1. Description

1.1. Project

Project Name	project
Board Name	custom
Generated with:	STM32CubeMX 6.5.0
Date	04/13/2024

1.2. MCU

MCU Series	STM32F1
MCU Line	STM32F103
MCU name	STM32F103VETx
MCU Package	LQFP100
MCU Pin number	100

1.3. Core(s) information

Core(s)	Arm Cortex-M3

2. Pinout Configuration
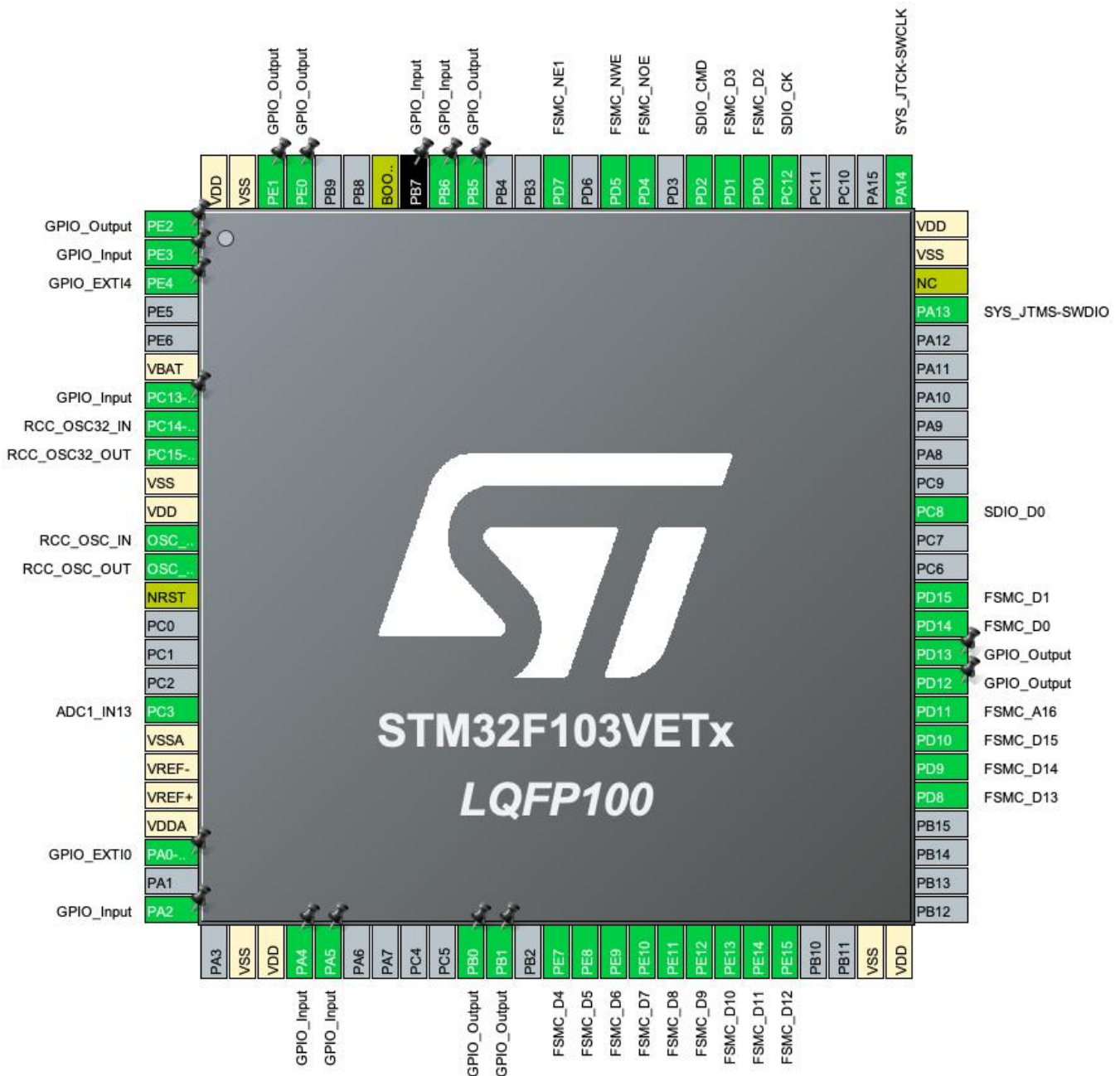
3. Pins Configuration

Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	PE2 *	I/O	GPIO_Output	
2	PE3 *	I/O	GPIO_Input	
3	PE4	I/O	GPIO_EXTI4	
6	VBAT	Power		
7	PC13-TAMPER-RTC *	I/O	GPIO_Input	
8	PC14-OSC32_IN	I/O	RCC_OSC32_IN	
9	PC15-OSC32_OUT	I/O	RCC_OSC32_OUT	
10	VSS	Power		
11	VDD	Power		
12	OSC_IN	MonoIO	RCC_OSC_IN	
13	OSC_OUT	MonoIO	RCC_OSC_OUT	
14	NRST	Reset		
18	PC3	I/O	ADC1_IN13	
19	VSSA	Power		
20	VREF-	Power		
21	VREF+	Power		
22	VDDA	Power		
23	PA0-WKUP	I/O	GPIO_EXTI0	
25	PA2 *	I/O	GPIO_Input	
27	VSS	Power		
28	VDD	Power		
29	PA4 *	I/O	GPIO_Input	
30	PA5 *	I/O	GPIO_Input	
35	PB0 *	I/O	GPIO_Output	
36	PB1 *	I/O	GPIO_Output	
38	PE7	I/O	FSMC_D4	
39	PE8	I/O	FSMC_D5	
40	PE9	I/O	FSMC_D6	
41	PE10	I/O	FSMC_D7	
42	PE11	I/O	FSMC_D8	
43	PE12	I/O	FSMC_D9	
44	PE13	I/O	FSMC_D10	
45	PE14	I/O	FSMC_D11	
46	PE15	I/O	FSMC_D12	
49	VSS	Power		
50	VDD	Power		

Pin Number LQFP100	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
55	PD8	I/O	FSMC_D13	
56	PD9	I/O	FSMC_D14	
57	PD10	I/O	FSMC_D15	
58	PD11	I/O	FSMC_A16	
59	PD12 *	I/O	GPIO_Output	
60	PD13 *	I/O	GPIO_Output	
61	PD14	I/O	FSMC_D0	
62	PD15	I/O	FSMC_D1	
65	PC8	I/O	SDIO_D0	
72	PA13	I/O	SYS_JTMS-SWDIO	
73	NC	NC		
74	VSS	Power		
75	VDD	Power		
76	PA14	I/O	SYS_JTCK-SWCLK	
80	PC12	I/O	SDIO_CK	
81	PD0	I/O	FSMC_D2	
82	PD1	I/O	FSMC_D3	
83	PD2	I/O	SDIO_CMD	
85	PD4	I/O	FSMC_NOE	
86	PD5	I/O	FSMC_NWE	
88	PD7	I/O	FSMC_NE1	
91	PB5 *	I/O	GPIO_Output	
92	PB6 *	I/O	GPIO_Input	
93	PB7 *	I/O	GPIO_Input	
94	BOOT0	Boot		
97	PE0 *	I/O	GPIO_Output	
98	PE1 *	I/O	GPIO_Output	
99	VSS	Power		
100	VDD	Power		

* The pin is affected with an I/O function

4. Clock Tree Configuration
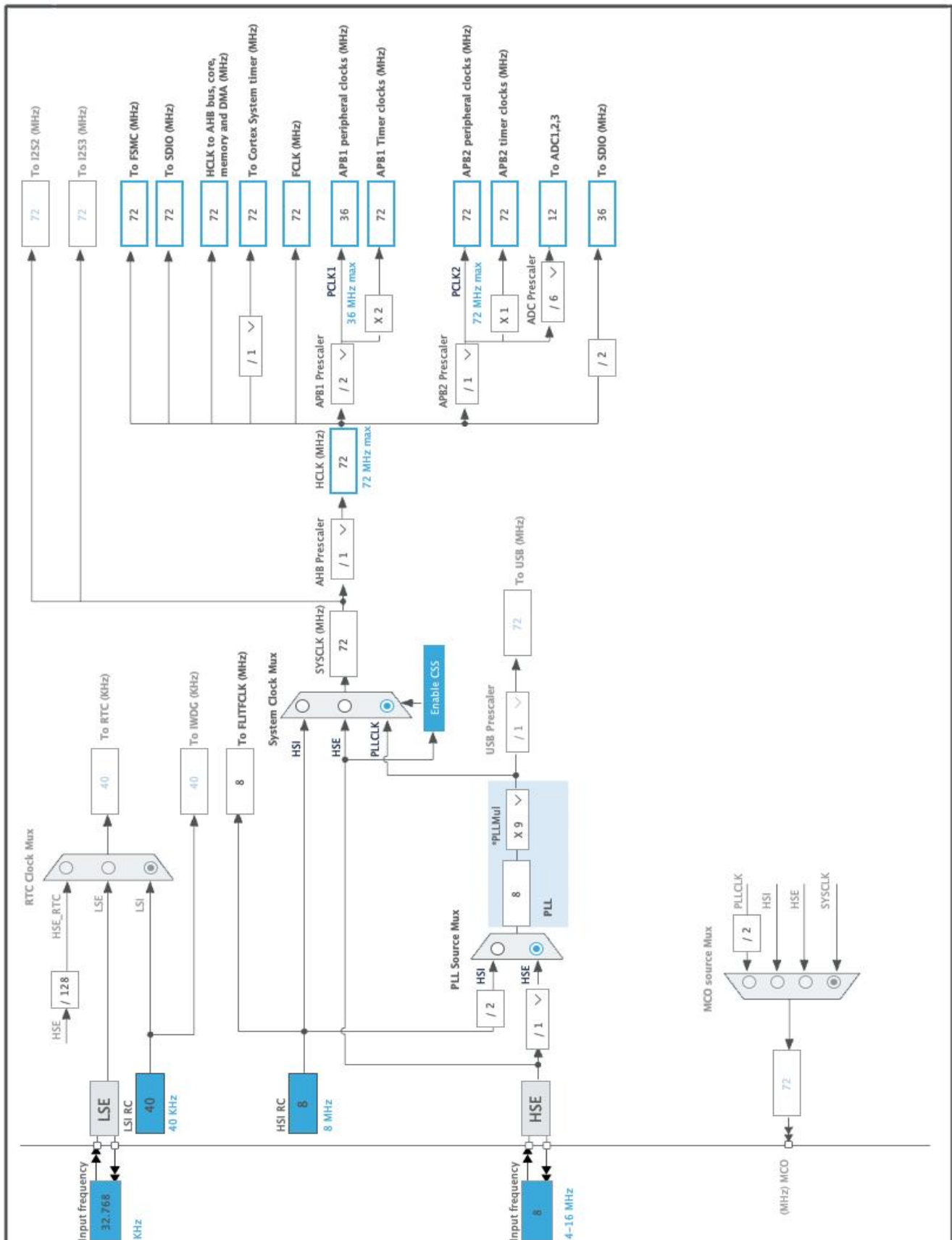
5. Software Project

5.1. Project Settings

Name	Value
Project Name	project
Project Folder	/Users/pinkylo/STM32CubeIDE/workspace_1.9.0/project
Toolchain / IDE	STM32CubeIDE
Firmware Package Name and Version	STM32Cube FW_F1 V1.8.4
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	Peripheral Instance Name
1	SystemClock_Config	RCC
2	MX_GPIO_Init	GPIO
3	MX_FSMC_Init	FSMC
4	MX_TIM3_Init	TIM3
5	MX_ADC1_Init	ADC1
6	MX_SDIO_SD_Init	SDIO
7	MX_FATFS_Init	FATFS

6. Power Consumption Calculator report

6.1. Microcontroller Selection

Series	STM32F1
Line	STM32F103
MCU	STM32F103VETx
Datasheet	DS5792_Rev12

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
Vdd	3.3	3.3
Voltage Source	Battery	Battery
Range	No Scale	No Scale
Fetch Type	FLASH	n/a
CPU Frequency	72 MHz	0 Hz
Clock Configuration	HSE PLL	Regulator_LP
Clock Source Frequency	8 MHz	0 Hz
Peripherals		
Additional Cons.	0 mA	0 mA
Average Current	30.5 mA	25 µA
Duration	0.1 ms	0.9 ms
DMIPS	90.0	0.0
Ta Max	100.37	105
Category	In DS Table	In DS Table

6.5. Results

Sequence Time	1 ms	Average Current	3.07 mA
Battery Life	1 month, 15 days, 15 hours	Average DMIPS	61.0 DMIPS

6.6. Chart

Consumption Profile by Step
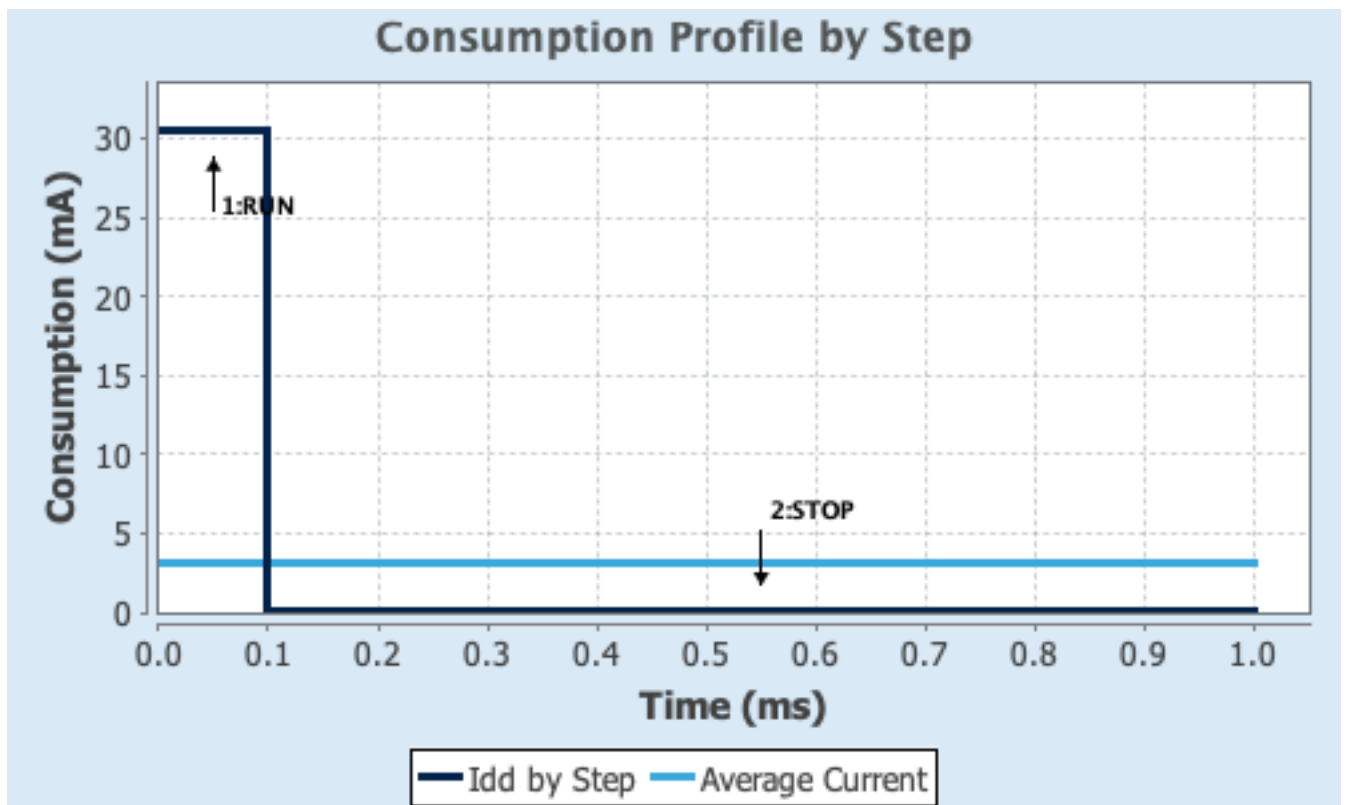
7. Peripherals and Middlewares Configuration

7.1. ADC1

mode: IN13

7.1.1. Parameter Settings:

ADCs_Common_Settings:

Mode	Independent mode

ADC_Settings:

Data Alignment	Right alignment
Scan Conversion Mode	Disabled
Continuous Conversion Mode	Disabled
Discontinuous Conversion Mode	Disabled

ADC_Regular_ConversionMode:

Enable Regular Conversions	Enable
Number Of Conversion	1
External Trigger Conversion Source	Regular Conversion launched by software
Rank	1
Channel	Channel 13
Sampling Time	1.5 Cycles

ADC_Injected_ConversionMode:

Enable Injected Conversions	Disable

WatchDog:

Enable Analog WatchDog Mode	false

7.2. FSMC

NOR Flash/PSRAM/SRAM/ROM/LCD 1

Chip Select: set

Memory type: LCD Interface

LCD Register Select: A16

Data: 16 bits

7.2.1. NOR/PSRAM 1:

NOR/PSRAM control:

Memory type	LCD Interface
Bank	Bank 1 NOR/PSRAM 1
Write operation	Enabled
Extended mode	Disabled

NOR/PSRAM timing:

Address setup time in HCLK clock cycles	15
Data setup time in HCLK clock cycles	255
Bus turn around time in HCLK clock cycles	15

7.3. RCC
High Speed Clock (HSE): Crystal/Ceramic Resonator
Low Speed Clock (LSE) : Crystal/Ceramic Resonator
7.3.1. 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

7.4. SDIO
Mode: SD 1 bit
7.4.1. 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 enabled ***
SDIOCLK clock divide factor	**4 ***

7.5. SYS
Debug: Serial Wire
Timebase Source: SysTick

7.6. TIM3
Clock Source   : Internal Clock
7.6.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	**7199 ***
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	**10000 ***
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)

7.7. FATFS
mode: SD Card
7.7.1. Set Defines:

Version:

FATFS version	R0.11

Function Parameters:

FS_READONLY (Read-only mode)	Disabled
FS_MINIMIZE (Minimization level)	Disabled
USE_STRFUNC (String functions)	Enabled with LF -> CRLF conversion
USE_FIND (Find functions)	Disabled
USE_MKFS (Make filesystem function)	Enabled
USE_FASTSEEK (Fast seek function)	Enabled
USE_LABEL (Volume label functions)	Disabled
USE_FORWARD (Forward function)	Disabled

Locale and Namespace Parameters:

CODE_PAGE (Code page on target)	Multilingual Latin 1 (OEM)
USE_LFN (Use Long Filename)	Disabled
MAX_LFN (Max Long Filename)	255
LFN_UNICODE (Enable Unicode)	ANSI/OEM
STRF_ENCODE (Character encoding)	UTF-8
FS_RPATH (Relative Path)	Disabled

Physical Drive Parameters:

VOLUMES (Logical drives)	1

MAX_SS (Maximum Sector Size)	512
MIN_SS (Minimum Sector Size)	512
MULTI_PARTITION (Volume partitions feature)	Disabled
USE_TRIM (Erase feature)	Disabled
FS_NOFSINFO (Force full FAT scan)	0

System Parameters:

FS_TINY (Tiny mode)	Disabled
FS_NORTC (Timestamp feature)	Dynamic timestamp
WORD_ACCESS (Platform dependent access option)	Byte access
FS_REENTRANT (Re-Entrancy)	Disabled
FS_TIMEOUT (Timeout ticks)	1000
FS_LOCK (Number of files opened simultaneously)	2

7.7.2. Advanced Settings:

SDIO/SDMMC:

SDIO instance	SDIO
BSP code for SD	Generic

* 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	PC3	ADC1_IN13	Analog mode	n/a	n/a	
FSMC	PE7	FSMC_D4	Alternate Function Push Pull	n/a	High	
	PE8	FSMC_D5	Alternate Function Push Pull	n/a	High	
	PE9	FSMC_D6	Alternate Function Push Pull	n/a	High	
	PE10	FSMC_D7	Alternate Function Push Pull	n/a	High	
	PE11	FSMC_D8	Alternate Function Push Pull	n/a	High	
	PE12	FSMC_D9	Alternate Function Push Pull	n/a	High	
	PE13	FSMC_D10	Alternate Function Push Pull	n/a	High	
	PE14	FSMC_D11	Alternate Function Push Pull	n/a	High	
	PE15	FSMC_D12	Alternate Function Push Pull	n/a	High	
	PD8	FSMC_D13	Alternate Function Push Pull	n/a	High	
	PD9	FSMC_D14	Alternate Function Push Pull	n/a	High	
	PD10	FSMC_D15	Alternate Function Push Pull	n/a	High	
	PD11	FSMC_A16	Alternate Function Push Pull	n/a	High	
	PD14	FSMC_D0	Alternate Function Push Pull	n/a	High	
	PD15	FSMC_D1	Alternate Function Push Pull	n/a	High	
	PD0	FSMC_D2	Alternate Function Push Pull	n/a	High	
	PD1	FSMC_D3	Alternate Function Push Pull	n/a	High	
	PD4	FSMC_NOE	Alternate Function Push Pull	n/a	High	
	PD5	FSMC_NWE	Alternate Function Push Pull	n/a	High	
	PD7	FSMC_NE1	Alternate Function Push Pull	n/a	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	
	OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	
	OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	
SDIO	PC8	SDIO_D0	Alternate Function Push Pull	n/a	High	
	PC12	SDIO_CK	Alternate Function Push Pull	n/a	High	
	PD2	SDIO_CMD	Alternate Function Push Pull	n/a	High	
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
GPIO	PE2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**High ***	
	PE3	GPIO_Input	Input mode	**Pull-up ***	**n/a**	

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PE4	GPIO_EXTI4	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	**n/a**	
	PC13-TAMPER-RTC	GPIO_Input	Input mode	**Pull-up ***	**n/a**	
	PA0-WKUP	GPIO_EXTI0	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	**n/a**	
	PA2	GPIO_Input	Input mode	**Pull-up ***	**n/a**	
	PA4	GPIO_Input	Input mode	**Pull-up ***	**n/a**	
	PA5	GPIO_Input	Input mode	**Pull-up ***	**n/a**	
	PB0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**High ***	
	PB1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**High ***	
	PD12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**High ***	
	PD13	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**High ***	
	PB5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**High ***	
	PB6	GPIO_Input	Input mode	**Pull-up ***	**n/a**	
	PB7	GPIO_Input	Input mode	**Pull-up ***	**n/a**	
	PE0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**High ***	
	PE1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	**High ***	

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
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	0	0
System tick timer	true	15	0
EXTI line0 interrupt	true	1	0
EXTI line4 interrupt	true	0	0
TIM3 global interrupt	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
ADC1 and ADC2 global interrupts	unused		
SDIO 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	true	false
Debug monitor	false	true	false
Pendable request for system service	false	true	false
System tick timer	false	true	true
EXTI line0 interrupt	false	true	true
EXTI line4 interrupt	false	true	true
TIM3 global interrupt	false	true	true

* User modified value

9. System Views

9.1. Category view

9.1.1. Current

10. Docs & Resources

Type	Link
BSDL files	https://www.st.com/resource/en/bsdl_model/stm32f1_bsdl.zip
IBIS models	https://www.st.com/resource/en/ibis_model/stm32ibis.zip
System View Description	https://www.st.com/resource/en/svd/stm32f1_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
Presentations	https://www.st.com/resource/en/product_presentation/microcontrollers-stm32-family-overview.pdf
Brochures	https://www.st.com/resource/en/brochure/products-and-solutions-for-plcs-and-smart-i-os.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/fldpstpfc11120.pdf
Product Certifications	https://www.st.com/resource/en/certification_document/1239988349.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/an2586-getting-started-with-stm32f10xxx-hardware-development-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/an2784-using-the-
highdensity-stm32f10xxx-fsmc-peripheral-to-drive-external-memories-
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

Application Notes https://www.st.com/resource/en/application_note/an3095-stevalisv002v1-
stevalisv002v2-3-kw-gridconnected-pv-system-based-on-the-
stm32f103xx-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an3108-stlm75-
firmware-library-for-the-stm32f10x-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an3126-audio-and-
waveform-generation-using-the-dac-in-stm32-products-
stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an3128-stm32-
embedded-graphic-objectstouchscreen-library-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an3154-can-protocol-
used-in-the-stm32-bootloader-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an3155-usart-protocol-
used-in-the-stm32-bootloader-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an3156-usb-dfu-
protocol-used-in-the-stm32-bootloader-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an3364-migration-and-
compatibility-guidelines-for-stm32-microcontroller-applications-
stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an3422-migration-of-microcontroller-applications-from-stm32f1-to-stm32l1-series-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an3427-migrating-a-microcontroller-application-from-stm32f1-to-stm32f2-series-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an3429-stm32-proprietary-code-protection-overview-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4013-stm32-crossseries-timer-overview-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4070-250-w-grid-connected-microinverter-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4076-two-or-three-shunt-resistor-based-current-sensing-circuit-design-in-3phase-inverters-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4088-migrating-between-stm32f1-and-stm32f0-series-microcontrollers-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4228-migrating-from-stm32f1-series-to-stm32f3-series-microcontrollers-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4229-how-to-implement-a-vocoder-solution-using-stm32-microcontrollers-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4277-using-stm32-device-pwm-shutdown-features-for-motor-control-and-digital-power-conversion-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4566-extending-the-dac-performance-of-stm32-microcontrollers-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4649-migrating-from-stm32f1-series-to-stm32l4-series--stm32l4-series-microntrollers-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4655-virtually-increasing-the-number-of-serial-communication-peripherals-in-stm32-applications-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4724-stm32cube-firmware-examples-for-stm32f1-series-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4750-handling-of-soft-errors-in-stm32-applications-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4776-generalpurpose-timer-cookbook-for-stm32-microcontrollers-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4803-highspeed-si-simulations-using-ibis-and-boardlevel-simulations-using-hyperlynx-si-on-stm32-mcus-and-mpus-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4904-migration-of-microcontroller-applications-from-stm32f1-series-to-stm32f4-access-lines-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4908-stm32-usart-automatic-baud-rate-detection-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4989-stm32-microcontroller-debug-toolbox-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an5027-interfacing-pdm-digital-microphones-using-stm32-mcus-and-mpus-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an5543-enhanced-methods-to-handle-spi-communication-on-stm32-devices-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4899-stm32-microcontroller-gpio-hardware-settings-and-lowpower-consumption-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an5612-esd-protection-of-stm32-mcus-and-mpus-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an5156-introduction-to-stm32-microcontrollers-security-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an2548-using-the-stm32f0f1f3cxgxlx-series-dma-controller-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4838-introduction-to-memory-protection-unit-management-on-stm32-mcus-stmicroelectronics.pdf

Application Notes	https://www.st.com/resource/en/application_note/an4879-introduction-to-usb-hardware-and-pcb-guidelines-using-stm32-mcus-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an5225-introduction-to-usb-typec-power-delivery-for-stm32-mcus-and-mpus-stmicroelectronics.pdf
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