
STM32
CubeMX

1. Description

1.1. Project

Project Name	ciach
Board Name	NUCLEO-F303RE
Generated with:	STM32CubeMX 6.0.0
Date	03/27/2024

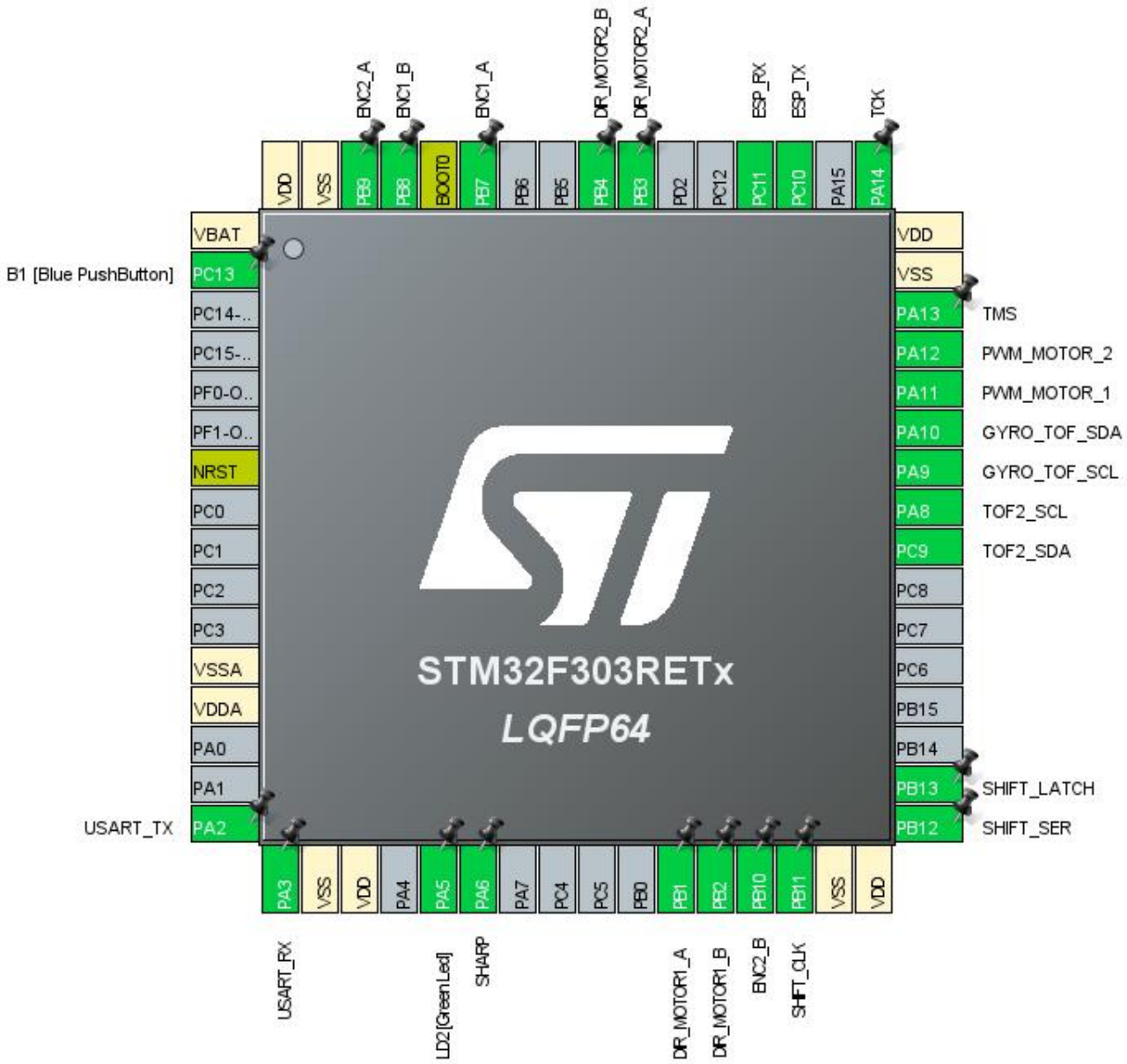
1.2. MCU

MCU Series	STM32F3
MCU Line	STM32F303
MCU name	STM32F303RETx
MCU Package	LQFP64
MCU Pin number	64

1.3. Core(s) information

Core(s)	Arm Cortex-M4

2. Pinout Configuration



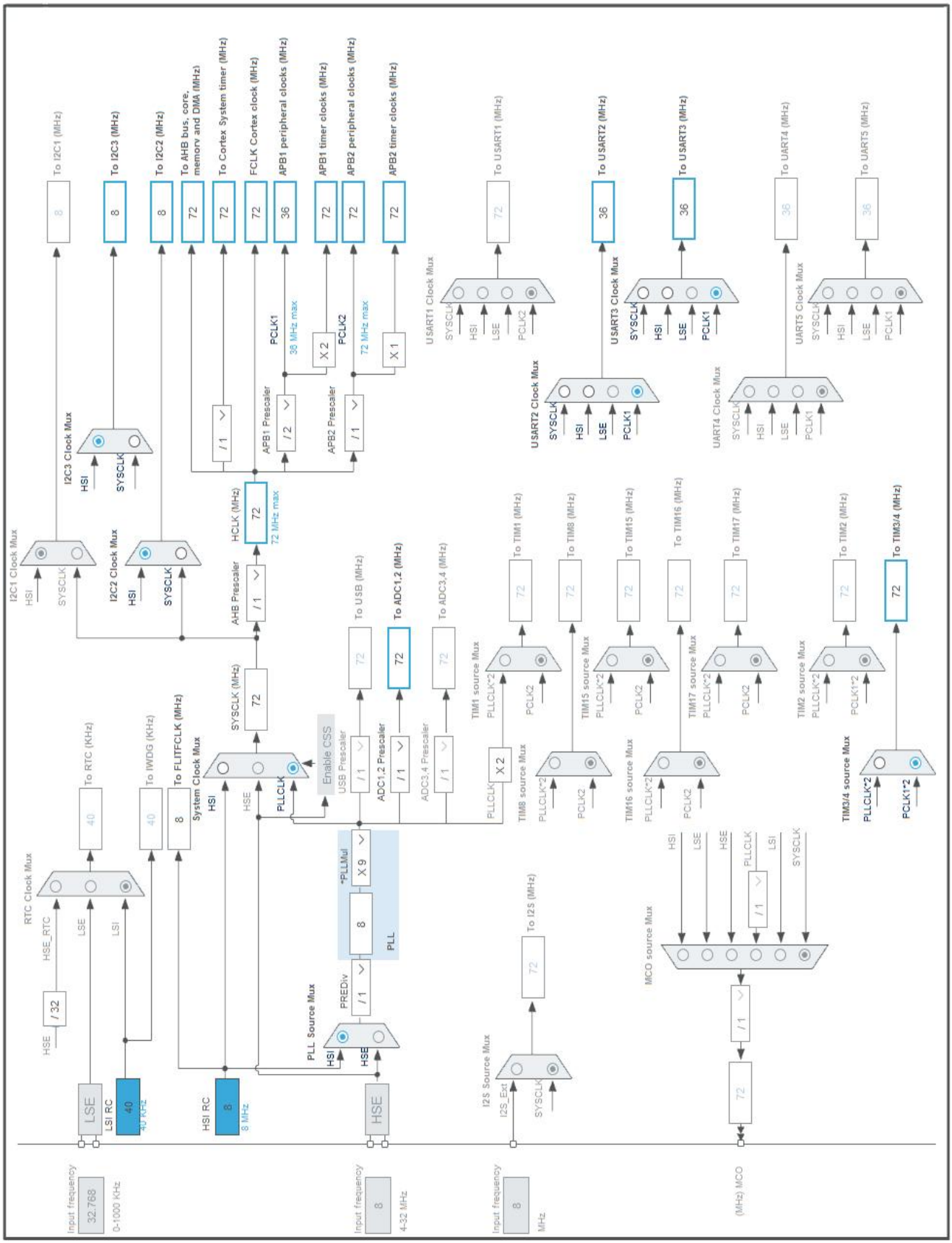
3. Pins Configuration

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
2	PC13	I/O	GPIO_EXTI13	B1 [Blue PushButton]
7	NRST	Reset		
12	VSSA	Power		
13	VDDA	Power		
16	PA2	I/O	USART2_TX	USART_TX
17	PA3	I/O	USART2_RX	USART_RX
18	VSS	Power		
19	VDD	Power		
21	PA5 *	I/O	GPIO_Output	LD2 [Green Led]
22	PA6	I/O	ADC2_IN3	SHARP
27	PB1 *	I/O	GPIO_Output	DIR_MOTOR1_A
28	PB2 *	I/O	GPIO_Output	DIR_MOTOR1_B
29	PB10 *	I/O	GPIO_Output	ENC2_B
30	PB11 *	I/O	GPIO_Output	SHIFT_CLK
31	VSS	Power		
32	VDD	Power		
33	PB12 *	I/O	GPIO_Output	SHIFT_SER
34	PB13 *	I/O	GPIO_Output	SHIFT_LATCH
40	PC9	I/O	I2C3_SDA	TOF2_SDA
41	PA8	I/O	I2C3_SCL	TOF2_SCL
42	PA9	I/O	I2C2_SCL	GYRO_TOF_SCL
43	PA10	I/O	I2C2_SDA	GYRO_TOF_SDA
44	PA11	I/O	TIM4_CH1	PWM_MOTOR_1
45	PA12	I/O	TIM4_CH2	PWM_MOTOR_2
46	PA13	I/O	SYS_JTMS-SWDIO	TMS
47	VSS	Power		
48	VDD	Power		
49	PA14	I/O	SYS_JTCK-SWCLK	TCK
51	PC10	I/O	USART3_TX	ESP_TX
52	PC11	I/O	USART3_RX	ESP_RX
55	PB3 *	I/O	GPIO_Output	DIR_MOTOR2_A
56	PB4 *	I/O	GPIO_Output	DIR_MOTOR2_B
59	PB7 *	I/O	GPIO_Output	ENC1_A
60	BOOT0	Boot		
61	PB8 *	I/O	GPIO_Output	ENC1_B

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
62	PB9 *	I/O	GPIO_Output	ENC2_A
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	ciach
Project Folder	C:\Users\szych\STM32CubeIDE\workspace_1.4.0\ciach
Toolchain / IDE	STM32CubeIDE
Firmware Package Name and Version	STM32Cube FW_F3 V1.11.3
Application Structure	Advanced
Generate Under Root	Yes
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 only the necessary library files
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	IP Instance Name
1	MX_GPIO_Init	GPIO
2	SystemClock_Config	RCC
3	MX_USART2_UART_Init	USART2
4	MX_ADC2_Init	ADC2
5	MX_I2C2_Init	I2C2
6	MX_I2C3_Init	I2C3
7	MX_USART3_UART_Init	USART3
8	MX_TIM4_Init	TIM4

6. Power Consumption Calculator report

6.1. Microcontroller Selection

Series	STM32F3
Line	STM32F303
MCU	STM32F303RETx
Datasheet	DS10362_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

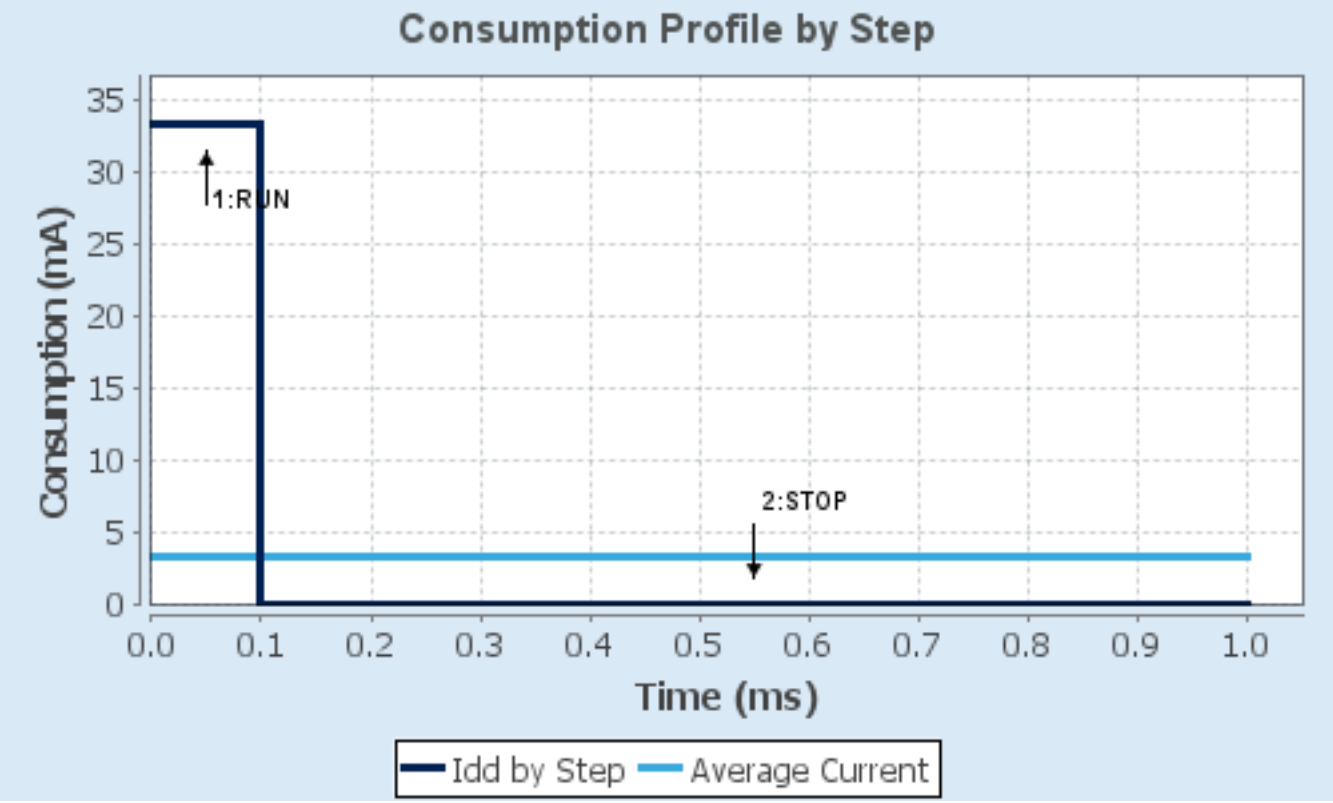
6.4. Sequence

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	72 MHz	0 Hz
Clock Configuration	HSEBYP PLL	Regulator_LP
Clock Source Frequency	8 MHz	0 Hz
Peripherals		
Additional Cons.	0 mA	0 mA
Average Current	33.24 mA	9.8 µA
Duration	0.1 ms	0.9 ms
DMIPS	63.0	0.0
Ta Max	99.5	105
Category	In DS Table	In DS Table

6.5. Results

Sequence Time	1 ms	Average Current	3.33 mA
Battery Life	1 month, 12 days, 1 hour	Average DMIPS	63.0 DMIPS

6.6. Chart


Consumption Profile by Step
Consumption (mA)
35
30
25
20
15
10
5
0
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. ADC2

IN3: IN3 Single-ended

7.1.1. Parameter Settings:

ADCs_Common_Settings:

Mode	Independent mode

ADC_Settings:

Clock Prescaler	ADC Asynchronous clock mode
Resolution	ADC 12-bit resolution
Data Alignment	Right alignment
Scan Conversion Mode	Disabled
Continuous Conversion Mode	Disabled
Discontinuous Conversion Mode	Disabled
DMA Continuous Requests	Disabled
End Of Conversion Selection	End of single conversion
Overrun behaviour	Overrun data overwritten
Low Power Auto Wait	Disabled

ADC_Regular_ConversionMode:

Enable Regular Conversions	Enable
Number Of Conversion	1
External Trigger Conversion Source	Regular Conversion launched by software
External Trigger Conversion Edge	None
Rank	1
Channel	Channel 3
Sampling Time	1.5 Cycles
Offset Number	No offset
Offset	0

ADC_Injected_ConversionMode:

Enable Injected Conversions	Enable
Number Of Conversions	0

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. GPIO

7.3. I2C2

I2C: I2C

7.3.1. 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

7.4. I2C3

I2C: I2C

7.4.1. 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

7.5. RCC

7.5.1. 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

7.6. SYS

Debug: Serial Wire

Timebase Source: SysTick

7.7. TIM4

Channel1: PWM Generation CH1

Channel2: PWM Generation CH2

7.7.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**71 ***
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**499 ***
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 (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

7.8. USART2

Mode: Asynchronous

7.8.1. 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

7.9. USART3

Mode: Asynchronous

7.9.1. 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
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
ADC2	PA6	ADC2_IN3	Analog mode	No pull up pull down	n/a	SHARP
I2C2	PA9	I2C2_SCL	Alternate Function Open Drain	Pull up	**High ***	GYRO_TOF_SCL
	PA10	I2C2_SDA	Alternate Function Open Drain	Pull up	**High ***	GYRO_TOF_SDA
I2C3	PC9	I2C3_SDA	Alternate Function Open Drain	Pull up	**High ***	TOF2_SDA
	PA8	I2C3_SCL	Alternate Function Open Drain	Pull up	**High ***	TOF2_SCL
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	TMS
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	TCK
TIM4	PA11	TIM4_CH1	Alternate Function Push Pull	No pull up pull down	Low	PWM_MOTOR_1
	PA12	TIM4_CH2	Alternate Function Push Pull	No pull up pull down	Low	PWM_MOTOR_2
USART2	PA2	USART2_TX	Alternate Function Push Pull	No pull up pull down	Low	USART_TX
	PA3	USART2_RX	Alternate Function Push Pull	No pull up pull down	Low	USART_RX
USART3	PC10	USART3_TX	Alternate Function Push Pull	No pull up pull down	**High ***	ESP_TX
	PC11	USART3_RX	Alternate Function Push Pull	No pull up pull down	**High ***	ESP_RX
GPIO	PC13	GPIO_EXTI13	**External Interrupt Mode with Falling edge trigger detection**	No pull up pull down	n/a	B1 [Blue PushButton]
	PA5	GPIO_Output	Output Push Pull	No pull up pull down	Low	LD2 [Green Led]
	PB1	GPIO_Output	Output Push Pull	No pull up pull down	Low	DIR_MOTOR1_A
	PB2	GPIO_Output	Output Push Pull	No pull up pull down	Low	DIR_MOTOR1_B
	PB10	GPIO_Output	Output Push Pull	No pull up pull down	Low	ENC2_B
	PB11	GPIO_Output	Output Push Pull	No pull up pull down	Low	SHIFT_CLK
	PB12	GPIO_Output	Output Push Pull	No pull up pull down	Low	SHIFT_SER
	PB13	GPIO_Output	Output Push Pull	No pull up pull down	Low	SHIFT_LATCH
	PB3	GPIO_Output	Output Push Pull	No pull up pull down	Low	DIR_MOTOR2_A
	PB4	GPIO_Output	Output Push Pull	No pull up pull down	Low	DIR_MOTOR2_B
	PB7	GPIO_Output	Output Push Pull	No pull up pull down	Low	ENC1_A
	PB8	GPIO_Output	Output Push Pull	No pull up pull down	Low	ENC1_B
	PB9	GPIO_Output	Output Push Pull	No pull up pull down	Low	ENC2_A

8.2. DMA configuration

nothing configured in DMA service

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	0	0
System tick timer	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
ADC1 and ADC2 interrupts	unused		
TIM4 global interrupt	unused		
I2C2 event global interrupt / I2C2 wake-up interrupt through EXTI line 24	unused		
I2C2 error interrupt	unused		
USART2 global interrupt / USART2 wake-up interrupt through EXTI line 26	unused		
USART3 global interrupt / USART3 wake-up interrupt through EXTI line 28	unused		
EXTI line[15:10] interrupts	unused		
I2C3 event interrupt / I2C3 wake-up interrupt through EXTI line 27	unused		
I2C3 error interrupt	unused		
Floating point unit 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	true	true	false
Hard fault interrupt	true	true	false
Memory management fault	true	true	false
Pre-fetch fault, memory access fault	true	true	false
Undefined instruction or illegal state	true	true	false
System service call via SWI instruction	true	true	false
Debug monitor	true	true	false
Pendable request for system service	true	true	false

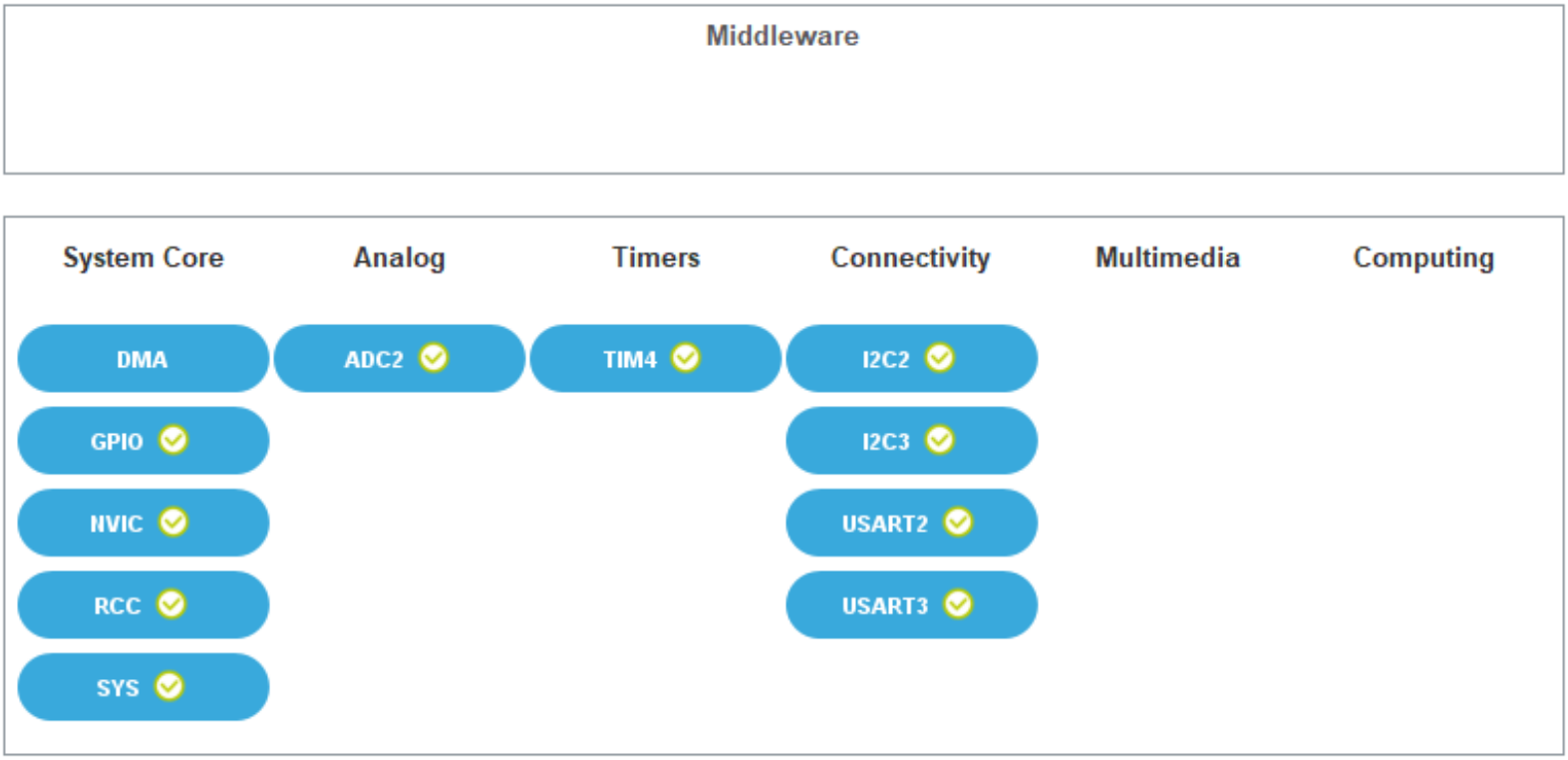
Enabled interrupt Table	Select for init sequence ordering	Generate IRQ handler	Call HAL handler
System tick timer	true	true	true

*** 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/DM00118585.pdf
Reference manual	http://www.st.com/resource/en/reference_manual/DM00043574.pdf
Programming manual	http://www.st.com/resource/en/programming_manual/DM00046982.pdf
Errata sheet	http://www.st.com/resource/en/errata_sheet/DM00118589.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/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/DM00047998.pdf
Application note	http://www.st.com/resource/en/application_note/DM00053084.pdf
Application note	http://www.st.com/resource/en/application_note/DM00070391.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/DM00074240.pdf
Application note	http://www.st.com/resource/en/application_note/DM00080497.pdf
Application note	http://www.st.com/resource/en/application_note/DM00083249.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/DM00121474.pdf
Application note	http://www.st.com/resource/en/application_note/DM00129215.pdf
Application note	http://www.st.com/resource/en/application_note/DM00129600.pdf
Application note	http://www.st.com/resource/en/application_note/DM00157785.pdf

Application note	http://www.st.com/resource/en/application_note/DM00160482.pdf
Application note	http://www.st.com/resource/en/application_note/DM00210617.pdf
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Application note	http://www.st.com/resource/en/application_note/DM00260340.pdf
Application note	http://www.st.com/resource/en/application_note/DM00272912.pdf
Application note	http://www.st.com/resource/en/application_note/DM00226326.pdf
Application note	http://www.st.com/resource/en/application_note/DM00236305.pdf
Application note	http://www.st.com/resource/en/application_note/DM00269146.pdf
Application note	http://www.st.com/resource/en/application_note/DM00296349.pdf
Application note	http://www.st.com/resource/en/application_note/DM00327191.pdf
Application note	http://www.st.com/resource/en/application_note/DM00355687.pdf
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Application note	http://www.st.com/resource/en/application_note/DM00442720.pdf
Application note	http://www.st.com/resource/en/application_note/DM00725181.pdf