

HARMcksL: ARM HAL toolbox (yet STM32 oriented)

1.1

Generated by Doxygen 1.8.13

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## 1 Class Index

### 1.1 Class List

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

**GPIO\_in**

GPIO input structure

**2**

## 2 File Index

### 2.1 File List

Here is a list of all files with brief descriptions:

<a href="#">exceptions.c</a>	
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## 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 hln](#)  
*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 [cfg](#)

```
struct { ... } GPIO_in::cfg
```

#### 3.1.2.2 [done](#)

```
bool GPIO_in::done
```

State change done.

#### 3.1.2.3 [edge](#)

```
eEdge GPIO_in::edge
```

Input edge.

#### 3.1.2.4 [filt](#)

```
uint16_t GPIO_in::filt
```

Filter time (ms)

### 3.1.2.5 GPIO\_Pin

```
uint16_t GPIO_in::GPIO_Pin
```

HAL GPIO pin.

### 3.1.2.6 GPIOx

```
GPIO_TypeDef* GPIO_in::GPIOx
```

HAL GPIO instance.

### 3.1.2.7 hIn

```
uint32_t GPIO_in::hIn
```

Filter time.

### 3.1.2.8 in

```
bool GPIO_in::in
```

Input value.

### 3.1.2.9 mem

```
bool GPIO_in::mem
```

Memo value.

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

- [GPIO\\_ex.h](#)

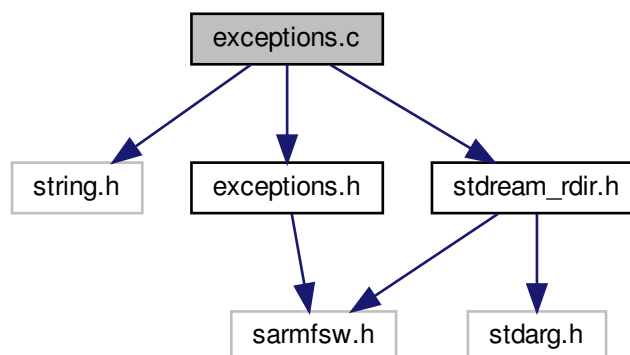
## 4 File Documentation

### 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[])  
*prints contents of stack*
- void [HardFault\\_Handler\\_callback](#) (uint32\_t stack[])  
*prints informations about current Hard Fault exception*
- void [Error\\_Handler\\_callback](#) (uint32\_t stack[])  
*prints informations about current Hard Fault exception*

#### 4.1.1 Detailed Description

Debug tool helpers functions.

##### Author

SMFSW

##### Date

2017

##### Copyright

MIT (c) 2017, SMFSW

## 4.1.2 Function Documentation

### 4.1.2.1 Error\_Handler\_callback()

```
void Error_Handler_callback (
    uint32_t stack[] )
```

prints informations about current Hard Fault exception

#### Parameters

in	<i>stack</i>	- pointer to stack address
----	--------------	----------------------------

#### Note

HardFault\_Handler\_callback should not be called directly use [exception\\_Handler\(\)](#) which prepares pointer to current stack instead

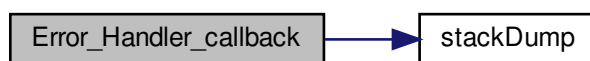
#### Warning

Depending how arm is fucked up, informations may not be printed, at least, you could inspect exception and stack through debug breakpoint

#### Returns

Never (anyways, arm fubared!)

Here is the call graph for this function:



### 4.1.2.2 HardFault\_Handler\_callback()

```
void HardFault_Handler_callback (
    uint32_t stack[] )
```

prints informations about current Hard Fault exception



**Parameters**

in	<i>stack</i>	- pointer to stack address
----	--------------	----------------------------

**Note**

HardFault\_Handler\_callback should not be called directly use [exception\\_Handler\(\)](#) which prepares pointer to current stack instead

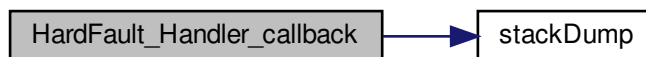
**Warning**

Depending how arm is fucked up, informations may not be printed, at least, you could inspect exception and stack through debug breakpoint

**Returns**

Never (anyways, arm fubared!)

Here is the call graph for this function:

**4.1.2.3 stackDump()**

```
void stackDump (
    uint32_t stack[] )
```

prints contents of stack

**Parameters**

in	<i>stack</i>	- pointer to stack address
----	--------------	----------------------------

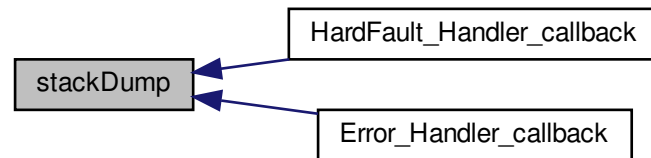
**Note**

stackDump should not be called directly, unless a particular stack is needed use [dump\\_stack\(\)](#) which prepares pointer to current stack instead

**Returns**

Nothing

Here is the caller graph for this function:

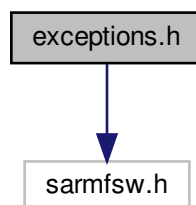


## 4.2 exceptions.h File Reference

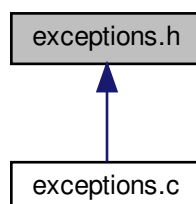
Debug tool and helpers declaration.

```
#include "sarmfsw.h"
```

Include dependency graph for exceptions.h:



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



## Macros

- #define `exception_Handler(e)`  
*Exception handler asm caller.*
- #define `dump_stack()`  
*Dump stack asm caller.*

## Functions

- void `stackDump (uint32_t stack[ ])`  
*prints contents of stack*
- void `HardFault_Handler_callback (uint32_t stack[ ])`  
*prints informations about current Hard Fault exception*
- void `Error_Handler_callback (uint32_t stack[ ])`  
*prints informations about current Hard Fault exception*

### 4.2.1 Detailed Description

Debug tool and helpers declaration.

#### Author

SMFSW

#### Date

2017

#### Copyright

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### 4.2.2 Macro Definition Documentation

#### 4.2.2.1 dump\_stack

```
#define dump_stack( )
```

#### Value:

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

Dump stack asm caller.

#### 4.2.2.2 exception\_Handler

```
#define exception_Handler(  
    e )
```

##### Value:

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

Exception handler asm caller.

##### Note

The exception\_Handler should be called with corresponding exception name **e** as parameter

#### 4.2.3 Function Documentation

##### 4.2.3.1 Error\_Handler\_callback()

```
void Error_Handler_callback (  
    uint32_t stack[] )
```

prints informations about current Hard Fault exception

##### Parameters

in	stack	- pointer to stack address
----	-------	----------------------------

##### Note

HardFault\_Handler\_callback should not be called directly use [exception\\_Handler\(\)](#) which prepares pointer to current stack instead

##### Warning

Depending how arm is fucked up, informations may not be printed, at least, you could inspect exception and stack through debug breakpoint

**Returns**

Never (anyways, arm fubared!)

Here is the call graph for this function:

**4.2.3.2 HardFault\_Handler\_callback()**

```
void HardFault_Handler_callback (
    uint32_t stack[] )
```

prints informations about current Hard Fault exception

**Parameters**

in	<i>stack</i>	- pointer to stack address
----	--------------	----------------------------

**Note**

`HardFault_Handler_callback` should not be called directly use [exception\\_Handler\(\)](#) which prepares pointer to current stack instead

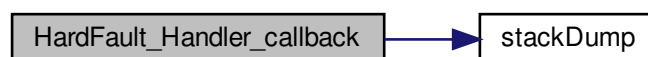
**Warning**

Depending how arm is fucked up, informations may not be printed, at least, you could inspect exception and stack through debug breakpoint

**Returns**

Never (anyways, arm fubared!)

Here is the call graph for this function:



#### 4.2.3.3 stackDump()

```
void stackDump (
    uint32_t stack[] )
```

prints contents of stack

##### Parameters

in	<i>stack</i>	- pointer to stack address
----	--------------	----------------------------

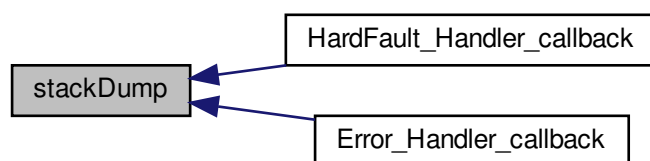
##### Note

stackDump should not be called directly, unless a particular stack is needed use [dump\\_stack\(\)](#) which prepares pointer to current stack instead

##### Returns

Nothing

Here is the caller graph for this function:

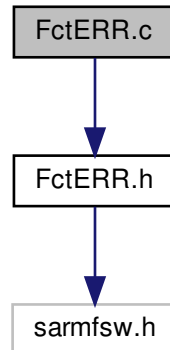


## 4.3 FctERR.c File Reference

errors to SMFSW FctERR code

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

Include dependency graph for FctERR.c:



#### Functions

- [FctERR HALERRtoFCTERR](#) (HAL\_StatusTypeDef status)  
*Convert HAL\_StatusTypeDef to FctERR.*

#### 4.3.1 Detailed Description

errors to SMFSW FctERR code

##### Author

SMFSW

##### Date

2017

##### Copyright

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#### 4.3.2 Function Documentation

##### 4.3.2.1 HALERRtoFCTERR()

```
FctERR HALERRtoFCTERR (
    HAL_StatusTypeDef status )
```

Convert HAL\_StatusTypeDef to FctERR.

**Parameters**

in	status	- HAL_StatusTypeDef status
----	--------	----------------------------

**Returns**

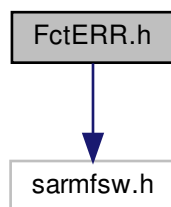
FctERR status

**4.4 FctERR.h File Reference**

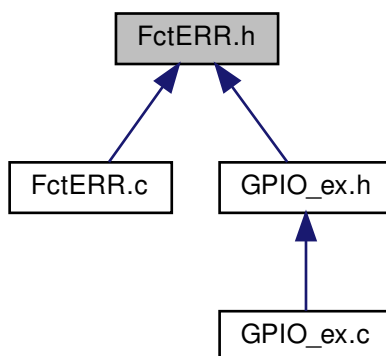
errors to SMFSW FctERR declarations

```
#include "sarmfsw.h"
```

Include dependency graph for FctERR.h:



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

**Typedefs**

- typedef enum [FctERR](#) FctERR



## Enumerations

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

*Enum of low/mid level functions return state.*

## Functions

- `FctERR HALERRtoFCTERR` (`HAL_StatusTypeDef` status)  
*Convert HAL\_StatusTypeDef to FctERR.*

## 4.4.1 Detailed Description

errors to SMFSW FctERR declarations

## Author

SMFSW

## Date

2017

## Copyright

MIT (c) 2017, SMFSW

## 4.4.2 Typedef Documentation

## 4.4.2.1 FctERR

```
typedef enum FctERR FctERR
```

## 4.4.3 Enumeration Type Documentation

## 4.4.3.1 FctERR

```
enum FctERR
```

Enum of low/mid level functions return state.

## Note

TODO: Fix !defined lines when `__mx_lwip_H` set (should not cause any harm, but ugly and set to cause issues sometime, somehow)

## Enumerator

ERR_OK	OK.
ERR_SPEED	This device does not work in the active speed mode.
ERR_RANGE	Parameter out of range.
ERR_TIMEOUT	Abort on timeout error.
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_NOTIMPLEM	Function not implemented error.
ERR_MEMORY	Memory error.
ERR_INSTANCE	Instance error.

## 4.4.4 Function Documentation

## 4.4.4.1 HALERRtoFCTERR()

```
FctERR HALERRtoFCTERR (
    HAL_StatusTypeDef status )
```

Convert HAL\_StatusTypeDef to FctERR.

## Parameters

in	status	- HAL_StatusTypeDef status
----	--------	----------------------------

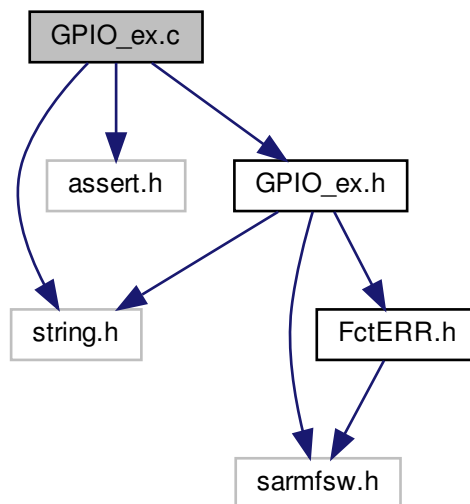
## Returns

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

##### Date

2017

##### Copyright

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#### 4.5.2 Macro Definition Documentation

##### 4.5.2.1 MAX\_PINS\_PORT

```
#define MAX_PINS_PORT 16
```

#### 4.5.3 Function Documentation

##### 4.5.3.1 GPIO\_in\_handler()

```
void GPIO_in_handler (  
    GPIO_in * in )
```

Handles [GPIO\\_in](#) read and treatment.

##### Parameters

<code>in, out</code>	<code>in</code>	- input instance to handle
----------------------	-----------------	----------------------------

##### Returns

Nothing

##### 4.5.3.2 GPIO\_in\_init()

```
void GPIO_in_init (  
    GPIO_in * in,
```

```
GPIO_TypeDef * GPIOx,  
uint16_t GPIO_Pin,  
uint16_t filter )
```

Initialize [GPIO\\_in](#) instance.

#### Parameters

in, out	<i>in</i>	- input instance to initialize
in	<i>GPIOx</i>	- port to write to
in	<i>GPIO_Pin</i>	- pin to write to
in	<i>filter</i>	- input filtering time

#### Returns

Nothing

#### 4.5.3.3 str\_GPIO\_name()

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

Get name from Port, Pin.

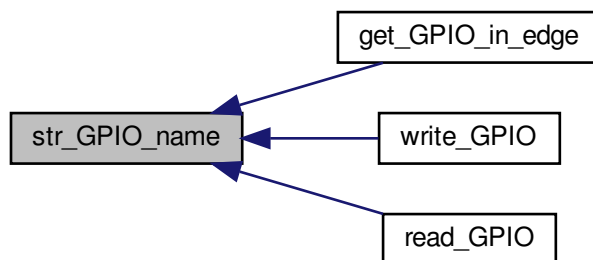
#### Parameters

in, out	<i>name</i>	- pointer to string for name
in	<i>GPIOx</i>	- port to write to
in	<i>GPIO_Pin</i>	- pin to write to

#### Returns

Error code

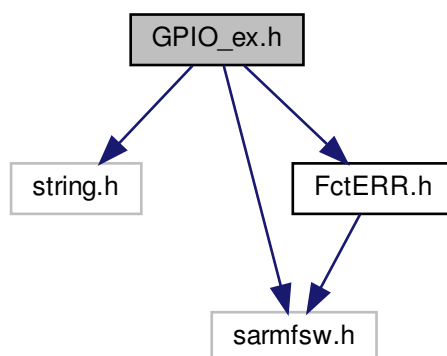
Here is the caller graph for this function:



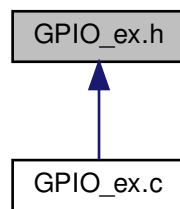
#### 4.6 GPIO\_ex.h File Reference

Simple extension for GPIOs.

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

##### Date

2017

##### Copyright

MIT (c) 2017, SMFSW

#### 4.6.2 Typedef Documentation

##### 4.6.2.1 eActOut

```
typedef enum ActOut eActOut
```

##### 4.6.2.2 GPIO\_in

```
typedef struct GPIO\_in GPIO_in
```

#### 4.6.3 Enumeration Type Documentation

##### 4.6.3.1 ActOut

```
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 get\_GPIO\_in()

```
bool get_GPIO_in (
    GPIO_in * in ) [inline]
```

Get GPIO\_in input value.

###### Parameters

in	<i>in</i>	- input instance
----	-----------	------------------

###### Returns

Input value

##### 4.6.4.2 get\_GPIO\_in\_edge()

```
bool get_GPIO_in_edge (
    GPIO_in * in ) [inline]
```

Get GPIO\_in input edge.

###### Parameters

in	<i>in</i>	- input instance
----	-----------	------------------

###### Returns

Input edge

Here is the call graph for this function:



#### 4.6.4.3 GPIO\_in\_handler()

```
void GPIO_in_handler (
    GPIO_in * in )
```

Handles [GPIO\\_in](#) read and treatment.

##### Parameters

in, out	<i>in</i>	- input instance to handle
---------	-----------	----------------------------

##### Returns

Nothing

#### 4.6.4.4 GPIO\_in\_init()

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

Initialize [GPIO\\_in](#) instance.

##### Parameters

in, out	<i>in</i>	- input instance to initialize
in	<i>GPIOx</i>	- port to write to
in	<i>GPIO_Pin</i>	- pin to write to
in	<i>filter</i>	- input filtering time

##### Returns

Nothing

#### 4.6.4.5 read\_GPIO()

```
GPIO_PinState read_GPIO (
    GPIO_TypeDef * GPIOx,
    uint16_t GPIO_Pin ) [inline]
```

Read GPIO.

##### Parameters

in	<i>GPIOx</i>	- port to read from
in	<i>GPIO_Pin</i>	- pin to read from

**Returns**

Pin state

Here is the call graph for this function:

**4.6.4.6 str\_GPIO\_name()**

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

Get name from Port, Pin.

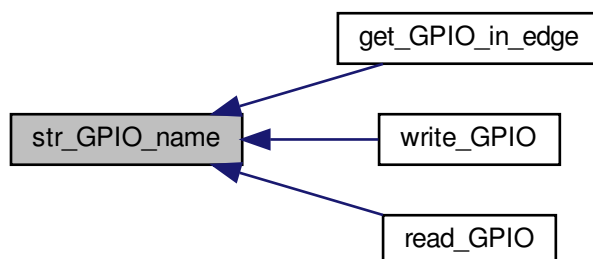
**Parameters**

in, out	<i>name</i>	- pointer to string for name
in	<i>GPIOx</i>	- port to write to
in	<i>GPIO_Pin</i>	- pin to write to

**Returns**

Error code

Here is the caller graph for this function:



#### 4.6.4.7 write\_GPIO()

```
void write_GPIO (
    GPIO_TypeDef * GPIOx,
    uint16_t GPIO_Pin,
    eActOut Act ) [inline]
```

Write GPIO.

##### Parameters

in	<i>GPIOx</i>	- port to write to
in	<i>GPIO_Pin</i>	- pin to write to
in	<i>Act</i>	- type of write

##### Returns

Nothing

Here is the call graph for this function:

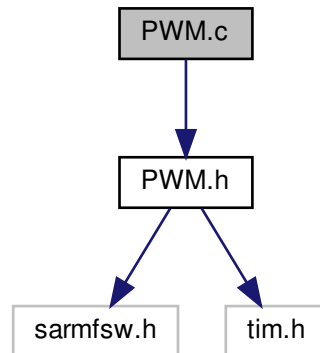


## 4.7 PWM.c File Reference

Straightforward PWM handling.

```
#include "PWM.h"
```

Include dependency graph for PWM.c:



## Functions

- HAL\_StatusTypeDef [init\\_TIM\\_Base](#) (TIM\_HandleTypeDef \*pTim, uint32\_t freq)  
*Init TIM module and start interruptions.*
- HAL\_StatusTypeDef [set\\_TIM\\_Freq](#) (TIM\_HandleTypeDef \*pTim, uint32\_t freq)  
*Set TIM module frequency.*
- HAL\_StatusTypeDef [init\\_PWM\\_Chan](#) (TIM\_HandleTypeDef \*pTim, uint32\_t chan, uint16\_t freq)  
*Init TIM PWM module channel with frequency and starts the 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)*

### 4.7.1 Detailed Description

Straightforward PWM handling.

#### Author

SMFSW

#### Date

2017

#### Copyright

MIT (c) 2017, SMFSW

## 4.7.2 Function Documentation

### 4.7.2.1 init\_PWM\_Chan()

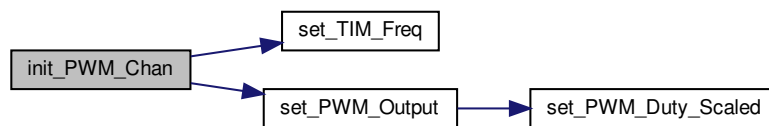
```
HAL_StatusTypeDef init_PWM_Chan (
    TIM_HandleTypeDef * pTim,
    uint32_t chan,
    uint16_t freq )
```

Init TIM PWM module channel with frequency and starts the channel.

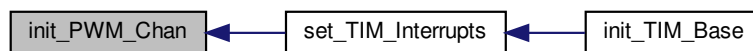
#### Parameters

in, out	<i>pTim</i>	- pointer to TIM instance for PWM generation
in	<i>chan</i>	- Channel to write
in	<i>freq</i>	- Desired PWM frequency

Here is the call graph for this function:



Here is the caller graph for this function:



### 4.7.2.2 init\_TIM\_Base()

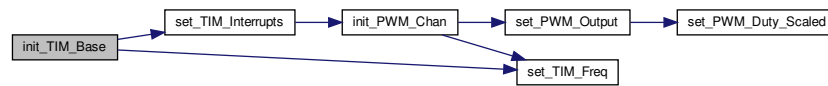
```
HAL_StatusTypeDef init_TIM_Base (
    TIM_HandleTypeDef * pTim,
    uint32_t freq )
```

Init TIM module and start interruptions.

## Parameters

in, out	<i>pTim</i>	- pointer to TIM instance
in	<i>freq</i>	- Desired TIM frequency

Here is the call graph for this function:



## 4.7.2.3 set\_PWM\_Duty\_Scaled()

```

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)

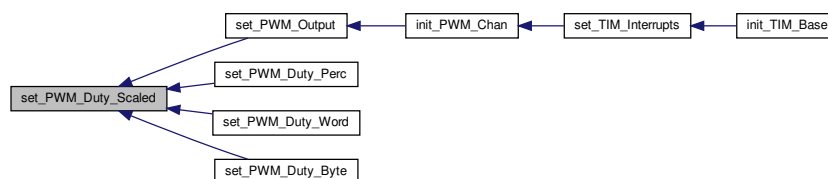
## Parameters

in, out	<i>pTim</i>	- pointer to TIM instance for PWM generation
in	<i>chan</i>	- Channel to write
in	<i>duty</i>	- Scaled duty cycle value to write
in	<i>scale</i>	- Full scale value

## Returns

HAL Status

Here is the caller graph for this function:



#### 4.7.2.4 set\_TIM\_Freq()

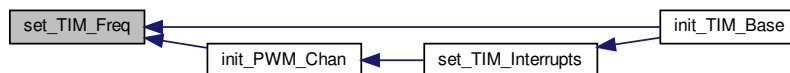
```
HAL_StatusTypeDef set_TIM_Freq (
    TIM_HandleTypeDef * pTim,
    uint32_t freq )
```

Set TIM module frequency.

##### Parameters

in, out	<i>pTim</i>	- pointer to TIM instance for Frequency computation
in	<i>freq</i>	- Desired TIM frequency

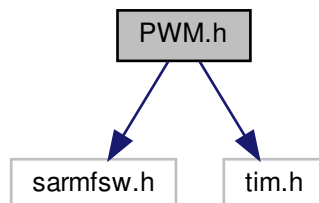
Here is the caller graph for this function:



## 4.8 PWM.h File Reference

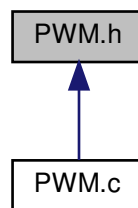
Straightforward PWM handling.

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





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



### Functions

- HAL\_StatusTypeDef [init\\_TIM\\_Base](#) (TIM\_HandleTypeDef \*pTim, uint32\_t freq)  
*Init TIM module and start interruptions.*
- HAL\_StatusTypeDef [set\\_TIM\\_Freq](#) (TIM\_HandleTypeDef \*pTim, uint32\_t freq)  
*Set TIM module frequency.*
- HAL\_StatusTypeDef [set\\_TIM\\_Interrupts](#) (TIM\_HandleTypeDef \*pTim, bool on)  
*Start TIM module interrupts.*
- HAL\_StatusTypeDef [init\\_PWM\\_Chan](#) (TIM\_HandleTypeDef \*pTim, uint32\_t chan, uint16\_t freq)  
*Init TIM PWM module channel with frequency and starts the channel.*
- HAL\_StatusTypeDef [set\\_PWM\\_Output](#) (TIM\_HandleTypeDef \*pTim, uint32\_t chan, bool on)  
*Set PWM channel output on/off.*
- 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

Straightforward PWM handling.

#### Author

SMFSW

#### Date

2017

#### Copyright

MIT (c) 2017, SMFSW

#### Warning

Shall work for all STM32 F families, L families not totally covered

## 4.8.2 Function Documentation

### 4.8.2.1 init\_PWM\_Chan()

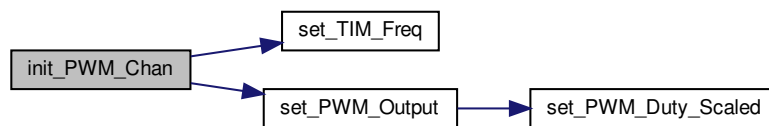
```
HAL_StatusTypeDef init_PWM_Chan (
    TIM_HandleTypeDef * pTim,
    uint32_t chan,
    uint16_t freq )
```

Init TIM PWM module channel with frequency and starts the channel.

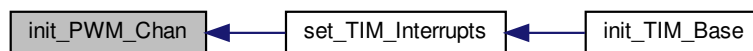
#### Parameters

in, out	<i>pTim</i>	- pointer to TIM instance for PWM generation
in	<i>chan</i>	- Channel to write
in	<i>freq</i>	- Desired PWM frequency

Here is the call graph for this function:



Here is the caller graph for this function:



### 4.8.2.2 init\_TIM\_Base()

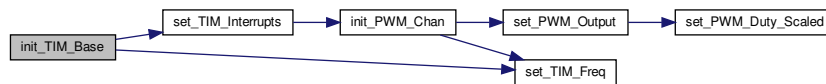
```
HAL_StatusTypeDef init_TIM_Base (
    TIM_HandleTypeDef * pTim,
    uint32_t freq )
```

Init TIM module and start interruptions.

## Parameters

in, out	<i>pTim</i>	- pointer to TIM instance
in	<i>freq</i>	- Desired TIM frequency

Here is the call graph for this function:



## 4.8.2.3 set\_PWM\_Duty\_Byte()

```

HAL_StatusTypeDef set_PWM_Duty_Byte (
    TIM_HandleTypeDef * pTim,
    uint32_t chan,
    uint8_t duty ) [inline]

```

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

## Parameters

in, out	<i>pTim</i>	- pointer to TIM instance for PWM generation
in	<i>chan</i>	- Channel to write
in	<i>duty</i>	- Scaled duty cycle value to write

## Returns

HAL Status

Here is the call graph for this function:



#### 4.8.2.4 set\_PWM\_Duty\_Perc()

```
HAL_StatusTypeDef set_PWM_Duty_Perc (
    TIM_HandleTypeDef * pTim,
    uint32_t chan,
    uint16_t duty ) [inline]
```

Set TIM module PWM duty cycle (percents)

##### Parameters

in, out	<i>pTim</i>	- pointer to TIM instance for PWM generation
in	<i>chan</i>	- Channel to write
in	<i>duty</i>	- Scaled duty cycle value to write

##### Returns

HAL Status

Here is the call graph for this function:



#### 4.8.2.5 set\_PWM\_Duty\_Scaled()

```
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)

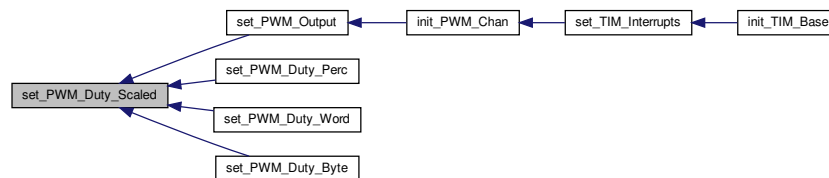
##### Parameters

in, out	<i>pTim</i>	- pointer to TIM instance for PWM generation
in	<i>chan</i>	- Channel to write
in	<i>duty</i>	- Scaled duty cycle value to write
in	<i>scale</i>	- Full scale value

**Returns**

HAL Status

Here is the caller graph for this function:

**4.8.2.6 set\_PWM\_Duty\_Word()**

```

HAL_StatusTypeDef set_PWM_Duty_Word (
    TIM_HandleTypeDef * pTim,
    uint32_t chan,
    uint16_t duty ) [inline]
  
```

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

**Parameters**

in, out	<i>pTim</i>	- pointer to TIM instance for PWM generation
in	<i>chan</i>	- Channel to write
in	<i>duty</i>	- Scaled duty cycle value to write

**Returns**

HAL Status

Here is the call graph for this function:



#### 4.8.2.7 set\_PWM\_Output()

```
HAL_StatusTypeDef set_PWM_Output (
    TIM_HandleTypeDef * pTim,
    uint32_t chan,
    bool on ) [inline]
```

Set PWM channel output on/off.

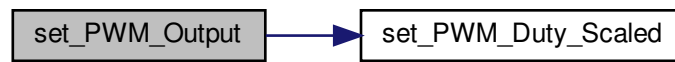
##### Parameters

in, out	<i>pTim</i>	- pointer to TIM instance for PWM generation
in	<i>chan</i>	- Channel to write
in	<i>on</i>	- Channel Output state 0: off, 1: on

##### Returns

HAL Status

Here is the call graph for this function:



Here is the caller graph for this function:



#### 4.8.2.8 set\_TIM\_Freq()

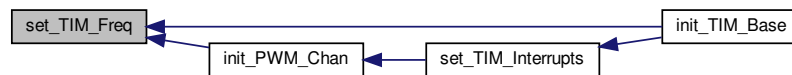
```
HAL_StatusTypeDef set_TIM_Freq (
    TIM_HandleTypeDef * pTim,
    uint32_t freq )
```

Set TIM module frequency.

## Parameters

in, out	<i>pTim</i>	- pointer to TIM instance for Frequency computation
in	<i>freq</i>	- Desired TIM frequency

Here is the caller graph for this function:



## 4.8.2.9 set\_TIM\_Interrupts()

```

HAL_StatusTypeDef set_TIM_Interrupts (
    TIM_HandleTypeDef * pTim,
    bool on ) [inline]

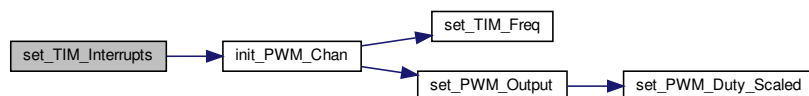
```

Start TIM module interrupts.

## Parameters

in, out	<i>pTim</i>	- pointer to TIM instance
in	<i>on</i>	- Time Interrupts 0: off, 1: on

Here is the call graph for this function:



Here is the caller graph for this function:

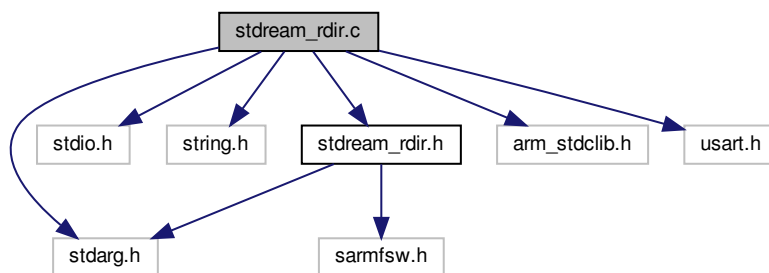


## 4.9 stdream\_rdir.c File Reference

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\\_itm\\_port](#) (int port, const char \*str, int len)  
*Sends string to chosen ITM port.*
- int [printf\\_ITM](#) (char \*str,...)
- int [vprintf\\_ITM](#) (char \*str, va\_list args)
- int [printf\\_rdir](#) (char \*str,...)
- int [vprintf\\_rdir](#) (char \*str, va\_list args)
- int32\_t [get\\_fp\\_dec](#) (float f, uint8\_t nb)  
*Get floating point number decimal part.*

### 4.9.1 Detailed Description

Stream redirection.

Author

SMFSW

Date

2017

Copyright

MIT (c) 2017, SMFSW



## 4.9.2 Function Documentation

### 4.9.2.1 get\_fp\_dec()

```
int32_t get_fp_dec (
    float f,
    uint8_t nb )
```

Get floating point number decimal part.

#### Note

in need to print floats, add '-u \_printf\_float' in Linker options

#### Warning

enabling floating point support from linker seems to fubar printing long variables

#### Parameters

in	<i>f</i>	- floating point value
in	<i>nb</i>	- Number of decimal to get after floating point

#### Returns

nb decimal part as integer

### 4.9.2.2 print\_itm\_port()

```
void print_itm_port (
    int port,
    const char * str,
    int len )
```

Sends string to chosen ITM port.

Get floating point number decimal part.

#### Parameters

in	<i>port</i>	- ITM port number
in	<i>str</i>	- pointer to string to send
in	<i>len</i>	- length of string

**Returns**

Nothing

**4.9.2.3 printf\_ITM()**

```
int printf_ITM (
    char * str,
    ... )
```

**4.9.2.4 printf\_rdir()**

```
int printf_rdir (
    char * str,
    ... )
```

**4.9.2.5 vprintf\_ITM()**

```
int vprintf_ITM (
    char * str,
    va_list args )
```

**4.9.2.6 vprintf\_rdir()**

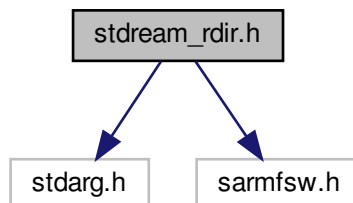
```
int vprintf_rdir (
    char * str,
    va_list args )
```

**4.10 stdream\_rdir.h File Reference**

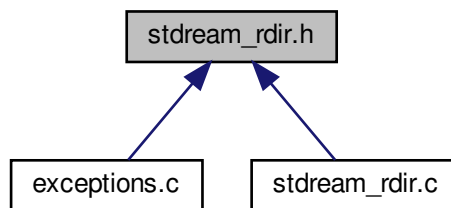
Stream redirection header.

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

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.*
- `#define vprintf vprintf_rdir`  
*Shadowing vprintf.*

#### Functions

- void `print_itm_port` (int port, const char \*str, int len)  
*Get floating point number decimal part.*
- int `printf_ITM` (char \*str,...)
- int `vprintf_ITM` (char \*str, va\_list args)
- int `printf_rdir` (char \*str,...)
- int `vprintf_rdir` (char \*str, va\_list args)
- int32\_t `get_fp_dec` (float f, uint8\_t nb)  
*Get floating point number decimal part.*

#### 4.10.1 Detailed Description

Stream redirection header.

#### Author

SMFSW

#### Date

2017

#### Copyright

MIT (c) 2017, SMFSW

#### Note

define `DBG_SERIAL` in compiler defines with an UART instance to send printf likes strings to UART otherwise, stings will be printed to ITM0 port only

## 4.10.2 Macro Definition Documentation

### 4.10.2.1 printf

```
#define printf printf_rdir
```

Shadowing printf.

### 4.10.2.2 vprintf

```
#define vprintf vprintf_rdir
```

Shadowing vprintf.

## 4.10.3 Function Documentation

### 4.10.3.1 get\_fp\_dec()

```
int32_t get_fp_dec (  
    float f,  
    uint8_t nb )
```

Get floating point number decimal part.

#### Note

in need to print floats, add '-u \_printf\_float' in Linker options

#### Warning

enabling floating point support from linker seems to fubar printing long variables

#### Parameters

in	<i>f</i>	- floating point value
in	<i>nb</i>	- Number of decimal to get after floating point

#### Returns

nb decimal part as integer

## 4.10.3.2 print\_itm\_port()

```
void print_itm_port (
    int port,
    const char * str,
    int len )
```

Get floating point number decimal part.

**Parameters**

in	<i>port</i>	- ITM port number
in	<i>str</i>	- pointer to message to send
in	<i>len</i>	- length of message to send

**Returns**

Nothing

Get floating point number decimal part.

**Parameters**

in	<i>port</i>	- ITM port number
in	<i>str</i>	- pointer to string to send
in	<i>len</i>	- length of string

**Returns**

Nothing

## 4.10.3.3 printf\_ITM()

```
int printf_ITM (
    char * str,
    ... )
```

## 4.10.3.4 printf\_rdir()

```
int printf_rdir (
    char * str,
    ... )
```

#### 4.10.3.5 vprintf\_ITM()

```
int vprintf_ITM (
    char * str,
    va_list args )
```

#### 4.10.3.6 vprintf\_rdir()

```
int vprintf_rdir (
    char * str,
    va_list args )
```

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