

1. Description

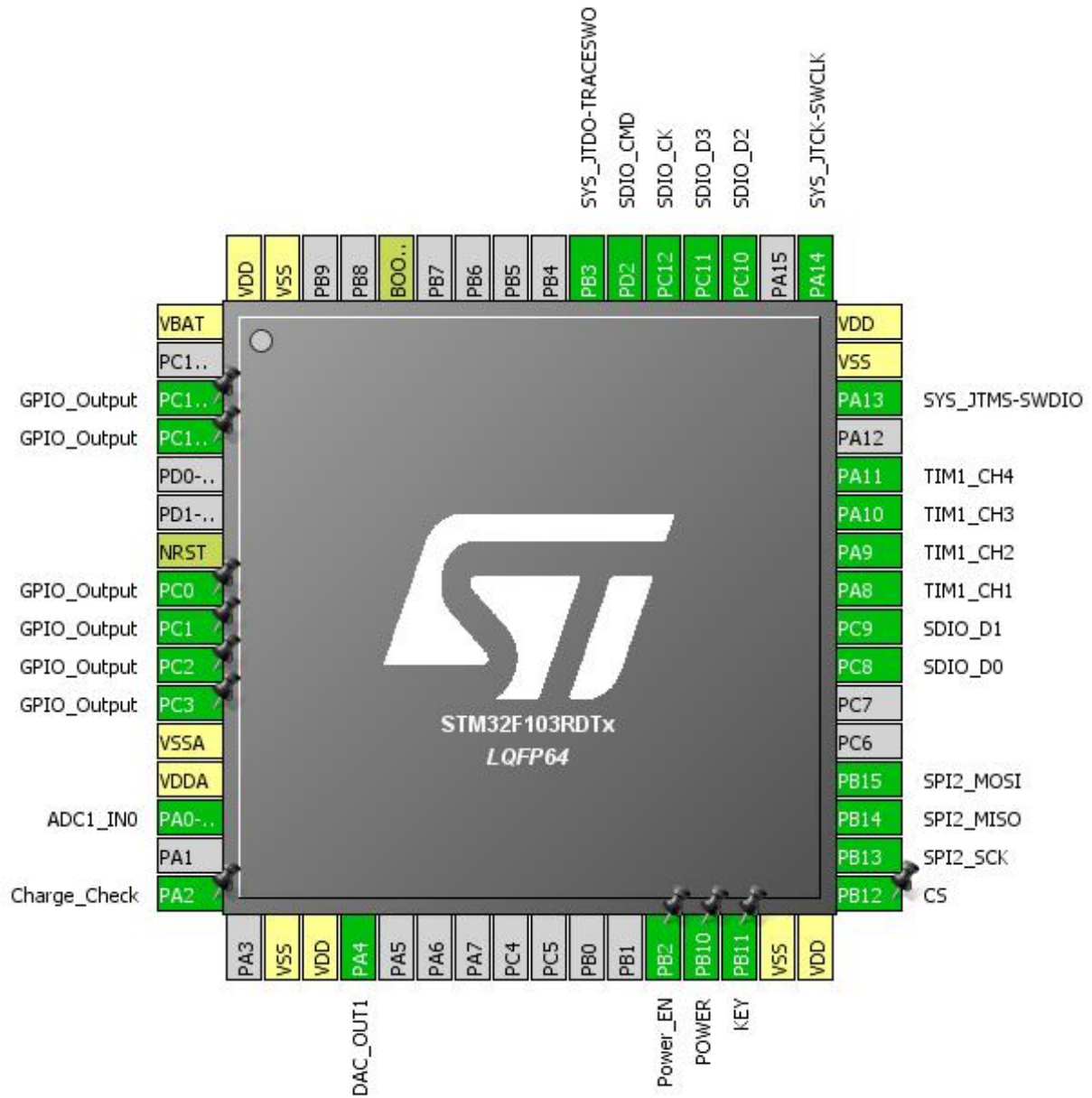
1.1. Project

Project Name	MX2_AudioPlayer
Board Name	MX2_AudioPlayer
Generated with:	STM32CubeMX 4.22.0
Date	09/13/2017

1.2. MCU

MCU Series	STM32F1
MCU Line	STM32F103
MCU name	STM32F103RDTx
MCU Package	LQFP64
MCU Pin number	64

2. Pinout Configuration



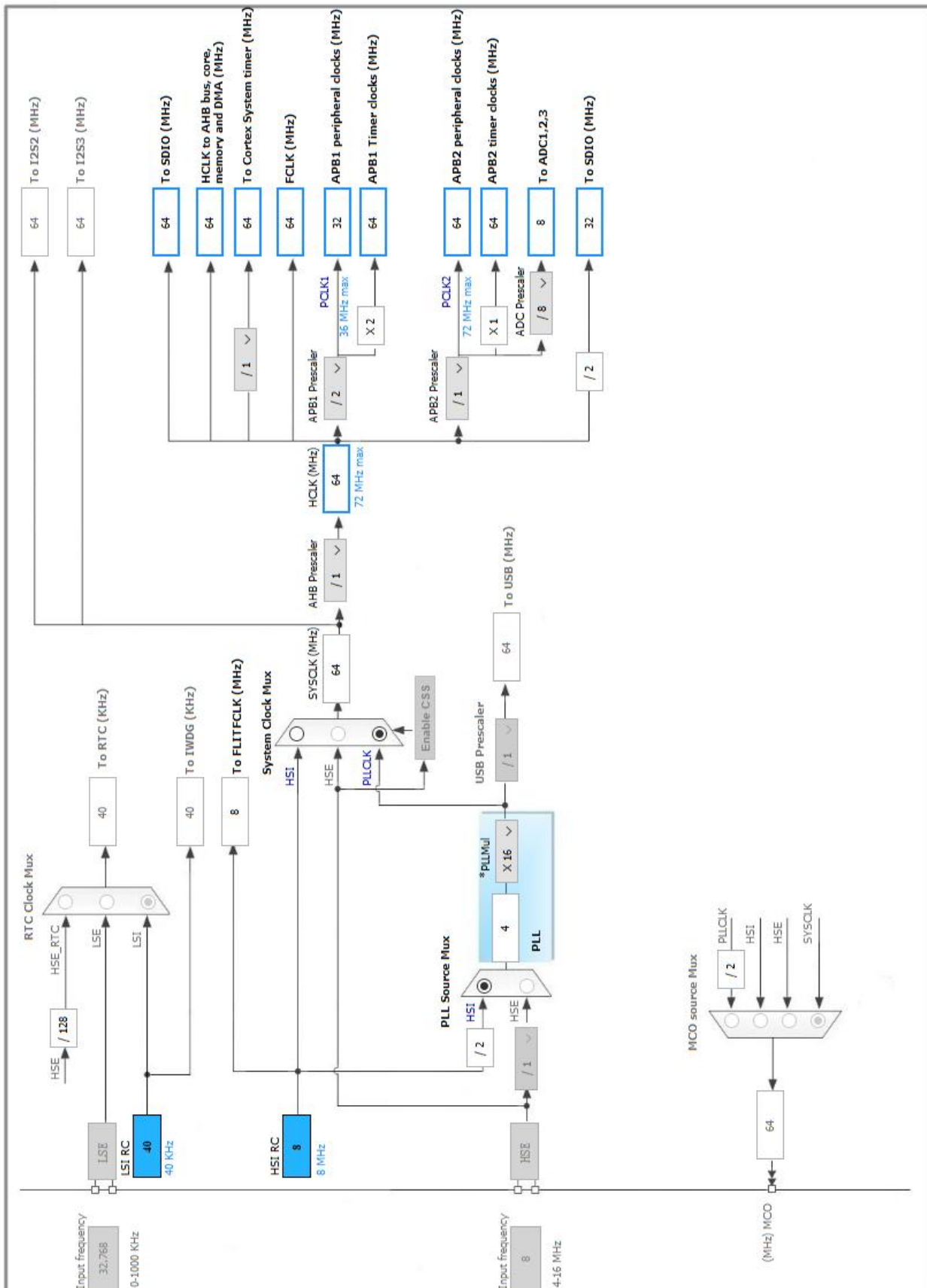
3. Pins Configuration

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
3	PC14-OSC32_IN *	I/O	GPIO_Output	
4	PC15-OSC32_OUT *	I/O	GPIO_Output	
7	NRST	Reset		
8	PC0 *	I/O	GPIO_Output	
9	PC1 *	I/O	GPIO_Output	
10	PC2 *	I/O	GPIO_Output	
11	PC3 *	I/O	GPIO_Output	
12	VSSA	Power		
13	VDDA	Power		
14	PA0-WKUP	I/O	ADC1_IN0	
16	PA2 *	I/O	GPIO_Input	Charge_Check
18	VSS	Power		
19	VDD	Power		
20	PA4	I/O	DAC_OUT1	
28	PB2 *	I/O	GPIO_Output	Power_EN
29	PB10 *	I/O	GPIO_Input	POWER
30	PB11 *	I/O	GPIO_Input	KEY
31	VSS	Power		
32	VDD	Power		
33	PB12 *	I/O	GPIO_Output	CS
34	PB13	I/O	SPI2_SCK	
35	PB14	I/O	SPI2_MISO	
36	PB15	I/O	SPI2_MOSI	
39	PC8	I/O	SDIO_D0	
40	PC9	I/O	SDIO_D1	
41	PA8	I/O	TIM1_CH1	
42	PA9	I/O	TIM1_CH2	
43	PA10	I/O	TIM1_CH3	
44	PA11	I/O	TIM1_CH4	
46	PA13	I/O	SYS_JTMS-SWDIO	
47	VSS	Power		
48	VDD	Power		
49	PA14	I/O	SYS_JTCK-SWCLK	
51	PC10	I/O	SDIO_D2	
52	PC11	I/O	SDIO_D3	

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
53	PC12	I/O	SDIO_CK	
54	PD2	I/O	SDIO_CMD	
55	PB3	I/O	SYS_JTDO-TRACESWO	
60	BOOT0	Boot		
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: IN0

5.1.1. Parameter Settings:

ADCs_Common_Settings:

Mode Independent mode

ADC_Settings:

Data Alignment Right alignment

Scan Conversion Mode Disabled

Continuous Conversion Mode **Enabled ***

Discontinuous Conversion Mode Disabled

ADC_Regular_ConversionMode:

Enable Regular Conversions Enable

Number Of Conversion 1

External Trigger Conversion Source Regular Conversion launched by software

Rank 1

Channel Channel 0

Sampling Time **239.5 Cycles ***

ADC_Injected_ConversionMode:

Number Of Conversions 0

WatchDog:

Enable Analog WatchDog Mode false

5.2. DAC

mode: OUT1 Configuration

5.2.1. Parameter Settings:

DAC Out1 Settings:

Output Buffer Enable

Trigger **Timer 7 Trigger Out event ***

Wave generation mode Disabled

5.3. SDIO

Mode: SD 4 bits Wide bus

5.3.1. Parameter Settings:

SDIO parameters:

SDIOCLK clock divide factor 5 *

5.4. SPI2

Mode: Full-Duplex Master

5.4.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	2
Baud Rate	16.0 MBits/s *
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Software

5.5. SYS

Debug: Trace Asynchronous Sw

Timebase Source: TIM8

5.6. TIM1

Clock Source : Internal Clock

Channel1: PWM Generation CH1

Channel2: PWM Generation CH2

Channel3: PWM Generation CH3

Channel4: PWM Generation CH4

5.6.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	63 *
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	1025 *
Internal Clock Division (CKD)	No Division
Repetition Counter (RCR - 8 bits value)	0
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)

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

PWM Generation Channel 1:

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

PWM Generation Channel 2:

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

PWM Generation Channel 3:

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

PWM Generation Channel 4:

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

5.7. TIM7

mode: Activated

5.7.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	2908 *
auto-reload preload	Disable

Trigger Output (TRGO) Parameters:

Trigger Event Selection	Update Event *
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5.8. FATFS

mode: SD Card

5.8.1. Set Defines:

Version:

FATFS version	R0.11
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Function Parameters:

FS_READONLY (Read-only mode)	Disabled
FS_MINIMIZE (Minimization level)	Enabled with 8 functions removed *
USE_STRFUNC (String functions)	Enabled with LF -> CRLF conversion
USE_FIND (Find functions)	Disabled

USE_MKFS (Make filesystem function)	Disabled *
USE_FASTSEEK (Fast seek function)	Enabled
USE_LABEL (Volume label functions)	Disabled
USE_FORWARD (Forward function)	Disabled

Locale and Namespace Parameters:

CODE_PAGE (Code page on target)	Japanese Shift-JIS (DBCS, OEM, Windows) *
USE_LFN (Use Long Filename)	Enabled with dynamic working buffer on the HEAP *
MAX_LFN (Max Long Filename)	30 *
LFN_UNICODE (Enable Unicode)	ANSI/OEM
STRF_ENCODE (Character encoding)	UTF-8
FS_RPATH (Relative Path)	Disabled

Physical Drive Parameters:

VOLUMES (Logical drives)	1
MAX_SS (Maximum Sector Size)	512
MIN_SS (Minimum Sector Size)	512
MULTI_PARTITION (Volume partitions feature)	Disabled
USE_TRIM (Erase feature)	Disabled
FS_NOFSINFO (Force full FAT scan)	0

System Parameters:

FS_TINY (Tiny mode)	Disabled
FS_NORTC (Timestamp feature)	Dynamic timestamp
NORTC_YEAR (Year for timestamp)	2015
NORTC_MON (Month for timestamp)	6
NORTC_MDAY (Day for timestamp)	4
WORD_ACCESS (Platform dependent access option)	Word access *
FS_REENTRANT (Re-Entrancy)	Enabled
FS_TIMEOUT (Timeout ticks)	1000
SYNC_t (O/S sync object)	osSemaphoreId
FS_LOCK (Number of files opened simultaneously)	2

5.8.2. IPs instances:

SDIO/SDMMC:

SDIO instance	SDIO
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5.9. FREERTOS

mode: Enabled

5.9.1. Config parameters:

Versions:

FreeRTOS version	9.0.0
CMSIS-RTOS version	1.02

Kernel settings:

USE_PREEMPTION	Enabled
CPU_CLOCK_HZ	SystemCoreClock
TICK_RATE_HZ	1000
MAX_PRIORITIES	7
MINIMAL_STACK_SIZE	128
MAX_TASK_NAME_LEN	16
USE_16_BIT_TICKS	Disabled
IDLE_SHOULD_YIELD	Enabled
USE_MUTEXES	Enabled
USE_RECURSIVE_MUTEXES	Disabled
USE_COUNTING_SEMAPHORES	Disabled
QUEUE_REGISTRY_SIZE	8
USE_APPLICATION_TASK_TAG	Disabled
ENABLE_BACKWARD_COMPATIBILITY	Enabled
USE_PORT_OPTIMISED_TASK_SELECTION	Enabled
USE_TICKLESS_IDLE	Disabled
USE_TASK_NOTIFICATIONS	Enabled

Memory management settings:

Memory Allocation	Dynamic
TOTAL_HEAP_SIZE	46000 *
Memory Management scheme	heap_4

Hook function related definitions:

USE_IDLE_HOOK	Disabled
USE_TICK_HOOK	Disabled
USE_MALLOC_FAILED_HOOK	Enabled *
USE_DAEMON_TASK_STARTUP_HOOK	Disabled
CHECK_FOR_STACK_OVERFLOW	Option2 *

Run time and task stats gathering related definitions:

GENERATE_RUN_TIME_STATS	Disabled
USE_TRACE_FACILITY	Disabled
USE_STATS_FORMATTING_FUNCTIONS	Disabled

Co-routine related definitions:

USE_CO_ROUTINES	Disabled
MAX_CO_ROUTINE_PRIORITIES	2

Software timer definitions:

USE_TIMERS Disabled

Interrupt nesting behaviour configuration:

LIBRARY_LOWEST_INTERRUPT_PRIORITY 15

LIBRARY_MAX_SYSCALL_INTERRUPT_PRIORITY 5

5.9.2. Include parameters:

Include definitions:

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

*** 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	PA0-WKUP	ADC1_IN0	Analog mode	n/a	n/a	
DAC	PA4	DAC_OUT1	Analog mode	n/a	n/a	
SDIO	PC8	SDIO_D0	Alternate Function Push Pull	n/a	High	
	PC9	SDIO_D1	Alternate Function Push Pull	n/a	High	
	PC10	SDIO_D2	Alternate Function Push Pull	n/a	High	
	PC11	SDIO_D3	Alternate Function Push Pull	n/a	High	
	PC12	SDIO_CK	Alternate Function Push Pull	n/a	High	
	PD2	SDIO_CMD	Alternate Function Push Pull	n/a	High	
SPI2	PB13	SPI2_SCK	Alternate Function Push Pull	n/a	High *	
	PB14	SPI2_MISO	Input mode	No pull-up and no pull-down	n/a	
	PB15	SPI2_MOSI	Alternate Function Push Pull	n/a	High *	
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
	PB3	SYS_JTDO-TRACESWO	n/a	n/a	n/a	
TIM1	PA8	TIM1_CH1	Alternate Function Push Pull	n/a	Low	
	PA9	TIM1_CH2	Alternate Function Push Pull	n/a	Low	
	PA10	TIM1_CH3	Alternate Function Push Pull	n/a	Low	
	PA11	TIM1_CH4	Alternate Function Push Pull	n/a	Low	
GPIO	PC14-OSC32_IN	GPIO_Output	Output Push Pull	n/a	Low	
	PC15-OSC32_OUT	GPIO_Output	Output Push Pull	n/a	Low	
	PC0	GPIO_Output	Output Push Pull	n/a	Low	
	PC1	GPIO_Output	Output Push Pull	n/a	Low	
	PC2	GPIO_Output	Output Push Pull	n/a	Low	
	PC3	GPIO_Output	Output Push Pull	n/a	Low	
	PA2	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	Charge_Check
	PB2	GPIO_Output	Output Push Pull	n/a	Low	Power_EN
	PB10	GPIO_Input	Input mode	Pull-down *	n/a	POWER
	PB11	GPIO_Input	Input mode	Pull-up *	n/a	KEY

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PB12	GPIO_Output	Output Push Pull	n/a	High *	CS

6.2. DMA configuration

DMA request	Stream	Direction	Priority
ADC1	DMA1_Channel1	Peripheral To Memory	Low
DAC_CH1	DMA2_Channel3	Memory To Peripheral	Low

ADC1: DMA1_Channel1 DMA request Settings:

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

DAC_CH1: DMA2_Channel3 DMA request Settings:

Mode: Normal
Peripheral Increment: Disable
Memory Increment: **Enable ***
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	15	0
System tick timer	true	15	0
DMA1 channel1 global interrupt	true	5	0
TIM8 update interrupt	true	0	0
DMA2 channel3 global interrupt	true	5	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
ADC1 and ADC2 global interrupts	unused		
TIM1 break interrupt	unused		
TIM1 update interrupt	unused		
TIM1 trigger and commutation interrupts	unused		
TIM1 capture compare interrupt	unused		
SPI2 global interrupt	unused		
SDIO global interrupt	unused		
TIM7 global interrupt	unused		

* User modified value

7. Power Consumption Calculator report

7.1. Microcontroller Selection

Series	STM32F1
Line	STM32F103
MCU	STM32F103RDTx
Datasheet	14611_Rev12

7.2. Parameter Selection

Temperature	25
Vdd	3.3

8. Software Project

8.1. Project Settings

Name	Value
Project Name	MX2_AudioPlayer
Project Folder	E:\GitHub_Clone\MX2\MX2_AudioPlayer
Toolchain / IDE	SW4STM32
Firmware Package Name and Version	STM32Cube FW_F1 V1.6.0

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