1. Description

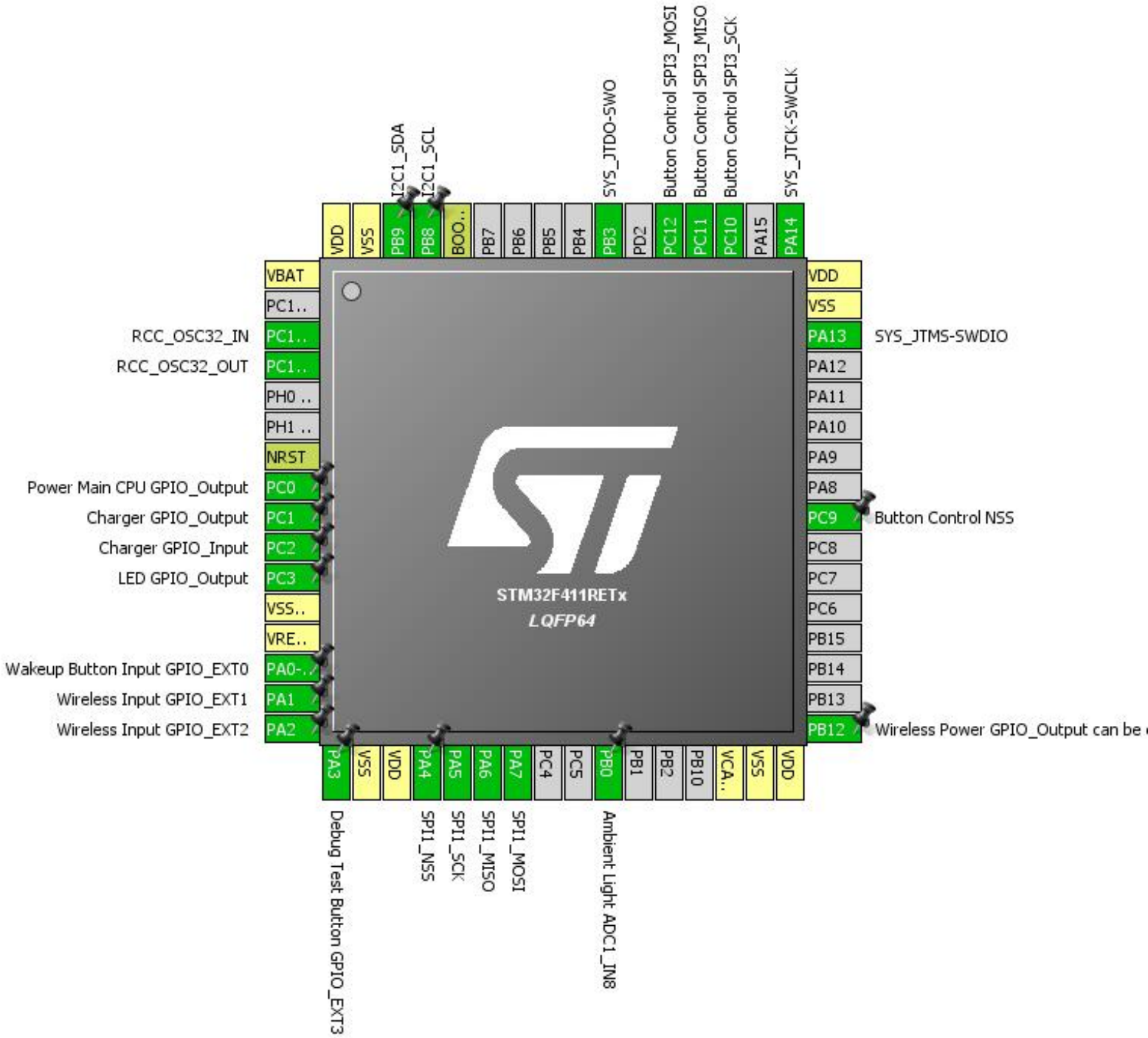
1.1. Project

Project Name	OSTC4 CPU2 F411
Board Name	No information
Generated with:	STM32CubeMX 4.9.0
Date	07/30/2015

1.2. MCU

MCU Series	STM32F4
MCU Line	STM32F411
MCU name	STM32F411RETx
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		
3	PC14-OSC32_IN	I/O	RCC_OSC32_IN	
4	PC15-OSC32_OUT	I/O	RCC_OSC32_OUT	
7	NRST	Reset		
8	PC0 *	I/O	GPIO_Output	Power Main CPU GPIO_Output
9	PC1 *	I/O	GPIO_Output	Charger GPIO_Output
10	PC2 *	I/O	GPIO_Input	Charger GPIO_Input
11	PC3 *	I/O	GPIO_Output	LED GPIO_Output
12	VSSA/VREF-	Power		
13	VREF+	Power		
14	PA0-WKUP	I/O	GPIO_EXTI0	Wakeup Button Input GPIO_EXT0
15	PA1	I/O	GPIO_EXTI1	Wireless Input GPIO_EXT1
16	PA2	I/O	GPIO_EXTI2	Wireless Input GPIO_EXT2
17	PA3	I/O	GPIO_EXTI3	Debug Test Button GPIO_EXT3
18	VSS	Power		
19	VDD	Power		
20	PA4	I/O	SPI1_NSS	
21	PA5	I/O	SPI1_SCK	
22	PA6	I/O	SPI1_MISO	
23	PA7	I/O	SPI1_MOSI	
26	PB0	I/O	ADC1_IN8	Ambient Light ADC1_IN8
30	VCAP1	Power		
31	VSS	Power		
32	VDD	Power		
33	PB12 *	I/O	GPIO_Output	Wireless Power GPIO_Output can be changed
40	PC9 *	I/O	GPIO_Output	Button Control NSS
46	PA13	I/O	SYS_JTMS-SWDIO	
47	VSS	Power		
48	VDD	Power		
49	PA14	I/O	SYS_JTCK-SWCLK	
51	PC10	I/O	SPI3_SCK	Button Control SPI3_SCK
52	PC11	I/O	SPI3_MISO	Button Control SPI3_MISO

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
53	PC12	I/O	SPI3_MOSI	Button Control SPI3_MOSI
55	PB3	I/O	SYS_JTDO-SWO	
60	BOOT0	Boot		
61	PB8	I/O	I2C1_SCL	
62	PB9	I/O	I2C1_SDA	
63	VSS	Power		
64	VDD	Power		

* The pin is affected with an I/O function

4. IPs and Middleware Configuration

4.1. ADC1

mode: IN8

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 single channel conversion

ADCgroup:

Number Of Conversion	1
External Trigger Conversion Edge	None
Number Of Conversions	0
Number Of Conversion	1
External Trigger Conversion Edge	None

WatchDog:

Enable Analog WatchDog Mode	false

ADC_Regular_ConversionMode:

Rank	1
Channel	**Channel 8 ***
Sampling Time	3 Cycles

4.2. CRC

mode: Activated

4.3. I2C1

I2C: I2C

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

4.4. RCC

Low Speed Clock (LSE) : Crystal/Ceramic Resonator

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

Power Parameters:

Power Regulatror Voltage Scale	Power Regulator Voltage Scale 2

4.5. RTC

Alarm A: Internal Alarm

General:

Hour Format	Hourformat 24
Asynchronous Predivider value	127
Synchronous Predivider value	255

Calendar Time:

Data Format	BCD data format
Day Light Saving: value of hour adjustment	Daylightsaving None
Store Operation	Storeoperation Reset

Alarm A:

Alarm Mask	Alarm Mask None
Alarm Sub Second Mask	All Alarm SS fields are masked.
Alarm Date Week Day Sel	Date
Alarm Date	1

4.6. SPI1

Mode: Full-Duplex Slave
mode: Hardware NSS Signal

Basic Parameters:

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	2
Baud Rate	**50.0 MBits/s ***
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Input Hardware

4.7. SPI3

Mode: Full-Duplex Master

Basic Parameters:

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	2
Baud Rate	**25.0 MBits/s ***
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Software

4.8. SYS

Debug: SWD and Asynchronous Trace

*** User modified value**

5. System Configuration

5.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
ADC1	PB0	ADC1_IN8	Analog mode	No pull-up and no pull-down	n/a	Ambient Light ADC1_IN8
I2C1	PB8	I2C1_SCL	Alternate Function Open Drain	Pull-up	**High ***	
	PB9	I2C1_SDA	Alternate Function Open Drain	Pull-up	**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	
SPI1	PA4	SPI1_NSS	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PA5	SPI1_SCK	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PA6	SPI1_MISO	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PA7	SPI1_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
SPI3	PC10	SPI3_SCK	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	Button Control SPI3_SCK
	PC11	SPI3_MISO	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	Button Control SPI3_MISO
	PC12	SPI3_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	Button Control SPI3_MOSI
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
	PB3	SYS_JTDO-SWO	n/a	n/a	n/a	
GPIO	PC0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	Power Main CPU GPIO_Output
	PC1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	Charger GPIO_Output
	PC2	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	Charger GPIO_Input
	PC3	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LED GPIO_Output
	PA0-WKUP	GPIO_EXTI0	External Event Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	Wakeup Button Input GPIO_EXT0
	PA1	GPIO_EXTI1	External Event Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	Wireless Input GPIO_EXT1
	PA2	GPIO_EXTI2	External Event Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	Wireless Input GPIO_EXT2
	PA3	GPIO_EXTI3	External Event Mode with	No pull-up and no pull-down	n/a	Debug Test Button

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
			Rising edge trigger detection			GPIO_EXT3
	PB12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	Wireless Power GPIO_Output can be changed
	PC9	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	Button Control NSS

5.2. DMA configuration

DMA request	Stream	Direction	Priority
SPI1_RX	DMA2_Stream0	Peripheral To Memory	**High ***
SPI1_TX	DMA2_Stream2	Memory To Peripheral	**High ***

SPI1_RX: DMA2_Stream0 DMA request Settings:

Mode:	Normal
Use fifo:	Disable
PeripheralIncrement:	Disable
MemoryIncrement:	Disable
Peripheral Data Width:	Byte

SPI1_TX: DMA2_Stream2 DMA request Settings:

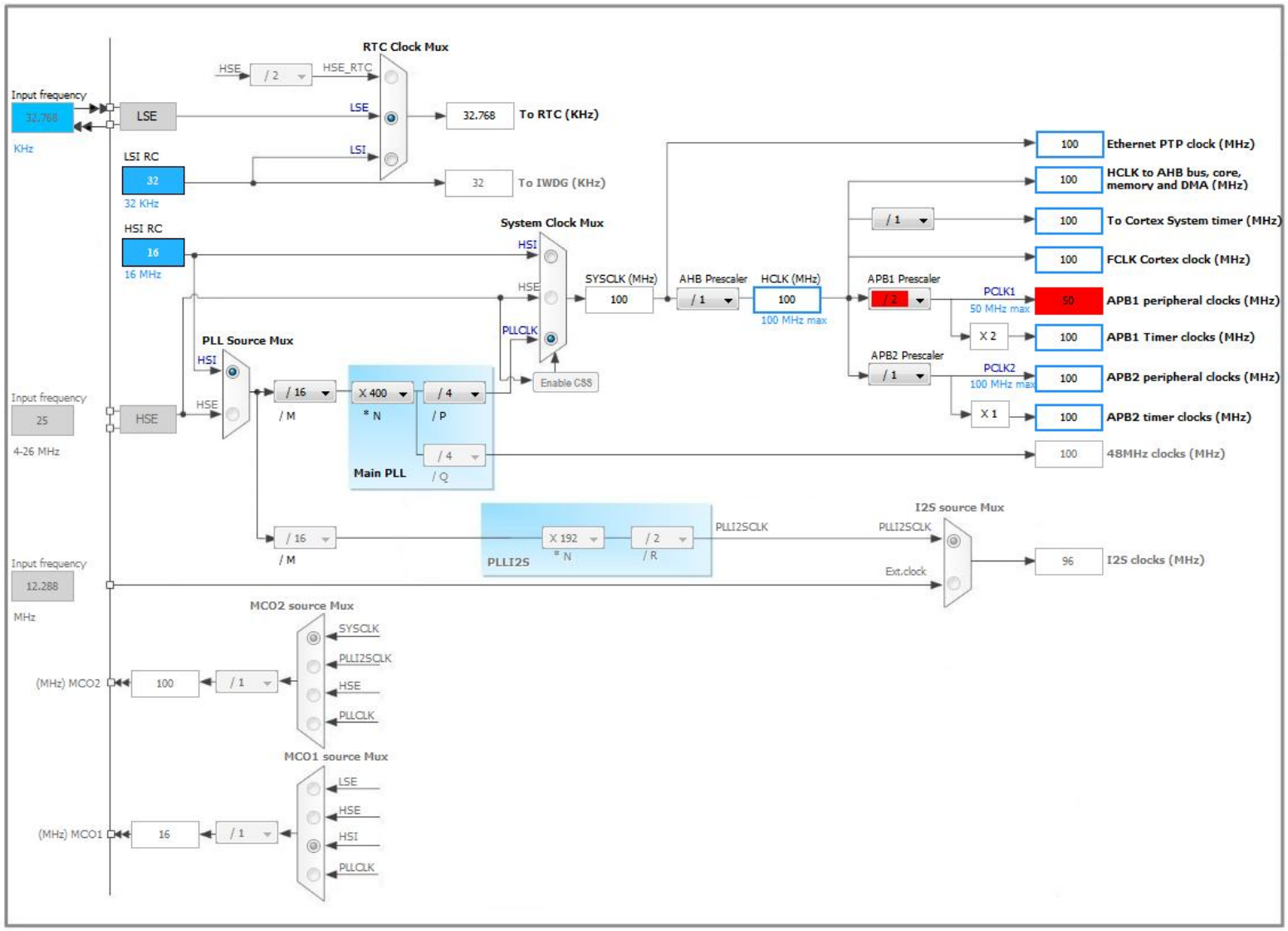
Mode:	Normal
Use fifo:	Disable
PeripheralIncrement:	Disable
MemoryIncrement:	Disable
Peripheral Data Width:	Byte

5.3. NVIC configuration

Interrupt Table	Enable	Preenmption Priority	SubPriority
System tick timer	true	0	0
DMA2 Stream0 global interrupt	true	0	0
DMA2 Stream2 global interrupt	true	0	0
Non Maskable Interrupt	unused		
Memory management fault	unused		
Pre-fetch fault, memory access fault	unused		
Undefined instruction or illegal state	unused		
Debug Monitor	unused		
PVD through EXTI Line16 interrupt	unused		
RCC global interrupt	unused		
ADC1 global interrupt	unused		
I2C1 event interrupt	unused		
I2C1 error interrupt	unused		
SPI1 global interrupt	unused		
RTC Alarms (A and B) through EXTI Line17 interrupt	unused		
SPI3 global interrupt	unused		

*** User modified value**

6. Clock Tree Configuration



7. Power Plugin report

7.1. Microcontroller Selection

Series	STM32F4
Line	STM32F411
MCU	STM32F411RETx
Datasheet	026289_Rev4

7.2. Parameter Selection

Temperature	25
Vdd	3.6

7.3. Battery Selection

Battery	Li-SOCL2(A3400)
Capacity	3400.0 mAh
Self discharge	0.08 %/month
Nominal voltage	3.6 V
Max Cont Current	100.0 mA
Max Pulse Current	200.0 mA
Cells in series	1
Cells in parallel	1

7.4. Sequence

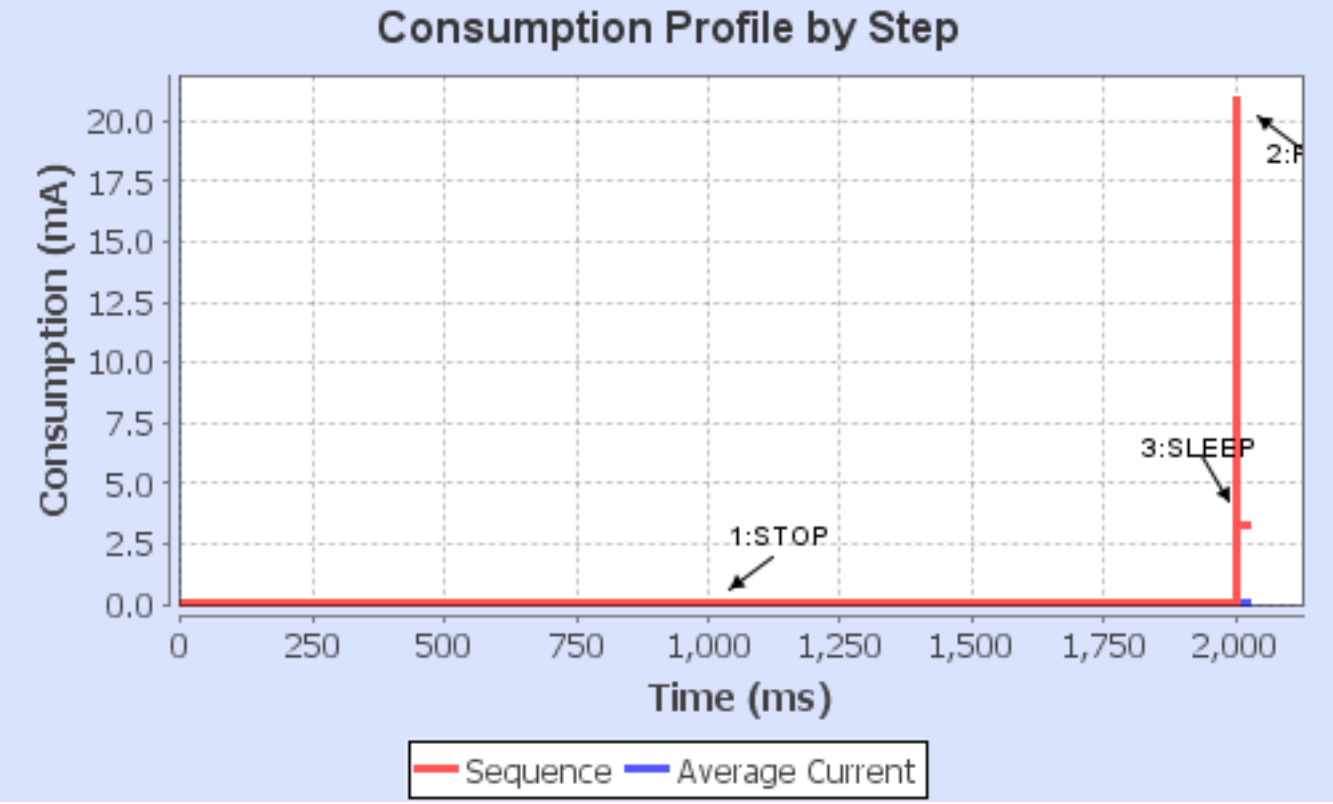
Step	STEP1	STEP2	STEP3
Mode	STOP	RUN	SLEEP
Range	No Scale	Scale1-Medium	Scale1-Medium
Fetch type	n/a	FLASH	RAM/FLASH

Clock Config.	Regulator_LP Flash-PwrDwn	HSE PLL	HSE PLL
Clock Source Freq.	0 Hz	4.0 MHz	4.0 MHz
CPU Freq.	0 Hz	100.0 MHz	100.0 MHz
Periph.	PVD* RTC*	GPIOB I2C1	GPIOB I2C1
Additional Cons.	5 µA	120 µA	0 mA
Average Current	19 µA	20.83 mA	3.31 mA
Duration	2 s	2 ms	22 ms
DMIPS	0.0	125.0	125.0

7.5. Results

Sequence time	2.02 s	Average current	75.34 µA
Battery Life	4 years , 11 months & 16 hours	Average DMIPS	125.0 DMIPS

7.6. Chart



8. Software Project

8.1. Project Settings

Name	Value
Project Name	OSTC4 CPU2 F411
Project Folder	C:\workspaces\ARM_M4\OSTC4\OSTC4smallCPU
Toolchain / IDE	MDK-ARM 4.73
Firmware Package Name and Version	STM32Cube FW_F4 V1.7.0

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

8.3. Toolchains Settings

Name	Value
Compiler Optimizations	Balanced Size/Speed