1. Description

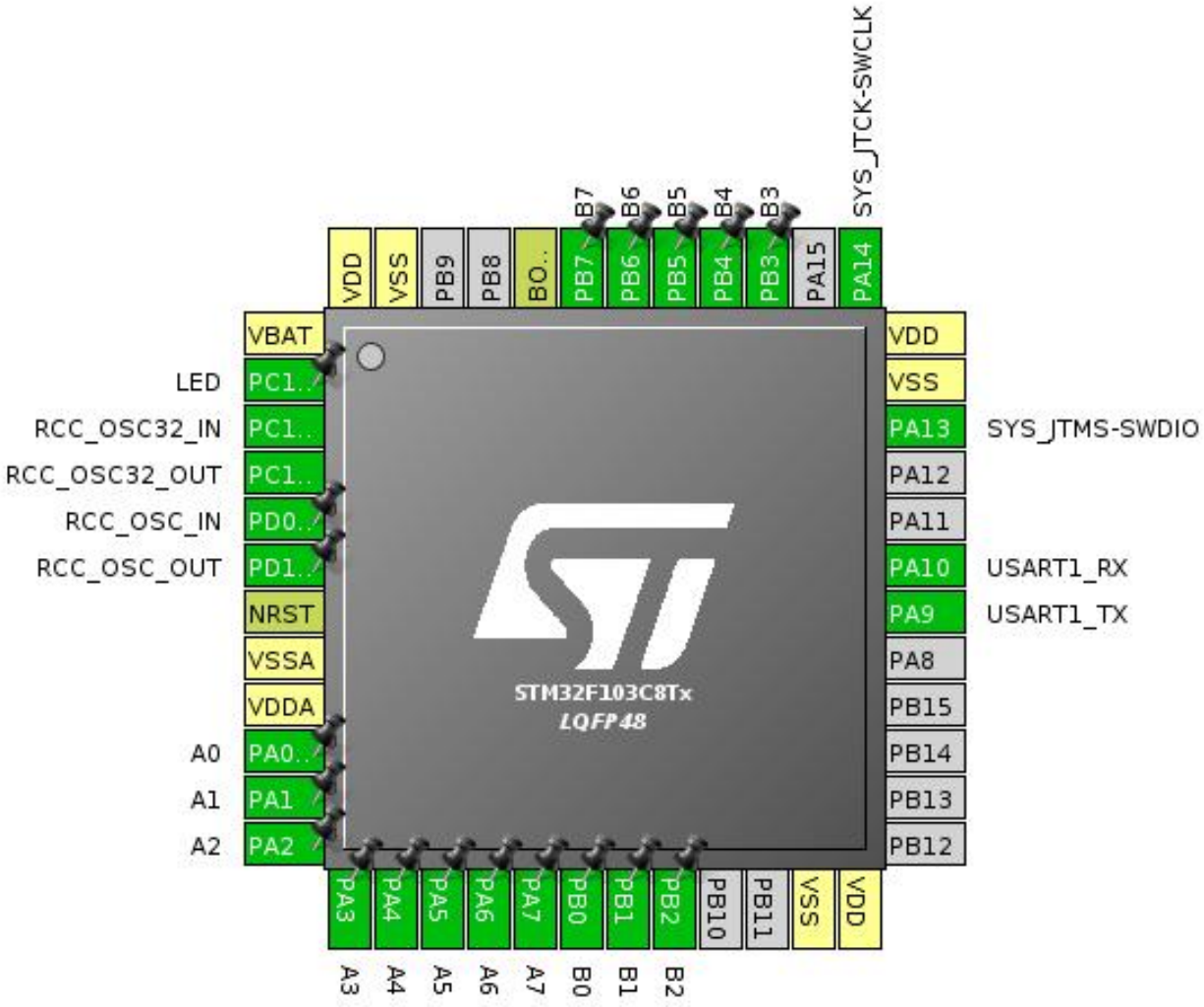
1.1. Project

Project Name	LED_Array
Board Name	LED_Array
Generated with:	STM32CubeMX 4.20.1
Date	02/09/2018

1.2. MCU

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

2. Pinout Configuration

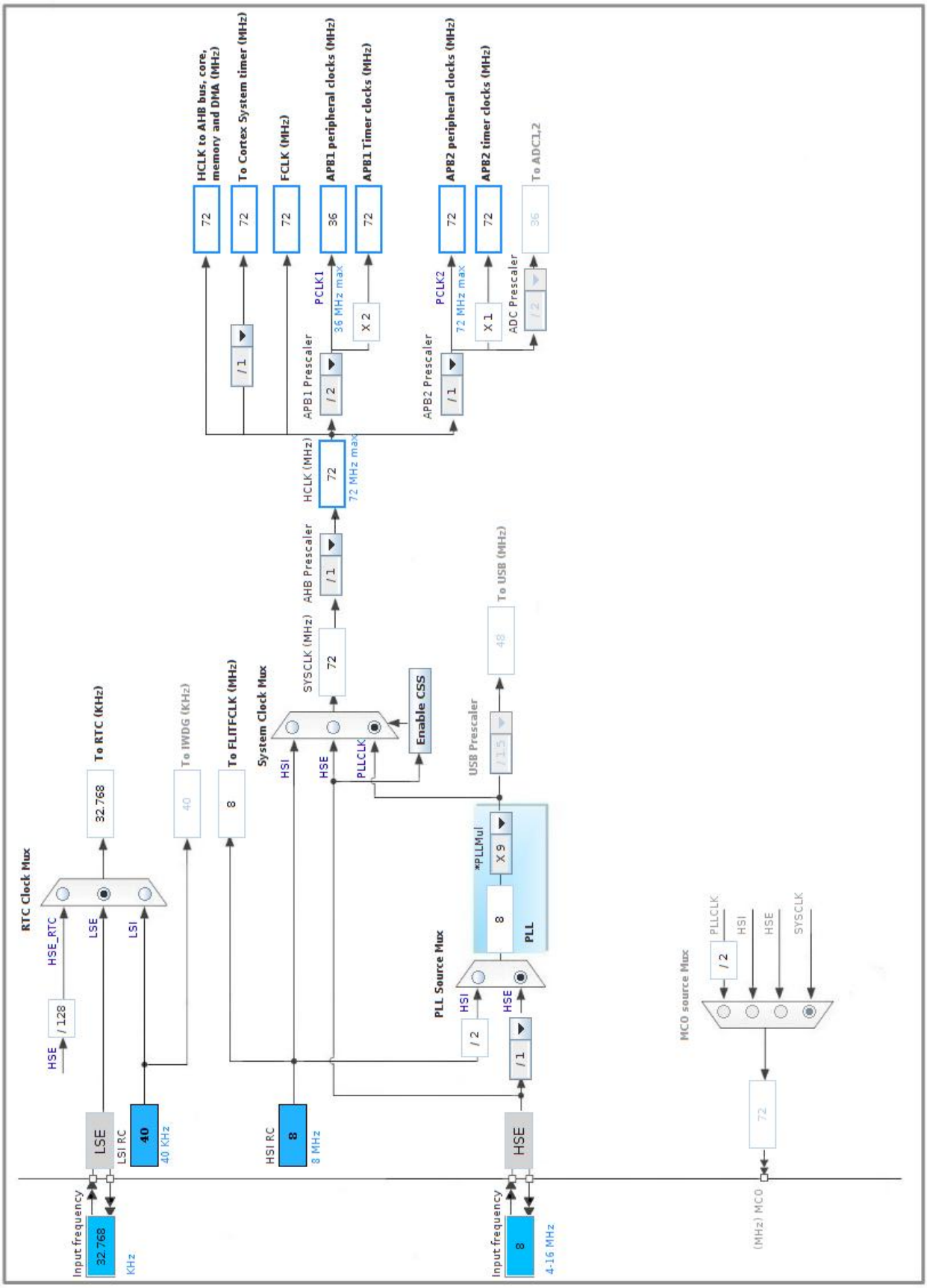


3. Pins Configuration

Pin Number LQFP48	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
2	PC13-TAMPER-RTC *	I/O	GPIO_Output	LED
3	PC14-OSC32_IN	I/O	RCC_OSC32_IN	
4	PC15-OSC32_OUT	I/O	RCC_OSC32_OUT	
5	PD0-OSC_IN	I/O	RCC_OSC_IN	
6	PD1-OSC_OUT	I/O	RCC_OSC_OUT	
7	NRST	Reset		
8	VSSA	Power		
9	VDDA	Power		
10	PA0-WKUP *	I/O	GPIO_Output	A0
11	PA1 *	I/O	GPIO_Output	A1
12	PA2 *	I/O	GPIO_Output	A2
13	PA3 *	I/O	GPIO_Output	A3
14	PA4 *	I/O	GPIO_Output	A4
15	PA5 *	I/O	GPIO_Output	A5
16	PA6 *	I/O	GPIO_Output	A6
17	PA7 *	I/O	GPIO_Output	A7
18	PB0 *	I/O	GPIO_Output	B0
19	PB1 *	I/O	GPIO_Output	B1
20	PB2 *	I/O	GPIO_Output	B2
23	VSS	Power		
24	VDD	Power		
30	PA9	I/O	USART1_TX	
31	PA10	I/O	USART1_RX	
34	PA13	I/O	SYS_JTMS-SWDIO	
35	VSS	Power		
36	VDD	Power		
37	PA14	I/O	SYS_JTCK-SWCLK	
39	PB3 *	I/O	GPIO_Output	B3
40	PB4 *	I/O	GPIO_Output	B4
41	PB5 *	I/O	GPIO_Output	B5
42	PB6 *	I/O	GPIO_Output	B6
43	PB7 *	I/O	GPIO_Output	B7
44	BOOT0	Boot		
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. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

Low Speed Clock (LSE) : Crystal/Ceramic Resonator

5.1.1. 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

5.2. RTC

mode: Activate Clock Source

5.2.1. Parameter Settings:

Calendar Time:	
Data Format	BCD data format
General:	
Auto Predivider Calculation	Enabled
Asynchronous Predivider value	Automatic Predivider Calculation Enabled
Output	Alarm pulse signal on the TAMPER pin

5.3. SYS

Debug: Serial Wire

Timebase Source: SysTick

5.4. TIM1

Clock Source : Internal Clock

Channel1: Output Compare No Output

Channel2: Output Compare No Output

5.4.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**17999 ***
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**1999 ***
Internal Clock Division (CKD)	No Division
Repetition Counter (RCR - 8 bits value)	0

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)

Break And Dead Time management - BRK Configuration:

BRK State	Disable
BRK Polarity	High

Break And Dead Time management - Output Configuration:

Automatic Output State	Disable
Off State Selection for Run Mode (OSSR)	Disable
Off State Selection for Idle Mode (OSSI)	Disable
Lock Configuration	Off

Output Compare No Output Channel 1:

Mode	Frozen (used for Timing base)
Pulse (16 bits value)	0
CH Polarity	High
CH Idle State	Reset

Output Compare No Output Channel 2:

Mode	Frozen (used for Timing base)
Pulse (16 bits value)	0
CH Polarity	High
CH Idle State	Reset

5.5. USART1

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
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	
	PD0-OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	
	PD1-OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
USART1	PA9	USART1_TX	Alternate Function Push Pull	n/a	**High ***	
	PA10	USART1_RX	Input mode	No pull-up and no pull-down	**n/a**	
GPIO	PC13-TAMPER-RTC	GPIO_Output	Output Push Pull	n/a	Low	LED
	PA0-WKUP	GPIO_Output	Output Push Pull	n/a	Low	A0
	PA1	GPIO_Output	Output Push Pull	n/a	Low	A1
	PA2	GPIO_Output	Output Push Pull	n/a	Low	A2
	PA3	GPIO_Output	Output Push Pull	n/a	Low	A3
	PA4	GPIO_Output	Output Push Pull	n/a	Low	A4
	PA5	GPIO_Output	Output Push Pull	n/a	Low	A5
	PA6	GPIO_Output	Output Push Pull	n/a	Low	A6
	PA7	GPIO_Output	Output Push Pull	n/a	Low	A7
	PB0	GPIO_Output	Output Push Pull	n/a	Low	B0
	PB1	GPIO_Output	Output Push Pull	n/a	Low	B1
	PB2	GPIO_Output	Output Push Pull	n/a	Low	B2
	PB3	GPIO_Output	Output Push Pull	n/a	Low	B3
	PB4	GPIO_Output	Output Push Pull	n/a	Low	B4
	PB5	GPIO_Output	Output Push Pull	n/a	Low	B5
	PB6	GPIO_Output	Output Push Pull	n/a	Low	B6
	PB7	GPIO_Output	Output Push Pull	n/a	Low	B7

6.2. DMA configuration

DMA request	Stream	Direction	Priority
TIM1_UP	DMA1_Channel5	Memory To Peripheral	**High ***
TIM1_CH1	DMA1_Channel2	Memory To Peripheral	**High ***
TIM1_CH2	DMA1_Channel3	Memory To Peripheral	**High ***

TIM1_UP: DMA1_Channel5 DMA request Settings:

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

TIM1_CH1: DMA1_Channel2 DMA request Settings:

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

TIM1_CH2: DMA1_Channel3 DMA request Settings:

Mode:	Normal
Peripheral Increment:	Disable
Memory Increment:	Disable
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	0	0
DMA1 channel2 global interrupt	true	0	0
DMA1 channel3 global interrupt	true	0	0
DMA1 channel5 global interrupt	true	0	0
TIM1 capture compare interrupt	true	0	0
USART1 global interrupt	true	0	0
PVD interrupt through EXTI line 16	unused		
RTC global interrupt	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
TIM1 break interrupt	unused		
TIM1 update interrupt	unused		
TIM1 trigger and commutation interrupts	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

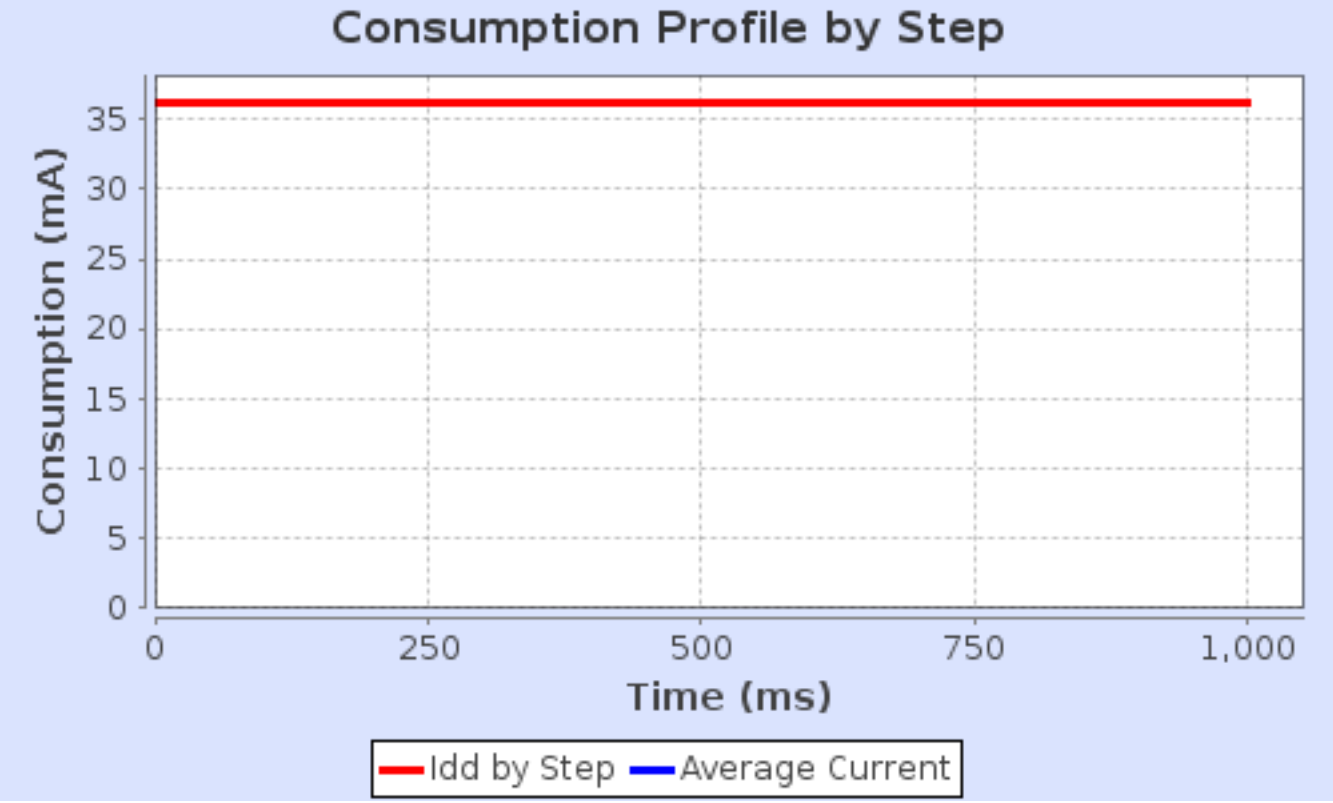
7.3. Sequence

Step	Step1
Mode	RUN
Vdd	3.3
Voltage Source	Vbus
Range	No Scale
Fetch Type	FLASH
Clock Configuration	HSE PLL
Clock Source Frequency	8.0 MHz
CPU Frequency	72.0 MHz
Peripherals	BusMatrix DMA1 GPIOA GPIOB GPIOC GPIOD I2C1 TIM1 TIM2 USART1
Additional Cons.	0 mA
Average Current	36.28 mA
Duration	1 s
DMIPS	61.0
Ta Max	98.42
Category	In DS Table

7.4. RESULTS

Sequence Time	1 s	Average Current	36.28 mA
Battery Life	0	Average DMIPS	61.0 DMIPS

7.5. Chart



8. Software Project

8.1. Project Settings

Name	Value
Project Name	LED_Array
Project Folder	/home/fabian/workspaces/workspace/LED_Array
Toolchain / IDE	SW4STM32
Firmware Package Name and Version	STM32Cube FW_F1 V1.4.0

8.2. 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	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