1. Description

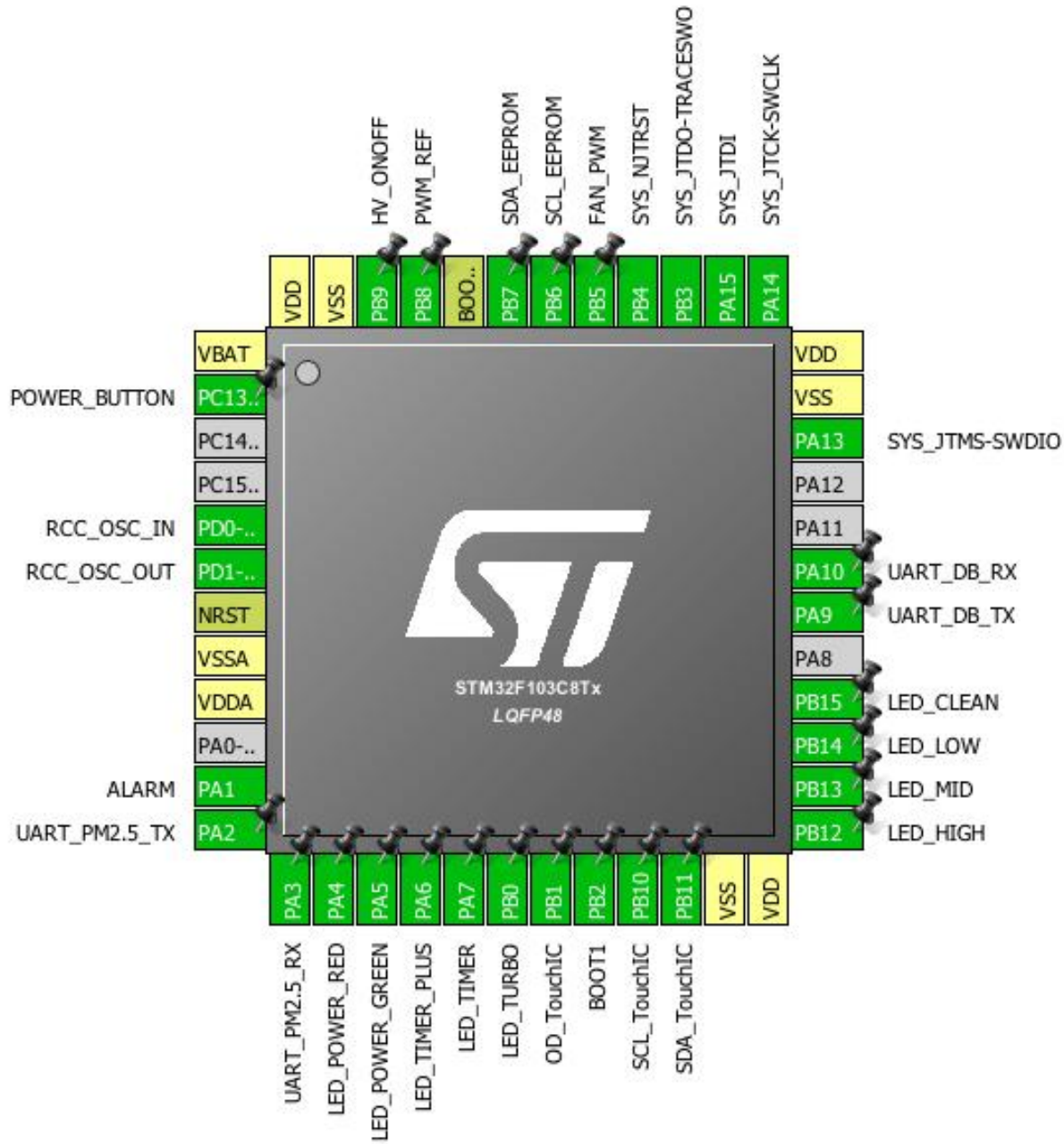
1.1. Project

Project Name	AP388
Board Name	AP388
Generated with:	STM32CubeMX 4.25.1
Date	05/21/2018

1.2. MCU

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

2. Pinout Configuration



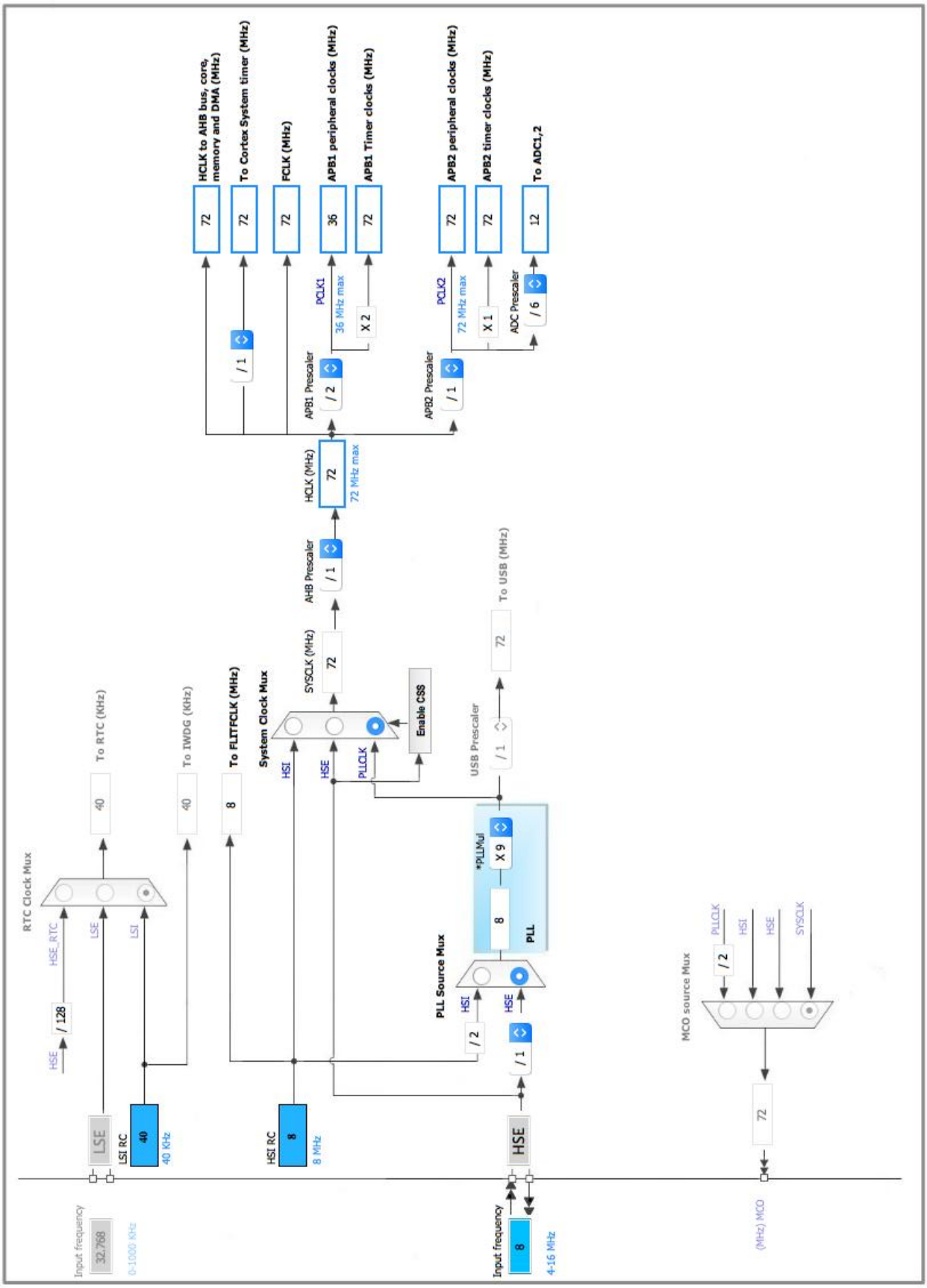
3. Pins Configuration

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	POWER_BUTTON
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		
11	PA1	I/O	ADC1_IN1	ALARM
12	PA2	I/O	USART2_TX	UART_PM2.5_TX
13	PA3	I/O	USART2_RX	UART_PM2.5_RX
14	PA4 *	I/O	GPIO_Output	LED_POWER_RED
15	PA5 *	I/O	GPIO_Output	LED_POWER_GREEN
16	PA6 *	I/O	GPIO_Output	LED_TIMER_PLUS
17	PA7 *	I/O	GPIO_Output	LED_TIMER
18	PB0 *	I/O	GPIO_Output	LED_TURBO
19	PB1 *	I/O	GPIO_Input	OD_TouchIC
20	PB2 *	I/O	GPIO_Input	BOOT1
21	PB10	I/O	I2C2_SCL	SCL_TouchIC
22	PB11	I/O	I2C2_SDA	SDA_TouchIC
23	VSS	Power		
24	VDD	Power		
25	PB12 *	I/O	GPIO_Output	LED_HIGH
26	PB13 *	I/O	GPIO_Output	LED_MID
27	PB14 *	I/O	GPIO_Output	LED_LOW
28	PB15 *	I/O	GPIO_Output	LED_CLEAN
30	PA9	I/O	USART1_TX	UART_DB_TX
31	PA10	I/O	USART1_RX	UART_DB_RX
34	PA13	I/O	SYS_JTMS-SWDIO	
35	VSS	Power		
36	VDD	Power		
37	PA14	I/O	SYS_JTCK-SWCLK	
38	PA15	I/O	SYS_JTDI	
39	PB3	I/O	SYS_JTDO-TRACESWO	
40	PB4	I/O	SYS_NJTRST	
41	PB5	I/O	TIM3_CH2	FAN_PWM
42	PB6	I/O	I2C1_SCL	SCL_EEPROM

Pin Number LQFP48	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
43	PB7	I/O	I2C1_SDA	SDA_EEPROM
44	BOOT0	Boot		
45	PB8	I/O	TIM4_CH3	PWM_REF
46	PB9 *	I/O	GPIO_Output	HV_ONOFF
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: IN1

5.1.1. 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 1
Sampling Time	1.5 Cycles

ADC_Injected_ConversionMode:

Number Of Conversions	0

WatchDog:

Enable Analog WatchDog Mode	false

5.2. I2C1

I2C: I2C

5.2.1. 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

5.3. I2C2

I2C: I2C

5.3.1. 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

5.4. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

5.4.1. 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 Timout Value (ms)	100
LSE Startup Timout Value (ms)	5000

5.5. SYS

Debug: JTAG (5 pins)

Timebase Source: TIM2

5.6. TIM3

Channel2: Output Compare CH2

5.6.1. 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)

Output Compare Channel 2:

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

5.7. TIM4

Channel3: Output Compare CH3

5.7.1. 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)

Output Compare Channel 3:

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

5.8. USART1

Mode: Asynchronous

5.8.1. 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

5.9. USART2

Mode: Asynchronous

5.9.1. 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

5.10. FREERTOS

mode: Enabled

5.10.1. Config parameters:

Versions:

FreeRTOS version	9.0.0
CMSIS-RTOS version	1.02

Kernel settings:

USE_PREEMPTION	Enabled
CPU_CLOCK_HZ	SystemCoreClock
TICK_RATE_HZ	1000
MAX_PRIORITIES	7
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

Memory management settings:

Memory Allocation	Dynamic
TOTAL_HEAP_SIZE	3072
Memory Management scheme	heap_4

Hook function related definitions:

USE_IDLE_HOOK	Disabled
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	Disabled

Interrupt nesting behaviour configuration:

LIBRARY_LOWEST_INTERRUPT_PRIORITY	15
LIBRARY_MAX_SYSCALL_INTERRUPT_PRIORITY	5

5.10.2. Include parameters:

Include definitions:

vTaskPrioritySet	Enabled
uxTaskPriorityGet	Enabled
vTaskDelete	Enabled
vTaskCleanUpResources	Disabled
vTaskSuspend	Enabled
vTaskDelayUntil	Disabled
vTaskDelay	Enabled
xTaskGetSchedulerState	Enabled
xTaskResumeFromISR	Enabled
xQueueGetMutexHolder	Disabled
xSemaphoreGetMutexHolder	Disabled
pcTaskGetTaskName	Disabled
uxTaskGetStackHighWaterMark	Disabled
xTaskGetCurrentTaskHandle	Disabled
eTaskGetState	Disabled
xEventGroupSetBitFromISR	Disabled
xTimerPendFunctionCall	Disabled
xTaskAbortDelay	Disabled
xTaskGetHandle	Disabled

*** 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	PA1	ADC1_IN1	Analog mode	n/a	n/a	ALARM
I2C1	PB6	I2C1_SCL	Alternate Function Open Drain	n/a	**High ***	SCL_EEPROM
	PB7	I2C1_SDA	Alternate Function Open Drain	n/a	**High ***	SDA_EEPROM
I2C2	PB10	I2C2_SCL	Alternate Function Open Drain	n/a	**High ***	SCL_TouchIC
	PB11	I2C2_SDA	Alternate Function Open Drain	n/a	**High ***	SDA_TouchIC
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	
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
	PA15	SYS_JTDI	n/a	n/a	n/a	
	PB3	SYS_JTDO-TRACESWO	n/a	n/a	n/a	
	PB4	SYS_NJTRST	n/a	n/a	n/a	
TIM3	PB5	TIM3_CH2	Alternate Function Push Pull	n/a	Low	FAN_PWM
TIM4	PB8	TIM4_CH3	Alternate Function Push Pull	n/a	Low	PWM_REF
USART1	PA9	USART1_TX	Alternate Function Push Pull	n/a	**High ***	UART_DB_TX
	PA10	USART1_RX	Input mode	No pull-up and no pull-down	**n/a**	UART_DB_RX
USART2	PA2	USART2_TX	Alternate Function Push Pull	n/a	**High ***	UART_PM2.5_TX
	PA3	USART2_RX	Input mode	No pull-up and no pull-down	**n/a**	UART_PM2.5_RX
GPIO	PC13-TAMPER-RTC	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	POWER_BUTTON
	PA4	GPIO_Output	Output Push Pull	n/a	Low	LED_POWER_RED
	PA5	GPIO_Output	Output Push Pull	n/a	Low	LED_POWER_GREEN
	PA6	GPIO_Output	Output Push Pull	n/a	Low	LED_TIMER_PLUS
	PA7	GPIO_Output	Output Push Pull	n/a	Low	LED_TIMER
	PB0	GPIO_Output	Output Push Pull	n/a	Low	LED_TURBO

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PB1	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	OD_TouchIC
	PB2	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	BOOT1
	PB12	GPIO_Output	Output Push Pull	n/a	Low	LED_HIGH
	PB13	GPIO_Output	Output Push Pull	n/a	Low	LED_MID
	PB14	GPIO_Output	Output Push Pull	n/a	Low	LED_LOW
	PB15	GPIO_Output	Output Push Pull	n/a	Low	LED_CLEAN
	PB9	GPIO_Output	Output Push Pull	n/a	Low	HV_ONOFF

6.2. DMA configuration

nothing configured in DMA service

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	15	0
System tick timer	true	15	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		
TIM3 global interrupt	unused		
TIM4 global interrupt	unused		
I2C1 event interrupt	unused		
I2C1 error interrupt	unused		
I2C2 event interrupt	unused		
I2C2 error interrupt	unused		
USART1 global interrupt	unused		
USART2 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	AP388
Project Folder	/Users/rockdeng/Embedded_projects/AP388-Cube/AP388
Toolchain / IDE	MDK-ARM V5
Firmware Package Name and Version	STM32Cube FW_F1 V1.6.1

9.2. 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