



1. Description

1.1. Project

Project Name	vccgnd_bluepill_stm32f051c8
Board Name	custom
Generated with:	STM32CubeMX 6.15.0
Date	08/07/2025

1.2. MCU

MCU Series	STM32F0
MCU Line	STM32F0x1
MCU name	STM32F051C8Tx
MCU Package	LQFP48
MCU Pin number	48

1.3. Core(s) information

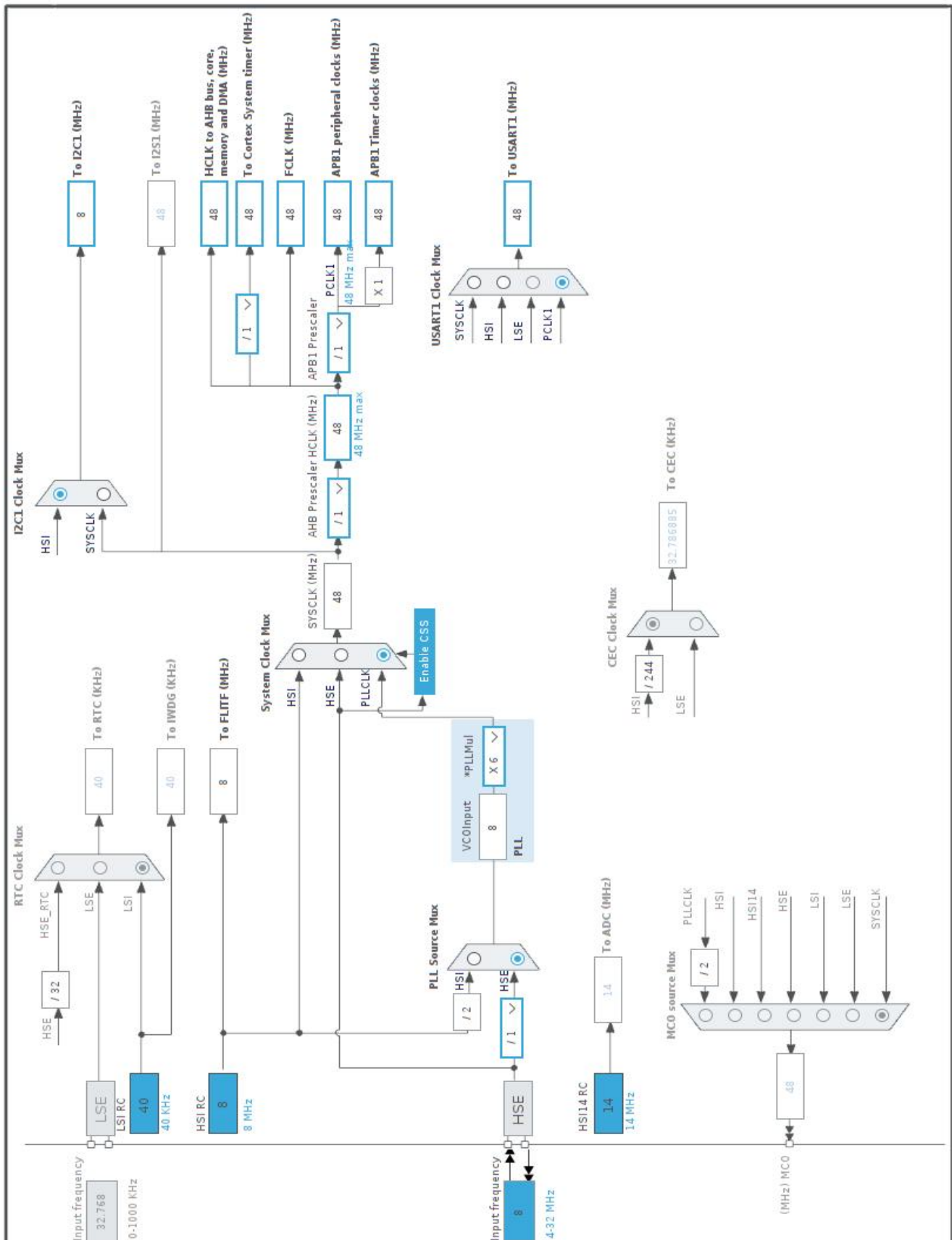
Core(s)	Arm Cortex-M0
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3. Pins Configuration

Pin Number LQFP48	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
2	PC13 *	I/O	GPIO_Output	USER_LED
5	PF0-OSC_IN	I/O	RCC_OSC_IN	
6	PF1-OSC_OUT	I/O	RCC_OSC_OUT	
7	NRST	Reset		
8	VSSA	Power		
9	VDDA	Power		
10	PA0	I/O	ADC_IN0	
11	PA1	I/O	ADC_IN1	
12	PA2	I/O	ADC_IN2	
13	PA3	I/O	ADC_IN3	
14	PA4	I/O	ADC_IN4	
15	PA5	I/O	ADC_IN5	
16	PA6	I/O	ADC_IN6	
17	PA7	I/O	ADC_IN7	
18	PB0	I/O	ADC_IN8	
19	PB1	I/O	ADC_IN9	
21	PB10	I/O	I2C2_SCL	
22	PB11	I/O	I2C2_SDA	
23	VSS	Power		
24	VDD	Power		
25	PB12	I/O	SPI2_NSS	
26	PB13	I/O	SPI2_SCK	
27	PB14	I/O	SPI2_MISO	
28	PB15	I/O	SPI2_MOSI	
30	PA9	I/O	USART1_TX	
31	PA10	I/O	USART1_RX	
34	PA13	I/O	SYS_SWDIO	SYS_SWDIO
37	PA14	I/O	SYS_SWCLK	SYS_SWCLK
42	PB6	I/O	I2C1_SCL	
43	PB7	I/O	I2C1_SDA	
44	BOOT0	Boot		
47	VSS	Power		
48	VDD	Power		

* The pin is affected with an I/O function

4. Clock Tree Configuration



1. Power Consumption Calculator report

1.1. Microcontroller Selection

Series	STM32F0
Line	STM32F0x1
MCU	STM32F051C8Tx
Datasheet	DS8668_Rev7

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

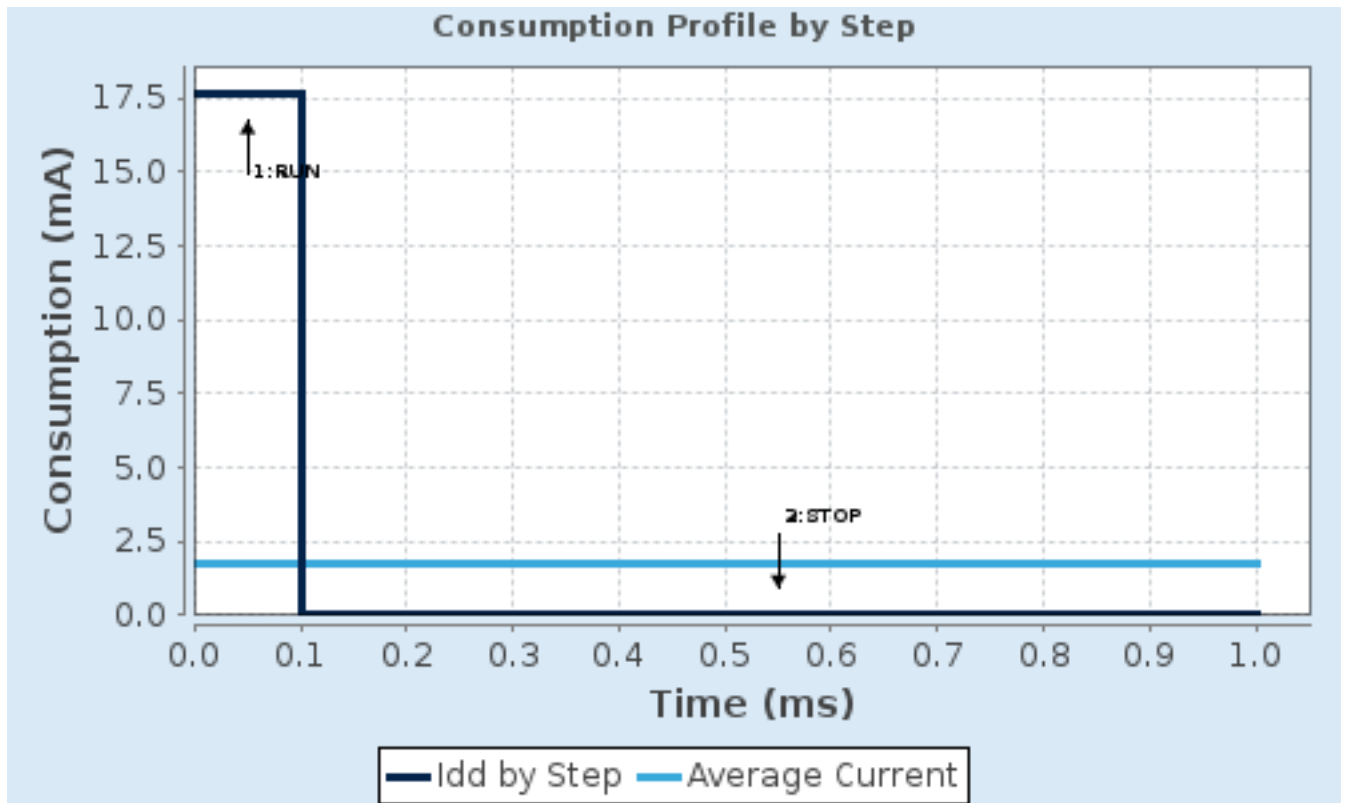
1.4. Sequence

Step	Step1	Step2
Mode	RUN	STOP
Vdd	3.3	3.3
Voltage Source	Battery	Battery
Range	No Scale	No Scale
Fetch Type	FLASH	n/a
CPU Frequency	48 MHz	0 Hz
Clock Configuration	HSE PLL	Regulator LP
Clock Source Frequency	8 MHz	0 Hz
Peripherals	ADC GPIOA GPIOB GPIOC GPIOF I2C1 I2C2 SPI2 SYS/COMP1:High_Speed USART1	
Additional Cons.	0 mA	0 mA
Average Current	17.64 mA	6.2 μ A
Duration	0.1 ms	0.9 ms
DMIPS	0.0	0.0
Ta Max	101.8	105
Category	In DS Table	In DS Table

1.5. Results

Sequence Time	1 ms	Average Current	1.77 mA
Battery Life	2 months, 19 days, 1 hour	Average DMIPS	0.0 DMIPS

1.6. Chart



2. Software Project

2.1. Project Settings

Name	Value
Project Name	vccgnd_bluepill_stm32f051c8
Project Folder	/store/EmbedTools/STM32CubeMX/vccgnd_bluepill/vccgnd_bluepill_stm32f051c
Toolchain / IDE	CMake
Firmware Package Name and Version	STM32Cube FW_F0 V1.11.5
Application Structure	Advanced
Generate Under Root	No
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 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	Yes
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)	Yes
Enable Full Assert	Yes

2.3. Advanced Settings - Generated Function Calls

Rank	Function Name	Peripheral Instance Name
1	SystemClock_Config	RCC
2	MX_GPIO_Init	GPIO
3	MX_USART1_UART_Init	USART1
4	MX_ADC_Init	ADC
5	MX_I2C1_Init	I2C1
6	MX_I2C2_Init	I2C2
7	MX_SPI2_Init	SPI2

3. Peripherals and Middlewares Configuration

3.1. ADC

mode: IN0

mode: IN1

mode: IN2

mode: IN3

mode: IN4

mode: IN5

mode: IN6

mode: IN7

mode: IN8

mode: IN9

mode: Temperature Sensor Channel

mode: Vrefint Channel

mode: Vbat Channel

3.1.1. Parameter Settings:

ADC_Settings:

Clock Prescaler

Resolution

Data Alignment

Scan Conversion Mode

Continuous Conversion Mode

Discontinuous Conversion Mode

DMA Continuous Requests

End Of Conversion Selection

Overrun behaviour

Low Power Auto Wait

Low Power Auto Power Off

Synchronous clock mode divided by 4 *

ADC 12-bit resolution

Right alignment

Forward

Disabled

Disabled

Disabled

End of single conversion

Overrun data preserved

Disabled

Disabled

ADC_Regular_ConversionMode:

Sampling Time

External Trigger Conversion Source

External Trigger Conversion Edge

1.5 Cycles

Regular Conversion launched by software

None

WatchDog:

Enable Analog WatchDog Mode

Low Threshold

false

0

3.2. I2C1

I2C: I2C

3.2.1. Parameter Settings:

Timing configuration:

I2C Speed Mode	Fast Mode *
I2C Speed Frequency (KHz)	400
Rise Time (ns)	100
Fall Time (ns)	100
Coefficient of Digital Filter	0
Analog Filter	Enabled
Timing	0x0010020A *

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

3.3. I2C2

mode: I2C

3.3.1. Parameter Settings:

Timing configuration:

I2C Speed Mode	Fast Mode *
I2C Speed Frequency (KHz)	400
Rise Time (ns)	100
Fall Time (ns)	100
Coefficient of Digital Filter	0
Analog Filter	Enabled
Timing	0x0090194B *

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

3.4. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

3.4.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Prefetch Buffer	Enabled
Flash Latency(WS)	1 WS (2 CPU cycle)

RCC Parameters:

HSI Calibration Value	16
HSE Startup Timeout Value (ms)	100
LSE Startup Timeout Value (ms)	5000

3.5. SPI2

Mode: Full-Duplex Master

Hardware NSS Signal: Hardware NSS Output Signal

3.5.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	16 Bits *
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	4 *
Baud Rate	12.0 MBits/s *
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSSP Mode	Enabled
NSS Signal Type	Output Hardware

3.6. SYS

mode: Debug Serial Wire
Timebase Source: SysTick

3.7. USART1

Mode: Asynchronous

3.7.1. 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

*** User modified value**

4. System Configuration

4.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
ADC	PA0	ADC_IN0	Analog mode	No pull-up and no pull-down	n/a	
	PA1	ADC_IN1	Analog mode	No pull-up and no pull-down	n/a	
	PA2	ADC_IN2	Analog mode	No pull-up and no pull-down	n/a	
	PA3	ADC_IN3	Analog mode	No pull-up and no pull-down	n/a	
	PA4	ADC_IN4	Analog mode	No pull-up and no pull-down	n/a	
	PA5	ADC_IN5	Analog mode	No pull-up and no pull-down	n/a	
	PA6	ADC_IN6	Analog mode	No pull-up and no pull-down	n/a	
	PA7	ADC_IN7	Analog mode	No pull-up and no pull-down	n/a	
	PB0	ADC_IN8	Analog mode	No pull-up and no pull-down	n/a	
	PB1	ADC_IN9	Analog mode	No pull-up and no pull-down	n/a	
I2C1	PB6	I2C1_SCL	Alternate Function Open Drain	No pull-up and no pull-down	High *	
	PB7	I2C1_SDA	Alternate Function Open Drain	No pull-up and no pull-down	High *	
I2C2	PB10	I2C2_SCL	Alternate Function Open Drain	No pull-up and no pull-down	High *	
	PB11	I2C2_SDA	Alternate Function Open Drain	No pull-up and no pull-down	High *	
RCC	PF0-OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	
	PF1-OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	
SPI2	PB12	SPI2_NSS	Alternate Function Push Pull	No pull-up and no pull-down	High *	
	PB13	SPI2_SCK	Alternate Function Push Pull	No pull-up and no pull-down	High *	
	PB14	SPI2_MISO	Alternate Function Push Pull	No pull-up and no pull-down	High *	
	PB15	SPI2_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	High *	
SYS	PA13	SYS_SWDIO	n/a	n/a	n/a	SYS_SWDIO
	PA14	SYS_SWCLK	n/a	n/a	n/a	SYS_SWCLK
USART1	PA9	USART1_TX	Alternate Function Push Pull	No pull-up and no pull-down	High *	
	PA10	USART1_RX	Alternate Function Push Pull	No pull-up and no pull-down	High *	
GPIO	PC13	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	USER_LED

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
System service call via SWI instruction	true	0	0
Pendable request for system service	true	0	0
System tick timer	true	3	0
RCC global interrupt	true	0	0
ADC and COMP interrupts (COMP interrupts through EXTI lines 21 and 22)	true	0	0
I2C1 event global interrupt / I2C1 wake-up interrupt through EXTI line 23	true	0	0
I2C2 global interrupt	true	0	0
SPI2 global interrupt	true	0	0
USART1 global interrupt / USART1 wake-up interrupt through EXTI line 25	true	0	0
PVD interrupt through EXTI Line16	unused		
Flash 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
System service call via SWI instruction	false	true	false
Pendable request for system service	false	true	false
System tick timer	false	true	true
RCC global interrupt	false	true	false
ADC and COMP interrupts (COMP interrupts through EXTI lines 21 and 22)	false	true	true
I2C1 event global interrupt / I2C1 wake-up interrupt through EXTI line 23	false	true	true
I2C2 global interrupt	false	true	true
SPI2 global interrupt	false	true	true
USART1 global interrupt / USART1 wake-up interrupt through EXTI line 25	false	true	true

* User modified value

5. System Views

5.1. Category view

5.1.1. Current

6. Docs & Resources

Type	Link
IBIS models	https://www.st.com/resource/en/ibis_model/stm32f0_ibis.zip
System View Description	https://www.st.com/resource/en/svd/stm32f0_svd.zip
Presentations	https://www.st.com/resource/en/product_presentation/gt_stm32f0-l0.pdf
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-usb-c-pd-solutions-presentation.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/fldpstpfc11120.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/an4067-calibrating-stm32f0x1-stm32f0x2-and-stm32f0x8-lines-internal-rc-oscillators-stmicroelectronics.pdf
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- Application Notes https://www.st.com/resource/en/application_note/an4112-using-

stm32f05xx-analog-comparators-in-application-cases-
stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4221-i2c-protocol-used-in-the-stm32-bootloader-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4617-migrating-between-stm32f0-and-stm32l0-microcontrollers-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/an4705-migration-guidelines-from-pic18-to-stm32f0-series-with-software-expansion-for-stm32cube-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4735-stm32cube-firmware-examples-for-stm32f0-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/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/an5145-migration-of-applications-from-stm32f0-series-to-stm32g0-series--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/an4991-how-to-wake-up-an-stm32-microcontroller-from-lowpower-mode-with-the-usart-or-the-lpuart-stmicroelectronics.pdf
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- Application Notes [https://www.st.com/resource/en/application_note/an2656-stm32f10xxx-for related Tools lcd-glass-driver-firmware-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an2656-stm32f10xxx-for-related-Tools-lcd-glass-driver-firmware-stmicroelectronics.pdf)
& Software
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& Software
- Application Notes [https://www.st.com/resource/en/application_note/an3307-guidelines-for-for related Tools obtaining-iec-60335-class-b-certification-for-any-stm32-application-](https://www.st.com/resource/en/application_note/an3307-guidelines-for-for-related-Tools-obtaining-iec-60335-class-b-certification-for-any-stm32-application-)

& Software	stmicroelectronics.pdf
Application Notes for related Tools	https://www.st.com/resource/en/application_note/an3364-migration-and-compatibility-guidelines-for-stm32-microcontroller-applications-stmicroelectronics.pdf
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Application Notes for related Tools	https://www.st.com/resource/en/application_note/an4066-developing-an-hdmicec-network-using-an-stm32f0xx-microcontroller-stmicroelectronics.pdf
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& Software	stmicroelectronics.pdf
Application Notes for related Tools	https://www.st.com/resource/en/application_note/an4100-designing-a-smartcard-interface-using-an-stm32f05xx-microcontroller-stmicroelectronics.pdf
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