



1. Description

1.1. Project

Project Name	base_example
Board Name	NUCLEO-L4A6ZG
Generated with:	STM32CubeMX 6.11.0
Date	05/09/2024

1.2. MCU

MCU Series	STM32L4
MCU Line	STM32L4x6
MCU name	STM32L4A6ZGTx
MCU Package	LQFP144
MCU Pin number	144

1.3. Core(s) information

Core(s)	Arm Cortex-M4
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3. Pins Configuration

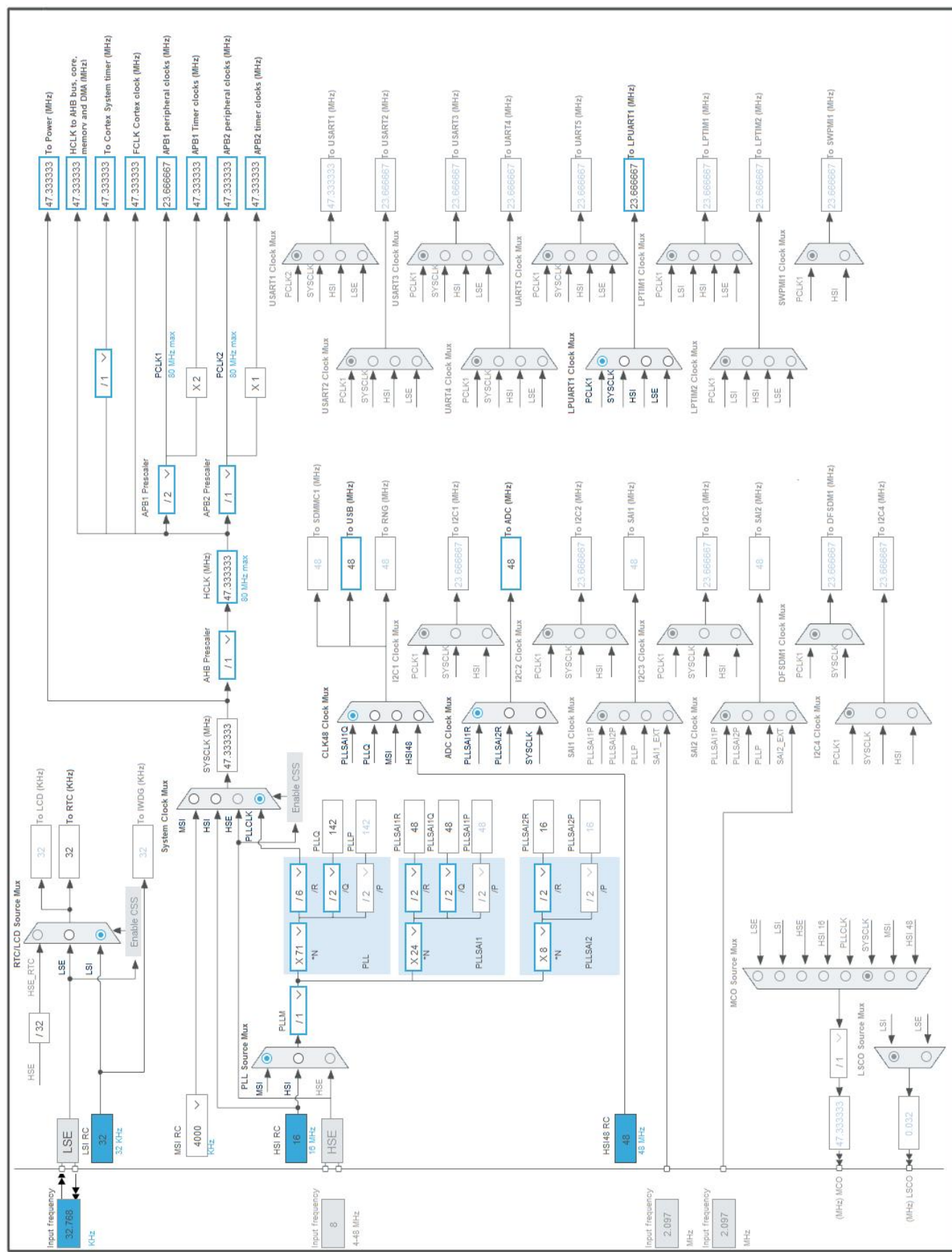
Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
6	VBAT	Power		
7	PC13	I/O	GPIO_EXTI13	B1
8	PC14-OSC32_IN (PC14)	I/O	RCC_OSC32_IN	
9	PC15-OSC32_OUT (PC15)	I/O	RCC_OSC32_OUT	
16	VSS	Power		
17	VDD	Power		
24	PH1-OSC_OUT (PH1) *	I/O	RCC_OSC_OUT	
25	NRST	Reset		
30	VSSA	Power		
31	VREF-	Power		
33	VDDA	Power		
34	PA0	I/O	ADC1_IN5	
35	PA1	I/O	ADC2_IN6	
38	VSS	Power		
39	VDD	Power		
51	VSS	Power		
52	VDD	Power		
61	VSS	Power		
62	VDD	Power		
71	VSS	Power		
72	VDD	Power		
75	PB14 **	I/O	GPIO_Output	LD3 [Red]
83	VSS	Power		
84	VDD	Power		
90	PG5 **	I/O	GPIO_Input	USB_OverCurrent [STMP2151STR_FAULT]
91	PG6 **	I/O	GPIO_Output	USB_PowerSwitchOn [STMP2151STR_EN]
92	PG7	I/O	LPUART1_TX	STLK_RX [STM32F103CBT6_PA3]
93	PG8	I/O	LPUART1_RX	STLK_TX [STM32F103CBT6_PA2]
94	VSS	Power		
95	VDDIO2	Power		
100	PA8	I/O	USB_OTG_FS_SOF	USB_SOF [TP1]
101	PA9	I/O	USB_OTG_FS_VBUS	USB_VBUS

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
102	PA10 *	I/O	USB_OTG_FS_ID	USB_ID
103	PA11	I/O	USB_OTG_FS_DM	USB_DM
104	PA12	I/O	USB_OTG_FS_DP	USB_DP
105	PA13 (JTMS/SWDIO)	I/O	SYS_JTMS-SWDIO	TMS
106	VDDUSB	Power		
107	VSS	Power		
108	VDD	Power		
109	PA14 (JTCK/SWCLK)	I/O	SYS_JTCK-SWCLK	TCK
120	VSS	Power		
121	VDD	Power		
130	VSS	Power		
131	VDDIO2	Power		
133	PB3 (JTDO/TRACESWO)	I/O	SYS_JTDO-SWO	SWO
137	PB7 **	I/O	GPIO_Output	LD2 [Blue]
143	VSS	Power		
144	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	base_example
Project Folder	C:\Users\DogusYukse\\Desktop\CUBEMX\base_example
Toolchain / IDE	CMake
Firmware Package Name and Version	STM32Cube FW_L4 V1.18.0
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	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_ADC1_Init	ADC1
5	MX_ADC2_Init	ADC2
6	MX_LPUART1_UART_Init	LPUART1
7	MX_USB_OTG_FS_PCD_Init	USB_OTG_FS
8	MX_RTC_Init	RTC

1. Power Consumption Calculator report

1.1. Microcontroller Selection

Series	STM32L4
Line	STM32L4x6
MCU	STM32L4A6ZGTx
Datasheet	DS11584_Rev2

1.2. Parameter Selection

Temperature	25
Vdd	3.0

1.3. Battery Selection

Battery	Li-SOCL2(A3400)
Capacity	3400.0 mAh
Self Discharge	0.08 %/month
Nominal Voltage	3.6 V
Max Cont Current	100.0 mA
Max Pulse Current	200.0 mA
Cells in series	1
Cells in parallel	1

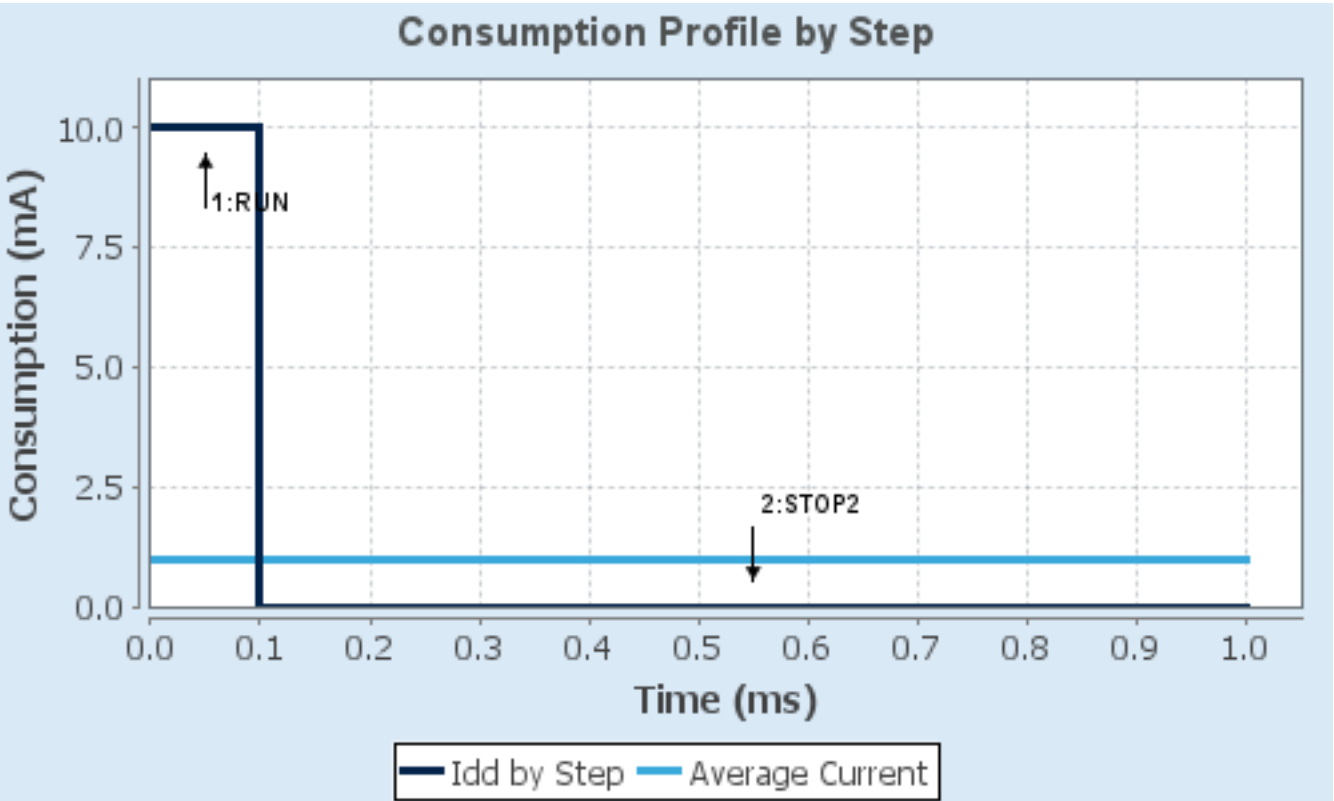
1.4. Sequence

Step	Step1	Step2
Mode	RUN	STOP2
Vdd	3.0	3.0
Voltage Source	Battery	Battery
Range	Range1-High	NoRange
Fetch Type	FLASH	n/a
CPU Frequency	80 MHz	0 Hz
Clock Configuration	HSE BYP PLL Flash-ON	ALL CLOCKS OFF
Clock Source Frequency	4 MHz	0 Hz
Peripherals		
Additional Cons.	0 mA	0 mA
Average Current	10 mA	2.69 μ A
Duration	0.1 ms	0.9 ms
DMIPS	100.0	0.0
Ta Max	104.04	105
Category	In DS Table	In DS Table

1.5. Results

Sequence Time	1 ms	Average Current	1 mA
Battery Life	4 months, 19 days, 3 hours	Average DMIPS	100.0 DMIPS

1.6. Chart



2. Peripherals and Middlewares Configuration

2.1. ADC1

IN5: IN5 Single-ended

2.1.1. Parameter Settings:

ADCs_Common_Settings:

Mode Independent mode

ADC_Settings:

Clock Prescaler Asynchronous clock mode divided by 1

Resolution ADC 12-bit resolution

Data Alignment Right alignment

Scan Conversion Mode Disabled

Continuous Conversion Mode Disabled

Discontinuous Conversion Mode Disabled

DMA Continuous Requests Disabled

End Of Conversion Selection End of single conversion

Overrun behaviour Overrun data preserved

Low Power Auto Wait Disabled

ADC_Regular_ConversionMode:

Enable Regular Conversions Enable

Enable Regular Oversampling Disable

Number Of Conversion 1

External Trigger Conversion Source Regular Conversion launched by software

External Trigger Conversion Edge None

Rank 1

Channel Channel 5

Sampling Time 2.5 Cycles

Offset Number No offset

ADC_Injected_ConversionMode:

Enable Injected Conversions Disable

Analog Watchdog 1:

Enable Analog WatchDog1 Mode false

Analog Watchdog 2:

Enable Analog WatchDog2 Mode false

Analog Watchdog 3:

Enable Analog WatchDog3 Mode false

2.2. ADC2

IN6: IN6 Single-ended

2.2.1. Parameter Settings:

ADCs_Common_Settings:

Mode Independent mode

ADC_Settings:

Clock Prescaler Asynchronous clock mode divided by 1

Resolution ADC 12-bit resolution

Data Alignment Right alignment

Scan Conversion Mode Disabled

Continuous Conversion Mode **Enabled ***

Discontinuous Conversion Mode Disabled

DMA Continuous Requests **Enabled ***

End Of Conversion Selection End of single conversion

Overrun behaviour Overrun data preserved

Low Power Auto Wait Disabled

ADC_Regular_ConversionMode:

Enable Regular Conversions Enable

Enable Regular Oversampling Disable

Number Of Conversion 1

External Trigger Conversion Source Regular Conversion launched by software

External Trigger Conversion Edge None

Rank 1

Channel Channel 6

Sampling Time 2.5 Cycles

Offset Number No offset

ADC_Injected_ConversionMode:

Enable Injected Conversions Disable

Analog Watchdog 1:

Enable Analog WatchDog1 Mode false

Analog Watchdog 2:

Enable Analog WatchDog2 Mode false

Analog Watchdog 3:

Enable Analog WatchDog3 Mode false

2.3. LPUART1

Mode: Asynchronous

2.3.1. 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
Single Sample	Disable

Advanced Features:

Auto Baudrate Mode	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

2.4. RCC

Low Speed Clock (LSE) : Crystal/Ceramic Resonator

2.4.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Instruction Cache	Enabled
Prefetch Buffer	Disabled
Data Cache	Enabled
Flash Latency(WS)	2 WS (3 CPU cycle)

RCC Parameters:

HSI Calibration Value	64
MSI Calibration Value	0
MSI Auto Calibration	Enabled
HSE Startup Timeout Value (ms)	100
LSE Startup Timeout Value (ms)	5000
LSE Drive Capability	LSE oscillator low drive capability

Power Parameters:

Power Regulator Voltage Scale

Power Regulator Voltage Scale 1

2.5. RTC

mode: Activate Clock Source

mode: Activate Calendar

2.5.1. Parameter Settings:

General:

Hour Format	Hourformat 24
Asynchronous Predivider value	127
Synchronous Predivider value	255

Calendar Time:

Data Format	BCD data format
Hours	0
Minutes	0
Seconds	0
Day Light Saving: value of hour adjustment	Daylightsaving None
Store Operation	Storeoperation Reset

Calendar Date:

Week Day	Monday
Month	January
Date	1
Year	0

2.6. SYS

Debug: Trace Asynchronous Sw

Timebase Source: TIM1

2.7. USB_OTG_FS

Mode: Device_Only

Activate_VBUS: VBUS sensing

mode: Activate_SOF

2.7.1. Parameter Settings:

Speed	Full Speed 12MBit/s
Low power	Disabled
Battery charging	Enabled

Link Power Management	Disabled
Use dedicated end point 1 interrupt	Disabled
VBUS sensing	Enabled
Signal start of frame	Enabled

*** User modified value**

3. System Configuration

3.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
ADC1	PA0	ADC1_IN5	Analog mode	No pull-up and no pull-down	n/a	
ADC2	PA1	ADC2_IN6	Analog mode	No pull-up and no pull-down	n/a	
LPUART1	PG7	LPUART1_TX	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	STLK_RX [STM32F103CBT6_PA3]
	PG8	LPUART1_RX	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	STLK_TX [STM32F103CBT6_PA2]
RCC	PC14-OSC32_IN (PC14)	RCC_OSC32_IN	n/a	n/a	n/a	
	PC15-OSC32_OUT (PC15)	RCC_OSC32_OUT	n/a	n/a	n/a	
SYS	PA13 (JTMS/SWDIO)	SYS_JTMS-SWDIO	n/a	n/a	n/a	TMS
	PA14 (JTCK/SWCLK)	SYS_JTCK-SWCLK	n/a	n/a	n/a	TCK
	PB3 (JTDO/TRACESWO)	SYS_JTDO-SWO	n/a	n/a	n/a	SWO
USB_OTG_FS	PA8	USB_OTG_FS_SOF	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	USB_SOF [TP1]
	PA9	USB_OTG_FS_VBUS	Input mode	No pull-up and no pull-down	n/a	USB_VBUS
	PA11	USB_OTG_FS_DM	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	USB_DM
	PA12	USB_OTG_FS_DP	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	USB_DP
Single Mapped Signals	PH1-OSC_OUT (PH1)	RCC_OSC_OUT	n/a	n/a	n/a	
	PA10	USB_OTG_FS_ID	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	USB_ID
GPIO	PC13	GPIO_EXTI13	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	B1
	PB14	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LD3 [Red]
	PG5	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	USB_OverCurrent

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
						[STMPS2151STR_FAULT]
	PG6	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	USB_PowerSwitchOn [STMPS2151STR_EN]
	PB7	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LD2 [Blue]

3.2. DMA configuration

DMA request	Stream	Direction	Priority
ADC2	DMA1_Channel2	Peripheral To Memory	Low

ADC2: DMA1_Channel2 DMA request Settings:

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

3.3. NVIC configuration

3.3.1. 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	0	0
DMA1 channel2 global interrupt	true	0	0
TIM1 update interrupt and TIM16 global interrupt	true	15	0
EXTI line[15:10] interrupts	true	0	0
LPUART1 global interrupt	true	0	0
PVD/PVM1/PVM2/PVM3/PVM4 interrupts through EXTI lines 16/35/36/37/38	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
ADC1 and ADC2 interrupts	unused		
USB OTG FS global interrupt	unused		
FPU global interrupt	unused		

3.3.2. 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
DMA1 channel2 global interrupt	false	true	true
TIM1 update interrupt and TIM16 global interrupt	false	true	true
EXTI line[15:10] interrupts	false	true	true

Enabled interrupt Table	Select for init sequence ordering	Generate IRQ handler	Call HAL handler
LPUART1_global interrupt	false	true	true

* User modified value

4. System Views

4.1. Category view

4.1.1. Current

Middleware						
System Core	Analog	Timers	Connectivity	Multimedia	Security	Computing
DMA ✓	ADC1 ✓	RTC ✓	LPUART1 ✓			
GPIO ⚠	ADC2 ✓		USB_FS ✓			
IVIC ✓						
RCC ✓						
SYS ✓						

5. Docs & Resources

Type	Link
BSDL files	https://www.st.com/resource/en/bsdl_model/stm32l4_bsdl.zip
IBIS models	https://www.st.com/resource/en/ibis_model/stm32l4_ibis.zip
System View Description	https://www.st.com/resource/en/svd/stm32l4_svd.zip
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/stm32l4_marketing-pres.pdf
Presentations	https://www.st.com/resource/en/product_presentation/stm32-stm8_software_development_tools.pdf
Presentations	https://www.st.com/resource/en/product_presentation/microcontrollers-stm32-family-overview.pdf
Brochures	https://www.st.com/resource/en/brochure/brstm32ulp.pdf
Flyers	https://www.st.com/resource/en/flyer/flstm32l4.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/flstm32trust.pdf
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Product Certifications	https://www.st.com/resource/en/certification_document/sesip-2000002-01-cert.pdf

Product Certifications	https://www.st.com/resource/en/certification_document/sesip-2000002-01-st2.pdf
Product Certifications	https://www.st.com/resource/en/certification_document/psa-certificate_stm32l4.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/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/an2867-oscillator-design-guide-for-stm8afals-stm32-mcus-and-mpus-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/an3154-can-protocol-used-in-the-stm32-bootloader-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an3155-uart-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/an3236-increase-the-number-of-touchkeys-for-touch-sensing-applications-on-mcus-stmicroelectronics.pdf
Application Notes	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
Application Notes	https://www.st.com/resource/en/application_note/an4221-i2c-protocol-

used-in-the-stm32-bootloader-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/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/an4286-spi-protocol-used-in-the-stm32-bootloader-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

Application Notes 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

Application Notes 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/an4555-getting-started-with-stm32l4-series-and-stm32l4-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

Application Notes https://www.st.com/resource/en/application_note/an4612-migrating-from-stm32l1-series-to-stm32l4-series-and-stm32l4-series-microcontrollers-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4616-migrating-from-stm32f401-and-stm32f411-lines-to-stm32l4-series-and-stm32l4-series-microcontrollers-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4621-stm32l4-and-stm32l4-ultralowpower-features-overview-stmicroelectronics.pdf

- Application Notes https://www.st.com/resource/en/application_note/an4629-adc-hardware-oversampling-for-microcontrollers-of-the-stm32-l0-and-l4-series-stmicroelectronics.pdf
- Application Notes https://www.st.com/resource/en/application_note/an4635-minimization-of-power-consumption-using-lpuart-for-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/an4726-stm32cube-firmware-examples-for-stm32l4-series-and-stm32l4-series-stmicroelectronics.pdf
- Application Notes https://www.st.com/resource/en/application_note/an4729-stm32l0l4-firewall-overview-stmicroelectronics.pdf
- Application Notes https://www.st.com/resource/en/application_note/an4730-using-the-firewall-embedded-in-stm32l0l4l4-series-mcus-for-secure-access-to-sensitive-parts-of-code-and-data-stmicroelectronics.pdf
- Application Notes https://www.st.com/resource/en/application_note/an4746-optimizing-power-and-performance-with-stm32l4-and-stm32l4-series-microcontrollers-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/an4759-using-the-hardware-realtime-clock-rtc-and-the-tamper-management-unit-tamp-with-stm32-microcontrollers-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/an4809-migrating-

between-stm32l0-series-and-stm32l4-series--stm32l4-series-
microcontrollers-stmicroelectronics.pdf

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Application Notes https://www.st.com/resource/en/application_note/an4822-migrating-between-stm32l476xx486xx-and-stm32l496xx4a6xx-microcontrollers-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4831-migrating-from-stm32f2x5-line-to-stm32l4-series-and-stm32l4-series-microcontrollers-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4832-migrating-from-stm32f303-line-to-stm32l4-series-and-stm32l4-series-microcontrollers-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

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