1. Description

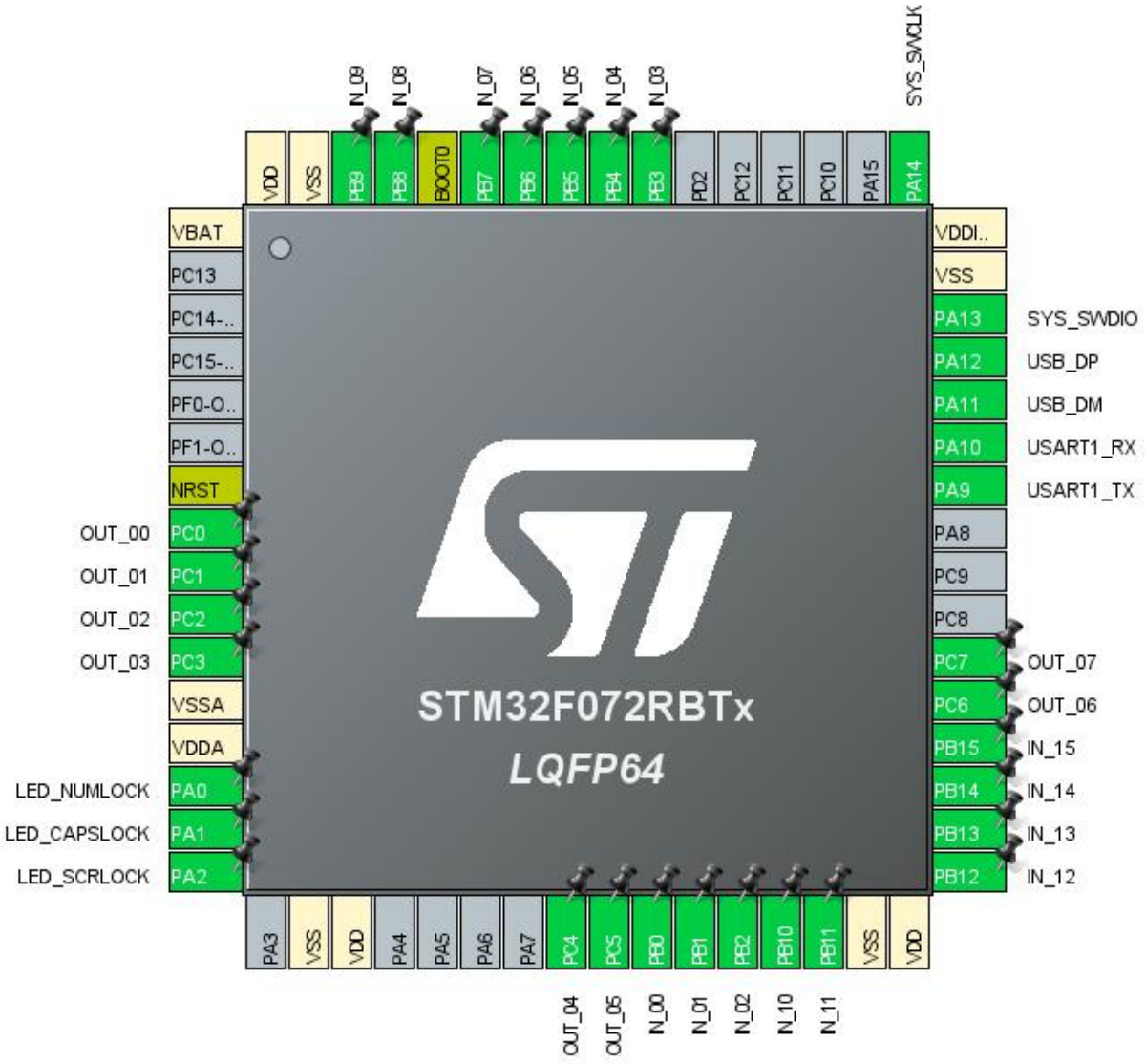
1.1. Project

Project Name	Keyboard01
Board Name	custom
Generated with:	STM32CubeMX 5.6.1
Date	05/20/2020

1.2. MCU

MCU Series	STM32F0
MCU Line	STM32F0x2
MCU name	STM32F072RBTx
MCU Package	LQFP64
MCU Pin number	64

2. Pinout Configuration



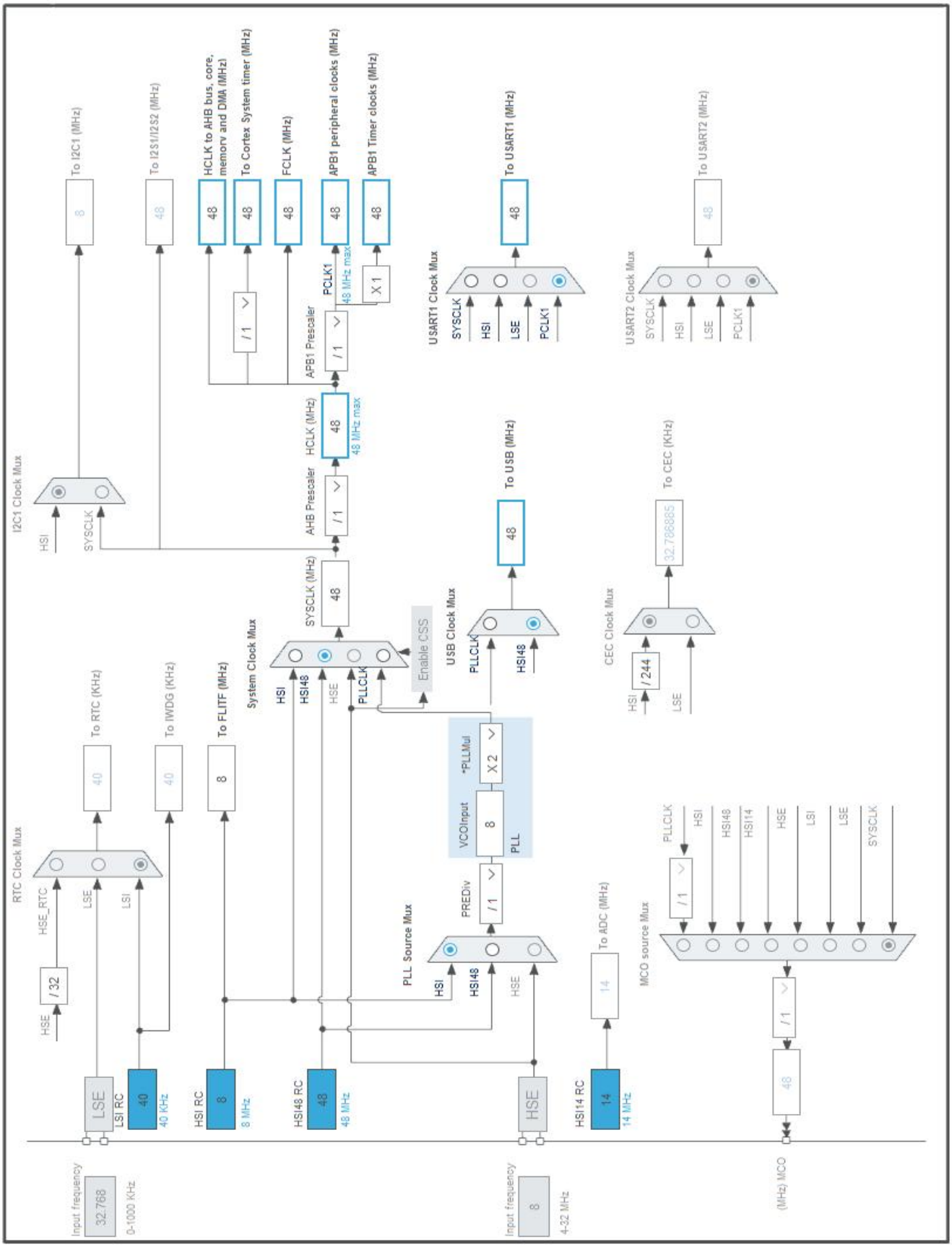
3. Pins Configuration

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
7	NRST	Reset		
8	PC0 *	I/O	GPIO_Input	OUT_00
9	PC1 *	I/O	GPIO_Input	OUT_01
10	PC2 *	I/O	GPIO_Input	OUT_02
11	PC3 *	I/O	GPIO_Input	OUT_03
12	VSSA	Power		
13	VDDA	Power		
14	PA0	I/O	TIM2_CH1	LED_NUMLOCK
15	PA1	I/O	TIM2_CH2	LED_CAPSLOCK
16	PA2	I/O	TIM2_CH3	LED_SCRLOCK
18	VSS	Power		
19	VDD	Power		
24	PC4 *	I/O	GPIO_Input	OUT_04
25	PC5 *	I/O	GPIO_Input	OUT_05
26	PB0 *	I/O	GPIO_Input	IN_00
27	PB1 *	I/O	GPIO_Input	IN_01
28	PB2 *	I/O	GPIO_Input	IN_02
29	PB10 *	I/O	GPIO_Input	IN_10
30	PB11 *	I/O	GPIO_Input	IN_11
31	VSS	Power		
32	VDD	Power		
33	PB12 *	I/O	GPIO_Input	IN_12
34	PB13 *	I/O	GPIO_Input	IN_13
35	PB14 *	I/O	GPIO_Input	IN_14
36	PB15 *	I/O	GPIO_Input	IN_15
37	PC6 *	I/O	GPIO_Input	OUT_06
38	PC7 *	I/O	GPIO_Input	OUT_07
42	PA9	I/O	USART1_TX	
43	PA10	I/O	USART1_RX	
44	PA11	I/O	USB_DM	
45	PA12	I/O	USB_DP	
46	PA13	I/O	SYS_SWDIO	
47	VSS	Power		
48	VDDIO2	Power		
49	PA14	I/O	SYS_SWCLK	

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
55	PB3 *	I/O	GPIO_Input	IN_03
56	PB4 *	I/O	GPIO_Input	IN_04
57	PB5 *	I/O	GPIO_Input	IN_05
58	PB6 *	I/O	GPIO_Input	IN_06
59	PB7 *	I/O	GPIO_Input	IN_07
60	BOOT0	Boot		
61	PB8 *	I/O	GPIO_Input	IN_08
62	PB9 *	I/O	GPIO_Input	IN_09
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	Keyboard01
Project Folder	C:\Users\nonoho\STM32CubeIDE\workspace_1.1.0\Keyboard01
Toolchain / IDE	STM32CubeIDE
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 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	STM32F0
Line	STM32F0x2
MCU	STM32F072RBTx
Datasheet	025004_Rev5

6.2. Parameter Selection

Temperature	25
Vdd	3.6

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

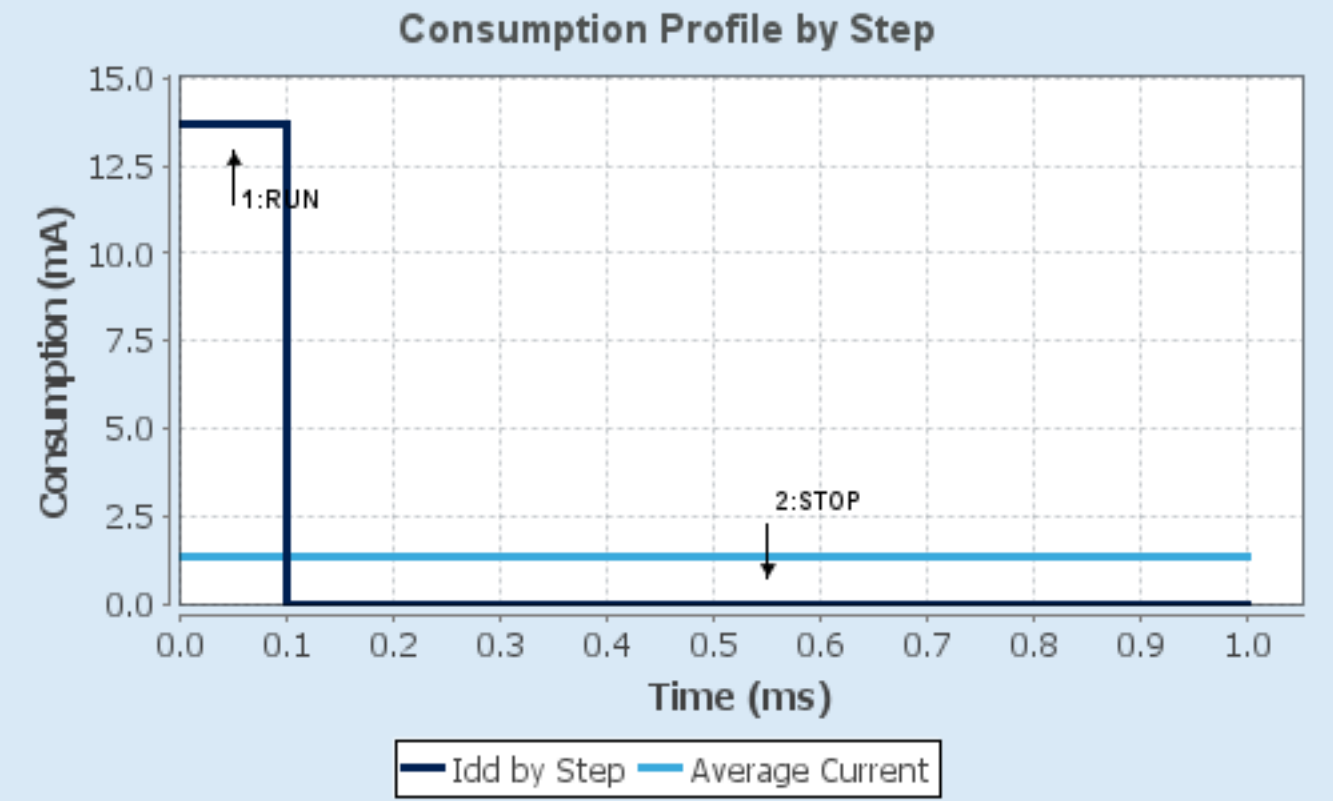
6.4. Sequence

Step	Step1	Step2
Mode	RUN	STOP
Vdd	3.6	3.6
Voltage Source	Battery	Battery
Range	No Scale	No Scale
Fetch Type	FLASH	n/a
CPU Frequency	48 MHz	0 Hz
Clock Configuration	HSE PLL	Regulator_LP
Clock Source Frequency	8 MHz	0 Hz
Peripherals		
Additional Cons.	0 mA	0 mA
Average Current	13.66 mA	6.5 µA
Duration	0.1 ms	0.9 ms
DMIPS	0.0	0.0
Ta Max	102.84	105
Category	In DS Table	In DS Table

6.5. RESULTS

Sequence Time	1 ms	Average Current	1.37 mA
Battery Life	3 months, 11 days, 17 hours	Average DMIPS	0.0 DMIPS

6.6. Chart


Consumption Profile by Step
15.0
12.5
10.0
7.5
5.0
2.5
0.0
Consumption (mA)
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

7. IPs and Middleware Configuration

7.1. GPIO

7.2. RCC

7.2.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Prefetch Buffer	Enabled
Flash Latency(WS)	1 WS (2 CPU cycle)

RCC Parameters:

HSE Startup Timout Value (ms)	100
LSE Startup Timout Value (ms)	5000

7.3. SYS

mode: Debug Serial Wire

Timebase Source: SysTick

7.4. TIM2

Channel1: PWM Generation CH1

Channel2: PWM Generation CH2

Channel3: PWM Generation CH3

7.4.1. Parameter Settings:

Counter Settings:

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

Clear Input:

Clear Input Source	Disable

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

7.5. TIM3

Clock Source : Internal Clock

7.5.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**479 ***
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**99 ***
Internal Clock Division (CKD)	No Division
auto-reload preload	**Enable ***

Trigger Output (TRGO) Parameters:

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

7.6. USART1

Mode: Asynchronous

7.6.1. 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

7.7. USB

mode: Device (FS)

7.7.1. Parameter Settings:

Basic Parameters:

Speed	Full Speed 12MBit/s
Physical interface	Internal Phy

Power Parameters:

Low Power	Disabled
Link Power Management	Disabled

7.8. USB_DEVICE

Class For FS IP: Human Interface Device Class (HID)

7.8.1. Parameter Settings:

Class Parameters:

HID_FS_BINTERVAL	**0xA ***

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

7.8.2. Device Descriptor:

Device Descriptor:

VID (Vendor IDentifier)	1155
LANGID_STRING (Language Identifier)	English(United States)
MANUFACTURER_STRING (Manufacturer Identifier)	STMicroelectronics

Device Descriptor FS:

PID (Product IDentifier)	22315
PRODUCT_STRING (Product Identifier)	STM32 Human interface
CONFIGURATION_STRING (Configuration Identifier)	HID Config
INTERFACE_STRING (Interface Identifier)	HID 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
SYS	PA13	SYS_SWDIO	n/a	n/a	n/a	
	PA14	SYS_SWCLK	n/a	n/a	n/a	
TIM2	PA0	TIM2_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Low	LED_NUMLOCK
	PA1	TIM2_CH2	Alternate Function Push Pull	No pull-up and no pull-down	Low	LED_CAPSLOCK
	PA2	TIM2_CH3	Alternate Function Push Pull	No pull-up and no pull-down	Low	LED_SCRLOCK
USART1	PA9	USART1_TX	Alternate Function Push Pull	No pull-up and no pull-down	**High ***	
	PA10	USART1_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	
GPIO	PC0	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	OUT_00
	PC1	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	OUT_01
	PC2	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	OUT_02
	PC3	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	OUT_03
	PC4	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	OUT_04
	PC5	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	OUT_05
	PB0	GPIO_Input	Input mode	**Pull-down ***	n/a	IN_00
	PB1	GPIO_Input	Input mode	**Pull-down ***	n/a	IN_01
	PB2	GPIO_Input	Input mode	**Pull-down ***	n/a	IN_02
	PB10	GPIO_Input	Input mode	**Pull-down ***	n/a	IN_10
	PB11	GPIO_Input	Input mode	**Pull-down ***	n/a	IN_11
	PB12	GPIO_Input	Input mode	**Pull-down ***	n/a	IN_12
	PB13	GPIO_Input	Input mode	**Pull-down ***	n/a	IN_13
	PB14	GPIO_Input	Input mode	**Pull-down ***	n/a	IN_14
	PB15	GPIO_Input	Input mode	**Pull-down ***	n/a	IN_15
	PC6	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	OUT_06
	PC7	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	OUT_07
	PB3	GPIO_Input	Input mode	**Pull-down ***	n/a	IN_03
	PB4	GPIO_Input	Input mode	**Pull-down ***	n/a	IN_04
	PB5	GPIO_Input	Input mode	**Pull-down ***	n/a	IN_05
	PB6	GPIO_Input	Input mode	**Pull-down ***	n/a	IN_06
	PB7	GPIO_Input	Input mode	**Pull-down ***	n/a	IN_07
	PB8	GPIO_Input	Input mode	**Pull-down ***	n/a	IN_08

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PB9	GPIO_Input	Input mode	**Pull-down ***	n/a	IN_09

8.2. DMA configuration

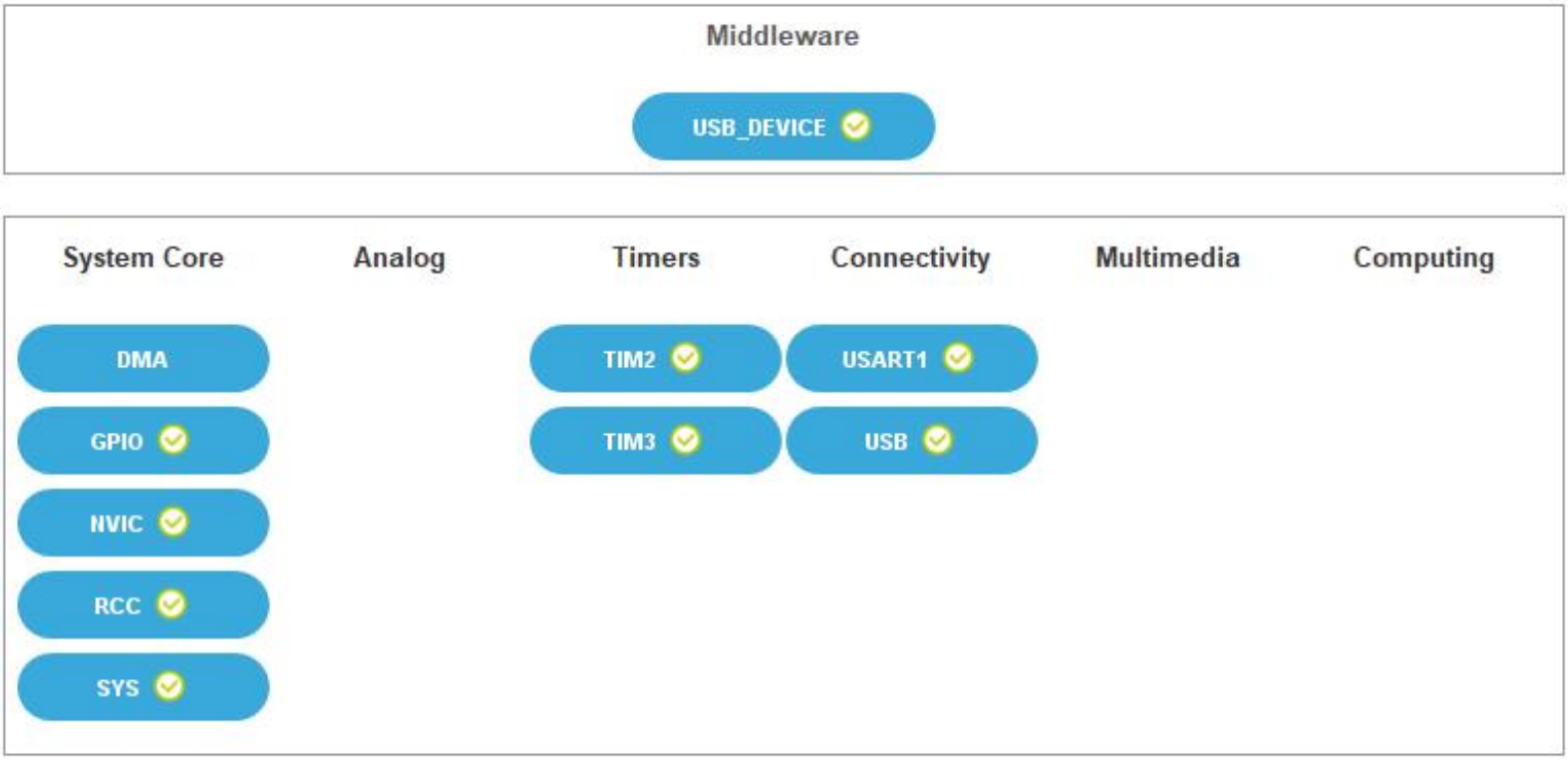
nothing configured in DMA service

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
TIM3 global interrupt	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		
TIM2 global interrupt	unused		
USART1 global interrupt / USART1 wake-up interrupt through EXTI line 25	unused		

*** User modified value**

9. Predefined Views - Category view : Current



10. Software Pack Report