1. Description

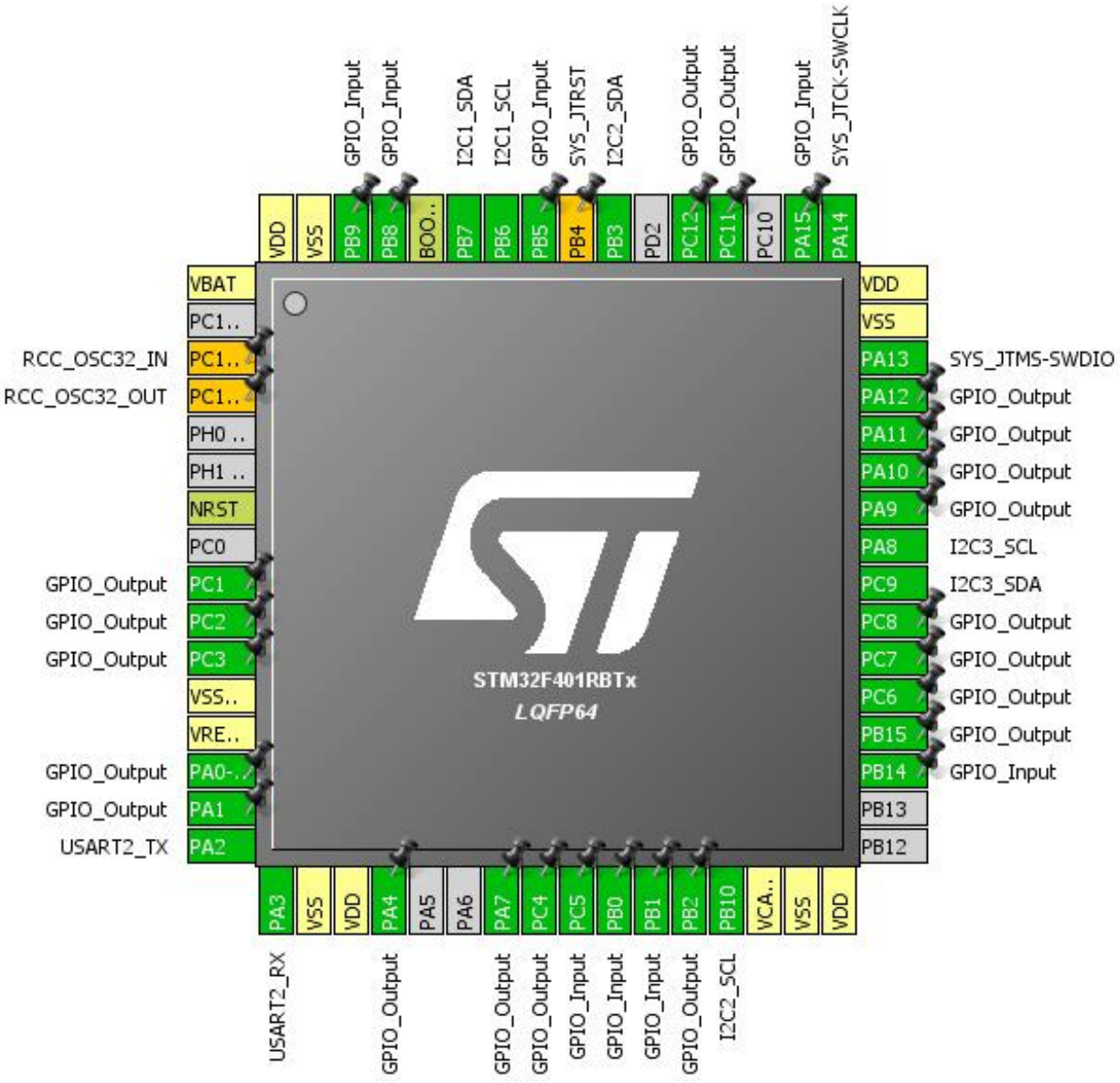
1.1. Project

Project Name	electronicLab
Board Name	custom
Generated with:	STM32CubeMX 4.27.0
Date	11/09/2018

1.2. MCU

MCU Series	STM32F4
MCU Line	STM32F401
MCU name	STM32F401RBTx
MCU Package	LQFP64
MCU Pin number	64

2. Pinout Configuration



3. Pins Configuration

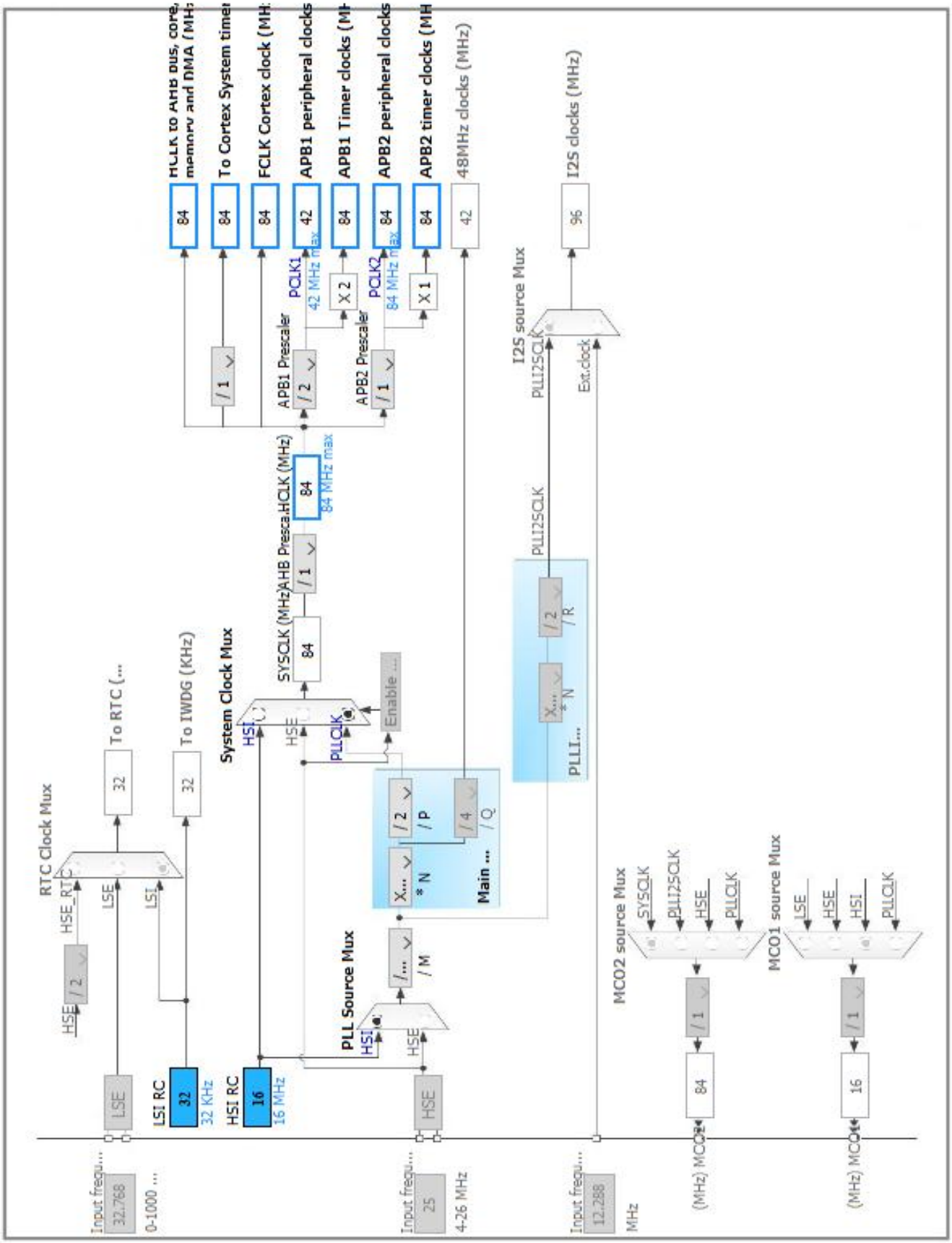
Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
3	PC14-OSC32_IN *	I/O	RCC_OSC32_IN	
4	PC15-OSC32_OUT *	I/O	RCC_OSC32_OUT	
7	NRST	Reset		
9	PC1 **	I/O	GPIO_Output	
10	PC2 **	I/O	GPIO_Output	
11	PC3 **	I/O	GPIO_Output	
12	VSSA/VREF-	Power		
13	VREF+	Power		
14	PA0-WKUP **	I/O	GPIO_Output	
15	PA1 **	I/O	GPIO_Output	
16	PA2	I/O	USART2_TX	
17	PA3	I/O	USART2_RX	
18	VSS	Power		
19	VDD	Power		
20	PA4 **	I/O	GPIO_Output	
23	PA7 **	I/O	GPIO_Output	
24	PC4 **	I/O	GPIO_Output	
25	PC5 **	I/O	GPIO_Input	
26	PB0 **	I/O	GPIO_Input	
27	PB1 **	I/O	GPIO_Input	
28	PB2 **	I/O	GPIO_Output	
29	PB10	I/O	I2C2_SCL	
30	VCAP1	Power		
31	VSS	Power		
32	VDD	Power		
35	PB14 **	I/O	GPIO_Input	
36	PB15 **	I/O	GPIO_Output	
37	PC6 **	I/O	GPIO_Output	
38	PC7 **	I/O	GPIO_Output	
39	PC8 **	I/O	GPIO_Output	
40	PC9	I/O	I2C3_SDA	
41	PA8	I/O	I2C3_SCL	
42	PA9 **	I/O	GPIO_Output	
43	PA10 **	I/O	GPIO_Output	
44	PA11 **	I/O	GPIO_Output	

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
45	PA12 **	I/O	GPIO_Output	
46	PA13	I/O	SYS_JTMS-SWDIO	
47	VSS	Power		
48	VDD	Power		
49	PA14	I/O	SYS_JTCK-SWCLK	
50	PA15 **	I/O	GPIO_Input	
52	PC11 **	I/O	GPIO_Output	
53	PC12 **	I/O	GPIO_Output	
55	PB3	I/O	I2C2_SDA	
56	PB4 *	I/O	SYS_JTRST	
57	PB5 **	I/O	GPIO_Input	
58	PB6	I/O	I2C1_SCL	
59	PB7	I/O	I2C1_SDA	
60	BOOT0	Boot		
61	PB8 **	I/O	GPIO_Input	
62	PB9 **	I/O	GPIO_Input	
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. I2C1

I2C: I2C

5.1.1. Parameter Settings:

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

5.2. I2C2

I2C: I2C

5.2.1. Parameter Settings:

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

5.3. I2C3

I2C: I2C

5.3.1. Parameter Settings:

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

5.4. SYS

Debug: Serial Wire

Timebase Source: SysTick

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

*** User modified value**

6. System Configuration

6.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
I2C1	PB6	I2C1_SCL	Alternate Function Open Drain	Pull-up	**Very High** *	
	PB7	I2C1_SDA	Alternate Function Open Drain	Pull-up	**Very High** *	
I2C2	PB10	I2C2_SCL	Alternate Function Open Drain	Pull-up	**Very High** *	
	PB3	I2C2_SDA	Alternate Function Open Drain	Pull-up	**Very High** *	
I2C3	PC9	I2C3_SDA	Alternate Function Open Drain	Pull-up	**Very High** *	
	PA8	I2C3_SCL	Alternate Function Open Drain	Pull-up	**Very High** *	
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
USART2	PA2	USART2_TX	Alternate Function Push Pull	Pull-up	**Very High** *	
	PA3	USART2_RX	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	
	PB4	SYS_JTRST	n/a	n/a	n/a	
GPIO	PC1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PC2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PC3	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PA0-WKUP	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PA1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PA4	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PA7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PC4	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PC5	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PB0	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PB1	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PB2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PB14	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PB15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PC6	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PC7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PC8	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_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PA11	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PA12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PA15	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PC11	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PC12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PB5	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PB8	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PB9	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	

6.2. DMA configuration

nothing configured in DMA service

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
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
I2C1 event interrupt	unused		
I2C1 error interrupt	unused		
I2C2 event interrupt	unused		
I2C2 error interrupt	unused		
USART2 global interrupt	unused		
I2C3 event interrupt	unused		
I2C3 error interrupt	unused		
FPU global interrupt	unused		

*** User modified value**

7. Power Consumption Calculator report

7.1. Microcontroller Selection

Series	STM32F4
Line	STM32F401
MCU	STM32F401RBTx
Datasheet	024738_Rev8

7.2. Parameter Selection

Temperature	25
Vdd	3.3

7.3. Sequence

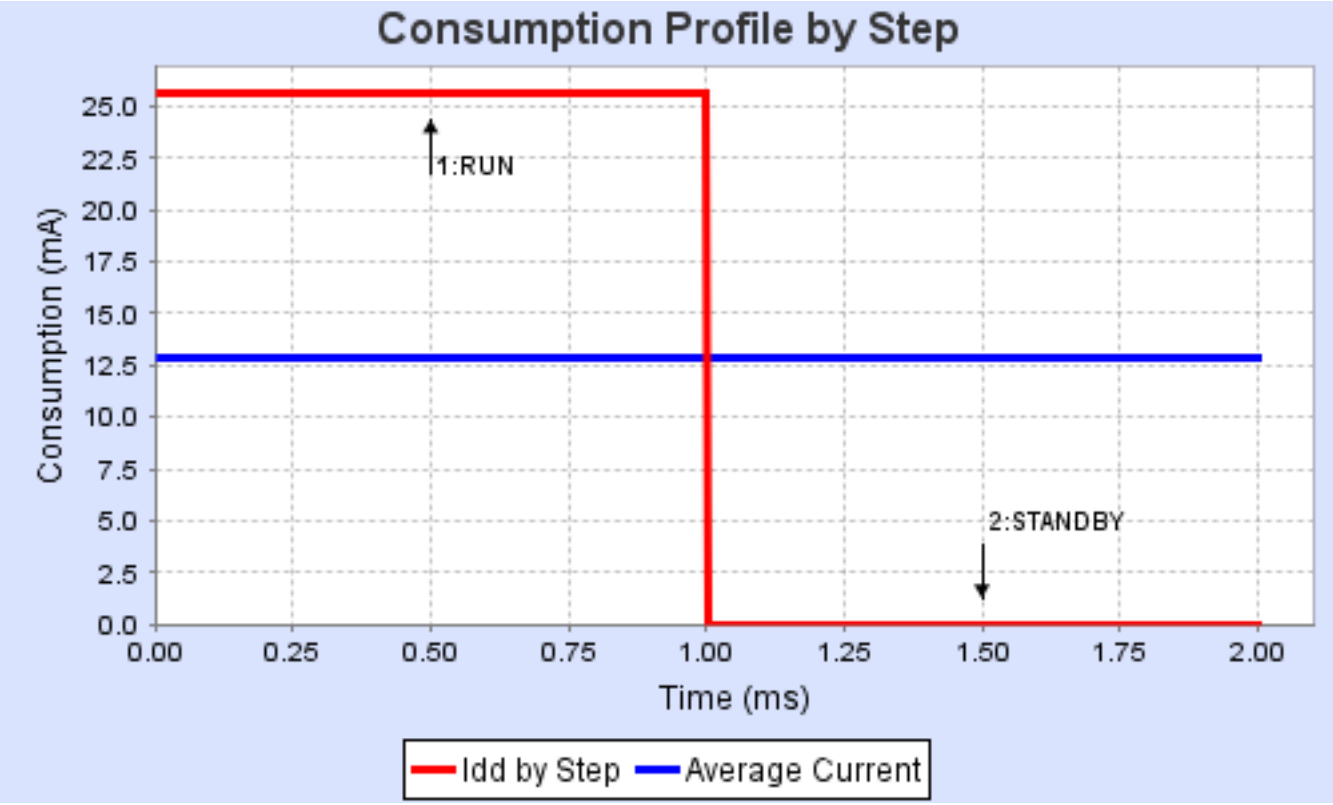
Step	Step1	Step2
Mode	RUN	STANDBY
Vdd	3.3	3.3
Voltage Source	Vbus	Vbus
Range	Scale3-Low	No Scale
Fetch Type	FLASH/ART/PREFETCH	n/a
Clock Configuration	HSE PLL	LSE RTC
Clock Source Frequency	4 MHz	32.768 kHz
CPU Frequency	60 MHz	0 Hz
Peripherals	GPIOA GPIOB GPIOC I2C1 I2C2 I2C3 RTC USART2	RTC*
Additional Cons.	10 mA	0 mA
Average Current	25.66 mA	2.8 µA
Duration	1 ms	1 ms
DMIPS	75.0	0.0
Ta Max	100.77	105
Category	In DS Table	In DS Table

7.4. RESULTS

Sequence Time	2 ms	Average Current	12.83 mA

Battery Life	0	Average DMIPS	75.0 DMIPS

7.5. Chart



8. Software Project

8.1. Project Settings

Name	Value
Project Name	electronicLab
Project Folder	C:\Users\Public\Documents\Altium\Projects\electronic_Lab_software\electronicLa
Toolchain / IDE	MDK-ARM V5
Firmware Package Name and Version	STM32Cube FW_F4 V1.21.0

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)	No

9. Software Pack Report