1. Description

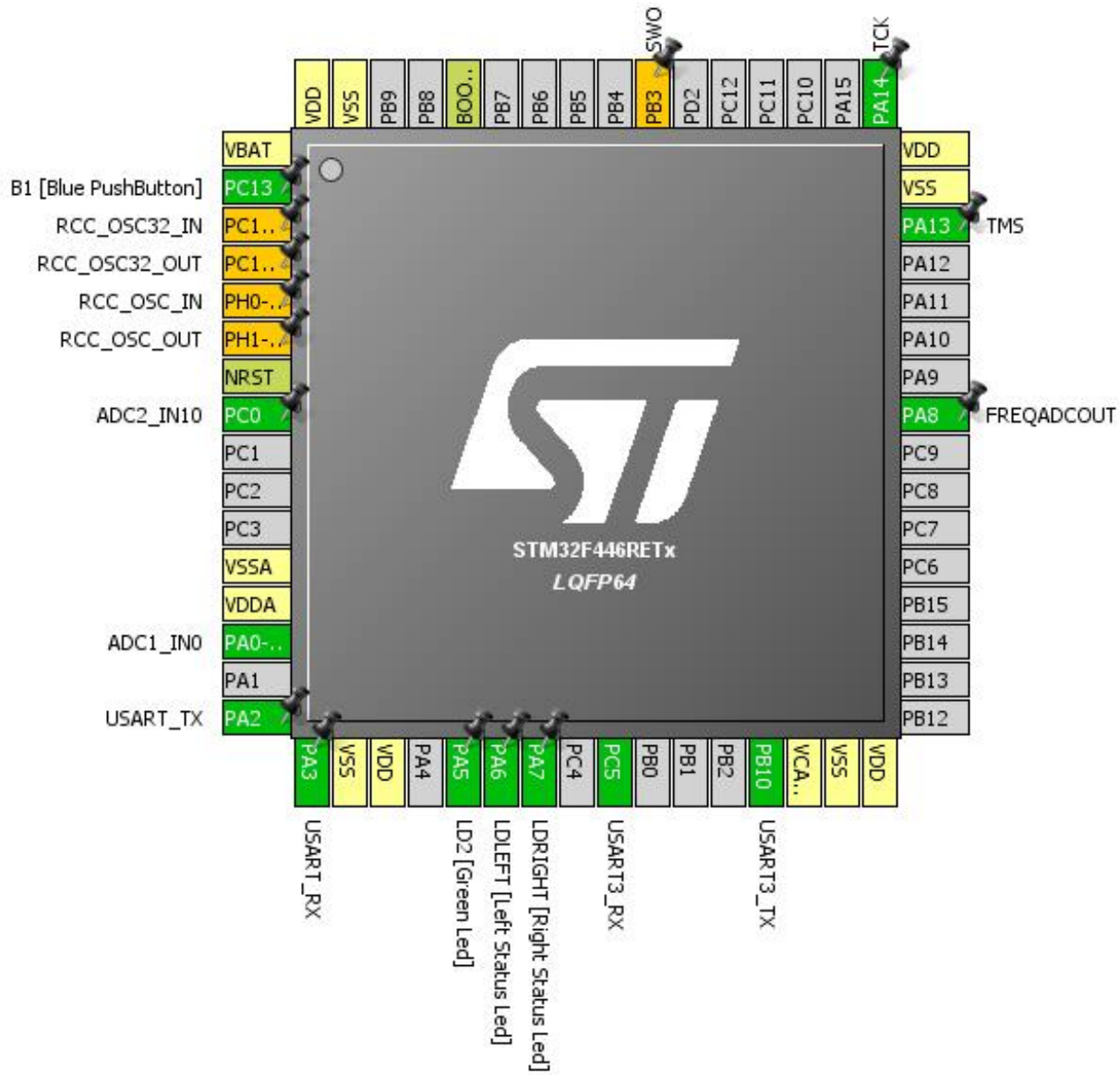
1.1. Project

Project Name	Schleifensensor
Board Name	NUCLEO-F446RE
Generated with:	STM32CubeMX 4.15.1
Date	07/24/2016

1.2. MCU

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

2. Pinout Configuration



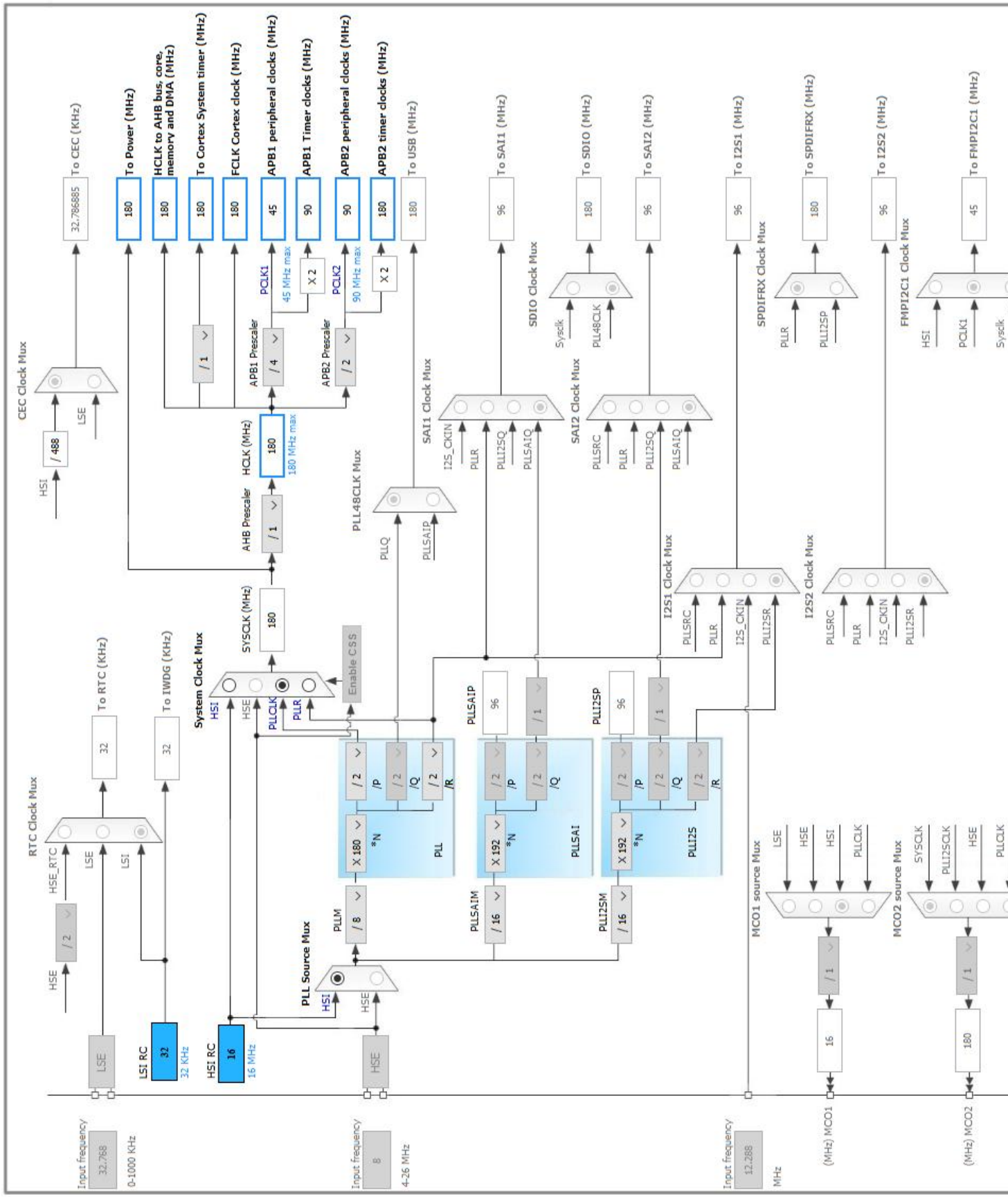
3. Pins Configuration

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		
8	PC0	I/O	ADC2_IN10	
12	VSSA	Power		
13	VDDA	Power		
14	PA0-WKUP	I/O	ADC1_IN0	
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	GPIO_Output	LD2 [Green Led]
22	PA6 **	I/O	GPIO_Output	LDLEFT [Left Status Led]
23	PA7 **	I/O	GPIO_Output	LDRIGHT [Right Status Led]
25	PC5	I/O	USART3_RX	
29	PB10	I/O	USART3_TX	
30	VCAP_1	Power		
31	VSS	Power		
32	VDD	Power		
41	PA8 **	I/O	GPIO_Output	FREQADCOUT
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	SYS_JTDO-SWO	SWO
60	BOOT0	Boot		
63	VSS	Power		
64	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. IPs and Middleware Configuration

5.1. ADC1

mode: IN0

5.1.1. Parameter Settings:

ADCs_Common_Settings:

Mode	Independent mode

ADC_Settings:

Clock Prescaler	PCLK2 divided by 4
Resolution	12 bits (15 ADC Clock cycles)
Data Alignment	Right alignment
Scan Conversion Mode	Disabled
Continuous Conversion Mode	Disabled
Discontinuous Conversion Mode	Disabled
DMA Continuous Requests	Disabled
End Of Conversion Selection	**EOC flag at the end of all conversions ***

ADC_Regular_ConversionMode:

Number Of Conversion	1
External Trigger Conversion Edge	**Trigger detection on the rising edge ***
External Trigger Conversion Source	**Timer 2 Trigger Out event ***
Rank	1
Channel	Channel 0
Sampling Time	**56 Cycles ***

ADC_Injected_ConversionMode:

Number Of Conversions	0

WatchDog:

Enable Analog WatchDog Mode	false

5.2. ADC2

mode: IN10

5.2.1. Parameter Settings:

ADCs_Common_Settings:

Mode	Independent mode

ADC_Settings:

Clock Prescaler	PCLK2 divided by 4
Resolution	12 bits (15 ADC Clock cycles)
Data Alignment	Right alignment
Scan Conversion Mode	Disabled
Continuous Conversion Mode	Disabled
Discontinuous Conversion Mode	Disabled
DMA Continuous Requests	Disabled
End Of Conversion Selection	**EOC flag at the end of all conversions ***

ADC_Regular_ConversionMode:

Number Of Conversion	1
External Trigger Conversion Edge	**Trigger detection on the rising edge ***
External Trigger Conversion Source	**Timer 2 Trigger Out event ***
Rank	1
Channel	Channel 10
Sampling Time	**56 Cycles ***

ADC_Injected_ConversionMode:

Number Of Conversions	0

WatchDog:

Enable Analog WatchDog Mode	false

5.3. SYS

Debug: Serial Wire

Timebase Source: SysTick

5.4. TIM2

Clock Source : Internal Clock

5.4.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 32 bits value)	**1185 ***
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	**Update Event ***

5.5. USART2

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

5.6. USART3

Mode: Asynchronous

5.6.1. Parameter Settings:

Basic Parameters:

Baud Rate	**19200 ***
Word Length	8 Bits (including Parity)
Parity	None
Stop Bits	1

Advanced Parameters:

Data Direction	**Transmit Only ***
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
ADC1	PA0-WKUP	ADC1_IN0	Analog mode	No pull-up and no pull-down	n/a	
ADC2	PC0	ADC2_IN10	Analog mode	No pull-up and no pull-down	n/a	
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	**Very High ***	USART_TX
	PA3	USART2_RX	Alternate Function Push Pull	Pull-up	**Very High ***	USART_RX
USART3	PC5	USART3_RX	Alternate Function Push Pull	Pull-up	**Very High ***	
	PB10	USART3_TX	Alternate Function Push Pull	Pull-up	**Very High ***	
Single Mapped Signals	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	
	PB3	SYS_JTDO-SWO	n/a	n/a	n/a	SWO
GPIO	PC13	GPIO_EXTI13	**External Event Mode with Rising edge trigger detection ***	No pull-up and no pull-down	n/a	B1 [Blue PushButton]
	PA5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LD2 [Green Led]
	PA6	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LDLEFT [Left Status Led]
	PA7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LDRIGHT [Right Status Led]
	PA8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**High ***	FREQADCOUT

6.2. DMA configuration

DMA request	Stream	Direction	Priority
USART2_RX	DMA1_Stream5	Peripheral To Memory	Low
ADC2	DMA2_Stream2	Peripheral To Memory	**High ***
ADC1	DMA2_Stream0	Peripheral To Memory	**High ***

USART2_RX: DMA1_Stream5 DMA request Settings:

Mode:	**Circular ***
Use fifo:	Disable
Peripheral Increment:	Disable
Memory Increment:	**Enable ***
Peripheral Data Width:	Byte
Memory Data Width:	Byte

ADC2: DMA2_Stream2 DMA request Settings:

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

ADC1: DMA2_Stream0 DMA request Settings:

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

Memory Burst Size:	Single

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
TIM2 global interrupt	true	0	0
DMA2 stream0 global interrupt	true	0	0
DMA2 stream2 global interrupt	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
ADC1, ADC2 and ADC3 interrupts	unused		
USART2 global interrupt	unused		
USART3 global interrupt	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_Rev5

7.2. Parameter Selection

Temperature	25
Vdd	null

8. Software Project

8.1. Project Settings

Name	Value
Project Name	Schleifensensor
Project Folder	D:\Documents\STM32\workspace\Schleifensensor
Toolchain / IDE	SW4STM32
Firmware Package Name and Version	STM32Cube FW_F4 V1.12.0

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	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)	Yes