

1. Description

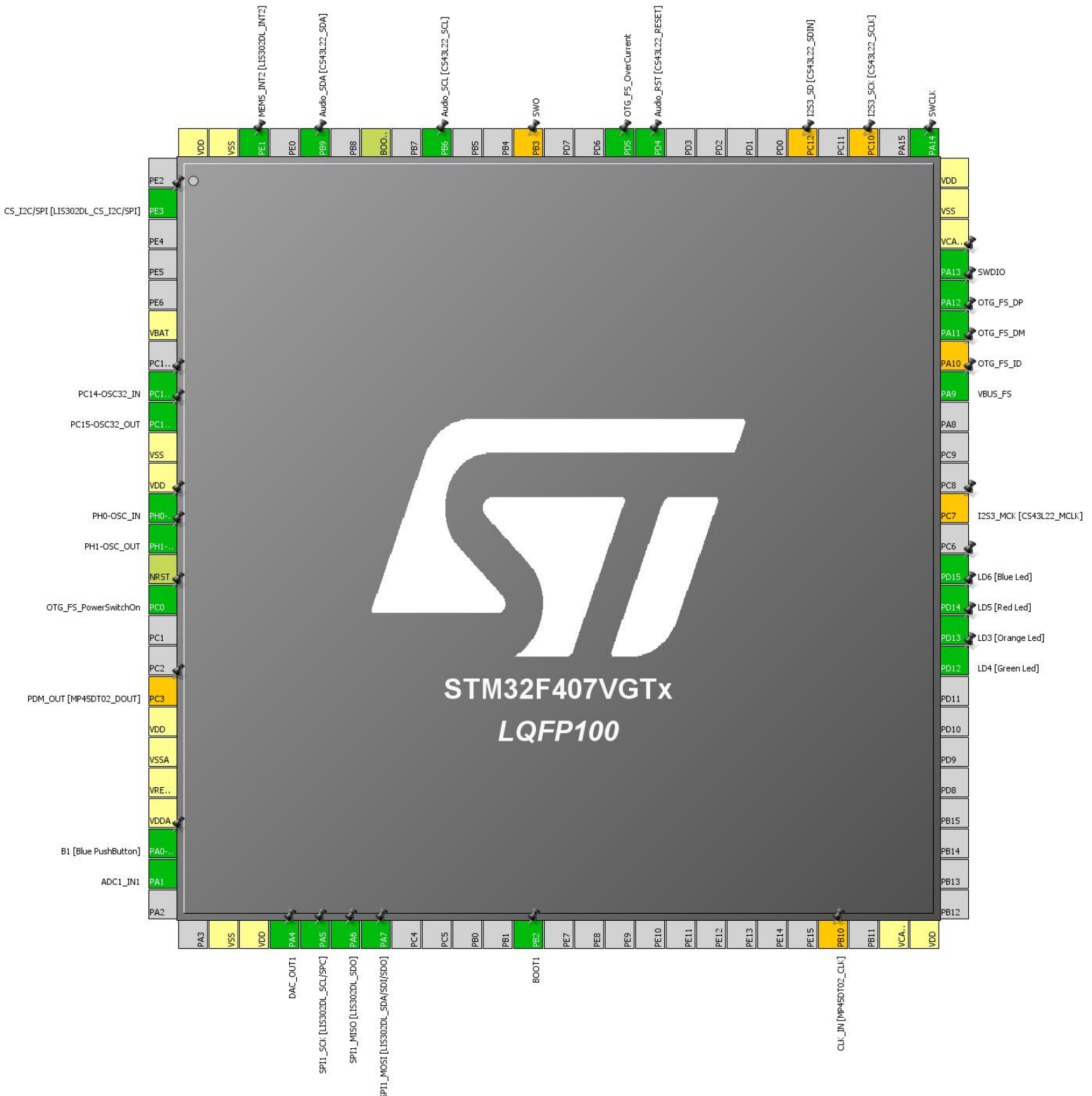
1.1. Project

| | |
|-----------------|--------------------|
| Project Name | Lab2_CodeGen |
| Board Name | STM32F4DISCOVERY |
| Generated with: | STM32CubeMX 4.24.0 |
| Date | 02/12/2018 |

1.2. MCU

| | |
|----------------|---------------|
| MCU Series | STM32F4 |
| MCU Line | STM32F407/417 |
| MCU name | STM32F407VGTx |
| MCU Package | LQFP100 |
| MCU Pin number | 100 |

2. Pinout Configuration



3. Pins Configuration

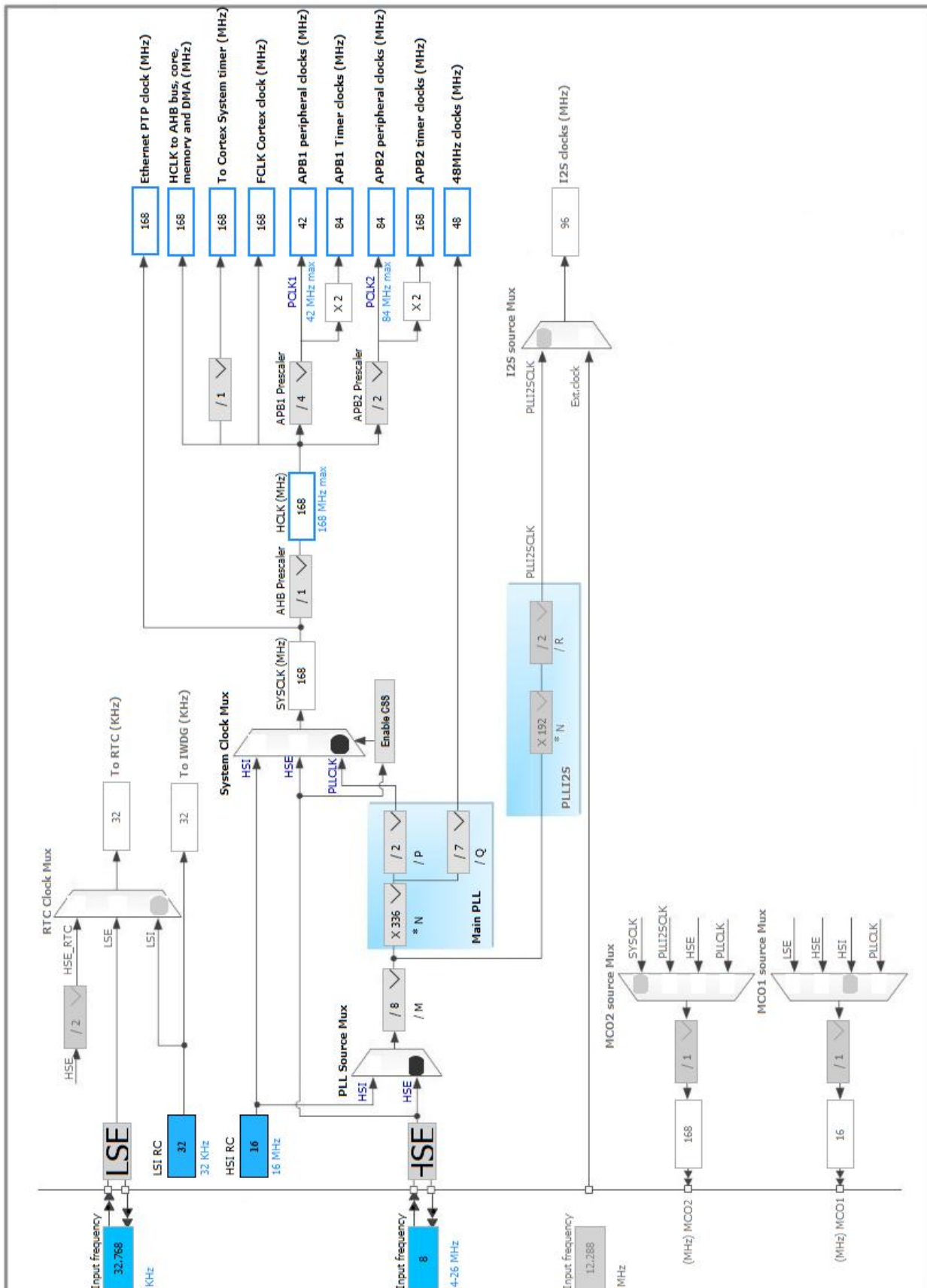
| Pin Number LQFP100 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|-----------------------|---------------------------------------|----------|--------------------------|-------------------------------------|
| 2 | PE3 * | I/O | GPIO_Output | CS_I2C/SPI [LIS302DL_CS_I2C/SPI] |
| 6 | VBAT | Power | | |
| 8 | PC14-OSC32_IN | I/O | RCC_OSC32_IN | PC14-OSC32_IN |
| 9 | PC15-OSC32_OUT | I/O | RCC_OSC32_OUT | PC15-OSC32_OUT |
| 10 | VSS | Power | | |
| 11 | VDD | Power | | |
| 12 | PH0-OSC_IN | I/O | RCC_OSC_IN | PH0-OSC_IN |
| 13 | PH1-OSC_OUT | I/O | RCC_OSC_OUT | PH1-OSC_OUT |
| 14 | NRST | Reset | | |
| 15 | PC0 * | I/O | GPIO_Output | OTG_FS_PowerSwitchOn |
| 18 | PC3 ** | I/O | I2S2_SD | PDM_OUT [MP45DT02_DOUT] |
| 19 | VDD | Power | | |
| 20 | VSSA | Power | | |
| 21 | VREF+ | Power | | |
| 22 | VDDA | Power | | |
| 23 | PA0-WKUP | I/O | GPIO_EXTI0 | B1 [Blue PushButton] |
| 24 | PA1 | I/O | ADC1_IN1 | |
| 27 | VSS | Power | | |
| 28 | VDD | Power | | |
| 29 | PA4 | I/O | DAC_OUT1 | |
| 30 | PA5 | I/O | SPI1_SCK | SPI1_SCK [LIS302DL_SCL/SPC] |
| 31 | PA6 | I/O | SPI1_MISO | SPI1_MISO [LIS302DL_SDO] |
| 32 | PA7 | I/O | SPI1_MOSI | SPI1_MOSI [LIS302DL_SDA/SDI/SDO] |
| 37 | PB2 * | I/O | GPIO_Input | BOOT1 |
| 47 | PB10 ** | I/O | I2S2_CK | CLK_IN [MP45DT02_CLK] |
| 49 | VCAP_1 | Power | | |
| 50 | VDD | Power | | |
| 59 | PD12 * | I/O | GPIO_Output | LD4 [Green Led] |
| 60 | PD13 * | I/O | GPIO_Output | LD3 [Orange Led] |
| 61 | PD14 * | I/O | GPIO_Output | LD5 [Red Led] |
| 62 | PD15 * | I/O | GPIO_Output | LD6 [Blue Led] |

| Pin Number LQFP100 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|-----------------------|---------------------------------------|----------|--------------------------|------------------------------|
| 64 | PC7 ** | I/O | I2S3_MCK | I2S3_MCK [CS43L22_MCLK] |
| 68 | PA9 | I/O | USB_OTG_FS_VBUS | VBUS_FS |
| 69 | PA10 ** | I/O | USB_OTG_FS_ID | OTG_FS_ID |
| 70 | PA11 | I/O | USB_OTG_FS_DM | OTG_FS_DM |
| 71 | PA12 | I/O | USB_OTG_FS_DP | OTG_FS_DP |
| 72 | PA13 | I/O | SYS_JTMS-SWDIO | SWDIO |
| 73 | VCAP_2 | Power | | |
| 74 | VSS | Power | | |
| 75 | VDD | Power | | |
| 76 | PA14 | I/O | SYS_JTCK-SWCLK | SWCLK |
| 78 | PC10 ** | I/O | I2S3_CK | I2S3_SCK [CS43L22_SCLK] |
| 80 | PC12 ** | I/O | I2S3_SD | I2S3_SD [CS43L22_SDIN] |
| 85 | PD4 * | I/O | GPIO_Output | Audio_RST [CS43L22_RESET] |
| 86 | PD5 * | I/O | GPIO_Input | OTG_FS_OverCurrent |
| 89 | PB3 ** | I/O | SYS_JTDO-SWO | SWO |
| 92 | PB6 | I/O | I2C1_SCL | Audio_SCL [CS43L22_SCL] |
| 94 | BOOT0 | Boot | | |
| 96 | PB9 | I/O | I2C1_SDA | Audio_SDA [CS43L22_SDA] |
| 98 | PE1 | I/O | GPIO_EXTI1 | MEMS_INT2 [LIS302DL_INT2] |
| 99 | VSS | Power | | |
| 100 | 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. ADC1

mode: IN1

5.1.1. Parameter Settings:

ADCs_Common_Settings:

Mode Independent mode

ADC_Settings:

Clock Prescaler PCLK2 divided by 4

Resolution **10 bits (13 ADC Clock cycles) ***

Data Alignment Right alignment

Scan Conversion Mode Disabled

Continuous Conversion Mode Disabled

Discontinuous Conversion Mode Disabled

DMA Continuous Requests Disabled

End Of Conversion Selection EOC flag at the end of single channel conversion

ADC_Regular_ConversionMode:

Number Of Conversion 1

External Trigger Conversion Source Regular Conversion launched by software

External Trigger Conversion Edge None

Rank 1

Channel Channel 1

Sampling Time 3 Cycles

ADC_Injected_ConversionMode:

Number Of Conversions 0

WatchDog:

Enable Analog WatchDog Mode false

5.2. DAC

mode: OUT1 Configuration

5.2.1. Parameter Settings:

DAC Out1 Settings:

| | |
|---------------|--------|
| Output Buffer | Enable |
| Trigger | None |

5.3. I2C1

I2C: I2C

5.3.1. Parameter Settings:

Master Features:

| | |
|----------------------|---------------|
| I2C Speed Mode | Standard Mode |
| I2C Clock Speed (Hz) | 100000 |

Slave Features:

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

5.4. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

Low Speed Clock (LSE) : Crystal/Ceramic Resonator

5.4.1. Parameter Settings:

System Parameters:

| | |
|-------------------|--------------------|
| VDD voltage (V) | 3.3 |
| Instruction Cache | Enabled |
| Prefetch Buffer | Enabled |
| Data Cache | Enabled |
| Flash Latency(WS) | 5 WS (6 CPU cycle) |

RCC Parameters:

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

Power Parameters:

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

5.5. SPI1

Mode: Full-Duplex Master

5.5.1. Parameter Settings:

Basic Parameters:

| | |
|--------------|-----------|
| Frame Format | Motorola |
| Data Size | 8 Bits |
| First Bit | MSB First |

Clock Parameters:

| | |
|---------------------------|-----------------------|
| Prescaler (for Baud Rate) | 2 |
| Baud Rate | 42.0 MBits/s * |
| Clock Polarity (CPOL) | Low |
| Clock Phase (CPHA) | 1 Edge |

Advanced Parameters:

| | |
|-----------------|----------|
| CRC Calculation | Disabled |
| NSS Signal Type | Software |

5.6. SYS

Debug: Serial Wire

Timebase Source: SysTick

5.7. USB_OTG_FS

Mode: Host_Only

mode: Activate_VBUS

5.7.1. Parameter Settings:

| | |
|------------------------|--------------------------|
| Speed | Host Full Speed 12MBit/s |
| Enable internal IP DMA | Disabled |
| Signal start of frame | Disabled |

5.8. USB_HOST

Class for FS IP: Communication Host Class (Virtual Port Com)

5.8.1. Parameter Settings:

Host Configuration:

| | |
|--|---------------------|
| USBH_MAX_NUM_ENDPOINTS (Maximum number of endpoints) | 2 |
| USBH_MAX_NUM_INTERFACES (Maximum number of interfaces) | 2 |
| USBH_MAX_NUM_SUPPORTED_CLASS (Maximum number of supported class) | 1 |
| USBH_MAX_NUM_CONFIGURATION (Maximum number of supported configuration) | 1 |
| USBH_KEEP_CFG_DESCRIPTOR (Keep the configuration into RAM) | Enabled |
| USBH_MAX_SIZE_CONFIGURATION (Maximum size in bytes for the Configuration Descriptor) | 256 |
| USBH_MAX_DATA_BUFFER (Maximum size of temporary data) | 512 |
| USBH_DEBUG_LEVEL (USBH Debug Level) | 0: No debug message |

CMSIS_RTOS:

| | |
|---|----------|
| USBH_USE_OS (Enable the support of an RTOS) | Disabled |
|---|----------|

* User modified value

6. System Configuration

6.1. GPIO configuration

| IP | Pin | Signal | GPIO mode | GPIO pull/up pull down | Max Speed | User Label |
|-----------------------|----------------|-----------------|-------------------------------|-----------------------------|-----------|-------------------------------------|
| ADC1 | PA1 | ADC1_IN1 | Analog mode | No pull-up and no pull-down | n/a | |
| DAC | PA4 | DAC_OUT1 | Analog mode | No pull-up and no pull-down | n/a | |
| I2C1 | PB6 | I2C1_SCL | Alternate Function Open Drain | Pull-up | Low | Audio_SCL [CS43L22_SCL] |
| | PB9 | I2C1_SDA | Alternate Function Open Drain | Pull-up | Low | Audio_SDA [CS43L22_SDA] |
| RCC | PC14-OSC32_IN | RCC_OSC32_IN | n/a | n/a | n/a | PC14-OSC32_IN |
| | PC15-OSC32_OUT | RCC_OSC32_OUT | n/a | n/a | n/a | PC15-OSC32_OUT |
| | PH0-OSC_IN | RCC_OSC_IN | n/a | n/a | n/a | PH0-OSC_IN |
| | PH1-OSC_OUT | RCC_OSC_OUT | n/a | n/a | n/a | PH1-OSC_OUT |
| SPI1 | PA5 | SPI1_SCK | Alternate Function Push Pull | No pull-up and no pull-down | Low | SPI1_SCK [LIS302DL_SCL/SPC] |
| | PA6 | SPI1_MISO | Alternate Function Push Pull | No pull-up and no pull-down | Low | SPI1_MISO [LIS302DL_SDO] |
| | PA7 | SPI1_MOSI | Alternate Function Push Pull | No pull-up and no pull-down | Low | SPI1_MOSI [LIS302DL_SDA/SDI/SDO] |
| SYS | PA13 | SYS_JTMS-SWDIO | n/a | n/a | n/a | SWDIO |
| | PA14 | SYS_JTCK-SWCLK | n/a | n/a | n/a | SWCLK |
| USB_OTG_FS | PA9 | USB_OTG_FS_VBUS | Input mode | No pull-up and no pull-down | n/a | VBUS_FS |
| | PA11 | USB_OTG_FS_DM | Alternate Function Push Pull | No pull-up and no pull-down | Low | OTG_FS_DM |
| | PA12 | USB_OTG_FS_DP | Alternate Function Push Pull | No pull-up and no pull-down | Low | OTG_FS_DP |
| Single Mapped Signals | PC3 | I2S2_SD | Alternate Function Push Pull | No pull-up and no pull-down | Low | PDM_OUT [MP45DT02_DOUT] |
| | PB10 | I2S2_CK | Alternate Function Push Pull | No pull-up and no pull-down | Low | CLK_IN [MP45DT02_CLK] |
| | PC7 | I2S3_MCK | Alternate Function Push Pull | No pull-up and no pull-down | Low | I2S3_MCK [CS43L22_MCLK] |
| | PA10 | USB_OTG_FS_ID | Alternate Function Push Pull | No pull-up and no pull-down | Low | OTG_FS_ID |

| IP | Pin | Signal | GPIO mode | GPIO pull/up pull down | Max Speed | User Label |
|------|----------|--------------|---|-----------------------------|-----------|----------------------------------|
| | PC10 | I2S3_CK | Alternate Function Push Pull | No pull-up and no pull-down | Low | I2S3_SCK [CS43L22_SCLK] |
| | PC12 | I2S3_SD | Alternate Function Push Pull | No pull-up and no pull-down | Low | I2S3_SD [CS43L22_SDIN] |
| | PB3 | SYS_JTDO-SWO | n/a | n/a | n/a | SWO |
| GPIO | PE3 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | CS_I2C/SPI [LIS302DL_CS_I2C/SPI] |
| | PC0 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | OTG_FS_PowerSwitchOn |
| | PA0-WKUP | GPIO_EXTI0 | External Event Mode with Rising edge trigger detection * | No pull-up and no pull-down | n/a | B1 [Blue PushButton] |
| | PB2 | GPIO_Input | Input mode | No pull-up and no pull-down | n/a | BOOT1 |
| | PD12 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | LD4 [Green Led] |
| | PD13 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | LD3 [Orange Led] |
| | PD14 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | LD5 [Red Led] |
| | PD15 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | LD6 [Blue Led] |
| | PD4 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | Audio_RST [CS43L22_RESET] |
| | PD5 | GPIO_Input | Input mode | No pull-up and no pull-down | n/a | OTG_FS_OverCurrent |
| | PE1 | GPIO_EXTI1 | External Event Mode with Rising edge trigger detection * | No pull-up and no pull-down | n/a | MEMS_INT2 [LIS302DL_INT2] |

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 |
| Pre-fetch 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 |
| ADC1, ADC2 and ADC3 global interrupts | true | 0 | 0 |
| USB On The Go FS global interrupt | true | 0 | 0 |
| PVD interrupt through EXTI line 16 | unused | | |
| Flash global interrupt | unused | | |
| RCC global interrupt | unused | | |
| I2C1 event interrupt | unused | | |
| I2C1 error interrupt | unused | | |
| SPI1 global interrupt | unused | | |
| TIM6 global interrupt, DAC1 and DAC2 underrun error interrupts | unused | | |
| FPU global interrupt | unused | | |

* User modified value

7. Power Consumption Calculator report

7.1. Microcontroller Selection

| | |
|-----------|---------------|
| Series | STM32F4 |
| Line | STM32F407/417 |
| MCU | STM32F407VGTx |
| Datasheet | 022152_Rev8 |

7.2. Parameter Selection

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

8. Software Project

8.1. Project Settings

| Name | Value |
|-----------------------------------|-------------------------|
| Project Name | Lab2_CodeGen |
| Project Folder | C:\Users\Isaac |
| Toolchain / IDE | EWARM |
| Firmware Package Name and Version | STM32Cube FW_F4 V1.19.0 |

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 |

9. Software Pack Report