# 1. Description

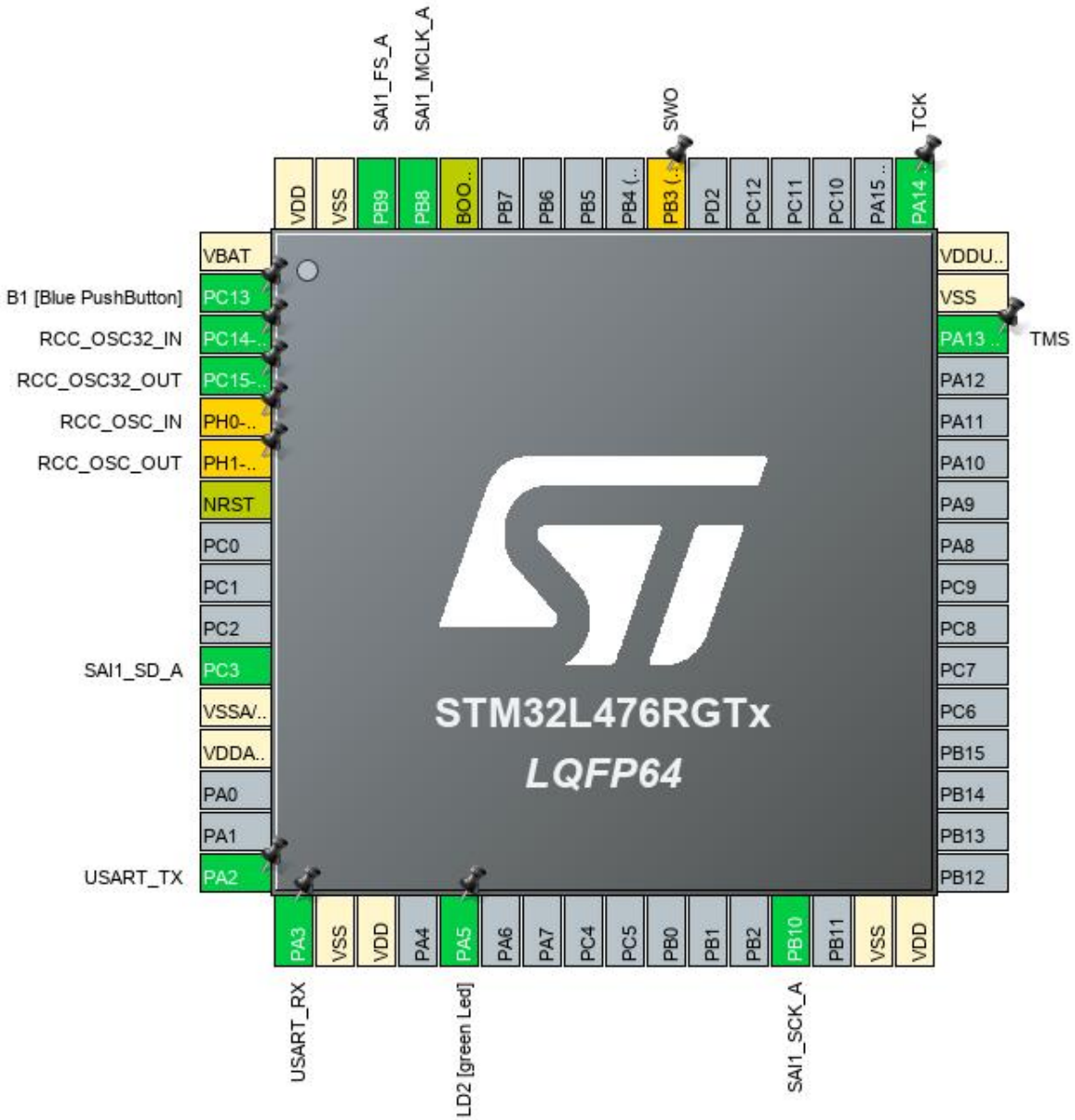
## 1.1. Project

| | |
|---|---|
| Project Name | Nucleo_L4_I2S_AudioDac_v1 |
| Board Name | NUCLEO-L476RG |
| Generated with: | STM32CubeMX 5.4.0 |
| Date | 12/21/2019 |

## 1.2. MCU

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

## 2. Pinout Configuration



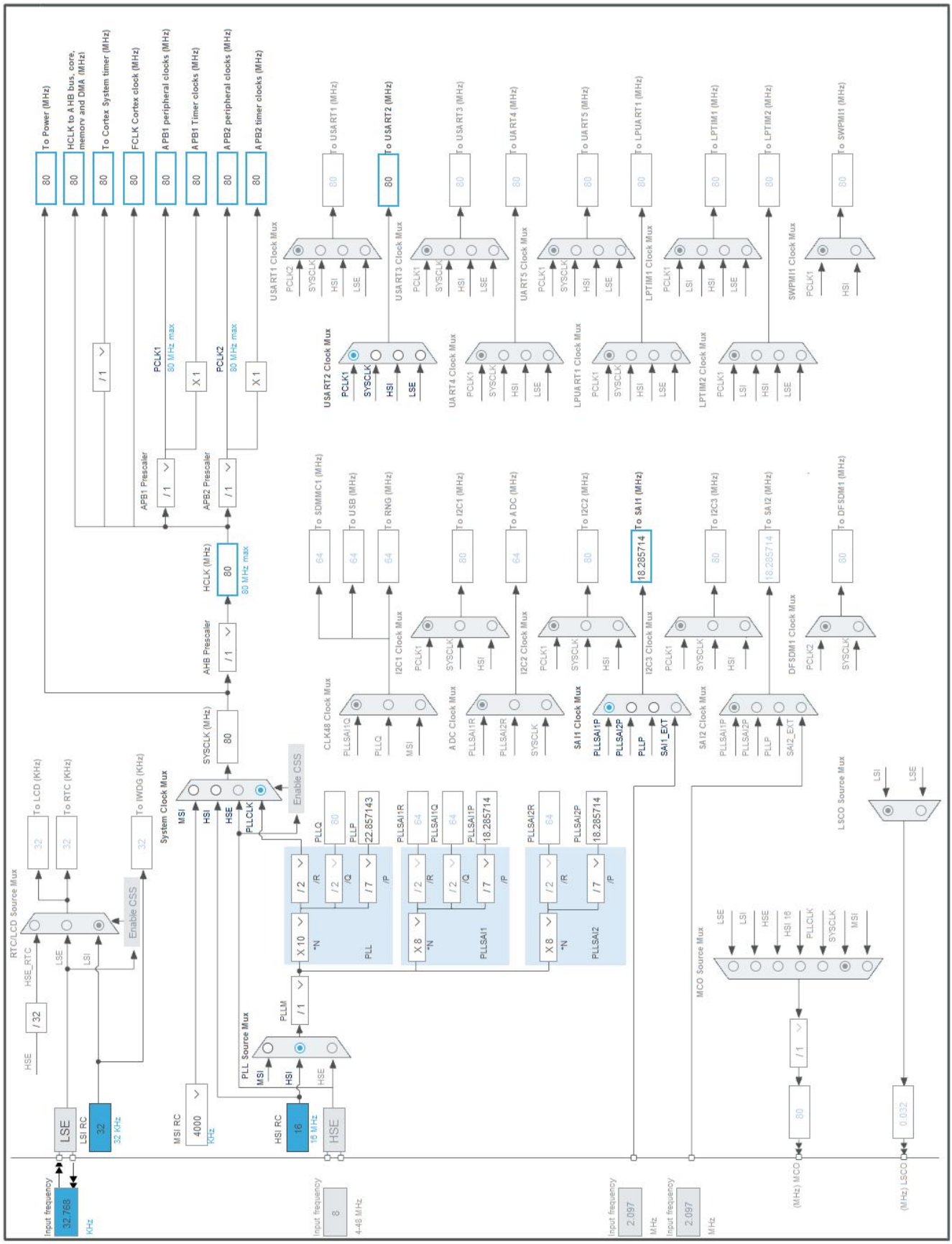
# 3. Pins Configuration

| 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 | | |
| 11 | PC3 | I/O | SAI1_SD_A | |
| 12 | VSSA/VREF- | Power | | |
| 13 | VDDA/VREF+ | Power | | |
| 16 | PA2 | I/O | USART2_TX | USART_TX |
| 17 | PA3 | I/O | USART2_RX | USART_RX |
| 18 | VSS | Power | | |
| 19 | VDD | Power | | |
| 21 | PA5 ** | I/O | GPIO_Output | LD2 [green Led] |
| 29 | PB10 | I/O | SAI1_SCK_A | |
| 31 | VSS | Power | | |
| 32 | VDD | Power | | |
| 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 |
| 60 | BOOT0 | Boot | | |
| 61 | PB8 | I/O | SAI1_MCLK_A | |
| 62 | PB9 | I/O | SAI1_FS_A | |
| 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. Software Project

## 5.1. Project Settings

| Name | Value |
|---|---|
| Project Name | Nucleo_L4_I2S_AudioDac_v1 |
| Project Folder | C:\Users\toussaij\Documents\STM32dev\Nucleo_L4_I2S_AudioDac_v1 |
| Toolchain / IDE | STM32CubeIDE |
| Firmware Package Name and Version | STM32Cube FW_L4 V1.14.0 |

## 5.2. Code Generation Settings

| Name | Value |
|---|---|
| STM32Cube MCU packages and embedded software | 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 | STM32L476RGTx |
| Datasheet | 025976_Rev4 |

6.2. Parameter Selection

| | |
|---|---|
| Temperature | 25 |
| Vdd | 3.0 |

# 7. IPs and Middleware Configuration

## 7.1. GPIO

## 7.2. RCC

**Low Speed Clock (LSE) : Crystal/Ceramic Resonator**

### 7.2.1. Parameter Settings:

**System Parameters:**

| | |
|---|---|
| VDD voltage (V) | 3.3 |
| Instruction Cache | Enabled |
| Prefetch Buffer | **Enabled *** |
| 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 Timout Value (ms) | 100 |
| LSE Startup Timout Value (ms) | 5000 |

**Power Parameters:**

| | |
|---|---|
| Power Regulator Voltage Scale | Power Regulator Voltage Scale 1 |

## 7.3. SAI1

**Mode: Master with Master Clock Out**

**mode: I2S/PCM Protocol**

### 7.3.1. Parameter Settings:

**SAI A:**

| | |
|---|---|
| Synchronization Inputs | Asynchronous |
| Basic Parameters | |
| Audio Mode | Master Transmit |
| Output Mode | Stereo |
| Companding Mode | No companding mode |
| SAI SD Line Output Mode | Driven |
| Protocol Parameters | |
| Protocol | I2S Standard |
| Data Size | 16 Bits |

| | |
|---|---|
| Number of Slots (only Even Values) | 2 |
| Clock Parameters | |
| Master Clock Divider | Enabled |
| Audio Frequency | 192 KHz |
| Real Audio Frequency | **71.428 KHz *** |
| Error between Selected | **-62.79 % *** |
| Advanced Parameters | |
| Fifo Threshold | Empty |
| Output Drive | Disabled |

## 7.4. SYS

**Debug: Serial Wire**

**Timebase Source: SysTick**

## 7.5. USART2

**Mode: Asynchronous**

### 7.5.1. 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 |

*** User modified value**

# 8. System Configuration

## 8.1. GPIO configuration

| IP | Pin | Signal | GPIO mode | GPIO pull/up pull down | Max Speed | User Label |
|---|---|---|---|---|---|---|
| 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 | |
| SAI1 | PC3 | SAI1_SD_A | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PB10 | SAI1_SCK_A | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PB8 | SAI1_MCLK_A | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PB9 | SAI1_FS_A | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| SYS | 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 |
| USART2 | 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 |
| Single Mapped Signals | 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 | |
| | PB3 (JTDO-TRACESWO) | SYS_JTDO-SWO | n/a | n/a | n/a | SWO |
| GPIO | PC13 | GPIO_EXTI13 | **External Interrupt Mode with Falling edge trigger detection** | No pull-up and no pull-down | n/a | B1 [Blue PushButton] |
| | PA5 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | LD2 [green Led] |

## 8.2. DMA configuration

nothing configured in DMA service

## 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 |
| PVD/PVM1/PVM2/PVM3/PVM4 interrupts through EXTI lines 16/35/36/37/38 | unused | | |
| Flash global interrupt | unused | | |
| RCC global interrupt | unused | | |
| USART2 global interrupt | unused | | |
| EXTI line[15:10] interrupts | unused | | |
| SAI1 global interrupt | unused | | |
| FPU global interrupt | unused | | |

*** User modified value**

# 9. Software Pack Report