# HARMcksL: ARM HAL toolbox (yet STM32 oriented)

0.5

Generated by Doxygen 1.8.11

# Contents

# 1 Class Index

## 1.1 Class List

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



# 2 File Index

## 2.1 File List

Here is a list of all files with brief descriptions:

# 3 Class Documentation

## 3.1 GPIO_in Struct Reference

GPIO input structure.

`#include <GPIO_ex.h>`

### Public Attributes

- bool in
  *Input value.*
- eEdge edge
  *Input edge.*
- bool mem
  *Memo value.*
- bool done
  *State change done.*
- uint32_t hIn
  *Filter time.*

- struct {
  GPIO_TypeDef * GPIOx
  *HAL GPIO instance.*
  uint16_t GPIO_Pin
  *HAL GPIO pin.*
  uint16_t filt
  *Filter time (ms)*
  } cfg

#### 3.1.1 Detailed Description

GPIO input structure.

#### 3.1.2 Member Data Documentation

##### 3.1.2.1 struct { ... } GPIO_in::cfg

##### 3.1.2.2 bool GPIO_in::done

State change done.

##### 3.1.2.3 eEdge GPIO_in::edge

Input edge.

##### 3.1.2.4 uint16_t GPIO_in::filt

Filter time (ms)

##### 3.1.2.5 uint16_t GPIO_in::GPIO_Pin

HAL GPIO pin.

##### 3.1.2.6 GPIO_TypeDef* GPIO_in::GPIOx

HAL GPIO instance.

##### 3.1.2.7 uint32_t GPIO_in::hln

Filter time.

##### 3.1.2.8 bool GPIO_in::in

Input value.

#### 3.1.2.9 bool GPIO_in::mem

Memo value.

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

- GPIO_ex.h

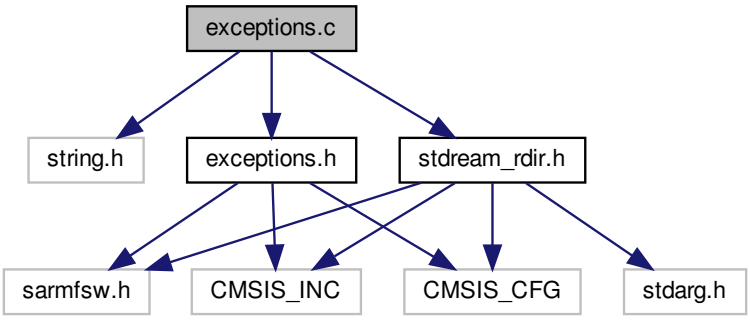
# 4 File Documentation

## 4.1 exceptions.c File Reference

Debug tool helpers functions.

```
#include <string.h>
#include "exceptions.h"
#include "stdream_rdir.h"
```

Include dependency graph for exceptions.c:




### Functions

- void stackDump (uint32_t stack[ ])
- void HardFault_Handler_callback (uint32_t stack[ ])
- void Error_Handler_callback (uint32_t stack[ ])

### 4.1.1 Detailed Description

Debug tool helpers functions.

#### Author

SMFSW

**Version**

v0.5

**Date**

2017

**Copyright**

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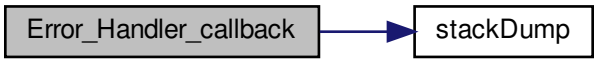
#### 4.1.2 Function Documentation

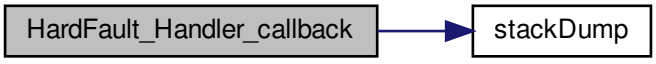
##### 4.1.2.1 void Error_Handler_callback ( uint32_t *stack[ ]* )

Here is the call graph for this function:



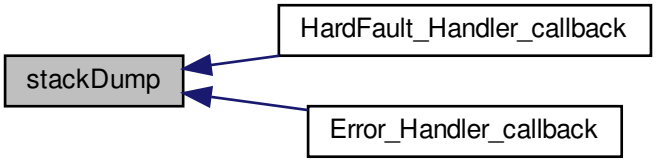

##### 4.1.2.2 void HardFault_Handler_callback ( uint32_t *stack[ ]* )

Here is the call graph for this function:




##### 4.1.2.3 void stackDump ( uint32_t *stack[ ]* )

Here is the caller graph for this function:

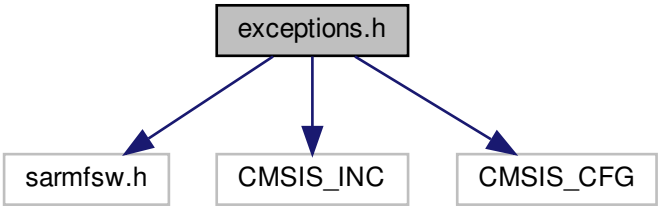


## 4.2 exceptions.h File Reference

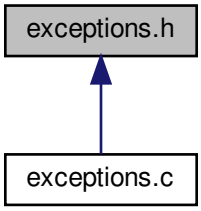
Debug tool and helpers declaration.

```
#include "sarmfsw.h"
#include <CMSIS_INC>
#include <CMSIS_CFG>
```

Include dependency graph for exceptions.h:




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




### Macros

- #define exception_Handler(e)

  *The exception_Handler should be called with corresponding exception name **e** as parameter.*
- #define dump_stack()

### Functions

- void HardFault_Handler_callback (uint32_t stack[ ])
- void Error_Handler_callback (uint32_t stack[ ])

#### 4.2.1 Detailed Description

Debug tool and helpers declaration.

**Author**

SMFSW

**Version**

v0.5

**Date**

2017

**Copyright**

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#### 4.2.2 Macro Definition Documentation

##### 4.2.2.1 #define dump_stack( )

**Value:**

```
__asm(  "tst lr, #4 \n"     \
            "ite EQ \n"         \
            "mrseq r0, MSP \n"  \
            "mrsne r0, PSP \n"  \
            "b stackDump \n")
```

##### 4.2.2.2 #define exception_Handler( *e* )

**Value:**

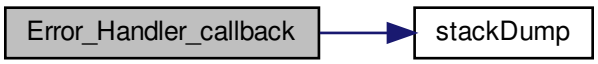
```
__asm(  "tst lr, #4 \n"                     \
            "ite EQ \n"                         \
            "mrseq r0, MSP \n"                  \
            "mrsne r0, PSP \n"                  \
            "b " #e "_Handler_callback \n")
```

The exception_Handler should be called with corresponding exception name **e** as parameter.

#### 4.2.3 Function Documentation

##### 4.2.3.1 void Error_Handler_callback ( uint32_t *stack[ ]* )

Here is the call graph for this function:




##### 4.2.3.2 void HardFault_Handler_callback ( uint32_t *stack[ ]* )

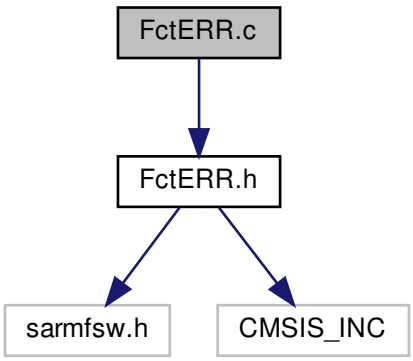
Here is the call graph for this function:


### 4.3 FctERR.c File Reference

errors to SMFSW FctERR code

```
#include "FctERR.h"
```

Include dependency graph for FctERR.c:



**Functions**

- FctERR HALERRtoFCTERR (HAL_StatusTypeDef st)
  *Convert HAL_StatusTypeDef to FctERR.*

#### 4.3.1 Detailed Description

errors to SMFSW FctERR code

**Author**

SMFSW

**Version**

v0.5

**Date**

2017

**Copyright**

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#### 4.3.2 Function Documentation

##### 4.3.2.1 FctERR HALERRtoFCTERR ( HAL_StatusTypeDef *st* )

Convert HAL_StatusTypeDef to FctERR.

**Parameters**

| | | |
|---|---|---|
| in | *st* | - HAL_StatusTypeDef status |

**Returns**

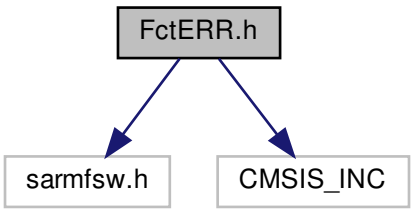
FctERR status

## 4.4 FctERR.h File Reference

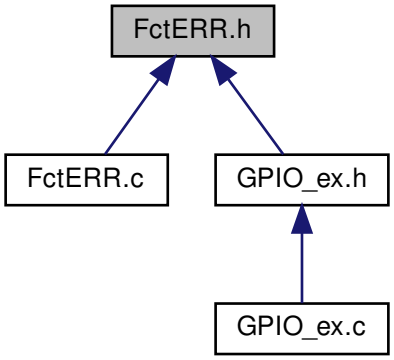
errors to SMFSW FctERR declarations

```
#include "sarmfsw.h"
#include <CMSIS_INC>
```

Include dependency graph for FctERR.h:




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




### Typedefs

- typedef enum EnumFctERR FctERR

### Enumerations

- enum EnumFctERR {
  ERR_OK = 0U, ERR_SPEED = 1U, ERR_RANGE = 2U, ERR_VALUE = 3U,
  ERR_OVERFLOW = 4U, ERR_MATH = 5U, ERR_ENABLED = 6U, ERR_DISABLED = 7U,
  ERR_BUSY = 8U, ERR_NOTAVAIL = 9U, ERR_RXEMPTY = 10U, ERR_TXFULL = 11U,
  ERR_BUSOFF = 12U, ERR_OVERRUN = 13U, ERR_FRAMING = 14U, ERR_PARITY = 15U,
  ERR_NOISE = 16U, ERR_IDLE = 17U, ERR_FAULT = 18U, ERR_BREAK = 19U,
  ERR_CRC = 20U, ERR_ARBITR = 21U, ERR_PROTECT = 22U, ERR_UNDERFLOW = 23U,
  ERR_UNDERRUN = 24U, ERR_COMMON = 25U, ERR_LINSYNC = 26U, ERR_FAILED = 27U,
  ERR_QFULL = 28U, ERR_CMD = 29U, ERR_TIMEOUT = 30U, ERR_NOTIMPLEM = 31U,
  ERR_MEMORY = 32U, ERR_INSTANCE = 33U }

  *Enum of high level functions return state.*

#### Functions

- FctERR HALERRtoFCTERR (HAL_StatusTypeDef st)
  *Convert HAL_StatusTypeDef to FctERR.*

### 4.4.1 Detailed Description

errors to SMFSW FctERR declarations

**Author**

SMFSW

**Version**

v0.5

**Date**

2017

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### 4.4.2 Typedef Documentation

#### 4.4.2.1 typedef enum EnumFctERR FctERR

### 4.4.3 Enumeration Type Documentation

#### 4.4.3.1 enum EnumFctERR

Enum of high level functions return state.

**Enumerator**

***ERR_OK*** OK.
***ERR_SPEED*** This device does not work in the active speed mode.
***ERR_RANGE*** Parameter out of range.
***ERR_VALUE*** Parameter of incorrect value.
***ERR_OVERFLOW*** Overflow.
***ERR_MATH*** Overflow during evaluation.
***ERR_ENABLED*** Device is enabled.
***ERR_DISABLED*** Device is disabled.
***ERR_BUSY*** Device is busy.
***ERR_NOTAVAIL*** Requested value or method not available.
***ERR_RXEMPTY*** No data in receiver.

***ERR_TXFULL*** Transmitter is full.

***ERR_BUSOFF*** Bus not available.

***ERR_OVERRUN*** Overrun error is detected.

***ERR_FRAMING*** Framing error is detected.

***ERR_PARITY*** Parity error is detected.

***ERR_NOISE*** Noise error is detected.

***ERR_IDLE*** Idle error is detected.

***ERR_FAULT*** Fault error is detected.

***ERR_BREAK*** Break char is received during communication.

***ERR_CRC*** CRC error is detected.

***ERR_ARBITR*** A node lost arbitration. This error occurs if two nodes start transmission at the same time.

***ERR_PROTECT*** Protection error is detected.

***ERR_UNDERFLOW*** Underflow error is detected.

***ERR_UNDERRUN*** Underrun error is detected.

***ERR_COMMON*** Common error of a device.

***ERR_LINSYNC*** LIN synchronization error is detected.

***ERR_FAILED*** Requested functionality or process failed.

***ERR_QFULL*** Queue is full.

***ERR_CMD*** Command error is detected.

***ERR_TIMEOUT*** Abort on timeout error.

***ERR_NOTIMPLEM*** Function not implemented error.

***ERR_MEMORY*** Memory error.

***ERR_INSTANCE*** Instance error.

#### 4.4.4 Function Documentation

##### 4.4.4.1 FctERR HALERRtoFCTERR ( HAL_StatusTypeDef *st* )

Convert HAL_StatusTypeDef to FctERR.

**Parameters**

| | | |
|---|---|---|
| in | *st* | - HAL_StatusTypeDef status |

**Returns**

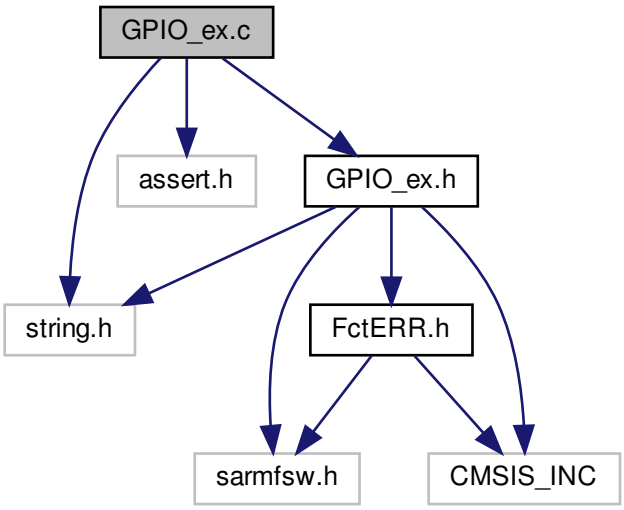
FctERR status

### 4.5 GPIO_ex.c File Reference

Simple extension for GPIOs.

```
#include <string.h>
#include <assert.h>
#include "GPIO_ex.h"
```

Include dependency graph for GPIO_ex.c:




### Macros

- #define MAX_PINS_PORT 16

### Functions

- void GPIO_in_init (GPIO_in ∗in, GPIO_TypeDef ∗GPIOx, uint16_t GPIO_Pin, uint16_t filter)
  *Initialize GPIO_in instance.*
- void GPIO_in_handler (GPIO_in ∗in)
  *Handles GPIO_in read and treatment.*
- FctERR str_GPIO_name (char ∗name, GPIO_TypeDef ∗GPIOx, uint16_t GPIO_Pin)
  *Get name from Port, Pin.*

#### 4.5.1 Detailed Description

Simple extension for GPIOs.

**Author**

SMFSW

**Version**

v0.5

**Date**

2017

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#### 4.5.2 Macro Definition Documentation

##### 4.5.2.1 #define MAX_PINS_PORT 16

#### 4.5.3 Function Documentation

##### 4.5.3.1 void GPIO_in_handler ( GPIO_in * *in* )

Handles GPIO_in read and treatment.

**Parameters**

| | | |
|---|---|---|
| in,out | *in* | - input instance to handle |

**Returns**

Nothing

##### 4.5.3.2 void GPIO_in_init ( GPIO_in * *in*, GPIO_TypeDef * *GPIOx*, uint16_t *GPIO_Pin*, uint16_t *filter* )

Initialize GPIO_in instance.

**Parameters**

| | | |
|---|---|---|
| in,out | *in* | - input instance to initialize |
| in | *GPIOx* | - port to write to |
| in | *GPIO_Pin* | - pin to write to |
| in | *filter* | - input filtering time |

**Returns**

Nothing

##### 4.5.3.3 FctERR str_GPIO_name ( char * *name*, GPIO_TypeDef * *GPIOx*, uint16_t *GPIO_Pin* )

Get name from Port, Pin.

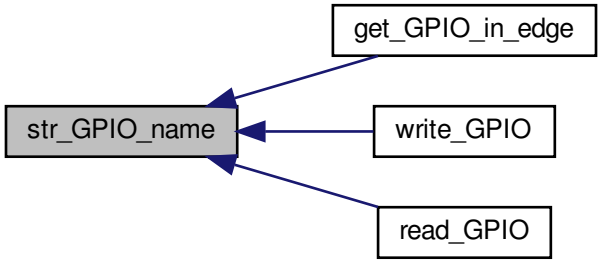
**Parameters**

| | | |
|---|---|---|
| in,out | *name* | - pointer to string for name |
| in | *GPIOx* | - port to write to |
| in | *GPIO_Pin* | - pin to write to |

**Returns**

Error code

Here is the caller graph for this function:

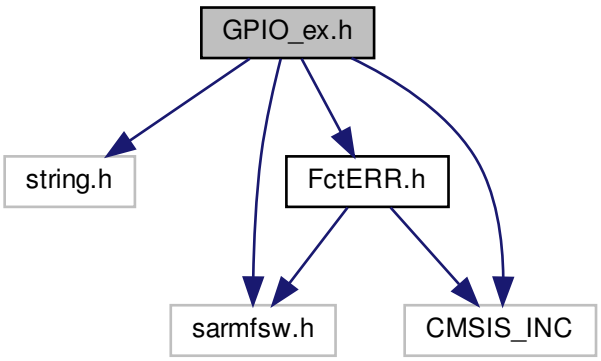



## 4.6 GPIO_ex.h File Reference

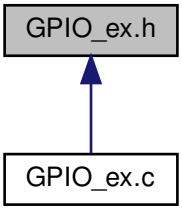
Simple extension for GPIOs.

```
#include <string.h>
#include "sarmfsw.h"
#include <CMSIS_INC>
#include "FctERR.h"
```

Include dependency graph for GPIO_ex.h:



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




### Classes

- struct GPIO_in

  *GPIO input structure.*

### Typedefs

- typedef enum ActOut eActOut
- typedef struct GPIO_in GPIO_in

### Enumerations

- enum ActOut { Reset = 0, Set, Toggle }

  *Logic output possible actions enumeration.*

### Functions

- void GPIO_in_init (GPIO_in *in, GPIO_TypeDef *GPIOx, uint16_t GPIO_Pin, uint16_t filter)

  *Initialize GPIO_in instance.*
- void GPIO_in_handler (GPIO_in *in)

  *Handles GPIO_in read and treatment.*
- bool get_GPIO_in (GPIO_in *in)

  *Get GPIO_in input value.*
- bool get_GPIO_in_edge (GPIO_in *in)

  *Get GPIO_in input edge.*
- FctERR str_GPIO_name (char *name, GPIO_TypeDef *GPIOx, uint16_t GPIO_Pin)

  *Get name from Port, Pin.*
- void write_GPIO (GPIO_TypeDef *GPIOx, uint16_t GPIO_Pin, eActOut Act)

  *Write GPIO.*
- GPIO_PinState read_GPIO (GPIO_TypeDef *GPIOx, uint16_t GPIO_Pin)

  *Read GPIO.*

#### 4.6.1 Detailed Description

Simple extension for GPIOs.

**Author**

SMFSW

**Version**

v0.5

**Date**

2017

**Copyright**



#### 4.6.2 Typedef Documentation

##### 4.6.2.1 typedef enum ActOut eActOut

##### 4.6.2.2 typedef struct GPIO_in GPIO_in

#### 4.6.3 Enumeration Type Documentation

##### 4.6.3.1 enum ActOut

Logic output possible actions enumeration.

**Enumerator**

***Reset*** Reset Output.

***Set*** Set Output.

***Toggle*** Toggle Output.

#### 4.6.4 Function Documentation

##### 4.6.4.1 bool get_GPIO_in ( GPIO_in * *in* )

Get GPIO_in input value.

**Parameters**

| | | |
|---|---|---|
| in | *in* | - input instance |

**Returns**

Input value

#### 4.6.4.2 bool get_GPIO_in_edge ( GPIO_in * *in* )

Get GPIO_in input edge.

**Parameters**

| | | |
|---|---|---|
| in | *in* | - input instance |

**Returns**

Input edge

Here is the call graph for this function:


#### 4.6.4.3 void GPIO_in_handler ( GPIO_in * *in* )

Handles GPIO_in read and treatment.

**Parameters**

| | | |
|---|---|---|
| in,out | *in* | - input instance to handle |

**Returns**

Nothing

#### 4.6.4.4 void GPIO_in_init ( GPIO_in * *in*, GPIO_TypeDef * *GPIOx*, uint16_t *GPIO_Pin*, uint16_t *filter* )

Initialize GPIO_in instance.

**Parameters**

| | | |
|---|---|---|
| in,out | *in* | - input instance to initialize |
| in | *GPIOx* | - port to write to |
| in | *GPIO_Pin* | - pin to write to |
| in | *filter* | - input filtering time |

**Returns**

Nothing

#### 4.6.4.5 GPIO_PinState read_GPIO ( GPIO_TypeDef * *GPIOx*, uint16_t *GPIO_Pin* )

Read GPIO.

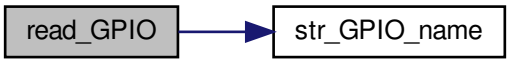
**Parameters**

| | | |
|---|---|---|
| in | *GPIOx* | - port to read from |
| in | *GPIO_Pin* | - pin to read from |

**Returns**

Pin state

Here is the call graph for this function:




#### 4.6.4.6 FctERR str_GPIO_name ( char * *name*, GPIO_TypeDef * *GPIOx*, uint16_t *GPIO_Pin* )

Get name from Port, Pin.

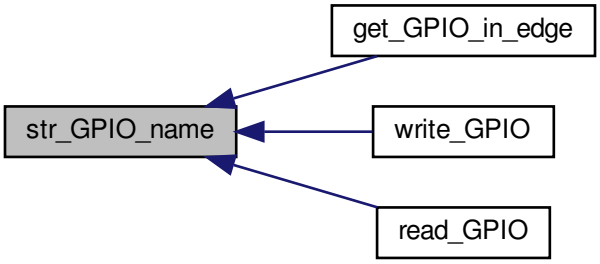
**Parameters**

| | | |
|---|---|---|
| in,out | *name* | - pointer to string for name |
| in | *GPIOx* | - port to write to |
| in | *GPIO_Pin* | - pin to write to |

**Returns**

Error code

Here is the caller graph for this function:




#### 4.6.4.7 void write_GPIO ( GPIO_TypeDef * *GPIOx*, uint16_t *GPIO_Pin*, eActOut *Act* )

Write GPIO.

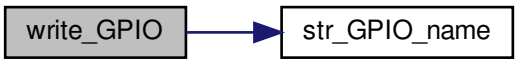
**Parameters**

| | | |
|---|---|---|
| in | *GPIOx* | - port to write to |
| in | *GPIO_Pin* | - pin to write to |
| in | *Act* | - type of write |

**Returns**

Nothing

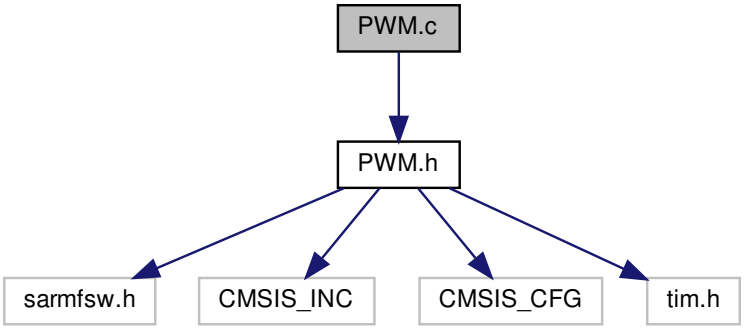
Here is the call graph for this function:




## 4.7 PWM.c File Reference

Simple PWM handling.

```
#include "PWM.h"
```
Include dependency graph for PWM.c:




### Functions

- HAL_StatusTypeDef set_PWM_Freq (TIM_HandleTypeDef ∗pTim, uint32_t freq)
  *Set TIM module PWM frequency for channel.*
- HAL_StatusTypeDef write_CCR (TIM_HandleTypeDef ∗pTim, uint32_t chan, uint16_t CCR_val)
  *Low level TIM module PWM duty cycle write.*
- HAL_StatusTypeDef set_PWM_Duty_Scaled (TIM_HandleTypeDef ∗pTim, uint32_t chan, uint16_t duty, uint16_t scale)
  *Set TIM module PWM duty cycle (scaled)*

#### 4.7.1 Detailed Description

Simple PWM handling.

**Author**

SMFSW

**Version**

v0.5

**Date**

2017

**Copyright**

MIT (c) 2017, SMFSW

#### 4.7.2 Function Documentation

##### 4.7.2.1 HAL_StatusTypeDef set_PWM_Duty_Scaled ( TIM_HandleTypeDef ∗ *pTim,* uint32_t *chan,* uint16_t *duty,* uint16_t *scale* )

Set TIM module PWM duty cycle (scaled)

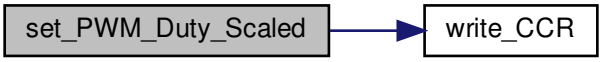
**Parameters**

| | | |
|---|---|---|
| in,out | *pTim* | - pointer to TIM instance for PWM generation |
| in | *chan* | - Channel to write |
| in | *duty* | - Scaled duty cycle value to write |
| in | *scale* | - Full scale value |

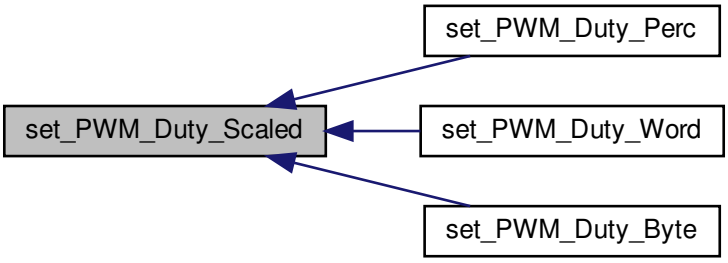
**Returns**

HAL Status

Here is the call graph for this function:




Here is the caller graph for this function:




#### 4.7.2.2 HAL_StatusTypeDef set_PWM_Freq ( TIM_HandleTypeDef * *pTim*, uint32_t *freq* )

Set TIM module PWM frequency for channel.

**Parameters**

| | | |
|---|---|---|
| in,out | *pTim* | - pointer to TIM instance for PWM generation |
| in | *freq* | - Desired PWM frequency |

#### 4.7.2.3 HAL_StatusTypeDef write_CCR ( TIM_HandleTypeDef * *pTim*, uint32_t *chan*, uint16_t *CCR_val* )

Low level TIM module PWM duty cycle write.

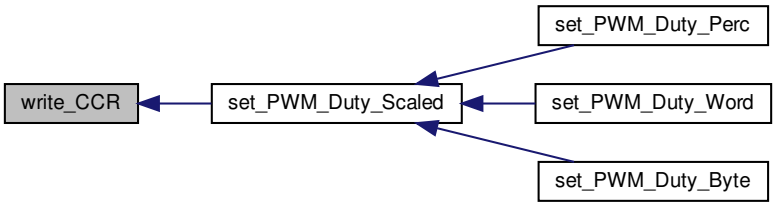
**Parameters**

| | | |
|---|---|---|
| in,out | *pTim* | - pointer to TIM instance for PWM generation |
| in | *chan* | - Channel to write |
| in | *CCR_val* | - Scaled duty cycle for CCR register |

**Returns**

HAL Status

Here is the caller graph for this function:

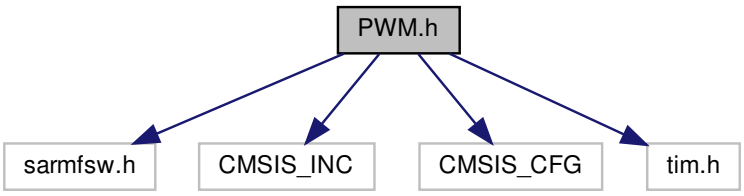



## 4.8 PWM.h File Reference

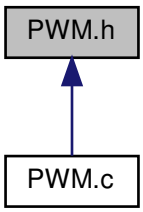
Simple PWM handling.

```
#include "sarmfsw.h"
#include <CMSIS_INC>
#include <CMSIS_CFG>
#include "tim.h"
```

Include dependency graph for PWM.h:



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




**Functions**

- HAL_StatusTypeDef set_PWM_Freq (TIM_HandleTypeDef ∗pTim, uint32_t freq)
  *Set TIM module PWM frequency for channel.*
- HAL_StatusTypeDef set_PWM_Duty_Scaled (TIM_HandleTypeDef ∗pTim, uint32_t chan, uint16_t duty, uint16_t scale)
  *Set TIM module PWM duty cycle (scaled)*
- HAL_StatusTypeDef set_PWM_Duty_Perc (TIM_HandleTypeDef ∗pTim, uint32_t chan, uint16_t duty)
  *Set TIM module PWM duty cycle (percents)*
- HAL_StatusTypeDef set_PWM_Duty_Word (TIM_HandleTypeDef ∗pTim, uint32_t chan, uint16_t duty)
  *Set TIM module PWM duty cycle (u16-bit value)*
- HAL_StatusTypeDef set_PWM_Duty_Byte (TIM_HandleTypeDef ∗pTim, uint32_t chan, uint8_t duty)
  *Set TIM module PWM duty cycle (u8-bit value)*

### 4.8.1 Detailed Description

Simple PWM handling.

**Author**

SMFSW

**Version**

v0.5

**Date**

2017

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### 4.8.2 Function Documentation

#### 4.8.2.1 HAL_StatusTypeDef set_PWM_Duty_Byte ( TIM_HandleTypeDef ∗ *pTim,* uint32_t *chan,* uint8_t *duty* )

Set TIM module PWM duty cycle (u8-bit value)

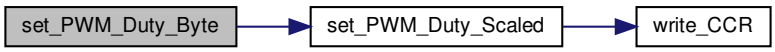
**Parameters**

| | | |
|---|---|---|
| in,out | *pTim* | - pointer to TIM instance for PWM generation |
| in | *chan* | - Channel to write |
| in | *duty* | - Scaled duty cycle value to write |

**Returns**

HAL Status

Here is the call graph for this function:




#### 4.8.2.2 HAL_StatusTypeDef set_PWM_Duty_Perc ( TIM_HandleTypeDef * *pTim*, uint32_t *chan*, uint16_t *duty* )

Set TIM module PWM duty cycle (percents)

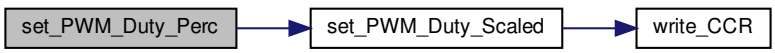
**Parameters**

| | | |
|---|---|---|
| in,out | *pTim* | - pointer to TIM instance for PWM generation |
| in | *chan* | - Channel to write |
| in | *duty* | - Scaled duty cycle value to write |

**Returns**

HAL Status

Here is the call graph for this function:




#### 4.8.2.3 HAL_StatusTypeDef set_PWM_Duty_Scaled ( TIM_HandleTypeDef * *pTim*, uint32_t *chan*, uint16_t *duty*, uint16_t *scale* )

Set TIM module PWM duty cycle (scaled)

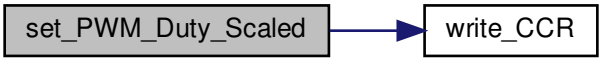
**Parameters**

| | | |
|---|---|---|
| in,out | *pTim* | - pointer to TIM instance for PWM generation |
| in | *chan* | - Channel to write |
| in | *duty* | - Scaled duty cycle value to write |
| in | *scale* | - Full scale value |

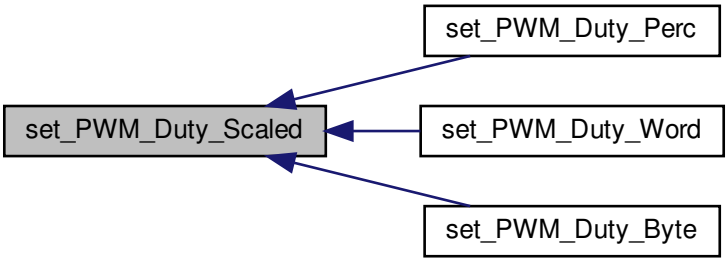
**Returns**

HAL Status

Here is the call graph for this function:




Here is the caller graph for this function:




#### 4.8.2.4 HAL_StatusTypeDef set_PWM_Duty_Word ( TIM_HandleTypeDef * *pTim*, uint32_t *chan*, uint16_t *duty* )

Set TIM module PWM duty cycle (u16-bit value)

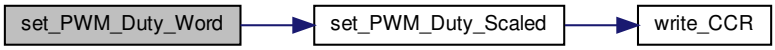
**Parameters**

| | | |
|---|---|---|
| in,out | *pTim* | - pointer to TIM instance for PWM generation |
| in | *chan* | - Channel to write |
| in | *duty* | - Scaled duty cycle value to write |

**Returns**

HAL Status

Here is the call graph for this function:




#### 4.8.2.5 HAL_StatusTypeDef set_PWM_Freq ( TIM_HandleTypeDef * *pTim*, uint32_t *freq* )

Set TIM module PWM frequency for channel.

**Parameters**

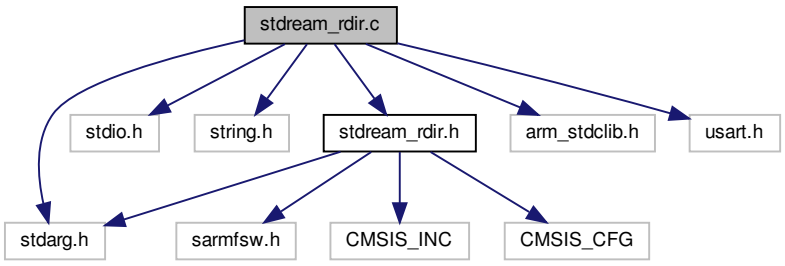
| | | |
|---|---|---|
| in,out | *pTim* | - pointer to TIM instance for PWM generation |
| in | *freq* | - Desired PWM frequency |

## 4.9 stdream_rdir.c File Reference

Stream redirection.

```
#include <stdarg.h>
#include <stdio.h>
#include <string.h>
#include "stdream_rdir.h"
#include "arm_stdclib.h"
#include "usart.h"
```

Include dependency graph for stdream_rdir.c:



#### Functions

- void print_uart (char ∗ptr, int len)
- void print_itm_port (int port, const char ∗msg, int len)
- int printf_ITM (char ∗string,...)
- int vprintf_ITM (char ∗string, va_list args)
- int printf_rdir (char ∗string,...)
- int vprintf_rdir (char ∗string, va_list args)

### 4.9.1 Detailed Description

Stream redirection.

**Author**

SMFSW

**Version**

v0.5

**Date**

2017

**Copyright**

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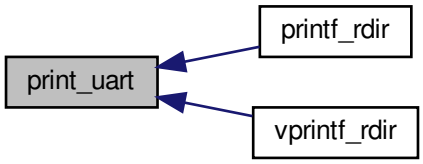
### 4.9.2 Function Documentation

#### 4.9.2.1 void print_itm_port ( int *port,* const char ∗ *msg,* int *len* )

#### 4.9.2.2 void print_uart ( char ∗ *ptr,* int *len* )

Here is the caller graph for this function:



#### 4.9.2.3 int printf_ITM ( char * *string*, ... )

#### 4.9.2.4 int printf_rdir ( char * *string*, ... )

Here is the call graph for this function:


#### 4.9.2.5 int vprintf_ITM ( char * *string*, va_list *args* )

#### 4.9.2.6 int vprintf_rdir ( char * *string*, va_list *args* )

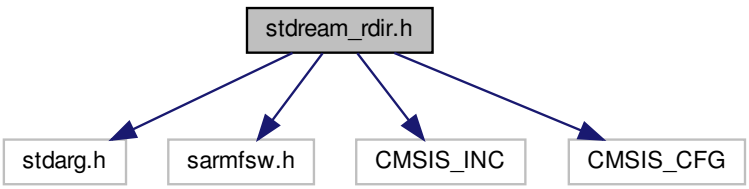
Here is the call graph for this function:


## 4.10 stdream_rdir.h File Reference

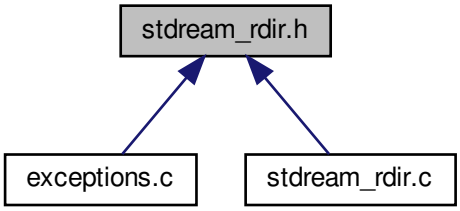
Stream redirection header.

```
#include <stdarg.h>
#include "sarmfsw.h"
#include <CMSIS_INC>
#include <CMSIS_CFG>
```

Include dependency graph for stdream_rdir.h:



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




**Macros**

- #define printf printf_rdir
  *Shadowing printf use.*
- #define vprintf vprintf_rdir
  *Shadowing vprintf use.*

**Functions**

- void print_itm_port (int port, const char ∗msg, int len)
- int printf_ITM (char ∗string,...)
- int vprintf_ITM (char ∗string, va_list args)
- int printf_rdir (char ∗string,...)
- int vprintf_rdir (char ∗string, va_list args)

#### 4.10.1 Detailed Description

Stream redirection header.

**Author**

SMFSW

**Version**

v0.5

**Date**

2017

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#### 4.10.2 Macro Definition Documentation

##### 4.10.2.1 #define printf printf_rdir

Shadowing printf use.

##### 4.10.2.2 #define vprintf vprintf_rdir

Shadowing vprintf use.

#### 4.10.3 Function Documentation

##### 4.10.3.1 void print_itm_port ( int *port*, const char * *msg*, int *len* )

##### 4.10.3.2 int printf_ITM ( char * *string*, ... )

##### 4.10.3.3 int printf_rdir ( char * *string*, ... )

Here is the call graph for this function:


##### 4.10.3.4 int vprintf_ITM ( char * *string*, va_list *args* )

##### 4.10.3.5 int vprintf_rdir ( char * *string*, va_list *args* )

Here is the call graph for this function:

# Index