



1. Description

1.1. Project

| | |
|-----------------|-------------------|
| Project Name | AI_Assistant |
| Board Name | custom |
| Generated with: | STM32CubeMX 6.9.2 |
| Date | 12/11/2023 |

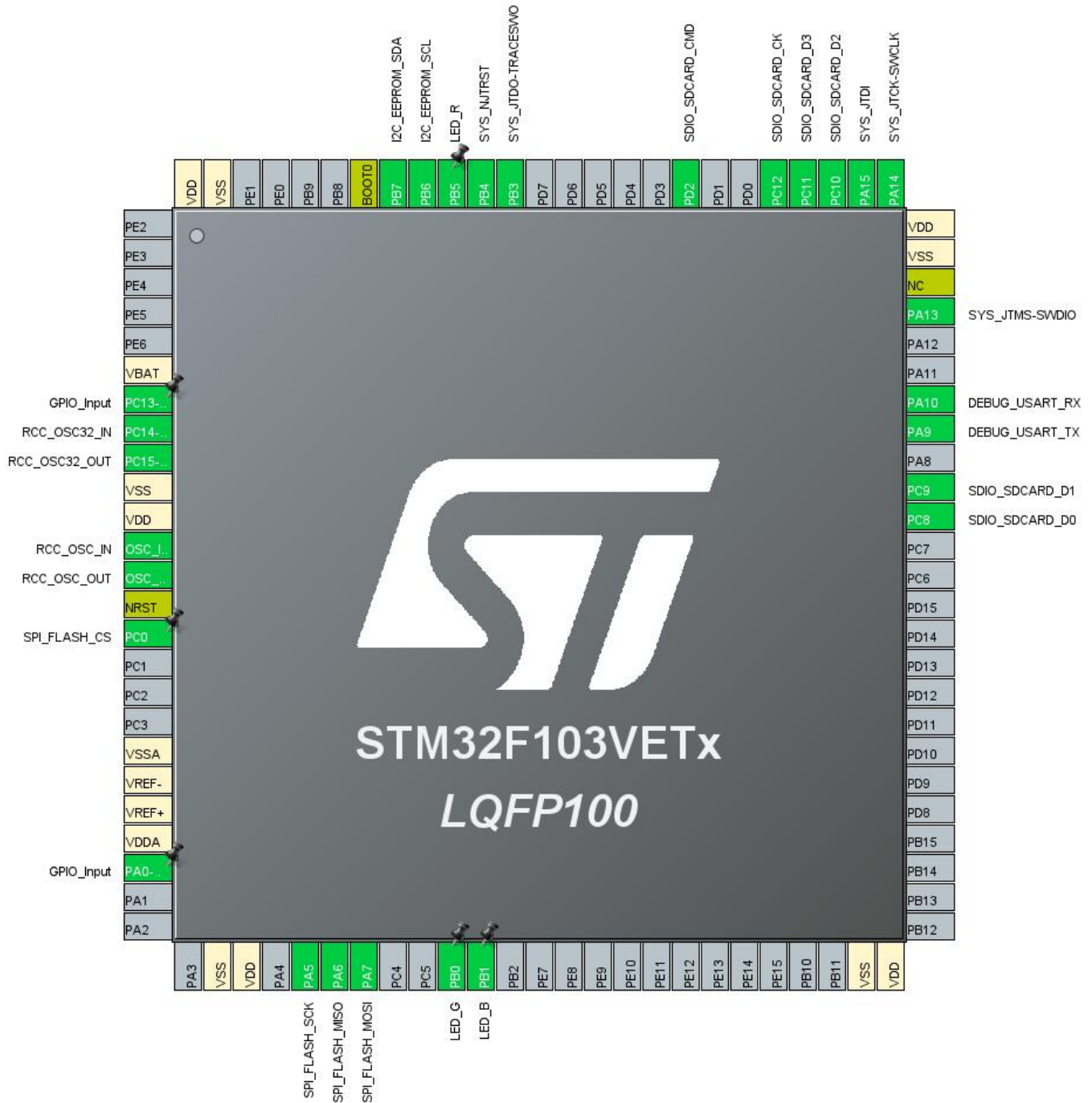
1.2. MCU

| | |
|----------------|---------------|
| MCU Series | STM32F1 |
| MCU Line | STM32F103 |
| MCU name | STM32F103VETx |
| MCU Package | LQFP100 |
| MCU Pin number | 100 |

1.3. Core(s) information

| | |
|---------|---------------|
| Core(s) | Arm Cortex-M3 |
|---------|---------------|

2. Pinout Configuration



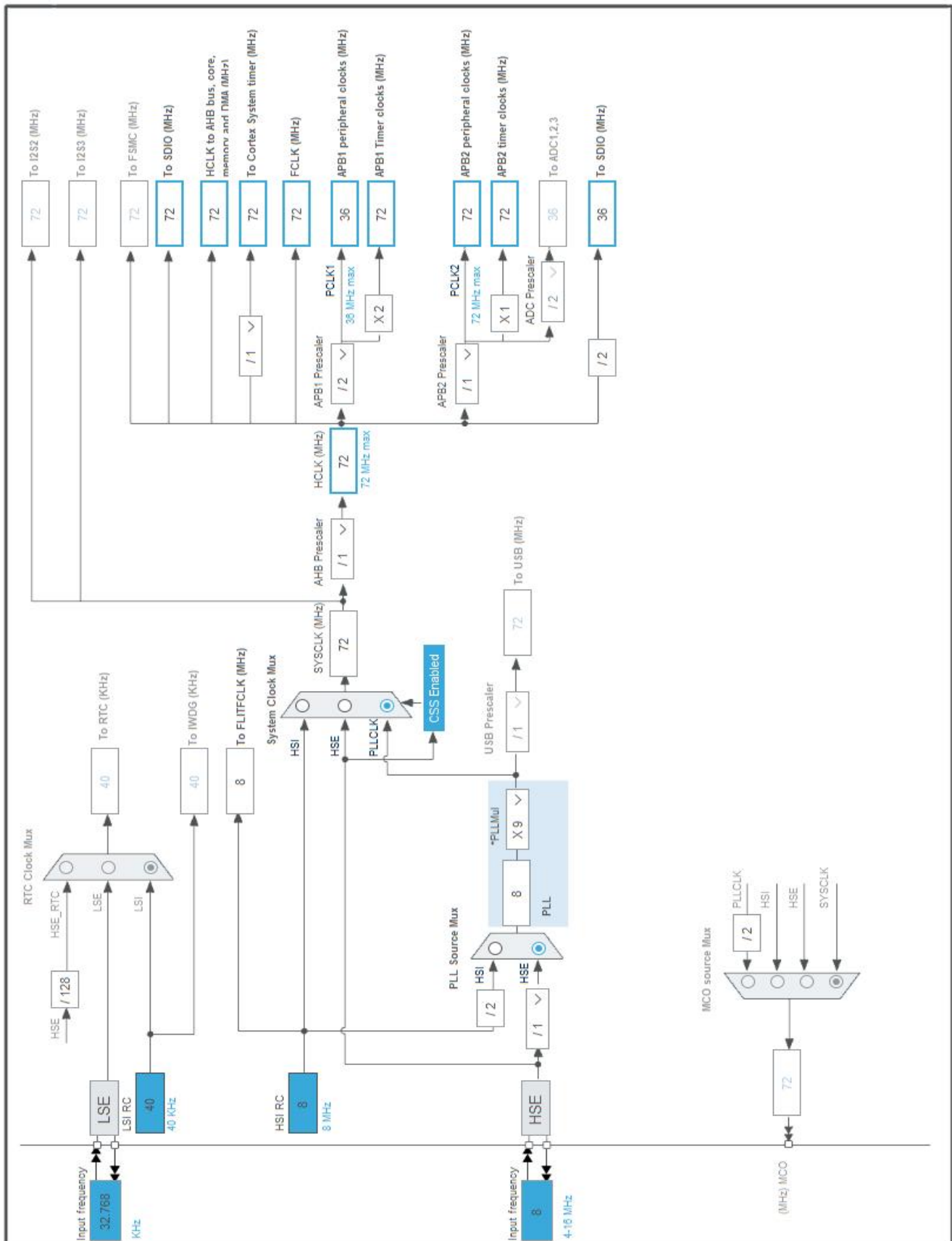
3. Pins Configuration

| Pin Number LQFP100 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|-----------------------|---------------------------------------|----------|--------------------------|----------------|
| 6 | VBAT | Power | | |
| 7 | PC13-TAMPER-RTC * | I/O | GPIO_Input | |
| 8 | PC14-OSC32_IN | I/O | RCC_OSC32_IN | |
| 9 | PC15-OSC32_OUT | I/O | RCC_OSC32_OUT | |
| 10 | VSS | Power | | |
| 11 | VDD | Power | | |
| 12 | OSC_IN | MonoIO | RCC_OSC_IN | |
| 13 | OSC_OUT | MonoIO | RCC_OSC_OUT | |
| 14 | NRST | Reset | | |
| 15 | PC0 * | I/O | GPIO_Output | SPI_FLASH_CS |
| 19 | VSSA | Power | | |
| 20 | VREF- | Power | | |
| 21 | VREF+ | Power | | |
| 22 | VDDA | Power | | |
| 23 | PA0-WKUP * | I/O | GPIO_Input | |
| 27 | VSS | Power | | |
| 28 | VDD | Power | | |
| 30 | PA5 | I/O | SPI1_SCK | SPI_FLASH_SCK |
| 31 | PA6 | I/O | SPI1_MISO | SPI_FLASH_MISO |
| 32 | PA7 | I/O | SPI1_MOSI | SPI_FLASH_MOSI |
| 35 | PB0 * | I/O | GPIO_Output | LED_G |
| 36 | PB1 * | I/O | GPIO_Output | LED_B |
| 49 | VSS | Power | | |
| 50 | VDD | Power | | |
| 65 | PC8 | I/O | SDIO_D0 | SDIO_SDCARD_D0 |
| 66 | PC9 | I/O | SDIO_D1 | SDIO_SDCARD_D1 |
| 68 | PA9 | I/O | USART1_TX | DEBUG_USART_TX |
| 69 | PA10 | I/O | USART1_RX | DEBUG_USART_RX |
| 72 | PA13 | I/O | SYS_JTMS-SWDIO | |
| 73 | NC | NC | | |
| 74 | VSS | Power | | |
| 75 | VDD | Power | | |
| 76 | PA14 | I/O | SYS_JTCK-SWCLK | |
| 77 | PA15 | I/O | SYS_JTDI | |
| 78 | PC10 | I/O | SDIO_D2 | SDIO_SDCARD_D2 |
| 79 | PC11 | I/O | SDIO_D3 | SDIO_SDCARD_D3 |

| Pin Number LQFP100 | Pin Name (function after reset) | Pin Type | Alternate Function(s) | Label |
|-----------------------|---------------------------------------|----------|--------------------------|-----------------|
| 80 | PC12 | I/O | SDIO_CK | SDIO_SDCARD_CK |
| 83 | PD2 | I/O | SDIO_CMD | SDIO_SDCARD_CMD |
| 89 | PB3 | I/O | SYS_JTDO-TRACESWO | |
| 90 | PB4 | I/O | SYS_NJTRST | |
| 91 | PB5 * | I/O | GPIO_Output | LED_R |
| 92 | PB6 | I/O | I2C1_SCL | I2C_EEPROM_SCL |
| 93 | PB7 | I/O | I2C1_SDA | I2C_EEPROM_SDA |
| 94 | BOOT0 | Boot | | |
| 99 | VSS | Power | | |
| 100 | VDD | Power | | |

* The pin is affected with an I/O function

4. Clock Tree Configuration



5. Software Project

5.1. Project Settings

| Name | Value |
|-----------------------------------|---------------------------|
| Project Name | AI_Assistant |
| Project Folder | D:\Workspace\AI_Assistant |
| Toolchain / IDE | MDK-ARM V5.32 |
| Firmware Package Name and Version | STM32Cube FW_F1 V1.8.5 |
| 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 | 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_DMA_Init | DMA |
| 4 | MX_USART1_UART_Init | USART1 |
| 5 | MX_I2C1_Init | I2C1 |
| 6 | MX_SPI1_Init | SPI1 |
| 7 | MX_SDIO_SD_Init | SDIO |

1. Power Consumption Calculator report

1.1. Microcontroller Selection

| | |
|-----------|---------------|
| Series | STM32F1 |
| Line | STM32F103 |
| MCU | STM32F103VETx |
| Datasheet | DS5792_Rev12 |

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 |

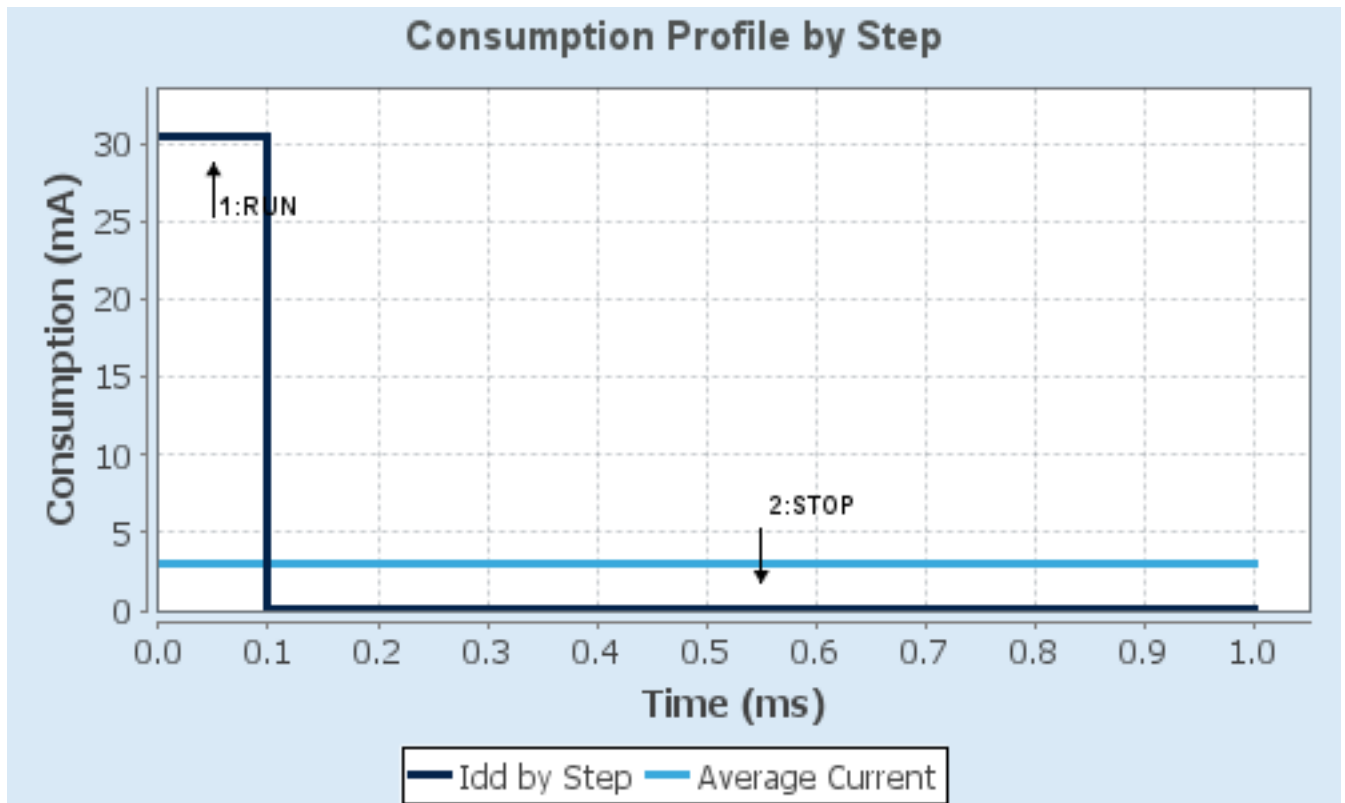
1.4. Sequence

| | | |
|-------------------------------|-------------|--------------|
| 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 | 30.5 mA | 25 μ A |
| Duration | 0.1 ms | 0.9 ms |
| DMIPS | 90.0 | 0.0 |
| Ta Max | 100.37 | 105 |
| Category | In DS Table | In DS Table |

1.5. Results

| | | | |
|---------------|-------------------------------|-----------------|------------|
| Sequence Time | 1 ms | Average Current | 3.07 mA |
| Battery Life | 1 month, 15 days, 15 hours | Average DMIPS | 61.0 DMIPS |

1.6. Chart



2. Peripherals and Middlewares Configuration

2.1. I2C1

I2C: I2C

2.1.1. Parameter Settings:

Master Features:

| | |
|----------------------|---------------------------|
| I2C Speed Mode | Fast Mode * |
| I2C Clock Speed (Hz) | 400000 |
| Fast Mode Duty Cycle | Duty cycle Tlow/Thigh = 2 |

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 |

2.2. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

Low Speed Clock (LSE) : Crystal/Ceramic Resonator

2.2.1. 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 Timeout Value (ms) | 100 |
| LSE Startup Timeout Value (ms) | 5000 |

2.3. SDIO

Mode: SD 4 bits Wide bus

2.3.1. Parameter Settings:

SDIO parameters:

| | |
|---|-------------------|
| Clock transition on which the bit capture is made | Rising transition |
|---|-------------------|

| | |
|---|---------------------------------------|
| SDIO Clock divider bypass | Disable |
| SDIO Clock output enable when the bus is idle | Disable the power save for the clock |
| SDIO hardware flow control | The hardware control flow is disabled |
| SDIOCLK clock divide factor | 0 |

2.4. SPI1

Mode: Full-Duplex Master

2.4.1. Parameter Settings:

Basic Parameters:

| | |
|--------------|-----------|
| Frame Format | Motorola |
| Data Size | 8 Bits |
| First Bit | MSB First |

Clock Parameters:

| | |
|---------------------------|----------------|
| Prescaler (for Baud Rate) | 4 * |
| Baud Rate | 18.0 MBits/s * |
| Clock Polarity (CPOL) | High * |
| Clock Phase (CPHA) | 2 Edge * |

Advanced Parameters:

| | |
|-----------------|----------|
| CRC Calculation | Disabled |
| NSS Signal Type | Software |

2.5. SYS

Debug: JTAG (5 pins)

Timebase Source: TIM6

2.6. USART1

Mode: Asynchronous

2.6.1. 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 |

2.7. FREERTOS

Interface: CMSIS_V2

2.7.1. Config parameters:

API:

| | |
|--------------|----------|
| FreeRTOS API | CMSIS v2 |
|--------------|----------|

Versions:

| | |
|--------------------|--------|
| FreeRTOS version | 10.0.1 |
| CMSIS-RTOS version | 2.00 |

Kernel settings:

| | |
|-----------------------------------|-----------------|
| USE_PREEMPTION | Enabled |
| CPU_CLOCK_HZ | SystemCoreClock |
| TICK_RATE_HZ | 1000 |
| MAX_PRIORITIES | 56 |
| MINIMAL_STACK_SIZE | 128 |
| MAX_TASK_NAME_LEN | 16 |
| USE_16_BIT_TICKS | Disabled |
| IDLE_SHOULD_YIELD | Enabled |
| USE_MUTEXES | Enabled |
| USE_RECURSIVE_MUTEXES | Enabled |
| USE_COUNTING_SEMAPHORES | Enabled |
| QUEUE_REGISTRY_SIZE | 8 |
| USE_APPLICATION_TASK_TAG | Disabled |
| ENABLE_BACKWARD_COMPATIBILITY | Enabled |
| USE_PORT_OPTIMISED_TASK_SELECTION | Disabled |
| USE_TICKLESS_IDLE | Disabled |
| USE_TASK_NOTIFICATIONS | Enabled |
| RECORD_STACK_HIGH_ADDRESS | Disabled |

Memory management settings:

| | |
|--------------------------|------------------|
| Memory Allocation | Dynamic / Static |
| TOTAL_HEAP_SIZE | 3072 |
| Memory Management scheme | heap_4 |

Hook function related definitions:

| | |
|------------------------------|----------|
| USE_IDLE_HOOK | Disabled |
| USE_TICK_HOOK | Disabled |
| USE_MALLOC_FAILED_HOOK | Disabled |
| USE_DAEMON_TASK_STARTUP_HOOK | Disabled |

CHECK_FOR_STACK_OVERFLOW Disabled

Run time and task stats gathering related definitions:

GENERATE_RUN_TIME_STATS Disabled

USE_TRACE_FACILITY Enabled

USE_STATS_FORMATTING_FUNCTIONS Disabled

Co-routine related definitions:

USE_CO_ROUTINES Disabled

MAX_CO_ROUTINE_PRIORITIES 2

Software timer definitions:

USE_TIMERS Enabled

TIMER_TASK_PRIORITY 2

TIMER_QUEUE_LENGTH 10

TIMER_TASK_STACK_DEPTH 256

Interrupt nesting behaviour configuration:

LIBRARY_LOWEST_INTERRUPT_PRIORITY 15

LIBRARY_MAX_SYSCALL_INTERRUPT_PRIORITY 5

2.7.2. Include parameters:

Include definitions:

vTaskPrioritySet Enabled

uxTaskPriorityGet Enabled

vTaskDelete Enabled

vTaskCleanUpResources Disabled

vTaskSuspend Enabled

vTaskDelayUntil Enabled

vTaskDelay Enabled

xTaskGetSchedulerState Enabled

xTaskResumeFromISR Enabled

xQueueGetMutexHolder Enabled

xSemaphoreGetMutexHolder Disabled

pcTaskGetTaskName Disabled

uxTaskGetStackHighWaterMark Enabled

xTaskGetCurrentTaskHandle Disabled

eTaskGetState Enabled

xEventGroupSetBitFromISR Disabled

xTimerPendFunctionCall Enabled

xTaskAbortDelay Disabled

xTaskGetHandle Disabled

2.7.3. Advanced settings:

Newlib settings (see parameter description first):

USE_NEWLIB_REENTRANT Disabled

Project settings (see parameter description first):

Use FW pack heap file 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 |
|--------|-----------------|-------------------|-------------------------------|-----------------------------|---------------|-----------------|
| I2C1 | PB6 | I2C1_SCL | Alternate Function Open Drain | n/a | High * | I2C_EEPROM_SCL |
| | PB7 | I2C1_SDA | Alternate Function Open Drain | n/a | High * | I2C_EEPROM_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 | |
| | OSC_IN | RCC_OSC_IN | n/a | n/a | n/a | |
| | OSC_OUT | RCC_OSC_OUT | n/a | n/a | n/a | |
| SDIO | PC8 | SDIO_D0 | Alternate Function Push Pull | n/a | High | SDIO_SDCARD_D0 |
| | PC9 | SDIO_D1 | Alternate Function Push Pull | n/a | High | SDIO_SDCARD_D1 |
| | PC10 | SDIO_D2 | Alternate Function Push Pull | n/a | High | SDIO_SDCARD_D2 |
| | PC11 | SDIO_D3 | Alternate Function Push Pull | n/a | High | SDIO_SDCARD_D3 |
| | PC12 | SDIO_CK | Alternate Function Push Pull | n/a | High | SDIO_SDCARD_CK |
| | PD2 | SDIO_CMD | Alternate Function Push Pull | n/a | High | SDIO_SDCARD_CMD |
| SPI1 | PA5 | SPI1_SCK | Alternate Function Push Pull | n/a | High * | SPI_FLASH_SCK |
| | PA6 | SPI1_MISO | Input mode | No pull-up and no pull-down | n/a | SPI_FLASH_MISO |
| | PA7 | SPI1_MOSI | Alternate Function Push Pull | n/a | High * | SPI_FLASH_MOSI |
| 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 | |
| USART1 | PA9 | USART1_TX | Alternate Function Push Pull | n/a | High * | DEBUG_USART_TX |
| | PA10 | USART1_RX | Input mode | No pull-up and no pull-down | n/a | DEBUG_USART_RX |
| GPIO | PC13-TAMPER-RTC | GPIO_Input | Input mode | No pull-up and no pull-down | n/a | |
| | PC0 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | High * | SPI_FLASH_CS |
| | PA0-WKUP | GPIO_Input | Input mode | No pull-up and no pull-down | n/a | |
| | PB0 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | High * | LED_G |
| | PB1 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | | LED_B |

| IP | Pin | Signal | GPIO mode | GPIO pull/up pull down | Max Speed | User Label |
|----|-----|-------------|------------------|-----------------------------|---------------|------------|
| | | | | | High * | |
| | PB5 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | High * | LED_R |

3.2. DMA configuration

| DMA request | Stream | Direction | Priority |
|-------------|---------------|----------------------|---------------|
| SDIO | DMA2_Channel4 | Peripheral To Memory | High * |

SDIO: DMA2_Channel4 DMA request Settings:

Mode: Normal
Peripheral Increment: Disable
Memory Increment: **Enable ***
Peripheral Data Width: **Word ***
Memory Data Width: 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 | 15 | 0 |
| System tick timer | true | 15 | 0 |
| USART1 global interrupt | true | 5 | 0 |
| TIM6 global interrupt | true | 15 | 0 |
| DMA2 channel4 and channel5 global interrupts | true | 5 | 0 |
| PVD interrupt through EXTI line 16 | unused | | |
| Flash global interrupt | unused | | |
| RCC global interrupt | unused | | |
| I2C1 event interrupt | unused | | |
| I2C1 error interrupt | unused | | |
| SPI1 global interrupt | unused | | |
| SDIO 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 | true |
| 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 | false | false |
| Debug monitor | false | true | false |
| Pendable request for system service | false | false | false |
| System tick timer | false | false | true |
| USART1 global interrupt | false | true | true |
| TIM6 global interrupt | false | true | true |
| DMA2 channel4 and channel5 global interrupts | false | true | true |

* User modified value

4. System Views

4.1. Category view

4.1.1. Current

5. Docs & Resources

| Type | Link |
|-------------------------|---|
| BSDL files | https://www.st.com/resource/en/bsdl_model/stm32f1_bsd1.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/breveco0518.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/fldpstpf11120.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/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/an2586-getting-started- |

with-stm32f10xxx-hardware-development-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/an2784-using-the-highdensity-stm32f10xxx-fsmc-peripheral-to-drive-external-memories-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/an4013-stm32-crossseries-timer-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/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/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-micronrollers-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

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