

## 1. Description

### 1.1. Project

Project Name	CubeProject
Board Name	NUCLEO-F446RE
Generated with:	STM32CubeMX 4.27.0
Date	01/15/2019

### 1.2. MCU

MCU Series	STM32F4
MCU Line	STM32F446
MCU name	STM32F446RETx
MCU Package	LQFP64
MCU Pin number	64

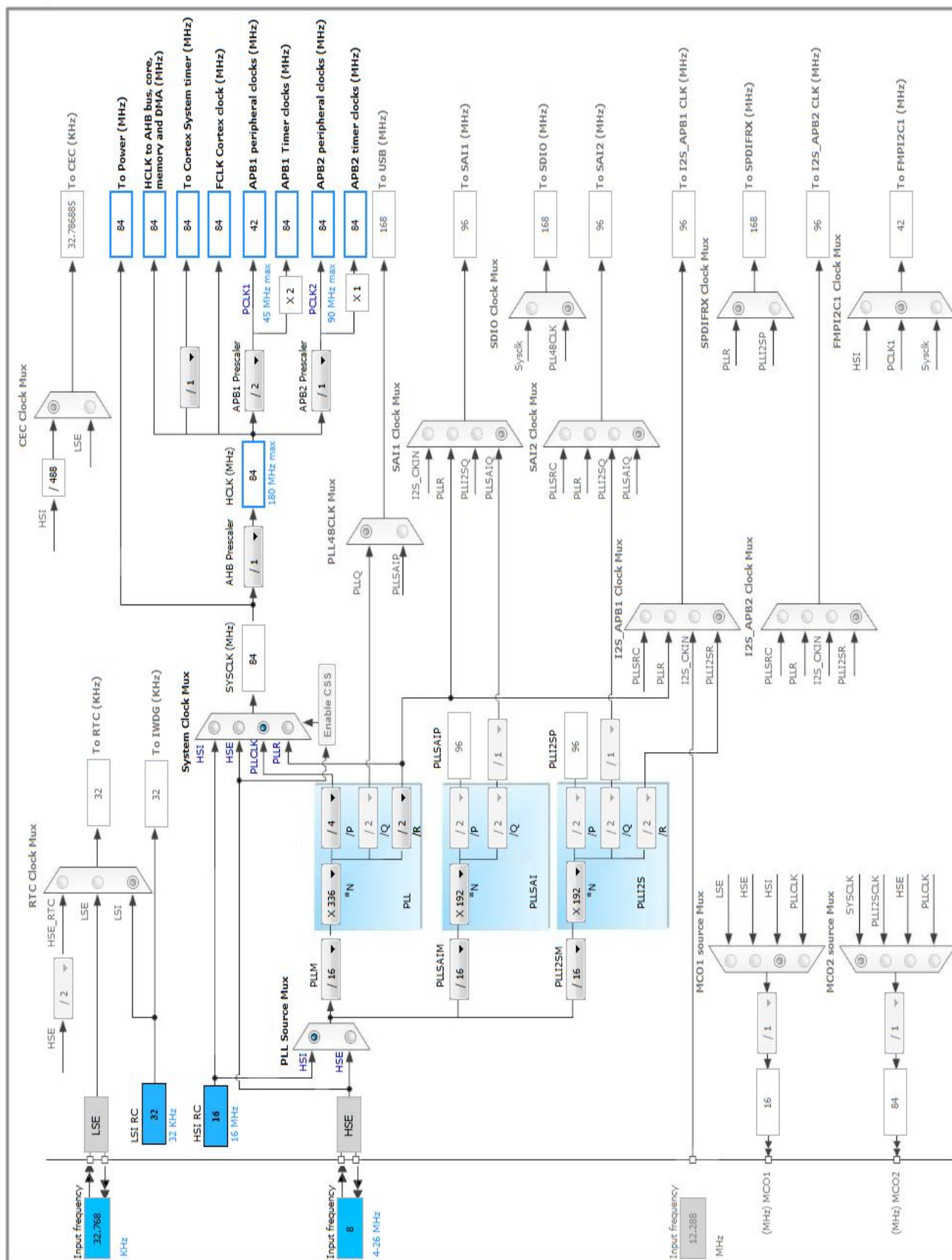


### 3. Pins Configuration

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
2	PC13	I/O	GPIO_EXTI13	B1 [Blue PushButton]
3	PC14-OSC32_IN	I/O	RCC_OSC32_IN	
4	PC15-OSC32_OUT	I/O	RCC_OSC32_OUT	
5	PH0-OSC_IN	I/O	RCC_OSC_IN	
6	PH1-OSC_OUT	I/O	RCC_OSC_OUT	
7	NRST	Reset		
12	VSSA	Power		
13	VDDA	Power		
14	PA0-WKUP *	I/O	GPIO_Analog	
15	PA1 *	I/O	GPIO_Analog	
16	PA2	I/O	USART2_TX	USART_TX
17	PA3	I/O	USART2_RX	USART_RX
18	VSS	Power		
19	VDD	Power		
21	PA5	I/O	SPI1_SCK	
22	PA6	I/O	SPI1_MISO	
23	PA7	I/O	SPI1_MOSI	
29	PB10 *	I/O	GPIO_Output	
30	VCAP_1	Power		
31	VSS	Power		
32	VDD	Power		
37	PC6	I/O	USART6_TX	
38	PC7	I/O	USART6_RX	
42	PA9 *	I/O	GPIO_Output	
43	PA10 *	I/O	GPIO_Input	
46	PA13	I/O	SYS_JTMS-SWDIO	TMS
47	VSS	Power		
48	VDD	Power		
49	PA14	I/O	SYS_JTCK-SWCLK	TCK
55	PB3 *	I/O	GPIO_Input	
57	PB5 *	I/O	GPIO_Input	
60	BOOT0	Boot		
63	VSS	Power		
64	VDD	Power		

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

## 4. Clock Tree Configuration



## 5. IPs and Middleware Configuration

### 5.1. RCC

**High Speed Clock (HSE): Crystal/Ceramic Resonator**

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

#### 5.1.1. Parameter Settings:

##### System Parameters:

VDD voltage (V)	3.3
Instruction Cache	Enabled
Prefetch Buffer	Enabled
Data Cache	Enabled
Flash Latency(WS)	2 WS (3 CPU cycle)

##### RCC Parameters:

HSI Calibration Value	16
TIM Prescaler Selection	Disabled
HSE Startup Timeout Value (ms)	100
LSE Startup Timeout Value (ms)	5000

##### Power Parameters:

Power Regulator Voltage Scale	Power Regulator Voltage Scale 3
Power Over Drive	Disabled

### 5.2. SPI1

**Mode: Full-Duplex Master**

#### 5.2.1. Parameter Settings:

##### Basic Parameters:

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

##### Clock Parameters:

Prescaler (for Baud Rate)	<b>256 *</b>
Baud Rate	<b>328.125 KBits/s *</b>
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

##### Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Software

### 5.3. SYS

Debug: Serial Wire

Timebase Source: SysTick

### 5.4. USART2

Mode: Asynchronous

#### 5.4.1. 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

### 5.5. USART6

Mode: Asynchronous

#### 5.5.1. 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

\* User modified value

## 6. System Configuration

### 6.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
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	
SPI1	PA5	SPI1_SCK	Alternate Function Push Pull	No pull-up and no pull-down	<b>Medium *</b>	
	PA6	SPI1_MISO	Alternate Function Push Pull	No pull-up and no pull-down	<b>Medium *</b>	
	PA7	SPI1_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	<b>Medium *</b>	
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	TMS
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	TCK
USART2	PA2	USART2_TX	Alternate Function Push Pull	Pull-up	<b>Very High *</b>	USART_TX
	PA3	USART2_RX	Alternate Function Push Pull	Pull-up	<b>Very High *</b>	USART_RX
USART6	PC6	USART6_TX	Alternate Function Push Pull	Pull-up	<b>Very High *</b>	
	PC7	USART6_RX	Alternate Function Push Pull	Pull-up	<b>Very High *</b>	
GPIO	PC13	GPIO_EXTI13	<b>External Interrupt Mode with Falling edge trigger detection</b>	<b>Pull-up *</b>	n/a	B1 [Blue PushButton]
	PA0-WKUP	GPIO_Analog	Analog mode	No pull-up and no pull-down	n/a	
	PA1	GPIO_Analog	Analog mode	No pull-up and no pull-down	n/a	
	PB10	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PA9	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PA10	GPIO_Input	Input mode	<b>Pull-up *</b>	n/a	
	PB3	GPIO_Input	Input mode	<b>Pull-up *</b>	n/a	
	PB5	GPIO_Input	Input mode	<b>Pull-up *</b>	n/a	





## 6.2. DMA configuration

DMA request	Stream	Direction	Priority
USART2_RX	DMA1_Stream5	Peripheral To Memory	Low
USART2_TX	DMA1_Stream6	Memory To Peripheral	Low
USART6_RX	DMA2_Stream1	Peripheral To Memory	Low
USART6_TX	DMA2_Stream6	Memory To Peripheral	Low
SPI1_TX	DMA2_Stream3	Memory To Peripheral	Low

### USART2\_RX: DMA1\_Stream5 DMA request Settings:

Mode: Normal  
 Use fifo: **Enable \***  
 FIFO Threshold: Full  
 Peripheral Increment: Disable  
 Memory Increment: **Enable \***  
 Peripheral Data Width: Byte  
 Memory Data Width: Byte  
 Peripheral Burst Size: Single  
 Memory Burst Size: Single

### USART2\_TX: DMA1\_Stream6 DMA request Settings:

Mode: Normal  
 Use fifo: **Enable \***  
 FIFO Threshold: Full  
 Peripheral Increment: Disable  
 Memory Increment: **Enable \***  
 Peripheral Data Width: Byte  
 Memory Data Width: Byte  
 Peripheral Burst Size: Single  
 Memory Burst Size: Single

### USART6\_RX: DMA2\_Stream1 DMA request Settings:

Mode: Normal  
 Use fifo: **Enable \***  
 FIFO Threshold: Full  
 Peripheral Increment: Disable

Memory Increment: **Enable \***  
Peripheral Data Width: Byte  
Memory Data Width: Byte  
Peripheral Burst Size: Single  
Memory Burst Size: Single

*USART6\_TX: DMA2\_Stream6 DMA request Settings:*

Mode: Normal  
Use fifo: **Enable \***  
FIFO Threshold: Full  
Peripheral Increment: Disable  
Memory Increment: **Enable \***  
Peripheral Data Width: Byte  
Memory Data Width: Byte  
Peripheral Burst Size: Single  
Memory Burst Size: Single

*SPI1\_TX: DMA2\_Stream3 DMA request Settings:*

Mode: Normal  
Use fifo: Disable  
Peripheral Increment: Disable  
Memory Increment: **Enable \***  
Peripheral Data Width: Byte  
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
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
DMA1 stream5 global interrupt	true	0	0
DMA1 stream6 global interrupt	true	0	0
SPI1 global interrupt	true	0	0
USART2 global interrupt	true	0	0
DMA2 stream1 global interrupt	true	0	0
DMA2 stream3 global interrupt	true	0	0
DMA2 stream6 global interrupt	true	0	0
USART6 global interrupt	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
EXTI line[15:10] interrupts	unused		
FPU global interrupt	unused		

\* User modified value

## 7. Power Consumption Calculator report

### 7.1. Microcontroller Selection

Series	STM32F4
Line	STM32F446
MCU	STM32F446RETx
Datasheet	027107_Rev6

### 7.2. Parameter Selection

Temperature	25
Vdd	null

## 8. Software Project

### 8.1. Project Settings

Name	Value
Project Name	CubeProject
Project Folder	E:\github\STM32F7xx_midi\CubeProject
Toolchain / IDE	Makefile
Firmware Package Name and Version	STM32Cube FW_F4 V1.21.0

### 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	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

## ***9. Software Pack Report***