



## 1. Description

### 1.1. Project

Project Name	smartsensorbd
Board Name	custom
Generated with:	STM32CubeMX 6.7.0
Date	05/25/2023

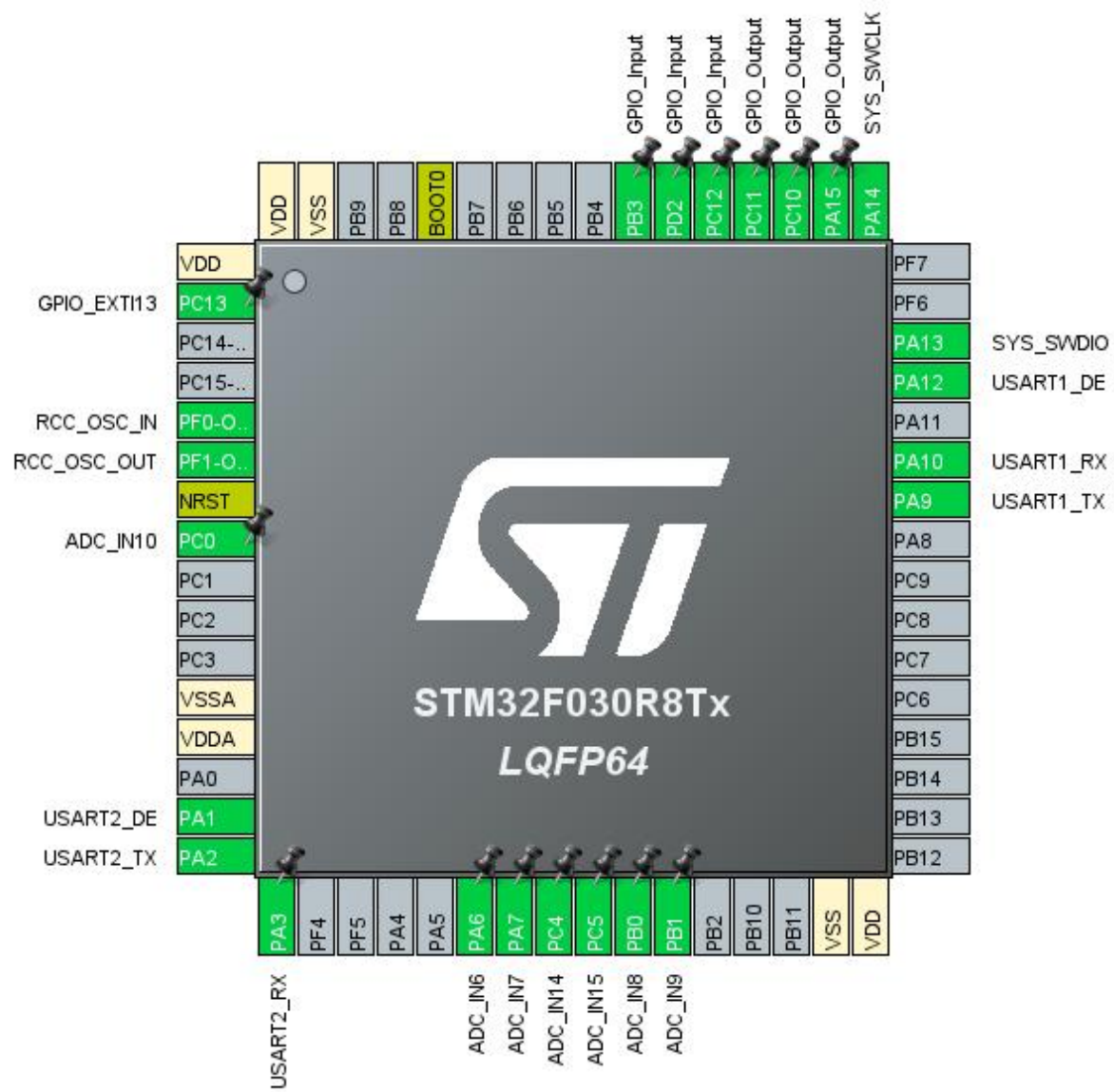
### 1.2. MCU

MCU Series	STM32F0
MCU Line	STM32F0x0 Value Line
MCU name	STM32F030R8Tx
MCU Package	LQFP64
MCU Pin number	64

### 1.3. Core(s) information

Core(s)	Arm Cortex-M0
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## 2. Pinout Configuration

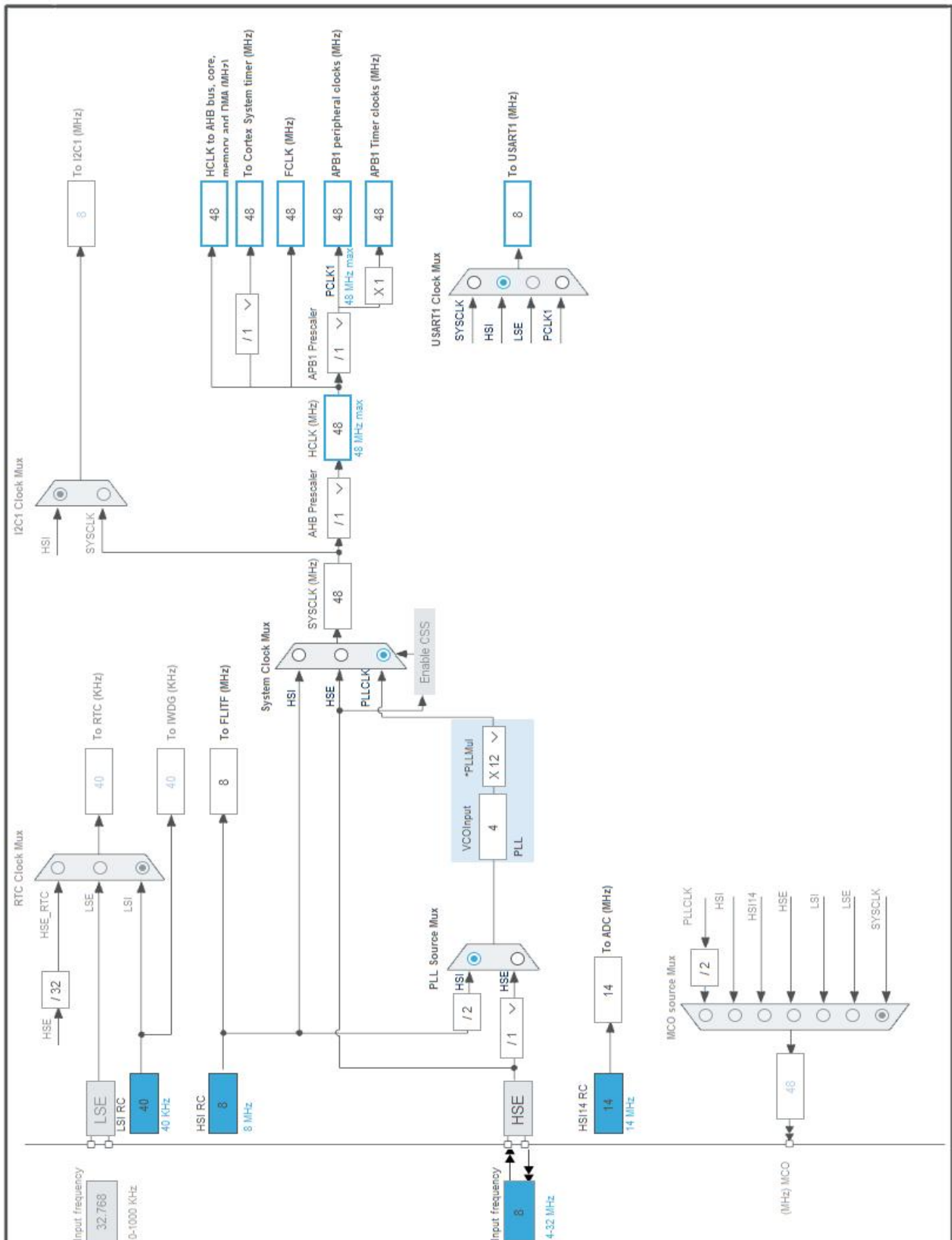


### 3. Pins Configuration

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VDD	Power		
2	PC13	I/O	GPIO_EXTI13	
5	PF0-OSC_IN	I/O	RCC_OSC_IN	
6	PF1-OSC_OUT	I/O	RCC_OSC_OUT	
7	NRST	Reset		
8	PC0	I/O	ADC_IN10	
12	VSSA	Power		
13	VDDA	Power		
15	PA1	I/O	USART2_DE	
16	PA2	I/O	USART2_TX	
17	PA3	I/O	USART2_RX	
22	PA6	I/O	ADC_IN6	
23	PA7	I/O	ADC_IN7	
24	PC4	I/O	ADC_IN14	
25	PC5	I/O	ADC_IN15	
26	PB0	I/O	ADC_IN8	
27	PB1	I/O	ADC_IN9	
31	VSS	Power		
32	VDD	Power		
42	PA9	I/O	USART1_TX	
43	PA10	I/O	USART1_RX	
45	PA12	I/O	USART1_DE	
46	PA13	I/O	SYS_SWDIO	
49	PA14	I/O	SYS_SWCLK	
50	PA15 *	I/O	GPIO_Output	
51	PC10 *	I/O	GPIO_Output	
52	PC11 *	I/O	GPIO_Output	
53	PC12 *	I/O	GPIO_Input	
54	PD2 *	I/O	GPIO_Input	
55	PB3 *	I/O	GPIO_Input	
60	BOOT0	Boot		
63	VSS	Power		
64	VDD	Power		

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

## 4. Clock Tree Configuration



## 5. Software Project

### 5.1. Project Settings

Name	Value
Project Name	smartsensorbd
Project Folder	D:\Work\SmartSensor\FW\smartsensorbd
Toolchain / IDE	STM32CubeIDE
Firmware Package Name and Version	STM32Cube FW_F0 V1.11.4
Application Structure	Basic
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_ADC_Init	ADC
5	MX_USART1_UART_Init	USART1
6	MX_USART2_UART_Init	USART2

## 6. Power Consumption Calculator report

### 6.1. Microcontroller Selection

Series	STM32F0
Line	STM32F0x0 Value Line
MCU	STM32F030R8Tx
Datasheet	DS9773_Rev2

### 6.2. Parameter Selection

Temperature	25
Vdd	3.6

### 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

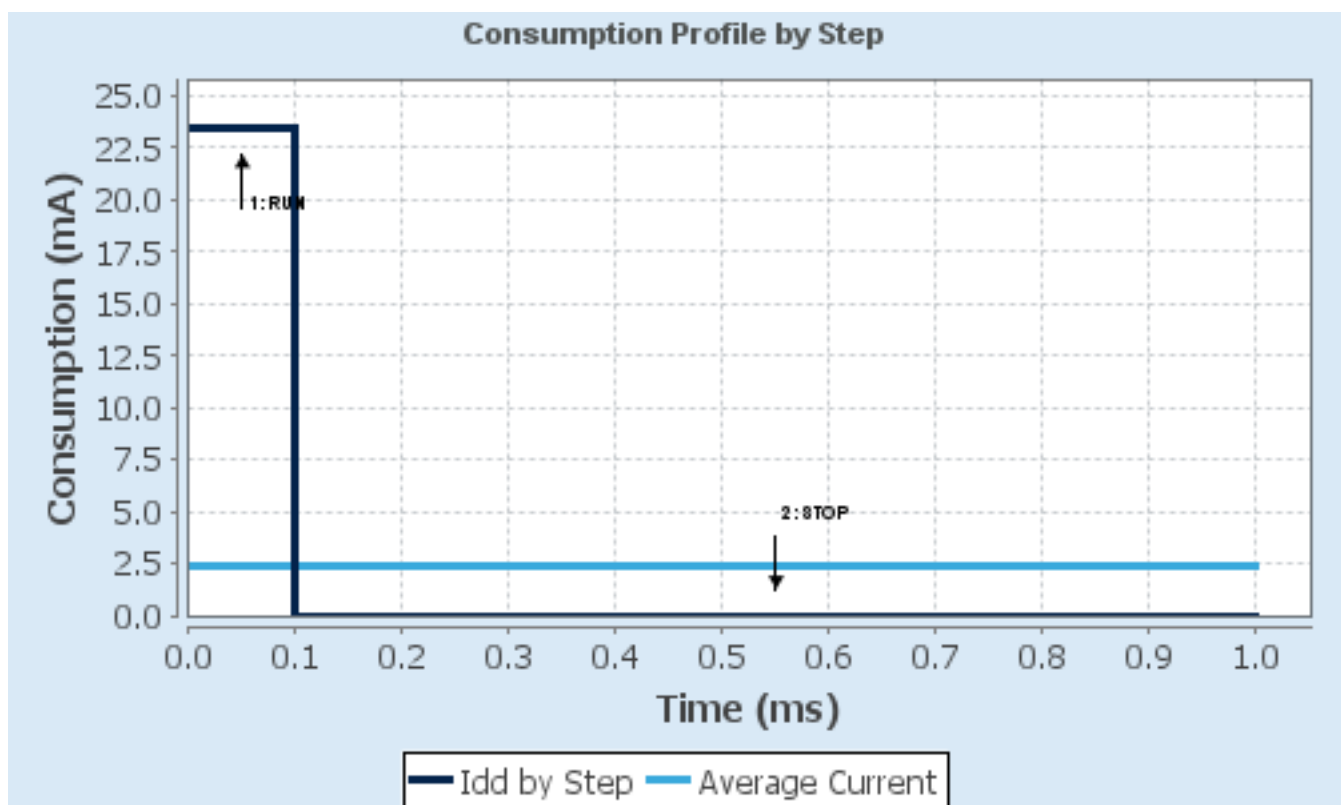
<b>Step</b>	Step1	Step2
<b>Mode</b>	RUN	STOP
<b>Vdd</b>	3.6	3.6
<b>Voltage Source</b>	Battery	Battery
<b>Range</b>	No Scale	No Scale
<b>Fetch Type</b>	FLASH	n/a
<b>CPU Frequency</b>	48 MHz	0 Hz
<b>Clock Configuration</b>	HSE PLL All IPs ON	Regulator LP
<b>Clock Source Frequency</b>	8 MHz	0 Hz
<b>Peripherals</b>		
<b>Additional Cons.</b>	0 mA	0 mA
<b>Average Current</b>	23.46 mA	7.9 $\mu$ A
<b>Duration</b>	0.1 ms	0.9 ms
<b>DMIPS</b>	0.0	0.0
<b>Ta Max</b>	101.28	105
<b>Category</b>	In DS Table	In DS Table

#### 6.5. Results

Sequence Time	1 ms	Average Current	2.35 mA
Battery Life	1 month, 29 days, 16 hours	Average DMIPS	0.0 DMIPS

#### 6.6. Chart





## 7. Peripherals and Middlewares Configuration

### 7.1. ADC

mode: IN6

mode: IN7

mode: IN8

mode: IN9

mode: IN10

mode: IN14

mode: IN15

#### 7.1.1. Parameter Settings:

##### ADC\_Settings:

Clock Prescaler	Asynchronous clock mode
Resolution	ADC 12-bit resolution
Data Alignment	Right alignment
Scan Conversion Mode	Forward
Continuous Conversion Mode	<b>Enabled *</b>
Discontinuous Conversion Mode	Disabled
DMA Continuous Requests	<b>Enabled *</b>
End Of Conversion Selection	End of single conversion
Overrun behaviour	Overrun data preserved
Low Power Auto Wait	Disabled
Low Power Auto Power Off	Disabled

##### ADC\_Regular\_ConversionMode:

Sampling Time	<b>239.5 Cycles *</b>
External Trigger Conversion Source	Regular Conversion launched by software
External Trigger Conversion Edge	None

##### WatchDog:

Enable Analog WatchDog Mode	false
Low Threshold	0

### 7.2. RCC

#### High Speed Clock (HSE): Crystal/Ceramic Resonator

#### 7.2.1. Parameter Settings:

##### System Parameters:

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

#### **RCC Parameters:**

HSI Calibration Value	16
HSI14 Calibration Value	16
HSE Startup Timeout Value (ms)	100
LSE Startup Timeout Value (ms)	5000

### **7.3. SYS**

**mode: Debug Serial Wire**

**Timebase Source: SysTick**

### **7.4. USART1**

**Mode: Asynchronous**

**mode: Hardware Flow Control (RS485)**

#### 7.4.1. Parameter Settings:

##### **Basic Parameters:**

Baud Rate	<b>115200 *</b>
Word Length	8 Bits (including Parity)
Parity	None
Stop Bits	1

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

Data Direction	Receive and Transmit
Over Sampling	16 Samples
Single Sample	Disable
Polarity	High
Assertion Time	0
Deassertion Time	0

##### **Advanced Features:**

Auto Baudrate	Disable
TX Pin Active Level Inversion	Disable
RX Pin Active Level Inversion	Disable
Data Inversion	Disable
TX and RX Pins Swapping	Disable
Overrun	Enable
DMA on RX Error	Enable
MSB First	Disable

## 7.5. USART2

**Mode: Asynchronous**

**mode: Hardware Flow Control (RS485)**

### 7.5.1. Parameter Settings:

#### **Basic Parameters:**

Baud Rate	<b>115200 *</b>
Word Length	8 Bits (including Parity)
Parity	None
Stop Bits	1

#### **Advanced Parameters:**

Data Direction	Receive and Transmit
Over Sampling	16 Samples
Single Sample	Disable
Polarity	High
Assertion Time	0
Deassertion Time	0

#### **Advanced Features:**

TX Pin Active Level Inversion	Disable
RX Pin Active Level Inversion	Disable
Data Inversion	Disable
TX and RX Pins Swapping	Disable
Overrun	Enable
DMA on RX Error	Enable
MSB First	Disable

**\* User modified value**

## 8. System Configuration

### 8.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
ADC	PC0	ADC_IN10	Analog mode	No pull-up and no pull-down	n/a	
	PA6	ADC_IN6	Analog mode	No pull-up and no pull-down	n/a	
	PA7	ADC_IN7	Analog mode	No pull-up and no pull-down	n/a	
	PC4	ADC_IN14	Analog mode	No pull-up and no pull-down	n/a	
	PC5	ADC_IN15	Analog mode	No pull-up and no pull-down	n/a	
	PB0	ADC_IN8	Analog mode	No pull-up and no pull-down	n/a	
	PB1	ADC_IN9	Analog mode	No pull-up and no pull-down	n/a	
RCC	PF0-OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	
	PF1-OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	
SYS	PA13	SYS_SWDIO	n/a	n/a	n/a	
	PA14	SYS_SWCLK	n/a	n/a	n/a	
USART1	PA9	USART1_TX	Alternate Function Push Pull	No pull-up and no pull-down	High *	
	PA10	USART1_RX	Alternate Function Push Pull	No pull-up and no pull-down	High *	
	PA12	USART1_DE	Alternate Function Push Pull	No pull-up and no pull-down	High *	
USART2	PA1	USART2_DE	Alternate Function Push Pull	No pull-up and no pull-down	High *	
	PA2	USART2_TX	Alternate Function Push Pull	No pull-up and no pull-down	High *	
	PA3	USART2_RX	Alternate Function Push Pull	No pull-up and no pull-down	High *	
GPIO	PC13	GPIO_EXTI13	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	
	PA15	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PC10	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PC11	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	
	PC12	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PD2	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	
	PB3	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	

## 8.2. DMA configuration

DMA request	Stream	Direction	Priority
ADC	DMA1_Channel1	Peripheral To Memory	Low

### ADC: DMA1\_Channel1 DMA request Settings:

Mode: **Circular \***  
Peripheral Increment: Disable  
Memory Increment: **Enable \***  
Peripheral Data Width: Half Word  
Memory Data Width: Half Word

### 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
System service call via SWI instruction	true	0	0
Pendable request for system service	true	0	0
System tick timer	true	3	0
DMA1 channel 1 interrupt	true	0	0
USART1 global interrupt	true	0	0
USART2 global interrupt	true	0	0
Flash global interrupt	unused		
RCC global interrupt	unused		
EXTI line 4 to 15 interrupts	unused		
ADC global interrupt	unused		

#### 8.3.2. NVIC Code generation

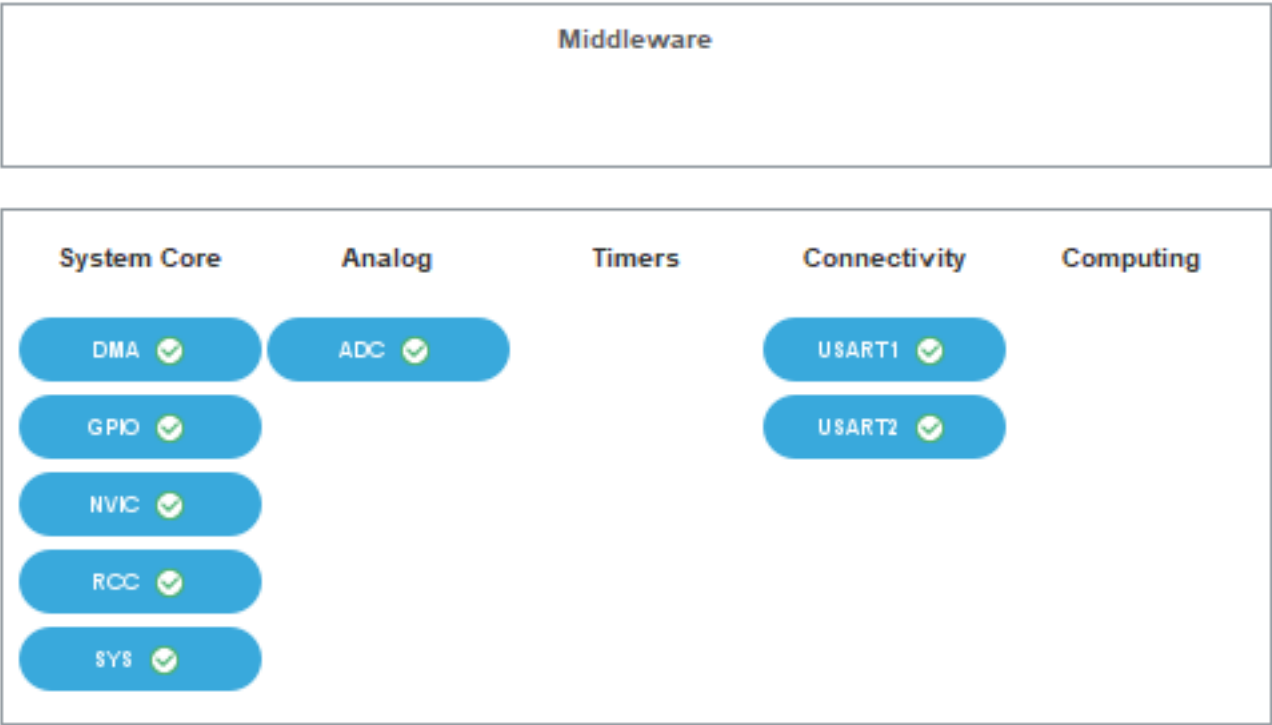
Enabled interrupt Table	Select for init sequence ordering	Generate IRQ handler	Call HAL handler
Non maskable interrupt	false	true	false
Hard fault interrupt	false	true	false
System service call via SWI instruction	false	true	false
Pendable request for system service	false	true	false
System tick timer	false	true	true
DMA1 channel 1 interrupt	false	true	true
USART1 global interrupt	false	true	true
USART2 global interrupt	false	true	true

\* User modified value

## 9. System Views

### 9.1. Category view

#### 9.1.1. Current





## 10. Docs & Resources

Type	Link
IBIS models	<a href="https://www.st.com/resource/en/ibis_model/stm32f0_ibis.zip">https://www.st.com/resource/en/ibis_model/stm32f0_ibis.zip</a>
System View	<a href="https://www.st.com/resource/en/svd/stm32f0_svd.zip">https://www.st.com/resource/en/svd/stm32f0_svd.zip</a>
Description	
IBIS models	<a href="https://www.st.com/resource/en/ibis_model/stm32f0_ibis.zip">https://www.st.com/resource/en/ibis_model/stm32f0_ibis.zip</a>
System View	<a href="https://www.st.com/resource/en/svd/stm32f0_svd.zip">https://www.st.com/resource/en/svd/stm32f0_svd.zip</a>
Description	
Presentations	<a href="https://www.st.com/resource/en/product_presentation/gt_stm32f0-io.pdf">https://www.st.com/resource/en/product_presentation/gt_stm32f0-io.pdf</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-usb-c-pd-solutions-presentation.pdf">https://www.st.com/resource/en/product_presentation/stm32-usb-c-pd-solutions-presentation.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>
Brochures	<a href="https://www.st.com/resource/en/brochure/brstm32f0.pdf">https://www.st.com/resource/en/brochure/brstm32f0.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/fldpstpfc11120.pdf">https://www.st.com/resource/en/flyer/fldpstpfc11120.pdf</a>
Product	<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>
Certifications	
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-">https://www.st.com/resource/en/application_note/an1709-emc-design-</a>

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/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/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/an3236-increase-the-number-of-touchkeys-for-touch-sensing-applications-on-mcus-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an3236-increase-the-number-of-touchkeys-for-touch-sensing-applications-on-mcus-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)

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Application Notes [https://www.st.com/resource/en/application\\_note/an3960-esd-considerations-for-touch-sensing-applications-on-mcus-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an3960-esd-considerations-for-touch-sensing-applications-on-mcus-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/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/an4099-implementation-of-transmitters-and-receivers-for-infrared-remote-control-protocols-with-mcus-of-the-stm32f0-and-stm32f3-series-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an4099-implementation-of-transmitters-and-receivers-for-infrared-remote-control-protocols-with-mcus-of-the-stm32f0-and-stm32f3-series-stmicroelectronics.pdf)
- Application Notes [https://www.st.com/resource/en/application\\_note/an4221-i2c-protocol-used-in-the-stm32-bootloader-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an4221-i2c-protocol-used-in-the-stm32-bootloader-stmicroelectronics.pdf)
- Application Notes [https://www.st.com/resource/en/application\\_note/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/an4299-improve-conducted-noise-robustness-for-touch-sensing-applications-on-mcus-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an4299-improve-conducted-noise-robustness-for-touch-sensing-applications-on-mcus-stmicroelectronics.pdf)
- Application Notes [https://www.st.com/resource/en/application\\_note/an4310-sampling-capacitor-selection-guide-for-touch-sensing-applications-on-mcus-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an4310-sampling-capacitor-selection-guide-for-touch-sensing-applications-on-mcus-stmicroelectronics.pdf)
- Application Notes [https://www.st.com/resource/en/application\\_note/an4312-design-with-surface-sensors-for-touch-sensing-applications-on-mcus-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an4312-design-with-surface-sensors-for-touch-sensing-applications-on-mcus-stmicroelectronics.pdf)
- Application Notes [https://www.st.com/resource/en/application\\_note/an4316-tuning-a-touch-sensing-application-on-mcus-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an4316-tuning-a-touch-sensing-application-on-mcus-stmicroelectronics.pdf)
- Application Notes [https://www.st.com/resource/en/application\\_note/an4325-getting-started-with-stm32f030xx-and-stm32f070xx-series-hardware-development-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an4325-getting-started-with-stm32f030xx-and-stm32f070xx-series-hardware-development-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)
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