



## 1. Description

### 1.1. Project

Project Name	FW
Board Name	custom
Generated with:	STM32CubeMX 6.0.0
Date	10/14/2020

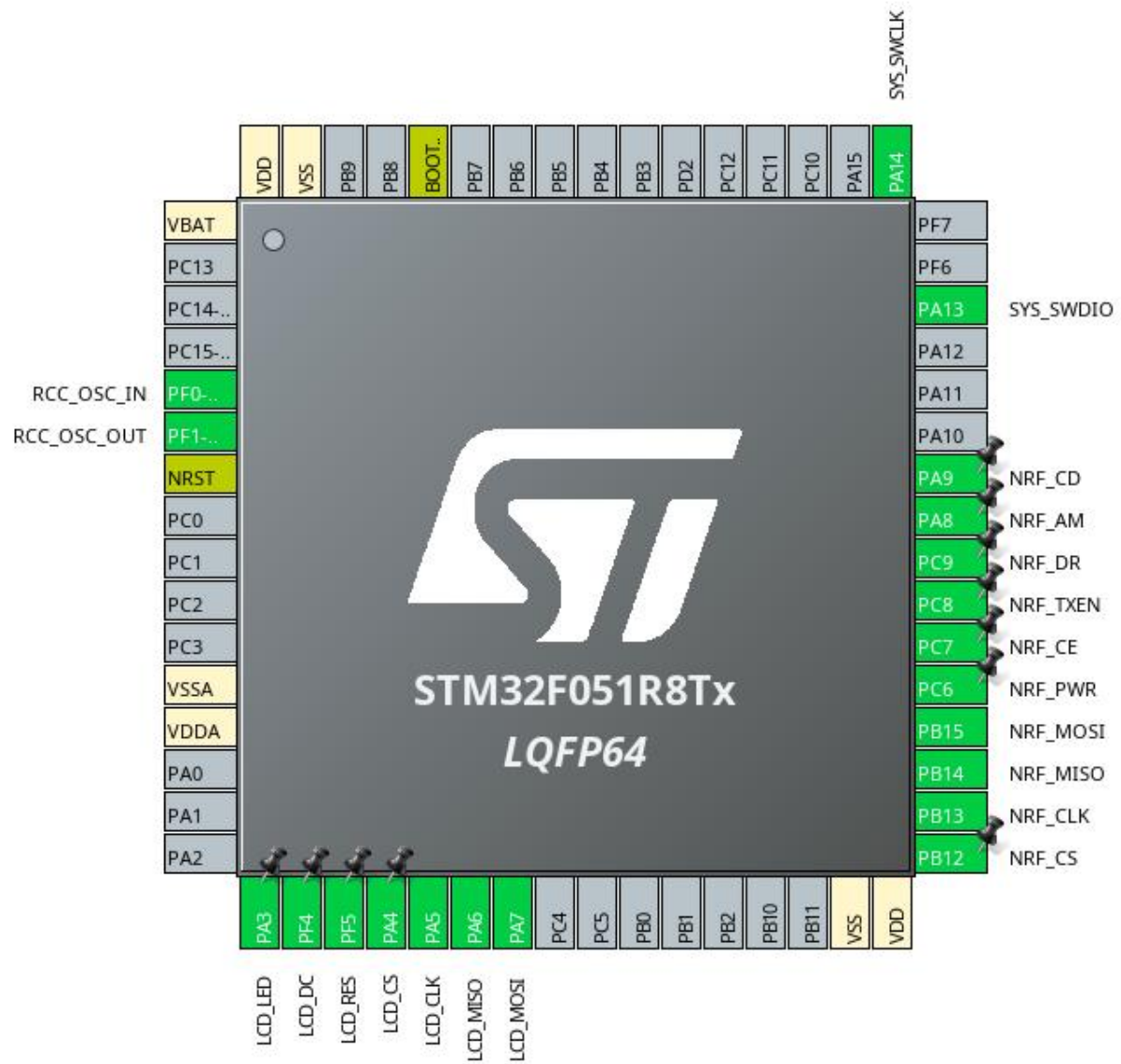
### 1.2. MCU

MCU Series	STM32F0
MCU Line	STM32F0x1
MCU name	STM32F051R8Tx
MCU Package	LQFP64
MCU Pin number	64

### 1.3. Core(s) information

Core(s)	Arm Cortex-M0
---------	---------------

## 2. Pinout Configuration

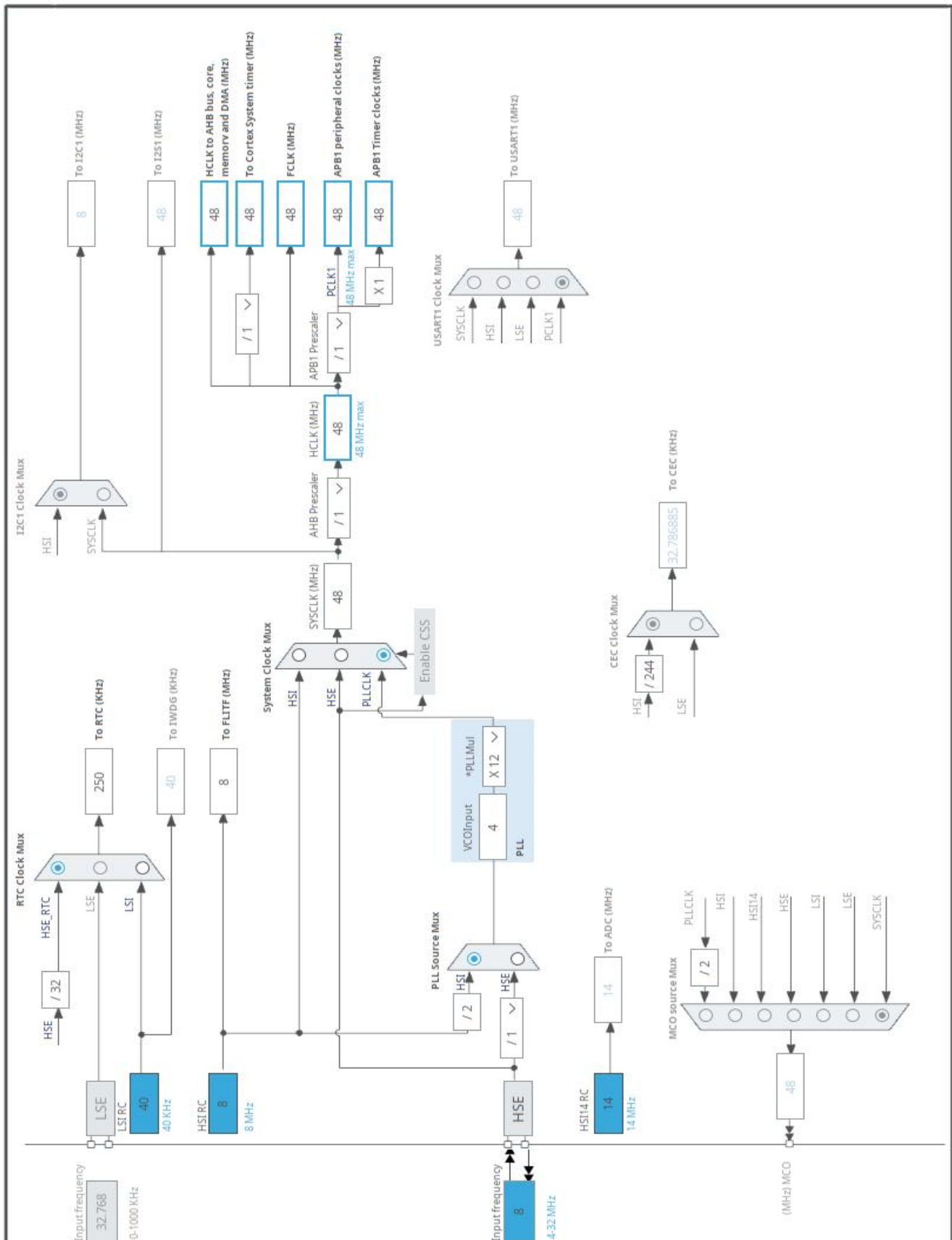


### 3. Pins Configuration

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
5	PF0-OSC_IN	I/O	RCC_OSC_IN	
6	PF1-OSC_OUT	I/O	RCC_OSC_OUT	
7	NRST	Reset		
12	VSSA	Power		
13	VDDA	Power		
17	PA3 *	I/O	GPIO_Output	LCD_LED
18	PF4 *	I/O	GPIO_Output	LCD_DC
19	PF5 *	I/O	GPIO_Output	LCD_RES
20	PA4 *	I/O	GPIO_Output	LCD_CS
21	PA5	I/O	SPI1_SCK	LCD_CLK
22	PA6	I/O	SPI1_MISO	LCD_MISO
23	PA7	I/O	SPI1_MOSI	LCD_MOSI
31	VSS	Power		
32	VDD	Power		
33	PB12 *	I/O	GPIO_Output	NRF_CS
34	PB13	I/O	SPI2_SCK	NRF_CLK
35	PB14	I/O	SPI2_MISO	NRF_MISO
36	PB15	I/O	SPI2_MOSI	NRF_MOSI
37	PC6 *	I/O	GPIO_Output	NRF_PWR
38	PC7 *	I/O	GPIO_Output	NRF_CE
39	PC8 *	I/O	GPIO_Output	NRF_TXEN
40	PC9	I/O	GPIO_EXTI9	NRF_DR
41	PA8 *	I/O	GPIO_Input	NRF_AM
42	PA9 *	I/O	GPIO_Input	NRF_CD
46	PA13	I/O	SYS_SWDIO	
49	PA14	I/O	SYS_SWCLK	
60	BOOT0	Boot		
63	VSS	Power		
64	VDD	Power		

\* The pin is affected with an I/O function

## 4. Clock Tree Configuration



## 5. Software Project

### 5.1. Project Settings

Name	Value
Project Name	FW
Project Folder	/home/maxx/Project/NRF905_SENDER/TEST_RECIVER/FW
Toolchain / IDE	Makefile
Firmware Package Name and Version	STM32Cube FW_F0 V1.11.1
Application Structure	Advanced
Generate Under Root	No
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 all used libraries into the project folder
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	IP Instance Name
1	MX_GPIO_Init	GPIO
2	SystemClock_Config	RCC
3	MX_RTC_Init	RTC
4	MX_SPI1_Init	SPI1
5	MX_SPI2_Init	SPI2

## 6. Power Consumption Calculator report

### 6.1. Microcontroller Selection

Series	STM32F0
Line	STM32F0x1
MCU	STM32F051R8Tx
Datasheet	DS8668_Rev7

### 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

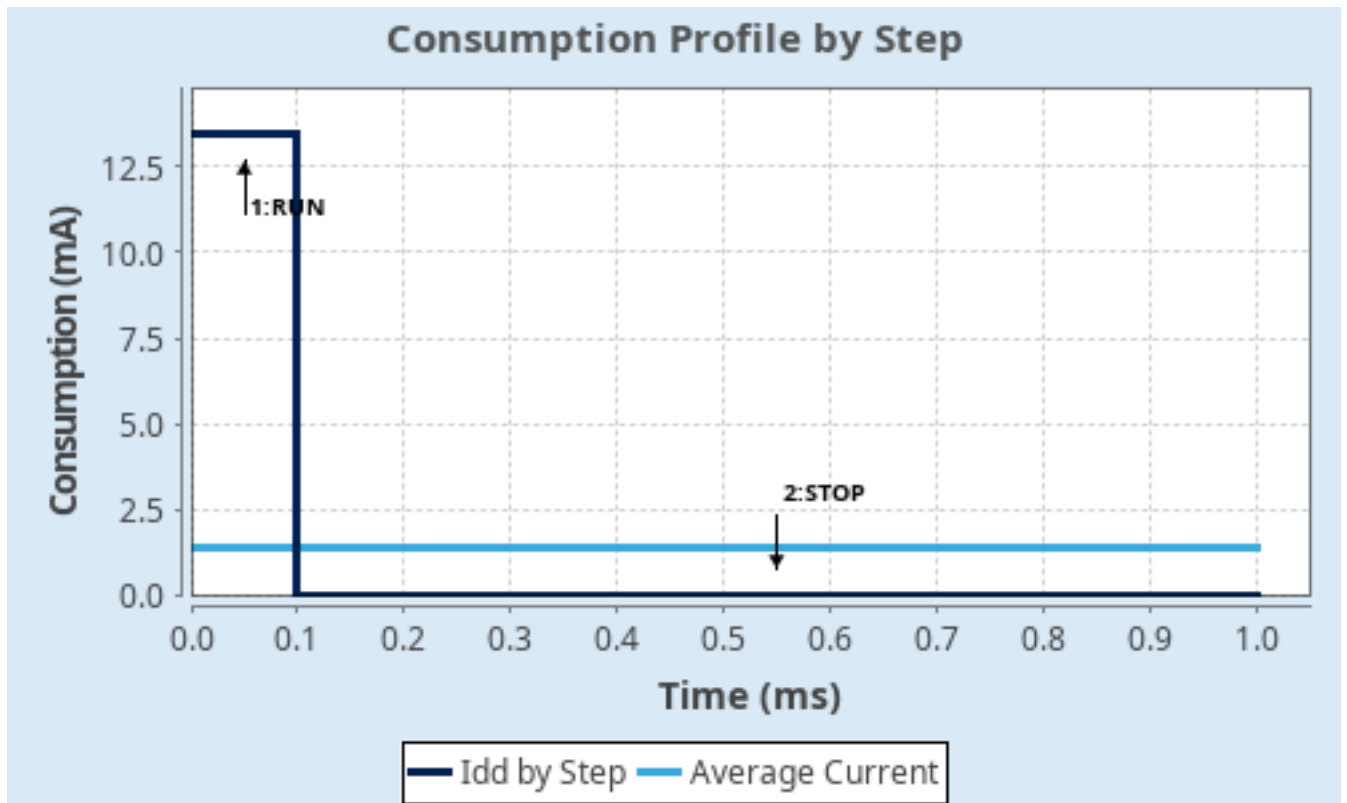
<b>Step</b>	Step1	Step2
<b>Mode</b>	RUN	STOP
<b>Vdd</b>	3.3	3.3
<b>Voltage Source</b>	Battery	Battery
<b>Range</b>	No Scale	No Scale
<b>Fetch Type</b>	FLASH	n/a
<b>CPU Frequency</b>	48 MHz	0 Hz
<b>Clock Configuration</b>	HSE PLL	Regulator LP
<b>Clock Source Frequency</b>	8 MHz	0 Hz
<b>Peripherals</b>		
<b>Additional Cons.</b>	0 mA	0 mA
<b>Average Current</b>	13.45 mA	6.2 $\mu$ A
<b>Duration</b>	0.1 ms	0.9 ms
<b>DMIPS</b>	0.0	0.0
<b>Ta Max</b>	103	105
<b>Category</b>	In DS Table	In DS Table

#### 6.5. Results

Sequence Time	1 ms	Average Current	1.35 mA
Battery Life	3 months, 13 days, 8 hours	Average DMIPS	0.0 DMIPS

#### 6.6. Chart





## 7. IPs and Middleware Configuration

### 7.1. GPIO

### 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 Timeout Value (ms)	100
LSE Startup Timeout Value (ms)	5000

### 7.3. RTC

#### mode: Activate Clock Source

#### mode: Activate Calendar

##### 7.3.1. Parameter Settings:

###### General:

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

###### Calendar Time:

Data Format	BCD data format
Hours	0
Minutes	0
Seconds	0
Day Light Saving: value of hour adjustment	Daylightsaving None
Store Operation	Storeoperation Reset

###### Calendar Date:

Week Day	Monday
Month	January
Date	1
Year	0

## 7.4. SPI1

### Mode: Full-Duplex Master

#### 7.4.1. Parameter Settings:

##### Basic Parameters:

Frame Format	Motorola
Data Size	4 Bits
First Bit	MSB First

##### Clock Parameters:

Prescaler (for Baud Rate)	2
Baud Rate	<b>24.0 MBits/s *</b>
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

##### Advanced Parameters:

CRC Calculation	Disabled
NSSP Mode	Enabled
NSS Signal Type	Software

## 7.5. SPI2

### Mode: Full-Duplex Master

#### 7.5.1. Parameter Settings:

##### Basic Parameters:

Frame Format	Motorola
Data Size	4 Bits
First Bit	MSB First

##### Clock Parameters:

Prescaler (for Baud Rate)	2
Baud Rate	<b>24.0 MBits/s *</b>
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**

**\* User modified value**

## 8. System Configuration

### 8.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
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	PA5	SPI1_SCK	Alternate Function Push Pull	No pull-up and no pull-down	High *	LCD_CLK
	PA6	SPI1_MISO	Alternate Function Push Pull	No pull-up and no pull-down	High *	LCD_MISO
	PA7	SPI1_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	High *	LCD_MOSI
SPI2	PB13	SPI2_SCK	Alternate Function Push Pull	No pull-up and no pull-down	High *	NRF_CLK
	PB14	SPI2_MISO	Alternate Function Push Pull	No pull-up and no pull-down	High *	NRF_MISO
	PB15	SPI2_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	High *	NRF_MOSI
SYS	PA13	SYS_SWDIO	n/a	n/a	n/a	
	PA14	SYS_SWCLK	n/a	n/a	n/a	
GPIO	PA3	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LCD_LED
	PF4	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LCD_DC
	PF5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LCD_RES
	PA4	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LCD_CS
	PB12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	NRF_CS
	PC6	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	NRF_PWR
	PC7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	NRF_CE
	PC8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	NRF_TXEN
	PC9	GPIO_EXTI9	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	NRF_DR
	PA8	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	NRF_AM
	PA9	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	NRF_CD

### 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
System service call via SWI instruction	true	0	0
Pendable request for system service	true	0	0
System tick timer	true	0	0
PVD interrupt through EXTI Line16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
EXTI line 4 to 15 interrupts	unused		
SPI1 global interrupt	unused		
SPI2 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	true	true	false
Hard fault interrupt	true	true	false
System service call via SWI instruction	true	true	false
Pendable request for system service	true	true	false
System tick timer	true	true	true

\* User modified value

## 9. System Views

### 9.1. Category view

#### 9.1.1. Current

#### Middleware

#### System Core

#### Analog

#### Timers

#### Connectivity

#### Multimedia

#### Computing

DMA

RTC 

SPI1 

GPIO 

SPI2 

NVIC 

RCC 

SYS 

## 10. Docs & Resources

Type	Link
Datasheet	<a href="http://www.st.com/resource/en/datasheet/DM00039193.pdf">http://www.st.com/resource/en/datasheet/DM00039193.pdf</a>
Reference manual	<a href="http://www.st.com/resource/en/reference_manual/DM00031936.pdf">http://www.st.com/resource/en/reference_manual/DM00031936.pdf</a>
Programming manual	<a href="http://www.st.com/resource/en/programming_manual/DM00051352.pdf">http://www.st.com/resource/en/programming_manual/DM00051352.pdf</a>
Errata sheet	<a href="http://www.st.com/resource/en/errata_sheet/DM00058837.pdf">http://www.st.com/resource/en/errata_sheet/DM00058837.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/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/CD00264342.pdf">http://www.st.com/resource/en/application_note/CD00264342.pdf</a>
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/DM00025071.pdf">http://www.st.com/resource/en/application_note/DM00025071.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/DM00042534.pdf">http://www.st.com/resource/en/application_note/DM00042534.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/DM00051986.pdf">http://www.st.com/resource/en/application_note/DM00051986.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/DM00052530.pdf">http://www.st.com/resource/en/application_note/DM00052530.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/DM00053084.pdf">http://www.st.com/resource/en/application_note/DM00053084.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/DM00072315.pdf">http://www.st.com/resource/en/application_note/DM00072315.pdf</a>
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>
Application note	<a href="http://www.st.com/resource/en/application_note/DM00080497.pdf">http://www.st.com/resource/en/application_note/DM00080497.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/DM00085385.pdf">http://www.st.com/resource/en/application_note/DM00085385.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/DM00087593.pdf">http://www.st.com/resource/en/application_note/DM00087593.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/DM00129215.pdf">http://www.st.com/resource/en/application_note/DM00129215.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/DM00145318.pdf">http://www.st.com/resource/en/application_note/DM00145318.pdf</a>
Application note	<a href="http://www.st.com/resource/en/application_note/DM00160482.pdf">http://www.st.com/resource/en/application_note/DM00160482.pdf</a>



Application note [http://www.st.com/resource/en/application\\_note/DM00210690.pdf](http://www.st.com/resource/en/application_note/DM00210690.pdf)  
Application note [http://www.st.com/resource/en/application\\_note/DM00220769.pdf](http://www.st.com/resource/en/application_note/DM00220769.pdf)  
Application note [http://www.st.com/resource/en/application\\_note/DM00257177.pdf](http://www.st.com/resource/en/application_note/DM00257177.pdf)  
Application note [http://www.st.com/resource/en/application\\_note/DM00226326.pdf](http://www.st.com/resource/en/application_note/DM00226326.pdf)  
Application note [http://www.st.com/resource/en/application\\_note/DM00236305.pdf](http://www.st.com/resource/en/application_note/DM00236305.pdf)  
Application note [http://www.st.com/resource/en/application\\_note/DM00188145.pdf](http://www.st.com/resource/en/application_note/DM00188145.pdf)  
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/DM00355687.pdf](http://www.st.com/resource/en/application_note/DM00355687.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)  
Application note [http://www.st.com/resource/en/application\\_note/DM00380469.pdf](http://www.st.com/resource/en/application_note/DM00380469.pdf)  
Application note [http://www.st.com/resource/en/application\\_note/DM00395696.pdf](http://www.st.com/resource/en/application_note/DM00395696.pdf)  
Application note [http://www.st.com/resource/en/application\\_note/DM00445657.pdf](http://www.st.com/resource/en/application_note/DM00445657.pdf)  
Application note [http://www.st.com/resource/en/application\\_note/DM00493651.pdf](http://www.st.com/resource/en/application_note/DM00493651.pdf)  
Application note [http://www.st.com/resource/en/application\\_note/DM00483659.pdf](http://www.st.com/resource/en/application_note/DM00483659.pdf)  
Application note [http://www.st.com/resource/en/application\\_note/DM00536349.pdf](http://www.st.com/resource/en/application_note/DM00536349.pdf)