

## 1. Description

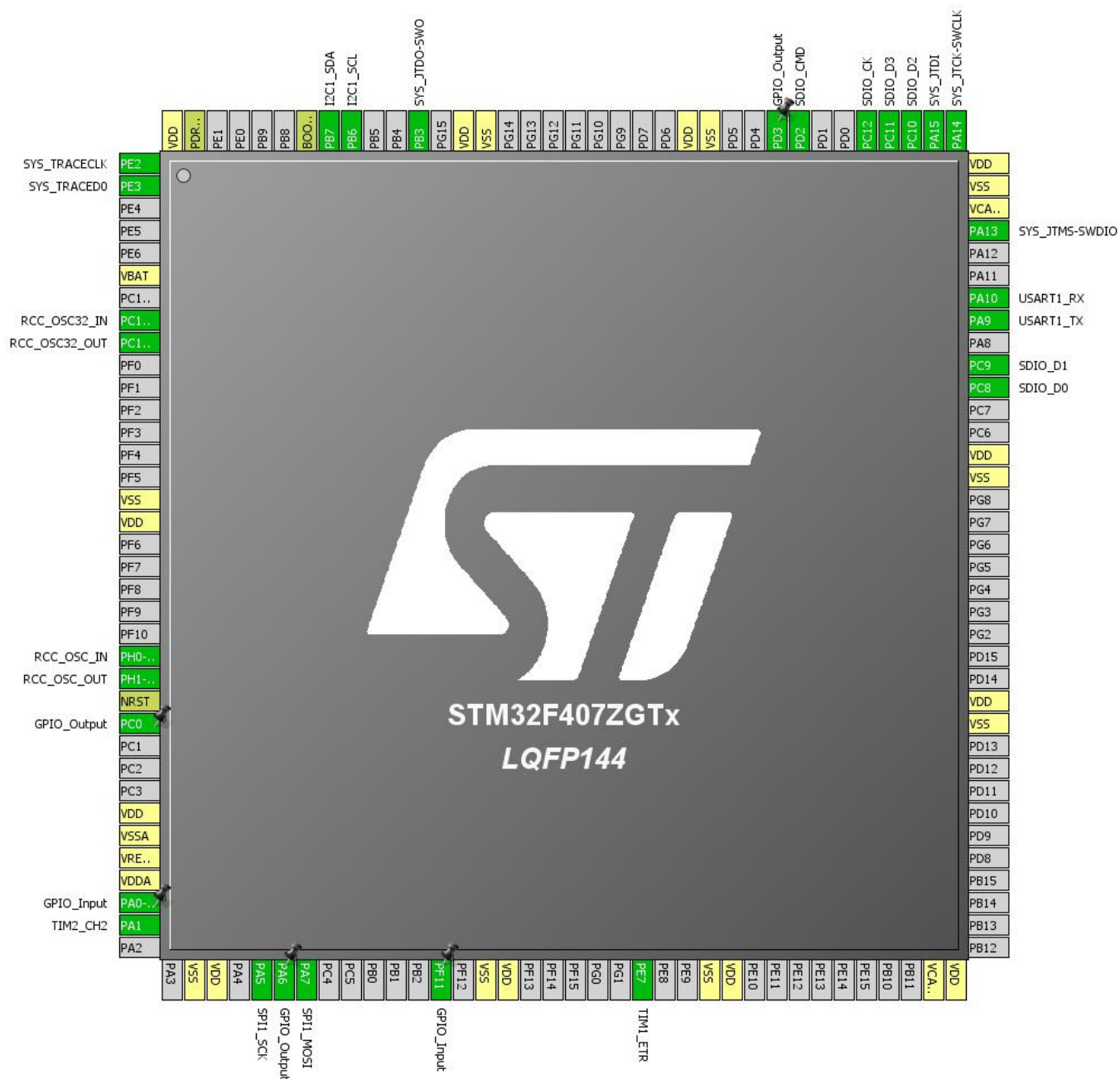
### 1.1. Project

Project Name	SRN-05
Board Name	SRN-05
Generated with:	STM32CubeMX 4.21.0
Date	08/17/2017

### 1.2. MCU

MCU Series	STM32F4
MCU Line	STM32F407/417
MCU name	STM32F407ZGTx
MCU Package	LQFP144
MCU Pin number	144

## 2. Pinout Configuration



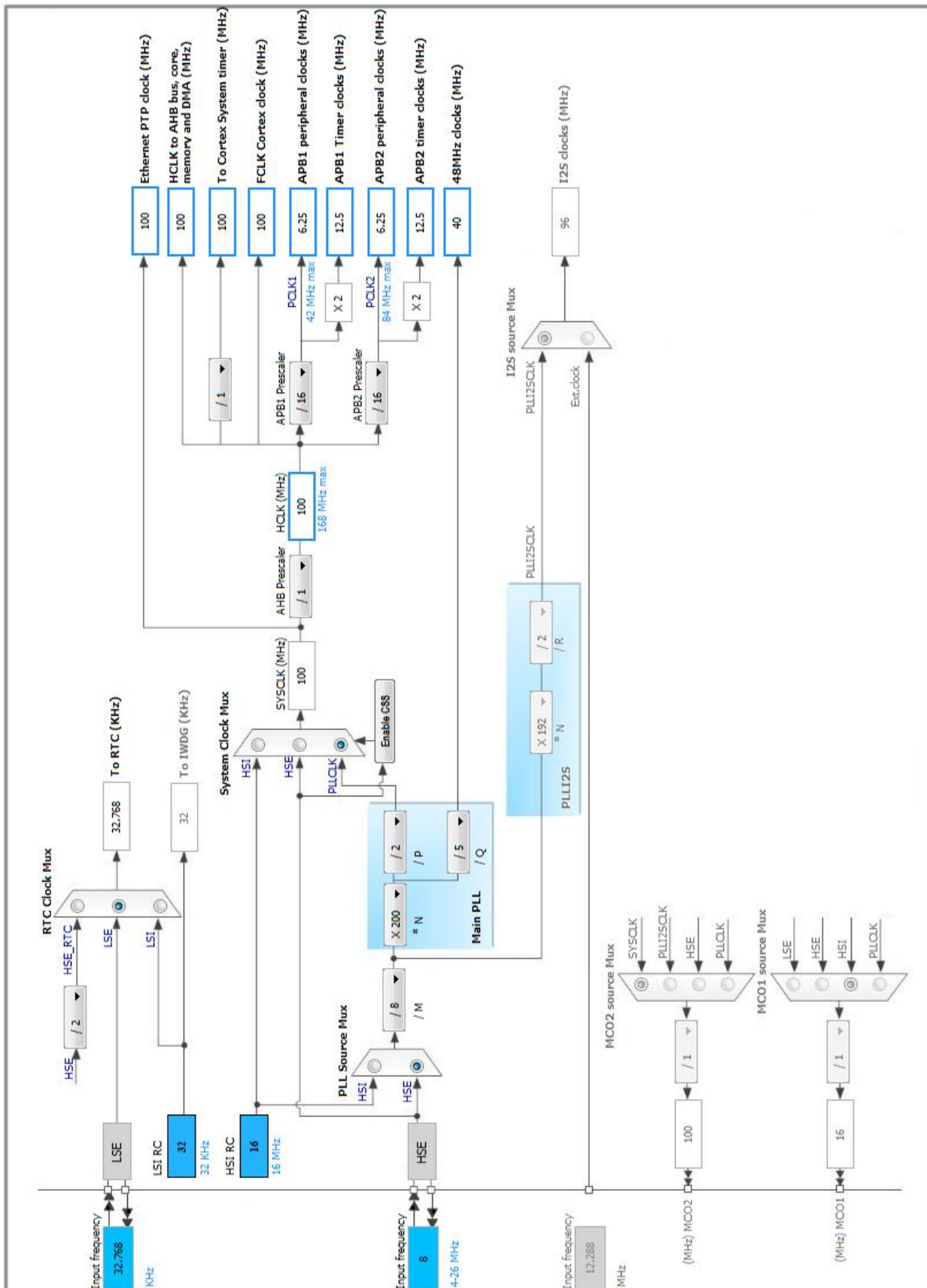
### 3. Pins Configuration

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	PE2	I/O	SYS_TRACECLK	
2	PE3	I/O	SYS_TRACED0	
6	VBAT	Power		
8	PC14-OSC32_IN	I/O	RCC_OSC32_IN	
9	PC15-OSC32_OUT	I/O	RCC_OSC32_OUT	
16	VSS	Power		
17	VDD	Power		
23	PH0-OSC_IN	I/O	RCC_OSC_IN	
24	PH1-OSC_OUT	I/O	RCC_OSC_OUT	
25	NRST	Reset		
26	PC0 *	I/O	GPIO_Output	
30	VDD	Power		
31	VSSA	Power		
32	VREF+	Power		
33	VDDA	Power		
34	PA0-WKUP *	I/O	GPIO_Input	
35	PA1	I/O	TIM2_CH2	
38	VSS	Power		
39	VDD	Power		
41	PA5	I/O	SPI1_SCK	
42	PA6 *	I/O	GPIO_Output	
43	PA7	I/O	SPI1_MOSI	
49	PF11 *	I/O	GPIO_Input	
51	VSS	Power		
52	VDD	Power		
58	PE7	I/O	TIM1_ETR	
61	VSS	Power		
62	VDD	Power		
71	VCAP_1	Power		
72	VDD	Power		
83	VSS	Power		
84	VDD	Power		
94	VSS	Power		
95	VDD	Power		
98	PC8	I/O	SDIO_D0	
99	PC9	I/O	SDIO_D1	

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
101	PA9	I/O	USART1_TX	
102	PA10	I/O	USART1_RX	
105	PA13	I/O	SYS_JTMS-SWDIO	
106	VCAP_2	Power		
107	VSS	Power		
108	VDD	Power		
109	PA14	I/O	SYS_JTCK-SWCLK	
110	PA15	I/O	SYS_JTDI	
111	PC10	I/O	SDIO_D2	
112	PC11	I/O	SDIO_D3	
113	PC12	I/O	SDIO_CK	
116	PD2	I/O	SDIO_CMD	
117	PD3 *	I/O	GPIO_Output	
120	VSS	Power		
121	VDD	Power		
130	VSS	Power		
131	VDD	Power		
133	PB3	I/O	SYS_JTDO-SWO	
136	PB6	I/O	I2C1_SCL	
137	PB7	I/O	I2C1_SDA	
138	BOOT0	Boot		
143	PDR_ON	Reset		
144	VDD	Power		

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

## 4. Clock Tree Configuration



## 5. IPs and Middleware Configuration

### 5.1. I2C1

#### I2C: I2C

##### 5.1.1. 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

### 5.2. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

Low Speed Clock (LSE) : Crystal/Ceramic Resonator

##### 5.2.1. Parameter Settings:

###### System Parameters:

VDD voltage (V)	3.3
Instruction Cache	Enabled
Prefetch Buffer	Enabled
Data Cache	Enabled
Flash Latency(WS)	3 WS (4 CPU cycle)

###### RCC Parameters:

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

###### Power Parameters:

Power Regulator Voltage Scale	Power Regulator Voltage Scale 1
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### 5.3. RTC

mode: Activate Clock Source

mode: Activate Calendar

#### 5.3.1. 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

### 5.4. SDIO

Mode: SD 4 bits Wide bus

#### 5.4.1. Parameter Settings:

##### SDIO parameters:

SDIOCLK clock divide factor	0
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### 5.5. SPI1

## Mode: Transmit Only Master

### 5.5.1. Parameter Settings:

#### Basic Parameters:

Frame Format	Motorola
Data Size	<b>16 Bits *</b>
First Bit	MSB First

#### Clock Parameters:

Prescaler (for Baud Rate)	2
Baud Rate	<b>3.125 MBits/s *</b>
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

#### Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Software

## 5.6. SYS

Debug: JTAG with Trace Synchro(1 bit)

Timebase Source: SysTick

## 5.7. TIM1

Clock Source : ETR2

Channel1: Output Compare No Output

### 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
Repetition Counter (RCR - 8 bits value)	0

#### Trigger Output (TRGO) Parameters:

Master/Slave Mode	Disable (no sync between this TIM (Master) and its Slaves)
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

#### **Clock:**

Clock Filter (4 bits value)	0
Clock Polarity	non inverted
Clock Prescaler	Prescaler not used

#### **Output Compare No Output Channel 1:**

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

## **5.8. TIM2**

**Clock Source : Internal Clock**  
**Channel2: Forced Output CH2**  
**mode: One Pulse Mode**

### **5.8.1. 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

#### **Trigger Output (TRGO) Parameters:**

Master/Slave Mode	Disable (no sync between this TIM (Master) and its Slaves)
Trigger Event Selection	Reset (UG bit from TIMx_EGR)

#### **Forced Output Channel 2:**

Mode	Forced Active
Pulse (32 bits value)	0
CH Polarity	High

## 5.9. USART1

**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. FATFS

**mode: SD Card**

### 5.10.1. Set Defines:

#### Version:

FATFS version	R0.11
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#### Function Parameters:

FS_READONLY (Read-only mode)	Disabled
FS_MINIMIZE (Minimization level)	Disabled
USE_STRFUNC (String functions)	Enabled with LF -> CRLF conversion
USE_FIND (Find functions)	<b>Enabled *</b>
USE_MKFS (Make filesystem function)	<b>Disabled *</b>
USE_FASTSEEK (Fast seek function)	Enabled
USE_LABEL (Volume label functions)	Disabled
USE_FORWARD (Forward function)	Disabled

#### Locale and Namespace Parameters:

CODE_PAGE (Code page on target)	<b>Cyrillic (OEM) *</b>
USE_LFN (Use Long Filename)	Disabled
MAX_LFN (Max Long Filename)	255
LFN_UNICODE (Enable Unicode)	ANSI/OEM
STRF_ENCODE (Character encoding)	UTF-8

FS\_RPATH (Relative Path) Disabled

**Physical Drive Parameters:**

VOLUMES (Logical drives) 1  
 MAX\_SS (Maximum Sector Size) 512  
 MIN\_SS (Minimum Sector Size) 512  
 MULTI\_PARTITION (Volume partitions feature) Disabled  
 USE\_TRIM (Erase feature) Disabled  
 FS\_NOFSINFO (Force full FAT scan) 0

**System Parameters:**

FS\_TINY (Tiny mode) Disabled  
 FS\_NORTC (Timestamp feature) Dynamic timestamp  
     NORTC\_YEAR (Year for timestamp) 2015  
     NORTC\_MON (Month for timestamp) 6  
     NORTC\_MDAY (Day for timestamp) 4  
 WORD\_ACCESS (Platform dependent access option) Byte access  
 FS\_REENTRANT (Re-Entrancy) Disabled  
 FS\_TIMEOUT (Timeout ticks) 1000  
 SYNC\_t (O/S sync object) osSemaphoreId  
 FS\_LOCK (Number of files opened simultaneously) 2

**5.10.2. IPs instances:**

**SDIO/SDMMC:**

SDIO instance SDIO

\* User modified value

## 6. System Configuration

### 6.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
I2C1	PB6	I2C1_SCL	Alternate Function Open Drain	Pull-up	Very High *	
	PB7	I2C1_SDA	Alternate Function Open Drain	Pull-up	Very 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	
	PH0-OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	
	PH1-OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	
SDIO	PC8	SDIO_D0	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PC9	SDIO_D1	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PC10	SDIO_D2	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PC11	SDIO_D3	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PC12	SDIO_CK	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD2	SDIO_CMD	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
SPI1	PA5	SPI1_SCK	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PA7	SPI1_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
SYS	PE2	SYS_TRACECLK	n/a	n/a	n/a	
	PE3	SYS_TRACED0	n/a	n/a	n/a	
	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-SWO	n/a	n/a	n/a	
TIM1	PE7	TIM1_ETR	Alternate Function Push Pull	No pull-up and no pull-down	Low	
TIM2	PA1	TIM2_CH2	Alternate Function Push Pull	No pull-up and no pull-down	Low	

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
USART1	PA9	USART1_TX	Alternate Function Push Pull	Pull-up	<b>Very High</b> *	
	PA10	USART1_RX	Alternate Function Push Pull	Pull-up	<b>Very High</b> *	
GPIO	PC0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PA0-WKUP	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PA6	GPIO_Output	Output Push Pull	<b>Pull-down *</b>	<b>High *</b>	
	PF11	GPIO_Input	Input mode	No pull-up and no pull-down	<b>n/a</b>	
	PD3	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	

## 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
Pre-fetch 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
USART1 global interrupt	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
TIM1 break interrupt and TIM9 global interrupt	unused		
TIM1 update interrupt and TIM10 global interrupt	unused		
TIM1 trigger and commutation interrupts and TIM11 global interrupt	unused		
TIM1 capture compare interrupt	unused		
TIM2 global interrupt	unused		
I2C1 event interrupt	unused		
I2C1 error interrupt	unused		
SPI1 global interrupt	unused		
SDIO global interrupt	unused		
FPU global interrupt	unused		

\* User modified value

## ***7. Power Consumption Calculator report***

### 7.1. Microcontroller Selection

Series	STM32F4
Line	STM32F407/417
MCU	STM32F407ZGTx
Datasheet	022152_Rev7

### 7.2. Parameter Selection

Temperature	25
Vdd	3.3

## 8. Software Project

### 8.1. Project Settings

Name	Value
Project Name	SRN-05
Project Folder	D:\!!!!DIY_PROJECTS!!!!\ARM\SRN05(STM32f407)\SRN-05
Toolchain / IDE	MDK-ARM V5
Firmware Package Name and Version	STM32Cube FW_F4 V1.16.0

### 8.2. 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	Yes
Backup previously generated files 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