
STM32
CubeMX

1. Description

1.1. Project

Project Name	FurnaceLogger
Board Name	custom
Generated with:	STM32CubeMX 6.12.1
Date	10/22/2024

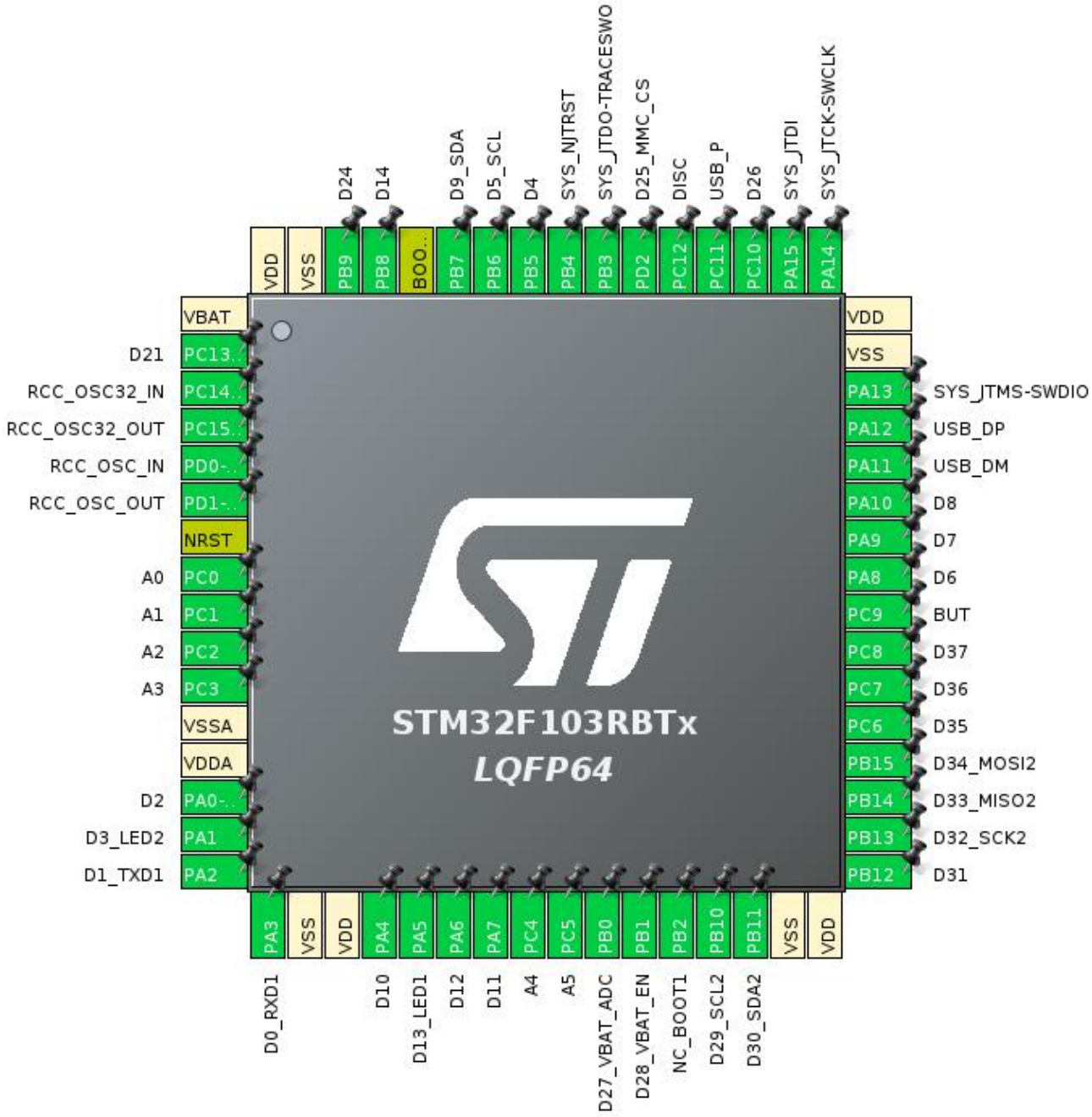
1.2. MCU

MCU Series	STM32F1
MCU Line	STM32F103
MCU name	STM32F103RBTx
MCU Package	LQFP64
MCU Pin number	64

1.3. Core(s) information

Core(s)	Arm Cortex-M3

2. Pinout Configuration



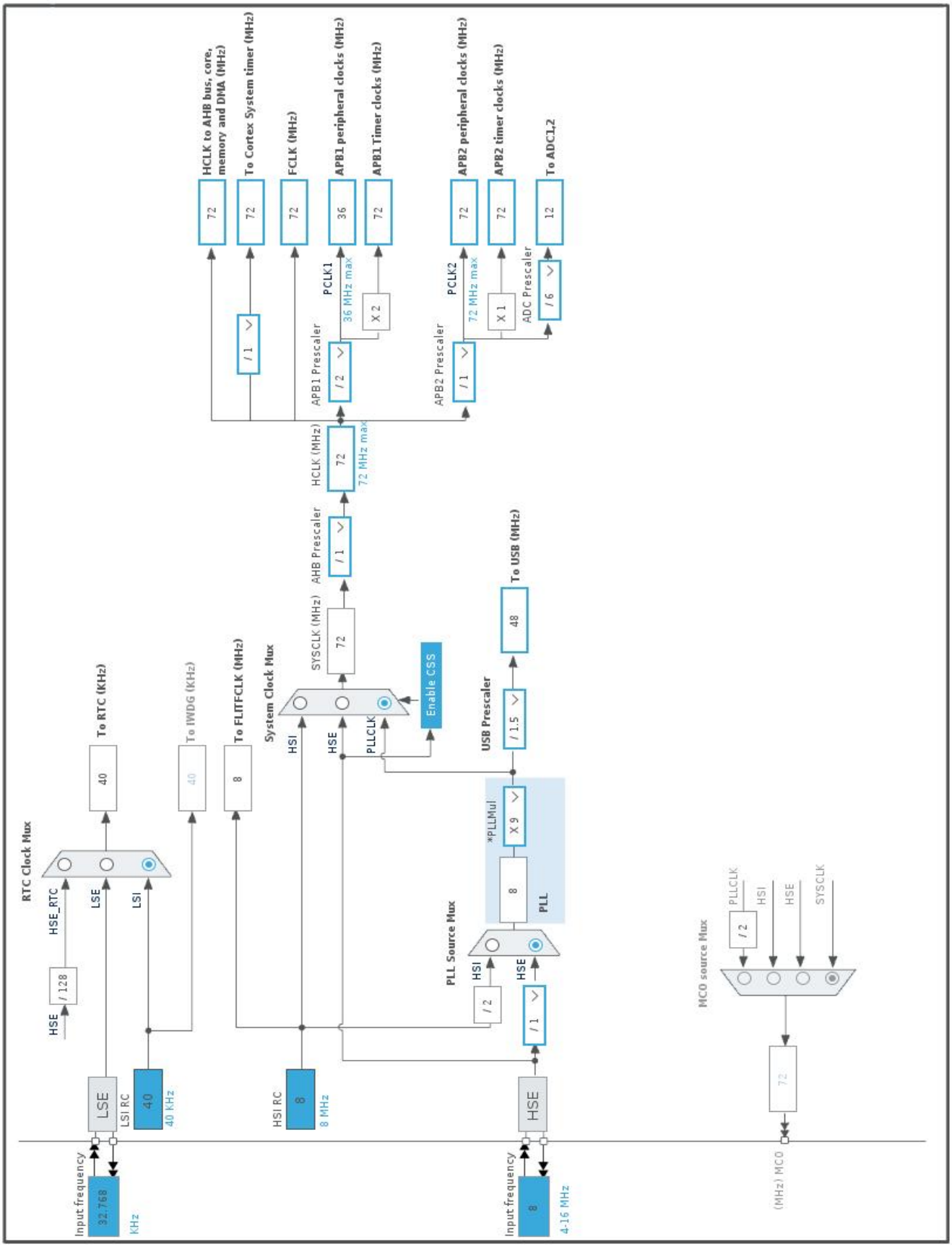
3. Pins Configuration

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
1	VBAT	Power		
2	PC13-TAMPER-RTC *	I/O	GPIO_Analog	D21
3	PC14-OSC32_IN	I/O	RCC_OSC32_IN	
4	PC15-OSC32_OUT	I/O	RCC_OSC32_OUT	
5	PD0-OSC_IN	I/O	RCC_OSC_IN	
6	PD1-OSC_OUT	I/O	RCC_OSC_OUT	
7	NRST	Reset		
8	PC0	I/O	ADC1_IN10	A0
9	PC1	I/O	ADC1_IN11	A1
10	PC2	I/O	ADC1_IN12	A2
11	PC3	I/O	ADC1_IN13	A3
12	VSSA	Power		
13	VDDA	Power		
14	PA0-WKUP *	I/O	GPIO_Input	D2
15	PA1 *	I/O	GPIO_Output	D3_LED2
16	PA2	I/O	USART2_TX	D1_TXD1
17	PA3	I/O	USART2_RX	D0_RXD1
18	VSS	Power		
19	VDD	Power		
20	PA4 *	I/O	GPIO_Input	D10
21	PA5 *	I/O	GPIO_Output	D13_LED1
22	PA6 *	I/O	GPIO_Input	D12
23	PA7 *	I/O	GPIO_Input	D11
24	PC4	I/O	ADC1_IN14	A4
25	PC5	I/O	ADC1_IN15	A5
26	PB0 *	I/O	GPIO_Analog	D27_VBAT_ADC
27	PB1 *	I/O	GPIO_Analog	D28_VBAT_EN
28	PB2 *	I/O	GPIO_Analog	NC_BOOT1
29	PB10 *	I/O	GPIO_Analog	D29_SCL2
30	PB11 *	I/O	GPIO_Analog	D30_SDA2
31	VSS	Power		
32	VDD	Power		
33	PB12 *	I/O	GPIO_Analog	D31
34	PB13	I/O	SPI2_SCK	D32_SCK2
35	PB14	I/O	SPI2_MISO	D33_MISO2
36	PB15	I/O	SPI2_MOSI	D34_MOSI2

Pin Number LQFP64	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
37	PC6 *	I/O	GPIO_Analog	D35
38	PC7 *	I/O	GPIO_Analog	D36
39	PC8 *	I/O	GPIO_Analog	D37
40	PC9 *	I/O	GPIO_Input	BUT
41	PA8 *	I/O	GPIO_Input	D6
42	PA9 *	I/O	GPIO_Input	D7
43	PA10 *	I/O	GPIO_Input	D8
44	PA11	I/O	USB_DM	
45	PA12	I/O	USB_DP	
46	PA13	I/O	SYS_JTMS-SWDIO	
47	VSS	Power		
48	VDD	Power		
49	PA14	I/O	SYS_JTCK-SWCLK	
50	PA15	I/O	SYS_JTDI	
51	PC10 *	I/O	GPIO_Analog	D26
52	PC11 *	I/O	GPIO_Input	USB_P
53	PC12 *	I/O	GPIO_Output	DISC
54	PD2 *	I/O	GPIO_Output	D25_MMC_CS
55	PB3	I/O	SYS_JTDO-TRACESWO	
56	PB4	I/O	SYS_NJTRST	
57	PB5 *	I/O	GPIO_Input	D4
58	PB6	I/O	I2C1_SCL	D5_SCL
59	PB7	I/O	I2C1_SDA	D9_SDA
60	BOOT0	Boot		
61	PB8 *	I/O	GPIO_Input	D14
62	PB9 *	I/O	GPIO_Analog	D24
63	VSS	Power		
64	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	STM32F1
Line	STM32F103
MCU	STM32F103RBTx
Datasheet	DS5319_Rev17

1.2. Parameter Selection

Temperature	25
Vdd	3.3

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

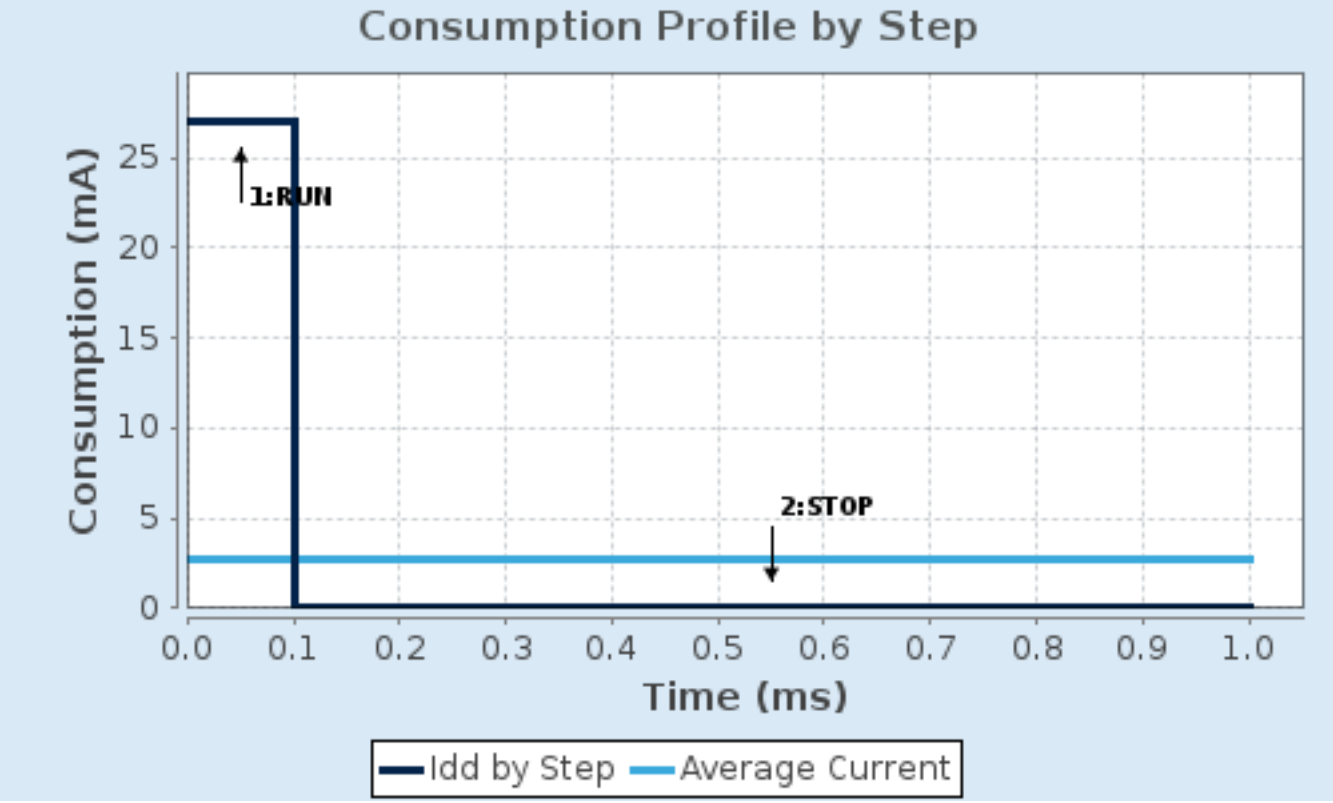
1.4. Sequence

Step	Step1	Step2
Mode	RUN	STOP
Vdd	3.3	3.3
Voltage Source	Battery	Battery
Range	No Scale	No Scale
Fetch Type	FLASH	n/a
CPU Frequency	72 MHz	0 Hz
Clock Configuration	HSE PLL	Regulator_LP
Clock Source Frequency	8 MHz	0 Hz
Peripherals		
Additional Cons.	0 mA	0 mA
Average Current	27 mA	14 µA
Duration	0.1 ms	0.9 ms
DMIPS	90.0	0.0
Ta Max	100.99	105
Category	In DS Table	In DS Table

1.5. Results

Sequence Time	1 ms	Average Current	2.71 mA
Battery Life	1 month, 21 days, 17 hours	Average DMIPS	61.0 DMIPS

1.6. Chart


Consumption Profile by Step
Consumption (mA)
25
20
15
10
5
0
1:RUN
2:STOP
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (ms)
Idd by Step
Average Current

2. Software Project

2.1. Project Settings

Name	Value
Project Name	FurnaceLogger
Project Folder	/home/riyadth/Work/git/FurnaceLogger
Toolchain / IDE	Makefile
Firmware Package Name and Version	STM32Cube FW_F1 V1.8.6
Application Structure	Advanced
Generate Under Root	No
Do not generate the main()	No
Minimum Heap Size	0x400
Minimum Stack Size	0x800

2.2. 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	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)	Yes
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_ADC1_Init	ADC1
4	MX_RTC_Init	RTC
5	MX_SPI2_Init	SPI2
6	MX_USART2_UART_Init	USART2
7	MX_USB_DEVICE_Init	USB_DEVICE
8	MX_I2C1_Init	I2C1

3. Peripherals and Middlewares Configuration

3.1. ADC1

mode: IN10

mode: IN11

mode: IN12

mode: IN13

mode: IN14

mode: IN15

3.1.1. Parameter Settings:

ADCs_Common_Settings:

Mode	Independent mode

ADC_Settings:

Data Alignment	Right alignment
Scan Conversion Mode	Disabled
Continuous Conversion Mode	Disabled
Discontinuous Conversion Mode	Disabled

ADC_Regular_ConversionMode:

Enable Regular Conversions	Enable
Number Of Conversion	1
External Trigger Conversion Source	Regular Conversion launched by software
Rank	1
Channel	Channel 10
Sampling Time	1.5 Cycles

ADC_Injected_ConversionMode:

Enable Injected Conversions	Disable

WatchDog:

Enable Analog WatchDog Mode	false

3.2. I2C1

I2C: I2C

3.2.1. Parameter Settings:

Master Features:

I2C Speed Mode	Standard Mode
I2C Clock Speed (Hz)	100000

Slave Features:

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

3.3. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

Low Speed Clock (LSE) : Crystal/Ceramic Resonator

3.3.1. Parameter Settings:

System Parameters:

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

RCC Parameters:

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

3.4. RTC

mode: Activate Clock Source

mode: Activate Calendar

3.4.1. Parameter Settings:

Calendar Time:

Data Format	BCD data format
Hours	0
Minutes	0
Seconds	0

General:

Auto Predivider Calculation	Enabled
Asynchronous Predivider value	Automatic Predivider Calculation Enabled
Output	Alarm pulse signal on the TAMPER pin

Calendar Date:

Week Day	Monday
Month	January

Date	1
Year	0

3.5. SPI2

Mode: Full-Duplex Master

3.5.1. Parameter Settings:

Basic Parameters:

Frame Format	Motorola
Data Size	8 Bits
First Bit	MSB First

Clock Parameters:

Prescaler (for Baud Rate)	2
Baud Rate	**18.0 MBits/s ***
Clock Polarity (CPOL)	Low
Clock Phase (CPHA)	1 Edge

Advanced Parameters:

CRC Calculation	Disabled
NSS Signal Type	Software

3.6. SYS

Debug: JTAG (5 pins)

Timebase Source: SysTick

3.7. USART2

Mode: Asynchronous

3.7.1. 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

3.8. USB

mode: Device (FS)

3.8.1. Parameter Settings:

Basic Parameters:

Speed	Full Speed 12MBit/s

Power Parameters:

Low Power	Disabled
Link Power Management	Disabled
Battery Charging	Disabled

3.9. USB_DEVICE

Class For FS IP: Communication Device Class (Virtual Port Com)

3.9.1. Parameter Settings:

Basic Parameters:

USBD_MAX_NUM_INTERFACES (Maximum number of supported interfaces)	1
USBD_MAX_NUM_CONFIGURATION (Maximum number of supported configuration)	1
USBD_MAX_STR_DESC_SIZ (Maximum size for the string descriptors)	512
USBD_SELF_POWERED (Enabled self power)	Enabled
USBD_DEBUG_LEVEL (USBD Debug Level)	0: No debug message

Class Parameters:

USB CDC Rx Buffer Size	1024
USB CDC Tx Buffer Size	1024

3.9.2. Device Descriptor:

Device Descriptor:

VID (Vendor IDentifier)	1155
LANGID_STRING (Language Identifier)	English(United States)
MANUFACTURER_STRING (Manufacturer Identifier)	STMicroelectronics

Device Descriptor FS:

PID (Product IDentifier)	22336
PRODUCT_STRING (Product Identifier)	STM32 Virtual ComPort
CONFIGURATION_STRING (Configuration Identifier)	CDC Config
INTERFACE_STRING (Interface Identifier)	CDC Interface

*** User modified value**

4. System Configuration

4.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
ADC1	PC0	ADC1_IN10	Analog mode	n/a	n/a	A0
	PC1	ADC1_IN11	Analog mode	n/a	n/a	A1
	PC2	ADC1_IN12	Analog mode	n/a	n/a	A2
	PC3	ADC1_IN13	Analog mode	n/a	n/a	A3
	PC4	ADC1_IN14	Analog mode	n/a	n/a	A4
	PC5	ADC1_IN15	Analog mode	n/a	n/a	A5
I2C1	PB6	I2C1_SCL	Alternate Function Open Drain	n/a	**High ***	D5_SCL
	PB7	I2C1_SDA	Alternate Function Open Drain	n/a	**High ***	D9_SDA
RCC	PC14-OSC32_IN	RCC_OSC32_IN	n/a	n/a	n/a	
	PC15-OSC32_OUT	RCC_OSC32_OUT	n/a	n/a	n/a	
	PD0-OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	
	PD1-OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	
SPI2	PB13	SPI2_SCK	Alternate Function Push Pull	n/a	**High ***	D32_SCK2
	PB14	SPI2_MISO	Input mode	No pull-up and no pull-down	**n/a**	D33_MISO2
	PB15	SPI2_MOSI	Alternate Function Push Pull	n/a	**High ***	D34_MOSI2
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
	PA15	SYS_JTDI	n/a	n/a	n/a	
	PB3	SYS_JTDO-TRACESWO	n/a	n/a	n/a	
	PB4	SYS_NJTRST	n/a	n/a	n/a	
USART2	PA2	USART2_TX	Alternate Function Push Pull	n/a	**High ***	D1_TXD1
	PA3	USART2_RX	Input mode	No pull-up and no pull-down	**n/a**	D0_RXD1
USB	PA11	USB_DM	n/a	n/a	n/a	
	PA12	USB_DP	n/a	n/a	n/a	
GPIO	PC13-TAMPER-RTC	GPIO_Analog	Analog mode	n/a	n/a	D21
	PA0-WKUP	GPIO_Input	Input mode		n/a	D2

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
				Pull-up *		
	PA1	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	D3_LED2
	PA4	GPIO_Input	Input mode	**Pull-up ***	n/a	D10
	PA5	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	D13_LED1
	PA6	GPIO_Input	Input mode	**Pull-up ***	n/a	D12
	PA7	GPIO_Input	Input mode	**Pull-up ***	n/a	D11
	PB0	GPIO_Analog	Analog mode	**n/a**	n/a	D27_VBAT_ADC
	PB1	GPIO_Analog	Analog mode	**n/a**	n/a	D28_VBAT_EN
	PB2	GPIO_Analog	Analog mode	**n/a**	n/a	NC_BOOT1
	PB10	GPIO_Analog	Analog mode	**n/a**	n/a	D29_SCL2
	PB11	GPIO_Analog	Analog mode	**n/a**	n/a	D30_SDA2
	PB12	GPIO_Analog	Analog mode	**n/a**	n/a	D31
	PC6	GPIO_Analog	Analog mode	**n/a**	n/a	D35
	PC7	GPIO_Analog	Analog mode	**n/a**	n/a	D36
	PC8	GPIO_Analog	Analog mode	**n/a**	n/a	D37
	PC9	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	BUT
	PA8	GPIO_Input	Input mode	**Pull-up ***	n/a	D6
	PA9	GPIO_Input	Input mode	**Pull-up ***	n/a	D7
	PA10	GPIO_Input	Input mode	**Pull-up ***	n/a	D8
	PC10	GPIO_Analog	Analog mode	**n/a**	n/a	D26
	PC11	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	USB_P
	PC12	GPIO_Output	**Output Open Drain ***	No pull-up and no pull-down	Low	DISC
	PD2	GPIO_Output	Output Push Pull	No pull-up and no pull-down	Low	D25_MMC_CS
	PB5	GPIO_Input	Input mode	**Pull-up ***	n/a	D4
	PB8	GPIO_Input	Input mode	**Pull-up ***	n/a	D14
	PB9	GPIO_Analog	Analog mode	**n/a**	n/a	D24

4.2. DMA configuration

nothing configured in DMA service

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
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	15	0
USB low priority or CAN RX0 interrupts	true	0	0
PVD interrupt through EXTI line 16	unused		
RTC global interrupt	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
ADC1 and ADC2 global interrupts	unused		
USB high priority or CAN TX interrupts	unused		
I2C1 event interrupt	unused		
I2C1 error interrupt	unused		
SPI2 global interrupt	unused		
USART2 global interrupt	unused		
RTC alarm interrupt through EXTI line 17	unused		

4.3.2. NVIC Code generation

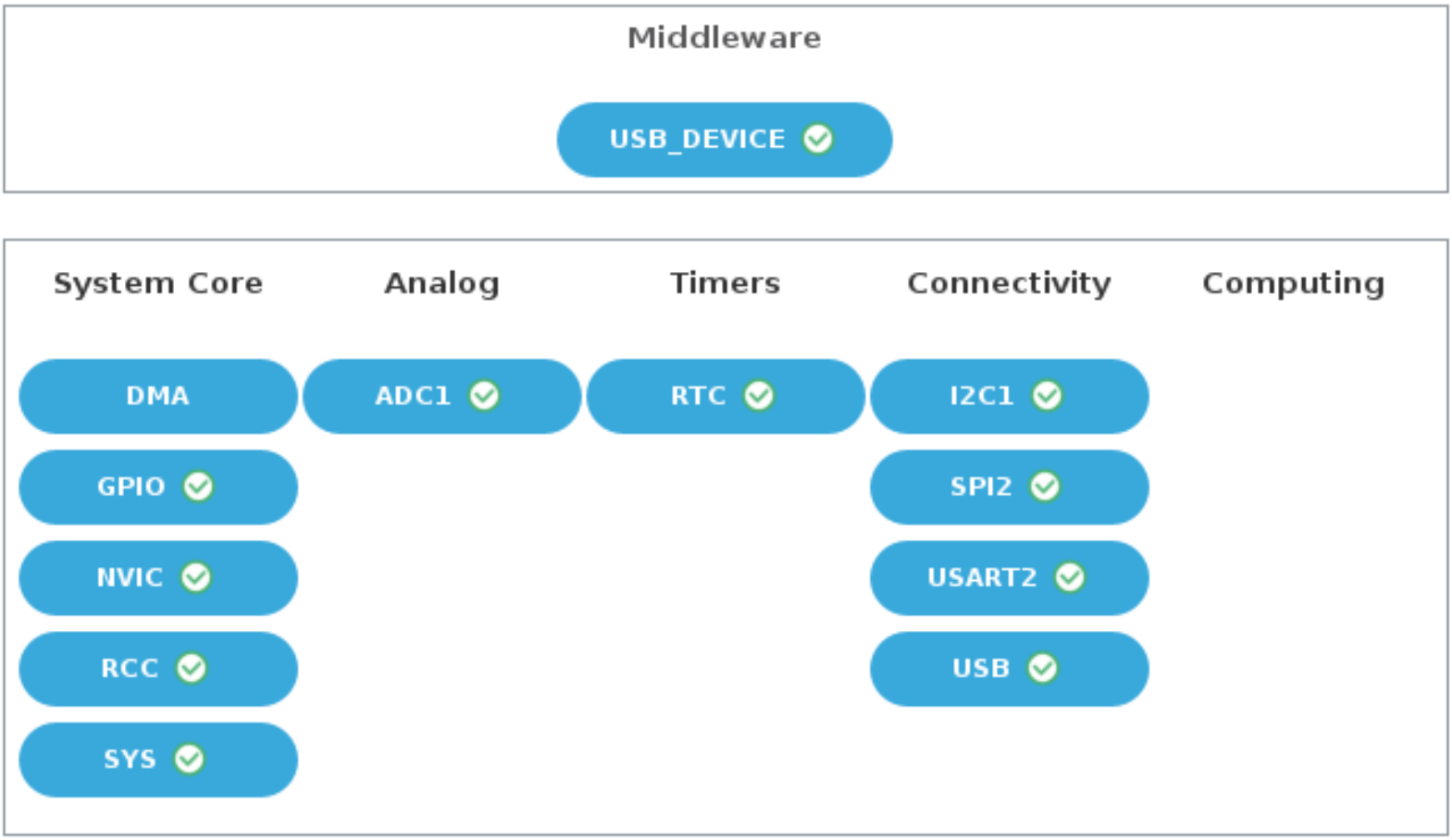
Enabled interrupt Table	Select for init sequence ordering	Generate IRQ handler	Call HAL handler
Non maskable interrupt	false	true	false
Hard fault interrupt	false	true	false
Memory management fault	false	true	false
Prefetch fault, memory access fault	false	true	false
Undefined instruction or illegal 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
USB low priority or CAN RX0 interrupts	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/stm32f1_bsdl.zip
IBIS models	https://www.st.com/resource/en/ibis_model/stm32ibis.zip
System View Description	https://www.st.com/resource/en/svd/stm32f1_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/flstmcsuite.pdf
Flyers	https://www.st.com/resource/en/flyer/fldpstpfc11120.pdf
Product Certifications	https://www.st.com/resource/en/certification_document/1239988349.pdf
Product Certifications	https://www.st.com/resource/en/certification_document/stm32_authentication_can.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/an2586-getting-started-with-stm32f10xxx-hardware-development-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an2604-stm32f101xx-and-stm32f103xx-rtc-calibration-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/an2799-measuring-mains-power-consumption-with-the-stm32x-and-stpm01-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
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
Application Notes	https://www.st.com/resource/en/application_note/an3095-stevalisv002v1-stevalisv002v2-3-kw-gridconnected-pv-system-based-on-the-stm32f103xx-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an3108-stlm75-firmware-library-for-the-stm32f10x-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/an3128-stm32-embedded-graphic-objectstouchscreen-library-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-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
Application Notes	https://www.st.com/resource/en/application_note/an3364-migration-and-compatibility-guidelines-for-stm32-microcontroller-applications-stmicroelectronics.pdf

Application Notes	https://www.st.com/resource/en/application_note/an3422-migration-of-microcontroller-applications-from-stm32f1-to-stm32l1-series-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an3427-migrating-a-microcontroller-application-from-stm32f1-to-stm32f2-series-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an3429-stm32-proprietary-code-protection-overview-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4070-250-w-grid-connected-microinverter-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4076-two-or-three-shunt-resistor-based-current-sensing-circuit-design-in-3phase-inverters-stmicroelectronics.pdf
Application Notes	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/an4228-migrating-from-stm32f1-series-to-stm32f3-series-microcontrollers-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/an4649-migrating-from-stm32f1-series-to-stm32l4-series--stm32l4-series-microntrollers-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/an4724-stm32cube-firmware-examples-for-stm32f1-series-stmicroelectronics.pdf
Application Notes	https://www.st.com/resource/en/application_note/an4750-handling-of-soft-errors-in-stm32-applications-stmicroelectronics.pdf
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