1. Description

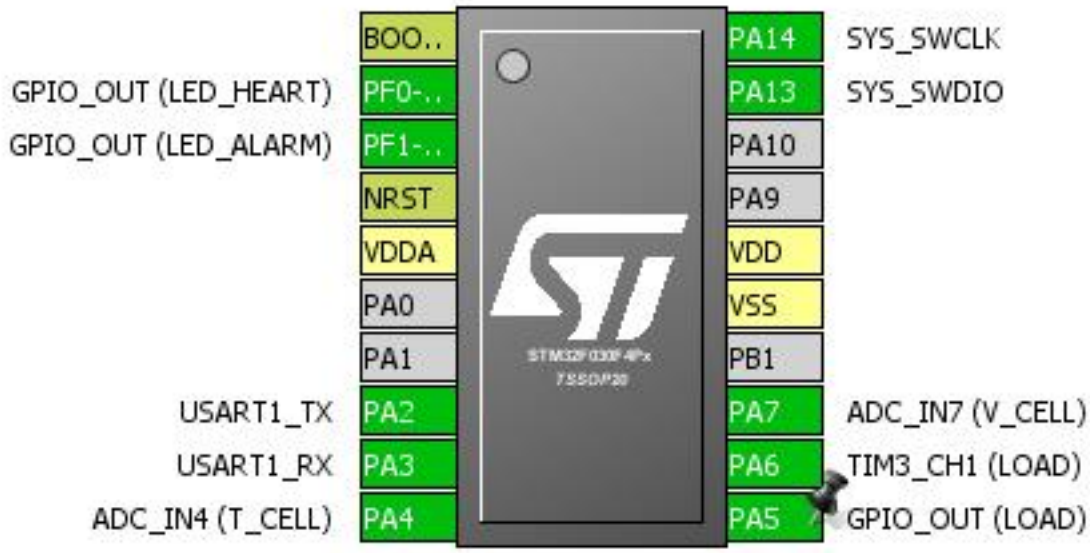
1.1. Project

Project Name	STM32F030F4_OSBMS
Board Name	STM32F030F4_OSBMS
Generated with:	STM32CubeMX 4.15.1
Date	07/06/2016

1.2. MCU

MCU Series	STM32F0
MCU Line	STM32F0x0 Value Line
MCU name	STM32F030F4Px
MCU Package	TSSOP20
MCU Pin number	20

2. Pinout Configuration

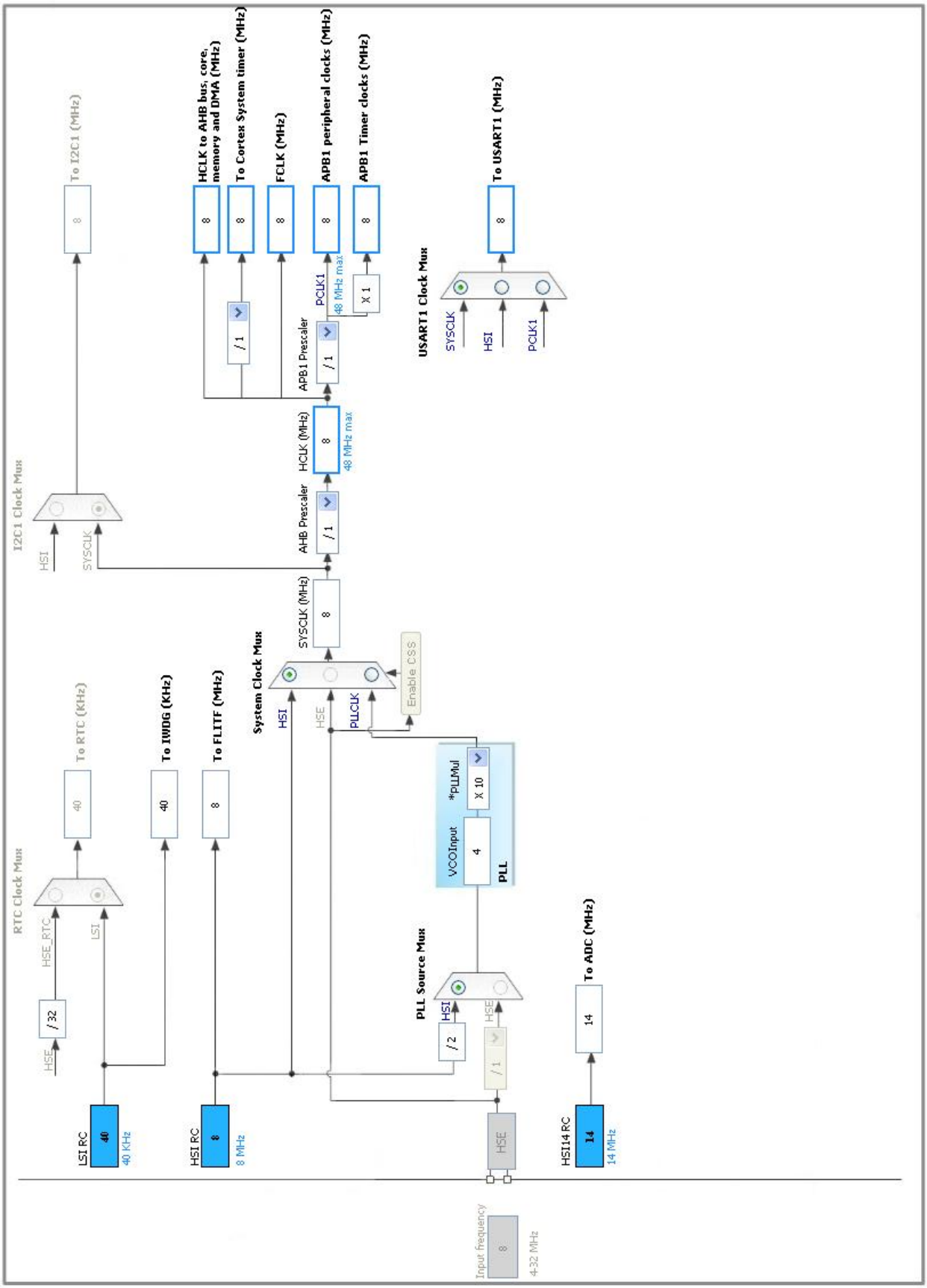


3. Pins Configuration

Pin Number TSSOP20	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	BOOT0	Boot		
2	PF0-OSC_IN *	I/O	GPIO_Output	GPIO_OUT (LED_HEART)
3	PF1-OSC_OUT *	I/O	GPIO_Output	GPIO_OUT (LED_ALARM)
4	NRST	Reset		
5	VDDA	Power		
8	PA2	I/O	USART1_TX	
9	PA3	I/O	USART1_RX	
10	PA4	I/O	ADC_IN4	ADC_IN4 (T_CELL)
11	PA5 *	I/O	GPIO_Output	GPIO_OUT (LOAD)
12	PA6	I/O	TIM3_CH1	TIM3_CH1 (LOAD)
13	PA7	I/O	ADC_IN7	ADC_IN7 (V_CELL)
15	VSS	Power		
16	VDD	Power		
19	PA13	I/O	SYS_SWDIO	
20	PA14	I/O	SYS_SWCLK	

* The pin is affected with an I/O function

4. Clock Tree Configuration



5. IPs and Middleware Configuration

5.1. ADC

mode: IN4

mode: IN7

5.1.1. Parameter Settings:

ADC_Settings:	
Clock Prescaler	Asynchronous clock mode
Resolution	ADC 12-bit resolution
Data Alignment	Right alignment
Scan Conversion Mode	Forward
Continuous Conversion Mode	Disabled
Discontinuous Conversion Mode	Disabled
DMA Continuous Requests	Disabled
End Of Conversion Selection	**End of sequence of conversion ***
Overrun behaviour	Overrun data preserved
Low Power Auto Wait	Disabled
Low Power Auto Power Off	Disabled
ADC_Regular_ConversionMode:	
Sampling Time	**71.5 Cycles ***
External Trigger Conversion Edge	None
WatchDog:	
Enable Analog WatchDog Mode	false

5.2. IWDG

mode: Activated

5.2.1. Parameter Settings:

Clocking:	
IWDG counter clock prescaler	4
IWDG window value	4095
IWDG down-counter reload value	4095

5.3. SYS

mode: Debug Serial Wire

Timebase Source: SysTick

5.4. TIM3

mode: Clock Source

Channel1: PWM Generation CH1

5.4.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**100 ***
Internal Clock Division (CKD)	No Division

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)

PWM Generation Channel 1:

Mode	PWM mode 1
Pulse (16 bits value)	0
Fast Mode	Disable
CH Polarity	High

5.5. TIM14

mode: Activated

5.5.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	0
Internal Clock Division (CKD)	No Division

5.6. USART1

Mode: Asynchronous

5.6.1. Parameter Settings:

Basic Parameters:

Baud Rate	**19200 ***
Word Length	8 Bits (including Parity)
Parity	None
Stop Bits	1

Advanced Parameters:

Data Direction	Receive and Transmit
Over Sampling	16 Samples
Single Sample	Disable

Advanced Features:

Auto Baudrate	Disable
TX Pin Active Level Inversion	Disable
RX Pin Active Level Inversion	Disable
Data Inversion	Disable
TX and RX Pins Swapping	Disable
Overrun	Enable
DMA on RX Error	Enable
MSB First	Disable

*** User modified value**

6. System Configuration

6.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
ADC	PA4	ADC_IN4	Analog mode	No pull-up and no pull-down	n/a	ADC_IN4 (T_CELL)
	PA7	ADC_IN7	Analog mode	No pull-up and no pull-down	n/a	ADC_IN7 (V_CELL)
SYS	PA13	SYS_SWDIO	n/a	n/a	n/a	
	PA14	SYS_SWCLK	n/a	n/a	n/a	
TIM3	PA6	TIM3_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Low	TIM3_CH1 (LOAD)
USART1	PA2	USART1_TX	Alternate Function Push Pull	Pull-up	**High ***	
	PA3	USART1_RX	Alternate Function Push Pull	Pull-up	**High ***	
GPIO	PF0-OSC_IN	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	GPIO_OUT (LED_HEART)
	PF1-OSC_OUT	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	GPIO_OUT (LED_ALARM)
	PA5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	GPIO_OUT (LOAD)

6.2. DMA configuration

DMA request	Stream	Direction	Priority
ADC	DMA1_Channel1	Peripheral To Memory	Low
USART1_RX	DMA1_Channel5	Peripheral To Memory	Low
USART1_TX	DMA1_Channel4	Memory To Peripheral	Low

ADC: DMA1_Channel1 DMA request Settings:

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

USART1_RX: DMA1_Channel5 DMA request Settings:

Mode:	**Circular ***
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

6.3. NVIC configuration

Interrupt Table	Enable	Preenmption Priority	SubPriority
Non maskable interrupt	true	0	0
Hard fault interrupt	true	0	0
System service call via SWI instruction	true	0	0
Pendable request for system service	true	0	0
System tick timer	true	0	0
DMA1 channel 1 interrupt	true	0	0
DMA1 channel 4 and 5 interrupts	true	0	0
TIM3 global interrupt	true	0	0
Flash global interrupt	unused		
RCC global interrupt	unused		
ADC interrupt	unused		
TIM14 global interrupt	unused		
USART1 global interrupt	unused		

*** User modified value**

7. Power Consumption Calculator report

7.1. Microcontroller Selection

Series	STM32F0
Line	STM32F0x0 Value Line
MCU	STM32F030F4Px
Datasheet	024849_Rev2

7.2. Parameter Selection

Temperature	25
Vdd	3.6

7.3. Battery Selection

Battery	LiFePO4(SP40)
Capacity	40000.0 mAh
Self Discharge	0.1 %/month
Nominal Voltage	3.2 V
Max Cont Current	40000.0 mA
Max Pulse Current	100000.0 mA
Cells in series	1
Cells in parallel	1

7.4. Sequence

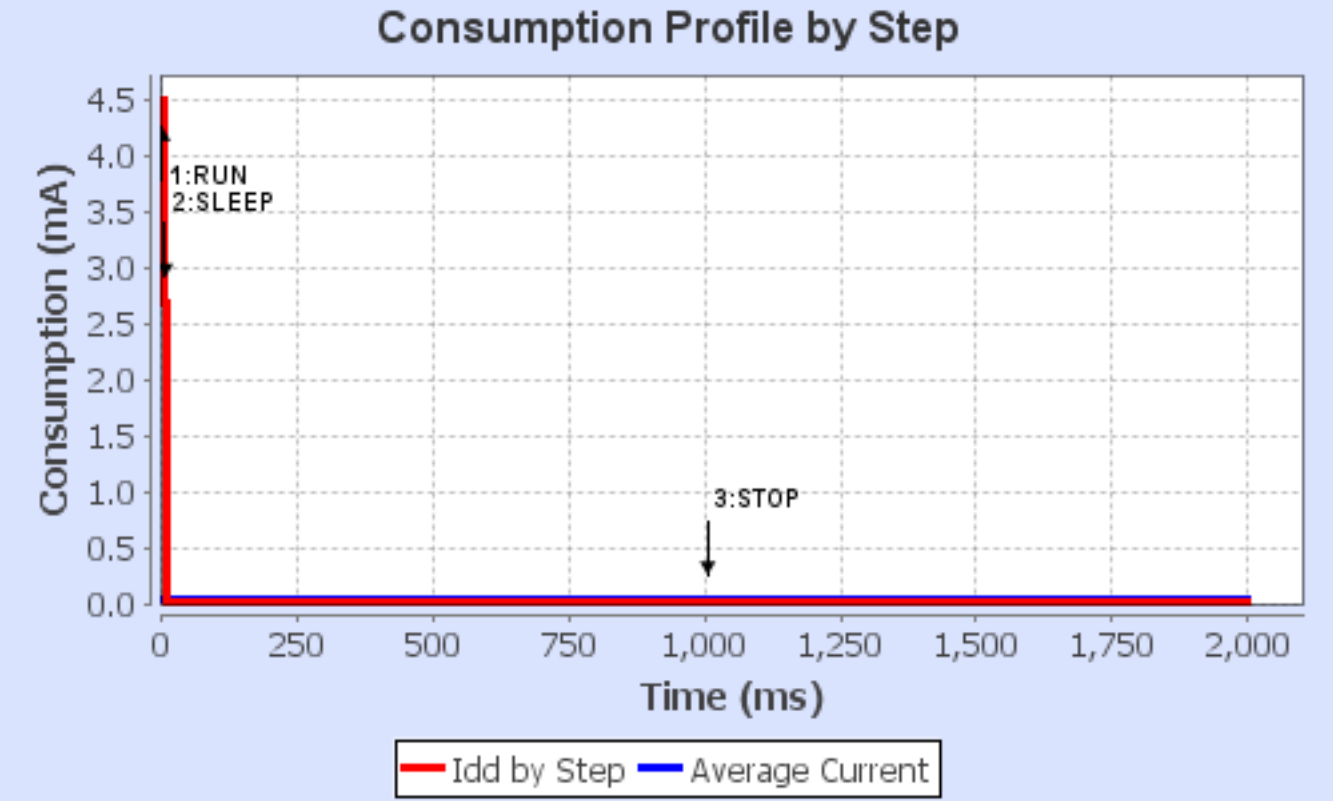
Step	Step1	Step2	Step3
Mode	RUN	SLEEP	STOP
Vdd	3.6	3.6	3.6
Voltage Source	Battery	Battery	Battery
Range	No Scale	No Scale	No Scale
Fetch Type	FLASH	RAM/FLASH	n/a

Clock Configuration	HSI/HSE All IPs ON	HSI/HSE All IPs ON	Regulator_ON
Clock Source Frequency	8.0 MHz	8.0 MHz	0 Hz
CPU Frequency	8.0 MHz	8.0 MHz	0 Hz
Peripherals			
Additional Cons.	0 mA	0 mA	0 mA
Average Current	4.49 mA	2.68 mA	21.9 µA
Duration	700 µs	9.3 ms	1990 ms
DMIPS	0.0	0.0	0.0
Ta Max	103.77	104.27	104.99
Category	In DS Table	In DS Table	In DS Table

7.5. RESULTS

Sequence Time	2 s	Average Current	35.82 µA
Battery Life	49 years, 11 months, 23 days, 22 hours	Average DMIPS	0.0 DMIPS

7.6. Chart



8. Software Project

8.1. Project Settings

Name	Value
Project Name	STM32F030F4_OSBMS
Project Folder	C:\Documents and Settings\Mad Dave\My
Toolchain / IDE	TrueSTUDIO
Firmware Package Name and Version	STM32Cube FW_F0 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	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