1. Description

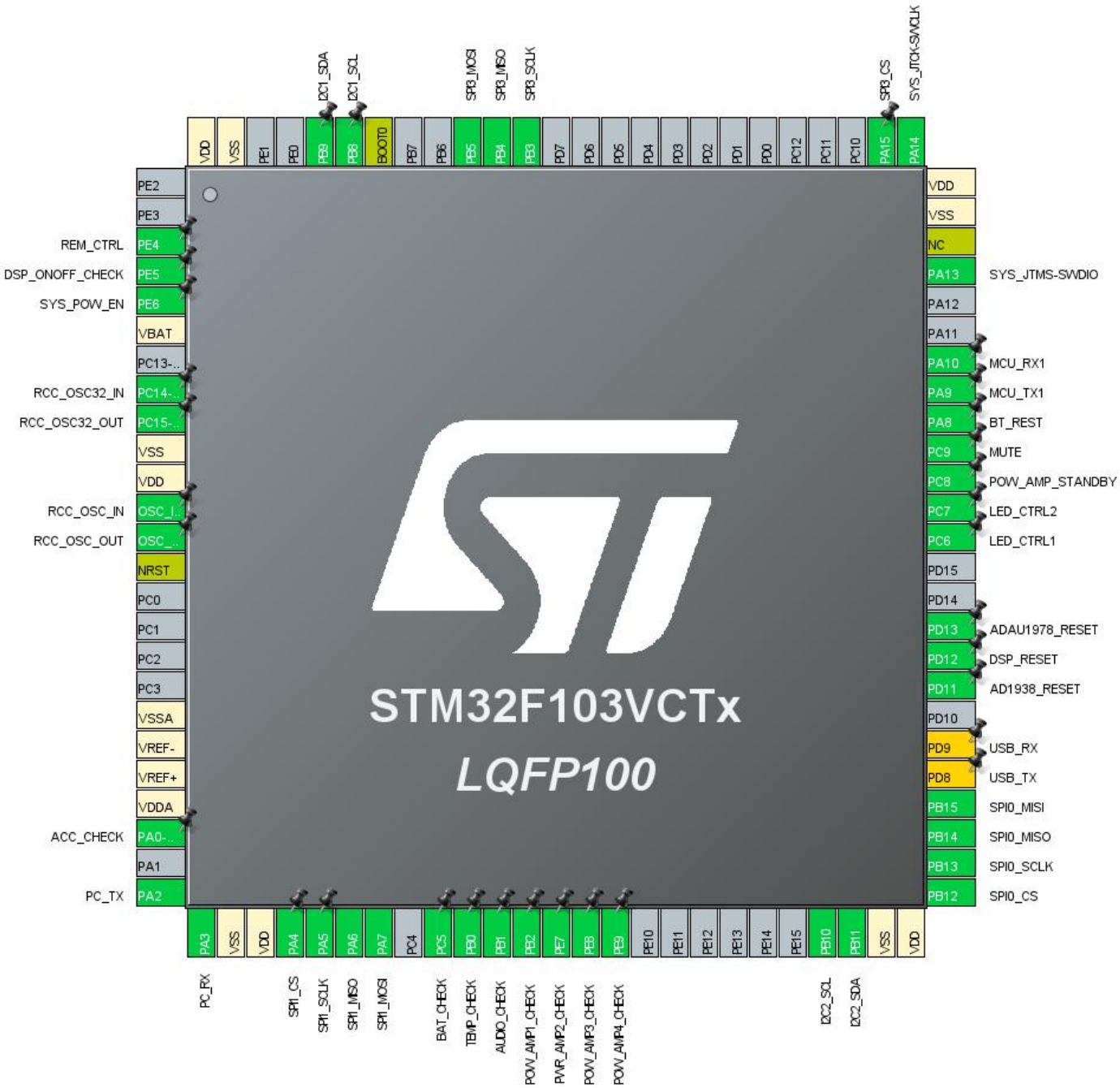
1.1. Project

Project Name	stm32f103vct6
Board Name	custom
Generated with:	STM32CubeMX 5.6.0
Date	07/14/2020

1.2. MCU

MCU Series	STM32F1
MCU Line	STM32F103
MCU name	STM32F103VCTx
MCU Package	LQFP100
MCU Pin number	100

2. Pinout Configuration



3. Pins Configuration

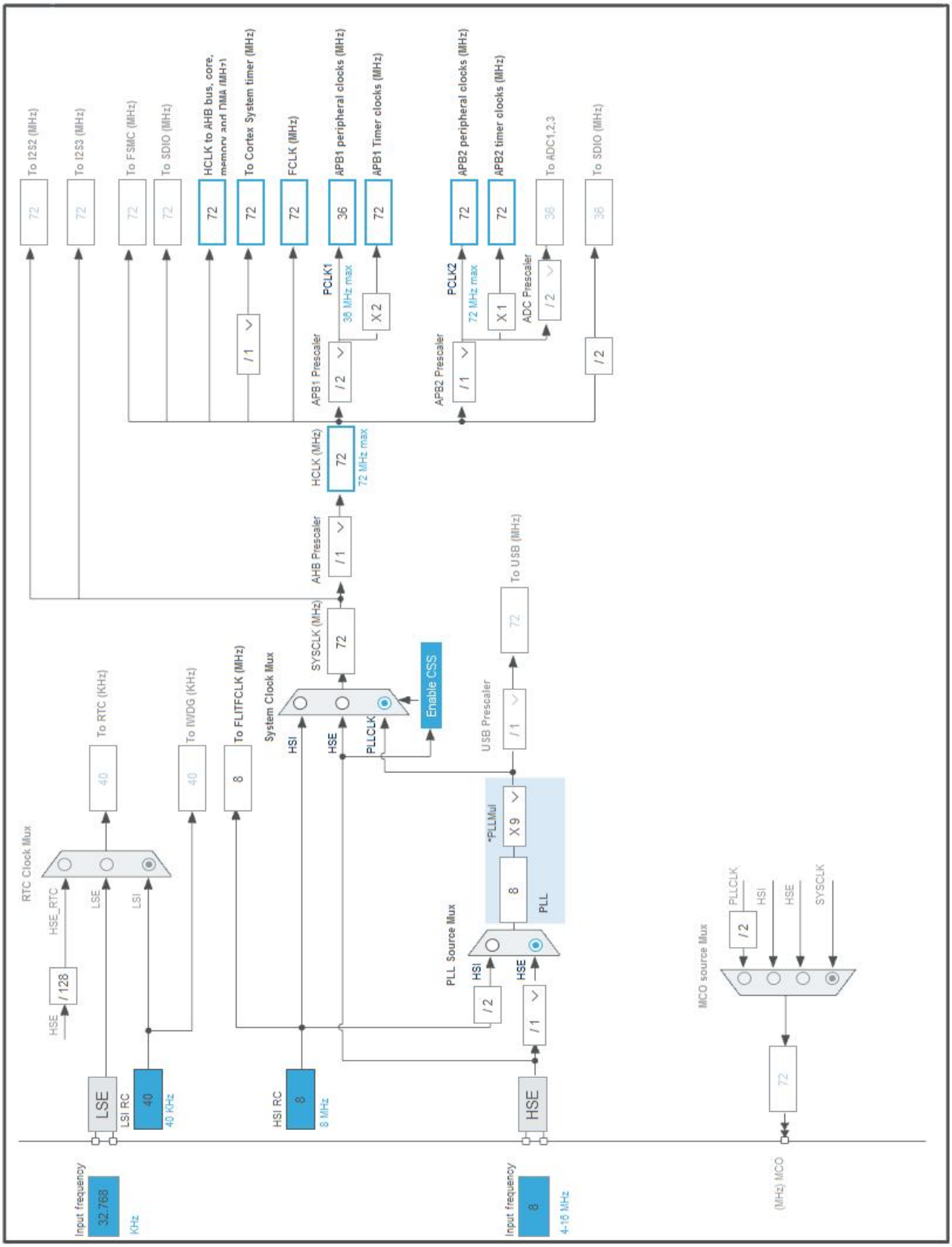
Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
3	PE4 *	I/O	GPIO_Output	REM_CTRL
4	PE5 *	I/O	GPIO_Input	DSP_ONOFF_CHECK
5	PE6 *	I/O	GPIO_Output	SYS_POW_EN
6	VBAT	Power		
8	PC14-OSC32_IN	I/O	RCC_OSC32_IN	
9	PC15-OSC32_OUT	I/O	RCC_OSC32_OUT	
10	VSS	Power		
11	VDD	Power		
12	OSC_IN	I/O	RCC_OSC_IN	
13	OSC_OUT	I/O	RCC_OSC_OUT	
14	NRST	Reset		
19	VSSA	Power		
20	VREF-	Power		
21	VREF+	Power		
22	VDDA	Power		
23	PA0-WKUP *	I/O	GPIO_Input	ACC_CHECK
25	PA2	I/O	USART2_TX	PC_TX
26	PA3	I/O	USART2_RX	PC_RX
27	VSS	Power		
28	VDD	Power		
29	PA4	I/O	SPI1_NSS	SPI1_CS
30	PA5	I/O	SPI1_SCK	SPI1_SCLK
31	PA6	I/O	SPI1_MISO	SPI1_MISO
32	PA7	I/O	SPI1_MOSI	SPI1_MOSI
34	PC5 *	I/O	GPIO_Input	BAT_CHECK
35	PB0 *	I/O	GPIO_Input	TEMP_CHECK
36	PB1 *	I/O	GPIO_Input	AUDIO_CHECK
37	PB2 *	I/O	GPIO_Input	POW_AMP1_CHECK
38	PE7 *	I/O	GPIO_Input	PWR_AMP2_CHECK
39	PE8 *	I/O	GPIO_Input	POW_AMP3_CHECK
40	PE9 *	I/O	GPIO_Input	POW_AMP4_CHECK
47	PB10	I/O	I2C2_SCL	I2C2_SCL
48	PB11	I/O	I2C2_SDA	I2C2_SDA
49	VSS	Power		
50	VDD	Power		
51	PB12	I/O	SPI2_NSS	SPI0_CS

Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
52	PB13	I/O	SPI2_SCK	SPI0_SCLK
53	PB14	I/O	SPI2_MISO	SPI0_MISO
54	PB15	I/O	SPI2_MOSI	SPI0_MISI
55	PD8 **	I/O	USART3_TX	USB_TX
56	PD9 **	I/O	USART3_RX	USB_RX
58	PD11 *	I/O	GPIO_Output	AD1938_RESET
59	PD12 *	I/O	GPIO_Output	DSP_RESET
60	PD13 *	I/O	GPIO_Output	ADAU1978_RESET
63	PC6 *	I/O	GPIO_Output	LED_CTRL1
64	PC7 *	I/O	GPIO_Output	LED_CTRL2
65	PC8 *	I/O	GPIO_Output	POW_AMP_STANDBY
66	PC9 *	I/O	GPIO_Output	MUTE
67	PA8 *	I/O	GPIO_Output	BT_REST
68	PA9	I/O	USART1_TX	MCU_TX1
69	PA10	I/O	USART1_RX	MCU_RX1
72	PA13	I/O	SYS_JTMS-SWDIO	
73	NC	NC		
74	VSS	Power		
75	VDD	Power		
76	PA14	I/O	SYS_JTCK-SWCLK	
77	PA15	I/O	SPI3_NSS	SPI3_CS
89	PB3	I/O	SPI3_SCK	SPI3_SCLK
90	PB4	I/O	SPI3_MISO	SPI3_MISO
91	PB5	I/O	SPI3_MOSI	SPI3_MOSI
94	BOOT0	Boot		
95	PB8	I/O	I2C1_SCL	I2C1_SCL
96	PB9	I/O	I2C1_SDA	I2C1_SDA
99	VSS	Power		
100	VDD	Power		

* The pin is affected with an I/O function

** The pin is affected with a peripheral function but no peripheral mode is activated

4. Clock Tree Configuration



5. Software Project

5.1. Project Settings

Name	Value
Project Name	stm32f103vct6
Project Folder	E:\project\DSP\16 chl DSP\SW\STM32CubeIDE\workspace_1.3.0\stm32f103vct6
Toolchain / IDE	STM32CubeIDE
Firmware Package Name and Version	STM32Cube FW_F1 V1.8.0

5.2. Code Generation Settings

Name	Value
STM32Cube MCU packages and embedded software	Copy only the necessary library files
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

6. Power Consumption Calculator report

6.1. Microcontroller Selection

Series	STM32F1
Line	STM32F103
MCU	STM32F103VCTx
Datasheet	14611_Rev12

6.2. Parameter Selection

Temperature	25
Vdd	3.3

6.3. Battery Selection

Battery	Li-SOCL2(A3400)
Capacity	3400.0 mAh
Self Discharge	0.08 %/month
Nominal Voltage	3.6 V
Max Cont Current	100.0 mA
Max Pulse Current	200.0 mA
Cells in series	1
Cells in parallel	1

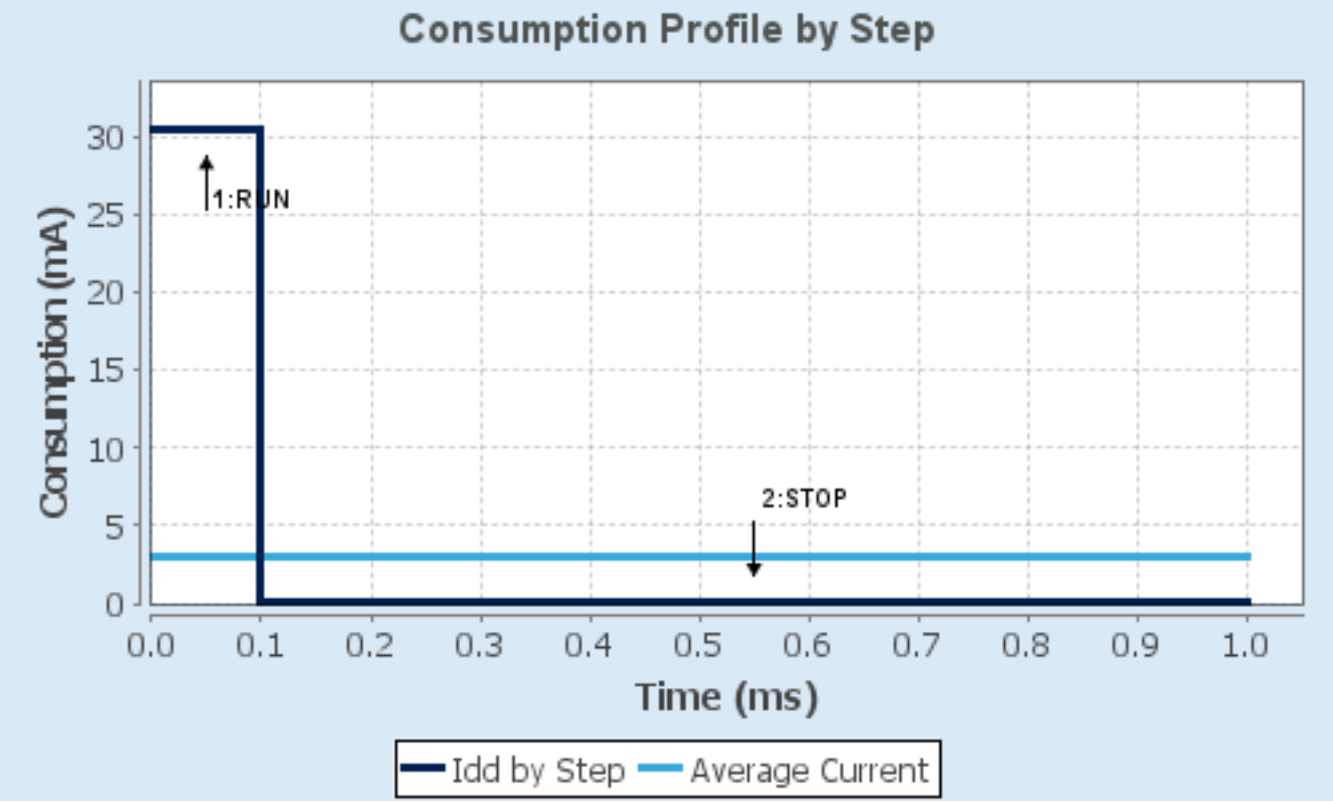
6.4. Sequence

Step	Step1	Step2
Mode	RUN	STOP
Vdd	3.3	3.3
Voltage Source	Battery	Battery
Range	No Scale	No Scale
Fetch Type	FLASH	n/a
CPU Frequency	72 MHz	0 Hz
Clock Configuration	HSE PLL	Regulator_LP
Clock Source Frequency	8 MHz	0 Hz
Peripherals		
Additional Cons.	0 mA	0 mA
Average Current	30.5 mA	25 µA
Duration	0.1 ms	0.9 ms
DMIPS	90.0	0.0
Ta Max	100.37	105
Category	In DS Table	In DS Table

6.5. RESULTS

Sequence Time	1 ms	Average Current	3.07 mA
Battery Life	1 month, 15 days, 15 hours	Average DMIPS	61.0 DMIPS

6.6. Chart


Consumption Profile by Step
Consumption (mA)
30
25
20
15
10
5
0
1:RUN
2:STOP
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (ms)
Idd by Step
Average Current

7. IPs and Middleware Configuration

7.1. GPIO

7.2. I2C1

I2C: I2C

7.2.1. 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

7.3. I2C2

I2C: I2C

7.3.1. 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

7.4. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

Low Speed Clock (LSE) : Crystal/Ceramic Resonator

7.4.1. 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

7.5. SPI1

Mode: Full-Duplex Master

Hardware NSS Signal: Hardware NSS Output Signal

7.5.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	8 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	Output Hardware

7.6. SPI2

Mode: Full-Duplex Master

Hardware NSS Signal: Hardware NSS Output Signal

7.6.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola

Data Size	8 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	2
Baud Rate	**18.0 MBits/s ***
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Output Hardware

7.7. SPI3

Mode: Full-Duplex Master

Hardware NSS Signal: Hardware NSS Output Signal

7.7.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	2
Baud Rate	**18.0 MBits/s ***
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Output Hardware

7.8. SYS

Debug: Serial Wire

Timebase Source: SysTick

7.9. USART1

Mode: Asynchronous

7.9.1. 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

7.10. USART2

Mode: Asynchronous

7.10.1. 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

7.11. FREERTOS

Interface: CMSIS_V2

7.11.1. Config parameters:

API:

FreeRTOS API	CMSIS v2

Versions:

FreeRTOS version	10.0.1
CMSIS-RTOS version	2.00

Kernel settings:

USE_PREEMPTION	Enabled

CPU_CLOCK_HZ	SystemCoreClock
TICK_RATE_HZ	1000
MAX_PRIORITIES	56
MINIMAL_STACK_SIZE	128
MAX_TASK_NAME_LEN	16
USE_16_BIT_TICKS	Disabled
IDLE_SHOULD_YIELD	Enabled
USE_MUTEXES	Enabled
USE_RECURSIVE_MUTEXES	Enabled
USE_COUNTING_SEMAPHORES	Enabled
QUEUE_REGISTRY_SIZE	8
USE_APPLICATION_TASK_TAG	Disabled
ENABLE_BACKWARD_COMPATIBILITY	Enabled
USE_PORT_OPTIMISED_TASK_SELECTION	Disabled
USE_TICKLESS_IDLE	Disabled
USE_TASK_NOTIFICATIONS	Enabled
RECORD_STACK_HIGH_ADDRESS	Disabled

Memory management settings:

Memory Allocation	Dynamic / Static
TOTAL_HEAP_SIZE	3072
Memory Management scheme	heap_4

Hook function related definitions:

USE_IDLE_HOOK	Disabled
USE_TICK_HOOK	Disabled
USE_MALLOC_FAILED_HOOK	Disabled
USE_DAEMON_TASK_STARTUP_HOOK	Disabled
CHECK_FOR_STACK_OVERFLOW	Disabled

Run time and task stats gathering related definitions:

GENERATE_RUN_TIME_STATS	Disabled
USE_TRACE_FACILITY	Enabled
USE_STATS_FORMATTING_FUNCTIONS	Disabled

Co-routine related definitions:

USE_CO_ROUTINES	Disabled
MAX_CO_ROUTINE_PRIORITIES	2

Software timer definitions:

USE_TIMERS	Enabled
TIMER_TASK_PRIORITY	2
TIMER_QUEUE_LENGTH	10
TIMER_TASK_STACK_DEPTH	256

Interrupt nesting behaviour configuration:

LIBRARY_LOWEST_INTERRUPT_PRIORITY	15
LIBRARY_MAX_SYSCALL_INTERRUPT_PRIORITY	5

7.11.2. Include parameters:

Include definitions:

vTaskPrioritySet	Enabled
uxTaskPriorityGet	Enabled
vTaskDelete	Enabled
vTaskCleanUpResources	Disabled
vTaskSuspend	Enabled
vTaskDelayUntil	Enabled
vTaskDelay	Enabled
xTaskGetSchedulerState	Enabled
xTaskResumeFromISR	Enabled
xQueueGetMutexHolder	Enabled
xSemaphoreGetMutexHolder	Disabled
pcTaskGetTaskName	Disabled
uxTaskGetStackHighWaterMark	Enabled
xTaskGetCurrentTaskHandle	Disabled
eTaskGetState	Enabled
xEventGroupSetBitFromISR	Disabled
xTimerPendFunctionCall	Enabled
xTaskAbortDelay	Disabled
xTaskGetHandle	Disabled

7.11.3. Advanced settings:

Newlib settings (see parameter description first):

USE_NEWLIB_REENTRANT	Disabled

Project settings:

Use FW pack heap file	Enabled

*** User modified value**

8. System Configuration

8.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
I2C1	PB8	I2C1_SCL	Alternate Function Open Drain	n/a	**High ***	I2C1_SCL
	PB9	I2C1_SDA	Alternate Function Open Drain	n/a	**High ***	I2C1_SDA
I2C2	PB10	I2C2_SCL	Alternate Function Open Drain	n/a	**High ***	I2C2_SCL
	PB11	I2C2_SDA	Alternate Function Open Drain	n/a	**High ***	I2C2_SDA
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	
	OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	
	OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	
SPI1	PA4	SPI1_NSS	Alternate Function Push Pull	n/a	**High ***	SPI1_CS
	PA5	SPI1_SCK	Alternate Function Push Pull	n/a	**High ***	SPI1_SCLK
	PA6	SPI1_MISO	Input mode	No pull-up and no pull-down	**n/a**	SPI1_MISO
	PA7	SPI1_MOSI	Alternate Function Push Pull	n/a	**High ***	SPI1_MOSI
SPI2	PB12	SPI2_NSS	Alternate Function Push Pull	n/a	**High ***	SPI0_CS
	PB13	SPI2_SCK	Alternate Function Push Pull	n/a	**High ***	SPI0_SCLK
	PB14	SPI2_MISO	Input mode	No pull-up and no pull-down	**n/a**	SPI0_MISO
	PB15	SPI2_MOSI	Alternate Function Push Pull	n/a	**High ***	SPI0_MISI
SPI3	PA15	SPI3_NSS	Alternate Function Push Pull	n/a	**High ***	SPI3_CS
	PB3	SPI3_SCK	Alternate Function Push Pull	n/a	**High ***	SPI3_SCLK
	PB4	SPI3_MISO	Input mode	No pull-up and no pull-down	**n/a**	SPI3_MISO
	PB5	SPI3_MOSI	Alternate Function Push Pull	n/a	**High ***	SPI3_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 ***	MCU_TX1
	PA10	USART1_RX	Input mode	No pull-up and no pull-down	**n/a**	MCU_RX1
USART2	PA2	USART2_TX	Alternate Function Push Pull	n/a	**High ***	PC_TX
	PA3	USART2_RX	Input mode	No pull-up and no pull-down		PC_RX

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
					n/a	
Single Mapped Signals	PD8	USART3_TX	Alternate Function Push Pull	n/a	**High ***	USB_TX
	PD9	USART3_RX	Input mode	No pull-up and no pull-down	**n/a**	USB_RX
GPIO	PE4	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	REM_CTRL
	PE5	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	DSP_ONOFF_CHECK
	PE6	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	SYS_POW_EN
	PA0-WKUP	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	ACC_CHECK
	PC5	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	BAT_CHECK
	PB0	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	TEMP_CHECK
	PB1	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	AUDIO_CHECK
	PB2	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	POW_AMP1_CHECK
	PE7	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	PWR_AMP2_CHECK
	PE8	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	POW_AMP3_CHECK
	PE9	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	POW_AMP4_CHECK
	PD11	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	AD1938_RESET
	PD12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DSP_RESET
	PD13	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	ADAU1978_RESET
	PC6	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LED_CTRL1
	PC7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LED_CTRL2
	PC8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	POW_AMP_STANDBY
	PC9	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	MUTE
	PA8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	BT_REST

8.2. DMA configuration

DMA request	Stream	Direction	Priority
I2C2_RX	DMA1_Channel5	Peripheral To Memory	Low
I2C2_TX	DMA1_Channel4	Memory To Peripheral	Low
I2C1_RX	DMA1_Channel7	Peripheral To Memory	Low
I2C1_TX	DMA1_Channel6	Memory To Peripheral	Low

I2C2_RX: DMA1_Channel5 DMA request Settings:

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

I2C2_TX: DMA1_Channel4 DMA request Settings:

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

I2C1_RX: DMA1_Channel7 DMA request Settings:

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

I2C1_TX: DMA1_Channel6 DMA request Settings:

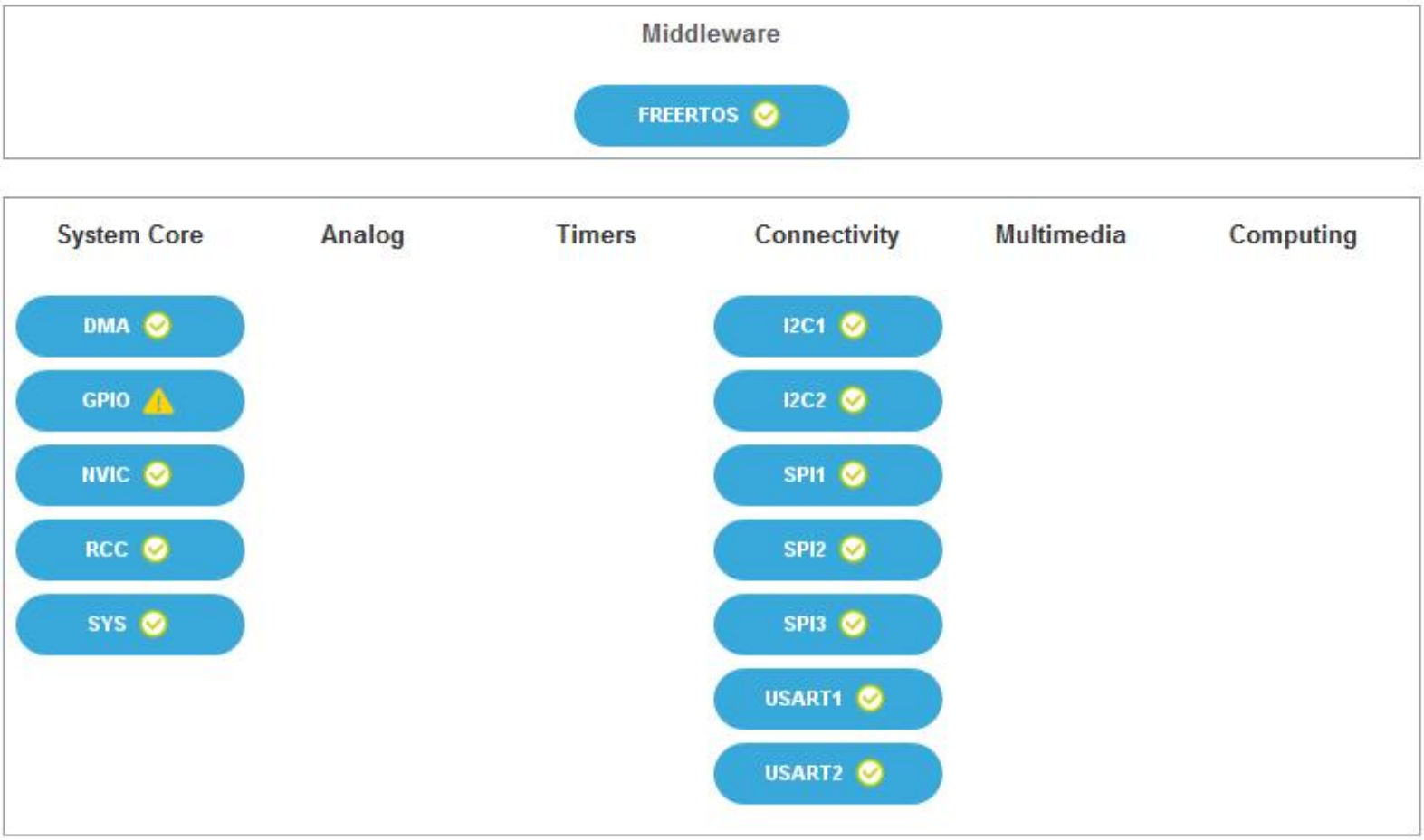
Mode:	Normal
Peripheral Increment:	Disable
Memory Increment:	**Enable ***
Peripheral Data Width:	Byte
Memory Data Width:	Byte

8.3. 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	15	0
System tick timer	true	15	0
DMA1 channel4 global interrupt	true	5	0
DMA1 channel5 global interrupt	true	5	0
DMA1 channel6 global interrupt	true	5	0
DMA1 channel7 global interrupt	true	5	0
I2C2 event interrupt	true	5	0
I2C2 error interrupt	true	5	0
USART1 global interrupt	true	5	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
I2C1 event interrupt	unused		
I2C1 error interrupt	unused		
SPI1 global interrupt	unused		
SPI2 global interrupt	unused		
USART2 global interrupt	unused		
SPI3 global interrupt	unused		

*** User modified value**

9. Predefined Views - Category view : Current



10. Software Pack Report

10.1. Software Pack selected

Vendor	Name	Version	Component
STMicroelectronics	FreeRTOS	0.0.1	Class : RTOS Group : Core Version : 10.2.0