



1. Description

1.1. Project

| | |
|-----------------|------------------------------------|
| Project Name | F767ZIV1_Bilateral_synchronization |
| Board Name | NUCLEO-F767ZI |
| Generated with: | STM32CubeMX 6.1.1 |
| Date | 10/10/2021 |

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 |
|---------|---------------|

2. Pinout Configuration

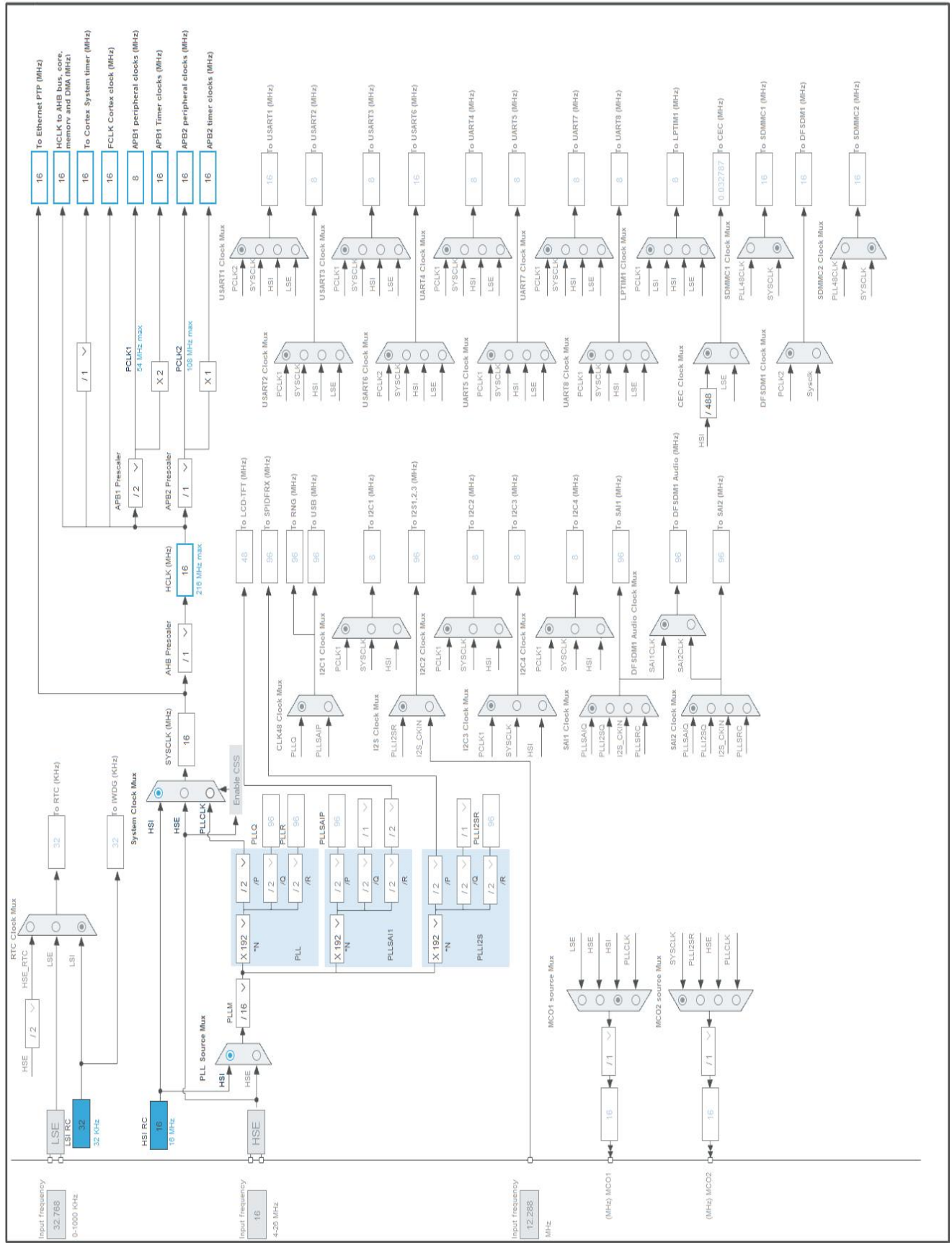


3. Pins Configuration

| 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 | | |
| 26 | PC0 * | I/O | GPIO_Output | EBlue |
| 29 | PC3 * | I/O | GPIO_Output | ERed |
| 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 | | |
| 83 | VSS | Power | | |
| 84 | VDD | Power | | |
| 94 | VSS | Power | | |
| 95 | VDDUSB | Power | | |
| 106 | VCAP_2 | Power | | |
| 107 | VSS | Power | | |
| 108 | VDD | Power | | |
| 120 | VSS | Power | | |
| 121 | VDDSDMMC | Power | | |
| 130 | VSS | Power | | |
| 131 | VDD | Power | | |
| 138 | BOOT0 | Boot | | |
| 143 | PDR_ON | Reset | | |
| 144 | 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 | F767ZIV1_Bilateral_synchronization |
| Project Folder | E:\Mysrc\EmbeddedSystems\RTOS\F767ZIV1_Bilateral_synchronization |
| Toolchain / IDE | STM32CubeIDE |
| Firmware Package Name and Version | STM32Cube FW_F7 V1.15.0 |
| Application Structure | Basic |
| 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 |

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 |

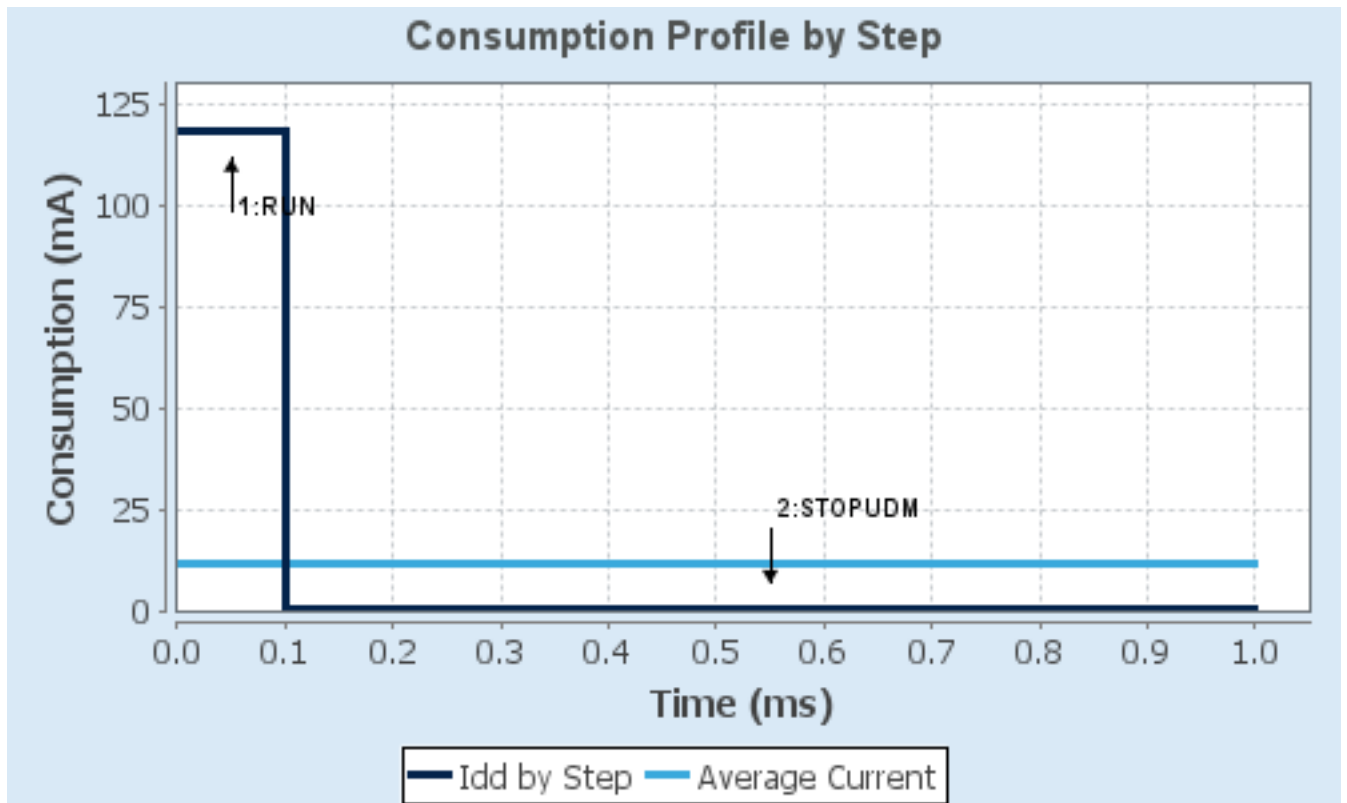
6.4. Sequence

| | | |
|-------------------------------|--------------------------------|---------------------------|
| 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. CORTEX_M7

7.1.1. Parameter Settings:

Cortex Interface Settings:

| | |
|----------------------|---------------|
| Flash Interface | AXI Interface |
| ART ACCELERATOR | Disabled |
| Instruction Prefetch | Disabled |
| CPU ICache | Disabled |
| CPU DCache | Disabled |

Cortex Memory Protection Unit Control Settings:

| | |
|------------------|--------------|
| MPU Control Mode | MPU NOT USED |
|------------------|--------------|

7.2. RCC

7.2.1. 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 |

7.3. SYS

Timebase Source: TIM1

7.4. FREERTOS

Interface: CMSIS_V1

7.4.1. Config parameters:

API:

FreeRTOS API CMSIS v1

Versions:

FreeRTOS version 10.0.1
CMSIS-RTOS version 1.02

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

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 |

*** User modified value**

8. System Configuration

8.1. GPIO configuration

| IP | Pin | Signal | GPIO mode | GPIO pull/up pull down | Max Speed | User Label |
|------|-----|-------------|------------------|-----------------------------|-----------|------------|
| GPIO | PC0 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | EBlue |
| | PC3 | GPIO_Output | Output Push Pull | No pull-up and no pull-down | Low | ERed |

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 | | |
| 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

| Middleware | | | | | | |
|-------------|--------|--------|--------------|------------|----------|-----------|
| FREERTOS | | | | | | |
| System Core | Analog | Timers | Connectivity | Multimedia | Security | Computing |
| CORTEX_M7 | | | | | | |
| DMA | | | | | | |
| GPIO | | | | | | |
| IVIC | | | | | | |
| RCC | | | | | | |
| SYS | | | | | | |

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