUP	ADC1_IN0	Analog mode	n/a	n/a	VOL_ADC1_IN0
	PA1	ADC1_IN1	Analog mode	n/a	n/a	VOL_ADC1_IN1
	PA2	ADC1_IN2	Analog mode	n/a	n/a	VOL_ADC1_IN2
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	PA4	SPI1_NSS	Input mode	No pull-up and no pull-down	n/a	ISD_SPI1_NSS
	PA5	SPI1_SCK	Alternate Function Push Pull	n/a	High *	ISD_SPI1_SCK
	PA6	SPI1_MISO	Input mode	No pull-up and no pull-down	n/a	ISD_SPI1_MISO
	PA7	SPI1_MOSI	Alternate Function Push Pull	n/a	High *	ISD_SPI1_MOSI
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
	PB3	SYS_JTDO-TRACESWO	n/a	n/a	n/a	
TIM1	PA9	TIM1_CH2	Alternate Function Push Pull	n/a	Low	VOL_TIM1_CH2
	PA10	TIM1_CH3	Alternate Function Push Pull	n/a	Low	VOL_TIM1_CH3
	PA11	TIM1_CH4	Alternate Function Push Pull	n/a	Low	VOL_TIM1_CH4
TIM4	PB6	TIM4_CH1	Input mode	No pull-up and no pull-down	n/a	ENC_TIM4_CH1
	PB7	TIM4_CH2	Input mode	No pull-up and no pull-down	n/a	ENC_TIM4_CH2
GPIO	PC13-TAMPER-RTC	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	PUSH_BTN_1
	PC14-OSC32_IN	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	PUSH_BTN_2
	PC15-OSC32_OUT	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	PUSH_BTN_3
	PA3	GPIO_Output	Output Push Pull	n/a	Low	ISD_GPIO_OUTPUT
	PB0	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	ISD_INT_INPUT
	PB1	GPIO_Output	Output Push Pull	n/a	Low	FV1_CODE_L
	PB2	GPIO_Output	Output Push Pull	n/a	Low	FV1_CODE_C
	PB10	GPIO_Output	Output Push Pull	n/a	Low	FV1_CODE_B
	PB11	GPIO_Output	Output Push Pull	n/a	Low	FV1_CODE_A
	PB12	GPIO_Output	Output Push Pull	n/a	Low	LCD_CS

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PB13	GPIO_Output	Output Push Pull	n/a	Low	LCD_SCK
	PB14	GPIO_Output	Output Push Pull	n/a	Low	LCD_A0
	PB15	GPIO_Output	Output Push Pull	n/a	Low	LCD_DATA
	PA8	GPIO_Output	Output Push Pull	n/a	Low	LCD_RESET
	PA12	GPIO_Output	Output Push Pull	n/a	Low	LED_STATUS
	PB5	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	PUSH_BTN_ENC
	PB8	GPIO_Output	Output Push Pull	n/a	Low	FV1_EEP2
	PB9	GPIO_Output	Output Push Pull	n/a	Low	FV1_EEP1

6.2. DMA configuration

DMA request	Stream	Direction	Priority
ADC1	DMA1_Channel1	Peripheral To Memory	High *

ADC1: DMA1_Channel1 DMA request Settings:

Mode: **Circular ***
Peripheral Increment: Disable
Memory Increment: **Enable ***
Peripheral Data Width: **Word ***
Memory Data Width: **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
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		
TIM4 global interrupt	unused		
SPI1 global interrupt	unused		

* User modified value

7. Power Consumption Calculator report

7.1. Microcontroller Selection

Series	STM32F1
Line	STM32F103
MCU	STM32F103C8Tx
Datasheet	13587_Rev17

7.2. Parameter Selection

Temperature	25
Vdd	3.3

8. Software Pack Report

9. Software Project

9.1. Project Settings

Name	Value
Project Name	mus_proj
Project Folder	/home/sam/w/musavi/mus_proj
Toolchain / IDE	SW4STM32
Firmware Package Name and Version	STM32Cube FW_F1 V1.6.1

9.2. 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