# 1. Description

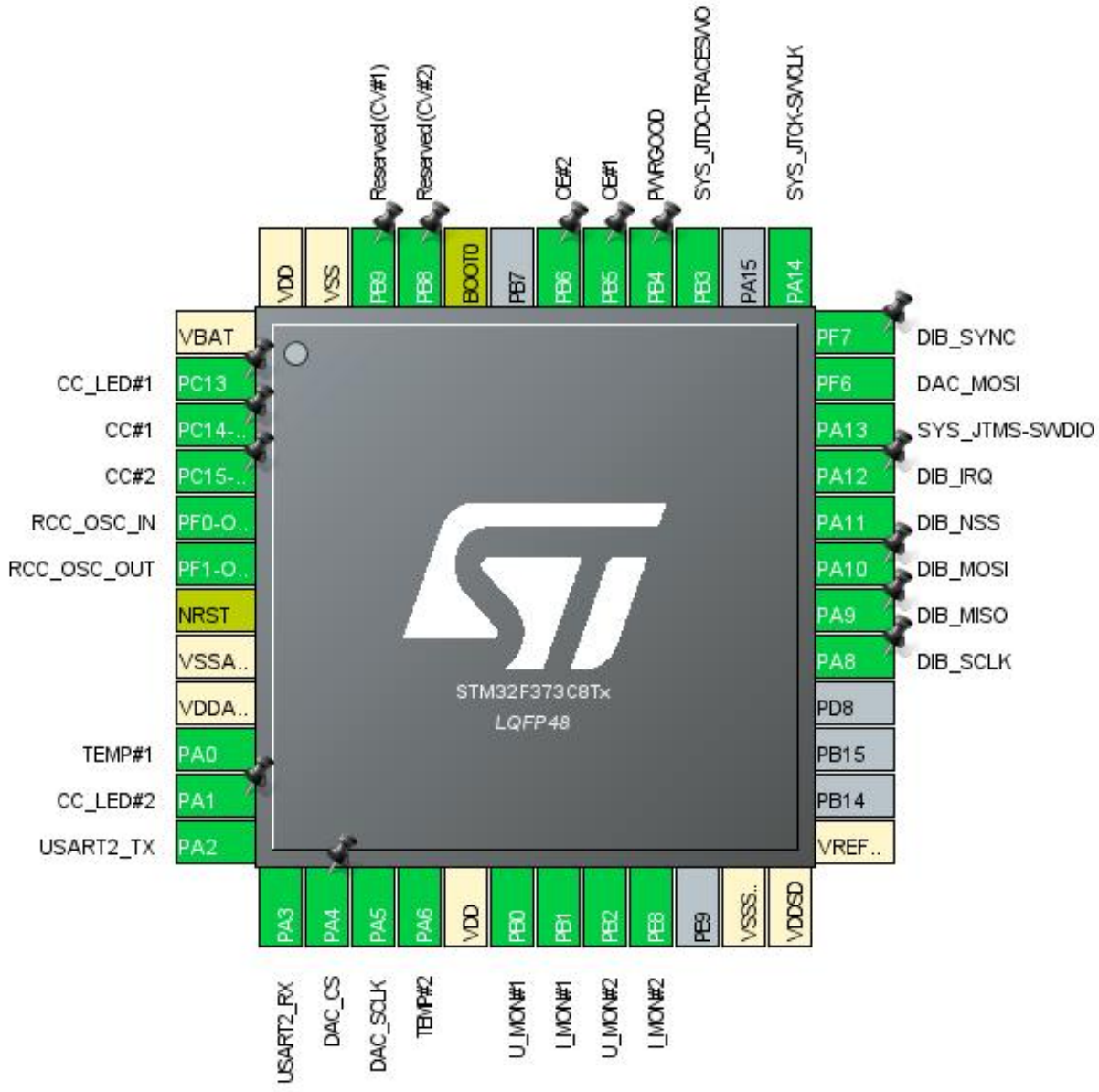
## 1.1. Project

| | |
|---|---|
| Project Name | dcm220-firmware |
| Board Name | custom |
| Generated with: | STM32CubeMX 5.3.0 |
| Date | 09/04/2019 |

## 1.2. MCU

| | |
|---|---|
| MCU Series | STM32F3 |
| MCU Line | STM32F373 |
| MCU name | STM32F373C8Tx |
| MCU Package | LQFP48 |
| MCU Pin number | 48 |

## 2. Pinout Configuration



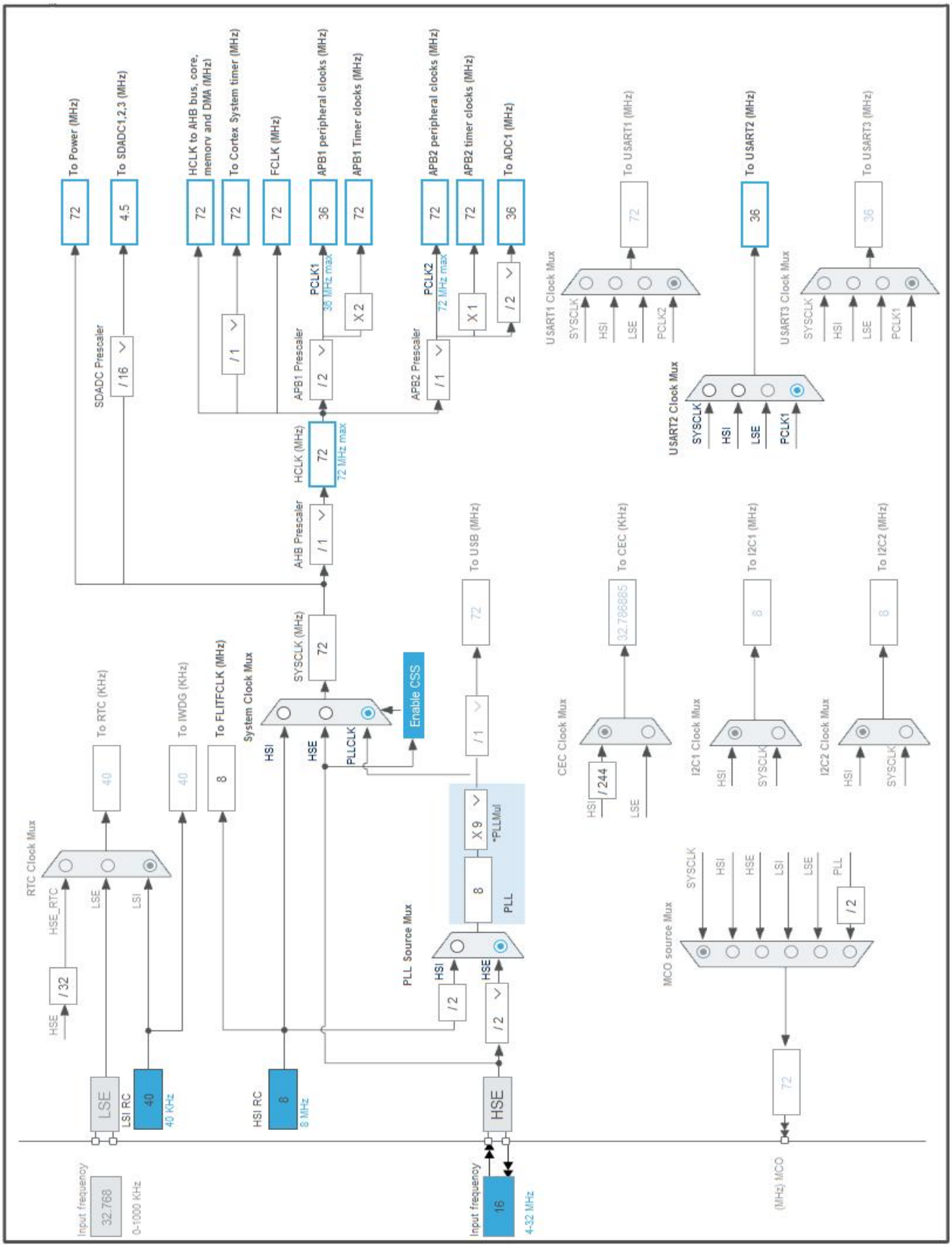
# 3. Pins Configuration

| Pin Number LQFP48 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|---|---|---|---|---|
| 1 | VBAT | Power | | |
| 2 | PC13 * | I/O | GPIO_Output | CC_LED#1 |
| 3 | PC14-OSC32_IN * | I/O | GPIO_Input | CC#1 |
| 4 | PC15-OSC32_OUT * | I/O | GPIO_Input | CC#2 |
| 5 | PF0-OSC_IN | I/O | RCC_OSC_IN | |
| 6 | PF1-OSC_OUT | I/O | RCC_OSC_OUT | |
| 7 | NRST | Reset | | |
| 8 | VSSA/VREF- | Power | | |
| 9 | VDDA/VREF+ | Power | | |
| 10 | PA0 | I/O | ADC1_IN0 | TEMP#1 |
| 11 | PA1 * | I/O | GPIO_Output | CC_LED#2 |
| 12 | PA2 | I/O | USART2_TX | |
| 13 | PA3 | I/O | USART2_RX | |
| 14 | PA4 * | I/O | GPIO_Output | DAC_CS |
| 15 | PA5 | I/O | SPI1_SCK | DAC_SCLK |
| 16 | PA6 | I/O | ADC1_IN6 | TEMP#2 |
| 17 | VDD | Power | | |
| 18 | PB0 | I/O | SDADC1_AIN6P | U_MON#1 |
| 19 | PB1 | I/O | SDADC1_AIN5P | I_MON#1 |
| 20 | PB2 | I/O | SDADC1_AIN4P | U_MON#2 |
| 21 | PE8 | I/O | SDADC1_AIN8P | I_MON#2 |
| 23 | VSSSD/VREFSD- | Power | | |
| 24 | VDDSD | Power | | |
| 25 | VREFSD+ | Power | | |
| 29 | PA8 | I/O | SPI2_SCK | DIB_SCLK |
| 30 | PA9 | I/O | SPI2_MISO | DIB_MISO |
| 31 | PA10 | I/O | SPI2_MOSI | DIB_MOSI |
| 32 | PA11 | I/O | SPI2_NSS | DIB_NSS |
| 33 | PA12 * | I/O | GPIO_Output | DIB_IRQ |
| 34 | PA13 | I/O | SYS_JTMS-SWDIO | |
| 35 | PF6 | I/O | SPI1_MOSI | DAC_MOSI |
| 36 | PF7 | I/O | GPIO_EXTI7 | DIB_SYNC |
| 37 | PA14 | I/O | SYS_JTCK-SWCLK | |
| 39 | PB3 | I/O | SYS_JTDO-TRACESWO | |
| 40 | PB4 * | I/O | GPIO_Input | PWRGOOD |
| 41 | PB5 * | I/O | GPIO_Output | OE#1 |

| Pin Number LQFP48 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|---|---|---|---|---|
| 42 | PB6 * | I/O | GPIO_Output | OE#2 |
| 44 | BOOT0 | Boot | | |
| 45 | PB8 * | I/O | GPIO_Input | Reserved (CV#2) |
| 46 | PB9 * | I/O | GPIO_Input | Reserved (CV#1) |
| 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 | dcm220-firmware |
| Project Folder | C:\Users\mvladic\Dropbox\Code\EEZ\dcm220-firmware |
| Toolchain / IDE | STM32CubeIDE |
| Firmware Package Name and Version | STM32Cube FW_F3 V1.10.0 |

## 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 | 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 | STM32F3 |
| Line | STM32F373 |
| MCU | STM32F373C8Tx |
| Datasheet | 022691_Rev7 |

6.2. Parameter Selection

| | |
|---|---|
| Temperature | 25 |
| Vdd | 3.6 |

# 7. IPs and Middleware Configuration

## 7.1. ADC1

**mode: IN0**

**mode: IN6**

**mode: Temperature Sensor Channel**

### 7.1.1. Parameter Settings:

**ADC_Settings:**

| | |
|---|---|
| Data Alignment | Right alignment |
| Scan Conversion Mode | Disabled |
| Continuous Conversion Mode | Disabled |
| Discontinuous Conversion Mode | Disabled |

**ADC_Regular_ConversionMode:**

| | |
|---|---|
| Enable Regular Conversions | Enable |
| Number Of Conversion | 1 |
| External Trigger Conversion Source | Regular Conversion launched by software |
| Rank | 1 |
| Channel | **Channel Temperature Sensor *** |
| Sampling Time | 1.5 Cycles |

**ADC_Injected_ConversionMode:**

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

**WatchDog:**

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

## 7.2. RCC

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

### 7.2.1. Parameter Settings:

**System Parameters:**

| | |
|---|---|
| VDD voltage (V) | 3.3 |
| Prefetch Buffer | Enabled |
| Flash Latency(WS) | 2 WS (3 CPU cycle) |

**RCC Parameters:**

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

## 7.3. SDADC1

**IN4: IN4-Single-Ended zero reference**
**IN5: IN5-Single-Ended zero reference**
**IN6: IN6-Single-Ended zero reference**
**IN8: IN8-Single-Ended zero reference**
**mode: Conversion Configuration 0**

### 7.3.1. Parameter Settings:

**General Settings:**

| | |
|---|---|
| Low Power Mode | None |
| Fast Conversion Mode | Disable |
| Slow Clock Mode | Disable |
| Reference Voltage | Forced externally using VREF pin |

**Conversion Configuration 0:**

| | |
|---|---|
| Input Mode | **Single-ended offset mode *** |
| Gain | equal to 1 |
| Common Mode | SDADC VSSA |
| Offset | 0 |

**SDADC Regular Conversions Settings:**

| | |
|---|---|
| Enable Regular Conversion | Disable |

**SDADC Injected Conversions Settings:**

| | |
|---|---|
| Enable Injected Conversion | Disable |

## 7.4. SPI1

**Mode: Half-Duplex Master**

### 7.4.1. Parameter Settings:

**Basic Parameters:**

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

**Clock Parameters:**

| | |
|---|---|
| Prescaler (for Baud Rate) | **4 *** |
| Baud Rate | **18.0 MBits/s *** |

| | |
|---|---|
| Clock Polarity (CPOL) | Low |
| Clock Phase (CPHA) | 1 Edge |

**Advanced Parameters:**

| | |
|---|---|
| CRC Calculation | Disabled |
| NSSP Mode | Enabled |
| NSS Signal Type | Software |

## 7.5. SPI2

**Mode: Full-Duplex Slave**

**Hardware NSS Signal: Hardware NSS Input Signal**

### 7.5.1. Parameter Settings:

**Basic Parameters:**

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

**Clock Parameters:**

| | |
|---|---|
| Clock Polarity (CPOL) | Low |
| Clock Phase (CPHA) | 1 Edge |

**Advanced Parameters:**

| | |
|---|---|
| CRC Calculation | Disabled |
| NSS Signal Type | Input Hardware |

## 7.6. SYS

**Debug: Trace Asynchronous Sw**

**Timebase Source: SysTick**

## 7.7. USART2

**Mode: Asynchronous**

### 7.7.1. Parameter Settings:

**Basic Parameters:**

| | |
|---|---|
| Baud Rate | 38400 |
| 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 |
|---|---|---|---|---|---|---|
| ADC1 | PA0 | ADC1_IN0 | Analog mode | No pull up pull down | n/a | TEMP#1 |
| | PA6 | ADC1_IN6 | Analog mode | No pull up pull down | n/a | TEMP#2 |
| RCC | PF0-OSC_IN | RCC_OSC_IN | n/a | n/a | n/a | |
| | PF1-OSC_OUT | RCC_OSC_OUT | n/a | n/a | n/a | |
| SDADC1 | PB0 | SDADC1_AIN6P | Analog mode | No pull up pull down | n/a | U_MON#1 |
| | PB1 | SDADC1_AIN5P | Analog mode | No pull up pull down | n/a | I_MON#1 |
| | PB2 | SDADC1_AIN4P | Analog mode | No pull up pull down | n/a | U_MON#2 |
| | PE8 | SDADC1_AIN8P | Analog mode | No pull up pull down | n/a | I_MON#2 |
| SPI1 | PA5 | SPI1_SCK | Alternate Function Push Pull | No pull up pull down | **High *** | DAC_SCLK |
| | PF6 | SPI1_MOSI | Alternate Function Push Pull | No pull up pull down | **High *** | DAC_MOSI |
| SPI2 | PA8 | SPI2_SCK | Alternate Function Push Pull | No pull up pull down | **High *** | DIB_SCLK |
| | PA9 | SPI2_MISO | Alternate Function Push Pull | No pull up pull down | **High *** | DIB_MISO |
| | PA10 | SPI2_MOSI | Alternate Function Push Pull | No pull up pull down | **High *** | DIB_MOSI |
| | PA11 | SPI2_NSS | Alternate Function Push Pull | No pull up pull down | **High *** | DIB_NSS |
| SYS | PA13 | SYS_JTMS-SWDIO | n/a | n/a | n/a | |
| | PA14 | SYS_JTCK-SWCLK | n/a | n/a | n/a | |
| | PB3 | SYS_JTDO-TRACESWO | n/a | n/a | n/a | |
| USART2 | PA2 | USART2_TX | Alternate Function Push Pull | No pull up pull down | **High *** | |
| | PA3 | USART2_RX | Alternate Function Push Pull | No pull up pull down | **High *** | |
| GPIO | PC13 | GPIO_Output | Output Push Pull | No pull up pull down | Low | CC_LED#1 |
| | PC14-OSC32_IN | GPIO_Input | Input mode | No pull up pull down | n/a | CC#1 |
| | PC15-OSC32_OUT | GPIO_Input | Input mode | No pull up pull down | n/a | CC#2 |
| | PA1 | GPIO_Output | Output Push Pull | No pull up pull down | Low | CC_LED#2 |
| | PA4 | GPIO_Output | Output Push Pull | No pull up pull down | Low | DAC_CS |
| | PA12 | GPIO_Output | Output Push Pull | No pull up pull down | Low | DIB_IRQ |
| | PF7 | GPIO_EXTI7 | External Interrupt Mode with Rising edge trigger detection | No pull up pull down | n/a | DIB_SYNC |
| | PB4 | GPIO_Input | Input mode | No pull up pull down | n/a | PWRGOOD |
| | PB5 | GPIO_Output | Output Push Pull | No pull up pull down | Low | OE#1 |

| IP | Pin | Signal | GPIO mode | GPIO pull/up pull down | Max Speed | User Label |
|---|---|---|---|---|---|---|
| | PB6 | GPIO_Output | Output Push Pull | No pull up pull down | Low | OE#2 |
| | PB8 | GPIO_Input | Input mode | No pull up pull down | n/a | Reserved (CV#2) |
| | PB9 | GPIO_Input | Input mode | No pull up pull down | n/a | Reserved (CV#1) |

## 8.2. DMA configuration

| DMA request | Stream | Direction | Priority |
|---|---|---|---|
| SPI2_RX | DMA1_Channel4 | Peripheral To Memory | Low |
| SPI2_TX | DMA1_Channel5 | Memory To Peripheral | Low |

### *SPI2_RX: DMA1_Channel4 DMA request Settings:*

| | |
|---|---|
| Mode: | Normal |
| Peripheral Increment: | Disable |
| Memory Increment: | **Enable *** |
| Peripheral Data Width: | Byte |
| Memory Data Width: | Byte |

### *SPI2_TX: DMA1_Channel5 DMA request Settings:*

| | |
|---|---|
| Mode: | Normal |
| Peripheral Increment: | Disable |
| Memory Increment: | **Enable *** |
| Peripheral Data Width: | Byte |
| Memory Data Width: | Byte |

## 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 |
| DMA1 channel4 global interrupt | true | 0 | 0 |
| DMA1 channel5 global interrupt | true | 0 | 0 |
| EXTI line[9:5] interrupts | true | 0 | 0 |
| PVD interrupt through EXTI line16 | unused | | |
| Flash global interrupt | unused | | |
| RCC global interrupt | unused | | |
| ADC1 interrupt | unused | | |
| SPI1 global interrupt | unused | | |
| SPI2 global interrupt | unused | | |
| USART2 global interrupt / USART2 wake-up interrupt through EXTI line 26 | unused | | |
| SDADC1 global interrupt | unused | | |
| Floating point unit interrupt | unused | | |

*** User modified value**

# 9. Software Pack Report