



## 1. Description

### 1.1. Project

|                 |                   |
|-----------------|-------------------|
| Project Name    | imu_logger_unit   |
| Board Name      | NUCLEO-F303K8     |
| Generated with: | STM32CubeMX 6.1.2 |
| Date            | 03/01/2021        |

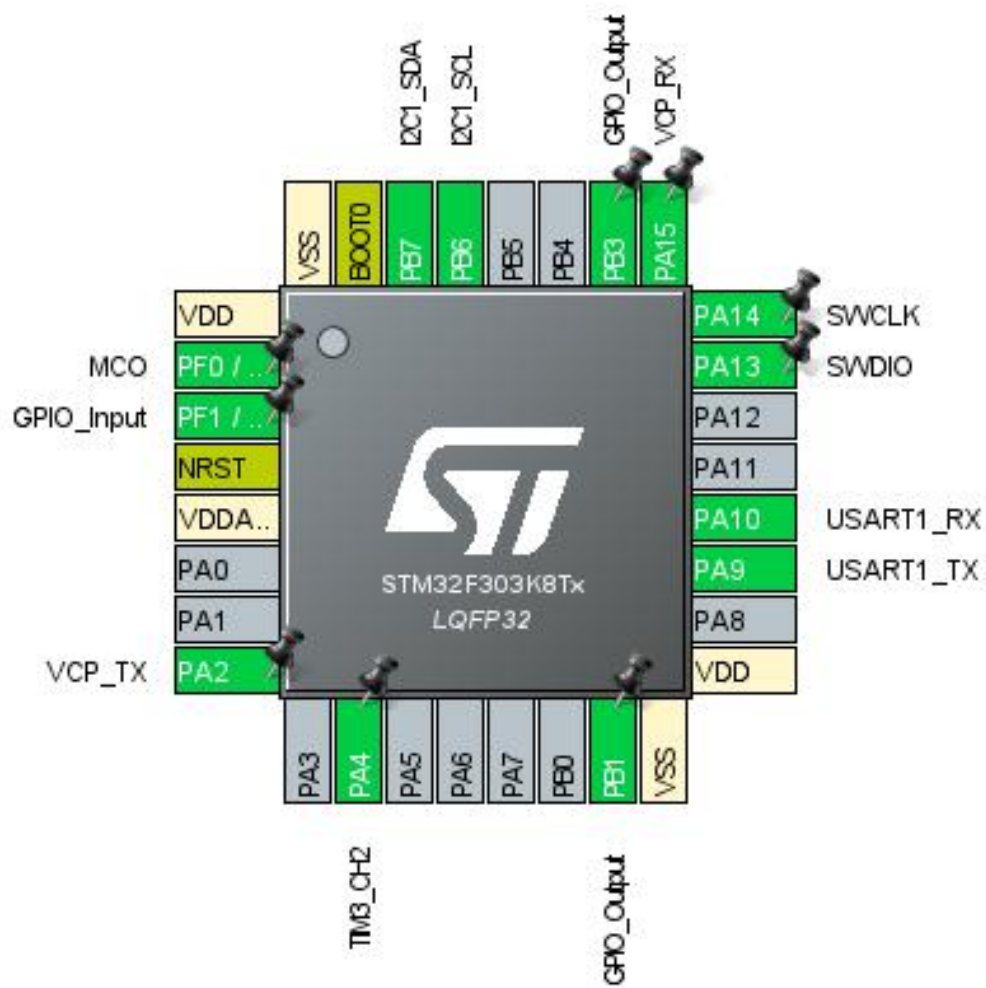
### 1.2. MCU

|                |               |
|----------------|---------------|
| MCU Series     | STM32F3       |
| MCU Line       | STM32F303     |
| MCU name       | STM32F303K8Tx |
| MCU Package    | LQFP32        |
| MCU Pin number | 32            |

### 1.3. Core(s) information

|         |               |
|---------|---------------|
| Core(s) | Arm Cortex-M4 |
|---------|---------------|

## 2. Pinout Configuration



### 3. Pins Configuration

| Pin Number<br>LQFP32 | Pin Name<br>(function after<br>reset) | Pin Type | Alternate<br>Function(s) | Label  |
|----------------------|---------------------------------------|----------|--------------------------|--------|
| 1                    | VDD                                   | Power    |                          |        |
| 2                    | PF0 / OSC_IN                          | I/O      | RCC_OSC_IN               | MCO    |
| 3                    | PF1 / OSC_OUT *                       | I/O      | GPIO_Input               |        |
| 4                    | NRST                                  | Reset    |                          |        |
| 5                    | VDDA/VREF+                            | Power    |                          |        |
| 8                    | PA2                                   | I/O      | USART2_TX                | VCP_TX |
| 10                   | PA4                                   | I/O      | TIM3_CH2                 |        |
| 15                   | PB1 *                                 | I/O      | GPIO_Output              |        |
| 16                   | VSS                                   | Power    |                          |        |
| 17                   | VDD                                   | Power    |                          |        |
| 19                   | PA9                                   | I/O      | USART1_TX                |        |
| 20                   | PA10                                  | I/O      | USART1_RX                |        |
| 23                   | PA13                                  | I/O      | SYS_JTMS-SWDIO           | SWDIO  |
| 24                   | PA14                                  | I/O      | SYS_JTCK-SWCLK           | SWCLK  |
| 25                   | PA15                                  | I/O      | USART2_RX                | VCP_RX |
| 26                   | PB3 *                                 | I/O      | GPIO_Output              |        |
| 29                   | PB6                                   | I/O      | I2C1_SCL                 |        |
| 30                   | PB7                                   | I/O      | I2C1_SDA                 |        |
| 31                   | BOOT0                                 | Boot     |                          |        |
| 32                   | VSS                                   | Power    |                          |        |

\* The pin is affected with an I/O function



## 5. Software Project

### 5.1. Project Settings

| Name                              | Value   |
|-----------------------------------|---|
| Project Name                      | imu_logger_unit   |
| Project Folder                    | /home/jack/STM32CubeIDE/workspace_1.4.0/imu_logger_unit |
| Toolchain / IDE                   | STM32CubeIDE  |
| Firmware Package Name and Version | STM32Cube FW_F3 V1.11.0                                 |
| 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   | 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    | MX_GPIO_Init        | GPIO                     |
| 2    | SystemClock_Config  | RCC                      |
| 3    | MX_USART2_UART_Init | USART2                   |
| 4    | MX_I2C1_Init        | I2C1                     |
| 5    | MX_TIM3_Init        | TIM3                     |
| 6    | MX_USART1_UART_Init | USART1                   |
| 7    | MX_TIM2_Init        | TIM2                     |

## 6. Power Consumption Calculator report

### 6.1. Microcontroller Selection

|           |               |
|-----------|---------------|
| Series    | STM32F3       |
| Line      | STM32F303     |
| MCU       | STM32F303K8Tx |
| Datasheet | DS9866_Rev5   |

### 6.2. Parameter Selection

|             |     |
|-------------|-----|
| Temperature | 25  |
| Vdd         | 3.6 |

### 6.3. 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               |

#### 6.4. Sequence

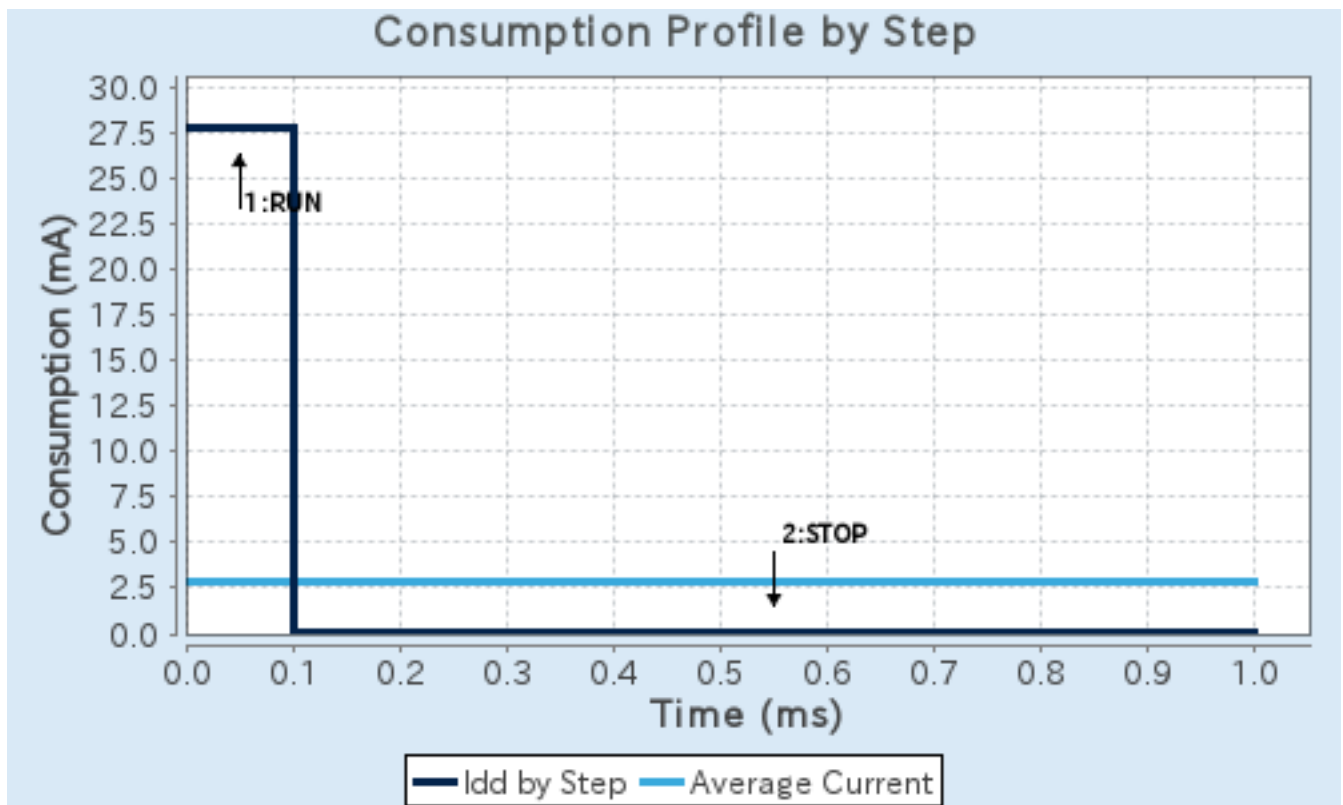
|                               |             |              |
|-------------------------------|-------------|--------------|
| <b>Step</b>                   | Step1       | Step2        |
| <b>Mode</b>                   | RUN         | STOP         |
| <b>Vdd</b>                    | 3.6         | 3.6          |
| <b>Voltage Source</b>         | Battery     | Battery      |
| <b>Range</b>                  | No Scale    | No Scale     |
| <b>Fetch Type</b>             | RAM         | n/a          |
| <b>CPU Frequency</b>          | 72 MHz      | 0 Hz         |
| <b>Clock Configuration</b>    | HSEBYP PLL  | Regulator LP |
| <b>Clock Source Frequency</b> | 8 MHz       | 0 Hz         |
| <b>Peripherals</b>            |             |              |
| <b>Additional Cons.</b>       | 0 mA        | 0 mA         |
| <b>Average Current</b>        | 27.84 mA    | 9.55 $\mu$ A |
| <b>Duration</b>               | 0.1 ms      | 0.9 ms       |
| <b>DMIPS</b>                  | 90.0        | 0.0          |
| <b>Ta Max</b>                 | 98.99       | 105          |
| <b>Category</b>               | In DS Table | In DS Table  |

#### 6.5. Results

|               |                              |                 |            |
|---------------|------------------------------|-----------------|------------|
| Sequence Time | 1 ms                         | Average Current | 2.79 mA    |
| Battery Life  | 1 month, 20 days,<br>5 hours | Average DMIPS   | 90.0 DMIPS |

#### 6.6. Chart





## 7. Peripherals and Middlewares Configuration

### 7.1. I2C1

#### I2C: I2C

##### 7.1.1. Parameter Settings:

###### Timing configuration:

|                               |                     |
|-------------------------------|---------------------|
| I2C Speed Mode                | <b>Fast Mode *</b>  |
| I2C Speed Frequency (KHz)     | 400                 |
| Rise Time (ns)                | 0                   |
| Fall Time (ns)                | 0                   |
| Coefficient of Digital Filter | 0                   |
| Analog Filter                 | Enabled             |
| Timing                        | <b>0x00602173 *</b> |

###### 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        |

### 7.2. RCC

#### High Speed Clock (HSE): BYPASS Clock Source

##### 7.2.1. 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 |

### 7.3. SYS

#### Debug: Serial Wire

## Timebase Source: SysTick

### 7.4. TIM2

**Clock Source : Internal Clock**

#### 7.4.1. Parameter Settings:

##### Counter Settings:

|   |                 |
|---|-----------------|
| Prescaler (PSC - 16 bits value)                       | <b>640-1 *</b>  |
| Counter Mode  | Up              |
| Counter Period (AutoReload Register - 32 bits value ) | <b>1000-1 *</b> |
| 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)               |

### 7.5. TIM3

**Clock Source : Internal Clock**

**Channel2: PWM Generation CH2**

#### 7.5.1. Parameter Settings:

##### Counter Settings:

|   |                |
|---|----------------|
| Prescaler (PSC - 16 bits value)                       | <b>248-1 *</b> |
| Counter Mode  | Up             |
| Counter Period (AutoReload Register - 16 bits value ) | <b>100-1 *</b> |
| 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)               |

##### Clear Input:

|                    |         |
|--------------------|---------|
| Clear Input Source | Disable |
|--------------------|---------|

##### PWM Generation Channel 2:

|                        |            |
|------------------------|------------|
| Mode                   | PWM mode 1 |
| Pulse (16 bits value)  | 0          |
| Output compare preload | Enable     |
| Fast Mode              | Disable    |

CH Polarity High

## 7.6. USART1

**Mode: Asynchronous**

### 7.6.1. Parameter Settings:

#### **Basic Parameters:**

|             |                           |
|-------------|---------------------------|
| Baud Rate   | <b>57600 *</b>            |
| 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 |

## 7.7. USART2

**Mode: Asynchronous**

### 7.7.1. Parameter Settings:

#### **Basic Parameters:**

|             |                           |
|-------------|---------------------------|
| Baud Rate   | 38400                     |
| 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:**

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

\* **User modified value**

## 8. System Configuration

### 8.1. GPIO configuration

| IP     | Pin           | Signal         | GPIO mode                     | GPIO pull/up pull down | Max Speed | User Label |
|--------|---------------|----------------|-------------------------------|------------------------|-----------|------------|
| I2C1   | PB6           | I2C1_SCL       | Alternate Function Open Drain | Pull up                | High *    |            |
|        | PB7           | I2C1_SDA       | Alternate Function Open Drain | Pull up                | High *    |            |
| RCC    | PF0 / OSC_IN  | RCC_OSC_IN     | n/a                           | n/a                    | n/a       | MCO        |
| SYS    | PA13          | SYS_JTMS-SWDIO | n/a                           | n/a                    | n/a       | SWDIO      |
|        | PA14          | SYS_JTCK-SWCLK | n/a                           | n/a                    | n/a       | SWCLK      |
| TIM3   | PA4           | TIM3_CH2       | Alternate Function Push Pull  | No pull up pull down   | Low       |            |
| USART1 | PA9           | USART1_TX      | Alternate Function Push Pull  | No pull up pull down   | High *    |            |
|        | PA10          | USART1_RX      | Alternate Function Push Pull  | No pull up pull down   | High *    |            |
| USART2 | PA2           | USART2_TX      | Alternate Function Push Pull  | No pull up pull down   | High *    | VCP_TX     |
|        | PA15          | USART2_RX      | Alternate Function Push Pull  | No pull up pull down   | High *    | VCP_RX     |
| GPIO   | PF1 / OSC_OUT | GPIO_Input     | Input mode                    | Pull up *              | n/a       |            |
|        | PB1           | GPIO_Output    | Output Push Pull              | No pull up pull down   | Low       |            |
|        | PB3           | GPIO_Output    | Output Push Pull              | No pull up pull down   | Low       |            |

### 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   | 0                    | 0           |
| System tick timer  | true   | 0                    | 0           |
| TIM2 global interrupt  | true   | 0                    | 0           |
| PVD interrupt through EXTI line 16                                       | unused |                      |             |
| Flash global interrupt   | unused |                      |             |
| RCC global interrupt   | unused |                      |             |
| TIM3 global interrupt  | unused |                      |             |
| I2C1 event global interrupt / I2C1 wake-up interrupt through EXT line 23 | unused |                      |             |
| I2C1 error interrupt   | unused |                      |             |
| USART1 global interrupt / USART1 wake-up interrupt through EXT line 25   | unused |                      |             |
| USART2 global interrupt / USART2 wake-up interrupt through EXT line 26   | unused |                      |             |
| Floating point unit 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                             | true                 | false            |
| Debug monitor                           | false                             | true                 | false            |
| Pendable request for system service     | false                             | true                 | false            |
| System tick timer                       | false                             | true                 | true             |
| TIM2 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          | <a href="http://www.st.com/resource/en/datasheet/DM00092070.pdf">http://www.st.com/resource/en/datasheet/DM00092070.pdf</a>                   |
| Reference manual   | <a href="http://www.st.com/resource/en/reference_manual/DM00043574.pdf">http://www.st.com/resource/en/reference_manual/DM00043574.pdf</a>     |
| Programming manual | <a href="http://www.st.com/resource/en/programming_manual/DM00046982.pdf">http://www.st.com/resource/en/programming_manual/DM00046982.pdf</a> |
| Errata sheet       | <a href="http://www.st.com/resource/en/errata_sheet/DM00109011.pdf">http://www.st.com/resource/en/errata_sheet/DM00109011.pdf</a>             |
| Application note   | <a href="http://www.st.com/resource/en/application_note/CD00160362.pdf">http://www.st.com/resource/en/application_note/CD00160362.pdf</a>     |
| Application note   | <a href="http://www.st.com/resource/en/application_note/CD00167594.pdf">http://www.st.com/resource/en/application_note/CD00167594.pdf</a>     |
| Application note   | <a href="http://www.st.com/resource/en/application_note/CD00211314.pdf">http://www.st.com/resource/en/application_note/CD00211314.pdf</a>     |
| Application note   | <a href="http://www.st.com/resource/en/application_note/CD00259245.pdf">http://www.st.com/resource/en/application_note/CD00259245.pdf</a>     |
| Application note   | <a href="http://www.st.com/resource/en/application_note/CD00264342.pdf">http://www.st.com/resource/en/application_note/CD00264342.pdf</a>     |
| Application note   | <a href="http://www.st.com/resource/en/application_note/CD00264379.pdf">http://www.st.com/resource/en/application_note/CD00264379.pdf</a>     |
| Application note   | <a href="http://www.st.com/resource/en/application_note/DM00042534.pdf">http://www.st.com/resource/en/application_note/DM00042534.pdf</a>     |
| Application note   | <a href="http://www.st.com/resource/en/application_note/DM00047998.pdf">http://www.st.com/resource/en/application_note/DM00047998.pdf</a>     |
| Application note   | <a href="http://www.st.com/resource/en/application_note/DM00053084.pdf">http://www.st.com/resource/en/application_note/DM00053084.pdf</a>     |
| Application note   | <a href="http://www.st.com/resource/en/application_note/DM00070391.pdf">http://www.st.com/resource/en/application_note/DM00070391.pdf</a>     |
| Application note   | <a href="http://www.st.com/resource/en/application_note/DM00072315.pdf">http://www.st.com/resource/en/application_note/DM00072315.pdf</a>     |
| Application note   | <a href="http://www.st.com/resource/en/application_note/DM00073742.pdf">http://www.st.com/resource/en/application_note/DM00073742.pdf</a>     |
| Application note   | <a href="http://www.st.com/resource/en/application_note/DM00074240.pdf">http://www.st.com/resource/en/application_note/DM00074240.pdf</a>     |
| Application note   | <a href="http://www.st.com/resource/en/application_note/DM00080497.pdf">http://www.st.com/resource/en/application_note/DM00080497.pdf</a>     |
| Application note   | <a href="http://www.st.com/resource/en/application_note/DM00083249.pdf">http://www.st.com/resource/en/application_note/DM00083249.pdf</a>     |
| Application note   | <a href="http://www.st.com/resource/en/application_note/DM00085385.pdf">http://www.st.com/resource/en/application_note/DM00085385.pdf</a>     |
| Application note   | <a href="http://www.st.com/resource/en/application_note/DM00087593.pdf">http://www.st.com/resource/en/application_note/DM00087593.pdf</a>     |
| Application note   | <a href="http://www.st.com/resource/en/application_note/DM00121474.pdf">http://www.st.com/resource/en/application_note/DM00121474.pdf</a>     |
| Application note   | <a href="http://www.st.com/resource/en/application_note/DM00129215.pdf">http://www.st.com/resource/en/application_note/DM00129215.pdf</a>     |
| Application note   | <a href="http://www.st.com/resource/en/application_note/DM00157785.pdf">http://www.st.com/resource/en/application_note/DM00157785.pdf</a>     |
| Application note   | <a href="http://www.st.com/resource/en/application_note/DM00160482.pdf">http://www.st.com/resource/en/application_note/DM00160482.pdf</a>     |

Application note [http://www.st.com/resource/en/application\\_note/DM00210617.pdf](http://www.st.com/resource/en/application_note/DM00210617.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00220769.pdf](http://www.st.com/resource/en/application_note/DM00220769.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00257177.pdf](http://www.st.com/resource/en/application_note/DM00257177.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00260340.pdf](http://www.st.com/resource/en/application_note/DM00260340.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00272912.pdf](http://www.st.com/resource/en/application_note/DM00272912.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00226326.pdf](http://www.st.com/resource/en/application_note/DM00226326.pdf)

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Application note [http://www.st.com/resource/en/application\\_note/DM00355687.pdf](http://www.st.com/resource/en/application_note/DM00355687.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00354244.pdf](http://www.st.com/resource/en/application_note/DM00354244.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00315319.pdf](http://www.st.com/resource/en/application_note/DM00315319.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00380469.pdf](http://www.st.com/resource/en/application_note/DM00380469.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00395696.pdf](http://www.st.com/resource/en/application_note/DM00395696.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00445657.pdf](http://www.st.com/resource/en/application_note/DM00445657.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00493651.pdf](http://www.st.com/resource/en/application_note/DM00493651.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00536349.pdf](http://www.st.com/resource/en/application_note/DM00536349.pdf)

Application note [http://www.st.com/resource/en/application\\_note/DM00607955.pdf](http://www.st.com/resource/en/application_note/DM00607955.pdf)

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