

1. Description

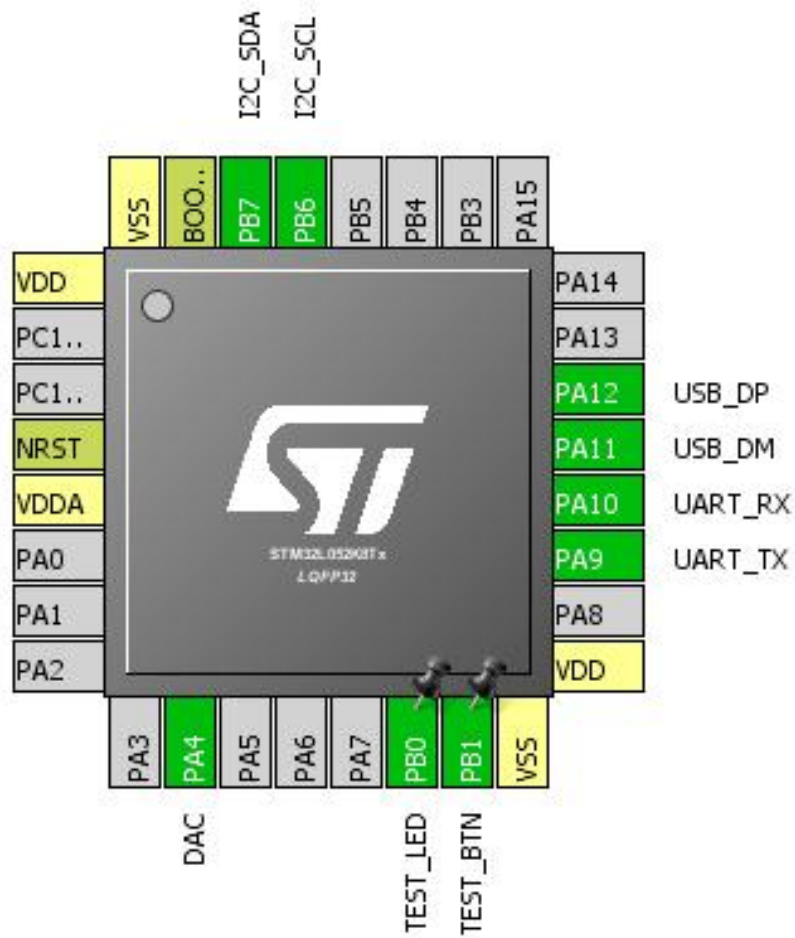
1.1. Project

Project Name	usbspeaker
Board Name	usbspeaker
Generated with:	STM32CubeMX 4.23.0
Date	02/04/2018

1.2. MCU

MCU Series	STM32L0
MCU Line	STM32L0x2
MCU name	STM32L052K8Tx
MCU Package	LQFP32
MCU Pin number	32

2. Pinout Configuration

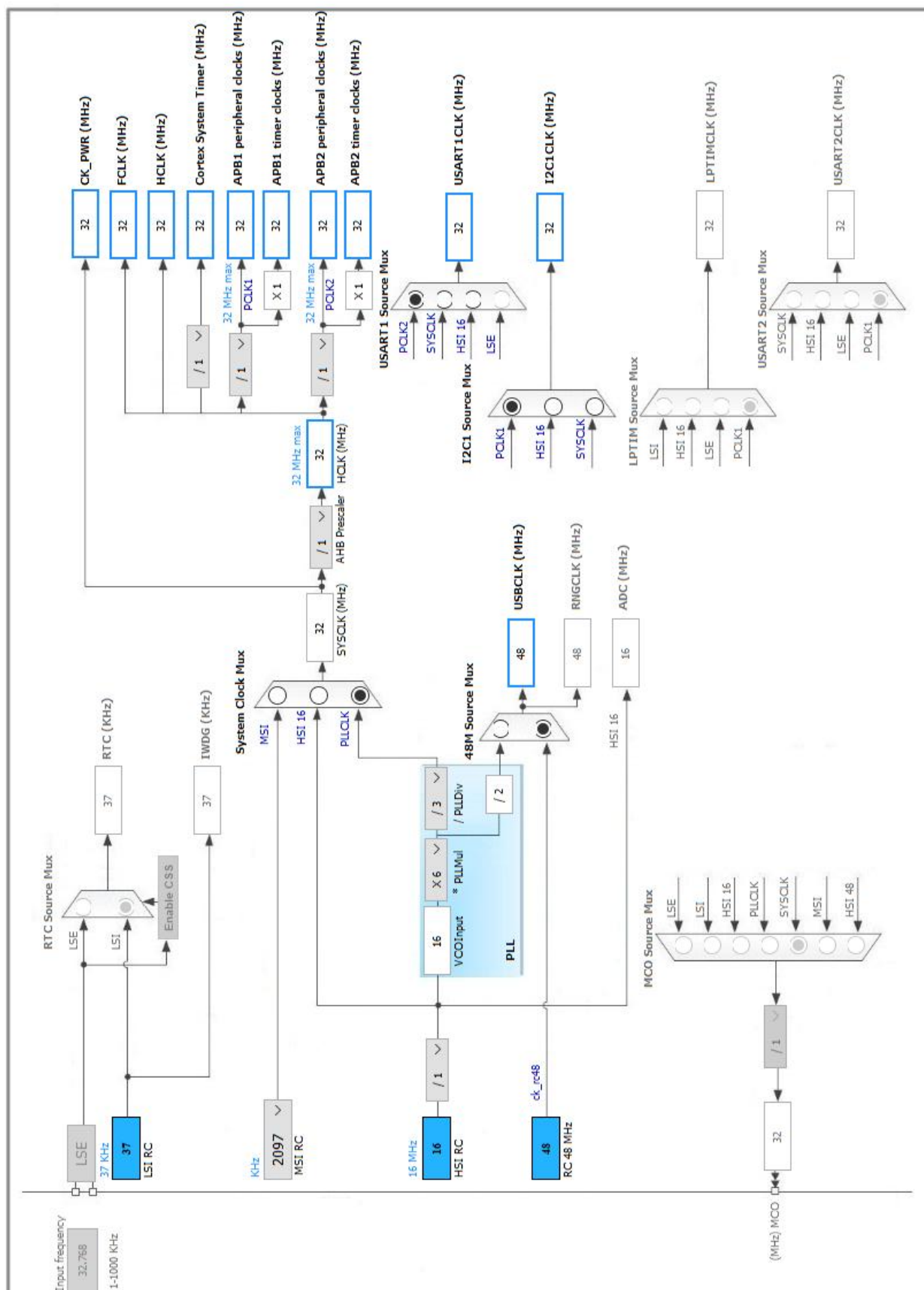


3. Pins Configuration

Pin Number LQFP32	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VDD	Power		
4	NRST	Reset		
5	VDDA	Power		
10	PA4	I/O	DAC_OUT1	DAC
14	PB0 *	I/O	GPIO_Output	TEST_LED
15	PB1 *	I/O	GPIO_Input	TEST_BTN
16	VSS	Power		
17	VDD	Power		
19	PA9	I/O	USART1_TX	UART_TX
20	PA10	I/O	USART1_RX	UART_RX
21	PA11	I/O	USB_DM	
22	PA12	I/O	USB_DP	
29	PB6	I/O	I2C1_SCL	I2C_SCL
30	PB7	I/O	I2C1_SDA	I2C_SDA
31	BOOT0	Boot		
32	VSS	Power		

* The pin is affected with an I/O function

4. Clock Tree Configuration



5. IPs and Middleware Configuration

5.1. DAC

mode: OUT1 Configuration

5.1.1. Parameter Settings:

DAC Out1 Settings:

Output Buffer	Enable
Trigger	Timer 6 Trigger Out event *
Wave generation mode	Disabled

5.2. I2C1

I2C: I2C

5.2.1. Parameter Settings:

Timing configuration:

I2C Speed Mode	Standard Mode
I2C Speed Frequency (KHz)	100
Rise Time (ns)	0
Fall Time (ns)	0
Coefficient of Digital Filter	0
Analog Filter	Enabled
Timing	0x00707CBB *

Slave Features:

Clock No Stretch Mode	Disabled
General Call Address Detection	Disabled
Primary Address Length selection	7-bit
Dual Address Acknowledged	Disabled
Primary slave address	0

5.3. SYS

Timebase Source: SysTick

5.4. TIM6

mode: Activated

5.4.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	1448 *

Trigger Output (TRGO) Parameters:

Trigger Event Selection	Update Event *
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5.5. USART1

Mode: Asynchronous

5.5.1. 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
Single Sample	Disable

Advanced Features:

Auto Baudrate	Disable
TX Pin Active Level Inversion	Disable
RX Pin Active Level Inversion	Disable
Data Inversion	Disable
TX and RX Pins Swapping	Disable
Overrun	Enable
DMA on RX Error	Enable
MSB First	Disable

5.6. USB

mode: Device (FS)

5.6.1. Parameter Settings:

Basic Parameters:

Speed	Full Speed 12MBit/s
Endpoint 0 Max Packet size	64 Bytes
Physical interface	Internal Phy

Power Parameters:

Low Power	Disabled
Link Power Management	Disabled

5.7. USB_DEVICE

Class For FS IP: Audio Device Class

5.7.1. Parameter Settings:

Basic Parameters:

USBD_MAX_NUM_INTERFACES (Maximum number of supported interfaces)	1
USBD_MAX_NUM_CONFIGURATION (Maximum number of supported configuration)	1
USBD_MAX_STR_DESC_SIZ (Maximum size for the string descriptors)	512
USBD_SUPPORT_USER_STRING (Enable user string descriptor)	Disabled
USBD_SELF_POWERED (Enabled self power)	Enabled
USBD_DEBUG_LEVEL (USBD Debug Level)	0: No debug message

Class Parameters:

USBD_AUDIO_FREQ (Audio sample frequency rate)	22100
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5.7.2. Device Descriptor:

Device Descriptor:

VID (Vendor Identifier)	1155
LANGID_STRING (Language Identifier)	English(United States)
MANUFACTURER_STRING (Manufacturer Identifier)	STMicroelectronics

Device Descriptor FS:

PID (Product Identifier)	0x5730 *
PRODUCT_STRING (Product Identifier)	STM32 Audio Class
SERIALNUMBER_STRING (Serial number)	00000000001A
CONFIGURATION_STRING (Configuration Identifier)	AUDIO Config
INTERFACE_STRING (Interface Identifier)	AUDIO Interface

* User modified value

6. System Configuration

6.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
DAC	PA4	DAC_OUT1	Analog mode	No pull-up and no pull-down	n/a	DAC
I2C1	PB6	I2C1_SCL	Alternate Function Open Drain	Pull-up	Very High *	I2C_SCL
	PB7	I2C1_SDA	Alternate Function Open Drain	Pull-up	Very High *	I2C_SDA
USART1	PA9	USART1_TX	Alternate Function Push Pull	Pull-up	Very High *	UART_TX
	PA10	USART1_RX	Alternate Function Push Pull	Pull-up	Very High *	UART_RX
USB	PA11	USB_DM	n/a	n/a	n/a	
	PA12	USB_DP	n/a	n/a	n/a	
GPIO	PB0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	TEST_LED
	PB1	GPIO_Input	Input mode	Pull-up *	n/a	TEST_BTN

6.2. DMA configuration

DMA request	Stream	Direction	Priority
DAC_CH1	DMA1_Channel2	Memory To Peripheral	Medium *

DAC_CH1: DMA1_Channel2 DMA request Settings:

Mode: **Circular ***
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
System service call via SWI instruction	true	0	0
Pendable request for system service	true	0	0
System tick timer	true	0	0
DMA1 channel 2 and channel 3 interrupts	true	0	0
USB event interrupt / USB wake-up interrupt through EXTI line 18	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash and EEPROM global interrupt	unused		
RCC and CRS global interrupt	unused		
TIM6 global interrupt and DAC1/DAC2 underrun error interrupts	unused		
I2C1 event global interrupt / I2C1 wake-up interrupt through EXTI line 23	unused		
USART1 global interrupt / USART1 wake-up interrupt through EXTI line 25	unused		

* User modified value

7. Power Consumption Calculator report

7.1. Microcontroller Selection

Series	STM32L0
Line	STM32L0x2
MCU	STM32L052K8Tx
Datasheet	025936_Rev7

7.2. Parameter Selection

Temperature	25
Vdd	null

8. Software Project

8.1. Project Settings

Name	Value
Project Name	usbspeaker
Project Folder	C:\Users\sungjune\Personal\Projects\usbspeaker
Toolchain / IDE	Makefile
Firmware Package Name and Version	STM32Cube FW_L0 V1.10.0

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	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