



## 1. Description

### 1.1. Project

Project Name	L432KC
Board Name	custom
Generated with:	STM32CubeMX 6.6.1
Date	11/06/2022

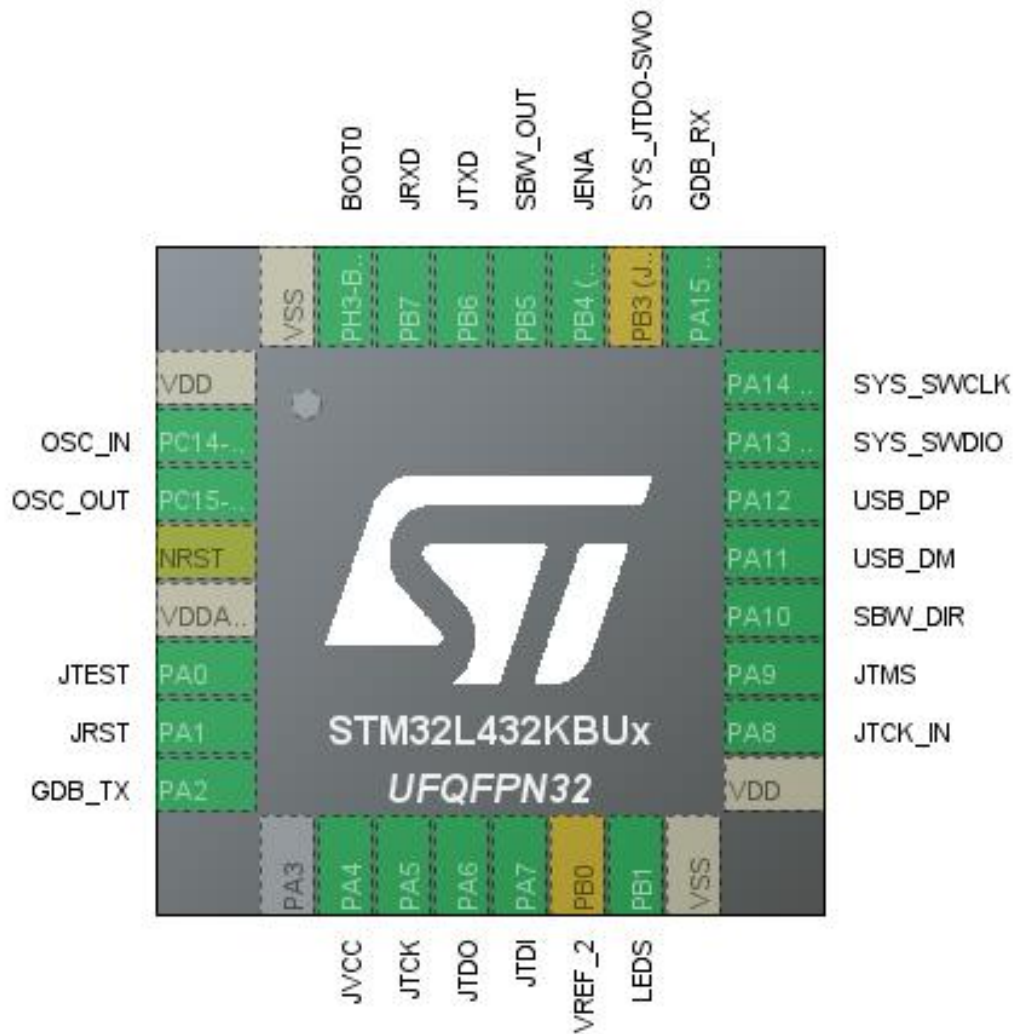
### 1.2. MCU

MCU Series	STM32L4
MCU Line	STM32L4x2
MCU name	STM32L432KBUx
MCU Package	UFQFPN32
MCU Pin number	32

### 1.3. Core(s) information

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



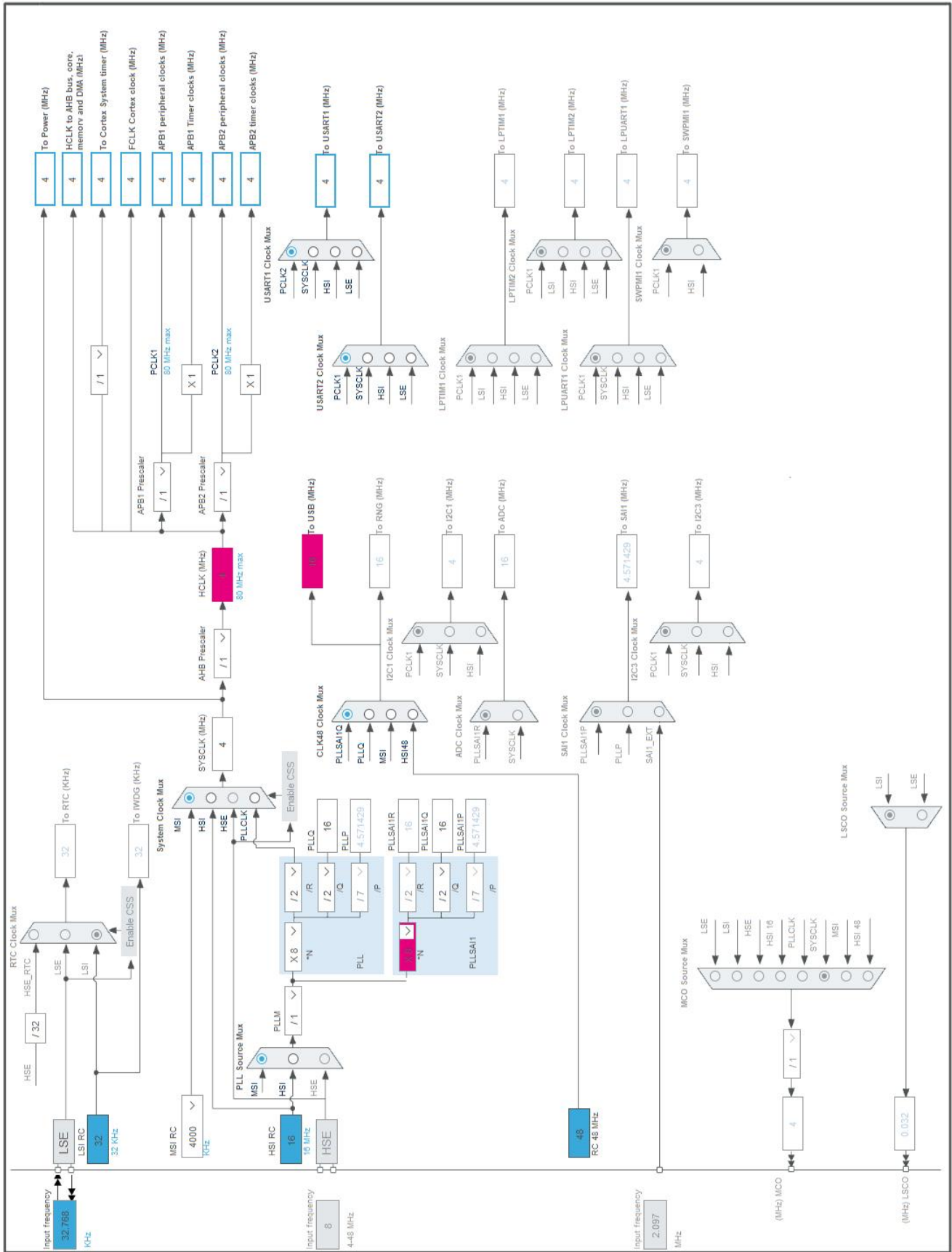
### 3. Pins Configuration

Pin Number UFQFPN32	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VDD	Power		
2	PC14-OSC32_IN (PC14)	I/O	RCC_OSC32_IN	OSC_IN
3	PC15-OSC32_OUT (PC15)	I/O	RCC_OSC32_OUT	OSC_OUT
4	NRST	Reset		
5	VDDA/VREF+	Power		
6	PA0 *	I/O	GPIO_Output	JTEST
7	PA1 *	I/O	GPIO_Output	JRST
8	PA2	I/O	USART2_TX	GDB_TX
10	PA4	I/O	DAC1_OUT1	JVCC
11	PA5	I/O	SPI1_SCK	JTCK
12	PA6	I/O	SPI1_MISO	JTDO
13	PA7	I/O	SPI1_MOSI	JTDI
14	PB0 **	I/O	ADC1_IN15	VREF_2
15	PB1 *	I/O	GPIO_Output	LEDS
16	VSS	Power		
17	VDD	Power		
18	PA8	I/O	TIM1_CH1	JTCK_IN
19	PA9	I/O	TIM1_CH2	JTMS
20	PA10	I/O	TIM1_CH3	SBW_DIR
21	PA11	I/O	USB_DM	
22	PA12	I/O	USB_DP	
23	PA13 (JTMS-SWDIO)	I/O	SYS_JTMS-SWDIO	SYS_SWDIO
24	PA14 (JTCK-SWCLK)	I/O	SYS_JTCK-SWCLK	SYS_SWCLK
25	PA15 (JTDI)	I/O	USART2_RX	GDB_RX
26	PB3 (JTDO-TRACESWO) **	I/O	SYS_JTDO-SWO	
27	PB4 (NJTRST) *	I/O	GPIO_Output	JENA
28	PB5 *	I/O	GPIO_Input	SBW_OUT
29	PB6	I/O	USART1_TX	JTXD
30	PB7	I/O	USART1_RX	JRXD
31	PH3-BOOT0 *	I/O	GPIO_Input	BOOT0
32	VSS	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	L432KC
Project Folder	P:\github.com\glossy-msp430\Hardware\L432KC\CubeMX
Toolchain / IDE	EWARM V8.32
Firmware Package Name and Version	STM32Cube FW_L4 V1.17.2
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	MX_GPIO_Init	GPIO
2	SystemClock_Config	RCC
3	MX_SPI1_Init	SPI1
4	MX_TIM1_Init	TIM1
5	MX_TIM2_Init	TIM2
6	MX_USART2_UART_Init	USART2
7	MX_USB_PCD_Init	USB
8	MX_DAC1_Init	DAC1
9	MX_USART1_UART_Init	USART1



## 6. Power Consumption Calculator report

### 6.1. Microcontroller Selection

Series	STM32L4
Line	STM32L4x2
MCU	STM32L432KBUx
Datasheet	DS11451_Rev2

### 6.2. Parameter Selection

Temperature	25
Vdd	3.0

### 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



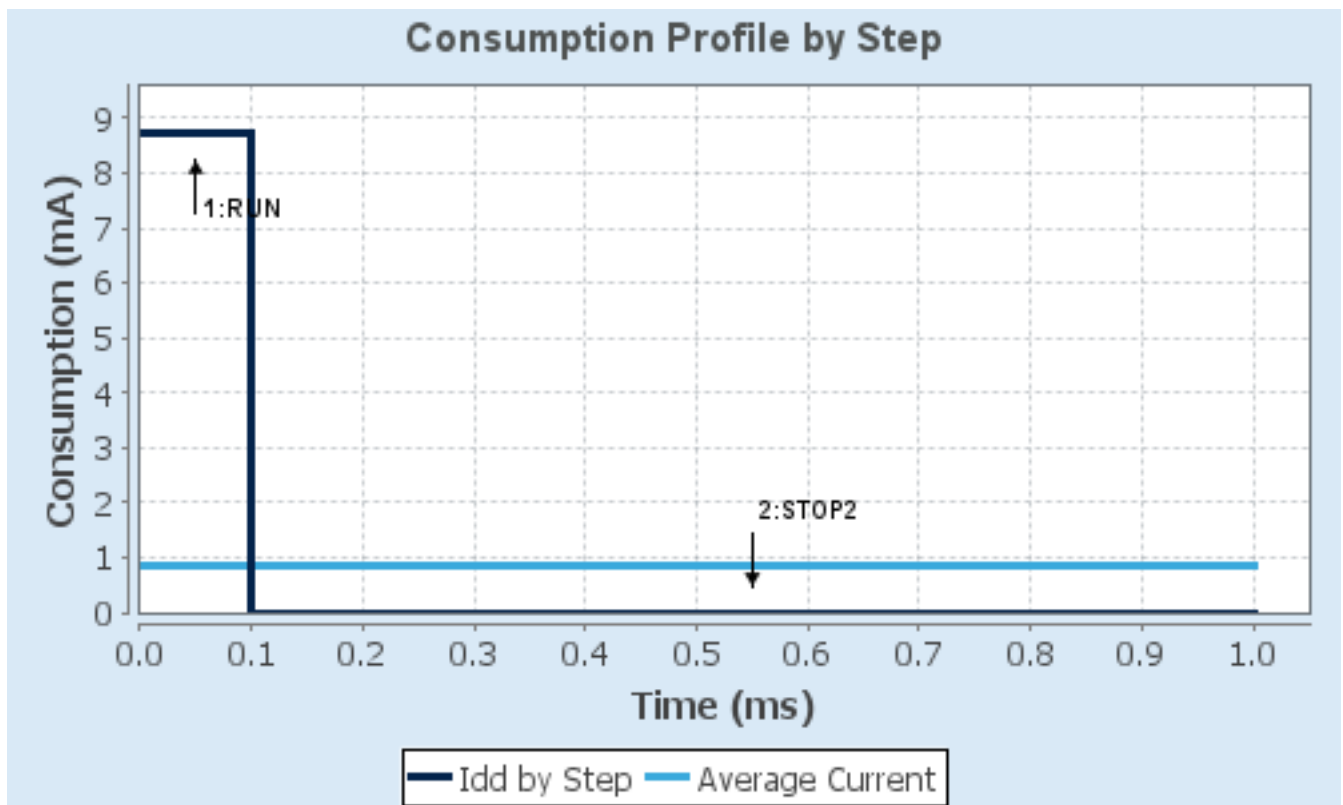
#### 6.4. Sequence

<b>Step</b>	Step1	Step2
<b>Mode</b>	RUN	STOP2
<b>Vdd</b>	3.0	3.0
<b>Voltage Source</b>	Battery	Battery
<b>Range</b>	Range1-High	NoRange
<b>Fetch Type</b>	SRAM2	n/a
<b>CPU Frequency</b>	80 MHz	0 Hz
<b>Clock Configuration</b>	HSE BYP PLL	ALL CLOCKS OFF
<b>Clock Source Frequency</b>	4 MHz	0 Hz
<b>Peripherals</b>		
<b>Additional Cons.</b>	0 mA	0 mA
<b>Average Current</b>	8.71 mA	1.06 $\mu$ A
<b>Duration</b>	0.1 ms	0.9 ms
<b>DMIPS</b>	100.0	0.0
<b>Ta Max</b>	103.98	105
<b>Category</b>	In DS Table	In DS Table

#### 6.5. Results

Sequence Time	1 ms	Average Current	871.95 $\mu$ A
Battery Life	5 months, 9 days, 16 hours	Average DMIPS	100.0 DMIPS

#### 6.6. Chart



## 7. Peripherals and Middlewares Configuration

### 7.1. DAC1

**OUT1 connected to: only to external pin**

#### 7.1.1. Parameter Settings:

##### **DAC Out1 Settings:**

Output Buffer	Enable
Trigger	None
User Trimming	Factory trimming
Sample And Hold	Sampleandhold Disable

### 7.2. RCC

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

#### 7.2.1. Parameter Settings:

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

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

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

HSI Calibration Value	16
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
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### 7.3. SPI1

**Mode: Full-Duplex Master**

#### 7.3.1. Parameter Settings:

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

Frame Format	Motorola
Data Size	4 Bits
First Bit	MSB First

#### **Clock Parameters:**

Prescaler (for Baud Rate)	2
Baud Rate	<b>2.0 MBits/s *</b>
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

#### **Advanced Parameters:**

CRC Calculation	Disabled
NSSP Mode	Enabled
NSS Signal Type	Software

## **7.4. SYS**

**Debug: Serial Wire**

**Timebase Source: SysTick**

## **7.5. TIM1**

**Slave Mode: External Clock Mode 1**

**Trigger Source: TI1FP1**

**Channel2: Output Compare CH2**

**Channel3: Output Compare CH3**

**mode: One Pulse Mode**

### 7.5.1. Parameter Settings:

#### **Counter Settings:**

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value )	65535
Internal Clock Division (CKD)	No Division
Repetition Counter (RCR - 8 bits value)	0
auto-reload preload	Disable
Slave Mode Controller	ETR mode 1

#### **Trigger Output (TRGO) Parameters:**

Master/Slave Mode (MSM bit)	Disable (Trigger input effect not delayed)
Trigger Event Selection TRGO	<b>Output Compare (OC2REF) *</b>
Trigger Event Selection TRGO2	Reset (UG bit from TIMx_EGR)

#### **Break And Dead Time management - BRK Configuration:**

BRK State	Disable
BRK Polarity	High
BRK Filter (4 bits value)	0
BRK Sources Configuration	
- Digital Input	Disable
- COMP1	Disable
- COMP2	Disable

#### Break And Dead Time management - BRK2 Configuration:

BRK2 State	Disable
BRK2 Polarity	High
BRK2 Filter (4 bits value)	0
BRK2 Sources Configuration	
- Digital Input	Disable
- COMP1	Disable
- COMP2	Disable

#### Break And Dead Time management - Output Configuration:

Automatic Output State	Disable
Off State Selection for Run Mode (OSSR)	Disable
Off State Selection for Idle Mode (OSSI)	Disable
Lock Configuration	Off

#### Clear Input:

Clear Input Source	Disable
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#### Trigger:

Trigger Polarity	Rising Edge
Trigger Filter (4 bits value)	0

#### Output Compare Channel 2:

Mode	Toggle on match *
Pulse (16 bits value)	0
Output compare preload	Disable
CH Polarity	High
CH Idle State	Reset

#### Output Compare Channel 3:

Mode	Frozen (used for Timing base)
Pulse (16 bits value)	0
Output compare preload	Disable
CH Polarity	High
CH Idle State	Reset

## 7.6. TIM2

## Trigger Source: ITR0

### 7.6.1. Parameter Settings:

#### Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 32 bits value )	4294967295
Internal Clock Division (CKD)	No Division
auto-reload preload	Disable
Slave Mode Controller	Slave mode disable

#### Trigger Output (TRGO) Parameters:

Master/Slave Mode (MSM bit)	Disable (Trigger input effect not delayed)
Trigger Event Selection TRGO	Reset (UG bit from TIMx_EGR)

## 7.7. USART1

### Mode: Asynchronous

### 7.7.1. 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
Single Sample	Disable

#### 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

## 7.8. USART2

### Mode: Asynchronous

#### 7.8.1. 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
Single Sample	Disable

##### 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

## 7.9. USB

### mode: Device (FS)

#### 7.9.1. Parameter Settings:

##### Basic Parameters:

Speed	Full Speed 12MBit/s
Physical interface	Internal Phy
Sof Enable	Disabled

##### Power Parameters:

Low Power	Disabled
Link Power Management	Disabled
Battery Charging	Disabled

**\* User modified value**



## 8. System Configuration

### 8.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
DAC1	PA4	DAC1_OUT1	Analog mode	No pull-up and no pull-down	n/a	JVCC
RCC	PC14-OSC32_IN (PC14)	RCC_OSC32_IN	n/a	n/a	n/a	OSC_IN
	PC15-OSC32_OUT (PC15)	RCC_OSC32_OUT	n/a	n/a	n/a	OSC_OUT
SPI1	PA5	SPI1_SCK	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	JTCK
	PA6	SPI1_MISO	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	JTDO
	PA7	SPI1_MOSI	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	JTDI
SYS	PA13 (JTMS-SWDIO)	SYS_JTMS-SWDIO	n/a	n/a	n/a	SYS_SWDIO
	PA14 (JTCK-SWCLK)	SYS_JTCK-SWCLK	n/a	n/a	n/a	SYS_SWCLK
TIM1	PA8	TIM1_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Low	JTCK_IN
	PA9	TIM1_CH2	Alternate Function Push Pull	No pull-up and no pull-down	Low	JTMS
	PA10	TIM1_CH3	Alternate Function Push Pull	No pull-up and no pull-down	Low	SBW_DIR
USART1	PB6	USART1_TX	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	JTXD
	PB7	USART1_RX	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	JRXD
USART2	PA2	USART2_TX	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	GDB_TX
	PA15 (JTDI)	USART2_RX	Alternate Function Push Pull	No pull-up and no pull-down	Very High *	GDB_RX
USB	PA11	USB_DM	n/a	n/a	n/a	
	PA12	USB_DP	n/a	n/a	n/a	
Single Mapped Signals	PB0	ADC1_IN15	Analog mode for ADC conversion	No pull-up and no pull-down	n/a	VREF_2
	PB3 (JTDO-TRACESWO)	SYS_JTDO-SWO	n/a	n/a	n/a	
GPIO	PA0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	JTEST

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
	PA1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	JRST
	PB1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LEDS
	PB4 (NJTRST)	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	JENA
	PB5	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	SBW_OUT
	PH3-BOOT0	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	BOOT0

## 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	0	0
USART2 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		
TIM1 break interrupt and TIM15 global interrupt	unused		
TIM1 update interrupt and TIM16 global interrupt	unused		
TIM1 trigger and commutation interrupts	unused		
TIM1 capture compare interrupt	unused		
TIM2 global interrupt	unused		
SPI1 global interrupt	unused		
USART1 global interrupt	unused		
TIM6 global interrupt, DAC channel1 and channel2 underrun error interrupts	unused		
USB event interrupt through EXTI line 17	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
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

Enabled interrupt Table	Select for init sequence ordering	Generate IRQ handler	Call HAL handler
System tick timer	false	true	true
USART2 global interrupt	false	true	true

\* User modified value

## 9. System Views

### 9.1. Category view

#### 9.1.1. Current

Middleware						
System Core	Analog	Timers	Connectivity	Multimedia	Security	Computing
DMA	DAC1 ✓	TIM1 ✓	SPI1 ✓			
GPIO ⚠		TIM2 ✓	USART1 ✓			
NVIC ✓			USART2 ✓			
RCC ✓			USB ✓			
SYS ✓						

## 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>
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Presentations	<a href="https://www.st.com/resource/en/product_presentation/stm32l4_marketing-pres.pdf">https://www.st.com/resource/en/product_presentation/stm32l4_marketing-pres.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>
Presentations	<a href="https://www.st.com/resource/en/product_presentation/microcontrollers_b-l462e-cell1_discovery_cellular_kit_product_overview.pdf">https://www.st.com/resource/en/product_presentation/microcontrollers_b-l462e-cell1_discovery_cellular_kit_product_overview.pdf</a>
Training Material	<a href="https://www.st.com/resource/en/sales_guide/sg_sc2157.pdf">https://www.st.com/resource/en/sales_guide/sg_sc2157.pdf</a>
Brochures	<a href="https://www.st.com/resource/en/brochure/brstm32ulp.pdf">https://www.st.com/resource/en/brochure/brstm32ulp.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/flstm32l4.pdf">https://www.st.com/resource/en/flyer/flstm32l4.pdf</a>
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Magazine Articles	<a href="https://www.st.com/resource/en/magazine/design-elektronik_october2016.pdf">https://www.st.com/resource/en/magazine/design-elektronik_october2016.pdf</a>
Product Certifications	<a href="https://www.st.com/resource/en/certification_document/sesip-2000002-01-cert.pdf">https://www.st.com/resource/en/certification_document/sesip-2000002-01-cert.pdf</a>
Product Certifications	<a href="https://www.st.com/resource/en/certification_document/sesip-2000002-01-st2.pdf">https://www.st.com/resource/en/certification_document/sesip-2000002-01-st2.pdf</a>
Product Certifications	<a href="https://www.st.com/resource/en/certification_document/psa-certificate_stm32l4.pdf">https://www.st.com/resource/en/certification_document/psa-certificate_stm32l4.pdf</a>

Application Notes [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)

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/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)

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/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-uart-protocol-used-in-the-stm32-bootloader-stmicroelectronics.pdf](https://www.st.com/resource/en/application_note/an3155-uart-protocol-used-in-the-stm32-bootloader-stmicroelectronics.pdf)

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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/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/an4221-i2c-protocol-](https://www.st.com/resource/en/application_note/an4221-i2c-protocol-)

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