

## 1. Description

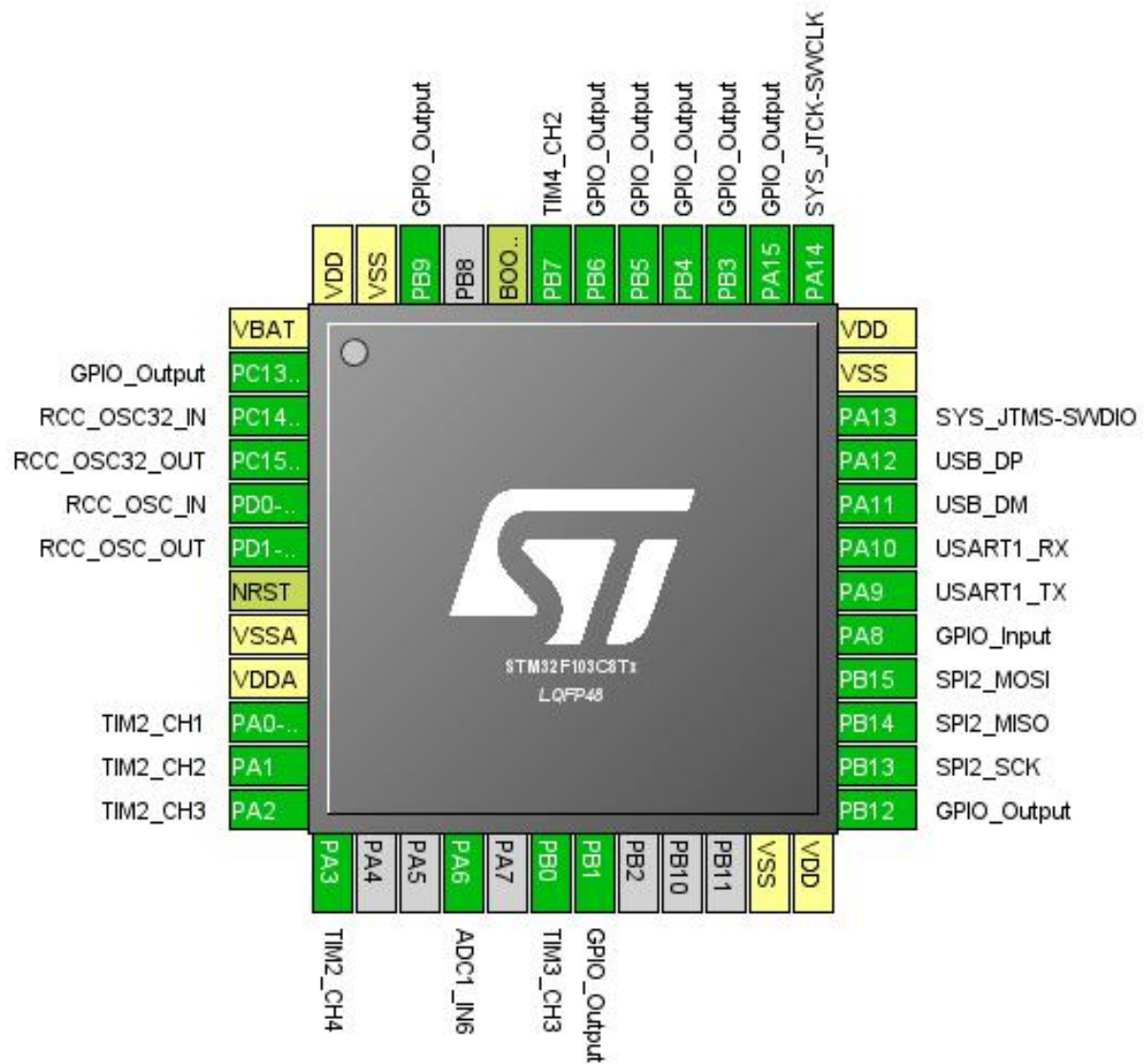
### 1.1. Project

Project Name	mini-sys
Board Name	mini-sys
Generated with:	STM32CubeMX 4.19.0
Date	05/17/2017

### 1.2. MCU

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

## 2. Pinout Configuration



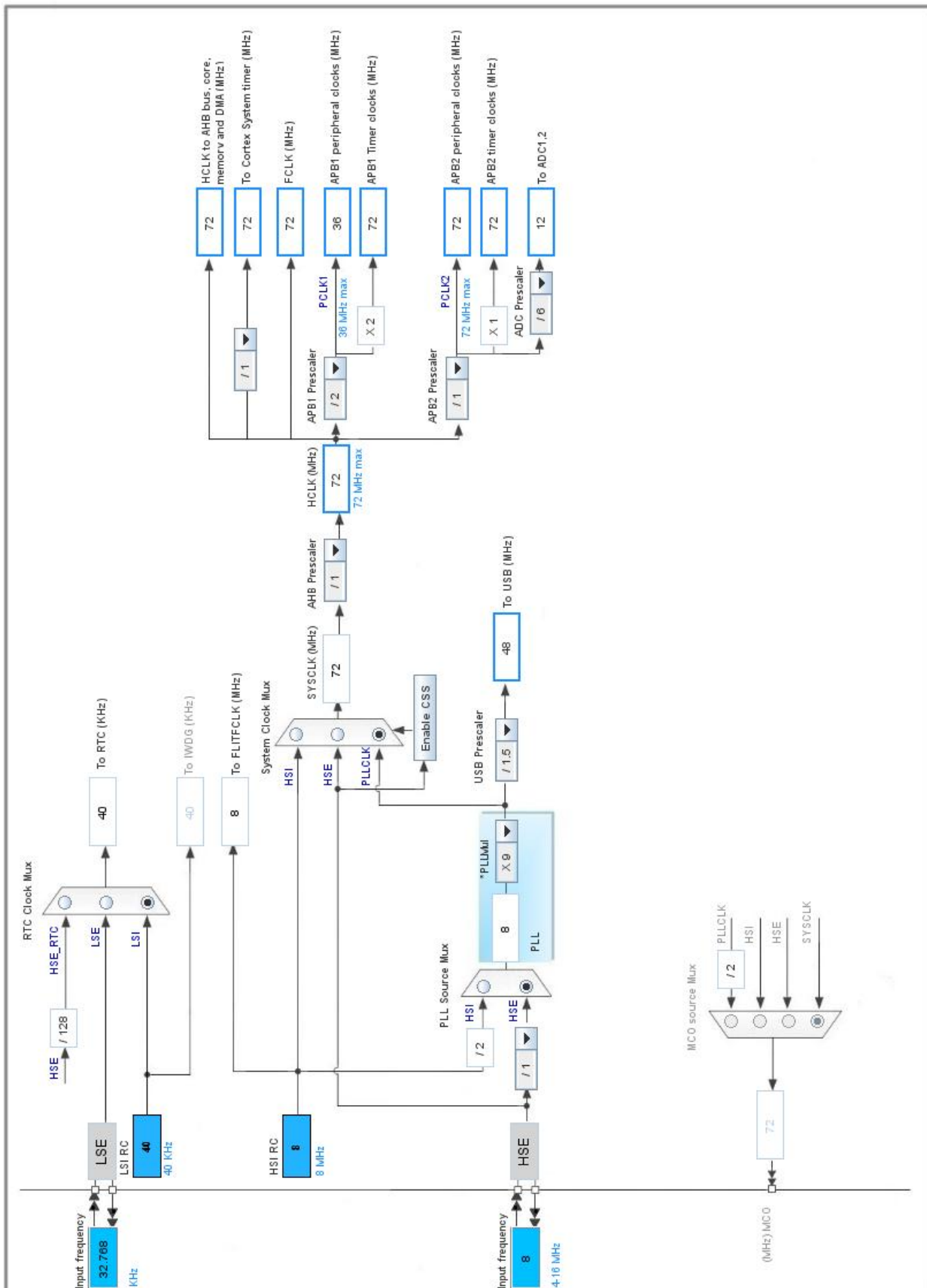
### 3. Pins Configuration

Pin Number LQFP48	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
2	PC13-TAMPER-RTC *	I/O	GPIO_Output	
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		
10	PA0-WKUP	I/O	TIM2_CH1	
11	PA1	I/O	TIM2_CH2	
12	PA2	I/O	TIM2_CH3	
13	PA3	I/O	TIM2_CH4	
16	PA6	I/O	ADC1_IN6	
18	PB0	I/O	TIM3_CH3	
19	PB1 *	I/O	GPIO_Output	
23	VSS	Power		
24	VDD	Power		
25	PB12 *	I/O	GPIO_Output	
26	PB13	I/O	SPI2_SCK	
27	PB14	I/O	SPI2_MISO	
28	PB15	I/O	SPI2_MOSI	
29	PA8 *	I/O	GPIO_Input	
30	PA9	I/O	USART1_TX	
31	PA10	I/O	USART1_RX	
32	PA11	I/O	USB_DM	
33	PA12	I/O	USB_DP	
34	PA13	I/O	SYS_JTMS-SWDIO	
35	VSS	Power		
36	VDD	Power		
37	PA14	I/O	SYS_JTCK-SWCLK	
38	PA15 *	I/O	GPIO_Output	
39	PB3 *	I/O	GPIO_Output	
40	PB4 *	I/O	GPIO_Output	
41	PB5 *	I/O	GPIO_Output	
42	PB6 *	I/O	GPIO_Output	

Pin Number LQFP48	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
43	PB7	I/O	TIM4_CH2	
44	BOOT0	Boot		
46	PB9 *	I/O	GPIO_Output	
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: IN6

#### 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 **Timer 1 Capture Compare 1 event \***

Rank 1

Channel Channel 6

Sampling Time **41.5 Cycles \***

##### ADC\_Injected\_ConversionMode:

Number Of Conversions 0

##### WatchDog:

Enable Analog WatchDog Mode false

### 5.2. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

Low Speed Clock (LSE) : 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. RTC

**mode: Activate Clock Source**

**RTC OUT: No RTC Output**

### 5.3.1. Parameter Settings:

**Calendar Time:**

Data Format	BCD data format
Hours	1
Minutes	0
Seconds	0

**General:**

Auto Predivider Calculation	Enabled
Asynchronous Predivider value	Automatic Predivider Calculation Enabled
Output	No output on the TAMPER pin

**Calendar Date:**

Week Day	Monday
Month	January
Date	1
Year	0

## 5.4. SPI2

**Mode: Full-Duplex Master**

### 5.4.1. Parameter Settings:

**Basic Parameters:**

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

**Clock Parameters:**

Prescaler (for Baud Rate)	4 *
Baud Rate	9.0 MBits/s *
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge
<b>Advanced Parameters:</b>	
CRC Calculation	Disabled
NSS Signal Type	Software

## 5.5. SYS

**Debug: Serial Wire**

**Timebase Source: SysTick**

## 5.6. TIM2

**Channel1: PWM Generation CH1**

**Channel2: PWM Generation CH2**

**Channel3: PWM Generation CH3**

**Channel4: PWM Generation CH4**

### 5.6.1. Parameter Settings:

#### Counter Settings:

Prescaler (PSC - 16 bits value)	17 *
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value )	12000 *
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	Enable (CNT_EN) *

#### PWM Generation Channel 1:

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

#### PWM Generation Channel 2:

Mode	PWM mode 1
Pulse (16 bits value)	0
Fast Mode	Disable



CH Polarity High

#### **PWM Generation Channel 3:**

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

#### **PWM Generation Channel 4:**

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

## **5.7. TIM3**

### **Channel3: PWM Generation CH3**

#### **5.7.1. Parameter Settings:**

##### **Counter Settings:**

Prescaler (PSC - 16 bits value) 0  
Counter Mode Up  
Counter Period (AutoReload Register - 16 bits value ) **89 \***  
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)

#### **PWM Generation Channel 3:**

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

## **5.8. TIM4**

**Slave Mode: Reset Mode**

**Trigger Source: TI2FP2**

**mode: Clock Source**

### 5.8.1. Parameter Settings:

#### Counter Settings:

Prescaler (PSC - 16 bits value)	17 *
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value )	4399 *
Internal Clock Division (CKD)	No Division
Slave Mode Controller	Reset Mode

#### Trigger Output (TRGO) Parameters:

Master/Slave Mode	Enable (sync between this TIM (Master) and its Slaves (through TRGO)) *
Trigger Event Selection	Update Event *

#### Trigger:

Trigger Polarity	Rising Edge
Trigger Filter (4 bits value)	0

## 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 Only *
Over Sampling	16 Samples

## 5.10. USB

mode: Device (FS)

### 5.10.1. Parameter Settings:

**Basic Parameters:**

Speed	Full Speed 12MBit/s
Endpoint 0 Max Packet size	8 Bytes

**Power Parameters:**

Low Power	Disabled
Link Power Management	Disabled
Battery Charging	Disabled

## 5.11. FATFS

mode: User-defined

### 5.11.1. Set Defines:

**Version:**

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

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

**Locale and Namespace Parameters:**

CODE_PAGE (Code page on target)	Latin 1 (Windows)
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\_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\_REENRANT (Re-Entrancy) Disabled  
 FS\_TIMEOUT (Timeout ticks) 1000  
 SYNC\_t (O/S sync object) osSemaphoreId  
 FS\_LOCK (Number of files opened simultaneously) 2

## 5.12. USB\_DEVICE

### Class For FS IP: Communication Device Class (Virtual Port Com)

#### 5.12.1. Parameter Settings:

##### Basic Parameters:

VirtualMode Cdc  
 USBD\_MAX\_NUM\_INTERFACES (Maximum number of supported interfaces) 1  
 USBD\_MAX\_NUM\_CONFIGURATION (Maximum number of supported configuration) 1  
 USBD\_MAX\_STR\_DESC\_SIZ (Maximum size for the string descriptors) 512  
 USBD\_SUPPORT\_USER\_STRING (Enable user string descriptor) Disabled  
 USBD\_SELF\_POWERED (Enabled self power) Enabled  
 USBD\_DEBUG\_LEVEL (USBD Debug Level) 0: No debug message

##### Class Parameters:

USBD\_CDC\_INTERVAL (Number of micro-frames interval) 1000

#### 5.12.2. Device Descriptor:

##### Device Descriptor:

VID (Vendor Identifier) 1155  
 LANGID\_STRING (Language Identifier) English(United States)  
 MANUFACTURER\_STRING (Manufacturer Identifier) STMicroelectronics

##### Device Descriptor FS:

PID (Product Identifier) 22336  
 PRODUCT\_STRING (Product Identifier) STM32 Virtual ComPort  
 SERIALNUMBER\_STRING (Serial number) 00000000001A  
 CONFIGURATION\_STRING (Configuration Identifier) CDC Config

INTERFACE\_STRING (Interface Identifier)

CDC Interface

**\* 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	PA6	ADC1_IN6	Analog mode	n/a	n/a	
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	
SPI2	PB13	SPI2_SCK	Alternate Function Push Pull	n/a	High *	
	PB14	SPI2_MISO	Input mode	No pull-up and no pull-down	n/a	
	PB15	SPI2_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	
TIM2	PA0-WKUP	TIM2_CH1	Alternate Function Push Pull	n/a	Low	
	PA1	TIM2_CH2	Alternate Function Push Pull	n/a	Low	
	PA2	TIM2_CH3	Alternate Function Push Pull	n/a	Low	
	PA3	TIM2_CH4	Alternate Function Push Pull	n/a	Low	
TIM3	PB0	TIM3_CH3	Alternate Function Open Drain *	n/a	High *	
TIM4	PB7	TIM4_CH2	Input mode	Pull-up *	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	
USB	PA11	USB_DM	n/a	n/a	n/a	
	PA12	USB_DP	n/a	n/a	n/a	
GPIO	PC13-TAMPER-RTC	GPIO_Output	Output Push Pull	n/a	High *	
	PB1	GPIO_Output	Output Push Pull	n/a	High *	
	PB12	GPIO_Output	Output Push Pull	n/a	Low	
	PA8	GPIO_Input	Input mode	Pull-up *	n/a	

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PA15	GPIO_Output	Output Push Pull	<b>n/a</b>	Low	
	PB3	GPIO_Output	Output Push Pull	<b>n/a</b>	<b>High *</b>	
	PB4	GPIO_Output	Output Push Pull	<b>n/a</b>	<b>High *</b>	
	PB5	GPIO_Output	Output Push Pull	<b>n/a</b>	<b>High *</b>	
	PB6	GPIO_Output	Output Push Pull	<b>n/a</b>	<b>High *</b>	
	PB9	GPIO_Output	Output Push Pull	<b>n/a</b>	<b>High *</b>	

## 6.2. DMA configuration

DMA request	Stream	Direction	Priority
TIM3_CH3	DMA1_Channel2	Memory To Peripheral	<b>High *</b>

### TIM3\_CH3: DMA1\_Channel2 DMA request Settings:

Mode: **Circular \***  
Peripheral Increment: Disable  
Memory Increment: **Enable \***  
Peripheral Data Width: **Word \***  
Memory Data Width: **Byte \***



### 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 channel2 global interrupt	true	0	0
USB low priority or CAN RX0 interrupts	true	0	0
TIM2 global interrupt	true	0	0
TIM4 global interrupt	true	0	0
USART1 global interrupt	true	0	0
PVD interrupt through EXTI line 16	unused		
RTC global interrupt	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
ADC1 and ADC2 global interrupts	unused		
USB high priority or CAN TX interrupts	unused		
TIM3 global interrupt	unused		
SPI2 global interrupt	unused		
RTC alarm interrupt through EXTI line 17	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 Project

### 8.1. Project Settings

Name	Value
Project Name	mini-sys
Project Folder	/array_data01/STM32-35/mini-sys
Toolchain / IDE	SW4STM32
Firmware Package Name and Version	STM32Cube FW_F1 V1.4.0

### 8.2. 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