



1. Description

1.1. Project

Project Name	Valeh_injec_pogram
Board Name	custom
Generated with:	STM32CubeMX 6.15.0
Date	08/10/2025

1.2. MCU

MCU Series	STM32F4
MCU Line	STM32F407/417
MCU name	STM32F407ZGTx
MCU Package	LQFP144
MCU Pin number	144

1.3. Core(s) information

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



3. Pins Configuration

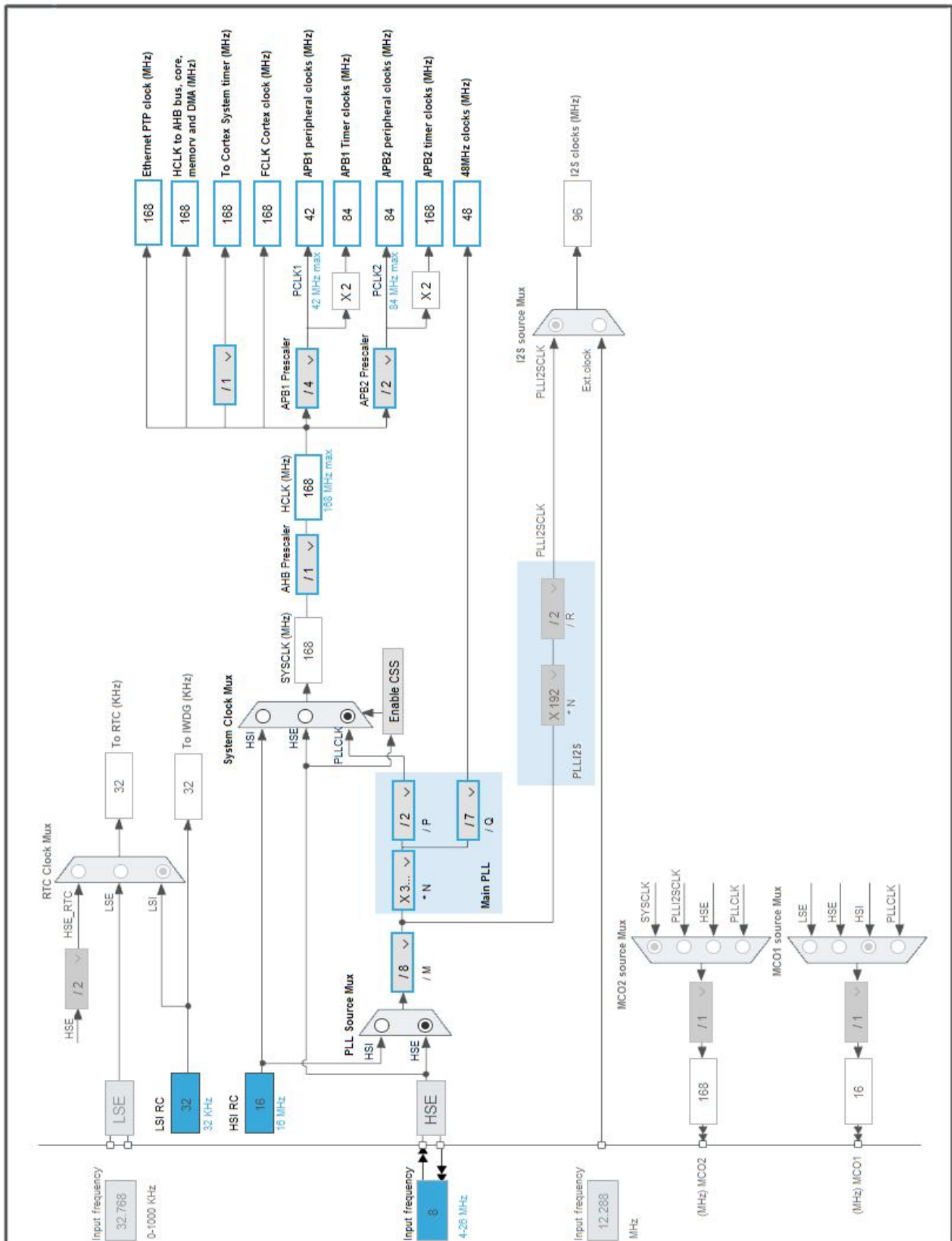
Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
6	VBAT	Power		
16	VSS	Power		
17	VDD	Power		
23	PH0-OSC_IN	I/O	RCC_OSC_IN	
24	PH1-OSC_OUT	I/O	RCC_OSC_OUT	
25	NRST	Reset		
30	VDD	Power		
31	VSSA	Power		
32	VREF+	Power		
33	VDDA	Power		
38	VSS	Power		
39	VDD	Power		
45	PC5 *	I/O	GPIO_Output	Lcd_RST
46	PB0 *	I/O	GPIO_Output	Lcd_LIG
51	VSS	Power		
52	VDD	Power		
56	PG0 **	I/O	FSMC_A10	Lcd_RS
58	PE7	I/O	FSMC_D4	
59	PE8	I/O	FSMC_D5	
60	PE9	I/O	FSMC_D6	
61	VSS	Power		
62	VDD	Power		
63	PE10	I/O	FSMC_D7	
64	PE11	I/O	FSMC_D8	
65	PE12	I/O	FSMC_D9	
66	PE13	I/O	FSMC_D10	
67	PE14	I/O	FSMC_D11	
68	PE15	I/O	FSMC_D12	
71	VCAP_1	Power		
72	VDD	Power		
77	PD8	I/O	FSMC_D13	
78	PD9	I/O	FSMC_D14	
79	PD10	I/O	FSMC_D15	
80	PD11	I/O	FSMC_A16	
83	VSS	Power		
84	VDD	Power		

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
85	PD14	I/O	FSMC_D0	
86	PD15	I/O	FSMC_D1	
94	VSS	Power		
95	VDD	Power		
103	PA11	I/O	USB_OTG_FS_DM	
104	PA12	I/O	USB_OTG_FS_DP	
105	PA13	I/O	SYS_JTMS-SWDIO	
106	VCAP_2	Power		
107	VSS	Power		
108	VDD	Power		
109	PA14	I/O	SYS_JTCK-SWCLK	
114	PD0	I/O	FSMC_D2	
115	PD1	I/O	FSMC_D3	
118	PD4	I/O	FSMC_NOE	
119	PD5	I/O	FSMC_NWE	
120	VSS	Power		
121	VDD	Power		
127	PG12	I/O	FSMC_NE4	
130	VSS	Power		
131	VDD	Power		
138	BOOT0	Boot		
143	PDR_ON	Reset		
144	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



1. Power Consumption Calculator report

1.1. Microcontroller Selection

Series	STM32F4
Line	STM32F407/417
MCU	STM32F407ZGTx
Datasheet	DS8626_Rev8

1.2. Parameter Selection

Temperature	25
Vdd	3.3

1.3. 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

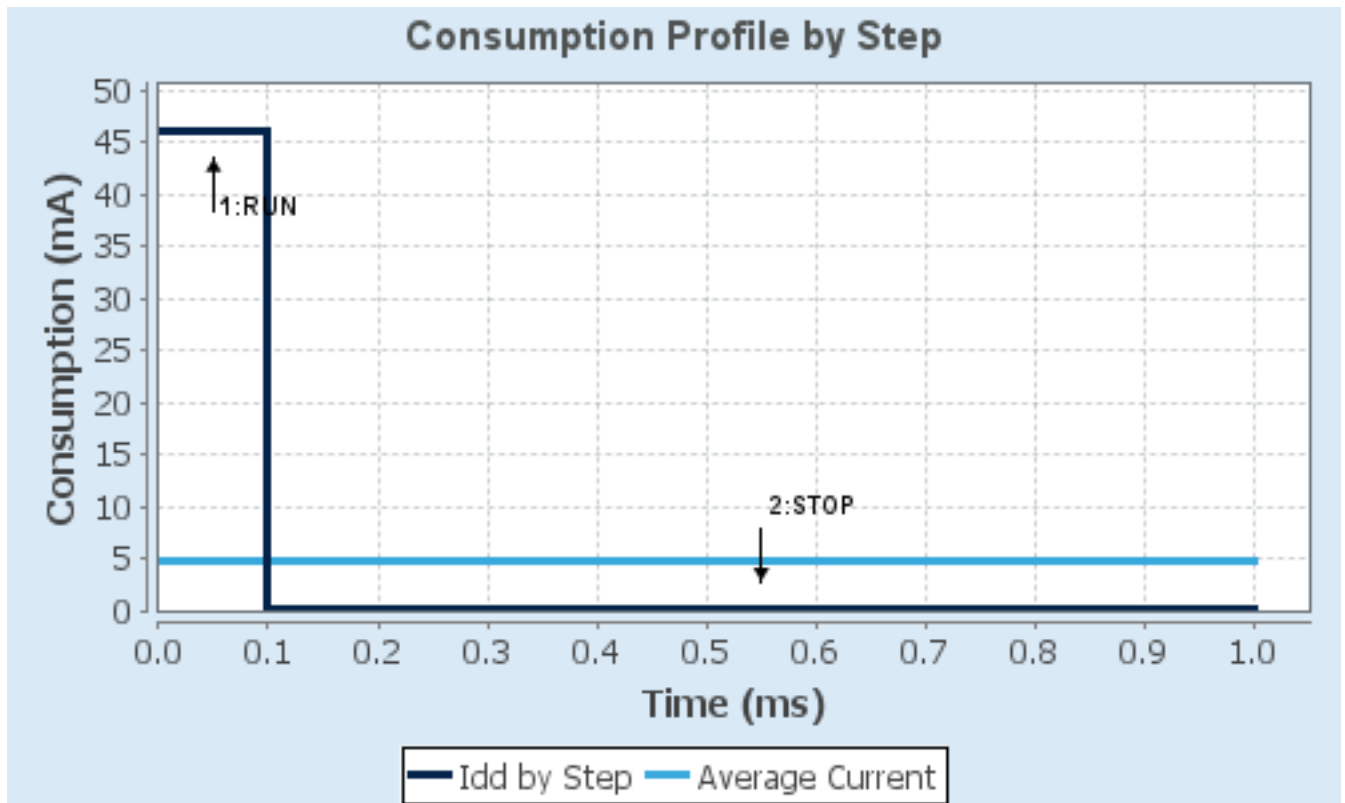
1.4. Sequence

Step	Step1	Step2
Mode	RUN	STOP
Vdd	3.3	3.3
Voltage Source	Battery	Battery
Range	Scale1-High	No Scale
Fetch Type	FLASH	n/a
CPU Frequency	168 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	280 μ A
Duration	0.1 ms	0.9 ms
DMIPS	210.0	0.0
Ta Max	98.93	104.96
Category	In DS Table	In DS Table

1.5. Results

Sequence Time	1 ms	Average Current	4.85 mA
Battery Life	29 days, 4 hours	Average DMIPS	210.0 DMIPS

1.6. Chart



2. Software Project

2.1. Project Settings

Name	Value
Project Name	Valeh_injec_pogram
Project Folder	D:\stm32f407zgt6_program
Toolchain / IDE	STM32CubeIDE
Firmware Package Name and Version	STM32Cube FW_F4 V1.28.2
Application Structure	Advanced
Generate Under Root	Yes
Do not generate the main()	No
Minimum Heap Size	0x200
Minimum Stack Size	0x400

2.2. 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

2.3. 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_USB_OTG_FS_HCD_Init	USB_OTG_FS

3. Peripherals and Middlewares Configuration

3.1. FSMC

NOR Flash/PSRAM/SRAM/ROM/LCD 1

Chip Select: NE4

Memory type: LCD Interface

LCD Register Select: A16

Data: 16 bits

3.1.1. NOR/PSRAM 1:

NOR/PSRAM control:

Memory type	LCD Interface
Bank	Bank 1 NOR/PSRAM 4
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

3.2. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

3.2.1. 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
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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3.3. SYS

Debug: Serial Wire

Timebase Source: SysTick

3.4. USB_OTG_FS

Mode: Host_Only

3.4.1. Parameter Settings:

Speed	Host Full Speed 12MBit/s
Signal start of frame	Disabled

*** User modified value**

4. System Configuration

4.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
FSMC	PE7	FSMC_D4	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE8	FSMC_D5	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE9	FSMC_D6	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE10	FSMC_D7	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE11	FSMC_D8	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE12	FSMC_D9	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE13	FSMC_D10	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE14	FSMC_D11	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PE15	FSMC_D12	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD8	FSMC_D13	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD9	FSMC_D14	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD10	FSMC_D15	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD11	FSMC_A16	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD14	FSMC_D0	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD15	FSMC_D1	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD0	FSMC_D2	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD1	FSMC_D3	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD4	FSMC_NOE	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PD5	FSMC_NWE	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
	PG12	FSMC_NE4	Alternate Function Push Pull	No pull-up and no pull-down	Very High	
RCC	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	
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 *	
Single Mapped Signals	PG0	FSMC_A10	Alternate Function Push Pull	No pull-up and no pull-down	Very High	Lcd_RS
GPIO	PC5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	Lcd_RST
	PB0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	Lcd_LIG

4.2. DMA configuration

nothing configured in DMA service

4.3. NVIC configuration

4.3.1. 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		
USB On The Go FS global interrupt	unused		
FPU global interrupt	unused		

4.3.2. 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

5. System Views

5.1. Category view

5.1.1. Current

Middleware						
System Core	Analog	Timers	Connectivity	Multimedia	Security	Computing
DMA			FSMC ✓			
GPIO ⚠			USB_FS ✓			
NVIC ✓						
RCC ✓						
SYS ✓						

6. Docs & Resources

Type	Link
BSDL files	https://www.st.com/resource/en/bsdl_model/stm32f405-415_407-417_bsdl.zip
IBIS models	https://www.st.com/resource/en/ibis_model/stm32f405-415_407-417_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
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/flstm32trust.pdf
Product Certifications	https://www.st.com/resource/en/certification_document/stm32_authentication_can.pdf
Security Bulletin	https://www.st.com/resource/en/technical_note/tn1489-security-bulletin-tn1489stpsirt-physical-attacks-on-stm32-and-stm32cube-firmware-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/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/an3126-audio-and-waveform-generation-using-the-dac-in-stm32-products-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/an3371-using-the-hardware-realtime-clock-rtc-in-stm32-f0-f2-f3-f4-and-l1-series-of-mcus-stmicroelectronics.pdf
- Application Notes https://www.st.com/resource/en/application_note/an3997-audio-playback-and-recording-using-the-stm32f4discovery-stmicroelectronics.pdf
- Application Notes https://www.st.com/resource/en/application_note/an3998-pdm-audio-software-decoding-on-stm32-microcontrollers-stmicroelectronics.pdf
- Application Notes https://www.st.com/resource/en/application_note/an4031-using-the-stm32f2-stm32f4-and-stm32f7-series-dma-controller-stmicroelectronics.pdf
- Application Notes https://www.st.com/resource/en/application_note/an4073-how-to-improve-adc-accuracy-when-using-stm32f2xx-and-stm32f4xx-microcontrollers-stmicroelectronics.pdf
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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/an4821-migrating-from-stm32f405415-line-and-stm32f407417-line-to-stm32l4-series-and-stm32l4-series-microcontrollers-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4850-stm32-mcus-spreadspectrum-clock-generation-principles-properties-and-implementation-stmicroelectronics.pdf

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for related Tools
& Software

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& Software

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