1. Description

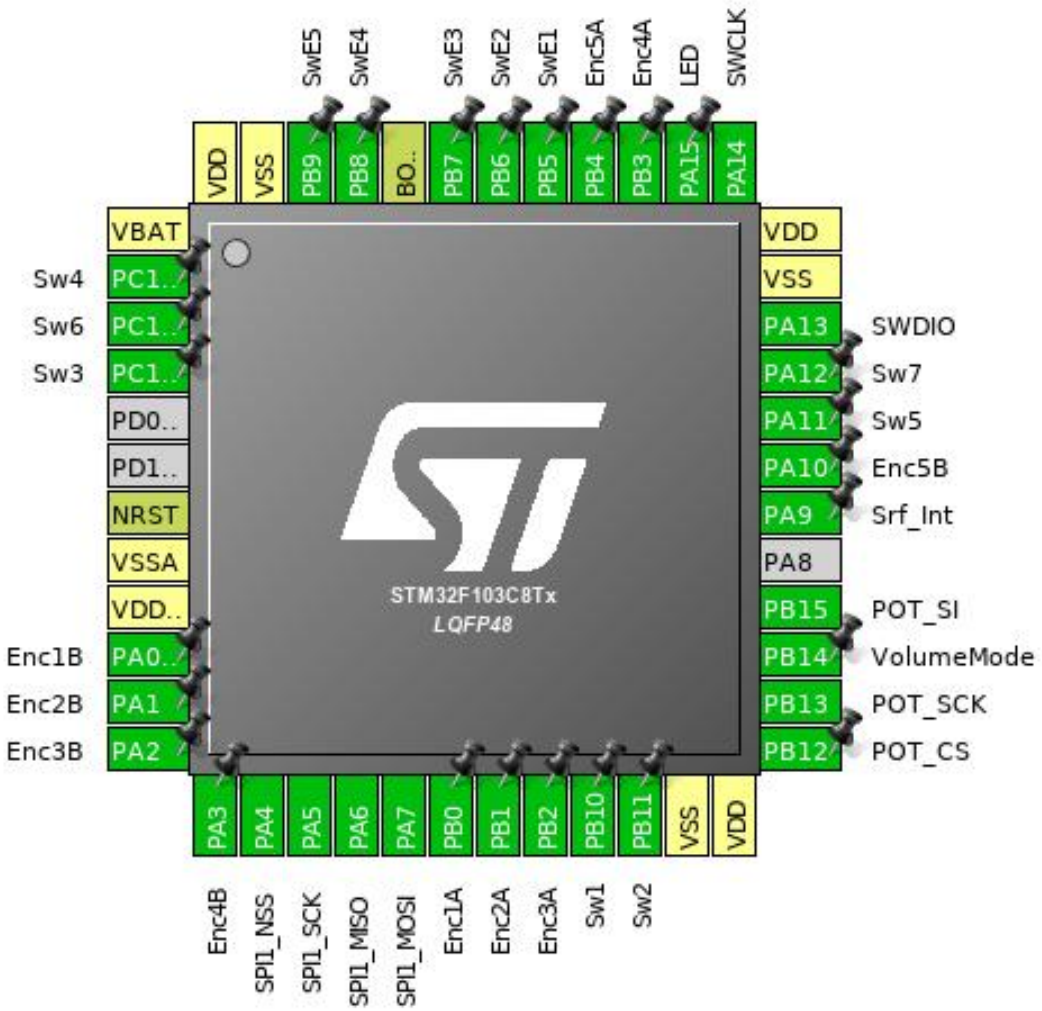
1.1. Project

Project Name	SurfaceControl_F103
Board Name	SurfaceControl_F103
Generated with:	STM32CubeMX 4.24.0
Date	01/23/2018

1.2. MCU

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

2. Pinout Configuration



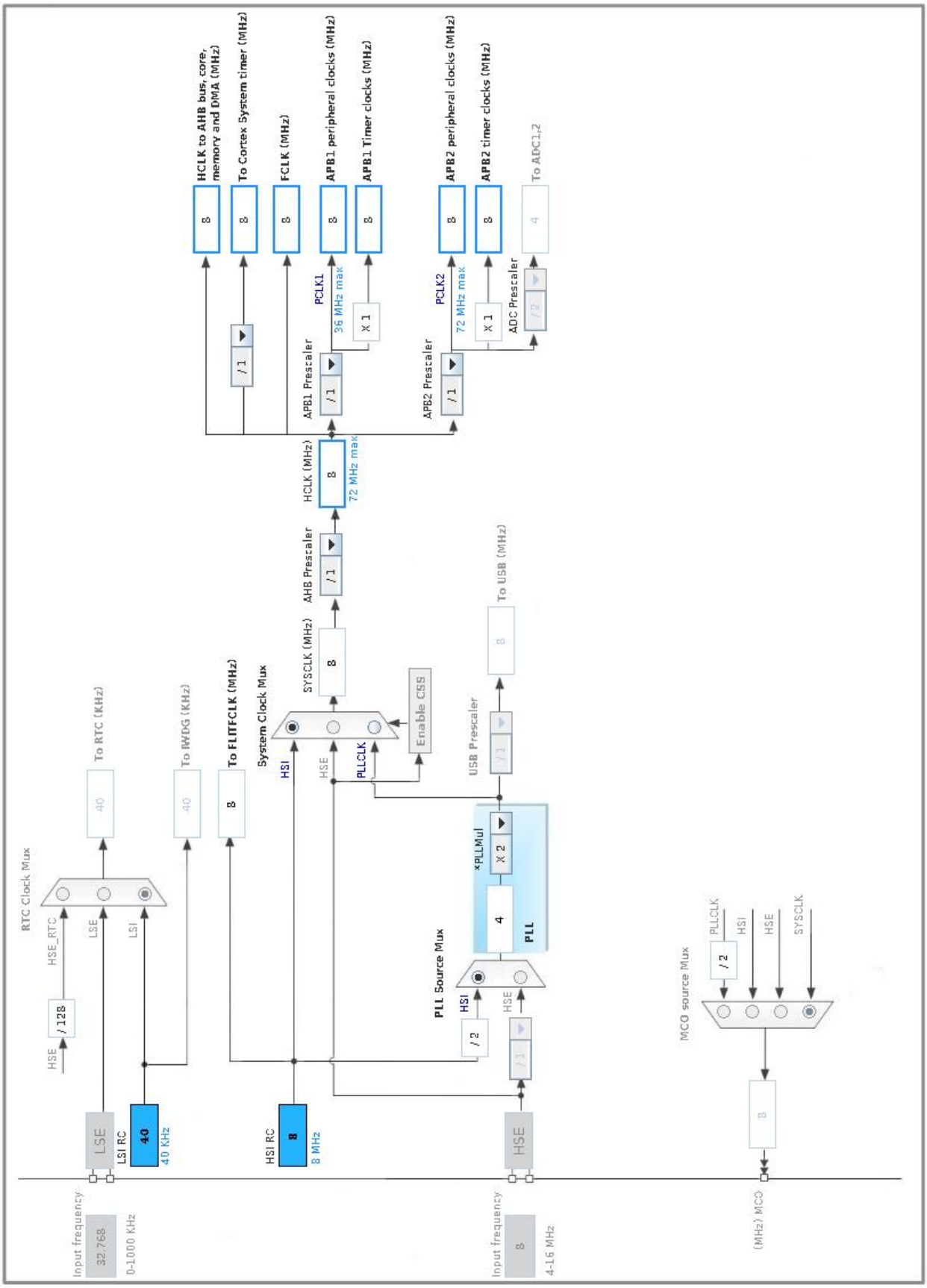
3. Pins Configuration

Pin Number LQFP48	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
2	PC13-TAMPER-RTC *	I/O	GPIO_Input	Sw4
3	PC14-OSC32_IN *	I/O	GPIO_Input	Sw6
4	PC15-OSC32_OUT *	I/O	GPIO_Input	Sw3
7	NRST	Reset		
8	VSSA	Power		
9	VDDA	Power		
10	PA0-WKUP *	I/O	GPIO_Input	Enc1B
11	PA1 *	I/O	GPIO_Input	Enc2B
12	PA2 *	I/O	GPIO_Input	Enc3B
13	PA3 *	I/O	GPIO_Input	Enc4B
14	PA4	I/O	SPI1_NSS	
15	PA5	I/O	SPI1_SCK	
16	PA6	I/O	SPI1_MISO	
17	PA7	I/O	SPI1_MOSI	
18	PB0 *	I/O	GPIO_Input	Enc1A
19	PB1 *	I/O	GPIO_Input	Enc2A
20	PB2 *	I/O	GPIO_Input	Enc3A
21	PB10 *	I/O	GPIO_Input	Sw1
22	PB11 *	I/O	GPIO_Input	Sw2
23	VSS	Power		
24	VDD	Power		
25	PB12 *	I/O	GPIO_Output	POT_CS
26	PB13	I/O	SPI2_SCK	POT_SCK
27	PB14 *	I/O	GPIO_Output	VolumeMode
28	PB15	I/O	SPI2_MOSI	POT_SI
30	PA9 *	I/O	GPIO_Output	Srf_Int
31	PA10 *	I/O	GPIO_Input	Enc5B
32	PA11 *	I/O	GPIO_Input	Sw5
33	PA12 *	I/O	GPIO_Input	Sw7
34	PA13	I/O	SYS_JTMS-SWDIO	SWDIO
35	VSS	Power		
36	VDD	Power		
37	PA14	I/O	SYS_JTCK-SWCLK	SWCLK
38	PA15 *	I/O	GPIO_Output	LED
39	PB3 *	I/O	GPIO_Input	Enc4A

Pin Number LQFP48	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
40	PB4 *	I/O	GPIO_Input	Enc5A
41	PB5 *	I/O	GPIO_Input	SwE1
42	PB6 *	I/O	GPIO_Input	SwE2
43	PB7 *	I/O	GPIO_Input	SwE3
44	BOOT0	Boot		
45	PB8 *	I/O	GPIO_Input	SwE4
46	PB9 *	I/O	GPIO_Input	SwE5
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. SPI1

Mode: Full-Duplex Slave

Hardware NSS Signal: Hardware NSS Input Signal

5.1.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	**16 Bits ***
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	**4 ***
Baud Rate	**2.0 MBits/s ***
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Input Hardware

5.2. SPI2

Mode: Half-Duplex Master

5.2.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	**16 Bits ***
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	**4 ***
Baud Rate	**2.0 MBits/s ***
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

*** User modified value**

6. System Configuration

6.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
SPI1	PA4	SPI1_NSS	Input mode	No pull-up and no pull-down	n/a	
	PA5	SPI1_SCK	Input mode	No pull-up and no pull-down	n/a	
	PA6	SPI1_MISO	Alternate Function Push Pull	n/a	**High ***	
	PA7	SPI1_MOSI	Input mode	No pull-up and no pull-down	**n/a**	
SPI2	PB13	SPI2_SCK	Alternate Function Push Pull	n/a	**High ***	POT_SCK
	PB15	SPI2_MOSI	Alternate Function Push Pull	n/a	**High ***	POT_SI
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	SWDIO
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	SWCLK
GPIO	PC13-TAMPER-RTC	GPIO_Input	Input mode	**Pull-up ***	n/a	Sw4
	PC14-OSC32_IN	GPIO_Input	Input mode	**Pull-up ***	n/a	Sw6
	PC15-OSC32_OUT	GPIO_Input	Input mode	**Pull-up ***	n/a	Sw3
	PA0-WKUP	GPIO_Input	Input mode	**Pull-up ***	n/a	Enc1B
	PA1	GPIO_Input	Input mode	**Pull-up ***	n/a	Enc2B
	PA2	GPIO_Input	Input mode	**Pull-up ***	n/a	Enc3B
	PA3	GPIO_Input	Input mode	**Pull-up ***	n/a	Enc4B
	PB0	GPIO_Input	Input mode	**Pull-up ***	n/a	Enc1A
	PB1	GPIO_Input	Input mode	**Pull-up ***	n/a	Enc2A
	PB2	GPIO_Input	Input mode	**Pull-up ***	n/a	Enc3A
	PB10	GPIO_Input	Input mode	**Pull-up ***	n/a	Sw1
	PB11	GPIO_Input	Input mode	**Pull-up ***	n/a	Sw2
	PB12	GPIO_Output	Output Push Pull	**n/a**	**Medium ***	POT_CS
	PB14	GPIO_Output	Output Push Pull	**n/a**	Low	VolumeMode
	PA9	GPIO_Output	Output Push Pull	**n/a**	**High ***	Srf_Int
	PA10	GPIO_Input	Input mode	**Pull-up ***	**n/a**	Enc5B
	PA11	GPIO_Input	Input mode	**Pull-up ***	**n/a**	Sw5

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PA12	GPIO_Input	Input mode	**Pull-up ***	**n/a**	Sw7
	PA15	GPIO_Output	Output Push Pull	**n/a**	Low	LED
	PB3	GPIO_Input	Input mode	**Pull-up ***	n/a	Enc4A
	PB4	GPIO_Input	Input mode	**Pull-up ***	n/a	Enc5A
	PB5	GPIO_Input	Input mode	**Pull-up ***	n/a	SwE1
	PB6	GPIO_Input	Input mode	**Pull-up ***	n/a	SwE2
	PB7	GPIO_Input	Input mode	**Pull-up ***	n/a	SwE3
	PB8	GPIO_Input	Input mode	**Pull-up ***	n/a	SwE4
	PB9	GPIO_Input	Input mode	**Pull-up ***	n/a	SwE5

6.2. DMA configuration

DMA request	Stream	Direction	Priority
SPI1_TX	DMA1_Channel3	Memory To Peripheral	Low
SPI1_RX	DMA1_Channel2	Peripheral To Memory	Low
SPI2_TX	DMA1_Channel5	Memory To Peripheral	Low

SPI1_TX: DMA1_Channel3 DMA request Settings:

Mode: Normal
Peripheral Increment: Disable
Memory Increment: **Enable ***
Peripheral Data Width: Half Word
Memory Data Width: Half Word

SPI1_RX: DMA1_Channel2 DMA request Settings:

Mode: Normal
Peripheral Increment: Disable
Memory Increment: **Enable ***
Peripheral Data Width: Half Word
Memory Data Width: Half Word

SPI2_TX: DMA1_Channel5 DMA request Settings:

Mode: Normal
Peripheral Increment: Disable
Memory Increment: **Enable ***
Peripheral Data Width: Half Word
Memory Data Width: Half Word

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	2	0
DMA1 channel2 global interrupt	true	1	0
DMA1 channel3 global interrupt	true	1	0
DMA1 channel5 global interrupt	true	1	1
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
SPI1 global interrupt	unused		
SPI2 global interrupt	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

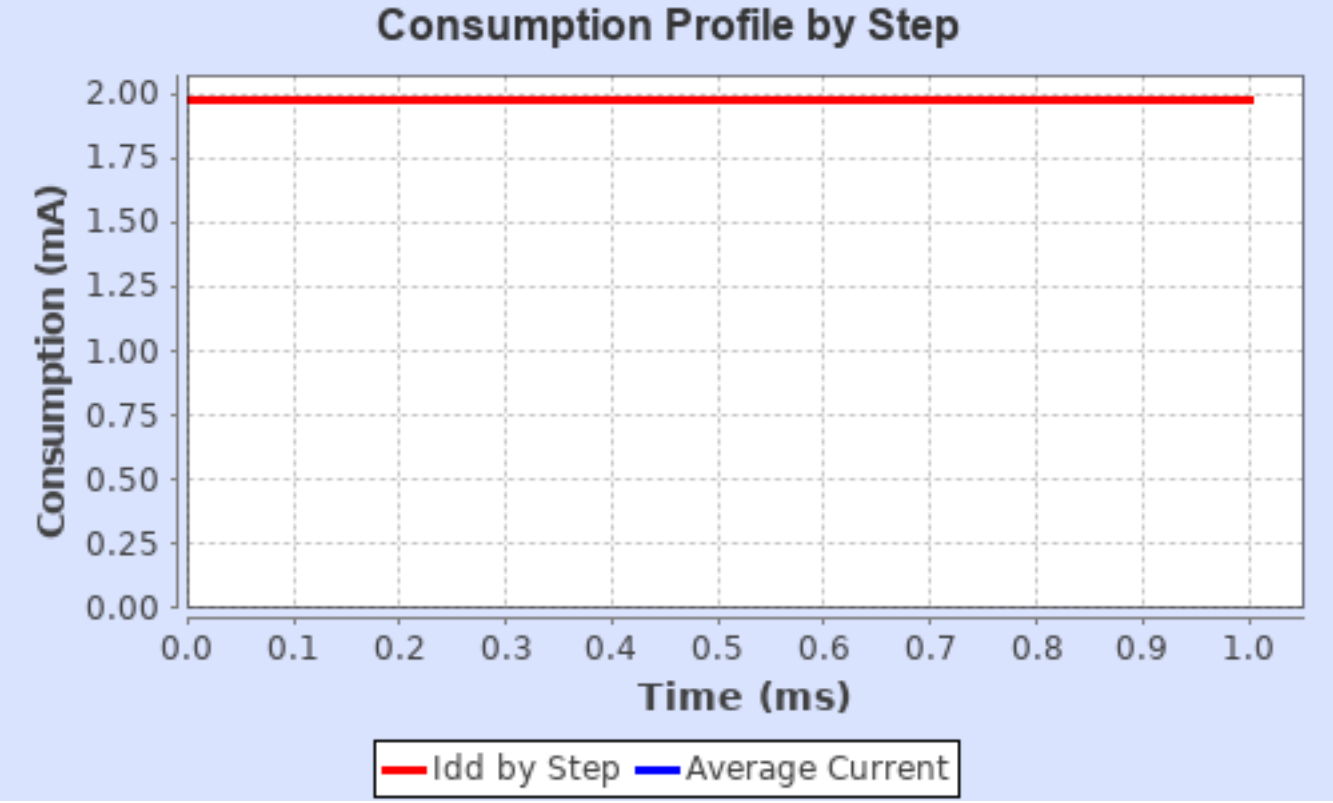
7.3. Sequence

Step	Step1
Mode	SLEEP
Vdd	3.3
Voltage Source	Battery
Range	No Scale
Fetch Type	RAM/FLASH
Clock Configuration	HSI
Clock Source Frequency	8 MHz
CPU Frequency	8 MHz
Peripherals	DMA1 GPIOA GPIOB GPIOC GPIOD SPI1 SPI2 TIM1 TIM2 TIM3 TIM4
Additional Cons.	0 mA
Average Current	1.97 mA
Duration	1 ms
DMIPS	0.0
Ta Max	104.64
Category	In DS Table

7.4. RESULTS

Sequence Time	1 ms	Average Current	1.97 mA
Battery Life	0	Average DMIPS	10.0 DMIPS

7.5. Chart



8. Software Pack Report

9. Software Project

9.1. Project Settings

Name	Value
Project Name	SurfaceControl_F103
Project Folder	/home/emil/Projects/OrCAD/Files/E37-PreenFM2/ARM/SurfaceControl_F103
Toolchain / IDE	Makefile
Firmware Package Name and Version	STM32Cube FW_F1 V1.6.0

9.2. 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)	Yes