
STM32
CubeMX

1. Description

1.1. Project

Project Name	bmsbq431R
Board Name	custom
Generated with:	STM32CubeMX 6.3.0
Date	10/29/2021

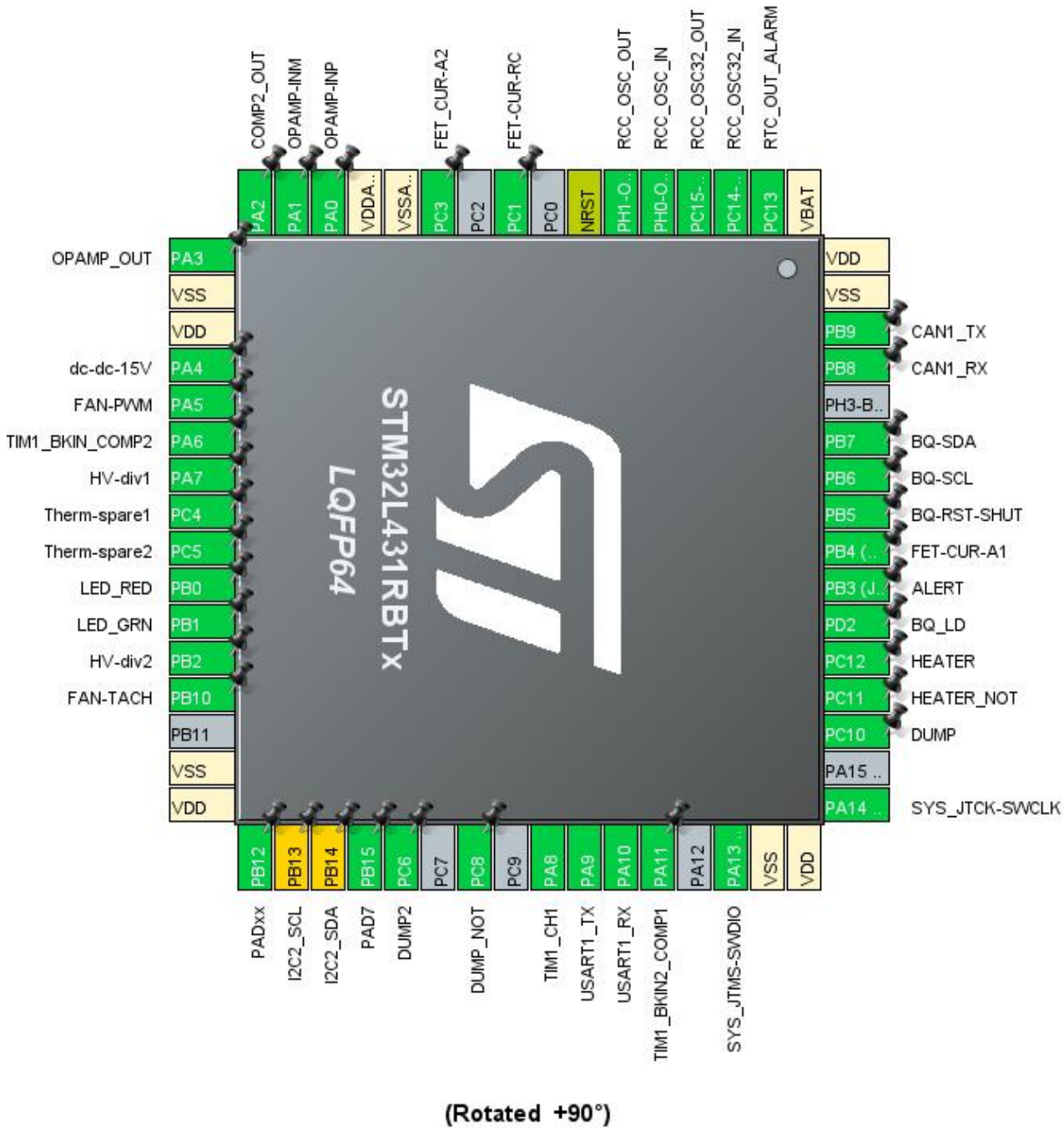
1.2. MCU

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



(Rotated +90°)

3. Pins Configuration

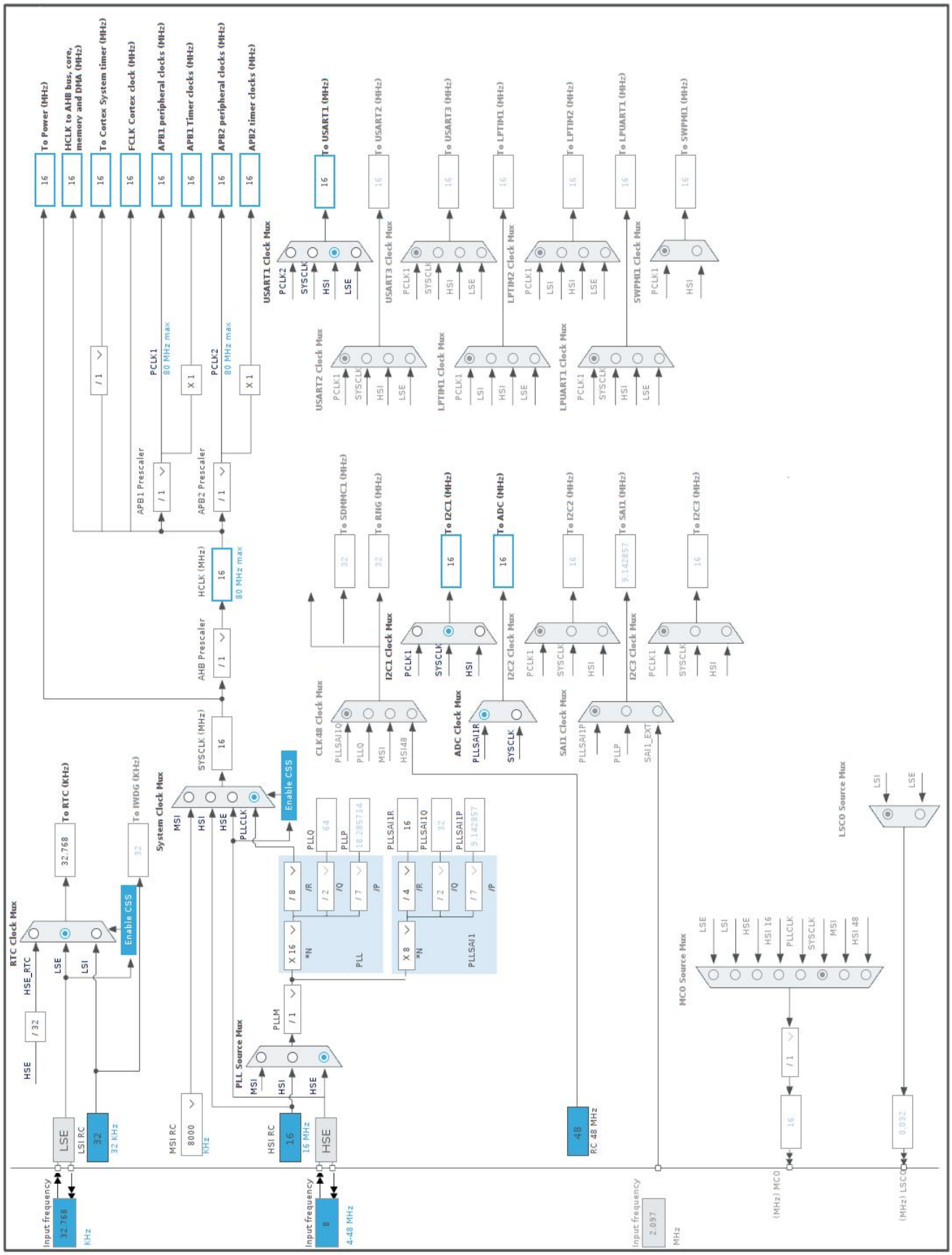
Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
2	PC13	I/O	RTC_OUT_ALARM	
3	PC14-OSC32_IN (PC14)	I/O	RCC_OSC32_IN	
4	PC15-OSC32_OUT (PC15)	I/O	RCC_OSC32_OUT	
5	PH0-OSC_IN (PH0)	I/O	RCC_OSC_IN	
6	PH1-OSC_OUT (PH1)	I/O	RCC_OSC_OUT	
7	NRST	Reset		
9	PC1	I/O	GPIO_Analog, ADC1_IN2	FET-CUR-RC
11	PC3	I/O	GPIO_Analog, ADC1_IN4	FET_CUR-A2
12	VSSA/VREF-	Power		
13	VDDA/VREF+	Power		
14	PA0	I/O	GPIO_Analog, ADC1_IN5, OPAMP1_VINP	OPAMP-INP
15	PA1	I/O	GPIO_Analog, OPAMP1_VINM	OPAMP-INM
16	PA2	I/O	COMP2_OUT	
17	PA3	I/O	GPIO_Analog, ADC1_IN8, OPAMP1_VOUT	OPAMP_OUT
18	VSS	Power		
19	VDD	Power		
20	PA4	I/O	GPIO_Analog, ADC1_IN9	dc-dc-15V
21	PA5	I/O	TIM2_CH1	FAN-PWM
22	PA6	I/O	TIM1_BKIN_COMP2	
23	PA7	I/O	GPIO_Analog, ADC1_IN12	HV-div1
24	PC4	I/O	ADC1_IN13	Therm-spare1
25	PC5	I/O	ADC1_IN14	Therm-spare2
26	PB0 *	I/O	GPIO_Output	LED_RED
27	PB1 *	I/O	GPIO_Output	LED_GRN
28	PB2	I/O	GPIO_Analog, COMP1_INP	HV-div2
29	PB10	I/O	TIM2_CH3	FAN-TACH
31	VSS	Power		
32	VDD	Power		
33	PB12 *	I/O	GPIO_Output	PADxx
34	PB13 **	I/O	I2C2_SCL	
35	PB14 **	I/O	I2C2_SDA	
36	PB15 *	I/O	GPIO_Output	PAD7

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
37	PC6 *	I/O	GPIO_Output	DUMP2
39	PC8 *	I/O	GPIO_Output	DUMP_NOT
41	PA8	I/O	TIM1_CH1	
42	PA9	I/O	USART1_TX	
43	PA10	I/O	USART1_RX	
44	PA11	I/O	TIM1_BKIN2_COMP1	
46	PA13 (JTMS-SWDIO)	I/O	SYS_JTMS-SWDIO	
47	VSS	Power		
48	VDD	Power		
49	PA14 (JTCK-SWCLK)	I/O	SYS_JTCK-SWCLK	
51	PC10 *	I/O	GPIO_Output	DUMP
52	PC11 *	I/O	GPIO_Output	HEATER_NOT
53	PC12 *	I/O	GPIO_Output	HEATER
54	PD2 *	I/O	GPIO_Output	BQ_LD
55	PB3 (JTDO-TRACESWO)	I/O	GPIO_EXTI3	ALERT
56	PB4 (NJTRST)	I/O	GPIO_Analog, COMP2_INP	FET-CUR-A1
57	PB5 *	I/O	GPIO_Output	BQ-RST-SHUT
58	PB6	I/O	I2C1_SCL	BQ-SCL
59	PB7	I/O	I2C1_SDA	BQ-SDA
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

** The pin is affected with a peripheral function but no peripheral mode is activated

4. Clock Tree Configuration



5. Software Project

5.1. Project Settings

Name	Value
Project Name	bmsbq431R
Project Folder	/home/deh/GliderWinchItems/BMS/bmsbq431R
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	MX_DMA_Init	DMA
3	SystemClock_Config	RCC
4	MX_ADC1_Init	ADC1
5	MX_CAN1_Init	CAN1
6	MX_I2C1_Init	I2C1
7	MX_RTC_Init	RTC
8	MX_TIM2_Init	TIM2
9	MX_USART1_UART_Init	USART1
10	MX_COMP1_Init	COMP1
11	MX_COMP2_Init	COMP2

Rank	Function Name	Peripheral Instance Name
12	MX_DAC1_Init	DAC1
13	MX_TIM1_Init	TIM1
14	MX_TIM15_Init	TIM15
15	MX_OPAMP1_Init	OPAMP1

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

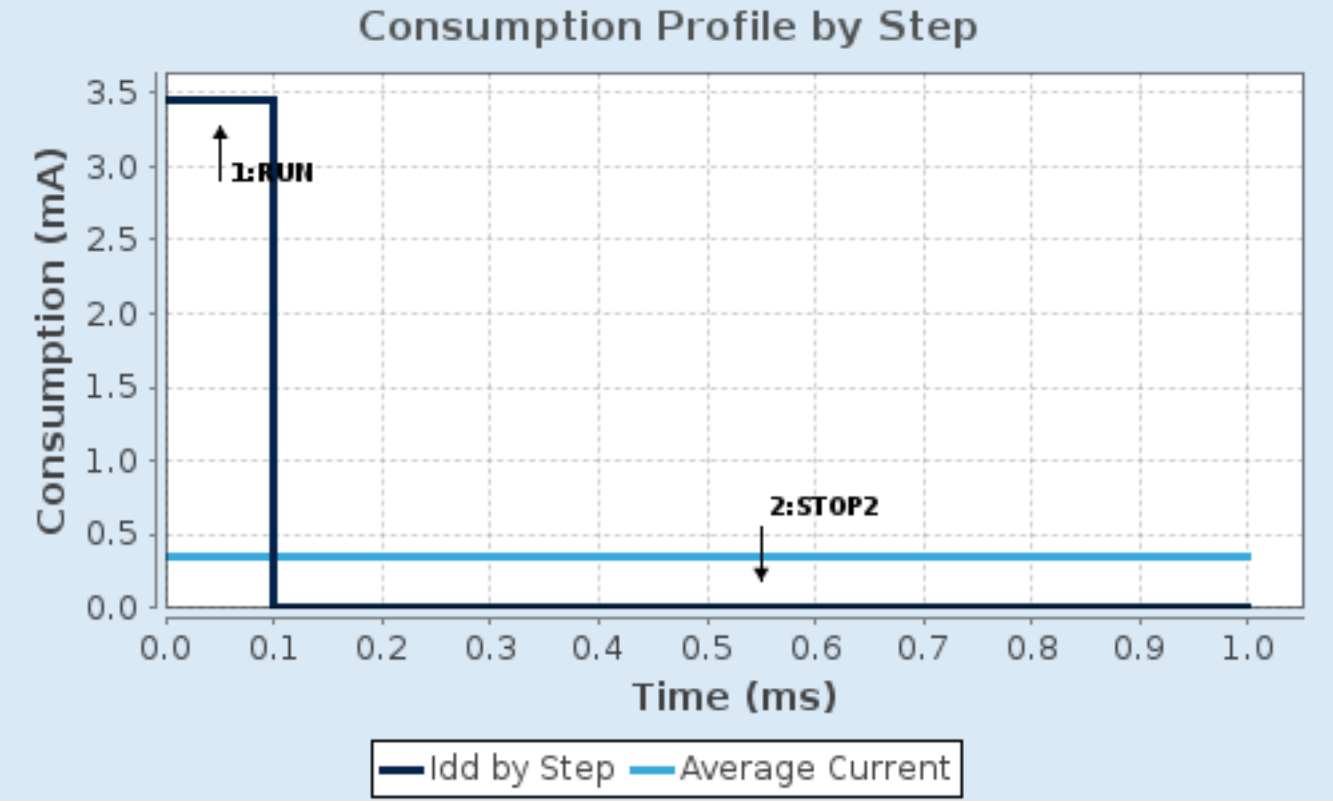
6.4. Sequence

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 µA
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 µA
Battery Life	1 year, 1 month, 8 days, 12 hours	Average DMIPS	40.0 DMIPS

6.6. Chart


Consumption Profile by Step
Consumption (mA)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1:RUN
2:STOP2
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

IN2: IN2 Single-ended

IN8: IN8 Single-ended

IN9: IN9 Single-ended

IN12: IN12 Single-ended

IN13: IN13 Single-ended

IN14: IN14 Single-ended

IN17: Temperature Sensor Channel

mode: Vrefint Channel

7.1.1. Parameter Settings:

ADC_Settings:

Clock Prescaler	Asynchronous clock mode divided by 1
Resolution	ADC 12-bit resolution
Data Alignment	Right alignment
Scan Conversion Mode	Enabled
Continuous Conversion Mode	**Enabled ***
Discontinuous Conversion Mode	Disabled
DMA Continuous Requests	**Enabled ***
End Of Conversion Selection	**End of sequence of conversion ***
Overrun behaviour	Overrun data preserved
Low Power Auto Wait	Disabled

ADC_Regular_ConversionMode:

Enable Regular Conversions	Enable
Enable Regular Oversampling	Disable
Number Of Conversion	**8 ***
External Trigger Conversion Source	Regular Conversion launched by software
External Trigger Conversion Edge	None
Rank	1
Channel	**Channel 8 ***
Sampling Time	**24.5 Cycles ***
Offset Number	No offset
Rank	**2 ***
Channel	**Channel 9 ***
Sampling Time	**47.5 Cycles ***
Offset Number	No offset
Rank	**3 ***

Channel	**Channel 12 ***
Sampling Time	**92.5 Cycles ***
Offset Number	No offset
Rank	**4 ***
Channel	Channel 2
Sampling Time	**12.5 Cycles ***
Offset Number	No offset
Rank	**5 ***
Channel	**Channel 13 ***
Sampling Time	**47.5 Cycles ***
Offset Number	No offset
Rank	**6 ***
Channel	**Channel 14 ***
Sampling Time	**47.5 Cycles ***
Offset Number	No offset
Rank	**7 ***
Channel	**Channel Temperature Sensor ***
Sampling Time	**247.5 Cycles ***
Offset Number	No offset
Rank	**8 ***
Channel	**Channel Vrefint ***
Sampling Time	**247.5 Cycles ***
Offset Number	No offset
ADC_Injected_ConversionMode:	
Enable Injected Conversions	Disable
Analog Watchdog 1:	
Enable Analog WatchDog1 Mode	false
Analog Watchdog 2:	
Enable Analog WatchDog2 Mode	false
Analog Watchdog 3:	
Enable Analog WatchDog3 Mode	false

7.2. CAN1

mode: Activated

7.2.1. Parameter Settings:

Bit Timings Parameters:

Prescaler (for Time Quantum)	16
Time Quantum	**1000.0 ***
Time Quanta in Bit Segment 1	1 Time
Time Quanta in Bit Segment 2	1 Time
Time for one Bit	**3000.00 ***
Baud Rate	**333333 ***
ReSynchronization Jump Width	1 Time

Basic Parameters:

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

Advanced Parameters:

Operating Mode	Normal

7.3. COMP1

mode: Input [+]

Input [-]: DAC OUT1

mode: External Output to TIM1 BKIN2

7.3.1. Parameter Settings:

Basic Parameters:

Speed / Power Mode	High Speed
Trigger Mode	None
Hysteresis Level	None

Output Configuration:

Blanking Source	None
Output Pol	COMP output on GPIO isn't inverted

7.4. COMP2

Input [+]: INP

Input [-]: DAC OUT2

mode: ExternalOutput

mode: External Output to TIM1 BKIN

7.4.1. Parameter Settings:

Basic Parameters:

Speed / Power Mode	High Speed
Trigger Mode	None
Hysteresis Level	None

Output Configuration:

Blanking Source	None
Output Pol	COMP output on GPIO isn't inverted

7.5. DAC1

OUT1 connected to: only to on chip analog peripherals

OUT2 connected to: only to on chip analog peripherals

7.5.1. Parameter Settings:

DAC Out1 Settings:

Output Buffer	Disable
Trigger	None
User Trimming	Factory trimming
Sample And Hold	Sampleandhold Disable
On chip peripheral(s)	connected

DAC Out2 Settings:

Output Buffer	Disable
Trigger	None
User Trimming	Factory trimming
Sample And Hold	Sampleandhold Disable
On chip peripheral(s)	connected

7.6. I2C1

I2C: I2C

7.6.1. Parameter Settings:

Timing configuration:

Custom Timing	Disabled
I2C Speed Mode	**Fast Mode ***
I2C Speed Frequency (KHz)	400

Rise Time (ns)	0
Fall Time (ns)	0
Coefficient of Digital Filter	0
Analog Filter	Enabled
Timing	**0x0010061A ***

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

7.7. OPAMP1

Mode: PGA Connected

7.7.1. Parameter Settings:

Basic Parameters:

Power Supply Range	**Power Supply Range High ***
Power Mode	Normal
PGA Gain	**8 ***
User Trimming	Disable

7.8. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

Low Speed Clock (LSE) : Crystal/Ceramic Resonator

7.8.1. 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 Timout Value (ms)	100
LSE Startup Timout Value (ms)	5000
LSE Drive Capability	LSE oscillator low drive capability

Power Parameters:

Power Regulator Voltage Scale	Power Regulator Voltage Scale 1

7.9. RTC
mode: Activate Clock Source
mode: Activate Calendar
Alarm A: Routed to OUT

7.9.1. Parameter Settings:

General:

Hour Format	Hourformat 24
Asynchronous Predivider value	127
Synchronous Predivider value	255
Output Polarity	Output Polarity High
Output Type	**Output Type Pushpull ***

Calendar Time:

Data Format	BCD data format
Hours	0
Minutes	0
Seconds	0
Day Light Saving: value of hour adjustment	Daylightsaving None
Store Operation	Storeoperation Reset

Calendar Date:

Week Day	Monday
Month	January
Date	1
Year	0

Alarm A:

Hours	0
Minutes	0
Seconds	0
Sub Seconds	0
Alarm Mask Date Week day	Disable
Alarm Mask Hours	Disable
Alarm Mask Minutes	Disable
Alarm Mask Seconds	Disable

Alarm Sub Second Mask	All Alarm SS fields are masked.
Alarm Date Week Day Sel	Date
Alarm Date	1

7.10. SYS

Debug: Serial Wire

Timebase Source: TIM16

7.11. TIM1

Clock Source : Internal Clock

Channel1: PWM Generation CH1

Activate-Break-Input: Activate Break Input on PIN shared with COMP2 out

Activate-Break-Input-2: Activate Break Input 2 on PIN shared with COMP1 out

7.11.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**79 ***
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 TRGO	Reset (UG bit from TIMx_EGR)
Trigger Event Selection TRGO2	Reset (UG bit from TIMx_EGR)

Break And Dead Time management - BRK Configuration:

BRK State	Enable
BRK Polarity	High
BRK Filter (4 bits value)	0
BRK Sources Configuration	
- Digital Input	Enable
Digital Input Polarity	Polarity High
- COMP1	Disable
- COMP2	**Enable ***
COMP2 Polarity	Polarity High

Break And Dead Time management - BRK2 Configuration:

BRK2 State	Enable

BRK2 Polarity	High
BRK2 Filter (4 bits value)	0
BRK2 Sources Configuration	
- Digital Input	Enable
Digital Input Polarity	Polarity High
- COMP1	**Enable ***
COMP1 Polarity	Polarity High
- COMP2	Disable

Break And Dead Time management - Output Configuration:

Automatic Output State	**Enable ***
Off State Selection for Run Mode (OSSR)	Enable
Off State Selection for Idle Mode (OSSI)	Enable
Lock Configuration	Off

Clear Input:

Clear Input Source	Disable

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

7.12. TIM2

Clock Source : Internal Clock

Channel1: PWM Generation CH1

Channel3: Input Capture direct mode

7.12.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
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 TRGO	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

Input Capture Channel 3:

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

7.13. TIM15

mode: Clock Source

7.13.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
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)

7.14. USART1

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	**8 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

7.15. FREERTOS

Interface: CMSIS_V2

7.15.1. Config parameters:

API:

FreeRTOS API	CMSIS v2

Versions:

FreeRTOS version	10.3.1
CMSIS-RTOS version	2.00

MPU/FPU:

ENABLE_MPU	Disabled
ENABLE_FPU	Disabled

Kernel settings:

USE_PREEMPTION	Enabled
CPU_CLOCK_HZ	SystemCoreClock
TICK_RATE_HZ	1000
MAX_PRIORITIES	56
MINIMAL_STACK_SIZE	128
MAX_TASK_NAME_LEN	16
USE_16_BIT_TICKS	Disabled
IDLE_SHOULD_YIELD	Enabled
USE_MUTEXES	Enabled
USE_RECURSIVE_MUTEXES	Enabled
USE_COUNTING_SEMAPHORES	Enabled
QUEUE_REGISTRY_SIZE	8

USE_APPLICATION_TASK_TAG	Disabled
ENABLE_BACKWARD_COMPATIBILITY	Enabled
USE_PORT_OPTIMISED_TASK_SELECTION	Disabled
USE_TICKLESS_IDLE	Disabled
USE_TASK_NOTIFICATIONS	Enabled
RECORD_STACK_HIGH_ADDRESS	Disabled

Memory management settings:

Memory Allocation	Dynamic / Static
TOTAL_HEAP_SIZE	**8000 ***
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	Enabled
USE_STATS_FORMATTING_FUNCTIONS	Disabled

Co-routine related definitions:

USE_CO_ROUTINES	Disabled
MAX_CO_ROUTINE_PRIORITIES	2

Software timer definitions:

USE_TIMERS	Enabled
TIMER_TASK_PRIORITY	2
TIMER_QUEUE_LENGTH	10
TIMER_TASK_STACK_DEPTH	256

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

CMSIS-RTOS V2 flags:

USE_OS2_THREAD_SUSPEND_RESUME	Enabled
USE_OS2_THREAD_ENUMERATE	Enabled
USE_OS2_EVENTFLAGS_FROM_ISR	Enabled
USE_OS2_THREAD_FLAGS	Enabled
USE_OS2_TIMER	Enabled
USE_OS2_MUTEX	Enabled

7.15.2. Include parameters:

Include definitions:

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

7.15.3. 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	PC1	ADC1_IN2	Analog mode	No pull-up and no pull-down	n/a	FET-CUR-RC
	PC3	ADC1_IN4	Analog mode	No pull-up and no pull-down	n/a	FET_CUR-A2
	PA0	ADC1_IN5	Analog mode	No pull-up and no pull-down	n/a	OPAMP-INP
	PA3	ADC1_IN8	Analog mode	No pull-up and no pull-down	n/a	OPAMP_OUT
	PA4	ADC1_IN9	Analog mode	No pull-up and no pull-down	n/a	dc-dc-15V
	PA7	ADC1_IN12	Analog mode	No pull-up and no pull-down	n/a	HV-div1
	PC4	ADC1_IN13	Analog mode for ADC conversion	No pull-up and no pull-down	n/a	Therm-spare1
	PC5	ADC1_IN14	Analog mode for ADC conversion	No pull-up and no pull-down	n/a	Therm-spare2
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 ***	
COMP1	PB2	COMP1_INP	Analog mode	No pull-up and no pull-down	n/a	HV-div2
	PA11	TIM1_BKIN2_COMP1	Alternate Function Push Pull	No pull-up and no pull-down	Low	
COMP2	PA2	COMP2_OUT	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PA6	TIM1_BKIN_COMP2	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PB4 (NJTRST)	COMP2_INP	Analog mode	No pull-up and no pull-down	n/a	FET-CUR-A1
I2C1	PB6	I2C1_SCL	Alternate Function Open Drain	**Pull-up ***	**Very High ***	BQ-SCL
	PB7	I2C1_SDA	Alternate Function Open Drain	**Pull-up ***	**Very High ***	BQ-SDA
OPAMP1	PA0	OPAMP1_VINP	Analog mode	No pull-up and no pull-down	n/a	OPAMP-INP
	PA1	OPAMP1_VINM	Analog mode	No pull-up and no pull-down	n/a	OPAMP-INM
	PA3	OPAMP1_VOUT	Analog mode	No pull-up and no pull-down	n/a	OPAMP_OUT
RCC	PC14-OSC32_IN (PC14)	RCC_OSC32_IN	n/a	n/a	n/a	
	PC15-OSC32_OUT (PC15)	RCC_OSC32_OUT	n/a	n/a	n/a	
	PH0-OSC_IN (PH0)	RCC_OSC_IN	n/a	n/a	n/a	

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PH1-OSC_OUT (PH1)	RCC_OSC_OUT	n/a	n/a	n/a	
RTC	PC13	RTC_OUT_ALARM	n/a	n/a	n/a	
SYS	PA13 (JTMS-SWDIO)	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14 (JTCK-SWCLK)	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	
TIM2	PA5	TIM2_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Low	FAN-PWM
	PB10	TIM2_CH3	Alternate Function Push Pull	**Pull-up ***	Low	FAN-TACH
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 ***	
Single Mapped Signals	PB13	I2C2_SCL	Alternate Function Open Drain	No pull-up and no pull-down	Low	
	PB14	I2C2_SDA	Alternate Function Open Drain	No pull-up and no pull-down	**Very High ***	
GPIO	PC1	GPIO_Analog	Analog mode	No pull-up and no pull-down	n/a	FET-CUR-RC
	PC3	GPIO_Analog	Analog mode	No pull-up and no pull-down	n/a	FET_CUR-A2
	PA0	GPIO_Analog	Analog mode	No pull-up and no pull-down	n/a	OPAMP-INP
	PA1	GPIO_Analog	Analog mode	No pull-up and no pull-down	n/a	OPAMP-INM
	PA3	GPIO_Analog	Analog mode	No pull-up and no pull-down	n/a	OPAMP_OUT
	PA4	GPIO_Analog	Analog mode	No pull-up and no pull-down	n/a	dc-dc-15V
	PA7	GPIO_Analog	Analog mode	No pull-up and no pull-down	n/a	HV-div1
	PB0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LED_RED
	PB1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LED_GRN
	PB2	GPIO_Analog	Analog mode	No pull-up and no pull-down	n/a	HV-div2
	PB12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	PADxx
	PB15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	PAD7
	PC6	GPIO_Output	Output Push Pull	**Pull-down ***	Low	DUMP2
	PC8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DUMP_NOT
	PC10	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DUMP
	PC11	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	HEATER_NOT
	PC12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	HEATER
	PD2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	BQ_LD
	PB3 (JTDO-TRACESWO	GPIO_EXTI3	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	ALERT

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	)					
	PB4 (NJTRST)	GPIO_Analog	Analog mode	No pull-up and no pull-down	n/a	FET-CUR-A1
	PB5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	BQ-RST-SHUT

8.2. DMA configuration

DMA request	Stream	Direction	Priority
USART1_RX	DMA2_Channel7	Peripheral To Memory	Low
USART1_TX	DMA2_Channel6	Memory To Peripheral	Low
I2C1_RX	DMA1_Channel7	Peripheral To Memory	Low
I2C1_TX	DMA1_Channel6	Memory To Peripheral	Low
ADC1	DMA1_Channel1	Peripheral To Memory	Low

USART1_RX: DMA2_Channel7 DMA request Settings:

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

USART1_TX: DMA2_Channel6 DMA request Settings:

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

I2C1_RX: DMA1_Channel7 DMA request Settings:

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

I2C1_TX: DMA1_Channel6 DMA request Settings:

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

Memory Data Width:	Byte

ADC1: DMA1_Channel1 DMA request Settings:

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

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	15	0
System tick timer	true	15	0
EXTI line3 interrupt	true	11	0
DMA1 channel1 global interrupt	true	6	0
DMA1 channel6 global interrupt	true	6	0
DMA1 channel7 global interrupt	true	6	0
ADC1 global interrupt	true	5	0
TIM1 update interrupt and TIM16 global interrupt	true	0	0
I2C1 event interrupt	true	8	0
USART1 global interrupt	true	10	0
DMA2 channel6 global interrupt	true	6	0
DMA2 channel7 global interrupt	true	6	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 TX interrupt	unused		
CAN1 RX0 interrupt	unused		
CAN1 RX1 interrupt	unused		
CAN1 SCE interrupt	unused		
TIM1 break interrupt and TIM15 global interrupt	unused		
TIM1 trigger and commutation interrupts	unused		
TIM1 capture compare interrupt	unused		
TIM2 global interrupt	unused		
I2C1 error interrupt	unused		
RTC alarm interrupt through EXTI line 18	unused		
TIM6 global interrupt, DAC channel1 and channel2 underrun error interrupts	unused		
COMP1 and COMP2 interrupts through EXTI lines 21 and 22	unused		
FPU global interrupt	unused		

8.3.2. NVIC Code generation

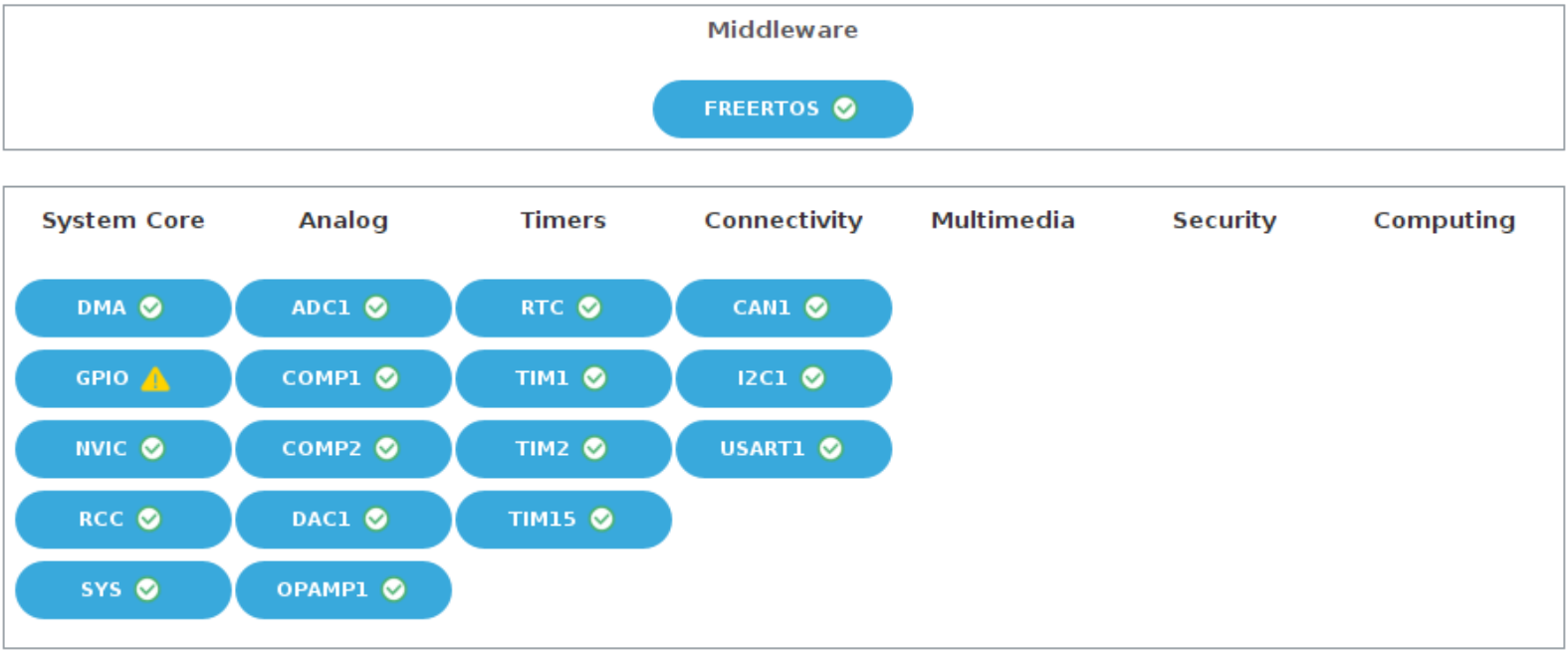
Enabled interrupt Table	Select for init sequence ordering	Generate IRQ handler	Call HAL handler
Non maskable interrupt	false	true	false
Hard fault interrupt	false	true	false
Memory management fault	false	true	false
Prefetch fault, memory access fault	false	true	false
Undefined instruction or illegal state	false	true	false
System service call via SWI instruction	false	false	false
Debug monitor	false	true	false
Pendable request for system service	false	false	false
System tick timer	false	false	true
EXTI line3 interrupt	false	true	true
DMA1 channel1 global interrupt	false	true	true
DMA1 channel6 global interrupt	false	true	true
DMA1 channel7 global interrupt	false	true	true
ADC1 global interrupt	false	true	true
TIM1 update interrupt and TIM16 global interrupt	false	true	true
I2C1 event interrupt	false	true	true
USART1 global interrupt	false	true	true
DMA2 channel6 global interrupt	false	true	true
DMA2 channel7 global 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/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