
STM32
CubeMX

# 1. Description

## 1.1. Project

| | |
|---|---|
| Project Name | Injection_STM32F407 |
| Board Name | custom |
| Generated with: | STM32CubeMX 6.12.0 |
| Date | 12/08/2024 |

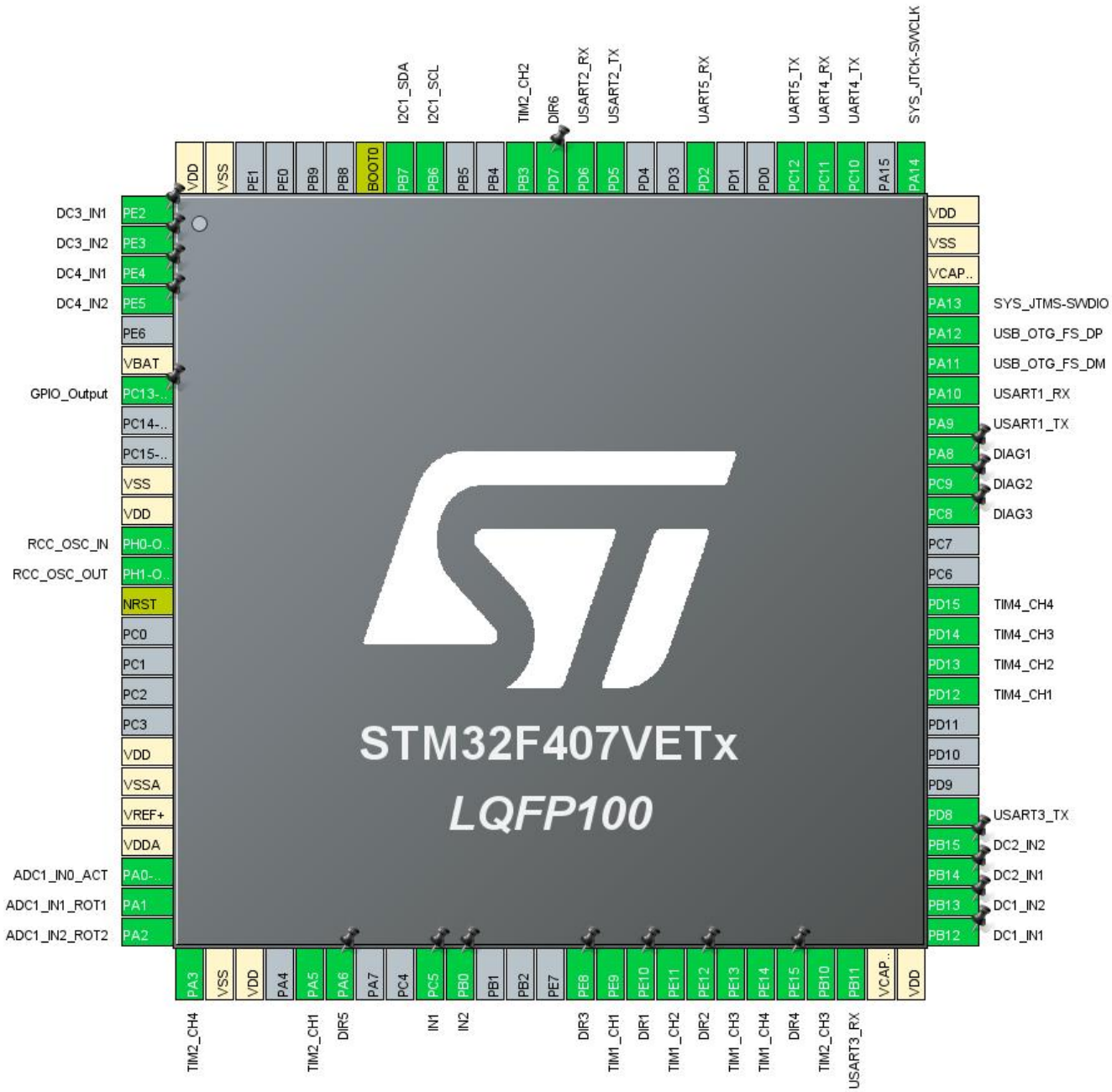
## 1.2. MCU

| | |
|---|---|
| MCU Series | STM32F4 |
| MCU Line | STM32F407/417 |
| MCU name | STM32F407VETx |
| MCU Package | LQFP100 |
| MCU Pin number | 100 |

## 1.3. Core(s) information

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

## 2. Pinout Configuration



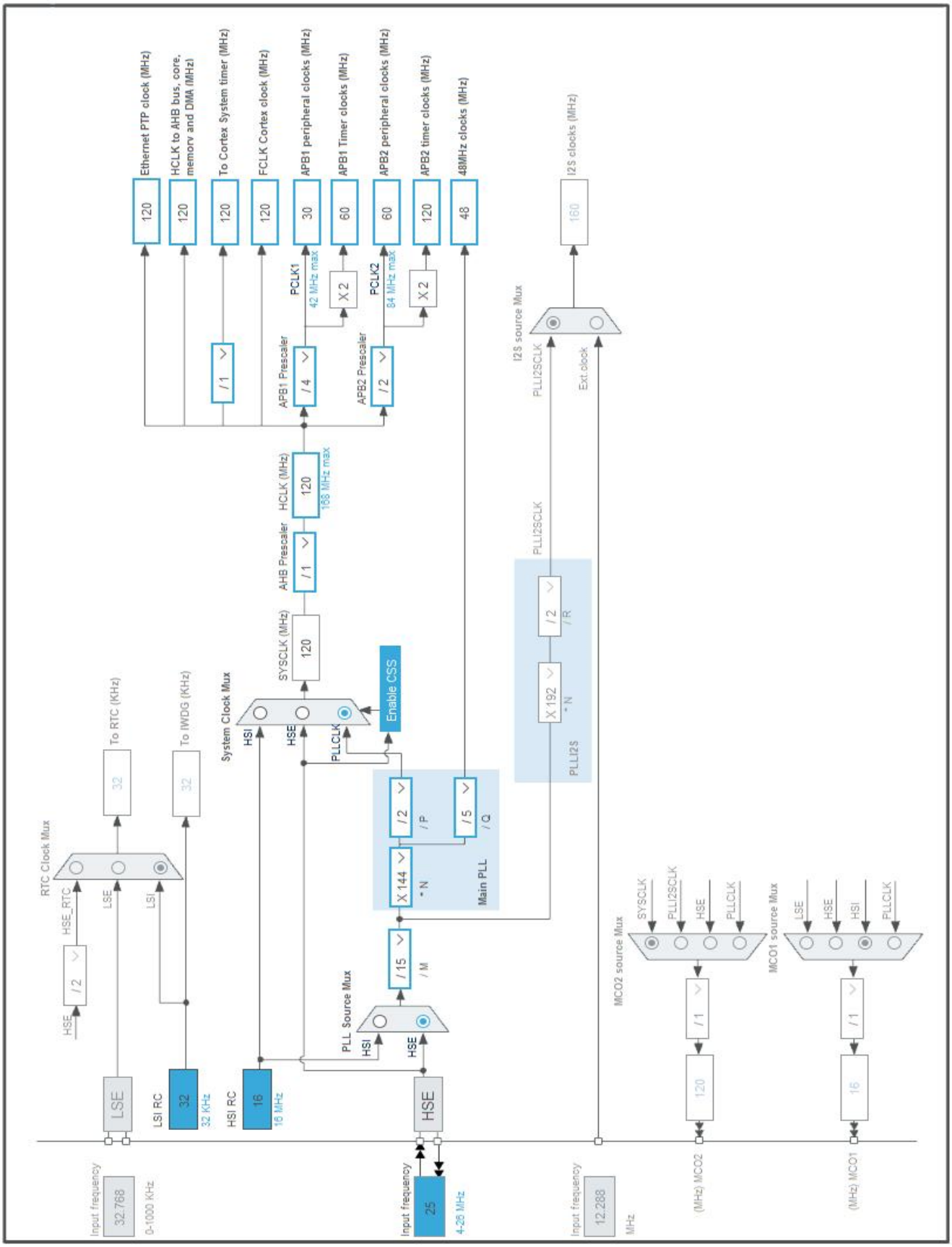
# 3. Pins Configuration

| Pin Number LQFP100 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|---|---|---|---|---|
| 1 | PE2 * | I/O | GPIO_Output | DC3_IN1 |
| 2 | PE3 * | I/O | GPIO_Output | DC3_IN2 |
| 3 | PE4 * | I/O | GPIO_Output | DC4_IN1 |
| 4 | PE5 * | I/O | GPIO_Output | DC4_IN2 |
| 6 | VBAT | Power | | |
| 7 | PC13-ANTI_TAMP * | I/O | GPIO_Output | |
| 10 | VSS | Power | | |
| 11 | VDD | Power | | |
| 12 | PH0-OSC_IN | I/O | RCC_OSC_IN | |
| 13 | PH1-OSC_OUT | I/O | RCC_OSC_OUT | |
| 14 | NRST | Reset | | |
| 19 | VDD | Power | | |
| 20 | VSSA | Power | | |
| 21 | VREF+ | Power | | |
| 22 | VDDA | Power | | |
| 23 | PA0-WKUP | I/O | ADC1_IN0 | ADC1_IN0_ACT |
| 24 | PA1 | I/O | ADC1_IN1 | ADC1_IN1_ROT1 |
| 25 | PA2 | I/O | ADC1_IN2 | ADC1_IN2_ROT2 |
| 26 | PA3 | I/O | TIM2_CH4 | |
| 27 | VSS | Power | | |
| 28 | VDD | Power | | |
| 30 | PA5 | I/O | TIM2_CH1 | |
| 31 | PA6 * | I/O | GPIO_Output | DIR5 |
| 34 | PC5 * | I/O | GPIO_Output | IN1 |
| 35 | PB0 * | I/O | GPIO_Output | IN2 |
| 39 | PE8 * | I/O | GPIO_Output | DIR3 |
| 40 | PE9 | I/O | TIM1_CH1 | |
| 41 | PE10 * | I/O | GPIO_Output | DIR1 |
| 42 | PE11 | I/O | TIM1_CH2 | |
| 43 | PE12 * | I/O | GPIO_Output | DIR2 |
| 44 | PE13 | I/O | TIM1_CH3 | |
| 45 | PE14 | I/O | TIM1_CH4 | |
| 46 | PE15 * | I/O | GPIO_Output | DIR4 |
| 47 | PB10 | I/O | TIM2_CH3 | |
| 48 | PB11 | I/O | USART3_RX | |
| 49 | VCAP_1 | Power | | |

| Pin Number LQFP100 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|---|---|---|---|---|
| 50 | VDD | Power | | |
| 51 | PB12 * | I/O | GPIO_Output | DC1_IN1 |
| 52 | PB13 * | I/O | GPIO_Output | DC1_IN2 |
| 53 | PB14 * | I/O | GPIO_Output | DC2_IN1 |
| 54 | PB15 * | I/O | GPIO_Output | DC2_IN2 |
| 55 | PD8 | I/O | USART3_TX | |
| 59 | PD12 | I/O | TIM4_CH1 | |
| 60 | PD13 | I/O | TIM4_CH2 | |
| 61 | PD14 | I/O | TIM4_CH3 | |
| 62 | PD15 | I/O | TIM4_CH4 | |
| 65 | PC8 * | I/O | GPIO_Input | DIAG3 |
| 66 | PC9 * | I/O | GPIO_Input | DIAG2 |
| 67 | PA8 * | I/O | GPIO_Input | DIAG1 |
| 68 | PA9 | I/O | USART1_TX | |
| 69 | PA10 | I/O | USART1_RX | |
| 70 | PA11 | I/O | USB_OTG_FS_DM | |
| 71 | PA12 | I/O | USB_OTG_FS_DP | |
| 72 | PA13 | I/O | SYS_JTMS-SWDIO | |
| 73 | VCAP_2 | Power | | |
| 74 | VSS | Power | | |
| 75 | VDD | Power | | |
| 76 | PA14 | I/O | SYS_JTCK-SWCLK | |
| 78 | PC10 | I/O | UART4_TX | |
| 79 | PC11 | I/O | UART4_RX | |
| 80 | PC12 | I/O | UART5_TX | |
| 83 | PD2 | I/O | UART5_RX | |
| 86 | PD5 | I/O | USART2_TX | |
| 87 | PD6 | I/O | USART2_RX | |
| 88 | PD7 * | I/O | GPIO_Output | DIR6 |
| 89 | PB3 | I/O | TIM2_CH2 | |
| 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



# 1. Power Consumption Calculator report

## 1.1. Microcontroller Selection

| | |
|---|---|
| Series | STM32F4 |
| Line | STM32F407/417 |
| MCU | STM32F407VETx |
| Datasheet | DS8626_Rev8 |

## 1.2. Parameter Selection

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

## 1.3. 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 |

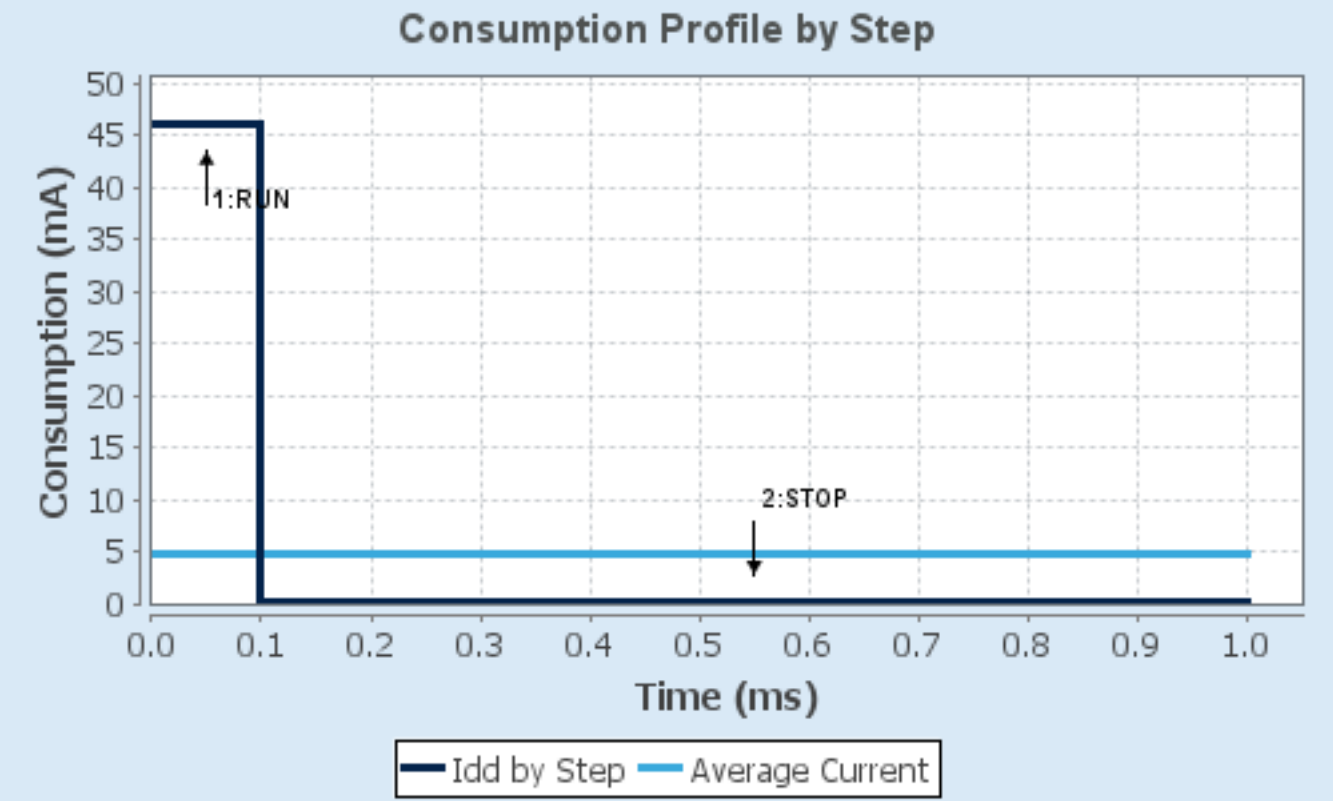
## 1.4. Sequence

| ***Step*** | Step1 | Step2 |
|---|---|---|
| ***Mode*** | RUN | STOP |
| ***Vdd*** | 3.3 | 3.3 |
| ***Voltage Source*** | Battery | Battery |
| ***Range*** | Scale1-High | No Scale |
| ***Fetch Type*** | FLASH | n/a |
| ***CPU Frequency*** | 168 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*** | 46 mA | 280 µA |
| ***Duration*** | 0.1 ms | 0.9 ms |
| ***DMIPS*** | 210.0 | 0.0 |
| ***Ta Max*** | 98.47 | 104.96 |
| ***Category*** | In DS Table | In DS Table |

## 1.5. Results

| Sequence Time | 1 ms | Average Current | 4.85 mA |
|---|---|---|---|
| Battery Life | 29 days, 4 hours | Average DMIPS | 210.0 DMIPS |

## 1.6. Chart


Consumption Profile by Step
Consumption (mA)
50
45
40
35
30
25
20
15
10
5
0
1:RUN
2:STOP
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (ms)
Idd by Step
Average Current

# 2. Software Project

## 2.1. Project Settings

| Name | Value |
|---|---|
| Project Name | Injection_STM32F407 |
| Project Folder | Z:\Desktop\igen\Injection\Injection_STM32F407 |
| Toolchain / IDE | Makefile |
| Firmware Package Name and Version | STM32Cube FW_F4 V1.28.1 |
| Application Structure | Advanced |
| Generate Under Root | No |
| Do not generate the main() | No |
| Minimum Heap Size | 0x200 |
| Minimum Stack Size | 0x400 |

## 2.2. Code Generation Settings

| Name | Value |
|---|---|
| STM32Cube MCU packages and embedded software | Copy all used libraries into the project folder |
| 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 |

## 2.3. Advanced Settings - Generated Function Calls

| Rank | Function Name | Peripheral Instance Name |
|---|---|---|
| 1 | SystemClock_Config | RCC |
| 2 | MX_GPIO_Init | GPIO |
| 3 | MX_ADC1_Init | ADC1 |
| 4 | MX_I2C1_Init | I2C1 |
| 5 | MX_TIM1_Init | TIM1 |
| 6 | MX_TIM2_Init | TIM2 |
| 7 | MX_UART4_Init | UART4 |
| 8 | MX_UART5_Init | UART5 |
| 9 | MX_USART1_UART_Init | USART1 |
| 10 | MX_USART2_UART_Init | USART2 |
| 11 | MX_USART3_UART_Init | USART3 |

| Rank | Function Name | Peripheral Instance Name |
|---|---|---|
| 12 | MX_USB_OTG_FS_PCD_Init | USB_OTG_FS |
| 13 | MX_TIM4_Init | TIM4 |

# 3. Peripherals and Middlewares Configuration

## 3.1. ADC1

**mode: IN0**

**mode: IN1**

**mode: IN2**

### 3.1.1. Parameter Settings:

**ADCs_Common_Settings:**

| | |
|---|---|
| Mode | Independent mode |

**ADC_Settings:**

| | |
|---|---|
| Clock Prescaler | PCLK2 divided by 2 |
| Resolution | 12 bits (15 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 0 |
| Sampling Time | 3 Cycles |

**ADC_Injected_ConversionMode:**

| | |
|---|---|
| Number Of Conversions | 0 |

**WatchDog:**

| | |
|---|---|
| Enable Analog WatchDog Mode | false |

## 3.2. I2C1

**I2C: I2C**

### 3.2.1. 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 |

## 3.3. RCC

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

### 3.3.1. Parameter Settings:

**System Parameters:**

| | |
|---|---|
| VDD voltage (V) | 3.3 |
| Instruction Cache | Enabled |
| Prefetch Buffer | Enabled |
| Data Cache | Enabled |
| Flash Latency(WS) | 3 WS (4 CPU cycle) |

**RCC Parameters:**

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

**Power Parameters:**

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

## 3.4. SYS

## Debug: Serial Wire

## Timebase Source: SysTick

## 3.5. TIM1

## Clock Source : Internal Clock

## Channel1: PWM Generation CH1

## Channel2: PWM Generation CH2

## Channel3: PWM Generation CH3

## Channel4: PWM Generation CH4

### 3.5.1. Parameter Settings:

### Counter Settings:

| | |
|---|---|
| Prescaler (PSC - 16 bits value) | 0 |
| Counter Mode | Up |
| Counter Period (AutoReload Register - 16 bits value ) | 65535 |
| Internal Clock Division (CKD) | No Division |
| Repetition Counter (RCR - 8 bits value) | 0 |
| auto-reload preload | Disable |

### Trigger Output (TRGO) Parameters:

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

### Break And Dead Time management - BRK Configuration:

| | |
|---|---|
| BRK State | Disable |
| BRK Polarity | High |

### Break And Dead Time management - Output Configuration:

| | |
|---|---|
| Automatic Output State | Disable |
| Off State Selection for Run Mode (OSSR) | Disable |
| Off State Selection for Idle Mode (OSSI) | Disable |
| Lock Configuration | Off |

### PWM Generation Channel 1:

| | |
|---|---|
| Mode | PWM mode 1 |
| Pulse (16 bits value) | 0 |
| Output compare preload | Enable |
| Fast Mode | Disable |
| CH Polarity | High |
| CH Idle State | Reset |

### PWM Generation Channel 2:

| | |
|---|---|
| Mode | PWM mode 1 |
| Pulse (16 bits value) | 0 |
| Output compare preload | Enable |
| Fast Mode | Disable |
| CH Polarity | High |
| CH Idle State | Reset |

### PWM Generation Channel 3:

| | |
|---|---|
| Mode | PWM mode 1 |
| Pulse (16 bits value) | 0 |
| Output compare preload | Enable |
| Fast Mode | Disable |
| CH Polarity | High |
| CH Idle State | Reset |

### PWM Generation Channel 4:

| | |
|---|---|
| Mode | PWM mode 1 |
| Pulse (16 bits value) | 0 |
| Output compare preload | Enable |
| Fast Mode | Disable |
| CH Polarity | High |
| CH Idle State | Reset |

## 3.6. TIM2

## Clock Source : Internal Clock

## Channel1: PWM Generation CH1

## Channel2: PWM Generation CH2

## Channel3: PWM Generation CH3

## Channel4: PWM Generation CH4

### 3.6.1. Parameter Settings:

**Counter Settings:**

| | |
|---|---|
| Prescaler (PSC - 16 bits value) | 0 |
| Counter Mode | Up |
| Counter Period (AutoReload Register - 32 bits value ) | 4294967295 |
| Internal Clock Division (CKD) | No Division |
| auto-reload preload | Disable |

**Trigger Output (TRGO) Parameters:**

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

**PWM Generation Channel 1:**

| | |
|---|---|
| Mode | PWM mode 1 |
| Pulse (32 bits value) | 0 |
| Output compare preload | Enable |
| Fast Mode | Disable |
| CH Polarity | High |

**PWM Generation Channel 2:**

| | |
|---|---|
| Mode | PWM mode 1 |
| Pulse (32 bits value) | 0 |
| Output compare preload | Enable |
| Fast Mode | Disable |
| CH Polarity | High |

**PWM Generation Channel 3:**

| | |
|---|---|
| Mode | PWM mode 1 |
| Pulse (32 bits value) | 0 |

| | |
|---|---|
| Output compare preload | Enable |
| Fast Mode | Disable |
| CH Polarity | High |

**PWM Generation Channel 4:**

| | |
|---|---|
| Mode | PWM mode 1 |
| Pulse (32 bits value) | 0 |
| Output compare preload | Enable |
| Fast Mode | Disable |
| CH Polarity | High |

## 3.7. TIM4

**Clock Source : Internal Clock**

**Channel1: PWM Generation CH1**

**Channel2: PWM Generation CH2**

**Channel3: PWM Generation CH3**

**Channel4: PWM Generation CH4**

### 3.7.1. Parameter Settings:

**Counter Settings:**

| | |
|---|---|
| Prescaler (PSC - 16 bits value) | 0 |
| Counter Mode | Up |
| Counter Period (AutoReload Register - 16 bits value ) | 65535 |
| Internal Clock Division (CKD) | No Division |
| auto-reload preload | Disable |

**Trigger Output (TRGO) Parameters:**

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

**PWM Generation Channel 1:**

| | |
|---|---|
| Mode | PWM mode 1 |
| Pulse (16 bits value) | 0 |
| Output compare preload | Enable |
| Fast Mode | Disable |
| CH Polarity | High |

**PWM Generation Channel 2:**

| | |
|---|---|
| Mode | PWM mode 1 |
| Pulse (16 bits value) | 0 |
| Output compare preload | Enable |
| Fast Mode | Disable |
| CH Polarity | High |

**PWM Generation Channel 3:**

| | |
|---|---|
| Mode | PWM mode 1 |
| Pulse (16 bits value) | 0 |
| Output compare preload | Enable |
| Fast Mode | Disable |
| CH Polarity | High |

**PWM Generation Channel 4:**

| | |
|---|---|
| Mode | PWM mode 1 |
| Pulse (16 bits value) | 0 |
| Output compare preload | Enable |
| Fast Mode | Disable |
| CH Polarity | High |

## 3.8. UART4

## Mode: Asynchronous

### 3.8.1. 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 |

## 3.9. UART5

## Mode: Asynchronous

### 3.9.1. 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 |

## 3.10. USART1

## Mode: Asynchronous

### 3.10.1. 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 |

## 3.11. USART2

## Mode: Asynchronous

### 3.11.1. 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 |

## 3.12. USART3

## Mode: Asynchronous

### 3.12.1. 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 |

## 3.13. USB_OTG_FS

## Mode: Device_Only

### 3.13.1. Parameter Settings:

| | |
|---|---|
| Speed | Device Full Speed 12MBit/s |
| Low power | Disabled |
| Link Power Management | Disabled |
| VBUS sensing | Disabled |
| Signal start of frame | Disabled |

*** User modified value**

# 4. System Configuration

## 4.1. GPIO configuration

| IP | Pin | Signal | GPIO mode | GPIO pull/up pull down | Max Speed | User Label |
|---|---|---|---|---|---|---|
| ADC1 | PA0-WKUP | ADC1_IN0 | Analog mode | No pull-up and no pull-down | n/a | ADC1_IN0_ACT |
| | PA1 | ADC1_IN1 | Analog mode | No pull-up and no pull-down | n/a | ADC1_IN1_ROT1 |
| | PA2 | ADC1_IN2 | Analog mode | No pull-up and no pull-down | n/a | ADC1_IN2_ROT2 |
| I2C1 | PB6 | I2C1_SCL | Alternate Function Open Drain | No pull-up and no pull-down | **Very High *** | |
| | PB7 | I2C1_SDA | Alternate Function Open Drain | No pull-up and no pull-down | **Very High *** | |
| RCC | PH0-OSC_IN | RCC_OSC_IN | n/a | n/a | n/a | |
| | PH1-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 | |
| TIM1 | PE9 | TIM1_CH1 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PE11 | TIM1_CH2 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PE13 | TIM1_CH3 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PE14 | TIM1_CH4 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| TIM2 | PA3 | TIM2_CH4 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PA5 | TIM2_CH1 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PB10 | TIM2_CH3 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PB3 | TIM2_CH2 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| TIM4 | PD12 | TIM4_CH1 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PD13 | TIM4_CH2 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PD14 | TIM4_CH3 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| | PD15 | TIM4_CH4 | Alternate Function Push Pull | No pull-up and no pull-down | Low | |
| UART4 | PC10 | UART4_TX | Alternate Function Push Pull | No pull-up and no pull-down | **Very High *** | |
| | PC11 | UART4_RX | Alternate Function Push Pull | No pull-up and no pull-down | **Very High *** | |
| UART5 | PC12 | UART5_TX | Alternate Function Push Pull | No pull-up and no pull-down | **Very High *** | |
| | PD2 | UART5_RX | Alternate Function Push Pull | No pull-up and no pull-down | **Very High *** | |
| USART1 | PA9 | USART1_TX | Alternate Function Push Pull | No pull-up and no pull-down | **Very High** | |

| IP | Pin | Signal | GPIO mode | GPIO pull/up pull down | Max Speed | User Label |
|---|---|---|---|---|---|---|
| | | | | | * | |
| | PA10 | USART1_RX | Alternate Function Push Pull | No pull-up and no pull-down | **Very High** * | |
| USART2 | PD5 | USART2_TX | Alternate Function Push Pull | No pull-up and no pull-down | **Very High** * | |
| | PD6 | USART2_RX | Alternate Function Push Pull | No pull-up and no pull-down | **Very High** * | |
| USART3 | PB11 | USART3_RX | Alternate Function Push Pull | No pull-up and no pull-down | **Very High** * | |
| | PD8 | USART3_TX | Alternate Function Push Pull | No pull-up and no pull-down | **Very High** * | |
| USB_OTG_FS | PA11 | USB_OTG_FS_DM | Alternate Function Push Pull | No pull-up and no pull-down | **Very High** * | |
| | PA12 | USB_OTG_FS_DP | Alternate Function Push Pull | No pull-up and no pull-down | **Very High** * | |
| GPIO | PE2 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | DC3_IN1 |
| | PE3 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | DC3_IN2 |
| | PE4 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | DC4_IN1 |
| | PE5 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | DC4_IN2 |
| | PC13-ANTI_TAMP | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | |
| | PA6 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | DIR5 |
| | PC5 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | IN1 |
| | PB0 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | IN2 |
| | PE8 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | DIR3 |
| | PE10 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | DIR1 |
| | PE12 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | DIR2 |
| | PE15 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | DIR4 |
| | PB12 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | DC1_IN1 |
| | PB13 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | DC1_IN2 |
| | PB14 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | DC2_IN1 |
| | PB15 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | DC2_IN2 |
| | PC8 | GPIO_Input | Input mode | No pull-up and no pull-down | n/a | DIAG3 |
| | PC9 | GPIO_Input | Input mode | No pull-up and no pull-down | n/a | DIAG2 |
| | PA8 | GPIO_Input | Input mode | No pull-up and no pull-down | n/a | DIAG1 |
| | PD7 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | DIR6 |

### 4.2. DMA configuration

nothing configured in DMA service

## 4.3. NVIC configuration

### 4.3.1. 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 | 15 | 0 |
| PVD interrupt through EXTI line 16 | unused | | |
| Flash global interrupt | unused | | |
| RCC global interrupt | unused | | |
| ADC1, ADC2 and ADC3 global interrupts | unused | | |
| TIM1 break interrupt and TIM9 global interrupt | unused | | |
| TIM1 update interrupt and TIM10 global interrupt | unused | | |
| TIM1 trigger and commutation interrupts and TIM11 global interrupt | unused | | |
| TIM1 capture compare interrupt | unused | | |
| TIM2 global interrupt | unused | | |
| TIM4 global interrupt | unused | | |
| I2C1 event interrupt | unused | | |
| I2C1 error interrupt | unused | | |
| USART1 global interrupt | unused | | |
| USART2 global interrupt | unused | | |
| USART3 global interrupt | unused | | |
| UART4 global interrupt | unused | | |
| UART5 global interrupt | unused | | |
| USB On The Go FS global interrupt | unused | | |
| FPU global interrupt | unused | | |

### 4.3.2. 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 |
| | | | |

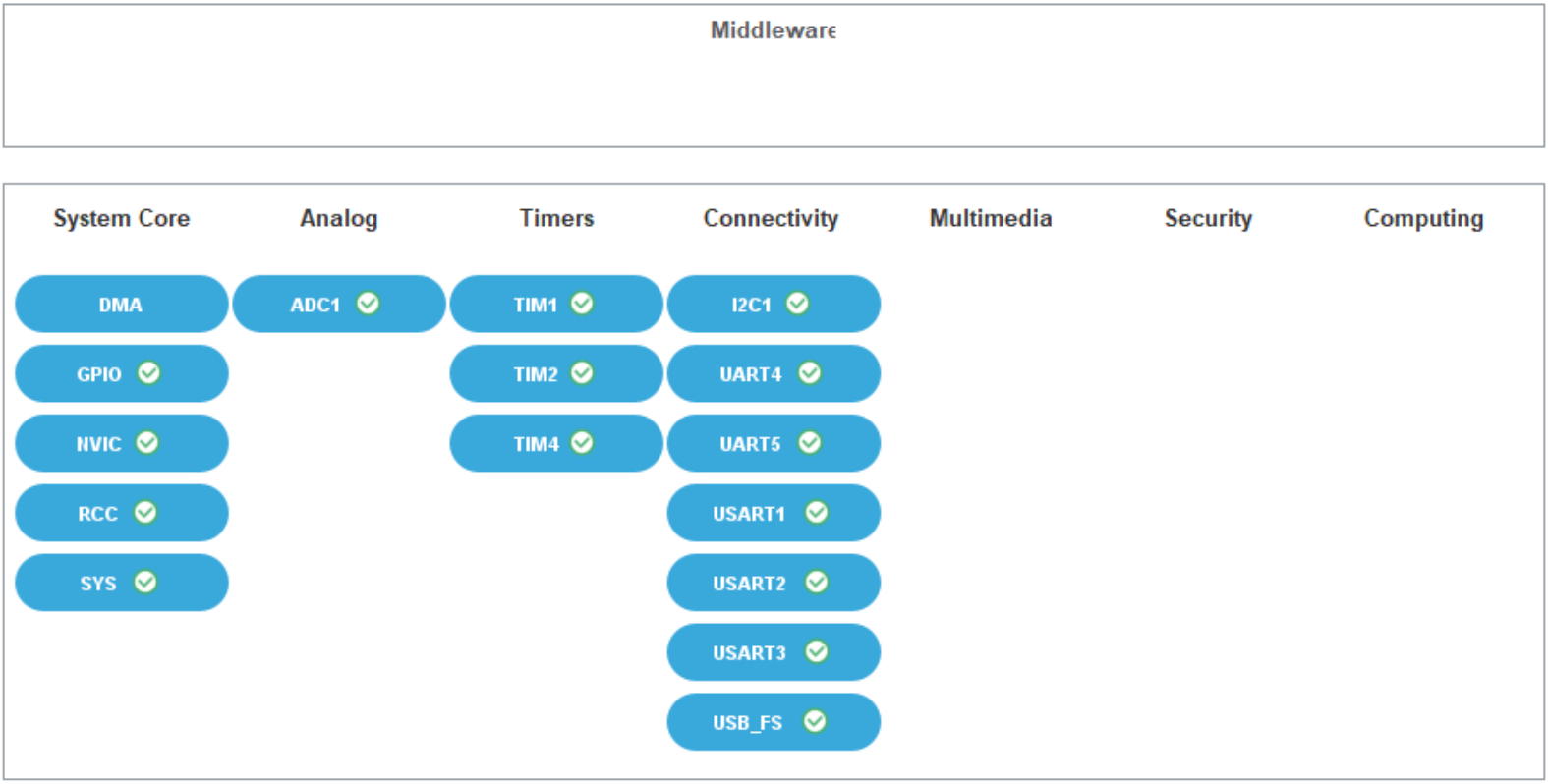
| Enabled interrupt Table | Select for init sequence ordering | Generate IRQ handler | Call HAL handler |
|---|---|---|---|
| Pre-fetch fault, memory access fault | false | true | false |
| Undefined instruction or illegal state | false | true | false |
| System service call via SWI instruction | false | true | false |
| Debug monitor | false | true | false |
| Pendable request for system service | false | true | false |
| System tick timer | false | true | true |

*** User modified value**

# 5. System Views

5.1. Category view

*5.1.1. Current*



# 6. Docs & Resources

| Type | Link |
|---|---|
| BSDL files | https://www.st.com/resource/en/bsdl_model/stm32f405-415_407-417_bsdl.zip |
| IBIS models | https://www.st.com/resource/en/ibis_model/stm32f405-415_407-417_ibis.zip |
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| Datasheet | https://www.st.com/resource/en/datasheet/dm00037051.pdf |
| Programming Manuals | https://www.st.com/resource/en/programming_manual/pm0214-stm32-cortexm4-mcus-and-mpus-programming-manual-stmicroelectronics.pdf |
| Reference Manuals | https://www.st.com/resource/en/reference_manual/rm0090-stm32f405415-stm32f407417-stm32f427437-and-stm32f429439-advanced-armbased-32bit-mcus-stmicroelectronics.pdf |
| Technical Notes & Articles | https://www.st.com/resource/en/technical_note/tn0516-overview-of-the-stm32f0xf100xxf103xx-and-stm32f2xxf30xf4xx-mcus-pmsm-singledual-foc-sdk-v40-stmicroelectronics.pdf |
| Technical Notes & Articles | https://www.st.com/resource/en/technical_note/tn1163-description-of-wlcsp-for-microcontrollers-and-recommendations-for-its-use-stmicroelectronics.pdf |
| Technical Notes & Articles | https://www.st.com/resource/en/technical_note/tn1204-tape-and-reel-shipping-media-for-stm32-microcontrollers-in-bga-packages-stmicroelectronics.pdf |
| Technical Notes & Articles | https://www.st.com/resource/en/technical_note/tn1205-tape-and-reel-shipping-media-for-stm8-and-stm32-microcontrollers-in-fpn-packages-stmicroelectronics.pdf |
| Technical Notes & Articles | https://www.st.com/resource/en/technical_note/tn1206-tape-and-reel-shipping-media-for-stm8-and-stm32-microcontrollers-in-qfp-packages-stmicroelectronics.pdf |
| Technical Notes & Articles | https://www.st.com/resource/en/technical_note/tn1207-tape-and-reel-shipping-media-for-stm8-and-stm32-microcontrollers-in-so-packages-stmicroelectronics.pdf |
| Technical Notes & Articles | https://www.st.com/resource/en/technical_note/tn1208-tape-and-reel-shipping-media-for-stm8-and-stm32-microcontrollers-in-tssop-and-ssop-packages-stmicroelectronics.pdf |
| Technical Notes & Articles | https://www.st.com/resource/en/technical_note/tn1433-reference-device-marking-schematics-for-stm32-microcontrollers-and-microprocessors-stmicroelectronics.pdf |
| Technical Notes & Articles | https://www.st.com/resource/en/technical_note/tn1489-security-bulletin-tn1489stpsirt-physical-attacks-on-stm32-and-stm32cube-firmware- |

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