

1. Description

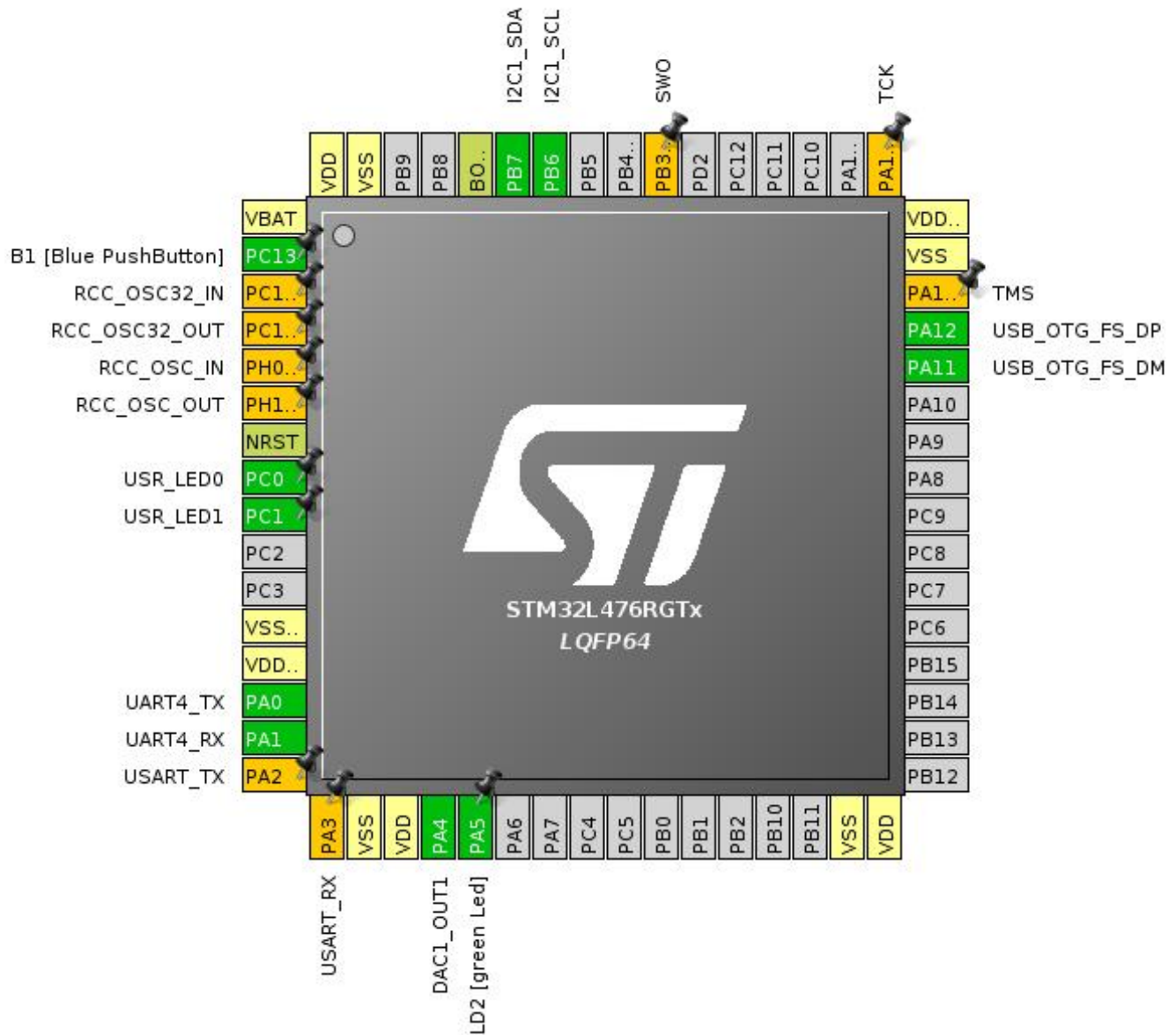
1.1. Project

Project Name	L4USBSpk
Board Name	NUCLEO-L476RG
Generated with:	STM32CubeMX 4.22.0
Date	08/07/2017

1.2. MCU

MCU Series	STM32L4
MCU Line	STM32L4x6
MCU name	STM32L476RGTx
MCU Package	LQFP64
MCU Pin number	64

2. Pinout Configuration



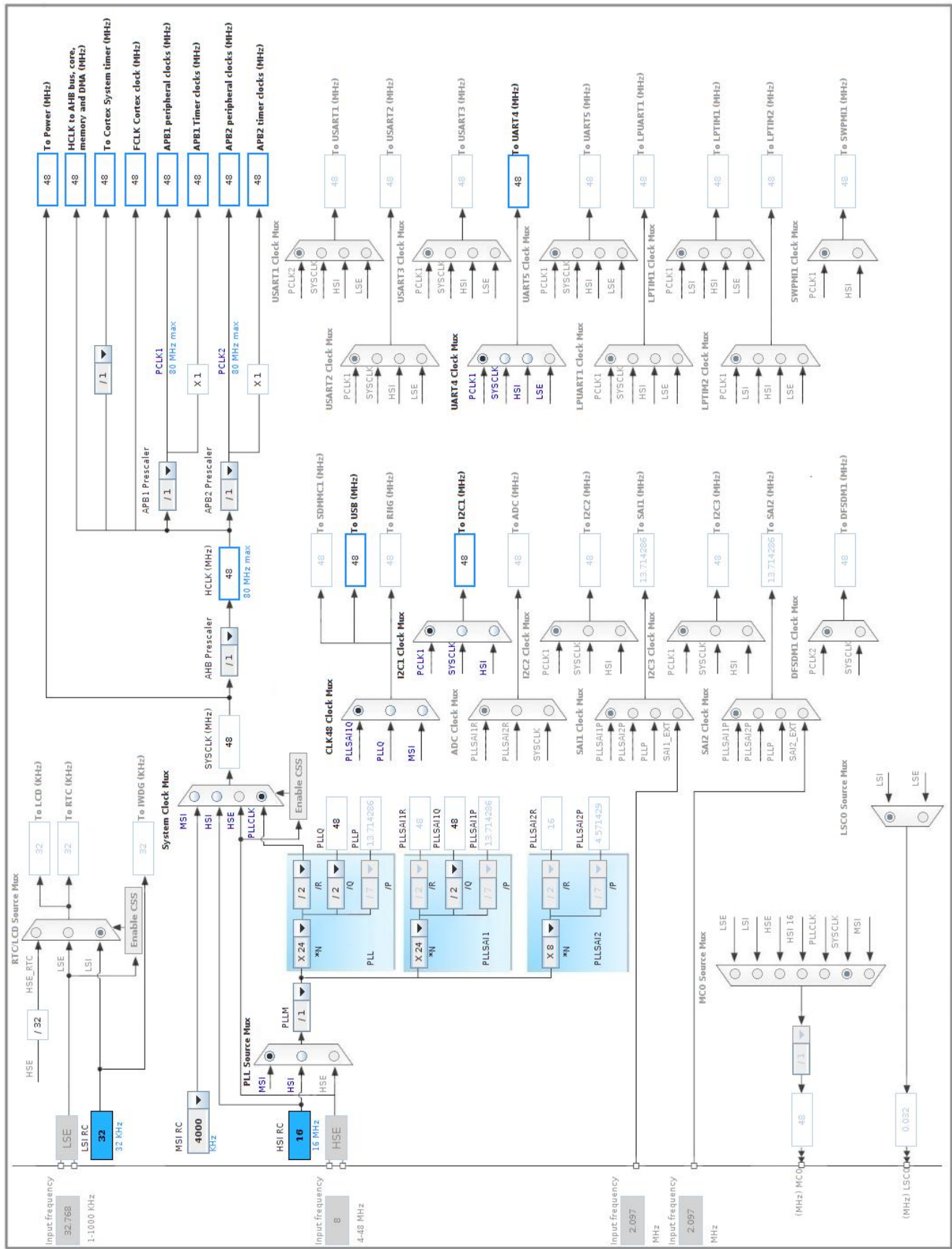
3. Pins Configuration

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
2	PC13	I/O	GPIO_EXTI13	B1 [Blue PushButton]
3	PC14-OSC32_IN (PC14) *	I/O	RCC_OSC32_IN	
4	PC15-OSC32_OUT (PC15) *	I/O	RCC_OSC32_OUT	
5	PH0-OSC_IN (PH0) *	I/O	RCC_OSC_IN	
6	PH1-OSC_OUT (PH1) *	I/O	RCC_OSC_OUT	
7	NRST	Reset		
8	PC0 **	I/O	GPIO_Output	USR_LED0
9	PC1 **	I/O	GPIO_Output	USR_LED1
12	VSSA/VREF-	Power		
13	VDDA/VREF+	Power		
14	PA0	I/O	UART4_TX	
15	PA1	I/O	UART4_RX	
16	PA2 *	I/O	USART2_TX	USART_TX
17	PA3 *	I/O	USART2_RX	USART_RX
18	VSS	Power		
19	VDD	Power		
20	PA4	I/O	DAC1_OUT1	
21	PA5 **	I/O	GPIO_Output	LD2 [green Led]
31	VSS	Power		
32	VDD	Power		
44	PA11	I/O	USB_OTG_FS_DM	
45	PA12	I/O	USB_OTG_FS_DP	
46	PA13 (JTMS-SWDIO) *	I/O	SYS_JTMS-SWDIO	TMS
47	VSS	Power		
48	VDDUSB	Power		
49	PA14 (JTCK-SWCLK) *	I/O	SYS_JTCK-SWCLK	TCK
55	PB3 (JTDO-TRACESWO) *	I/O	SYS_JTDO-SWO	SWO
58	PB6	I/O	I2C1_SCL	
59	PB7	I/O	I2C1_SDA	
60	BOOT0	Boot		
63	VSS	Power		
64	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. IPs and Middleware Configuration

5.1. DAC1

OUT1 mode: Connected to external pin only

5.1.1. Parameter Settings:

DAC Out1 Settings:

Output Buffer	Enable
Trigger	Software trigger *
Wave generation mode	Disabled
User Trimming	Factory trimming
Sample And Hold	Sampleandhold Disable

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	0x20303E5D *

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. TIM7

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)	1000 *

Trigger Output (TRGO) Parameters:

Trigger Event Selection	Update Event *
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5.5. UART4

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

Mode: Device_Only

Speed	Full Speed 12MBit/s
Endpoint 0 Max Packet size	64 Bytes
Enable internal IP DMA	Disabled
Low power	Disabled
Link Power Management	Disabled
VBUS sensing	Disabled *
Signal start of frame	Disabled

Class For FS IP: Audio Device Class

Basic Parameters:

USB_D_MAX_NUM_INTERFACES (Maximum number of supported interfaces)	1
USB_D_MAX_NUM_CONFIGURATION (Maximum number of supported configuration)	1
USB_D_MAX_STR_DESC_SIZ (Maximum size for the string descriptors)	512
USB_D_SUPPORT_USER_STRING (Enable user string descriptor)	Disabled
USB_D_SELF_POWERED (Enabled self power)	Enabled
USB_D_DEBUG_LEVEL (USB_D Debug Level)	0: No debug message
USB_D_LPM_ENABLED (Link Power Management)	1: Link Power Management supported

Class Parameters:

USBD_AUDIO_FREQ (Audio sample frequency rate)	24000 *
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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)

22336

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
DAC1	PA4	DAC1_OUT1	Analog mode	No pull-up and no pull-down	n/a	
I2C1	PB6	I2C1_SCL	Alternate Function Open Drain	Pull-up	Very High *	
	PB7	I2C1_SDA	Alternate Function Open Drain	Pull-up	Very High *	
UART4	PA0	UART4_TX	Alternate Function Push Pull	Pull-up	Very High *	
	PA1	UART4_RX	Alternate Function Push Pull	Pull-up	Very High *	
USB_OTG_FS	PA11	USB_OTG_FS_DM	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PA12	USB_OTG_FS_DP	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
Single Mapped Signals	PC14-OSC32_IN (PC14)	RCC_OSC32_IN	n/a	n/a	n/a	
	PC15-OSC32_OUT (PC15)	RCC_OSC32_OUT	n/a	n/a	n/a	
	PH0-OSC_IN (PH0)	RCC_OSC_IN	n/a	n/a	n/a	
	PH1-OSC_OUT (PH1)	RCC_OSC_OUT	n/a	n/a	n/a	
	PA2	USART2_TX	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	USART_TX
	PA3	USART2_RX	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	USART_RX
	PA13 (JTMS-SWDIO)	SYS_JTMS-SWDIO	n/a	n/a	n/a	TMS
	PA14 (JTCK-SWCLK)	SYS_JTCK-SWCLK	n/a	n/a	n/a	TCK
	PB3 (JTDO-SWDIO)	SYS_JTDO-SWDIO	n/a	n/a		SWO

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	TRACESWO)	SWO			n/a	
GPIO	PC13	GPIO_EXTI13	External Interrupt Mode with Falling edge trigger detection	No pull-up and no pull-down	n/a	B1 [Blue PushButton]
	PC0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	USR_LED0
	PC1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	USR_LED1
	PA5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LD2 [green Led]

6.2. DMA configuration

nothing configured in DMA service

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
TIM6 global interrupt, DAC channel1 and channel2 underrun error interrupts	true	0	0
TIM7 global interrupt	true	0	0
USB OTG FS global interrupt	true	0	0
PVD/PVM1/PVM2/PVM3/PVM4 interrupts through EXTI lines 16/35/36/37/38	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
I2C1 event interrupt	unused		
I2C1 error interrupt	unused		
EXTI line[15:10] interrupts	unused		
UART4 global interrupt	unused		
FPU global interrupt	unused		

* User modified value

7. Power Consumption Calculator report

7.1. Microcontroller Selection

Series	STM32L4
Line	STM32L4x6
MCU	STM32L476RGTx
Datasheet	025976_Rev4

7.2. Parameter Selection

Temperature	25
Vdd	3.0

8. Software Project

8.1. Project Settings

Name	Value
Project Name	L4USBSpk
Project Folder	/home/brian/Projects/STMicro/projects/L4USBSpk
Toolchain / IDE	Makefile
Firmware Package Name and Version	STM32Cube FW_L4 V1.8.1

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