



## 1. Description

### 1.1. Project

Project Name	SerialIO
Board Name	custom
Generated with:	STM32CubeMX 6.6.1
Date	10/31/2022

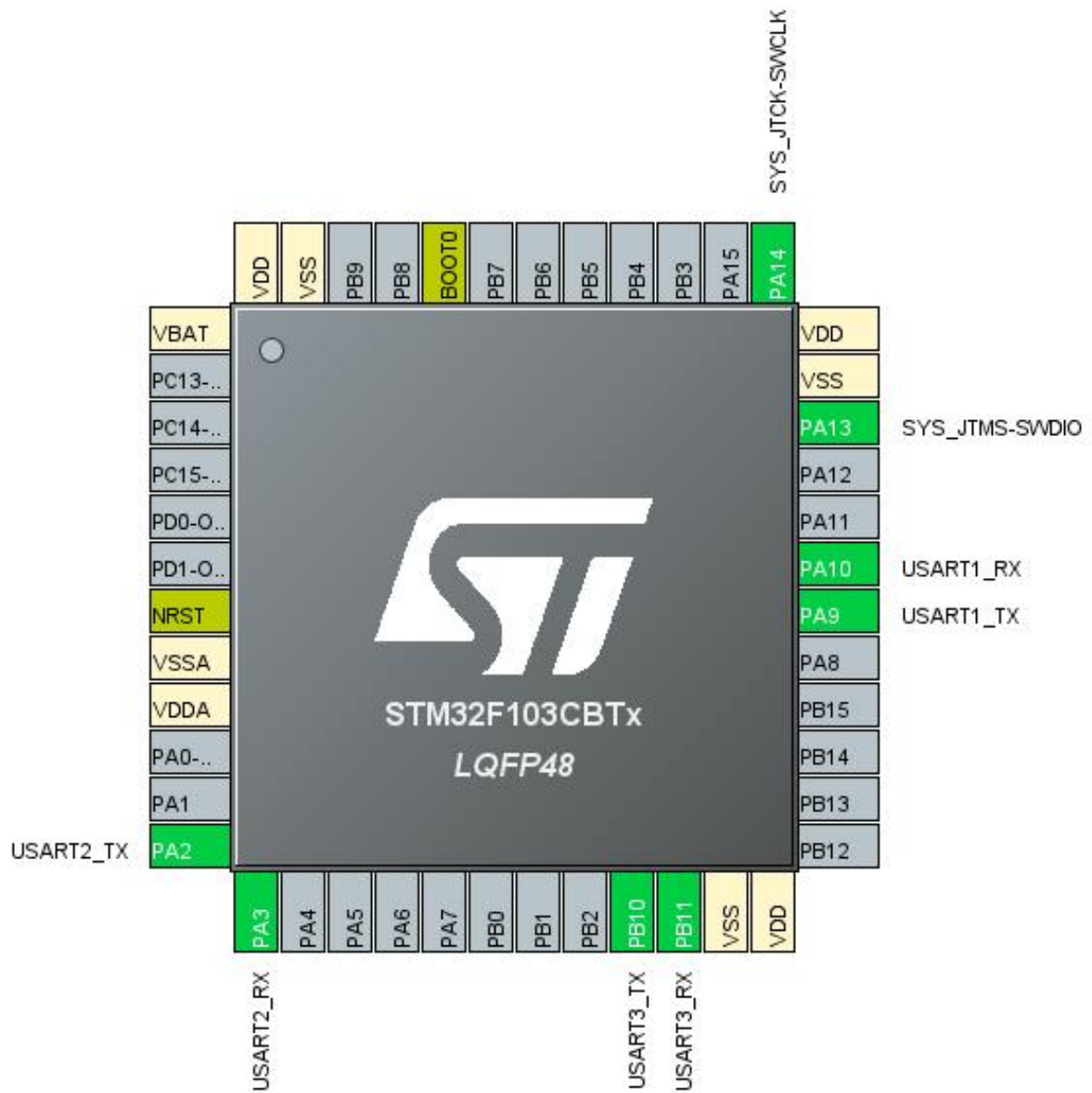
### 1.2. MCU

MCU Series	STM32F1
MCU Line	STM32F103
MCU name	STM32F103CBTx
MCU Package	LQFP48
MCU Pin number	48

### 1.3. Core(s) information

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

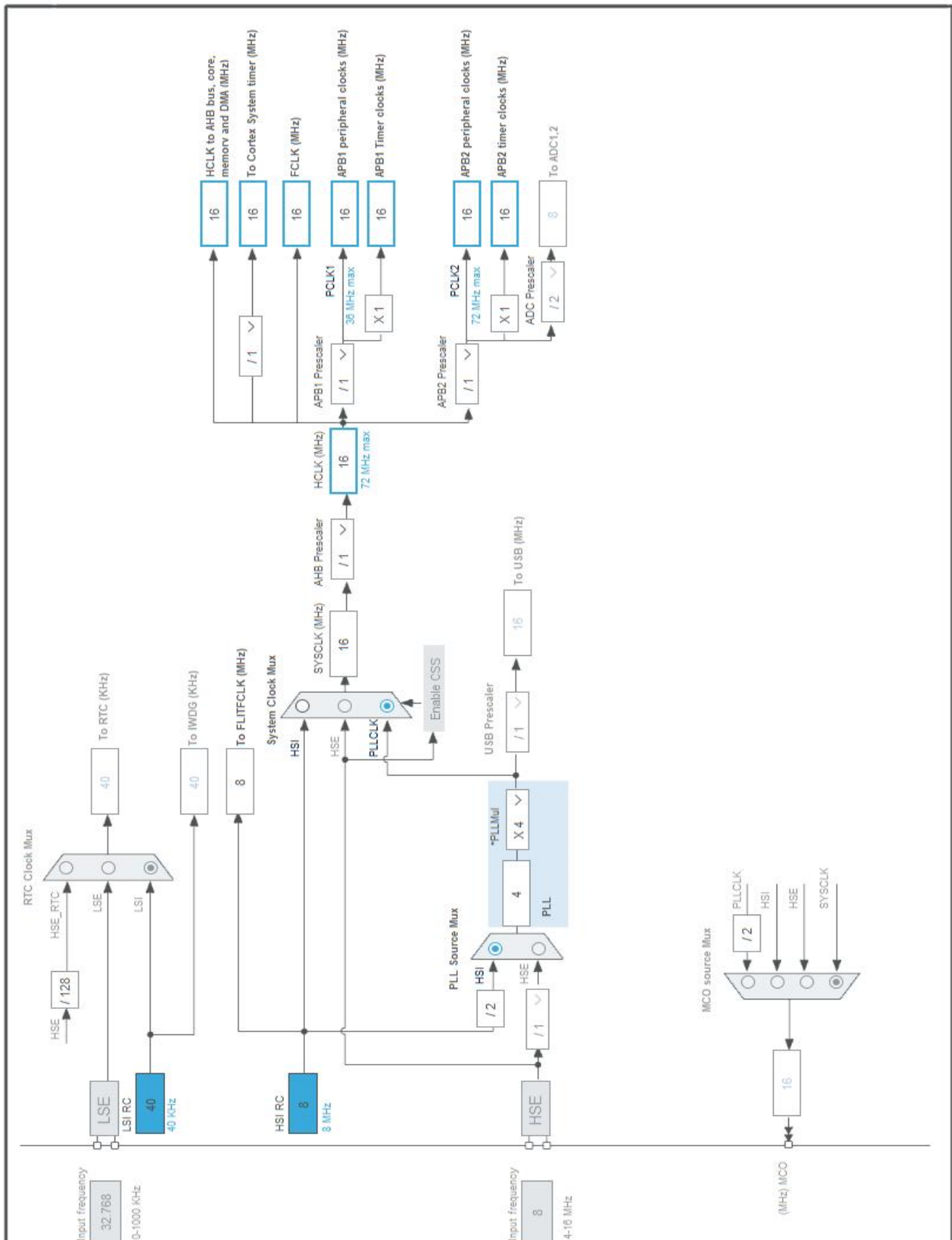
## 2. Pinout Configuration



### 3. Pins Configuration

Pin Number LQFP48	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
7	NRST	Reset		
8	VSSA	Power		
9	VDDA	Power		
12	PA2	I/O	USART2_TX	
13	PA3	I/O	USART2_RX	
21	PB10	I/O	USART3_TX	
22	PB11	I/O	USART3_RX	
23	VSS	Power		
24	VDD	Power		
30	PA9	I/O	USART1_TX	
31	PA10	I/O	USART1_RX	
34	PA13	I/O	SYS_JTMS-SWDIO	
35	VSS	Power		
36	VDD	Power		
37	PA14	I/O	SYS_JTCK-SWCLK	
44	BOOT0	Boot		
47	VSS	Power		
48	VDD	Power		

## 4. Clock Tree Configuration



## 5. Software Project

### 5.1. Project Settings

Name	Value
Project Name	SerialIO
Project Folder	F:\Projects\EmbeddedProjects\VSCode\SerialIO
Toolchain / IDE	Makefile
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	0x000
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	Yes
Set all free pins as analog (to optimize the power consumption)	Yes
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_USART1_UART_Init	USART1
4	MX_USART2_UART_Init	USART2
5	MX_USART3_UART_Init	USART3

## 6. Power Consumption Calculator report

### 6.1. Microcontroller Selection

Series	STM32F1
Line	STM32F103
MCU	STM32F103CBTx
Datasheet	DS5319_Rev17

### 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

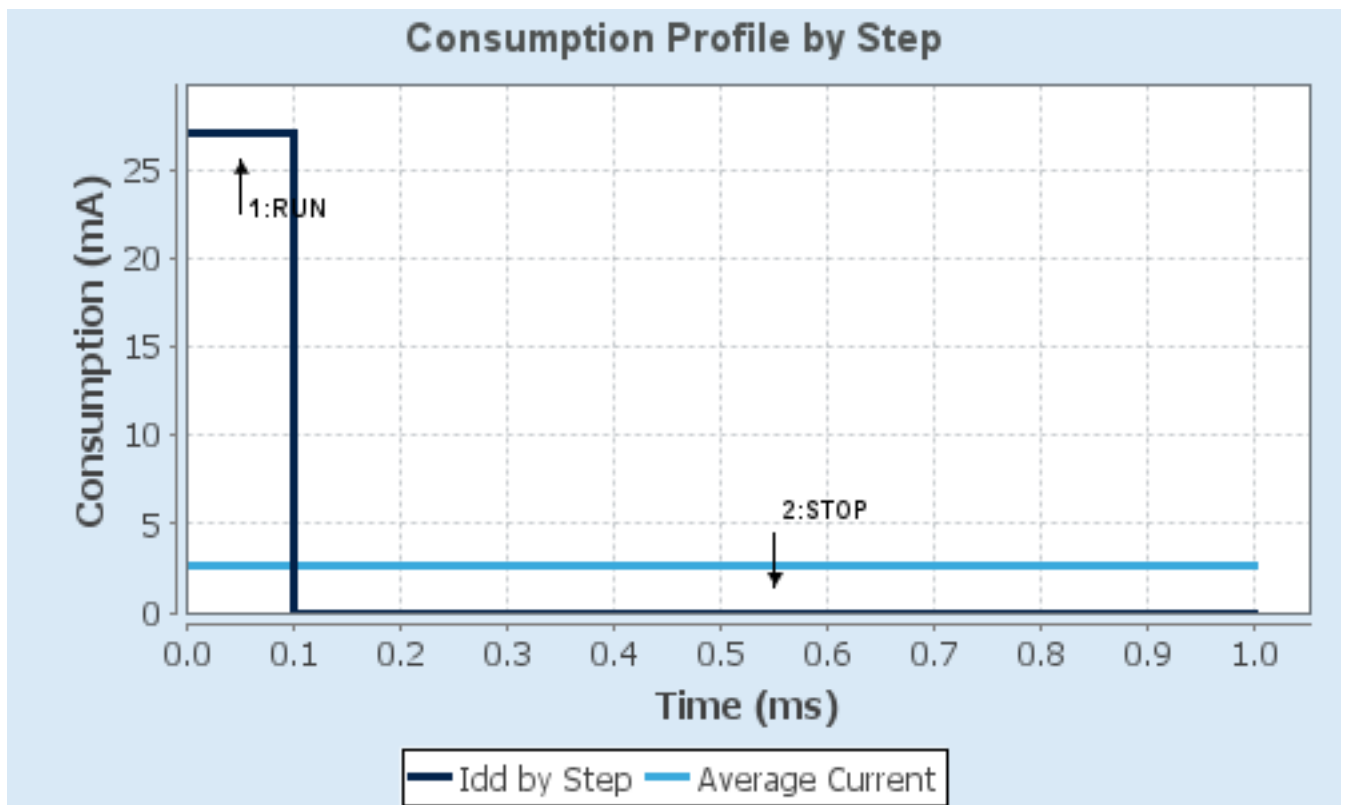
<b>Step</b>	Step1	Step2
<b>Mode</b>	RUN	STOP
<b>Vdd</b>	3.3	3.3
<b>Voltage Source</b>	Battery	Battery
<b>Range</b>	No Scale	No Scale
<b>Fetch Type</b>	FLASH	n/a
<b>CPU Frequency</b>	72 MHz	0 Hz
<b>Clock Configuration</b>	HSE PLL	Regulator LP
<b>Clock Source Frequency</b>	8 MHz	0 Hz
<b>Peripherals</b>		
<b>Additional Cons.</b>	0 mA	0 mA
<b>Average Current</b>	27 mA	14 $\mu$ A
<b>Duration</b>	0.1 ms	0.9 ms
<b>DMIPS</b>	90.0	0.0
<b>Ta Max</b>	100.1	105
<b>Category</b>	In DS Table	In DS Table

#### 6.5. Results

Sequence Time	1 ms	Average Current	2.71 mA
Battery Life	1 month, 21 days, 17 hours	Average DMIPS	61.0 DMIPS

#### 6.6. Chart





## 7. Peripherals and Middlewares Configuration

### 7.1. RCC

#### 7.1.1. Parameter Settings:

##### System Parameters:

VDD voltage (V)	3.3
Prefetch Buffer	Enabled
Flash Latency(WS)	0 WS (1 CPU cycle)

##### RCC Parameters:

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

### 7.2. SYS

**Debug: Serial Wire**

**Timebase Source: SysTick**

### 7.3. USART1

**Mode: Asynchronous**

#### 7.3.1. Parameter Settings:

##### Basic Parameters:

Baud Rate	115200
Word Length	8 Bits (including Parity)
Parity	None
Stop Bits	1

##### Advanced Parameters:

Data Direction	Receive and Transmit
Over Sampling	16 Samples

### 7.4. USART2

**Mode: Asynchronous**

#### 7.4.1. Parameter Settings:

##### Basic Parameters:

Baud Rate	115200
Word Length	8 Bits (including Parity)
Parity	None
Stop Bits	1

**Advanced Parameters:**

Data Direction	Receive and Transmit
Over Sampling	16 Samples

## 7.5. USART3

### Mode: Asynchronous

#### 7.5.1. 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
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
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	
USART2	PA2	USART2_TX	Alternate Function Push Pull	n/a	High *	
	PA3	USART2_RX	Input mode	No pull-up and no pull-down	n/a	
USART3	PB10	USART3_TX	Alternate Function Push Pull	n/a	High *	
	PB11	USART3_RX	Input mode	No pull-up and no pull-down	n/a	

### 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		
USART1 global interrupt	unused		
USART2 global interrupt	unused		
USART3 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	false	true

\* User modified value

## 9. System Views

### 9.1. Category view

#### 9.1.1. Current

## 10. Docs & Resources

Type	Link
Presentations	<a href="https://www.st.com/resource/en/product_presentation/stm32-stm8_embedded_software_solutions.pdf">https://www.st.com/resource/en/product_presentation/stm32-stm8_embedded_software_solutions.pdf</a>
Presentations	<a href="https://www.st.com/resource/en/product_presentation/stm32_eval-tools_portfolio.pdf">https://www.st.com/resource/en/product_presentation/stm32_eval-tools_portfolio.pdf</a>
Presentations	<a href="https://www.st.com/resource/en/product_presentation/stm32_stm8_functional-safety-packages.pdf">https://www.st.com/resource/en/product_presentation/stm32_stm8_functional-safety-packages.pdf</a>
Presentations	<a href="https://www.st.com/resource/en/product_presentation/stm32-stm8_software_development_tools.pdf">https://www.st.com/resource/en/product_presentation/stm32-stm8_software_development_tools.pdf</a>
Training Material	<a href="https://www.st.com/resource/en/sales_guide/sg_sc2155.pdf">https://www.st.com/resource/en/sales_guide/sg_sc2155.pdf</a>
Brochures	<a href="https://www.st.com/resource/en/brochure/breveco0518.pdf">https://www.st.com/resource/en/brochure/breveco0518.pdf</a>
Flyers	<a href="https://www.st.com/resource/en/flyer/flnucleolrwan.pdf">https://www.st.com/resource/en/flyer/flnucleolrwan.pdf</a>
Flyers	<a href="https://www.st.com/resource/en/flyer/flstm32nucleo.pdf">https://www.st.com/resource/en/flyer/flstm32nucleo.pdf</a>
Flyers	<a href="https://www.st.com/resource/en/flyer/flstmcsuite.pdf">https://www.st.com/resource/en/flyer/flstmcsuite.pdf</a>
Flyers	<a href="https://www.st.com/resource/en/flyer/fldpstpf11120.pdf">https://www.st.com/resource/en/flyer/fldpstpf11120.pdf</a>
Product Certifications	<a href="https://www.st.com/resource/en/certification_document/1239988349.pdf">https://www.st.com/resource/en/certification_document/1239988349.pdf</a>
Product Certifications	<a href="https://www.st.com/resource/en/certification_document/stm32_authentication_can.pdf">https://www.st.com/resource/en/certification_document/stm32_authentication_can.pdf</a>
Application Notes	<a href="https://www.st.com/resource/en/application_note/an1181-electrostatic-discharge-sensitivity-measurement-stmicroelectronics.pdf">https://www.st.com/resource/en/application_note/an1181-electrostatic-discharge-sensitivity-measurement-stmicroelectronics.pdf</a>
Application Notes	<a href="https://www.st.com/resource/en/application_note/an1709-emc-design-guide-for-stm8-stm32-and-legacy-mcus-stmicroelectronics.pdf">https://www.st.com/resource/en/application_note/an1709-emc-design-guide-for-stm8-stm32-and-legacy-mcus-stmicroelectronics.pdf</a>
Application Notes	<a href="https://www.st.com/resource/en/application_note/an2548-using-the-stm32f0f1f3gxl-series-dma-controller-stmicroelectronics.pdf">https://www.st.com/resource/en/application_note/an2548-using-the-stm32f0f1f3gxl-series-dma-controller-stmicroelectronics.pdf</a>
Application Notes	<a href="https://www.st.com/resource/en/application_note/an2586-getting-started-with-stm32f10xxx-hardware-development-stmicroelectronics.pdf">https://www.st.com/resource/en/application_note/an2586-getting-started-with-stm32f10xxx-hardware-development-stmicroelectronics.pdf</a>
Application Notes	<a href="https://www.st.com/resource/en/application_note/an2606-stm32-microcontroller-system-memory-boot-mode-stmicroelectronics.pdf">https://www.st.com/resource/en/application_note/an2606-stm32-microcontroller-system-memory-boot-mode-stmicroelectronics.pdf</a>
Application Notes	<a href="https://www.st.com/resource/en/application_note/an2639-soldering-">https://www.st.com/resource/en/application_note/an2639-soldering-</a>

recommendations-and-package-information-for-leadfree-ecopack-mcus-and-mpus-stmicroelectronics.pdf

Application Notes [https://www.st.com/resource/en/application\\_note/an2834-how-to-get-the-best-adc-accuracy-in-stm32-microcontrollers-stmicroelectronics.pdf](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](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](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](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](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](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](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](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](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](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](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](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-](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](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/an3970-plm-smartplug-v2-getting-started-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an3970-plm-smartplug-v2-getting-started-stmicroelectronics.pdf)

Application Notes [https://www.st.com/resource/en/application\\_note/an4013-stm32-crossseries-timer-overview-stmicroelectronics.pdf](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/an4068-st7580-power-line-communication-systemonchip-design-guide-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an4068-st7580-power-line-communication-systemonchip-design-guide-stmicroelectronics.pdf)

Application Notes [https://www.st.com/resource/en/application\\_note/an4070-250-w-grid-connected-microinverter-stmicroelectronics.pdf](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](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](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](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](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](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](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-micronrollers-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an4649-migrating-from-stm32f1-series-to-stm32l4-series--stm32l4-series-micronrollers-stmicroelectronics.pdf)

Application Notes [https://www.st.com/resource/en/application\\_note/an4655-virtually-increasing-the-number-of-serial-communication-peripherals-in-stm32-](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](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](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](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](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](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](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](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](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](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](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](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](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](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](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-](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/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_installation_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_installation_in_truestudio-stm32cubemx-installation-in-truestudio-stmicroelectronics.pdf)  
& Software [stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/stm32cubemx_installation_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](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](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](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](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](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](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](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](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](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](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](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-from-the-stm32f10xxx-firmware-library-v203-to-the-stm32f10xxx-standard-peripheral-library-v300-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an2953-how-to-migrate-for-related-Tools-&Software/https://www.st.com/resource/en/application_note/an2953-how-to-migrate-from-the-stm32f10xxx-firmware-library-v203-to-the-stm32f10xxx-standard-peripheral-library-v300-stmicroelectronics.pdf)

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

Application Notes [https://www.st.com/resource/en/application\\_note/an3078-stm32-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)

Application Notes [https://www.st.com/resource/en/application\\_note/an3109-communication-peripheral-fifo-emulation-with-dma-and-dma-timeout-in-stm32f10x-microcontrollers-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an3109-communication-for-related-Tools-&Software/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-modes-and-their-applications-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an3116-stm32s-adc-for-related-Tools-&Software/https://www.st.com/resource/en/application_note/an3116-stm32s-adc-modes-and-their-applications-stmicroelectronics.pdf)

Application Notes [https://www.st.com/resource/en/application\\_note/an3174-implementing-receivers-for-infrared-remote-control-protocols-using-stm32f10xxx-microcontrollers-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an3174-implementing-for-related-Tools-&Software/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-pulser-demonstration-board-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an3240-ultrasound-hv-for-related-Tools-&Software/https://www.st.com/resource/en/application_note/an3240-ultrasound-hv-pulser-demonstration-board-stmicroelectronics.pdf)

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

Application Notes [https://www.st.com/resource/en/application\\_note/an3307-guidelines-for-obtaining-iec-60335-class-b-certification-for-any-stm32-application-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an3307-guidelines-for-for-related-Tools-&Software/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-v2-getting-started-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an3970-plm-smartplug-for-related-Tools-&Software/https://www.st.com/resource/en/application_note/an3970-plm-smartplug-v2-getting-started-stmicroelectronics.pdf)

Application Notes [https://www.st.com/resource/en/application\\_note/an3991-how-to-drive-multiple-stepper-motors-with-the-l6470-motor-driver-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an3991-how-to-drive-for-related-Tools-&Software/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-https://www.st.com/resource/en/application_note/an4075-stevalifp016v2-)

for related Tools    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-peripheral-in-the-stm32-family-stmicroelectronics.pdf)  
for related Tools    [peripheral-in-the-stm32-family-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an4187-using-the-crc-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-with-stemwin-library-stmicroelectronics.pdf)  
for related Tools    [with-stemwin-library-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an4323-getting-started-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-](https://www.st.com/resource/en/application_note/an4435-guidelines-for-obtaining-ulcsaiec-607301603351-class-b-certification-in-any-stm32-application-stmicroelectronics.pdf)  
& Software            [application-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an4435-guidelines-for-obtaining-ulcsaiec-607301603351-class-b-certification-in-any-stm32-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](https://www.st.com/resource/en/application_note/an4453-implementing-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](https://www.st.com/resource/en/application_note/an4499-stm32-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-smbuspmbus-embedded-software-expansion-for-stm32cube-stmicroelectronics.pdf)  
for related Tools    [smbuspmbus-embedded-software-expansion-for-stm32cube-](https://www.st.com/resource/en/application_note/an4502-stm32-smbuspmbus-embedded-software-expansion-for-stm32cube-stmicroelectronics.pdf)  
& Software            [stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an4502-stm32-smbuspmbus-embedded-software-expansion-for-stm32cube-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-](https://www.st.com/resource/en/application_note/an4578-16channels-led-driver-with-independent-pwm-dimming-control-based-on-led7708-stmicroelectronics.pdf)  
& Software            [stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an4578-16channels-led-driver-with-independent-pwm-dimming-control-based-on-led7708-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](https://www.st.com/resource/en/application_note/an4657-stm32-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](https://www.st.com/resource/en/application_note/an4724-stm32cube-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](https://www.st.com/resource/en/application_note/an4841-digital-signal-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](https://www.st.com/resource/en/application_note/an5054-secure-programming-using-stm32cubeprogrammer-stmicroelectronics.pdf)

& Software

Application Notes for related Tools & Software	<a href="https://www.st.com/resource/en/application_note/an5360-getting-started-with-projects-based-on-the-stm32mp1-series-in-stm32cubeide-stmicroelectronics.pdf">https://www.st.com/resource/en/application_note/an5360-getting-started-with-projects-based-on-the-stm32mp1-series-in-stm32cubeide-stmicroelectronics.pdf</a>
Application Notes for related Tools & Software	<a href="https://www.st.com/resource/en/application_note/an5361-getting-started-with-projects-based-on-dualcore-stm32h7-microcontrollers-in-stm32cubeide-stmicroelectronics.pdf">https://www.st.com/resource/en/application_note/an5361-getting-started-with-projects-based-on-dualcore-stm32h7-microcontrollers-in-stm32cubeide-stmicroelectronics.pdf</a>
Application Notes for related Tools & Software	<a href="https://www.st.com/resource/en/application_note/an5394-getting-started-with-projects-based-on-the-stm32l5-series-in-stm32cubeide-stmicroelectronics.pdf">https://www.st.com/resource/en/application_note/an5394-getting-started-with-projects-based-on-the-stm32l5-series-in-stm32cubeide-stmicroelectronics.pdf</a>
Application Notes for related Tools & Software	<a href="https://www.st.com/resource/en/application_note/an5418-how-to-build-a-simple-usbp-d-sink-application-with-stm32cubemx-stmicroelectronics.pdf">https://www.st.com/resource/en/application_note/an5418-how-to-build-a-simple-usbp-d-sink-application-with-stm32cubemx-stmicroelectronics.pdf</a>
Application Notes for related Tools & Software	<a href="https://www.st.com/resource/en/application_note/an5426-migrating-graphics-middleware-projects-from-stm32cubemx-540-to-stm32cubemx-550-stmicroelectronics.pdf">https://www.st.com/resource/en/application_note/an5426-migrating-graphics-middleware-projects-from-stm32cubemx-540-to-stm32cubemx-550-stmicroelectronics.pdf</a>
Application Notes for related Tools & Software	<a href="https://www.st.com/resource/en/application_note/an5564-getting-started-with-projects-based-on-dualcore-stm32wl-microcontrollers-in-stm32cubeide-stmicroelectronics.pdf">https://www.st.com/resource/en/application_note/an5564-getting-started-with-projects-based-on-dualcore-stm32wl-microcontrollers-in-stm32cubeide-stmicroelectronics.pdf</a>
Application Notes for related Tools & Software	<a href="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">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</a>
Application Notes for related Tools & Software	<a href="https://www.st.com/resource/en/application_note/an5731-stm32cubemx-and-stm32cubeide-threadsafe-solution-stmicroelectronics.pdf">https://www.st.com/resource/en/application_note/an5731-stm32cubemx-and-stm32cubeide-threadsafe-solution-stmicroelectronics.pdf</a>
Device Option Lists	<a href="https://www.st.com/resource/en/device_option_list/opl_stm32f103_128k.zip">https://www.st.com/resource/en/device_option_list/opl_stm32f103_128k.zip</a>
Errata Sheets	<a href="https://www.st.com/resource/en/errata_sheet/es096-stm32f101x8b-stm32f102x8b-and-stm32f103x8b-mediumdensity-device-limitations-stmicroelectronics.pdf">https://www.st.com/resource/en/errata_sheet/es096-stm32f101x8b-stm32f102x8b-and-stm32f103x8b-mediumdensity-device-limitations-stmicroelectronics.pdf</a>
Datasheet	<a href="https://www.st.com/resource/en/datasheet/cd00161566.pdf">https://www.st.com/resource/en/datasheet/cd00161566.pdf</a>
Programming Manuals	<a href="https://www.st.com/resource/en/programming_manual/pm0056-stm32f10xxx20xxx21xxx1xxxx-cortexm3-programming-manual-stmicroelectronics.pdf">https://www.st.com/resource/en/programming_manual/pm0056-stm32f10xxx20xxx21xxx1xxxx-cortexm3-programming-manual-stmicroelectronics.pdf</a>

Programming Manuals	<a href="https://www.st.com/resource/en/programming_manual/pm0075-stm32f10xxx-flash-memory-microcontrollers-stmicroelectronics.pdf">https://www.st.com/resource/en/programming_manual/pm0075-stm32f10xxx-flash-memory-microcontrollers-stmicroelectronics.pdf</a>
Reference Manuals	<a href="https://www.st.com/resource/en/reference_manual/rm0008-stm32f101xx-stm32f102xx-stm32f103xx-stm32f105xx-and-stm32f107xx-advanced-armbased-32bit-mcus-stmicroelectronics.pdf">https://www.st.com/resource/en/reference_manual/rm0008-stm32f101xx-stm32f102xx-stm32f103xx-stm32f105xx-and-stm32f107xx-advanced-armbased-32bit-mcus-stmicroelectronics.pdf</a>
Technical Notes & Articles	<a href="https://www.st.com/resource/en/technical_note/tn0516-overview-of-the-stm32f0xf100xxf103xx-and-stm32f2xxf30xf4xx-mcus-pmsm-singledual-foc-sdk-v40-stmicroelectronics.pdf">https://www.st.com/resource/en/technical_note/tn0516-overview-of-the-stm32f0xf100xxf103xx-and-stm32f2xxf30xf4xx-mcus-pmsm-singledual-foc-sdk-v40-stmicroelectronics.pdf</a>
Technical Notes & Articles	<a href="https://www.st.com/resource/en/technical_note/tn1163-description-of-wlcsp-for-microcontrollers-and-recommendations-for-its-use-stmicroelectronics.pdf">https://www.st.com/resource/en/technical_note/tn1163-description-of-wlcsp-for-microcontrollers-and-recommendations-for-its-use-stmicroelectronics.pdf</a>
Technical Notes & Articles	<a href="https://www.st.com/resource/en/technical_note/tn1204-tape-and-reel-shipping-media-for-stm32-microcontrollers-in-bga-packages-stmicroelectronics.pdf">https://www.st.com/resource/en/technical_note/tn1204-tape-and-reel-shipping-media-for-stm32-microcontrollers-in-bga-packages-stmicroelectronics.pdf</a>
Technical Notes & Articles	<a href="https://www.st.com/resource/en/technical_note/tn1205-tape-and-reel-shipping-media-for-stm8-and-stm32-microcontrollers-in-fpn-packages-stmicroelectronics.pdf">https://www.st.com/resource/en/technical_note/tn1205-tape-and-reel-shipping-media-for-stm8-and-stm32-microcontrollers-in-fpn-packages-stmicroelectronics.pdf</a>
Technical Notes & Articles	<a href="https://www.st.com/resource/en/technical_note/tn1206-tape-and-reel-shipping-media-for-stm8-and-stm32-microcontrollers-in-qfp-packages-stmicroelectronics.pdf">https://www.st.com/resource/en/technical_note/tn1206-tape-and-reel-shipping-media-for-stm8-and-stm32-microcontrollers-in-qfp-packages-stmicroelectronics.pdf</a>
Technical Notes & Articles	<a href="https://www.st.com/resource/en/technical_note/tn1207-tape-and-reel-shipping-media-for-stm8-and-stm32-microcontrollers-in-so-packages-stmicroelectronics.pdf">https://www.st.com/resource/en/technical_note/tn1207-tape-and-reel-shipping-media-for-stm8-and-stm32-microcontrollers-in-so-packages-stmicroelectronics.pdf</a>
Technical Notes & Articles	<a href="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">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</a>
User Manuals	<a href="https://www.st.com/resource/en/user_manual/um1561-stevalisv003v1-firmware-user-manual-stmicroelectronics.pdf">https://www.st.com/resource/en/user_manual/um1561-stevalisv003v1-firmware-user-manual-stmicroelectronics.pdf</a>
User Manuals	<a href="https://www.st.com/resource/en/user_manual/um1573-st7540-power-line-modem-firmware-stack-stmicroelectronics.pdf">https://www.st.com/resource/en/user_manual/um1573-st7540-power-line-modem-firmware-stack-stmicroelectronics.pdf</a>