# 1. Description

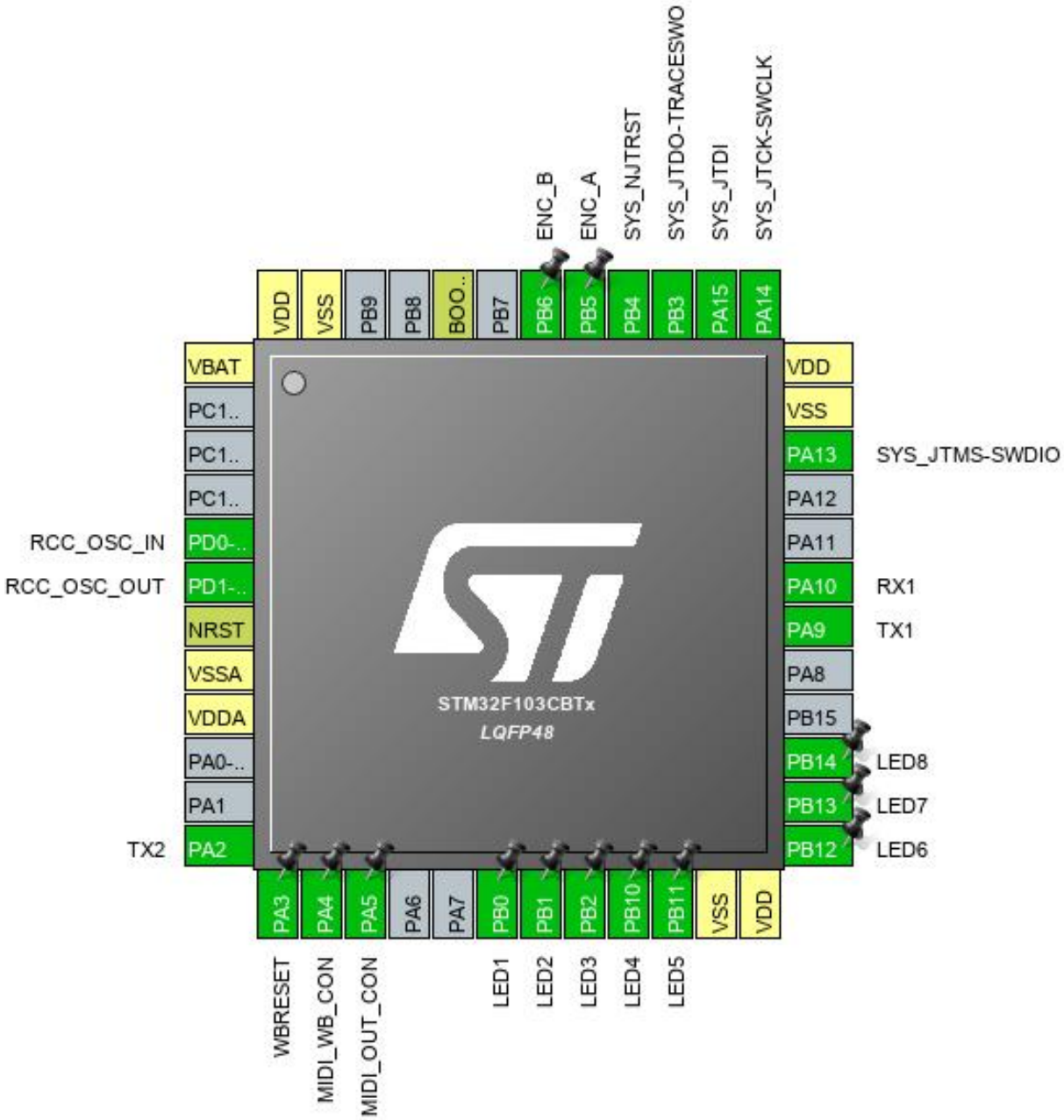
## 1.1. Project

| | |
|---|---|
| Project Name | stm32 |
| Board Name | custom |
| Generated with: | STM32CubeMX 5.1.0 |
| Date | 04/28/2019 |

## 1.2. MCU

| | |
|---|---|
| MCU Series | STM32F1 |
| MCU Line | STM32F103 |
| MCU name | STM32F103CBTx |
| MCU Package | LQFP48 |
| MCU Pin number | 48 |

## 2. Pinout Configuration

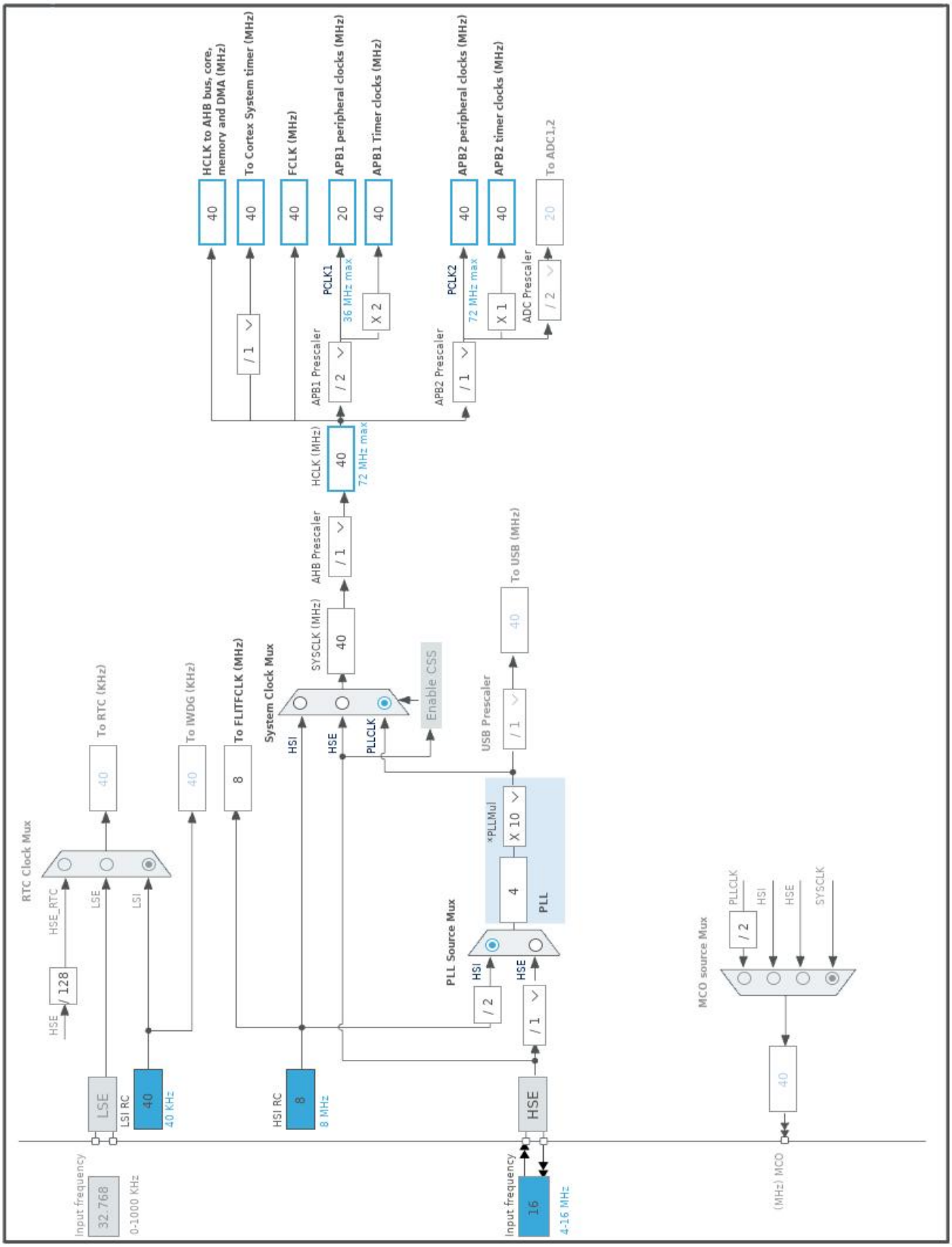


# 3. Pins Configuration

| Pin Number LQFP48 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|---|---|---|---|---|
| 1 | VBAT | Power | | |
| 5 | PD0-OSC_IN | I/O | RCC_OSC_IN | |
| 6 | PD1-OSC_OUT | I/O | RCC_OSC_OUT | |
| 7 | NRST | Reset | | |
| 8 | VSSA | Power | | |
| 9 | VDDA | Power | | |
| 12 | PA2 | I/O | USART2_TX | TX2 |
| 13 | PA3 * | I/O | GPIO_Output | WBRESET |
| 14 | PA4 * | I/O | GPIO_Output | MIDI_WB_CON |
| 15 | PA5 * | I/O | GPIO_Output | MIDI_OUT_CON |
| 18 | PB0 * | I/O | GPIO_Output | LED1 |
| 19 | PB1 * | I/O | GPIO_Output | LED2 |
| 20 | PB2 * | I/O | GPIO_Output | LED3 |
| 21 | PB10 * | I/O | GPIO_Output | LED4 |
| 22 | PB11 * | I/O | GPIO_Output | LED5 |
| 23 | VSS | Power | | |
| 24 | VDD | Power | | |
| 25 | PB12 * | I/O | GPIO_Output | LED6 |
| 26 | PB13 * | I/O | GPIO_Output | LED7 |
| 27 | PB14 * | I/O | GPIO_Output | LED8 |
| 30 | PA9 | I/O | USART1_TX | TX1 |
| 31 | PA10 | I/O | USART1_RX | RX1 |
| 34 | PA13 | I/O | SYS_JTMS-SWDIO | |
| 35 | VSS | Power | | |
| 36 | VDD | Power | | |
| 37 | PA14 | I/O | SYS_JTCK-SWCLK | |
| 38 | PA15 | I/O | SYS_JTDI | |
| 39 | PB3 | I/O | SYS_JTDO-TRACESWO | |
| 40 | PB4 | I/O | SYS_NJTRST | |
| 41 | PB5 | I/O | GPIO_EXTI5 | ENC_A |
| 42 | PB6 | I/O | GPIO_EXTI6 | ENC_B |
| 44 | BOOT0 | Boot | | |
| 47 | VSS | Power | | |
| 48 | 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 | stm32 |
| Project Folder | /home/nil/KiCADProjects/MidiBox3/stm32 |
| Toolchain / IDE | Makefile |
| Firmware Package Name and Version | STM32Cube FW_F1 V1.7.0 |

## 5.2. 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 |

# 6. Power Consumption Calculator report

6.1. Microcontroller Selection

| | |
|---|---|
| Series | STM32F1 |
| Line | STM32F103 |
| MCU | STM32F103CBTx |
| Datasheet | 13587_Rev17 |

6.2. Parameter Selection

| | |
|---|---|
| Temperature | 25 |
| Vdd | 3.3 |

# 7. IPs and Middleware Configuration

## 7.1. RCC

**High Speed Clock (HSE): Crystal/Ceramic Resonator**

### 7.1.1. Parameter Settings:

**System Parameters:**

| | |
|---|---|
| VDD voltage (V) | 3.3 |
| Prefetch Buffer | Enabled |
| Flash Latency(WS) | 1 WS (2 CPU cycle) |

**RCC Parameters:**

| | |
|---|---|
| HSI Calibration Value | 16 |
| HSE Startup Timout Value (ms) | 100 |
| LSE Startup Timout Value (ms) | 5000 |

## 7.2. SYS

**Debug: JTAG (5 pins)**

**Timebase Source: SysTick**

## 7.3. TIM2

**Clock Source : Internal Clock**

### 7.3.1. Parameter Settings:

**Counter Settings:**

| | |
|---|---|
| Prescaler (PSC - 16 bits value) | 0 |
| Counter Mode | Up |
| Counter Period (AutoReload Register - 16 bits value ) | **10000 *** |
| Internal Clock Division (CKD) | No Division |
| auto-reload preload | **Enable *** |

**Trigger Output (TRGO) Parameters:**

| | |
|---|---|
| Master/Slave Mode (MSM bit) | Disable (Trigger input effect not delayed) |
| Trigger Event Selection | Reset (UG bit from TIMx_EGR) |

## 7.4. USART1

### Mode: Asynchronous

### 7.4.1. Parameter Settings:

**Basic Parameters:**

| | |
|---|---|
| Baud Rate | **31250 *** |
| Word Length | 8 Bits (including Parity) |
| Parity | None |
| Stop Bits | 1 |

**Advanced Parameters:**

| | |
|---|---|
| Data Direction | Receive and Transmit |
| Over Sampling | 16 Samples |

## *7.5. USART2*

### Mode: Single Wire (Half-Duplex)

### 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 | **Transmit Only *** |
| Over Sampling | 16 Samples |

*** 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 | PD0-OSC_IN | RCC_OSC_IN | n/a | n/a | n/a | |
| | PD1-OSC_OUT | RCC_OSC_OUT | n/a | n/a | n/a | |
| SYS | PA13 | SYS_JTMS-SWDIO | n/a | n/a | n/a | |
| | PA14 | SYS_JTCK-SWCLK | n/a | n/a | n/a | |
| | PA15 | SYS_JTDI | n/a | n/a | n/a | |
| | PB3 | SYS_JTDO-TRACESWO | n/a | n/a | n/a | |
| | PB4 | SYS_NJTRST | n/a | n/a | n/a | |
| USART1 | PA9 | USART1_TX | Alternate Function Push Pull | n/a | **High *** | TX1 |
| | PA10 | USART1_RX | Input mode | No pull-up and no pull-down | **n/a** | RX1 |
| USART2 | PA2 | USART2_TX | Alternate Function Open Drain | n/a | **High *** | TX2 |
| GPIO | PA3 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | WBRESET |
| | PA4 | GPIO_Output | **Output Open Drain *** | No pull-up and no pull-down | Low | MIDI_WB_CON |
| | PA5 | GPIO_Output | **Output Open Drain *** | No pull-up and no pull-down | Low | MIDI_OUT_CON |
| | PB0 | GPIO_Output | Output Push Pull | **Pull-down *** | Low | LED1 |
| | PB1 | GPIO_Output | Output Push Pull | **Pull-down *** | Low | LED2 |
| | PB2 | GPIO_Output | Output Push Pull | **Pull-down *** | Low | LED3 |
| | PB10 | GPIO_Output | Output Push Pull | **Pull-down *** | Low | LED4 |
| | PB11 | GPIO_Output | Output Push Pull | **Pull-down *** | Low | LED5 |
| | PB12 | GPIO_Output | Output Push Pull | **Pull-down *** | Low | LED6 |
| | PB13 | GPIO_Output | Output Push Pull | **Pull-down *** | Low | LED7 |
| | PB14 | GPIO_Output | Output Push Pull | **Pull-down *** | Low | LED8 |
| | PB5 | GPIO_EXTI5 | **External Interrupt Mode with Rising/Falling edge** | No pull-up and no pull-down | n/a | ENC_A |
| | PB6 | GPIO_EXTI6 | **External Interrupt Mode with Falling edge trigger detection** | No pull-up and no pull-down | n/a | ENC_B |

### 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 |
| TIM2 global interrupt | true | 0 | 0 |
| USART1 global interrupt | true | 0 | 0 |
| PVD interrupt through EXTI line 16 | unused | | |
| Flash global interrupt | unused | | |
| RCC global interrupt | unused | | |
| EXTI line[9:5] interrupts | unused | | |
| USART2 global interrupt | unused | | |

*** User modified value**

# 9. Software Pack Report