



1. Description

1.1. Project

| | |
|-----------------|---------------------|
| Project Name | F767ZIV1_Gatekeeper |
| Board Name | NUCLEO-F767ZI |
| Generated with: | STM32CubeMX 6.1.1 |
| Date | 10/05/2021 |

1.2. MCU

| | |
|----------------|---------------|
| MCU Series | STM32F7 |
| MCU Line | STM32F7x7 |
| MCU name | STM32F767ZITx |
| MCU Package | LQFP144 |
| MCU Pin number | 144 |

1.3. Core(s) information

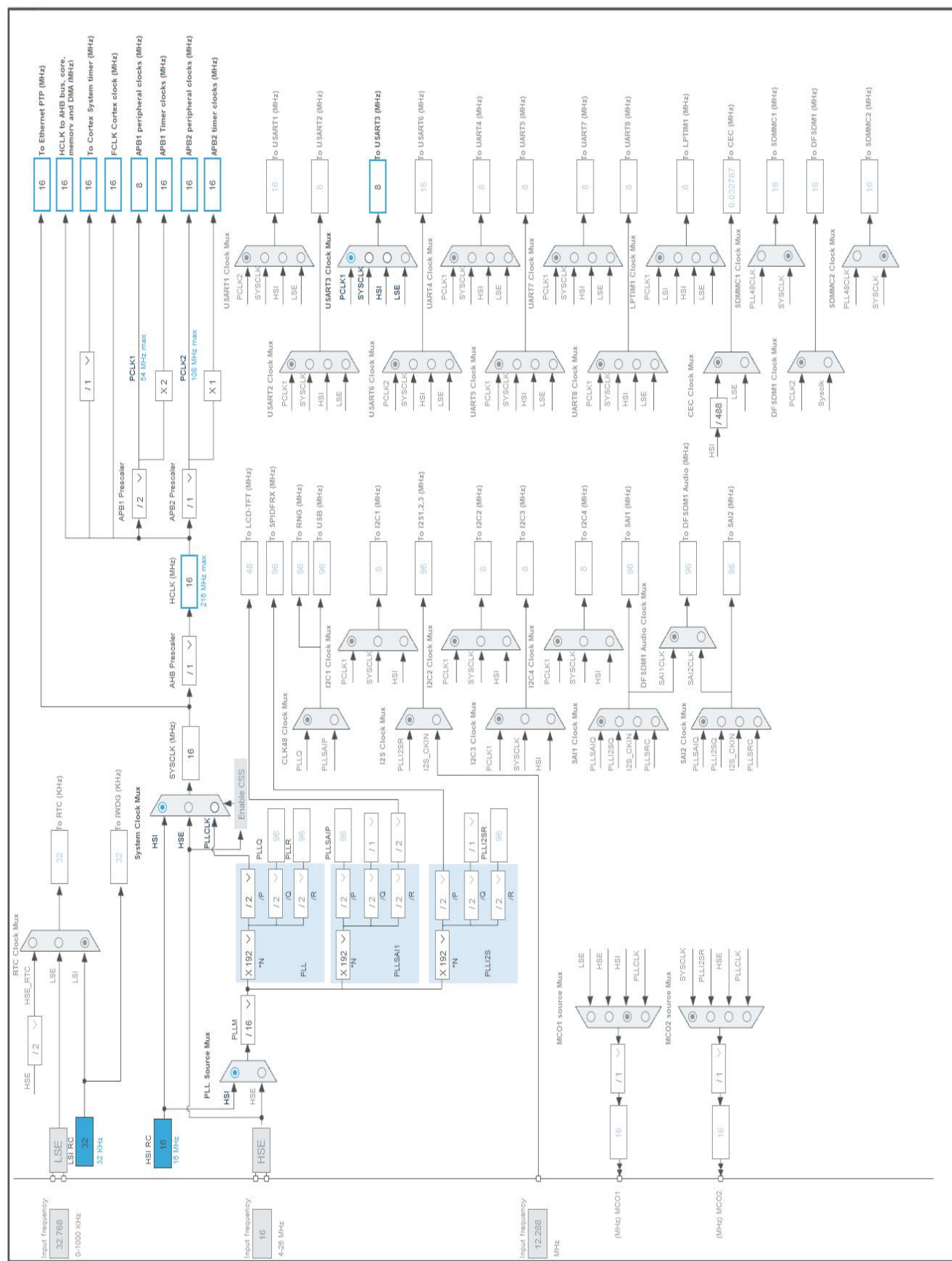
| | |
|---------|---------------|
| Core(s) | Arm Cortex-M7 |
|---------|---------------|



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 | | |
| 30 | VDD | Power | | |
| 31 | VSSA | Power | | |
| 32 | VREF+ | Power | | |
| 33 | VDDA | Power | | |
| 38 | VSS | Power | | |
| 39 | VDD | Power | | |
| 51 | VSS | Power | | |
| 52 | VDD | Power | | |
| 61 | VSS | Power | | |
| 62 | VDD | Power | | |
| 71 | VCAP_1 | Power | | |
| 72 | VDD | Power | | |
| 77 | PD8 | I/O | USART3_TX | |
| 78 | PD9 | I/O | USART3_RX | |
| 83 | VSS | Power | | |
| 84 | VDD | Power | | |
| 94 | VSS | Power | | |
| 95 | VDDUSB | Power | | |
| 105 | PA13 | I/O | SYS_JTMS-SWDIO | |
| 106 | VCAP_2 | Power | | |
| 107 | VSS | Power | | |
| 108 | VDD | Power | | |
| 109 | PA14 | I/O | SYS_JTCK-SWCLK | |
| 120 | VSS | Power | | |
| 121 | VDDSDMMC | Power | | |
| 130 | VSS | Power | | |
| 131 | VDD | Power | | |
| 138 | BOOT0 | Boot | | |
| 143 | PDR_ON | Reset | | |
| 144 | VDD | Power | | |

4. Clock Tree Configuration



5. Software Project

5.1. Project Settings

| Name | Value |
|-----------------------------------|---|
| Project Name | F767ZIV1_Gatekeeper |
| Project Folder | E:\Mysrc\EmbeddedSystems\RTOS\F767ZIV1_Gatekeeper |
| Toolchain / IDE | STM32CubeIDE |
| Firmware Package Name and Version | STM32Cube FW_F7 V1.16.0 |
| 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 | 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_USART3_UART_Init | USART3 |

6. Power Consumption Calculator report

6.1. Microcontroller Selection

| | |
|-----------|---------------|
| Series | STM32F7 |
| Line | STM32F7x7 |
| MCU | STM32F767ZITx |
| Datasheet | DS11532_Rev4 |

6.2. Parameter Selection

| | |
|-------------|-----|
| Temperature | 25 |
| Vdd | 3.3 |

6.3. 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 |

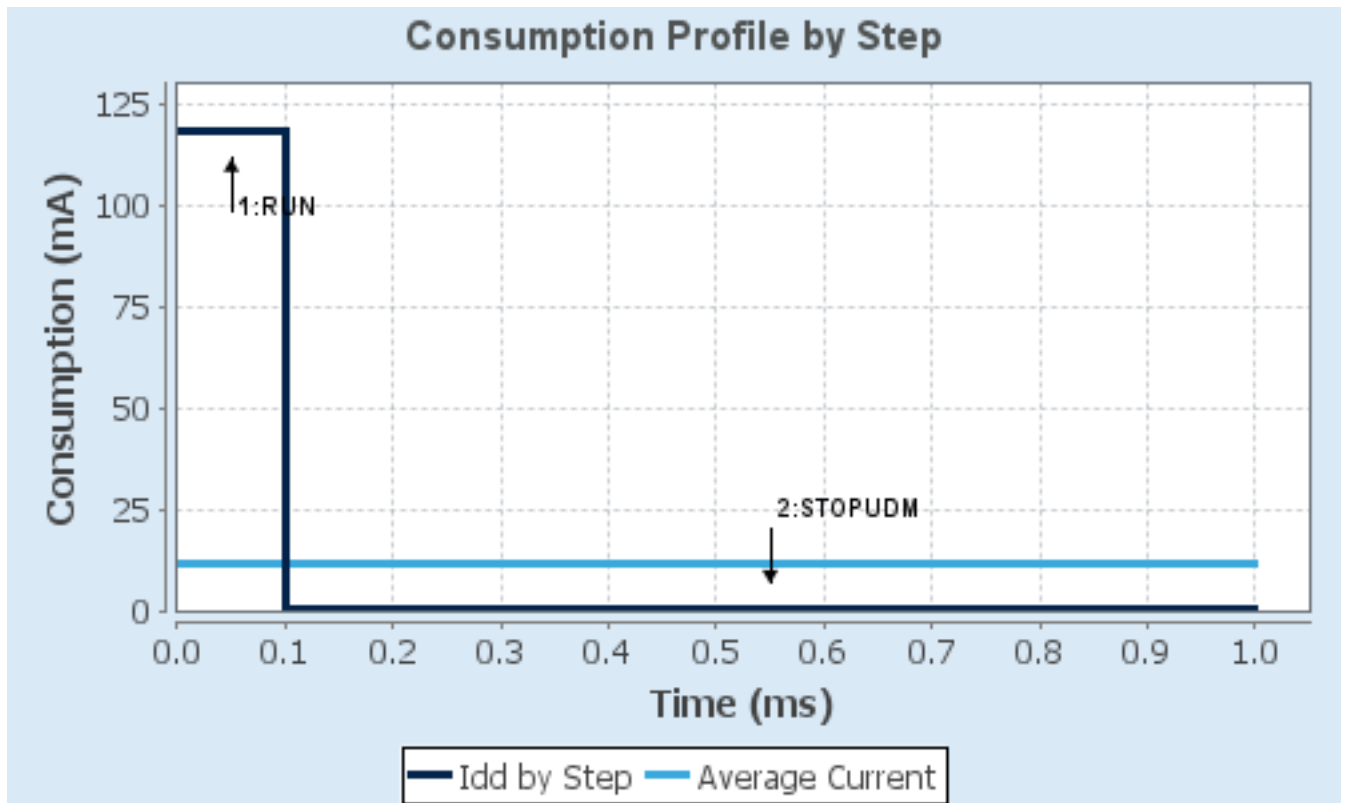
6.4. Sequence

| | | |
|-------------------------------|--------------------------------|---------------------------|
| 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 | ICTM FLASH-SingleBank 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 | 118 mA | 130 μ A |
| Duration | 0.1 ms | 0.9 ms |
| DMIPS | 462.0 | 0.0 |
| Ta Max | 89.42 | 104.98 |
| Category | In DS Table | In DS Table |

6.5. Results

| | | | |
|---------------|-----------------|-----------------|--------------------|
| Sequence Time | 1 ms | Average Current | 11.92 mA |
| Battery Life | 2 days, 4 hours | Average DMIPS | 462.24005 DMIPS |

6.6. Chart



7. Peripherals and Middlewares Configuration

7.1. RCC

7.1.1. Parameter Settings:

System Parameters:

| | |
|-------------------|--------------------|
| VDD voltage (V) | 3.3 |
| Flash Latency(WS) | 0 WS (1 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 | Disabled |
| Power Regulator Voltage Scale | Power Regulator Voltage Scale 3 |

7.2. SYS

Debug: Serial Wire

Timebase Source: TIM1

7.3. USART3

Mode: Asynchronous

7.3.1. 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 |

7.4. FREERTOS

Interface: CMSIS_V1

7.4.1. Config parameters:

API:

| | |
|--------------|----------|
| FreeRTOS API | CMSIS v1 |
|--------------|----------|

Versions:

| | |
|--------------------|--------|
| FreeRTOS version | 10.2.1 |
| CMSIS-RTOS version | 1.02 |

MPU/FPU:

| | |
|------------|----------|
| ENABLE_MPU | Disabled |
| ENABLE_FPU | Disabled |

Kernel settings:

| | |
|-----------------------------------|-----------------|
| USE_PREEMPTION | Enabled |
| CPU_CLOCK_HZ | SystemCoreClock |
| TICK_RATE_HZ | 1000 |
| MAX_PRIORITIES | 7 |
| MINIMAL_STACK_SIZE | 128 |
| MAX_TASK_NAME_LEN | 16 |
| USE_16_BIT_TICKS | Disabled |
| IDLE_SHOULD_YIELD | Enabled |
| USE_MUTEXES | Enabled |
| USE_RECURSIVE_MUTEXES | Disabled |
| USE_COUNTING_SEMAPHORES | Disabled |
| QUEUE_REGISTRY_SIZE | 8 |
| USE_APPLICATION_TASK_TAG | Disabled |
| ENABLE_BACKWARD_COMPATIBILITY | Enabled |
| USE_PORT_OPTIMISED_TASK_SELECTION | Enabled |
| USE_TICKLESS_IDLE | Disabled |
| USE_TASK_NOTIFICATIONS | Enabled |
| RECORD_STACK_HIGH_ADDRESS | Disabled |

Memory management settings:

| | |
|-------------------|------------------|
| Memory Allocation | Dynamic / Static |
| TOTAL_HEAP_SIZE | 15360 |

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 | Disabled |
| USE_STATS_FORMATTING_FUNCTIONS | Disabled |

Co-routine related definitions:

| | |
|---------------------------|----------|
| USE_CO_ROUTINES | Disabled |
| MAX_CO_ROUTINE_PRIORITIES | 2 |

Software timer definitions:

| | |
|------------|----------|
| USE_TIMERS | Disabled |
|------------|----------|

Interrupt nesting behaviour configuration:

| | |
|--|----|
| LIBRARY_LOWEST_INTERRUPT_PRIORITY | 15 |
| LIBRARY_MAX_SYSCALL_INTERRUPT_PRIORITY | 5 |

Added with 10.2.1 support:

| | |
|----------------------------|----------|
| MESSAGE_BUFFER_LENGTH_TYPE | size_t |
| USE_POSIX_ERRNO | Disabled |

7.4.2. Include parameters:

Include definitions:

| | |
|-----------------------------|----------|
| vTaskPrioritySet | Enabled |
| uxTaskPriorityGet | Enabled |
| vTaskDelete | Enabled |
| vTaskCleanUpResources | Disabled |
| vTaskSuspend | Enabled |
| vTaskDelayUntil | Disabled |
| vTaskDelay | Enabled |
| xTaskGetSchedulerState | Enabled |
| xTaskResumeFromISR | Enabled |
| xQueueGetMutexHolder | Disabled |
| xSemaphoreGetMutexHolder | Disabled |
| pcTaskGetTaskName | Disabled |
| uxTaskGetStackHighWaterMark | Disabled |
| xTaskGetCurrentTaskHandle | Disabled |
| eTaskGetState | Disabled |

| | |
|------------------------------|----------|
| xEventGroupSetBitFromISR | Disabled |
| xTimerPendFunctionCall | Disabled |
| xTaskAbortDelay | Disabled |
| xTaskGetHandle | Disabled |
| uxTaskGetStackHighWaterMark2 | Disabled |

7.4.3. 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

8. System Configuration

8.1. GPIO configuration

| IP | Pin | Signal | GPIO mode | GPIO pull/up pull down | Max Speed | User Label |
|--------|------|----------------|------------------------------|-----------------------------|-----------------------|------------|
| SYS | PA13 | SYS_JTMS-SWDIO | n/a | n/a | n/a | |
| | PA14 | SYS_JTCK-SWCLK | n/a | n/a | n/a | |
| USART3 | PD8 | USART3_TX | Alternate Function Push Pull | No pull-up and no pull-down | Very High * | |
| | PD9 | USART3_RX | Alternate Function Push Pull | No pull-up and no pull-down | Very High * | |

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 |
| 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 | 15 | 0 |
| System tick timer | true | 15 | 0 |
| TIM1 update interrupt and TIM10 global interrupt | true | 0 | 0 |
| PVD interrupt through EXTI line 16 | unused | | |
| Flash global interrupt | unused | | |
| RCC global interrupt | unused | | |
| USART3 global interrupt | 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 |
| Pre-fetch 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 |
| TIM1 update interrupt and TIM10 global interrupt | false | true | true |

* User modified value

9. System Views

9.1. Category view

9.1.1. Current

10. Docs & Resources

| Type | Link |
|--------------------|---|
| Datasheet | http://www.st.com/resource/en/datasheet/DM00273119.pdf |
| Reference manual | http://www.st.com/resource/en/reference_manual/DM00224583.pdf |
| Programming manual | http://www.st.com/resource/en/programming_manual/DM00237416.pdf |
| Errata sheet | http://www.st.com/resource/en/errata_sheet/DM00257543.pdf |
| Application note | http://www.st.com/resource/en/application_note/CD00167594.pdf |
| Application note | http://www.st.com/resource/en/application_note/CD00211314.pdf |
| Application note | http://www.st.com/resource/en/application_note/CD00259245.pdf |
| Application note | http://www.st.com/resource/en/application_note/CD00264321.pdf |
| Application note | http://www.st.com/resource/en/application_note/CD00264342.pdf |
| Application note | http://www.st.com/resource/en/application_note/CD00264379.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00042534.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00046011.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00072315.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00073742.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00073853.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00080497.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00081379.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00129215.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00160482.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00164538.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00164549.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00173083.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00210367.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00220769.pdf |
| Application note | http://www.st.com/resource/en/application_note/DM00227538.pdf |

Application note http://www.st.com/resource/en/application_note/DM00257177.pdf

Application note http://www.st.com/resource/en/application_note/DM00272912.pdf

Application note http://www.st.com/resource/en/application_note/DM00272913.pdf

Application note http://www.st.com/resource/en/application_note/DM00226326.pdf

Application note http://www.st.com/resource/en/application_note/DM00236305.pdf

Application note http://www.st.com/resource/en/application_note/DM00281138.pdf

Application note http://www.st.com/resource/en/application_note/DM00296349.pdf

Application note http://www.st.com/resource/en/application_note/DM00327191.pdf

Application note http://www.st.com/resource/en/application_note/DM00287603.pdf

Application note http://www.st.com/resource/en/application_note/DM00337702.pdf

Application note http://www.st.com/resource/en/application_note/DM00354244.pdf

Application note http://www.st.com/resource/en/application_note/DM00373474.pdf

Application note http://www.st.com/resource/en/application_note/DM00315319.pdf

Application note http://www.st.com/resource/en/application_note/DM00380469.pdf

Application note http://www.st.com/resource/en/application_note/DM00354333.pdf

Application note http://www.st.com/resource/en/application_note/DM00395696.pdf

Application note http://www.st.com/resource/en/application_note/DM00431633.pdf

Application note http://www.st.com/resource/en/application_note/DM00493651.pdf

Application note http://www.st.com/resource/en/application_note/DM00536349.pdf

Application note http://www.st.com/resource/en/application_note/DM00600614.pdf

Application note http://www.st.com/resource/en/application_note/DM00725181.pdf