



1. Description

1.1. Project

Project Name	Funkit-mini2
Board Name	custom
Generated with:	STM32CubeMX 6.14.1
Date	05/22/2025

1.2. MCU

MCU Series	STM32F7
MCU Line	STM32F7x6
MCU name	STM32F756ZGTx
MCU Package	LQFP144
MCU Pin number	144

1.3. Core(s) information

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



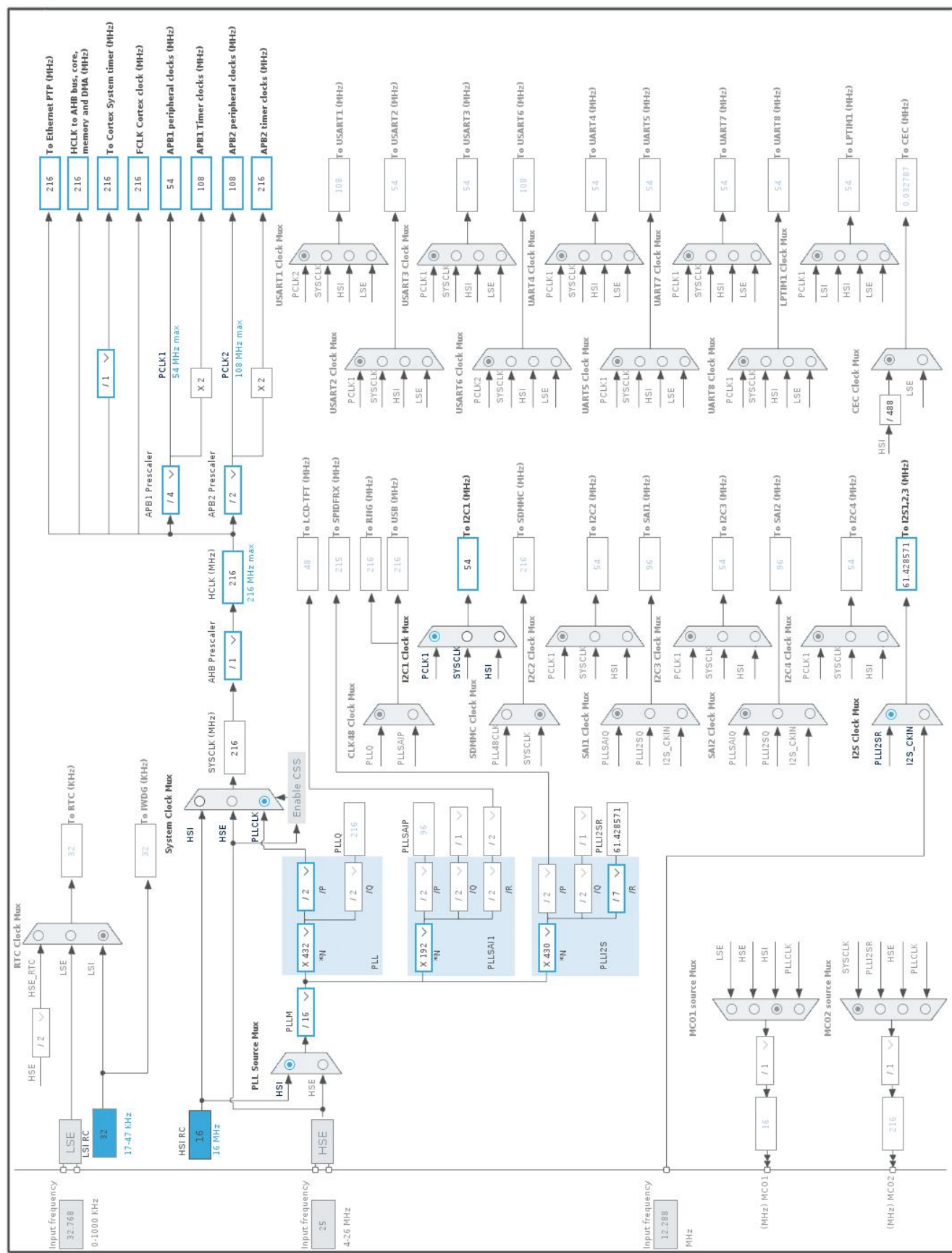
3. Pins Configuration

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
6	VBAT	Power		
16	VSS	Power		
17	VDD	Power		
25	NRST	Reset		
29	PC3	I/O	I2S2_SD	
30	VDD	Power		
31	VSSA	Power		
32	VREF+	Power		
33	VDDA	Power		
34	PA0/WKUP	I/O	TIM2_CH1	
38	VSS	Power		
39	VDD	Power		
40	PA4	I/O	I2S3_WS	
51	VSS	Power		
52	VDD	Power		
56	PG0 *	I/O	GPIO_Input	EncoderSW
57	PG1 *	I/O	GPIO_Input	Button1
60	PE9	I/O	TIM1_CH1	
61	VSS	Power		
62	VDD	Power		
64	PE11	I/O	TIM1_CH2	
69	PB10	I/O	I2S2_CK	
71	VCAP_1	Power		
72	VDD	Power		
73	PB12	I/O	I2S2_WS	
83	VSS	Power		
84	VDD	Power		
94	VSS	Power		
95	VDDUSB	Power		
96	PC6	I/O	I2S2_MCK	
106	VCAP_2	Power		
107	VSS	Power		
108	VDD	Power		
111	PC10	I/O	I2S3_CK	
113	PC12	I/O	I2S3_SD	
115	PD1 *	I/O	GPIO_Input	EncoderSW2

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
120	VSS	Power		
121	VDD	Power		
130	VSS	Power		
131	VDD	Power		
133	PB3	I/O	TIM2_CH2	
138	BOOT0	Boot		
139	PB8	I/O	I2C1_SCL	
140	PB9	I/O	I2C1_SDA	
143	PDR_ON	Reset		
144	VDD	Power		

* The pin is affected with an I/O function

4. Clock Tree Configuration



1. Power Consumption Calculator report

1.1. Microcontroller Selection

Series	STM32F7
Line	STM32F7x6
MCU	STM32F756ZGTx
Datasheet	DS10915_Rev4

1.2. Parameter Selection

Temperature	25
Vdd	3.3

1.3. Battery Selection

Battery	Alkaline(9V)
Capacity	625.0 mAh
Self Discharge	0.3 %/month
Nominal Voltage	9.0 V
Max Cont Current	200.0 mA
Max Pulse Current	0.0 mA
Cells in series	1
Cells in parallel	1

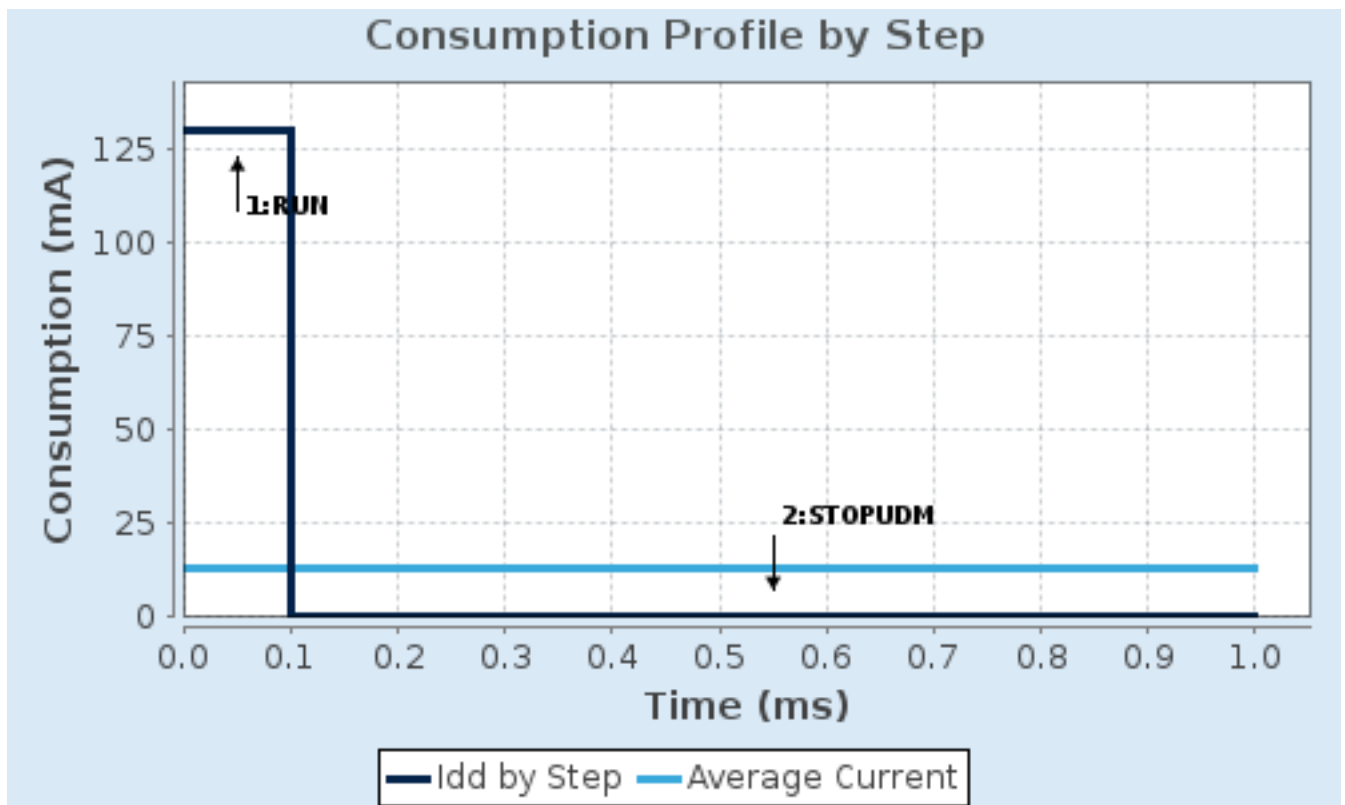
1.4. Sequence

Step	Step1	Step2
Mode	RUN	STOP UDM (Under Drive)
Vdd	3.3	3.3
Voltage Source	Battery	Battery
Range	Scale1-High	No Scale
Fetch Type	ITCM/FLASH/REGON	n/a
CPU Frequency	216 MHz	0 Hz
Clock Configuration	HSE PLL	Regulator LP Flash-PwrDwn
Clock Source Frequency	4 MHz	0 Hz
Peripherals		
Additional Cons.	0 mA	0 mA
Average Current	130 mA	100 μ A
Duration	0.1 ms	0.9 ms
DMIPS	462.0	0.0
Ta Max	87.84	104.99
Category	In DS Table	In DS Table

1.5. Results

Sequence Time	1 ms	Average Current	13.09 mA
Battery Life	1 day, 23 hours	Average DMIPS	462.24005 DMIPS

1.6. Chart



2. Software Project

2.1. Project Settings

Name	Value
Project Name	Funkit-mini2
Project Folder	/home/sasha/STM32CubeIDE/workspace_live_proj/Funkit-mini2
Toolchain / IDE	STM32CubeIDE
Firmware Package Name and Version	STM32Cube FW_F7 V1.17.3
Application Structure	Advanced
Generate Under Root	Yes
Do not generate the main()	No
Minimum Heap Size	0x200
Minimum Stack Size	0x400

2.2. 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	Yes

2.3. 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_I2S2_Init	I2S2
5	MX_I2S3_Init	I2S3
6	MX_TIM1_Init	TIM1
7	MX_I2C1_Init	I2C1
8	MX_TIM2_Init	TIM2

3. Peripherals and Middlewares Configuration

3.1. CORTEX_M7

3.1.1. Parameter Settings:

Speculation default mode Settings:

Speculation default mode **Enabled ***

Cortex Interface Settings:

Flash Interface AXI Interface

ART ACCELERATOR Disabled

Instruction Prefetch **Enabled ***

CPU ICache Disabled

CPU DCache Disabled

Cortex Memory Protection Unit Control Settings:

MPU Control Mode Background Region Privileged accesses only + MPU Disabled during hard fault, NMI and FAULTMASK handlers

Cortex Memory Protection Unit Region 0 Settings:

MPU Region Enabled

MPU Region Base Address **0x0 ***

MPU Region Size 4GB

MPU SubRegion Disable **0x87 ***

MPU TEX field level level 0

MPU Access Permission ALL ACCESS NOT PERMITTED

MPU Instruction Access DISABLE

MPU Shareability Permission ENABLE

MPU Cacheable Permission DISABLE

MPU Bufferable Permission DISABLE

Cortex Memory Protection Unit Region 1 Settings:

MPU Region Disabled

Cortex Memory Protection Unit Region 2 Settings:

MPU Region Disabled

Cortex Memory Protection Unit Region 3 Settings:

MPU Region Disabled

Cortex Memory Protection Unit Region 4 Settings:

MPU Region Disabled

Cortex Memory Protection Unit Region 5 Settings:

MPU Region Disabled

Cortex Memory Protection Unit Region 6 Settings:

MPU Region Disabled

Cortex Memory Protection Unit Region 7 Settings:

MPU Region Disabled

3.2. I2C1

I2C: I2C

3.2.1. Parameter Settings:

Timing configuration:

I2C Speed Mode	Fast Mode Plus *
I2C Speed Frequency (KHz)	1000
Rise Time (ns)	0
Fall Time (ns)	0
Coefficient of Digital Filter	0
Analog Filter	Enabled
Timing	0x00200922 *

Slave Features:

Clock No Stretch Mode	Disabled
General Call Address Detection	Disabled
Primary Address Length selection	7-bit
Dual Address Acknowledged	Disabled
Primary slave address	0

3.3. I2S2

Mode: Half-Duplex Master

mode: Master Clock Output

3.3.1. Parameter Settings:

Generic Parameters:

Transmission Mode	Mode Master Receive *
Communication Standard	MSB First (Left Justified) *
Data and Frame Format	24 Bits Data on 32 Bits Frame *
Selected Audio Frequency	48 KHz *
Real Audio Frequency	47.991 KHz *
Error between Selected and Real	-0.01 % *

Clock Parameters:

Clock Source	PLL I2SR Clock
Clock Polarity	Low

3.4. I2S3

Mode: Half-Duplex Slave

3.4.1. Parameter Settings:

Generic Parameters:

Transmission Mode	Mode Slave Transmit
Communication Standard	MSB First (Left Justified) *
Data and Frame Format	24 Bits Data on 32 Bits Frame *
Selected Audio Frequency	48 KHz *
Real Audio Frequency	47.991 KHz *
Error between Selected and Real	-0.01 % *

Clock Parameters:

Clock Source	PLL I2SR Clock
Clock Polarity	Low

3.5. RCC

3.5.1. Parameter Settings:

System Parameters:

VDD voltage (V)	3.3
Flash Latency(WS)	7 WS (8 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 Over Drive	Enabled
Power Regulator Voltage Scale	Power Regulator Voltage Scale 1

3.6. SYS

Timebase Source: SysTick

3.7. TIM1

Combined Channels: Encoder Mode

3.7.1. 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 - 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)

Encoder:

Encoder Mode	Encoder Mode T11
____ Parameters for Channel 1 ____	
Polarity	Rising Edge
IC Selection	Direct
Prescaler Division Ratio	No division
Input Filter	0
____ Parameters for Channel 2 ____	
Polarity	Rising Edge
IC Selection	Direct
Prescaler Division Ratio	No division
Input Filter	0

3.8. TIM2

Combined Channels: Encoder Mode

3.8.1. Parameter Settings:

Counter Settings:

Prescaler (PSC - 16 bits value)	0
Counter Mode	Up
Counter Period (AutoReload Register - 32 bits value)	9999 *
Internal Clock Division (CKD)	No Division
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)

Encoder:

Encoder Mode	Encoder Mode TI1
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____ Parameters for Channel 1 ____

Polarity	Rising Edge
IC Selection	Direct
Prescaler Division Ratio	No division
Input Filter	10 *

____ Parameters for Channel 2 ____

Polarity	Rising Edge
IC Selection	Direct
Prescaler Division Ratio	No division
Input Filter	10 *

*** User modified value**

4. System Configuration

4.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
I2C1	PB8	I2C1_SCL	Alternate Function Open Drain	No pull-up and no pull-down	Very High *	
	PB9	I2C1_SDA	Alternate Function Open Drain	No pull-up and no pull-down	Very High *	
I2S2	PC3	I2S2_SD	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PB10	I2S2_CK	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PB12	I2S2_WS	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PC6	I2S2_MCK	Alternate Function Push Pull	No pull-up and no pull-down	Low	
I2S3	PA4	I2S3_WS	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PC10	I2S3_CK	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PC12	I2S3_SD	Alternate Function Push Pull	No pull-up and no pull-down	Low	
TIM1	PE9	TIM1_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PE11	TIM1_CH2	Alternate Function Push Pull	No pull-up and no pull-down	Low	
TIM2	PA0/WKUP	TIM2_CH1	Alternate Function Push Pull	No pull-up and no pull-down	Low	
	PB3	TIM2_CH2	Alternate Function Push Pull	No pull-up and no pull-down	Low	
GPIO	PG0	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	EncoderSW
	PG1	GPIO_Input	Input mode	Pull-up *	n/a	Button1
	PD1	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	EncoderSW2

4.2. DMA configuration

DMA request	Stream	Direction	Priority
SPI3_TX	DMA1_Stream5	Memory To Peripheral	Low
SPI2_RX	DMA1_Stream3	Peripheral To Memory	Low

SPI3_TX: DMA1_Stream5 DMA request Settings:

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

SPI2_RX: DMA1_Stream3 DMA request Settings:

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

4.3. NVIC configuration

4.3.1. 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	15	0
DMA1 stream3 global interrupt	true	0	0
DMA1 stream5 global interrupt	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
TIM1 break interrupt and TIM9 global interrupt	unused		
TIM1 update interrupt and TIM10 global interrupt	unused		
TIM1 trigger and commutation interrupts and TIM11 global interrupt	unused		
TIM1 capture compare interrupt	unused		
TIM2 global interrupt	unused		
I2C1 event interrupt	unused		
I2C1 error interrupt	unused		
SPI2 global interrupt	unused		
SPI3 global interrupt	unused		
FPU global interrupt	unused		

4.3.2. 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

Enabled interrupt Table	Select for init sequence ordering	Generate IRQ handler	Call HAL handler
Pendable request for system service	false	true	false
System tick timer	false	true	true
DMA1 stream3 global interrupt	false	true	true
DMA1 stream5 global interrupt	false	true	true

* User modified value

5. System Views

5.1. Category view

5.1.1. Current

6. Docs & Resources

Type	Link
BSDL files	https://www.st.com/resource/en/bsdl_model/stm32f7_bsdl.zip
IBIS models	https://www.st.com/resource/en/ibis_model/stm32f7_ibis.zip
System View Description	https://www.st.com/resource/en/svd/stm32f7-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/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/products-and-solutions-for-plcs-and-smart-i-os.pdf
Flyers	https://www.st.com/resource/en/flyer/flstm32nucleo.pdf
Flyers	https://www.st.com/resource/en/flyer/flstm32trust.pdf
Flyers	https://www.st.com/resource/en/flyer/flstm32gui.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/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

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/an4031-using-the-stm32f2-stm32f4-and-stm32f7-series-dma-controller-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/an4286-spi-protocol-used-in-the-stm32-bootloader-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/an4655-virtually-increasing-the-number-of-serial-communication-peripherals-in-stm32-applications-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4660-migration-of-microcontroller-applications-from-stm32f42xxx/43xxx-devices-to-stm32f7-series-devices-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4661-getting-started-with-stm32f7-series-mcu-hardware-development-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4676-stm32f7-series-peripheral-interconnections-stmicroelectronics.pdf

Application Notes https://www.st.com/resource/en/application_note/an4731-stm32cube-mcu-package-examples-for-stm32f7-series-stmicroelectronics.pdf

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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/an4839-level-1-cache-on-stm32f7-series-and-stm32h7-series-stmicroelectronics.pdf

- Application Notes https://www.st.com/resource/en/application_note/an4850-stm32-mcus-spreadspectrum-clock-generation-principles-properties-and-implementation-stmicroelectronics.pdf
- Application Notes https://www.st.com/resource/en/application_note/an4936-migration-of-microcontroller-applications-from-stm32f7-series-to-stm32h743753-line-stmicroelectronics.pdf
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for related Tools
& Software

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for related Tools
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