
STM32
CubeMX

1. Description

1.1. Project

Project Name	F446
Board Name	custom
Generated with:	STM32CubeMX 6.3.0
Date	10/13/2023

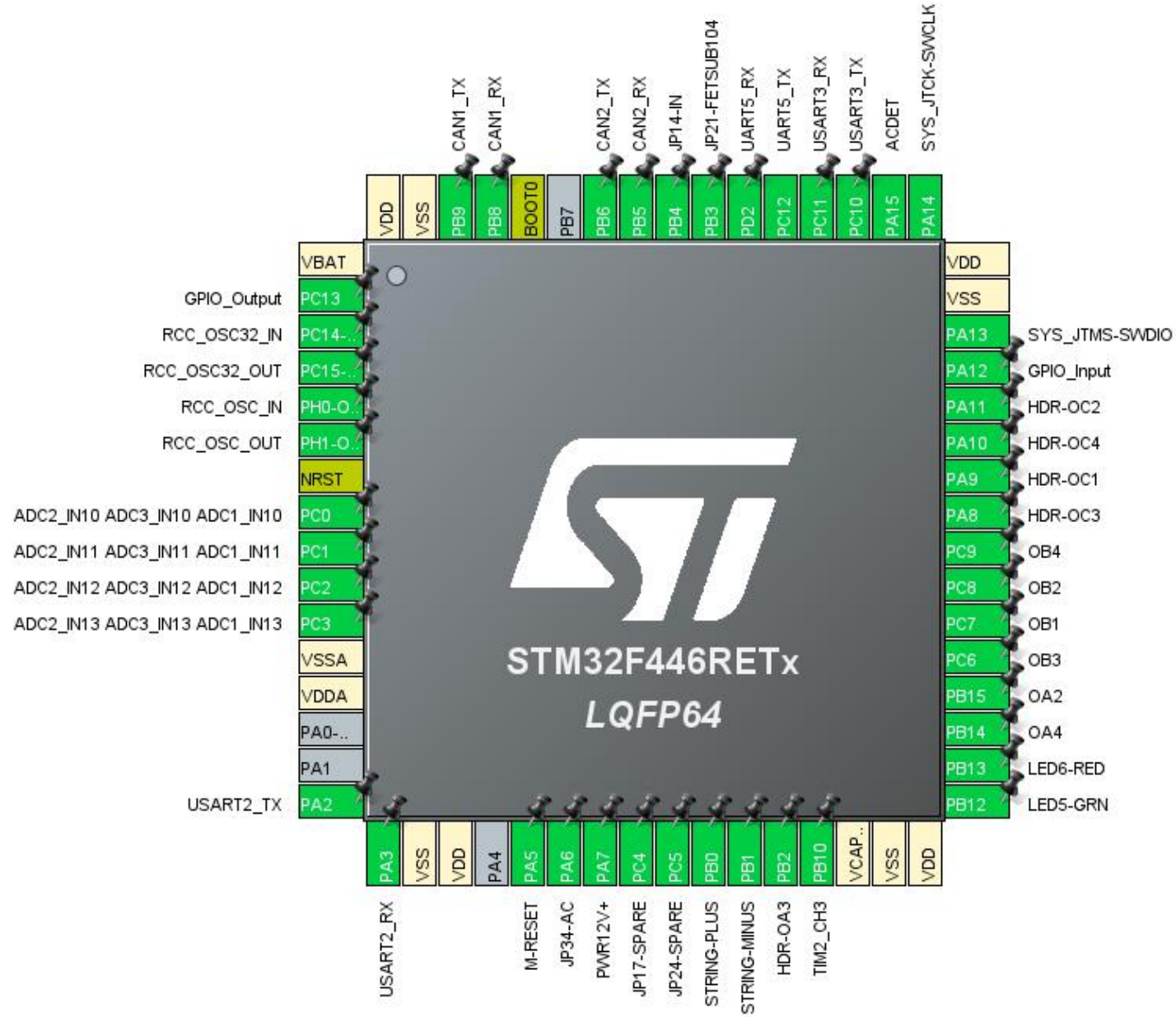
1.2. MCU

MCU Series	STM32F4
MCU Line	STM32F446
MCU name	STM32F446RETx
MCU Package	LQFP64
MCU Pin number	64

1.3. Core(s) information

Core(s)	Arm Cortex-M4

2. Pinout Configuration



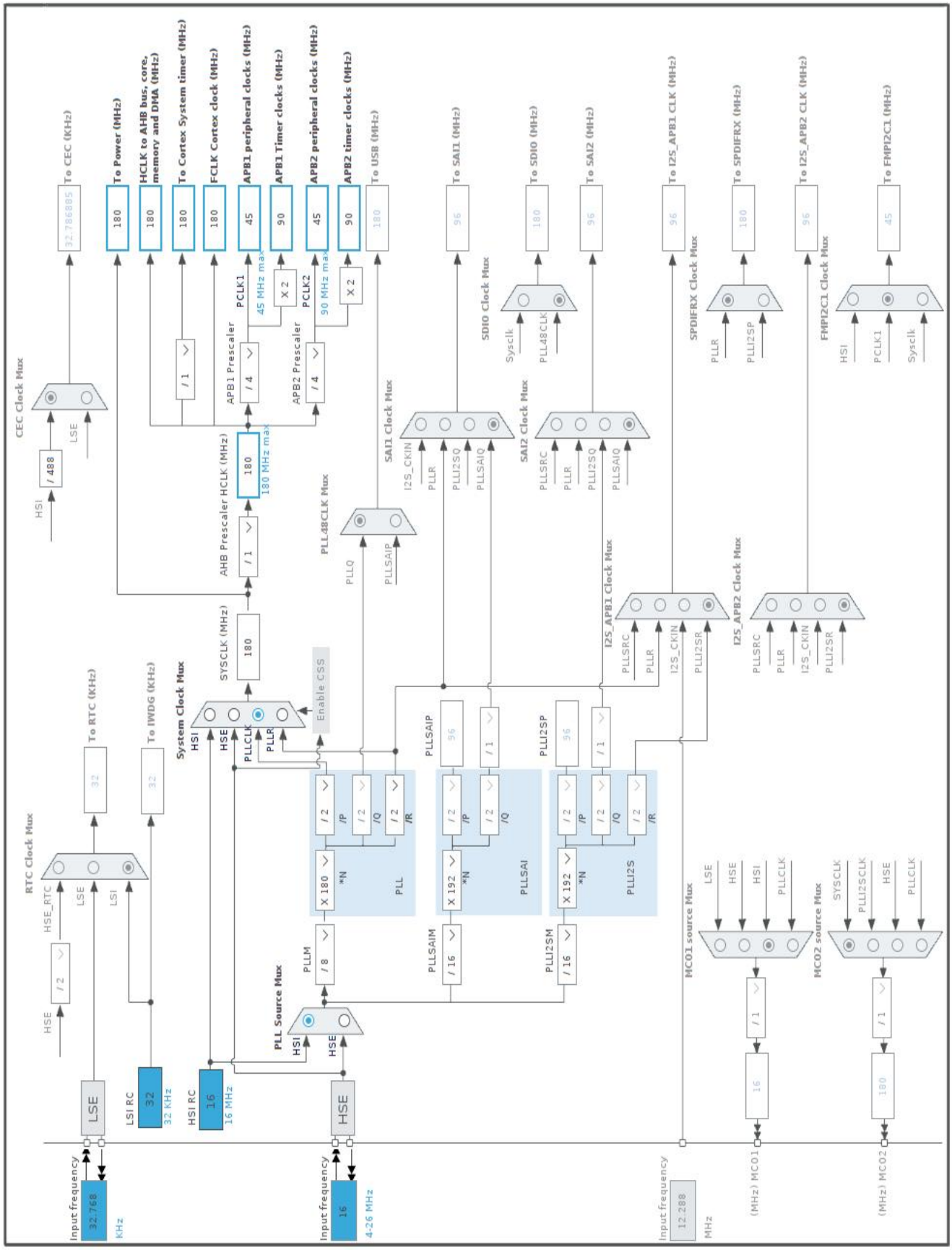
3. Pins Configuration

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
2	PC13 *	I/O	GPIO_Output	
3	PC14-OSC32_IN	I/O	RCC_OSC32_IN	
4	PC15-OSC32_OUT	I/O	RCC_OSC32_OUT	
5	PH0-OSC_IN	I/O	RCC_OSC_IN	
6	PH1-OSC_OUT	I/O	RCC_OSC_OUT	
7	NRST	Reset		
8	PC0	I/O	ADC2_IN10, ADC3_IN10, ADC1_IN10	
9	PC1	I/O	ADC2_IN11, ADC3_IN11, ADC1_IN11	
10	PC2	I/O	ADC2_IN12, ADC3_IN12, ADC1_IN12	
11	PC3	I/O	ADC2_IN13, ADC3_IN13, ADC1_IN13	
12	VSSA	Power		
13	VDDA	Power		
16	PA2	I/O	USART2_TX	
17	PA3	I/O	USART2_RX	
18	VSS	Power		
19	VDD	Power		
21	PA5 *	I/O	GPIO_Output	M-RESET
22	PA6	I/O	ADC1_IN6	JP34-AC
23	PA7	I/O	GPIO_Analog, ADC1_IN7	PWR12V+
24	PC4	I/O	ADC1_IN14	JP17-SPARE
25	PC5	I/O	ADC1_IN15	JP24-SPARE
26	PB0	I/O	ADC1_IN8	STRING-PLUS
27	PB1	I/O	ADC1_IN9	STRING-MINUS
28	PB2	I/O	TIM2_CH4	HDR-OA3
29	PB10	I/O	TIM2_CH3	
30	VCAP_1	Power		
31	VSS	Power		
32	VDD	Power		
33	PB12 *	I/O	GPIO_Output	LED5-GRN
34	PB13 *	I/O	GPIO_Output	LED6-RED
35	PB14	I/O	TIM12_CH1	OA4

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
36	PB15	I/O	TIM12_CH2	OA2
37	PC6	I/O	TIM3_CH1	OB3
38	PC7	I/O	TIM3_CH2	OB1
39	PC8	I/O	TIM3_CH3	OB2
40	PC9	I/O	TIM3_CH4	OB4
41	PA8	I/O	TIM1_CH1	HDR-OC3
42	PA9	I/O	TIM1_CH2	HDR-OC1
43	PA10	I/O	TIM1_CH3	HDR-OC4
44	PA11	I/O	TIM1_CH4	HDR-OC2
45	PA12 *	I/O	GPIO_Input	
46	PA13	I/O	SYS_JTMS-SWDIO	
47	VSS	Power		
48	VDD	Power		
49	PA14	I/O	SYS_JTCK-SWCLK	
50	PA15	I/O	TIM2_CH1	ACDET
51	PC10	I/O	USART3_TX	
52	PC11	I/O	USART3_RX	
53	PC12	I/O	UART5_TX	
54	PD2	I/O	UART5_RX	
55	PB3	I/O	TIM2_CH2	JP21-FETSUB104
56	PB4 *	I/O	GPIO_Input	JP14-IN
57	PB5	I/O	CAN2_RX	
58	PB6	I/O	CAN2_TX	
60	BOOT0	Boot		
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	F446
Project Folder	/home/deh/GliderWinchItems/bmsmot/emcmmc/F446
Toolchain / IDE	Makefile
Firmware Package Name and Version	STM32Cube FW_F4 V1.26.2
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	SystemClock_Config	RCC
2	MX_GPIO_Init	GPIO
3	MX_DMA_Init	DMA
4	MX_CAN1_Init	CAN1
5	MX_CAN2_Init	CAN2
6	MX_UART5_Init	UART5
7	MX_USART2_UART_Init	USART2
8	MX_USART3_UART_Init	USART3
9	MX_TIM1_Init	TIM1
10	MX_TIM2_Init	TIM2
11	MX_ADC1_Init	ADC1

Rank	Function Name	Peripheral Instance Name
12	MX_TIM3_Init	TIM3
13	MX_TIM12_Init	TIM12
14	MX_TIM5_Init	TIM5
15	MX_TIM13_Init	TIM13
16	MX_TIM9_Init	TIM9

6. Power Consumption Calculator report

6.1. Microcontroller Selection

Series	STM32F4
Line	STM32F446
MCU	STM32F446RETx
Datasheet	DS10693_Rev6

6.2. Parameter Selection

Temperature	25
Vdd	3.3

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

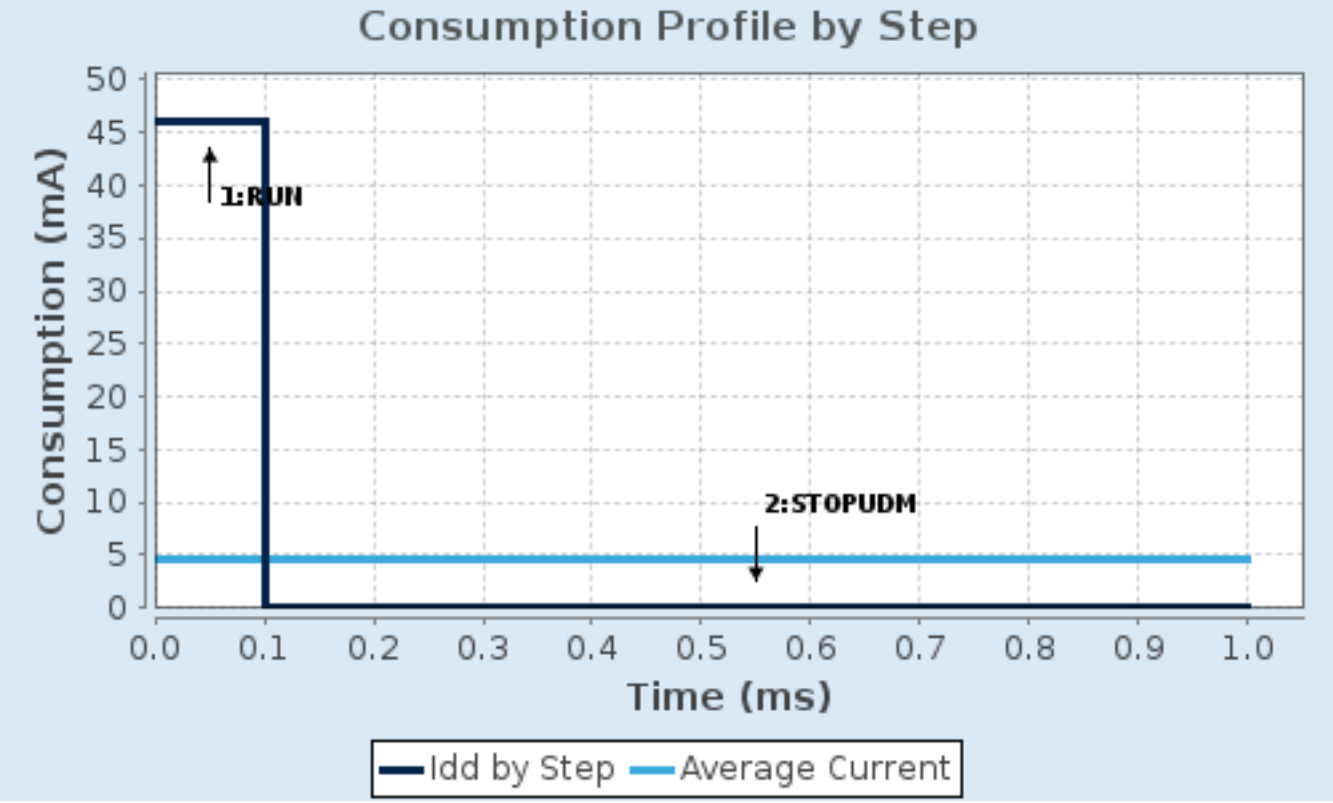
6.4. Sequence

Step	Step1	Step2
Mode	RUN	STOP_UDM (Under Drive)
Vdd	3.3	3.3
Voltage Source	Battery	Battery
Range	Scale1-High	No Scale
Fetch Type	RAM/FLASH/REGON/ART/PREFETCH	n/a
CPU Frequency	180 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	55 µA
Duration	0.1 ms	0.9 ms
DMIPS	225.0	0.0
Ta Max	98.02	104.99
Category	In DS Table	In DS Table

6.5. Results

Sequence Time	1 ms	Average Current	4.65 mA
Battery Life	1 month	Average DMIPS	225.0 DMIPS

6.6. Chart


Consumption Profile by Step
Consumption (mA)
50
45
40
35
30
25
20
15
10
5
0
1:RUN
2:STOPUDM
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. Peripherals and Middlewares Configuration

7.1. ADC1

mode: IN6

mode: IN7

mode: IN8

mode: IN9

mode: IN10

mode: IN11

mode: IN12

mode: IN13

mode: IN14

mode: IN15

mode: Vrefint Channel

mode: Vbat Channel

7.1.1. 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	Enabled
Continuous Conversion Mode	**Enabled ***
Discontinuous Conversion Mode	Disabled
DMA Continuous Requests	**Enabled ***
End Of Conversion Selection	EOC flag at the end of single channel conversion

ADC_Regular_ConversionMode:

Number Of Conversion	**12 ***
External Trigger Conversion Source	Regular Conversion launched by software
External Trigger Conversion Edge	None
Rank	1
Channel	**Channel 10 ***
Sampling Time	**56 Cycles ***
Rank	**2 ***
Channel	**Channel 11 ***
Sampling Time	**56 Cycles ***

Rank	**3 ***
Channel	**Channel 12 ***
Sampling Time	**56 Cycles ***
Rank	**4 ***
Channel	**Channel 13 ***
Sampling Time	**56 Cycles ***
Rank	**5 ***
Channel	**Channel 14 ***
Sampling Time	**56 Cycles ***
Rank	**6 ***
Channel	**Channel 15 ***
Sampling Time	**56 Cycles ***
Rank	**7 ***
Channel	**Channel 7 ***
Sampling Time	**144 Cycles ***
Rank	**8 ***
Channel	**Channel 8 ***
Sampling Time	**56 Cycles ***
Rank	**9 ***
Channel	**Channel 9 ***
Sampling Time	**56 Cycles ***
Rank	**10 ***
Channel	Channel 6
Sampling Time	**480 Cycles ***
Rank	**11 ***
Channel	**Channel Vbat ***
Sampling Time	**480 Cycles ***
Rank	**12 ***
Channel	Channel 6
Sampling Time	**56 Cycles ***

ADC_Injected_ConversionMode:

Number Of Conversions	0

WatchDog:

Enable Analog WatchDog Mode	false

7.2. CAN1

mode: Activated

7.2.1. Parameter Settings:

Bit Timings Parameters:

Prescaler (for Time Quantum)	**10 ***
Time Quantum	**222.22222222222223 ***
Time Quanta in Bit Segment 1	**6 Times ***
Time Quanta in Bit Segment 2	**2 Times ***
Time for one Bit	**1999.99 ***
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

7.3. CAN2

mode: Activated

7.3.1. Parameter Settings:

Bit Timings Parameters:

Prescaler (for Time Quantum)	**10 ***
Time Quantum	**222.22222222222223 ***
Time Quanta in Bit Segment 1	**6 Times ***
Time Quanta in Bit Segment 2	**2 Times ***
Time for one Bit	**1999.99 ***
Baud Rate	**500000 ***
ReSynchronization Jump Width	**2 Times ***

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

7.4. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

Low Speed Clock (LSE) : Crystal/Ceramic Resonator

7.4.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Instruction Cache	Enabled
Prefetch Buffer	Enabled
Data Cache	Enabled
Flash Latency(WS)	5 WS (6 CPU cycle)

RCC Parameters:

HSI Calibration Value	16
TIM Prescaler Selection	Disabled
HSE Startup Timout Value (ms)	100
LSE Startup Timout Value (ms)	5000

Power Parameters:

Power Regulator Voltage Scale	Power Regulator Voltage Scale 1
Power Over Drive	Enabled

7.5. SYS

Debug: Serial Wire

Timebase Source: TIM14

7.6. TIM1

Clock Source : Internal Clock

Channel1: Output Compare CH1

Channel2: PWM Generation CH2
Channel3: PWM Generation CH3
Channel4: PWM Generation CH4

7.6.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**36000 ***
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

Output Compare Channel 1:

Mode	Frozen (used for Timing base)
Pulse (16 bits value)	0
Output compare preload	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

7.7. TIM2

Clock Source : Internal Clock

Channel1: Input Capture direct mode

Channel2: PWM Generation CH2

Channel3: PWM Generation CH3

Channel4: PWM Generation CH4

7.7.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**2 ***
Counter Mode	Up
Counter Period (AutoReload Register - 32 bits value)	**36000 ***
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)

Input Capture Channel 1:

Polarity Selection	Rising Edge
IC Selection	Direct
Prescaler Division Ratio	No division
Input Filter (4 bits value)	0

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

7.8. TIM3

Clock Source : Internal Clock

Channel1: PWM Generation CH1

Channel2: PWM Generation CH2

Channel3: PWM Generation CH3

Channel4: PWM Generation CH4

7.8.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**36000 ***
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

7.9. TIM5

mode: Clock Source

Channel1: Output Compare No Output

7.9.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**9000 ***
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)

Output Compare No Output Channel 1:

Mode	Frozen (used for Timing base)
Pulse (32 bits value)	0
Output compare preload	Disable
CH Polarity	High

7.10. TIM9

mode: Clock Source

mode: One Pulse Mode

7.10.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**9000 ***
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	65535
Internal Clock Division (CKD)	No Division
auto-reload preload	Disable

7.11. TIM12

mode: Clock Source

Channel1: PWM Generation CH1

Channel2: PWM Generation CH2

7.11.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**36000 ***
Internal Clock Division (CKD)	No Division
auto-reload preload	Disable

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

7.12. TIM13

mode: Activated

Channel1: Output Compare No Output

7.12.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**9000 ***
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	65535
Internal Clock Division (CKD)	No Division
auto-reload preload	Disable

Output Compare No Output Channel 1:

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

7.13. UART5

Mode: Asynchronous

7.13.1. Parameter Settings:

Basic Parameters:

Baud Rate	115200
Word Length	8 Bits (including Parity)
Parity	None
Stop Bits	1

Advanced Parameters:

Data Direction	**Receive Only ***
Over Sampling	16 Samples

7.14. USART2

Mode: Asynchronous

7.14.1. 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

7.15. USART3

Mode: Asynchronous

7.15.1. 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

7.16. FREERTOS

Interface: CMSIS_V1

7.16.1. Config parameters:

API:

FreeRTOS API	CMSIS v1

Versions:

FreeRTOS version	10.3.1
CMSIS-RTOS version	1.02

MPU/FPU:

ENABLE_MPU	Disabled
ENABLE_FPU	Disabled

Kernel settings:

USE_PREEMPTION	Enabled
CPU_CLOCK_HZ	SystemCoreClock
TICK_RATE_HZ	1000
MAX_PRIORITIES	7

MINIMAL_STACK_SIZE	128
MAX_TASK_NAME_LEN	16
USE_16_BIT_TICKS	Disabled
IDLE_SHOULD_YIELD	Enabled
USE_MUTEXES	Enabled
USE_RECURSIVE_MUTEXES	Disabled
USE_COUNTING_SEMAPHORES	Disabled
QUEUE_REGISTRY_SIZE	8
USE_APPLICATION_TASK_TAG	Disabled
ENABLE_BACKWARD_COMPATIBILITY	Enabled
USE_PORT_OPTIMISED_TASK_SELECTION	Enabled
USE_TICKLESS_IDLE	Disabled
USE_TASK_NOTIFICATIONS	Enabled
RECORD_STACK_HIGH_ADDRESS	Disabled

Memory management settings:

Memory Allocation	Dynamic / Static
TOTAL_HEAP_SIZE	15360
Memory Management scheme	heap_4

Hook function related definitions:

USE_IDLE_HOOK	Disabled
USE_TICK_HOOK	Disabled
USE_MALLOC_FAILED_HOOK	Disabled
USE_DAEMON_TASK_STARTUP_HOOK	Disabled
CHECK_FOR_STACK_OVERFLOW	Disabled

Run time and task stats gathering related definitions:

GENERATE_RUN_TIME_STATS	Disabled
USE_TRACE_FACILITY	Disabled
USE_STATS_FORMATTING_FUNCTIONS	Disabled

Co-routine related definitions:

USE_CO_ROUTINES	Disabled
MAX_CO_ROUTINE_PRIORITIES	2

Software timer definitions:

USE_TIMERS	Disabled

Interrupt nesting behaviour configuration:

LIBRARY_LOWEST_INTERRUPT_PRIORITY	15
LIBRARY_MAX_SYSCALL_INTERRUPT_PRIORITY	5

Added with 10.2.1 support:

MESSAGE_BUFFER_LENGTH_TYPE	size_t
USE_POSIX_ERRNO	Disabled

7.16.2. Include parameters:

Include definitions:

vTaskPrioritySet	Enabled
uxTaskPriorityGet	Enabled
vTaskDelete	Enabled
vTaskCleanUpResources	Disabled
vTaskSuspend	Enabled
vTaskDelayUntil	Disabled
vTaskDelay	Enabled
xTaskGetSchedulerState	Enabled
xTaskResumeFromISR	Enabled
xQueueGetMutexHolder	Disabled
xSemaphoreGetMutexHolder	Disabled
pcTaskGetTaskName	Disabled
uxTaskGetStackHighWaterMark	Disabled
xTaskGetCurrentTaskHandle	Disabled
eTaskGetState	Disabled
xEventGroupSetBitFromISR	Disabled
xTimerPendFunctionCall	Disabled
xTaskAbortDelay	Disabled
xTaskGetHandle	Disabled
uxTaskGetStackHighWaterMark2	Disabled

7.16.3. Advanced settings:

Newlib settings (see parameter description first):

USE_NEWLIB_REENTRANT	Disabled

Project settings (see parameter description first):

Use FW pack heap file	Enabled

*** 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	PC0	ADC1_IN10	Analog mode	No pull-up and no pull-down	n/a	
	PC1	ADC1_IN11	Analog mode	No pull-up and no pull-down	n/a	
	PC2	ADC1_IN12	Analog mode	No pull-up and no pull-down	n/a	
	PC3	ADC1_IN13	Analog mode	No pull-up and no pull-down	n/a	
	PA6	ADC1_IN6	Analog mode	No pull-up and no pull-down	n/a	JP34-AC
	PA7	ADC1_IN7	Analog mode	No pull-up and no pull-down	n/a	PWR12V+
	PC4	ADC1_IN14	Analog mode	No pull-up and no pull-down	n/a	JP17-SPARE
	PC5	ADC1_IN15	Analog mode	No pull-up and no pull-down	n/a	JP24-SPARE
	PB0	ADC1_IN8	Analog mode	No pull-up and no pull-down	n/a	STRING-PLUS
	PB1	ADC1_IN9	Analog mode	No pull-up and no pull-down	n/a	STRING-MINUS
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 ***	
CAN2	PB5	CAN2_RX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PB6	CAN2_TX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
RCC	PC14-OSC32_IN	RCC_OSC32_IN	n/a	n/a	n/a	
	PC15-OSC32_OUT	RCC_OSC32_OUT	n/a	n/a	n/a	
	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	PA8	TIM1_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Low	HDR-OC3
	PA9	TIM1_CH2	Alternate Function Push Pull	No pull-up and no pull-down	Low	HDR-OC1
	PA10	TIM1_CH3	Alternate Function Push Pull	No pull-up and no pull-down	Low	HDR-OC4
	PA11	TIM1_CH4	Alternate Function Push Pull	No pull-up and no pull-down	Low	HDR-OC2
TIM2	PB2	TIM2_CH4	Alternate Function Push Pull	No pull-up and no pull-down	Low	HDR-OA3
	PB10	TIM2_CH3	Alternate Function Push Pull	No pull-up and no pull-down	Low	

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PA15	TIM2_CH1	**Alternate Function Open Drain ***	No pull-up and no pull-down	Low	ACDET
	PB3	TIM2_CH2	Alternate Function Push Pull	No pull-up and no pull-down	Low	JP21-FETSUB104
TIM3	PC6	TIM3_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Low	OB3
	PC7	TIM3_CH2	Alternate Function Push Pull	No pull-up and no pull-down	Low	OB1
	PC8	TIM3_CH3	Alternate Function Push Pull	No pull-up and no pull-down	Low	OB2
	PC9	TIM3_CH4	Alternate Function Push Pull	No pull-up and no pull-down	Low	OB4
TIM12	PB14	TIM12_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Low	OA4
	PB15	TIM12_CH2	Alternate Function Push Pull	No pull-up and no pull-down	Low	OA2
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 ***	
USART2	PA2	USART2_TX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PA3	USART2_RX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
USART3	PC10	USART3_TX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
	PC11	USART3_RX	Alternate Function Push Pull	No pull-up and no pull-down	**Very High ***	
GPIO	PC13	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PA5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	M-RESET
	PA7	GPIO_Analog	Analog mode	No pull-up and no pull-down	n/a	PWR12V+
	PB12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LED5-GRN
	PB13	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LED6-RED
	PA12	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PB4	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	JP14-IN

8.2. DMA configuration

DMA request	Stream	Direction	Priority
UART5_RX	DMA1_Stream0	Peripheral To Memory	Low
USART2_TX	DMA1_Stream6	Memory To Peripheral	Low
USART3_RX	DMA1_Stream1	Peripheral To Memory	Low
USART3_TX	DMA1_Stream3	Memory To Peripheral	Low
ADC1	DMA2_Stream0	Peripheral To Memory	Low
USART2_RX	DMA1_Stream5	Peripheral To Memory	Low

UART5_RX: DMA1_Stream0 DMA request Settings:

Mode:	**Circular ***
Use fifo:	Disable
Peripheral Increment:	Disable
Memory Increment:	**Enable ***
Peripheral Data Width:	Byte
Memory Data Width:	Byte

USART2_TX: DMA1_Stream6 DMA request Settings:

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

USART3_RX: DMA1_Stream1 DMA request Settings:

Mode:	**Circular ***
Use fifo:	Disable
Peripheral Increment:	Disable
Memory Increment:	**Enable ***
Peripheral Data Width:	Byte
Memory Data Width:	Byte

USART3_TX: DMA1_Stream3 DMA request Settings:

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

ADC1: DMA2_Stream0 DMA request Settings:

Mode:	**Circular ***
Use fifo:	Disable
Peripheral Increment:	Disable
Memory Increment:	**Enable ***
Peripheral Data Width:	Half Word
Memory Data Width:	Half Word

USART2_RX: DMA1_Stream5 DMA request Settings:

Mode:	**Circular ***
Use fifo:	Disable
Peripheral Increment:	Disable
Memory Increment:	**Enable ***
Peripheral Data Width:	Byte
Memory Data Width:	Byte

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
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	15	0
System tick timer	true	15	0
DMA1 stream0 global interrupt	true	5	0
DMA1 stream1 global interrupt	true	5	0
DMA1 stream3 global interrupt	true	5	0
DMA1 stream5 global interrupt	true	5	0
DMA1 stream6 global interrupt	true	5	0
CAN1 TX interrupt	true	5	0
CAN1 RX0 interrupt	true	5	0
CAN1 RX1 interrupt	true	5	0
TIM1 break interrupt and TIM9 global interrupt	true	8	0
USART2 global interrupt	true	5	0
USART3 global interrupt	true	5	0
TIM8 update interrupt and TIM13 global interrupt	true	8	0
TIM8 trigger and commutation interrupts and TIM14 global interrupt	true	15	0
TIM5 global interrupt	true	8	0
UART5 global interrupt	true	5	0
DMA2 stream0 global interrupt	true	5	0
CAN2 TX interrupt	true	5	0
CAN2 RX0 interrupt	true	5	0
CAN2 RX1 interrupt	true	5	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
ADC1, ADC2 and ADC3 interrupts	unused		
CAN1 SCE interrupt	unused		
TIM1 update interrupt and TIM10 global interrupt	unused		
TIM1 trigger and commutation interrupts and TIM11 global interrupt	unused		

Interrupt Table	Enable	Preenmption Priority	SubPriority
TIM1 capture compare interrupt	unused		
TIM2 global interrupt	unused		
TIM3 global interrupt	unused		
TIM8 break interrupt and TIM12 global interrupt	unused		
CAN2 SCE interrupt	unused		
FPU global interrupt	unused		

8.3.2. NVIC Code generation

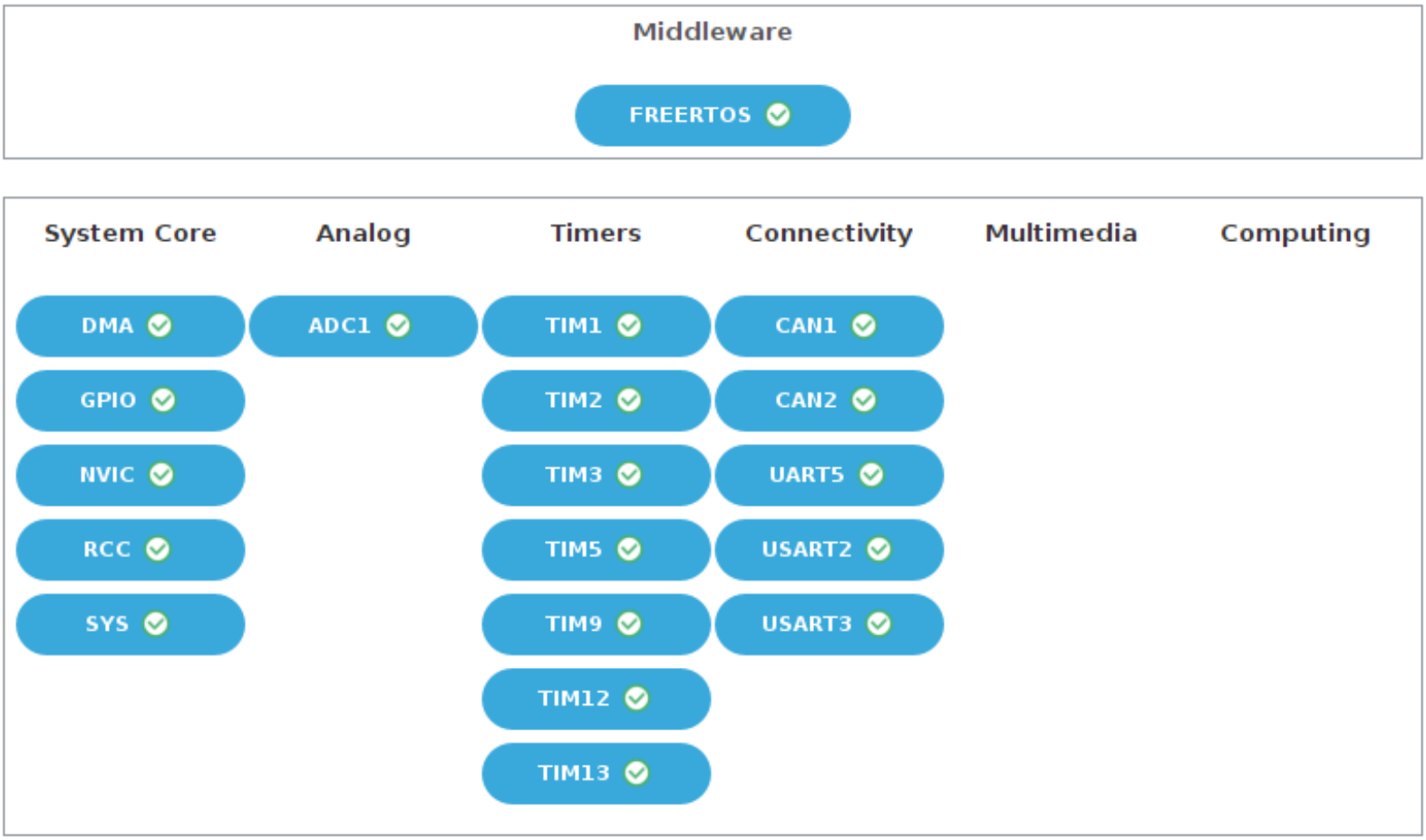
Enabled interrupt Table	Select for init sequence ordering	Generate IRQ handler	Call HAL handler
Non maskable interrupt	false	true	false
Hard fault interrupt	false	true	false
Memory management fault	false	true	false
Pre-fetch fault, memory access fault	false	true	false
Undefined instruction or illegal state	false	true	false
System service call via SWI instruction	false	false	false
Debug monitor	false	true	false
Pendable request for system service	false	false	false
System tick timer	false	false	true
DMA1 stream0 global interrupt	false	true	true
DMA1 stream1 global interrupt	false	true	true
DMA1 stream3 global interrupt	false	true	true
DMA1 stream5 global interrupt	false	true	true
DMA1 stream6 global interrupt	false	true	true
CAN1 TX interrupt	false	true	true
CAN1 RX0 interrupt	false	true	true
CAN1 RX1 interrupt	false	true	true
TIM1 break interrupt and TIM9 global interrupt	false	true	true
USART2 global interrupt	false	true	true
USART3 global interrupt	false	true	true
TIM8 update interrupt and TIM13 global interrupt	false	true	true
TIM8 trigger and commutation interrupts and TIM14 global interrupt	false	true	true
TIM5 global interrupt	false	true	true
UART5 global interrupt	false	true	true
DMA2 stream0 global interrupt	false	true	true
CAN2 TX interrupt	false	true	true
CAN2 RX0 interrupt	false	true	true
CAN2 RX1 interrupt	false	true	true

*** User modified value**

9. System Views

9.1. Category view

9.1.1. Current



10. Docs & Resources

Type	Link
Datasheet	http://www.st.com/resource/en/datasheet/DM00141306.pdf
Reference manual	http://www.st.com/resource/en/reference_manual/DM00135183.pdf
Programming manual	http://www.st.com/resource/en/programming_manual/DM00046982.pdf
Errata sheet	http://www.st.com/resource/en/errata_sheet/DM00155929.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/CD00249778.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/DM00024853.pdf
Application note	http://www.st.com/resource/en/application_note/DM00040802.pdf
Application note	http://www.st.com/resource/en/application_note/DM00040808.pdf
Application note	http://www.st.com/resource/en/application_note/DM00042534.pdf
Application note	http://www.st.com/resource/en/application_note/DM00046011.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/DM00115714.pdf
Application note	http://www.st.com/resource/en/application_note/DM00129215.pdf
Application note	http://www.st.com/resource/en/application_note/DM00154959.pdf
Application note	http://www.st.com/resource/en/application_note/DM00160482.pdf

Application note	http://www.st.com/resource/en/application_note/DM00161778.pdf
Application note	http://www.st.com/resource/en/application_note/DM00213525.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/DM00272912.pdf
Application note	http://www.st.com/resource/en/application_note/DM00281138.pdf
Application note	http://www.st.com/resource/en/application_note/DM00296349.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/DM00373474.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/DM00431633.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/DM00725181.pdf