1. Description

1.1. Project

Project Name	MX_AudioPlayer
Board Name	MX_AudioPlayer
Generated with:	STM32CubeMX 4.16.1
Date	12/31/2016

1.2. MCU

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

2. Pinout Configuration
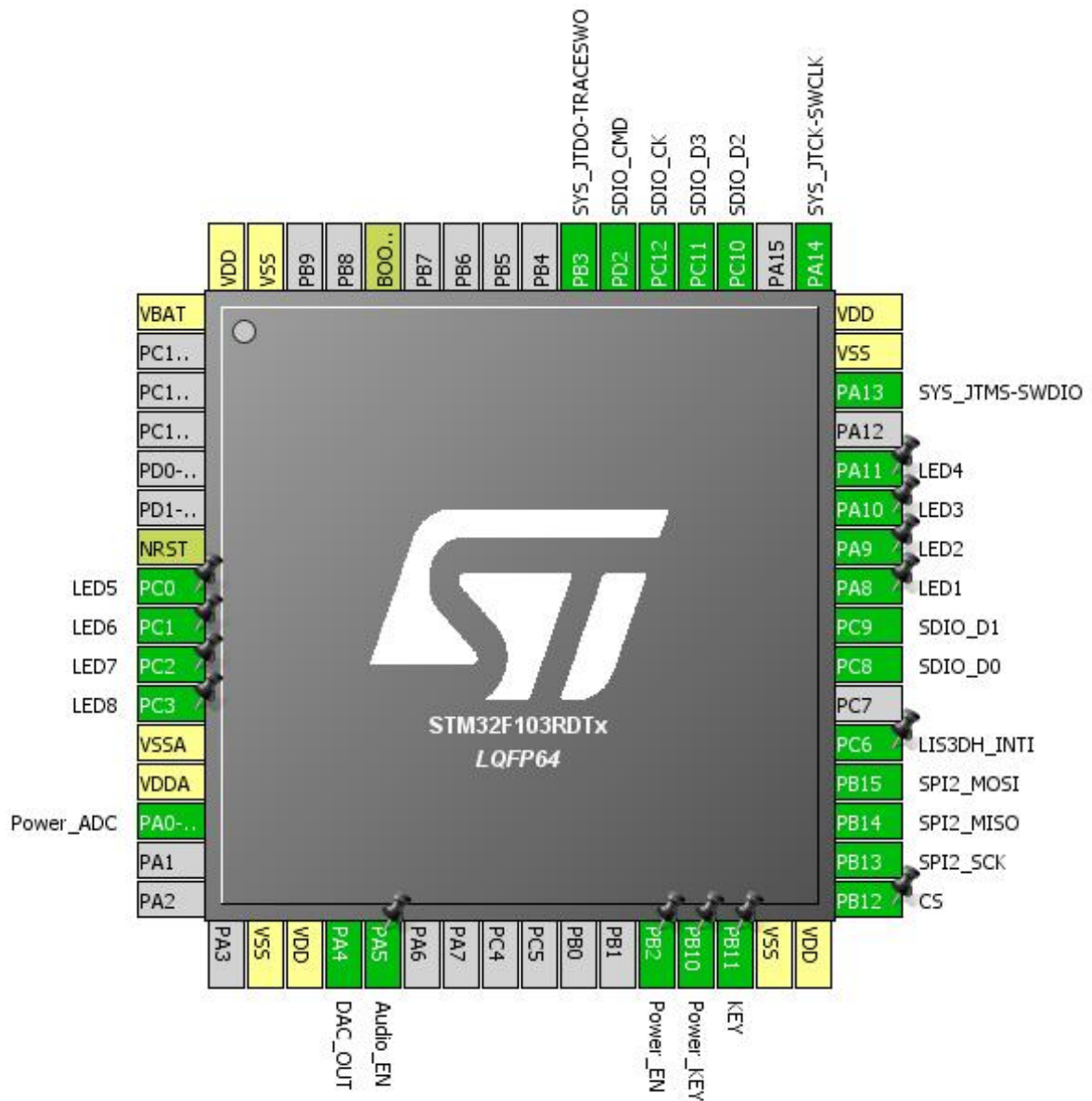
3. Pins Configuration

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
7	NRST	Reset		
8	PC0 *	I/O	GPIO_Output	LED5
9	PC1 *	I/O	GPIO_Output	LED6
10	PC2 *	I/O	GPIO_Output	LED7
11	PC3 *	I/O	GPIO_Output	LED8
12	VSSA	Power		
13	VDDA	Power		
14	PA0-WKUP	I/O	ADC1_IN0	Power_ADC
18	VSS	Power		
19	VDD	Power		
20	PA4	I/O	DAC_OUT1	DAC_OUT
21	PA5 *	I/O	GPIO_Output	Audio_EN
28	PB2 *	I/O	GPIO_Output	Power_EN
29	PB10 *	I/O	GPIO_Input	Power_KEY
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	
37	PC6 *	I/O	GPIO_Input	LIS3DH_INTI
39	PC8	I/O	SDIO_D0	
40	PC9	I/O	SDIO_D1	
41	PA8 *	I/O	GPIO_Output	LED1
42	PA9 *	I/O	GPIO_Output	LED2
43	PA10 *	I/O	GPIO_Output	LED3
44	PA11 *	I/O	GPIO_Output	LED4
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	
53	PC12	I/O	SDIO_CK	

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
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
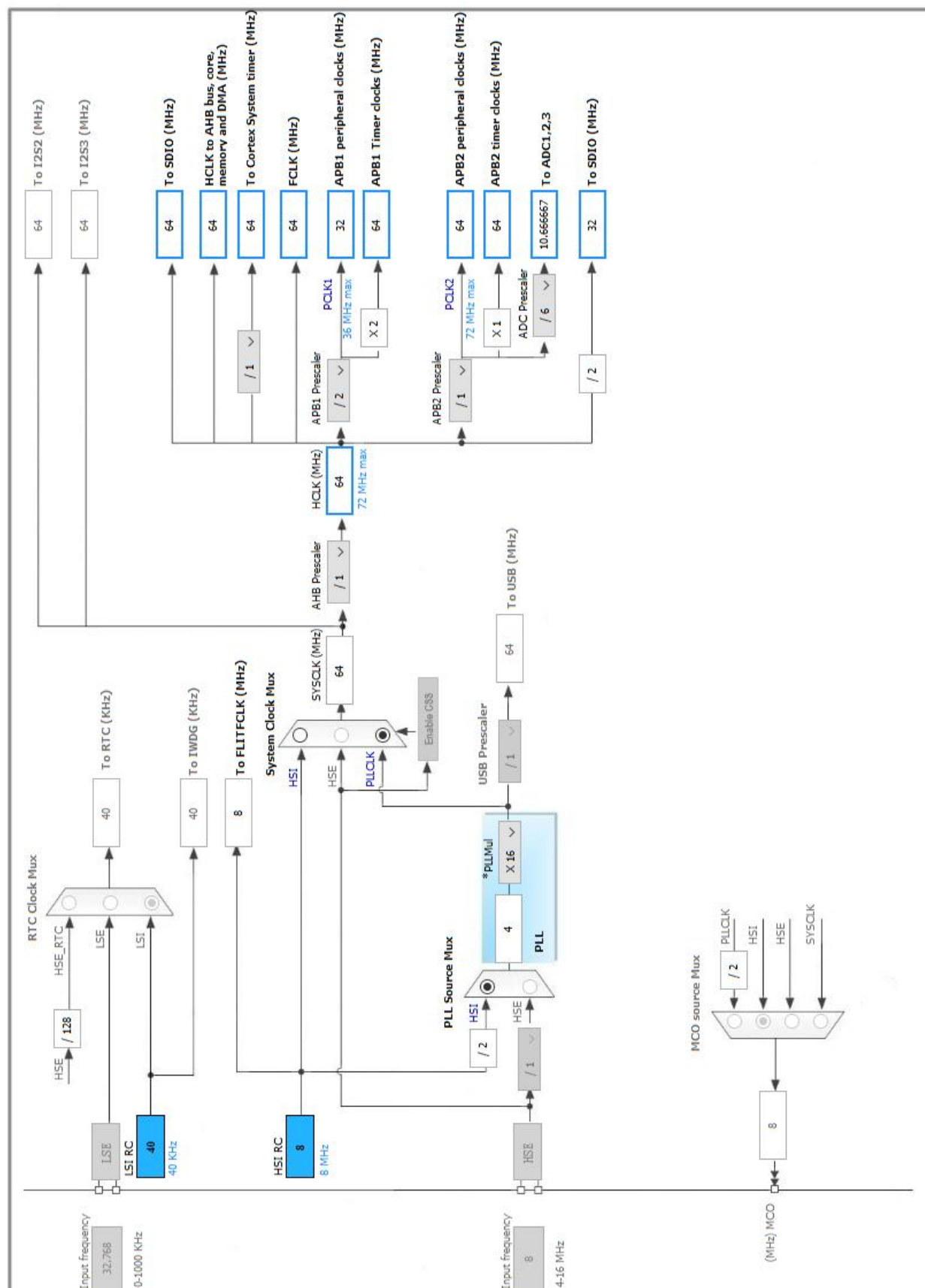
5. IPs and Middleware Configuration

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	Disabled
Discontinuous Conversion Mode	Disabled

ADC_Regular_ConversionMode:

Enable Regular Conversions	Enable
Number Of Conversion	1
External Trigger Conversion Edge	None
<u>Rank</u>	1
Channel	Channel 0
Sampling Time	1.5 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 2 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	**1 ***

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: Serial Wire
Timebase Source: TIM8

5.6. TIM2

Slave Mode: Reset Mode
Trigger Source: ITR0
Clock Source   : Internal Clock

5.6.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**2908 ***
Internal Clock Division (CKD)	No Division
Slave Mode Controller	Reset Mode

Trigger Output (TRGO) Parameters:

Master/Slave Mode	Disable (no sync between this TIM (Master) and its Slaves
Trigger Event Selection	**Update Event ***

5.7. FATFS

mode: SD Card

5.7.1. Set Defines:

Version:

FATFS version	R0.11

Function Parameters:

FS_TINY (Tiny mode)	Disabled
FS_READONLY (Read-only mode)	Disabled
FS_MINIMIZE (Minimization level)	Disabled
USE_STRFUNC (String functions)	Enabled with LF -> CRLF conversion
USE_FIND (Find functions)	Disabled
USE_MKFS (Make filesystem function)	Enabled
USE_FORWARD (Forward function)	Disabled
USE_LABEL (Volume label functions)	Disabled
USE_FASTSEEK (Fast seek function)	Enabled

Locale and Namespace Parameters:

CODE_PAGE (Code page on target)	**ASCII only ***
USE_LFN (Use Long Filename)	Disabled
MAX_LFN (Max Long Filename)	255
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_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)	Byte 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

5.7.2. IPs instances:

SDIO/SDMMC:

SDIO instance	SDIO

5.8. FREERTOS

mode: Enabled

5.8.1. Config parameters:

Versions:

CMSIS-RTOS version	1.02
FreeRTOS version	8.2.3

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
TOTAL_HEAP_SIZE	3072
Memory Management scheme	heap_4
USE_ALTERNATIVE_API	Disabled
ENABLE_BACKWARD_COMPATIBILITY	Enabled
USE_PORT_OPTIMISED_TASK_SELECTION	Disabled
USE_TICKLESS_IDLE	Disabled
USE_TASK_NOTIFICATIONS	Enabled

Hook function related definitions:

USE_IDLE_HOOK	Disabled
USE_TICK_HOOK	Disabled
USE_MALLOC_FAILED_HOOK	Disabled
CHECK_FOR_STACK_OVERFLOW	Disabled

Run time and task stats gathering related definitions:

USE_TRACE_FACILITY	Enabled
GENERATE_RUN_TIME_STATS	Disabled

Co-routine related definitions:

USE_CO_ROUTINES	Disabled
MAX_CO_ROUTINE_PRIORITIES	2

Software timer definitions:

USE_TIMERS	Disabled
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

5.8.2. 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	Disabled
xTaskGetCurrentTaskHandle	Disabled
eTaskGetState	Disabled
xEventGroupSetBitFromISR	Disabled
xTimerPendFunctionCall	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	Power_ADC
DAC	PA4	DAC_OUT1	Analog mode	n/a	n/a	DAC_OUT
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	
GPIO	PC0	GPIO_Output	Output Push Pull	n/a	Low	LED5
	PC1	GPIO_Output	Output Push Pull	n/a	Low	LED6
	PC2	GPIO_Output	Output Push Pull	n/a	Low	LED7
	PC3	GPIO_Output	Output Push Pull	n/a	Low	LED8
	PA5	GPIO_Output	Output Push Pull	n/a	Low	Audio_EN
	PB2	GPIO_Output	Output Push Pull	n/a	Low	Power_EN
	PB10	GPIO_Input	Input mode	**Pull-up ***	n/a	Power_KEY
	PB11	GPIO_Input	Input mode	**Pull-up ***	n/a	KEY
	PB12	GPIO_Output	Output Push Pull	**n/a**	Low	CS
	PC6	GPIO_Input	Input mode	**Pull-up ***	n/a	LIS3DH_INTI
	PA8	GPIO_Output	Output Push Pull	**n/a**	Low	LED1
	PA9	GPIO_Output	Output Push Pull	**n/a**	Low	LED2
	PA10	GPIO_Output	Output Push Pull	**n/a**	Low	LED3
	PA11	GPIO_Output	Output Push Pull	**n/a**	Low	LED4

6.2. DMA configuration

DMA request	Stream	Direction	Priority
DAC_CH1	DMA2_Channel3	Memory To Peripheral	Low

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
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		
TIM2 global interrupt	unused		
SPI2 global interrupt	unused		
SDIO 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	MX_AudioPlayer
Project Folder	E:\GitHub_Clone\MX_AudioPlayer\MX_AudioPlayer
Toolchain / IDE	MDK-ARM V5
Firmware Package Name and Version	STM32Cube FW_F1 V1.4.0

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