



1. Description

1.1. Project

| | |
|-----------------|-------------------|
| Project Name | Lab4 |
| Board Name | custom |
| Generated with: | STM32CubeMX 6.3.0 |
| Date | 09/13/2021 |

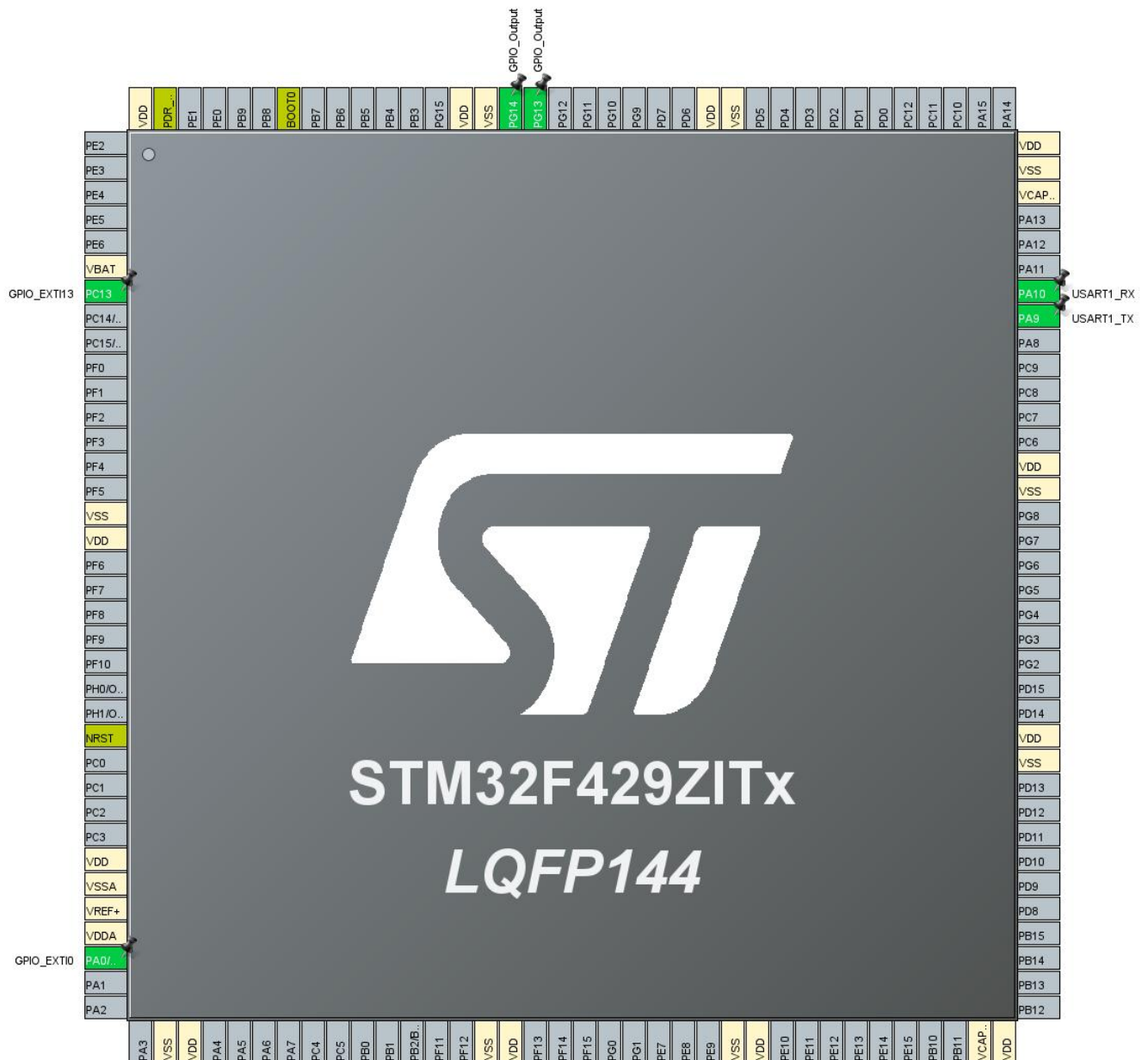
1.2. MCU

| | |
|----------------|---------------|
| MCU Series | STM32F4 |
| MCU Line | STM32F429/439 |
| MCU name | STM32F429ZITx |
| MCU Package | LQFP144 |
| MCU Pin number | 144 |

1.3. Core(s) information

| | |
|---------|---------------|
| Core(s) | Arm Cortex-M4 |
|---------|---------------|

2. Pinout Configuration

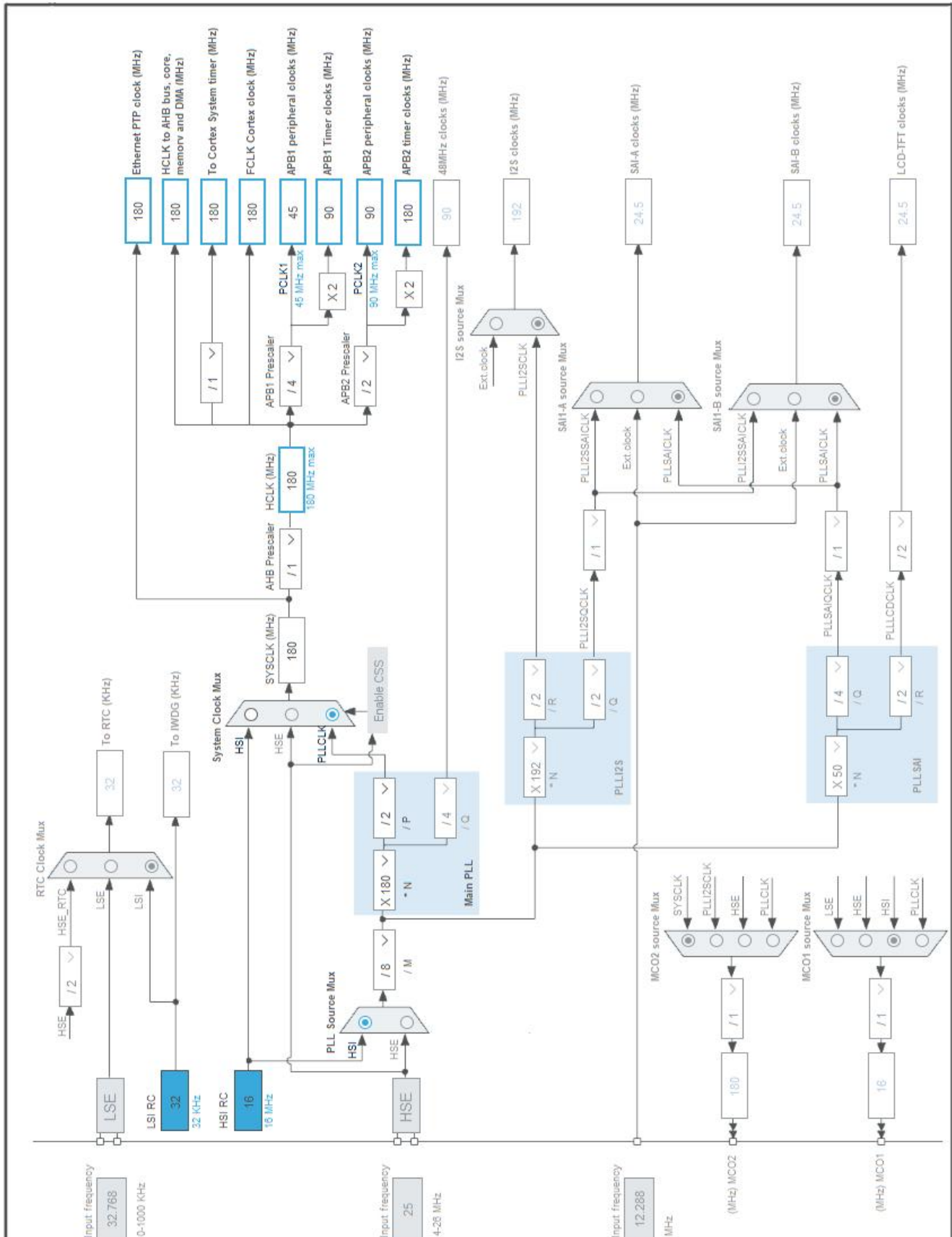


3. Pins Configuration

| Pin Number LQFP144 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|-----------------------|---------------------------------------|----------|--------------------------|-------|
| 6 | VBAT | Power | | |
| 7 | PC13 | I/O | GPIO_EXTI13 | |
| 16 | VSS | Power | | |
| 17 | VDD | Power | | |
| 25 | NRST | Reset | | |
| 30 | VDD | Power | | |
| 31 | VSSA | Power | | |
| 32 | VREF+ | Power | | |
| 33 | VDDA | Power | | |
| 34 | PA0/WKUP | I/O | GPIO_EXTI0 | |
| 38 | VSS | Power | | |
| 39 | VDD | Power | | |
| 51 | VSS | Power | | |
| 52 | VDD | Power | | |
| 61 | VSS | Power | | |
| 62 | VDD | Power | | |
| 71 | VCAP_1 | Power | | |
| 72 | VDD | Power | | |
| 83 | VSS | Power | | |
| 84 | VDD | Power | | |
| 94 | VSS | Power | | |
| 95 | VDD | Power | | |
| 101 | PA9 | I/O | USART1_TX | |
| 102 | PA10 | I/O | USART1_RX | |
| 106 | VCAP_2 | Power | | |
| 107 | VSS | Power | | |
| 108 | VDD | Power | | |
| 120 | VSS | Power | | |
| 121 | VDD | Power | | |
| 128 | PG13 * | I/O | GPIO_Output | |
| 129 | PG14 * | I/O | GPIO_Output | |
| 130 | VSS | Power | | |
| 131 | VDD | Power | | |
| 138 | BOOT0 | Boot | | |
| 143 | PDR_ON | Reset | | |
| 144 | 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 | Lab4 |
| Project Folder | E:\Project Year 3\MicroCon\Lab4 |
| Toolchain / IDE | STM32CubeIDE |
| Firmware Package Name and Version | STM32Cube FW_F4 V1.26.2 |
| Application Structure | Advanced |
| Generate Under Root | Yes |
| Do not generate the main() | No |
| Minimum Heap Size | 0x200 |
| Minimum Stack Size | 0x400 |

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 | Yes |
| Backup previously generated files when re-generating | No |
| Keep User Code when re-generating | Yes |
| Delete previously generated files when not re-generated | Yes |
| Set all free pins as analog (to optimize the power consumption) | No |
| Enable Full Assert | No |

5.3. Advanced Settings - Generated Function Calls

| Rank | Function Name | Peripheral Instance Name |
|------|---------------------|--------------------------|
| 1 | SystemClock_Config | RCC |
| 2 | MX_GPIO_Init | GPIO |
| 3 | MX_USART1_UART_Init | USART1 |

6. Power Consumption Calculator report

6.1. Microcontroller Selection

| | |
|-----------|---------------|
| Series | STM32F4 |
| Line | STM32F429/439 |
| MCU | STM32F429ZITx |
| Datasheet | DS9405_Rev9 |

6.2. Parameter Selection

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

6.3. Battery Selection

| | |
|-------------------|-----------------|
| Battery | Li-SOCL2(A3400) |
| Capacity | 3400.0 mAh |
| Self Discharge | 0.08 %/month |
| Nominal Voltage | 3.6 V |
| Max Cont Current | 100.0 mA |
| Max Pulse Current | 200.0 mA |
| Cells in series | 1 |
| Cells in parallel | 1 |

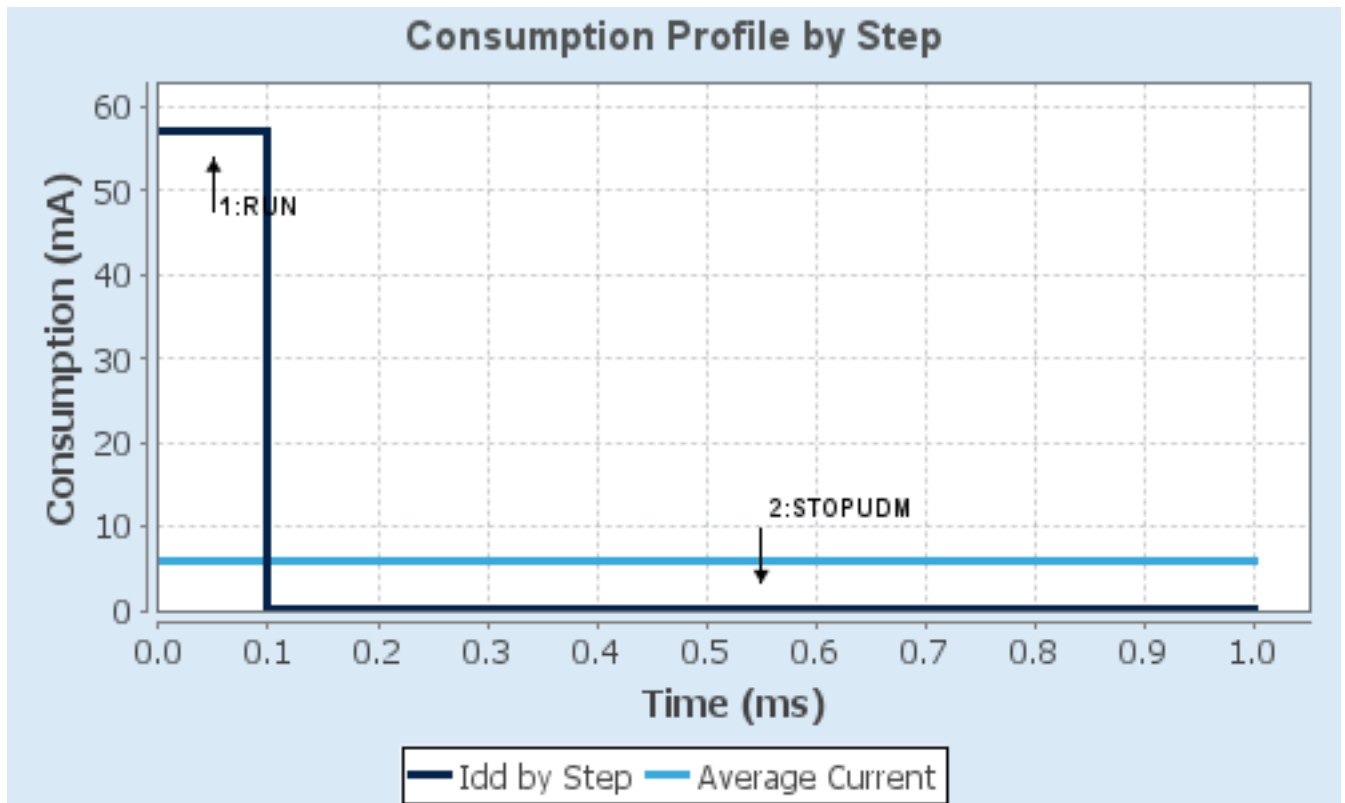
6.4. Sequence

| | | |
|-------------------------------|-------------|---------------------------|
| Step | Step1 | Step2 |
| Mode | RUN | STOP UDM (Under Drive) |
| Vdd | 3.3 | 3.3 |
| Voltage Source | Battery | Battery |
| Range | Scale1-High | No Scale |
| Fetch Type | FLASH | n/a |
| CPU Frequency | 180 MHz | 0 Hz |
| Clock Configuration | HSE PLL | Regulator LP Flash-PwrDwn |
| Clock Source Frequency | 4 MHz | 0 Hz |
| Peripherals | | |
| Additional Cons. | 0 mA | 0 mA |
| Average Current | 57 mA | 100 μ A |
| Duration | 0.1 ms | 0.9 ms |
| DMIPS | 225.0 | 0.0 |
| Ta Max | 97.48 | 104.99 |
| Category | In DS Table | In DS Table |

6.5. Results

| | | | |
|---------------|-------------------|-----------------|-------------|
| Sequence Time | 1 ms | Average Current | 5.79 mA |
| Battery Life | 24 days, 10 hours | Average DMIPS | 225.0 DMIPS |

6.6. Chart



7. Peripherals and Middlewares Configuration

7.1. RCC

7.1.1. 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 |
| TIM Prescaler Selection | Disabled |
| HSE Startup Timeout Value (ms) | 100 |
| LSE Startup Timeout Value (ms) | 5000 |

Power Parameters:

| | |
|-------------------------------|---------------------------------|
| Power Regulator Voltage Scale | Power Regulator Voltage Scale 1 |
| Power Over Drive | Enabled |

7.2. SYS

Timebase Source: SysTick

7.3. USART1

Mode: Asynchronous

7.3.1. 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 |

*** User modified value**

8. System Configuration

8.1. GPIO configuration

| IP | Pin | Signal | GPIO mode | GPIO pull/up pull down | Max Speed | User Label |
|--------|----------|-------------|--|-----------------------------|-----------------------|------------|
| USART1 | PA9 | USART1_TX | Alternate Function Push Pull | No pull-up and no pull-down | Very High * | |
| | PA10 | USART1_RX | Alternate Function Push Pull | No pull-up and no pull-down | Very High * | |
| GPIO | PC13 | GPIO_EXTI13 | External Interrupt Mode with Rising edge trigger detection | No pull-up and no pull-down | n/a | |
| | PA0/WKUP | GPIO_EXTI0 | External Interrupt Mode with Rising edge trigger detection | No pull-up and no pull-down | n/a | |
| | PG13 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | |
| | PG14 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | |

8.2. DMA configuration

nothing configured in DMA service

8.3. NVIC configuration

8.3.1. NVIC

| 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 |
| EXTI line0 interrupt | true | 3 | 1 |
| EXTI line[15:10] interrupts | true | 2 | 3 |
| PVD interrupt through EXTI line 16 | unused | | |
| Flash global interrupt | unused | | |
| RCC global interrupt | unused | | |
| USART1 global interrupt | unused | | |
| FPU global interrupt | unused | | |

8.3.2. NVIC Code generation

| Enabled interrupt Table | Select for init sequence ordering | Generate IRQ handler | Call HAL handler |
|---|-----------------------------------|----------------------|------------------|
| Non maskable interrupt | false | true | false |
| Hard fault interrupt | false | true | false |
| Memory management fault | false | true | false |
| Pre-fetch fault, memory access fault | false | true | false |
| Undefined instruction or illegal state | false | true | false |
| System service call via SWI instruction | false | true | false |
| Debug monitor | false | true | false |
| Pendable request for system service | false | true | false |
| System tick timer | false | true | true |
| EXTI line0 interrupt | false | true | true |
| EXTI line[15:10] interrupts | false | true | true |

* User modified value

9. System Views

9.1. Category view

9.1.1. Current

Middleware

System Core

Analog

Timers

Connectivity

Multimedia

Security

Computing

DMA

USART1 

GPIO 

NVIC 

RCC 

SYS 

10. Docs & Resources

| Type | Link |
|--------------------|---|
| Datasheet | http://www.st.com/resource/en/datasheet/DM00071990.pdf |
| Reference manual | http://www.st.com/resource/en/reference_manual/DM00031020.pdf |
| Programming manual | http://www.st.com/resource/en/programming_manual/DM00046982.pdf |
| Errata sheet | http://www.st.com/resource/en/errata_sheet/DM00068628.pdf |
| Application note | http://www.st.com/resource/en/application_note/CD00167594.pdf |
| Application note | http://www.st.com/resource/en/application_note/CD00211314.pdf |
| Application note | http://www.st.com/resource/en/application_note/CD00249778.pdf |
| Application note | http://www.st.com/resource/en/application_note/CD00259245.pdf |
| Application note | http://www.st.com/resource/en/application_note/CD00264321.pdf |
| Application note | http://www.st.com/resource/en/application_note/CD00264342.pdf |
| Application note | http://www.st.com/resource/en/application_note/CD00264379.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00024853.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00040802.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00040808.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00042534.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00046011.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00050879.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00072315.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00073742.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00073853.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00080497.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00081379.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00115714.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00123028.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00129215.pdf |

Application note http://www.st.com/resource/en/application_note/DM00154959.pdf

Application note http://www.st.com/resource/en/application_note/DM00160482.pdf

Application note http://www.st.com/resource/en/application_note/DM00161778.pdf

Application note http://www.st.com/resource/en/application_note/DM00164538.pdf

Application note http://www.st.com/resource/en/application_note/DM00172465.pdf

Application note http://www.st.com/resource/en/application_note/DM00213525.pdf

Application note http://www.st.com/resource/en/application_note/DM00220769.pdf

Application note http://www.st.com/resource/en/application_note/DM00226326.pdf

Application note http://www.st.com/resource/en/application_note/DM00236305.pdf

Application note http://www.st.com/resource/en/application_note/DM00257177.pdf

Application note http://www.st.com/resource/en/application_note/DM00272912.pdf

Application note http://www.st.com/resource/en/application_note/DM00281138.pdf

Application note http://www.st.com/resource/en/application_note/DM00287603.pdf

Application note http://www.st.com/resource/en/application_note/DM00296349.pdf

Application note http://www.st.com/resource/en/application_note/DM00315319.pdf

Application note http://www.st.com/resource/en/application_note/DM00327191.pdf

Application note http://www.st.com/resource/en/application_note/DM00354244.pdf

Application note http://www.st.com/resource/en/application_note/DM00373474.pdf

Application note http://www.st.com/resource/en/application_note/DM00380469.pdf

Application note http://www.st.com/resource/en/application_note/DM00395696.pdf

Application note http://www.st.com/resource/en/application_note/DM00431633.pdf

Application note http://www.st.com/resource/en/application_note/DM00493651.pdf

Application note http://www.st.com/resource/en/application_note/DM00536349.pdf

Application note http://www.st.com/resource/en/application_note/DM00725181.pdf