



## 1. Description

### 1.1. Project

Project Name	PTMv1
Board Name	custom
Generated with:	STM32CubeMX 6.2.1
Date	06/16/2021

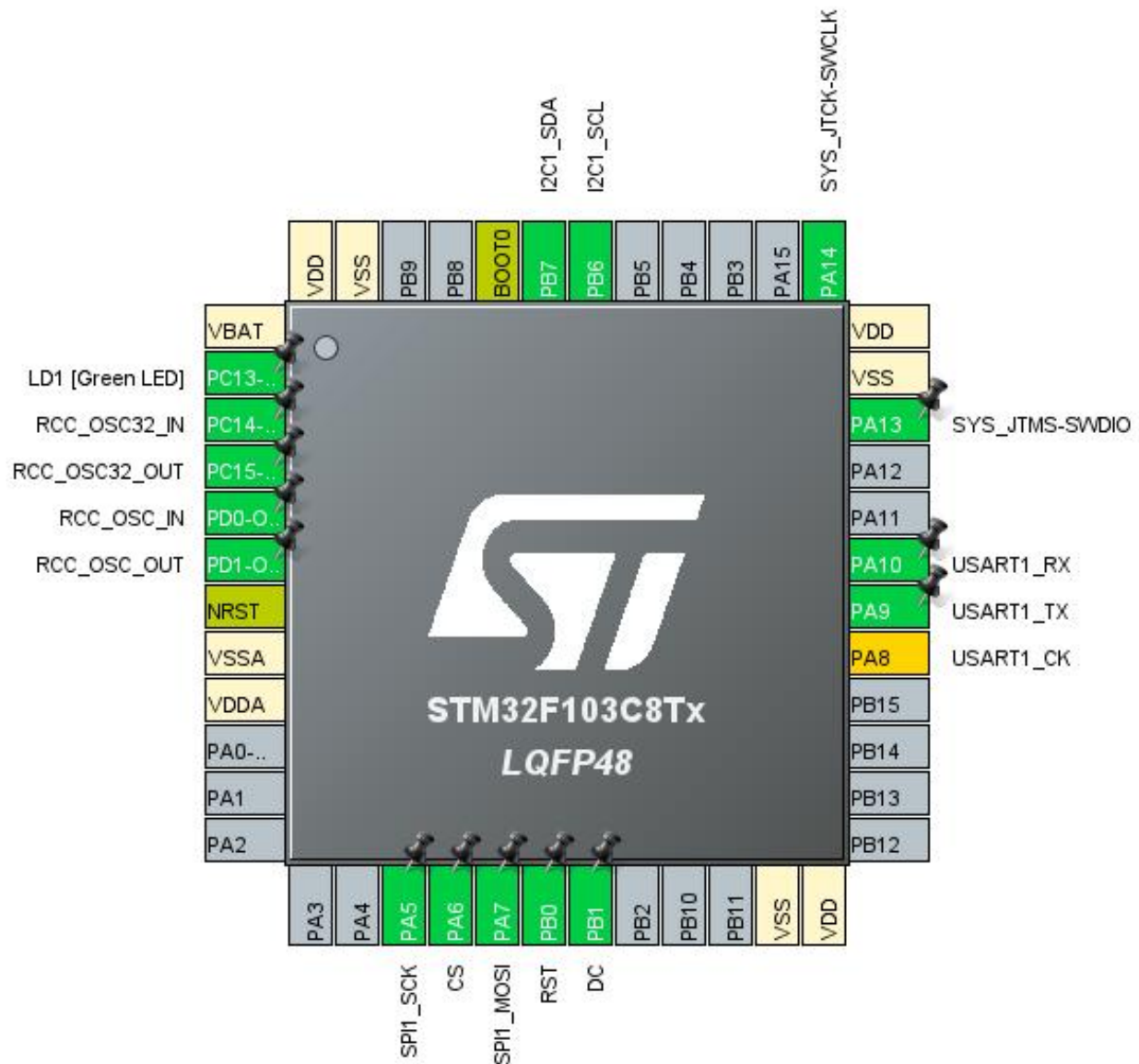
### 1.2. MCU

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

### 1.3. Core(s) information

Core(s)	Arm Cortex-M3
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## 2. Pinout Configuration



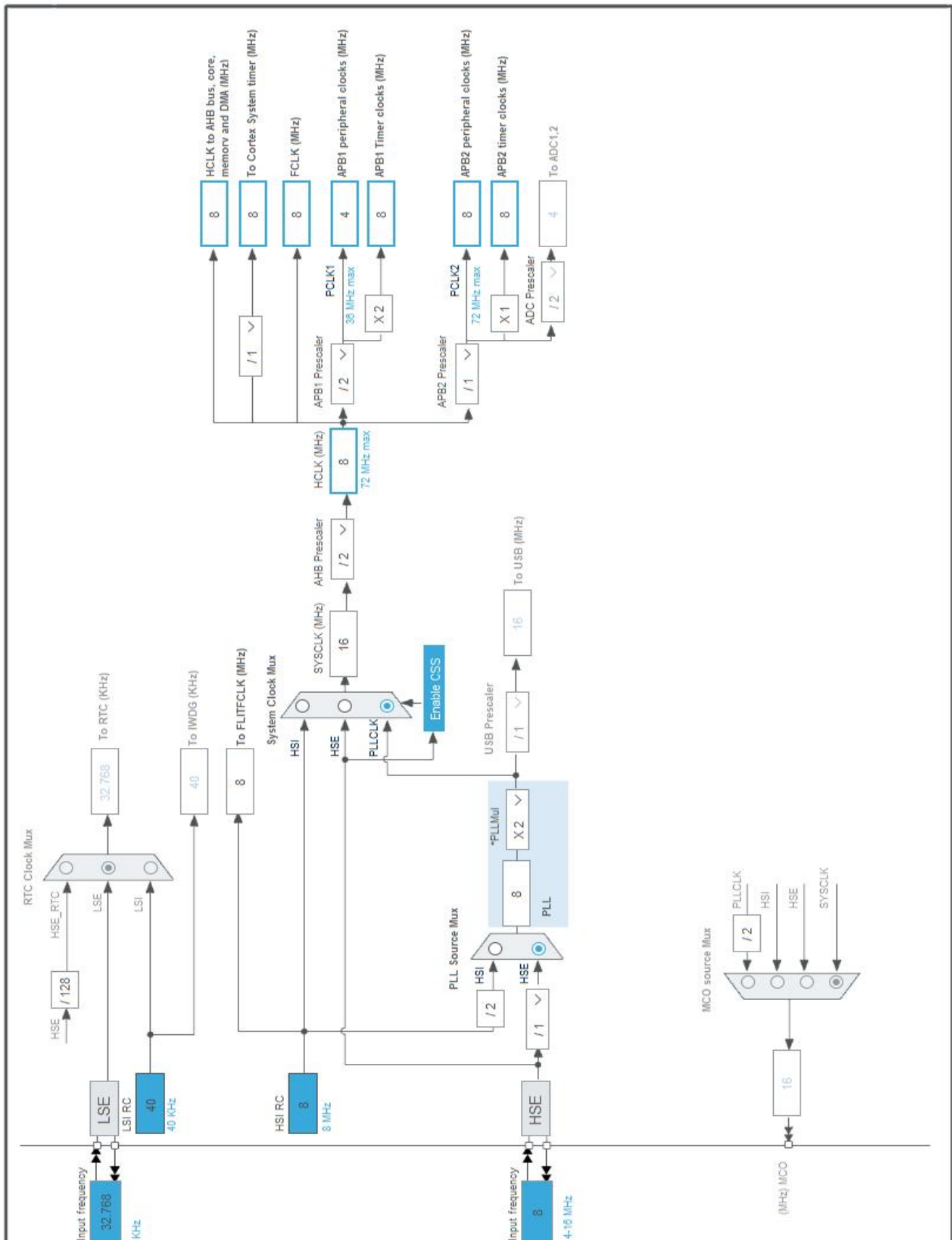
### 3. Pins Configuration

Pin Number LQFP48	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
2	PC13-TAMPER-RTC *	I/O	GPIO_Output	LD1 [Green LED]
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		
8	VSSA	Power		
9	VDDA	Power		
15	PA5	I/O	SPI1_SCK	
16	PA6 *	I/O	GPIO_Output	CS
17	PA7	I/O	SPI1_MOSI	
18	PB0 *	I/O	GPIO_Output	RST
19	PB1 *	I/O	GPIO_Output	DC
23	VSS	Power		
24	VDD	Power		
29	PA8 **	I/O	USART1_CK	
30	PA9	I/O	USART1_TX	
31	PA10	I/O	USART1_RX	
34	PA13	I/O	SYS_JTMS-SWDIO	
35	VSS	Power		
36	VDD	Power		
37	PA14	I/O	SYS_JTCK-SWCLK	
42	PB6	I/O	I2C1_SCL	
43	PB7	I/O	I2C1_SDA	
44	BOOT0	Boot		
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	PTMv1
Project Folder	C:\Users\Damian\STM32CubeIDE\PTM\PTMv1
Toolchain / IDE	STM32CubeIDE
Firmware Package Name and Version	STM32Cube FW_F1 V1.8.4
Application Structure	Advanced
Generate Under Root	Yes
Do not generate the main()	No
Minimum Heap Size	0x200
Minimum Stack Size	0x400

### 5.2. Code Generation Settings

Name	Value
STM32Cube MCU packages and embedded software	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
Keep User Code when re-generating	Yes
Delete previously generated files when not re-generated	Yes
Set all free pins as analog (to optimize the power consumption)	No
Enable Full Assert	No

### 5.3. Advanced Settings - Generated Function Calls

Rank	Function Name	Peripheral Instance Name
1	MX_GPIO_Init	GPIO
2	SystemClock_Config	RCC
3	MX_I2C1_Init	I2C1
4	MX_USART1_UART_Init	USART1
5	MX_SPI1_Init	SPI1
6	MX_TIM1_Init	TIM1

## 6. Power Consumption Calculator report

### 6.1. Microcontroller Selection

Series	STM32F1
Line	STM32F103
MCU	STM32F103C8Tx
Datasheet	DS5319_Rev17

### 6.2. Parameter Selection

Temperature	25
Vdd	3.3

### 6.3. Battery Selection

Battery	Li-SOCL2(A3400)
Capacity	3400.0 mAh
Self Discharge	0.08 %/month
Nominal Voltage	3.6 V
Max Cont Current	100.0 mA
Max Pulse Current	200.0 mA
Cells in series	1
Cells in parallel	1

#### 6.4. Sequence

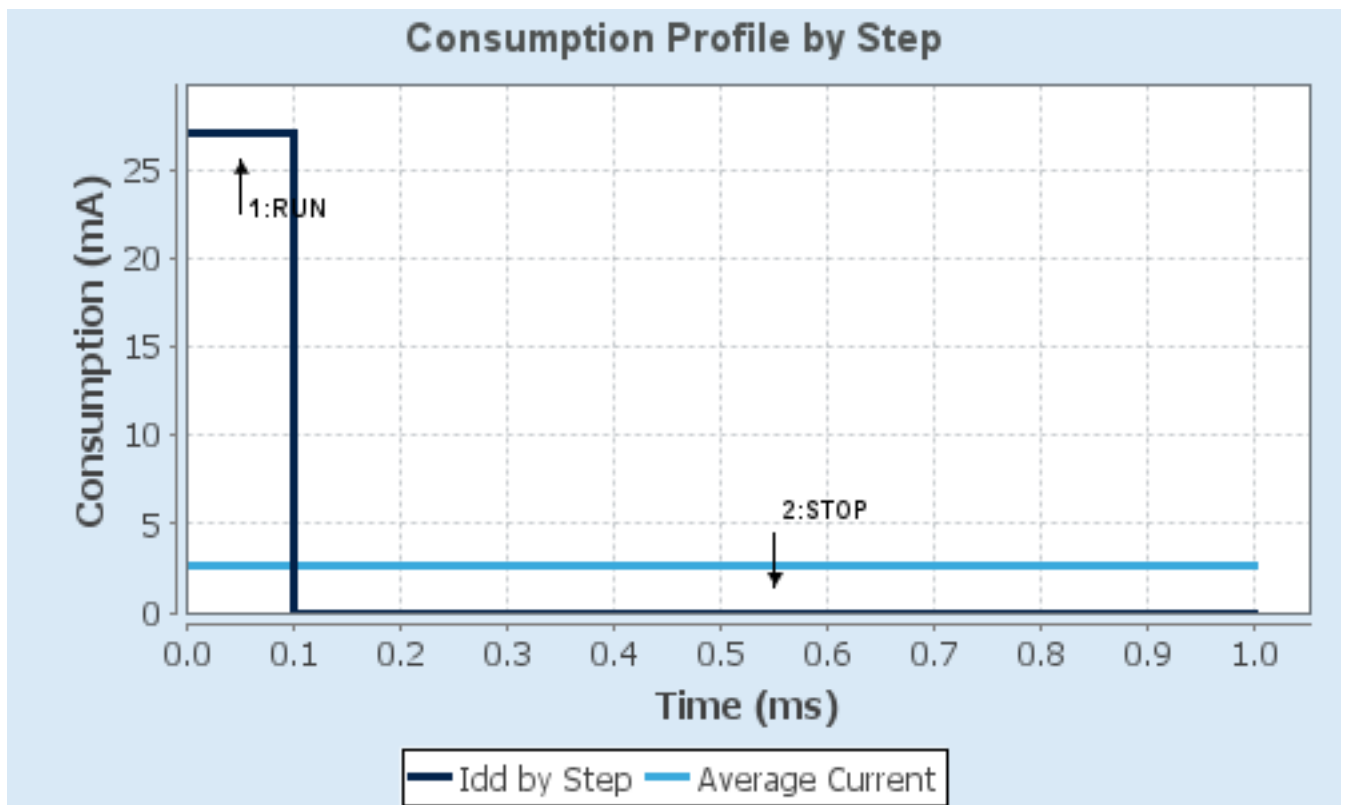
<b>Step</b>	Step1	Step2
<b>Mode</b>	RUN	STOP
<b>Vdd</b>	3.3	3.3
<b>Voltage Source</b>	Battery	Battery
<b>Range</b>	No Scale	No Scale
<b>Fetch Type</b>	FLASH	n/a
<b>CPU Frequency</b>	72 MHz	0 Hz
<b>Clock Configuration</b>	HSE PLL	Regulator LP
<b>Clock Source Frequency</b>	8 MHz	0 Hz
<b>Peripherals</b>		
<b>Additional Cons.</b>	0 mA	0 mA
<b>Average Current</b>	27 mA	14 $\mu$ A
<b>Duration</b>	0.1 ms	0.9 ms
<b>DMIPS</b>	90.0	0.0
<b>Ta Max</b>	100.1	105
<b>Category</b>	In DS Table	In DS Table

#### 6.5. Results

Sequence Time	1 ms	Average Current	2.71 mA
Battery Life	1 month, 21 days, 17 hours	Average DMIPS	61.0 DMIPS

#### 6.6. Chart





## 7. Peripherals and Middlewares 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

#### Low Speed Clock (LSE) : Crystal/Ceramic Resonator

##### 7.2.1. Parameter Settings:

###### System Parameters:

VDD voltage (V)	3.3
Prefetch Buffer	Enabled
Flash Latency(WS)	0 WS (1 CPU cycle)

###### RCC Parameters:

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

### 7.3. SPI1

#### Mode: Transmit Only Master

##### 7.3.1. Parameter Settings:

###### Basic Parameters:

Frame Format	Motorola
Data Size	8 Bits

First Bit	MSB First
<b>Clock Parameters:</b>	
Prescaler (for Baud Rate)	8 *
Baud Rate	1000.0 KBits/s *
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge
<b>Advanced Parameters:</b>	
CRC Calculation	Disabled
NSS Signal Type	Software

## 7.4. SYS

**Debug: Serial Wire**

**Timebase Source: SysTick**

## 7.5. TIM1

**Clock Source : Internal Clock**

### 7.5.1. Parameter Settings:

#### **Counter Settings:**

Prescaler (PSC - 16 bits value)	8000-1 *
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value )	100-1 *
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)

## 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
<b>Advanced Parameters:</b>	
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	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	
SPI1	PA5	SPI1_SCK	Alternate Function Push Pull	n/a	High *	
	PA7	SPI1_MOSI	Alternate Function Push Pull	n/a	High *	
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
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	
Single Mapped Signals	PA8	USART1_CK	Alternate Function Push Pull	n/a	High *	
GPIO	PC13-TAMPER-RTC	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LD1 [Green LED]
	PA6	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	CS
	PB0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	RST
	PB1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DC

### 8.2. DMA configuration

nothing configured in DMA service

### 8.3. NVIC configuration

#### 8.3.1. NVIC

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
TIM1 update interrupt	true	0	0
USART1 global interrupt	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
TIM1 break interrupt	unused		
TIM1 trigger and commutation interrupts	unused		
TIM1 capture compare interrupt	unused		
I2C1 event interrupt	unused		
I2C1 error interrupt	unused		
SPI1 global interrupt	unused		

#### 8.3.2. NVIC Code generation

Enabled interrupt Table	Select for init sequence ordering	Generate IRQ handler	Call HAL handler
Non maskable interrupt	false	true	false
Hard fault interrupt	false	true	false
Memory management fault	false	true	false
Prefetch fault, memory access fault	false	true	false
Undefined instruction or illegal state	false	true	false
System service call via SWI instruction	false	true	false
Debug monitor	false	true	false
Pendable request for system service	false	true	false
System tick timer	false	true	true
TIM1 update interrupt	true	true	true
USART1 global interrupt	false	true	true

**\* User modified value**

## 9. System Views

### 9.1. Category view

#### 9.1.1. Current

#### Middleware

#### System Core

#### Analog

#### Timers

#### Connectivity

#### Computing

DMA

TIM1 

I2C1 

GPIO 

SPI1 

IVIC 

USART1 

RCC 

SYS 



## 10. Docs & Resources

Type	Link
Datasheet	<a href="http://www.st.com/resource/en/datasheet/CD00161566.pdf">http://www.st.com/resource/en/datasheet/CD00161566.pdf</a>
Reference manual	<a href="http://www.st.com/resource/en/reference_manual/CD00171190.pdf">http://www.st.com/resource/en/reference_manual/CD00171190.pdf</a>
Programming manual	<a href="http://www.st.com/resource/en/programming_manual/CD00228163.pdf">http://www.st.com/resource/en/programming_manual/CD00228163.pdf</a>
Programming manual	<a href="http://www.st.com/resource/en/programming_manual/CD00283419.pdf">http://www.st.com/resource/en/programming_manual/CD00283419.pdf</a>
Errata sheet	<a href="http://www.st.com/resource/en/errata_sheet/CD00190234.pdf">http://www.st.com/resource/en/errata_sheet/CD00190234.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/CD00160362.pdf">http://www.st.com/resource/en/application_note/CD00160362.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/CD00164185.pdf">http://www.st.com/resource/en/application_note/CD00164185.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/CD00167326.pdf">http://www.st.com/resource/en/application_note/CD00167326.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/CD00167594.pdf">http://www.st.com/resource/en/application_note/CD00167594.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/CD00211314.pdf">http://www.st.com/resource/en/application_note/CD00211314.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/CD00249778.pdf">http://www.st.com/resource/en/application_note/CD00249778.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/CD00259245.pdf">http://www.st.com/resource/en/application_note/CD00259245.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/CD00264321.pdf">http://www.st.com/resource/en/application_note/CD00264321.pdf</a>
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Application note	<a href="http://www.st.com/resource/en/application_note/CD00264379.pdf">http://www.st.com/resource/en/application_note/CD00264379.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/DM00024853.pdf">http://www.st.com/resource/en/application_note/DM00024853.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/DM00032987.pdf">http://www.st.com/resource/en/application_note/DM00032987.pdf</a>
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Application note	<a href="http://www.st.com/resource/en/application_note/DM00073742.pdf">http://www.st.com/resource/en/application_note/DM00073742.pdf</a>
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Application note [http://www.st.com/resource/en/application\\_note/DM00327191.pdf](http://www.st.com/resource/en/application_note/DM00327191.pdf)  
Application note [http://www.st.com/resource/en/application\\_note/DM00354244.pdf](http://www.st.com/resource/en/application_note/DM00354244.pdf)  
Application note [http://www.st.com/resource/en/application\\_note/DM00315319.pdf](http://www.st.com/resource/en/application_note/DM00315319.pdf)  
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