1. Description

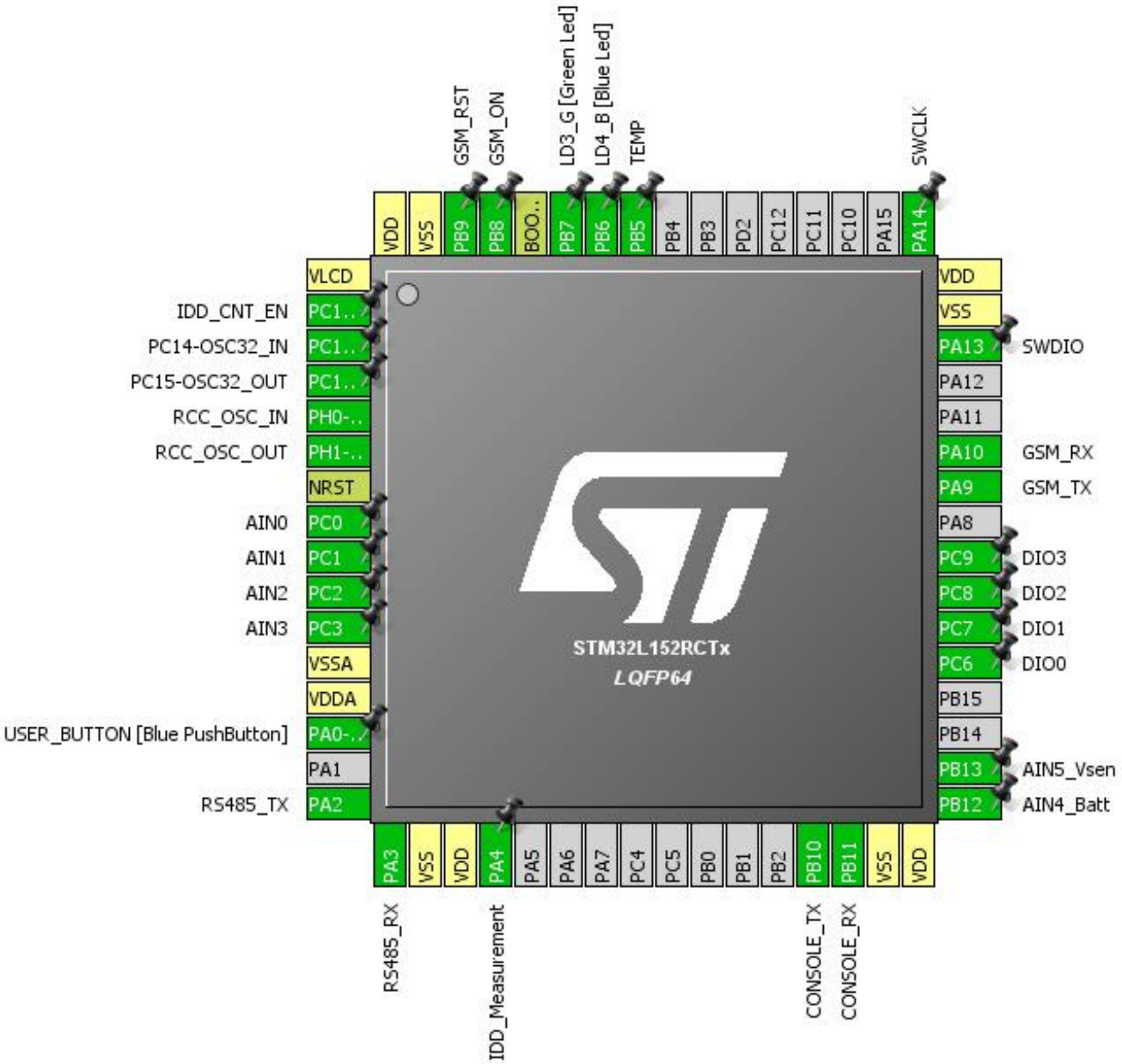
1.1. Project

Project Name	Portable_Logger
Board Name	32L152CDISCOVERY
Generated with:	STM32CubeMX 4.25.0
Date	04/05/2018

1.2. MCU

MCU Series	STM32L1
MCU Line	STM32L151/152
MCU name	STM32L152RCTx
MCU Package	LQFP64
MCU Pin number	64

2. Pinout Configuration



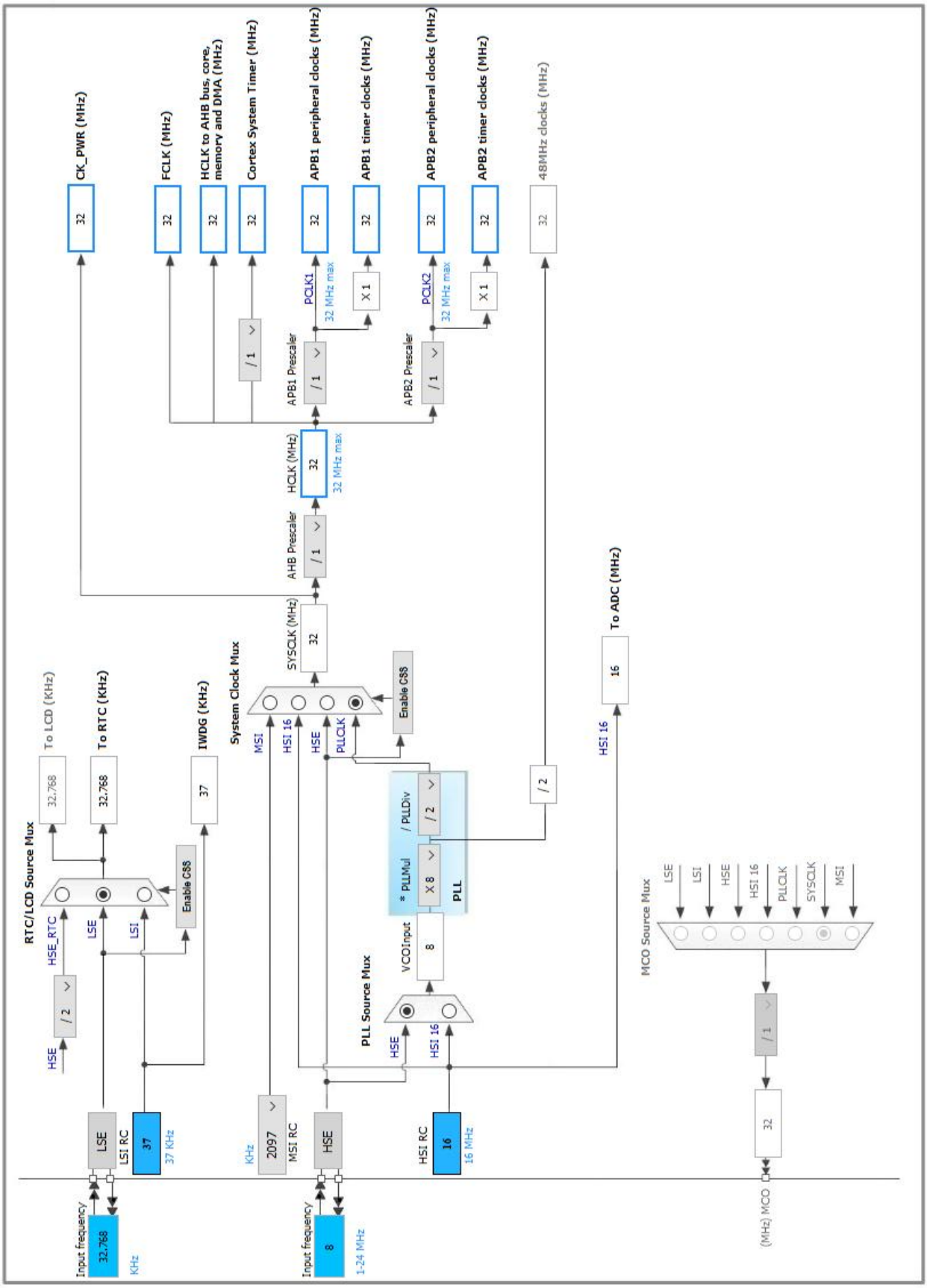
3. Pins Configuration

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VLCD	Power		
2	PC13-WKUP2 *	I/O	GPIO_Output	IDD_CNT_EN
3	PC14-OSC32_IN	I/O	RCC_OSC32_IN	PC14-OSC32_IN
4	PC15-OSC32_OUT	I/O	RCC_OSC32_OUT	PC15-OSC32_OUT
5	PH0-OSC_IN	I/O	RCC_OSC_IN	
6	PH1-OSC_OUT	I/O	RCC_OSC_OUT	
7	NRST	Reset		
8	PC0	I/O	ADC_IN10	AIN0
9	PC1	I/O	ADC_IN11	AIN1
10	PC2	I/O	ADC_IN12	AIN2
11	PC3	I/O	ADC_IN13	AIN3
12	VSSA	Power		
13	VDDA	Power		
14	PA0-WKUP1	I/O	GPIO_EXTI0	USER_BUTTON [Blue PushButton]
16	PA2	I/O	USART2_TX	RS485_TX
17	PA3	I/O	USART2_RX	RS485_RX
18	VSS	Power		
19	VDD	Power		
20	PA4	I/O	ADC_IN4	IDD_Measurement
29	PB10	I/O	USART3_TX	CONSOLE_TX
30	PB11	I/O	USART3_RX	CONSOLE_RX
31	VSS	Power		
32	VDD	Power		
33	PB12	I/O	ADC_IN18	AIN4_Batt
34	PB13	I/O	ADC_IN19	AIN5_Vsen
37	PC6 *	I/O	GPIO_Output	DIO0
38	PC7 *	I/O	GPIO_Output	DIO1
39	PC8 *	I/O	GPIO_Output	DIO2
40	PC9 *	I/O	GPIO_Output	DIO3
42	PA9	I/O	USART1_TX	GSM_TX
43	PA10	I/O	USART1_RX	GSM_RX
46	PA13	I/O	SYS_JTMS-SWDIO	SWDIO
47	VSS	Power		
48	VDD	Power		
49	PA14	I/O	SYS_JTCK-SWCLK	SWCLK

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
57	PB5 *	I/O	GPIO_Output	TEMP
58	PB6 *	I/O	GPIO_Output	LD4_B [Blue Led]
59	PB7 *	I/O	GPIO_Output	LD3_G [Green Led]
60	BOOT0	Boot		
61	PB8 *	I/O	GPIO_Output	GSM_ON
62	PB9 *	I/O	GPIO_Output	GSM_RST
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. ADC

mode: IN4

mode: IN10

mode: IN11

mode: IN12

mode: IN13

mode: IN18

mode: IN19

5.1.1. Parameter Settings:

ADC_Settings:

Clock Prescaler	Asynchronous clock mode divided by 1
Resolution	ADC 12-bit resolution
Data Alignment	Right alignment
Scan Mode	Disabled
Continuous Conversion Mode	Disabled
Discontinuous Conversion Mode	Disabled
DMA Continuous Requests	**Enabled ***
End Of Conversion Selection	End of sequence conversion
Low Power Auto Wait	**Wait until the result of previous conversion is read ***
Low Power Auto Off	**power off when ADC is not converting ***

ADC_Regular_ConversionMode:

Number Of Conversion	1
External Trigger Conversion Source	**Timer 2 Capture Compare 3 event ***
External Trigger Conversion Edge	Trigger detection on the rising edge
Rank	1
Channel	Channel 4
Sampling Time	4 Cycles

ADC_Injected_ConversionMode:

Number Of Conversions	0

WatchDog:

Enable Analog WatchDog Mode	false

5.2. IWDG

mode: Activated

5.2.1. Parameter Settings:

Clocking:

IWDG counter clock prescaler	4
IWDG down-counter reload value	4095

5.3. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

Low Speed Clock (LSE) : Crystal/Ceramic Resonator

5.3.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Instruction Cache	Enabled
Prefetch Buffer	Disabled
Data Cache	Enabled
Flash Latency(WS)	1 WS (2 CPU cycle)

RCC Parameters:

HSI Calibration Value	16
MSI Calibration Value	0
HSE Startup Timout Value (ms)	100
LSE Startup Timout Value (ms)	5000

Power Parameters:

Power Regulator Voltage Scale	Power Regulator Voltage Scale 1

5.4. RTC

mode: Activate Clock Source

mode: Activate Calendar

5.4.1. Parameter Settings:

General:

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

Calendar Time:

Data Format	BCD data format
Hours	**19 ***
Minutes	**30 ***
Seconds	0
Day Light Saving: value of hour adjustment	Daylightsaving None
Store Operation	Storeoperation Reset

Calendar Date:

Week Day	Monday
Month	**February ***
Date	**25 ***
Year	**18 ***

5.5. SYS

Debug: Serial Wire

Timebase Source: SysTick

5.6. TIM3

Clock Source : Internal Clock

5.6.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**10000 ***
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**65535 ***
Internal Clock Division (CKD)	No Division

Trigger Output (TRGO) Parameters:

Master/Slave Mode (MSM bit)	Disable (Trigger input effect not delayed)
Trigger Event Selection	Reset (UG bit from TIMx_EGR)

5.7. USART1

Mode: Asynchronous

5.7.1. 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

5.8. USART2

Mode: Asynchronous

5.8.1. 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

5.9. USART3

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

*** 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	PC0	ADC_IN10	Analog mode	No pull-up and no pull-down	n/a	AIN0
	PC1	ADC_IN11	Analog mode	No pull-up and no pull-down	n/a	AIN1
	PC2	ADC_IN12	Analog mode	No pull-up and no pull-down	n/a	AIN2
	PC3	ADC_IN13	Analog mode	No pull-up and no pull-down	n/a	AIN3
	PA4	ADC_IN4	Analog mode	No pull-up and no pull-down	n/a	IDD_Measurement
	PB12	ADC_IN18	Analog mode	No pull-up and no pull-down	n/a	AIN4_Batt
	PB13	ADC_IN19	Analog mode	No pull-up and no pull-down	n/a	AIN5_Vsen
RCC	PC14-OSC32_IN	RCC_OSC32_IN	n/a	n/a	n/a	PC14-OSC32_IN
	PC15-OSC32_OUT	RCC_OSC32_OUT	n/a	n/a	n/a	PC15-OSC32_OUT
	PH0-OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	
	PH1-OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	SWDIO
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	SWCLK
USART1	PA9	USART1_TX	Alternate Function Push Pull	Pull-up	**High ***	GSM_TX
	PA10	USART1_RX	Alternate Function Push Pull	Pull-up	**High ***	GSM_RX
USART2	PA2	USART2_TX	Alternate Function Push Pull	Pull-up	**High ***	RS485_TX
	PA3	USART2_RX	Alternate Function Push Pull	Pull-up	**High ***	RS485_RX
USART3	PB10	USART3_TX	Alternate Function Push Pull	Pull-up	**High ***	CONSOLE_TX
	PB11	USART3_RX	Alternate Function Push Pull	Pull-up	**High ***	CONSOLE_RX
GPIO	PC13-WKUP2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Very Low	IDD_CNT_EN
	PA0-WKUP1	GPIO_EXTI0	**External Event Mode with Rising edge trigger detection ***	No pull-up and no pull-down	n/a	USER_BUTTON [Blue PushButton]
	PC6	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**Medium ***	DIO0
	PC7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**Medium ***	DIO1
	PC8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**Medium ***	DIO2

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PC9	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**Medium ***	DIO3
	PB5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**High ***	TEMP
	PB6	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**Medium ***	LD4_B [Blue Led]
	PB7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**Medium ***	LD3_G [Green Led]
	PB8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**High ***	GSM_ON
	PB9	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**High ***	GSM_RST

6.2. DMA configuration

DMA request	Stream	Direction	Priority
USART1_RX	DMA1_Channel5	Peripheral To Memory	**Very High ***
ADC	DMA1_Channel1	Peripheral To Memory	**Medium ***
USART3_RX	DMA1_Channel3	Peripheral To Memory	**Very High ***
USART3_TX	DMA1_Channel2	Memory To Peripheral	**Very High ***
USART2_RX	DMA1_Channel6	Peripheral To Memory	**High ***
USART2_TX	DMA1_Channel7	Memory To Peripheral	**High ***
USART1_TX	DMA1_Channel4	Memory To Peripheral	**Very High ***

USART1_RX: DMA1_Channel5 DMA request Settings:

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

ADC: DMA1_Channel1 DMA request Settings:

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

USART3_RX: DMA1_Channel3 DMA request Settings:

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

USART3_TX: DMA1_Channel2 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:	**Circular ***
Peripheral Increment:	Disable
Memory Increment:	**Enable ***
Peripheral Data Width:	Byte
Memory Data Width:	Byte

USART2_TX: DMA1_Channel7 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:	**Circular ***
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
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
DMA1 channel1 global interrupt	true	0	0
DMA1 channel2 global interrupt	true	0	0
DMA1 channel3 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
TIM3 global interrupt	true	0	6
USART1 global interrupt	true	0	0
USART2 global interrupt	true	0	1
USART3 global interrupt	true	0	3
Flash global interrupt	unused		
RCC global interrupt	unused		
ADC global interrupt	unused		

*** User modified value**

7. Power Consumption Calculator report

7.1. Microcontroller Selection

Series	STM32L1
Line	STM32L151/152
MCU	STM32L152RCTx
Datasheet	022799_Rev12

7.2. Parameter Selection

Temperature	25
Vdd	3.0

8. Software Project

8.1. Project Settings

Name	Value
Project Name	Portable_Logger
Project Folder	E:\Document\Do an\Do an tot nghiep\Portable Logger -
Toolchain / IDE	MDK-ARM V5
Firmware Package Name and Version	STM32Cube FW_L1 V1.8.1

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	Yes
Delete previously generated files when not re-generated	Yes
Set all free pins as analog (to optimize the power consumption)	Yes

9. Software Pack Report