

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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| File List | File Members |           |          |              |   |   |   |        |   |   |   |   |   |   |   |   |   |   |
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| a         | b            | c         | d        | e            | f | g | h | i      | k | l | m | n | p | r | s | t | u | v |

Here is a list of all documented file members with links to the documentation:

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- Get\_UART\_Data() : [stm32F302\\_nucleo\\_ihm07m1.h](#)
- GETSPD\_CMD : [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F302\\_nucleo\\_ihm07m1.h](#) , [stm32F401\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#)
- GPIO\_CH\_COMM : [stm32F302\\_nucleo\\_ihm07m1.h](#) , [stm32F401\\_nucleo\\_ihm07m1.h](#) , [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#)
- GPIO\_CH\_ZCR : [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#) , [stm32F302\\_nucleo\\_ihm07m1.h](#) , [stm32F401\\_nucleo\\_ihm07m1.h](#)
- GPIO\_COMM : [MC\\_SixStep\\_param.h](#)
- GPIO\_PORT\_COMM : [stm32F103\\_nucleo\\_ihm07m1.h](#) , [stm32F302\\_nucleo\\_ihm07m1.h](#) , [stm32F401\\_nucleo\\_ihm07m1.h](#) , [stm32F030\\_nucleo\\_ihm07m1.h](#)
- GPIO\_PORT\_ZCR : [stm32F103\\_nucleo\\_ihm07m1.h](#) , [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F401\\_nucleo\\_ihm07m1.h](#) , [stm32F302\\_nucleo\\_ihm07m1.h](#)
- GPIO\_ZERO\_CROSS : [MC\\_SixStep\\_param.h](#)

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X-CUBE-SPN7  
for X-  
NUCLEO-  
IHM07M1

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## X-CUBE-SPN7 Documentation

### Version

1.1.0

### Author

STMicroelectronics - SystemLab, 2017

# Introduction

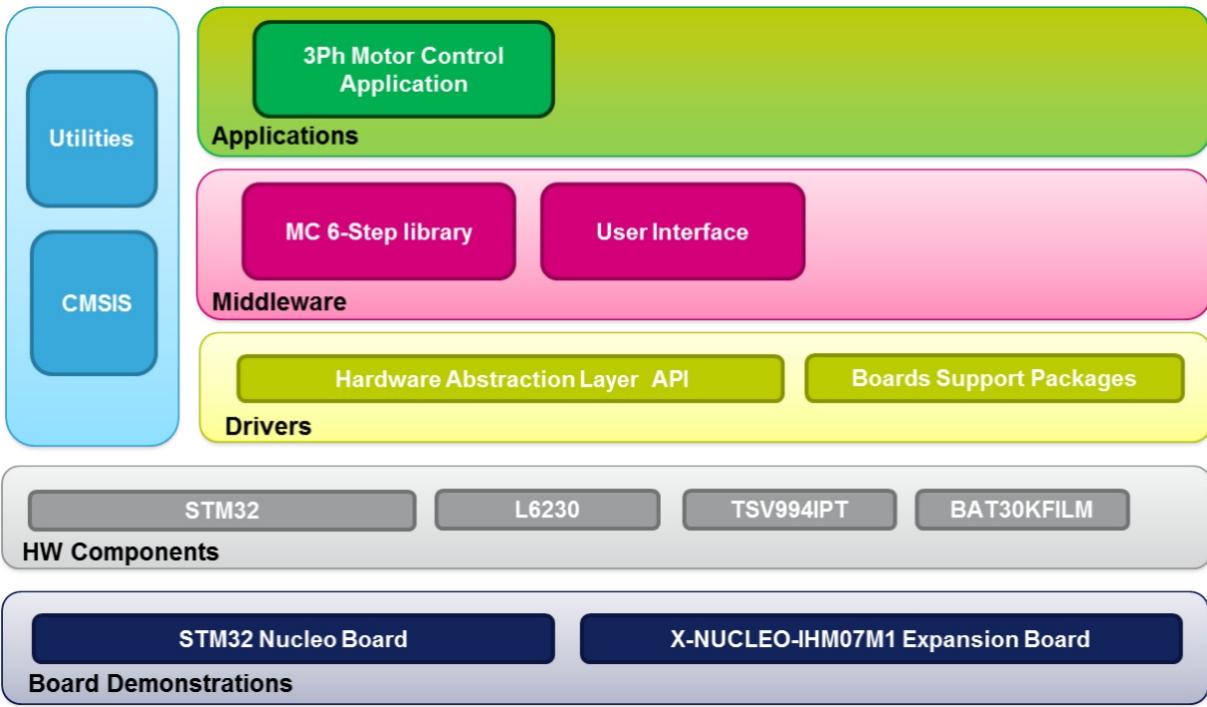
X-CUBE-SPN7 is an expansion software package for STM32Cube. The software runs on the STM32 and includes drivers that initialize and send application commands to 3ph motor driver (L6230) mounted on dedicated expansion board (X-NUCLEO-IHM07M1) stacked on a STM32 Nucleo Board. The expansion is built on STM32Cube software technology to ease portability across different STM32 microcontrollers..

It was developed by means of **STM32CUBE** so it based on the HAL (Hardware Abstraction Layer) Library.

The firmware is split into modules:

- L6230: to manage the motor driver;
- X-NUCLEO-IHM07M1: to manage the expansion board;
- 6STEP LIBRARY: it contains the 6STEP FW library for motor control and the interface file between MCU and LIB
- the "main" to manage the whole system.

The X-CUBE-SPN7 FW package contains also the bin file for P-NUCLEO-IHM001 Motor Control Nucleo Pack (STM32CubeExpansion\_SPN7xxx/Project/..../Binary/P-NUCLEO-IHM001):



## X-NUCLEO-IHM07M1 FW Layers

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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## Modules

Here is a list of all modules:

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|  |  |
|--|--|
| <b>▼ DRIVERS</b>                               | Driver Layer                                     |
| <b>▼ BSP</b>                                   | BSP Layer  |
| <b>▼ COMPONENTS</b>                            | Components                                       |
| <a href="#">L6230_Motor_Driver_handler</a>     | Handler for L6230 Motor driver                   |
| <b>▼ L6230</b>                                 | L6230 driver set                                 |
| <a href="#">L6230MotorDriver</a>               | API pointer for L6230                            |
| <a href="#">EnableInput_CH1_E_CH2_E_CH3_D</a>  | Enable Input channels CH1 and CH2 for L6230      |
| <a href="#">EnableInput_CH1_E_CH2_D_CH3_E</a>  | Enable Input channels CH1 and CH3 for L6230      |
| <a href="#">EnableInput_CH1_D_CH2_E_CH3_E</a>  | Enable Input channels CH2 and CH3 for L6230      |
| <a href="#">DisableInput_CH1_D_CH2_D_CH3_D</a> | Enable Input channels CH1, CH2 and CH3 for L6230 |
| <a href="#">Start_PWM_driving</a>              | Enable PWM channels for L6230                    |
| <a href="#">Stop_PWM_driving</a>               | Disable PWM channels for L6230                   |
| <a href="#">HF_TIMx_SetDutyCycle_CH1</a>       | Set the Duty Cycle for Channel 1                 |

|                                    |   |                |
|------------------------------------|---|----------------|
|                                    |   | value for CH1  |
| <b>HF_TIMx_SetDutyCycle_CH2</b>    | Set the Duty Cy value for CH2                       |                |
| <b>HF_TIMx_SetDutyCycle_CH3</b>    | Set the Duty Cy value for CH3                       |                |
| <b>Current_Reference_Start</b>     | Enable the Current Reference generation             |                |
| <b>Current_Reference_Stop</b>      | Disable the Current Reference generation            |                |
| <b>Current_Reference_Setvalue</b>  | Set the value for Current Reference                 | X-Nucleo board |
| <b>▼ X-NUCLEO-IHM07M1</b>          |   |                |
| <b>L6230_ECH1CH2_DCH3_IO_Write</b> | Enable Input channels CH1 and CH2 for L6230         |                |
| <b>L6230_ECH1CH3_DCH2_IO_Write</b> | Enable Input channels CH1 and CH3 for L6230         |                |
| <b>L6230_ECH2CH3_DCH1_IO_Write</b> | Enable Input channels CH2 and CH3 for L6230         |                |
| <b>L6230_DCH1CH2CH3_IO_Write</b>   | Disable all channels for L6230                      |                |
| <b>L6230_Start_PWM_generation</b>  | Enable the PWM generation on Ir channels for L6230  |                |
| <b>L6230_Stop_PWM_generation</b>   | Disable the PWM generation on Ir channels for L6230 |                |
| <b>L6230_HFTIM_DC_CH1</b>          | Set the Duty Cy value for CH1                       |                |
| <b>L6230_HFTIM_DC_CH2</b>          | Set the Duty Cy value for CH2                       |                |
| <b>L6230_HFTIM_DC_CH3</b>          | Set the Duty Cy value for CH3                       |                |

|  |   |
|--|---|
| <b>BSP_X_NUCLEOFAULT_LED_ON</b>                  | Turns selected I<br>On  |
| <b>BSP_X_NUCLEOFAULT_LED_OFF</b>                 | Turns selected I<br>Off   |
| <b>▼ MIDDLEWARES</b>                             | Middlewares La  |
| <b>▼ MC_6-STEP_LIB</b>                           | Motor Control d   |
| <b>Exported_types</b>                            |   |
| <b>Exported_function_6StepLib</b>                |   |
| <b>MC_SixStep_TABLE</b>                          | Set the peripheral<br>(TIMx, GPIO etc)<br>each step   |
| <b>MC_SixStep_NEXT_step</b>                      | Generate the next<br>number according<br>the direction (CW<br>CCW)                              |
| <b>MC_SixStep_RESET</b>                          | Reset all variables<br>used for 6Step<br>algorithm  |
| <b>MC_SixStep_Ramp_Motor_calc</b>                | Calculate the<br>acceleration proce-<br>ss step by step for<br>during start-up                  |
| <b>MC_SixStep_ARR_step</b>                       | Generate the AI<br>value for Low<br>Frequency TIM<br>start-up                                   |
| <b>MC_SixStep_Alignment</b>                      | Generate the motor<br>alignment   |
| <b>MC_SixStep_Speed_Val_target_potentiometer</b> | Calculate the Motor<br>Speed validation<br>threshold accord-<br>with the potentiometer<br>value |
| <b>MC_SixStep_Speed_Potentiometer</b>            | Calculate the<br>potentiometer v  |

|   |  |
|---|--|
|   | set the Motor Sp   |
| <b>MC_Set_PI_param</b>                        | Set all parameters for the PI regulator  |
| <b>MC_PI_Controller</b>                       | Compute the PI for the Current Reference   |
| <b>MC_Task_Speed</b>                          | Main task: Speed with PI regulator   |
| <b>MC_Set_Speed</b>                           | Set the new motor speed value  |
| <b>MC_Bemf_Delay</b>                          | Take the delay time after each new commutation   |
| <b>MC_StartMotor</b>                          | Start the Motor  |
| <b>MC_StopMotor</b>                           | Stop the Motor   |
| <b>MC_GetEISpeedHz</b>                        | Get the Electrical Speed from ARI of LF TIM  |
| <b>MC_GetMechSpeedRPM</b>                     | Get the Mechanical Motor Speed (RPM)   |
| <b>MC_SixStep_Init_main_data</b>              | Init the main variables for motor driving  |
| <b>MC_SixStep_INIT</b>                        | Initialitation function for SixStep library  |
| <b>MC_TIMx_SixStep_timebase</b>               | Low Frequency Callback - Call to get the next step and return the filtered speed value |
| <b>MC_Speed_Filter</b>                        | Calculate the speed filtered   |
| <b>MC_Potentiometer_filter</b>                | Calculate the filtered potentiometer value   |
| <b>MC_SysTick_SixStep_MediumFrequencyTask</b> | Systick Callback   |

|   |                                 |   |
|---|---------------------------------|---|
|   | <b>MC_SixStep_ARR_Bemf</b>      | the Speed loop<br>Calculate the ne<br>Autoreload val<br>(ARR) for Low<br>Frequency time |
|   | <b>MC_ADCx_SixStep_Bemf</b>     | Compute the ze<br>crossing detecti  |
|   | <b>MC_EXT_button_SixStep</b>    | GPIO EXT Callk<br>Start or Stop the<br>through the Blue<br>button on<br>STM32Nucleo     |
|   | <b>Main_Motor_parameters</b>    | All motor param<br>for 6Step driving  |
| ▼ | <b>UART_UI</b>                  | Serial communic<br>through PC seri<br>terminal  |
|   | <b>Exported_function_Uart</b>   |   |
| ▼ | <b>stm32F030_nucleo_ihm07m1</b> | Interface file for<br>STM32F030 and<br>Library configura                                |
|   | <b>Exported_function_F030</b>   |   |
| ▼ | <b>stm32F103_nucleo_ihm07m1</b> | Interface file for<br>STM32F103 and<br>Library configura                                |
|   | <b>Exported_function_F103</b>   |   |
| ▼ | <b>stm32F302_nucleo_ihm07m1</b> | Interface file for<br>STM32F302 and<br>Library configura                                |
|   | <b>Exported_function_F302</b>   |   |
| ▼ | <b>stm32F401_nucleo_ihm07m1</b> | Interface file for<br>STM32F401 and<br>Library configura                                |
|   | <b>Exported_function_F401</b>   |   |

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

| Main Page  | Modules     | Classes       | Files |
|------------|-------------|---------------|-------|
| Class List | Class Index | Class Members |       |

## Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

|   |                             |
|---|-----------------------------|
| <a href="#"> <b>CMD_T</b></a>                          |                             |
| <a href="#"> <b>L6230_MotorDriver_TypeDef</b></a>      |                             |
| <a href="#"> <b>SIXSTEP_Base_InitTypeDef</b></a>       | Six Step parameters         |
| <a href="#"> <b>SIXSTEP_PI_PARAM_InitTypeDef_t</b></a> | Six PI regulator parameters |

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

| Main Page  | Modules      | Classes | Files   |  |  |
|--|--------------|---------|---|--|--|
| File List  | File Members |         |   |  |  |
| <h2>File List</h2>   |              |         |   |  |  |
| Here is a list of all documented files with brief descriptions:  |              |         |   |  |  |
|  |              |         | [detail level <a href="#">1</a> <a href="#">2</a> <a href="#">3</a> <a href="#">4</a> <a href="#">5</a> <a href="#">6</a> ] |  |  |
| <ul style="list-style-type: none"><li>▼  Drivers</li><li>  ▼  BSP</li><li>    ▼  Components</li><li>      ▼  Common<ul style="list-style-type: none"><li> MC_Common.h</li></ul></li><li>    ▼  I6230<ul style="list-style-type: none"><li> I6230.c</li><li> I6230.h</li></ul></li><li>  ▼  X-NUCLEO-IHM07M1<ul style="list-style-type: none"><li> X-NUCLEO-IHM07M1.c</li><li> X-NUCLEO-IHM07M1.h</li></ul></li></ul> |              |         |   |  |  |
| <p> MC_Common.h</p>  |              |         | This header file is a common file   |  |  |
| <p> I6230.c</p>  |              |         | This file provides a set of functions to manage L6230 driver  |  |  |
| <p> I6230.h</p>  |              |         | This file provides a set of functions to manage L6230 driver  |  |  |
| <p> X-NUCLEO-IHM07M1.c</p>   |              |         | This file provides the set of functions to manage the X-Nucleo board  |  |  |
| <p> X-NUCLEO-IHM07M1.h</p>   |              |         | This file provides the set of functions to manage the X-Nucleo board  |  |  |

|   |                               |  |
|---|-------------------------------|--|
|   | <b>Middlewares</b>            |  |
| ▼ | <b>ST</b>                     |  |
| ▼ | <b>MC_6Step_Lib</b>           |  |
| ▼ | <b>Inc</b>                    |  |
|   | <b>6Step_Lib.h</b>            | This header file provides the set of functions for Motor Control library |
|   | <b>stm32_nucleo_ihm07m1.h</b> | This file provides the interface between the MC-lib and STM Nucleo       |
| ▼ | <b>Src</b>                    |  |
|   | <b>6Step_Lib.c</b>            | This file provides the set of functions for Motor Control library        |
| ▼ | <b>UART_serial_com</b>        |  |
| ▼ | <b>Inc</b>                    |  |
|   | <b>UART_UI.h</b>              | This file provides a set of functions needed to manage the UART com      |
| ▼ | <b>Src</b>                    |  |
|   | <b>UART_UI.c</b>              | This file provides a set of functions needed to manage the UART com      |
| ▼ | <b>Projects</b>               |  |
| ▼ | <b>Multi</b>                  |  |
| ▼ | <b>Examples</b>               |  |
| ▼ | <b>MotorControl</b>           |  |
| ▼ | <b>Inc</b>                    |  |
|   | <b>main_F030.h</b>            |  |

|  |   |
|--|---|
|  <a href="#">main_F103.h</a>                  | This file provides a set of functions needed to configure STM32 MCU           |
|  <a href="#">main_F302.h</a>                  |   |
|  <a href="#">main_F401.h</a>                  |   |
|  <a href="#">MC_SixStep_param.h</a>           | This header file provides all parameters to driver a motor with 6Step library |
|  <a href="#">MC_SixStep_param_F030.h</a>      |   |
|  <a href="#">MC_SixStep_param_F103.h</a>      |   |
|  <a href="#">stm32F030_nucleo_ihm07m1.h</a>   | This file provides the interface between the MC-lib and STM Nucleo            |
|  <a href="#">stm32f0xx_hal_conf.h</a>       | HAL configuration file  |
|  <a href="#">stm32f0xx_it.h</a>             | This file contains the headers of the interrupt handlers                      |
|  <a href="#">stm32F103_nucleo_ihm07m1.h</a> | This file provides the interface between the MC-lib and STM Nucleo            |
|  <a href="#">stm32f1xx_hal_conf.h</a>       | HAL configuration file  |
|  <a href="#">stm32f1xx_it.h</a>             | This file contains the headers of the interrupt handlers                      |
|  <a href="#">stm32F302_nucleo_ihm07m1.h</a> | This file provides the interface between the MC-lib and STM Nucleo            |
|  <a href="#">stm32f3xx_hal_conf.h</a>       | HAL configuration file  |
|  <a href="#">stm32f3xx_it.h</a>             | This file contains the  |

|  |  |
|--|--|
|  <a href="#">stm32F401_nucleo_ihm07m1.h</a> | headers of the interrupt handlers  |
|  <a href="#">stm32f4xx_hal_conf.h</a>       | This file provides the interface between the MC-lib and STM Nucleo                 |
|  <a href="#">stm32f4xx_it.h</a>             | HAL configuration file<br>This file contains the headers of the interrupt handlers |

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| File List | File Members |           |          |              |   |   |   |        |   |   |   |   |   |   |   |   |   |   |
| All       | Functions    | Variables | TypeDefs | Enumerations |   |   |   | Macros |   |   |   |   |   |   |   |   |   |   |
| a         | b            | c         | d        | e            | f | g | h | i      | k | l | m | n | p | r | s | t | u | v |

Here is a list of all documented file members with links to the documentation:

## - a -

- ACC : [MC\\_SixStep\\_param.h](#)
- ACCELE\_CMD : [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F302\\_nucleo\\_ihm07m1.h](#) , [stm32F401\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#)
- ADC\_SPEED\_TH : [MC\\_SixStep\\_param.h](#)
- ARR\_LF : [6Step\\_Lib.c](#)
- array\_completed : [6Step\\_Lib.c](#)
- assert\_param : [stm32f3xx\\_hal\\_conf.h](#) , [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#) , [stm32f0xx\\_hal\\_conf.h](#)

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|-----------|--------------|-----------|----------|--------------|--------|
| File List | File Members |           |          |              |        |
| All       | Functions    | Variables | Typedefs | Enumerations | Macros |
|           |              |           |          |              |        |

- CMD\_STARTM() : [UART\\_UI.h](#)
- Get\_UART\_Data() : [stm32F302\\_nucleo\\_ihm07m1.h](#)
- HAL\_GetTick() : [6Step\\_Lib.c](#)
- HAL\_IncTick() : [6Step\\_Lib.c](#)
- MC\_SixStep\_ADC\_Channel() : [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#) , [stm32F401\\_nucleo\\_ihm07m1.h](#)
- MCM\_Sqrt() : [6Step\\_Lib.c](#)

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|-----------|--------------|-----------|----------|--------------|--------|
| File List | File Members |           |          |              |        |
| All       | Functions    | Variables | TypeDefs | Enumerations | Macros |
|           |              |           |          |              |        |

- ARR\_LF : [6Step.Lib.c](#)
- array\_completed : [6Step.Lib.c](#)
- buffer\_completed : [6Step.Lib.c](#)
- constant\_k : [6Step.Lib.c](#)
- delta : [6Step.Lib.c](#)
- El\_Speed\_Hz : [6Step.Lib.c](#)
- Enable\_start\_button : [6Step.Lib.c](#)
- HFBuffer : [6Step.Lib.c](#)
- HFBufferIndex : [6Step.Lib.c](#)
- index\_adc\_chn : [6Step.Lib.c](#)
- index\_array : [6Step.Lib.c](#)
- index\_motor\_run : [6Step.Lib.c](#)
- mech\_accel\_hz : [6Step.Lib.c](#)
- Mech\_Speed\_RPM : [6Step.Lib.c](#)
- PI\_parameters : [6Step.Lib.c](#)
- Rotor\_poles\_pairs : [6Step.Lib.c](#)
- SIXSTEP\_parameters : [6Step.Lib.c](#)
- speed\_tmp\_array : [6Step.Lib.c](#)
- speed\_tmp\_buffer : [6Step.Lib.c](#)
- T\_single\_step : [6Step.Lib.c](#)
- T\_single\_step\_first\_value : [6Step.Lib.c](#)
- target\_speed : [6Step.Lib.c](#)
- test\_motor\_run : [6Step.Lib.c](#)
- Time\_vector\_prev\_tmp : [6Step.Lib.c](#)
- Time\_vector\_tmp : [6Step.Lib.c](#)
- UART\_FLAG\_RECEIVE : [6Step.Lib.c](#)
- uwTick : [6Step.Lib.c](#)

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| File List | File Members |           |          |              |        |  |
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- SIXSTEP\_pi\_PARAM\_InitTypeDef\_t : [6Step\\_Lib.h](#)

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| File List | File Members |           |          |              |        |
| All       | Functions    | Variables | TypeDefs | Enumerations | Macros |
|           |              |           |          |              |        |

- SIXSTEP\_Base\_SystStatus\_t : [6Step\\_Lib.h](#)

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|-----------|--------------|-----------|----------|--------------|---|---|---|--------|---|---|---|---|---|---|---|---|---|
| File List | File Members |           |          |              |   |   |   |        |   |   |   |   |   |   |   |   |   |
| All       | Functions    | Variables | TypeDefs | Enumerations |   |   |   | Macros |   |   |   |   |   |   |   |   |   |
| a         | b            | c         | d        | e            | f | g | h | i      | k | l | m | n | p | s | t | u | v |

## - a -

- ACC : [MC\\_SixStep\\_param.h](#)
- ACCELE\_CMD : [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F302\\_nucleo\\_ihm07m1.h](#) , [stm32F401\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#)
- ADC\_SPEED\_TH : [MC\\_SixStep\\_param.h](#)
- assert\_param : [stm32f3xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#) , [stm32f0xx\\_hal\\_conf.h](#) , [stm32f1xx\\_hal\\_conf.h](#)

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| a         | b            | c         | d        | e            | f | g | h | i      | k | l | m | n | p | r | s | t | u | v |

Here is a list of all documented file members with links to the documentation:

## - b -

- BEMF\_CNT\_EVENT\_MAX : [MC\\_SixStep\\_param.h](#)
- BEMF\_CONSEC\_DOWN\_MAX : [MC\\_SixStep\\_param.h](#)
- BEMF\_THRSLD\_DOWN : [MC\\_SixStep\\_param.h](#)
- BEMF\_THRSLD\_UP : [MC\\_SixStep\\_param.h](#)
- buffer\_completed : [6Step\\_Lib.c](#)
- BUTTON\_DELAY : [MC\\_SixStep\\_param.h](#)

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| File List | File Members |           |          |              |        |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
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| a         | b            | c         | d        | e            | f      | g | h | i | k | l | m | n | p | r | s | t | u | v |  |

Here is a list of all documented file members with links to the documentation:

## - C -

- CCRx : [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#)
- CMD\_STARTM() : [UART\\_UI.h](#)
- constant\_k : [6Step\\_Lib.c](#)

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| File List | File Members |           |          |              |   |   |   |        |   |   |   |   |   |   |   |   |   |   |
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| a         | b            | c         | d        | e            | f | g | h | i      | k | l | m | n | p | r | s | t | u | v |

Here is a list of all documented file members with links to the documentation:

## - d -

- DAC\_CH : [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#)
- DAC\_ENABLE : [stm32F302\\_nucleo\\_ihm07m1.h](#) , [stm32F401\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#)
- DACx : [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#)
- DACx\_ALIGN : [stm32F302\\_nucleo\\_ihm07m1.h](#)
- DACx\_CH : [stm32F302\\_nucleo\\_ihm07m1.h](#)
- delta : [6Step.Lib.c](#)
- DEMAGN\_VAL\_1 : [MC\\_SixStep\\_param.h](#)
- DEMAGN\_VAL\_10 : [MC\\_SixStep\\_param.h](#)
- DEMAGN\_VAL\_11 : [MC\\_SixStep\\_param.h](#)
- DEMAGN\_VAL\_12 : [MC\\_SixStep\\_param.h](#)
- DEMAGN\_VAL\_13 : [MC\\_SixStep\\_param.h](#)
- DEMAGN\_VAL\_14 : [MC\\_SixStep\\_param.h](#)
- DEMAGN\_VAL\_2 : [MC\\_SixStep\\_param.h](#)
- DEMAGN\_VAL\_3 : [MC\\_SixStep\\_param.h](#)
- DEMAGN\_VAL\_4 : [MC\\_SixStep\\_param.h](#)
- DEMAGN\_VAL\_5 : [MC\\_SixStep\\_param.h](#)
- DEMAGN\_VAL\_6 : [MC\\_SixStep\\_param.h](#)
- DEMAGN\_VAL\_7 : [MC\\_SixStep\\_param.h](#)
- DEMAGN\_VAL\_8 : [MC\\_SixStep\\_param.h](#)

- DEMAGN\_VAL\_9 : [MC\\_SixStep\\_param.h](#)
  - DEMO\_START\_TIME : [MC\\_SixStep\\_param.h](#)
  - DEMO\_STOP\_TIME : [MC\\_SixStep\\_param.h](#)
  - DIRECT\_CMD : [stm32F030\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F401\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F302\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F103\\_nucleo\\_ihm07m1.h](#)
  - DIRECTION : [MC\\_SixStep\\_param.h](#)
  - DMGCTR\_CMD : [stm32F103\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F030\\_nucleo\\_ihm07m1.h](#)
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| File List | File Members |           |          |              |   |   |   |        |   |   |   |   |   |   |   |   |   |   |
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| a         | b            | c         | d        | e            | f | g | h | i      | k | l | m | n | p | r | s | t | u | v |

Here is a list of all documented file members with links to the documentation:

- e -

- El\_Speed\_Hz : [6Step\\_Lib.c](#)
- Enable\_start\_button : [6Step\\_Lib.c](#)
- EXTERNAL\_CLOCK\_VALUE : [stm32f3xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)

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| a         | b            | c         | d        | e            | f | g | h | i      | k | l | m | n | p | r | s | t | u | v |

Here is a list of all documented file members with links to the documentation:

- f -

- FALSE : [MC\\_SixStep\\_param.h](#)
- FILTER\_DEEP : [MC\\_SixStep\\_param.h](#)

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| a         | b            | c         | d        | e            | f | g | h | i      | k | l | m | n | p | r | s | t | u | v |  |

Here is a list of all documented file members with links to the documentation:

## - h -

- HAL\_GetTick() : [6Step\\_Lib.c](#)
- HAL\_IncTick() : [6Step\\_Lib.c](#)
- HAL\_MODULE\_ENABLED : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f3xx\\_hal\\_conf.h](#) , [stm32f0xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- HELP\_CMD : [stm32F103\\_nucleo\\_ihm07m1.h](#) , [stm32F302\\_nucleo\\_ihm07m1.h](#) , [stm32F401\\_nucleo\\_ihm07m1.h](#) , [stm32F030\\_nucleo\\_ihm07m1.h](#)
- HFBuffer : [6Step\\_Lib.c](#)
- HFBufferIndex : [6Step\\_Lib.c](#)
- HSE\_STARTUP\_TIMEOUT : [stm32f4xx\\_hal\\_conf.h](#) , [stm32f0xx\\_hal\\_conf.h](#) , [stm32f1xx\\_hal\\_conf.h](#) , [stm32f3xx\\_hal\\_conf.h](#)
- HSE\_VALUE : [stm32f3xx\\_hal\\_conf.h](#) , [stm32f0xx\\_hal\\_conf.h](#) , [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- HSI14\_VALUE : [stm32f0xx\\_hal\\_conf.h](#)
- HSI48\_VALUE : [stm32f0xx\\_hal\\_conf.h](#)
- HSI\_STARTUP\_TIMEOUT : [stm32f0xx\\_hal\\_conf.h](#) , [stm32f3xx\\_hal\\_conf.h](#)
- HSI\_VALUE : [stm32f3xx\\_hal\\_conf.h](#) , [stm32f1xx\\_hal\\_conf.h](#) , [stm32f0xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)

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| a         | b            | c         | d        | e            | f | g | h | i      | k | l | m | n | p | r | s | t | u | v |

Here is a list of all documented file members with links to the documentation:

- i -

- index\_adc\_chn : [6Step.Lib.c](#)
- index\_array : [6Step.Lib.c](#)
- index\_motor\_run : [6Step.Lib.c](#)
- INIREF\_CMD : [stm32F302\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F103\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F030\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F401\\_nucleo\\_ihm07m1.h](#)
- INITIAL\_DEMAGN\_DELAY : [MC\\_SixStep\\_param.h](#)

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| File List | File Members |           |          |              |   |   |   |        |   |   |   |   |   |   |   |   |   |   |
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| a         | b            | c         | d        | e            | f | g | h | i      | k | l | m | n | p | r | s | t | u | v |

Here is a list of all documented file members with links to the documentation:

## - k -

- KI\_DIV : [MC\\_SixStep\\_param.h](#)
- KI\_GAIN : [MC\\_SixStep\\_param.h](#)
- KI\_PRM\_CMD : [stm32F103\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F302\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F030\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F401\\_nucleo\\_ihm07m1.h](#)
- KP\_DIV : [MC\\_SixStep\\_param.h](#)
- KP\_GAIN : [MC\\_SixStep\\_param.h](#)
- KP\_PRM\_CMD : [stm32F302\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F103\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F401\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F030\\_nucleo\\_ihm07m1.h](#)

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| a         | b            | c         | d        | e            | f | g | h | i      | k | <b>I</b> | m | n | p | r | s | t | u | v |

Here is a list of all documented file members with links to the documentation:

- I -

- LOWER\_OUT\_LIMIT : [MC\\_SixStep\\_param.h](#)
- LSE\_STARTUP\_TIMEOUT : [stm32f1xx\\_hal\\_conf.h](#)
- LSE\_VALUE : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f3xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#) , [stm32f0xx\\_hal\\_conf.h](#)
- LSI\_VALUE : [stm32f4xx\\_hal\\_conf.h](#) , [stm32f3xx\\_hal\\_conf.h](#) , [stm32f0xx\\_hal\\_conf.h](#)

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| File List | File Members |           |          |              |   |   |   |        |   |   |   |   |   |   |   |   |   |   |
| All       | Functions    | Variables | TypeDefs | Enumerations |   |   |   | Macros |   |   |   |   |   |   |   |   |   |   |
| a         | b            | c         | d        | e            | f | g | h | i      | k | l | m | n | p | r | s | t | u | v |

Here is a list of all documented file members with links to the documentation:

## - m -

- MAC\_ADDR0 : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- MAX\_POT\_SPEED : [MC\\_SixStep\\_param.h](#)
- MAXDMG\_CMD : [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#)
- MC\_SixStep\_ADC\_Channel() : [stm32F401\\_nucleo\\_ihm07m1.h](#) , [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#)
- MCM\_Sqrt() : [6Step\\_Lib.c](#)
- mech\_accel\_hz : [6Step\\_Lib.c](#)
- Mech\_Speed\_RPM : [6Step\\_Lib.c](#)
- MIN\_POT\_SPEED : [MC\\_SixStep\\_param.h](#)
- MINDMG\_CMD : [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#)
- MINIMUM\_ACC : [MC\\_SixStep\\_param.h](#)

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| a         | b            | c         | d        | e            | f | g | h | i      | k | l | m | n | p | r | s | t | u | v |

Here is a list of all documented file members with links to the documentation:

- n -

- NUM\_POLE\_PAIRS : [MC\\_SixStep\\_param.h](#)
- NUMBER\_OF\_STEPS : [MC\\_SixStep\\_param.h](#)
- NUMBER\_ZCR : [MC\\_SixStep\\_param.h](#)

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| File List | File Members |           |          |              |   |   |   |        |   |   |   |   |   |   |   |   |   |   |
| All       | Functions    | Variables | TypeDefs | Enumerations |   |   |   | Macros |   |   |   |   |   |   |   |   |   |   |
| a         | b            | c         | d        | e            | f | g | h | i      | k | l | m | n | p | r | s | t | u | v |

Here is a list of all documented file members with links to the documentation:

- p -

- PHY\_AUTONEGO\_COMPLETE : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- PHY\_AUTONEGOTIATION : [stm32f4xx\\_hal\\_conf.h](#) , [stm32f1xx\\_hal\\_conf.h](#)
- PHY\_BCR : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- PHY\_BSR : [stm32f4xx\\_hal\\_conf.h](#) , [stm32f1xx\\_hal\\_conf.h](#)
- PHY\_DUPLEX\_STATUS : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- PHY\_FULLDUPLEX\_100M : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- PHY\_FULLDUPLEX\_10M : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- PHY\_HALFDUPLEX\_100M : [stm32f4xx\\_hal\\_conf.h](#) , [stm32f1xx\\_hal\\_conf.h](#)
- PHY\_HALFDUPLEX\_10M : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- PHY\_ISOLATE : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- PHY\_JABBER\_DETECTION : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- PHY\_LINK\_INTERRUPT : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- PHY\_LINK\_STATUS : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)

- PHY\_LINKED\_STATUS : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- PHY\_LOOPBACK : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- PHY\_MICR : [stm32f4xx\\_hal\\_conf.h](#) , [stm32f1xx\\_hal\\_conf.h](#)
- PHY\_MICR\_INT\_EN : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- PHY\_MICR\_INT\_OE : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- PHY\_MISR : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- PHY\_MISR\_LINK\_INT\_EN : [stm32f4xx\\_hal\\_conf.h](#) , [stm32f1xx\\_hal\\_conf.h](#)
- PHY\_POWERDOWN : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- PHY\_RESET : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- PHY\_RESTART\_AUTONEGOTIATION : [stm32f4xx\\_hal\\_conf.h](#) , [stm32f1xx\\_hal\\_conf.h](#)
- PHY\_SPEED\_STATUS : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- PHY\_SR : [stm32f4xx\\_hal\\_conf.h](#) , [stm32f1xx\\_hal\\_conf.h](#)
- PI\_parameters : [6Step.Lib.c](#)
- POLESP\_CMD : [stm32F103\\_nucleo\\_ihm07m1.h](#) , [stm32F302\\_nucleo\\_ihm07m1.h](#) , [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F401\\_nucleo\\_ihm07m1.h](#)
- POTENTIOMETER : [MC\\_SixStep\\_param.h](#)
- POTENZ\_CMD : [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F302\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#) , [stm32F401\\_nucleo\\_ihm07m1.h](#)

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

| Main Page | Modules      | Classes   | Files    |              |   |   |   |        |   |   |   |   |   |   |   |   |   |   |
|-----------|--------------|-----------|----------|--------------|---|---|---|--------|---|---|---|---|---|---|---|---|---|---|
| File List | File Members |           |          |              |   |   |   |        |   |   |   |   |   |   |   |   |   |   |
| All       | Functions    | Variables | TypeDefs | Enumerations |   |   |   | Macros |   |   |   |   |   |   |   |   |   |   |
| a         | b            | c         | d        | e            | f | g | h | i      | k | l | m | n | p | r | s | t | u | v |

Here is a list of all documented file members with links to the documentation:

- r -

- Rotor\_poles\_pairs : [6Step.Lib.c](#)

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

| Main Page | Modules      | Classes   | Files    |              |   |   |   |        |   |   |   |   |   |   |   |   |   |   |
|-----------|--------------|-----------|----------|--------------|---|---|---|--------|---|---|---|---|---|---|---|---|---|---|
| File List | File Members |           |          |              |   |   |   |        |   |   |   |   |   |   |   |   |   |   |
| All       | Functions    | Variables | TypeDefs | Enumerations |   |   |   | Macros |   |   |   |   |   |   |   |   |   |   |
| a         | b            | c         | d        | e            | f | g | h | i      | k | l | m | n | p | r | s | t | u | v |

Here is a list of all documented file members with links to the documentation:

## - S -

- SETSPD\_CMD : [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#) , [stm32F401\\_nucleo\\_ihm07m1.h](#) , [stm32F302\\_nucleo\\_ihm07m1.h](#)
- SIXSTEP\_Base\_SystStatus\_t : [6Step\\_Lib.h](#)
- SIXSTEP\_parameters : [6Step\\_Lib.c](#)
- SIXSTEP\_pi\_PARAM\_InitTypeDef\_t : [6Step\\_Lib.h](#)
- SPEED\_LOOP\_TIME : [MC\\_SixStep\\_param.h](#)
- speed\_tmp\_array : [6Step\\_Lib.c](#)
- speed\_tmp\_buffer : [6Step\\_Lib.c](#)
- STARTM\_CMD : [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#) , [stm32F302\\_nucleo\\_ihm07m1.h](#) , [stm32F401\\_nucleo\\_ihm07m1.h](#)
- STARTUP\_CURRENT\_REFERENCE : [MC\\_SixStep\\_param.h](#)
- STATUS\_CMD : [stm32F302\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#) , [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F401\\_nucleo\\_ihm07m1.h](#)
- STOPMT\_CMD : [stm32F103\\_nucleo\\_ihm07m1.h](#) , [stm32F302\\_nucleo\\_ihm07m1.h](#) , [stm32F401\\_nucleo\\_ihm07m1.h](#) , [stm32F030\\_nucleo\\_ihm07m1.h](#)

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

| Main Page | Modules      | Classes   | Files    |              |   |   |   |        |   |   |   |   |   |   |   |   |   |   |
|-----------|--------------|-----------|----------|--------------|---|---|---|--------|---|---|---|---|---|---|---|---|---|---|
| File List | File Members |           |          |              |   |   |   |        |   |   |   |   |   |   |   |   |   |   |
| All       | Functions    | Variables | TypeDefs | Enumerations |   |   |   | Macros |   |   |   |   |   |   |   |   |   |   |
| a         | b            | c         | d        | e            | f | g | h | i      | k | l | m | n | p | r | s | t | u | v |

Here is a list of all documented file members with links to the documentation:

- t -

- T\_single\_step : [6Step.Lib.c](#)
- T\_single\_step\_first\_value : [6Step.Lib.c](#)
- target\_speed : [6Step.Lib.c](#)
- TARGET\_SPEED : [MC\\_SixStep\\_param.h](#)
- test\_motor\_run : [6Step.Lib.c](#)
- TICK\_INT\_PRIORITY : [stm32f3xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#) , [stm32f1xx\\_hal\\_conf.h](#) , [stm32f0xx\\_hal\\_conf.h](#)
- TIME\_FOR\_ALIGN : [MC\\_SixStep\\_param.h](#)
- Time\_vector\_prev\_tmp : [6Step.Lib.c](#)
- Time\_vector\_tmp : [6Step.Lib.c](#)
- TRUE : [MC\\_SixStep\\_param.h](#)

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

| Main Page | Modules      | Classes   | Files    |              |   |   |   |        |   |   |   |   |   |   |   |   |   |   |
|-----------|--------------|-----------|----------|--------------|---|---|---|--------|---|---|---|---|---|---|---|---|---|---|
| File List | File Members |           |          |              |   |   |   |        |   |   |   |   |   |   |   |   |   |   |
| All       | Functions    | Variables | TypeDefs | Enumerations |   |   |   | Macros |   |   |   |   |   |   |   |   |   |   |
| a         | b            | c         | d        | e            | f | g | h | i      | k | l | m | n | p | r | s | t | u | v |

Here is a list of all documented file members with links to the documentation:

## - u -

- UART\_FLAG\_RECEIVE : [6Step.Lib.c](#)
- UPPER\_OUT\_LIMIT : [MC\\_SixStep\\_param.h](#)
- uwTick : [6Step.Lib.c](#)

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| Main Page | Modules      | Classes   | Files    |              |   |   |   |        |   |   |   |   |   |   |   |   |   |   |
|-----------|--------------|-----------|----------|--------------|---|---|---|--------|---|---|---|---|---|---|---|---|---|---|
| File List | File Members |           |          |              |   |   |   |        |   |   |   |   |   |   |   |   |   |   |
| All       | Functions    | Variables | TypeDefs | Enumerations |   |   |   | Macros |   |   |   |   |   |   |   |   |   |   |
| a         | b            | c         | d        | e            | f | g | h | i      | k | l | m | n | p | r | s | t | u | v |

Here is a list of all documented file members with links to the documentation:

- v -

- VAL\_POT\_SPEED\_DIV : [MC\\_SixStep\\_param.h](#)
- VDD\_VALUE : [stm32f4xx\\_hal\\_conf.h](#) , [stm32f3xx\\_hal\\_conf.h](#) , [stm32f1xx\\_hal\\_conf.h](#) , [stm32f0xx\\_hal\\_conf.h](#)

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

Main Page

Modules

Classes

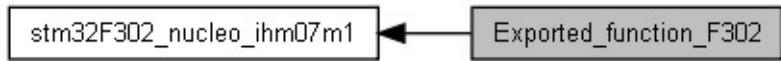
Files

Functions

## Exported\_function\_F302

[stm32F302\\_nucleo\\_ihm07m1](#)

Collaboration diagram for Exported\_function\_F302:



## Functions

uint32\_t **Get\_UART\_Data** (void)

API function for STM32 instruction.

void **MC\_SixStep\_ADC\_Channel** (uint32\_t)

void **MC\_SixStep\_Nucleo\_Init** (void)

void **START\_Ref\_Generation** (void)

void **STOP\_Ref\_Generation** (void)

void **Set\_Ref\_Generation** (uint16\_t)

void **START\_DAC** (void)

void **STOP\_DAC** (void)

void **SET\_DAC\_value** (uint16\_t)

void **Bemf\_delay\_calc** (void)

void **MC\_SixStep\_EnableInput\_CH1\_E\_CH2\_E\_CH3\_D** (void)

void **MC\_SixStep\_EnableInput\_CH1\_E\_CH2\_D\_CH3\_E** (void)

void **MC\_SixStep\_EnableInput\_CH1\_D\_CH2\_E\_CH3\_E** (void)

void **MC\_SixStep\_DisableInput\_CH1\_D\_CH2\_D\_CH3\_D** (void)

void **MC\_SixStep\_Start\_PWM\_driving** (void)

void **MC\_SixStep\_Stop\_PWM\_driving** (void)

```
void MC_SixStep_HF_TIMx_SetDutyCycle_CH1 (uint16_t)
```

```
void MC_SixStep_HF_TIMx_SetDutyCycle_CH2 (uint16_t)
```

```
void MC_SixStep_HF_TIMx_SetDutyCycle_CH3 (uint16_t)
```

```
void MC_SixStep_Current_Reference_Start (void)
```

```
void MC_SixStep_Current_Reference_Stop (void)
```

```
void MC_SixStep_Current_Reference_Setvalue (uint16_t)
```

---

## Detailed Description

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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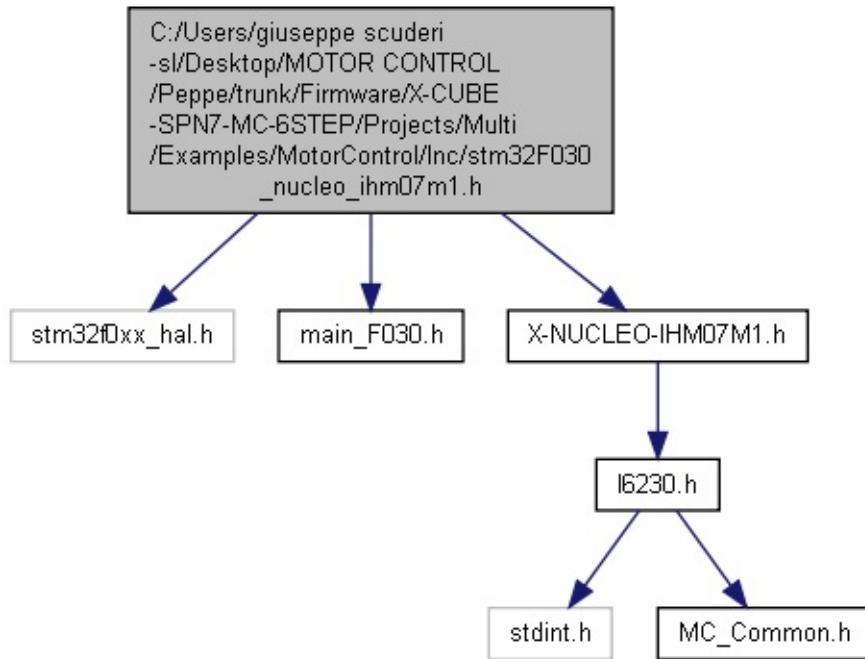
Macros | Functions

## stm32F030\_nucleo\_ihm07m1.h File Reference

This file provides the interface between the MC-lib and STM Nucleo.  
[More...](#)

```
#include "stm32f0xx_hal.h" #include "main_F030.h"  
#include "X-NUCLEO-IHM07M1.h"
```

Include dependency graph for stm32F030\_nucleo\_ihm07m1.h:



[Go to the source code of this file.](#)

## Macros

```
#define HF_TIMx htim1
```

```
#define LF_TIMx htim6
```

```
#define HALL_ENCODER_TIMx htim2
```

```
#define ADCx hadc
```

```
#define REFx htim3
```

```
#define UART huart2
```

```
#define GPIO_PORT_1 GPIOC
```

```
#define GPIO_CH1 GPIO_PIN_10
```

```
#define GPIO_PORT_2 GPIOC
```

```
#define GPIO_CH2 GPIO_PIN_11
```

```
#define GPIO_PORT_3 GPIOC
```

```
#define GPIO_CH3 GPIO_PIN_12
```

```
#define GPIO_SET GPIO_PIN_SET
```

```
#define GPIO_RESET GPIO_PIN_RESET
```

```
#define ADC_CH_1 ADC_CHANNEL_11 /*CURRENT*/
```

```
#define ADC_CH_2 ADC_CHANNEL_9 /*SPEED*/
```

```
#define ADC_CH_3 ADC_CHANNEL_1 /*VBUS*/
```

```
#define ADC_CH_4 ADC_CHANNEL_12 /*TEMP*/  
  
#define ADC_Bemf_CH1 ADC_CHANNEL_13 /*BEMF1*/  
  
#define ADC_Bemf_CH2 ADC_CHANNEL_8 /*BEMF2*/  
  
#define ADC_Bemf_CH3 ADC_CHANNEL_7 /*BEMF3*/  
  
#define ADC_CH_1_ST ADC_SAMPLETIME_1CYCLE_5  
/*CURRENT sampling time */  
  
#define ADC_CH_2_ST ADC_SAMPLETIME_1CYCLE_5 /*SPEED  
sampling time*/  
  
#define ADC_CH_3_ST ADC_SAMPLETIME_1CYCLE_5 /*VBUS  
sampling time*/  
  
#define ADC_CH_4_ST ADC_SAMPLETIME_1CYCLE_5 /*TEMP  
sampling time*/  
  
#define ADC_Bemf_CH1_ST ADC_SAMPLETIME_1CYCLE_5  
/*BEMF1 sampling time*/  
  
#define ADC_Bemf_CH2_ST ADC_SAMPLETIME_1CYCLE_5  
/*BEMF2 sampling time*/  
  
#define ADC_Bemf_CH3_ST ADC_SAMPLETIME_1CYCLE_5  
/*BEMF3 sampling time*/  
  
#define HF_TIMx_CH1 TIM_CHANNEL_1  
  
#define HF_TIMx_CH2 TIM_CHANNEL_2  
  
#define HF_TIMx_CH3 TIM_CHANNEL_3  
  
#define HF_TIMx_CCR1 CCR1 /*Channel 1*/  
  
#define HF_TIMx_CCR2 CCR2 /*Channel 2*/
```

```
#define HF_TIMx_CCR3 CCR3 /*Channel 3*/  
  
#define DAC_ENABLE 0  
  
#define DACx htim3  
  
#define DAC_CH TIM_CHANNEL_2  
  
#define CCRx CCR2  
  
#define GPIO_PORT_ZCR GPIOC  
  
#define GPIO_CH_ZCR GPIO_PIN_7  
  
#define GPIO_PORT_COMM GPIOC  
  
#define GPIO_CH_COMM GPIO_PIN_4  
  
#define STARTM_CMD 0  
  
#define STOPMT_CMD 1  
  
#define SETSPD_CMD 2  
  
#define GETSPD_CMD 3  
  
#define INIREF_CMD 4  
  
#define POLESP_CMD 5  
  
#define ACCELE_CMD 6  
  
#define DMGCTR_CMD 7  
  
#define MAXDMG_CMD 8
```

```
#define MINDMG_CMD 9
```

```
#define KP_PRM_CMD 10
```

```
#define KI_PRM_CMD 11
```

```
#define POTENZ_CMD 12
```

```
#define HELP_CMD 13
```

```
#define STATUS_CMD 14
```

```
#define DIRECT_CMD 15
```

---

## Functions

```
void MC_SixStep_ADC_Channel (uint32_t)
```

API function for STM32 instruction.

```
void MC_SixStep_Nucleo_Init (void)
```

```
void START_Ref_Generation (void)
```

```
void STOP_Ref_Generation (void)
```

```
void Set_Ref_Generation (uint16_t)
```

```
void Bemf_delay_calc (void)
```

```
void START_DAC (void)
```

```
void STOP_DAC (void)
```

```
void SET_DAC_value (uint16_t)
```

```
uint32_t Get_UART_Data (void)
```

```
void MC_SixStep_EnableInput_CH1_E_CH2_E_CH3_D (void)
```

```
void MC_SixStep_EnableInput_CH1_E_CH2_D_CH3_E (void)
```

```
void MC_SixStep_EnableInput_CH1_D_CH2_E_CH3_E (void)
```

```
void MC_SixStep_DisableInput_CH1_D_CH2_D_CH3_D (void)
```

```
void MC_SixStep_Start_PWM_driving (void)
```

```
void MC_SixStep_Stop_PWM_driving (void)
```

```
void MC_SixStep_HF_TIMx_SetDutyCycle_CH1 (uint16_t)
```

```
void MC_SixStep_HF_TIMx_SetDutyCycle_CH2 (uint16_t)
```

```
void MC_SixStep_HF_TIMx_SetDutyCycle_CH3 (uint16_t)
```

```
void MC_SixStep_Current_Reference_Start (void)
```

```
void MC_SixStep_Current_Reference_Stop (void)
```

```
void MC_SixStep_Current_Reference_Setvalue (uint16_t)
```

---

## Detailed Description

---

This file provides the interface between the MC-lib and STM Nucleo.

**Author**

System lab - Automation and Motion control team

**Version**

V1.0.0

**Date**

06-July-2015

**Attention**

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# Macro Definition Documentation

---

**#define ACCELE\_CMD 6**

---

Set the Accelleration for Start-up of the motor command received

**#define CCRx CCR2**

---

TIM channel number for DAC output (CCR<sub>x</sub>)

**#define DAC\_CH TIM\_CHANNEL\_2**

---

TIM channel for DAC output

**#define DACx htim3**

---

TIM peripheral for DAC output

**#define DIRECT\_CMD 15**

---

Get the motor direction

**#define DMGCTR\_CMD 7**

---

Enable the DEMAG dynamic control command received

**#define GETSPD\_CMD 3**

---

Get Mechanical Motor Speed command received

---

```
#define GPIO_CH_COMM GPIO_PIN_4
```

---

GPIO pin name for 6Step commutation

---

```
#define GPIO_CH_ZCR GPIO_PIN_7
```

---

GPIO pin name for zero crossing detection

---

```
#define GPIO_PORT_COMM GPIOC
```

---

GPIO port name for 6Step commutation

---

```
#define GPIO_PORT_ZCR GPIOC
```

---

GPIO port name for zero crossing detection

---

```
#define HELP_CMD 13
```

---

Help command received

---

```
#define INIREF_CMD 4
```

---

Set the new STARUP\_CURRENT\_REFERENCE value command received

---

```
#define KI_PRM_CMD 11
```

---

Set the KI PI param command received

---

```
#define KP_PRM_CMD 10
```

---

Set the KP PI param command received

---

```
#define MAXDMG_CMD 8
```

---

Set the BEMF Demagn MAX command received

---

```
#define MINDMG_CMD 9
```

---

Set the BEMF Demagn MIN command received

---

```
#define POLESP_CMD 5
```

---

Set the Pole Pairs value command received

---

```
#define POTENZ_CMD 12
```

---

Enable Potentiometer command received

---

```
#define SETSPD_CMD 2
```

---

Set the new speed value command received

---

```
#define STARTM_CMD 0
```

---

Start Motor command received

---

**#define STATUS\_CMD 14**

---

Get the Status of the system command received

---

**#define STOPMT\_CMD 1**

---

Stop Motor command received

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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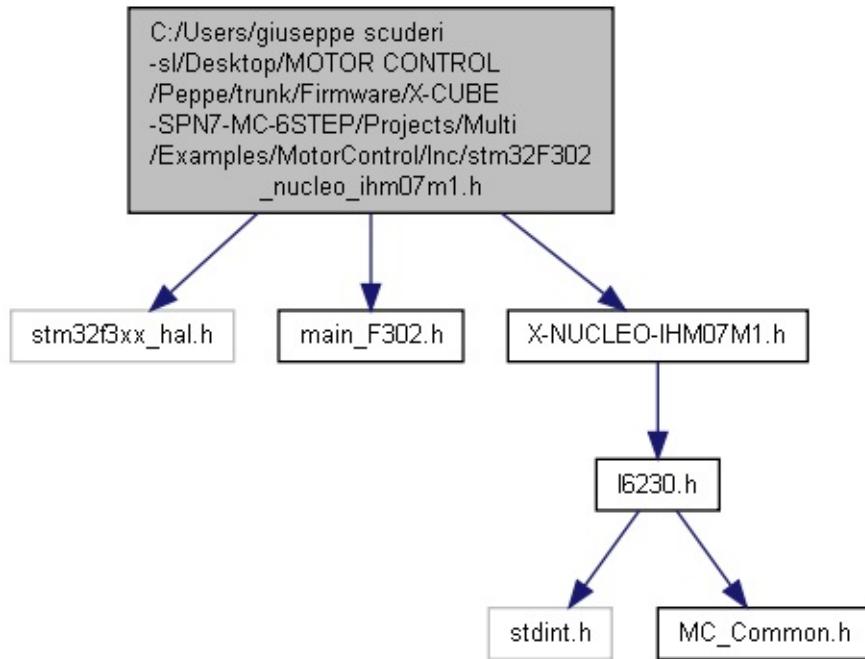
Macros | Functions

## stm32F302\_nucleo\_ihm07m1.h File Reference

This file provides the interface between the MC-lib and STM Nucleo.  
[More...](#)

```
#include "stm32f3xx_hal.h" #include "main_F302.h"  
#include "X-NUCLEO-IHM07M1.h"
```

Include dependency graph for stm32F302\_nucleo\_ihm07m1.h:



[Go to the source code of this file.](#)

## Macros

```
#define HF_TIMx htim1
```

```
#define LF_TIMx htim6
```

```
#define HALL_ENCODER_TIMx htim2
```

```
#define ADCx hadc1
```

```
#define REFx htim16
```

```
#define UART huart2
```

```
#define GPIO_PORT_1 GPIOC
```

```
#define GPIO_CH1 GPIO_PIN_10
```

```
#define GPIO_PORT_2 GPIOC
```

```
#define GPIO_CH2 GPIO_PIN_11
```

```
#define GPIO_PORT_3 GPIOC
```

```
#define GPIO_CH3 GPIO_PIN_12
```

```
#define GPIO_SET GPIO_PIN_SET
```

```
#define GPIO_RESET GPIO_PIN_RESET
```

```
#define ADC_CH_1 ADC_CHANNEL_7 /*CURRENT*/
```

```
#define ADC_CH_2 ADC_CHANNEL_12 /*SPEED*/
```

```
#define ADC_CH_3 ADC_CHANNEL_2 /*VBUS*/
```

```
#define ADC_CH_4 ADC_CHANNEL_8 /*TEMP*/  
  
#define ADC_Bemf_CH1 ADC_CHANNEL_9 /*BEMF1*/  
  
#define ADC_Bemf_CH2 ADC_CHANNEL_11 /*BEMF2*/  
  
#define ADC_Bemf_CH3 ADC_CHANNEL_15 /*BEMF3*/  
  
#define ADC_CH_1_ST ADC_SAMPLETIME_1CYCLE_5  
/*CURRENT sampling time */  
  
#define ADC_CH_2_ST ADC_SAMPLETIME_181CYCLES_5  
/*SPEED sampling time*/  
  
#define ADC_CH_3_ST ADC_SAMPLETIME_181CYCLES_5  
/*VBUS sampling time*/  
  
#define ADC_CH_4_ST ADC_SAMPLETIME_181CYCLES_5  
/*TEMP sampling time*/  
  
#define ADC_Bemf_CH1_ST ADC_SAMPLETIME_61CYCLES_5  
/*BEMF1 sampling time*/  
  
#define ADC_Bemf_CH2_ST ADC_SAMPLETIME_61CYCLES_5  
/*BEMF2 sampling time*/  
  
#define ADC_Bemf_CH3_ST ADC_SAMPLETIME_61CYCLES_5  
/*BEMF3 sampling time*/  
  
#define HF_TIMx_CH1 TIM_CHANNEL_1  
  
#define HF_TIMx_CH2 TIM_CHANNEL_2  
  
#define HF_TIMx_CH3 TIM_CHANNEL_3  
  
#define HF_TIMx_CCR1 CCR1 /*Channel 1*/  
  
#define HF_TIMx_CCR2 CCR2 /*Channel 2*/
```

```
#define HF_TIMx_CCR3 CCR3 /*Channel 3*/  
  
#define DAC_ENABLE 1  
  
#define DACx hdac  
  
#define DACx_CH DAC1_CHANNEL_1  
  
#define DACx_ALIGN DAC_ALIGN_12B_L  
  
#define GPIO_PORT_ZCR GPIOC  
  
#define GPIO_CH_ZCR GPIO_PIN_7  
  
#define GPIO_PORT_COMM GPIOC  
  
#define GPIO_CH_COMM GPIO_PIN_4  
  
#define STARTM_CMD 0  
  
#define STOPMT_CMD 1  
  
#define SETSPD_CMD 2  
  
#define GETSPD_CMD 3  
  
#define INIREF_CMD 4  
  
#define POLESP_CMD 5  
  
#define ACCELE_CMD 6  
  
#define KP_PRM_CMD 7  
  
#define KI_PRM_CMD 8
```

```
#define POTENZ_CMD 9
```

```
#define HELP_CMD 10
```

```
#define STATUS_CMD 11
```

```
#define DIRECT_CMD 12
```

---

## Functions

uint32\_t **Get\_UART\_Data** (void)

API function for STM32 instruction.

void **MC\_SixStep\_ADC\_Channel** (uint32\_t)

void **MC\_SixStep\_Nucleo\_Init** (void)

void **START\_Ref\_Generation** (void)

void **STOP\_Ref\_Generation** (void)

void **Set\_Ref\_Generation** (uint16\_t)

void **START\_DAC** (void)

void **STOP\_DAC** (void)

void **SET\_DAC\_value** (uint16\_t)

void **Bemf\_delay\_calc** (void)

void **MC\_SixStep\_EnableInput\_CH1\_E\_CH2\_E\_CH3\_D** (void)

void **MC\_SixStep\_EnableInput\_CH1\_E\_CH2\_D\_CH3\_E** (void)

void **MC\_SixStep\_EnableInput\_CH1\_D\_CH2\_E\_CH3\_E** (void)

void **MC\_SixStep\_DisableInput\_CH1\_D\_CH2\_D\_CH3\_D** (void)

void **MC\_SixStep\_Start\_PWM\_driving** (void)

void **MC\_SixStep\_Stop\_PWM\_driving** (void)

```
void MC_SixStep_HF_TIMx_SetDutyCycle_CH1 (uint16_t)
```

```
void MC_SixStep_HF_TIMx_SetDutyCycle_CH2 (uint16_t)
```

```
void MC_SixStep_HF_TIMx_SetDutyCycle_CH3 (uint16_t)
```

```
void MC_SixStep_Current_Reference_Start (void)
```

```
void MC_SixStep_Current_Reference_Stop (void)
```

```
void MC_SixStep_Current_Reference_Setvalue (uint16_t)
```

---

## Detailed Description

---

This file provides the interface between the MC-lib and STM Nucleo.

**Author**

System lab - Automation and Motion control team

**Version**

V1.0.0

**Date**

06-July-2015

**Attention**

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# Macro Definition Documentation

---

**#define ACCELE\_CMD 6**

---

Set the Accelleration for Start-up of the motor command received

**#define DAC\_ENABLE 1**

---

Enable (1) the DAC peripheral

**#define DACx\_ALIGN DAC\_ALIGN\_12B\_L**

---

DAC Aligment value

**#define DACx\_CH DAC1\_CHANNEL\_1**

---

DAC Channel

**#define DIRECT\_CMD 12**

---

Get the motor direction

**#define GETSPD\_CMD 3**

---

Get Mechanical Motor Speed command received

**#define GPIO\_CH\_COMM GPIO\_PIN\_4**

---

GPIO pin name for 6Step commutation

---

```
#define GPIO_CH_ZCR GPIO_PIN_7
```

---

GPIO pin name for zero crossing detection

---

```
#define GPIO_PORT_COMM GPIOC
```

---

GPIO port name for 6Step commutation

---

```
#define GPIO_PORT_ZCR GPIOC
```

---

GPIO port name for zero crossing detection

---

```
#define HELP_CMD 10
```

---

Help command received

---

```
#define INIREF_CMD 4
```

---

Set the new STARUP\_CURRENT\_REFERENCE value command received

---

```
#define KI_PRM_CMD 8
```

---

Set the KI PI param command received

---

```
#define KP_PRM_CMD 7
```

---

Set the KP PI param command received

---

```
#define POLESP_CMD 5
```

---

Set the Pole Pairs value command received

---

```
#define POTENZ_CMD 9
```

---

Enable Potentiometer command received

---

```
#define SETSPD_CMD 2
```

---

Set the new speed value command received

---

```
#define STARTM_CMD 0
```

---

Start Motor command received

---

```
#define STATUS_CMD 11
```

---

Get the Status of the system command received

---

```
#define STOPMT_CMD 1
```

---

Stop Motor command received

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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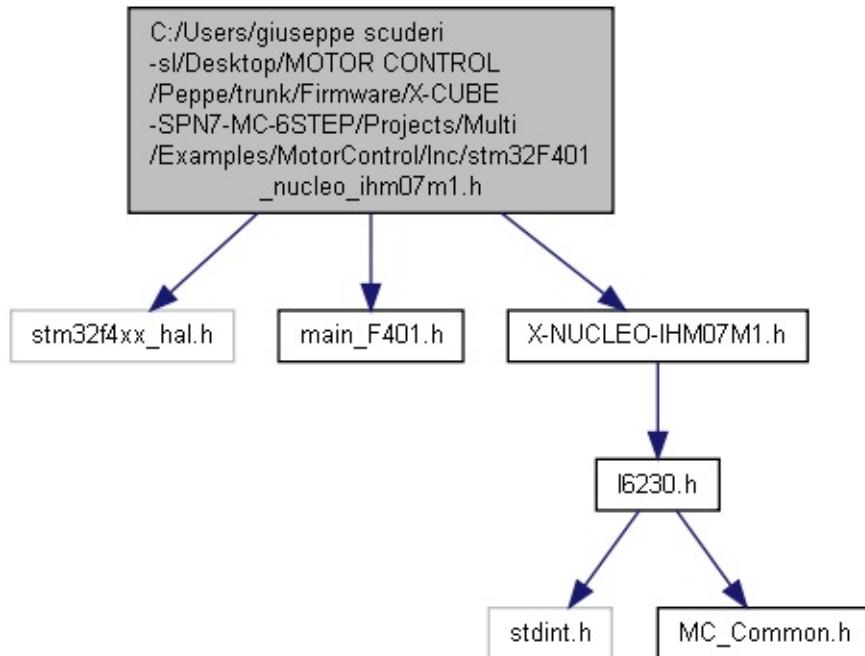
Macros | Functions

## stm32F401\_nucleo\_ihm07m1.h File Reference

This file provides the interface between the MC-lib and STM Nucleo.  
[More...](#)

```
#include "stm32f4xx_hal.h" #include "main_F401.h"  
#include "X-NUCLEO-IHM07M1.h"
```

Include dependency graph for stm32F401\_nucleo\_ihm07m1.h:



[Go to the source code of this file.](#)

## Macros

```
#define HF_TIMx htim1
```

```
#define LF_TIMx htim4
```

```
#define HALL_ENCODER_TIMx htim2
```

```
#define ADCx hadc1
```

```
#define DACx htim3
```

```
#define UART huart2
```

```
#define GPIO_PORT_1 GPIOC
```

```
#define GPIO_CH1 GPIO_PIN_10
```

```
#define GPIO_PORT_2 GPIOC
```

```
#define GPIO_CH2 GPIO_PIN_11
```

```
#define GPIO_PORT_3 GPIOC
```

```
#define GPIO_CH3 GPIO_PIN_12
```

```
#define GPIO_SET GPIO_PIN_SET
```

```
#define GPIO_RESET GPIO_PIN_RESET
```

```
#define ADC_CH_1 ADC_CHANNEL_11 /*CURRENT*/
```

```
#define ADC_CH_2 ADC_CHANNEL_9 /*SPEED*/
```

```
#define ADC_CH_3 ADC_CHANNEL_1 /*VBUS*/
```

```
#define ADC_CH_4 ADC_CHANNEL_12 /*TEMP*/  
  
#define ADC_Bemf_CH1 ADC_CHANNEL_13 /*BEMF1*/  
  
#define ADC_Bemf_CH2 ADC_CHANNEL_8 /*BEMF2*/  
  
#define ADC_Bemf_CH3 ADC_CHANNEL_7 /*BEMF3*/  
  
#define ADC_CH_1_ST ADC_SAMPLETIME_3CYCLES  
/*CURRENT sampling time */  
  
#define ADC_CH_2_ST ADC_SAMPLETIME_84CYCLES /*SPEED  
sampling time*/  
  
#define ADC_CH_3_ST ADC_SAMPLETIME_84CYCLES /*VBUS  
sampling time*/  
  
#define ADC_CH_4_ST ADC_SAMPLETIME_84CYCLES /*TEMP  
sampling time*/  
  
#define ADC_Bemf_CH1_ST ADC_SAMPLETIME_28CYCLES  
/*BEMF1 sampling time*/  
  
#define ADC_Bemf_CH2_ST ADC_SAMPLETIME_28CYCLES  
/*BEMF2 sampling time*/  
  
#define ADC_Bemf_CH3_ST ADC_SAMPLETIME_28CYCLES  
/*BEMF3 sampling time*/  
  
#define HF_TIMx_CH1 TIM_CHANNEL_1  
  
#define HF_TIMx_CH2 TIM_CHANNEL_2  
  
#define HF_TIMx_CH3 TIM_CHANNEL_3  
  
#define HF_TIMx_CCR1 CCR1 /*Channel 1*/  
  
#define HF_TIMx_CCR2 CCR2 /*Channel 2*/
```

```
#define HF_TIMx_CCR3 CCR3 /*Channel 3*/  
  
#define DAC_ENABLE 0  
  
#define GPIO_PORT_ZCR GPIOC  
  
#define GPIO_CH_ZCR GPIO_PIN_7  
  
#define GPIO_PORT_COMM GPIOC  
  
#define GPIO_CH_COMM GPIO_PIN_4  
  
#define STARTM_CMD 0  
  
#define STOPMT_CMD 1  
  
#define SETSPD_CMD 2  
  
#define GETSPD_CMD 3  
  
#define INIREF_CMD 4  
  
#define POLESP_CMD 5  
  
#define ACCELE_CMD 6  
  
#define KP_PRM_CMD 7  
  
#define KI_PRM_CMD 8  
  
#define POTENZ_CMD 9  
  
#define HELP_CMD 10  
  
#define STATUS_CMD 11
```

```
#define DIRECT_CMD 12
```

---

## Functions

```
void MC_SixStep_ADC_Channel (uint32_t)  
API function for STM32 instruction.
```

```
void MC_SixStep_Nucleo_Init (void)
```

```
void START_Ref_Generation (void)
```

```
void STOP_Ref_Generation (void)
```

```
void Set_Ref_Generation (uint16_t)
```

```
void START_DAC (void)
```

```
void STOP_DAC (void)
```

```
void SET_DAC_value (uint16_t)
```

```
void Bemf_delay_calc (void)
```

```
uint32_t Get_UART_Data (void)
```

```
void MC_SixStep_EnableInput_CH1_E_CH2_E_CH3_D (void)
```

```
void MC_SixStep_EnableInput_CH1_E_CH2_D_CH3_E (void)
```

```
void MC_SixStep_EnableInput_CH1_D_CH2_E_CH3_E (void)
```

```
void MC_SixStep_DisableInput_CH1_D_CH2_D_CH3_D (void)
```

```
void MC_SixStep_Start_PWM_driving (void)
```

```
void MC_SixStep_Stop_PWM_driving (void)
```

```
void MC_SixStep_HF_TIMx_SetDutyCycle_CH1 (uint16_t)
```

```
void MC_SixStep_HF_TIMx_SetDutyCycle_CH2 (uint16_t)
```

```
void MC_SixStep_HF_TIMx_SetDutyCycle_CH3 (uint16_t)
```

```
void MC_SixStep_Current_Reference_Start (void)
```

```
void MC_SixStep_Current_Reference_Stop (void)
```

```
void MC_SixStep_Current_Reference_Setvalue (uint16_t)
```

---

## Detailed Description

---

This file provides the interface between the MC-lib and STM Nucleo.

**Author**

System lab - Automation and Motion control team

**Version**

V1.0.0

**Date**

06-July-2015

**Attention**

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# Macro Definition Documentation

---

**#define ACCELE\_CMD 6**

---

Set the Accelleration for Start-up of the motor command received

**#define DAC\_ENABLE 0**

---

Enable (1) the DAC peripheral

**#define DIRECT\_CMD 12**

---

Get the motor direction

**#define GETSPD\_CMD 3**

---

Get Mechanical Motor Speed command received

**#define GPIO\_CH\_COMM GPIO\_PIN\_4**

---

GPIO pin name for 6Step commutation

**#define GPIO\_CH\_ZCR GPIO\_PIN\_7**

---

GPIO pin name for zero crossing detection

**#define GPIO\_PORT\_COMM GPIOC**

---

GPIO port name for 6Step commutation

---

**#define GPIO\_PORT\_ZCR GPIOC**

---

GPIO port name for zero crossing detection

---

**#define HELP\_CMD 10**

---

Help command received

---

**#define INIREF\_CMD 4**

---

Set the new STARUP\_CURRENT\_REFERENCE value command received

---

**#define KI\_PRM\_CMD 8**

---

Set the KI PI param command received

---

**#define KP\_PRM\_CMD 7**

---

Set the KP PI param command received

---

**#define POLESP\_CMD 5**

---

Set the Pole Pairs value command received

---

**#define POTENZ\_CMD 9**

---

Enable Potentiometer command received

---

```
#define SETSPD_CMD 2
```

---

Set the new speed value command received

---

```
#define STARTM_CMD 0
```

---

Start Motor command received

---

```
#define STATUS_CMD 11
```

---

Get the Status of the system command received

---

```
#define STOPMT_CMD 1
```

---

Stop Motor command received

---

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[doxygen](#) 1.8.9.1

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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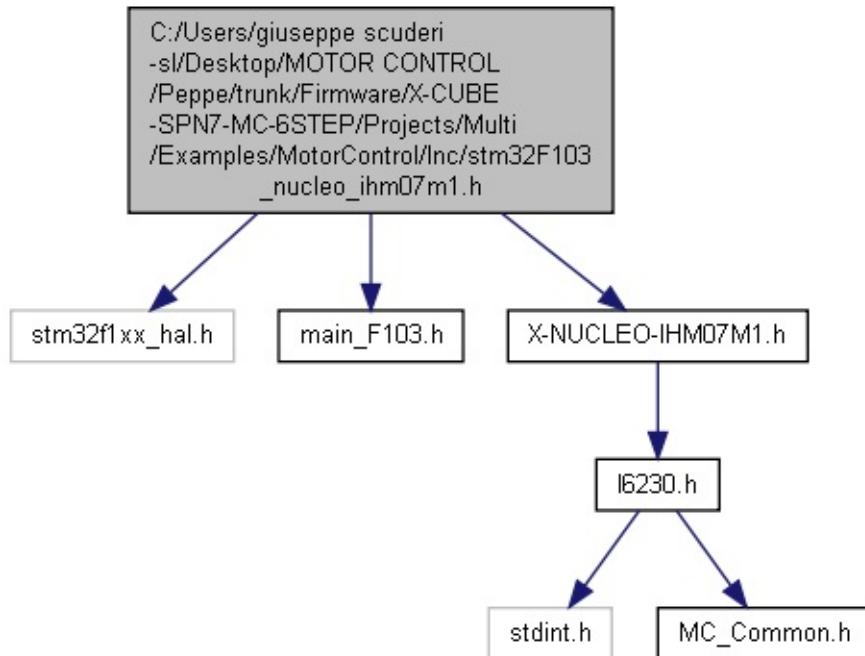
Macros | Functions

## stm32F103\_nucleo\_ihm07m1.h File Reference

This file provides the interface between the MC-lib and STM Nucleo.  
[More...](#)

```
#include "stm32f1xx_hal.h" #include "main_F103.h"  
#include "X-NUCLEO-IHM07M1.h"
```

Include dependency graph for stm32F103\_nucleo\_ihm07m1.h:



[Go to the source code of this file.](#)

## Macros

```
#define HF_TIMx htim1
```

```
#define LF_TIMx htim4
```

```
#define HALL_ENCODER_TIMx htim2
```

```
#define ADCx hadc1
```

```
#define REFx htim3
```

```
#define UART huart2
```

```
#define GPIO_PORT_1 GPIOC
```

```
#define GPIO_CH1 GPIO_PIN_10
```

```
#define GPIO_PORT_2 GPIOC
```

```
#define GPIO_CH2 GPIO_PIN_11
```

```
#define GPIO_PORT_3 GPIOC
```

```
#define GPIO_CH3 GPIO_PIN_12
```

```
#define GPIO_SET GPIO_PIN_SET
```

```
#define GPIO_RESET GPIO_PIN_RESET
```

```
#define ADC_CH_1 ADC_CHANNEL_11 /*CURRENT*/
```

```
#define ADC_CH_2 ADC_CHANNEL_9 /*SPEED*/
```

```
#define ADC_CH_3 ADC_CHANNEL_1 /*VBUS*/
```

```
#define ADC_CH_4 ADC_CHANNEL_12 /*TEMP*/  
  
#define ADC_Bemf_CH1 ADC_CHANNEL_13 /*BEMF1*/  
  
#define ADC_Bemf_CH2 ADC_CHANNEL_8 /*BEMF2*/  
  
#define ADC_Bemf_CH3 ADC_CHANNEL_7 /*BEMF3*/  
  
#define ADC_CH_1_ST ADC_SAMPLETIME_1CYCLE_5  
/*CURRENT sampling time */  
  
#define ADC_CH_2_ST ADC_SAMPLETIME_28CYCLES_5  
/*SPEED sampling time*/  
  
#define ADC_CH_3_ST ADC_SAMPLETIME_28CYCLES_5  
/*VBUS sampling time*/  
  
#define ADC_CH_4_ST ADC_SAMPLETIME_28CYCLES_5  
/*TEMP sampling time*/  
  
#define ADC_Bemf_CH1_ST ADC_SAMPLETIME_28CYCLES_5  
/*BEMF1 sampling time*/  
  
#define ADC_Bemf_CH2_ST ADC_SAMPLETIME_28CYCLES_5  
/*BEMF2 sampling time*/  
  
#define ADC_Bemf_CH3_ST ADC_SAMPLETIME_28CYCLES_5  
/*BEMF3 sampling time*/  
  
#define HF_TIMx_CH1 TIM_CHANNEL_1  
  
#define HF_TIMx_CH2 TIM_CHANNEL_2  
  
#define HF_TIMx_CH3 TIM_CHANNEL_3  
  
#define HF_TIMx_CCR1 CCR1 /*Channel 1*/  
  
#define HF_TIMx_CCR2 CCR2 /*Channel 2*/
```

```
#define HF_TIMx_CCR3 CCR3 /*Channel 3*/  
  
#define DAC_ENABLE 0  
  
#define DACx htim3  
  
#define DAC_CH TIM_CHANNEL_2  
  
#define CCRx CCR2  
  
#define GPIO_PORT_ZCR GPIOC  
  
#define GPIO_CH_ZCR GPIO_PIN_7  
  
#define GPIO_PORT_COMM GPIOC  
  
#define GPIO_CH_COMM GPIO_PIN_4  
  
#define STARTM_CMD 0  
  
#define STOPMT_CMD 1  
  
#define SETSPD_CMD 2  
  
#define GETSPD_CMD 3  
  
#define INIREF_CMD 4  
  
#define POLESP_CMD 5  
  
#define ACCELE_CMD 6  
  
#define DMGCTR_CMD 7  
  
#define MAXDMG_CMD 8
```

```
#define MINDMG_CMD 9
```

```
#define KP_PRM_CMD 10
```

```
#define KI_PRM_CMD 11
```

```
#define POTENZ_CMD 12
```

```
#define HELP_CMD 13
```

```
#define STATUS_CMD 14
```

```
#define DIRECT_CMD 15
```

---

## Functions

```
void MC_SixStep_ADC_Channel (uint32_t)  
API function for STM32 instruction.
```

```
void MC_SixStep_Nucleo_Init (void)
```

```
void START_Ref_Generation (void)
```

```
void STOP_Ref_Generation (void)
```

```
void Set_Ref_Generation (uint16_t)
```

```
void START_DAC (void)
```

```
void STOP_DAC (void)
```

```
void SET_DAC_value (uint16_t)
```

```
void Bemf_delay_calc (void)
```

```
uint32_t Get_UART_Data (void)
```

```
void MC_SixStep_EnableInput_CH1_E_CH2_E_CH3_D (void)
```

```
void MC_SixStep_EnableInput_CH1_E_CH2_D_CH3_E (void)
```

```
void MC_SixStep_EnableInput_CH1_D_CH2_E_CH3_E (void)
```

```
void MC_SixStep_DisableInput_CH1_D_CH2_D_CH3_D (void)
```

```
void MC_SixStep_Start_PWM_driving (void)
```

```
void MC_SixStep_Stop_PWM_driving (void)
```

```
void MC_SixStep_HF_TIMx_SetDutyCycle_CH1 (uint16_t)
```

```
void MC_SixStep_HF_TIMx_SetDutyCycle_CH2 (uint16_t)
```

```
void MC_SixStep_HF_TIMx_SetDutyCycle_CH3 (uint16_t)
```

```
void MC_SixStep_Current_Reference_Start (void)
```

```
void MC_SixStep_Current_Reference_Stop (void)
```

```
void MC_SixStep_Current_Reference_Setvalue (uint16_t)
```

---

## Detailed Description

---

This file provides the interface between the MC-lib and STM Nucleo.

**Author**

System lab - Automation and Motion control team

**Version**

V1.0.0

**Date**

06-July-2015

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# Macro Definition Documentation

---

**#define ACCELE\_CMD 6**

---

Set the Accelleration for Start-up of the motor command received

**#define CCRx CCR2**

---

TIM channel number for DAC output (CCR<sub>x</sub>)

**#define DAC\_CH TIM\_CHANNEL\_2**

---

TIM channel for DAC output

**#define DAC\_ENABLE 0**

---

Enable (1) the DAC peripheral

**#define DACx htim3**

---

TIM peripheral for DAC output

**#define DIRECT\_CMD 15**

---

Get the motor direction

**#define DMGCTR\_CMD 7**

---

Enable the DEMAG dynamic control command received

---

```
#define GETSPD_CMD 3
```

---

Get Mechanical Motor Speed command received

---

```
#define GPIO_CH_COMM GPIO_PIN_4
```

---

GPIO pin name for 6Step commutation

---

```
#define GPIO_CH_ZCR GPIO_PIN_7
```

---

GPIO pin name for zero crossing detection

---

```
#define GPIO_PORT_COMM GPIOC
```

---

GPIO port name for 6Step commutation

---

```
#define GPIO_PORT_ZCR GPIOC
```

---

GPIO port name for zero crossing detection

---

```
#define HELP_CMD 13
```

---

Help command received

---

```
#define INIREF_CMD 4
```

---

Set the new STARUP\_CURRENT\_REFERENCE value command received

---

**#define KI\_PRM\_CMD 11**

Set the KI PI param command received

---

**#define KP\_PRM\_CMD 10**

Set the KP PI param command received

---

**#define MAXDMG\_CMD 8**

Set the BEMF Demagn MAX command received

---

**#define MINDMG\_CMD 9**

Set the BEMF Demagn MIN command received

---

**#define POLESP\_CMD 5**

Set the Pole Pairs value command received

---

**#define POTENZ\_CMD 12**

Enable Potentiometer command received

---

**#define SETSPD\_CMD 2**

Set the new speed value command received

---

```
#define STARTM_CMD 0
```

---

Start Motor command received

---

```
#define STATUS_CMD 14
```

---

Get the Status of the system command received

---

```
#define STOPMT_CMD 1
```

---

Stop Motor command received

---

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 doxygen 1.8.9.1

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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Macros

## Main\_Motor\_parameters

MIDDLEWARES » MC\_6-STEP\_LIB

All motor parameters for 6Step driving. [More...](#)

Collaboration diagram for Main\_Motor\_parameters:



## Macros

---

```
#define NUM_POLE_PAIRS 7  
  
#define DIRECTION 0  
  
#define TARGET_SPEED 3000  
  
#define POTENTIOMETER 1  
  
#define STARTUP_CURRENT_REFERENCE 2000  
  
#define ACC 600000  
  
#define MINIMUM_ACC 500  
  
#define NUMBER_OF_STEPS 20000  
  
#define TIME_FOR_ALIGN 500  
  
#define BUTTON_DELAY 1000  
  
#define NUMBER_ZCR 12  
  
#define SPEED_LOOP_TIME 1  
  
#define KP_GAIN 8000  
  
#define KI_GAIN 50  
  
#define KP_DIV 4096  
  
#define KI_DIV 4096  
  
#define LOWER_OUT_LIMIT 120
```

```
#define UPPER_OUT_LIMIT 2000  
  
#define MAX_POT_SPEED 10000  
  
#define MIN_POT_SPEED 1500  
  
#define VAL_POT_SPEED_DIV 2  
  
#define INITIAL_DEMAGN_DELAY 10  
  
#define BEMF_THRSLD_DOWN 200  
  
#define BEMF_THRSLD_UP 200  
  
#define FILTER_DEEP 20  
  
#define HFBUFFERSIZE 10  
  
#define ADC_SPEED_TH 82  
  
#define BEMF_CONSEC_DOWN_MAX 10  
  
#define BEMF_CNT_EVENT_MAX 100  
  
#define GPIO_ZERO_CROSS 1  
  
#define GPIO_COMM 1  
  
#define DEMO_START_TIME 5000  
  
#define DEMO_STOP_TIME 2000  
  
#define DEMAGN_VAL_1 1  
  
#define DEMAGN_VAL_2 2  
  
#define DEMAGN_VAL_3 3
```

```
#define DEMAGN_VAL_4 4
#define DEMAGN_VAL_5 5
#define DEMAGN_VAL_6 6
#define DEMAGN_VAL_7 7
#define DEMAGN_VAL_8 8
#define DEMAGN_VAL_9 9
#define DEMAGN_VAL_10 10
#define DEMAGN_VAL_11 11
#define DEMAGN_VAL_12 12
#define DEMAGN_VAL_13 13
#define DEMAGN_VAL_14 14
#define TRUE 1
#define FALSE 0
#define NUM_POLE_PAIRS 7
#define DIRECTION 0
#define TARGET_SPEED 3000
#define POTENTIOMETER 1
#define STARTUP_CURRENT_REFERENCE 2000
```

```
#define ACC 600000

#define MINIMUM_ACC 500

#define NUMBER_OF_STEPS 20000

#define TIME_FOR_ALIGN 500

#define BUTTON_DELAY 1000

#define NUMBER_ZCR 12

#define SPEED_LOOP_TIME 4

#define KP_GAIN 2000

#define KI_GAIN 100

#define KP_DIV 4096

#define KI_DIV 4096

#define LOWER_OUT_LIMIT 120

#define UPPER_OUT_LIMIT 2000

#define MAX_POT_SPEED 7000

#define MIN_POT_SPEED 1500

#define VAL_POT_SPEED_DIV 2

#define INITIAL_DEMAGN_DELAY 5

#define BEMF_THRSLD_DOWN 200

#define BEMF_THRSLD_UP 200
```

```
#define FILTER_DEEP 9
```

```
#define HFBUFFERSIZE 10
```

```
#define ADC_SPEED_TH 82
```

```
#define BEMF_CONSEC_DOWN_MAX 10
```

```
#define BEMF_CNT_EVENT_MAX 100
```

```
#define GPIO_ZERO_CROSS 1
```

```
#define GPIO_COMM 1
```

```
#define DEMO_START_TIME 10000
```

```
#define DEMO_STOP_TIME 5000
```

```
#define DEMAGN_VAL_1 1
```

```
#define DEMAGN_VAL_2 2
```

```
#define DEMAGN_VAL_3 3
```

```
#define DEMAGN_VAL_4 4
```

```
#define DEMAGN_VAL_5 5
```

```
#define DEMAGN_VAL_6 6
```

```
#define DEMAGN_VAL_7 7
```

```
#define DEMAGN_VAL_8 8
```

```
#define DEMAGN_VAL_9 9
```

```
#define DEMAGN_VAL_10 10
```

```
#define DEMAGN_VAL_11 11
```

```
#define DEMAGN_VAL_12 12
```

```
#define DEMAGN_VAL_13 13
```

```
#define DEMAGN_VAL_14 14
```

```
#define TRUE 1
```

```
#define FALSE 0
```

```
#define NUM_POLE_PAIRS 7
```

```
#define DIRECTION 0
```

```
#define TARGET_SPEED 3000
```

```
#define POTENTIOMETER 1
```

```
#define STARTUP_CURRENT_REFERENCE 2000
```

```
#define ACC 200000
```

```
#define MINIMUM_ACC 500
```

```
#define NUMBER_OF_STEPS 20000
```

```
#define TIME_FOR_ALIGN 500
```

```
#define BUTTON_DELAY 1000
```

```
#define NUMBER_ZCR 12
```

```
#define SPEED_LOOP_TIME 5

#define KP_GAIN 8000

#define KI_GAIN 50

#define KP_DIV 4096

#define KI_DIV 4096

#define LOWER_OUT_LIMIT 120

#define UPPER_OUT_LIMIT 2500

#define MAX_POT_SPEED 10000

#define MIN_POT_SPEED 1500

#define VAL_POT_SPEED_DIV 2

#define INITIAL_DEMAGN_DELAY 10

#define BEMF_THRSLD_DOWN 200

#define BEMF_THRSLD_UP 200

#define FILTER_DEEP 20

#define HFBUFFERSIZE 10

#define ADC_SPEED_TH 82

#define BEMF_CONSEC_DOWN_MAX 10

#define BEMF_CNT_EVENT_MAX 100
```

```
#define GPIO_ZERO_CROSS 1  
  
#define GPIO_COMM 1  
  
#define DEMO_START_TIME 10000  
  
#define DEMO_STOP_TIME 5000  
  
#define DEMAGN_VAL_1 1  
  
#define DEMAGN_VAL_2 2  
  
#define DEMAGN_VAL_3 3  
  
#define DEMAGN_VAL_4 4  
  
#define DEMAGN_VAL_5 5  
  
#define DEMAGN_VAL_6 6  
  
#define DEMAGN_VAL_7 7  
  
#define DEMAGN_VAL_8 8  
  
#define DEMAGN_VAL_9 9  
  
#define DEMAGN_VAL_10 10  
  
#define DEMAGN_VAL_11 11  
  
#define DEMAGN_VAL_12 12  
  
#define DEMAGN_VAL_13 13  
  
#define DEMAGN_VAL_14 14  
  
#define TRUE 1
```

```
#define FALSE 0
```

---

## Detailed Description

---

All motor parameters for 6Step driving.

# Macro Definition Documentation

---

**#define ACC 600000**

---

Mechanical acceleration rate (setting available in manual mode,  
LOAD\_TYPE = 0)

**#define ACC 600000**

---

Mechanical acceleration rate (setting available in manual mode,  
LOAD\_TYPE = 0)

**#define ACC 200000**

---

Mechanical acceleration rate (setting available in manual mode,  
LOAD\_TYPE = 0)

**#define ADC\_SPEED\_TH 82**

---

Fixed threshold to change the target speed (t.b.f) Motor stall detection  
parameters

**#define ADC\_SPEED\_TH 82**

---

Fixed threshold to change the target speed (t.b.f) Motor stall detection  
parameters

**#define ADC\_SPEED\_TH 82**

---

Fixed threshold to change the target speed (t.b.f) Motor stall detection parameters

---

```
#define BEMF_CNT_EVENT_MAX 100
```

---

Maximum number of BEMF Counter in open loop Debug pin

---

```
#define BEMF_CNT_EVENT_MAX 100
```

---

Maximum number of BEMF Counter in open loop Debug pin

---

```
#define BEMF_CNT_EVENT_MAX 100
```

---

Maximum number of BEMF Counter in open loop Debug pin

---

```
#define BEMF_CONSEC_DOWN_MAX 10
```

---

Maximum value of BEMF Consecutive Threshold Falling Crossings Counter in closed loop

---

```
#define BEMF_CONSEC_DOWN_MAX 10
```

---

Maximum value of BEMF Consecutive Threshold Falling Crossings Counter in closed loop

---

```
#define BEMF_CONSEC_DOWN_MAX 10
```

---

Maximum value of BEMF Consecutive Threshold Falling Crossings Counter in closed loop

---

```
#define BEMF_THRSLD_DOWN 200
```

---

Zero Crossing threshold

---

```
#define BEMF_THRSLD_DOWN 200
```

---

Zero Crossing threshold

---

```
#define BEMF_THRSLD_DOWN 200
```

---

Zero Crossing threshold

---

```
#define BEMF_THRSLD_UP 200
```

---

Zero Crossing threshold Speed filtering parameters

---

```
#define BEMF_THRSLD_UP 200
```

---

Zero Crossing threshold Speed filtering parameters

---

```
#define BEMF_THRSLD_UP 200
```

---

Zero Crossing threshold Speed filtering parameters

---

```
#define BUTTON_DELAY 1000
```

---

Delay time to enable push button for new command (1 = 1msec)

---

```
#define BUTTON_DELAY 1000
```

---

Delay time to enable push button for new command (1 = 1msec)

---

**#define BUTTON\_DELAY 1000**

---

Delay time to enable push button for new command (1 = 1msec)

---

**#define DEMAGN\_VAL\_1 1**

---

Look UP table for dynamic demagn control for speed into  
(10000,12000] or [-12000,-10000) range

---

**#define DEMAGN\_VAL\_1 1**

---

Look UP table for dynamic demagn control for speed into  
(10000,12000] or [-12000,-10000) range

---

**#define DEMAGN\_VAL\_1 1**

---

Look UP table for dynamic demagn control for speed into  
(10000,12000] or [-12000,-10000) range

---

**#define DEMAGN\_VAL\_10 10**

---

Look UP table for dynamic demagn control for speed into ( 1800,  
2600] or [- 2600,- 1800) range

---

**#define DEMAGN\_VAL\_10 10**

---

Look UP table for dynamic demagn control for speed into ( 1800,  
2600] or [- 2600,- 1800) range

---

**#define DEMAGN\_VAL\_10 10**

Look UP table for dynamic demagn control for speed into ( 1800, 2600] or [- 2600,- 1800) range

---

**#define DEMAGN\_VAL\_11 11**

Look UP table for dynamic demagn control for speed into ( 1500, 1800] or [- 1800,- 1500) range

---

**#define DEMAGN\_VAL\_11 11**

Look UP table for dynamic demagn control for speed into ( 1500, 1800] or [- 1800,- 1500) range

---

**#define DEMAGN\_VAL\_11 11**

Look UP table for dynamic demagn control for speed into ( 1500, 1800] or [- 1800,- 1500) range

---

**#define DEMAGN\_VAL\_12 12**

Look UP table for dynamic demagn control for speed into ( 1300, 1500] or [- 1500,- 1300) range

---

**#define DEMAGN\_VAL\_12 12**

Look UP table for dynamic demagn control for speed into ( 1300, 1500] or [- 1500,- 1300) range

---

**#define DEMAGN\_VAL\_12 12**

---

Look UP table for dynamic demagn control for speed into ( 1300, 1500] or [- 1500,- 1300) range

---

**#define DEMAGN\_VAL\_13 13**

---

Look UP table for dynamic demagn control for speed into ( 1000, 1300] or [- 1300,- 1000) range

---

**#define DEMAGN\_VAL\_13 13**

---

Look UP table for dynamic demagn control for speed into ( 1000, 1300] or [- 1300,- 1000) range

---

**#define DEMAGN\_VAL\_13 13**

---

Look UP table for dynamic demagn control for speed into ( 1000, 1300] or [- 1300,- 1000) range

---

**#define DEMAGN\_VAL\_14 14**

---

Look UP table for dynamic demagn control for speed into [ 500, 1000] or [- 1000,- 500] range

---

**#define DEMAGN\_VAL\_14 14**

---

Look UP table for dynamic demagn control for speed into [ 500, 1000] or [- 1000,- 500] range

---

**#define DEMAGN\_VAL\_14 14**

Look UP table for dynamic demagn control for speed into [ 500, 1000] or [- 1000,- 500] range

---

**#define DEMAGN\_VAL\_2 2**

---

Look UP table for dynamic demagn control for speed into ( 7800,10000] or [-10000,- 7800) range

---

**#define DEMAGN\_VAL\_2 2**

---

Look UP table for dynamic demagn control for speed into ( 7800,10000] or [-10000,- 7800) range

---

**#define DEMAGN\_VAL\_2 2**

---

Look UP table for dynamic demagn control for speed into ( 7800,10000] or [-10000,- 7800) range

---

**#define DEMAGN\_VAL\_3 3**

---

Look UP table for dynamic demagn control for speed into ( 6400, 7800] or [- 7800,- 6400) range

---

**#define DEMAGN\_VAL\_3 3**

---

Look UP table for dynamic demagn control for speed into ( 6400, 7800] or [- 7800,- 6400) range

---

**#define DEMAGN\_VAL\_3 3**

---

Look UP table for dynamic demagn control for speed into ( 6400, 7800] or [- 7800,- 6400) range

---

```
#define DEMAGN_VAL_4 4
```

---

Look UP table for dynamic demagn control for speed into ( 5400, 6400] or [- 6400,- 5400) range

---

```
#define DEMAGN_VAL_4 4
```

---

Look UP table for dynamic demagn control for speed into ( 5400, 6400] or [- 6400,- 5400) range

---

```
#define DEMAGN_VAL_4 4
```

---

Look UP table for dynamic demagn control for speed into ( 5400, 6400] or [- 6400,- 5400) range

---

```
#define DEMAGN_VAL_5 5
```

---

Look UP table for dynamic demagn control for speed into ( 4650, 5400] or [- 5400,- 4650) range

---

```
#define DEMAGN_VAL_5 5
```

---

Look UP table for dynamic demagn control for speed into ( 4650, 5400] or [- 5400,- 4650) range

---

```
#define DEMAGN_VAL_5 5
```

---

Look UP table for dynamic demagn control for speed into ( 4650, 5400] or [- 5400,- 4650) range

---

**#define DEMAGN\_VAL\_6 6**

---

Look UP table for dynamic demagn control for speed into ( 4100, 4650] or [- 4650,- 4100) range

---

**#define DEMAGN\_VAL\_6 6**

---

Look UP table for dynamic demagn control for speed into ( 4100, 4650] or [- 4650,- 4100) range

---

**#define DEMAGN\_VAL\_6 6**

---

Look UP table for dynamic demagn control for speed into ( 4100, 4650] or [- 4650,- 4100) range

---

**#define DEMAGN\_VAL\_7 7**

---

Look UP table for dynamic demagn control for speed into ( 3650, 4100] or [- 4100,- 3650) range

---

**#define DEMAGN\_VAL\_7 7**

---

Look UP table for dynamic demagn control for speed into ( 3650, 4100] or [- 4100,- 3650) range

---

**#define DEMAGN\_VAL\_7 7**

---

Look UP table for dynamic demagn control for speed into ( 3650, 4100] or [- 4100,- 3650) range

---

**#define DEMAGN\_VAL\_8 8**

---

Look UP table for dynamic demagn control for speed into ( 3300, 3650] or [- 3650,- 3300) range

---

**#define DEMAGN\_VAL\_8 8**

---

Look UP table for dynamic demagn control for speed into ( 3300, 3650] or [- 3650,- 3300) range

---

**#define DEMAGN\_VAL\_8 8**

---

Look UP table for dynamic demagn control for speed into ( 3300, 3650] or [- 3650,- 3300) range

---

**#define DEMAGN\_VAL\_9 9**

---

Look UP table for dynamic demagn control for speed into ( 2600, 3300] or [- 3300,- 2600) range

---

**#define DEMAGN\_VAL\_9 9**

---

Look UP table for dynamic demagn control for speed into ( 2600, 3300] or [- 3300,- 2600) range

---

**#define DEMAGN\_VAL\_9 9**

---

Look UP table for dynamic demagn control for speed into ( 2600, 3300] or [- 3300,- 2600) range

---

```
#define DEMO_START_TIME 10000
```

---

Time (msec) to keep the motor in run mode

---

```
#define DEMO_START_TIME 5000
```

---

Time (msec) to keep the motor in run mode

---

```
#define DEMO_START_TIME 10000
```

---

Time (msec) to keep the motor in run mode

---

```
#define DEMO_STOP_TIME 5000
```

---

Time (msec) to keep the motor in stop mode Look UP table for dynamic demagn control of speed

---

```
#define DEMO_STOP_TIME 5000
```

---

Time (msec) to keep the motor in stop mode Look UP table for dynamic demagn control of speed

---

```
#define DEMO_STOP_TIME 2000
```

---

Time (msec) to keep the motor in stop mode Look UP table for dynamic demagn control of speed

---

```
#define DIRECTION 0
```

---

Set motor direction CW = 0 and CCW = 1

---

```
#define DIRECTION 0
```

---

Set motor direction CW = 0 and CCW = 1

---

```
#define DIRECTION 0
```

---

Set motor direction CW = 0 and CCW = 1

---

```
#define FALSE 0
```

---

Define FALSE

---

```
#define FALSE 0
```

---

Define FALSE

---

```
#define FALSE 0
```

---

Define FALSE

---

```
#define FILTER_DEEP 9
```

---

Number of bits for digital filter

---

```
#define FILTER_DEEP 20
```

---

Number of bits for digital filter

---

```
#define FILTER_DEEP 20
```

---

Number of bits for digital filter

---

```
#define GPIO_COMM 1
```

---

Enable (1) the GPIO toggling for commutation Demo mode parameters

---

```
#define GPIO_COMM 1
```

---

Enable (1) the GPIO toggling for commutation Demo mode parameters

---

```
#define GPIO_COMM 1
```

---

Enable (1) the GPIO toggling for commutation Demo mode parameters

---

```
#define GPIO_ZERO_CROSS 1
```

---

Enable (1) the GPIO toggling for zero crossing detection

---

```
#define GPIO_ZERO_CROSS 1
```

---

Enable (1) the GPIO toggling for zero crossing detection

---

```
#define GPIO_ZERO_CROSS 1
```

---

Enable (1) the GPIO toggling for zero crossing detection

---

```
#define INITIAL_DEMAGN_DELAY 5
```

---

Initial value for delay time during startup for Bemf detection Zero Crossissing parameters

---

```
#define INITIAL_DEMAGN_DELAY 10
```

---

Initial value for delay time during startup for Bemf detection Zero Crossissing parameters

---

```
#define INITIAL_DEMAGN_DELAY 10
```

---

Initial value for delay time during startup for Bemf detection Zero Crossissing parameters

---

```
#define KI_DIV 4096
```

---

Ki parameter divider for PI regulator

---

```
#define KI_DIV 4096
```

---

Ki parameter divider for PI regulator

---

```
#define KI_DIV 4096
```

---

Ki parameter divider for PI regulator

---

```
#define KI_GAIN 50
```

---

Ki parameter for PI regulator

---

```
#define KI_GAIN 50
```

---

Ki parameter for PI regulator

---

```
#define KI_GAIN 100
```

---

Ki parameter for PI regulator

---

```
#define KP_DIV 4096
```

---

Kp parameter divider for PI regulator

---

```
#define KP_DIV 4096
```

---

Kp parameter divider for PI regulator

---

```
#define KP_DIV 4096
```

---

Kp parameter divider for PI regulator

---

```
#define KP_GAIN 2000
```

---

Kp parameter for PI regulator

---

```
#define KP_GAIN 8000
```

---

Kp parameter for PI regulator

---

```
#define KP_GAIN 8000
```

---

Kp parameter for PI regulator

---

```
#define LOWER_OUT_LIMIT 120
```

---

Low Out value of PI regulator

---

```
#define LOWER_OUT_LIMIT 120
```

---

Low Out value of PI regulator

---

```
#define LOWER_OUT_LIMIT 120
```

---

Low Out value of PI regulator

---

```
#define MAX_POT_SPEED 10000
```

---

Maximum Speed regulated by potentiometer

---

```
#define MAX_POT_SPEED 7000
```

---

Maximum Speed regulated by potentiometer

---

```
#define MAX_POT_SPEED 10000
```

---

Maximum Speed regulated by potentiometer

---

```
#define MIN_POT_SPEED 1500
```

---

Minimum Speed regulated by potentiometer

---

```
#define MIN_POT_SPEED 1500
```

---

Minimum Speed regulated by potentiometer

---

```
#define MIN_POT_SPEED 1500
```

---

Minimum Speed regulated by potentiometer

---

```
#define MINIMUM_ACC 500
```

---

Mechanical acceleration rate for BIG load application

---

```
#define MINIMUM_ACC 500
```

---

Mechanical acceleration rate for BIG load application

---

```
#define MINIMUM_ACC 500
```

---

Mechanical acceleration rate for BIG load application

---

```
#define NUM_POLE_PAIRS 7
```

---

Number of Motor Pole pairs

---

```
#define NUM_POLE_PAIRS 7
```

---

Number of Motor Pole pairs

---

```
#define NUM_POLE_PAIRS 7
```

---

Number of Motor Pole pairs

---

```
#define NUMBER_OF_STEPS 20000
```

---

Number of elements for motor start-UP (max value 65535)

---

```
#define NUMBER_OF_STEPS 20000
```

---

Number of elements for motor start-UP (max value 65535)

---

```
#define NUMBER_OF_STEPS 20000
```

---

Number of elements for motor start-UP (max value 65535)

---

```
#define NUMBER_ZCR 12
```

---

Number of zero crossing event during the startup for closed loop  
control begin \*\*\*\*\* Closed Loop control

---

```
#define NUMBER_ZCR 12
```

---

Number of zero crossing event during the startup for closed loop control begin \*\*\*\*\* Closed Loop control

---

**#define NUMBER\_ZCR 12**

---

Number of zero crossing event during the startup for closed loop control begin \*\*\*\*\* Closed Loop control

---

**#define POTENTIOMETER 1**

---

Enable (1)/Disable (0) the potentiometer

---

**#define POTENTIOMETER 1**

---

Enable (1)/Disable (0) the potentiometer

---

**#define POTENTIOMETER 1**

---

Enable (1)/Disable (0) the potentiometer

---

**#define SPEED\_LOOP\_TIME 1**

---

Speed Loop time (1 = 1msec)

---

**#define SPEED\_LOOP\_TIME 4**

---

Speed Loop time (1 = 1msec)

---

**#define SPEED\_LOOP\_TIME 5**

---

Speed Loop time (1 = 1msec)

---

```
#define STARTUP_CURRENT_REFERENCE 2000
```

---

< \*\*\*\*\* Open loop control StartUP Currente Reference  
(2000 = 2.2A)

---

```
#define STARTUP_CURRENT_REFERENCE 2000
```

---

< \*\*\*\*\* Open loop control StartUP Currente Reference  
(2000 = 2.2A)

---

```
#define STARTUP_CURRENT_REFERENCE 2000
```

---

< \*\*\*\*\* Open loop control StartUP Currente Reference  
(2000 = 2.2A)

---

```
#define TARGET_SPEED 3000
```

---

Target speed in closed loop control

---

```
#define TARGET_SPEED 3000
```

---

Target speed in closed loop control

---

```
#define TARGET_SPEED 3000
```

---

Target speed in closed loop control

---

```
#define TIME_FOR_ALIGN 500
```

---

Time for alignment (msec)

---

```
#define TIME_FOR_ALIGN 500
```

---

Time for alignment (msec)

---

```
#define TIME_FOR_ALIGN 500
```

---

Time for alignment (msec)

---

```
#define TRUE 1
```

---

Define TRUE

---

```
#define TRUE 1
```

---

Define TRUE

---

```
#define TRUE 1
```

---

Define TRUE

---

```
#define UPPER_OUT_LIMIT 2000
```

---

High Out value of PI regulator

---

```
#define UPPER_OUT_LIMIT 2000
```

---

High Out value of PI regulator

---

```
#define UPPER_OUT_LIMIT 2500
```

---

High Out value of PI regulator

---

```
#define VAL_POT_SPEED_DIV 2
```

---

Validation potentiometer speed divider

---

```
#define VAL_POT_SPEED_DIV 2
```

---

Validation potentiometer speed divider

---

```
#define VAL_POT_SPEED_DIV 2
```

---

Validation potentiometer speed divider

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

Main Page

Modules

Classes

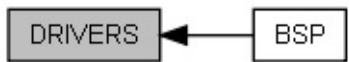
Files

Modules

## DRIVERS

Driver Layer. [More...](#)

Collaboration diagram for DRIVERS:



# Modules

---

## BSP

BSP Layer.

---

# Detailed Description

---

Driver Layer.

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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Modules

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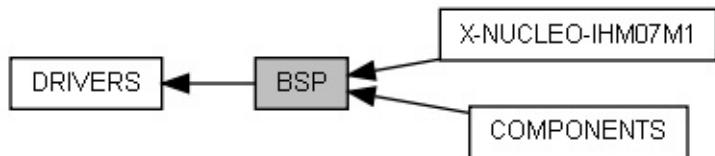
Modules

## BSP

DRIVERS

BSP Layer. [More...](#)

Collaboration diagram for BSP:



# Modules

---

## COMPONENTS

Components.

### X-NUCLEO-IHM07M1

X-Nucleo board.

---

# Detailed Description

---

## BSP Layer.

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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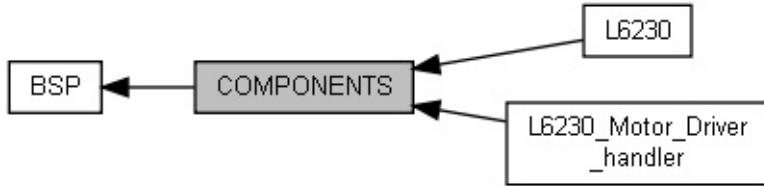
Modules

## COMPONENTS

DRIVERS » BSP

Components. [More...](#)

Collaboration diagram for COMPONENTS:



## Modules

---

### **L6230\_Motor\_Driver\_handler**

Handler for L6230 Motor driver.

### **L6230**

L6230 driver section.

---

# Detailed Description

---

## Components.

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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Modules

Classes

Files

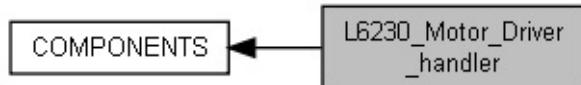
Classes

## L6230\_Motor\_Driver\_handler

DRIVERS » BSP » COMPONENTS

Handler for L6230 Motor driver. [More...](#)

Collaboration diagram for L6230\_Motor\_Driver\_handler:



## Classes

---

struct **L6230\_MotorDriver\_TypeDef**

---

# Detailed Description

---

Handler for L6230 Motor driver.

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

Main Page

Modules

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Files

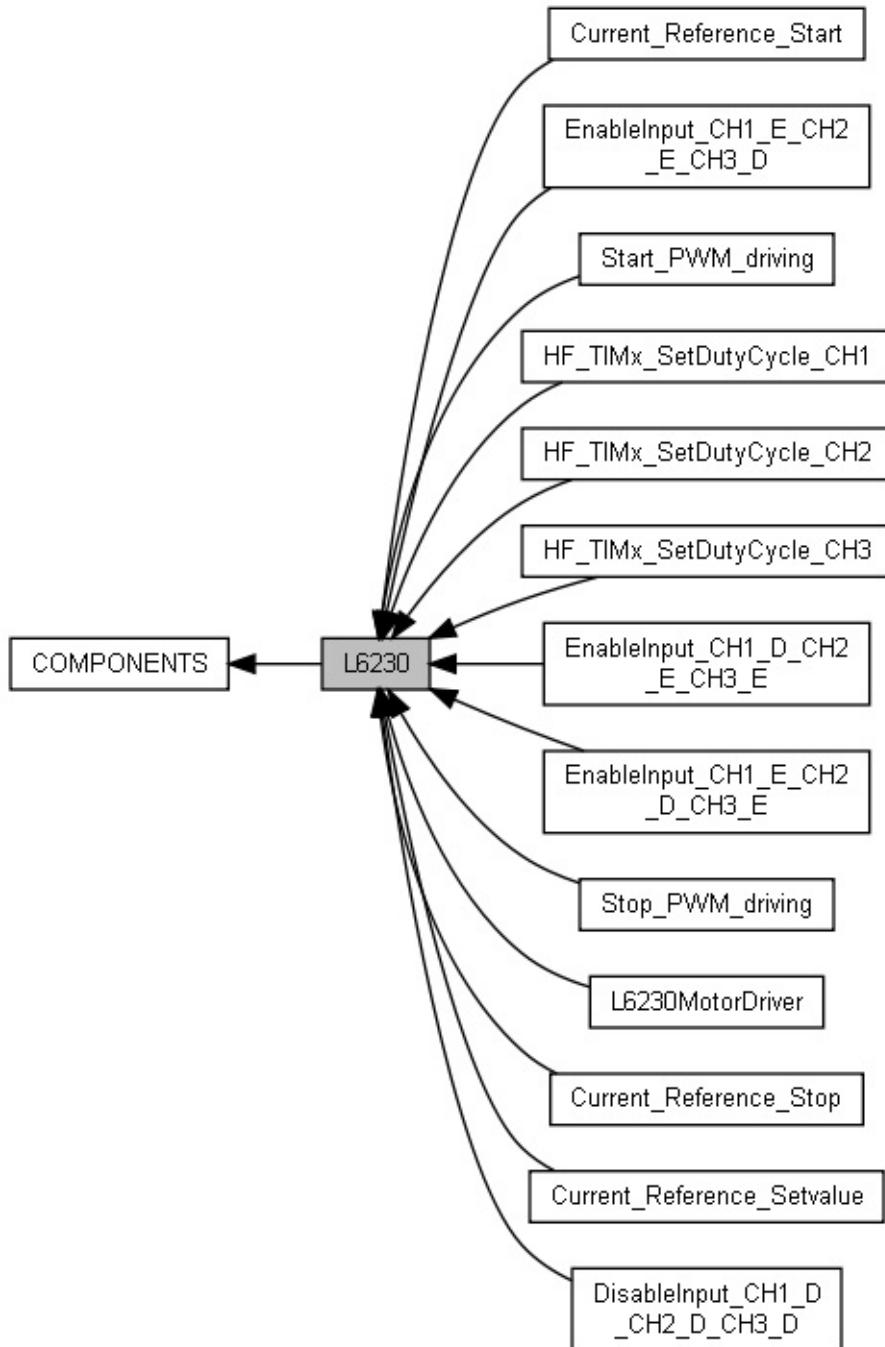
Modules

## L6230

[DRIVERS](#) » [BSP](#) » [COMPONENTS](#)

L6230 driver section. [More...](#)

Collaboration diagram for L6230:



# Modules

## **L6230MotorDriver**

API pointer for L6230.

### **EnableInput\_CH1\_E\_CH2\_E\_CH3\_D**

Enable Input channel CH1 and CH2 for L6230.

### **EnableInput\_CH1\_E\_CH2\_D\_CH3\_E**

Enable Input channel CH1 and CH3 for L6230.

### **EnableInput\_CH1\_D\_CH2\_E\_CH3\_E**

Enable Input channel CH2 and CH3 for L6230.

### **DisableInput\_CH1\_D\_CH2\_D\_CH3\_D**

Enable Input channel CH2 and CH3 for L6230.

### **Start\_PWM\_driving**

Enable PWM channels for L6230.

### **Stop\_PWM\_driving**

Disable PWM channels for L6230.

### **HF\_TIMx\_SetDutyCycle\_CH1**

Set the Duty Cycle value for CH1.

### **HF\_TIMx\_SetDutyCycle\_CH2**

Set the Duty Cycle value for CH2.

### **HF\_TIMx\_SetDutyCycle\_CH3**

Set the Duty Cycle value for CH3.

### **Current\_Reference\_Start**

Enable the Current Reference generation.

**Current\_Reference\_Stop**

Disable the Current Reference generation.

**Current\_Reference\_Setvalue**

Set the value for Current Reference.

---

# Detailed Description

---

L6230 driver section.

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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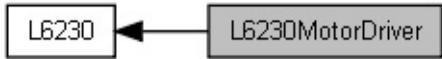
Variables

## L6230MotorDriver

DRIVERS » BSP » COMPONENTS » L6230

API pointer for L6230. [More...](#)

Collaboration diagram for L6230MotorDriver:



## Variables

---

**L6230\_MotorDriver\_TypeDef L6230MotorDriver**

---

## Detailed Description

---

API pointer for L6230.

# Variable Documentation

---

## **L6230\_MotorDriver\_TypeDef L6230MotorDriver**

---

### **Initial value:**

```
=  
{  
    EnableInput_CH1_E_CH2_E_CH3_D,  
    EnableInput_CH1_E_CH2_D_CH3_E,  
    EnableInput_CH1_D_CH2_E_CH3_E,  
    DisableInput_CH1_D_CH2_D_CH3_D,  
    Start_PWM_driving,  
    Stop_PWM_driving,  
    HF_TIMx_SetDutyCycle_CH1,  
    HF_TIMx_SetDutyCycle_CH2,  
    HF_TIMx_SetDutyCycle_CH3,  
    Current_Reference_Start,  
    Current_Reference_Stop,  
    Current_Reference_Setvalue,  
}
```

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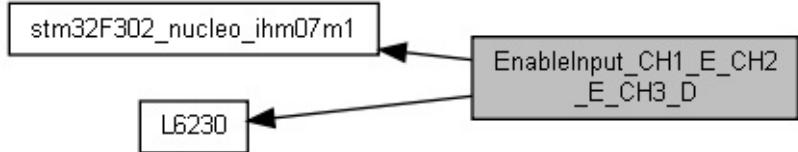
Functions

## EnableInput\_CH1\_E\_CH2\_E\_CH3\_D

DRIVERS » BSP » COMPONENTS » L6230

Enable Input channel CH1 and CH2 for L6230. [More...](#)

Collaboration diagram for EnableInput\_CH1\_E\_CH2\_E\_CH3\_D:



## Functions

---

```
void EnableInput_CH1_E_CH2_E_CH3_D ()
```

---

## Detailed Description

---

Enable Input channel CH1 and CH2 for L6230.

### Return values

**None**

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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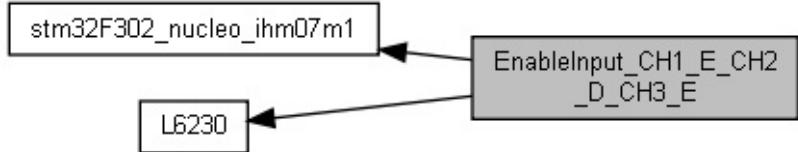
Functions

## EnableInput\_CH1\_E\_CH2\_D\_CH3\_E

DRIVERS » BSP » COMPONENTS » L6230

Enable Input channel CH1 and CH3 for L6230. [More...](#)

Collaboration diagram for EnableInput\_CH1\_E\_CH2\_D\_CH3\_E:



## Functions

---

```
void EnableInput_CH1_E_CH2_D_CH3_E ()
```

---

## Detailed Description

---

Enable Input channel CH1 and CH3 for L6230.

### Return values

**None**

---

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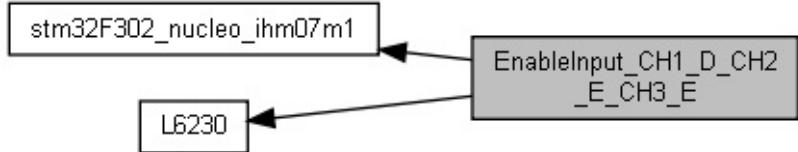
Functions

## EnableInput\_CH1\_D\_CH2\_E\_CH3\_E

DRIVERS » BSP » COMPONENTS » L6230

Enable Input channel CH2 and CH3 for L6230. [More...](#)

Collaboration diagram for EnableInput\_CH1\_D\_CH2\_E\_CH3\_E:



## Functions

---

```
void EnableInput_CH1_D_CH2_E_CH3_E ()
```

---

## Detailed Description

---

Enable Input channel CH2 and CH3 for L6230.

### Return values

**None**

---

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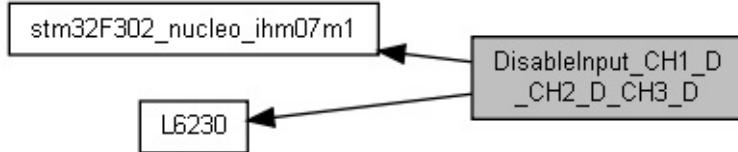
Functions

## DisableInput\_CH1\_D\_CH2\_D\_CH3\_D

DRIVERS » BSP » COMPONENTS » L6230

Enable Input channel CH2 and CH3 for L6230. [More...](#)

Collaboration diagram for DisableInput\_CH1\_D\_CH2\_D\_CH3\_D:



## Functions

---

```
void DisableInput_CH1_D_CH2_D_CH3_D ()
```

---

## Detailed Description

---

Enable Input channel CH2 and CH3 for L6230.

### Return values

**None**

---

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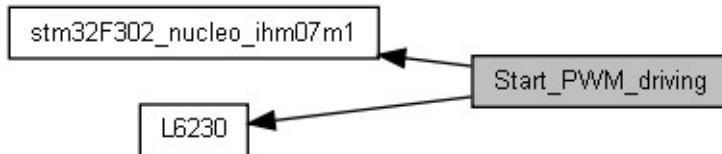
Functions

## Start\_PWM\_driving

DRIVERS » BSP » COMPONENTS » L6230

Enable PWM channels for L6230. [More...](#)

Collaboration diagram for Start\_PWM\_driving:



## Functions

---

```
void Start_PWM_driving ()
```

---

## Detailed Description

---

Enable PWM channels for L6230.

### Return values

**None**

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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## Stop\_PWM\_driving

DRIVERS » BSP » COMPONENTS » L6230

Disable PWM channels for L6230. [More...](#)

Collaboration diagram for Stop\_PWM\_driving:



## Functions

---

```
void Stop_PWM_driving ()
```

---

## Detailed Description

---

Disable PWM channels for L6230.

### Return values

**None**

---

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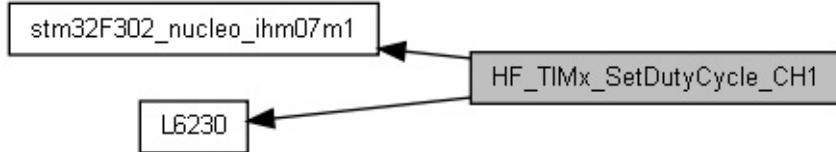
Functions

## HF\_TIMx\_SetDutyCycle\_CH1

DRIVERS » BSP » COMPONENTS » L6230

Set the Duty Cycle value for CH1. [More...](#)

Collaboration diagram for HF\_TIMx\_SetDutyCycle\_CH1:



## Functions

---

```
void HF_TIMx_SetDutyCycle_CH1 (uint16_t CCR_value)
```

---

## Detailed Description

---

Set the Duty Cycle value for CH1.

### Return values

**None**

---

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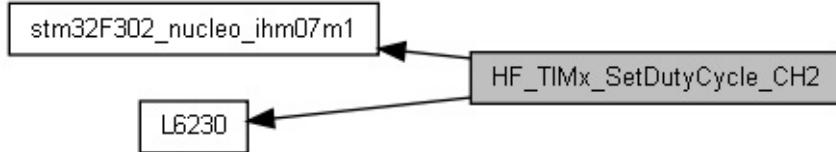
Functions

## HF\_TIMx\_SetDutyCycle\_CH2

DRIVERS » BSP » COMPONENTS » L6230

Set the Duty Cycle value for CH2. [More...](#)

Collaboration diagram for HF\_TIMx\_SetDutyCycle\_CH2:



## Functions

---

```
void HF_TIMx_SetDutyCycle_CH2 (uint16_t CCR_value)
```

---

## Detailed Description

---

Set the Duty Cycle value for CH2.

### Return values

**None**

---

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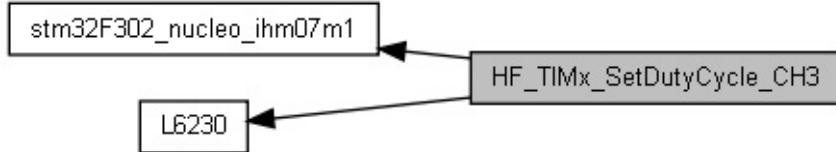
Functions

## HF\_TIMx\_SetDutyCycle\_CH3

DRIVERS » BSP » COMPONENTS » L6230

Set the Duty Cycle value for CH3. [More...](#)

Collaboration diagram for HF\_TIMx\_SetDutyCycle\_CH3:



## Functions

---

```
void HF_TIMx_SetDutyCycle_CH3 (uint16_t CCR_value)
```

---

## Detailed Description

---

Set the Duty Cycle value for CH3.

### Return values

**None**

---

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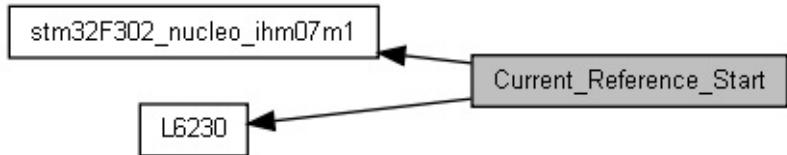
Functions

## Current\_Reference\_Start

DRIVERS » BSP » COMPONENTS » L6230

Enable the Current Reference generation. [More...](#)

Collaboration diagram for Current\_Reference\_Start:



## Functions

---

```
void Current_Reference_Start()
```

---

## Detailed Description

---

Enable the Current Reference generation.

### Return values

**None**

---

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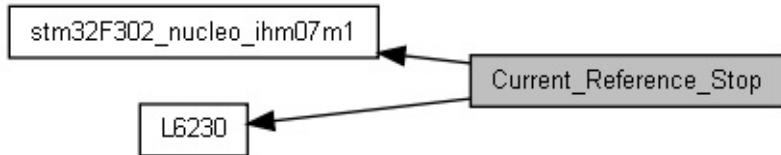
Functions

## Current\_Reference\_Stop

DRIVERS » BSP » COMPONENTS » L6230

Disable the Current Reference generation. [More...](#)

Collaboration diagram for Current\_Reference\_Stop:



## Functions

---

```
void Current_Reference_Stop ()
```

---

## Detailed Description

---

Disable the Current Reference generation.

### Return values

**None**

---

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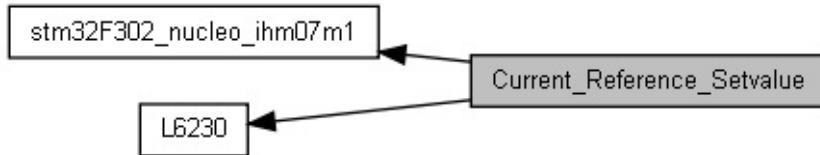
Functions

## Current\_Reference\_Setvalue

DRIVERS » BSP » COMPONENTS » L6230

Set the value for Current Reference. [More...](#)

Collaboration diagram for Current\_Reference\_Setvalue:



## Functions

---

```
void Current_Reference_Setvalue (uint16_t lref)
```

---

## Detailed Description

---

Set the value for Current Reference.

### Return values

**None**

---

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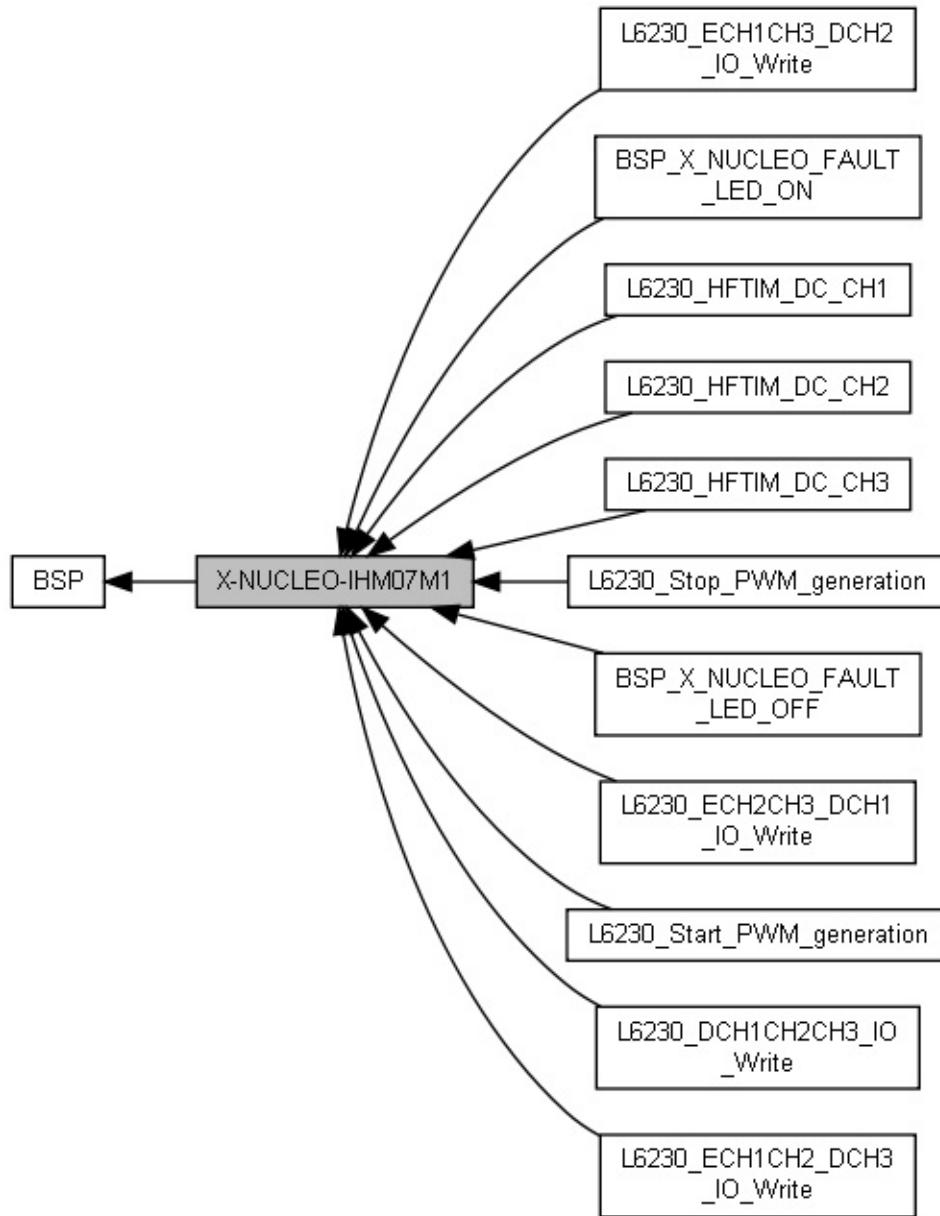
Modules

## X-NUCLEO-IHM07M1

DRIVERS » BSP

X-Nucleo board. [More...](#)

Collaboration diagram for X-NUCLEO-IHM07M1:



## Modules

### **L6230\_ECH1CH2\_DCH3\_IO\_Write**

Enable Input channel CH1 and CH2 for L6230.

### **L6230\_ECH1CH3\_DCH2\_IO\_Write**

Enable Input channel CH1 and CH3 for L6230.

### **L6230\_ECH2CH3\_DCH1\_IO\_Write**

Enable Input channel CH2 and CH3 for L6230.

### **L6230\_DCH1CH2CH3\_IO\_Write**

Disable all channels for L6230.

### **L6230\_Start\_PWM\_generation**

Enable the PWM generation on Input channels for L6230.

### **L6230\_Stop\_PWM\_generation**

Disable the PWM generation on Input channels for L6230.

### **L6230\_HFTIM\_DC\_CH1**

Set the Duty Cycle value for CH1.

### **L6230\_HFTIM\_DC\_CH2**

Set the Duty Cycle value for CH2.

### **L6230\_HFTIM\_DC\_CH3**

Set the Duty Cycle value for CH3.

### **BSP\_X\_NUCLEOFAULTLEDON**

Turns selected LED On.

### **BSP\_X\_NUCLEOFAULTLEDOFF**

Turns selected LED Off.

# Detailed Description

---

X-Nucleo board.

---

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**[doxygen](#)** 1.8.9.1

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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Functions

## L6230\_ECH1CH2\_DCH3\_IO\_Write

DRIVERS » BSP » X-NUCLEO-IHM07M1

Enable Input channel CH1 and CH2 for L6230. [More...](#)

Collaboration diagram for L6230\_ECH1CH2\_DCH3\_IO\_Write:



## Functions

---

```
void L6230_ECH1CH2_DCH3_IO_Write()
```

---

## Detailed Description

---

Enable Input channel CH1 and CH2 for L6230.

### Return values

**None**

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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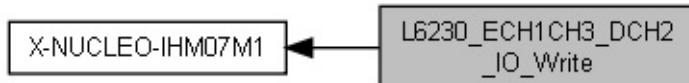
Functions

## L6230\_ECH1CH3\_DCH2\_IO\_Write

DRIVERS » BSP » X-NUCLEO-IHM07M1

Enable Input channel CH1 and CH3 for L6230. [More...](#)

Collaboration diagram for L6230\_ECH1CH3\_DCH2\_IO\_Write:



## Functions

---

```
void L6230_ECH1CH3_DCH2_IO_Write()
```

---

## Detailed Description

---

Enable Input channel CH1 and CH3 for L6230.

### Return values

**None**

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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Functions

## L6230\_ECH2CH3\_DCH1\_IO\_Write

DRIVERS » BSP » X-NUCLEO-IHM07M1

Enable Input channel CH2 and CH3 for L6230. [More...](#)

Collaboration diagram for L6230\_ECH2CH3\_DCH1\_IO\_Write:



## Functions

---

```
void L6230_ECH2CH3_DCH1_IO_Write()
```

---

## Detailed Description

---

Enable Input channel CH2 and CH3 for L6230.

### Return values

**None**

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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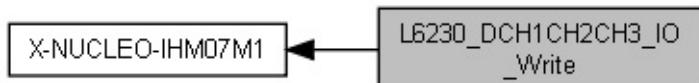
Functions

## L6230\_DCH1CH2CH3\_IO\_Write

DRIVERS » BSP » X-NUCLEO-IHM07M1

Disable all channels for L6230. [More...](#)

Collaboration diagram for L6230\_DCH1CH2CH3\_IO\_Write:



## Functions

---

```
void L6230_DCH1CH2CH3_IO_Write()
```

---

## Detailed Description

---

Disable all channels for L6230.

### Return values

**None**

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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Functions

## L6230\_Start\_PWM\_generation

DRIVERS » BSP » X-NUCLEO-IHM07M1

Enable the PWM generation on Input channels for L6230. [More...](#)

Collaboration diagram for L6230\_Start\_PWM\_generation:



## Functions

---

```
void L6230_Start_PWM_generation ()
```

---

## Detailed Description

---

Enable the PWM generation on Input channels for L6230.

### Return values

**None**

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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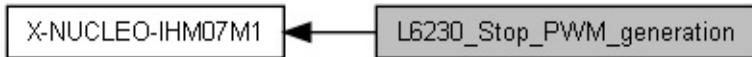
Functions

## L6230\_Stop\_PWM\_generation

DRIVERS » BSP » X-NUCLEO-IHM07M1

Disable the PWM generation on Input channels for L6230. [More...](#)

Collaboration diagram for L6230\_Stop\_PWM\_generation:



## Functions

---

```
void L6230_Stop_PWM_generation()
```

---

## Detailed Description

---

Disable the PWM generation on Input channels for L6230.

### Return values

**None**

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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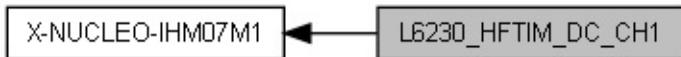
Functions

## L6230\_HFTIM\_DC\_CH1

DRIVERS » BSP » X-NUCLEO-IHM07M1

Set the Duty Cycle value for CH1. [More...](#)

Collaboration diagram for L6230\_HFTIM\_DC\_CH1:



## Functions

---

```
void L6230_HFTIM_DC_CH1 (uint16_t CCRx)
```

---

## Detailed Description

---

Set the Duty Cycle value for CH1.

### Return values

**None**

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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## L6230\_HFTIM\_DC\_CH2

DRIVERS » BSP » X-NUCLEO-IHM07M1

Set the Duty Cycle value for CH2. [More...](#)

Collaboration diagram for L6230\_HFTIM\_DC\_CH2:



## Functions

---

```
void L6230_HFTIM_DC_CH2 (uint16_t CCRx)
```

---

## Detailed Description

---

Set the Duty Cycle value for CH2.

### Return values

**None**

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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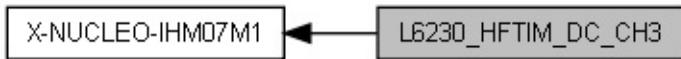
Functions

## L6230\_HFTIM\_DC\_CH3

DRIVERS » BSP » X-NUCLEO-IHM07M1

Set the Duty Cycle value for CH3. [More...](#)

Collaboration diagram for L6230\_HFTIM\_DC\_CH3:



## Functions

---

```
void L6230_HFTIM_DC_CH3 (uint16_t CCRx)
```

---

## Detailed Description

---

Set the Duty Cycle value for CH3.

### Return values

**None**

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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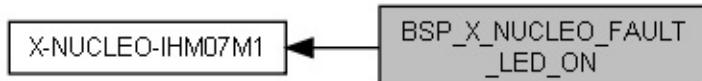
Functions

## BSP\_X\_NUCLEOFAULTLEDON

DRIVERS » BSP » X-NUCLEO-IHM07M1

Turns selected LED On. [More...](#)

Collaboration diagram for BSP\_X\_NUCLEOFAULTLEDON:



## Functions

---

```
void BSP_X_NUCLEOFAULT_LED_ON()
```

---

## Detailed Description

---

Turns selected LED On.

### **Return values**

**None**

---

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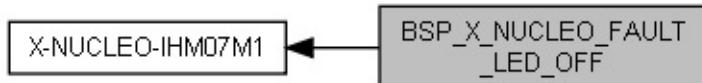
Functions

## BSP\_X\_NUCLEOFAULT\_LED\_OFF

DRIVERS » BSP » X-NUCLEO-IHM07M1

Turns selected LED Off. [More...](#)

Collaboration diagram for BSP\_X\_NUCLEOFAULT\_LED\_OFF:



## Functions

---

```
void BSP_X_NUCLEOFAULT_LED_OFF()
```

---

## Detailed Description

---

Turns selected LED Off.

### Return values

**None**

---

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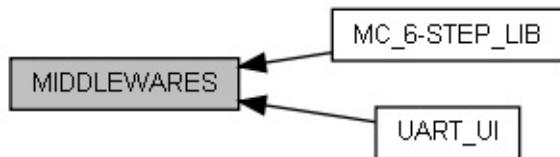
Files

Modules

## MIDDLEWARES

Middlewares Layer. [More...](#)

Collaboration diagram for MIDDLEWARES:



# Modules

---

## **MC\_6-STEP\_LIB**

Motor Control driver.

## **UART\_UI**

Serial communication through PC serial terminal.

---

## Detailed Description

---

Middlewares Layer.

\*\*\*\*\*

## ##### Main functions for 6-Step algorithm #####

The main function are the following:

- 1) MC\_SixStep\_TABLE(...) -> Set the peripherals (TIMx, GPIO etc.) for each step
- 2) MC\_SixStep\_ARR\_step() -> Generate the ARR value for Low Frequency TIM during start-up
- 3) MC\_SixStep\_INIT() -> Init the main variables for motor driving from [MC\\_SixStep\\_param.h](#)
- 4) MC\_SixStep\_RESET() -> Reset all variables used for 6Step control algorithm
- 5) MC\_SixStep\_Ramp\_Motor\_calc() -> Calculate the acceleration profile step by step for motor during start-up
- 6) MC\_SixStep\_NEXT\_step()-> Generate the next step number according with the direction (CW or CCW)
- 7) MC\_Task\_Speed() -> Speed Loop with PI regulator
- 8) MC\_Set\_Speed(...) -> Set the new motor speed value
- 9) MC\_StartMotor() -> Start the Motor
- 10) MC\_StopMotor() -> Stop the Motor

---

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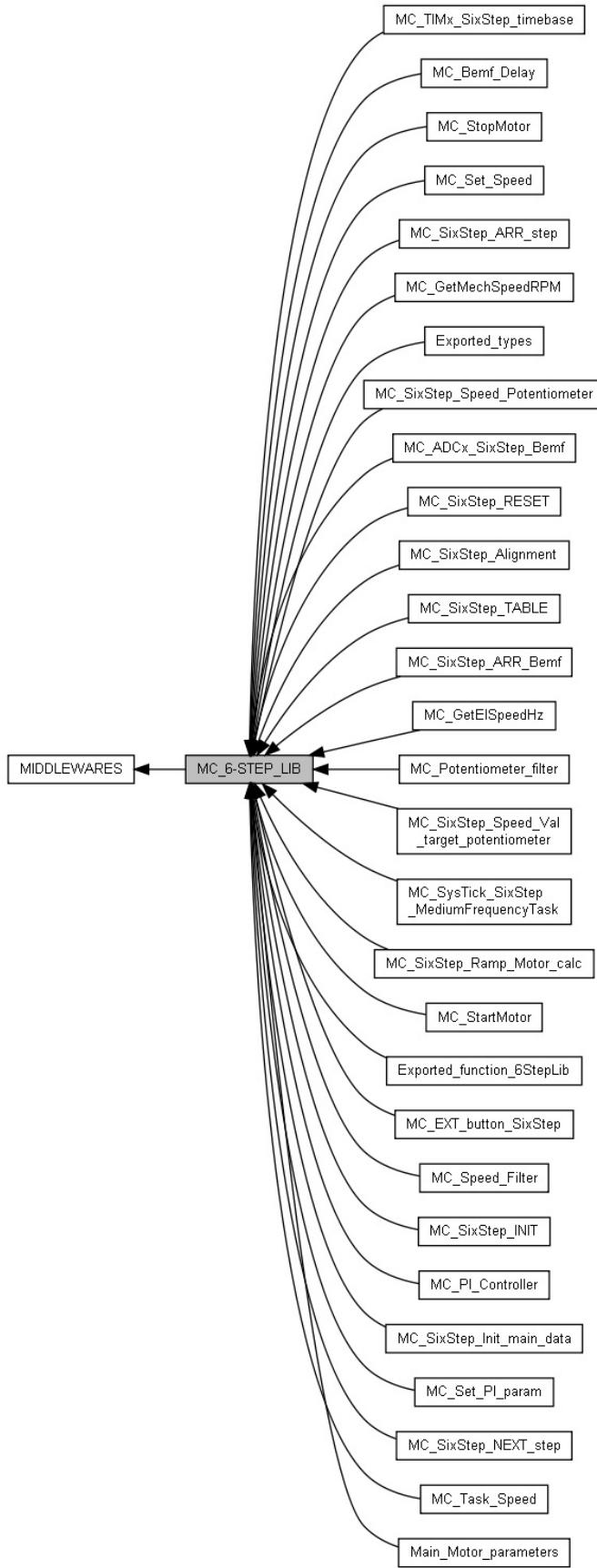
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## MC\_6-STEP\_LIB

MIDDLEWARES

Motor Control driver. [More...](#)

Collaboration diagram for MC\_6-STEP\_LIB:



# Modules

## Exported\_types

## Exported\_function\_6StepLib

### MC\_SixStep\_TABLE

Set the peripherals (TIMx, GPIO etc.) for each step.

### MC\_SixStep\_NEXT\_step

Generate the next step number according with the direction (CW or CCW)

### MC\_SixStep\_RESET

Reset all variables used for 6Step control algorithm.

### MC\_SixStep\_Ramp\_Motor\_calc

Calculate the acceleration profile step by step for motor during start-up.

### MC\_SixStep\_ARR\_step

Generate the ARR value for Low Frequency TIM during start-up.

### MC\_SixStep\_Alignment

Generate the motor alignment.

### MC\_SixStep\_Speed\_Val\_target\_potentiometer

Calculate the Motor Speed validation threshold according with the potentiometer value.

### MC\_SixStep\_Speed\_Potentiometer

Calculate the potentiometer value to set the Motor Speed.

### MC\_Set\_PI\_param

Set all parameters for PI regulator.

### **MC\_PI\_Controller**

Compute the PI output for the Current Reference.

### **MC\_Task\_Speed**

Main task: Speed Loop with PI regulator.

### **MC\_Set\_Speed**

Set the new motor speed value.

### **MC\_Bemf\_Delay**

Take the delay time after each new 6-step commutation.

### **MC\_StartMotor**

Start the Motor.

### **MC\_StopMotor**

Stop the Motor.

### **MC\_GetElSpeedHz**

Get the Elelctrical Motor Speed from ARR value of LF TIM.

### **MC\_GetMechSpeedRPM**

Get the Mechanical Motor Speed (RPM)

### **MC\_SixStep\_Init\_main\_data**

Init the main variables for motor driving from

**MC\_SixStep\_param.h**.

### **MC\_SixStep\_INIT**

Initialitation function for SixStep library.

### **MC\_TIMx\_SixStep\_timebase**

Low Frequency Timer Callback - Call the next step and request the filtered speed value.

### **MC\_Speed\_Filter**

Calculate the speed filtered.

### **MC\_Potentiometer\_filter**

Calculate the filtered potentiometer value.

### **MC\_SysTick\_SixStep\_MediumFrequencyTask**

Systick Callback - Call the Speed loop.

### **MC\_SixStep\_ARR\_Bemf**

Calculate the new Autoreload value (ARR) for Low Frequency timer.

### **MC\_ADCx\_SixStep\_Bemf**

Compute the zero crossing detection.

### **MC\_EXT\_button\_SixStep**

GPIO EXT Callback - Start or Stop the motor through the Blue push button on STM32Nucleo.

### **Main\_Motor\_parameters**

All motor parameters for 6Step driving.

## Functions

uint64\_t **MCM\_Sqrt** (uint64\_t wInput)

It calculates the square root of a non-negative s64. It returns 0 for negative s64. [More...](#)

void **MC\_SixStep\_EnableInput\_CH1\_E\_CH2\_E\_CH3\_D** (void)

void **MC\_SixStep\_EnableInput\_CH1\_E\_CH2\_D\_CH3\_E** (void)

void **MC\_SixStep\_EnableInput\_CH1\_D\_CH2\_E\_CH3\_E** (void)

void **MC\_SixStep\_DisableInput\_CH1\_D\_CH2\_D\_CH3\_D** (void)

void **MC\_SixStep\_Start\_PWM\_driving** (void)

void **MC\_SixStep\_Stop\_PWM\_driving** (void)

void **MC\_SixStep\_HF\_TIMx\_SetDutyCycle\_CH1** (uint16\_t)

void **MC\_SixStep\_HF\_TIMx\_SetDutyCycle\_CH2** (uint16\_t)

void **MC\_SixStep\_HF\_TIMx\_SetDutyCycle\_CH3** (uint16\_t)

void **MC\_SixStep\_Current\_Reference\_Start** (void)

void **MC\_SixStep\_Current\_Reference\_Stop** (void)

void **MC\_SixStep\_Current\_Reference\_Setvalue** (uint16\_t)

void **MC\_UI\_INIT** (void)

void **UART\_Set\_Value** (void)

void **UART\_Communication\_Task** (void)

```
void CMD_Parser (char *pCommandString)
```

```
void HAL_IncTick (void)
```

This function is called to increment a global variable "uwTick" used as application time base. [More...](#)

```
uint32_t HAL_GetTick (void)
```

Povides a tick value in millisecond. [More...](#)

---

## Variables

SIXSTEP\_Base\_InitTypeDef SIXSTEP\_parameters

SIXSTEP\_PI\_PARAM\_InitTypeDef\_t PI\_parameters

uint16\_t Rotor\_poles\_pairs

uint32\_t mech\_accel\_hz = 0

uint32\_t constant\_k = 0

uint32\_t Time\_vector\_tmp = 0

uint32\_t Time\_vector\_prev\_tmp = 0

uint32\_t T\_single\_step = 0

uint32\_t T\_single\_step\_first\_value = 0

int32\_t delta = 0

uint16\_t index\_array = 1

int16\_t speed\_tmp\_array [FILTER\_DEEP]

uint16\_t speed\_tmp\_buffer [FILTER\_DEEP]

uint16\_t HFBuffer [HFBUFFERSIZE]

uint16\_t HFBufferIndex = 0

uint8\_t array\_completed = FALSE

uint8\_t **buffer\_completed** = FALSE

uint8\_t **UART\_FLAG\_RECEIVE** =  
FALSE

uint32\_t **ARR\_LF** = 0

int32\_t **Mech\_Speed\_RPM** = 0

int32\_t **EI\_Speed\_Hz** = 0

uint16\_t **index\_adc\_chn** = 0

uint16\_t **index\_motor\_run** = 0

uint16\_t **test\_motor\_run** = 1

uint8\_t **Enable\_start\_button** = TRUE

uint16\_t **index\_ARR\_step** = 1

uint32\_t **n\_zcr\_startup** = 0

uint16\_t **index\_startup\_motor** = 1

uint16\_t **target\_speed** =  
**TARGET\_SPEED**

uint16\_t **shift\_n\_sqrt** = 14

uint16\_t **cnt\_bemf\_event** = 0

uint8\_t **startup\_bemf\_failure** = 0

uint8\_t **speed\_fdbk\_error** = 0

\_\_IO uint32\_t uwTick = 0

uint8\_t dac\_status = DAC\_ENABLE

uint16\_t index\_align = 1

int32\_t speed\_sum\_sp\_filt = 0

int32\_t speed\_sum\_pot\_filt = 0

uint16\_t index\_pot\_filt = 1

int16\_t potent\_filtered = 0

uint32\_t Tick\_cnt = 0

uint32\_t counter.ARR\_Bemf = 0

uint64\_t constant\_multiplier\_tmp = 0

## Detailed Description

---

Motor Control driver.

# Function Documentation

---

## `uint32_t HAL_GetTick ( void )`

---

Povides a tick value in millisecond.

### Note

The function is declared as `_Weak` to be overwritten in case of other implementations in user file.

### Return values

**tick** value

## `void HAL_IncTick ( void )`

---

This function is called to increment a global variable "uwTick" used as application time base.

### Note

In the default implementation, this variable is incremented each 1ms in Systick ISR.

This function is declared as `_weak` to be overwritten in case of other implementations in user file.

### Return values

**None**

## `uint64_t MCM_Sqrt ( uint64_t wInput )`

---

It calculates the square root of a non-negative s64. It returns 0 for negative s64.

## Parameters

**Input** uint64\_t number

## Return values

**int32\_t** Square root of Input (0 if Input<0)

## Variable Documentation

---

**uint32\_t ARR\_LF = 0**

---

Autoreload LF TIM variable

**uint8\_t array\_completed = FALSE**

---

Speed filter variable

**uint8\_t buffer\_completed = FALSE**

---

Potentiometer filter variable

**uint32\_t constant\_k = 0**

---

$1/3 * \text{mech\_accel\_hz}$

**int32\_t delta = 0**

---

Startup variable

**int32\_t EI\_Speed\_Hz = 0**

---

Electrical motor speed

**uint8\_t Enable\_start\_button = TRUE**

---

Start/stop button filter to avoid double command

---

**uint16\_t HFBuffer[HFBUFFERSIZE]**

Buffer for Potentiometer Value Filtering at the High-Frequency ADC conversion

---

**uint16\_t HFBufferIndex = 0**

High-Frequency Buffer Index

---

**uint16\_t index\_adc\_chn = 0**

Index of ADC channel selector for measuring

---

**uint16\_t index\_array = 1**

Speed filter variable

---

**uint16\_t index\_motor\_run = 0**

Tmp variable for DEMO mode

---

**uint32\_t mech\_accel\_hz = 0**

Hz – Mechanical acceleration rate

---

**int32\_t Mech\_Speed\_RPM = 0**

Mechanical motor speed

---

**SIXSTEP\_PI\_PARAM\_InitTypeDef\_t PI\_parameters**

SixStep PI regulator structure

---

**uint16\_t Rotor\_poles\_pairs**

Number of pole pairs of the motor

---

**SIXSTEP\_Base\_InitTypeDef SIXSTEP\_parameters**

Main SixStep structure

---

**int16\_t speed\_tmp\_array[FILTER\_DEEP]**

Speed filter variable

---

**uint16\_t speed\_tmp\_buffer[FILTER\_DEEP]**

Potentiometer filter variable

---

**uint32\_t T\_single\_step = 0**

Startup variable

---

**uint32\_t T\_single\_step\_first\_value = 0**

Startup variable

---

**`uint16_t target_speed = TARGET_SPEED`**

Target speed for closed loop control

---

**`uint16_t test_motor_run = 1`**

Tmp variable for DEMO mode

---

**`uint32_t Time_vector_prev_tmp = 0`**

Startup variable

---

**`uint32_t Time_vector_tmp = 0`**

Startup variable

---

**`uint8_t UART_FLAG_RECEIVE = FALSE`**

UART communication flag

---

**`__IO uint32_t uwTick = 0`**

Tick counter - 1msec updated

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[Classes](#) | [Typedefs](#) | [Enumerations](#)

## Exported\_types

[MIDDLEWARES](#) » [MC\\_6-STEP\\_LIB](#)

Collaboration diagram for Exported\_types:



## Classes

---

struct **SIXSTEP\_Base\_InitTypeDef**

Six Step parameters. More...

struct **SIXSTEP\_PI\_PARAM\_InitTypeDef\_t**

Six PI regulator parameters. More...

---

## TypeDefs

---

```
typedef struct SIXSTEP_PI_PARAM_InitTypeDef_t * SIXSTEP_pi_PA
```

---

## Enumerations

---

```
enum SIXSTEP_Base_SystStatus_t {
    IDLE, STARTUP, VALIDATION, STOP,
    START, RUN, ALIGNMENT, SPEEDFBKERROR,
    OVERCURRENT, STARTUP_FAILURE,
    STARTUP_BEMF_FAILURE
}
Six Step parameters.
```

---

## Detailed Description

---

### Typedef Documentation

---

```
typedef struct SIXSTEP_PI_PARAM_InitTypeDef_t *  
SIXSTEP_pi_PARAM_InitTypeDef_t
```

---

#### PI Data Structure

---

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## Exported\_function\_6StepLib

MIDDLEWARES » MC\_6-STEP\_LIB

Collaboration diagram for Exported\_function\_6StepLib:



## Functions

---

```
void MC_SixStep_INIT (void)
```

```
void MC_SixStep_RESET (void)
```

```
void MC_StartMotor (void)
```

```
void MC_StopMotor (void)
```

```
void MC_Set_Speed (uint16_t)
```

```
void MC_EXT_button_SixStep (void)
```

---

## Detailed Description

---

---

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## MC\_SixStep\_TABLE

MIDDLEWARES » MC\_6-STEP\_LIB

Set the peripherals (TIMx, GPIO etc.) for each step. [More...](#)

Collaboration diagram for MC\_SixStep\_TABLE:



## Functions

---

```
void MC_SixStep_TABLE (uint8_t)
```

---

## Detailed Description

---

Set the peripherals (TIMx, GPIO etc.) for each step.

### Parameters

**step\_number** step number selected

### Return values

**None**

---

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## MC\_SixStep\_NEXT\_step

MIDDLEWARES » MC\_6-STEP\_LIB

Generate the next step number according with the direction (CW or CCW) [More...](#)

Collaboration diagram for MC\_SixStep\_NEXT\_step:



## Functions

---

```
void MC_SixStep_NEXT_step (void)
```

---

## Detailed Description

---

Generate the next step number according with the direction (CW or CCW)

### Return values

`uint8_t` SIXSTEP\_parameters.status

---

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## MC\_SixStep\_RESET

MIDDLEWARES » MC\_6-STEP\_LIB

Reset all variables used for 6Step control algorithm. [More...](#)

Collaboration diagram for MC\_SixStep\_RESET:



## Functions

---

```
void MC_SixStep_RESET ()
```

---

## Detailed Description

---

Reset all variables used for 6Step control algorithm.

### Return values

**None**

---

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## MC\_SixStep\_Ramp\_Motor\_calc

MIDDLEWARES » MC\_6-STEP\_LIB

Calculate the acceleration profile step by step for motor during start-up.

[More...](#)

Collaboration diagram for MC\_SixStep\_Ramp\_Motor\_calc:



## Functions

---

```
void MC_SixStep_Ramp_Motor_calc (void)
```

---

## Detailed Description

---

Calculate the acceleration profile step by step for motor during start-up.

### Return values

**None**

---

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## MC\_SixStep\_ARR\_step

MIDDLEWARES » MC\_6-STEP\_LIB

Generate the ARR value for Low Frequency TIM during start-up.

[More...](#)

Collaboration diagram for MC\_SixStep\_ARR\_step:



## Functions

---

```
void MC_SixStep_ARR_step (void)
```

---

## Detailed Description

---

Generate the ARR value for Low Frequency TIM during start-up.

### Return values

**None**

---

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## MC\_SixStep\_Alignment

MIDDLEWARES » MC\_6-STEP\_LIB

Generate the motor alignment. [More...](#)

Collaboration diagram for MC\_SixStep\_Alignment:



## Functions

---

```
void MC_SixStep_Alignment (void)
```

---

## Detailed Description

---

Generate the motor alignment.

### Return values

**None**

---

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## MC\_SixStep\_Speed\_Val\_target\_potentiometer

MIDDLEWARES » MC\_6-STEP\_LIB

Calculate the Motor Speed validation threshold according with the potentiometer value. [More...](#)

Collaboration diagram for  
MC\_SixStep\_Speed\_Val\_target\_potentiometer:



## Functions

---

```
void MC_SixStep_Speed_Val_target_potentiometer(void)
```

---

## Detailed Description

---

Calculate the Motor Speed validation threshold according with the potentiometer value.

### Return values

**None**

---

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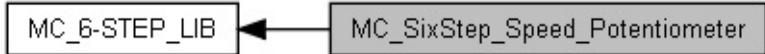
Functions

## MC\_SixStep\_Speed\_Potentiometer

MIDDLEWARES » MC\_6-STEP\_LIB

Calculate the potentiometer value to set the Motor Speed. [More...](#)

Collaboration diagram for MC\_SixStep\_Speed\_Potentiometer:



## Functions

---

```
void MC_SixStep_Speed_Potentiometer (void)
```

---

## Detailed Description

---

Calculate the potentiometer value to set the Motor Speed.

### Return values

**None**

---

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## MC\_Set\_PI\_param

MIDDLEWARES » MC\_6-STEP\_LIB

Set all parameters for PI regulator. [More...](#)

Collaboration diagram for MC\_Set\_PI\_param:



## Functions

---

```
void MC_Set_PI_param (SIXSTEP_PI_PARAM_InitTypeDef_t *)
```

---

## Detailed Description

---

Set all parameters for PI regulator.

### Parameters

**PI\_PARAM**

### Return values

**None**

---

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## MC\_PI\_Controller

MIDDLEWARES » MC\_6-STEP\_LIB

Compute the PI output for the Current Reference. [More...](#)

Collaboration diagram for MC\_PI\_Controller:



## Functions

---

```
int16_t MC_PI_Controller (SIXSTEP_PI_PARAM_InitTypeDef_t *,  
                           int16_t)
```

---

## Detailed Description

---

Compute the PI output for the Current Reference.

### Parameters

**PI\_PARAM** PI parameters structure

**speed\_fdb** motor\_speed\_value

### Return values

**int16\_t** Currente reference

---

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## MC\_Task\_Speed

MIDDLEWARES » MC\_6-STEP\_LIB

Main task: Speed Loop with PI regulator. [More...](#)

Collaboration diagram for MC\_Task\_Speed:



## Functions

---

```
void MC_Task_Speed (void)
```

---

# Detailed Description

---

Main task: Speed Loop with PI regulator.

## Return values

**None**

---

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## MC\_Set\_Speed

MIDDLEWARES » MC\_6-STEP\_LIB

Set the new motor speed value. [More...](#)

Collaboration diagram for MC\_Set\_Speed:



## Functions

---

```
void MC_Set_Speed (uint16_t speed_value)
```

---

## Detailed Description

---

Set the new motor speed value.

### Parameters

**speed\_value** set new motor speed

### Return values

**None**

---

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## MC\_Bemf\_Delay

MIDDLEWARES » MC\_6-STEP\_LIB

Take the delay time after each new 6-step commutation. [More...](#)

Collaboration diagram for MC\_Bemf\_Delay:



## Functions

---

```
void MC_Bemf_Delay (void)
```

---

## Detailed Description

---

Take the delay time after each new 6-step commutation.

### Return values

**None**

---

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## MC\_StartMotor

MIDDLEWARES » MC\_6-STEP\_LIB

Start the Motor. [More...](#)

Collaboration diagram for MC\_StartMotor:



## Functions

---

```
void MC_StartMotor ()
```

---

# Detailed Description

---

Start the Motor.

## Return values

**None**

---

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## MC\_StopMotor

MIDDLEWARES » MC\_6-STEP\_LIB

Stop the Motor. [More...](#)

Collaboration diagram for MC\_StopMotor:



## Functions

---

```
void MC_StopMotor ()
```

---

# Detailed Description

---

Stop the Motor.

## Return values

**None**

---

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## MC\_GetElSpeedHz

MIDDLEWARES » MC\_6-STEP\_LIB

Get the Electrical Motor Speed from ARR value of LF TIM. [More...](#)

Collaboration diagram for MC\_GetElSpeedHz:



## Functions

---

```
int32_t MC_GetElSpeedHz (void)
```

---

## Detailed Description

---

Get the Eletrical Motor Speed from ARR value of LF TIM.

### Return values

**int32\_t** Return the electrical motor speed

---

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## MC\_GetMechSpeedRPM

MIDDLEWARES » MC\_6-STEP\_LIB

Get the Mechanical Motor Speed (RPM) [More...](#)

Collaboration diagram for MC\_GetMechSpeedRPM:



## Functions

---

```
int32_t MC_GetMechSpeedRPM (void)
```

---

## Detailed Description

---

Get the Mechanical Motor Speed (RPM)

### Return values

**int32\_t** Return the mechanical motor speed (RPM)

---

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## MC\_SixStep\_Init\_main\_data

MIDDLEWARES » MC\_6-STEP\_LIB

Init the main variables for motor driving from [MC\\_SixStep\\_param.h](#).

[More...](#)

Collaboration diagram for MC\_SixStep\_Init\_main\_data:



## Functions

---

```
void MC_SixStep_Init_main_data (void)
```

---

## Detailed Description

---

Init the main variables for motor driving from [MC\\_SixStep\\_param.h](#).

### Return values

**None**

---

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Macros

## MC\_SixStep\_param.h

### File Reference

This header file provides all parameters to driver a motor with 6Step library. [More...](#)

[Go to the source code of this file.](#)

## Macros

---

```
#define NUM_POLE_PAIRS 7  
  
#define DIRECTION 0  
  
#define TARGET_SPEED 3000  
  
#define POTENTIOMETER 1  
  
#define STARTUP_CURRENT_REFERENCE 2000  
  
#define ACC 600000  
  
#define MINIMUM_ACC 500  
  
#define NUMBER_OF_STEPS 20000  
  
#define TIME_FOR_ALIGN 500  
  
#define BUTTON_DELAY 1000  
  
#define NUMBER_ZCR 12  
  
#define SPEED_LOOP_TIME 1  
  
#define KP_GAIN 8000  
  
#define KI_GAIN 50  
  
#define KP_DIV 4096  
  
#define KI_DIV 4096  
  
#define LOWER_OUT_LIMIT 120
```

```
#define UPPER_OUT_LIMIT 2000  
  
#define MAX_POT_SPEED 10000  
  
#define MIN_POT_SPEED 1500  
  
#define VAL_POT_SPEED_DIV 2  
  
#define INITIAL_DEMAGN_DELAY 10  
  
#define BEMF_THRSLD_DOWN 200  
  
#define BEMF_THRSLD_UP 200  
  
#define FILTER_DEEP 20  
  
#define HFBUFFERSIZE 10  
  
#define ADC_SPEED_TH 82  
  
#define BEMF_CONSEC_DOWN_MAX 10  
  
#define BEMF_CNT_EVENT_MAX 100  
  
#define GPIO_ZERO_CROSS 1  
  
#define GPIO_COMM 1  
  
#define DEMO_START_TIME 5000  
  
#define DEMO_STOP_TIME 2000  
  
#define DEMAGN_VAL_1 1  
  
#define DEMAGN_VAL_2 2  
  
#define DEMAGN_VAL_3 3
```

```
#define DEMAGN_VAL_4 4  
  
#define DEMAGN_VAL_5 5  
  
#define DEMAGN_VAL_6 6  
  
#define DEMAGN_VAL_7 7  
  
#define DEMAGN_VAL_8 8  
  
#define DEMAGN_VAL_9 9  
  
#define DEMAGN_VAL_10 10  
  
#define DEMAGN_VAL_11 11  
  
#define DEMAGN_VAL_12 12  
  
#define DEMAGN_VAL_13 13  
  
#define DEMAGN_VAL_14 14  
  
#define TRUE 1  
  
#define FALSE 0
```

## Detailed Description

---

This header file provides all parameters to driver a motor with 6Step library.

**Author**

System lab - Automation and Motion control team

**Version**

V1.0.0

**Date**

06-July-2015

**Attention**

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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## MC\_SixStep\_INIT

MIDDLEWARES » MC\_6-STEP\_LIB

Initialitation function for SixStep library. [More...](#)

Collaboration diagram for MC\_SixStep\_INIT:



## Functions

---

```
void MC_SixStep_INIT ()
```

---

# Detailed Description

---

Initialitation function for SixStep library.

## Return values

**None**

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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**MC\_TIMx\_SixStep\_timebase**  
MIDDLEWARES » MC\_6-STEP\_LIB

Low Frequency Timer Callback - Call the next step and request the filtered speed value. [More...](#)

Collaboration diagram for MC\_TIMx\_SixStep\_timebase:



## Functions

---

```
void MC_TIMx_SixStep_timebase (void)
```

---

## Detailed Description

---

Low Frequency Timer Callback - Call the next step and request the filtered speed value.

### Return values

**None**

---

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## MC\_Speed\_Filter

MIDDLEWARES » MC\_6-STEP\_LIB

Calculate the speed filtered. [More...](#)

Collaboration diagram for MC\_Speed\_Filter:



## Functions

---

```
void MC_Speed_Filter (void)
```

---

## Detailed Description

---

Calculate the speed filtered.

### Return values

**None**

---

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## MC\_Potentiometer\_filter

MIDDLEWARES » MC\_6-STEP\_LIB

Calculate the filtered potentiometer value. [More...](#)

Collaboration diagram for MC\_Potentiometer\_filter:



## Functions

---

```
uint16_t MC_Potentiometer_filter (uint16_t)
```

---

## Detailed Description

---

Calculate the filtered potentiometer value.

### Return values

`uint16_t` Return the filtered potentiometer value

---

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## MC\_SysTick\_SixStep\_MediumFrequencyTask

MIDDLEWARES » MC\_6-STEP\_LIB

Systick Callback - Call the Speed loop. [More...](#)

Collaboration diagram for  
MC\_SysTick\_SixStep\_MediumFrequencyTask:



## Functions

---

```
void MC_SysTick_SixStep_MediumFrequencyTask (void)
```

---

## Detailed Description

---

Systick Callback - Call the Speed loop.

### Return values

**None**

---

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## MC\_SixStep\_ARR\_Bemf

MIDDLEWARES » MC\_6-STEP\_LIB

Calculate the new Autoreload value (ARR) for Low Frequency timer.

[More...](#)

Collaboration diagram for MC\_SixStep\_ARR\_Bemf:



## Functions

---

```
void MC_SixStep.ARR_Bemf (uint8_t)
```

---

## Detailed Description

---

Calculate the new Autoreload value (ARR) for Low Frequency timer.

### Return values

**None**

---

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## MC\_ADCx\_SixStep\_Bemf

MIDDLEWARES » MC\_6-STEP\_LIB

Compute the zero crossing detection. [More...](#)

Collaboration diagram for MC\_ADCx\_SixStep\_Bemf:



## Functions

---

```
void MC_ADCx_SixStep_Bemf (void)
```

---

## Detailed Description

---

Compute the zero crossing detection.

### Return values

**None**

---

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## MC\_EXT\_button\_SixStep

MIDDLEWARES » MC\_6-STEP\_LIB

GPIO EXT Callback - Start or Stop the motor through the Blue push button on STM32Nucleo. [More...](#)

Collaboration diagram for MC\_EXT\_button\_SixStep:



## Functions

---

```
void MC_EXT_button_SixStep ()
```

---

## Detailed Description

---

GPIO EXT Callback - Start or Stop the motor through the Blue push button on STM32Nucleo.

### Return values

**None**

---

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## UART\_UI

MIDDLEWARES

Serial communication through PC serial terminal. [More...](#)

Collaboration diagram for UART\_UI:



# Modules

---

**Exported\_function\_Uart**

---

## Detailed Description

---

Serial communication through PC serial terminal.

---

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## Exported\_function\_Uart

MIDDLEWARES » UART\_UI

Collaboration diagram for Exported\_function\_Uart:



## Functions

---

```
void CMD_STARTM (void)  
UART function.
```

```
void CMD_STOPMT (void)
```

```
void CMD_DIRECTION (void)
```

```
void CMD_SETSPD (void)
```

```
void CMD_GETSPD (void)
```

```
void CMD_STATUS (void)
```

```
void CMD_POTENZ (void)
```

```
void CMD_HELP (void)
```

```
void CMD_INIREF (void)
```

```
void CMD_POLESP (void)
```

```
void CMD_ACCELE (void)
```

```
void CMD_KP_PRM (void)
```

```
void CMD_KI_PRM (void)
```

---

## Detailed Description

---

---

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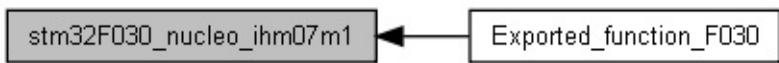
Files

Modules

## **stm32F030\_nucleo\_ihm07m1**

Interface file for STM32F030 and Library configuration. [More...](#)

Collaboration diagram for stm32F030\_nucleo\_ihm07m1:



# Modules

---

**Exported\_function\_F030**

---

# Detailed Description

---

Interface file for STM32F030 and Library configuration.

---

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Functions

## Exported\_function\_F030

[stm32F030\\_nucleo\\_ihm07m1](#)

Collaboration diagram for Exported\_function\_F030:



## Functions

```
void MC_SixStep_ADC_Channel (uint32_t)
```

API function for STM32 instruction.

```
void MC_SixStep_Nucleo_Init (void)
```

```
void START_Ref_Generation (void)
```

```
void STOP_Ref_Generation (void)
```

```
void Set_Ref_Generation (uint16_t)
```

```
void Bemf_delay_calc (void)
```

```
void START_DAC (void)
```

```
void STOP_DAC (void)
```

```
void SET_DAC_value (uint16_t)
```

```
uint32_t Get_UART_Data (void)
```

```
void MC_SixStep_EnableInput_CH1_E_CH2_E_CH3_D (void)
```

```
void MC_SixStep_EnableInput_CH1_E_CH2_D_CH3_E (void)
```

```
void MC_SixStep_EnableInput_CH1_D_CH2_E_CH3_E (void)
```

```
void MC_SixStep_DisableInput_CH1_D_CH2_D_CH3_D (void)
```

```
void MC_SixStep_Start_PWM_driving (void)
```

```
void MC_SixStep_Stop_PWM_driving (void)
```

```
void MC_SixStep_HF_TIMx_SetDutyCycle_CH1 (uint16_t)
```

```
void MC_SixStep_HF_TIMx_SetDutyCycle_CH2 (uint16_t)
```

```
void MC_SixStep_HF_TIMx_SetDutyCycle_CH3 (uint16_t)
```

```
void MC_SixStep_Current_Reference_Start (void)
```

```
void MC_SixStep_Current_Reference_Stop (void)
```

```
void MC_SixStep_Current_Reference_Setvalue (uint16_t)
```

---

## Detailed Description

---

---

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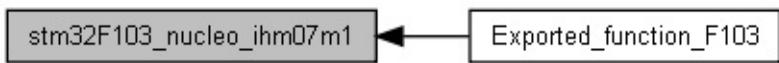
Files

Modules

## **stm32F103\_nucleo\_ihm07m1**

Interface file for STM32F103 and Library configuration. [More...](#)

Collaboration diagram for stm32F103\_nucleo\_ihm07m1:



# Modules

---

**Exported\_function\_F103**

---

# Detailed Description

---

Interface file for STM32F103 and Library configuration.

---

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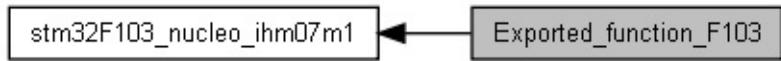
Files

Functions

## Exported\_function\_F103

[stm32F103\\_nucleo\\_ihm07m1](#)

Collaboration diagram for Exported\_function\_F103:



## Functions

```
void MC_SixStep_ADC_Channel (uint32_t)  
API function for STM32 instruction.
```

```
void MC_SixStep_Nucleo_Init (void)
```

```
void START_Ref_Generation (void)
```

```
void STOP_Ref_Generation (void)
```

```
void Set_Ref_Generation (uint16_t)
```

```
void START_DAC (void)
```

```
void STOP_DAC (void)
```

```
void SET_DAC_value (uint16_t)
```

```
void Bemf_delay_calc (void)
```

```
uint32_t Get_UART_Data (void)
```

```
void MC_SixStep_EnableInput_CH1_E_CH2_E_CH3_D (void)
```

```
void MC_SixStep_EnableInput_CH1_E_CH2_D_CH3_E (void)
```

```
void MC_SixStep_EnableInput_CH1_D_CH2_E_CH3_E (void)
```

```
void MC_SixStep_DisableInput_CH1_D_CH2_D_CH3_D (void)
```

```
void MC_SixStep_Start_PWM_driving (void)
```

```
void MC_SixStep_Stop_PWM_driving (void)
```

```
void MC_SixStep_HF_TIMx_SetDutyCycle_CH1 (uint16_t)
```

```
void MC_SixStep_HF_TIMx_SetDutyCycle_CH2 (uint16_t)
```

```
void MC_SixStep_HF_TIMx_SetDutyCycle_CH3 (uint16_t)
```

```
void MC_SixStep_Current_Reference_Start (void)
```

```
void MC_SixStep_Current_Reference_Stop (void)
```

```
void MC_SixStep_Current_Reference_Setvalue (uint16_t)
```

---

## Detailed Description

---

---

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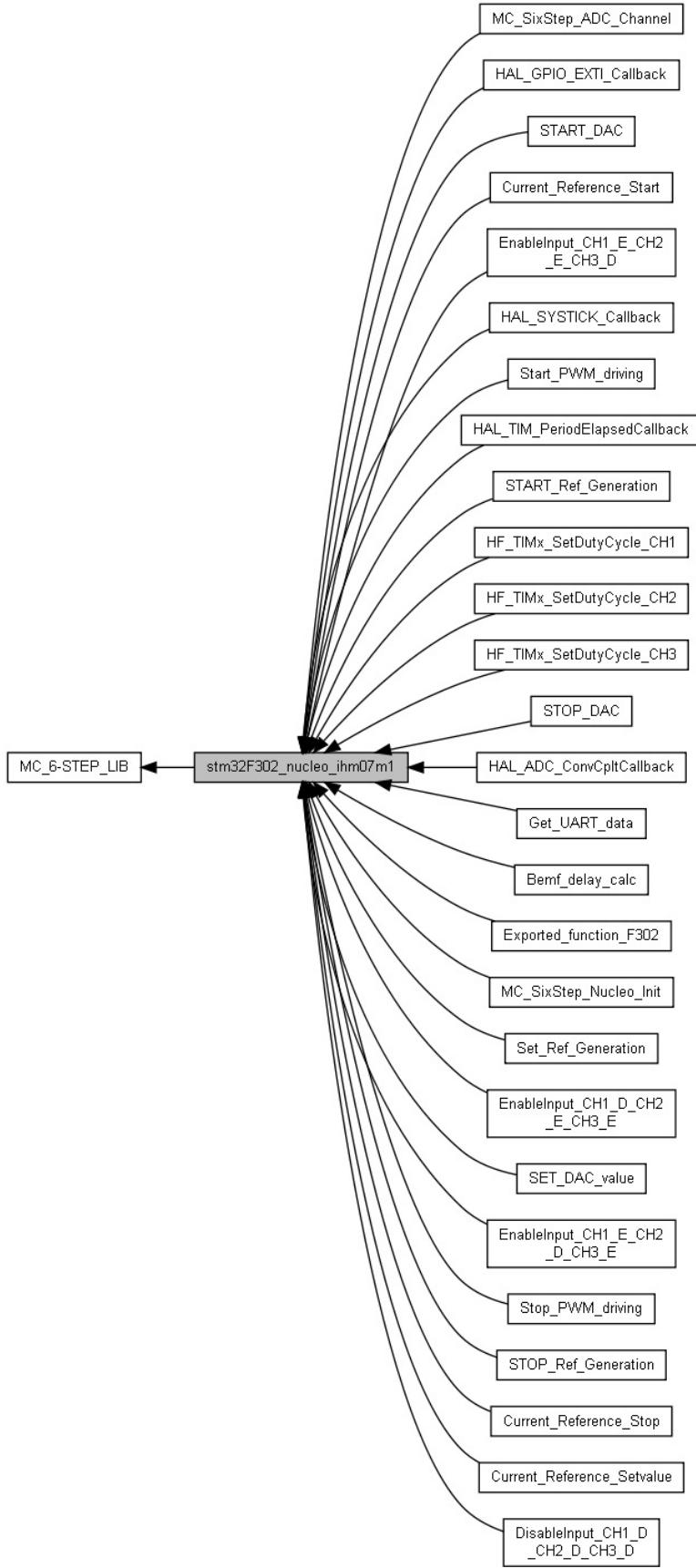
Files

Modules

## **stm32F302\_nucleo\_ihm07m1**

Interface file for STM32F302 and Library configuration. [More...](#)

Collaboration diagram for stm32F302\_nucleo\_ihm07m1:



# Modules

---

**Exported\_function\_F302**

---

# Detailed Description

---

Interface file for STM32F302 and Library configuration.

---

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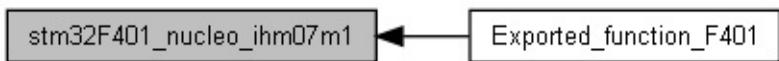
Files

Modules

## **stm32F401\_nucleo\_ihm07m1**

Interface file for STM32F401 and Library configuration. [More...](#)

Collaboration diagram for stm32F401\_nucleo\_ihm07m1:



# Modules

---

## **Exported\_function\_F401**

---

# Detailed Description

---

Interface file for STM32F401 and Library configuration.

---

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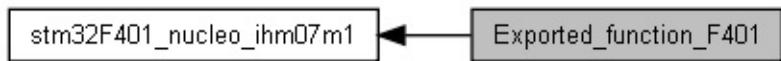
Files

Functions

## Exported\_function\_F401

[stm32F401\\_nucleo\\_ihm07m1](#)

Collaboration diagram for Exported\_function\_F401:



## Functions

```
void MC_SixStep_ADC_Channel (uint32_t)  
API function for STM32 instruction.
```

```
void MC_SixStep_Nucleo_Init (void)
```

```
void START_Ref_Generation (void)
```

```
void STOP_Ref_Generation (void)
```

```
void Set_Ref_Generation (uint16_t)
```

```
void START_DAC (void)
```

```
void STOP_DAC (void)
```

```
void SET_DAC_value (uint16_t)
```

```
void Bemf_delay_calc (void)
```

```
uint32_t Get_UART_Data (void)
```

```
void MC_SixStep_EnableInput_CH1_E_CH2_E_CH3_D (void)
```

```
void MC_SixStep_EnableInput_CH1_E_CH2_D_CH3_E (void)
```

```
void MC_SixStep_EnableInput_CH1_D_CH2_E_CH3_E (void)
```

```
void MC_SixStep_DisableInput_CH1_D_CH2_D_CH3_D (void)
```

```
void MC_SixStep_Start_PWM_driving (void)
```

```
void MC_SixStep_Stop_PWM_driving (void)
```

```
void MC_SixStep_HF_TIMx_SetDutyCycle_CH1 (uint16_t)
```

```
void MC_SixStep_HF_TIMx_SetDutyCycle_CH2 (uint16_t)
```

```
void MC_SixStep_HF_TIMx_SetDutyCycle_CH3 (uint16_t)
```

```
void MC_SixStep_Current_Reference_Start (void)
```

```
void MC_SixStep_Current_Reference_Stop (void)
```

```
void MC_SixStep_Current_Reference_Setvalue (uint16_t)
```

---

## Detailed Description

---

---

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C

L

S

[CMD\\_T](#) [L6230\\_MotorDriver\\_TypeDef](#) [SIXSTEP\\_Base\\_InitTypeDef](#)

C | L | S

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| a          | b           | c             | d     | e | f | h | i | k | l | m | n | p | r | s | u | v |

Here is a list of all documented class members with links to the class documentation for each member:

## - a -

- ACCEL : [SIXSTEP\\_Base\\_InitTypeDef](#)
- ADC\_BEMF\_threshold\_DOWN : [SIXSTEP\\_Base\\_InitTypeDef](#)
- ADC\_BEMF\_threshold\_UP : [SIXSTEP\\_Base\\_InitTypeDef](#)
- ADC\_BUFFER : [SIXSTEP\\_Base\\_InitTypeDef](#)
- ADC-Regular\_Buffer : [SIXSTEP\\_Base\\_InitTypeDef](#)
- ADC\_SEQ\_CHANNEL : [SIXSTEP\\_Base\\_InitTypeDef](#)
- ALIGN\_OK : [SIXSTEP\\_Base\\_InitTypeDef](#)
- ALIGNMENT : [SIXSTEP\\_Base\\_InitTypeDef](#)
- ARR\_OK : [SIXSTEP\\_Base\\_InitTypeDef](#)
- ARR\_value : [SIXSTEP\\_Base\\_InitTypeDef](#)

## - b -

- Bemf\_delay\_start : [SIXSTEP\\_Base\\_InitTypeDef](#)
- bemf\_state\_1 : [SIXSTEP\\_Base\\_InitTypeDef](#)
- bemf\_state\_2 : [SIXSTEP\\_Base\\_InitTypeDef](#)
- bemf\_state\_3 : [SIXSTEP\\_Base\\_InitTypeDef](#)
- bemf\_state\_4 : [SIXSTEP\\_Base\\_InitTypeDef](#)
- bemf\_state\_5 : [SIXSTEP\\_Base\\_InitTypeDef](#)
- bemf\_state\_6 : [SIXSTEP\\_Base\\_InitTypeDef](#)
- BEMF\_Tdown\_count : [SIXSTEP\\_Base\\_InitTypeDef](#)

## - c -

- CMD : **SIXSTEP\_Base\_InitTypeDef**
- Current\_Reference : **SIXSTEP\_Base\_InitTypeDef**
- Current\_Reference\_Setvalue : **L6230\_MotorDriver\_TypeDef**
- Current\_Reference\_Start : **L6230\_MotorDriver\_TypeDef**
- Current\_Reference\_Stop : **L6230\_MotorDriver\_TypeDef**
- CurrentRegular\_BEMF\_ch : **SIXSTEP\_Base\_InitTypeDef**
- CW\_CCW : **SIXSTEP\_Base\_InitTypeDef**

- d -

- demagn\_counter : **SIXSTEP\_Base\_InitTypeDef**
- demagn\_value : **SIXSTEP\_Base\_InitTypeDef**
- DisableInput\_CH1\_D\_CH2\_D\_CH3\_D :  
**L6230\_MotorDriver\_TypeDef**

- e -

- EnableInput\_CH1\_D\_CH2\_E\_CH3\_E :  
**L6230\_MotorDriver\_TypeDef**
- EnableInput\_CH1\_E\_CH2\_D\_CH3\_E :  
**L6230\_MotorDriver\_TypeDef**
- EnableInput\_CH1\_E\_CH2\_E\_CH3\_D :  
**L6230\_MotorDriver\_TypeDef**

- f -

- filter\_depth : **SIXSTEP\_Base\_InitTypeDef**

- h -

- HF\_TIMx\_ARR : **SIXSTEP\_Base\_InitTypeDef**
- HF\_TIMx\_CCR : **SIXSTEP\_Base\_InitTypeDef**
- HF\_TIMx\_PSC : **SIXSTEP\_Base\_InitTypeDef**
- HF\_TIMx\_SetDutyCycle\_CH1 : **L6230\_MotorDriver\_TypeDef**
- HF\_TIMx\_SetDutyCycle\_CH2 : **L6230\_MotorDriver\_TypeDef**
- HF\_TIMx\_SetDutyCycle\_CH3 : **L6230\_MotorDriver\_TypeDef**

- i -

- Integral\_Term\_sum : **SIXSTEP\_Base\_InitTypeDef**
- IREFERENCE : **SIXSTEP\_Base\_InitTypeDef**
- Ireference : **SIXSTEP\_Base\_InitTypeDef**

- k -

- KI : **SIXSTEP\_Base\_InitTypeDef**
- Ki\_Gain : **SIXSTEP\_PI\_PARAM\_InitTypeDef\_t**
- KP : **SIXSTEP\_Base\_InitTypeDef**
- Kp\_Gain : **SIXSTEP\_PI\_PARAM\_InitTypeDef\_t**

- l -

- LF\_TIMx\_ARR : **SIXSTEP\_Base\_InitTypeDef**
- LF\_TIMx\_PSC : **SIXSTEP\_Base\_InitTypeDef**
- Lower\_Limit\_Output : **SIXSTEP\_PI\_PARAM\_InitTypeDef\_t**

- m -

- Max\_PID\_Output : **SIXSTEP\_PI\_PARAM\_InitTypeDef\_t**
- MediumFrequencyTask\_flag : **SIXSTEP\_Base\_InitTypeDef**
- Min\_PID\_Output : **SIXSTEP\_PI\_PARAM\_InitTypeDef\_t**

- n -

- numberofitemArr : **SIXSTEP\_Base\_InitTypeDef**
- NUMPOLESPAIRS : **SIXSTEP\_Base\_InitTypeDef**

- p -

- Potentiometer : **SIXSTEP\_Base\_InitTypeDef**
- prescaler\_value : **SIXSTEP\_Base\_InitTypeDef**
- pulse\_value : **SIXSTEP\_Base\_InitTypeDef**

- r -

- Ramp\_Start : **SIXSTEP\_Base\_InitTypeDef**
- Reference : **SIXSTEP\_PI\_PARAM\_InitTypeDef\_t**
- Regular\_channel : **SIXSTEP\_Base\_InitTypeDef**

- RUN\_Motor : **SIXSTEP\_Base\_InitTypeDef**

- S -

- speed\_fdbk : **SIXSTEP\_Base\_InitTypeDef**
- speed\_fdbk\_filtered : **SIXSTEP\_Base\_InitTypeDef**
- Speed\_Loop\_Time : **SIXSTEP\_Base\_InitTypeDef**
- Speed\_Ref\_filtered : **SIXSTEP\_Base\_InitTypeDef**
- Speed\_target\_ramp : **SIXSTEP\_Base\_InitTypeDef**
- Speed\_target\_time : **SIXSTEP\_Base\_InitTypeDef**
- SPEED\_VALIDATED : **SIXSTEP\_Base\_InitTypeDef**
- Start\_PWM\_driving : **L6230\_MotorDriver\_TypeDef**
- STATUS : **SIXSTEP\_Base\_InitTypeDef**
- status\_prev : **SIXSTEP\_Base\_InitTypeDef**
- step\_position : **SIXSTEP\_Base\_InitTypeDef**
- Stop\_PWM\_driving : **L6230\_MotorDriver\_TypeDef**
- SYSCLK\_frequency : **SIXSTEP\_Base\_InitTypeDef**

- U -

- Upper\_Limit\_Output : **SIXSTEP\_PI\_PARAM\_InitTypeDef\_t**

- V -

- VALIDATION\_OK : **SIXSTEP\_Base\_InitTypeDef**

---

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**doxygen** 1.8.9.1

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

| Main Page                     | Modules     | Classes       | Files   |
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| Class List                    | Class Index | Class Members |   |
| <b>CMD_T Struct Reference</b> |             |               | <a href="#">Public Attributes</a>   <a href="#">List of all members</a> |
|                               |             |               |   |

## Public Attributes

---

```
char name [10]
```

```
void(* pCmdFunc )(void)
```

---

The documentation for this struct was generated from the following file:

- C:/Users/giuseppe scuderi-sl/Desktop/MOTOR  
CONTROL/Peppe/trunk/Firmware/X-CUBE-SPN7-MC-  
6STEP/Middlewares/ST/UART\_serial\_com/Inc/**UART\_UI.h**

---

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**doxygen** 1.8.9.1

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

| Main Page  | Modules     | Classes       | Files |
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| Class List   | Class Index | Class Members |       |
| Public Attributes   List of all members                                      |             |               |       |
| <b>L6230_MotorDriver_TypeDef Struct Reference</b>                            |             |               |       |
| <a href="#">DRIVERS</a> » <a href="#">BSP</a> » <a href="#">COMPONENTS</a> » |             |               |       |
| <a href="#">L6230_Motor_Driver_handler</a>                                   |             |               |       |

## Public Attributes

---

```
void(* EnableInput_CH1_E_CH2_E_CH3_D )(void)
```

```
void(* EnableInput_CH1_E_CH2_D_CH3_E )(void)
```

```
void(* EnableInput_CH1_D_CH2_E_CH3_E )(void)
```

```
void(* DisableInput_CH1_D_CH2_D_CH3_D )(void)
```

```
void(* Start_PWM_driving )(void)
```

```
void(* Stop_PWM_driving )(void)
```

```
void(* HF_TIMx_SetDutyCycle_CH1 )(uint16_t)
```

```
void(* HF_TIMx_SetDutyCycle_CH2 )(uint16_t)
```

```
void(* HF_TIMx_SetDutyCycle_CH3 )(uint16_t)
```

```
void(* Current_Reference_Start )(void)
```

```
void(* Current_Reference_Stop )(void)
```

```
void(* Current_Reference_Setvalue )(uint16_t)
```

---

## Member Data Documentation

---

```
void(*  
L6230_MotorDriver_TypeDef::Current_Reference_Setvalue)  
(uint16_t)
```

---

Set current reference value for closed loop control

```
void(* L6230_MotorDriver_TypeDef::Current_Reference_Start)  
(void)
```

---

Start current reference generation for closed loop control

```
void(* L6230_MotorDriver_TypeDef::Current_Reference_Stop)  
(void)
```

---

Stop current reference generation for closed loop control

```
void(*  
L6230_MotorDriver_TypeDef::DisableInput_CH1_D_CH2_D_CH3_D)  
(void)
```

---

Disable all channels

```
void(*  
L6230_MotorDriver_TypeDef::EnableInput_CH1_D_CH2_E_CH3_E)  
(void)
```

---

Enable the channel 2,3 and Disable the channel 1

```
void(*  
L6230_MotorDriver_TypeDef::EnableInput_CH1_E_CH2_D_CH3_E)  
(void)
```

---

Enable the channel 1,3 and Disable the channel 2

```
void(*  
L6230_MotorDriver_TypeDef::EnableInput_CH1_E_CH2_E_CH3_D)  
(void)
```

---

Enable the channel 1,2 and Disable the channel 3

```
void(*  
L6230_MotorDriver_TypeDef::HF_TIMx_SetDutyCycle_CH1)  
(uint16_t)
```

---

High Frequency Timer - Change DutyCycle value for CH1

```
void(*  
L6230_MotorDriver_TypeDef::HF_TIMx_SetDutyCycle_CH2)  
(uint16_t)
```

---

High Frequency Timer - Change DutyCycle value for CH2

```
void(*  
L6230_MotorDriver_TypeDef::HF_TIMx_SetDutyCycle_CH3)  
(uint16_t)
```

---

High Frequency Timer - Change DutyCycle value for CH3

```
void(* L6230_MotorDriver_TypeDef::Start_PWM_driving) (void)
```

---

Start PWM generation

---

**void(\* L6230\_MotorDriver\_TypeDef::Stop\_PWM\_driving) (void)**

---

Stop PWM generation

---

The documentation for this struct was generated from the following file:

- C:/Users/giuseppe scuderi-sl/Desktop/MOTOR  
CONTROL/Peppe/trunk/Firmware/X-CUBE-SPN7-MC-  
6STEP/Drivers/BSP/Components/Common/**MC\_Common.h**
- 

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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| Public Attributes   List of all members                       |             |               |       |
| <b>SIXSTEP_Base_InitTypeDef Struct Reference</b>              |             |               |       |
| <a href="#">MIDDLEWARES</a> » <a href="#">MC_6-STEP_LIB</a> » |             |               |       |
| <a href="#">Exported_types</a>                                |             |               |       |

Six Step parameters. More...

```
#include <6Step_Lib.h>
```

## Public Attributes

uint32\_t **LF\_TIMx\_PSC**

uint32\_t **LF\_TIMx\_ARR**

uint32\_t **HF\_TIMx\_PSC**

uint32\_t **HF\_TIMx\_ARR**

uint32\_t **HF\_TIMx\_CCR**

uint8\_t **step\_position**

**SIXSTEP\_Base\_SystStatus\_t STATUS**

uint8\_t **status\_prev**

uint16\_t **pulse\_value**

uint16\_t **ARR\_value**

uint32\_t **Regular\_channel** [4]

uint32\_t **CurrentRegular\_BEMF\_ch**

uint32\_t **prescaler\_value**

uint16\_t **numberofitemArr**

uint32\_t **ADC\_BUFFER** [4]

uint32\_t **ADC\_SEQ\_CHANNEL** [4]

uint32\_t **ADC\_Regular\_Buffer** [5]

`uint16_t ADC_BEMF_threshold_UP`

`uint16_t ADC_BEMF_threshold_DOWN`

`uint16_t demagn_counter`

`uint16_t demagn_value`

`int16_t speed_fdbk`

`int16_t speed_fdbk_filtered`

`int16_t filter_depth`

`uint16_t Current_Reference`

`uint16_t Ireference`

`int32_t Integral_Term_sum`

`uint8_t CMD`

`uint8_t ALIGN_OK`

`uint8_t ALIGNMENT`

`uint8_t bemf_state_1`

`uint8_t bemf_state_2`

`uint8_t bemf_state_3`

`uint8_t bemf_state_4`

`uint8_t bemf_state_5`

`uint8_t bemf_state_6`

`uint16_t Speed_Loop_Time`

`uint16_t Speed_Ref_filtered`

`uint16_t RUN_Motor`

`uint8_t ARR_OK`

`uint8_t VALIDATION_OK`

`uint8_t SPEED_VALIDATED`

`uint16_t Speed_target_ramp`

`uint16_t Speed_target_time`

`uint16_t Ramp_Start`

`uint16_t Bemf_delay_start`

`uint16_t MediumFrequencyTask_flag`

`uint32_t SYSCLK_frequency`

`uint32_t Uart_cmd_to_set`

`uint32_t Uart_value_to_set`

`uint8_t Button_ready`

`uint8_t BEMF_OK`

`uint8_t CL_READY`

`uint8_t BEMF_Tdown_count`

`uint16_t IREFERENCE`

`uint16_t NUMPOLESPAIRS`

`uint32_t ACCEL`

`uint16_t KP`

`uint16_t KI`

`uint8_t CW_CCW`

`uint8_t Potentiometer`

---

## Detailed Description

---

Six Step parameters.

## Member Data Documentation

---

**uint32\_t SIXSTEP\_Base\_InitTypeDef::ACCEL**

---

Acceleration start-up parameter

**uint16\_t  
SIXSTEP\_Base\_InitTypeDef::ADC\_BEMF\_threshold\_DOWN**

---

Voltage threshold for BEMF detection in down direction

**uint16\_t SIXSTEP\_Base\_InitTypeDef::ADC\_BEMF\_threshold\_UP**

---

Voltage threshold for BEMF detection in up direction

**uint32\_t SIXSTEP\_Base\_InitTypeDef::ADC\_BUFFER[4]**

---

Buffer for ADC regular channel

**uint32\_t SIXSTEP\_Base\_InitTypeDef::ADC\_Regular\_Buffer[5]**

---

Buffer for ADC regular channel

**uint32\_t SIXSTEP\_Base\_InitTypeDef::ADC\_SEQ\_CHANNEL[4]**

---

Buffer for ADC regular channel

---

**uint8\_t SIXSTEP\_Base\_InitTypeDef::ALIGN\_OK**

Flag control for Motor Alignment

---

**uint8\_t SIXSTEP\_Base\_InitTypeDef::ALIGNMENT**

Flag control for Motor Alignment ongoing

---

**uint8\_t SIXSTEP\_Base\_InitTypeDef::ARR\_OK**

ARR flag control for Accell status

---

**uint16\_t SIXSTEP\_Base\_InitTypeDef::ARR\_value**

ARR vector for Accell compute

---

**uint16\_t SIXSTEP\_Base\_InitTypeDef::Bemf\_delay\_start**

Bemf variable

---

**uint8\_t SIXSTEP\_Base\_InitTypeDef::bemf\_state\_1**

Bemf variable

---

**uint8\_t SIXSTEP\_Base\_InitTypeDef::bemf\_state\_2**

Bemf variable

---

**uint8\_t SIXSTEP\_Base\_InitTypeDef::bemf\_state\_3**

Bemf variable

---

**uint8\_t SIXSTEP\_Base\_InitTypeDef::bemf\_state\_4**

---

Bemf variable

---

**uint8\_t SIXSTEP\_Base\_InitTypeDef::bemf\_state\_5**

---

Bemf variable

---

**uint8\_t SIXSTEP\_Base\_InitTypeDef::bemf\_state\_6**

---

Bemf variable

---

**uint8\_t SIXSTEP\_Base\_InitTypeDef::BEMF\_Tdown\_count**

---

BEMF Consecutive Threshold Falling Crossings Counter

---

**uint8\_t SIXSTEP\_Base\_InitTypeDef::CMD**

---

Flag control for Motor Start/Stop

---

**uint16\_t SIXSTEP\_Base\_InitTypeDef::Current\_Reference**

---

Current reference for SixStep algorithm

---

**uint32\_t SIXSTEP\_Base\_InitTypeDef::CurrentRegular\_BEMF\_ch**

---

ADC regular channel to select

---

**uint8\_t SIXSTEP\_Base\_InitTypeDef::CW\_CCW**

---

Set the motor direction

---

**uint16\_t SIXSTEP\_Base\_InitTypeDef::demagn\_counter**

---

Demagnetization counter

---

**uint16\_t SIXSTEP\_Base\_InitTypeDef::demagn\_value**

---

Demagnetization value

---

**int16\_t SIXSTEP\_Base\_InitTypeDef::filter\_depth**

---

Filter depth for speed measuring

---

**uint32\_t SIXSTEP\_Base\_InitTypeDef::HF\_TIMx\_ARR**

---

ARR variable for high frequency timer

---

**uint32\_t SIXSTEP\_Base\_InitTypeDef::HF\_TIMx\_CCR**

---

CCR variable for high frequency timer

---

**uint32\_t SIXSTEP\_Base\_InitTypeDef::HF\_TIMx\_PSC**

---

Prescaler variable for high frequency timer

---

**int32\_t SIXSTEP\_Base\_InitTypeDef::Integral\_Term\_sum**

---

Global Integral part for PI

---

**uint16\_t SIXSTEP\_Base\_InitTypeDef::lreference**

Current reference for SixStep algorithm

---

**uint16\_t SIXSTEP\_Base\_InitTypeDef::lREFERENCE**

Current reference

---

**uint16\_t SIXSTEP\_Base\_InitTypeDef::KI**

KI parameter for PI regulator

---

**uint16\_t SIXSTEP\_Base\_InitTypeDef::KP**

KP parameter for PI regulator

---

**uint32\_t SIXSTEP\_Base\_InitTypeDef::LF\_TIMx\_ARR**

ARR variable for low frequency timer

---

**uint32\_t SIXSTEP\_Base\_InitTypeDef::LF\_TIMx\_PSC**

Prescaler variable for low frequency timer

---

**uint16\_t  
SIXSTEP\_Base\_InitTypeDef::MediumFrequencyTask\_flag**

Flag for Medium Task Frequency

---

**uint16\_t SIXSTEP\_Base\_InitTypeDef::numberofitemArr**

Number of elements

---

**uint16\_t SIXSTEP\_Base\_InitTypeDef::NUMPOLESPAIRS**

Number of motor pole pairs

---

**uint8\_t SIXSTEP\_Base\_InitTypeDef::Potentiometer**

Enable/Disable potentiometer for speed control

---

**uint32\_t SIXSTEP\_Base\_InitTypeDef::prescaler\_value**

Prescaler value for low freq timer

---

**uint16\_t SIXSTEP\_Base\_InitTypeDef::pulse\_value**

CCR value for SixStep algorithm

---

**uint16\_t SIXSTEP\_Base\_InitTypeDef::Ramp\_Start**

Ramp time start

---

**uint32\_t SIXSTEP\_Base\_InitTypeDef::Regular\_channel[4]**

Buffer for ADC regular channel

---

**uint16\_t SIXSTEP\_Base\_InitTypeDef::RUN\_Motor**

Flag for Motor status

---

**int16\_t SIXSTEP\_Base\_InitTypeDef::speed\_fdbk**

Motor speed variable

---

**int16\_t SIXSTEP\_Base\_InitTypeDef::speed\_fdbk\_filtered**

Filtered Motor speed variable

---

**uint16\_t SIXSTEP\_Base\_InitTypeDef::Speed\_Loop\_Time**

Speed loop variable for timing

---

**uint16\_t SIXSTEP\_Base\_InitTypeDef::Speed\_Ref\_filtered**

Filtered Reference Motor Speed variable

---

**uint16\_t SIXSTEP\_Base\_InitTypeDef::Speed\_target\_ramp**

Target Motor Speed

---

**uint16\_t SIXSTEP\_Base\_InitTypeDef::Speed\_target\_time**

Target Motor Ramp time

---

**uint8\_t SIXSTEP\_Base\_InitTypeDef::SPEED\_VALIDATED**

Validation flag for Speed before closed loop control

---

**SIXSTEP\_Base\_SystStatus\_t  
SIXSTEP\_Base\_InitTypeDef::STATUS**

Status variable for SixStep algorithm

---

**uint8\_t SIXSTEP\_Base\_InitTypeDef::status\_prev**

Previous status variable for SixStep algorithm

---

**uint8\_t SIXSTEP\_Base\_InitTypeDef::step\_position**

Step number variable for SixStep algorithm

---

**uint32\_t SIXSTEP\_Base\_InitTypeDef::SYSCLK\_frequency**

System clock main frequency

---

**uint8\_t SIXSTEP\_Base\_InitTypeDef::VALIDATION\_OK**

Validation flag for Closed loop control begin

---

The documentation for this struct was generated from the following file:

- C:/Users/giuseppe scuderi-sl/Desktop/MOTOR  
CONTROL/Peppe/trunk/Firmware/X-CUBE-SPN7-MC-  
6STEP/Middlewares/ST/MC\_6Step\_Lib/Inc/**6Step\_Lib.h**
- 

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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| Class List   | Class Index | Class Members |       |
| Public Attributes   List of all members  |             |               |       |
| <h2>SIXSTEP_PI_PARAM_InitTypeDef_t Struct Reference</h2> <p><a href="#">MIDDLEWARES</a> » <a href="#">MC_6-STEP_LIB</a> » <a href="#">Exported_types</a></p> |             |               |       |

Six PI regulator parameters. [More...](#)

```
#include <6Step_Lib.h>
```

## Public Attributes

---

`int16_t Reference`

`int16_t Kp_Gain`

`int16_t Ki_Gain`

`int16_t Lower_Limit_Output`

`int16_t Upper_Limit_Output`

`int8_t Max_PID_Output`

`int8_t Min_PID_Output`

---

## Detailed Description

---

Six PI regulator parameters.

## Member Data Documentation

---

**int16\_t SIXSTEP\_PI\_PARAM\_InitTypeDef\_t::Ki\_Gain**

---

Ki value for PI regulator

**int16\_t SIXSTEP\_PI\_PARAM\_InitTypeDef\_t::Kp\_Gain**

---

Kp value for PI regulator

**int16\_t SIXSTEP\_PI\_PARAM\_InitTypeDef\_t::Lower\_Limit\_Output**

---

Min output value for PI regulator

**int8\_t SIXSTEP\_PI\_PARAM\_InitTypeDef\_t::Max\_PID\_Output**

---

Max Saturation indicator flag

**int8\_t SIXSTEP\_PI\_PARAM\_InitTypeDef\_t::Min\_PID\_Output**

---

Min Saturation indicator flag

**int16\_t SIXSTEP\_PI\_PARAM\_InitTypeDef\_t::Reference**

---

Refence value for PI regulator

**int16\_t SIXSTEP\_PI\_PARAM\_InitTypeDef\_t::Upper\_Limit\_Output**

---

## Max output value for PI regulator

---

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- C:/Users/giuseppe scuderi-sl/Desktop/MOTOR  
CONTROL/Peppe/trunk/Firmware/X-CUBE-SPN7-MC-  
6STEP/Middlewares/ST/MC\_6Step\_Lib/Inc/**6Step\_Lib.h**
- 

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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## Drivers Directory Reference

Directory dependency graph for Drivers:



# Directories

---

directory **BSP**

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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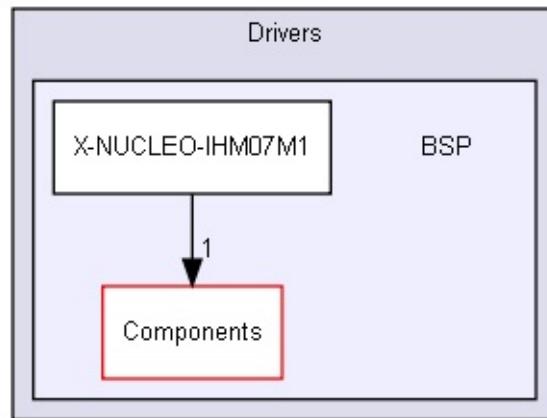
Files

Drivers >

BSP >

## BSP Directory Reference

Directory dependency graph for BSP:



# Directories

---

directory **Components**

directory **X-NUCLEO-IHM07M1**

---

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**doxygen** 1.8.9.1

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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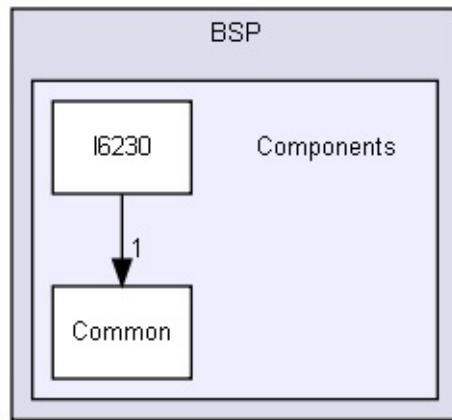
Drivers

BSP

Components

## Components Directory Reference

Directory dependency graph for Components:



# Directories

---

directory **Common**

directory **I6230**

---

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**doxygen** 1.8.9.1

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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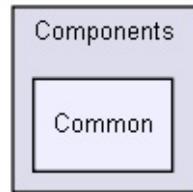
BSP

Components

Common

## Common Directory Reference

Directory dependency graph for Common:



## Files

---

file [\*\*MC\\_Common.h \[code\]\*\*](#)

This header file is a common file.

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

|           |              |            |        |
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| File List | File Members |            |        |
| Drivers   | BSP          | Components | Common |

## MC\_Common.h

Go to the documentation of this file.

```
1
39 /* Define to prevent recursive inclusion ---
-----*/
40 #ifndef __MC_COMMON_H
41 #define __MC_COMMON_H
42
43     typedef struct
44     {
45         void (*EnableInput_CH1_E_CH2_E_CH3_D)
46         (void);
47         void (*EnableInput_CH1_E_CH2_D_CH3_E)
48         (void);
49         void (*EnableInput_CH1_D_CH2_E_CH3_E)
50         (void);
51         void (*DisableInput_CH1_D_CH2_D_CH3_D)
52         (void);
53         void (*Start_PWM_driving)(void);
54         void (*Stop_PWM_driving)(void);
55         void (*HF_TIMx_SetDutyCycle_CH1)
56         (uint16_t);
57         void (*HF_TIMx_SetDutyCycle_CH2)
58         (uint16_t);
59         void (*HF_TIMx_SetDutyCycle_CH3)
60         (uint16_t);
```

```
74     void (*Current_Reference_Start)(void);
75     void (*Current_Reference_Stop)(void);
76     void (*Current_Reference_Setvalue)
77     (uint16_t);
77 } L6230_MotorDriver_TypeDef;
95 #endif
96
```

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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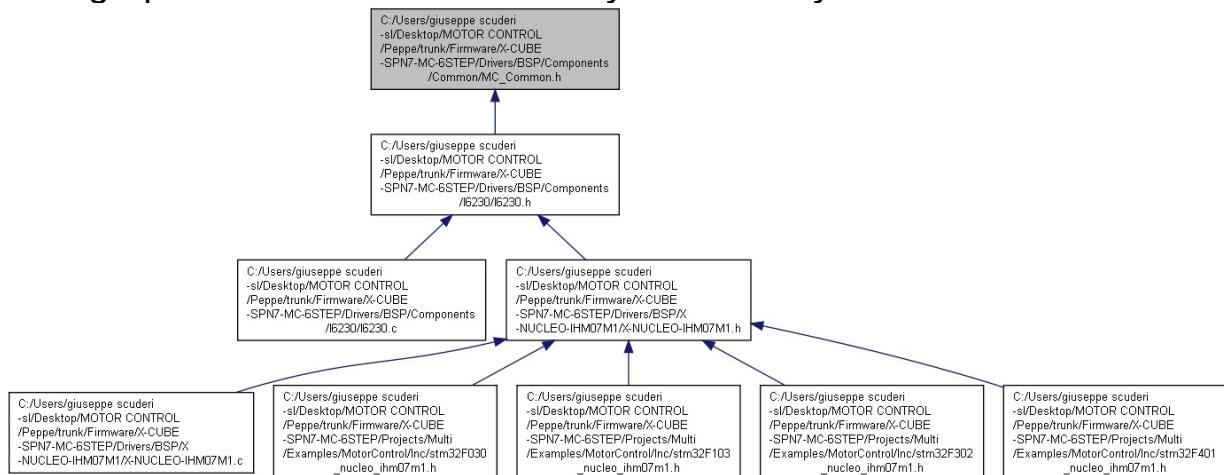
Drivers > BSP > Components > Common >

Classes

## MC\_Common.h File Reference

This header file is a common file. More...

This graph shows which files directly or indirectly include this file:



Go to the source code of this file.

## Classes

---

struct **L6230\_MotorDriver\_TypeDef**

---

## Detailed Description

---

This header file is a common file.

**Author**

System lab - Automation and Motion control team

**Version**

V1.0.0

**Date**

06-July-2015

**Attention**

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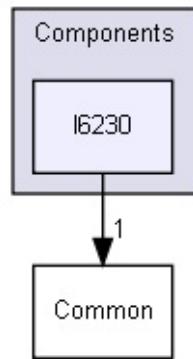
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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

| Main Page | Modules | Classes    | Files |
|-----------|---------|------------|-------|
| Drivers   | BSP     | Components | I6230 |

## I6230 Directory Reference

Directory dependency graph for I6230:



## Files

---

file **I6230.c**

This file provides a set of functions to manage L6230 driver.

file **I6230.h [code]**

This file provides a set of functions to manage L6230 driver.

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

|           |              |            |       |
|-----------|--------------|------------|-------|
| Main Page | Modules      | Classes    | Files |
| File List | File Members |            |       |
| Drivers   | BSP          | Components | I6230 |

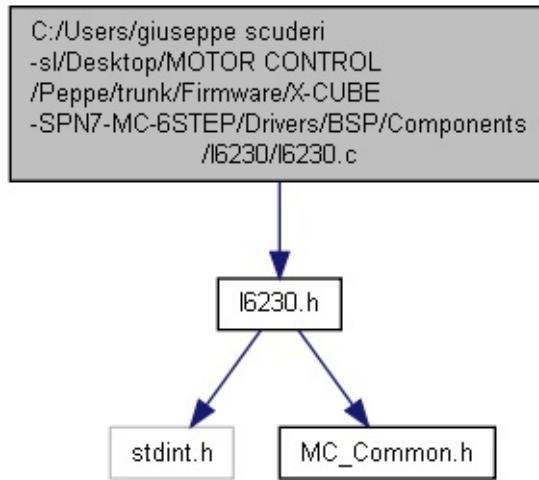
Functions | Variables

## I6230.c File Reference

This file provides a set of functions to manage L6230 driver. More...

```
#include "I6230.h"
```

Include dependency graph for I6230.c:



## Functions

---

```
void EnableInput_CH1_E_CH2_E_CH3_D ()
```

```
void EnableInput_CH1_E_CH2_D_CH3_E ()
```

```
void EnableInput_CH1_D_CH2_E_CH3_E ()
```

```
void DisableInput_CH1_D_CH2_D_CH3_D ()
```

```
void Start_PWM_driving ()
```

```
void Stop_PWM_driving ()
```

```
void HF_TIMx_SetDutyCycle_CH1 (uint16_t CCR_value)
```

```
void HF_TIMx_SetDutyCycle_CH2 (uint16_t CCR_value)
```

```
void HF_TIMx_SetDutyCycle_CH3 (uint16_t CCR_value)
```

```
void Current_Reference_Start ()
```

```
void Current_Reference_Stop ()
```

```
void Current_Reference_Setvalue (uint16_t Iref)
```

---

## Variables

---

**L6230\_MotorDriver\_TypeDef L6230MotorDriver**

---

## Detailed Description

---

This file provides a set of functions to manage L6230 driver.

**Author**

System lab - Automation and Motion control team

**Version**

V1.0.0

**Date**

06-July-2015

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

|           |              |            |       |
|-----------|--------------|------------|-------|
| Main Page | Modules      | Classes    | Files |
| File List | File Members |            |       |
| Drivers   | BSP          | Components | I6230 |

## I6230.h

Go to the documentation of this file.

```
1
38 /* Define to prevent recursive inclusion ---
-----*/
39 #ifndef __L6230_H
40 #define __L6230_H
41
42 #include "stdint.h"
43 #include "MC_Common.h"
44
45 extern void
    L6230_ECH1CH2_DCH3_IO_Write(void);
46 extern void
    L6230_ECH1CH3_DCH2_IO_Write(void);
47 extern void
    L6230_ECH2CH3_DCH1_IO_Write(void);
48 extern void
    L6230_DCH1CH2CH3_IO_Write(void);
49 extern void
    L6230_Start_PWM_generation(void);
50 extern void
    L6230_Stop_PWM_generation(void);
51 extern void L6230_HFTIM_DC_CH1(uint16_t
    CCR_value);
52 extern void L6230_HFTIM_DC_CH2(uint16_t
```

```
    CCR_value);
53 |     extern void L6230_HFTIM_DC_CH3(uint16_t
      CCR_value);
54 |     extern void START_Ref_Generation(void);
55 |     extern void STOP_Ref_Generation(void);
56 |     extern void Set_Ref_Generation(uint16_t);
57 |
58 |     void EnableInput_CH1_E_CH2_E_CH3_D(void);
59 |     void EnableInput_CH1_E_CH2_D_CH3_E(void);
60 |     void EnableInput_CH1_D_CH2_E_CH3_E(void);
61 |     void DisableInput_CH1_D_CH2_D_CH3_D(void);
62 |     void Start_PWM_driving(void);
63 |     void Stop_PWM_driving(void);
64 |     void HF_TIMx_SetDutyCycle_CH1(uint16_t);
65 |     void HF_TIMx_SetDutyCycle_CH2(uint16_t);
66 |     void HF_TIMx_SetDutyCycle_CH3(uint16_t);
67 |     void Current_Reference_Start(void);
68 |     void Current_Reference_Stop(void);
69 |     void Current_Reference_Setvalue(uint16_t);
70 |
71 |
72 | #endif
```

---

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[doxygen](#) 1.8.9.1

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

| Main Page | Modules      | Classes    | Files |
|-----------|--------------|------------|-------|
| File List | File Members |            |       |
| Drivers   | BSP          | Components | I6230 |

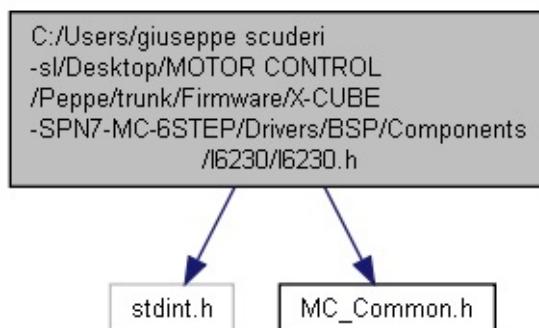
Functions

## I6230.h File Reference

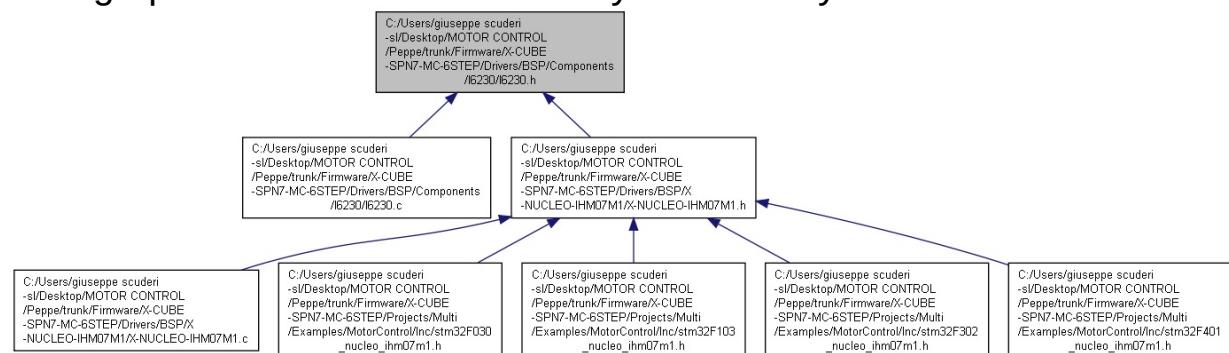
This file provides a set of functions to manage L6230 driver. More...

```
#include "stdint.h" #include "MC_Common.h"
```

Include dependency graph for I6230.h:



This graph shows which files directly or indirectly include this file:



Go to the source code of this file.

## Functions

```
void L6230_ECH1CH2_DCH3_IO_Write (void)
```

```
void L6230_ECH1CH3_DCH2_IO_Write (void)
```

```
void L6230_ECH2CH3_DCH1_IO_Write (void)
```

```
void L6230_DCH1CH2CH3_IO_Write (void)
```

```
void L6230_Start_PWM_generation (void)
```

```
void L6230_Stop_PWM_generation (void)
```

```
void L6230_HFTIM_DC_CH1 (uint16_t CCR_value)
```

```
void L6230_HFTIM_DC_CH2 (uint16_t CCR_value)
```

```
void L6230_HFTIM_DC_CH3 (uint16_t CCR_value)
```

```
void START_Ref_Generation (void)
```

```
void STOP_Ref_Generation (void)
```

```
void Set_Ref_Generation (uint16_t)
```

```
void EnableInput_CH1_E_CH2_E_CH3_D (void)
```

```
void EnableInput_CH1_E_CH2_D_CH3_E (void)
```

```
void EnableInput_CH1_D_CH2_E_CH3_E (void)
```

```
void DisableInput_CH1_D_CH2_D_CH3_D (void)
```

```
void Start_PWM_driving (void)
```

```
void Stop_PWM_driving (void)  
  
void HF_TIMx_SetDutyCycle_CH1 (uint16_t)  
  
void HF_TIMx_SetDutyCycle_CH2 (uint16_t)  
  
void HF_TIMx_SetDutyCycle_CH3 (uint16_t)  
  
void Current_Reference_Start (void)  
  
void Current_Reference_Stop (void)  
  
void Current_Reference_Setvalue (uint16_t)
```

---

## Detailed Description

---

This file provides a set of functions to manage L6230 driver.

**Author**

System lab - Automation and Motion control team

**Version**

V1.0.0

**Date**

06-July-2015

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

Main Page

Modules

Classes

Files

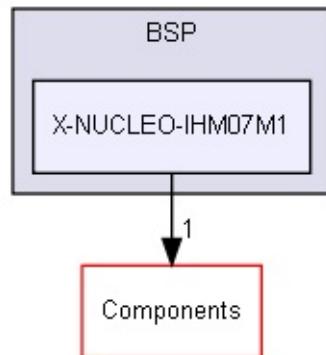
Drivers

BSP

X-NUCLEO-IHM07M1

## X-NUCLEO-IHM07M1 Directory Reference

Directory dependency graph for X-NUCLEO-IHM07M1:



## Files

file **X-NUCLEO-IHM07M1.c**

This file provides the set of functions to manage the X-Nucleo board.

file **X-NUCLEO-IHM07M1.h [code]**

This file provides the set of functions to manage the X-Nucleo board.

---

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**doxygen** 1.8.9.1

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

| Main Page | Modules      | Classes          | Files |
|-----------|--------------|------------------|-------|
| File List | File Members |                  |       |
| Drivers   | BSP          | X-NUCLEO-IHM07M1 |       |

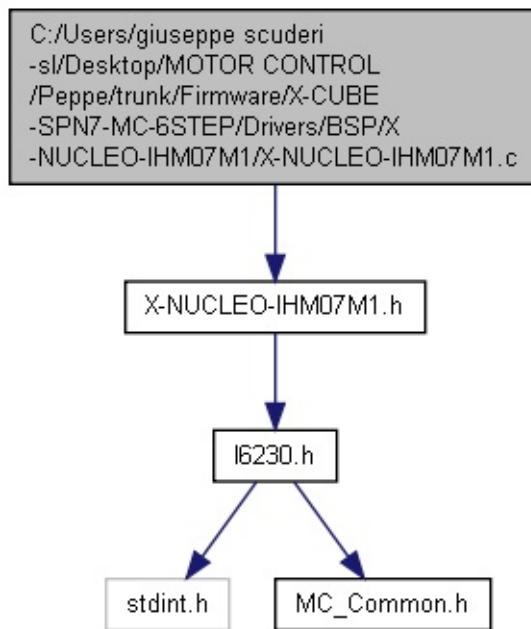
**X-NUCLEO-IHM07M1.c**  
File Reference

Functions

This file provides the set of functions to manage the X-Nucleo board.  
[More...](#)

```
#include "X-NUCLEO-IHM07M1.h"
```

Include dependency graph for X-NUCLEO-IHM07M1.c:



## Functions

---

```
void L6230_ECH1CH2_DCH3_IO_Write ()
```

```
void L6230_ECH1CH3_DCH2_IO_Write ()
```

```
void L6230_ECH2CH3_DCH1_IO_Write ()
```

```
void L6230_DCH1CH2CH3_IO_Write ()
```

```
void L6230_Start_PWM_generation ()
```

```
void L6230_Stop_PWM_generation ()
```

```
void L6230_HFTIM_DC_CH1 (uint16_t CCRx)
```

```
void L6230_HFTIM_DC_CH2 (uint16_t CCRx)
```

```
void L6230_HFTIM_DC_CH3 (uint16_t CCRx)
```

```
void BSP_X_NUCLEO_FAULT_LED_ON ()
```

```
void BSP_X_NUCLEO_FAULT_LED_OFF ()
```

---

## Detailed Description

---

This file provides the set of functions to manage the X-Nucleo board.

**Author**

System lab - Automation and Motion control team

**Version**

V1.0.0

**Date**

06-July-2015

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

|           |              |                  |       |
|-----------|--------------|------------------|-------|
| Main Page | Modules      | Classes          | Files |
| File List | File Members |                  |       |
| Drivers   | BSP          | X-NUCLEO-IHM07M1 |       |

## X-NUCLEO-IHM07M1.h

Go to the documentation of this file.

```
1
38 /* Includes -----
-----*/
39
40 #include "l6230.h"
41
42 void L6230_ECH1CH2_DCH3_IO_Write(void);
43 void L6230_ECH1CH3_DCH2_IO_Write(void);
44 void L6230_ECH2CH3_DCH1_IO_Write(void);
45 void L6230_DCH1CH2CH3_IO_Write(void);
46 void L6230_Start_PWM_generation(void);
47 void L6230_Stop_PWM_generation(void);
48 void L6230_HFTIM_DC_CH1(uint16_t CCR_value);
49 void L6230_HFTIM_DC_CH2(uint16_t CCR_value);
50 void L6230_HFTIM_DC_CH3(uint16_t CCR_value);
51
52 void BSP_X_NUCLEOFAULT_LED_ON(void);
53 void BSP_X_NUCLEOFAULT_LED_OFF(void);
```

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

| Main Page | Modules      | Classes          | Files |
|-----------|--------------|------------------|-------|
| File List | File Members |                  |       |
| Drivers   | BSP          | X-NUCLEO-IHM07M1 |       |

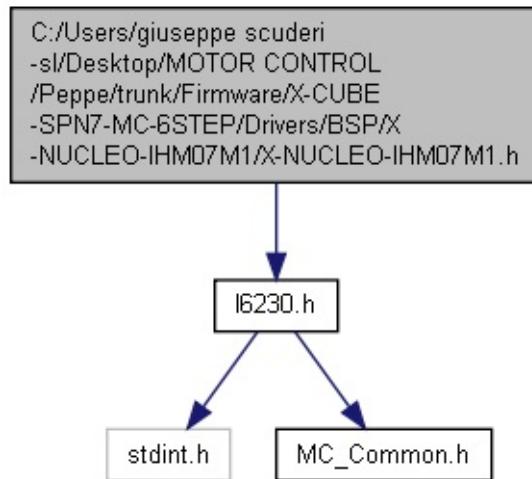
Functions

## X-NUCLEO-IHM07M1.h File Reference

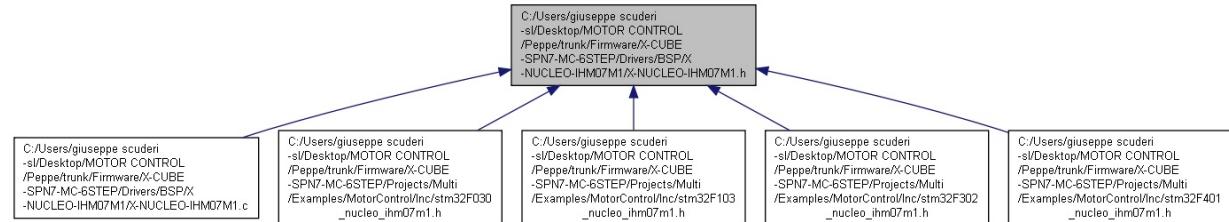
This file provides the set of functions to manage the X-Nucleo board.  
[More...](#)

```
#include "16230.h"
```

Include dependency graph for X-NUCLEO-IHM07M1.h:



This graph shows which files directly or indirectly include this file:



[Go to the source code of this file.](#)

## Functions

---

```
void L6230_ECH1CH2_DCH3_IO_Write (void)
```

```
void L6230_ECH1CH3_DCH2_IO_Write (void)
```

```
void L6230_ECH2CH3_DCH1_IO_Write (void)
```

```
void L6230_DCH1CH2CH3_IO_Write (void)
```

```
void L6230_Start_PWM_generation (void)
```

```
void L6230_Stop_PWM_generation (void)
```

```
void L6230_HFTIM_DC_CH1 (uint16_t CCR_value)
```

```
void L6230_HFTIM_DC_CH2 (uint16_t CCR_value)
```

```
void L6230_HFTIM_DC_CH3 (uint16_t CCR_value)
```

```
void BSP_X_NUCLEO_FAULT_LED_ON (void)
```

```
void BSP_X_NUCLEO_FAULT_LED_OFF (void)
```

---

## Detailed Description

---

This file provides the set of functions to manage the X-Nucleo board.

**Author**

System lab - Automation and Motion control team

**Version**

V1.0.0

**Date**

06-July-2015

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

Main Page

Modules

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Middlewares

## Middlewares Directory Reference

Directory dependency graph for Middlewares:



## Directories

---

directory **ST**

---

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**[doxygen](#)** 1.8.9.1

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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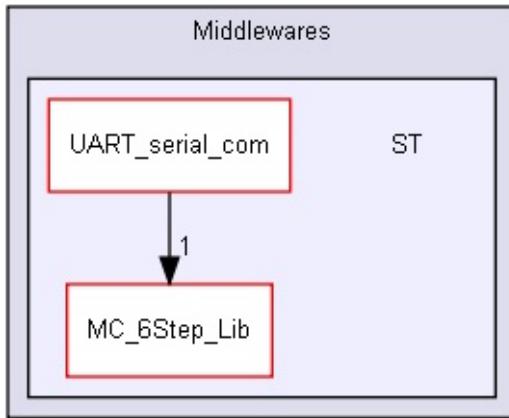
Files

Middlewares

ST

## ST Directory Reference

Directory dependency graph for ST:



## Directories

---

directory **MC\_6Step\_Lib**

directory **UART\_serial\_com**

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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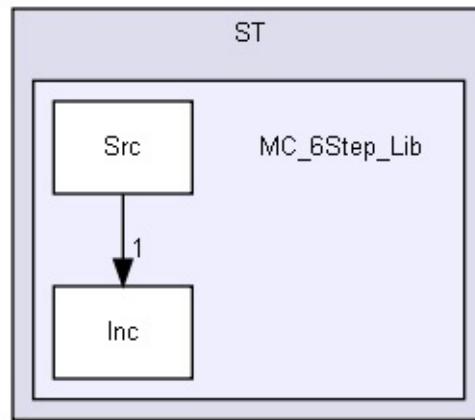
Middlewares

ST

MC\_6Step\_Lib

## MC\_6Step\_Lib Directory Reference

Directory dependency graph for MC\_6Step\_Lib:



# Directories

---

directory **Inc**

directory **Src**

---

---

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**doxygen** 1.8.9.1

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

Main Page

Modules

Classes

Files

Middlewares > ST > MC\_6Step\_Lib > Inc >

## Inc Directory Reference

Directory dependency graph for Inc:



## Files

---

file [\*\*6Step\\_Lib.h \[code\]\*\*](#)

This header file provides the set of functions for Motor Control library.

---

file [\*\*stm32\\_nucleo\\_ihm07m1.h \[code\]\*\*](#)

This file provides the interface between the MC-lib and STM Nucleo.

---

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[doxygen](#) 1.8.9.1

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

|             |              |              |       |
|-------------|--------------|--------------|-------|
| Main Page   | Modules      | Classes      | Files |
| File List   | File Members |              |       |
| Middlewares | ST           | MC_6Step_Lib | Inc   |

## 6Step\_Lib.h

Go to the documentation of this file.

```
1  /* Define to prevent recursive inclusion ---  
40  -----*/  
41 #ifndef __6STEP_LIB_H  
42 #define __6STEP_LIB_H  
43  
44 #include "stm32_nucleo_ihm07m1.h"  
45  
46 #include "math.h"  
47 #include "stdlib.h"  
48 #include "stdio.h"  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60  
61  
62  
63  
64  
65  
66  
67 typedef enum  
68 {  
69     IDLE,                                     /* 0  
70     */  
71     STARTUP,                                    /* 1  
72     */  
73     VALIDATION,                                 /* 2  
74     */  
75     STOP,                                       /* 3  
76     */  
77     START,                                      /* 4  
78     */  
79     */  
80 }
```

```

74     RUN,          /* 5
*/
75     ALIGNMENT,    /* 6
*/
76     SPEEDFBKERROR, /* 7
*/
77     OVERCURRENT,  /* 8
*/
78     STARTUP_FAILURE, /* 9
*/
79     STARTUP_BEMF_FAILURE /* 10 */
10   */
80 } SIXSTEP_Base_SystStatus_t;
81
93 typedef struct
94 {
95     uint32_t LF_TIMx_PSC;
96     uint32_t LF_TIMx_ARR;
97     uint32_t HF_TIMx_PSC;
98     uint32_t HF_TIMx_ARR;
99     uint32_t HF_TIMx_CCR;
100    uint8_t step_position;
101    SIXSTEP_Base_SystStatus_t STATUS;
102    uint8_t status_prev;
103    uint16_t pulse_value;
104    uint16_t ARR_value;
105    uint32_t Regular_channel[4];
106    uint32_t CurrentRegular_BEMF_ch;
107    uint32_t prescaler_value;
108    uint16_t numberofitemArr;
109    uint32_t ADC_BUFFER[4];
110    uint32_t ADC_SEQ_CHANNEL[4];
111    uint32_t ADC_Regular_Buffer[5];
112    uint16_t ADC_BEMF_threshold_UP;
113    uint16_t ADC_BEMF_threshold_DOWN;
114    uint16_t demagn_counter;
115    uint16_t demagn_value;

```

```
116 int16_t speed_fdbk;
117 int16_t speed_fdbk_filtered;
118 int16_t filter_depth;
119 uint16_t Current_Reference;
120 uint16_t Ireference;
121 int32_t Integral_Term_sum;
122 uint8_t CMD;
123 uint8_t ALIGN_OK;
124 uint8_t ALIGNMENT;
125 uint8_t bemf_state_1;
126 uint8_t bemf_state_2;
127 uint8_t bemf_state_3;
128 uint8_t bemf_state_4;
129 uint8_t bemf_state_5;
130 uint8_t bemf_state_6;
131 uint16_t Speed_Loop_Time;
132 uint16_t Speed_Ref_filtered;
133 uint16_t RUN_Motor;
134 uint8_t ARR_OK;
135 uint8_t VALIDATION_OK;
136 uint8_t SPEED_VALIDATED;
137 uint16_t Speed_target_ramp;
138 uint16_t Speed_target_time;
139 uint16_t Ramp_Start;
140 uint16_t Bemf_delay_start;
141 uint16_t MediumFrequencyTask_flag;
142 uint32_t SYSCLK_frequency;
143 uint32_t Uart_cmd_to_set;
144 uint32_t Uart_value_to_set;
145 uint8_t Button_ready;
146 uint8_t BEMF_OK;
147 uint8_t CL_READY;
148 uint8_t BEMF_Tdown_count;
149 uint16_t IREFERENCE;
150 uint16_t NUMPOLESPAIRS;
151 uint32_t ACCEL;
152 uint16_t KP;
```

```
153     uint16_t KI;
154     uint8_t CW_CCW;
155     uint8_t Potentiometer;
156 } SIXSTEP_Base_InitTypeDef;
169 typedef struct
170 {
171     int16_t Reference;
172     int16_t Kp_Gain;
173     int16_t Ki_Gain;
174     int16_t Lower_Limit_Output;
175     int16_t Upper_Limit_Output;
176     int8_t Max_PID_Output;
177     int8_t Min_PID_Output;
178 } SIXSTEP_PI_PARAM_InitTypeDef_t,
 *SIXSTEP_pi_PARAM_InitTypeDef_t;
188 void MC_SixStep_INIT(void);
189 void MC_SixStep_RESET(void);
190 void MC_StartMotor(void);
191 void MC_StopMotor(void);
192 void MC_Set_Speed(uint16_t);
193 void MC_EXT_button_SixStep(void);
194
208 #endif
```

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

Main Page    Modules    Classes    **Files**

File List    File Members

Middlewares > ST > MC\_6Step\_Lib > Inc >

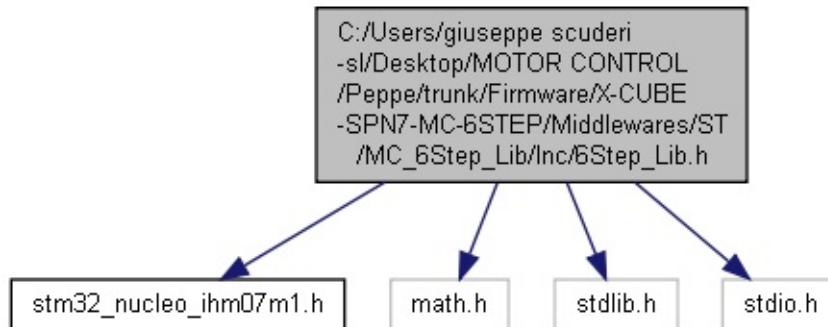
Classes | Typedefs | Enumerations | Functions

## 6Step\_Lib.h File Reference

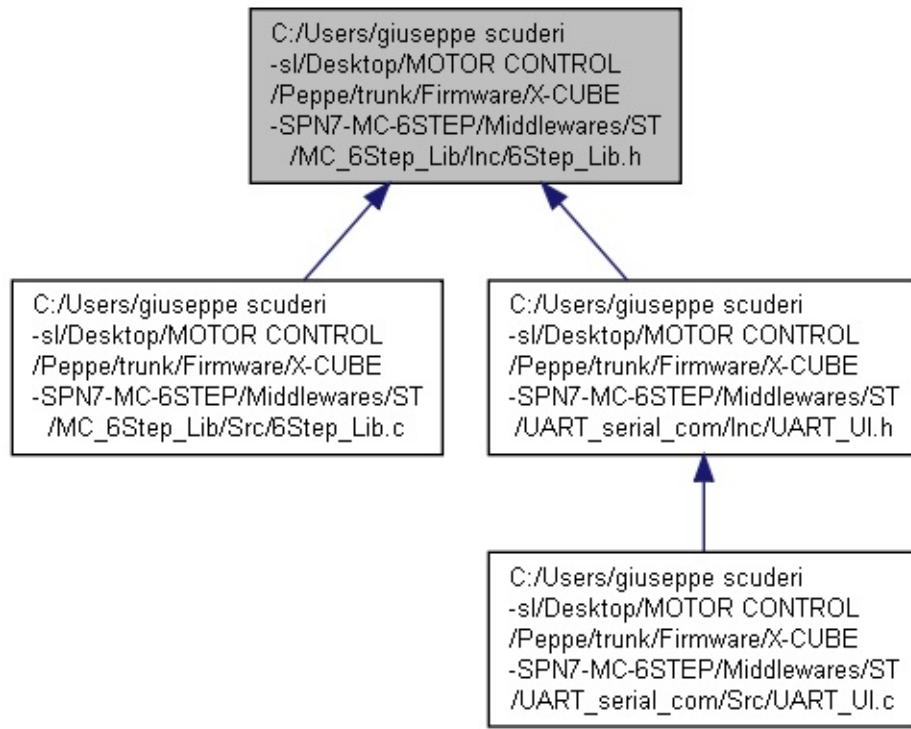
This header file provides the set of functions for Motor Control library.  
[More...](#)

```
#include "stm32_nucleo_ihm07m1.h" #include "math.h"  
#include "stdlib.h"  
#include "stdio.h"
```

Include dependency graph for 6Step\_Lib.h:



This graph shows which files directly or indirectly include this file:



Go to the source code of this file.

## Classes

---

struct **SIXSTEP\_Base\_InitTypeDef**

Six Step parameters. More...

struct **SIXSTEP\_PI\_PARAM\_InitTypeDef\_t**

Six PI regulator parameters. More...

---

## TypeDefs

---

```
typedef struct SIXSTEP_PI_PARAM_InitTypeDef_t * SIXSTEP_pi_PA
```

---

## Enumerations

---

```
enum SIXSTEP_Base_SystStatus_t {
    IDLE, STARTUP, VALIDATION, STOP,
    START, RUN, ALIGNMENT, SPEEDFBKERROR,
    OVERCURRENT, STARTUP_FAILURE,
    STARTUP_BEMF_FAILURE
}
Six Step parameters.
```

---

## Functions

---

```
void MC_SixStep_INIT (void)
```

```
void MC_SixStep_RESET (void)
```

```
void MC_StartMotor (void)
```

```
void MC_StopMotor (void)
```

```
void MC_Set_Speed (uint16_t)
```

```
void MC_EXT_button_SixStep (void)
```

---

## Detailed Description

---

This header file provides the set of functions for Motor Control library.

**Author**

System lab

**Version**

V1.0.0

**Date**

06-July-2015

**Attention**

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

|             |              |              |       |
|-------------|--------------|--------------|-------|
| Main Page   | Modules      | Classes      | Files |
| File List   | File Members |              |       |
| Middlewares | ST           | MC_6Step_Lib | Inc   |

## stm32\_nucleo\_ihm07m1.h

Go to the documentation of this file.

```
1
38 #ifdef STM32F030x8
39 #include "stm32F030_nucleo_ihm07m1.h"
40 #include "MC_SixStep_param_F030.h"
41 #endif
42 #ifdef STM32F103xB
43 #include "stm32F103_nucleo_ihm07m1.h"
44 #include "MC_SixStep_param.h"
45 #endif
46 #ifdef STM32F302x8
47 #include "stm32F302_nucleo_ihm07m1.h"
48 #include "MC_SixStep_param.h"
49 #endif
50 #ifdef STM32F401xE
51 #include "stm32F401_nucleo_ihm07m1.h"
52 #include "MC_SixStep_param.h"
53 #endif
54
55
56
```

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

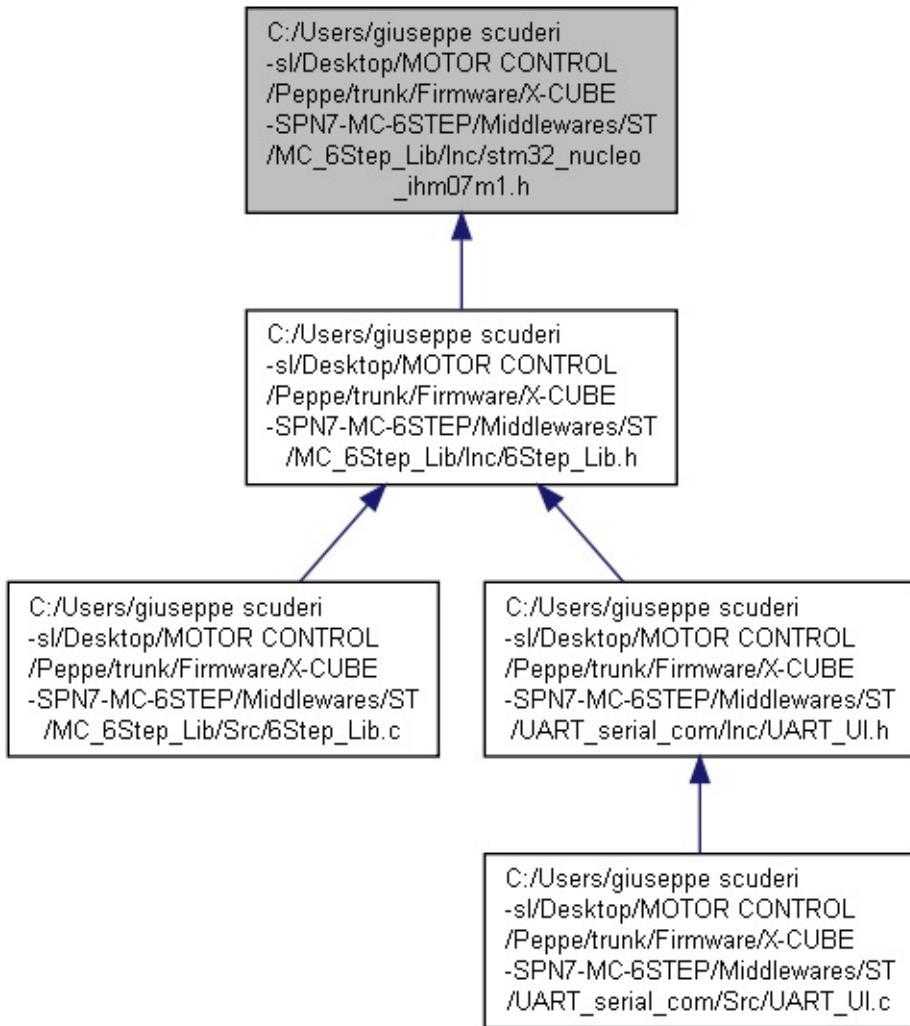
|             |              |              |       |
|-------------|--------------|--------------|-------|
| Main Page   | Modules      | Classes      | Files |
| File List   | File Members |              |       |
| Middlewares | ST           | MC_6Step_Lib | Inc   |

## stm32\_nucleo\_ihm07m1.h File Reference

This file provides the interface between the MC-lib and STM Nucleo.

[More...](#)

This graph shows which files directly or indirectly include this file:



Go to the source code of this file.

## Detailed Description

---

This file provides the interface between the MC-lib and STM Nucleo.

**Author**

System lab - Automation and Motion control team

**Version**

V1.0.0

**Date**

06-July-2015

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

Main Page

Modules

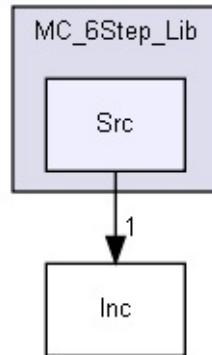
Classes

Files

Middlewares > ST > MC\_6Step\_Lib > Src >

## Src Directory Reference

Directory dependency graph for Src:



## Files

---

file **6Step\_Lib.c**

This file provides the set of functions for Motor Control library.

---

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**doxygen** 1.8.9.1

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

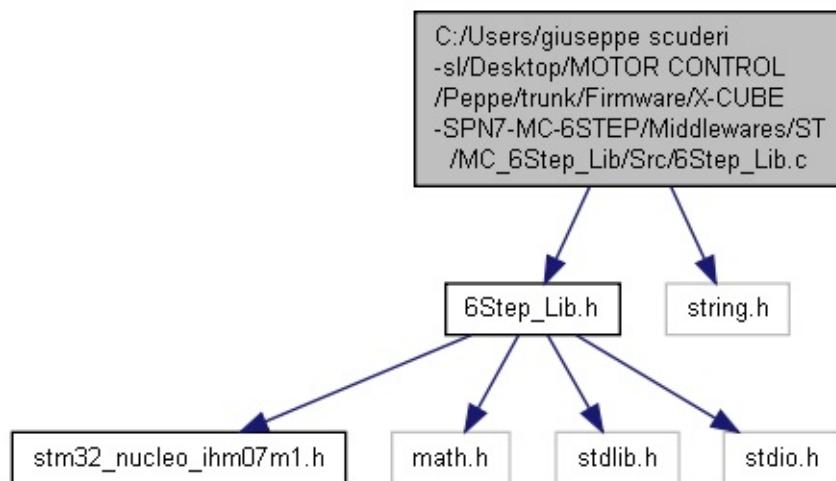
|             |              |              |       |
|-------------|--------------|--------------|-------|
| Main Page   | Modules      | Classes      | Files |
| File List   | File Members |              |       |
| Middlewares | ST           | MC_6Step_Lib | Src   |

6Step\_Lib.c File Reference

This file provides the set of functions for Motor Control library. [More...](#)

```
#include "6Step_Lib.h" #include <string.h>
```

Include dependency graph for 6Step\_Lib.c:



## Functions

int16\_t **MC\_PI\_Controller** (**SIXSTEP\_PI\_PARAM\_InitTypeDef\_t** \*,  
int16\_t)

uint16\_t **MC\_Potentiometer\_filter** (uint16\_t)

uint64\_t **MCM\_Sqrt** (uint64\_t wInput)

It calculates the square root of a non-negative s64. It returns 0 for negative s64. [More...](#)

int32\_t **MC\_GetEISpeedHz** (void)

int32\_t **MC\_GetMechSpeedRPM** (void)

void **MC\_SixStep\_NEXT\_step** (void)

void **MC\_Speed\_Filter** (void)

void **MC\_SixStep\_ARR\_step** (void)

void **MC\_SixStep\_TABLE** (uint8\_t)

void **MC\_SixStep\_Speed\_Potentiometer** (void)

void **MC\_Set\_PI\_param** (**SIXSTEP\_PI\_PARAM\_InitTypeDef\_t**  
\*)

void **MC\_Task\_Speed** (void)

void **MC\_SixStep\_Alignment** (void)

void **MC\_Bemf\_Delay** (void)

void **MC\_TIMx\_SixStep\_timebase** (void)

```
void MC_ADCx_SixStep_Bemf (void)

void MC_SysTick_SixStep_MediumFrequencyTask (void)

void MC_SixStep_Ramp_Motor_calc (void)

void MC_SixStep_EnableInput_CH1_E_CH2_E_CH3_D (void)

void MC_SixStep_EnableInput_CH1_E_CH2_D_CH3_E (void)

void MC_SixStep_EnableInput_CH1_D_CH2_E_CH3_E (void)

void MC_SixStep_DisableInput_CH1_D_CH2_D_CH3_D (void)

void MC_SixStep_Start_PWM_driving (void)

void MC_SixStep_Stop_PWM_driving (void)

void MC_SixStep_HF_TIMx_SetDutyCycle_CH1 (uint16_t)

void MC_SixStep_HF_TIMx_SetDutyCycle_CH2 (uint16_t)

void MC_SixStep_HF_TIMx_SetDutyCycle_CH3 (uint16_t)

void MC_SixStep_Current_Reference_Start (void)

void MC_SixStep_Current_Reference_Stop (void)

void MC_SixStep_Current_Reference_Setvalue (uint16_t)

void MC_SixStep_ARR_Bemf (uint8_t)

void MC_UI_INIT (void)

void UART_Set_Value (void)

void UART_Communication_Task (void)
```

```
void MC_SixStep_Init_main_data (void)

void CMD_Parser (char *pCommandString)

void MC_SixStep_Speed_Val_target_potentiometer (void)

void MC_SixStep_RESET ()

void MC_Set_Speed (uint16_t speed_value)

void MC_StartMotor ()

void MC_StopMotor ()

void MC_SixStep_INIT ()

void MC_EXT_button_SixStep ()

void HAL_IncTick (void)
    This function is called to increment a global variable
    "uwTick" used as application time base. More...
```

---

```
uint32_t HAL_GetTick (void)
    Provides a tick value in millisecond. More...
```

## Variables

SIXSTEP\_Base\_InitTypeDef SIXSTEP\_parameters

SIXSTEP\_PI\_PARAM\_InitTypeDef\_t PI\_parameters

uint16\_t Rotor\_poles\_pairs

uint32\_t mech\_accel\_hz = 0

uint32\_t constant\_k = 0

uint32\_t Time\_vector\_tmp = 0

uint32\_t Time\_vector\_prev\_tmp = 0

uint32\_t T\_single\_step = 0

uint32\_t T\_single\_step\_first\_value = 0

int32\_t delta = 0

uint16\_t index\_array = 1

int16\_t speed\_tmp\_array [FILTER\_DEEP]

uint16\_t speed\_tmp\_buffer [FILTER\_DEEP]

uint16\_t HFBuffer [HFBUFFERSIZE]

uint16\_t HFBufferIndex = 0

uint8\_t array\_completed = FALSE

uint8\_t **buffer\_completed** = FALSE

uint8\_t **UART\_FLAG\_RECEIVE** =  
FALSE

uint32\_t **ARR\_LF** = 0

int32\_t **Mech\_Speed\_RPM** = 0

int32\_t **EI\_Speed\_Hz** = 0

uint16\_t **index\_adc\_chn** = 0

uint16\_t **index\_motor\_run** = 0

uint16\_t **test\_motor\_run** = 1

uint8\_t **Enable\_start\_button** = TRUE

uint16\_t **index\_ARR\_step** = 1

uint32\_t **n\_zcr\_startup** = 0

uint16\_t **index\_startup\_motor** = 1

uint16\_t **target\_speed** =  
**TARGET\_SPEED**

uint16\_t **shift\_n\_sqrt** = 14

uint16\_t **cnt\_bemf\_event** = 0

uint8\_t **startup\_bemf\_failure** = 0

uint8\_t **speed\_fdbk\_error** = 0

\_\_IO uint32\_t uwTick = 0

uint8\_t dac\_status = DAC\_ENABLE

uint16\_t index\_align = 1

int32\_t speed\_sum\_sp\_filt = 0

int32\_t speed\_sum\_pot\_filt = 0

uint16\_t index\_pot\_filt = 1

int16\_t potent\_filtered = 0

uint32\_t Tick\_cnt = 0

uint32\_t counter.ARR\_Bemf = 0

uint64\_t constant\_multiplier\_tmp = 0

## Detailed Description

---

This file provides the set of functions for Motor Control library.

**Author**

System lab - Automation and Motion control team

**Version**

V1.0.0

**Date**

06-July-2015

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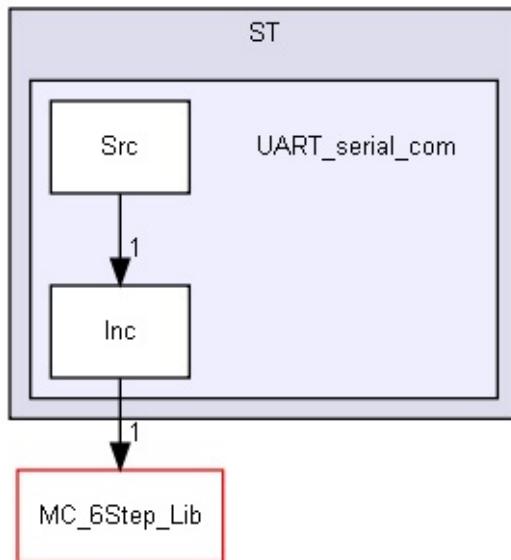
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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1



## UART\_serial\_com Directory Reference

Directory dependency graph for UART\_serial\_com:



# Directories

---

directory **Inc**

directory **Src**

---

---

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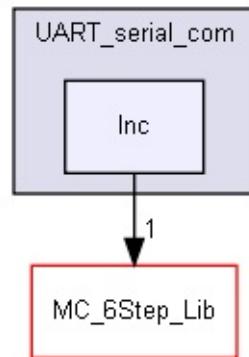
**doxygen** 1.8.9.1

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

| Main Page   | Modules | Classes         | Files |
|-------------|---------|-----------------|-------|
| Middlewares | ST      | UART_serial_com | Inc   |

## Inc Directory Reference

Directory dependency graph for Inc:



## Files

---

file **UART\_UI.h [code]**

This file provides a set of functions needed to manage the UART com.

---

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**doxygen** 1.8.9.1

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

|             |              |                 |       |
|-------------|--------------|-----------------|-------|
| Main Page   | Modules      | Classes         | Files |
| File List   | File Members |                 |       |
| Middlewares | ST           | UART_serial_com | Inc   |

## UART\_UI.h

Go to the documentation of this file.

```
1
38 #include "6Step_Lib.h"
39 #include "stdlib.h"
40 #include "stdio.h"
41 #include <string.h>
42
43 #define TOKEN "\r"
44 #define CMD_NUM 16
45
46 #define COUNTOF(__BUFFER__)
        (sizeof(__BUFFER__) / sizeof(*(__BUFFER__)))
47 #define TXBUFFERSIZE
        (COUNTOF(aTxBuffer) - 1)
48 #define RXBUFFERSIZE 8
49
50 typedef struct {
51     char name[10];
52     void (*pCmdFunc)(void);
53 } CMD_T;
54
73 void CMD_STARTM( void );
74 void CMD_STOPMT( void );
75 void CMD_DIRECTION( void );
76 void CMD_SETSPD( void );
```

```
77 void CMD_GETSPD( void );
78 void CMD_STATUS( void );
79 void CMD_POTENZ( void );
80 void CMD_HELP(void);
81 void CMD_INIREF(void);
82 void CMD_POLESP(void);
83 void CMD_ACCELE(void);
84 void CMD_KP_PRM(void);
85 void CMD_KI_PRM(void);
86
```

---

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**doxygen** 1.8.9.1

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

Main Page    Modules    Classes    **Files**

File List    File Members

Middlewares > ST > UART\_serial\_com > Inc >

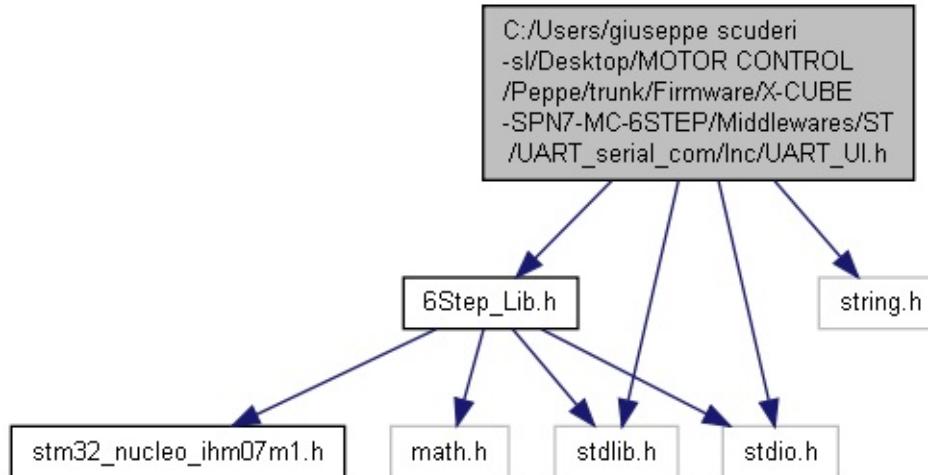
Classes | Macros | Functions

## UART\_UI.h File Reference

This file provides a set of functions needed to manage the UART com.  
[More...](#)

```
#include "6Step_Lib.h" #include "stdlib.h"  
#include "stdio.h"  
#include <string.h>
```

Include dependency graph for UART\_UI.h:



This graph shows which files directly or indirectly include this file:

```
C:/Users/giuseppe scuderi  
-sl/Desktop/MOTOR CONTROL  
/Peppe/trunk/Firmware/X-CUBE  
-SPN7-MC-6STEP/Middlewares/ST  
/UART_serial_com/Inc/UART_UI.h
```

```
C:/Users/giuseppe scuderi  
-sl/Desktop/MOTOR CONTROL  
/Peppe/trunk/Firmware/X-CUBE  
-SPN7-MC-6STEP/Middlewares/ST  
/UART_serial_com/Src/UART_UI.c
```

Go to the source code of this file.

## Classes

---

struct **CMD\_T**

---

## Macros

---

```
#define TOKEN "\r"
```

```
#define CMD_NUM 16
```

```
#define COUNTOF(__BUFFER__) (sizeof(__BUFFER__) / sizeof(*  
    __BUFFER__)))
```

```
#define TXBUFFERSIZE (COUNTOF(aTxBuffer) - 1)
```

```
#define RXBUFFERSIZE 8
```

---

## Functions

---

```
void CMD_STARTM (void)  
UART function.
```

```
void CMD_STOPMT (void)
```

```
void CMD_DIRECTION (void)
```

```
void CMD_SETSPD (void)
```

```
void CMD_GETSPD (void)
```

```
void CMD_STATUS (void)
```

```
void CMD_POTENZ (void)
```

```
void CMD_HELP (void)
```

```
void CMD_INIREF (void)
```

```
void CMD_POLESP (void)
```

```
void CMD_ACCELE (void)
```

```
void CMD_KP_PRM (void)
```

```
void CMD_KI_PRM (void)
```

---

## Detailed Description

---

This file provides a set of functions needed to manage the UART com.

**Author**

System lab

**Version**

V1.0.0

**Date**

06-July-2015

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

Main Page

Modules

Classes

Files

Middlewares

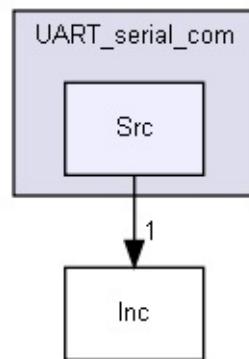
ST

UART\_serial\_com

Src

## Src Directory Reference

Directory dependency graph for Src:



## Files

---

file **UART\_UI.c**

This file provides a set of functions needed to manage the UART com.

---

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**doxygen** 1.8.9.1

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

Main Page    Modules    Classes    **Files**

File List    File Members

Middlewares > ST > UART\_serial\_com > Src >

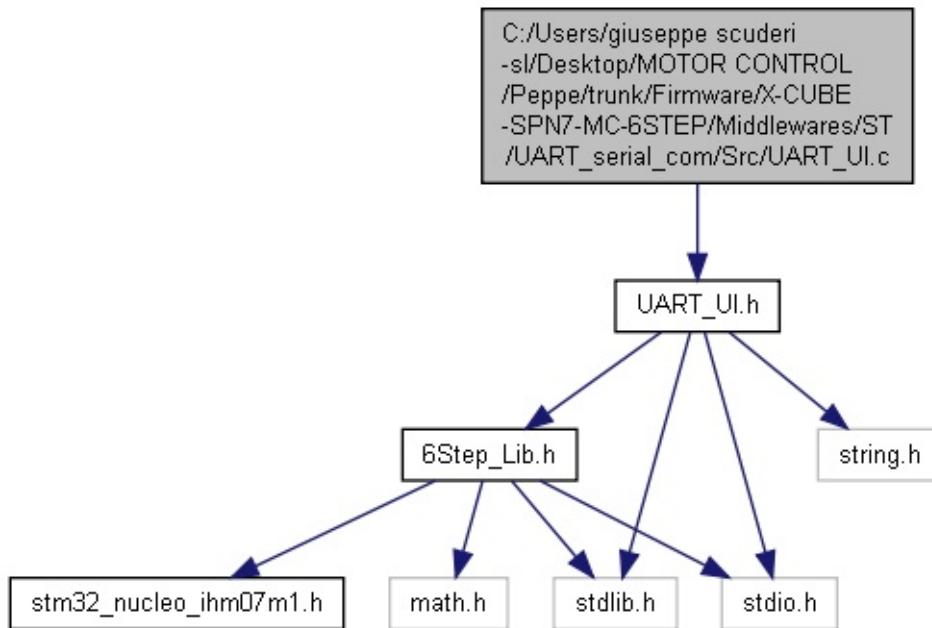
## UART\_UI.c File Reference

This file provides a set of functions needed to manage the UART com.

[More...](#)

```
#include "UART_UI.h"
```

Include dependency graph for UART\_UI.c:



## Detailed Description

---

This file provides a set of functions needed to manage the UART com.

**Author**

System lab - Automation and Motion control team

**Version**

V1.0.0

**Date**

06-July-2015

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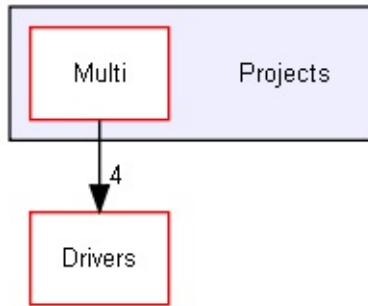
# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

Main Page    Modules    Classes    Files

Projects >

## Projects Directory Reference

Directory dependency graph for Projects:



# Directories

---

directory **Multi**

---

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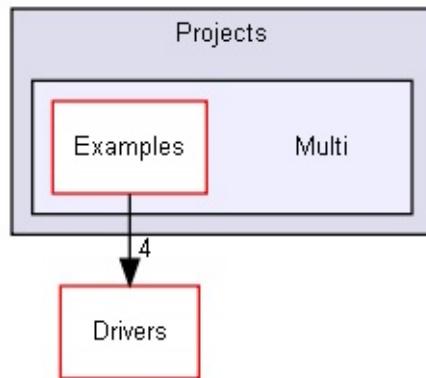
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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1



## Multi Directory Reference

Directory dependency graph for Multi:



# Directories

---

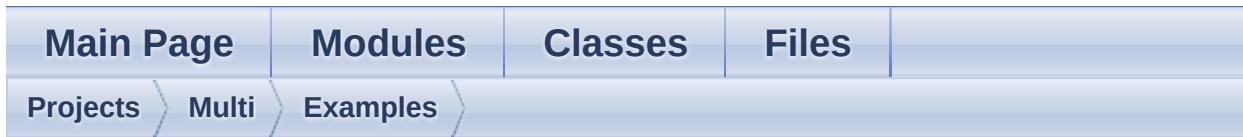
directory **Examples**

---

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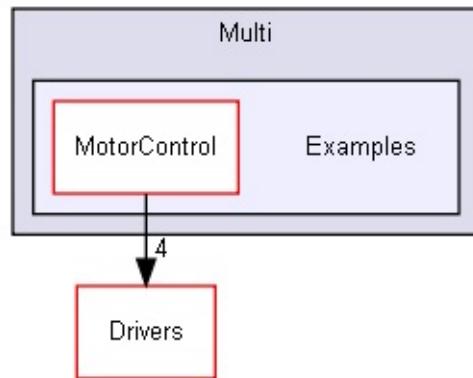
**doxygen** 1.8.9.1

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1



## Examples Directory Reference

Directory dependency graph for Examples:



# Directories

---

directory **MotorControl**

---

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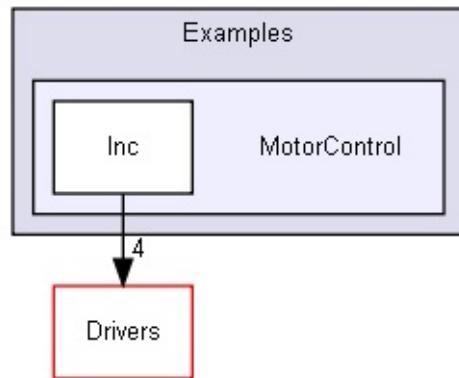
**doxygen** 1.8.9.1

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1



## MotorControl Directory Reference

Directory dependency graph for MotorControl:



# Directories

---

directory **Inc**

---

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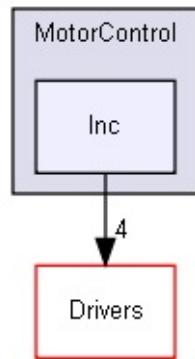
**[doxygen](#)** 1.8.9.1

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

| Main Page        | Modules                       | Classes | Files |
|------------------|-------------------------------|---------|-------|
| Projects > Multi | Examples > MotorControl > Inc |         |       |

## Inc Directory Reference

Directory dependency graph for Inc:



## Files

file **main\_F030.h** [code]

file **main\_F103.h** [code]

file **main\_F302.h** [code]

This file provides a set of functions needed to configure STM32 MCU.

file **main\_F401.h** [code]

file **MC\_SixStep\_param.h** [code]

This header file provides all parameters to driver a motor with 6Step library.

file **MC\_SixStep\_param\_F030.h** [code]

file **MC\_SixStep\_param\_F103.h** [code]

file **stm32F030\_nucleo\_ihm07m1.h** [code]

This file provides the interface between the MC-lib and STM Nucleo.

file **stm32f0xx\_hal\_conf.h** [code]

HAL configuration file.

file **stm32f0xx\_it.h** [code]

This file contains the headers of the interrupt handlers.

file **stm32F103\_nucleo\_ihm07m1.h** [code]

This file provides the interface between the MC-lib and STM Nucleo.

file **stm32f1xx\_hal\_conf.h** [code]

HAL configuration file.

**file [stm32f1xx\\_it.h \[code\]](#)**

This file contains the headers of the interrupt handlers.

**file [stm32F302\\_nucleo\\_ihm07m1.h \[code\]](#)**

This file provides the interface between the MC-lib and STM Nucleo.

**file [stm32f3xx\\_hal\\_conf.h \[code\]](#)**

HAL configuration file.

**file [stm32f3xx\\_it.h \[code\]](#)**

This file contains the headers of the interrupt handlers.

**file [stm32F401\\_nucleo\\_ihm07m1.h \[code\]](#)**

This file provides the interface between the MC-lib and STM Nucleo.

**file [stm32f4xx\\_hal\\_conf.h \[code\]](#)**

HAL configuration file.

**file [stm32f4xx\\_it.h \[code\]](#)**

This file contains the headers of the interrupt handlers.

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

| Main Page                 | Modules                      | Classes                  | Files                        |
|---------------------------|------------------------------|--------------------------|------------------------------|
| <a href="#">File List</a> | <a href="#">File Members</a> |                          |                              |
| <a href="#">Projects</a>  | <a href="#">Multi</a>        | <a href="#">Examples</a> | <a href="#">MotorControl</a> |

## main\_F030.h

```
1
35 extern ADC_HandleTypeDef hadc;
36 extern TIM_HandleTypeDef htim1;
37 extern TIM_HandleTypeDef htim3;
38 extern TIM_HandleTypeDef htim6;
39 extern UART_HandleTypeDef huart2;
```

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

| Main Page                 | Modules                      | Classes                  | Files                        |
|---------------------------|------------------------------|--------------------------|------------------------------|
| <a href="#">File List</a> | <a href="#">File Members</a> |                          |                              |
| <a href="#">Projects</a>  | <a href="#">Multi</a>        | <a href="#">Examples</a> | <a href="#">MotorControl</a> |

## main\_F103.h

```
1
35 extern ADC_HandleTypeDef hadc1;
36 extern TIM_HandleTypeDef htim1;
37 extern TIM_HandleTypeDef htim2;
38 extern TIM_HandleTypeDef htim3;
39 extern TIM_HandleTypeDef htim4;
40 extern UART_HandleTypeDef huart2;
```

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

| Main Page                 | Modules                      | Classes                  | Files                        |
|---------------------------|------------------------------|--------------------------|------------------------------|
| <a href="#">File List</a> | <a href="#">File Members</a> |                          |                              |
| <a href="#">Projects</a>  | <a href="#">Multi</a>        | <a href="#">Examples</a> | <a href="#">MotorControl</a> |

## main\_F302.h

Go to the documentation of this file.

```
1
38 extern ADC_HandleTypeDef hadc1;
39 extern DAC_HandleTypeDef hdac;
40 extern TIM_HandleTypeDef htim16;
41 extern TIM_HandleTypeDef htim1;
42 extern TIM_HandleTypeDef htim6;
43 extern UART_HandleTypeDef huart2;
```

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

Main Page    Modules    Classes    **Files**

File List    File Members

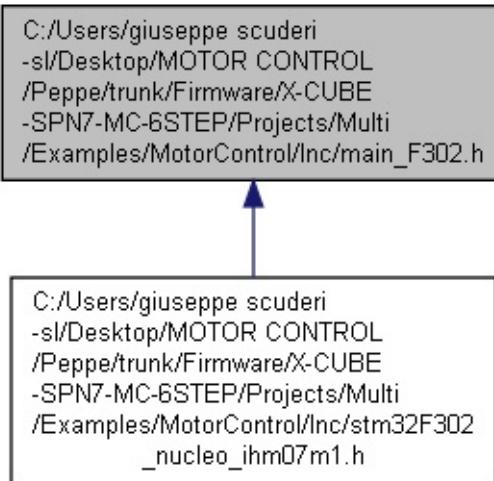
Projects > Multi > Examples > MotorControl > Inc >

Variables

## main\_F302.h File Reference

This file provides a set of functions needed to configure STM32 MCU.  
[More...](#)

This graph shows which files directly or indirectly include this file:



[Go to the source code of this file.](#)

## Variables

---

ADC\_HandleTypeDef **hadc1**

DAC\_HandleTypeDef **hdac**

TIM\_HandleTypeDef **htim16**

TIM\_HandleTypeDef **htim1**

TIM\_HandleTypeDef **htim6**

UART\_HandleTypeDef **huart2**

---

## Detailed Description

---

This file provides a set of functions needed to configure STM32 MCU.

**Author**

System lab

**Version**

V1.0.0

**Date**

06-July-2015

**Attention**

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

|           |              |          |              |
|-----------|--------------|----------|--------------|
| Main Page | Modules      | Classes  | Files        |
| File List | File Members |          |              |
| Projects  | Multi        | Examples | MotorControl |

## main\_F401.h

```
1
35 extern ADC_HandleTypeDef hadc1;
36 extern TIM_HandleTypeDef htim1;
37 extern TIM_HandleTypeDef htim3;
38 extern TIM_HandleTypeDef htim4;
39 extern UART_HandleTypeDef huart2;
```

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**doxygen** 1.8.9.1

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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# MC\_SixStep\_param.h

[Go to the documentation of this file.](#)

```
1 /* ****
54 ****
55 -----
56 ##### BASIC
PARAMETERS #####
57 -----
58 **** */
59 #define NUM_POLE_PAIRS
7
60 #define DIRECTION
0
61 #define TARGET_SPEED
3000
62 #define POTENTIOMETER
1
65 /*
*****
```

```
*****
66 |
=====
=====
67 |      ##### ADVANCED
PARAMETERS #####
68 |
=====
69 | ****
***** */
70 |
71 | #define STARTUP_CURRENT_REFERENCE
2000
72 | #define ACC
600000
73 | #define MINIMUM_ACC
500
74 | #define NUMBER_OF_STEPS
20000
75 | #define TIME_FOR_ALIGN
500
76 | #define BUTTON_DELAY
1000
77 | #define NUMBER_ZCR
12
79 | #define SPEED_LOOP_TIME
1
80 | #define KP_GAIN
8000
81 | #define KI_GAIN
50
82 | #define KP_DIV
4096
83 | #define KI_DIV
4096
84 | #define LOWER_OUT_LIMIT
```

```
120
85 #define UPPER_OUT_LIMIT
2000
86 #define MAX_POT_SPEED
10000
87 #define MIN_POT_SPEED
1500
88 #define VAL_POT_SPEED_DIV
2
89 #define INITIAL_DEMAGN_DELAY
10
92 #define BEMF_THRSLD_DOWN
200
93 #define BEMF_THRSLD_UP
200
96 #define FILTER_DEEP
20
97 #define HFBUFFERSIZE
10
98 #define ADC_SPEED_TH
82
101 #define BEMF_CONSEC_DOWN_MAX
10
102 #define BEMF_CNT_EVENT_MAX
100
105 #define GPIO_ZERO_CROSS
1
106 #define GPIO_COMM
1
110 #define DEMO_START_TIME
5000
111 #define DEMO_STOP_TIME
2000
114 #define DEMAGN_VAL_1
1
115 #define DEMAGN_VAL_2
2
```

```
116 #define DEMAGN_VAL_3  
    3  
117 #define DEMAGN_VAL_4  
    4  
118 #define DEMAGN_VAL_5  
    5  
119 #define DEMAGN_VAL_6  
    6  
120 #define DEMAGN_VAL_7  
    7  
121 #define DEMAGN_VAL_8  
    8  
122 #define DEMAGN_VAL_9  
    9  
123 #define DEMAGN_VAL_10  
   10  
124 #define DEMAGN_VAL_11  
   11  
125 #define DEMAGN_VAL_12  
   12  
126 #define DEMAGN_VAL_13  
   13  
127 #define DEMAGN_VAL_14  
   14  
129 #define TRUE  
   1  
130 #define FALSE  
   0
```

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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Projects Multi Examples MotorControl Inc

## **MC\_SixStep\_param\_F030.h**

```
1 /* ****
54 ****
55 -----
56 ##### BASIC
PARAMETERS #####
57 -----
58 **** */
59 #define NUM_POLE_PAIRS
7
60 #define DIRECTION
0
61 #define TARGET_SPEED
3000
62 #define POTENTIOMETER
1
65 /*
*****
```

```
66 |
=====
=====

67 |           ##### ADVANCED
PARAMETERS #####
68 |
=====

69 | **** * **** * **** * **** * **** * **** * **** * **** * **** *
**** * **** * **** * **** * **** * **** * **** * **** * **** * **** */
70 |
71 | #define STARTUP_CURRENT_REFERENCE
2000
72 | #define ACC
600000
73 | #define MINIMUM_ACC
500
74 | #define NUMBER_OF_STEPS
20000
75 | #define TIME_FOR_ALIGN
500
76 | #define BUTTON_DELAY
1000
77 | #define NUMBER_ZCR
12
79 | #define SPEED_LOOP_TIME
4
80 | #define KP_GAIN
2000
81 | #define KI_GAIN
100
82 | #define KP_DIV
4096
83 | #define KI_DIV
4096
84 | #define LOWER_OUT_LIMIT
120
```

```
85 | #define UPPER_OUT_LIMIT  
85 | 2000  
86 | #define MAX_POT_SPEED  
86 | 7000  
87 | #define MIN_POT_SPEED  
87 | 1500  
88 | #define VAL_POT_SPEED_DIV  
88 | 2  
89 | #define INITIAL_DEMAGN_DELAY  
89 | 5  
92 | #define BEMF_THRSLD_DOWN  
92 | 200  
93 | #define BEMF_THRSLD_UP  
93 | 200  
96 | #define FILTER_DEEP  
96 | 9  
97 | #define HFBUFFERSIZE  
97 | 10  
98 | #define ADC_SPEED_TH  
98 | 82  
101| #define BEMF_CONSEC_DOWN_MAX  
101| 10  
102| #define BEMF_CNT_EVENT_MAX  
102| 100  
105| #define GPIO_ZERO_CROSS  
105| 1  
106| #define GPIO_COMM  
106| 1  
110| #define DEMO_START_TIME  
110| 10000  
111| #define DEMO_STOP_TIME  
111| 5000  
114| #define DEMAGN_VAL_1  
114| 1  
115| #define DEMAGN_VAL_2  
115| 2  
116| #define DEMAGN_VAL_3
```

```
3
117 #define DEMAGN_VAL_4
4
118 #define DEMAGN_VAL_5
5
119 #define DEMAGN_VAL_6
6
120 #define DEMAGN_VAL_7
7
121 #define DEMAGN_VAL_8
8
122 #define DEMAGN_VAL_9
9
123 #define DEMAGN_VAL_10
10
124 #define DEMAGN_VAL_11
11
125 #define DEMAGN_VAL_12
12
126 #define DEMAGN_VAL_13
13
127 #define DEMAGN_VAL_14
14
129 #define TRUE
1
130 #define FALSE
0
```

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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## **MC\_SixStep\_param\_F103.h**

```
1 /* ****
54 ****
55 -----
56 ##### BASIC
PARAMETERS #####
57 -----
58 **** */
59 #define NUM_POLE_PAIRS
7
60 #define DIRECTION
0
61 #define TARGET_SPEED
3000
62 #define POTENTIOMETER
1
65 /*
*****
```

```
66 |
=====
=====

67 |      ##### ADVANCED
PARAMETERS #####
68 |
=====

69 | **** * **** * **** * **** * **** * **** * **** * **** * **** * **** *
**** * **** * **** * **** * **** * **** * **** * **** * **** * **** * /
70 |
71 | #define STARTUP_CURRENT_REFERENCE
2000
72 | #define ACC
200000
73 | #define MINIMUM_ACC
500
74 | #define NUMBER_OF_STEPS
20000
75 | #define TIME_FOR_ALIGN
500
76 | #define BUTTON_DELAY
1000
77 | #define NUMBER_ZCR
12
79 | #define SPEED_LOOP_TIME
5
80 | #define KP_GAIN
8000
81 | #define KI_GAIN
50
82 | #define KP_DIV
4096
83 | #define KI_DIV
4096
84 | #define LOWER_OUT_LIMIT
120
```

```
85 | #define UPPER_OUT_LIMIT  
85 | 2500  
86 | #define MAX_POT_SPEED  
86 | 10000  
87 | #define MIN_POT_SPEED  
87 | 1500  
88 | #define VAL_POT_SPEED_DIV  
88 | 2  
89 | #define INITIAL_DEMAGN_DELAY  
89 | 10  
92 | #define BEMF_THRSLD_DOWN  
92 | 200  
93 | #define BEMF_THRSLD_UP  
93 | 200  
96 | #define FILTER_DEEP  
96 | 20  
97 | #define HFBUFFERSIZE  
97 | 10  
98 | #define ADC_SPEED_TH  
98 | 82  
101| #define BEMF_CONSEC_DOWN_MAX  
101| 10  
102| #define BEMF_CNT_EVENT_MAX  
102| 100  
105| #define GPIO_ZERO_CROSS  
105| 1  
106| #define GPIO_COMM  
106| 1  
110| #define DEMO_START_TIME  
110| 10000  
111| #define DEMO_STOP_TIME  
111| 5000  
114| #define DEMAGN_VAL_1  
114| 1  
115| #define DEMAGN_VAL_2  
115| 2  
116| #define DEMAGN_VAL_3
```

```
3
117 #define DEMAGN_VAL_4
4
118 #define DEMAGN_VAL_5
5
119 #define DEMAGN_VAL_6
6
120 #define DEMAGN_VAL_7
7
121 #define DEMAGN_VAL_8
8
122 #define DEMAGN_VAL_9
9
123 #define DEMAGN_VAL_10
10
124 #define DEMAGN_VAL_11
11
125 #define DEMAGN_VAL_12
12
126 #define DEMAGN_VAL_13
13
127 #define DEMAGN_VAL_14
14
129 #define TRUE
1
130 #define FALSE
0
```

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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## stm32F030\_nucleo\_ihm07m1.h

Go to the documentation of this file.

```
1
38 /* Define to prevent recursive inclusion -----
-----*/
39 #ifndef __STM32F030_NUCLEO_IHM07M1_H
40 #define __STM32F030_NUCLEO_IHM07M1_H
41
42 #include "stm32f0xx_hal.h"
43 #include "main_F030.h"
44 #include "X-NUCLEO-IHM07M1.h"
45 #include "X-NUCLEO-IHM07M1.h"
46
47 #define HF_TIMx           htim1
48 #define LF_TIMx           htim6
49 #define HALL_ENCODER_TIMx htim2
50 #define ADCx              hadc
51 #define REFx              htim3
52 #define UART              huart2
53
54 #define GPIO_PORT_1         GPIOC
55 #define GPIO_CH1            GPIO_PIN_10
56 #define GPIO_PORT_2         GPIOC
57 #define GPIO_CH2            GPIO_PIN_11
58 #define GPIO_PORT_3         GPIOC
59 #define GPIO_CH3            GPIO_PIN_12
```

```
60 #define GPIO_SET           GPIO_PIN_SET
61 #define GPIO_RESET         GPIO_PIN_RESET
62
63 #define ADC_CH_1           ADC_CHANNEL_11 /*CURRENT*/
64 #define ADC_CH_2           ADC_CHANNEL_9  /*SPEED*/
65 #define ADC_CH_3           ADC_CHANNEL_1  /*VBUS*/
66 #define ADC_CH_4           ADC_CHANNEL_12 /*TEMP*/
67 #define ADC_Bemf_CH1        ADC_CHANNEL_13 /*BEMF1*/
68 #define ADC_Bemf_CH2        ADC_CHANNEL_8  /*BEMF2*/
69 #define ADC_Bemf_CH3        ADC_CHANNEL_7  /*BEMF3*/
70
71 #define ADC_CH_1_ST          ADC_SAMPLETIME_1CYCLE_5 /*CURRENT sampling
time */
72 #define ADC_CH_2_ST          ADC_SAMPLETIME_1CYCLE_5 /*SPEED sampling
time*/
73 #define ADC_CH_3_ST          ADC_SAMPLETIME_1CYCLE_5 /*VBUS sampling time*/
74 #define ADC_CH_4_ST          ADC_SAMPLETIME_1CYCLE_5 /*TEMP sampling time*/
75 #define ADC_Bemf_CH1_ST       ADC_SAMPLETIME_1CYCLE_5 /*BEMF1 sampling
time*/
76 #define ADC_Bemf_CH2_ST       ADC_SAMPLETIME_1CYCLE_5 /*BEMF2 sampling
time*/
77 #define ADC_Bemf_CH3_ST       ADC_SAMPLETIME_1CYCLE_5 /*BEMF3 sampling
```

```

    time*/
78 | #define HF_TIMx_CH1
    TIM_CHANNEL_1
80 | #define HF_TIMx_CH2
    TIM_CHANNEL_2
81 | #define HF_TIMx_CH3
    TIM_CHANNEL_3
82 | #define HF_TIMx_CCR1           CCR1
    /*Channel 1*/
83 | #define HF_TIMx_CCR2           CCR2
    /*Channel 2*/
84 | #define HF_TIMx_CCR3           CCR3
    /*Channel 3*/
85 |
86 | #define DAC_ENABLE            0
87 | #define DACx                  htim3
88 | #define DAC_CH
    TIM_CHANNEL_2
89 | #define CCRx                 CCR2
91 | #define GPIO_PORT_ZCR          GPIOC
92 | #define GPIO_CH_ZCR            GPIO_PIN_7
93 | #define GPIO_PORT_COMM         GPIOC
94 | #define GPIO_CH_COMM           GPIO_PIN_4
96 | #define STARTM_CMD             0
97 | #define STOPMT_CMD              1
98 | #define SETSPD_CMD              2
99 | #define GETSPD_CMD              3
100 | #define INIREF_CMD             4
101 | #define POLESP_CMD              5
102 | #define ACCELE_CMD              6
103 | #define DMGCTR_CMD              7
104 | #define MAXDMG_CMD              8
105 | #define MINDMG_CMD              9
106 | #define KP_PRM_CMD              10
107 | #define KI_PRM_CMD              11
108 | #define POTENZ_CMD             12

```

```
109 #define HELP_CMD           13
110 #define STATUS_CMD          14
111 #define DIRECT_CMD          15
124 void MC_SixStep_ADC_Channel(uint32_t);
125 void MC_SixStep_Nucleo_Init(void);
126 void START_Ref_Generation(void);
127 void STOP_Ref_Generation(void);
128 void Set_Ref_Generation(uint16_t);
129 void Bemf_delay_calc(void);
130 void START_DAC(void);
131 void STOP_DAC(void);
132 void SET_DAC_value(uint16_t);
133 uint32_t Get_UART_Data(void);
134 void
    MC_SixStep_EnableInput_CH1_E_CH2_E_CH3_D(void)
;
135 void
    MC_SixStep_EnableInput_CH1_E_CH2_D_CH3_E(void)
;
136 void
    MC_SixStep_EnableInput_CH1_D_CH2_E_CH3_E(void)
;
137 void
    MC_SixStep_DisableInput_CH1_D_CH2_D_CH3_D(void
);
138 void MC_SixStep_Start_PWM_driving(void);
139 void MC_SixStep_Stop_PWM_driving(void);
140 void
    MC_SixStep_HF_TIMx_SetDutyCycle_CH1(uint16_t);
141 void
    MC_SixStep_HF_TIMx_SetDutyCycle_CH2(uint16_t);
142 void
    MC_SixStep_HF_TIMx_SetDutyCycle_CH3(uint16_t);
143 void
    MC_SixStep_Current_Reference_Start(void);
144 void
    MC_SixStep_Current_Reference_Stop(void);
```

```
145     void
146         MC_SixStep_Current_Reference_Setvalue(uint16_t
147 );
148
149 #endif
150
151
```

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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## stm32f0xx\_hal\_conf.h

Go to the documentation of this file.

```
1
35 /* Define to prevent recursive inclusion -----
-----*/
36 #ifndef __STM32F0xx_HAL_CONF_H
37 #define __STM32F0xx_HAL_CONF_H
38
39 #ifdef __cplusplus
40   extern "C" {
41 #endif
42
43 /* Exported types -----
-----*/
44 /* Exported constants -----
-----*/
45
46 /* ##### Module
Selection ##### */
50 #define HAL_MODULE_ENABLED
51 #define HAL_ADC_MODULE_ENABLED
52 // #define HAL_CAN_MODULE_ENABLED
53 // #define HAL_CEC_MODULE_ENABLED
54 // #define HAL_COMP_MODULE_ENABLED
55 #define HAL_CRC_MODULE_ENABLED
56 // #define HAL_CRYP_MODULE_ENABLED
```

```
57 // #define HAL_TSC_MODULE_ENABLED  
58 // #define HAL_DAC_MODULE_ENABLED  
59 // #define HAL_I2C_MODULE_ENABLED  
60 // #define HAL_I2S_MODULE_ENABLED  
61 // #define HAL_IWDG_MODULE_ENABLED  
62 // #define HAL_LCD_MODULE_ENABLED  
63 // #define HAL_LPTIM_MODULE_ENABLED  
64 // #define HAL_RNG_MODULE_ENABLED  
65 // #define HAL_RTC_MODULE_ENABLED  
66 // #define HAL_SPI_MODULE_ENABLED  
67 #define HAL_TIM_MODULE_ENABLED  
68 #define HAL_UART_MODULE_ENABLED  
69 // #define HAL_USART_MODULE_ENABLED  
70 // #define HAL_IRDA_MODULE_ENABLED  
71 // #define HAL_SMARTCARD_MODULE_ENABLED  
72 // #define HAL_SMBUS_MODULE_ENABLED  
73 // #define HAL_WWDG_MODULE_ENABLED  
74 // #define HAL_PCD_MODULE_ENABLED  
75 #define HAL_CORTEX_MODULE_ENABLED  
76 #define HAL_DMA_MODULE_ENABLED  
77 #define HAL_FLASH_MODULE_ENABLED  
78 #define HAL_GPIO_MODULE_ENABLED  
79 #define HAL_PWR_MODULE_ENABLED  
80 #define HAL_RCC_MODULE_ENABLED  
81  
82 /* ##### HSE/HSI Values  
adaptation ##### */  
83 #if !defined (HSE_VALUE)  
84     #define HSE_VALUE      ((uint32_t)8000000)  
85 #endif /* HSE_VALUE */  
86  
87 #if !defined (HSE_STARTUP_TIMEOUT)  
88     #define HSE_STARTUP_TIMEOUT  
89     ((uint32_t)5000)  
90 #endif /* HSE_STARTUP_TIMEOUT */  
91  
92 #if !defined (HSI_VALUE)  
93     #define HSI_VALUE      ((uint32_t)8000000)  
94 #endif /* HSI_VALUE */  
95  
96 #if !defined (HAL_RCC_MODULE_ENABLED)  
97     #define HAL_RCC_MODULE_ENABLED  
98 #endif /* HAL_RCC_MODULE_ENABLED */  
99  
100 #if !defined (HAL_I2C_MODULE_ENABLED)  
101     #define HAL_I2C_MODULE_ENABLED  
102 #endif /* HAL_I2C_MODULE_ENABLED */  
103  
104 #if !defined (HAL_I2S_MODULE_ENABLED)  
105     #define HAL_I2S_MODULE_ENABLED  
106 #endif /* HAL_I2S_MODULE_ENABLED */
```

```
106 #define HSI_VALUE ((uint32_t)8000000)
107 #endif /* HSI_VALUE */
108
113 #if !defined (HSI_STARTUP_TIMEOUT)
114 #define HSI_STARTUP_TIMEOUT
115 ((uint32_t)5000)
116 #endif /* HSI_STARTUP_TIMEOUT */
117
120 #if !defined (HSI14_VALUE)
121 #define HSI14_VALUE ((uint32_t)14000000)
122 #endif /* HSI14_VALUE */
123
129 #if !defined (HSI48_VALUE)
130 #define HSI48_VALUE ((uint32_t)48000000)
131 #endif /* HSI48_VALUE */
132
138 #if !defined (LSI_VALUE)
139 #define LSI_VALUE ((uint32_t)40000)
140 #endif /* LSI_VALUE */
146 #if !defined (LSE_VALUE)
147 #define LSE_VALUE ((uint32_t)32768)
148 #endif /* LSE_VALUE */
149
150 /* Tip: To avoid modifying this file each
   time you need to use different HSE,
151 === you can define the HSE value in your
   toolchain compiler preprocessor. */
152
153 /* ##### System
   Configuration ##### */
154 #define VDD_VALUE
155 ((uint32_t)3300)
156 #define TICK_INT_PRIORITY
157 ((uint32_t)2)
158 /* Warning: Must be set to higher priority
   for HAL_Delay() */
159
160
```

```
/* and HAL_GetTick() usage under interrupt
context */
161 #define USE_RTOS 0
162 #define PREFETCH_ENABLE 1
163 #define INSTRUCTION_CACHE_ENABLE 0
164 #define DATA_CACHE_ENABLE 0
165 /* ##### Assert
Selection ##### */
170 /* #define USE_FULL_ASSERT 1 */
171
172 /* Includes -----
----- */
177 #ifdef HAL_RCC_MODULE_ENABLED
178     #include "stm32f0xx_hal_rcc.h"
179 #endif /* HAL_RCC_MODULE_ENABLED */
180
181 #ifdef HAL_GPIO_MODULE_ENABLED
182     #include "stm32f0xx_hal_gpio.h"
183 #endif /* HAL_GPIO_MODULE_ENABLED */
184
185 #ifdef HAL_DMA_MODULE_ENABLED
186     #include "stm32f0xx_hal_dma.h"
187 #endif /* HAL_DMA_MODULE_ENABLED */
188
189 #ifdef HAL_CORTEX_MODULE_ENABLED
190     #include "stm32f0xx_hal_cortex.h"
191 #endif /* HAL_CORTEX_MODULE_ENABLED */
192
193 #ifdef HAL_ADC_MODULE_ENABLED
194     #include "stm32f0xx_hal_adc.h"
195 #endif /* HAL_ADC_MODULE_ENABLED */
196
197 #ifdef HAL_CAN_MODULE_ENABLED
198     #include "stm32f0xx_hal_can.h"
199 #endif /* HAL_CAN_MODULE_ENABLED */
200
201 #ifdef HAL_CEC_MODULE_ENABLED
```

```
202 #include "stm32f0xx_hal_cec.h"
203 #endif /* HAL_CEC_MODULE_ENABLED */
204
205 #ifdef HAL_COMP_MODULE_ENABLED
206     #include "stm32f0xx_hal_comp.h"
207 #endif /* HAL_COMP_MODULE_ENABLED */
208
209 #ifdef HAL_CRC_MODULE_ENABLED
210     #include "stm32f0xx_hal_crc.h"
211 #endif /* HAL_CRC_MODULE_ENABLED */
212
213 #ifdef HAL_DAC_MODULE_ENABLED
214     #include "stm32f0xx_hal_dac.h"
215 #endif /* HAL_DAC_MODULE_ENABLED */
216
217 #ifdef HAL_FLASH_MODULE_ENABLED
218     #include "stm32f0xx_hal_flash.h"
219 #endif /* HAL_FLASH_MODULE_ENABLED */
220
221 #ifdef HAL_I2C_MODULE_ENABLED
222     #include "stm32f0xx_hal_i2c.h"
223 #endif /* HAL_I2C_MODULE_ENABLED */
224
225 #ifdef HAL_I2S_MODULE_ENABLED
226     #include "stm32f0xx_hal_i2s.h"
227 #endif /* HAL_I2S_MODULE_ENABLED */
228
229 #ifdef HAL_IRDA_MODULE_ENABLED
230     #include "stm32f0xx_hal_irda.h"
231 #endif /* HAL_IRDA_MODULE_ENABLED */
232
233 #ifdef HAL_IWDG_MODULE_ENABLED
234     #include "stm32f0xx_hal_iwdg.h"
235 #endif /* HAL_IWDG_MODULE_ENABLED */
236
237 #ifdef HAL_PCD_MODULE_ENABLED
238     #include "stm32f0xx_hal_pcd.h"
```

```
239 #endif /* HAL_PCD_MODULE_ENABLED */
240
241 #ifdef HAL_PWR_MODULE_ENABLED
242     #include "stm32f0xx_hal_pwr.h"
243 #endif /* HAL_PWR_MODULE_ENABLED */
244
245 #ifdef HAL_RTC_MODULE_ENABLED
246     #include "stm32f0xx_hal_rtc.h"
247 #endif /* HAL_RTC_MODULE_ENABLED */
248
249 #ifdef HAL_SMARTCARD_MODULE_ENABLED
250     #include "stm32f0xx_hal_smartcard.h"
251 #endif /* HAL_SMARTCARD_MODULE_ENABLED */
252
253 #ifdef HAL_SMBUS_MODULE_ENABLED
254     #include "stm32f0xx_hal_smbus.h"
255 #endif /* HAL_SMBUS_MODULE_ENABLED */
256
257 #ifdef HAL_SPI_MODULE_ENABLED
258     #include "stm32f0xx_hal_spi.h"
259 #endif /* HAL_SPI_MODULE_ENABLED */
260
261 #ifdef HAL_TIM_MODULE_ENABLED
262     #include "stm32f0xx_hal_tim.h"
263 #endif /* HAL_TIM_MODULE_ENABLED */
264
265 #ifdef HAL_TSC_MODULE_ENABLED
266     #include "stm32f0xx_hal_tsc.h"
267 #endif /* HAL_TSC_MODULE_ENABLED */
268
269 #ifdef HAL_UART_MODULE_ENABLED
270     #include "stm32f0xx_hal_uart.h"
271 #endif /* HAL_UART_MODULE_ENABLED */
272
273 #ifdef HAL_USART_MODULE_ENABLED
274     #include "stm32f0xx_hal_usart.h"
275 #endif /* HAL_USART_MODULE_ENABLED */
```

```

276
277 #ifdef HAL_WWDG_MODULE_ENABLED
278     #include "stm32f0xx_hal_wwdg.h"
279 #endif /* HAL_WWDG_MODULE_ENABLED */
280
281 /* Exported macro -----
282 -----*/
282 #ifdef USE_FULL_ASSERT
283
284     #define assert_param(expr) ((expr) ?
285         (void)0 : assert_failed((uint8_t *)__FILE__,
286         __LINE__))
287 /* Exported functions -----
288 -----*/
289
290     void assert_failed(uint8_t* file, uint32_t
291         line);
292 #else
293     #define assert_param(expr) ((void)0)
294 #endif /* USE_FULL_ASSERT */
295
296
297 #ifdef __cplusplus
298 }
299#endif
300
301#endif /* __STM32F0XX_HAL_CONF_H */
302
303
304 /***** (C) COPYRIGHT
305 STMicroelectronics *****END OF FILE****/

```

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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Macros

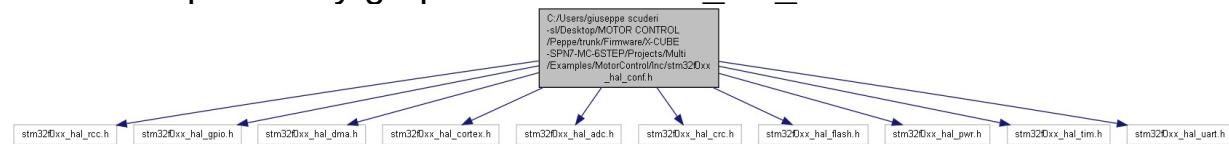
## stm32f0xx\_hal\_conf.h

### File Reference

HAL configuration file. [More...](#)

```
#include "stm32f0xx_hal_rcc.h" #include "stm32f0xx_hal_gpio.h"  
#include "stm32f0xx_hal_dma.h"  
#include "stm32f0xx_hal_cortex.h"  
#include "stm32f0xx_hal_adc.h"  
#include "stm32f0xx_hal_crc.h"  
#include "stm32f0xx_hal_flash.h"  
#include "stm32f0xx_hal_pwr.h"  
#include "stm32f0xx_hal_tim.h"  
#include "stm32f0xx_hal_uart.h"
```

Include dependency graph for stm32f0xx\_hal\_conf.h:



[Go to the source code of this file.](#)

## Macros

```
#define HAL_MODULE_ENABLED
```

This is the list of modules to be used in the HAL driver.

```
#define HAL_ADC_MODULE_ENABLED
```

```
#define HAL_CRC_MODULE_ENABLED
```

```
#define HAL_TIM_MODULE_ENABLED
```

```
#define HAL_UART_MODULE_ENABLED
```

```
#define HAL_CORTEX_MODULE_ENABLED
```

```
#define HAL_DMA_MODULE_ENABLED
```

```
#define HAL_FLASH_MODULE_ENABLED
```

```
#define HAL_GPIO_MODULE_ENABLED
```

```
#define HAL_PWR_MODULE_ENABLED
```

```
#define HAL_RCC_MODULE_ENABLED
```

```
#define HSE_VALUE ((uint32_t)8000000)
```

Adjust the value of External High Speed oscillator (HSE) used in your application. This value is used by the RCC HAL module to compute the system frequency (when HSE is used as system clock source, directly or through the PLL).

[More...](#)

```
#define HSE_STARTUP_TIMEOUT ((uint32_t)5000)
```

In the following line adjust the External High Speed oscillator (HSE) Startup Timeout value. [More...](#)

```
#define HSI_VALUE ((uint32_t)8000000)
```

Internal High Speed oscillator (HSI) value. This value is used by the RCC HAL module to compute the system frequency (when HSI is used as system clock source, directly or through the PLL). [More...](#)

```
#define HSI_STARTUP_TIMEOUT ((uint32_t)5000)
```

In the following line adjust the Internal High Speed oscillator (HSI) Startup Timeout value. [More...](#)

```
#define HSI14_VALUE ((uint32_t)14000000)
```

Internal High Speed oscillator for ADC (HSI14) value. [More...](#)

```
#define HSI48_VALUE ((uint32_t)48000000)
```

Internal High Speed oscillator for USB (HSI48) value. [More...](#)

```
#define LSI_VALUE ((uint32_t)40000)
```

Internal Low Speed oscillator (LSI) value.

```
#define LSE_VALUE ((uint32_t)32768)
```

External Low Speed oscillator (LSI) value. [More...](#)

```
#define VDD_VALUE ((uint32_t)3300)
```

This is the HAL system configuration section. [More...](#)

```
#define TICK_INT_PRIORITY ((uint32_t)2)
```

```
#define USERTOS 0
```

```
#define PREFETCH_ENABLE 1
```

```
#define INSTRUCTION_CACHE_ENABLE 0
```

```
#define DATA_CACHE_ENABLE 0
```

```
#define assert_param(expr) ((void)0)
```

Uncomment the line below to expand the "assert\_param" macro in the HAL drivers code. [More...](#)

---

## Detailed Description

---

HAL configuration file.

**Attention**

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# Macro Definition Documentation

---

**#define assert\_param ( expr ) ((void)0)**

---

Uncomment the line below to expand the "assert\_param" macro in the HAL drivers code.

Include module's header file

**#define HSE\_STARTUP\_TIMEOUT ((uint32\_t)5000)**

---

In the following line adjust the External High Speed oscillator (HSE) Startup Timeout value.

Time out for HSE start up, in ms

**#define HSE\_VALUE ((uint32\_t)8000000)**

---

Adjust the value of External High Speed oscillator (HSE) used in your application. This value is used by the RCC HAL module to compute the system frequency (when HSE is used as system clock source, directly or through the PLL).

Value of the External oscillator in Hz

**#define HSI14\_VALUE ((uint32\_t)14000000)**

---

Internal High Speed oscillator for ADC (HSI14) value.

Value of the Internal High Speed oscillator for ADC in Hz. The real value may vary depending on the variations in voltage and temperature.

---

```
#define HSI48_VALUE ((uint32_t)48000000)
```

---

Internal High Speed oscillator for USB (HSI48) value.

Value of the Internal High Speed oscillator for USB in Hz. The real value may vary depending on the variations in voltage and temperature.

---

```
#define HSI_STARTUP_TIMEOUT ((uint32_t)5000)
```

---

In the following line adjust the Internal High Speed oscillator (HSI) Startup Timeout value.

Time out for HSI start up

---

```
#define HSI_VALUE ((uint32_t)8000000)
```

---

Internal High Speed oscillator (HSI) value. This value is used by the RCC HAL module to compute the system frequency (when HSI is used as system clock source, directly or through the PLL).

Value of the Internal oscillator in Hz

---

```
#define LSE_VALUE ((uint32_t)32768)
```

---

External Low Speed oscillator (LSI) value.

< Value of the Internal Low Speed oscillator in Hz The real value may vary depending on the variations in voltage and temperature.  
Value of the External Low Speed oscillator in Hz

---

```
#define TICK_INT_PRIORITY ((uint32_t)2)
```

---

tick interrupt priority (lowest by default)

---

**#define VDD\_VALUE ((uint32\_t)3300)**

---

This is the HAL system configuration section.

Value of VDD in mv

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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## stm32f0xx\_it.h

Go to the documentation of this file.

```
1
35 /* Define to prevent recursive inclusion -----
   -----*/
36 #ifndef __STM32F0xx_IT_H
37 #define __STM32F0xx_IT_H
38
39 #ifdef __cplusplus
40   extern "C" {
41 #endif
42
43 /* Includes -----
   -----*/
44 /* Exported types -----
   -----*/
45 /* Exported constants -----
   -----*/
46 /* Exported macro -----
   -----*/
47 /* Exported functions -----
   -----*/
48
49 void USART2_IRQHandler(void);
50 void TIM1_BRK_UP_TRG_COM_IRQHandler(void);
51 void ADC1_IRQHandler(void);
```

```
52 void EXTI4_15_IRQHandler(void);
53 void SysTick_Handler(void);
54 void TIM6_IRQHandler(void);
55
56 #ifdef __cplusplus
57 }
58#endif
59
60#endif /* __STM32F0xx_IT_H */
61
62 /***** (C) COPYRIGHT
STMicroelectronics *****END OF FILE****/
```

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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Inc > Functions

## stm32f0xx\_it.h File Reference

This file contains the headers of the interrupt handlers. [More...](#)

[Go to the source code of this file.](#)

## Functions

---

```
void USART2_IRQHandler (void)
```

```
void TIM1_BRK_UP_TRG_COM_IRQHandler (void)
```

```
void ADC1_IRQHandler (void)
```

```
void EXTI4_15_IRQHandler (void)
```

```
void SysTick_Handler (void)
```

```
void TIM6_IRQHandler (void)
```

---

## Detailed Description

---

This file contains the headers of the interrupt handlers.

### Date

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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## stm32F103\_nucleo\_ihm07m1.h

Go to the documentation of this file.

```
1  /* Define to prevent recursive inclusion -----
37-----*/
38 #ifndef __STM32F103_NUCLEO_IHM07M1_H
39 #define __STM32F103_NUCLEO_IHM07M1_H
40
41 #include "stm32f1xx_hal.h"
42 #include "main_F103.h"
43 #include "X-NUCLEO-IHM07M1.h"
44
45 #define HF_TIMx           htim1
46 #define LF_TIMx           htim4
47 #define HALL_ENCODER_TIMx htim2
48 #define ADCx              hadc1
49 #define REFx              htim3
50 #define UART              huart2
51
52 #define GPIO_PORT_1         GPIOC
53 #define GPIO_CH1            GPIO_PIN_10
54 #define GPIO_PORT_2         GPIOC
55 #define GPIO_CH2            GPIO_PIN_11
56 #define GPIO_PORT_3         GPIOC
57 #define GPIO_CH3            GPIO_PIN_12
58 #define GPIO_SET             GPIO_PIN_SET
```

```
59 #define GPIO_RESET  
    GPIO_PIN_RESET  
60  
61 #define ADC_CH_1  
    ADC_CHANNEL_11 /*CURRENT*/  
62 #define ADC_CH_2  
    ADC_CHANNEL_9 /*SPEED*/  
63 #define ADC_CH_3  
    ADC_CHANNEL_1 /*VBUS*/  
64 #define ADC_CH_4  
    ADC_CHANNEL_12 /*TEMP*/  
65 #define ADC_Bemf_CH1  
    ADC_CHANNEL_13 /*BEMF1*/  
66 #define ADC_Bemf_CH2  
    ADC_CHANNEL_8 /*BEMF2*/  
67 #define ADC_Bemf_CH3  
    ADC_CHANNEL_7 /*BEMF3*/  
68  
69 #define ADC_CH_1_ST  
    ADC_SAMPLETIME_1CYCLE_5 /*CURRENT sampling  
time */  
70 #define ADC_CH_2_ST  
    ADC_SAMPLETIME_28CYCLES_5 /*SPEED sampling  
time */  
71 #define ADC_CH_3_ST  
    ADC_SAMPLETIME_28CYCLES_5 /*VBUS sampling  
time */  
72 #define ADC_CH_4_ST  
    ADC_SAMPLETIME_28CYCLES_5 /*TEMP sampling  
time */  
73 #define ADC_Bemf_CH1_ST  
    ADC_SAMPLETIME_28CYCLES_5 /*BEMF1 sampling  
time */  
74 #define ADC_Bemf_CH2_ST  
    ADC_SAMPLETIME_28CYCLES_5 /*BEMF2 sampling  
time */  
75 #define ADC_Bemf_CH3_ST
```

```

    ADC_SAMPLETIME_28CYCLES_5 /*BEMF3 sampling
    time*/
76
77 #define HF_TIMx_CH1
    TIM_CHANNEL_1
78 #define HF_TIMx_CH2
    TIM_CHANNEL_2
79 #define HF_TIMx_CH3
    TIM_CHANNEL_3
80 #define HF_TIMx_CCR1          CCR1
/*Channel 1*/
81 #define HF_TIMx_CCR2          CCR2
/*Channel 2*/
82 #define HF_TIMx_CCR3          CCR3
/*Channel 3*/
83
84 #define DAC_ENABLE            0
85 #define DACx                  htim3
86 #define DAC_CH
    TIM_CHANNEL_2
87 #define CCRx                 CCR2
88 #define GPIO_PORT_ZCR          GPIOC
89 #define GPIO_CH_ZCR            GPIO_PIN_7
90 #define GPIO_PORT_COMM          GPIOC
91 #define GPIO_CH_COMM            GPIO_PIN_4
92 #define STARTM_CMD              0
93 #define STOPMT_CMD              1
94 #define SETSPD_CMD              2
95 #define GETSPD_CMD              3
96 #define INIREF_CMD              4
97 #define POLESP_CMD              5
98 #define ACCELE_CMD              6
99 #define DMGCTR_CMD              7
100 #define MAXDMG_CMD              8
101 #define MINDMG_CMD              9
102 #define KP_PRM_CMD              10
103 #define KI_PRM_CMD              11

```

```
106 #define POTENZ_CMD 12
107 #define HELP_CMD 13
108 #define STATUS_CMD 14
109 #define DIRECT_CMD 15
122 void MC_SixStep_ADC_Channel(uint32_t);
123 void MC_SixStep_Nucleo_Init(void);
124 void START_Ref_Generation(void);
125 void STOP_Ref_Generation(void);
126 void Set_Ref_Generation(uint16_t);
127 void START_DAC(void);
128 void STOP_DAC(void);
129 void SET_DAC_value(uint16_t);
130 void Bemf_delay_calc(void);
131 uint32_t Get_UART_Data(void);
132 void
    MC_SixStep_EnableInput_CH1_E_CH2_E_CH3_D(void)
;
133 void
    MC_SixStep_EnableInput_CH1_E_CH2_D_CH3_E(void)
;
134 void
    MC_SixStep_EnableInput_CH1_D_CH2_E_CH3_E(void)
;
135 void
    MC_SixStep_DisableInput_CH1_D_CH2_D_CH3_D(void)
);
136 void MC_SixStep_Start_PWM_driving(void);
137 void MC_SixStep_Stop_PWM_driving(void);
138 void
    MC_SixStep_HF_TIMx_SetDutyCycle_CH1(uint16_t);
139 void
    MC_SixStep_HF_TIMx_SetDutyCycle_CH2(uint16_t);
140 void
    MC_SixStep_HF_TIMx_SetDutyCycle_CH3(uint16_t);
141 void
    MC_SixStep_Current_Reference_Start(void);
142 void
```

```
    MC_SixStep_Current_Reference_Stop(void);
143 | void
    MC_SixStep_Current_Reference_Setvalue(uint16_t
    );
152 | #endif
```

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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## stm32f1xx\_hal\_conf.h

Go to the documentation of this file.

```
1
35 /* Define to prevent recursive inclusion -----
   -----*/
36 #ifndef __STM32F1xx_HAL_CONF_H
37 #define __STM32F1xx_HAL_CONF_H
38
39 #ifdef __cplusplus
40   extern "C" {
41 #endif
42
43 /* Exported types -----
   -----*/
44 /* Exported constants -----
   -----*/
45
46 /* ##### Module
Selection ##### */
50 #define HAL_MODULE_ENABLED
51 #define HAL_ADC_MODULE_ENABLED
52 // #define HAL_CAN_MODULE_ENABLED
53 // #define HAL_CEC_MODULE_ENABLED
54 // #define HAL_CORTEX_MODULE_ENABLED
55 // #define HAL_CRC_MODULE_ENABLED
56 // #define HAL_DAC_MODULE_ENABLED
```

```
57 // #define HAL_DMA_MODULE_ENABLED
58 // #define HAL_ETH_MODULE_ENABLED
59 // #define HAL_FLASH_MODULE_ENABLED
60 #define HAL_GPIO_MODULE_ENABLED
61 // #define HAL_I2C_MODULE_ENABLED
62 // #define HAL_I2S_MODULE_ENABLED
63 // #define HAL_IRDA_MODULE_ENABLED
64 // #define HAL_IWDG_MODULE_ENABLED
65 // #define HAL_NOR_MODULE_ENABLED
66 // #define HAL_NAND_MODULE_ENABLED
67 // #define HAL_PCCARD_MODULE_ENABLED
68 // #define HAL_PCD_MODULE_ENABLED
69 // #define HAL_HCD_MODULE_ENABLED
70 // #define HAL_PWR_MODULE_ENABLED
71 // #define HAL_RCC_MODULE_ENABLED
72 // #define HAL_RTC_MODULE_ENABLED
73 // #define HAL_SD_MODULE_ENABLED
74 // #define HAL_SDRAM_MODULE_ENABLED
75 // #define HAL_SMARTCARD_MODULE_ENABLED
76 // #define HAL_SPI_MODULE_ENABLED
77 // #define HAL_SRAM_MODULE_ENABLED
78 #define HAL_TIM_MODULE_ENABLED
79 #define HAL_UART_MODULE_ENABLED
80 // #define HAL_USART_MODULE_ENABLED
81 // #define HAL_WWDG_MODULE_ENABLED
82
83 #define HAL_CORTEX_MODULE_ENABLED
84 #define HAL_DMA_MODULE_ENABLED
85 #define HAL_FLASH_MODULE_ENABLED
86 #define HAL_GPIO_MODULE_ENABLED
87 #define HAL_PWR_MODULE_ENABLED
88 #define HAL_RCC_MODULE_ENABLED
89
90 /* ##### Oscillator
   Values adaptation ##### */
96 #if !defined (HSE_VALUE)
97     #define HSE_VALUE      ((uint32_t)8000000)
```

```
98 #endif /* HSE_VALUE */
99
100 #if !defined (HSE_STARTUP_TIMEOUT)
101     #define HSE_STARTUP_TIMEOUT
102     ((uint32_t)5000)
103 #endif /* HSE_STARTUP_TIMEOUT */
104
105 #if !defined (HSI_VALUE)
106     #define HSI_VALUE      ((uint32_t)8000000)
107 #endif /* HSI_VALUE */
108
109 #if !defined (LSE_VALUE)
110     #define LSE_VALUE      ((uint32_t)32768)
111 #endif /* LSE_VALUE */
112
113 #if !defined (LSE_STARTUP_TIMEOUT)
114     #define LSE_STARTUP_TIMEOUT
115     ((uint32_t)5000)
116 #endif /* LSE_STARTUP_TIMEOUT */
117
118 /* Tip: To avoid modifying this file each
   time you need to use different HSE,
119 === you can define the HSE value in your
   toolchain compiler preprocessor. */
120
121 /* ###### System Configuration ###### */
122
123 #define VDD_VALUE
124     ((uint32_t)3300))
125
126 #define TICK_INT_PRIORITY
127     ((uint32_t)2)
128
129 #define USE_RTOS          0
130 #define PREFETCH_ENABLE    1
131
132 /* ##### Assert Selection ##### */
133
134 #define USE_FULL_ASSERT    1
```

```

143
144 /* ##### Ethernet peripheral
   configuration #### */
145
146 /* Section 1 : Ethernet peripheral
   configuration */
147
148 /* MAC ADDRESS:
   MAC_ADDR0:MAC_ADDR1:MAC_ADDR2:MAC_ADDR3:MAC_AD
   DR4:MAC_ADDR5 */
149 #define MAC_ADDR0    2
150 #define MAC_ADDR1    0
151 #define MAC_ADDR2    0
152 #define MAC_ADDR3    0
153 #define MAC_ADDR4    0
154 #define MAC_ADDR5    0
155
156 /* Definition of the Ethernet driver buffers
   size and count */
157 #define ETH_RX_BUF_SIZE
   ETH_MAX_PACKET_SIZE /* buffer size for receive
   */
158 #define ETH_TX_BUF_SIZE
   ETH_MAX_PACKET_SIZE /* buffer size for
   transmit */
159 #define ETH_RXBUFN
   ((uint32_t)8) /* 4 Rx buffers of size
   ETH_RX_BUF_SIZE */
160 #define ETH_TXBUFN
   ((uint32_t)4) /* 4 Tx buffers of size
   ETH_TX_BUF_SIZE */
161
162 /* Section 2: PHY configuration section */
163
164 /* DP83848 PHY Address*/
165 #define DP83848_PHY_ADDRESS          0x01
166 /* PHY Reset delay these values are based on

```

```
    a 1 ms Systick interrupt*/
167 #define PHY_RESET_DELAY
      ((uint32_t)0x000000FF)
168 /* PHY Configuration delay */
169 #define PHY_CONFIG_DELAY
      ((uint32_t)0x00000FFF)
170
171 #define PHY_READ_TO
      ((uint32_t)0x0000FFFF)
172 #define PHY_WRITE_TO
      ((uint32_t)0x00000FFF)
173
174 /* Section 3: Common PHY Registers */
175
176 #define PHY_BCR
      ((uint16_t)0x00)
177 #define PHY_BSR
      ((uint16_t)0x01)
178 #define PHY_RESET
      ((uint16_t)0x8000)
180 #define PHY_LOOPBACK
      ((uint16_t)0x4000)
181 #define PHY_FULLDUPLEX_100M
      ((uint16_t)0x2100)
182 #define PHY_HALFDUPLEX_100M
      ((uint16_t)0x2000)
183 #define PHY_FULLDUPLEX_10M
      ((uint16_t)0x0100)
184 #define PHY_HALFDUPLEX_10M
      ((uint16_t)0x0000)
185 #define PHY_AUTONEGOTIATION
      ((uint16_t)0x1000)
186 #define PHY_RESTART_AUTONEGOTIATION
      ((uint16_t)0x0200)
187 #define PHY_POWERDOWN
      ((uint16_t)0x0800)
188 #define PHY_ISOLATE
```

```
    ((uint16_t)0x0400)
190 #define PHY_AUTONEGO_COMPLETE
    ((uint16_t)0x0020)
191 #define PHY_LINKED_STATUS
    ((uint16_t)0x0004)
192 #define PHY_JABBER_DETECTION
    ((uint16_t)0x0002)
194 /* Section 4: Extended PHY Registers */
195
196 #define PHY_SR
    ((uint16_t)0x10)
197 #define PHY_MICR
    ((uint16_t)0x11)
198 #define PHY_MISR
    ((uint16_t)0x12)
200 #define PHY_LINK_STATUS
    ((uint16_t)0x0001)
201 #define PHY_SPEED_STATUS
    ((uint16_t)0x0002)
202 #define PHY_DUPLEX_STATUS
    ((uint16_t)0x0004)
204 #define PHY_MICR_INT_EN
    ((uint16_t)0x0002)
205 #define PHY_MICR_INT_OE
    ((uint16_t)0x0001)
207 #define PHY_MISR_LINK_INT_EN
    ((uint16_t)0x0020)
208 #define PHY_LINK_INTERRUPT
    ((uint16_t)0x2000)
210 /* Includes -----
-----*/
211
215 #ifdef HAL_RCC_MODULE_ENABLED
216     #include "stm32f1xx_hal_rcc.h"
217 #endif /* HAL_RCC_MODULE_ENABLED */
218
219 #ifdef HAL_GPIO_MODULE_ENABLED
```

```
220 #include "stm32f1xx_hal_gpio.h"
221 #endif /* HAL_GPIO_MODULE_ENABLED */
222
223 #ifdef HAL_DMA_MODULE_ENABLED
224     #include "stm32f1xx_hal_dma.h"
225 #endif /* HAL_DMA_MODULE_ENABLED */
226
227 #ifdef HAL_ETH_MODULE_ENABLED
228     #include "stm32f1xx_hal_eth.h"
229 #endif /* HAL_ETH_MODULE_ENABLED */
230
231 #ifdef HAL_CAN_MODULE_ENABLED
232     #include "stm32f1xx_hal_can.h"
233 #endif /* HAL_CAN_MODULE_ENABLED */
234
235 #ifdef HAL_CEC_MODULE_ENABLED
236     #include "stm32f1xx_hal_cec.h"
237 #endif /* HAL_CEC_MODULE_ENABLED */
238
239 #ifdef HAL_CORTEX_MODULE_ENABLED
240     #include "stm32f1xx_hal_cortex.h"
241 #endif /* HAL_CORTEX_MODULE_ENABLED */
242
243 #ifdef HAL_ADC_MODULE_ENABLED
244     #include "stm32f1xx_hal_adc.h"
245 #endif /* HAL_ADC_MODULE_ENABLED */
246
247 #ifdef HAL_CRC_MODULE_ENABLED
248     #include "stm32f1xx_hal_crc.h"
249 #endif /* HAL_CRC_MODULE_ENABLED */
250
251 #ifdef HAL_DAC_MODULE_ENABLED
252     #include "stm32f1xx_hal_dac.h"
253 #endif /* HAL_DAC_MODULE_ENABLED */
254
255 #ifdef HAL_FLASH_MODULE_ENABLED
256     #include "stm32f1xx_hal_flash.h"
```

```
257 #endif /* HAL_FLASH_MODULE_ENABLED */  
258  
259 #ifdef HAL_SRAM_MODULE_ENABLED  
260     #include "stm32f1xx_hal_sram.h"  
261 #endif /* HAL_SRAM_MODULE_ENABLED */  
262  
263 #ifdef HAL_NOR_MODULE_ENABLED  
264     #include "stm32f1xx_hal_nor.h"  
265 #endif /* HAL_NOR_MODULE_ENABLED */  
266  
267 #ifdef HAL_I2C_MODULE_ENABLED  
268     #include "stm32f1xx_hal_i2c.h"  
269 #endif /* HAL_I2C_MODULE_ENABLED */  
270  
271 #ifdef HAL_I2S_MODULE_ENABLED  
272     #include "stm32f1xx_hal_i2s.h"  
273 #endif /* HAL_I2S_MODULE_ENABLED */  
274  
275 #ifdef HAL_IWDG_MODULE_ENABLED  
276     #include "stm32f1xx_hal_iwdg.h"  
277 #endif /* HAL_IWDG_MODULE_ENABLED */  
278  
279 #ifdef HAL_PWR_MODULE_ENABLED  
280     #include "stm32f1xx_hal_pwr.h"  
281 #endif /* HAL_PWR_MODULE_ENABLED */  
282  
283 #ifdef HAL_RTC_MODULE_ENABLED  
284     #include "stm32f1xx_hal_rtc.h"  
285 #endif /* HAL_RTC_MODULE_ENABLED */  
286  
287 #ifdef HAL_PCCARD_MODULE_ENABLED  
288     #include "stm32f1xx_hal_pccard.h"  
289 #endif /* HAL_PCCARD_MODULE_ENABLED */  
290  
291 #ifdef HAL_SD_MODULE_ENABLED  
292     #include "stm32f1xx_hal_sd.h"  
293 #endif /* HAL_SD_MODULE_ENABLED */
```

```
294
295 #ifdef HAL_NAND_MODULE_ENABLED
296     #include "stm32f1xx_hal_nand.h"
297 #endif /* HAL_NAND_MODULE_ENABLED */
298
299 #ifdef HAL_SPI_MODULE_ENABLED
300     #include "stm32f1xx_hal_spi.h"
301 #endif /* HAL_SPI_MODULE_ENABLED */
302
303 #ifdef HAL_TIM_MODULE_ENABLED
304     #include "stm32f1xx_hal_tim.h"
305 #endif /* HAL_TIM_MODULE_ENABLED */
306
307 #ifdef HAL_UART_MODULE_ENABLED
308     #include "stm32f1xx_hal_uart.h"
309 #endif /* HAL_UART_MODULE_ENABLED */
310
311 #ifdef HAL_USART_MODULE_ENABLED
312     #include "stm32f1xx_hal_usart.h"
313 #endif /* HAL_USART_MODULE_ENABLED */
314
315 #ifdef HAL_IRDA_MODULE_ENABLED
316     #include "stm32f1xx_hal_irda.h"
317 #endif /* HAL_IRDA_MODULE_ENABLED */
318
319 #ifdef HAL_SMARTCARD_MODULE_ENABLED
320     #include "stm32f1xx_hal_smartcard.h"
321 #endif /* HAL_SMARTCARD_MODULE_ENABLED */
322
323 #ifdef HAL_WWDG_MODULE_ENABLED
324     #include "stm32f1xx_hal_wwdg.h"
325 #endif /* HAL_WWDG_MODULE_ENABLED */
326
327 #ifdef HAL_PCD_MODULE_ENABLED
328     #include "stm32f1xx_hal_pcd.h"
329 #endif /* HAL_PCD_MODULE_ENABLED */
330
```

```

331 #ifdef HAL_HCD_MODULE_ENABLED
332     #include "stm32f1xx_hal_hcd.h"
333 #endif /* HAL_HCD_MODULE_ENABLED */
334
335
336 /* Exported macro -----
337 -----*/
337 #ifdef USE_FULL_ASSERT
338
346     #define assert_param(expr) ((expr) ?
347         (void)0 : assert_failed((uint8_t *)__FILE__,
348         __LINE__))
347 /* Exported functions -----
348 -----*/
348     void assert_failed(uint8_t* file, uint32_t
349     line);
349 #else
350     #define assert_param(expr) ((void)0)
351 #endif /* USE_FULL_ASSERT */
352
353 #ifdef __cplusplus
354 }
355#endif
356
357#endif /* __STM32F1XX_HAL_CONF_H */
358
359 /***** (C) COPYRIGHT
STMicroelectronics *****END OF FILE****/

```

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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Macros

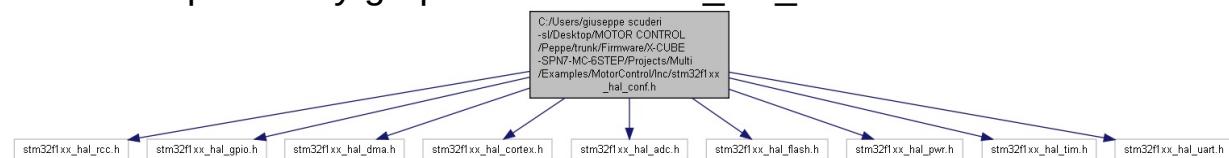
## stm32f1xx\_hal\_conf.h

### File Reference

HAL configuration file. [More...](#)

```
#include "stm32f1xx_hal_rcc.h" #include "stm32f1xx_hal_gpio.h"  
#include "stm32f1xx_hal_dma.h"  
#include "stm32f1xx_hal_cortex.h"  
#include "stm32f1xx_hal_adc.h"  
#include "stm32f1xx_hal_flash.h"  
#include "stm32f1xx_hal_pwr.h"  
#include "stm32f1xx_hal_tim.h"  
#include "stm32f1xx_hal_uart.h"
```

Include dependency graph for stm32f1xx\_hal\_conf.h:



[Go to the source code of this file.](#)

## Macros

```
#define HAL_MODULE_ENABLED
```

This is the list of modules to be used in the HAL driver.

```
#define HAL_ADC_MODULE_ENABLED
```

```
#define HAL_GPIO_MODULE_ENABLED
```

```
#define HAL_TIM_MODULE_ENABLED
```

```
#define HAL_UART_MODULE_ENABLED
```

```
#define HAL_CORTEX_MODULE_ENABLED
```

```
#define HAL_DMA_MODULE_ENABLED
```

```
#define HAL_FLASH_MODULE_ENABLED
```

```
#define HAL_GPIO_MODULE_ENABLED
```

```
#define HAL_PWR_MODULE_ENABLED
```

```
#define HAL_RCC_MODULE_ENABLED
```

```
#define HSE_VALUE ((uint32_t)8000000)
```

Adjust the value of External High Speed oscillator (HSE) used in your application. This value is used by the RCC HAL module to compute the system frequency (when HSE is used as system clock source, directly or through the PLL).

[More...](#)

```
#define HSE_STARTUP_TIMEOUT ((uint32_t)5000)
```

```
#define HSI_VALUE ((uint32_t)8000000)
```

Internal High Speed oscillator (HSI) value. This value is

used by the RCC HAL module to compute the system frequency (when HSI is used as system clock source, directly or through the PLL). [More...](#)

```
#define LSE_VALUE ((uint32_t)32768)
```

External Low Speed oscillator (LSE) value. This value is used by the UART, RTC HAL module to compute the system frequency. [More...](#)

```
#define LSE_STARTUP_TIMEOUT ((uint32_t)5000)
```

```
#define VDD_VALUE ((uint32_t)3300))
```

This is the HAL system configuration section. [More...](#)

```
#define TICK_INT_PRIORITY ((uint32_t)2)
```

```
#define USE_RTOS 0
```

```
#define PREFETCH_ENABLE 1
```

```
#define MAC_ADDR0 2
```

Uncomment the line below to expand the "assert\_param" macro in the HAL drivers code.

```
#define MAC_ADDR1 0
```

```
#define MAC_ADDR2 0
```

```
#define MAC_ADDR3 0
```

```
#define MAC_ADDR4 0
```

```
#define MAC_ADDR5 0
```

```
#define ETH_RX_BUF_SIZE ETH_MAX_PACKET_SIZE /* buffer size for receive */
```

```
#define ETH_TX_BUF_SIZE ETH_MAX_PACKET_SIZE /* buffer size for transmit */

#define ETH_RXBUFN ((uint32_t)8) /* 4 Rx buffers of size ETH_RX_BUF_SIZE */

#define ETH_TXBUFN ((uint32_t)4) /* 4 Tx buffers of size ETH_TX_BUF_SIZE */

#define DP83848_PHY_ADDRESS 0x01

#define PHY_RESET_DELAY ((uint32_t)0x000000FF)

#define PHY_CONFIG_DELAY ((uint32_t)0x00000FFF)

#define PHY_READ_TO ((uint32_t)0x0000FFFF)

#define PHY_WRITE_TO ((uint32_t)0x0000FFFF)

#define PHY_BCR ((uint16_t)0x00)

#define PHY_BSR ((uint16_t)0x01)

#define PHY_RESET ((uint16_t)0x8000)

#define PHY_LOOPBACK ((uint16_t)0x4000)

#define PHY_FULLDUPLEX_100M ((uint16_t)0x2100)

#define PHY_HALFDUPLEX_100M ((uint16_t)0x2000)

#define PHY_FULLDUPLEX_10M ((uint16_t)0x0100)

#define PHY_HALFDUPLEX_10M ((uint16_t)0x0000)

#define PHY_AUTONEGOTIATION ((uint16_t)0x1000)
```

```
#define PHY_RESTART_AUTONEGOTIATION ((uint16_t)0x0200)

#define PHY_POWERDOWN ((uint16_t)0x0800)

#define PHY_ISOLATE ((uint16_t)0x0400)

#define PHY_AUTONEGO_COMPLETE ((uint16_t)0x0020)

#define PHY_LINKED_STATUS ((uint16_t)0x0004)

#define PHY_JABBER_DETECTION ((uint16_t)0x0002)

#define PHY_SR ((uint16_t)0x10)

#define PHY_MICR ((uint16_t)0x11)

#define PHY_MISR ((uint16_t)0x12)

#define PHY_LINK_STATUS ((uint16_t)0x0001)

#define PHY_SPEED_STATUS ((uint16_t)0x0002)

#define PHY_DUPLEX_STATUS ((uint16_t)0x0004)

#define PHY_MICR_INT_EN ((uint16_t)0x0002)

#define PHY_MICR_INT_OE ((uint16_t)0x0001)

#define PHY_MISR_LINK_INT_EN ((uint16_t)0x0020)

#define PHY_LINK_INTERRUPT ((uint16_t)0x2000)

#define assert_param(expr) ((void)0)
Include module's header file.
```

## Detailed Description

---

HAL configuration file.

**Attention**

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# Macro Definition Documentation

---

**#define HSE\_STARTUP\_TIMEOUT ((uint32\_t)5000)**

---

Time out for HSE start up, in ms

**#define HSE\_VALUE ((uint32\_t)8000000)**

---

Adjust the value of External High Speed oscillator (HSE) used in your application. This value is used by the RCC HAL module to compute the system frequency (when HSE is used as system clock source, directly or through the PLL).

Value of the External oscillator in Hz

**#define HSI\_VALUE ((uint32\_t)8000000)**

---

Internal High Speed oscillator (HSI) value. This value is used by the RCC HAL module to compute the system frequency (when HSI is used as system clock source, directly or through the PLL).

Value of the Internal oscillator in Hz

**#define LSE\_STARTUP\_TIMEOUT ((uint32\_t)5000)**

---

Time out for LSE start up, in ms

**#define LSE\_VALUE ((uint32\_t)32768)**

---

External Low Speed oscillator (LSE) value. This value is used by the

UART, RTC HAL module to compute the system frequency.

Value of the External oscillator in Hz

---

```
#define PHY_AUTONEGO_COMPLETE ((uint16_t)0x0020)
```

---

Auto-Negotiation process completed

---

```
#define PHY_AUTONEGOTIATION ((uint16_t)0x1000)
```

---

Enable auto-negotiation function

---

```
#define PHY_BCR ((uint16_t)0x00)
```

---

Transceiver Basic Control Register

---

```
#define PHY_BSR ((uint16_t)0x01)
```

---

Transceiver Basic Status Register

---

```
#define PHY_DUPLEX_STATUS ((uint16_t)0x0004)
```

---

PHY Duplex mask

---

```
#define PHY_FULLDUPLEX_100M ((uint16_t)0x2100)
```

---

Set the full-duplex mode at 100 Mb/s

---

```
#define PHY_FULLDUPLEX_10M ((uint16_t)0x0100)
```

---

Set the full-duplex mode at 10 Mb/s

---

```
#define PHY_HALFDUPLEX_100M ((uint16_t)0x2000)
```

---

Set the half-duplex mode at 100 Mb/s

---

```
#define PHY_HALFDUPLEX_10M ((uint16_t)0x0000)
```

---

Set the half-duplex mode at 10 Mb/s

---

```
#define PHY_ISOLATE ((uint16_t)0x0400)
```

---

Isolate PHY from MII

---

```
#define PHY_JABBER_DETECTION ((uint16_t)0x0002)
```

---

Jabber condition detected

---

```
#define PHY_LINK_INTERRUPT ((uint16_t)0x2000)
```

---

PHY link status interrupt mask

---

```
#define PHY_LINK_STATUS ((uint16_t)0x0001)
```

---

PHY Link mask

---

```
#define PHY_LINKED_STATUS ((uint16_t)0x0004)
```

---

Valid link established

---

```
#define PHY_LOOPBACK ((uint16_t)0x4000)
```

---

Select loop-back mode

---

```
#define PHY_MICR ((uint16_t)0x11)
```

---

MII Interrupt Control Register

---

```
#define PHY_MICR_INT_EN ((uint16_t)0x0002)
```

---

PHY Enable interrupts

---

```
#define PHY_MICR_INT_OE ((uint16_t)0x0001)
```

---

PHY Enable output interrupt events

---

```
#define PHY_MISR ((uint16_t)0x12)
```

---

MII Interrupt Status and Misc. Control Register

---

```
#define PHY_MISR_LINK_INT_EN ((uint16_t)0x0020)
```

---

Enable Interrupt on change of link status

---

```
#define PHY_POWERDOWN ((uint16_t)0x0800)
```

---

Select the power down mode

---

```
#define PHY_RESET ((uint16_t)0x8000)
```

PHY Reset

---

```
#define PHY_RESTART_AUTONEGOTIATION ((uint16_t)0x0200)
```

Restart auto-negotiation function

---

```
#define PHY_SPEED_STATUS ((uint16_t)0x0002)
```

PHY Speed mask

---

```
#define PHY_SR ((uint16_t)0x10)
```

PHY status register Offset

---

```
#define TICK_INT_PRIORITY ((uint32_t)2)
```

tick interrupt priority (lowest by default)

---

```
#define VDD_VALUE ((uint32_t)3300))
```

This is the HAL system configuration section.

Value of VDD in mv

**doxygen** 1.8.9.1

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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## stm32f1xx\_it.h

Go to the documentation of this file.

```
1
35 /* Define to prevent recursive inclusion -----
   -----*/
36 #ifndef __STM32F1XX_IT_H
37 #define __STM32F1XX_IT_H
38
39 #ifdef __cplusplus
40   extern "C" {
41 #endif
42
43 /* Includes -----
   -----*/
44 /* Exported types -----
   -----*/
45 /* Exported constants -----
   -----*/
46 /* Exported macro -----
   -----*/
47 /* Exported functions -----
   -----*/
48
49 void SysTick_Handler(void);
50 void TIM1_BRK_IRQHandler(void);
51 void USART2_IRQHandler(void);
```

```
52 void TIM4_IRQHandler(void);
53 void ADC1_2_IRQHandler(void);
54 void EXTI15_10_IRQHandler(void);
55
56 #ifdef __cplusplus
57 }
58#endif
59
60#endif /* __STM32F1xx_IT_H */
61
62 /***** (C) COPYRIGHT
STMicroelectronics *****END OF FILE****/
```

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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Inc > Functions

## stm32f1xx\_it.h File Reference

This file contains the headers of the interrupt handlers. [More...](#)

[Go to the source code of this file.](#)

## Functions

---

```
void SysTick_Handler (void)
```

```
void TIM1_BRK_IRQHandler (void)
```

```
void USART2_IRQHandler (void)
```

```
void TIM4_IRQHandler (void)
```

```
void ADC1_2_IRQHandler (void)
```

```
void EXTI15_10_IRQHandler (void)
```

---

## Detailed Description

---

This file contains the headers of the interrupt handlers.

### Date

27/04/2015 12:18:22 COPYRIGHT(c) 2015 STMicroelectronics

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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## stm32F302\_nucleo\_ihm07m1.h

Go to the documentation of this file.

```
1
39 /* Define to prevent recursive inclusion ---
40   -----
41 #ifndef __STM32F302_NUCLEO_IHM07M1_H
42 #define __STM32F302_NUCLEO_IHM07M1_H
43
44 #include "stm32f3xx_hal.h"
45 #include "main_F302.h"
46 #include "X-NUCLEO-IHM07M1.h"
47
48 #define HF_TIMx          htim1
49 #define LF_TIMx          htim6
50 #define HALL_ENCODER_TIMx htim2
51 #define ADCx             hadc1
52 #define REFx             htim16
53 #define UART             huart2
54
55 #define GPIO_PORT_1        GPIOC
56 #define GPIO_CH1           GPIO_PIN_10
57 #define GPIO_PORT_2        GPIOC
58 #define GPIO_CH2           GPIO_PIN_11
59 #define GPIO_PORT_3        GPIOC
60 #define GPIO_CH3           GPIO_PIN_12
61 #define GPIO_SET           GPIO_PIN_SET
```

```
61 #define GPIO_RESET
    GPIO_PIN_RESET
62
63 #define ADC_CH_1
    ADC_CHANNEL_7 /*CURRENT*/
64 #define ADC_CH_2
    ADC_CHANNEL_12 /*SPEED*/
65 #define ADC_CH_3
    ADC_CHANNEL_2 /*VBUS*/
66 #define ADC_CH_4
    ADC_CHANNEL_8 /*TEMP*/
67 #define ADC_Bemf_CH1
    ADC_CHANNEL_9 /*BEMF1*/
68 #define ADC_Bemf_CH2
    ADC_CHANNEL_11 /*BEMF2*/
69 #define ADC_Bemf_CH3
    ADC_CHANNEL_15 /*BEMF3*/
70
71 #define ADC_CH_1_ST
    ADC_SAMPLETIME_1CYCLE_5 /*CURRENT sampling
    time */
72 #define ADC_CH_2_ST
    ADC_SAMPLETIME_181CYCLES_5 /*SPEED sampling
    time*/
73 #define ADC_CH_3_ST
    ADC_SAMPLETIME_181CYCLES_5 /*VBUS sampling
    time*/
74 #define ADC_CH_4_ST
    ADC_SAMPLETIME_181CYCLES_5 /*TEMP sampling
    time*/
75 #define ADC_Bemf_CH1_ST
    ADC_SAMPLETIME_61CYCLES_5 /*BEMF1 sampling
    time*/
76 #define ADC_Bemf_CH2_ST
    ADC_SAMPLETIME_61CYCLES_5 /*BEMF2 sampling
    time*/
77 #define ADC_Bemf_CH3_ST
```

```

    ADC_SAMPLETIME_61CYCLES_5 /*BEMF3 sampling
    time*/
78
79 #define HF_TIMx_CH1
    TIM_CHANNEL_1
80 #define HF_TIMx_CH2
    TIM_CHANNEL_2
81 #define HF_TIMx_CH3
    TIM_CHANNEL_3
82 #define HF_TIMx_CCR1           CCR1
/*Channel 1*/
83 #define HF_TIMx_CCR2           CCR2
/*Channel 2*/
84 #define HF_TIMx_CCR3           CCR3
/*Channel 3*/
85
86 #define DAC_ENABLE             1
87 #define DACx
88 #define DACx_CH
    DAC1_CHANNEL_1
89 #define DACx_ALIGN
    DAC_ALIGN_12B_L
90
91 #define GPIO_PORT_ZCR          GPIOC
92 #define GPIO_CH_ZCR            GPIO_PIN_7
93 #define GPIO_PORT_COMM          GPIOC
94 #define GPIO_CH_COMM            GPIO_PIN_4
95
96 #define STARTM_CMD              0
97 #define STOPMT_CMD              1
98 #define SETSPD_CMD              2
99 #define GETSPD_CMD              3
100
101 #define INIREF_CMD              4
102 #define POLESP_CMD              5
103 #define ACCELE_CMD              6
104 #define KP_PRM_CMD              7
105 #define KI_PRM_CMD              8
106 #define POTENZ_CMD              9
107 #define HELP_CMD                10

```

```
107 #define STATUS_CMD           11
108 #define DIRECT_CMD          12
121 uint32_t Get_UART_Data(void);
122 void MC_SixStep_ADC_Channel(uint32_t);
123 void MC_SixStep_Nucleo_Init(void);
124 void START_Ref_Generation(void);
125 void STOP_Ref_Generation(void);
126 void Set_Ref_Generation(uint16_t);
127 void START_DAC(void);
128 void STOP_DAC(void);
129 void SET_DAC_value(uint16_t);
130 void Bemf_delay_calc(void);
131 void
132     MC_SixStep_EnableInput_CH1_E_CH2_E_CH3_D(void)
133     ;
132     void
133     MC_SixStep_EnableInput_CH1_E_CH2_D_CH3_E(void)
134     ;
133     void
134     MC_SixStep_EnableInput_CH1_D_CH2_E_CH3_E(void)
135     ;
134     void
135     MC_SixStep_DisableInput_CH1_D_CH2_D_CH3_D(void
136     );
135     void MC_SixStep_Start_PWM_driving(void);
136     void MC_SixStep_Stop_PWM_driving(void);
137     void
138     MC_SixStep_HF_TIMx_SetDutyCycle_CH1(uint16_t);
138     void
139     MC_SixStep_HF_TIMx_SetDutyCycle_CH2(uint16_t);
139     void
140     MC_SixStep_HF_TIMx_SetDutyCycle_CH3(uint16_t);
140     void
141     MC_SixStep_Current_Reference_Start(void);
141     void
142     MC_SixStep_Current_Reference_Stop(void);
142     void
```

```
    MC_SixStep_Current_Reference_Setvalue(uint16_t
);
143
152 #endif
```

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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## stm32f3xx\_hal\_conf.h

Go to the documentation of this file.

```
1
35 /* Define to prevent recursive inclusion -----
   -----*/
36 #ifndef __STM32F3xx_HAL_CONF_H
37 #define __STM32F3xx_HAL_CONF_H
38
39 #ifdef __cplusplus
40   extern "C" {
41 #endif
42
43 /* Exported types -----
   -----*/
44 /* Exported constants -----
   -----*/
45
46 /* ##### Module
   Selection ##### */
47 #define HAL_MODULE_ENABLED
48 #define HAL_ADC_MODULE_ENABLED
49 // #define HAL_CAN_MODULE_ENABLED
50 // #define HAL_CEC_MODULE_ENABLED
51 // #define HAL_NAND_MODULE_ENABLED
52 // #define HAL_NOR_MODULE_ENABLED
53 // #define HAL_PCCARD_MODULE_ENABLED
```

```
58 //##define HAL_SRAM_MODULE_ENABLED
59 //##define HAL_HRTIM_MODULE_ENABLED
60 //##define HAL_OPAMP_MODULE_ENABLED
61 //##define HAL_SDADC_MODULE_ENABLED
62 //##define HAL_TSC_MODULE_ENABLED
63 //##define HAL_COMP_MODULE_ENABLED
64 //##define HAL_CRC_MODULE_ENABLED
65 //##define HAL_CRYP_MODULE_ENABLED
66 #define HAL_DAC_MODULE_ENABLED
67 //##define HAL_I2C_MODULE_ENABLED
68 //##define HAL_I2S_MODULE_ENABLED
69 //##define HAL_IWDG_MODULE_ENABLED
70 //##define HAL_LCD_MODULE_ENABLED
71 //##define HAL_LPTIM_MODULE_ENABLED
72 //##define HAL_RNG_MODULE_ENABLED
73 //##define HAL_RTC_MODULE_ENABLED
74 //##define HAL_SPI_MODULE_ENABLED
75 #define HAL_TIM_MODULE_ENABLED
76 #define HAL_UART_MODULE_ENABLED
77 //##define HAL_USART_MODULE_ENABLED
78 //##define HAL_IRDA_MODULE_ENABLED
79 //##define HAL_SMARTCARD_MODULE_ENABLED
80 //##define HAL_SMBUS_MODULE_ENABLED
81 //##define HAL_WWDG_MODULE_ENABLED
82 //##define HAL_PCD_MODULE_ENABLED
83 #define HAL_GPIO_MODULE_ENABLED
84 #define HAL_DMA_MODULE_ENABLED
85 #define HAL_RCC_MODULE_ENABLED
86 #define HAL_FLASH_MODULE_ENABLED
87 #define HAL_PWR_MODULE_ENABLED
88 #define HAL_CORTEX_MODULE_ENABLED
89 /* ##### HSE/HSI Values
adaptation ##### */
95 #if !defined (HSE_VALUE)
96     #define HSE_VALUE ((uint32_t)8000000)
97 #endif /* HSE_VALUE */
98
```

```
103 #if !defined (HSE_STARTUP_TIMEOUT)
104     #define HSE_STARTUP_TIMEOUT
105     ((uint32_t)5000)
106 #endif /* HSE_STARTUP_TIMEOUT */
107
112 #if !defined (HSI_VALUE)
113     #define HSI_VALUE      ((uint32_t)80000000)
114 #endif /* HSI_VALUE */
115
120 #if !defined (HSI_STARTUP_TIMEOUT)
121     #define HSI_STARTUP_TIMEOUT
122     ((uint32_t)5000)
123 #endif /* HSI_STARTUP_TIMEOUT */
124
127 #if !defined (LSI_VALUE)
128     #define LSI_VALUE      ((uint32_t)40000)
129 #endif /* LSI_VALUE */
135 #if !defined (LSE_VALUE)
136     #define LSE_VALUE      ((uint32_t)32768)
137 #endif /* LSE_VALUE */
138
146 #if !defined (EXTERNAL_CLOCK_VALUE)
147     #define EXTERNAL_CLOCK_VALUE
148     ((uint32_t)80000000)
149 #endif /* EXTERNAL_CLOCK_VALUE */
150
150 /* Tip: To avoid modifying this file each
   time you need to use different HSE,
151 === you can define the HSE value in your
   toolchain compiler preprocessor. */
152
153 /* ##### System
   Configuration ##### */
158 #define VDD_VALUE
159     ((uint32_t)3300)
159 #define TICK_INT_PRIORITY
159     ((uint32_t)2)
```

```
160 #define USE_RTOS 0
161 #define PREFETCH_ENABLE 1
162 #define INSTRUCTION_CACHE_ENABLE 0
163 #define DATA_CACHE_ENABLE 0
164
165 /* ##### Assert
   Selection ###### */
170 /* #define USE_FULL_ASSERT 1 */
171
172 /* Includes -----
   -----*/
177 #ifdef HAL_RCC_MODULE_ENABLED
178     #include "stm32f3xx_hal_rcc.h"
179 #endif /* HAL_RCC_MODULE_ENABLED */
180
181 #ifdef HAL_GPIO_MODULE_ENABLED
182     #include "stm32f3xx_hal_gpio.h"
183 #endif /* HAL_GPIO_MODULE_ENABLED */
184
185 #ifdef HAL_DMA_MODULE_ENABLED
186     #include "stm32f3xx_hal_dma.h"
187 #endif /* HAL_DMA_MODULE_ENABLED */
188
189 #ifdef HAL_CORTEX_MODULE_ENABLED
190     #include "stm32f3xx_hal_cortex.h"
191 #endif /* HAL_CORTEX_MODULE_ENABLED */
192
193 #ifdef HAL_ADC_MODULE_ENABLED
194     #include "stm32f3xx_hal_adc.h"
195 #endif /* HAL_ADC_MODULE_ENABLED */
196
197 #ifdef HAL_CAN_MODULE_ENABLED
198     #include "stm32f3xx_hal_can.h"
199 #endif /* HAL_CAN_MODULE_ENABLED */
200
201 #ifdef HAL_CEC_MODULE_ENABLED
202     #include "stm32f3xx_hal_cec.h"
```

```
203 #endif /* HAL_CEC_MODULE_ENABLED */  
204  
205 #ifdef HAL_COMP_MODULE_ENABLED  
206     #include "stm32f3xx_hal_comp.h"  
207 #endif /* HAL_COMP_MODULE_ENABLED */  
208  
209 #ifdef HAL_CRC_MODULE_ENABLED  
210     #include "stm32f3xx_hal_crc.h"  
211 #endif /* HAL_CRC_MODULE_ENABLED */  
212  
213 #ifdef HAL_DAC_MODULE_ENABLED  
214     #include "stm32f3xx_hal_dac.h"  
215 #endif /* HAL_DAC_MODULE_ENABLED */  
216  
217 #ifdef HAL_FLASH_MODULE_ENABLED  
218     #include "stm32f3xx_hal_flash.h"  
219 #endif /* HAL_FLASH_MODULE_ENABLED */  
220  
221 #ifdef HAL_SRAM_MODULE_ENABLED  
222     #include "stm32f3xx_hal_sram.h"  
223 #endif /* HAL_SRAM_MODULE_ENABLED */  
224  
225 #ifdef HAL_NOR_MODULE_ENABLED  
226     #include "stm32f3xx_hal_nor.h"  
227 #endif /* HAL_NOR_MODULE_ENABLED */  
228  
229 #ifdef HAL_NAND_MODULE_ENABLED  
230     #include "stm32f3xx_hal_nand.h"  
231 #endif /* HAL_NAND_MODULE_ENABLED */  
232  
233 #ifdef HAL_PCCARD_MODULE_ENABLED  
234     #include "stm32f3xx_hal_pccard.h"  
235 #endif /* HAL_PCCARD_MODULE_ENABLED */  
236  
237 #ifdef HAL_HRTIM_MODULE_ENABLED  
238     #include "stm32f3xx_hal_hrtim.h"  
239 #endif /* HAL_HRTIM_MODULE_ENABLED */
```

```
240
241 #ifdef HAL_I2C_MODULE_ENABLED
242     #include "stm32f3xx_hal_i2c.h"
243 #endif /* HAL_I2C_MODULE_ENABLED */
244
245 #ifdef HAL_I2S_MODULE_ENABLED
246     #include "stm32f3xx_hal_i2s.h"
247 #endif /* HAL_I2S_MODULE_ENABLED */
248
249 #ifdef HAL_IRDA_MODULE_ENABLED
250     #include "stm32f3xx_hal_irda.h"
251 #endif /* HAL_IRDA_MODULE_ENABLED */
252
253 #ifdef HAL_IWDG_MODULE_ENABLED
254     #include "stm32f3xx_hal_iwdg.h"
255 #endif /* HAL_IWDG_MODULE_ENABLED */
256
257 #ifdef HAL_OPAMP_MODULE_ENABLED
258     #include "stm32f3xx_hal_opamp.h"
259 #endif /* HAL_OPAMP_MODULE_ENABLED */
260
261 #ifdef HAL_PCD_MODULE_ENABLED
262     #include "stm32f3xx_hal_pcd.h"
263 #endif /* HAL_PCD_MODULE_ENABLED */
264
265 #ifdef HAL_PWR_MODULE_ENABLED
266     #include "stm32f3xx_hal_pwr.h"
267 #endif /* HAL_PWR_MODULE_ENABLED */
268
269 #ifdef HAL_RTC_MODULE_ENABLED
270     #include "stm32f3xx_hal_rtc.h"
271 #endif /* HAL_RTC_MODULE_ENABLED */
272
273 #ifdef HAL_SDADC_MODULE_ENABLED
274     #include "stm32f3xx_hal_sdadc.h"
275 #endif /* HAL_SDADC_MODULE_ENABLED */
276
```

```
277 #ifdef HAL_SMARTCARD_MODULE_ENABLED  
278     #include "stm32f3xx_hal_smartcard.h"  
279 #endif /* HAL_SMARTCARD_MODULE_ENABLED */  
280  
281 #ifdef HAL_SMBUS_MODULE_ENABLED  
282     #include "stm32f3xx_hal_smbus.h"  
283 #endif /* HAL_SMBUS_MODULE_ENABLED */  
284  
285 #ifdef HAL_SPI_MODULE_ENABLED  
286     #include "stm32f3xx_hal_spi.h"  
287 #endif /* HAL_SPI_MODULE_ENABLED */  
288  
289 #ifdef HAL_TIM_MODULE_ENABLED  
290     #include "stm32f3xx_hal_tim.h"  
291 #endif /* HAL_TIM_MODULE_ENABLED */  
292  
293 #ifdef HAL_TSC_MODULE_ENABLED  
294     #include "stm32f3xx_hal_tsc.h"  
295 #endif /* HAL_TSC_MODULE_ENABLED */  
296  
297 #ifdef HAL_UART_MODULE_ENABLED  
298     #include "stm32f3xx_hal_uart.h"  
299 #endif /* HAL_UART_MODULE_ENABLED */  
300  
301 #ifdef HAL_USART_MODULE_ENABLED  
302     #include "stm32f3xx_hal_usart.h"  
303 #endif /* HAL_USART_MODULE_ENABLED */  
304  
305 #ifdef HAL_WWDG_MODULE_ENABLED  
306     #include "stm32f3xx_hal_wwdg.h"  
307 #endif /* HAL_WWDG_MODULE_ENABLED */  
308  
309 /* Exported macro -----*/  
----- */  
310 #ifdef USE_FULL_ASSERT  
311  
319 #define assert_param(expr) ((expr) ?
```

```
(void)0 : assert_failed((uint8_t *)__FILE__,
                         __LINE__))
320 /* Exported functions -----
----- */
321 void assert_failed(uint8_t* file, uint32_t
line);
322 #else
323 #define assert_param(expr) ((void)0)
324 #endif /* USE_FULL_ASSERT */
325
326 #ifdef __cplusplus
327 }
328#endif
329
330#endif /* __STM32F3xx_HAL_CONF_H */
331
332 /***** (C) COPYRIGHT
STMicroelectronics *****END OF FILE****/
```

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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Macros

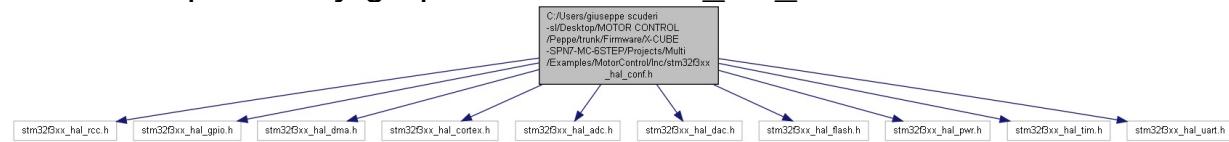
## stm32f3xx\_hal\_conf.h

### File Reference

HAL configuration file. [More...](#)

```
#include "stm32f3xx_hal_rcc.h" #include "stm32f3xx_hal_gpio.h"  
#include "stm32f3xx_hal_dma.h"  
#include "stm32f3xx_hal_cortex.h"  
#include "stm32f3xx_hal_adc.h"  
#include "stm32f3xx_hal_dac.h"  
#include "stm32f3xx_hal_flash.h"  
#include "stm32f3xx_hal_pwr.h"  
#include "stm32f3xx_hal_tim.h"  
#include "stm32f3xx_hal_uart.h"
```

Include dependency graph for stm32f3xx\_hal\_conf.h:



[Go to the source code of this file.](#)

## Macros

```
#define HAL_MODULE_ENABLED
```

This is the list of modules to be used in the HAL driver.

```
#define HAL_ADC_MODULE_ENABLED
```

```
#define HAL_DAC_MODULE_ENABLED
```

```
#define HAL_TIM_MODULE_ENABLED
```

```
#define HAL_UART_MODULE_ENABLED
```

```
#define HAL_GPIO_MODULE_ENABLED
```

```
#define HAL_DMA_MODULE_ENABLED
```

```
#define HAL_RCC_MODULE_ENABLED
```

```
#define HAL_FLASH_MODULE_ENABLED
```

```
#define HAL_PWR_MODULE_ENABLED
```

```
#define HAL_CORTEX_MODULE_ENABLED
```

```
#define HSE_VALUE ((uint32_t)8000000)
```

Adjust the value of External High Speed oscillator (HSE) used in your application. This value is used by the RCC HAL module to compute the system frequency (when HSE is used as system clock source, directly or through the PLL).

[More...](#)

```
#define HSE_STARTUP_TIMEOUT ((uint32_t)5000)
```

In the following line adjust the External High Speed oscillator (HSE) Startup Timeout value. [More...](#)

```
#define HSI_VALUE ((uint32_t)8000000)
```

Internal High Speed oscillator (HSI) value. This value is used by the RCC HAL module to compute the system frequency (when HSI is used as system clock source, directly or through the PLL). [More...](#)

```
#define HSI_STARTUP_TIMEOUT ((uint32_t)5000)
```

In the following line adjust the Internal High Speed oscillator (HSI) Startup Timeout value. [More...](#)

```
#define LSI_VALUE ((uint32_t)40000)
```

Internal Low Speed oscillator (LSI) value.

```
#define LSE_VALUE ((uint32_t)32768)
```

External Low Speed oscillator (LSI) value. [More...](#)

```
#define EXTERNAL_CLOCK_VALUE ((uint32_t)8000000)
```

External clock source for I2S peripheral This value is used by the I2S HAL module to compute the I2S clock source frequency, this source is inserted directly through I2S\_CKIN pad. [More...](#)

```
#define VDD_VALUE ((uint32_t)3300)
```

This is the HAL system configuration section. [More...](#)

```
#define TICK_INT_PRIORITY ((uint32_t)2)
```

```
#define USE_RTOs 0
```

```
#define PREFETCH_ENABLE 1
```

```
#define INSTRUCTION_CACHE_ENABLE 0
```

```
#define DATA_CACHE_ENABLE 0
```

```
#define assert_param(expr) ((void)0)
```

Uncomment the line below to expand the "assert\_param"

macro in the HAL drivers code. More...

---

## Detailed Description

---

HAL configuration file.

**Attention**

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# Macro Definition Documentation

---

**#define assert\_param ( expr ) ((void)0)**

---

Uncomment the line below to expand the "assert\_param" macro in the HAL drivers code.

Include module's header file

**#define EXTERNAL\_CLOCK\_VALUE ((uint32\_t)8000000)**

---

External clock source for I2S peripheral This value is used by the I2S HAL module to compute the I2S clock source frequency, this source is inserted directly through I2S\_CKIN pad.

- External clock generated through external PLL component on EVAL 303 (based on MCO or crystal)
- External clock not generated on EVAL 373Value of the External oscillator in Hz

**#define HSE\_STARTUP\_TIMEOUT ((uint32\_t)5000)**

---

In the following line adjust the External High Speed oscillator (HSE) Startup Timeout value.

Time out for HSE start up, in ms

**#define HSE\_VALUE ((uint32\_t)8000000)**

---

Adjust the value of External High Speed oscillator (HSE) used in your application. This value is used by the RCC HAL module to compute the system frequency (when HSE is used as system clock

source, directly or through the PLL).

Value of the External oscillator in Hz

---

**#define HSI\_STARTUP\_TIMEOUT ((uint32\_t)5000)**

---

In the following line adjust the Internal High Speed oscillator (HSI) Startup Timeout value.

Time out for HSI start up

---

**#define HSI\_VALUE ((uint32\_t)8000000)**

---

Internal High Speed oscillator (HSI) value. This value is used by the RCC HAL module to compute the system frequency (when HSI is used as system clock source, directly or through the PLL).

Value of the Internal oscillator in Hz

---

**#define LSE\_VALUE ((uint32\_t)32768)**

---

External Low Speed oscillator (LSI) value.

< Value of the Internal Low Speed oscillator in Hz The real value may vary depending on the variations in voltage and temperature.  
Value of the External Low Speed oscillator in Hz

---

**#define TICK\_INT\_PRIORITY ((uint32\_t)2)**

---

tick interrupt priority (lowest by default)

---

**#define VDD\_VALUE ((uint32\_t)3300)**

---

This is the HAL system configuration section.

Value of VDD in mv

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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## stm32f3xx\_it.h

Go to the documentation of this file.

```
1
35 /* Define to prevent recursive inclusion -----
   -----*/
36 #ifndef __STM32F3xx_IT_H
37 #define __STM32F3xx_IT_H
38
39 #ifdef __cplusplus
40   extern "C" {
41 #endif
42
43 /* Includes -----
   -----*/
44 /* Exported types -----
   -----*/
45 /* Exported constants -----
   -----*/
46 /* Exported macro -----
   -----*/
47 /* Exported functions -----
   -----*/
48
49 void TIM6_DAC_IRQHandler(void);
50 void ADC1_IRQHandler(void);
51 void SysTick_Handler(void);
```

```
52 void USART2_IRQHandler(void);
53 void TIM1_BRK_TIM15_IRQHandler(void);
54 void EXTI15_10_IRQHandler(void);
55
56 #ifdef __cplusplus
57 }
58#endif
59
60#endif /* __STM32F3xx_IT_H */
61
62 /***** (C) COPYRIGHT
STMicroelectronics *****END OF FILE****/
```

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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Inc > Functions

## stm32f3xx\_it.h File Reference

This file contains the headers of the interrupt handlers. [More...](#)

[Go to the source code of this file.](#)

## Functions

---

```
void TIM6_DAC_IRQHandler (void)
```

```
void ADC1_IRQHandler (void)
```

```
void SysTick_Handler (void)
```

```
void USART2_IRQHandler (void)
```

```
void TIM1_BRK_TIM15_IRQHandler (void)
```

```
void EXTI15_10_IRQHandler (void)
```

---

## Detailed Description

---

This file contains the headers of the interrupt handlers.

### Date

27/04/2015 12:33:08 COPYRIGHT(c) 2015 STMicroelectronics

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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## stm32F401\_nucleo\_ihm07m1.h

Go to the documentation of this file.

```
1
38 /* Define to prevent recursive inclusion ---
-----*/
39 #ifndef __STM32F401_NUCLEO_IHM07M1_H
40 #define __STM32F401_NUCLEO_IHM07M1_H
41
42 #include "stm32f4xx_hal.h"
43 #include "main_F401.h"
44 #include "X-NUCLEO-IHM07M1.h"
45
46 #define HF_TIMx           htim1
47 #define LF_TIMx           htim4
48 #define HALL_ENCODER_TIMx htim2
49 #define ADCx              hadc1
50 #define DACx              htim3
51 #define UART              huart2
52
53 #define GPIO_PORT_1         GPIOC
54 #define GPIO_CH1            GPIO_PIN_10
55 #define GPIO_PORT_2         GPIOC
56 #define GPIO_CH2            GPIO_PIN_11
57 #define GPIO_PORT_3         GPIOC
58 #define GPIO_CH3            GPIO_PIN_12
59 #define GPIO_SET             GPIO_PIN_SET
```

```
60 #define GPIO_RESET  
    GPIO_PIN_RESET  
61  
62 #define ADC_CH_1  
    ADC_CHANNEL_11 /*CURRENT*/  
63 #define ADC_CH_2  
    ADC_CHANNEL_9 /*SPEED*/  
64 #define ADC_CH_3  
    ADC_CHANNEL_1 /*VBUS*/  
65 #define ADC_CH_4  
    ADC_CHANNEL_12 /*TEMP*/  
66 #define ADC_Bemf_CH1  
    ADC_CHANNEL_13 /*BEMF1*/  
67 #define ADC_Bemf_CH2  
    ADC_CHANNEL_8 /*BEMF2*/  
68 #define ADC_Bemf_CH3  
    ADC_CHANNEL_7 /*BEMF3*/  
69  
70 #define ADC_CH_1_ST  
    ADC_SAMPLETIME_3CYCLES /*CURRENT sampling  
time */  
71 #define ADC_CH_2_ST  
    ADC_SAMPLETIME_84CYCLES /*SPEED sampling  
time */  
72 #define ADC_CH_3_ST  
    ADC_SAMPLETIME_84CYCLES /*VBUS sampling time*/  
73 #define ADC_CH_4_ST  
    ADC_SAMPLETIME_84CYCLES /*TEMP sampling time*/  
74 #define ADC_Bemf_CH1_ST  
    ADC_SAMPLETIME_28CYCLES /*BEMF1 sampling  
time */  
75 #define ADC_Bemf_CH2_ST  
    ADC_SAMPLETIME_28CYCLES /*BEMF2 sampling  
time */  
76 #define ADC_Bemf_CH3_ST  
    ADC_SAMPLETIME_28CYCLES /*BEMF3 sampling  
time */
```

```

77
78 #define HF_TIMx_CH1
    TIM_CHANNEL_1
79 #define HF_TIMx_CH2
    TIM_CHANNEL_2
80 #define HF_TIMx_CH3
    TIM_CHANNEL_3
81 #define HF_TIMx_CCR1          CCR1
/*Channel 1*/
82 #define HF_TIMx_CCR2          CCR2
/*Channel 2*/
83 #define HF_TIMx_CCR3          CCR3
/*Channel 3*/
84
85 #define DAC_ENABLE            0
87 #define GPIO_PORT_ZCR          GPIOC
88 #define GPIO_CH_ZCR            GPIO_PIN_7
89 #define GPIO_PORT_COMM          GPIOC
90 #define GPIO_CH_COMM            GPIO_PIN_4
92 #define STARTM_CMD              0
93 #define STOPMT_CMD              1
94 #define SETSPD_CMD              2
95 #define GETSPD_CMD              3
96 #define INIREF_CMD              4
97 #define POLESP_CMD              5
98 #define ACCELE_CMD              6
99 #define KP_PRM_CMD              7
100 #define KI_PRM_CMD              8
101 #define POTENZ_CMD              9
102 #define HELP_CMD                10
103 #define STATUS_CMD              11
104 #define DIRECT_CMD              12
117 void MC_SixStep_ADC_Channel(uint32_t);
118 void MC_SixStep_Nucleo_Init(void);
119 void START_Ref_Generation(void);
120 void STOP_Ref_Generation(void);
121 void Set_Ref_Generation(uint16_t);

```

```

122 void START_DAC(void);
123 void STOP_DAC(void);
124 void SET_DAC_value(uint16_t);
125 void Bemf_delay_calc(void);
126 uint32_t Get_UART_Data(void);
127 void
    MC_SixStep_EnableInput_CH1_E_CH2_E_CH3_D(void)
;
128 void
    MC_SixStep_EnableInput_CH1_E_CH2_D_CH3_E(void)
;
129 void
    MC_SixStep_EnableInput_CH1_D_CH2_E_CH3_E(void)
;
130 void
    MC_SixStep_DisableInput_CH1_D_CH2_D_CH3_D(void
);
131 void MC_SixStep_Start_PWM_driving(void);
132 void MC_SixStep_Stop_PWM_driving(void);
133 void
    MC_SixStep_HF_TIMx_SetDutyCycle_CH1(uint16_t);
134 void
    MC_SixStep_HF_TIMx_SetDutyCycle_CH2(uint16_t);
135 void
    MC_SixStep_HF_TIMx_SetDutyCycle_CH3(uint16_t);
136 void
    MC_SixStep_Current_Reference_Start(void);
137 void
    MC_SixStep_Current_Reference_Stop(void);
138 void
    MC_SixStep_Current_Reference_Setvalue(uint16_t
);
146 #endif

```

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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## stm32f4xx\_hal\_conf.h

Go to the documentation of this file.

```
1
35 /* Define to prevent recursive inclusion -----
-----*/
36 #ifndef __STM32F4xx_HAL_CONF_H
37 #define __STM32F4xx_HAL_CONF_H
38
39 #ifdef __cplusplus
40   extern "C" {
41 #endif
42
43 /* Exported types -----
-----*/
44 /* Exported constants -----
-----*/
45
46 /* ##### Module
Selection ##### */
50 #define HAL_MODULE_ENABLED
51 #define HAL_ADC_MODULE_ENABLED
52 // #define HAL_CAN_MODULE_ENABLED
53 // #define HAL_CRC_MODULE_ENABLED
54 // #define HAL_CRYP_MODULE_ENABLED
55 // #define HAL_DAC_MODULE_ENABLED
56 // #define HAL_DCMI_MODULE_ENABLED
```

```
57 // #define HAL_DMA2D_MODULE_ENABLED
58 // #define HAL_ETH_MODULE_ENABLED
59 // #define HAL_NAND_MODULE_ENABLED
60 // #define HAL_NOR_MODULE_ENABLED
61 // #define HAL_PCCARD_MODULE_ENABLED
62 // #define HAL_SRAM_MODULE_ENABLED
63 // #define HAL_SDRAM_MODULE_ENABLED
64 // #define HAL_HASH_MODULE_ENABLED
65 // #define HAL_I2C_MODULE_ENABLED
66 // #define HAL_I2S_MODULE_ENABLED
67 // #define HAL_IWDG_MODULE_ENABLED
68 // #define HAL_LTDC_MODULE_ENABLED
69 // #define HAL_RNG_MODULE_ENABLED
70 // #define HAL_RTC_MODULE_ENABLED
71 // #define HAL_SAI_MODULE_ENABLED
72 // #define HAL_SD_MODULE_ENABLED
73 #define HAL_SPI_MODULE_ENABLED
74 #define HAL_TIM_MODULE_ENABLED
75 #define HAL_UART_MODULE_ENABLED
76 // #define HAL_USART_MODULE_ENABLED
77 // #define HAL_IRDA_MODULE_ENABLED
78 // #define HAL_SMARTCARD_MODULE_ENABLED
79 // #define HAL_WWDG_MODULE_ENABLED
80 // #define HAL_PCD_MODULE_ENABLED
81 // #define HAL_HCD_MODULE_ENABLED
82 #define HAL_GPIO_MODULE_ENABLED
83 #define HAL_DMA_MODULE_ENABLED
84 #define HAL_RCC_MODULE_ENABLED
85 #define HAL_FLASH_MODULE_ENABLED
86 #define HAL_PWR_MODULE_ENABLED
87 #define HAL_CORTEX_MODULE_ENABLED
88
89 /* ##### HSE/HSI Values
adaptation ##### */
95 #if !defined (HSE_VALUE)
96     #define HSE_VALUE ((uint32_t)8000000)
97 #endif /* HSE_VALUE */
```

```

98
99 #if !defined (HSE_STARTUP_TIMEOUT)
100 #define HSE_STARTUP_TIMEOUT
101 ((uint32_t)5000)
102
108 #if !defined (HSI_VALUE)
109 #define HSI_VALUE ((uint32_t)16000000)
110#endif /* HSI_VALUE */
111
115 #if !defined (LSI_VALUE)
116 #define LSI_VALUE ((uint32_t)32000)
117#endif /* LSI_VALUE */
123 #if !defined (LSE_VALUE)
124 #define LSE_VALUE ((uint32_t)32768)
125#endif /* LSE_VALUE */
126
132 #if !defined (EXTERNAL_CLOCK_VALUE)
133 #define EXTERNAL_CLOCK_VALUE
134 ((uint32_t)12288000)
135#endif /* EXTERNAL_CLOCK_VALUE */
136 /* Tip: To avoid modifying this file each
   time you need to use different HSE,
137 === you can define the HSE value in your
   toolchain compiler preprocessor. */
138
139 /* ##### System
   Configuration #####
144 #define VDD_VALUE
145 ((uint32_t)3300)
145 #define TICK_INT_PRIORITY
146 ((uint32_t)2)
146 #define USERTOS 0
147 #define PREFETCH_ENABLE 1
148 #define INSTRUCTION_CACHE_ENABLE 1
149 #define DATA_CACHE_ENABLE 1

```

```
150
151 /* ##### Assert
Selection ##### */
156 /* #define USE_FULL_ASSERT      1 */
157
158 /* ##### Ethernet peripheral
configuration ##### */
159
160 /* Section 1 : Ethernet peripheral
configuration */
161
162 /* MAC ADDRESS:
MAC_ADDR0:MAC_ADDR1:MAC_ADDR2:MAC_ADDR3:MAC_AD
DR4:MAC_ADDR5 */
163 #define MAC_ADDR0      2
164 #define MAC_ADDR1      0
165 #define MAC_ADDR2      0
166 #define MAC_ADDR3      0
167 #define MAC_ADDR4      0
168 #define MAC_ADDR5      0
169
170 /* Definition of the Ethernet driver buffers
size and count */
171 #define ETH_RX_BUF_SIZE
ETH_MAX_PACKET_SIZE /* buffer size for receive
*/
172 #define ETH_TX_BUF_SIZE
ETH_MAX_PACKET_SIZE /* buffer size for
transmit */
173 #define ETH_RXBUFNB
((uint32_t)4)        /* 4 Rx buffers of size
ETH_RX_BUF_SIZE */
174 #define ETH_TXBUFNB
((uint32_t)4)        /* 4 Tx buffers of size
ETH_TX_BUF_SIZE */
175
176 /* Section 2: PHY configuration section */
```

```
177 /* DP83848 PHY Address*/
178 #define DP83848_PHY_ADDRESS 0x01
180 /* PHY Reset delay these values are based on
   a 1 ms Systick interrupt*/
181 #define PHY_RESET_DELAY
   ((uint32_t)0x000000FF)
182 /* PHY Configuration delay */
183 #define PHY_CONFIG_DELAY
   ((uint32_t)0x00000FFF)
184
185 #define PHY_READ_TO
   ((uint32_t)0x0000FFFF)
186 #define PHY_WRITE_TO
   ((uint32_t)0x0000FFFF)
187
188 /* Section 3: Common PHY Registers */
189
190 #define PHY_BCR
   ((uint16_t)0x00)
191 #define PHY_BSR
   ((uint16_t)0x01)
193 #define PHY_RESET
   ((uint16_t)0x8000)
194 #define PHY_LOOPBACK
   ((uint16_t)0x4000)
195 #define PHY_FULLDUPLEX_100M
   ((uint16_t)0x2100)
196 #define PHY_HALFDUPLEX_100M
   ((uint16_t)0x2000)
197 #define PHY_FULLDUPLEX_10M
   ((uint16_t)0x0100)
198 #define PHY_HALFDUPLEX_10M
   ((uint16_t)0x0000)
199 #define PHY_AUTONEGOTIATION
   ((uint16_t)0x1000)
200 #define PHY_RESTART_AUTONEGOTIATION
```

```
    ((uint16_t)0x0200)
201| #define PHY_POWERDOWN
    ((uint16_t)0x0800)
202| #define PHY_ISOLATE
    ((uint16_t)0x0400)
204| #define PHY_AUTONEGO_COMPLETE
    ((uint16_t)0x0020)
205| #define PHY_LINKED_STATUS
    ((uint16_t)0x0004)
206| #define PHY_JABBER_DETECTION
    ((uint16_t)0x0002)
208| /* Section 4: Extended PHY Registers */
209|
210| #define PHY_SR
    ((uint16_t)0x10)
211| #define PHY_MICR
    ((uint16_t)0x11)
212| #define PHY_MISR
    ((uint16_t)0x12)
214| #define PHY_LINK_STATUS
    ((uint16_t)0x0001)
215| #define PHY_SPEED_STATUS
    ((uint16_t)0x0002)
216| #define PHY_DUPLEX_STATUS
    ((uint16_t)0x0004)
218| #define PHY_MICR_INT_EN
    ((uint16_t)0x0002)
219| #define PHY_MICR_INT_OE
    ((uint16_t)0x0001)
221| #define PHY_MISR_LINK_INT_EN
    ((uint16_t)0x0020)
222| #define PHY_LINK_INTERRUPT
    ((uint16_t)0x2000)
224| /* Includes -----
----- */
225|
229| #ifdef HAL_RCC_MODULE_ENABLED
```

```
230 #include "stm32f4xx_hal_rcc.h"
231 #endif /* HAL_RCC_MODULE_ENABLED */
232
233 #ifdef HAL_GPIO_MODULE_ENABLED
234     #include "stm32f4xx_hal_gpio.h"
235 #endif /* HAL_GPIO_MODULE_ENABLED */
236
237 #ifdef HAL_DMA_MODULE_ENABLED
238     #include "stm32f4xx_hal_dma.h"
239 #endif /* HAL_DMA_MODULE_ENABLED */
240
241 #ifdef HAL_CORTEX_MODULE_ENABLED
242     #include "stm32f4xx_hal_cortex.h"
243 #endif /* HAL_CORTEX_MODULE_ENABLED */
244
245 #ifdef HAL_ADC_MODULE_ENABLED
246     #include "stm32f4xx_hal_adc.h"
247 #endif /* HAL_ADC_MODULE_ENABLED */
248
249 #ifdef HAL_CAN_MODULE_ENABLED
250     #include "stm32f4xx_hal_can.h"
251 #endif /* HAL_CAN_MODULE_ENABLED */
252
253 #ifdef HAL_CRC_MODULE_ENABLED
254     #include "stm32f4xx_hal_crc.h"
255 #endif /* HAL_CRC_MODULE_ENABLED */
256
257 #ifdef HAL_CRYP_MODULE_ENABLED
258     #include "stm32f4xx_hal_cryp.h"
259 #endif /* HAL_CRYP_MODULE_ENABLED */
260
261 #ifdef HAL_DMA2D_MODULE_ENABLED
262     #include "stm32f4xx_hal_dma2d.h"
263 #endif /* HAL_DMA2D_MODULE_ENABLED */
264
265 #ifdef HAL_DAC_MODULE_ENABLED
266     #include "stm32f4xx_hal_dac.h"
```

```
267 #endif /* HAL_DAC_MODULE_ENABLED */  
268  
269 #ifdef HAL_DCMI_MODULE_ENABLED  
270     #include "stm32f4xx_hal_dcmi.h"  
271 #endif /* HAL_DCMI_MODULE_ENABLED */  
272  
273 #ifdef HAL_ETH_MODULE_ENABLED  
274     #include "stm32f4xx_hal_eth.h"  
275 #endif /* HAL_ETH_MODULE_ENABLED */  
276  
277 #ifdef HAL_FLASH_MODULE_ENABLED  
278     #include "stm32f4xx_hal_flash.h"  
279 #endif /* HAL_FLASH_MODULE_ENABLED */  
280  
281 #ifdef HAL_SRAM_MODULE_ENABLED  
282     #include "stm32f4xx_hal_sram.h"  
283 #endif /* HAL_SRAM_MODULE_ENABLED */  
284  
285 #ifdef HAL_NOR_MODULE_ENABLED  
286     #include "stm32f4xx_hal_nor.h"  
287 #endif /* HAL_NOR_MODULE_ENABLED */  
288  
289 #ifdef HAL_NAND_MODULE_ENABLED  
290     #include "stm32f4xx_hal_nand.h"  
291 #endif /* HAL_NAND_MODULE_ENABLED */  
292  
293 #ifdef HAL_PCCARD_MODULE_ENABLED  
294     #include "stm32f4xx_hal_pccard.h"  
295 #endif /* HAL_PCCARD_MODULE_ENABLED */  
296  
297 #ifdef HAL_SDRAM_MODULE_ENABLED  
298     #include "stm32f4xx_hal_sdram.h"  
299 #endif /* HAL_SDRAM_MODULE_ENABLED */  
300  
301 #ifdef HAL_HASH_MODULE_ENABLED  
302     #include "stm32f4xx_hal_hash.h"  
303 #endif /* HAL_HASH_MODULE_ENABLED */
```

```
304
305 #ifdef HAL_I2C_MODULE_ENABLED
306     #include "stm32f4xx_hal_i2c.h"
307 #endif /* HAL_I2C_MODULE_ENABLED */
308
309 #ifdef HAL_I2S_MODULE_ENABLED
310     #include "stm32f4xx_hal_i2s.h"
311 #endif /* HAL_I2S_MODULE_ENABLED */
312
313 #ifdef HAL_IWDG_MODULE_ENABLED
314     #include "stm32f4xx_hal_iwdg.h"
315 #endif /* HAL_IWDG_MODULE_ENABLED */
316
317 #ifdef HAL_LTDC_MODULE_ENABLED
318     #include "stm32f4xx_hal_ltdc.h"
319 #endif /* HAL_LTDC_MODULE_ENABLED */
320
321 #ifdef HAL_PWR_MODULE_ENABLED
322     #include "stm32f4xx_hal_pwr.h"
323 #endif /* HAL_PWR_MODULE_ENABLED */
324
325 #ifdef HAL_RNG_MODULE_ENABLED
326     #include "stm32f4xx_hal_rng.h"
327 #endif /* HAL_RNG_MODULE_ENABLED */
328
329 #ifdef HAL_RTC_MODULE_ENABLED
330     #include "stm32f4xx_hal_rtc.h"
331 #endif /* HAL_RTC_MODULE_ENABLED */
332
333 #ifdef HAL_SAI_MODULE_ENABLED
334     #include "stm32f4xx_hal_sai.h"
335 #endif /* HAL_SAI_MODULE_ENABLED */
336
337 #ifdef HAL_SD_MODULE_ENABLED
338     #include "stm32f4xx_hal_sd.h"
339 #endif /* HAL_SD_MODULE_ENABLED */
340
```

```
341 #ifdef HAL_SPI_MODULE_ENABLED  
342     #include "stm32f4xx_hal_spi.h"  
343 #endif /* HAL_SPI_MODULE_ENABLED */  
344  
345 #ifdef HAL_TIM_MODULE_ENABLED  
346     #include "stm32f4xx_hal_tim.h"  
347 #endif /* HAL_TIM_MODULE_ENABLED */  
348  
349 #ifdef HAL_UART_MODULE_ENABLED  
350     #include "stm32f4xx_hal_uart.h"  
351 #endif /* HAL_UART_MODULE_ENABLED */  
352  
353 #ifdef HAL_USART_MODULE_ENABLED  
354     #include "stm32f4xx_hal_usart.h"  
355 #endif /* HAL_USART_MODULE_ENABLED */  
356  
357 #ifdef HAL_IRDA_MODULE_ENABLED  
358     #include "stm32f4xx_hal_irda.h"  
359 #endif /* HAL_IRDA_MODULE_ENABLED */  
360  
361 #ifdef HAL_SMARTCARD_MODULE_ENABLED  
362     #include "stm32f4xx_hal_smartcard.h"  
363 #endif /* HAL_SMARTCARD_MODULE_ENABLED */  
364  
365 #ifdef HAL_WWDG_MODULE_ENABLED  
366     #include "stm32f4xx_hal_wwdg.h"  
367 #endif /* HAL_WWDG_MODULE_ENABLED */  
368  
369 #ifdef HAL_PCD_MODULE_ENABLED  
370     #include "stm32f4xx_hal_pcd.h"  
371 #endif /* HAL_PCD_MODULE_ENABLED */  
372  
373 #ifdef HAL_HCD_MODULE_ENABLED  
374     #include "stm32f4xx_hal_hcd.h"  
375 #endif /* HAL_HCD_MODULE_ENABLED */  
376  
377 /* Exported macro -----*/
```

```
----- */
378 #ifdef USE_FULL_ASSERT
379
387 #define assert_param(expr) ((expr) ?
390     (void)0 : assert_failed((uint8_t *)__FILE__,
391     __LINE__))
388 /* Exported functions -----
----- */
389 void assert_failed(uint8_t* file, uint32_t
line);
390 #else
391 #define assert_param(expr) ((void)0)
392 #endif /* USE_FULL_ASSERT */
393
394 #ifdef __cplusplus
395 }
396 #endif
397
398#endif /* __STM32F4xx_HAL_CONF_H */
399
400
401 /***** (C) COPYRIGHT
STMicroelectronics *****END OF FILE****/
```

---

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[doxygen](#) 1.8.9.1

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

Main Page    Modules    Classes    **Files**

File List    File Members

Projects > Multi > Examples > MotorControl > Inc >

Macros

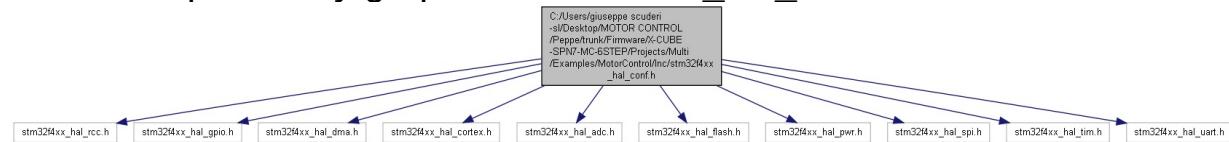
## stm32f4xx\_hal\_conf.h

### File Reference

HAL configuration file. [More...](#)

```
#include "stm32f4xx_hal_rcc.h" #include "stm32f4xx_hal_gpio.h"  
#include "stm32f4xx_hal_dma.h"  
#include "stm32f4xx_hal_cortex.h"  
#include "stm32f4xx_hal_adc.h"  
#include "stm32f4xx_hal_flash.h"  
#include "stm32f4xx_hal_pwr.h"  
#include "stm32f4xx_hal_spi.h"  
#include "stm32f4xx_hal_tim.h"  
#include "stm32f4xx_hal_uart.h"
```

Include dependency graph for stm32f4xx\_hal\_conf.h:



[Go to the source code of this file.](#)

## Macros

```
#define HAL_MODULE_ENABLED
```

This is the list of modules to be used in the HAL driver.

```
#define HAL_ADC_MODULE_ENABLED
```

```
#define HAL_SPI_MODULE_ENABLED
```

```
#define HAL_TIM_MODULE_ENABLED
```

```
#define HAL_UART_MODULE_ENABLED
```

```
#define HAL_GPIO_MODULE_ENABLED
```

```
#define HAL_DMA_MODULE_ENABLED
```

```
#define HAL_RCC_MODULE_ENABLED
```

```
#define HAL_FLASH_MODULE_ENABLED
```

```
#define HAL_PWR_MODULE_ENABLED
```

```
#define HAL_CORTEX_MODULE_ENABLED
```

```
#define HSE_VALUE ((uint32_t)8000000)
```

Adjust the value of External High Speed oscillator (HSE) used in your application. This value is used by the RCC HAL module to compute the system frequency (when HSE is used as system clock source, directly or through the PLL).

[More...](#)

```
#define HSE_STARTUP_TIMEOUT ((uint32_t)5000)
```

```
#define HSI_VALUE ((uint32_t)16000000)
```

Internal High Speed oscillator (HSI) value. This value is

used by the RCC HAL module to compute the system frequency (when HSI is used as system clock source, directly or through the PLL). [More...](#)

```
#define LSI_VALUE ((uint32_t)32000)  
Internal Low Speed oscillator (LSI) value.
```

```
#define LSE_VALUE ((uint32_t)32768)  
External Low Speed oscillator (LSE) value. More...
```

```
#define EXTERNAL_CLOCK_VALUE ((uint32_t)12288000)  
External clock source for I2S peripheral This value is used  
by the I2S HAL module to compute the I2S clock source  
frequency, this source is inserted directly through I2S_CKIN  
pad. More...
```

```
#define VDD_VALUE ((uint32_t)3300)  
This is the HAL system configuration section. More...
```

```
#define TICK_INT_PRIORITY ((uint32_t)2)
```

```
#define USE_RTOS 0
```

```
#define PREFETCH_ENABLE 1
```

```
#define INSTRUCTION_CACHE_ENABLE 1
```

```
#define DATA_CACHE_ENABLE 1
```

```
#define MAC_ADDR0 2  
Uncomment the line below to expand the "assert_param"  
macro in the HAL drivers code.
```

```
#define MAC_ADDR1 0
```

```
#define MAC_ADDR2 0
```

```
#define MAC_ADDR3 0

#define MAC_ADDR4 0

#define MAC_ADDR5 0

#define ETH_RX_BUF_SIZE ETH_MAX_PACKET_SIZE /* buffer size for receive */

#define ETH_TX_BUF_SIZE ETH_MAX_PACKET_SIZE /* buffer size for transmit */

#define ETH_RXBUFN 4 /* 4 Rx buffers of size ETH_RX_BUF_SIZE */

#define ETH_TXBUFN 4 /* 4 Tx buffers of size ETH_TX_BUF_SIZE */

#define DP83848_PHY_ADDRESS 0x01

#define PHY_RESET_DELAY ((uint32_t)0x000000FF)

#define PHY_CONFIG_DELAY ((uint32_t)0x00000FFF)

#define PHY_READ_TO ((uint32_t)0x0000FFFF)

#define PHY_WRITE_TO ((uint32_t)0x0000FFFF)

#define PHY_BCR ((uint16_t)0x00)

#define PHY_BSR ((uint16_t)0x01)

#define PHY_RESET ((uint16_t)0x8000)

#define PHY_LOOPBACK ((uint16_t)0x4000)

#define PHY_FULLDUPLEX_100M ((uint16_t)0x2100)
```

```
#define PHY_HALFDUPLEX_100M ((uint16_t)0x2000)

#define PHY_FULLDUPLEX_10M ((uint16_t)0x0100)

#define PHY_HALFDUPLEX_10M ((uint16_t)0x0000)

#define PHY_AUTONEGOTIATION ((uint16_t)0x1000)

#define PHY_RESTART_AUTONEGOTIATION ((uint16_t)0x0200)

#define PHY_POWERDOWN ((uint16_t)0x0800)

#define PHY_ISOLATE ((uint16_t)0x0400)

#define PHY_AUTONEGO_COMPLETE ((uint16_t)0x0020)

#define PHY_LINKED_STATUS ((uint16_t)0x0004)

#define PHY_JABBER_DETECTION ((uint16_t)0x0002)

#define PHY_SR ((uint16_t)0x10)

#define PHY_MICR ((uint16_t)0x11)

#define PHY_MISR ((uint16_t)0x12)

#define PHY_LINK_STATUS ((uint16_t)0x0001)

#define PHY_SPEED_STATUS ((uint16_t)0x0002)

#define PHY_DUPLEX_STATUS ((uint16_t)0x0004)

#define PHY_MICR_INT_EN ((uint16_t)0x0002)

#define PHY_MICR_INT_OE ((uint16_t)0x0001)
```

```
#define PHY_MISR_LINK_INT_EN ((uint16_t)0x0020)
```

```
#define PHY_LINK_INTERRUPT ((uint16_t)0x2000)
```

```
#define assert_param(expr) ((void)0)
```

Include module's header file.

---

## Detailed Description

---

HAL configuration file.

**Attention**

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# Macro Definition Documentation

---

**#define EXTERNAL\_CLOCK\_VALUE ((uint32\_t)12288000)**

---

External clock source for I2S peripheral This value is used by the I2S HAL module to compute the I2S clock source frequency, this source is inserted directly through I2S\_CKIN pad.

Value of the External audio frequency in Hz

**#define HSE\_STARTUP\_TIMEOUT ((uint32\_t)5000)**

---

Time out for HSE start up, in ms

**#define HSE\_VALUE ((uint32\_t)8000000)**

---

Adjust the value of External High Speed oscillator (HSE) used in your application. This value is used by the RCC HAL module to compute the system frequency (when HSE is used as system clock source, directly or through the PLL).

Value of the External oscillator in Hz

**#define HSI\_VALUE ((uint32\_t)16000000)**

---

Internal High Speed oscillator (HSI) value. This value is used by the RCC HAL module to compute the system frequency (when HSI is used as system clock source, directly or through the PLL).

Value of the Internal oscillator in Hz

---

```
#define LSE_VALUE ((uint32_t)32768)
```

---

External Low Speed oscillator (LSE) value.

< Value of the Internal Low Speed oscillator in Hz The real value may vary depending on the variations in voltage and temperature.  
Value of the External Low Speed oscillator in Hz

---

```
#define PHY_AUTONEGO_COMPLETE ((uint16_t)0x0020)
```

---

Auto-Negotiation process completed

---

```
#define PHY_AUTONEGOTIATION ((uint16_t)0x1000)
```

---

Enable auto-negotiation function

---

```
#define PHY_BCR ((uint16_t)0x00)
```

---

Transceiver Basic Control Register

---

```
#define PHY_BSR ((uint16_t)0x01)
```

---

Transceiver Basic Status Register

---

```
#define PHY_DUPLEX_STATUS ((uint16_t)0x0004)
```

---

PHY Duplex mask

---

```
#define PHY_FULLDUPLEX_100M ((uint16_t)0x2100)
```

---

Set the full-duplex mode at 100 Mb/s

---

```
#define PHY_FULLDUPLEX_10M ((uint16_t)0x0100)
```

---

Set the full-duplex mode at 10 Mb/s

---

```
#define PHY_HALFDUPLEX_100M ((uint16_t)0x2000)
```

---

Set the half-duplex mode at 100 Mb/s

---

```
#define PHY_HALFDUPLEX_10M ((uint16_t)0x0000)
```

---

Set the half-duplex mode at 10 Mb/s

---

```
#define PHY_ISOLATE ((uint16_t)0x0400)
```

---

Isolate PHY from MII

---

```
#define PHY_JABBER_DETECTION ((uint16_t)0x0002)
```

---

Jabber condition detected

---

```
#define PHY_LINK_INTERRUPT ((uint16_t)0x2000)
```

---

PHY link status interrupt mask

---

```
#define PHY_LINK_STATUS ((uint16_t)0x0001)
```

---

PHY Link mask

---

```
#define PHY_LINKED_STATUS ((uint16_t)0x0004)
```

---

Valid link established

---

```
#define PHY_LOOPBACK ((uint16_t)0x4000)
```

---

Select loop-back mode

---

```
#define PHY_MICR ((uint16_t)0x11)
```

---

MII Interrupt Control Register

---

```
#define PHY_MICR_INT_EN ((uint16_t)0x0002)
```

---

PHY Enable interrupts

---

```
#define PHY_MICR_INT_OE ((uint16_t)0x0001)
```

---

PHY Enable output interrupt events

---

```
#define PHY_MISR ((uint16_t)0x12)
```

---

MII Interrupt Status and Misc. Control Register

---

```
#define PHY_MISR_LINK_INT_EN ((uint16_t)0x0020)
```

---

Enable Interrupt on change of link status

---

```
#define PHY_POWERDOWN ((uint16_t)0x0800)
```

---

Select the power down mode

---

```
#define PHY_RESET ((uint16_t)0x8000)
```

---

PHY Reset

---

```
#define PHY_RESTART_AUTONEGOTIATION ((uint16_t)0x0200)
```

---

Restart auto-negotiation function

---

```
#define PHY_SPEED_STATUS ((uint16_t)0x0002)
```

---

PHY Speed mask

---

```
#define PHY_SR ((uint16_t)0x10)
```

---

PHY status register Offset

---

```
#define TICK_INT_PRIORITY ((uint32_t)2)
```

---

tick interrupt priority

---

```
#define VDD_VALUE ((uint32_t)3300)
```

---

This is the HAL system configuration section.

Value of VDD in mv

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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## stm32f4xx\_it.h

Go to the documentation of this file.

```
1
35 /* Define to prevent recursive inclusion -----
   -----*/
36 #ifndef __STM32F4xx_IT_H
37 #define __STM32F4xx_IT_H
38
39 #ifdef __cplusplus
40   extern "C" {
41 #endif
42
43 /* Includes -----
   -----*/
44 /* Exported types -----
   -----*/
45 /* Exported constants -----
   -----*/
46 /* Exported macro -----
   -----*/
47 /* Exported functions -----
   -----*/
48
49 void ADC_IRQHandler(void);
50 void SysTick_Handler(void);
51 void USART2_IRQHandler(void);
```

```
52 void TIM4_IRQHandler(void);
53 void EXTI15_10_IRQHandler(void);
54 void TIM1_BRK_TIM9_IRQHandler(void);
55
56 #ifdef __cplusplus
57 }
58#endif
59
60#endif /* __STM32F4xx_IT_H */
61
62 /***** (C) COPYRIGHT
STMicroelectronics *****END OF FILE****/
```

---

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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Inc > Functions

## stm32f4xx\_it.h File Reference

This file contains the headers of the interrupt handlers. [More...](#)

[Go to the source code of this file.](#)

## Functions

---

```
void ADC_IRQHandler (void)
```

```
void SysTick_Handler (void)
```

```
void USART2_IRQHandler (void)
```

```
void TIM4_IRQHandler (void)
```

```
void EXTI15_10_IRQHandler (void)
```

```
void TIM1_BRK_TIM9_IRQHandler (void)
```

---

## Detailed Description

---

This file contains the headers of the interrupt handlers.

### Date

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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## - b -

- BEMF\_CNT\_EVENT\_MAX : [MC\\_SixStep\\_param.h](#)
- BEMF\_CONSEC\_DOWN\_MAX : [MC\\_SixStep\\_param.h](#)
- BEMF\_THRSLD\_DOWN : [MC\\_SixStep\\_param.h](#)
- BEMF\_THRSLD\_UP : [MC\\_SixStep\\_param.h](#)
- BUTTON\_DELAY : [MC\\_SixStep\\_param.h](#)

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| All       | Functions    | Variables | TypeDefs | Enumerations |   |   |   | Macros |   |   |   |   |   |   |   |   |   |
| a         | b            | c         | d        | e            | f | g | h | i      | k | l | m | n | p | s | t | u | v |

## - C -

- CCRx : [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#)

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# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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| a         | b            | c         | d        | e            | f | g | h | i      | k | l | m | n | p | s | t | u | v |

- d -

- DAC\_CH : [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#)
- DAC\_ENABLE : [stm32F302\\_nucleo\\_ihm07m1.h](#) , [stm32F401\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#)
- DACx : [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#)
- DACx\_ALIGN : [stm32F302\\_nucleo\\_ihm07m1.h](#)
- DACx\_CH : [stm32F302\\_nucleo\\_ihm07m1.h](#)
- DEMAGN\_VAL\_1 : [MC\\_SixStep\\_param.h](#)
- DEMAGN\_VAL\_10 : [MC\\_SixStep\\_param.h](#)
- DEMAGN\_VAL\_11 : [MC\\_SixStep\\_param.h](#)
- DEMAGN\_VAL\_12 : [MC\\_SixStep\\_param.h](#)
- DEMAGN\_VAL\_13 : [MC\\_SixStep\\_param.h](#)
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- DEMAGN\_VAL\_6 : [MC\\_SixStep\\_param.h](#)
- DEMAGN\_VAL\_7 : [MC\\_SixStep\\_param.h](#)
- DEMAGN\_VAL\_8 : [MC\\_SixStep\\_param.h](#)
- DEMAGN\_VAL\_9 : [MC\\_SixStep\\_param.h](#)
- DEMO\_START\_TIME : [MC\\_SixStep\\_param.h](#)

- DEMO\_STOP\_TIME : [MC\\_SixStep\\_param.h](#)
  - DIRECT\_CMD : [stm32F401\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F030\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F103\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F302\\_nucleo\\_ihm07m1.h](#)
  - DIRECTION : [MC\\_SixStep\\_param.h](#)
  - DMGCTR\_CMD : [stm32F103\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F030\\_nucleo\\_ihm07m1.h](#)
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| a         | b            | c         | d        | e            | f | g | h | i      | k | l | m | n | p | s | t | u | v |

- e -

- EXTERNAL\_CLOCK\_VALUE : [stm32f3xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)

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| All       | Functions    | Variables | TypeDefs | Enumerations |   |   |   | Macros |   |   |   |   |   |   |   |   |   |
| a         | b            | c         | d        | e            | f | g | h | i      | k | l | m | n | p | s | t | u | v |

- f -

- FALSE : [MC\\_SixStep\\_param.h](#)
- FILTER\_DEEP : [MC\\_SixStep\\_param.h](#)

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| a         | b            | c         | d        | e            | f | g | h | i      | k | l | m | n | p | s | t | u | v |

- g -

- GETSPD\_CMD : [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#) , [stm32F401\\_nucleo\\_ihm07m1.h](#) , [stm32F302\\_nucleo\\_ihm07m1.h](#)
- GPIO\_CH\_COMM : [stm32F401\\_nucleo\\_ihm07m1.h](#) , [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#) , [stm32F302\\_nucleo\\_ihm07m1.h](#)
- GPIO\_CH\_ZCR : [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#) , [stm32F302\\_nucleo\\_ihm07m1.h](#) , [stm32F401\\_nucleo\\_ihm07m1.h](#)
- GPIO\_COMM : [MC\\_SixStep\\_param.h](#)
- GPIO\_PORT\_COMM : [stm32F302\\_nucleo\\_ihm07m1.h](#) , [stm32F401\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#) , [stm32F030\\_nucleo\\_ihm07m1.h](#)
- GPIO\_PORT\_ZCR : [stm32F302\\_nucleo\\_ihm07m1.h](#) , [stm32F401\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#) , [stm32F030\\_nucleo\\_ihm07m1.h](#)
- GPIO\_ZERO\_CROSS : [MC\\_SixStep\\_param.h](#)

**doxygen** 1.8.9.1

# X-CUBE-SPN7 for X-NUCLEO-IHM07M1

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| File List | File Members |           |          |              |        |   |   |   |   |   |   |   |   |   |   |   |   |  |  |
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| a         | b            | c         | d        | e            | f      | g | h | i | k | l | m | n | p | s | t | u | v |  |  |

## - h -

- HAL\_MODULE\_ENABLED : [stm32f0xx\\_hal\\_conf.h](#) , [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#) , [stm32f3xx\\_hal\\_conf.h](#)
- HELP\_CMD : [stm32F401\\_nucleo\\_ihm07m1.h](#) , [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#) , [stm32F302\\_nucleo\\_ihm07m1.h](#)
- HSE\_STARTUP\_TIMEOUT : [stm32f0xx\\_hal\\_conf.h](#) , [stm32f1xx\\_hal\\_conf.h](#) , [stm32f3xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- HSE\_VALUE : [stm32f3xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#) , [stm32f0xx\\_hal\\_conf.h](#) , [stm32f1xx\\_hal\\_conf.h](#)
- HSI14\_VALUE : [stm32f0xx\\_hal\\_conf.h](#)
- HSI48\_VALUE : [stm32f0xx\\_hal\\_conf.h](#)
- HSI\_STARTUP\_TIMEOUT : [stm32f3xx\\_hal\\_conf.h](#) , [stm32f0xx\\_hal\\_conf.h](#)
- HSI\_VALUE : [stm32f3xx\\_hal\\_conf.h](#) , [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#) , [stm32f0xx\\_hal\\_conf.h](#)

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- i -

- INIREF\_CMD : [stm32F030\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F103\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F401\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F302\\_nucleo\\_ihm07m1.h](#)
- INITIAL\_DEMAGN\_DELAY : [MC\\_SixStep\\_param.h](#)

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## - k -

- KI\_DIV : [MC\\_SixStep\\_param.h](#)
- KI\_GAIN : [MC\\_SixStep\\_param.h](#)
- KI\_PRM\_CMD : [stm32F103\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F302\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F030\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F401\\_nucleo\\_ihm07m1.h](#)
- KP\_DIV : [MC\\_SixStep\\_param.h](#)
- KP\_GAIN : [MC\\_SixStep\\_param.h](#)
- KP\_PRM\_CMD : [stm32F302\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F103\\_nucleo\\_ihm07m1.h](#) ,  
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[stm32F030\\_nucleo\\_ihm07m1.h](#)

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| a         | b            | c         | d        | e            | f | g | h | i      | k | <b>I</b> | m | n | p | s | t | u | v |

- I -

- LOWER\_OUT\_LIMIT : [MC\\_SixStep\\_param.h](#)
- LSE\_STARTUP\_TIMEOUT : [stm32f1xx\\_hal\\_conf.h](#)
- LSE\_VALUE : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f3xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#) , [stm32f0xx\\_hal\\_conf.h](#)
- LSI\_VALUE : [stm32f4xx\\_hal\\_conf.h](#) , [stm32f3xx\\_hal\\_conf.h](#) , [stm32f0xx\\_hal\\_conf.h](#)

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## - M -

- MAC\_ADDR0 : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- MAX\_POT\_SPEED : [MC\\_SixStep\\_param.h](#)
- MAXDMG\_CMD : [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#)
- MIN\_POT\_SPEED : [MC\\_SixStep\\_param.h](#)
- MINDMG\_CMD : [stm32F103\\_nucleo\\_ihm07m1.h](#) , [stm32F030\\_nucleo\\_ihm07m1.h](#)
- MINIMUM\_ACC : [MC\\_SixStep\\_param.h](#)

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- n -

- NUM\_POLE\_PAIRS : [MC\\_SixStep\\_param.h](#)
- NUMBER\_OF\_STEPS : [MC\\_SixStep\\_param.h](#)
- NUMBER\_ZCR : [MC\\_SixStep\\_param.h](#)

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- p -

- PHY\_AUTONEGO\_COMPLETE : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- PHY\_AUTONEGOTIATION : [stm32f4xx\\_hal\\_conf.h](#) , [stm32f1xx\\_hal\\_conf.h](#)
- PHY\_BCR : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- PHY\_BSR : [stm32f4xx\\_hal\\_conf.h](#) , [stm32f1xx\\_hal\\_conf.h](#)
- PHY\_DUPLEX\_STATUS : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- PHY\_FULLDUPLEX\_100M : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- PHY\_FULLDUPLEX\_10M : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- PHY\_HALFDUPLEX\_100M : [stm32f4xx\\_hal\\_conf.h](#) , [stm32f1xx\\_hal\\_conf.h](#)
- PHY\_HALFDUPLEX\_10M : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- PHY\_ISOLATE : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- PHY\_JABBER\_DETECTION : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- PHY\_LINK\_INTERRUPT : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- PHY\_LINK\_STATUS : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- PHY\_LINKED\_STATUS : [stm32f1xx\\_hal\\_conf.h](#) ,

## **stm32f4xx\_hal\_conf.h**

- **PHY\_LOOPBACK** : [stm32f1xx\\_hal\\_conf.h](#) ,  
[stm32f4xx\\_hal\\_conf.h](#)
- **PHY\_MICR** : [stm32f4xx\\_hal\\_conf.h](#) , [stm32f1xx\\_hal\\_conf.h](#)
- **PHY\_MICR\_INT\_EN** : [stm32f1xx\\_hal\\_conf.h](#) ,  
[stm32f4xx\\_hal\\_conf.h](#)
- **PHY\_MICR\_INT\_OE** : [stm32f1xx\\_hal\\_conf.h](#) ,  
[stm32f4xx\\_hal\\_conf.h](#)
- **PHY\_MISR** : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- **PHY\_MISR\_LINK\_INT\_EN** : [stm32f1xx\\_hal\\_conf.h](#) ,  
[stm32f4xx\\_hal\\_conf.h](#)
- **PHY\_POWERDOWN** : [stm32f1xx\\_hal\\_conf.h](#) ,  
[stm32f4xx\\_hal\\_conf.h](#)
- **PHY\_RESET** : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- **PHY\_RESTART\_AUTONEGOTIATION** : [stm32f4xx\\_hal\\_conf.h](#) ,  
[stm32f1xx\\_hal\\_conf.h](#)
- **PHY\_SPEED\_STATUS** : [stm32f4xx\\_hal\\_conf.h](#) ,  
[stm32f1xx\\_hal\\_conf.h](#)
- **PHY\_SR** : [stm32f1xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#)
- **POLESP\_CMD** : [stm32F103\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F030\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F302\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F401\\_nucleo\\_ihm07m1.h](#)
- **POTENTIOMETER** : [MC\\_SixStep\\_param.h](#)
- **POTENZ\_CMD** : [stm32F030\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F103\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F401\\_nucleo\\_ihm07m1.h](#) ,  
[stm32F302\\_nucleo\\_ihm07m1.h](#)

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## - S -

- SETSPD\_CMD : [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#) , [stm32F401\\_nucleo\\_ihm07m1.h](#) , [stm32F302\\_nucleo\\_ihm07m1.h](#)
- SPEED\_LOOP\_TIME : [MC\\_SixStep\\_param.h](#)
- STARTM\_CMD : [stm32F302\\_nucleo\\_ihm07m1.h](#) , [stm32F401\\_nucleo\\_ihm07m1.h](#) , [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#)
- STARTUP\_CURRENT\_REFERENCE : [MC\\_SixStep\\_param.h](#)
- STATUS\_CMD : [stm32F401\\_nucleo\\_ihm07m1.h](#) , [stm32F302\\_nucleo\\_ihm07m1.h](#) , [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#)
- STOPMT\_CMD : [stm32F030\\_nucleo\\_ihm07m1.h](#) , [stm32F302\\_nucleo\\_ihm07m1.h](#) , [stm32F103\\_nucleo\\_ihm07m1.h](#) , [stm32F401\\_nucleo\\_ihm07m1.h](#)

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- t -

- TARGET\_SPEED : [MC\\_SixStep\\_param.h](#)
- TICK\_INT\_PRIORITY : [stm32f0xx\\_hal\\_conf.h](#) , [stm32f3xx\\_hal\\_conf.h](#) , [stm32f4xx\\_hal\\_conf.h](#) , [stm32f1xx\\_hal\\_conf.h](#)
- TIME\_FOR\_ALIGN : [MC\\_SixStep\\_param.h](#)
- TRUE : [MC\\_SixStep\\_param.h](#)

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| All       | Functions    | Variables | TypeDefs | Enumerations |   |   |   | Macros |   |   |   |   |   |   |   |   |   |
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- u -

- UPPER\_OUT\_LIMIT : [MC\\_SixStep\\_param.h](#)

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| All       | Functions    | Variables | TypeDefs | Enumerations |   |   |   | Macros |   |   |   |   |   |   |   |   |   |
| a         | b            | c         | d        | e            | f | g | h | i      | k | l | m | n | p | s | t | u | v |

- V -

- VAL\_POT\_SPEED\_DIV : [MC\\_SixStep\\_param.h](#)
- VDD\_VALUE : [stm32f4xx\\_hal\\_conf.h](#) , [stm32f3xx\\_hal\\_conf.h](#) , [stm32f1xx\\_hal\\_conf.h](#) , [stm32f0xx\\_hal\\_conf.h](#)

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| a          | b           | c             | d     | e | f | h | i | k | l | m | n | p | r | s | u | v |

## - a -

- ACCEL : [SIXSTEP\\_Base\\_InitTypeDef](#)
- ADC\_BEMF\_threshold\_DOWN : [SIXSTEP\\_Base\\_InitTypeDef](#)
- ADC\_BEMF\_threshold\_UP : [SIXSTEP\\_Base\\_InitTypeDef](#)
- ADC\_BUFFER : [SIXSTEP\\_Base\\_InitTypeDef](#)
- ADC-Regular\_Buffer : [SIXSTEP\\_Base\\_InitTypeDef](#)
- ADC\_SEQ\_CHANNEL : [SIXSTEP\\_Base\\_InitTypeDef](#)
- ALIGN\_OK : [SIXSTEP\\_Base\\_InitTypeDef](#)
- ALIGNMENT : [SIXSTEP\\_Base\\_InitTypeDef](#)
- ARR\_OK : [SIXSTEP\\_Base\\_InitTypeDef](#)
- ARR\_value : [SIXSTEP\\_Base\\_InitTypeDef](#)

## - b -

- Bemf\_delay\_start : [SIXSTEP\\_Base\\_InitTypeDef](#)
- bemf\_state\_1 : [SIXSTEP\\_Base\\_InitTypeDef](#)
- bemf\_state\_2 : [SIXSTEP\\_Base\\_InitTypeDef](#)
- bemf\_state\_3 : [SIXSTEP\\_Base\\_InitTypeDef](#)
- bemf\_state\_4 : [SIXSTEP\\_Base\\_InitTypeDef](#)
- bemf\_state\_5 : [SIXSTEP\\_Base\\_InitTypeDef](#)
- bemf\_state\_6 : [SIXSTEP\\_Base\\_InitTypeDef](#)
- BEMF\_Tdown\_count : [SIXSTEP\\_Base\\_InitTypeDef](#)

## - c -

- CMD : **SIXSTEP\_Base\_InitTypeDef**
- Current\_Reference : **SIXSTEP\_Base\_InitTypeDef**
- Current\_Reference\_Setvalue : **L6230\_MotorDriver\_TypeDef**
- Current\_Reference\_Start : **L6230\_MotorDriver\_TypeDef**
- Current\_Reference\_Stop : **L6230\_MotorDriver\_TypeDef**
- CurrentRegular\_BEMF\_ch : **SIXSTEP\_Base\_InitTypeDef**
- CW\_CCW : **SIXSTEP\_Base\_InitTypeDef**

- d -

- demagn\_counter : **SIXSTEP\_Base\_InitTypeDef**
- demagn\_value : **SIXSTEP\_Base\_InitTypeDef**
- DisableInput\_CH1\_D\_CH2\_D\_CH3\_D :  
**L6230\_MotorDriver\_TypeDef**

- e -

- EnableInput\_CH1\_D\_CH2\_E\_CH3\_E :  
**L6230\_MotorDriver\_TypeDef**
- EnableInput\_CH1\_E\_CH2\_D\_CH3\_E :  
**L6230\_MotorDriver\_TypeDef**
- EnableInput\_CH1\_E\_CH2\_E\_CH3\_D :  
**L6230\_MotorDriver\_TypeDef**

- f -

- filter\_depth : **SIXSTEP\_Base\_InitTypeDef**

- h -

- HF\_TIMx\_ARR : **SIXSTEP\_Base\_InitTypeDef**
- HF\_TIMx\_CCR : **SIXSTEP\_Base\_InitTypeDef**
- HF\_TIMx\_PSC : **SIXSTEP\_Base\_InitTypeDef**
- HF\_TIMx\_SetDutyCycle\_CH1 : **L6230\_MotorDriver\_TypeDef**
- HF\_TIMx\_SetDutyCycle\_CH2 : **L6230\_MotorDriver\_TypeDef**
- HF\_TIMx\_SetDutyCycle\_CH3 : **L6230\_MotorDriver\_TypeDef**

- i -

- Integral\_Term\_sum : **SIXSTEP\_Base\_InitTypeDef**
- IREFERENCE : **SIXSTEP\_Base\_InitTypeDef**
- Ireference : **SIXSTEP\_Base\_InitTypeDef**

- k -

- KI : **SIXSTEP\_Base\_InitTypeDef**
- Ki\_Gain : **SIXSTEP\_PI\_PARAM\_InitTypeDef\_t**
- KP : **SIXSTEP\_Base\_InitTypeDef**
- Kp\_Gain : **SIXSTEP\_PI\_PARAM\_InitTypeDef\_t**

- l -

- LF\_TIMx\_ARR : **SIXSTEP\_Base\_InitTypeDef**
- LF\_TIMx\_PSC : **SIXSTEP\_Base\_InitTypeDef**
- Lower\_Limit\_Output : **SIXSTEP\_PI\_PARAM\_InitTypeDef\_t**

- m -

- Max\_PID\_Output : **SIXSTEP\_PI\_PARAM\_InitTypeDef\_t**
- MediumFrequencyTask\_flag : **SIXSTEP\_Base\_InitTypeDef**
- Min\_PID\_Output : **SIXSTEP\_PI\_PARAM\_InitTypeDef\_t**

- n -

- numberofitemArr : **SIXSTEP\_Base\_InitTypeDef**
- NUMPOLESPAIRS : **SIXSTEP\_Base\_InitTypeDef**

- p -

- Potentiometer : **SIXSTEP\_Base\_InitTypeDef**
- prescaler\_value : **SIXSTEP\_Base\_InitTypeDef**
- pulse\_value : **SIXSTEP\_Base\_InitTypeDef**

- r -

- Ramp\_Start : **SIXSTEP\_Base\_InitTypeDef**
- Reference : **SIXSTEP\_PI\_PARAM\_InitTypeDef\_t**
- Regular\_channel : **SIXSTEP\_Base\_InitTypeDef**

- RUN\_Motor : **SIXSTEP\_Base\_InitTypeDef**

- S -

- speed\_fdbk : **SIXSTEP\_Base\_InitTypeDef**
- speed\_fdbk\_filtered : **SIXSTEP\_Base\_InitTypeDef**
- Speed\_Loop\_Time : **SIXSTEP\_Base\_InitTypeDef**
- Speed\_Ref\_filtered : **SIXSTEP\_Base\_InitTypeDef**
- Speed\_target\_ramp : **SIXSTEP\_Base\_InitTypeDef**
- Speed\_target\_time : **SIXSTEP\_Base\_InitTypeDef**
- SPEED\_VALIDATED : **SIXSTEP\_Base\_InitTypeDef**
- Start\_PWM\_driving : **L6230\_MotorDriver\_TypeDef**
- STATUS : **SIXSTEP\_Base\_InitTypeDef**
- status\_prev : **SIXSTEP\_Base\_InitTypeDef**
- step\_position : **SIXSTEP\_Base\_InitTypeDef**
- Stop\_PWM\_driving : **L6230\_MotorDriver\_TypeDef**
- SYSCLK\_frequency : **SIXSTEP\_Base\_InitTypeDef**

- U -

- Upper\_Limit\_Output : **SIXSTEP\_PI\_PARAM\_InitTypeDef\_t**

- V -

- VALIDATION\_OK : **SIXSTEP\_Base\_InitTypeDef**

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## CMD\_T Member List

This is the complete list of members for **CMD\_T**, including all inherited members.

**name** (defined in **CMD\_T**) [CMD\\_T](#)

**pCmdFunc** (defined in **CMD\_T**) [CMD\\_T](#)

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## L6230\_MotorDriver\_TypeDef Member List

This is the complete list of members for [L6230\\_MotorDriver\\_TypeDef](#), including all inherited members.

|  |   |
|--|---|
| <a href="#">Current_Reference_Setvalue</a>     | <a href="#">L6230_MotorDriver_TypeDef</a> |
| <a href="#">Current_Reference_Start</a>        | <a href="#">L6230_MotorDriver_TypeDef</a> |
| <a href="#">Current_Reference_Stop</a>         | <a href="#">L6230_MotorDriver_TypeDef</a> |
| <a href="#">DisableInput_CH1_D_CH2_D_CH3_D</a> | <a href="#">L6230_MotorDriver_TypeDef</a> |
| <a href="#">EnableInput_CH1_D_CH2_E_CH3_E</a>  | <a href="#">L6230_MotorDriver_TypeDef</a> |
| <a href="#">EnableInput_CH1_E_CH2_D_CH3_E</a>  | <a href="#">L6230_MotorDriver_TypeDef</a> |
| <a href="#">EnableInput_CH1_E_CH2_E_CH3_D</a>  | <a href="#">L6230_MotorDriver_TypeDef</a> |
| <a href="#">HF_TIMx_SetDutyCycle_CH1</a>       | <a href="#">L6230_MotorDriver_TypeDef</a> |
| <a href="#">HF_TIMx_SetDutyCycle_CH2</a>       | <a href="#">L6230_MotorDriver_TypeDef</a> |
| <a href="#">HF_TIMx_SetDutyCycle_CH3</a>       | <a href="#">L6230_MotorDriver_TypeDef</a> |
| <a href="#">Start_PWM_driving</a>              | <a href="#">L6230_MotorDriver_TypeDef</a> |
| <a href="#">Stop_PWM_driving</a>               | <a href="#">L6230_MotorDriver_TypeDef</a> |

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## SIXSTEP\_Base\_InitTypeDef Member List

This is the complete list of members for [SIXSTEP\\_Base\\_InitTypeDef](#), including all inherited members.

|   |                         |
|---|-------------------------|
| ACCEL   | <a href="#">SIXSTEP</a> |
| ADC_BEMF_threshold_DOWN   | <a href="#">SIXSTEP</a> |
| ADC_BEMF_threshold_UP   | <a href="#">SIXSTEP</a> |
| ADC_BUFFER  | <a href="#">SIXSTEP</a> |
| ADC-Regular_Buffer  | <a href="#">SIXSTEP</a> |
| ADC_SEQ_CHANNEL   | <a href="#">SIXSTEP</a> |
| ALIGN_OK  | <a href="#">SIXSTEP</a> |
| ALIGNMENT   | <a href="#">SIXSTEP</a> |
| ARR_OK  | <a href="#">SIXSTEP</a> |
| ARR_value   | <a href="#">SIXSTEP</a> |
| Bemf_delay_start  | <a href="#">SIXSTEP</a> |
| <b>BEMF_OK</b> (defined in <a href="#">SIXSTEP_Base_InitTypeDef</a> ) | <a href="#">SIXSTEP</a> |
| bemf_state_1  | <a href="#">SIXSTEP</a> |
| bemf_state_2  | <a href="#">SIXSTEP</a> |
| bemf_state_3  | <a href="#">SIXSTEP</a> |
| bemf_state_4  | <a href="#">SIXSTEP</a> |
| bemf_state_5  | <a href="#">SIXSTEP</a> |
| bemf_state_6  | <a href="#">SIXSTEP</a> |
| <b>BEMF_Tdown_count</b>   | <a href="#">SIXSTEP</a> |

|   |         |
|---|---------|
| Button_ready (defined in <a href="#">SIXSTEP_Base_InitTypeDef</a> ) | SIXSTEP |
| CL_READY (defined in <a href="#">SIXSTEP_Base_InitTypeDef</a> )     | SIXSTEP |
| CMD   | SIXSTEP |
| Current_Reference   | SIXSTEP |
| CurrentRegular_BEMF_ch  | SIXSTEP |
| CW_CCW  | SIXSTEP |
| demagn_counter  | SIXSTEP |
| demagn_value  | SIXSTEP |
| filter_depth  | SIXSTEP |
| HF_TIMx_ARR   | SIXSTEP |
| HF_TIMx_CCR   | SIXSTEP |
| HF_TIMx_PSC   | SIXSTEP |
| Integral_Term_sum   | SIXSTEP |
| Ireference  | SIXSTEP |
| IREFERENCE  | SIXSTEP |
| KI  | SIXSTEP |
| KP  | SIXSTEP |
| LF_TIMx_ARR   | SIXSTEP |
| LF_TIMx_PSC   | SIXSTEP |
| MediumFrequencyTask_flag  | SIXSTEP |
| numberofitemArr   | SIXSTEP |
| NUMPOLESPAIRS   | SIXSTEP |
| Potentiometer   | SIXSTEP |
| prescaler_value   | SIXSTEP |
| pulse_value   | SIXSTEP |
| Ramp_Start  | SIXSTEP |
| Regular_channel   | SIXSTEP |
| RUN_Motor   | SIXSTEP |
| speed_fdbk  | SIXSTEP |
| speed_fdbk_filtered   | SIXSTEP |
| Speed_Loop_Time   | SIXSTEP |

|  |         |
|--|---------|
| Speed_Ref_filtered   | SIXSTEP |
| Speed_target_ramp  | SIXSTEP |
| Speed_target_time  | SIXSTEP |
| SPEED_VALIDATED  | SIXSTEP |
| STATUS   | SIXSTEP |
| status_prev  | SIXSTEP |
| step_position  | SIXSTEP |
| SYSCLK_frequency   | SIXSTEP |
| Uart_cmd_to_set (defined in <a href="#">SIXSTEP_Base_InitTypeDef</a> )   | SIXSTEP |
| Uart_value_to_set (defined in <a href="#">SIXSTEP_Base_InitTypeDef</a> ) | SIXSTEP |
| <b>VALIDATION_OK</b>   | SIXSTEP |

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## SIXSTEP\_PI\_PARAM\_InitTypeDef\_t Member List

This is the complete list of members for [SIXSTEP\\_PI\\_PARAM\\_InitTypeDef\\_t](#), including all inherited members.

|                    |  |
|--------------------|--|
| Ki_Gain            | <a href="#">SIXSTEP_PI_PARAM_InitTypeDef_t</a> |
| Kp_Gain            | <a href="#">SIXSTEP_PI_PARAM_InitTypeDef_t</a> |
| Lower_Limit_Output | <a href="#">SIXSTEP_PI_PARAM_InitTypeDef_t</a> |
| Max_PID_Output     | <a href="#">SIXSTEP_PI_PARAM_InitTypeDef_t</a> |
| Min_PID_Output     | <a href="#">SIXSTEP_PI_PARAM_InitTypeDef_t</a> |
| Reference          | <a href="#">SIXSTEP_PI_PARAM_InitTypeDef_t</a> |
| Upper_Limit_Output | <a href="#">SIXSTEP_PI_PARAM_InitTypeDef_t</a> |

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