IndInf02_Ampelsteuerung_Weinb_5BHIT

1.0

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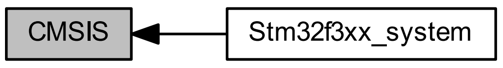
Module Documentation

4.1 CMSIS

Collaboration diagram for CMSIS:



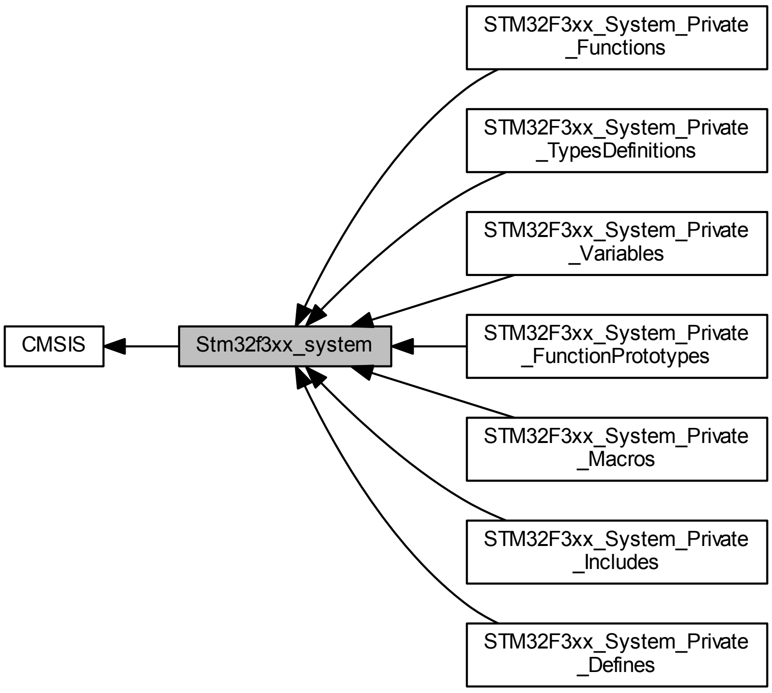
Modules

- Stm32f3xx_system

4.1.1 Detailed Description

4.2 Stm32f3xx_system

Collaboration diagram for Stm32f3xx_system:


STM32F3xx_System_Private_Functions
STM32F3xx_System_Private_TypesDefinitions
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STM32F3xx_System_Private_FunctionPrototypes
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Modules

- STM32F3xx_System_Private_Includes
- STM32F3xx_System_Private_TypesDefinitions
- STM32F3xx_System_Private_Defines
- STM32F3xx_System_Private_Macros
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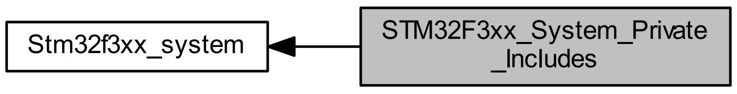
4.2.1 Detailed Description

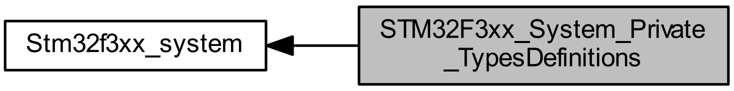
4.3 STM32F3xx_System_Private_Includes

Collaboration diagram for STM32F3xx_System_Private_Includes:



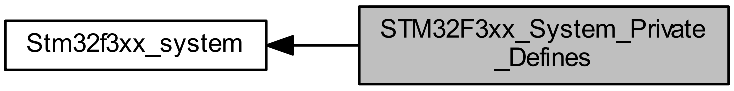
4.4 STM32F3xx_System_Private_TypesDefinitions

Collaboration diagram for STM32F3xx_System_Private_TypesDefinitions:



4.5 STM32F3xx_System_Private_Defines

Collaboration diagram for STM32F3xx_System_Private_Defines:



Macros

- #define HSE_VALUE ((uint32_t)8000000)
- #define HSI_VALUE ((uint32_t)8000000)
- #define VECT_TAB_OFFSET 0x0

4.5.1 Detailed Description

4.5.2 Macro Definition Documentation

4.5.2.1 #define HSE_VALUE ((uint32_t)8000000)

Default value of the External oscillator in Hz. This value can be provided and adapted by the user application.

4.5.2.2 #define HSI_VALUE ((uint32_t)8000000)

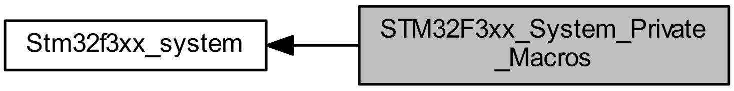
Default value of the Internal oscillator in Hz. This value can be provided and adapted by the user application.

4.5.2.3 #define VECT_TAB_OFFSET 0x0

$<$ Uncomment the following line if you need to relocate your vector Table in Internal SRAM. Vector Table base offset field. This value must be a multiple of 0x200.

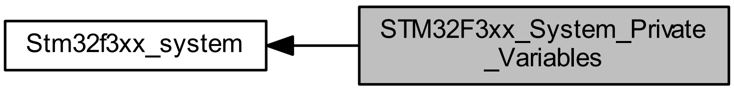
4.6 STM32F3xx_System_Private_Macros

Collaboration diagram for STM32F3xx_System_Private_Macros:



4.7 STM32F3xx_System_Private_Variables

Collaboration diagram for STM32F3xx_System_Private_Variables:



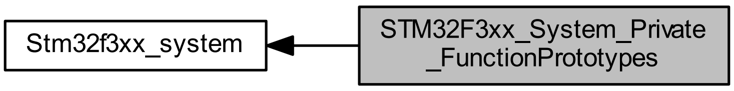
Variables

- uint32_t **SystemCoreClock** = 8000000
- __IO const uint8_t **AHBPrescTable** [16] = {0, 0, 0, 0, 0, 0, 0, 0, 1, 2, 3, 4, 6, 7, 8, 9}

4.7.1 Detailed Description

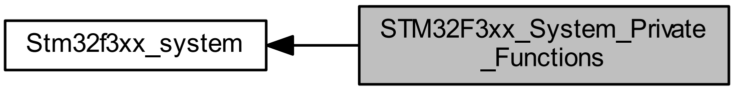
4.8 STM32F3xx_System_Private_FunctionPrototypes

Collaboration diagram for STM32F3xx_System_Private_FunctionPrototypes:



4.9 STM32F3xx_System_Private_Functions

Collaboration diagram for STM32F3xx_System_Private_Functions:



Functions

- void SystemInit (void)

  Setup the microcontroller system Initialize the FPU setting, vector table location and the PLL configuration is reset.
- void SystemCoreClockUpdate (void)

  Update SystemCoreClock variable according to Clock Register Values. The SystemCoreClock variable contains the core clock (HCLK), it can be used by the user application to setup the SysTick timer or configure other parameters.

4.9.1 Detailed Description

4.9.2 Function Documentation

4.9.2.1 void SystemCoreClockUpdate (void)

Update SystemCoreClock variable according to Clock Register Values. The SystemCoreClock variable contains the core clock (HCLK), it can be used by the user application to setup the SysTick timer or configure other parameters.

Note

Each time the core clock (HCLK) changes, this function must be called to update SystemCoreClock variable value. Otherwise, any configuration based on this variable will be incorrect.
- The system frequency computed by this function is not the real frequency in the chip. It is calculated based on the predefined constant and the selected clock source:

- If SYSCLK source is HSI, SystemCoreClock will contain the HSI_VALUE(∗)
- If SYSCLK source is HSE, SystemCoreClock will contain the HSE_VALUE(∗∗)
- If SYSCLK source is PLL, SystemCoreClock will contain the HSE_VALUE(∗∗) or HSI_VALUE(∗) multiplied/divided by the PLL factors.

(∗) HSI_VALUE is a constant defined in stm32f3xx_hal.h file (default value 8 MHz) but the real value may vary depending on the variations in voltage and temperature.

(∗∗) HSE_VALUE is a constant defined in stm32f3xx_hal.h file (default value 8 MHz), user has to ensure that HSE_VALUE is same as the real frequency of the crystal used. Otherwise, this function may have wrong result.

- The result of this function could be not correct when using fractional value for HSE crystal.

Parameters

None	

Return values

None	

4.9.2.2 void SystemInit (void)

Setup the microcontroller system Initialize the FPU setting, vector table location and the PLL configuration is reset.

Parameters

None	

Return values

None	

Chapter 5

Data Structure Documentation

5.1 traffic_light_data Struct Reference

Data Fields

- traffic_state **state**
- traffic_event **event**

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

- src/traffic_light.h

Chapter 6

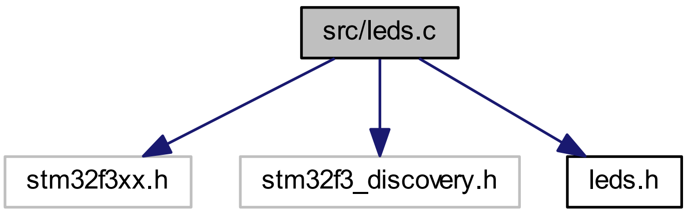
File Documentation

6.1 src/leds.c File Reference

Functions to control LEDs.

```
#include "stm32f3xx.h"
#include "stm32f3_discovery.h"
#include "leds.h"
```

Include dependency graph for leds.c:



Functions

- void led_init ()

  This function initializes the LEDs of the board.
- void led_reset ()

  This function switches all LEDs (red, orange, green) off.
- void led_red ()

  This function switches on the red LED for 4s.
- void led_red_yellow ()

  This function switches on the red & yellow LED for 2s.
- void led_green ()

  This function switches on the green LED for 2s.
- void led_green_blink ()

  This function switches on/off the green LED 4 times for 0,5s.
- void led_yellow ()

This function switches on the orange LED for 2s.

- void led_yellow_blink ()

  This function switches on/off the yellow led twice for 0,5s.

6.1.1 Detailed Description

Functions to control LEDs.

Author

Mathias Ritter

Version

V1.0

Date

13-November-2015

6.1.2 Function Documentation

6.1.2.1 void led_green ( )

This function switches on the green LED for 2s.

Parameters

none	

Return values

6.1.2.2 void led_green_blink ( )

This function switches on/off the green LED 4 times for 0,5s.

Parameters

none	

Return values

none	

6.1.2.3 void led_init ( )

This function initializes the LEDs of the board.

Parameters

none	

Return values

none	

6.1.2.4 void led_red ( )

This function switches on the red LED for 4s.

Parameters

none	

Return values

none	

6.1.2.5 void led_red_yellow ( )

This function switches on the red & yellow LED for 2s.

Parameters

none	

Return values

none	

6.1.2.6 void led_reset ( )

This function switches all LEDs (red, orange, green) off.

Parameters

none	

Return values

none	

6.1.2.7 void led_yellow ( )

This function switches on the orange LED for 2s.

Parameters

none	

Return values

none	

6.1.2.8 void led_yellow_blink ( )

This function switches on/off the yellow led twice for 0,5s.

Parameters

none	

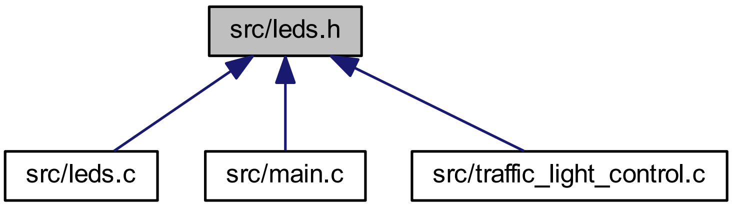
Return values

none	

6.2 src/leds.h File Reference

Definition of LED functions.

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



Functions

- void led_init ()

  This function initializes the LEDs of the board.
- void led_reset ()

  This function switches all LEDs (red, orange, green) off.
- void led_red ()

  This function switches on the red LED for 4s.
- void led_red_yellow ()

  This function switches on the red & yellow LED for 2s.
- void led_green ()

  This function switches on the green LED for 2s.
- void led_green_blink ()

  This function switches on/off the green LED 4 times for 0,5s.
- void led_yellow ()

  This function switches on the orange LED for 2s.
- void led_yellow_blink ()

  This function switches on/off the yellow led twice for 0,5s.

6.2.1 Detailed Description

Definition of LED functions.

Author

Mathias Ritter

Version

V1.0

Date

13-November-2015

6.2.2 Function Documentation

6.2.2.1 void led_green ( )

This function switches on the green LED for 2s.

Parameters

none	

Return values

6.2.2.2 void led_green_blink ( )

This function switches on/off the green LED 4 times for 0,5s.

Parameters

none	

Return values

none	

6.2.2.3 void led_init ( )

This function initializes the LEDs of the board.

Parameters

none	

Return values

none	

6.2.2.4 void led_red ( )

This function switches on the red LED for 4s.

Parameters

none	

Return values

none	

6.2.2.5 void led_red_yellow ( )

This function switches on the red & yellow LED for 2s.

Parameters

none	

Return values

none	

6.2.2.6 void led_reset ( )

This function switches all LEDs (red, orange, green) off.

Parameters

none	

Return values

none	

6.2.2.7 void led_yellow ( )

This function switches on the orange LED for 2s.

Parameters

none	

Return values

none	

6.2.2.8 void led_yellow_blink ( )

This function switches on/off the yellow led twice for 0,5s.

Parameters

none	

Return values

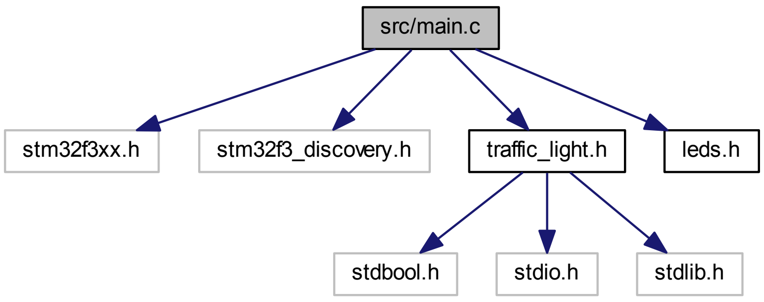
none	

6.3 src/main.c File Reference

Default main function.

```
#include "stm32f3xx.h"
#include "stm32f3_discovery.h"
#include "traffic_light.h"
#include "leds.h"
```

Include dependency graph for main.c:



Functions

- int **main** (void)

Variables

- traffic_light_data **traffic_light**

6.3.1 Detailed Description

Default main function.

Author

Mathias Ritter

Version

V1.0

Date

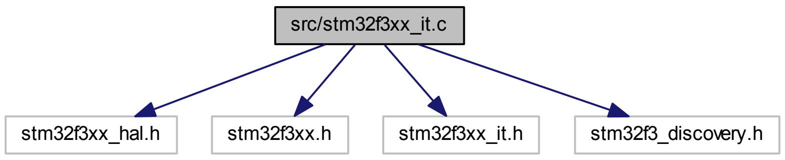
13-November-2015

6.4 src/stm32f3xx_it.c File Reference

Default Interrupt Service Routines.

```
#include "stm32f3xx_hal.h"
#include "stm32f3xx.h"
#include "stm32f3xx_it.h"
#include "stm32f3_discovery.h"
```

Include dependency graph for stm32f3xx_it.c:



Functions

- void SysTick_Handler (void)

  This function handles SysTick Handler.
- void EXTI0_IRQHandler (void)

  This function handles External Interrupt Handler.

6.4.1 Detailed Description

Default Interrupt Service Routines.

Author

Ac6

Version

V1.0

Date

02-Feb-2015

6.4.2 Function Documentation

6.4.2.1 void EXTI0_IRQHandler (void)

This function handles External Interrupt Handler.

Parameters

None	

Return values

None	

6.4.2.2 void SysTick_Handler (void)

This function handles SysTick Handler.

Parameters

None	

Return values

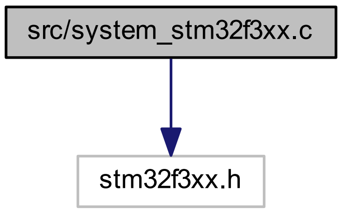
None	

6.5 src/system_stm32f3xx.c File Reference

CMSIS Cortex-M4 Device Peripheral Access Layer System Source File.

```
#include "stm32f3xx.h"
```

Include dependency graph for system_stm32f3xx.c:



Macros

- #define HSE_VALUE ((uint32_t)8000000)
- #define HSI_VALUE ((uint32_t)8000000)
- #define VECT_TAB_OFFSET 0x0

Functions

- void SystemInit (void)

  Setup the microcontroller system Initialize the FPU setting, vector table location and the PLL configuration is reset.
- void SystemCoreClockUpdate (void)

  Update SystemCoreClock variable according to Clock Register Values. The SystemCoreClock variable contains the core clock (HCLK), it can be used by the user application to setup the SysTick timer or configure other parameters.

Variables

- uint32_t **SystemCoreClock** = 8000000
- __IO const uint8_t **AHBPrescTable** [16] = {0, 0, 0, 0, 0, 0, 0, 0, 1, 2, 3, 4, 6, 7, 8, 9}

6.5.1 Detailed Description

CMSIS Cortex-M4 Device Peripheral Access Layer System Source File.

Author

MCD Application Team

Version

V1.2.0

Date

19-June-2015

1. This file provides two functions and one global variable to be called from user application:
   - SystemInit(): This function is called at startup just after reset and before branch to main program. This call is made inside the "startup_stm32f3xx.s" file.
   - SystemCoreClock variable: Contains the core clock (HCLK), it can be used by the user application to setup the SysTick timer or configure other parameters.
   - SystemCoreClockUpdate(): Updates the variable SystemCoreClock and must be called whenever the core clock is changed during program execution.
2. After each device reset the HSI (8 MHz) is used as system clock source. Then SystemInit() function is called, in "startup_stm32f3xx.s" file, to configure the system clock before to branch to main program.

3. This file configures the system clock as follows:

Supported STM32F3xx device

System Clock source | HSI

SYSCLK(Hz) | 8000000

HCLK(Hz) | 8000000

AHB Prescaler | 1

APB2 Prescaler | 1

APB1 Prescaler | 1

USB Clock | DISABLE

===

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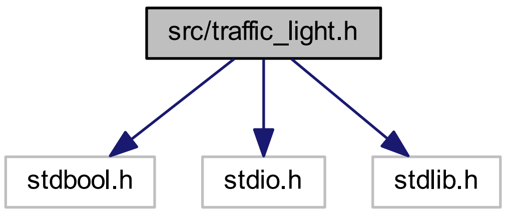
6.6 src/traffic_light.h File Reference

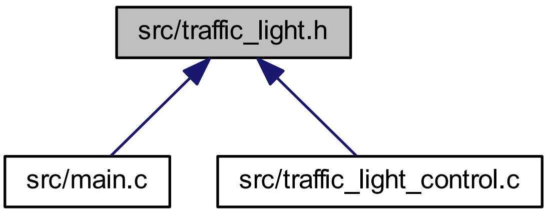
Definition of the traffic lights (including states and events)

```
#include <stdbool.h>
#include <stdio.h>
#include <stdlib.h>
```

Include dependency graph for traffic_light.h:



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



Data Structures

- struct traffic_light_data

Enumerations

- enum **traffic_state** {
RED, **RED_YELLOW**, **GREEN**, **GREEN_BLINK**,
YELLOW, **YELLOW_BLINK** }
- enum **traffic_event** {
STOP, **PREPARE_GO**, **GO**, **PREPARE_CAUTION**,
CAUTION, **FAULT** }

Functions

- void traffic_light_control (traffic_light_data ∗traffic_light)

    This function represents a event centric state machine to control the traffic light.

6.6.1 Detailed Description

Definition of the traffic lights (including states and events)

Author

Mathias Ritter

Version

V1.0

Date

13-November-2015

6.6.2 Function Documentation

6.6.2.1 void traffic_light_control (**traffic_light_data** ∗ *p_traffic_light*)

This function represents a event centric state machine to control the traffic light.

Parameters

none	

Return values

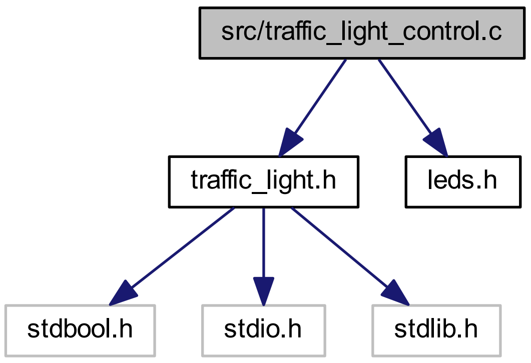
none	

6.7 src/traffic_light_control.c File Reference

event centric state machine to control the traffic light

```
#include "traffic_light.h"
#include "leds.h"
```

Include dependency graph for traffic_light_control.c:



Functions

- void traffic_light_control (traffic_light_data ∗p_traffic_light)
  This function represents a event centric state machine to control the traffic light.

6.7.1 Detailed Description

event centric state machine to control the traffic light

Author

Mathias Ritter

Version

V1.0

Date

13-November-2015

6.7.2 Function Documentation

6.7.2.1 void traffic_light_control (traffic_light_data ∗ *p_traffic_light*)

This function represents a event centric state machine to control the traffic light.

Parameters

none	

Return values

none	

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