



1. Description

1.1. Project

| | |
|-----------------|-------------------|
| Project Name | IdrfixedL431 |
| Board Name | custom |
| Generated with: | STM32CubeMX 6.3.0 |
| Date | 08/29/2022 |

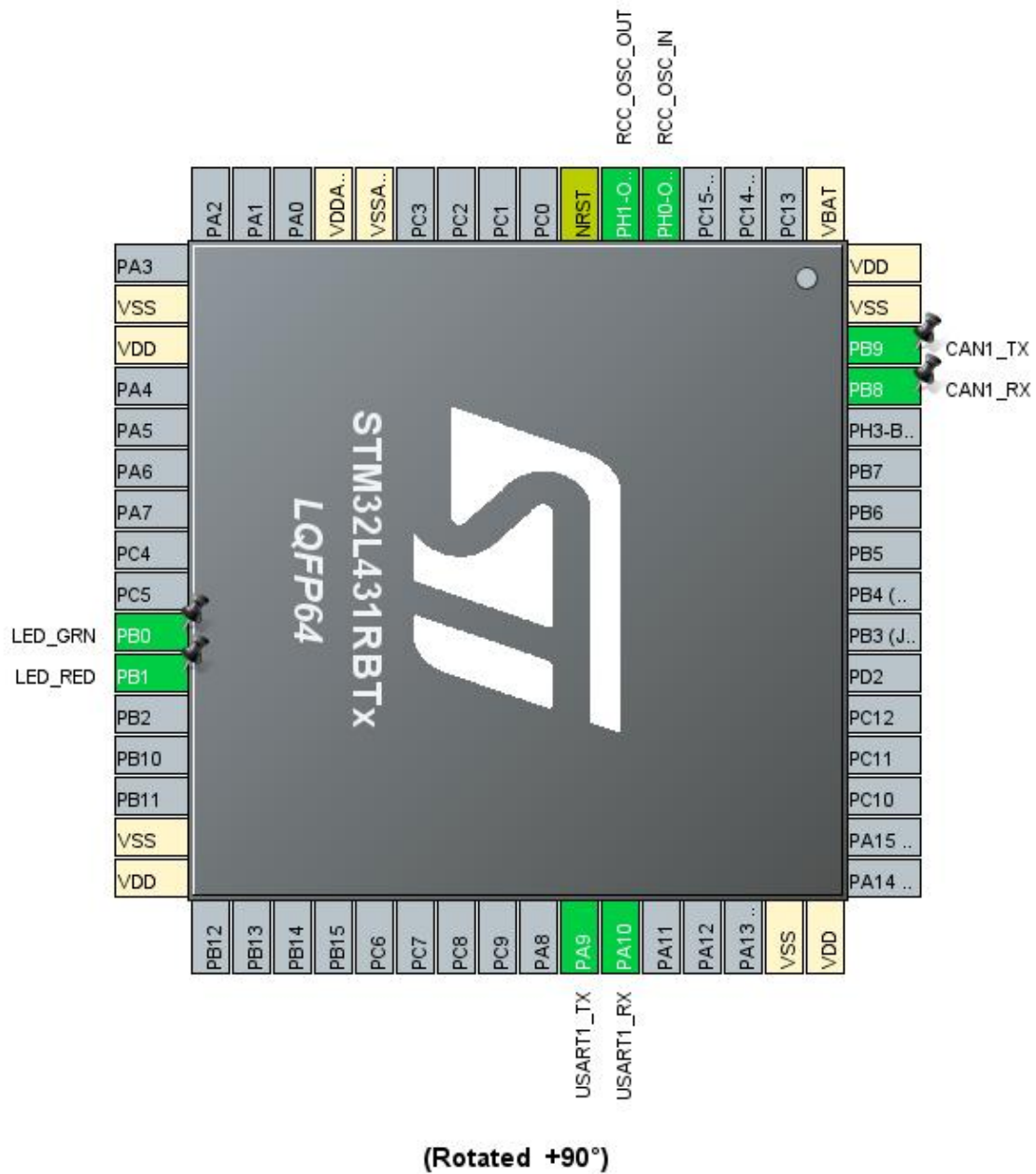
1.2. MCU

| | |
|----------------|---------------|
| MCU Series | STM32L4 |
| MCU Line | STM32L4x1 |
| MCU name | STM32L431RBTx |
| MCU Package | LQFP64 |
| MCU Pin number | 64 |

1.3. Core(s) information

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

2. Pinout Configuration

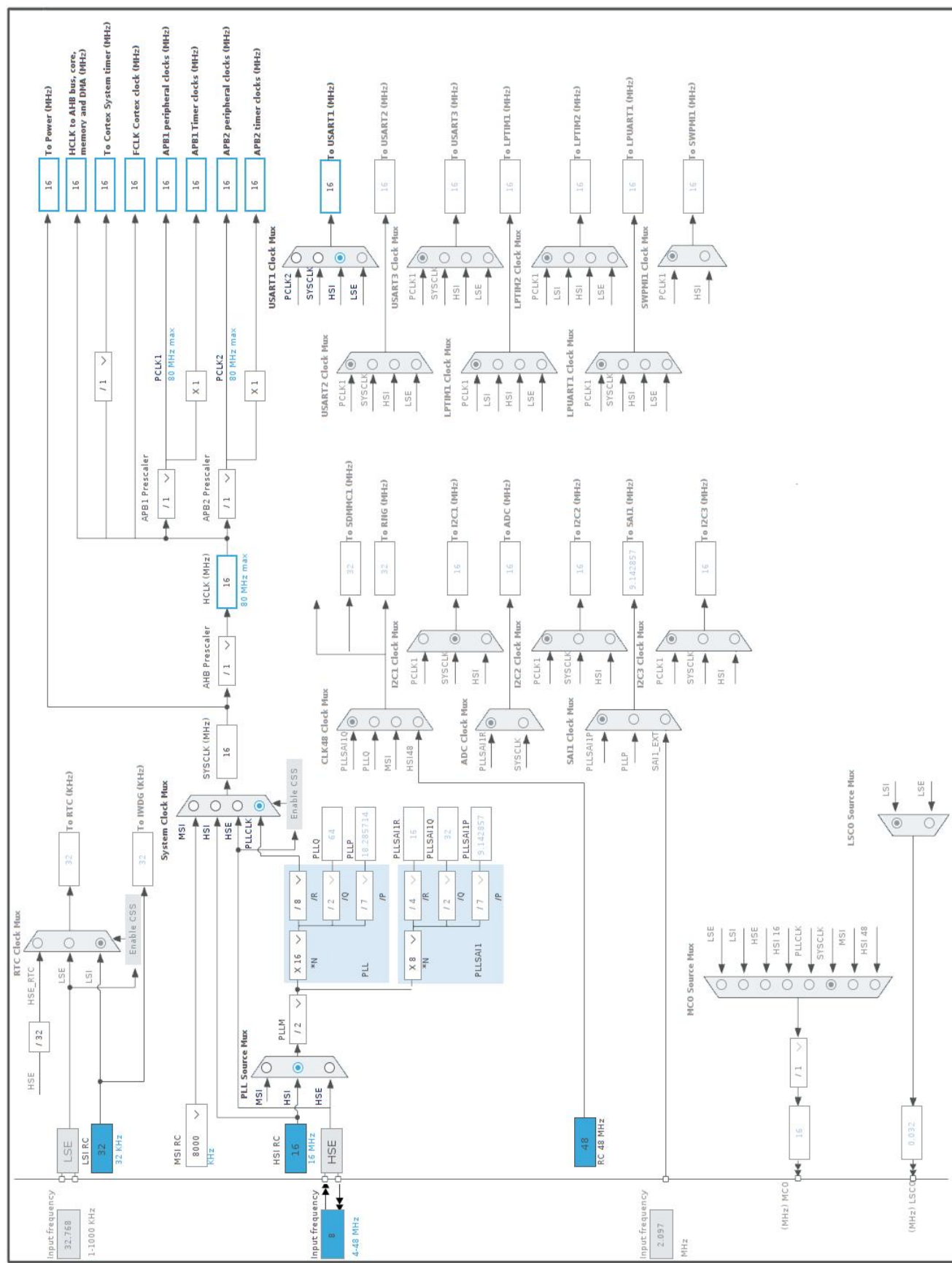


3. Pins Configuration

| Pin Number LQFP64 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|----------------------|---------------------------------------|----------|--------------------------|---------|
| 1 | VBAT | Power | | |
| 5 | PH0-OSC_IN (PH0) | I/O | RCC_OSC_IN | |
| 6 | PH1-OSC_OUT (PH1) | I/O | RCC_OSC_OUT | |
| 7 | NRST | Reset | | |
| 12 | VSSA/VREF- | Power | | |
| 13 | VDDA/VREF+ | Power | | |
| 18 | VSS | Power | | |
| 19 | VDD | Power | | |
| 26 | PB0 * | I/O | GPIO_Output | LED_GRN |
| 27 | PB1 * | I/O | GPIO_Output | LED_RED |
| 31 | VSS | Power | | |
| 32 | VDD | Power | | |
| 42 | PA9 | I/O | USART1_TX | |
| 43 | PA10 | I/O | USART1_RX | |
| 47 | VSS | Power | | |
| 48 | VDD | Power | | |
| 61 | PB8 | I/O | CAN1_RX | |
| 62 | PB9 | I/O | CAN1_TX | |
| 63 | VSS | Power | | |
| 64 | 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 | IdrfixedL431 |
| Project Folder | /home/deh/GliderWinchItems/CANloader/IdrfixedL431 |
| Toolchain / IDE | Makefile |
| Firmware Package Name and Version | STM32Cube FW_L4 V1.17.0 |
| Application Structure | Advanced |
| Generate Under Root | No |
| 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 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 |
| 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 | MX_GPIO_Init | GPIO |
| 2 | SystemClock_Config | RCC |
| 3 | MX_CAN1_Init | CAN1 |
| 4 | MX_USART1_UART_Init | USART1 |
| 5 | MX_TIM15_Init | TIM15 |
| 6 | MX_CRC_Init | CRC |

6. Power Consumption Calculator report

6.1. Microcontroller Selection

| | |
|-----------|---------------|
| Series | STM32L4 |
| Line | STM32L4x1 |
| MCU | STM32L431RBTx |
| Datasheet | DS11453_Rev1 |

6.2. Parameter Selection

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

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 |

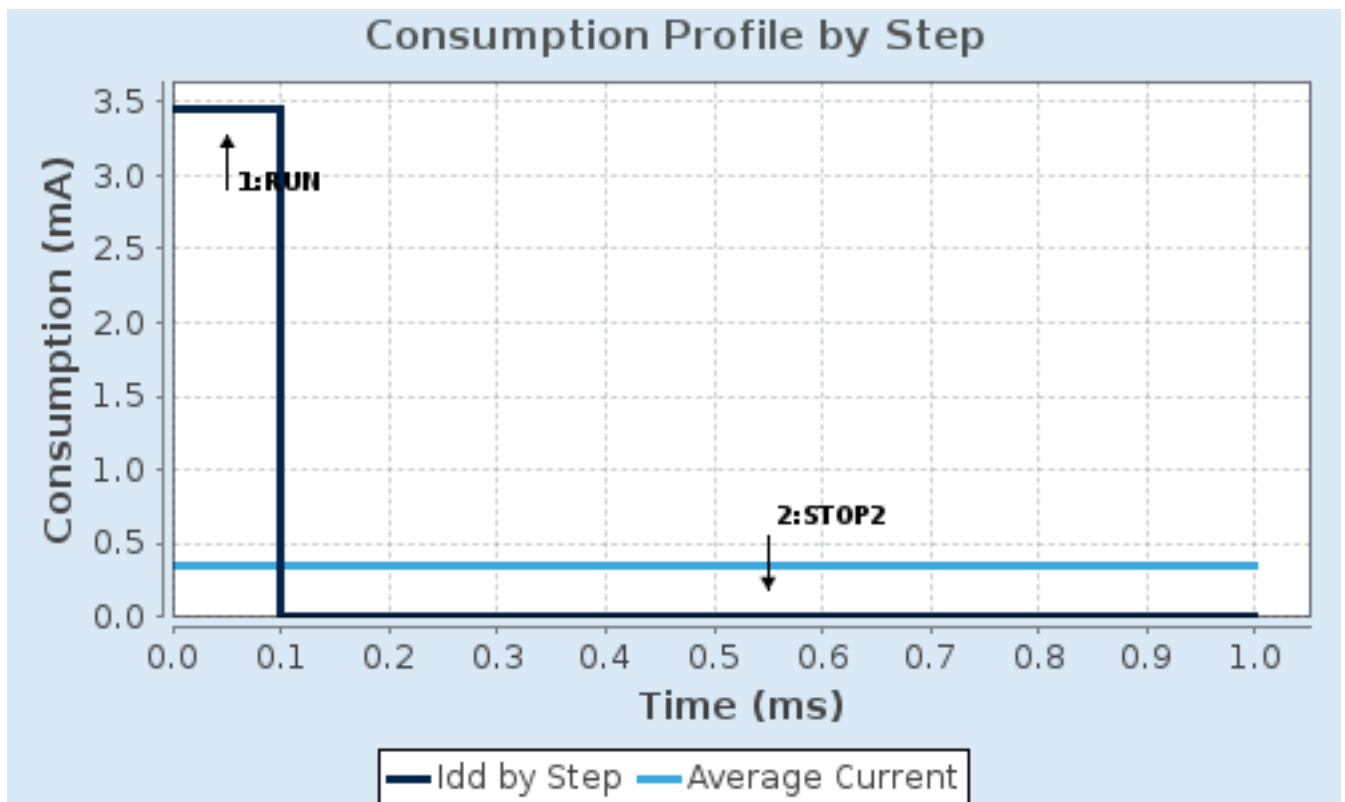
6.4. Sequence

| | | |
|-------------------------------|-------------|----------------|
| Step | Step1 | Step2 |
| Mode | RUN | STOP2 |
| Vdd | 3.0 | 3.0 |
| Voltage Source | Battery | Battery |
| Range | Range1-High | NoRange |
| Fetch Type | FLASH | n/a |
| CPU Frequency | 32 MHz | 0 Hz |
| Clock Configuration | HSE BYP ART | ALL CLOCKS OFF |
| Clock Source Frequency | 32 MHz | 0 Hz |
| Peripherals | | |
| Additional Cons. | 0 mA | 0 mA |
| Average Current | 3.46 mA | 1.06 μ A |
| Duration | 0.1 ms | 0.9 ms |
| DMIPS | 40.0 | 0.0 |
| Ta Max | 104.53 | 105 |
| Category | In DS Table | In DS Table |

6.5. Results

| | | | |
|---------------|-----------------------------------|-----------------|----------------|
| Sequence Time | 1 ms | Average Current | 346.95 μ A |
| Battery Life | 1 year, 1 month, 8 days, 12 hours | Average DMIPS | 40.0 DMIPS |

6.6. Chart



7. Peripherals and Middlewares Configuration

7.1. CAN1

mode: Activated

7.1.1. Parameter Settings:

Bit Timings Parameters:

| | |
|------------------------------|------------------|
| Prescaler (for Time Quantum) | 4 * |
| Time Quantum | 250.0 * |
| Time Quanta in Bit Segment 1 | 5 Times * |
| Time Quanta in Bit Segment 2 | 2 Times * |
| Time for one Bit | 2000.00 * |
| Baud Rate | 500000 * |
| ReSynchronization Jump Width | 1 Time |

Basic Parameters:

| | |
|-----------------------------------|-----------------|
| Time Triggered Communication Mode | Disable |
| Automatic Bus-Off Management | Disable |
| Automatic Wake-Up Mode | Disable |
| Automatic Retransmission | Enable * |
| Receive Fifo Locked Mode | Disable |
| Transmit Fifo Priority | Disable |

Advanced Parameters:

| | |
|----------------|--------|
| Operating Mode | Normal |
|----------------|--------|

7.2. CRC

mode: Activated

7.2.1. Parameter Settings:

Basic Parameters:

| | |
|--------------------------|--------|
| Default Polynomial State | Enable |
| Default Init Value State | Enable |

Advanced Parameters:

| | |
|----------------------------|----------------|
| Input Data Inversion Mode | None |
| Output Data Inversion Mode | Disable |
| Input Data Format | Words * |

7.3. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

7.3.1. Parameter Settings:

System Parameters:

| | |
|-------------------|--------------------|
| VDD voltage (V) | 3.3 |
| Instruction Cache | Enabled |
| Prefetch Buffer | Disabled |
| Data Cache | Enabled |
| Flash Latency(WS) | 0 WS (1 CPU cycle) |

RCC Parameters:

| | |
|--------------------------------|----------|
| HSI Calibration Value | 16 |
| MSI Calibration Value | 0 |
| MSI Auto Calibration | Disabled |
| HSE Startup Timeout Value (ms) | 100 |
| LSE Startup Timeout Value (ms) | 5000 |

Power Parameters:

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

7.4. SYS

Timebase Source: TIM16

7.5. TIM15

mode: Clock Source

Channel1: Output Compare No Output

7.5.1. Parameter Settings:

Counter Settings:

| | |
|---|-------------|
| Prescaler (PSC - 16 bits value) | 16 * |
| 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 |
| BRK Sources Configuration | |
| - Digital Input | Disable |
| - COMP1 | Disable |
| - COMP2 | Disable |

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 |

Output Compare No Output Channel 1:

| | |
|------------------------|-------------------------------|
| Mode | Frozen (used for Timing base) |
| Pulse (16 bits value) | 0 |
| Output compare preload | Disable |
| CH Polarity | High |
| CH Idle State | Reset |

7.6. USART1

Mode: Asynchronous

7.6.1. 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 |
|--------|-------------------|-------------|------------------------------|-----------------------------|-----------------------|------------|
| CAN1 | PB8 | CAN1_RX | Alternate Function Push Pull | No pull-up and no pull-down | Very High * | |
| | PB9 | CAN1_TX | Alternate Function Push Pull | No pull-up and no pull-down | Very High * | |
| RCC | 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 | |
| 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 | PB0 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | LED_GRN |
| | PB1 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | LED_RED |

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 |
| 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 | 15 | 0 |
| CAN1 TX interrupt | true | 5 | 0 |
| CAN1 RX0 interrupt | true | 5 | 0 |
| CAN1 RX1 interrupt | true | 5 | 0 |
| TIM1 update interrupt and TIM16 global interrupt | true | 0 | 0 |
| USART1 global interrupt | 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 | | |
| CAN1 SCE interrupt | unused | | |
| TIM1 break interrupt and TIM15 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 |
| Prefetch 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 |
| CAN1 TX interrupt | false | true | true |
| CAN1 RX0 interrupt | false | true | true |
| | | | |

| Enabled interrupt Table | Select for init sequence ordering | Generate IRQ handler | Call HAL handler |
|---|--------------------------------------|-------------------------|------------------|
| CAN1 RX1 interrupt | false | true | true |
| TIM1 update interrupt and TIM16 global interrupt | false | true | true |
| USART1 global interrupt | 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

TIM15 

CAN1 

CRC 

GPIO 

USART1 

NVIC 

RCC 

SYS 

10. Docs & Resources

| Type | Link |
|--------------------|---|
| Datasheet | http://www.st.com/resource/en/datasheet/DM00257211.pdf |
| Reference manual | http://www.st.com/resource/en/reference_manual/DM00151940.pdf |
| Programming manual | http://www.st.com/resource/en/programming_manual/DM00046982.pdf |
| Errata sheet | http://www.st.com/resource/en/errata_sheet/DM00218224.pdf |
| Application note | http://www.st.com/resource/en/application_note/CD00160362.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/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/DM00042534.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/DM00085385.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00087593.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00125306.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00129215.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00141025.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00144612.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00148033.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00150423.pdf |

Application note http://www.st.com/resource/en/application_note/DM00151811.pdf

Application note http://www.st.com/resource/en/application_note/DM00156964.pdf

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

Application note http://www.st.com/resource/en/application_note/DM00209748.pdf

Application note http://www.st.com/resource/en/application_note/DM00209768.pdf

Application note http://www.st.com/resource/en/application_note/DM00209772.pdf

Application note http://www.st.com/resource/en/application_note/DM00216518.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/DM00227538.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/DM00260952.pdf

Application note http://www.st.com/resource/en/application_note/DM00263732.pdf

Application note http://www.st.com/resource/en/application_note/DM00269143.pdf

Application note http://www.st.com/resource/en/application_note/DM00269146.pdf

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

Application note http://www.st.com/resource/en/application_note/DM00311483.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/DM00354333.pdf

Application note http://www.st.com/resource/en/application_note/DM00355687.pdf

Application note http://www.st.com/resource/en/application_note/DM00367673.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/DM00445657.pdf

Application note http://www.st.com/resource/en/application_note/DM00476869.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/DM00660597.pdf

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