1. Description

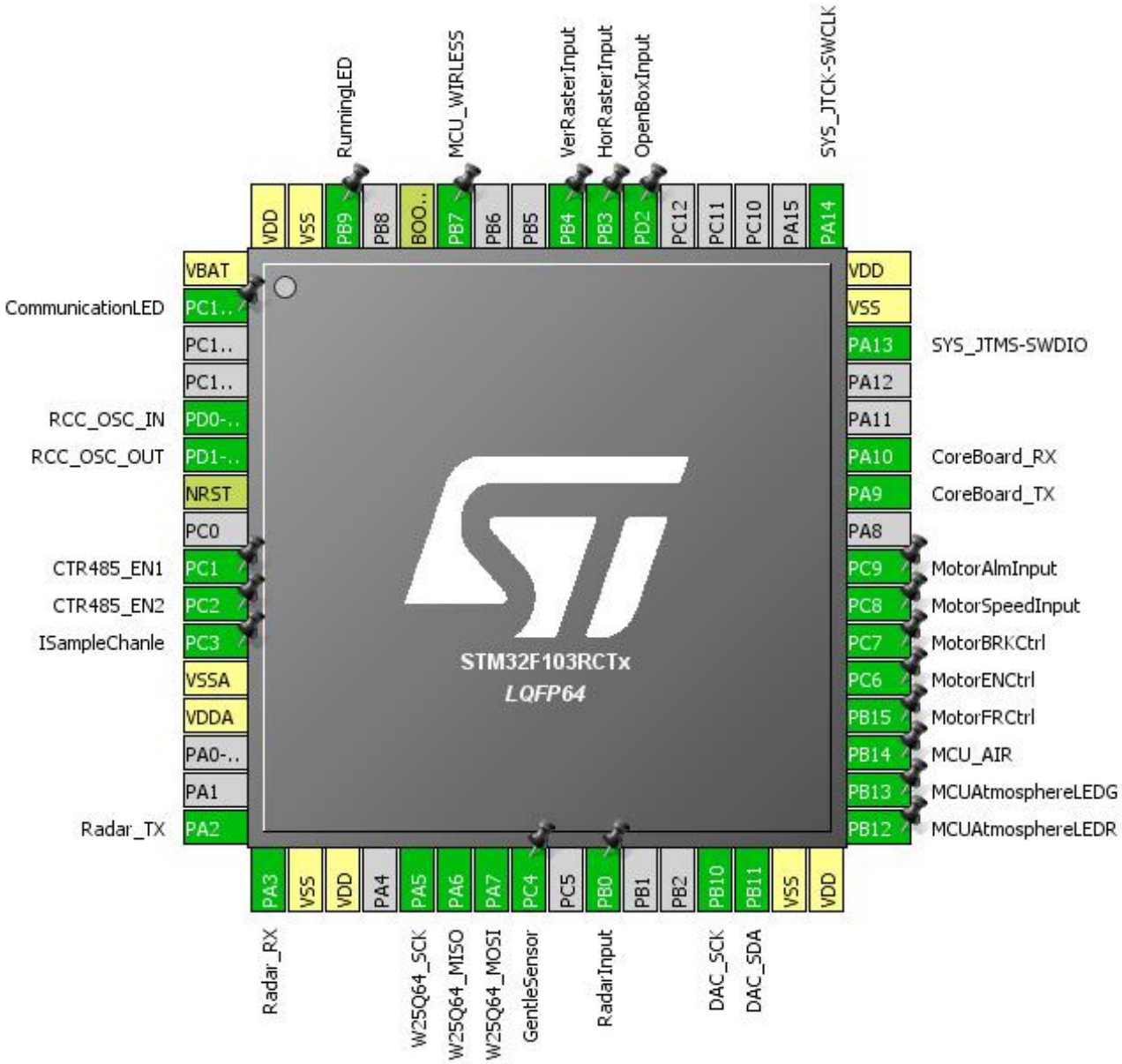
1.1. Project

Project Name	BSPv1
Board Name	BSPv1.4
Generated with:	STM32CubeMX 4.23.0
Date	01/10/2018

1.2. MCU

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

2. Pinout Configuration



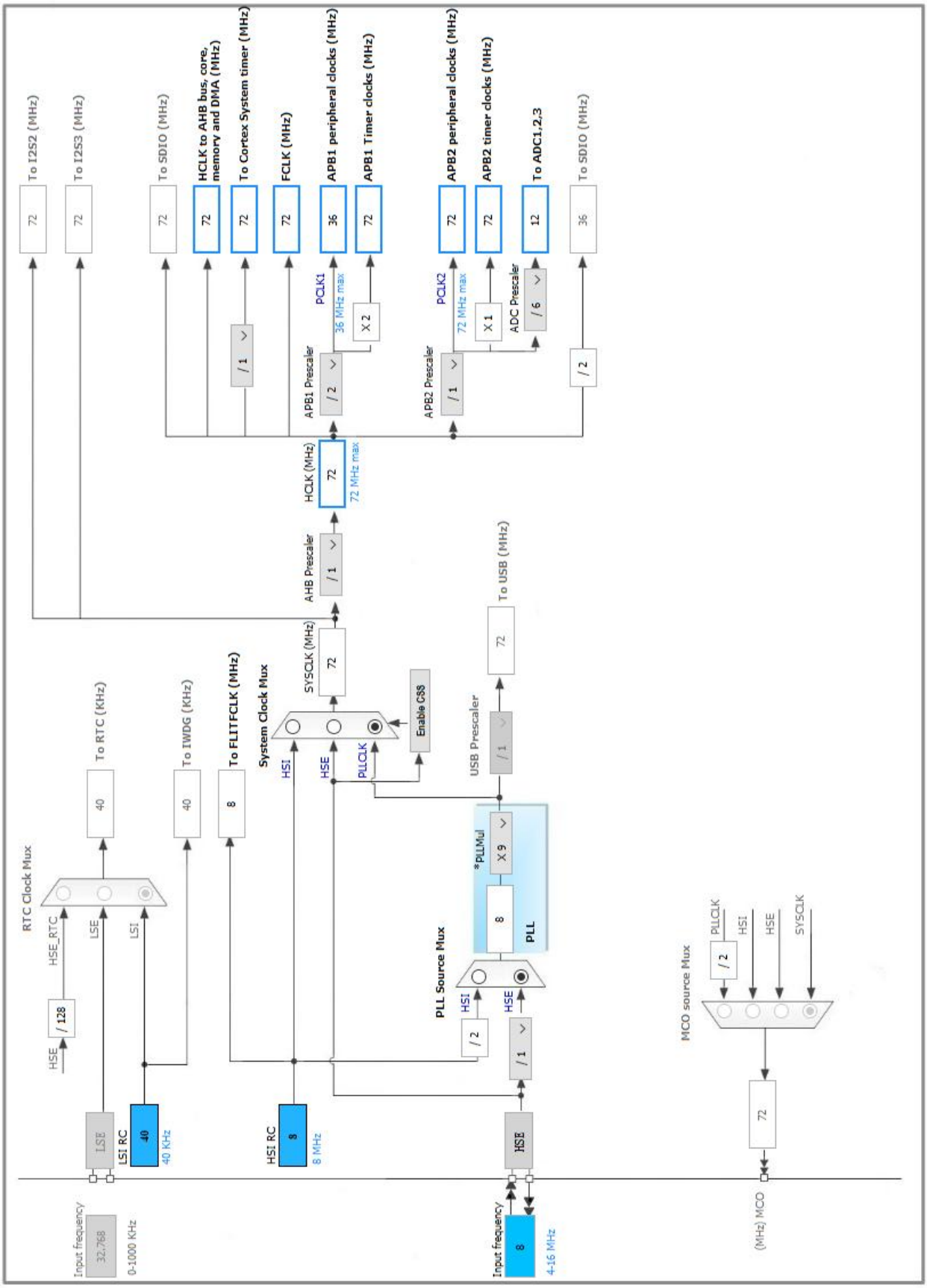
3. Pins Configuration

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_EN1
10	PC2 *	I/O	GPIO_Output	CTR485_EN2
11	PC3	I/O	ADC1_IN13	ISampleChanle
12	VSSA	Power		
13	VDDA	Power		
16	PA2	I/O	USART2_TX	Radar_TX
17	PA3	I/O	USART2_RX	Radar_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
26	PB0 *	I/O	GPIO_Input	RadarInput
29	PB10	I/O	I2C2_SCL	DAC_SCK
30	PB11	I/O	I2C2_SDA	DAC_SDA
31	VSS	Power		
32	VDD	Power		
33	PB12 *	I/O	GPIO_Output	MCUAtmosphereLEDR
34	PB13 *	I/O	GPIO_Output	MCUAtmosphereLEDG
35	PB14 *	I/O	GPIO_Input	MCU_AIR
36	PB15 *	I/O	GPIO_Output	MotorFRCtrl
37	PC6 *	I/O	GPIO_Output	MotorENCtrl
38	PC7 *	I/O	GPIO_Output	MotorBRKCtrl
39	PC8 *	I/O	GPIO_Input	MotorSpeedInput
40	PC9 *	I/O	GPIO_Input	MotorAlmInput
42	PA9	I/O	USART1_TX	CoreBoard_TX
43	PA10	I/O	USART1_RX	CoreBoard_RX
46	PA13	I/O	SYS_JTMS-SWDIO	
47	VSS	Power		
48	VDD	Power		

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
49	PA14	I/O	SYS_JTCK-SWCLK	
54	PD2 *	I/O	GPIO_Input	OpenBoxInput
55	PB3 *	I/O	GPIO_Input	HorRasterInput
56	PB4 *	I/O	GPIO_Input	VerRasterInput
59	PB7 *	I/O	GPIO_Input	MCU_WIRLESS
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: IN13

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 13
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. 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. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

5.3.1. 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

5.4. SPI1

Mode: Full-Duplex Master

5.4.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	**16 Bits ***
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	**4 ***

Baud Rate	**18.0 MBits/s ***
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Software

5.5. SYS

Debug: Serial Wire

Timebase Source: SysTick

5.6. TIM4

mode: Clock Source

5.6.1. 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	Disable

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)

5.7. TIM5

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	Disable

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. USART1

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. USART2

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
ADC1	PC3	ADC1_IN13	Analog mode	n/a	n/a	ISampleChanle
I2C2	PB10	I2C2_SCL	Alternate Function Open Drain	n/a	**High ***	DAC_SCK
	PB11	I2C2_SDA	Alternate Function Open Drain	n/a	**High ***	DAC_SDA
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	
USART1	PA9	USART1_TX	Alternate Function Push Pull	n/a	**High ***	CoreBoard_TX
	PA10	USART1_RX	Input mode	**Pull-up ***	**n/a**	CoreBoard_RX
USART2	PA2	USART2_TX	Alternate Function Push Pull	n/a	**High ***	Radar_TX
	PA3	USART2_RX	Input mode	**Pull-up ***	**n/a**	Radar_RX
GPIO	PC13-TAMPER-RTC	GPIO_Output	Output Push Pull	n/a	Low	CommunicationLED
	PC1	GPIO_Output	Output Push Pull	n/a	Low	CTR485_EN1
	PC2	GPIO_Output	Output Push Pull	n/a	Low	CTR485_EN2
	PC4	GPIO_Input	Input mode	**Pull-up ***	n/a	GentleSensor
	PB0	GPIO_Input	Input mode	**Pull-up ***	n/a	RadarInput
	PB12	GPIO_Output	Output Push Pull	**n/a**	Low	MCUAtmosphereLEDR
	PB13	GPIO_Output	Output Push Pull	**n/a**	Low	MCUAtmosphereLEDG
	PB14	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	MCU_AIR
	PB15	GPIO_Output	Output Push Pull	n/a	Low	MotorFRCtrl
	PC6	GPIO_Output	Output Push Pull	n/a	Low	MotorENCtrl
	PC7	GPIO_Output	Output Push Pull	n/a	Low	MotorBRKCtrl

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PC8	GPIO_Input	Input mode	**Pull-up ***	n/a	MotorSpeedInput
	PC9	GPIO_Input	Input mode	**Pull-down ***	n/a	MotorAlmInput
	PD2	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	OpenBoxInput
	PB3	GPIO_Input	Input mode	**Pull-up ***	n/a	HorRasterInput
	PB4	GPIO_Input	Input mode	**Pull-down ***	n/a	VerRasterInput
	PB7	GPIO_Input	Input mode	**Pull-up ***	n/a	MCU_WIRLESS
	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
USART2_RX	DMA1_Channel6	Peripheral To Memory	Low
USART2_TX	DMA1_Channel7	Memory To Peripheral	Low
ADC1	DMA1_Channel1	Peripheral To Memory	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

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

ADC1: DMA1_Channel1 DMA request Settings:

Mode:	**Circular ***
Peripheral Increment:	Disable
Memory Increment:	**Enable ***
Peripheral Data Width:	**Word ***
Memory Data Width:	**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 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
TIM4 global interrupt	true	0	0
USART1 global interrupt	true	0	0
USART2 global interrupt	true	0	0
TIM5 global interrupt	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
I2C2 event interrupt	unused		
I2C2 error interrupt	unused		
SPI1 global interrupt	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

8. Software Project

8.1. Project Settings

Name	Value
Project Name	BSPv1.4
Project Folder	E:\Users\bertz\Documents\GitHub\BSPv1.4
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