1. Description

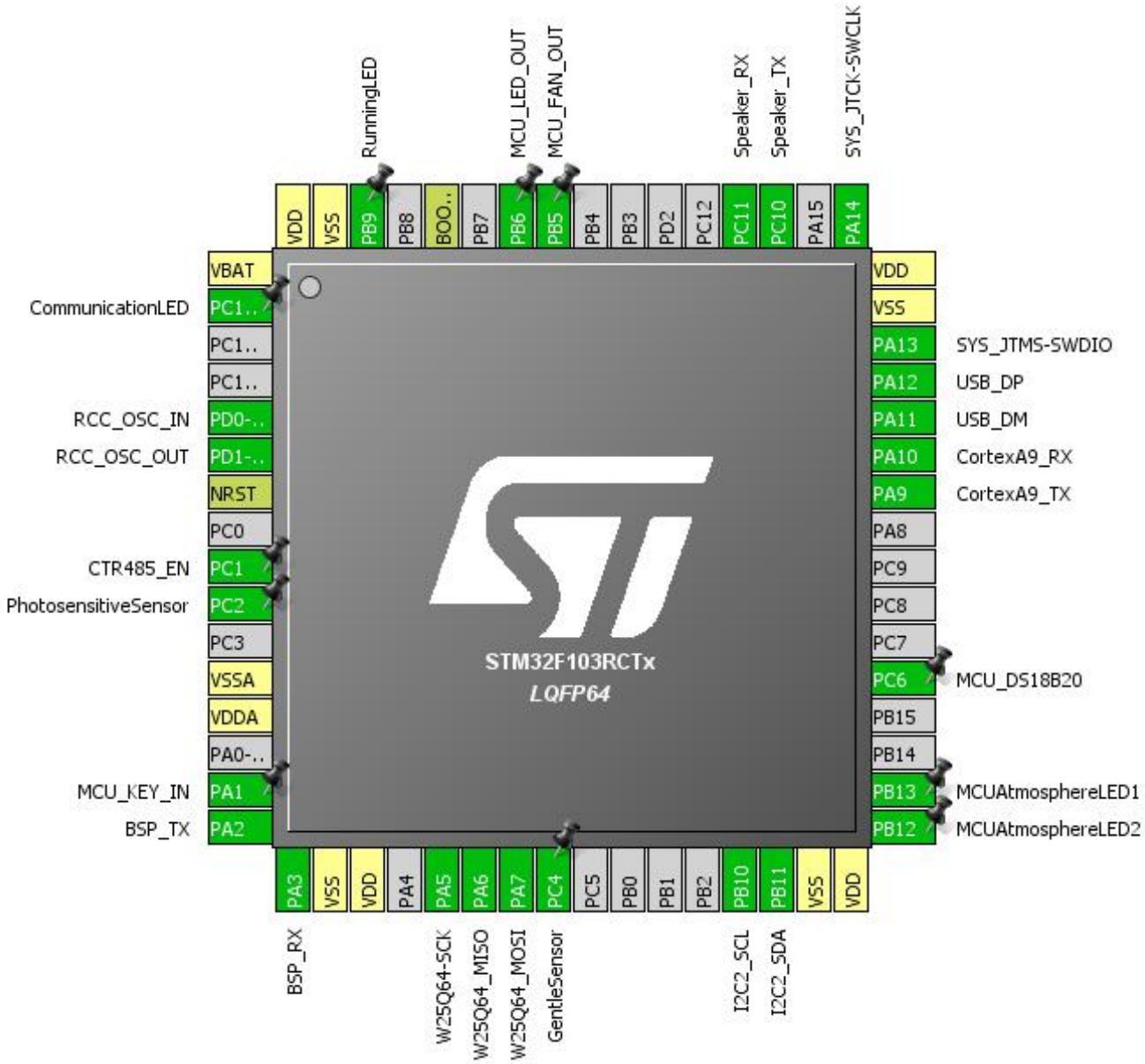
1.1. Project

Project Name	DSPro
Board Name	DSPro
Generated with:	STM32CubeMX 4.23.0
Date	12/25/2017

1.2. MCU

MCU Series	STM32F1
MCU Line	STM32F103
MCU name	STM32F103RCTx
MCU Package	LQFP64
MCU Pin number	64

2. Pinout Configuration



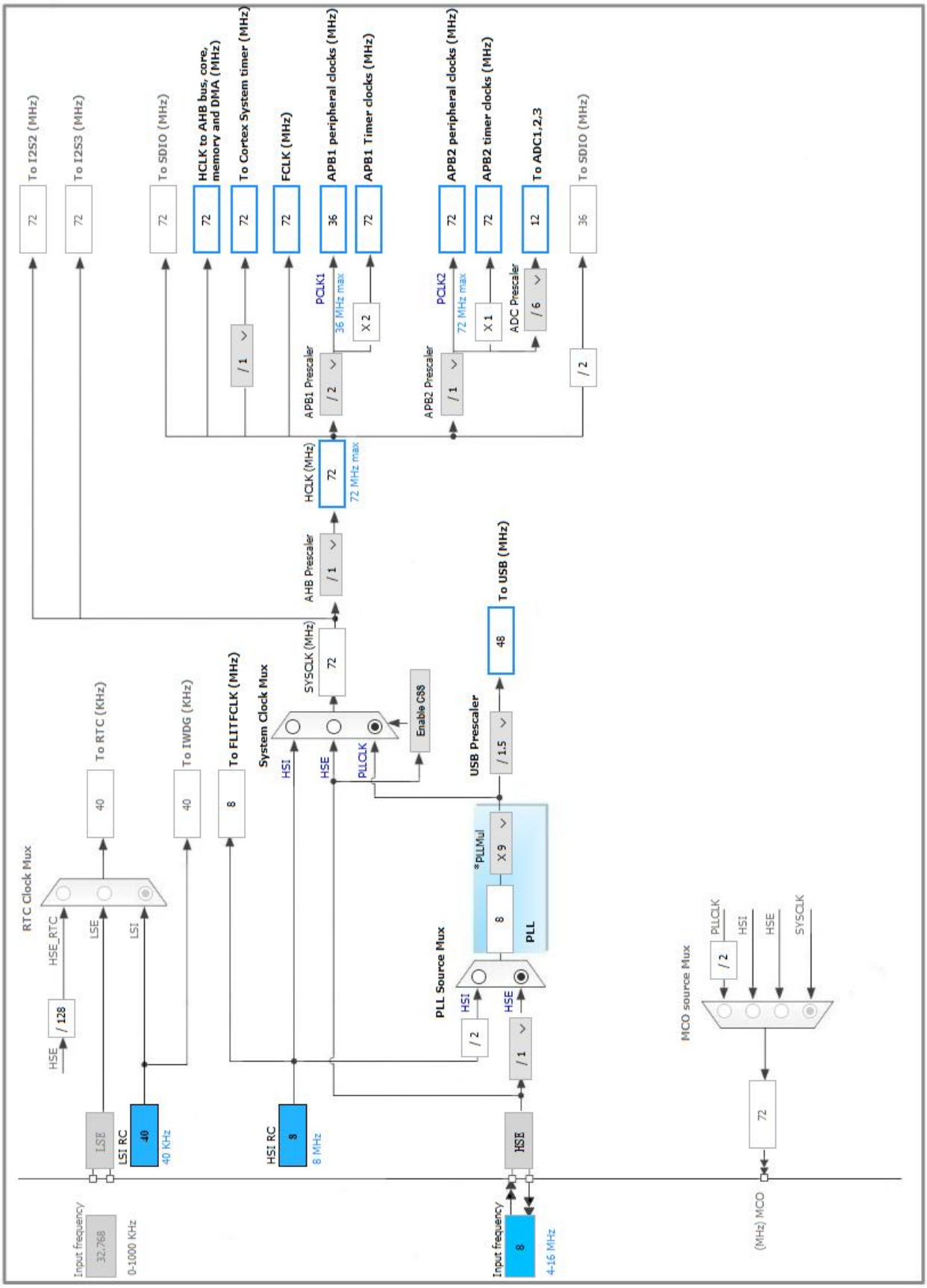
3. Pins Configuration

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
2	PC13-TAMPER-RTC *	I/O	GPIO_Output	CommunicationLED
5	PD0-OSC_IN	I/O	RCC_OSC_IN	
6	PD1-OSC_OUT	I/O	RCC_OSC_OUT	
7	NRST	Reset		
9	PC1 *	I/O	GPIO_Output	CTR485_EN
10	PC2	I/O	ADC1_IN12	PhotosensitiveSensor
12	VSSA	Power		
13	VDDA	Power		
15	PA1	I/O	GPIO_EXTI1	MCU_KEY_IN
16	PA2	I/O	USART2_TX	BSP_TX
17	PA3	I/O	USART2_RX	BSP_RX
18	VSS	Power		
19	VDD	Power		
21	PA5	I/O	SPI1_SCK	W25Q64-SCK
22	PA6	I/O	SPI1_MISO	W25Q64_MISO
23	PA7	I/O	SPI1_MOSI	W25Q64_MOSI
24	PC4 *	I/O	GPIO_Input	GentleSensor
29	PB10	I/O	I2C2_SCL	
30	PB11	I/O	I2C2_SDA	
31	VSS	Power		
32	VDD	Power		
33	PB12 *	I/O	GPIO_Output	MCUAtmosphereLED2
34	PB13 *	I/O	GPIO_Output	MCUAtmosphereLED1
37	PC6 *	I/O	GPIO_Output	MCU_DS18B20
42	PA9	I/O	USART1_TX	CortexA9_TX
43	PA10	I/O	USART1_RX	CortexA9_RX
44	PA11	I/O	USB_DM	
45	PA12	I/O	USB_DP	
46	PA13	I/O	SYS_JTMS-SWDIO	
47	VSS	Power		
48	VDD	Power		
49	PA14	I/O	SYS_JTCK-SWCLK	
51	PC10	I/O	UART4_TX	Speaker_TX
52	PC11	I/O	UART4_RX	Speaker_RX
57	PB5 *	I/O	GPIO_Output	MCU_FAN_OUT

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
58	PB6 *	I/O	GPIO_Output	MCU_LED_OUT
60	BOOT0	Boot		
62	PB9 *	I/O	GPIO_Output	RunningLED
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. ADC1

mode: IN12

mode: Temperature Sensor Channel

5.1.1. Parameter Settings:

ADCs_Common_Settings:	
Mode	Independent mode
ADC_Settings:	
Data Alignment	Right alignment
Scan Conversion Mode	Enabled
Continuous Conversion Mode	Disabled
Discontinuous Conversion Mode	Disabled
ADC_Regular_ConversionMode:	
Enable Regular Conversions	Enable
Number Of Conversion	**2 ***
External Trigger Conversion Source	Regular Conversion launched by software
Rank	1
Channel	Channel 12
Sampling Time	**239.5 Cycles ***
Rank	**2 ***
Channel	**Channel Temperature Sensor ***
Sampling Time	**239.5 Cycles ***
ADC_Injected_ConversionMode:	
Number Of Conversions	0
WatchDog:	
Enable Analog WatchDog Mode	false

5.2. CRC

mode: Activated

5.3. I2C2

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. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

5.4.1. Parameter Settings:

System Parameters:

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

RCC Parameters:

HSI Calibration Value	16
HSE Startup Timout Value (ms)	100
LSE Startup Timout Value (ms)	5000

5.5. SPI1

Mode: Full-Duplex Master

5.5.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	**16 Bits ***

First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	**8 ***
Baud Rate	**9.0 MBits/s ***
Clock Polarity (CPOL)	**High ***
Clock Phase (CPHA)	**2 Edge ***

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Software

5.6. SYS

Debug: Serial Wire

Timebase Source: SysTick

5.7. TIM4

mode: Clock Source

5.7.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**72-1 ***
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**1000-1 ***
Internal Clock Division (CKD)	No Division
auto-reload preload	**Enable ***

Trigger Output (TRGO) Parameters:

Master/Slave Mode	Disable (no sync between this TIM (Master) and its Slaves
Trigger Event Selection	Reset (UG bit from TIMx_EGR)

5.8. TIM5

mode: Clock Source

5.8.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**72-1 ***
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**100-1 ***
Internal Clock Division (CKD)	No Division
auto-reload preload	**Enable ***

Trigger Output (TRGO) Parameters:

Master/Slave Mode	Disable (no sync between this TIM (Master) and its Slaves
Trigger Event Selection	Reset (UG bit from TIMx_EGR)

5.9. UART4

Mode: Asynchronous

5.9.1. 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

5.10. USART1

Mode: Asynchronous

5.10.1. 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

5.11. USART2

Mode: Asynchronous

5.11.1. 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

5.12. USB

mode: Device (FS)

5.12.1. Parameter Settings:

Basic Parameters:

Speed	Full Speed 12MBit/s
Endpoint 0 Max Packet size	8 Bytes

Power Parameters:

Low Power	Disabled
Link Power Management	Disabled
Battery Charging	Disabled

5.13. USB_DEVICE

Class For FS IP: Communication Device Class (Virtual Port Com)

5.13.1. Parameter Settings:

Basic Parameters:

USBD_MAX_NUM_INTERFACES (Maximum number of supported interfaces)	1
USBD_MAX_NUM_CONFIGURATION (Maximum number of supported configuration)	1
USBD_MAX_STR_DESC_SIZ (Maximum size for the string descriptors)	512
USBD_SUPPORT_USER_STRING (Enable user string descriptor)	Disabled
USBD_SELF_POWERED (Enabled self power)	Enabled
USBD_DEBUG_LEVEL (USBD Debug Level)	0: No debug message

Class Parameters:

USB CDC Rx Buffer Size	2048
USB CDC Tx Buffer Size	2048

5.13.2. Device Descriptor:

Device Descriptor:

VID (Vendor IDentifier)	1155
LANGID_STRING (Language Identifier)	English(United States)
MANUFACTURER_STRING (Manufacturer Identifier)	STMicroelectronics

Device Descriptor FS:

PID (Product IDentifier)	22336
PRODUCT_STRING (Product Identifier)	STM32 Virtual ComPort
SERIALNUMBER_STRING (Serial number)	00000000001A
CONFIGURATION_STRING (Configuration Identifier)	CDC Config
INTERFACE_STRING (Interface Identifier)	CDC Interface

*** 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	PC2	ADC1_IN12	Analog mode	n/a	n/a	PhotosensitiveSensor
I2C2	PB10	I2C2_SCL	Alternate Function Open Drain	n/a	**High ***	
	PB11	I2C2_SDA	Alternate Function Open Drain	n/a	**High ***	
RCC	PD0-OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	
	PD1-OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	
SPI1	PA5	SPI1_SCK	Alternate Function Push Pull	n/a	**High ***	W25Q64-SCK
	PA6	SPI1_MISO	Input mode	No pull-up and no pull-down	**n/a**	W25Q64_MISO
	PA7	SPI1_MOSI	Alternate Function Push Pull	n/a	**High ***	W25Q64_MOSI
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
UART4	PC10	UART4_TX	Alternate Function Push Pull	n/a	**High ***	Speaker_TX
	PC11	UART4_RX	Input mode	No pull-up and no pull-down	**n/a**	Speaker_RX
USART1	PA9	USART1_TX	Alternate Function Push Pull	n/a	**High ***	CortexA9_TX
	PA10	USART1_RX	Input mode	No pull-up and no pull-down	**n/a**	CortexA9_RX
USART2	PA2	USART2_TX	Alternate Function Push Pull	n/a	**High ***	BSP_TX
	PA3	USART2_RX	Input mode	No pull-up and no pull-down	**n/a**	BSP_RX
USB	PA11	USB_DM	n/a	n/a	n/a	
	PA12	USB_DP	n/a	n/a	n/a	
GPIO	PC13-TAMPER-RTC	GPIO_Output	Output Push Pull	n/a	Low	CommunicationLED
	PC1	GPIO_Output	Output Push Pull	n/a	Low	CTR485_EN
	PA1	GPIO_EXTI1	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	MCU_KEY_IN
	PC4	GPIO_Input	Input mode	**Pull-up ***	n/a	GentleSensor
	PB12	GPIO_Output	Output Push Pull	**n/a**	Low	MCUAtmosphereLED2
	PB13	GPIO_Output	Output Push Pull	**n/a**	Low	MCUAtmosphereLED1

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PC6	GPIO_Output	Output Push Pull	**n/a**	Low	MCU_DS18B20
	PB5	GPIO_Output	Output Push Pull	**n/a**	Low	MCU_FAN_OUT
	PB6	GPIO_Output	Output Push Pull	**n/a**	Low	MCU_LED_OUT
	PB9	GPIO_Output	Output Push Pull	**n/a**	Low	RunningLED

6.2. DMA configuration

DMA request	Stream	Direction	Priority
USART1_RX	DMA1_Channel5	Peripheral To Memory	Low
USART1_TX	DMA1_Channel4	Memory To Peripheral	Low
ADC1	DMA1_Channel1	Peripheral To Memory	Low
UART4_TX	DMA2_Channel5	Memory To Peripheral	Low
USART2_RX	DMA1_Channel6	Peripheral To Memory	Low
USART2_TX	DMA1_Channel7	Memory To Peripheral	Low

USART1_RX: DMA1_Channel5 DMA request Settings:

Mode: Normal
Peripheral Increment: Disable
Memory Increment: **Enable ***
Peripheral Data Width: Byte
Memory Data Width: Byte

USART1_TX: DMA1_Channel4 DMA request Settings:

Mode: Normal
Peripheral Increment: Disable
Memory Increment: **Enable ***
Peripheral Data Width: Byte
Memory Data Width: Byte

ADC1: DMA1_Channel1 DMA request Settings:

Mode: **Circular ***
Peripheral Increment: Disable
Memory Increment: **Enable ***
Peripheral Data Width: **Word ***
Memory Data Width: **Word ***

UART4_TX: DMA2_Channel5 DMA request Settings:

Mode: Normal
Peripheral Increment: Disable

Memory Increment:	**Enable ***
Peripheral Data Width:	Byte
Memory Data Width:	Byte

USART2_RX: DMA1_Channel6 DMA request Settings:

Mode:	Normal
Peripheral Increment:	Disable
Memory Increment:	**Enable ***
Peripheral Data Width:	Byte
Memory Data Width:	Byte

USART2_TX: DMA1_Channel7 DMA request Settings:

Mode:	Normal
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
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	0	0
EXTI line1 interrupt	true	0	0
DMA1 channel1 global interrupt	true	0	0
DMA1 channel4 global interrupt	true	0	0
DMA1 channel5 global interrupt	true	0	0
DMA1 channel6 global interrupt	true	0	0
DMA1 channel7 global interrupt	true	0	0
ADC1 and ADC2 global interrupts	true	0	0
USB low priority or CAN RX0 interrupts	true	0	0
TIM4 global interrupt	true	0	0
I2C2 event interrupt	true	0	0
I2C2 error interrupt	true	0	0
SPI1 global interrupt	true	0	0
USART1 global interrupt	true	0	0
USART2 global interrupt	true	0	0
TIM5 global interrupt	true	0	0
UART4 global interrupt	true	0	0
DMA2 channel4 and channel5 global interrupts	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
USB high priority or CAN TX interrupts	unused		

*** User modified value**

7. Power Consumption Calculator report

7.1. Microcontroller Selection

Series	STM32F1
Line	STM32F103
MCU	STM32F103RCTx
Datasheet	14611_Rev12

7.2. Parameter Selection

Temperature	25
Vdd	3.3

7.3. Sequence

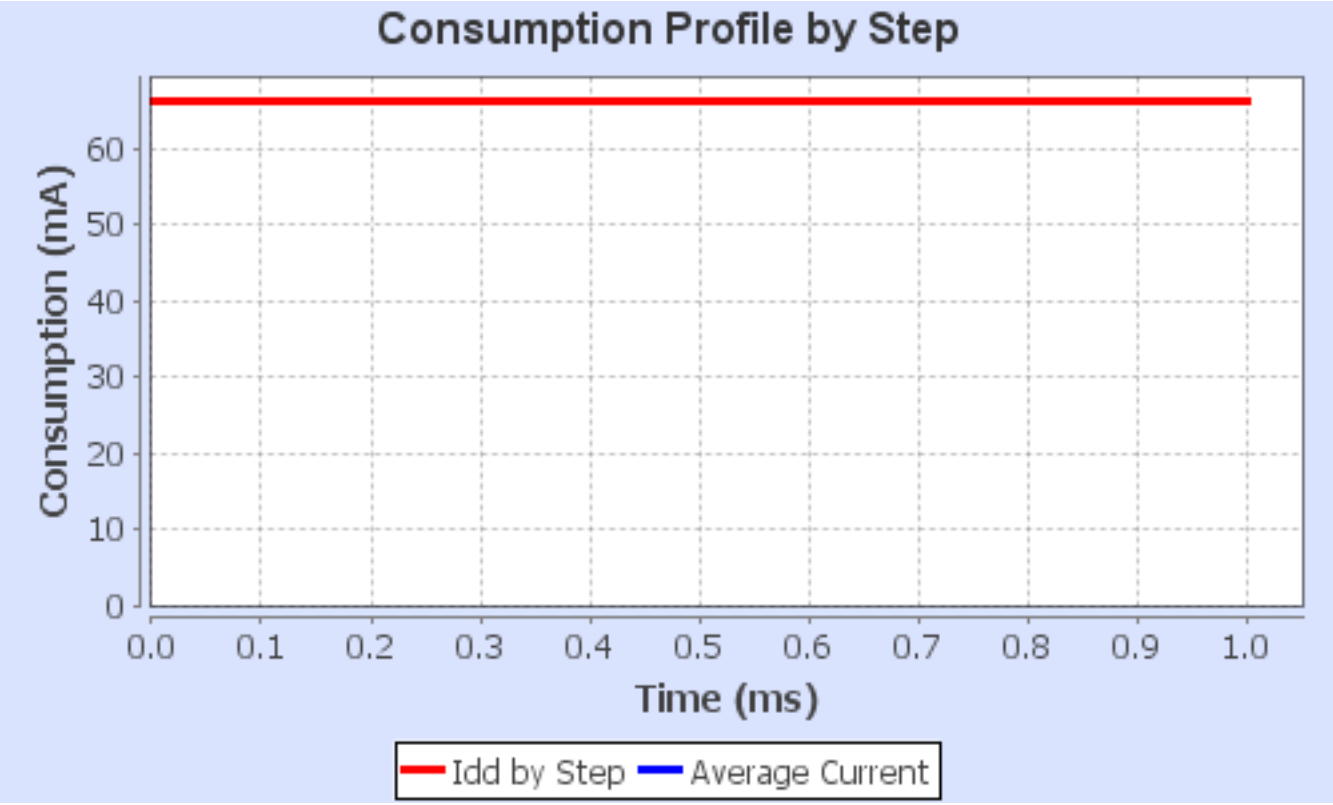
Step	Step1
Mode	RUN
Vdd	3.3
Voltage Source	Battery
Range	No Scale
Fetch Type	FLASH
Clock Configuration	HSE PLL
Clock Source Frequency	8 MHz
CPU Frequency	72 MHz
Peripherals	ADC1 ADC2 ADC3 APB1-Bridge APB2-Bridge BKP BusMatrix CRC DAC:OUT1 DMA1 DMA2 GPIOA GPIOB GPIOC GPIOD I2C1 I2C2 IWDG PVD/BOR PWR RTC SDIO SPI1 SPI2 SPI3 TIM1 TIM2 TIM3 TIM4 TIM5 TIM6 TIM7 TIM8 UART4 UART5 USART1 USART2 USART3 USB WWDG
Additional Cons.	0 mA
Average Current	66.04 mA
Duration	1 ms
DMIPS	61.0

Ta Max	95.19
Category	In DS Table

7.4. RESULTS

Sequence Time	1 ms	Average Current	66.04 mA
Battery Life	0	Average DMIPS	61.0 DMIPS

7.5. Chart



8. Software Project

8.1. Project Settings

Name	Value
Project Name	DSPro
Project Folder	E:\Users\bertz\Documents\GitHub\DSv1.3\DSPro
Toolchain / IDE	EWARM
Firmware Package Name and Version	STM32Cube FW_F1 V1.6.0

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	Yes
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