1. Description

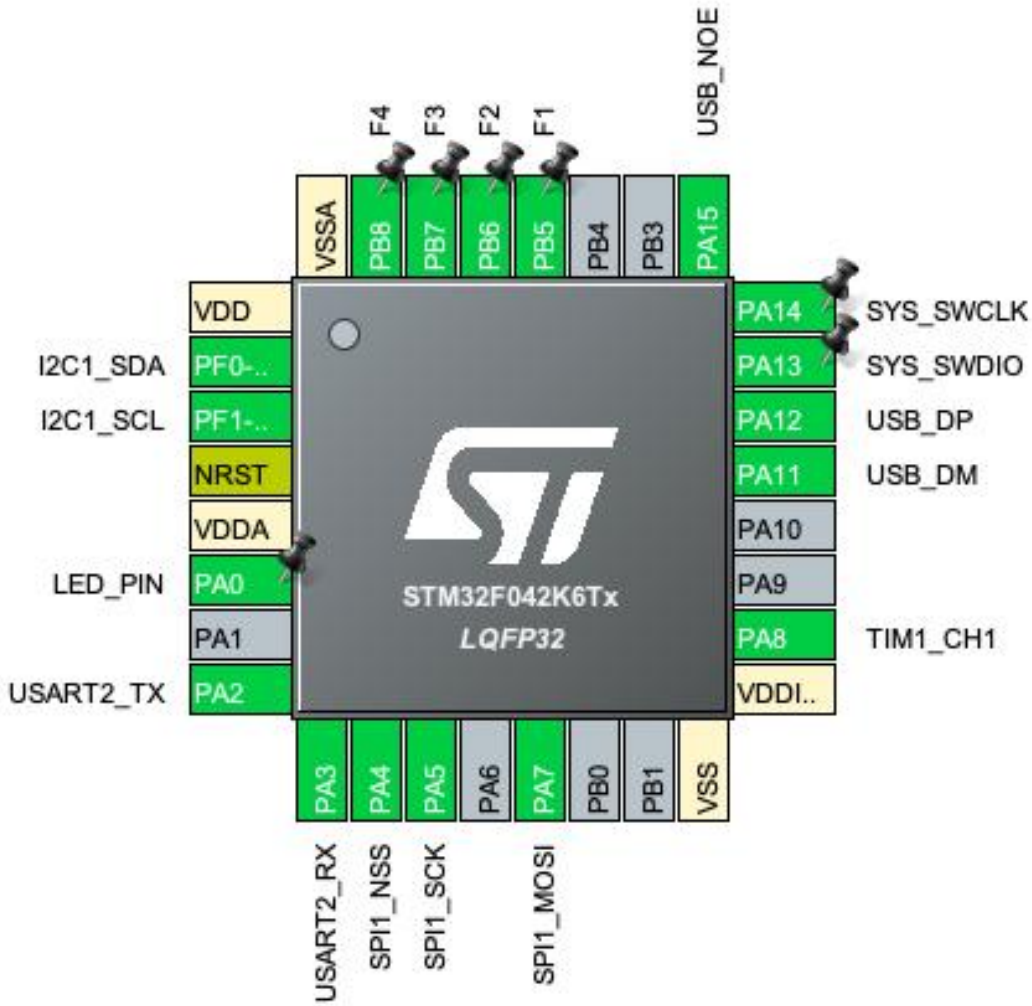
1.1. Project

Project Name	FLClassic
Board Name	custom
Generated with:	STM32CubeMX 5.4.0
Date	11/17/2019

1.2. MCU

MCU Series	STM32F0
MCU Line	STM32F0x2
MCU name	STM32F042K6Tx
MCU Package	LQFP32
MCU Pin number	32

2. Pinout Configuration

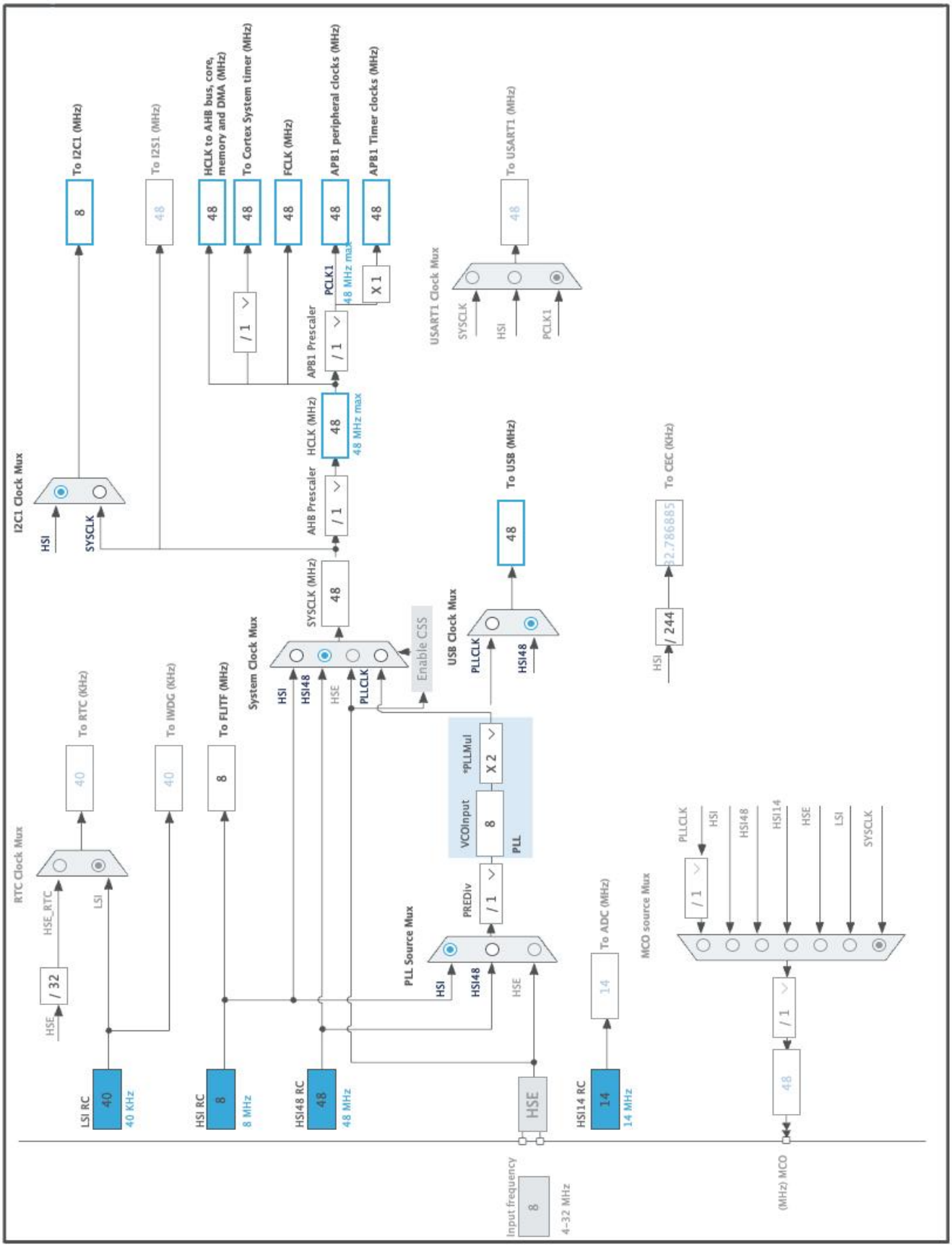


3. Pins Configuration

Pin Number LQFP32	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VDD	Power		
2	PF0-OSC_IN	I/O	I2C1_SDA	
3	PF1-OSC_OUT	I/O	I2C1_SCL	
4	NRST	Reset		
5	VDDA	Power		
6	PA0	I/O	TIM2_CH1	LED_PIN
8	PA2	I/O	USART2_TX	
9	PA3	I/O	USART2_RX	
10	PA4	I/O	SPI1_NSS	
11	PA5	I/O	SPI1_SCK	
13	PA7	I/O	SPI1_MOSI	
16	VSS	Power		
17	VDDIO2	Power		
18	PA8	I/O	TIM1_CH1	
21	PA11	I/O	USB_DM	
22	PA12	I/O	USB_DP	
23	PA13	I/O	SYS_SWDIO	
24	PA14	I/O	SYS_SWCLK	
25	PA15	I/O	USB_NOE	
28	PB5 *	I/O	GPIO_Input	F1
29	PB6 *	I/O	GPIO_Input	F2
30	PB7 *	I/O	GPIO_Input	F3
31	PB8 *	I/O	GPIO_Input	F4
32	VSSA	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	FLClassic
Project Folder	/Users/HARDWARECOP/Documents/github/thevfdcollective/openvfd_firmware_d
Toolchain / IDE	EWARM V8.32
Firmware Package Name and Version	STM32Cube FW_F0 V1.11.0

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
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	STM32F0
Line	STM32F0x2
MCU	STM32F042K6Tx
Datasheet	025832_Rev5

6.2. Parameter Selection

Temperature	25
Vdd	3.6

6.3. Sequence

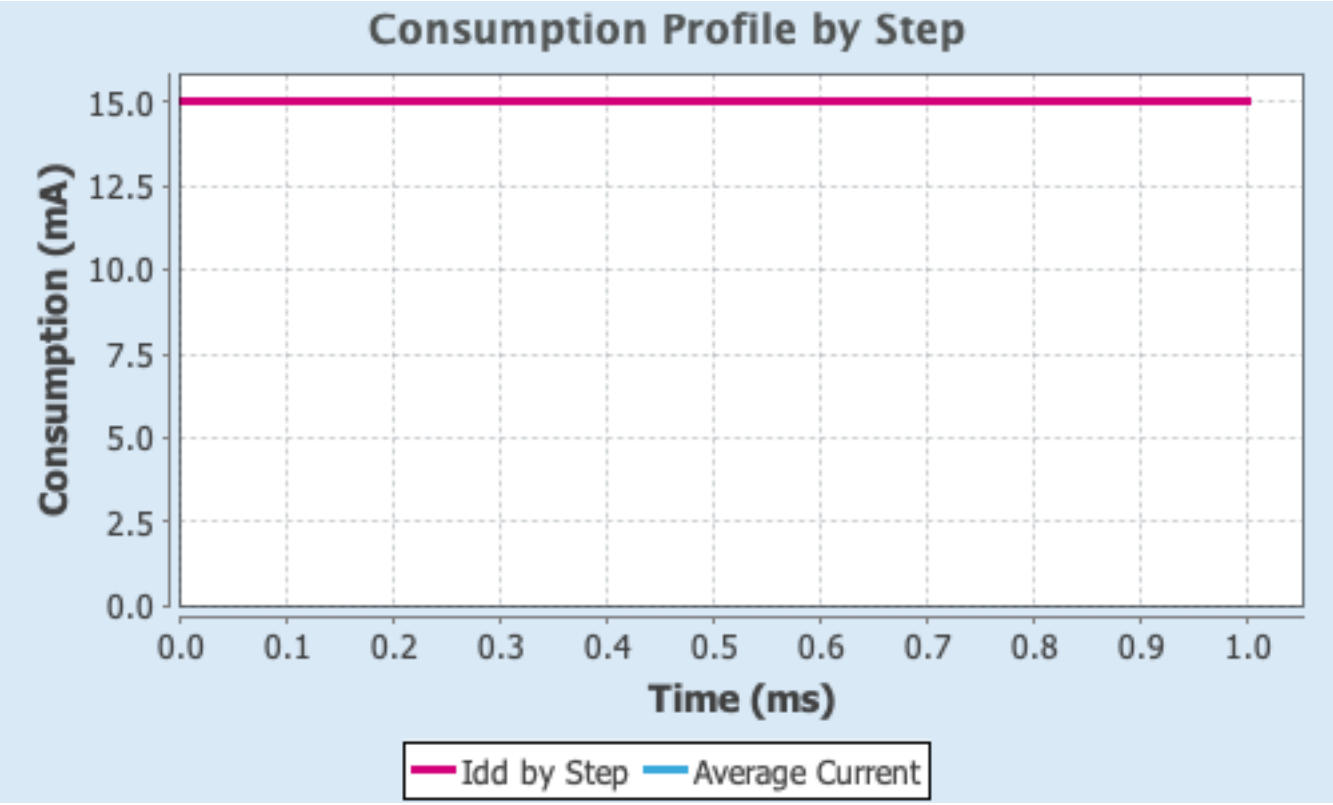
Step	Step1
Mode	RUN
Vdd	3.6
Voltage Source	Vbus
Range	No Scale
Fetch Type	FLASH
CPU Frequency	48 MHz
Clock Configuration	HSI PLL
Clock Source Frequency	8 MHz
Peripherals	GPIOA GPIOB GPIOF I2C1 SPI1 SYS USART2 USB
Additional Cons.	0 mA
Average Current	15.06 mA
Duration	1 ms
DMIPS	0.0
Ta Max	101.91
Category	In DS Table

6.4. RESULTS

Sequence Time	1 ms	Average Current	15.06 mA

Battery Life	0	Average DMIPS	0.0 DMIPS

6.5. Chart



7. IPs and Middleware Configuration

7.1. GPIO

7.2. I2C1

I2C: I2C

7.2.1. Parameter Settings:

Timing configuration:

I2C Speed Mode	Standard Mode
I2C Speed Frequency (KHz)	100
Rise Time (ns)	0
Fall Time (ns)	0
Coefficient of Digital Filter	0
Analog Filter	Enabled
Timing	0x2000090E

Slave Features:

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

7.3. SPI1

Mode: Transmit Only Master

Hardware NSS Signal: Hardware NSS Output Signal

7.3.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	4 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	**4 ***
Baud Rate	**12.0 MBits/s ***
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSSP Mode	Enabled
NSS Signal Type	Output Hardware

7.4. SYS

mode: Debug Serial Wire

Timebase Source: SysTick

7.5. TIM1

Clock Source : Internal Clock

Channel1: PWM Generation CH1

Channel2: PWM Generation No Output

7.5.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	0
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

7.6. TIM2

Channel1: PWM Generation CH1

7.6.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 32 bits value)	**60-1 ***
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

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:

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

7.8. USB

mode: Device (FS)

mode: Activate NOE

7.8.1. Parameter Settings:

Basic Parameters:

Speed	Full Speed 12MBit/s
Physical interface	Internal Phy

Power Parameters:

Low Power	Disabled
Link Power Management	Disabled

7.9. USB_DEVICE

Class For FS IP: Communication Device Class (Virtual Port Com)

7.9.1. Parameter Settings:

Basic Parameters:

USBD_MAX_NUM_INTERFACES (Maximum number of supported interfaces)	1
USBD_MAX_NUM_CONFIGURATION (Maximum number of supported configuration)	1
USBD_MAX_STR_DESC_SIZ (Maximum size for the string descriptors)	512
USBD_SELF_POWERED (Enabled self power)	Enabled
USBD_DEBUG_LEVEL (USBD Debug Level)	0: No debug message

Class Parameters:

USB CDC Rx Buffer Size	1000
USB CDC Tx Buffer Size	1000

7.9.2. Device Descriptor:

Device Descriptor:

VID (Vendor IDentifier)	1155
LANGID_STRING (Language Identifier)	English(United States)
MANUFACTURER_STRING (Manufacturer Identifier)	**The VFD Collective ***

Device Descriptor FS:

PID (Product IDentifier)	22336
PRODUCT_STRING (Product Identifier)	**Fluorescence Classic ***
CONFIGURATION_STRING (Configuration Identifier)	CDC Config
INTERFACE_STRING (Interface Identifier)	CDC Interface

*** User modified value**

8. System Configuration

8.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
I2C1	PF0-OSC_IN	I2C1_SDA	Alternate Function Open Drain	Pull-up	**High ***	
	PF1-OSC_OUT	I2C1_SCL	Alternate Function Open Drain	Pull-up	**High ***	
SPI1	PA4	SPI1_NSS	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PA5	SPI1_SCK	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PA7	SPI1_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
SYS	PA13	SYS_SWDIO	n/a	n/a	n/a	
	PA14	SYS_SWCLK	n/a	n/a	n/a	
TIM1	PA8	TIM1_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Low	
TIM2	PA0	TIM2_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Low	LED_PIN
USART2	PA2	USART2_TX	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PA3	USART2_RX	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
USB	PA11	USB_DM	n/a	n/a	n/a	
	PA12	USB_DP	n/a	n/a	n/a	
	PA15	USB_NOE	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
GPIO	PB5	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	F1
	PB6	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	F2
	PB7	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	F3
	PB8	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	F4

8.2. DMA configuration

DMA request	Stream	Direction	Priority
SPI1_TX	DMA1_Channel3	Memory To Peripheral	**High ***
TIM2_CH1	DMA1_Channel5	Memory To Peripheral	**High ***

SPI1_TX: DMA1_Channel3 DMA request Settings:

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

TIM2_CH1: 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
System service call via SWI instruction	true	0	0
Pendable request for system service	true	0	0
System tick timer	true	0	0
DMA1 channel 2 and 3 interrupts	true	0	0
DMA1 channel 4 and 5 interrupts	true	0	0
USB global Interrupt / USB wake-up interrupt through EXTI line 18	true	0	0
PVD and VDDIO2 supply comparator interrupts through EXTI lines 16 and 31	unused		
Flash global interrupt	unused		
RCC and CRS global interrupts	unused		
TIM1 break, update, trigger and commutation interrupts	unused		
TIM1 capture compare interrupt	unused		
TIM2 global interrupt	unused		
I2C1 event global interrupt / I2C1 wake-up interrupt through EXTI line 23	unused		
SPI1 global interrupt	unused		
USART2 global interrupt	unused		

*** User modified value**

9. Software Pack Report