



1. Description

1.1. Project

Project Name	Nucleo-H7A3ZIQ_Test_01
Board Name	NUCLEO-H7A3ZI-Q
Generated with:	STM32CubeMX 6.8.1
Date	08/05/2024

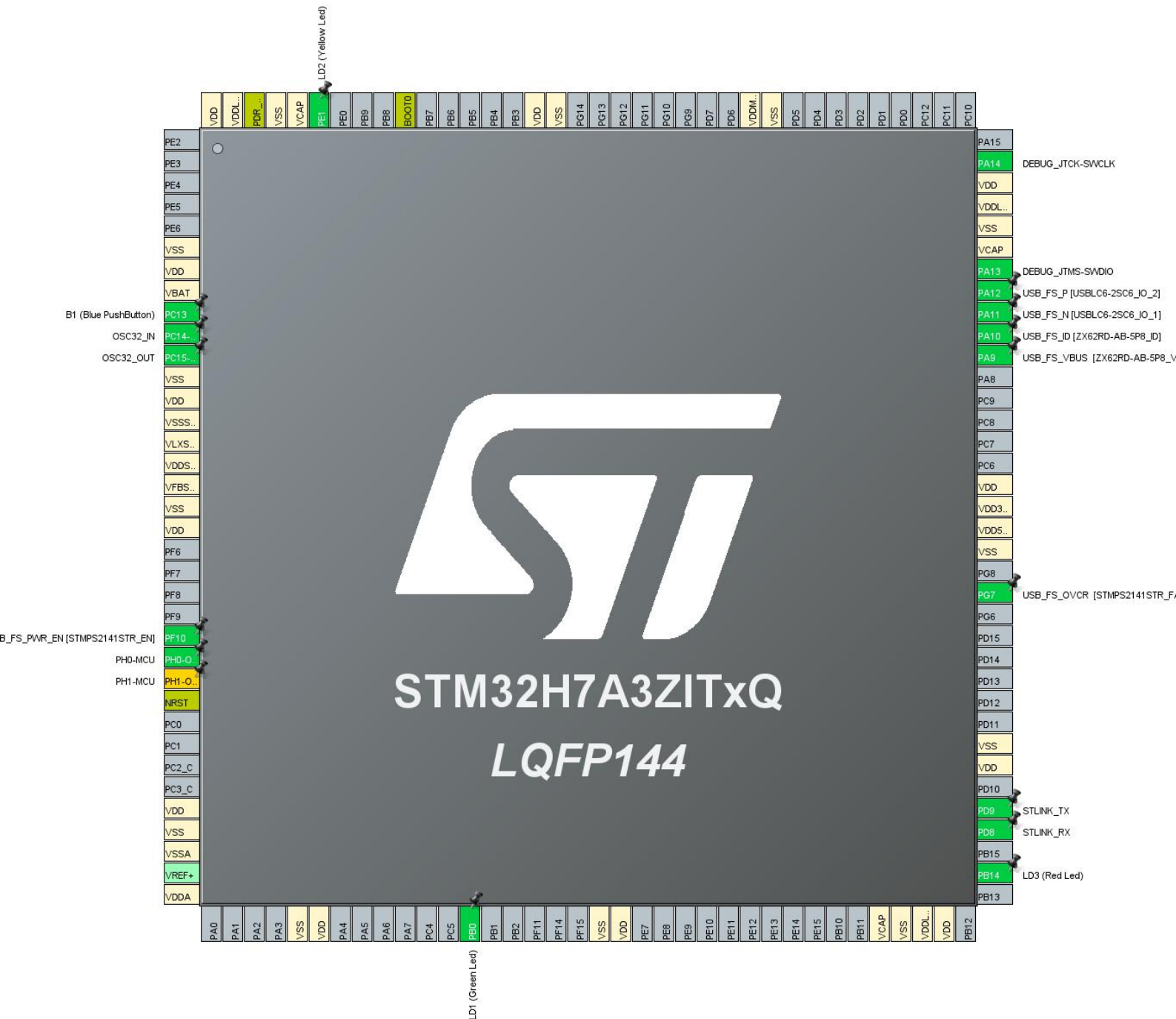
1.2. MCU

MCU Series	STM32H7
MCU Line	STM32H7A3/7B3
MCU name	STM32H7A3ZITxQ
MCU Package	LQFP144
MCU Pin number	144

1.3. Core(s) information

Core(s)	Arm Cortex-M7
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2. Pinout Configuration



3. Pins Configuration

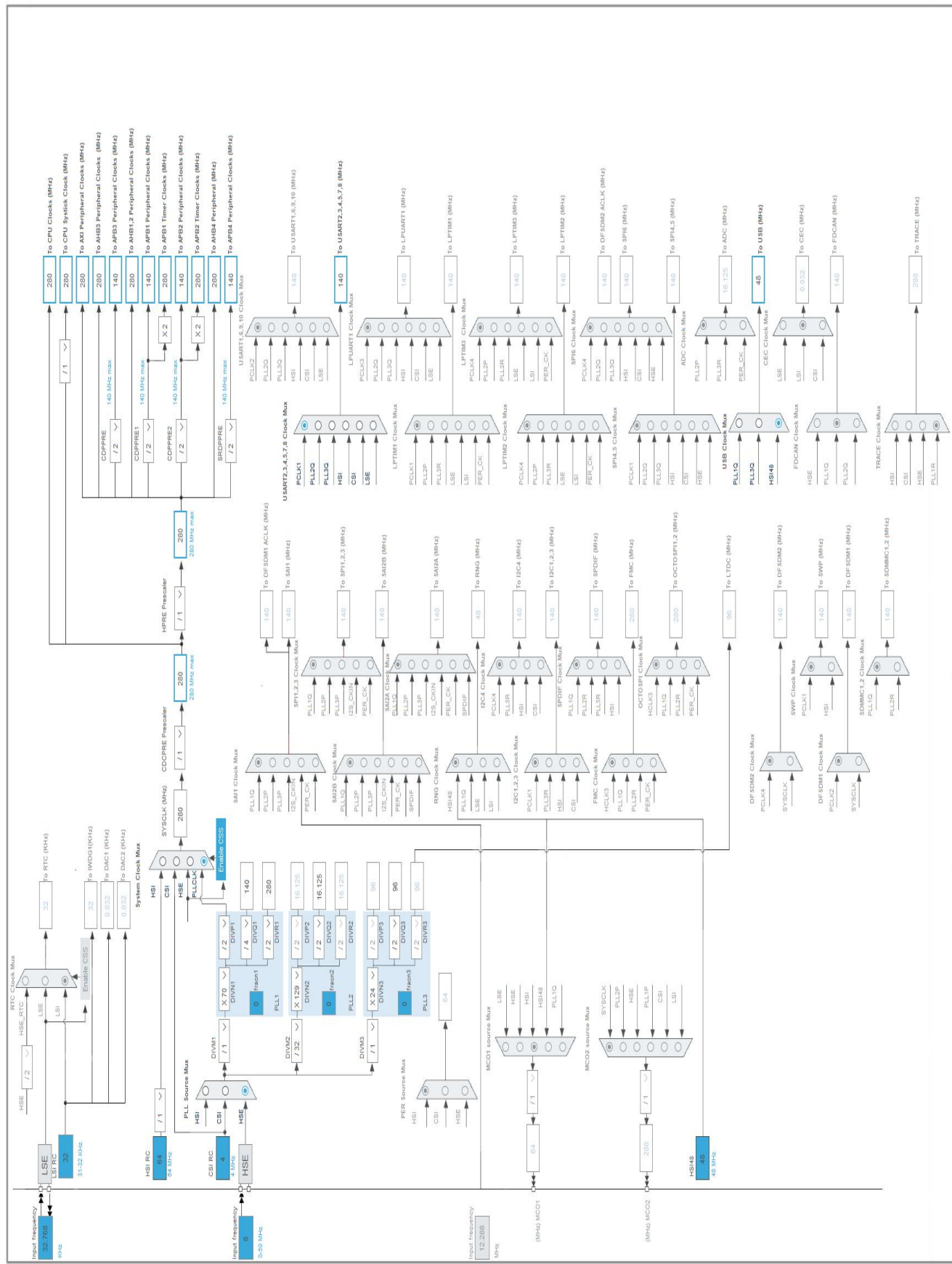
Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
6	VSS	Power		
7	VDD	Power		
8	VBAT	Power		
9	PC13 *	I/O	GPIO_Input	B1 (Blue PushButton)
10	PC14-OSC32_IN	I/O	RCC_OSC32_IN	OSC32_IN
11	PC15-OSC32_OUT	I/O	RCC_OSC32_OUT	OSC32_OUT
12	VSS	Power		
13	VDD	Power		
14	VSSSMPS	Power		
15	VLXSMPS	Power		
16	VDDSMPS	Power		
17	VFBSMPS	Power		
18	VSS	Power		
19	VDD	Power		
24	PF10 *	I/O	GPIO_Output	USB_FS_PWR_EN [STMPS2141STR_EN]
25	PH0-OSC_IN	I/O	RCC_OSC_IN	PH0-MCU
26	PH1-OSC_OUT **	I/O	RCC_OSC_OUT	PH1-MCU
27	NRST	Reset		
32	VDD	Power		
33	VSS	Power		
34	VSSA	Power		
36	VDDA	Power		
41	VSS	Power		
42	VDD	Power		
49	PB0 *	I/O	GPIO_Output	LD1 (Green Led)
55	VSS	Power		
56	VDD	Power		
68	VCAP	Power		
69	VSS	Power		
70	VDDLDO	Power		
71	VDD	Power		
74	PB14 *	I/O	GPIO_Output	LD3 (Red Led)
76	PD8	I/O	USART3_TX	STLINK_RX
77	PD9	I/O	USART3_RX	STLINK_TX
79	VDD	Power		

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
80	VSS	Power		
87	PG7	I/O	GPIO_EXTI7	USB_FS_OVCR [STMP2141STR_FAULT]
89	VSS	Power		
90	VDD50_USB	Power		
91	VDD33_USB	Power		
92	VDD	Power		
98	PA9	I/O	USB_OTG_HS_VBUS	USB_FS_VBUS [ZX62RD- AB-5P8_VBUS]
99	PA10	I/O	USB_OTG_HS_ID	USB_FS_ID [ZX62RD-AB- 5P8_ID]
100	PA11	I/O	USB_OTG_HS_DM	USB_FS_N [USBL6- 2SC6_IO_1]
101	PA12	I/O	USB_OTG_HS_DP	USB_FS_P [USBL6- 2SC6_IO_2]
102	PA13	I/O	DEBUG_JTMS-SWDIO	
103	VCAP	Power		
104	VSS	Power		
105	VDDLDO	Power		
106	VDD	Power		
107	PA14	I/O	DEBUG_JTCK-SWCLK	
118	VSS	Power		
119	VDDMMC	Power		
128	VSS	Power		
129	VDD	Power		
135	BOOT0	Boot		
139	PE1 *	I/O	GPIO_Output	LD2 (Yellow Led)
140	VCAP	Power		
141	VSS	Power		
142	PDR_ON	Reset		
143	VDDLDO	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	Nucleo-H7A3ZIQ_Test_01
Project Folder	C:\000. Work\001. FW\Git_ESP32_Server_http_json\Nucleo-H7A3ZIQ_Test_01
Toolchain / IDE	STM32CubeIDE
Firmware Package Name and Version	STM32Cube FW_H7 V1.11.2
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	Yes
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_USART3_UART_Init	USART3
4	MX_USB_OTG_HS_USB_Init	USB_OTG_HS
5	MX_TIM1_Init	TIM1

6. Power Consumption Calculator report

6.1. Microcontroller Selection

Series	STM32H7
Line	STM32H7A3/7B3
MCU	STM32H7A3ZITxQ
Datasheet	DS13139_Rev0

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

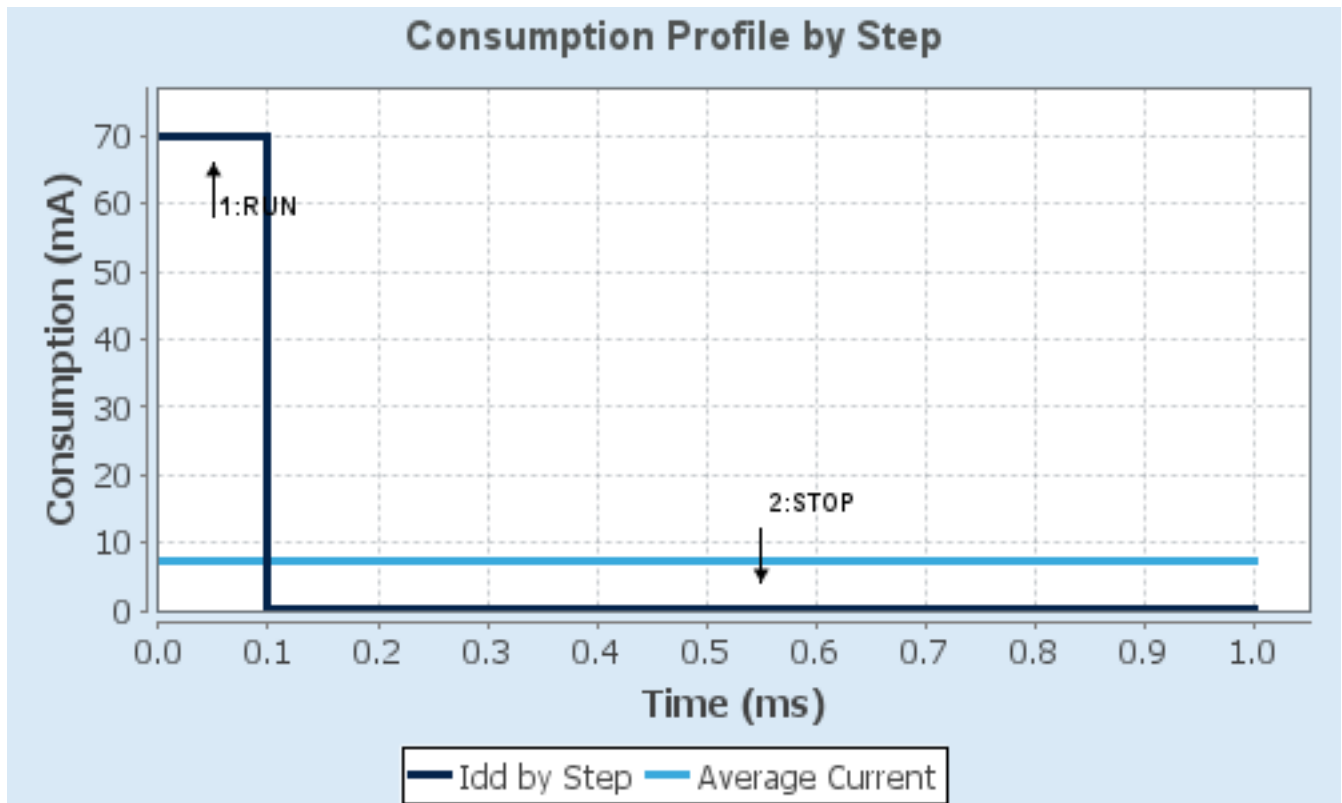
6.4. Sequence

Step	Step1	Step2
Mode	RUN	STOP
Vdd	3.0	3.0
Voltage Source	Battery	Battery
Range	VOS0	SVOS5
SRDomain	DRUN	DSTOP
n/a	SRDRUN	SRDSTOP
Fetch Type	ITCM/DTCM/Cache	NA
CPU Frequency	280 MHz	64 MHz
Clock Configuration	HSE PLL	HSI Flash-ON
Clock Source Frequency	16 MHz	64 MHz
Peripherals		
Additional Cons.	0 mA	0 mA
Average Current	69.92 mA	263.82 μ A
Duration	0.1 ms	0.9 ms
DMIPS	599.0	0.0
Ta Max	115.77	124.97
Category	In DS Table	In DS Table

6.5. Results

Sequence Time	1 ms	Average Current	7.23 mA
Battery Life	19 days, 14 hours	Average DMIPS	599.2 DMIPS

6.6. Chart



7. Peripherals and Middlewares Configuration

7.1. DEBUG

Debug: Serial Wire

7.2. RCC

High Speed Clock (HSE): BYPASS Clock Source

Low Speed Clock (LSE) : Crystal/Ceramic Resonator

7.2.1. Parameter Settings:

Power Parameters:

SupplySource	PWR_DIRECT_SMPS_SUPPLY
Power Regulator Voltage Scale	Power Regulator Voltage Scale 0

RCC Parameters:

TIM Prescaler Selection	Disabled
HSE Startup Timeout Value (ms)	100
LSE Startup Timeout Value (ms)	5000
CSI Calibration Value	16
HSI Calibration Value	64

System Parameters:

VDD voltage (V)	3.3
Flash Latency(WS)	7 WS (8 CPU cycle)

PLL range Parameters:

PLL1 input frequency range	Between 8 and 16 MHz
PLL1 clock Output range	Wide VCO range

7.3. SYS

Timebase Source: SysTick

7.4. TIM1

Clock Source : Internal Clock

7.4.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	279 *
Counter Mode	Up
Counter Period (AutoReload Register - 16 bits value)	999 *

Internal Clock Division (CKD)	No Division
Repetition Counter (RCR - 16 bits value)	0
auto-reload preload	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)
Trigger Event Selection TRGO2	Reset (UG bit from TIMx_EGR)

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
Single Sample	Disable
ClockPrescaler	1
Fifo Mode	Disable
Txfifo Threshold	1 eighth full configuration
Rxfifo Threshold	1 eighth full configuration

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

7.6. USB_OTG_HS

Internal FS Phy: OTG/Dual_Role_Device

Activate_VBUS: Activate-VBUS

* User modified value

8. System Configuration

8.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
DEBUG	PA13	DEBUG_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	DEBUG_JTCK-SWCLK	n/a	n/a	n/a	
RCC	PC14-OSC32_IN	RCC_OSC32_IN	n/a	n/a	n/a	OSC32_IN
	PC15-OSC32_OUT	RCC_OSC32_OUT	n/a	n/a	n/a	OSC32_OUT
	PH0-OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	PH0-MCU
USART3	PD8	USART3_TX	Alternate Function Push Pull	No pull-up and no pull-down	Low	STLINK_RX
	PD9	USART3_RX	Alternate Function Push Pull	No pull-up and no pull-down	Low	STLINK_TX
USB_OTG_HS	PA9	USB_OTG_HS_VBUS	Input mode	No pull-up and no pull-down	n/a	USB_FS_VBUS [ZX62RD-AB-5P8_VBUS]
	PA10	USB_OTG_HS_ID	Alternate Function Push Pull	No pull-up and no pull-down	Low	USB_FS_ID [ZX62RD-AB-5P8_ID]
	PA11	USB_OTG_HS_DM	Alternate Function Push Pull	No pull-up and no pull-down	Low	USB_FS_N [USBLC6-2SC6_IO_1]
	PA12	USB_OTG_HS_DP	Alternate Function Push Pull	No pull-up and no pull-down	Low	USB_FS_P [USBLC6-2SC6_IO_2]
Single Mapped Signals	PH1-OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	PH1-MCU
GPIO	PC13	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	B1 (Blue PushButton)
	PF10	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	USB_FS_PWR_EN [STMPS2141STR_EN]
	PB0	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LD1 (Green Led)
	PB14	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LD3 (Red Led)
	PG7	GPIO_EXTI7	External Interrupt Mode with Rising edge trigger detection	No pull-up and no pull-down	n/a	USB_FS_OVCR [STMPS2141STR_FAULT]
	PE1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	LD2 (Yellow Led)

8.2. DMA configuration

nothing configured in DMA service

8.3. BDMA1 configuration

nothing configured in DMA service

8.4. BDMA2 configuration

nothing configured in DMA service

8.5. MDMA configuration

nothing configured in DMA service

8.6. NVIC configuration

8.6.1. 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
TIM1 update interrupt	true	0	0
PVD and PVM interrupts through EXTI line	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
EXTI line[9:5] interrupts	unused		
TIM1 break interrupt	unused		
TIM1 trigger and commutation interrupts	unused		
TIM1 capture compare interrupt	unused		
USART3 global interrupt	unused		
FPU global interrupt	unused		
HSEM1 global interrupt	unused		
ECC diagnostic Global Interrupt	unused		

8.6.2. 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
TIM1 update 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

Trace and Debug

Power and Thermal

BDMA1

BDMA2

CORTEX_M7

DMA

GPIO

MDMA

IVIC

RCC

SYS

TIM1

USART3

USB_HS

DEBUG

10. Docs & Resources

Type	Link
BSDL files	https://www.st.com/resource/en/bsdl_model/stm32h7_bsdl.zip
IBIS models	https://www.st.com/resource/en/ibis_model/stm32h7_ibis.zip
System View Description	https://www.st.com/resource/en/svd/stm32h7-svd.zip
System View Description	https://www.st.com/resource/en/svd/stm32h7rs-svd.zip
Presentations	https://www.st.com/resource/en/product_presentation/microcontrollers_stm32h7_series_product_overview.pdf
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/stm32-stm8_software_development_tools.pdf
Presentations	https://www.st.com/resource/en/product_presentation/microcontrollers_stm32h7a3-b3_line_product-overview.pdf
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Brochures	https://www.st.com/resource/en/brochure/products-and-solutions-for-plcs-and-smart-i-os.pdf
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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

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on-stm32f7-series-and-stm32h7-series-stmicroelectronics.pdf

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& Software

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& Software

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