



1. Description

1.1. Project

Project Name	d3vk1t
Board Name	custom
Generated with:	STM32CubeMX 6.8.0
Date	04/25/2023

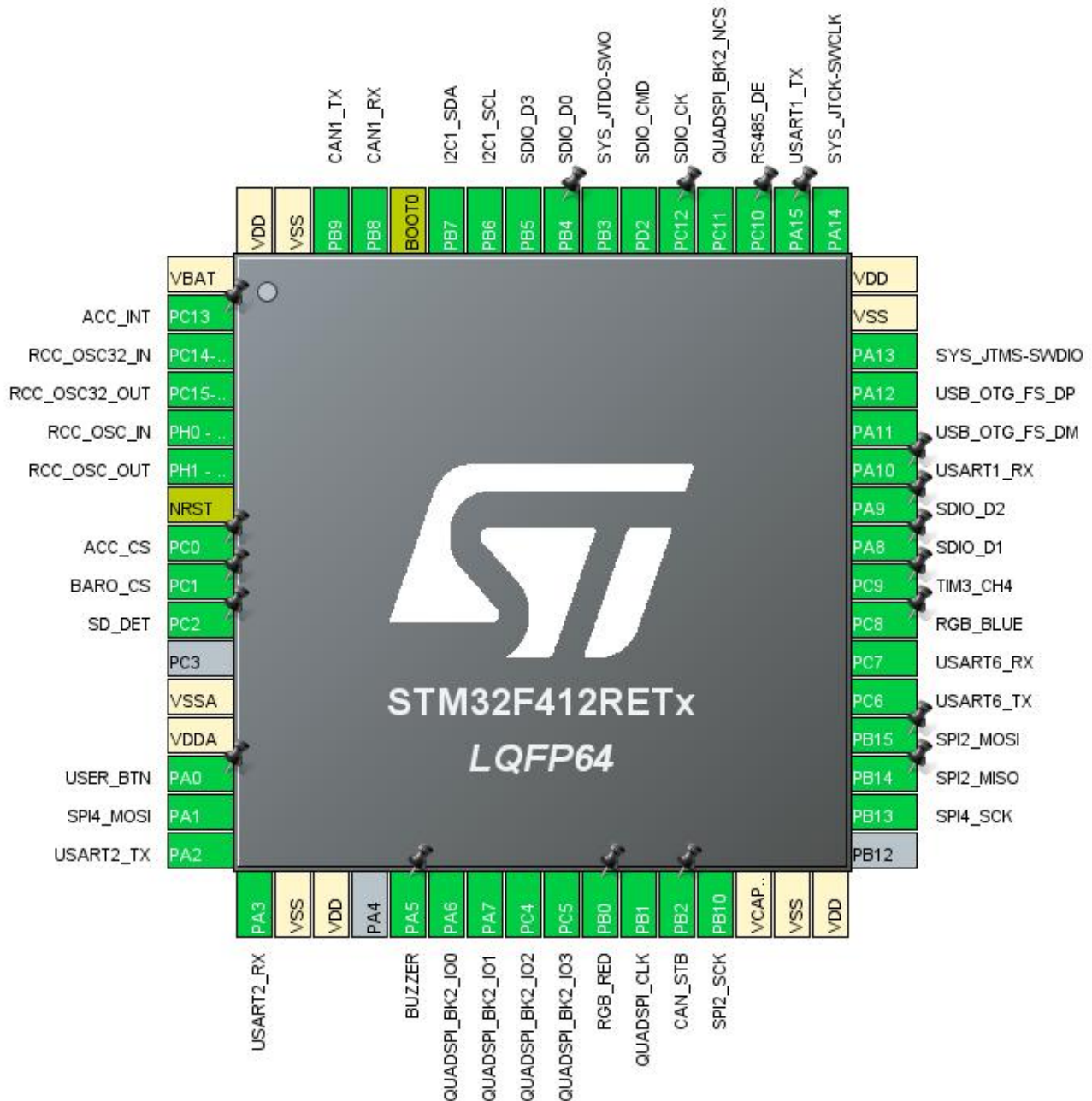
1.2. MCU

MCU Series	STM32F4
MCU Line	STM32F412
MCU name	STM32F412RETx
MCU Package	LQFP64
MCU Pin number	64

1.3. Core(s) information

Core(s)	Arm Cortex-M4
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2. Pinout Configuration



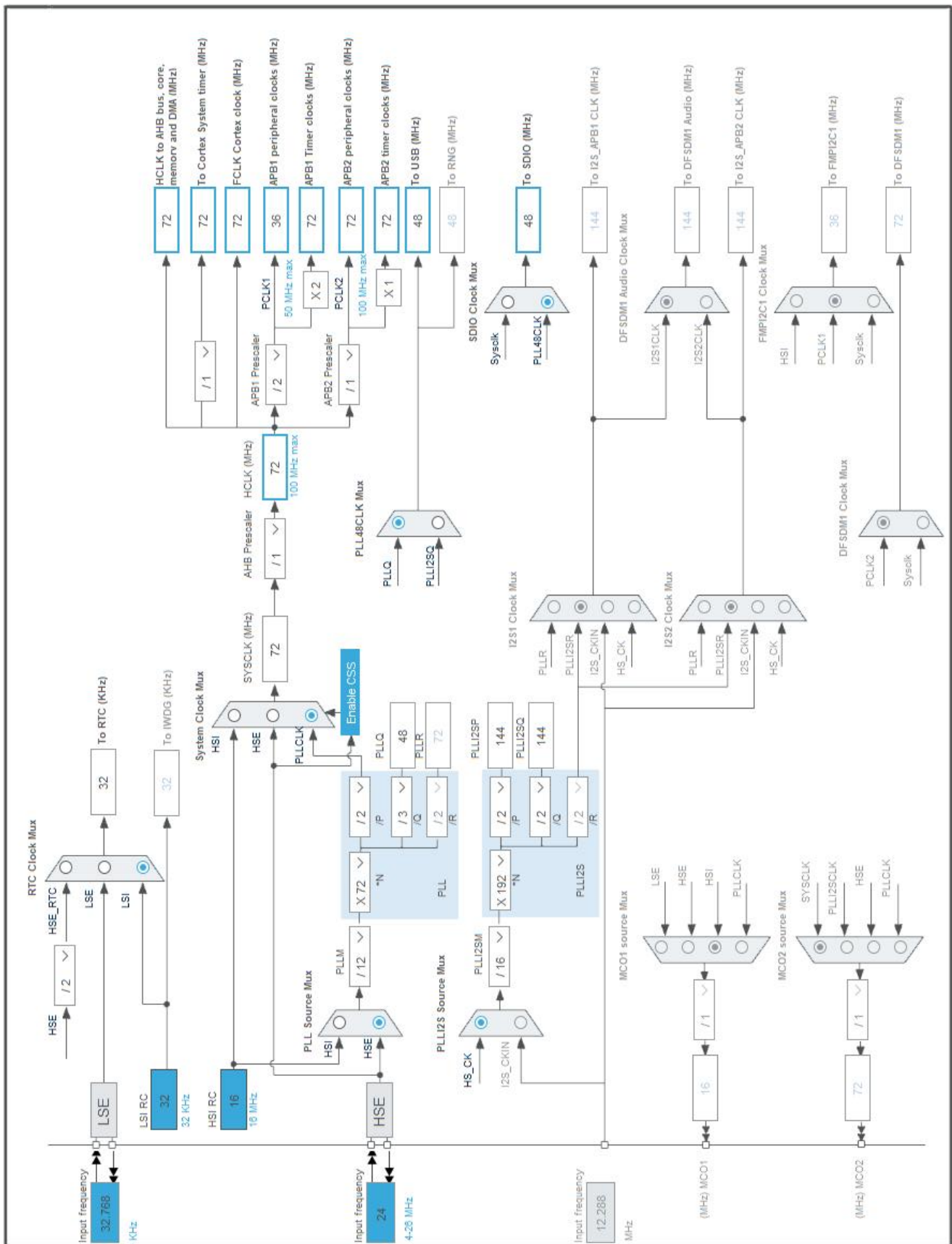
3. Pins Configuration

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
2	PC13	I/O	GPIO_EXTI13	ACC_INT
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	GPIO_Output	ACC_CS
9	PC1 *	I/O	GPIO_Output	BARO_CS
10	PC2	I/O	GPIO_EXTI2	SD_DET
12	VSSA	Power		
13	VDDA	Power		
14	PA0	I/O	GPIO_EXTI0	USER_BTN
15	PA1	I/O	SPI4_MOSI	
16	PA2	I/O	USART2_TX	
17	PA3	I/O	USART2_RX	
18	VSS	Power		
19	VDD	Power		
21	PA5	I/O	TIM2_CH1	BUZZER
22	PA6	I/O	QUADSPI_BK2_IO0	
23	PA7	I/O	QUADSPI_BK2_IO1	
24	PC4	I/O	QUADSPI_BK2_IO2	
25	PC5	I/O	QUADSPI_BK2_IO3	
26	PB0	I/O	TIM3_CH3	RGB_RED
27	PB1	I/O	QUADSPI_CLK	
28	PB2 *	I/O	GPIO_Output	CAN_STB
29	PB10	I/O	SPI2_SCK	
30	VCAP_1	Power		
31	VSS	Power		
32	VDD	Power		
34	PB13	I/O	SPI4_SCK	
35	PB14	I/O	SPI2_MISO	
36	PB15	I/O	SPI2_MOSI	
37	PC6	I/O	USART6_TX	
38	PC7	I/O	USART6_RX	
39	PC8	I/O	TIM8_CH3	RGB_BLUE

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
40	PC9	I/O	TIM3_CH4	
41	PA8	I/O	SDIO_D1	
42	PA9	I/O	SDIO_D2	
43	PA10	I/O	USART1_RX	
44	PA11	I/O	USB_OTG_FS_DM	
45	PA12	I/O	USB_OTG_FS_DP	
46	PA13	I/O	SYS_JTMS-SWDIO	
47	VSS	Power		
48	VDD	Power		
49	PA14	I/O	SYS_JTCK-SWCLK	
50	PA15	I/O	USART1_TX	
51	PC10 *	I/O	GPIO_Output	RS485_DE
52	PC11	I/O	QUADSPI_BK2_NCS	
53	PC12	I/O	SDIO_CK	
54	PD2	I/O	SDIO_CMD	
55	PB3	I/O	SYS_JTDO-SWO	
56	PB4	I/O	SDIO_D0	
57	PB5	I/O	SDIO_D3	
58	PB6	I/O	I2C1_SCL	
59	PB7	I/O	I2C1_SDA	
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	d3vk1t
Project Folder	C:\dev\personal\hardware\d3vk1t\doc
Toolchain / IDE	EWARM V8.50
Firmware Package Name and Version	STM32Cube FW_F4 V1.27.1
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_CAN1_Init	CAN1
4	MX_I2C1_Init	I2C1
5	MX_SDIO_SD_Init	SDIO
6	MX_USART1_UART_Init	USART1
7	MX_USART2_UART_Init	USART2
8	MX_USB_OTG_FS_PCD_Init	USB_OTG_FS
9	MX_TIM2_Init	TIM2
10	MX_TIM3_Init	TIM3
11	MX_QUADSPI_Init	QUADSPI

Rank	Function Name	Peripheral Instance Name
12	MX_RTC_Init	RTC
13	MX_SPI2_Init	SPI2
14	MX_SPI4_Init	SPI4
15	MX_TIM8_Init	TIM8
16	MX_TIM14_Init	TIM14
17	MX_USART6_UART_Init	USART6

6. Power Consumption Calculator report

6.1. Microcontroller Selection

Series	STM32F4
Line	STM32F412
MCU	STM32F412RETx
Datasheet	DS11139_Rev5

6.2. Parameter Selection

Temperature	25
Vdd	1.7

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

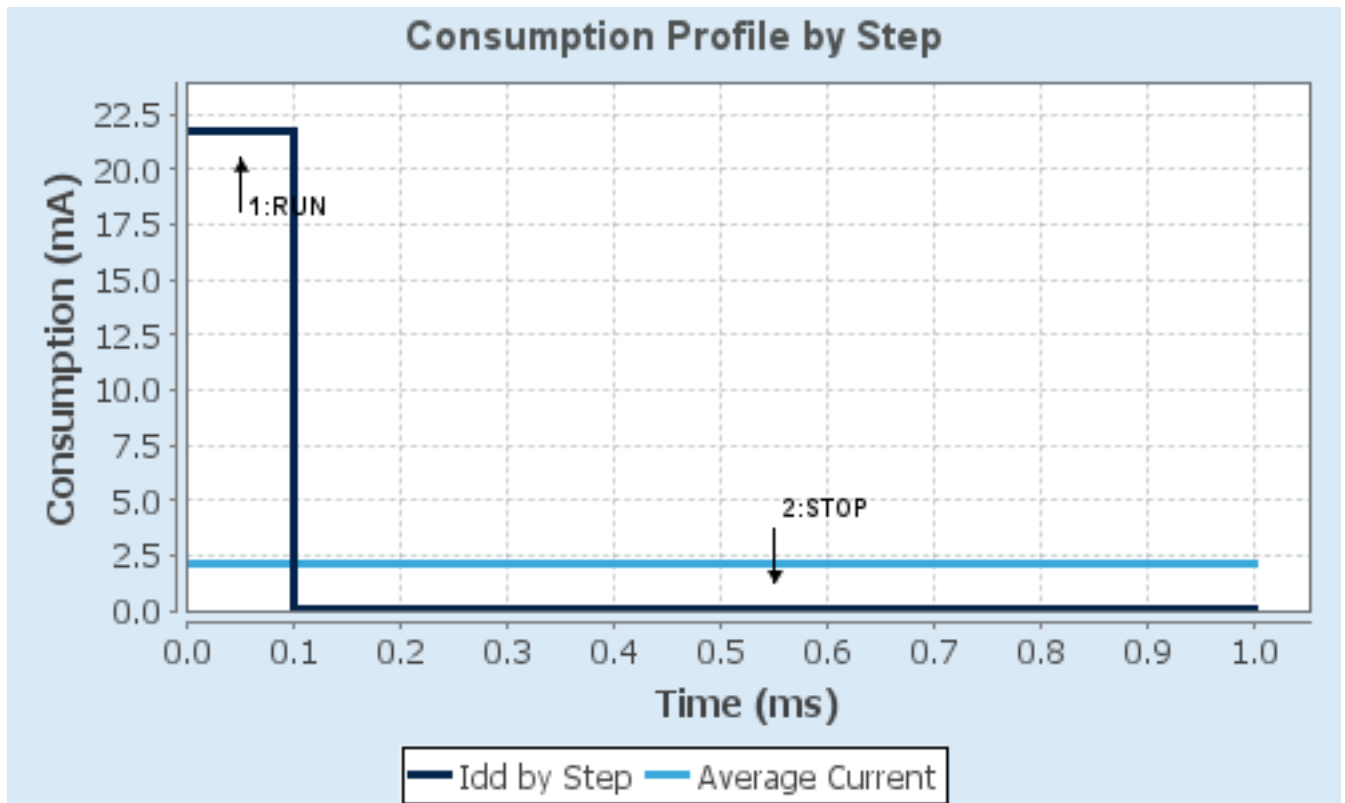
6.4. Sequence

Step	Step1	Step2
Mode	RUN	STOP
Vdd	1.7	1.7
Voltage Source	Battery	Battery
Range	Scale1-High	No Scale
Fetch Type	FLASH	n/a
CPU Frequency	100 MHz	0 Hz
Clock Configuration	HSE PLL	Regulator_LPLV Flash-PwrDwn
Clock Source Frequency	4 MHz	0 Hz
Peripherals		
Additional Cons.	0 mA	0 mA
Average Current	21.7 mA	18.5 μ A
Duration	0.1 ms	0.9 ms
DMIPS	125.0	0.0
Ta Max	103.27	105
Category	In DS Table	In DS Table

6.5. Results

Sequence Time	1 ms	Average Current	2.19 mA
Battery Life	2 months, 3 days, 20 hours	Average DMIPS	125.0 DMIPS

6.6. Chart



7. Peripherals and Middlewares Configuration

7.1. CAN1

mode: Activated

7.1.1. Parameter Settings:

Bit Timings Parameters:

Prescaler (for Time Quantum)	16
Time Quantum	444.44444444444446 *
Time Quanta in Bit Segment 1	1 Time
Time Quanta in Bit Segment 2	1 Time
Time for one Bit	1333 *
Baud Rate	749999 *
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
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7.2. I2C1

I2C: I2C

7.2.1. Parameter Settings:

Master Features:

I2C Speed Mode	Standard Mode
I2C Clock Speed (Hz)	100000

Slave Features:

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

7.3. QUADSPI

QuadSPI Mode: Bank2 with Quad SPI Lines

7.3.1. Parameter Settings:

General Parameters:

Clock Prescaler	255
Fifo Threshold	1
Sample Shifting	No Sample Shifting
Flash Size	1
Chip Select High Time	1 Cycle
Clock Mode	Low
Flash ID	Flash ID 2
Dual Flash	Disabled

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)	2 WS (3 CPU cycle)

RCC Parameters:

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

Power Parameters:

Power Regulator Voltage Scale	Power Regulator Voltage Scale 1
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7.5. RTC

mode: Activate Clock Source

7.5.1. Parameter Settings:

General:

Hour Format	Hourformat 24
Asynchronous Predivider value	127
Synchronous Predivider value	255

7.6. SDIO

Mode: SD 4 bits Wide bus

7.6.1. Parameter Settings:

SDIO parameters:

Clock transition on which the bit capture is made	Rising transition
SDIO Clock divider bypass	Disable
SDIO Clock output enable when the bus is idle	Disable the power save for the clock
SDIO hardware flow control	The hardware control flow is disabled
SDIOCLK clock divide factor	0

7.7. SPI2

Mode: Full-Duplex Master

7.7.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	2
Baud Rate	18.0 MBits/s *
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Software

7.8. SPI4

Mode: Transmit Only Master

7.8.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	2
Baud Rate	36.0 MBits/s *
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Software

7.9. SYS

Debug: Trace Asynchronous Sw

Timebase Source: SysTick

7.10. TIM2

Channel1: PWM Generation CH1

7.10.1. 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	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

7.11. TIM3

Channel3: PWM Generation CH3

Channel4: PWM Generation CH4

7.11.1. 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
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 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

7.12. TIM8

Channel3: PWM Generation CH3

7.12.1. 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)

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 3:

Mode	PWM mode 1
Pulse (16 bits value)	0
Output compare preload	Enable
Fast Mode	Disable
CH Polarity	High
CH Idle State	Reset

7.13. TIM14

mode: Activated**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
auto-reload preload	Disable

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	16 Samples

7.15. USART2

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. USART6

Mode: Asynchronous

7.16.1. 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

7.17. USB_OTG_FS

Mode: Device_Only

7.17.1. Parameter Settings:

Speed	Full Speed 12MBit/s
Low power	Disabled
Battery charging	Disabled
Link Power Management	Disabled
VBUS sensing	Disabled
Signal start of frame	Disabled

*** User modified value**

8. System Configuration

8.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
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 *	
I2C1	PB6	I2C1_SCL	Alternate Function Open Drain	No pull-up and no pull-down	Very High *	
	PB7	I2C1_SDA	Alternate Function Open Drain	No pull-up and no pull-down	Very High *	
QUADSPI	PA6	QUADSPI_BK2_IO0	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PA7	QUADSPI_BK2_IO1	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PC4	QUADSPI_BK2_IO2	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PC5	QUADSPI_BK2_IO3	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PB1	QUADSPI_CLK	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PC11	QUADSPI_BK2_NCS	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	
SDIO	PA8	SDIO_D1	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PA9	SDIO_D2	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PC12	SDIO_CK	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD2	SDIO_CMD	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PB4	SDIO_D0	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PB5	SDIO_D3	Alternate Function Push Pull	No pull-up and no pull-down	Very High	

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
SPI2	PB10	SPI2_SCK	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PB14	SPI2_MISO	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PB15	SPI2_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
SPI4	PA1	SPI4_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PB13	SPI4_SCK	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
	PB3	SYS_JTDO-SWO	n/a	n/a	n/a	
TIM2	PA5	TIM2_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Low	BUZZER
TIM3	PB0	TIM3_CH3	Alternate Function Push Pull	No pull-up and no pull-down	Low	RGB_RED
	PC9	TIM3_CH4	Alternate Function Push Pull	No pull-up and no pull-down	Low	
TIM8	PC8	TIM8_CH3	Alternate Function Push Pull	No pull-up and no pull-down	Low	RGB_BLUE
USART1	PA10	USART1_RX	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PA15	USART1_TX	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 *	
USART6	PC6	USART6_TX	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PC7	USART6_RX	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
USB_OTG_FS	PA11	USB_OTG_FS_DM	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PA12	USB_OTG_FS_DP	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
GPIO	PC13	GPIO_EXTI13	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	ACC_INT
	PC0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	ACC_CS

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PC1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	BARO_CS
	PC2	GPIO_EXTI2	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	SD_DET
	PA0	GPIO_EXTI0	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	USER_BTN
	PB2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	CAN_STB
	PC10	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	RS485_DE

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	15	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
EXTI line0 interrupt	unused		
EXTI line2 interrupt	unused		
CAN1 TX interrupts	unused		
CAN1 RX0 interrupts	unused		
CAN1 RX1 interrupt	unused		
CAN1 SCE interrupt	unused		
TIM2 global interrupt	unused		
TIM3 global interrupt	unused		
I2C1 event interrupt	unused		
I2C1 error interrupt	unused		
SPI2 global interrupt	unused		
USART1 global interrupt	unused		
USART2 global interrupt	unused		
EXTI line[15:10] interrupts	unused		
TIM8 break interrupt and TIM12 global interrupt	unused		
TIM8 update interrupt and TIM13 global interrupt	unused		
TIM8 trigger and commutation interrupts and TIM14 global interrupt	unused		
TIM8 capture compare interrupt	unused		
SDIO global interrupt	unused		
USB On The Go FS global interrupt	unused		
USART6 global interrupt	unused		
FPU global interrupt	unused		
SPI4 global interrupt	unused		
QUADSPI 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	true	false
Debug monitor	false	true	false
Pendable request for system service	false	true	false
System tick timer	false	true	true

* User modified value

9. System Views

9.1. Category view

9.1.1. Current

Middleware						
System Core	Analog	Timers	Connectivity	Multimedia	Security	Computing
DMA		RTC ✓	CAH1 ✓			
GPIO ✓		TIM2 ✓	I2C1 ✓			
IVVIC ✓		TIM3 ✓	QUADSPI ✓			
RCC ✓		TIM8 ✓	SDIO ✓			
SYS ✓		TIM14 ✓	SPI2 ✓			
			SPI4 ✓			
			USART1 ✓			
			USART2 ✓			
			USART6 ✓			
			USB_FS ✓			

10. Docs & Resources

Type	Link
BSDL files	https://www.st.com/resource/en/bsdl_model/stm32f412_bsd1.zip
IBIS models	https://www.st.com/resource/en/ibis_model/stm32f412_ibis.zip
System View Description	https://www.st.com/resource/en/svd/stm32f4_svd.zip
BSDL files	https://www.st.com/resource/en/bsdl_model/stm32f412_bsd1.zip
IBIS models	https://www.st.com/resource/en/ibis_model/stm32f412_ibis.zip
System View Description	https://www.st.com/resource/en/svd/stm32f4_svd.zip
Presentations	https://www.st.com/resource/en/product_presentation/stm32-stm8_embedded_software_solutions.pdf
Presentations	https://www.st.com/resource/en/product_presentation/stm32_eval-tools_portfolio.pdf
Presentations	https://www.st.com/resource/en/product_presentation/stm32_stm8_functional-safety-packages.pdf
Presentations	https://www.st.com/resource/en/product_presentation/stm32-stm8_software_development_tools.pdf
Training Material	https://www.st.com/resource/en/sales_guide/sg_sc2154.pdf
Flyers	https://www.st.com/resource/en/flyer/flstm32f4x1.pdf
Flyers	https://www.st.com/resource/en/flyer/flstm32nucleo.pdf
Flyers	https://www.st.com/resource/en/flyer/flstmcsuite.pdf
Flyers	https://www.st.com/resource/en/flyer/flstm32trust.pdf
Product Certifications	https://www.st.com/resource/en/certification_document/stm32_authentication_can.pdf
Application Notes	https://www.st.com/resource/en/application_note/an1181-electrostatic-discharge-sensitivity-measurement-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an1709-emc-design-guide-for-stm8-stm32-and-legacy-mcus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an2606-stm32-

microcontroller-system-memory-boot-mode-stmicroelectronics.pdf

- Application Notes https://www.st.com/resource/en/application_note/an2639-soldering-recommendations-and-package-information-for-leadfree-ecopack-mcus-and-mpus-stmicroelectronics.pdf
- Application Notes https://www.st.com/resource/en/application_note/an2834-how-to-get-the-best-adc-accuracy-in-stm32-microcontrollers-stmicroelectronics.pdf
- Application Notes https://www.st.com/resource/en/application_note/an2867-oscillator-design-guide-for-stm8afals-stm32-mcus-and-mpus-stmicroelectronics.pdf
- Application Notes https://www.st.com/resource/en/application_note/an2945-stm8s-and-stm32-mcus-a-consistent-832bit-product-line-for-painless-migration-stmicroelectronics.pdf
- Application Notes https://www.st.com/resource/en/application_note/an3070-managing-the-driver-enable-signal-for-rs485-and-iolink-communications-with-the-stm32s-usart-stmicroelectronics.pdf
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