



## 1. Description

### 1.1. Project

Project Name	Driver_SPI_DMAMode
Board Name	NUCLEO-F429ZI
Generated with:	STM32CubeMX 6.8.0
Date	04/28/2023

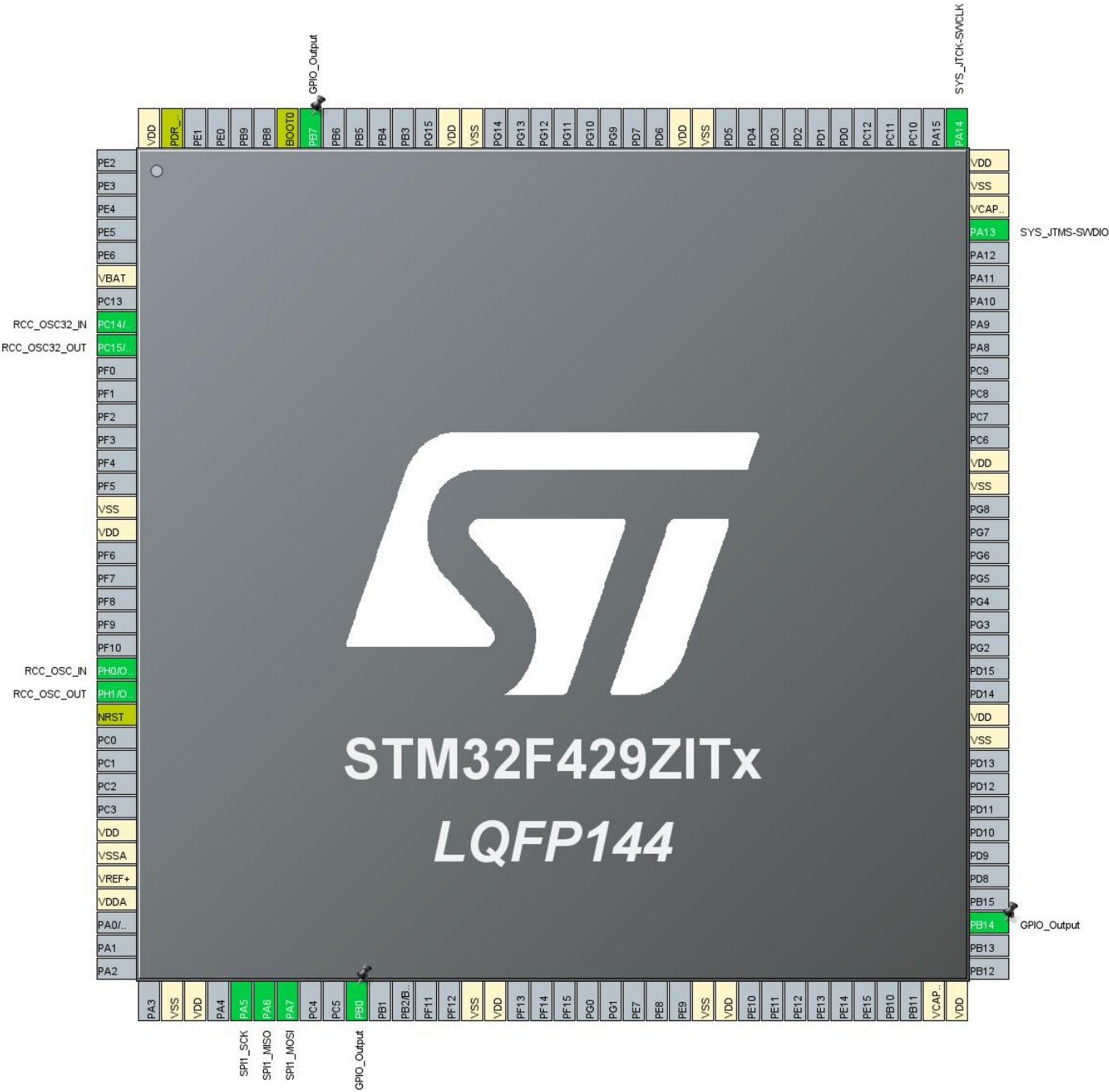
### 1.2. MCU

MCU Series	STM32F4
MCU Line	STM32F429/439
MCU name	STM32F429ZITx
MCU Package	LQFP144
MCU Pin number	144

### 1.3. Core(s) information

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



### 3. Pins Configuration

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
6	VBAT	Power		
8	PC14/OSC32_IN	I/O	RCC_OSC32_IN	
9	PC15/OSC32_OUT	I/O	RCC_OSC32_OUT	
16	VSS	Power		
17	VDD	Power		
23	PH0/OSC_IN	I/O	RCC_OSC_IN	
24	PH1/OSC_OUT	I/O	RCC_OSC_OUT	
25	NRST	Reset		
30	VDD	Power		
31	VSSA	Power		
32	VREF+	Power		
33	VDDA	Power		
38	VSS	Power		
39	VDD	Power		
41	PA5	I/O	SPI1_SCK	
42	PA6	I/O	SPI1_MISO	
43	PA7	I/O	SPI1_MOSI	
46	PB0 *	I/O	GPIO_Output	
51	VSS	Power		
52	VDD	Power		
61	VSS	Power		
62	VDD	Power		
71	VCAP_1	Power		
72	VDD	Power		
75	PB14 *	I/O	GPIO_Output	
83	VSS	Power		
84	VDD	Power		
94	VSS	Power		
95	VDD	Power		
105	PA13	I/O	SYS_JTMS-SWDIO	
106	VCAP_2	Power		
107	VSS	Power		
108	VDD	Power		
109	PA14	I/O	SYS_JTCK-SWCLK	
120	VSS	Power		
121	VDD	Power		

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
130	VSS	Power		
131	VDD	Power		
137	PB7 *	I/O	GPIO_Output	
138	BOOT0	Boot		
143	PDR_ON	Reset		
144	VDD	Power		

\* The pin is affected with an I/O function



## 5. Software Project

### 5.1. Project Settings

Name	Value
Project Name	Driver_SPI_DMAMode
Project Folder	C:\Users\George
Toolchain / IDE	STM32CubeIDE
Firmware Package Name and Version	STM32Cube FW_F4 V1.27.1
Application Structure	Advanced
Generate Under Root	Yes
Do not generate the main()	No
Minimum Heap Size	0x200
Minimum Stack Size	0x400

### 5.2. Code Generation Settings

Name	Value
STM32Cube MCU packages and embedded software	Copy only the necessary library files
Generate peripheral initialization as a pair of '.c/.h' files	No
Backup previously generated files when re-generating	No
Keep User Code when re-generating	Yes
Delete previously generated files when not re-generated	Yes
Set all free pins as analog (to optimize the power consumption)	No
Enable Full Assert	No

### 5.3. Advanced Settings - Generated Function Calls

Rank	Function Name	Peripheral Instance Name
1	SystemClock_Config	RCC
2	MX_GPIO_Init	GPIO
3	MX_DMA_Init	DMA
4	MX_SPI1_Init	SPI1

## 6. Power Consumption Calculator report

### 6.1. Microcontroller Selection

Series	STM32F4
Line	STM32F429/439
MCU	STM32F429ZITx
Datasheet	DS9405_Rev9

### 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



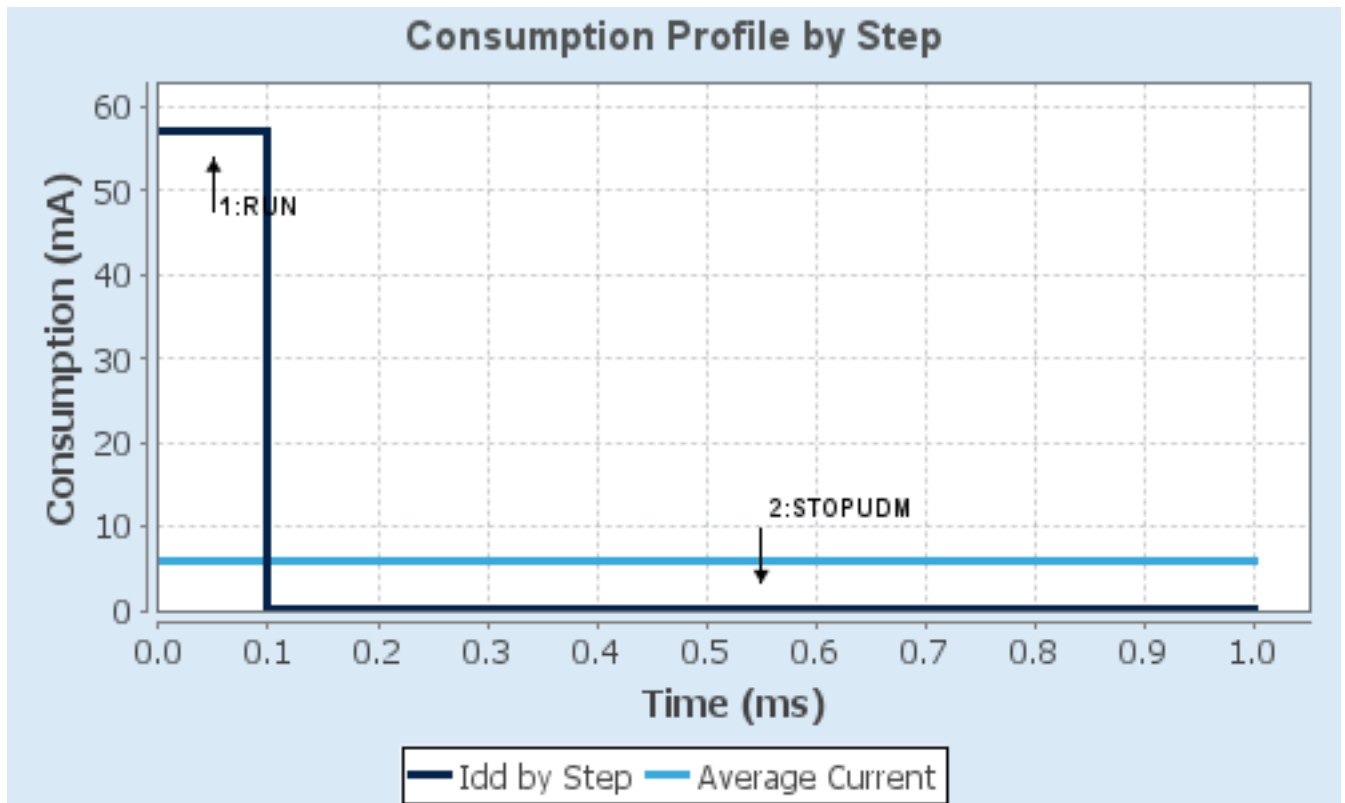
#### 6.4. Sequence

<b>Step</b>	Step1	Step2
<b>Mode</b>	RUN	STOP UDM (Under Drive)
<b>Vdd</b>	3.3	3.3
<b>Voltage Source</b>	Battery	Battery
<b>Range</b>	Scale1-High	No Scale
<b>Fetch Type</b>	FLASH	n/a
<b>CPU Frequency</b>	180 MHz	0 Hz
<b>Clock Configuration</b>	HSE PLL	Regulator LP Flash-PwrDwn
<b>Clock Source Frequency</b>	4 MHz	0 Hz
<b>Peripherals</b>		
<b>Additional Cons.</b>	0 mA	0 mA
<b>Average Current</b>	57 mA	100 $\mu$ A
<b>Duration</b>	0.1 ms	0.9 ms
<b>DMIPS</b>	225.0	0.0
<b>Ta Max</b>	97.48	104.99
<b>Category</b>	In DS Table	In DS Table

#### 6.5. Results

Sequence Time	1 ms	Average Current	5.79 mA
Battery Life	24 days, 10 hours	Average DMIPS	225.0 DMIPS

#### 6.6. Chart



## 7. Peripherals and Middlewares Configuration

### 7.1. RCC

**High Speed Clock (HSE): BYPASS Clock Source**

**Low Speed Clock (LSE) : Crystal/Ceramic Resonator**

#### 7.1.1. Parameter Settings:

##### **System Parameters:**

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

##### **RCC Parameters:**

HSI Calibration Value	16
TIM Prescaler Selection	Disabled
HSE Startup Timeout Value (ms)	100
LSE Startup Timeout Value (ms)	5000

##### **Power Parameters:**

Power Regulator Voltage Scale	Power Regulator Voltage Scale 3
Power Over Drive	Disabled

### 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)	<b>256 *</b>
Baud Rate	<b>62.5 KBits/s *</b>
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

##### **Advanced Parameters:**

CRC Calculation	Disabled
NSS Signal Type	Software

### 7.3. SYS

**Debug: Serial Wire**

**Timebase Source: SysTick**

\* 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	
	PH0/OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	
	PH1/OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	
SPI1	PA5	SPI1_SCK	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PA6	SPI1_MISO	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
	PA7	SPI1_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
GPIO	PB0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PB14	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PB7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	

## 8.2. DMA configuration

DMA request	Stream	Direction	Priority
SPI1_TX	DMA2_Stream3	Memory To Peripheral	Low
SPI1_RX	DMA2_Stream0	Peripheral To Memory	Low

### SPI1\_TX: DMA2\_Stream3 DMA request Settings:

Mode: Normal  
Use fifo: Disable  
Peripheral Increment: Disable  
Memory Increment: **Enable \***  
Peripheral Data Width: Byte  
Memory Data Width: Byte

### SPI1\_RX: DMA2\_Stream0 DMA request Settings:

Mode: Normal  
Use fifo: Disable  
Peripheral Increment: Disable  
Memory Increment: **Enable \***  
Peripheral Data Width: Byte  
Memory Data Width: Byte

### 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
Pre-fetch fault, memory access fault	true	0	0
Undefined instruction or illegal state	true	0	0
System service call via SWI instruction	true	0	0
Debug monitor	true	0	0
Pendable request for system service	true	0	0
System tick timer	true	0	0
DMA2 stream0 global interrupt	true	0	0
DMA2 stream3 global interrupt	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
SPI1 global interrupt	unused		
FPU 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
Pre-fetch fault, memory access fault	false	true	false
Undefined instruction or illegal state	false	true	false
System service call via SWI instruction	false	true	false
Debug monitor	false	true	false
Pendable request for system service	false	true	false
System tick timer	false	true	true
DMA2 stream0 global interrupt	false	true	true
DMA2 stream3 global interrupt	false	true	true

\* User modified value

## 9. System Views

### 9.1. Category view

#### 9.1.1. Current



## 10. Docs & Resources

Type	Link
BSDL files	<a href="https://www.st.com/resource/en/bsdl_model/stm32f427-437_429-439_bsd1.zip">https://www.st.com/resource/en/bsdl_model/stm32f427-437_429-439_bsd1.zip</a>
IBIS models	<a href="https://www.st.com/resource/en/ibis_model/stm32f427-437_429-439_ibis.zip">https://www.st.com/resource/en/ibis_model/stm32f427-437_429-439_ibis.zip</a>
System View Description	<a href="https://www.st.com/resource/en/svd/stm32f4_svd.zip">https://www.st.com/resource/en/svd/stm32f4_svd.zip</a>
BSDL files	<a href="https://www.st.com/resource/en/bsdl_model/stm32f427-437_429-439_bsd1.zip">https://www.st.com/resource/en/bsdl_model/stm32f427-437_429-439_bsd1.zip</a>
IBIS models	<a href="https://www.st.com/resource/en/ibis_model/stm32f427-437_429-439_ibis.zip">https://www.st.com/resource/en/ibis_model/stm32f427-437_429-439_ibis.zip</a>
System View Description	<a href="https://www.st.com/resource/en/svd/stm32f4_svd.zip">https://www.st.com/resource/en/svd/stm32f4_svd.zip</a>
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_sc2154.pdf">https://www.st.com/resource/en/sales_guide/sg_sc2154.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/flstm32trust.pdf">https://www.st.com/resource/en/flyer/flstm32trust.pdf</a>
Flyers	<a href="https://www.st.com/resource/en/flyer/flstm32gui.pdf">https://www.st.com/resource/en/flyer/flstm32gui.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 [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)

Application Notes [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)

Application Notes [https://www.st.com/resource/en/application\\_note/an2639-soldering-recommendations-and-package-information-for-leadfree-ecopack-mcus-and-mpus-stmicroelectronics.pdf](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/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/an2867-oscillator-design-guide-for-stm8afals-stm32-mcus-and-mpus-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an2867-oscillator-design-guide-for-stm8afals-stm32-mcus-and-mpus-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/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/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)

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Application Notes [https://www.st.com/resource/en/application\\_note/an3997-audio-playback-and-recording-using-the-stm32f4discovery-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an3997-audio-playback-and-recording-using-the-stm32f4discovery-stmicroelectronics.pdf)

Application Notes [https://www.st.com/resource/en/application\\_note/an3998-pdm-audio-software-decoding-on-stm32-microcontrollers-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an3998-pdm-audio-software-decoding-on-stm32-microcontrollers-stmicroelectronics.pdf)

- Application Notes [https://www.st.com/resource/en/application\\_note/an4013-stm32-crossseries-timer-overview-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an4013-stm32-crossseries-timer-overview-stmicroelectronics.pdf)
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- Application Notes [https://www.st.com/resource/en/application\\_note/an4286-spi-protocol-used-in-the-stm32-bootloader-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an4286-spi-protocol-used-in-the-stm32-bootloader-stmicroelectronics.pdf)
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- Application Notes [https://www.st.com/resource/en/application\\_note/an4547-migrating-from-stm32f407xx417xx-to-stm32f427xx429xx437xx439xx-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an4547-migrating-from-stm32f407xx417xx-to-stm32f427xx429xx437xx439xx-stmicroelectronics.pdf)
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- Application Notes [https://www.st.com/resource/en/application\\_note/an4640-peripherals-interconnections-on-stm32f4057xx-stm32f4157xx-stm32f42xxx-stm32f43xxx-stm32f446xx-and-stm32f469479xx-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an4640-peripherals-interconnections-on-stm32f4057xx-stm32f4157xx-stm32f42xxx-stm32f43xxx-stm32f446xx-and-stm32f469479xx-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](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/an4658-migration-of-applications-from-stm32f429439-lines-to-stm32f446-line-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an4658-migration-of-applications-from-stm32f429439-lines-to-stm32f446-line-stmicroelectronics.pdf)
- Application Notes [https://www.st.com/resource/en/application\\_note/an4660-migration-of-microcontroller-applications-from-stm32f42xxxf43xxx-devices-to-stm32f7-series-devices-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an4660-migration-of-microcontroller-applications-from-stm32f42xxxf43xxx-devices-to-stm32f7-series-devices-stmicroelectronics.pdf)
- Application Notes [https://www.st.com/resource/en/application\\_note/an4675-migration-of-microcontroller-applications-from-stm32f42xxxstm32f43xxx-to-stm32f469xxstm32f479xx-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an4675-migration-of-microcontroller-applications-from-stm32f42xxxstm32f43xxx-to-stm32f469xxstm32f479xx-stmicroelectronics.pdf)
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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>
Errata Sheets	<a href="https://www.st.com/resource/en/errata_sheet/es0206-stm32f427437-and-stm32f429439-line-limitations-stmicroelectronics.pdf">https://www.st.com/resource/en/errata_sheet/es0206-stm32f427437-and-stm32f429439-line-limitations-stmicroelectronics.pdf</a>
Datasheet	<a href="https://www.st.com/resource/en/datasheet/dm00071990.pdf">https://www.st.com/resource/en/datasheet/dm00071990.pdf</a>
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