



1. Description

1.1. Project

Project Name	SPO
Board Name	custom
Generated with:	STM32CubeMX 6.6.0
Date	07/08/2022

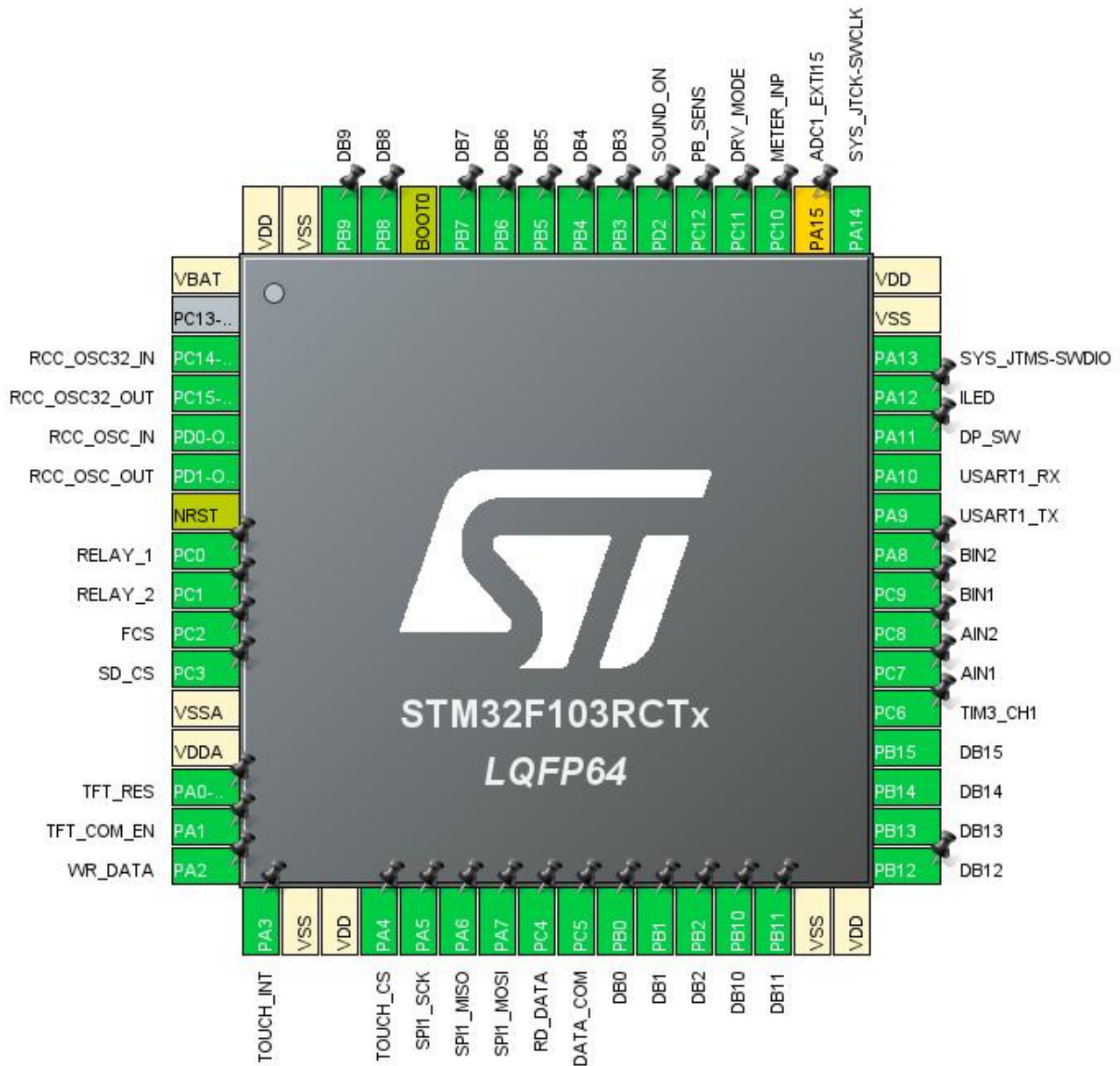
1.2. MCU

MCU Series	STM32F1
MCU Line	STM32F103
MCU name	STM32F103RCTx
MCU Package	LQFP64
MCU Pin number	64

1.3. Core(s) information

Core(s)	Arm Cortex-M3
---------	---------------

2. Pinout Configuration



3. Pins Configuration

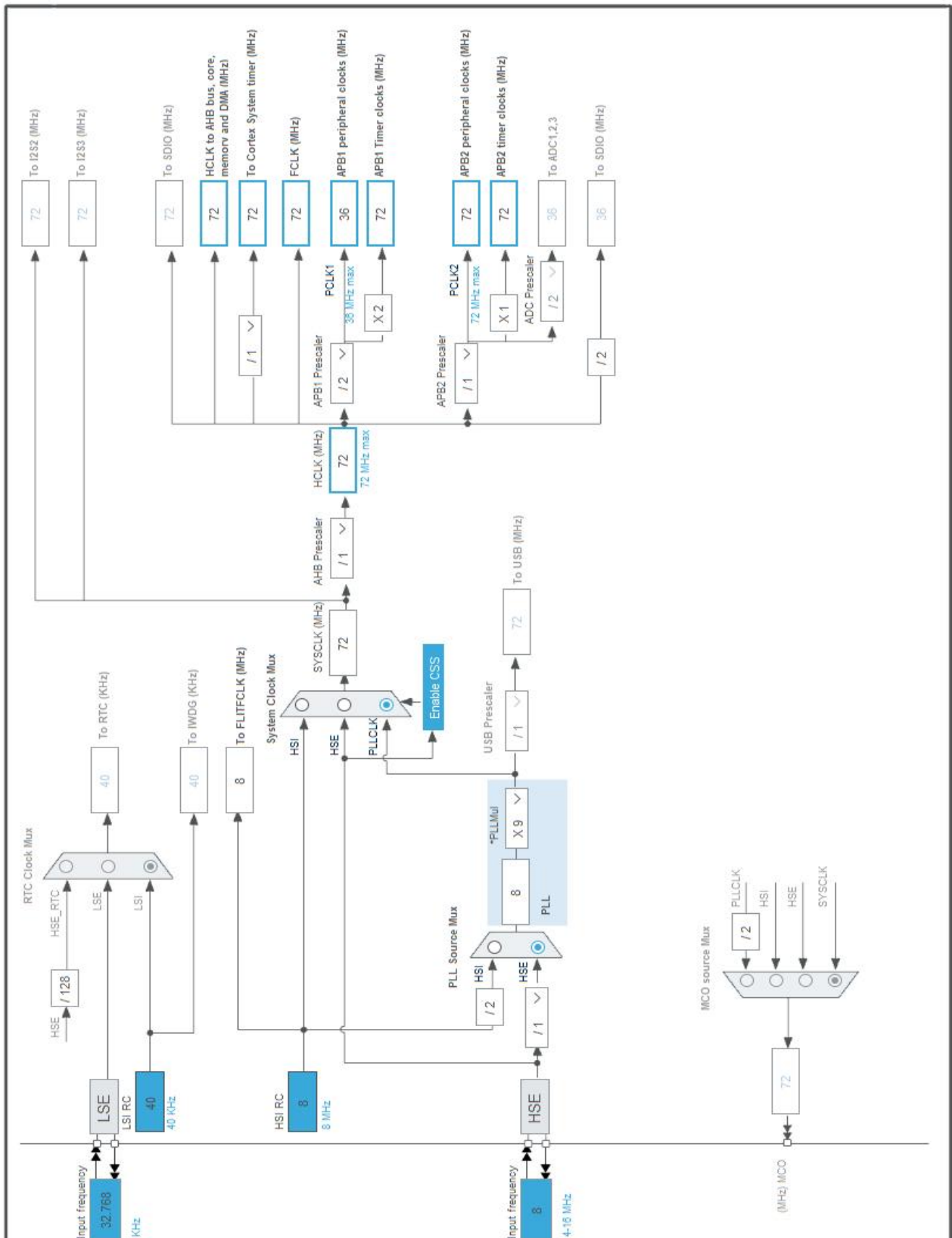
Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
3	PC14-OSC32_IN	I/O	RCC_OSC32_IN	
4	PC15-OSC32_OUT	I/O	RCC_OSC32_OUT	
5	PD0-OSC_IN	I/O	RCC_OSC_IN	
6	PD1-OSC_OUT	I/O	RCC_OSC_OUT	
7	NRST	Reset		
8	PC0 *	I/O	GPIO_Output	RELAY_1
9	PC1 *	I/O	GPIO_Output	RELAY_2
10	PC2 *	I/O	GPIO_Output	FCS
11	PC3 *	I/O	GPIO_Output	SD_CS
12	VSSA	Power		
13	VDDA	Power		
14	PA0-WKUP *	I/O	GPIO_Output	TFT_RES
15	PA1 *	I/O	GPIO_Output	TFT_COM_EN
16	PA2 *	I/O	GPIO_Output	WR_DATA
17	PA3	I/O	GPIO_EXTI3	TOUCH_INT
18	VSS	Power		
19	VDD	Power		
20	PA4 *	I/O	GPIO_Output	TOUCH_CS
21	PA5	I/O	SPI1_SCK	
22	PA6	I/O	SPI1_MISO	
23	PA7	I/O	SPI1_MOSI	
24	PC4 *	I/O	GPIO_Output	RD_DATA
25	PC5 *	I/O	GPIO_Output	DATA_COM
26	PB0 *	I/O	GPIO_Output	DB0
27	PB1 *	I/O	GPIO_Output	DB1
28	PB2 *	I/O	GPIO_Output	DB2
29	PB10 *	I/O	GPIO_Output	DB10
30	PB11 *	I/O	GPIO_Output	DB11
31	VSS	Power		
32	VDD	Power		
33	PB12 *	I/O	GPIO_Output	DB12
34	PB13	I/O	SPI2_SCK	DB13
35	PB14	I/O	SPI2_MISO	DB14
36	PB15	I/O	SPI2_MOSI	DB15
37	PC6	I/O	TIM3_CH1	

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
38	PC7 *	I/O	GPIO_Output	AIN1
39	PC8 *	I/O	GPIO_Output	AIN2
40	PC9 *	I/O	GPIO_Output	BIN1
41	PA8 *	I/O	GPIO_Output	BIN2
42	PA9	I/O	USART1_TX	
43	PA10	I/O	USART1_RX	
44	PA11 *	I/O	GPIO_Input	DP_SW
45	PA12 *	I/O	GPIO_Output	ILED
46	PA13	I/O	SYS_JTMS-SWDIO	
47	VSS	Power		
48	VDD	Power		
49	PA14	I/O	SYS_JTCK-SWCLK	
50	PA15 **	I/O	ADC1_EXTI15	
51	PC10 *	I/O	GPIO_Input	METER_INP
52	PC11 *	I/O	GPIO_Output	DRV_MODE
53	PC12 *	I/O	GPIO_Input	PB_SENS
54	PD2 *	I/O	GPIO_Output	SOUND_ON
55	PB3 *	I/O	GPIO_Output	DB3
56	PB4 *	I/O	GPIO_Output	DB4
57	PB5 *	I/O	GPIO_Output	DB5
58	PB6 *	I/O	GPIO_Output	DB6
59	PB7 *	I/O	GPIO_Output	DB7
60	BOOT0	Boot		
61	PB8 *	I/O	GPIO_Output	DB8
62	PB9 *	I/O	GPIO_Output	DB9
63	VSS	Power		
64	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



5. Software Project

5.1. Project Settings

Name	Value
Project Name	SPO
Project Folder	E:\MyData\Projects\water_treatment_controller\SPO
Toolchain / IDE	MDK-ARM V5.32
Firmware Package Name and Version	STM32Cube FW_F1 V1.8.4
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	Yes
Backup previously generated files when re-generating	Yes
Keep User Code when re-generating	Yes
Delete previously generated files when not re-generated	No
Set all free pins as analog (to optimize the power consumption)	No
Enable Full Assert	Yes

5.3. Advanced Settings - Generated Function Calls

Rank	Function Name	Peripheral Instance Name
1	SystemClock_Config	RCC
2	MX_GPIO_Init	GPIO
3	MX_SPI1_Init	SPI1
4	MX_SPI2_Init	SPI2
5	MX_TIM3_Init	TIM3
6	MX_USART1_UART_Init	USART1

6. Power Consumption Calculator report

6.1. Microcontroller Selection

Series	STM32F1
Line	STM32F103
MCU	STM32F103RCTx
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

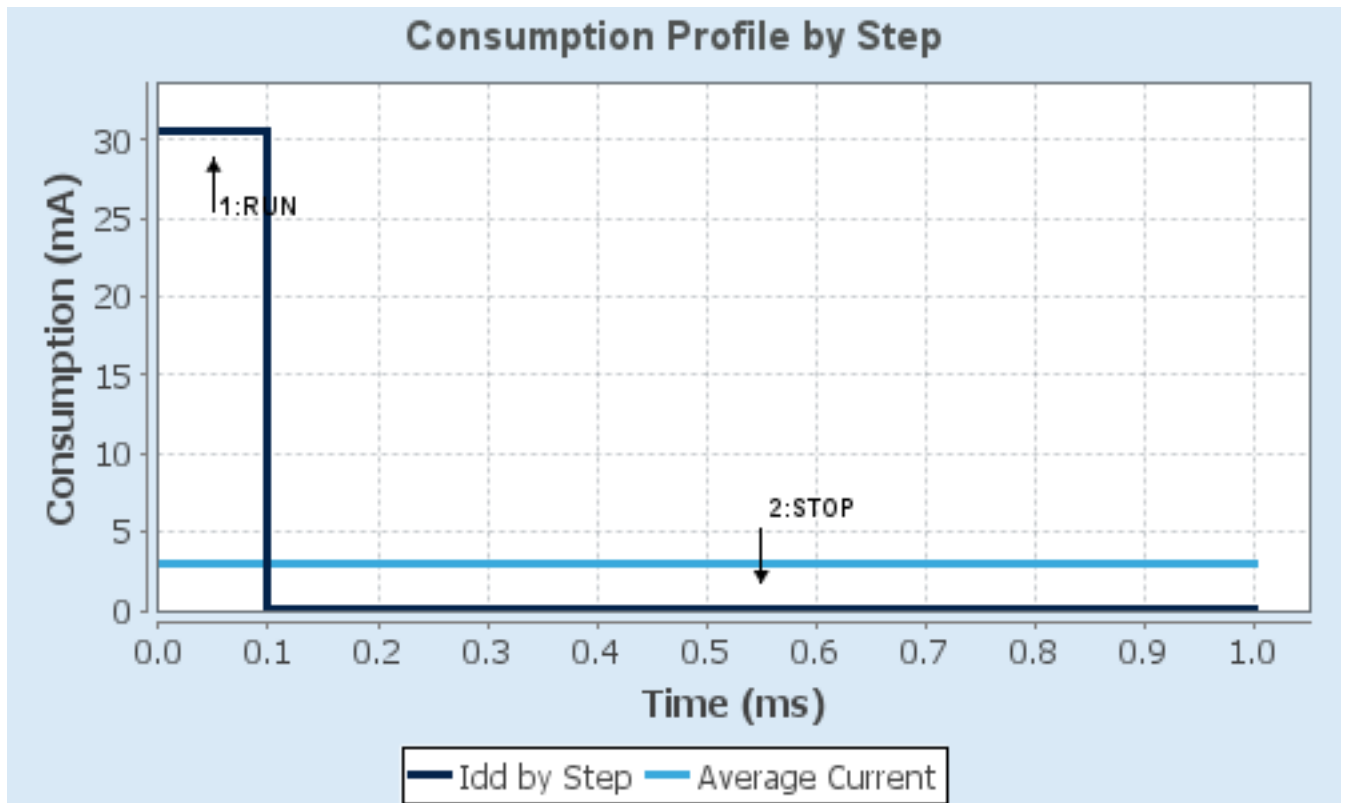
6.4. Sequence

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 μ A
Duration	0.1 ms	0.9 ms
DMIPS	90.0	0.0
Ta Max	100.47	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



7. Peripherals and Middlewares Configuration

7.1. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

Low Speed Clock (LSE) : Crystal/Ceramic Resonator

7.1.1. 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 Timeout Value (ms)	100
LSE Startup Timeout Value (ms)	5000

7.2. SPI1

Mode: Full-Duplex Master

7.2.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	4 *
Baud Rate	18.0 MBits/s *
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Software

7.3. SPI2

Mode: Full-Duplex Master

7.3.1. 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

7.4. SYS

Debug: Serial Wire

Timebase Source: SysTick

7.5. TIM3

Channel1: PWM Generation CH1

7.5.1. 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 1:

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

7.6. USART1

Mode: Asynchronous

7.6.1. 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

*** User modified value**

8. System Configuration

8.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
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	
	PD0-OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	
	PD1-OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	
SPI1	PA5	SPI1_SCK	Alternate Function Push Pull	n/a	High *	
	PA6	SPI1_MISO	Input mode	No pull-up and no pull-down	n/a	
	PA7	SPI1_MOSI	Alternate Function Push Pull	n/a	High *	
SPI2	PB13	SPI2_SCK	Alternate Function Push Pull	n/a	High *	DB13
	PB14	SPI2_MISO	Input mode	No pull-up and no pull-down	n/a	DB14
	PB15	SPI2_MOSI	Alternate Function Push Pull	n/a	High *	DB15
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
TIM3	PC6	TIM3_CH1	Alternate Function Push Pull	n/a	Low	
USART1	PA9	USART1_TX	Alternate Function Push Pull	n/a	High *	
	PA10	USART1_RX	Input mode	No pull-up and no pull-down	n/a	
Single Mapped Signals	PA15	ADC1_EXTI15	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	
GPIO	PC0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	RELAY_1
	PC1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	RELAY_2
	PC2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	FCS
	PC3	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	SD_CS
	PA0-WKUP	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	TFT_RES
	PA1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	TFT_COM_EN
	PA2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	WR_DATA
	PA3	GPIO_EXTI3	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	TOUCH_INT
	PA4	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	TOUCH_CS
	PC4	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	RD_DATA
	PC5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DATA_COM

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PB0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DB0
	PB1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DB1
	PB2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DB2
	PB10	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DB10
	PB11	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DB11
	PB12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DB12
	PC7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	AIN1
	PC8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	AIN2
	PC9	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	BIN1
	PA8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	BIN2
	PA11	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	DP_SW
	PA12	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	ILED
	PC10	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	METER_INP
	PC11	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DRV_MODE
	PC12	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	PB_SENS
	PD2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	SOUND_ON
	PB3	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DB3
	PB4	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DB4
	PB5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DB5
	PB6	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DB6
	PB7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DB7
	PB8	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DB8
	PB9	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	DB9

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
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
EXTI line3 interrupt	unused		
TIM3 global interrupt	unused		
SPI1 global interrupt	unused		
SPI2 global interrupt	unused		
USART1 global interrupt	unused		
EXTI line[15:10] interrupts	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

* User modified value

9. System Views

9.1. Category view

9.1.1. Current

Middleware

System Core

Analog

Timers

Connectivity

Multimedia

Computing

DMA

TIM3 

SPI1 

GPIO 

SPI2 

IIVIC 

USART1 

RCC 

SYS 

10. Docs & Resources

Type	Link
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_sc2155.pdf
Brochures	https://www.st.com/resource/en/brochure/breveco0518.pdf
Flyers	https://www.st.com/resource/en/flyer/flnucleolrwan.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/fldpstpf11120.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/an2548-using-the-stm32f0f1f3gxl-series-dma-controller-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/an2834-how-to-get-the-best-adc-accuracy-in-stm32-microcontrollers-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-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/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/an4838-managing-memory-protection-unit-in-stm32-mcus-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4879-usb-hardware-and-pcb-guidelines-using-stm32-mcus-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/an5036-thermal-management-guidelines-for-stm32-applications-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/an5225-usb-typec-power-delivery-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

stmicroelectronics.pdf

Application Notes [https://www.st.com/resource/en/application_note/an1202_freertos_guide-](https://www.st.com/resource/en/application_note/an1202_freertos_guide-for_related_Tools_freertos-guide-stmicroelectronics.pdf)
for related Tools [freertos-guide-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an1202_freertos_guide-for_related_Tools_freertos-guide-stmicroelectronics.pdf)
& Software

Application Notes [https://www.st.com/resource/en/application_note/an1602_semihosting_in](https://www.st.com/resource/en/application_note/an1602_semihosting_in_for_related_Tools_truestudio-how-to-do-semihosting-in-truestudio-stmicroelectronics.pdf)
for related Tools [_truestudio-how-to-do-semihosting-in-truestudio-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an1602_semihosting_in_for_related_Tools_truestudio-how-to-do-semihosting-in-truestudio-stmicroelectronics.pdf)
& Software

Application Notes [https://www.st.com/resource/en/application_note/an1801_stm32cubeprog](https://www.st.com/resource/en/application_note/an1801_stm32cubeprog_for_related_Tools_rammer_in_truestudio-installing-stm32cubeprogrammer-in-truestudio-stmicroelectronics.pdf)
for related Tools [rammer_in_truestudio-installing-stm32cubeprogrammer-in-truestudio-](https://www.st.com/resource/en/application_note/an1801_stm32cubeprog_for_related_Tools_rammer_in_truestudio-installing-stm32cubeprogrammer-in-truestudio-stmicroelectronics.pdf)
& Software [stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an1801_stm32cubeprog_for_related_Tools_rammer_in_truestudio-installing-stm32cubeprogrammer-in-truestudio-stmicroelectronics.pdf)

Application Notes [https://www.st.com/resource/en/application_note/atollic_editing_keyboard](https://www.st.com/resource/en/application_note/atollic_editing_keyboard_for_related_Tools_shortcuts-atollic-editing-keyboard-shortcuts-stmicroelectronics.pdf)
for related Tools [_shortcuts-atollic-editing-keyboard-shortcuts-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/atollic_editing_keyboard_for_related_Tools_shortcuts-atollic-editing-keyboard-shortcuts-stmicroelectronics.pdf)
& Software

Application Notes [https://www.st.com/resource/en/application_note/iar_to_atollic_truestudio](https://www.st.com/resource/en/application_note/iar_to_atollic_truestudio_for_related_Tools_migration_guide-truestudio-for-arm-migration-guide-iar-embedded-workbench-to-truestudio-stmicroelectronics.pdf)
for related Tools [_migration_guide-truestudio-for-arm-migration-guide-iar-embedded-](https://www.st.com/resource/en/application_note/iar_to_atollic_truestudio_for_related_Tools_migration_guide-truestudio-for-arm-migration-guide-iar-embedded-workbench-to-truestudio-stmicroelectronics.pdf)
& Software [workbench-to-truestudio-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/iar_to_atollic_truestudio_for_related_Tools_migration_guide-truestudio-for-arm-migration-guide-iar-embedded-workbench-to-truestudio-stmicroelectronics.pdf)

Application Notes [https://www.st.com/resource/en/application_note/stm32cubemx_installatio](https://www.st.com/resource/en/application_note/stm32cubemx_installatio_for_related_Tools_n_in_truestudio-stm32cubemx-installation-in-truestudio-stmicroelectronics.pdf)
for related Tools [n_in_truestudio-stm32cubemx-installation-in-truestudio-](https://www.st.com/resource/en/application_note/stm32cubemx_installatio_for_related_Tools_n_in_truestudio-stm32cubemx-installation-in-truestudio-stmicroelectronics.pdf)
& Software [stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/stm32cubemx_installatio_for_related_Tools_n_in_truestudio-stm32cubemx-installation-in-truestudio-stmicroelectronics.pdf)

Application Notes [https://www.st.com/resource/en/application_note/an2557-stm32f10x-](https://www.st.com/resource/en/application_note/an2557-stm32f10x-inapplication-programming-using-the-usart-stmicroelectronics.pdf)
for related Tools [inapplication-programming-using-the-usart-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an2557-stm32f10x-inapplication-programming-using-the-usart-stmicroelectronics.pdf)
& Software

Application Notes [https://www.st.com/resource/en/application_note/an2592-achieving-32bit-](https://www.st.com/resource/en/application_note/an2592-achieving-32bit-timer-resolution-with-software-expansion-for-stm32cube-and-standard-peripheral-library-stmicroelectronics.pdf)
for related Tools [timer-resolution-with-software-expansion-for-stm32cube-and-standard-](https://www.st.com/resource/en/application_note/an2592-achieving-32bit-timer-resolution-with-software-expansion-for-stm32cube-and-standard-peripheral-library-stmicroelectronics.pdf)
& Software [peripheral-library-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an2592-achieving-32bit-timer-resolution-with-software-expansion-for-stm32cube-and-standard-peripheral-library-stmicroelectronics.pdf)

Application Notes [https://www.st.com/resource/en/application_note/an2594-eeeprom-](https://www.st.com/resource/en/application_note/an2594-eeeprom-emulation-in-stm32f10x-microcontrollers-stmicroelectronics.pdf)
for related Tools [emulation-in-stm32f10x-microcontrollers-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an2594-eeeprom-emulation-in-stm32f10x-microcontrollers-stmicroelectronics.pdf)
& Software

Application Notes [https://www.st.com/resource/en/application_note/an2598-smartcard-](https://www.st.com/resource/en/application_note/an2598-smartcard-interface-with-stm32f10x-and-stm32l1xx-microcontrollers-stmicroelectronics.pdf)
for related Tools [interface-with-stm32f10x-and-stm32l1xx-microcontrollers-](https://www.st.com/resource/en/application_note/an2598-smartcard-interface-with-stm32f10x-and-stm32l1xx-microcontrollers-stmicroelectronics.pdf)
& Software [stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an2598-smartcard-interface-with-stm32f10x-and-stm32l1xx-microcontrollers-stmicroelectronics.pdf)

Application Notes [https://www.st.com/resource/en/application_note/an2629-stm32f101xx-](https://www.st.com/resource/en/application_note/an2629-stm32f101xx-stm32f102xx-and-stm32f103xx-lowpower-modes-stmicroelectronics.pdf)
for related Tools [stm32f102xx-and-stm32f103xx-lowpower-modes-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an2629-stm32f101xx-stm32f102xx-and-stm32f103xx-lowpower-modes-stmicroelectronics.pdf)
& Software

Application Notes https://www.st.com/resource/en/application_note/an2656-stm32f10xxx-lcd-glass-driver-firmware-stmicroelectronics.pdf
for related Tools
& Software

Application Notes https://www.st.com/resource/en/application_note/an2668-improving-stm32f1-series-stm32f3-series-and-stm32lx-series-adc-resolution-by-oversampling-stmicroelectronics.pdf
for related Tools
& Software

Application Notes https://www.st.com/resource/en/application_note/an2739-how-to-use-the-highdensity-stm32f103xx-microcontroller-to-play-audio-files-with-an-external-is-audio-codec-stmicroelectronics.pdf
for related Tools
& Software

Application Notes https://www.st.com/resource/en/application_note/an2784-using-the-highdensity-stm32f10xxx-fsmc-peripheral-to-drive-external-memories-stmicroelectronics.pdf
for related Tools
& Software

Application Notes https://www.st.com/resource/en/application_note/an2790-tft-lcd-interfacing-with-the-highdensity-stm32f10xxx-fsmc-stmicroelectronics.pdf
for related Tools
& Software

Application Notes https://www.st.com/resource/en/application_note/an2820-driving-bipolar-stepper-motors-using-a-mediumdensity-stm32f103xx-microcontroller-stmicroelectronics.pdf
for related Tools
& Software

Application Notes https://www.st.com/resource/en/application_note/an2821-clockcalendar-implementation-on-the-stm32f10xxx-microcontroller-rtc-stmicroelectronics.pdf
for related Tools
& Software

Application Notes https://www.st.com/resource/en/application_note/an2824-stm32f10xxx-ic-optimized-examples-stmicroelectronics.pdf
for related Tools
& Software

Application Notes https://www.st.com/resource/en/application_note/an2841-led-dimming-implemented-on-stm32-microcontroller-stmicroelectronics.pdf
for related Tools
& Software

Application Notes https://www.st.com/resource/en/application_note/an2868-stm32f10xxx-internal-rc-oscillator-hsi-calibration-stmicroelectronics.pdf
for related Tools
& Software

Application Notes https://www.st.com/resource/en/application_note/an2931-implementing-the-adpcm-algorithm-in-highdensity-stm32f103xx-microcontrollers-stmicroelectronics.pdf
for related Tools
& Software

Application Notes https://www.st.com/resource/en/application_note/an2953-how-to-migrate-

for related Tools from-the-stm32f10xxx-firmware-library-v203-to-the-stm32f10xxx-standard-
& Software peripheral-library-v300-stmicroelectronics.pdf

Application Notes [https://www.st.com/resource/en/application_note/an3012-getting-started-](https://www.st.com/resource/en/application_note/an3012-getting-started-with-uclinux-for-stm32f10x-highdensity-devices-stmicroelectronics.pdf)
for related Tools [with-uclinux-for-stm32f10x-highdensity-devices-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an3012-getting-started-with-uclinux-for-stm32f10x-highdensity-devices-stmicroelectronics.pdf)
& Software

Application Notes [https://www.st.com/resource/en/application_note/an3078-stm32-](https://www.st.com/resource/en/application_note/an3078-stm32-inapplication-programming-over-the-ic-bus-stmicroelectronics.pdf)
for related Tools [inapplication-programming-over-the-ic-bus-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an3078-stm32-inapplication-programming-over-the-ic-bus-stmicroelectronics.pdf)
& Software

Application Notes [https://www.st.com/resource/en/application_note/an3109-communication-](https://www.st.com/resource/en/application_note/an3109-communication-peripheral-fifo-emulation-with-dma-and-dma-timeout-in-stm32f10x-microcontrollers-stmicroelectronics.pdf)
for related Tools [peripheral-fifo-emulation-with-dma-and-dma-timeout-in-stm32f10x-](https://www.st.com/resource/en/application_note/an3109-communication-peripheral-fifo-emulation-with-dma-and-dma-timeout-in-stm32f10x-microcontrollers-stmicroelectronics.pdf)
& Software [microcontrollers-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an3109-communication-peripheral-fifo-emulation-with-dma-and-dma-timeout-in-stm32f10x-microcontrollers-stmicroelectronics.pdf)

Application Notes [https://www.st.com/resource/en/application_note/an3116-stm32s-adc-](https://www.st.com/resource/en/application_note/an3116-stm32s-adc-modes-and-their-applications-stmicroelectronics.pdf)
for related Tools [modes-and-their-applications-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an3116-stm32s-adc-modes-and-their-applications-stmicroelectronics.pdf)
& Software

Application Notes [https://www.st.com/resource/en/application_note/an3174-implementing-](https://www.st.com/resource/en/application_note/an3174-implementing-receivers-for-infrared-remote-control-protocols-using-stm32f10xxx-microcontrollers-stmicroelectronics.pdf)
for related Tools [receivers-for-infrared-remote-control-protocols-using-stm32f10xxx-](https://www.st.com/resource/en/application_note/an3174-implementing-receivers-for-infrared-remote-control-protocols-using-stm32f10xxx-microcontrollers-stmicroelectronics.pdf)
& Software [microcontrollers-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an3174-implementing-receivers-for-infrared-remote-control-protocols-using-stm32f10xxx-microcontrollers-stmicroelectronics.pdf)

Application Notes [https://www.st.com/resource/en/application_note/an3240-ultrasound-hv-](https://www.st.com/resource/en/application_note/an3240-ultrasound-hv-pulser-demonstration-board-stmicroelectronics.pdf)
for related Tools [pulser-demonstration-board-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an3240-ultrasound-hv-pulser-demonstration-board-stmicroelectronics.pdf)
& Software

Application Notes [https://www.st.com/resource/en/application_note/an3241-qvga-fttlcd-](https://www.st.com/resource/en/application_note/an3241-qvga-fttlcd-direct-drive-using-the-stm32f10xx-fsmc-peripheral-stmicroelectronics.pdf)
for related Tools [direct-drive-using-the-stm32f10xx-fsmc-peripheral-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an3241-qvga-fttlcd-direct-drive-using-the-stm32f10xx-fsmc-peripheral-stmicroelectronics.pdf)
& Software

Application Notes [https://www.st.com/resource/en/application_note/an3307-guidelines-for-](https://www.st.com/resource/en/application_note/an3307-guidelines-for-obtaining-iec-60335-class-b-certification-for-any-stm32-application-stmicroelectronics.pdf)
for related Tools [obtaining-iec-60335-class-b-certification-for-any-stm32-application-](https://www.st.com/resource/en/application_note/an3307-guidelines-for-obtaining-iec-60335-class-b-certification-for-any-stm32-application-stmicroelectronics.pdf)
& Software [stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an3307-guidelines-for-obtaining-iec-60335-class-b-certification-for-any-stm32-application-stmicroelectronics.pdf)

Application Notes [https://www.st.com/resource/en/application_note/an3970-plm-smartplug-](https://www.st.com/resource/en/application_note/an3970-plm-smartplug-v2-getting-started-stmicroelectronics.pdf)
for related Tools [v2-getting-started-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an3970-plm-smartplug-v2-getting-started-stmicroelectronics.pdf)
& Software

Application Notes [https://www.st.com/resource/en/application_note/an3991-how-to-drive-](https://www.st.com/resource/en/application_note/an3991-how-to-drive-multiple-stepper-motors-with-the-l6470-motor-driver-stmicroelectronics.pdf)
for related Tools [multiple-stepper-motors-with-the-l6470-motor-driver-](https://www.st.com/resource/en/application_note/an3991-how-to-drive-multiple-stepper-motors-with-the-l6470-motor-driver-stmicroelectronics.pdf)
& Software [stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an3991-how-to-drive-multiple-stepper-motors-with-the-l6470-motor-driver-stmicroelectronics.pdf)

Application Notes [https://www.st.com/resource/en/application_note/an4075-stevalifp016v2-](https://www.st.com/resource/en/application_note/an4075-stevalifp016v2-iolink-communication-master-transceiver-demonstration-board-)
for related Tools [iolink-communication-master-transceiver-demonstration-board-](https://www.st.com/resource/en/application_note/an4075-stevalifp016v2-iolink-communication-master-transceiver-demonstration-board-)

& Software [stmicroelectronics.pdf](#)

Application Notes [https://www.st.com/resource/en/application_note/an4187-using-the-crc-](https://www.st.com/resource/en/application_note/an4187-using-the-crc-for-related-Tools-peripheral-in-the-stm32-family-stmicroelectronics.pdf)
for related Tools [peripheral-in-the-stm32-family-stmicroelectronics.pdf](#)

& Software

Application Notes [https://www.st.com/resource/en/application_note/an4323-getting-started-](https://www.st.com/resource/en/application_note/an4323-getting-started-for-related-Tools-with-stemwin-library-stmicroelectronics.pdf)
for related Tools [with-stemwin-library-stmicroelectronics.pdf](#)

& Software

Application Notes [https://www.st.com/resource/en/application_note/an4435-guidelines-for-](https://www.st.com/resource/en/application_note/an4435-guidelines-for-obtaining-ulcsaiec-607301603351-class-b-certification-in-any-stm32-application-stmicroelectronics.pdf)
for related Tools [obtaining-ulcsaiec-607301603351-class-b-certification-in-any-stm32-](#)
& Software [application-stmicroelectronics.pdf](#)

Application Notes [https://www.st.com/resource/en/application_note/an4453-implementing-](https://www.st.com/resource/en/application_note/an4453-implementing-the-adpcm-algorithm-in-stm32l1xx-microcontrollers-stmicroelectronics.pdf)
for related Tools [the-adpcm-algorithm-in-stm32l1xx-microcontrollers-stmicroelectronics.pdf](#)

& Software

Application Notes [https://www.st.com/resource/en/application_note/an4499-stm32--](https://www.st.com/resource/en/application_note/an4499-stm32--nrf51822-bluetooth-low-energy-system-solution-stmicroelectronics.pdf)
for related Tools [nrf51822-bluetooth-low-energy-system-solution-stmicroelectronics.pdf](#)

& Software

Application Notes [https://www.st.com/resource/en/application_note/an4502-stm32-](https://www.st.com/resource/en/application_note/an4502-stm32-smbuspmibus-embedded-software-expansion-for-stm32cube-stmicroelectronics.pdf)
for related Tools [smbuspmibus-embedded-software-expansion-for-stm32cube-](#)
& Software [stmicroelectronics.pdf](#)

Application Notes [https://www.st.com/resource/en/application_note/an4578-16channels-led-](https://www.st.com/resource/en/application_note/an4578-16channels-led-driver-with-independent-pwm-dimming-control-based-on-led7708-stmicroelectronics.pdf)
for related Tools [driver-with-independent-pwm-dimming-control-based-on-led7708-](#)
& Software [stmicroelectronics.pdf](#)

Application Notes [https://www.st.com/resource/en/application_note/an4657-stm32-](https://www.st.com/resource/en/application_note/an4657-stm32-inapplication-programming-iap-using-the-usart-stmicroelectronics.pdf)
for related Tools [inapplication-programming-iap-using-the-usart-stmicroelectronics.pdf](#)

& Software

Application Notes [https://www.st.com/resource/en/application_note/an4724-stm32cube-](https://www.st.com/resource/en/application_note/an4724-stm32cube-firmware-examples-for-stm32f1-series-stmicroelectronics.pdf)
for related Tools [firmware-examples-for-stm32f1-series-stmicroelectronics.pdf](#)

& Software

Application Notes [https://www.st.com/resource/en/application_note/an4841-digital-signal-](https://www.st.com/resource/en/application_note/an4841-digital-signal-processing-for-stm32-microcontrollers-using-cmsis-stmicroelectronics.pdf)
for related Tools [processing-for-stm32-microcontrollers-using-cmsis-stmicroelectronics.pdf](#)

& Software

Application Notes [https://www.st.com/resource/en/application_note/an5054-secure-](https://www.st.com/resource/en/application_note/an5054-secure-programming-using-stm32cubeprogrammer-stmicroelectronics.pdf)
for related Tools [programming-using-stm32cubeprogrammer-stmicroelectronics.pdf](#)

& Software

Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an5360-getting-started-with-projects-based-on-the-stm32mp1-series-in-stm32cubeide-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an5361-getting-started-with-projects-based-on-dualcore-stm32h7-microcontrollers-in-stm32cubeide-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an5394-getting-started-with-projects-based-on-the-stm32l5-series-in-stm32cubeide-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an5418-how-to-build-a-simple-usbp-d-sink-application-with-stm32cubemx-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an5426-migrating-graphics-middleware-projects-from-stm32cubemx-540-to-stm32cubemx-550-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an5564-getting-started-with-projects-based-on-dualcore-stm32wl-microcontrollers-in-stm32cubeide-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an5698-adapting-the-xcubestl-functional-safety-package-for-stm32-iec-61508-compliant-to-other-safety-standards-stmicroelectronics.pdf
Application Notes for related Tools & Software	https://www.st.com/resource/en/application_note/an5731-stm32cubemx-and-stm32cubeide-threadsafe-solution-stmicroelectronics.pdf
Device Option Lists	https://www.st.com/resource/en/device_option_list/opl_stm32f103_384k.zip
Errata Sheets	https://www.st.com/resource/en/errata_sheet/es0340-stm32f101xcde-and-stm32f103xcde-highdensity-device-limitations-stmicroelectronics.pdf
Datasheet	https://www.st.com/resource/en/datasheet/cd00191185.pdf
Programming Manuals	https://www.st.com/resource/en/programming_manual/pm0056-stm32f10xxx20xxx21xxx1xxxx-cortexm3-programming-manual-stmicroelectronics.pdf
Programming Manuals	https://www.st.com/resource/en/programming_manual/pm0075-stm32f10xxx-flash-memory-microcontrollers-stmicroelectronics.pdf

Reference Manuals	https://www.st.com/resource/en/reference_manual/rm0008-stm32f101xx-stm32f102xx-stm32f103xx-stm32f105xx-and-stm32f107xx-advanced-armbased-32bit-mcus-stmicroelectronics.pdf
Technical Notes & Articles	https://www.st.com/resource/en/technical_note/tn0516-overview-of-the-stm32f0xf100xxf103xx-and-stm32f2xxf30xf4xx-mcus-pmsm-singledual-foc-sdk-v40-stmicroelectronics.pdf
Technical Notes & Articles	https://www.st.com/resource/en/technical_note/tn1163-description-of-wlcsp-for-microcontrollers-and-recommendations-for-its-use-stmicroelectronics.pdf
Technical Notes & Articles	https://www.st.com/resource/en/technical_note/tn1204-tape-and-reel-shipping-media-for-stm32-microcontrollers-in-bga-packages-stmicroelectronics.pdf
Technical Notes & Articles	https://www.st.com/resource/en/technical_note/tn1205-tape-and-reel-shipping-media-for-stm8-and-stm32-microcontrollers-in-fpn-packages-stmicroelectronics.pdf
Technical Notes & Articles	https://www.st.com/resource/en/technical_note/tn1206-tape-and-reel-shipping-media-for-stm8-and-stm32-microcontrollers-in-qfp-packages-stmicroelectronics.pdf
Technical Notes & Articles	https://www.st.com/resource/en/technical_note/tn1207-tape-and-reel-shipping-media-for-stm8-and-stm32-microcontrollers-in-so-packages-stmicroelectronics.pdf
Technical Notes & Articles	https://www.st.com/resource/en/technical_note/tn1208-tape-and-reel-shipping-media-for-stm8-and-stm32-microcontrollers-in-tssop-and-ssop-packages-stmicroelectronics.pdf
User Manuals	https://www.st.com/resource/en/user_manual/um1561-stevalisv003v1-firmware-user-manual-stmicroelectronics.pdf
User Manuals	https://www.st.com/resource/en/user_manual/um1573-st7540-power-line-modem-firmware-stack-stmicroelectronics.pdf