

1. Description

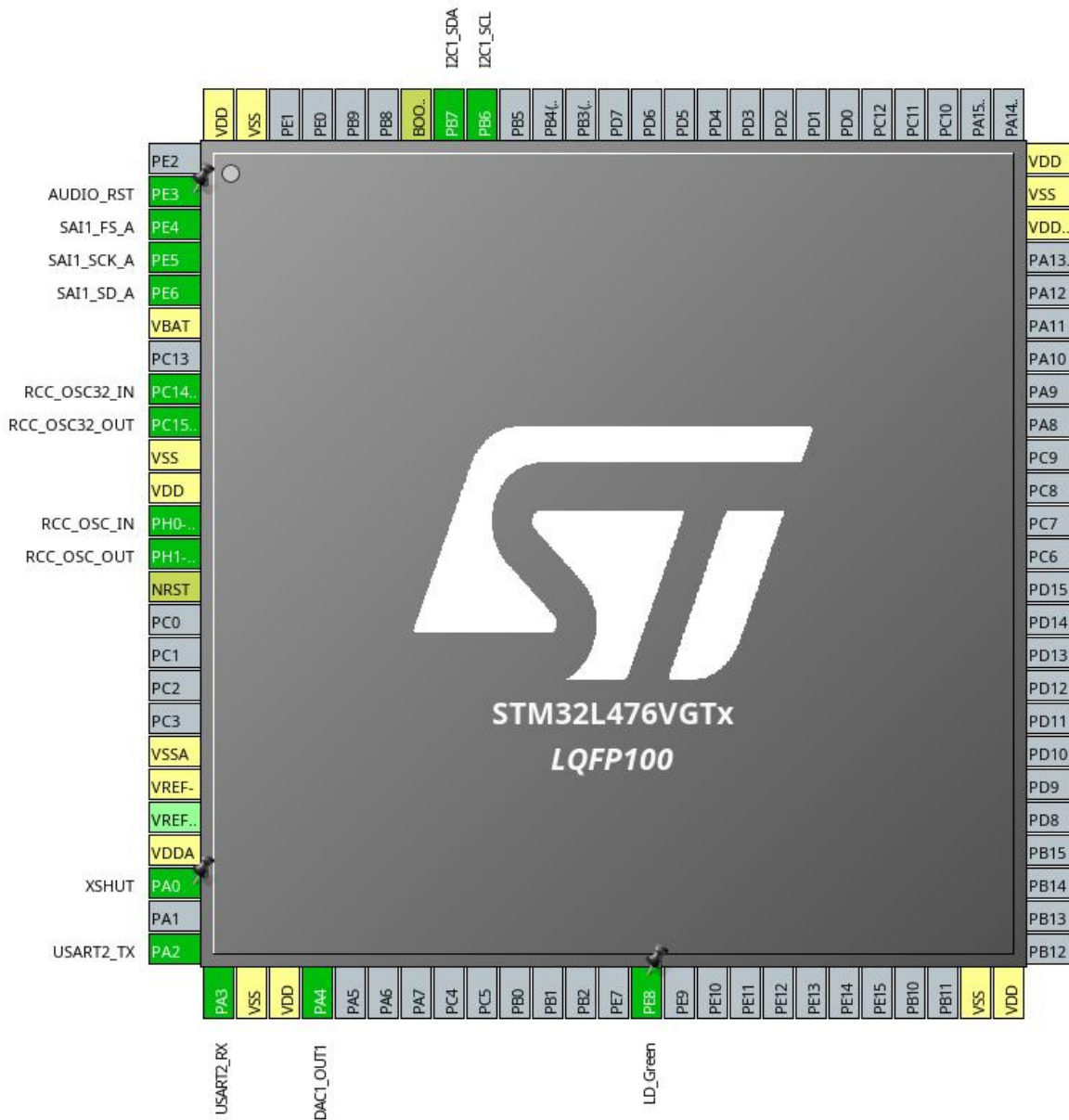
1.1. Project

Project Name	theremin
Board Name	custom
Generated with:	STM32CubeMX 5.0.1
Date	05/21/2019

1.2. MCU

MCU Series	STM32L4
MCU Line	STM32L4x6
MCU name	STM32L476VGTx
MCU Package	LQFP100
MCU Pin number	100

2. Pinout Configuration

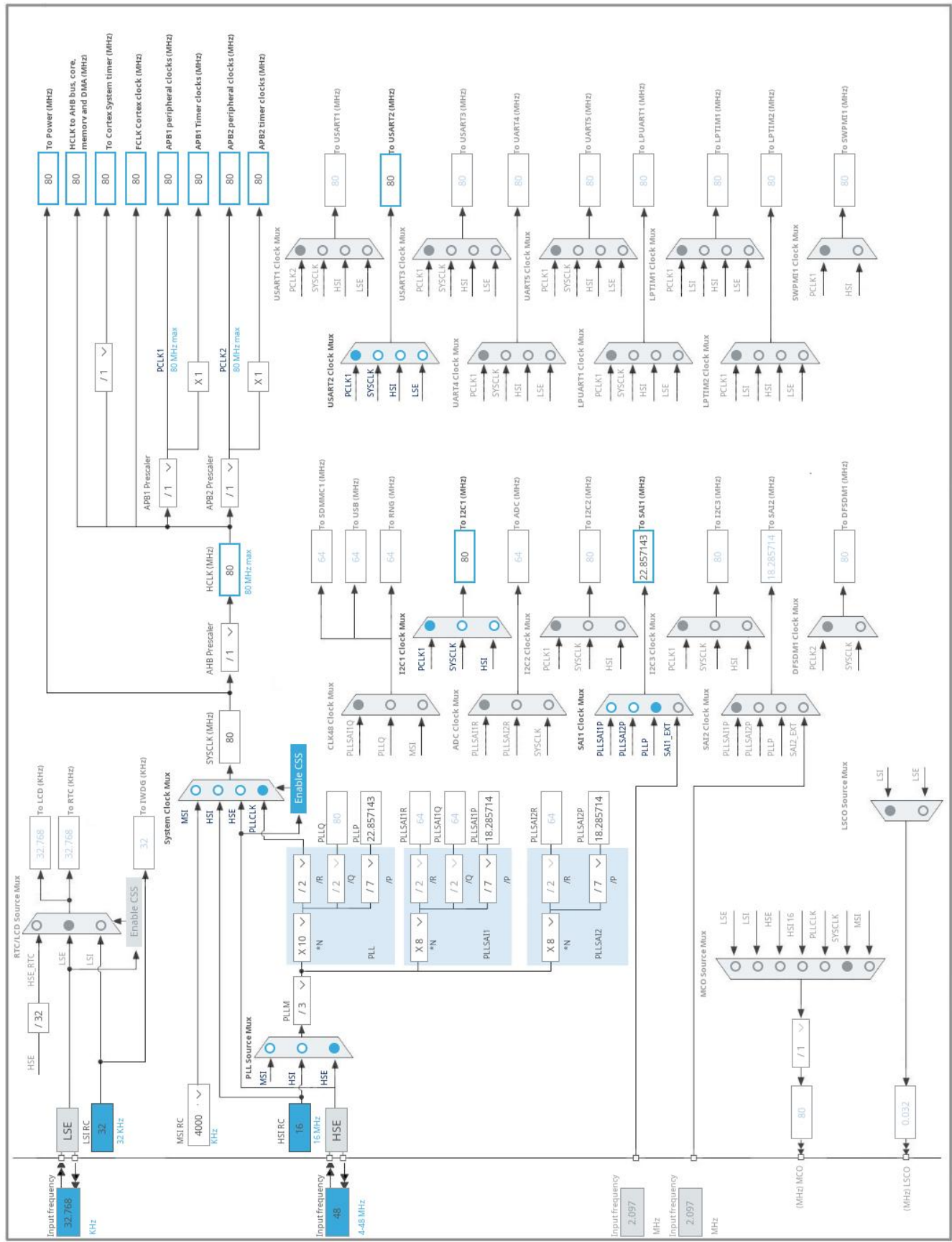


3. Pins Configuration

Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
2	PE3 *	I/O	GPIO_Output	AUDIO_RST
3	PE4	I/O	SAI1_FS_A	
4	PE5	I/O	SAI1_SCK_A	
5	PE6	I/O	SAI1_SD_A	
6	VBAT	Power		
8	PC14-OSC32_IN (PC14)	I/O	RCC_OSC32_IN	
9	PC15-OSC32_OUT (PC15)	I/O	RCC_OSC32_OUT	
10	VSS	Power		
11	VDD	Power		
12	PH0-OSC_IN (PH0)	I/O	RCC_OSC_IN	
13	PH1-OSC_OUT (PH1)	I/O	RCC_OSC_OUT	
14	NRST	Reset		
19	VSSA	Power		
20	VREF-	Power		
22	VDDA	Power		
23	PA0 *	I/O	GPIO_Output	XSHUT
25	PA2	I/O	USART2_TX	
26	PA3	I/O	USART2_RX	
27	VSS	Power		
28	VDD	Power		
29	PA4	I/O	DAC1_OUT1	
39	PE8 *	I/O	GPIO_Output	LD_Green
49	VSS	Power		
50	VDD	Power		
73	VDDUSB	Power		
74	VSS	Power		
75	VDD	Power		
92	PB6	I/O	I2C1_SCL	
93	PB7	I/O	I2C1_SDA	
94	BOOT0	Boot		
99	VSS	Power		
100	VDD	Power		

* The pin is affected with an I/O function

4. Clock Tree Configuration



5. Software Project

5.1. Project Settings

Name	Value
Project Name	theremin
Project Folder	/home/bum/repos/Theremin/software
Toolchain / IDE	TrueSTUDIO
Firmware Package Name and Version	STM32Cube FW_L4 V1.13.0

5.2. 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	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	STM32L4
Line	STM32L4x6
MCU	STM32L476VGTx
Datasheet	025976_Rev4

6.2. Parameter Selection

Temperature	25
Vdd	null

7. IPs and Middleware Configuration

7.1. DAC1

OUT1 mode: Connected to external pin and to on chip-peripherals

7.1.1. Parameter Settings:

DAC Out1 Settings:

Output Buffer	Enable
Trigger	Timer 6 Trigger Out event *
Wave generation mode	Disabled
User Trimming	Factory trimming
Sample And Hold	Sampleandhold Disable

7.2. I2C1

I2C: I2C

7.2.1. 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	0x10909CEC

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

7.3. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

Low Speed Clock (LSE) : Crystal/Ceramic Resonator

7.3.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Instruction Cache	Enabled
Prefetch Buffer	Disabled
Data Cache	Enabled
Flash Latency(WS)	4 WS (5 CPU cycle)

RCC Parameters:

HSI Calibration Value	16
MSI Calibration Value	0
MSI Auto Calibration	Disabled
HSE Startup Timeout Value (ms)	100
LSE Startup Timeout Value (ms)	5000

Power Parameters:

Power Regulator Voltage Scale	Power Regulator Voltage Scale 1
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7.4. SAI1

Mode: Master

7.4.1. Parameter Settings:

SAI A:

Basic Parameters

Protocol	Free
Audio Mode	Master Transmit
Frame Length	32 bits *
Data Size	16 Bits *
Slot Size	DataSize
Output Mode	Mono *
Companding Mode	No companding mode
SAI SD Line Output Mode	Driven

Frame Parameters

First Bit	MSB First
Frame Synchro Active Level Length	16 *
Frame Synchro Definition	Start Frame
Frame Synchro Polarity	Active Low
Frame Synchro Offset	First Bit

Slot Parameters

First Bit Offset	0
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Number of Slots (only Even Values)	2
Slot Active Final Value	0x00000003 *
Slot Active	Use Slot 0 and 1 only
Clock Parameters	
Master Clock Divider	Enabled
Audio Frequency	48 KHz *
Real Audio Frequency	44.642 KHz *
Error between Selected	-6.99 % *
Clock Strobing	Falling Edge
Advanced Parameters	
Fifo Threshold	Empty
Output Drive	Enabled *
Synchronization External	Disabled

7.5. SYS

Timebase Source: SysTick

7.6. TIM6

mode: Activated

7.6.1. Parameter Settings:

Counter Settings:

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

Trigger Output (TRGO) Parameters:

Trigger Event Selection	Update Event *
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7.7. USART2

Mode: Asynchronous

7.7.1. Parameter Settings:

Basic Parameters:

Baud Rate	115200
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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

* **User modified value**

8. System Configuration

8.1. 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 *	
RCC	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	
SAI1	PE4	SAI1_FS_A	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PE5	SAI1_SCK_A	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PE6	SAI1_SD_A	Alternate Function Push Pull	No pull-up and no pull-down	Low	
USART2	PA2	USART2_TX	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PA3	USART2_RX	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
GPIO	PE3	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	AUDIO_RST
	PA0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	XSHUT
	PE8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LD_Green

8.2. DMA configuration

DMA request	Stream	Direction	Priority
DAC_CH1	DMA1_Channel3	Memory To Peripheral	Low
USART2_RX	DMA1_Channel6	Peripheral To Memory	Low
USART2_TX	DMA1_Channel7	Memory To Peripheral	Low

DAC_CH1: DMA1_Channel3 DMA request Settings:

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

USART2_RX: DMA1_Channel6 DMA request Settings:

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

USART2_TX: DMA1_Channel7 DMA request Settings:

Mode: **Circular ***
 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	0	0
System tick timer	true	0	0
DMA1 channel3 global interrupt	true	0	0
DMA1 channel6 global interrupt	true	0	0
DMA1 channel7 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		
USART2 global interrupt	unused		
TIM6 global interrupt, DAC channel1 and channel2 underrun error interrupts	unused		
SAI1 global interrupt	unused		
FPU global interrupt	unused		

* User modified value

9. Software Pack Report