# GPS

Generated by Doxygen 1.8.11

# Contents

# Chapter 1

# Hardware project

This project is part of an enginnering school programming project and aims to built a GPS software of an embedded system: compass, favorites places, waypoints, navigation, etc.

### Project

Hardware used:

- Texas Instrument MSP430F169
- Adafruit Ultimate GPS Breakout
- 4D Systems uOLED-128-G2

A presentation of the project is available in `French`.

### Documentation

An `HTML` documentation is available, with graph to a better understanding of the process (see `Files` tabs).

An `PDF` (LaTex) documentation is also available.

To update the documentation, make sure you have installed `Doxygen` and `Graphviz`.

Then browse to the root of the project folder and run: `doxygen doxygen.cfg`

To update the LaTEX documentation, browse `doc/latex` and run `make`

### Usage and options

To compile the project, you'll need `CrossWorks for MSP430`.

Open `project.hzp` to launch project. See `CrossWorks for MSP430 Reference Manual` for further explanations.

# Chapter 2

# Data Structure Index

## 2.1 Data Structures

Here are the data structures with brief descriptions:

# Chapter 3

# File Index

## 3.1 File List

Here is a list of all documented files with brief descriptions:

# Chapter 4

# Data Structure Documentation

## 4.1 gps_data Struct Reference

`#include <gps.h>`

### Data Fields

- float latitude
  *The latitude.*
- float longitude
  *The longitude.*
- float speed
  *The speed.*
- float heading
  *The heading.*

### 4.1.1 Detailed Description

Structure that contains useful GPS data

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

- software/gps.h

## 4.2 nmea_sentence_gga Struct Reference

`#include <parser_nmea.h>`

### Data Fields

- float latitude
  *Latitude.*
- float longitude
  *Longitude.*
- int fix_quality
  *Quality.*
- int satellites_tracked
  *Number of satellites.*
- float hdop
  *HDOP.*
- float altitude
  *Altitude.*
- char altitude_units
  *Altitude unit.*
- float height
  *Height.*
- char height_units
  *Height unit.*
- int dgps_age
  *Age.*

#### 4.2.1 Detailed Description

The structure that contains the data of GGA sentences

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

- software/parser_nmea.h

## 4.3 nmea_sentence_rmc Struct Reference

```
#include <parser_nmea.h>
```

### Data Fields

- int valid
  *Sentence validity.*
- float latitude
  *Latitude.*
- float longitude
  *Longitude.*
- float speed
  *Speed.*
- float heading
  *Heading.*

#### 4.3.1 Detailed Description

The structure that contains the data of RMC sentences

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

- software/parser_nmea.h

# Chapter 5

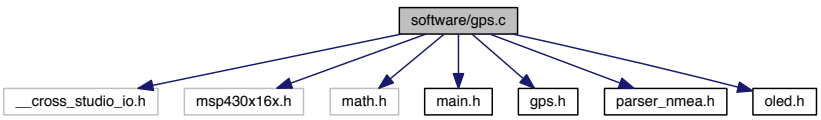
# File Documentation

## 5.1 software/gps.c File Reference

File containing the GPS functions.

```
#include <__cross_studio_io.h>
#include <msp430x16x.h>
#include <math.h>
#include "main.h"
#include "gps.h"
#include "parser_nmea.h"
#include "oled.h"
```

Include dependency graph for gps.c:




### Functions

- void toggleGPS (unsigned int state)

  *Toggle GPS (P4.0, ENABLE_GPS)*
- void toggleGPSInterrupt (unsigned int state)

  *Toggle GPS interrupt.*
- void enableUSARTforGPS (void)

  *Enable and config USART for GPS.*
- void gpsSend (char *message)

  *Send sentences to GPS to configure it (interrupt mode)*
- void usart0_rx (void)

  *Receive function for GPS data (USART0, interrupt mode)*
- float calcDistance (float lat1, float lon1, float lat2, float lon2)

  *Calculate the distance between two points (Haversine formula)*
- float deg2rad (float deg)

  *Degrees to radians converter.*

### Variables

- unsigned int dataValid
- gps_data GPSData

  *Store GPS valid data.*

### 5.1.1 Detailed Description

File containing the GPS functions.

**Author**

Gaël Foppolo (gaelfoppolo)

### 5.1.2 Function Documentation

#### 5.1.2.1 float calcDistance ( float *lat1*, float *lon1*, float *lat2*, float *lon2* )

Calculate the distance between two points (Haversine formula)

**See also**

Wikipedia

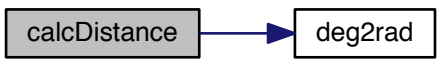
**Parameters**

| | |
|---|---|
| *lat1* | The latitude of the first point |
| *lon1* | The longitude of the first point |
| *lat2* | The latitude of the second point |
| *lon2* | The longitude of the second point |

**Returns**

The distance (in km)

Here is the call graph for this function:



#### 5.1.2.2 float deg2rad ( float *deg* )

Degrees to radians converter.

**Parameters**

| | |
|---|---|
| *deg* | The angle in degrees |

**Returns**

The angle in radians

Here is the caller graph for this function:

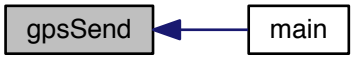

#### 5.1.2.3 void gpsSend ( char * *message* )

Send sentences to GPS to configure it (interrupt mode)

**Parameters**

| | |
|---|---|
| *message* | Message to send |

Here is the caller graph for this function:




#### 5.1.2.4 void toggleGPS ( unsigned int *state* )

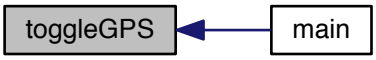
Toggle GPS (P4.0, ENABLE_GPS)

1 = enable, 0 = disable

**Parameters**

| | |
|---|---|
| *state* | The new state |

Here is the caller graph for this function:




#### 5.1.2.5 void toggleGPSInterrupt ( unsigned int *state* )

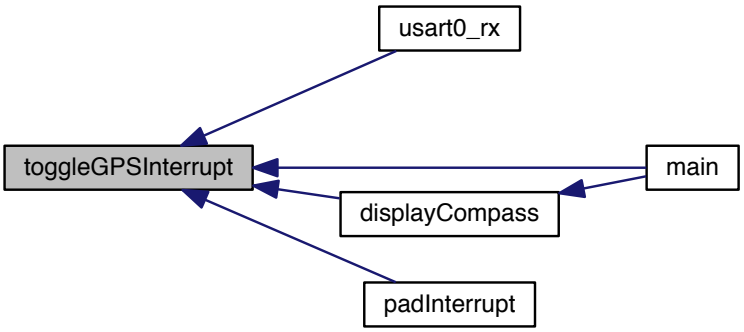
Toggle GPS interrupt.

1 = interrupt enable for GPS, 0 = disable

**Parameters**

| | |
|---|---|
| *state* | The new state |

Here is the caller graph for this function:




### 5.1.3 Variable Documentation

#### 5.1.3.1 unsigned int dataValid

Data are valid or not?

#### 5.1.3.2 gps_data GPSData

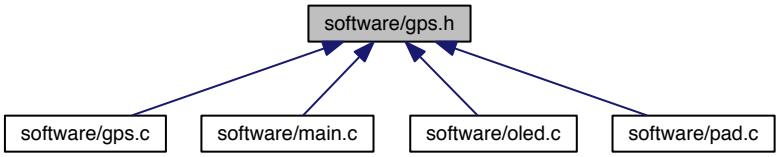
Store GPS valid data.

Useful data received and valid.

## 5.2 software/gps.h File Reference

File containing the GPS functions.

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




### Data Structures

- struct gps_data

### Macros

- #define NUMBERS_OF_SENTENCE 4

  *How many sentences do we want to receive in interrupt mode.*
- #define NUMBERS_OF_SENTENCE_MAX 10

  *How many sentences do we want to receive in interrupt mode (MAX)*
- #define RATE_1SEC "$PMTK220,1000∗1F\r\n"

  *GPS emits NMEA sentences every 1 sec.*
- #define RATE_2SEC "$PMTK220,2000∗1C\r\n"

  *GPS emits NMEA sentences every 2 sec.*
- #define RATE_5SEC "$PMTK220,5000∗1B\r\n"

  *GPS emits NMEA sentences every 5 sec.*
- #define RATE_10SEC "$PMTK220,10000∗2F\r\n"

  *GPS emits NMEA sentences every 10 sec.*
- #define DISABLE_ALL "$PMTK314,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0∗28\r\n"

  *Tell the GPS to not send sentences.*
- #define TURN_ALL "$PMTK314,1,1,1,1,1,1,0,0,0,0,0,0,0,0,0,0,0,0,0∗28\r\n"

  *Tell the GPS to send all sentences.*
- #define GGA_RMC "$PMTK314,0,1,0,1,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0∗28\r\n"

  *Tell the GPS to send GGA and RMC sentences only.*
- #define RMC_ONLY "$PMTK314,0,1,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0∗29\r\n"

  *Tell the GPS to send RMC sentences only.*

### Typedefs

- typedef struct gps_data gps_data

### Functions

- void toggleGPS (unsigned int state)

  *Toggle GPS (P4.0, ENABLE_GPS)*
- void toggleGPSInterrupt (unsigned int state)

  *Toggle GPS interrupt.*
- void enableUSARTforGPS (void)

  *Enable and config USART for GPS.*
- void gpsSend (char ∗message)

  *Send sentences to GPS to configure it (interrupt mode)*
- void usart0_rx (void)

  *Receive function for GPS data (USART0, interrupt mode)*
- float calcDistance (float lat1, float lon1, float lat2, float lon2)

  *Calculate the distance between two points (Haversine formula)*
- float deg2rad (float deg)

  *Degrees to radians converter.*

### Variables

- unsigned int dataValid
- struct gps_data GPSData

  *Useful data received and valid.*

## 5.2.1 Detailed Description

File containing the GPS functions.

**Author**

Gaël Foppolo (gaelfoppolo)

## 5.2.2 Typedef Documentation

### 5.2.2.1 typedef struct gps_data gps_data

Structure that contains useful GPS data

## 5.2.3 Function Documentation

### 5.2.3.1 float calcDistance ( float *lat1*, float *lon1*, float *lat2*, float *lon2* )

Calculate the distance between two points (Haversine formula)

**See also**

Wikipedia

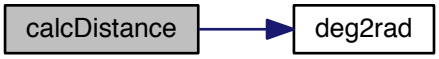
**Parameters**

| | |
|---|---|
| *lat1* | The latitude of the first point |
| *lon1* | The longitude of the first point |
| *lat2* | The latitude of the second point |
| *lon2* | The longitude of the second point |

**Returns**

The distance (in km)

Here is the call graph for this function:




#### 5.2.3.2 float deg2rad ( float *deg* )

Degrees to radians converter.

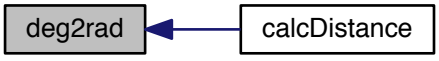
**Parameters**

| | |
|---|---|
| *deg* | The angle in degrees |

**Returns**

The angle in radians

Here is the caller graph for this function:



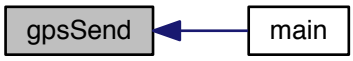

#### 5.2.3.3 void gpsSend ( char * *message* )

Send sentences to GPS to configure it (interrupt mode)

**Parameters**

| | |
|---|---|
| *message* | Message to send |

Here is the caller graph for this function:




#### 5.2.3.4 void toggleGPS ( unsigned int *state* )

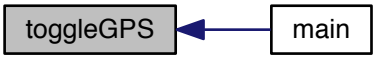
Toggle GPS (P4.0, ENABLE_GPS)

1 = enable, 0 = disable

**Parameters**

| | |
|---|---|
| *state* | The new state |

Here is the caller graph for this function:




#### 5.2.3.5 void toggleGPSInterrupt ( unsigned int *state* )

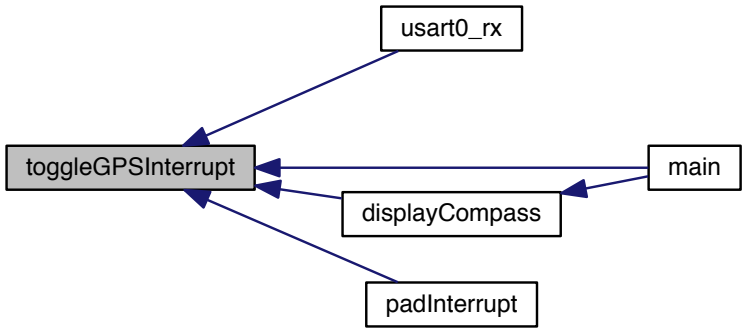
Toggle GPS interrupt.

1 = interrupt enable for GPS, 0 = disable

**Parameters**

| | |
|---|---|
| *state* | The new state |

Here is the caller graph for this function:




### 5.2.4 Variable Documentation

#### 5.2.4.1 unsigned int dataValid

Data are valid or not?

#### 5.2.4.2 struct gps_data GPSData

Useful data received and valid.

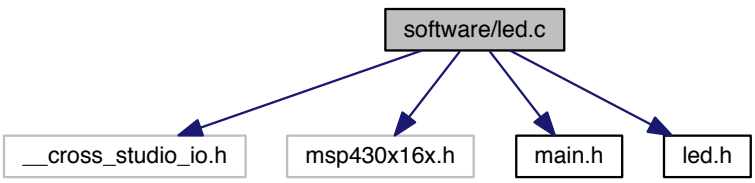
Useful data received and valid.

## 5.3 software/led.c File Reference

File containing the LED functions.

```
#include <__cross_studio_io.h>
#include <msp430x16x.h>
#include "main.h"
#include "led.h"
```

Include dependency graph for led.c:



## Functions

- void initLED (void)

  *Init LED (P1.0 -> P1.4)*
- void toggleLED (int n, unsigned int state, unsigned int duration)

  *Toogle the state of the choosen LED for a choosen time.*

### 5.3.1 Detailed Description

File containing the LED functions.

**Author**

Gaël Foppolo (gaelfoppolo)

### 5.3.2 Function Documentation

#### 5.3.2.1 void initLED ( void )

Init LED (P1.0 -> P1.4)

All ready to use and state cleared

Here is the caller graph for this function:


#### 5.3.2.2 void toggleLED ( int *n*, unsigned int *state*, unsigned int *duration* )

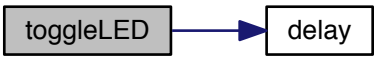
Toogle the state of the choosen LED for a choosen time.

duration = 0 -> stay in the state choosen

**Parameters**

| | |
|---|---|
| *n* | The LED to toogle |
| *state* | The new state |
| *duration* | The time to toogle the state of the LED |

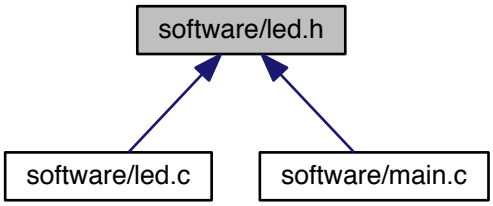
Here is the call graph for this function:




## 5.4 software/led.h File Reference

File containing the LED functions.

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




### Functions

- void initLED (void)

  *Init LED (P1.0 -> P1.4)*
- void toggleLED (int n, unsigned int state, unsigned int duration)

  *Toogle the state of the choosen LED for a choosen time.*

### 5.4.1 Detailed Description

File containing the LED functions.

**Author**

Gaël Foppolo (gaelfoppolo)

### 5.4.2 Function Documentation

#### 5.4.2.1 void initLED ( void )

Init LED (P1.0 -> P1.4)

All ready to use and state cleared

Here is the caller graph for this function:


#### 5.4.2.2 void toggleLED ( int *n*, unsigned int *state*, unsigned int *duration* )

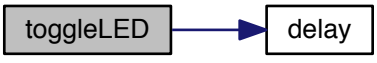
Toogle the state of the choosen LED for a choosen time.

duration = 0 -> stay in the state choosen

**Parameters**

| | |
|---|---|
| *n* | The LED to toogle |
| *state* | The new state |
| *duration* | The time to toogle the state of the LED |

Here is the call graph for this function:

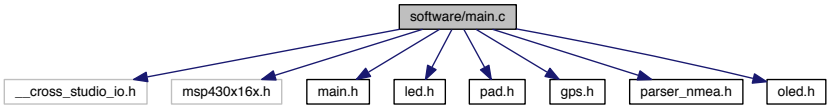



## 5.5 software/main.c File Reference

File containing the main functions.

```
#include <__cross_studio_io.h>
#include <msp430x16x.h>
#include "main.h"
#include "led.h"
#include "pad.h"
#include "gps.h"
#include "parser_nmea.h"
#include "oled.h"
```

Include dependency graph for main.c:




## Functions

- void main (void)
- void toggleCommunication (unsigned int state)

  *Toogle the communication (P4.2, CMD_SWITCH)*
- void configureClock (void)

  *Configure the external clock.*
- void delay (float x)

  *Wait for x sec.*

## Variables

- unsigned int modeSelected

### 5.5.1 Detailed Description

File containing the main functions.

#### Author

Gaël Foppolo (gaelfoppolo)

### 5.5.2 Function Documentation

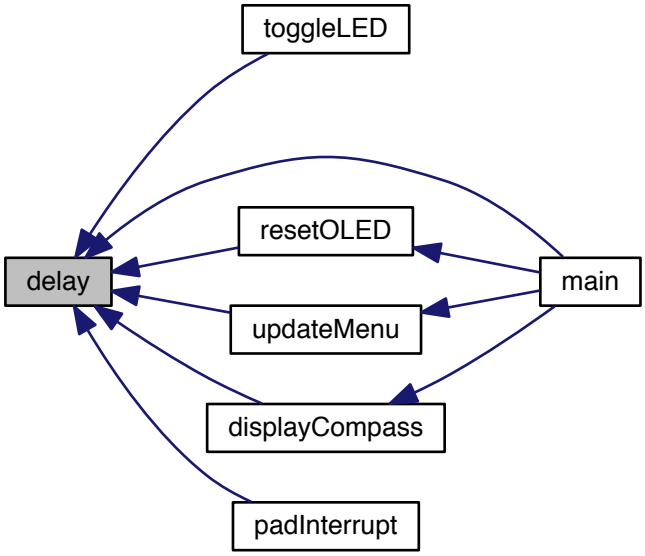
#### 5.5.2.1 void delay ( float *x* )

Wait for x sec.

#### Parameters

| | |
|---|---|
| *x* | The time to wait (in sec ~) |

Here is the caller graph for this function:




#### 5.5.2.2 void main ( void )

Menu entry point

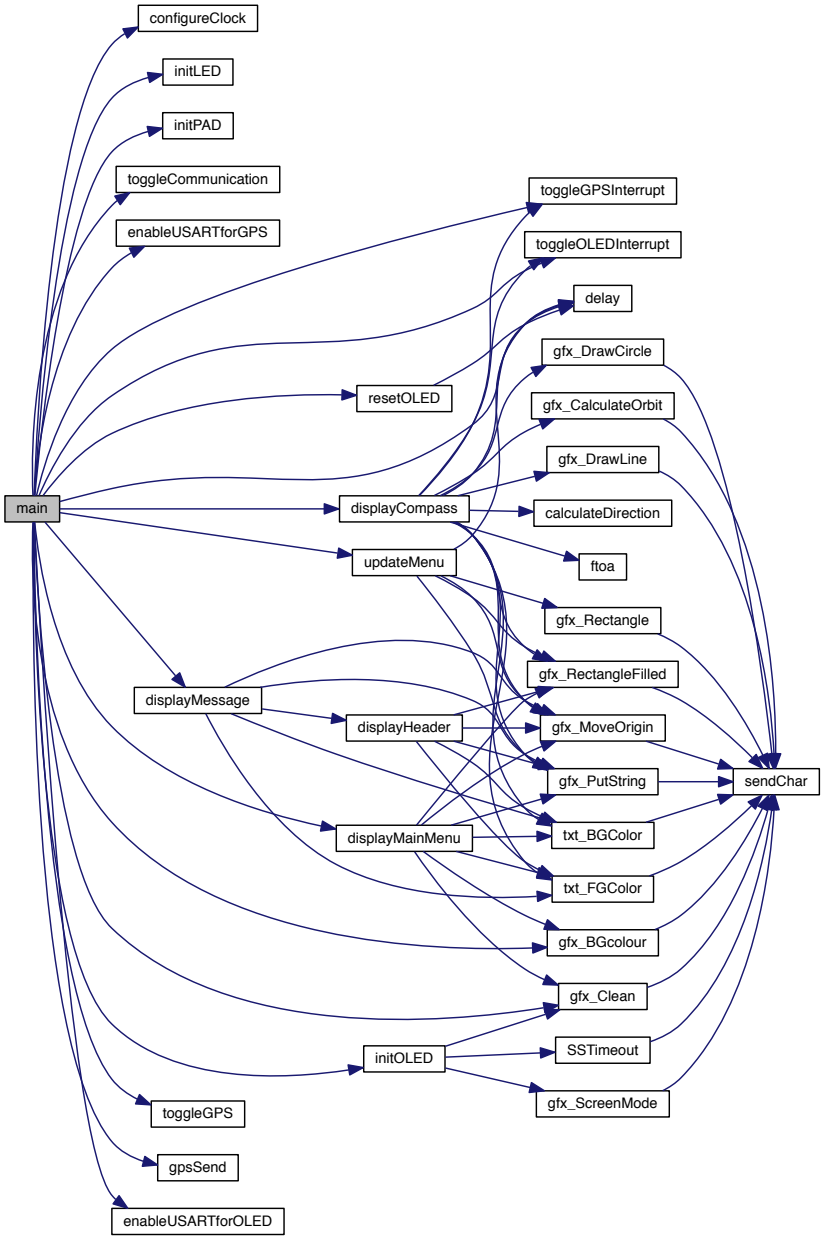
Compass entry point

Navigation entry point

Record entry point

Shutdown entry point

Here is the call graph for this function:




#### 5.5.2.3 void toggleCommunication ( unsigned int *state* )

Toogle the communication (P4.2, CMD_SWITCH)

1 = USB, 0 = GPS

**Parameters**

| | |
|---|---|
| *state* | The new state |

Here is the caller graph for this function:


### 5.5.3 Variable Documentation

#### 5.5.3.1 unsigned int modeSelected

Mode selected by the user,

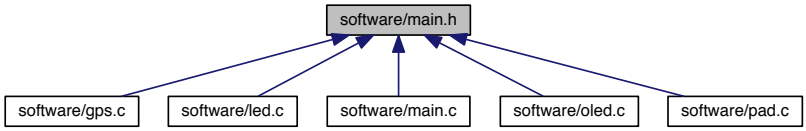
**See also**

M_MENU, etc.

## 5.6 software/main.h File Reference

File containing the main functions.

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




### Macros

- #define M_MENU 0
  *Mode menu.*
- #define M_COMPASS 1
  *Mode compass.*
- #define M_NAVIG 2
  *Mode navigation.*
- #define M_RECORD 3
  *Mode record.*
- #define M_SHUTDOWN 4
  *Mode shutdown.*

- #define COMM_GPS 0

  *Communication with GPS module.*
- #define COMM_USB 1

  *Communication with USB.*
- #define YES 1

  *YES.*
- #define NO 0

  *NO.*

### Functions

- void configureClock (void)

  *Configure the external clock.*
- void toggleCommunication (unsigned int state)

  *Toogle the communication (P4.2, CMD_SWITCH)*
- void delay (float x)

  *Wait for x sec.*

### Variables

- unsigned int modeSelected

## 5.6.1 Detailed Description

File containing the main functions.

**Author**

Gaël Foppolo (gaelfoppolo)

## 5.6.2 Function Documentation

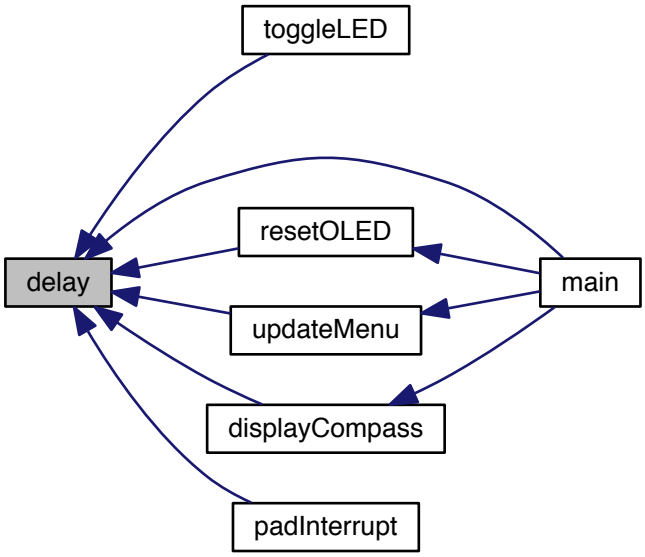
### 5.6.2.1 void delay ( float *x* )

Wait for x sec.

**Parameters**

| | |
|---|---|
| *x* | The time to wait (in sec ~) |

Here is the caller graph for this function:




#### 5.6.2.2 void toggleCommunication ( unsigned int *state* )

Toogle the communication (P4.2, CMD_SWITCH)

1 = USB, 0 = GPS

**Parameters**

| | |
|---|---|
| *state* | The new state |

Here is the caller graph for this function:


### 5.6.3 Variable Documentation

#### 5.6.3.1 unsigned int modeSelected

Mode selected by the user,

**See also**

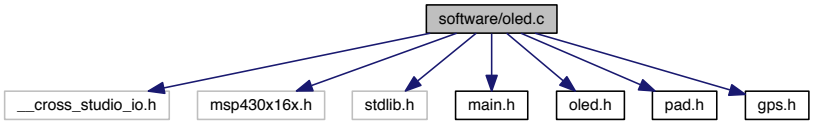
M_MENU, etc.

## 5.7 software/oled.c File Reference

File containing the OLED functions.

```
#include <__cross_studio_io.h>
#include <msp430x16x.h>
#include <stdlib.h>
#include "main.h"
#include "oled.h"
#include "pad.h"
#include "gps.h"
```

Include dependency graph for oled.c:




### Functions

- void enableUSARTforOLED (void)

  *Enable and config USART for OLED.*
- void resetOLED ()

  *Reset OLED.*
- void toggleOLEDInterrupt (unsigned int state)

  *Toggle OLED interrupt.*
- void sendChar (int c)

  *Send char.*
- void usart1_rx (void)

  *Receive function for OLED data (USART1, interrupt mode)*
- void gfx_Clean ()

  *Clean the screen.*
- void gfx_BGcolour (int color)

  *Set the background color.*
- void gfx_PutString (char *string)

  *Put a string on the screen.*
- void gfx_RectangleFilled (int x1, int y1, int x2, int y2, int color)

  *Draw a rectangle filled with a color.*

- void SSTimeout (int t)

  *Screensave mode.*
- void gfx_CalculateOrbit (int angle, int distance, int ∗x, int ∗y)

  *Calculate the (x,y) pos (orbit) from angle and distance.*
- void gfx_DrawCircle (int x, int y, int radius, int color)

  *Draw a circle.*
- void gfx_DrawLine (int x1, int y1, int x2, int y2, int color)

  *Draw a line.*
- void gfx_MoveOrigin (int x, int y)

  *Move to origin to a position.*
- void gfx_ScreenMode (int mode)

  *Screen mode (portrait/landscape)*
- void txt_FGColor (int color)

  *Set the text color.*
- void txt_BGColor (int color)

  *Set the text background color.*
- void setBaudRate ()

  *Set the baud rate.*
- void gfx_Rectangle (int x1, int y1, int x2, int y2, int color)

  *Draw a rectangle.*
- void txt_Width (int multi)

  *Set the width of the text.*
- void initOLED ()

  *Configure OLED for proper using.*
- void displayMainMenu ()

  *Display menu.*
- void updateMenu ()

  *Update the menu with currently selected.*
- void displayHeader ()

  *Display message header.*
- void displayMessage (char ∗string)

  *Display a string in the center of the screen.*
- void displayCompass ()

  *Display the compass.*
- void ftoa (char ∗p, float x)

  *Float to string conversion.*
- char ∗ calculateDirection ()

  *Calculate the direction (N, S, NE, etc.)*

## Variables

- int displayHasBeenUpdated
- unsigned int modeDisplay = MD_SHUTDOWN
- unsigned int oldModeDisplay
- int answer = 0

  *The answer received by the OLED.*
- int flagReceive = 0

  *Answer received?*

### 5.7.1 Detailed Description

File containing the OLED functions.

**Author**

Gaël Foppolo (gaelfoppolo)

### 5.7.2 Function Documentation

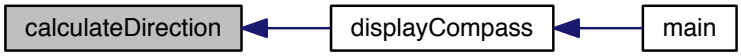
#### 5.7.2.1 char* calculateDirection ( )

Calculate the direction (N, S, NE, etc.)

**Returns**

The direction.

Here is the caller graph for this function:



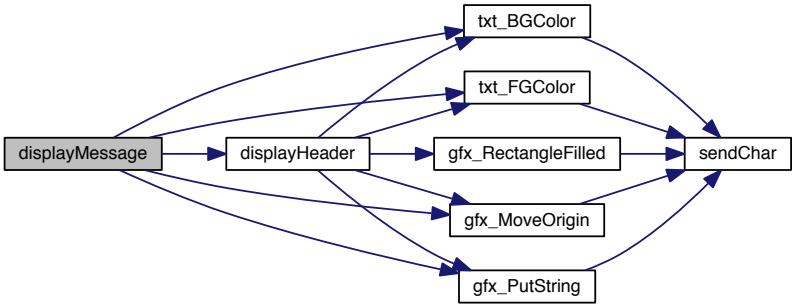

#### 5.7.2.2 void displayMessage ( char * *string* )

Display a string in the center of the screen.

**Parameters**

| | |
|---|---|
| *string* | The string to display |

Here is the call graph for this function:




Here is the caller graph for this function:


#### 5.7.2.3 void ftoa ( char * p, float x )

Float to string conversion.

**Parameters**

| | | |
|---|---|---|
| | *p* | The buffer (string) |
| in | *x* | The float |

Here is the caller graph for this function:

#### 5.7.2.4 void gfx_BGcolour ( int *color* )

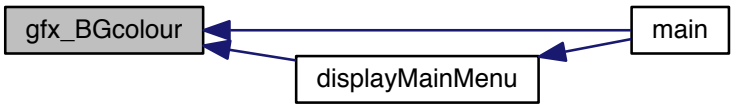
Set the background color.

**Parameters**

| | | |
|---|---|---|
| in | *color* | The color |

Here is the call graph for this function:


Here is the caller graph for this function:



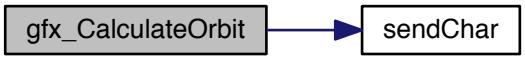

#### 5.7.2.5 void gfx_CalculateOrbit ( int *angle*, int *distance*, int * *x*, int * *y* )

Calculate the (x,y) pos (orbit) from angle and distance.

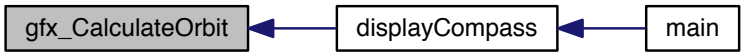
**Parameters**

| | | |
|---|---|---|
| in | *angle* | The angle |
| in | *distance* | The distance |
| | *x* | The x pos computed |
| | *y* | The y pos computed |

Here is the call graph for this function:




Here is the caller graph for this function:



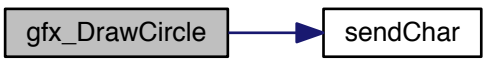

#### 5.7.2.6 void gfx_DrawCircle ( int *x*, int *y*, int *radius*, int *color* )

Draw a circle.

**Parameters**

| | | |
|---|---|---|
| in | *x* | x pos of center of the circle |
| in | *y* | y pos of center of the circle |
| in | *radius* | The radius |
| in | *color* | The color |

Here is the call graph for this function:



Here is the caller graph for this function:

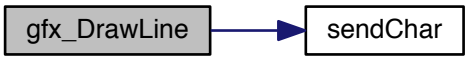

#### 5.7.2.7 void gfx_DrawLine ( int *x1,* int *y1,* int *x2,* int *y2,* int *color* )

Draw a line.

**Parameters**

| | | |
|---|---|---|
| in | *x1* | The x pos of the beginning of the line |
| in | *y1* | The y pos of the beginning of the line |
| in | *x2* | The x pos of the ending of the line |
| in | *y2* | The y pos of the ending of the line |
| in | *color* | The color |

Here is the call graph for this function:




Here is the caller graph for this function:

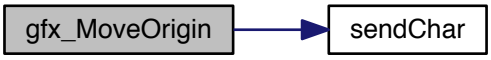

#### 5.7.2.8 void gfx_MoveOrigin ( int *x,* int *y* )

Move to origin to a position.

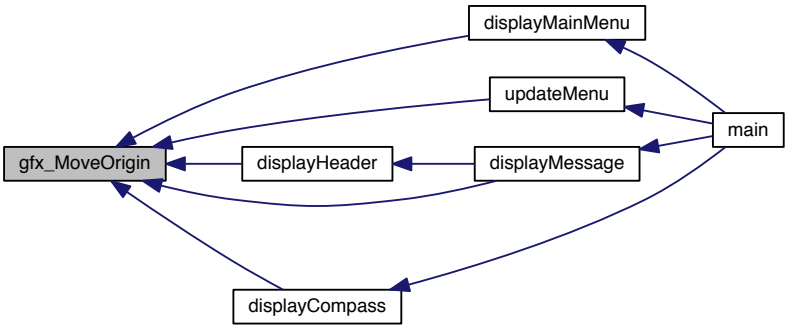
**Parameters**

| | | |
|---|---|---|
| in | *x* | The new x pos |
| in | *y* | The new y pos |

Here is the call graph for this function:




Here is the caller graph for this function:




#### 5.7.2.9 void gfx_PutString ( char * *string* )

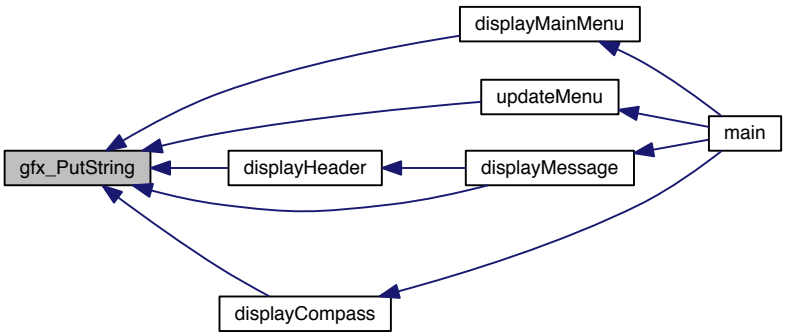
Put a string on the screen.

**Parameters**

| | |
|---|---|
| *string* | The string |

Here is the call graph for this function:


Here is the caller graph for this function:



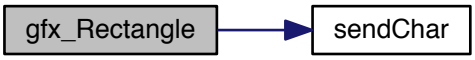

#### 5.7.2.10 void gfx_Rectangle ( int *x1*, int *y1*, int *x2*, int *y2*, int *color* )

Draw a rectangle.

**Parameters**

| | | |
|---|---|---|
| in | *x1* | The x pos of the top left corner |
| in | *y1* | The y pos of the top left corner |
| in | *x2* | The x pos of the bottom right corner |
| in | *y2* | The y pos of the bottom right corner |
| in | *color* | The color |

Here is the call graph for this function:




Here is the caller graph for this function:

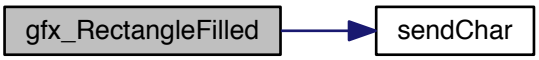

#### 5.7.2.11 void gfx_RectangleFilled ( int *x1*, int *y1*, int *x2*, int *y2*, int *color* )

Draw a rectangle filled with a color.

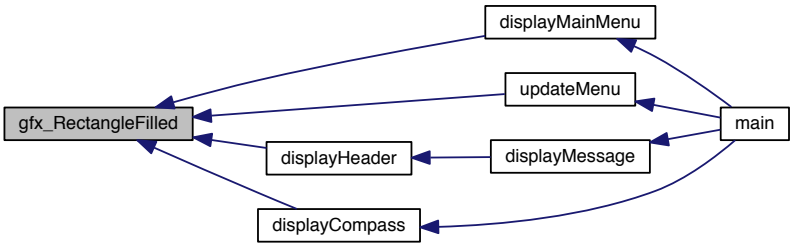
**Parameters**

| | | |
|---|---|---|
| in | *x1* | The x pos of the top left corner |
| in | *y1* | The y pos of the top left corner |
| in | *x2* | The x pos of the bottom right corner |
| in | *y2* | The y pos of the bottom right corner |
| in | *color* | The color |

Here is the call graph for this function:



Here is the caller graph for this function:



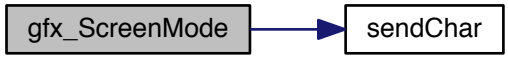

#### 5.7.2.12 void gfx_ScreenMode ( int *mode* )

Screen mode (portrait/landscape)

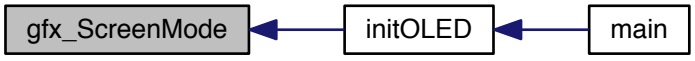
**Parameters**

| | | |
|---|---|---|
| in | *mode* | The mode |

Here is the call graph for this function:




Here is the caller graph for this function:



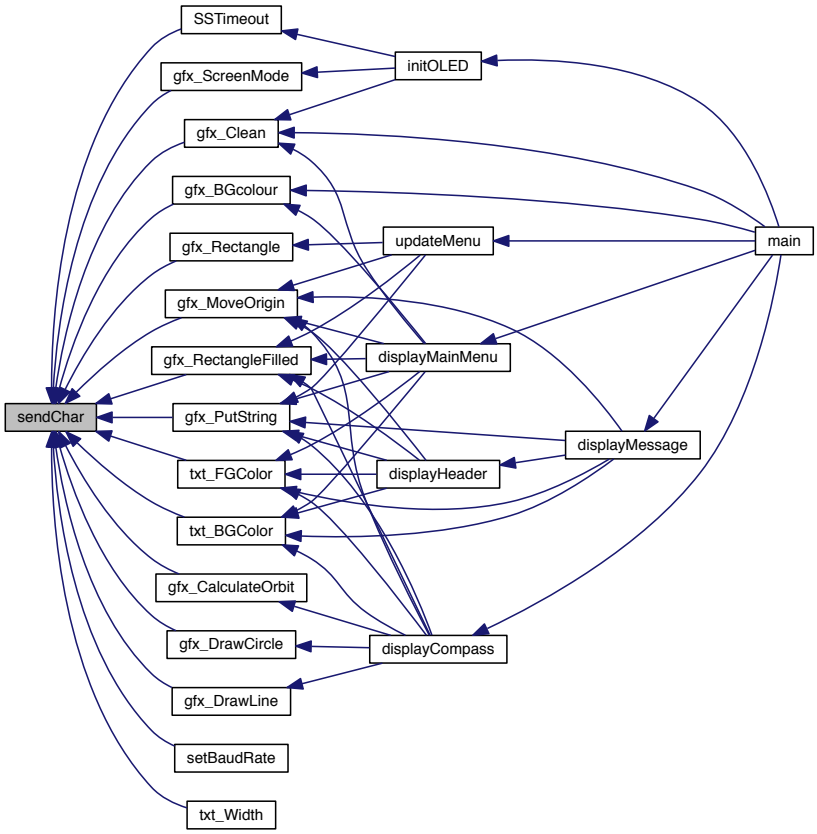

#### 5.7.2.13 void sendChar ( int *c* )

Send char.

**Parameters**

| | |
|---|---|
| *c* | The int to send |

Here is the caller graph for this function:




#### 5.7.2.14 void SSTimeout ( int *t* )

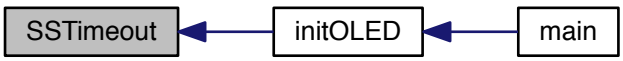
Screensave mode.

**Parameters**

| | | |
|---|---|---|
| in | *t* | The mode |

Here is the call graph for this function:


Here is the caller graph for this function:




#### 5.7.2.15 void toggleOLEDInterrupt ( unsigned int *state* )

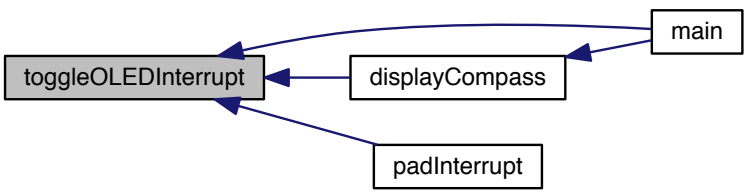
Toggle OLED interrupt.

1 = interrupt enable for OLED, 0 = disable

**Parameters**

| | |
|---|---|
| *state* | The new state |

Here is the caller graph for this function:



#### 5.7.2.16 void txt_BGColor ( int *color* )

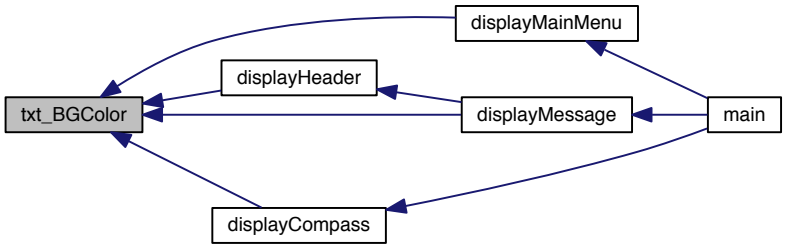
Set the text background color.

**Parameters**

| | | |
|---|---|---|
| in | *color* | The color |

Here is the call graph for this function:


Here is the caller graph for this function:




#### 5.7.2.17 void txt_FGColor ( int *color* )

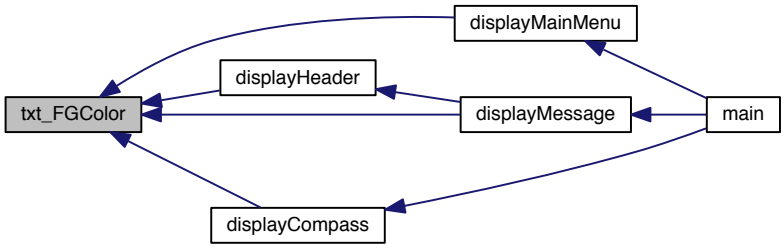
Set the text color.

**Parameters**

| | | |
|---|---|---|
| in | *color* | The color |

Here is the call graph for this function:


Here is the caller graph for this function:




#### 5.7.2.18 void txt_Width ( int *multi* )

Set the width of the text.

**Parameters**

| | | |
|---|---|---|
| in | *multi* | The multi |

Here is the call graph for this function:


### 5.7.3 Variable Documentation

#### 5.7.3.1 int displayHasBeenUpdated

Is the display has been updated, aka needed

#### 5.7.3.2 unsigned int modeDisplay = MD_SHUTDOWN

What mode is selected right now

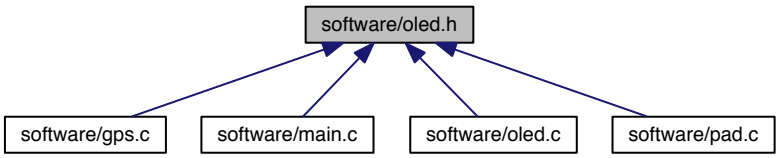
#### 5.7.3.3 unsigned int oldModeDisplay

What mode was selected just before

## 5.8 software/oled.h File Reference

File containing the OLED functions.

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




### Macros

- #define CURRENT 1
  *Current.*
- #define OLD 0
  *OLD.*
- #define MD_COMPASS 0
  *Mode selected on display is compass.*
- #define MD_NAVIG 1
  *Mode selected on display is naviguation.*
- #define MD_RECORD 2
  *Mode selected on display is record.*
- #define MD_SHUTDOWN 3
  *Mode selected on display is shutdown.*
- #define NONE ""
  *Direction is none.*
- #define NORTH "N"
  *Direction is north.*

- #define NE "NE"

  *Direction is north-east.*
- #define EAST "E"

  *Direction is east.*
- #define SE "SE"

  *Direction is south-east.*
- #define SOUTH "S"

  *Direction is south.*
- #define SW "SO"

  *Direction is south-west.*
- #define WEST "O"

  *Direction is west.*
- #define NW "NO"

  *Direction is north-west.*
- #define OLED_ANSWER_ACK 6

  *OLED respond is ACK.*
- #define ALICEBLUE 0xF7DF

  *Color.*
- #define ANTIQUEWHITE 0xFF5A

  *Color.*
- #define AQUA 0x07FF

  *Color.*
- #define AQUAMARINE 0x7FFA

  *Color.*
- #define AZURE 0xF7FF

  *Color.*
- #define BEIGE 0xF7BB

  *Color.*
- #define BISQUE 0xFF38

  *Color.*
- #define BLACK 0x0000

  *Color.*
- #define BLANCHEDALMOND 0xFF59

  *Color.*
- #define BLUE 0x001F

  *Color.*
- #define BLUEVIOLET 0x895C

  *Color.*
- #define BROWN 0xA145

  *Color.*
- #define BURLYWOOD 0xDDD0

  *Color.*
- #define CADETBLUE 0x5CF4

  *Color.*
- #define CHARTREUSE 0x7FE0

  *Color.*
- #define CHOCOLATE 0xD343

  *Color.*
- #define CORAL 0xFBEA

  *Color.*
- #define CORNFLOWERBLUE 0x64BD

*Color.*

- #define CORNSILK 0xFFDB

  *Color.*
- #define CRIMSON 0xD8A7

  *Color.*
- #define CYAN 0x07FF

  *Color.*
- #define DARKBLUE 0x0011

  *Color.*
- #define DARKCYAN 0x0451

  *Color.*
- #define DARKGOLDENROD 0xBC21

  *Color.*
- #define DARKGRAY 0xAD55

  *Color.*
- #define DARKGREEN 0x0320

  *Color.*
- #define DARKKHAKI 0xBDAD

  *Color.*
- #define DARKMAGENTA 0x8811

  *Color.*
- #define DARKOLIVEGREEN 0x5345

  *Color.*
- #define DARKORANGE 0xFC60

  *Color.*
- #define DARKORCHID 0x9999

  *Color.*
- #define DARKRED 0x8800

  *Color.*
- #define DARKSALMON 0xECAF

  *Color.*
- #define DARKSEAGREEN 0x8DF1

  *Color.*
- #define DARKSLATEBLUE 0x49F1

  *Color.*
- #define DARKSLATEGRAY 0x2A69

  *Color.*
- #define DARKTURQUOISE 0x067A

  *Color.*
- #define DARKVIOLET 0x901A

  *Color.*
- #define DEEPPINK 0xF8B2

  *Color.*
- #define DEEPSKYBLUE 0x05FF

  *Color.*
- #define DIMGRAY 0x6B4D

  *Color.*
- #define DODGERBLUE 0x1C9F

  *Color.*
- #define FIREBRICK 0xB104

  *Color.*

- #define FLORALWHITE 0xFFDE
  *Color.*
- #define FORESTGREEN 0x2444
  *Color.*
- #define FUCHSIA 0xF81F
  *Color.*
- #define GAINSBORO 0xDEFB
  *Color.*
- #define GHOSTWHITE 0xFFDF
  *Color.*
- #define GOLD 0xFEA0
  *Color.*
- #define GOLDENROD 0xDD24
  *Color.*
- #define GRAY 0x8410
  *Color.*
- #define GREEN 0x0400
  *Color.*
- #define GREENYELLOW 0xAFE5
  *Color.*
- #define HONEYDEW 0xF7FE
  *Color.*
- #define HOTPINK 0xFB56
  *Color.*
- #define INDIANRED 0xCAEB
  *Color.*
- #define INDIGO 0x4810
  *Color.*
- #define IVORY 0xFFFE
  *Color.*
- #define KHAKI 0xF731
  *Color.*
- #define LAVENDER 0xE73F
  *Color.*
- #define LAVENDERBLUSH 0xFF9E
  *Color.*
- #define LAWNGREEN 0x7FE0
  *Color.*
- #define LEMONCHIFFON 0xFFD9
  *Color.*
- #define LIGHTBLUE 0xAEDC
  *Color.*
- #define LIGHTCORAL 0xF410
  *Color.*
- #define LIGHTCYAN 0xE7FF
  *Color.*
- #define LIGHTGOLD 0xFFDA
  *Color.*
- #define LIGHTGREEN 0x9772
  *Color.*
- #define LIGHTGREY 0xD69A

*Color.*

- #define LIGHTPINK 0xFDB8

  *Color.*
- #define LIGHTSALMON 0xFD0F

  *Color.*
- #define LIGHTSEAGREEN 0x2595

  *Color.*
- #define LIGHTSKYBLUE 0x867F

  *Color.*
- #define LIGHTSLATEGRAY 0x7453

  *Color.*
- #define LIGHTSTEELBLUE 0xB63B

  *Color.*
- #define LIGHTYELLOW 0xFFFC

  *Color.*
- #define LIME 0x07E0

  *Color.*
- #define LIMEGREEN 0x3666

  *Color.*
- #define LINEN 0xFF9C

  *Color.*
- #define MAGENTA 0xF81F

  *Color.*
- #define MAROON 0x8000

  *Color.*
- #define MEDIUMAQUAMARINE 0x6675

  *Color.*
- #define MEDIUMBLUE 0x0019

  *Color.*
- #define MEDIUMORCHID 0xBABA

  *Color.*
- #define MEDIUMPURPLE 0x939B

  *Color.*
- #define MEDIUMSEAGREEN 0x3D8E

  *Color.*
- #define MEDIUMSLATEBLUE 0x7B5D

  *Color.*
- #define MEDIUMSPRINGGREEN 0x07D3

  *Color.*
- #define MEDIUMTURQUOISE 0x4E99

  *Color.*
- #define MEDIUMVIOLETRED 0xC0B0

  *Color.*
- #define MIDNIGHTBLUE 0x18CE

  *Color.*
- #define MINTCREAM 0xF7FF

  *Color.*
- #define MISTYROSE 0xFF3C

  *Color.*
- #define MOCCASIN 0xFF36

  *Color.*

- #define NAVAJOWHITE 0xFEF5
  *Color.*
- #define NAVY 0x0010
  *Color.*
- #define OLDLACE 0xFFBC
  *Color.*
- #define OLIVE 0x8400
  *Color.*
- #define OLIVEDRAB 0x6C64
  *Color.*
- #define ORANGE 0xFD20
  *Color.*
- #define ORANGERED 0xFA20
  *Color.*
- #define ORCHID 0xDB9A
  *Color.*
- #define PALEGOLDENROD 0xEF55
  *Color.*
- #define PALEGREEN 0x9FD3
  *Color.*
- #define PALETURQUOISE 0xAF7D
  *Color.*
- #define PALEVIOLETRED 0xDB92
  *Color.*
- #define PAPAYAWHIP 0xFF7A
  *Color.*
- #define PEACHPUFF 0xFED7
  *Color.*
- #define PERU 0xCC27
  *Color.*
- #define PINK 0xFE19
  *Color.*
- #define PLUM 0xDD1B
  *Color.*
- #define POWDERBLUE 0xB71C
  *Color.*
- #define PURPLE 0x8010
  *Color.*
- #define RED 0xF800
  *Color.*
- #define ROSYBROWN 0xBC71
  *Color.*
- #define ROYALBLUE 0x435C
  *Color.*
- #define SADDLEBROWN 0x8A22
  *Color.*
- #define SALMON 0xFC0E
  *Color.*
- #define SANDYBROWN 0xF52C
  *Color.*
- #define SEAGREEN 0x2C4A

*Color.*

- #define SEASHELL 0xFFBD
  *Color.*
- #define SIENNA 0xA285
  *Color.*
- #define SILVER 0xC618
  *Color.*
- #define SKYBLUE 0x867D
  *Color.*
- #define SLATEBLUE 0x6AD9
  *Color.*
- #define SLATEGRAY 0x7412
  *Color.*
- #define SNOW 0xFFDF
  *Color.*
- #define SPRINGGREEN 0x07EF
  *Color.*
- #define STEELBLUE 0x4416
  *Color.*
- #define TAN 0xD5B1
  *Color.*
- #define TEAL 0x0410
  *Color.*
- #define THISTLE 0xDDFB
  *Color.*
- #define TOMATO 0xFB08
  *Color.*
- #define TURQUOISE 0x471A
  *Color.*
- #define VIOLET 0xEC1D
  *Color.*
- #define WHEAT 0xF6F6
  *Color.*
- #define WHITE 0xFFFF
  *Color.*
- #define WHITESMOKE 0xF7BE
  *Color.*
- #define YELLOW 0xFFE0
  *Color.*
- #define YELLOWGREEN 0x9E66
  *Color.*

## Functions

- void enableUSARTforOLED ()
  *Enable and config USART for OLED.*
- void resetOLED ()
  *Reset OLED.*
- void toggleOLEDInterrupt (unsigned int state)
  *Toggle OLED interrupt.*

- void sendChar (int c)

  *Send char.*
- void usart1_rx ()

  *Receive function for OLED data (USART1, interrupt mode)*
- void gfx_Clean ()

  *Clean the screen.*
- void gfx_BGcolour (int color)

  *Set the background color.*
- void gfx_PutString (char *string)

  *Put a string on the screen.*
- void gfx_RectangleFilled (int x1, int y1, int x2, int y2, int color)

  *Draw a rectangle filled with a color.*
- void SSTimeout (int t)

  *Screensave mode.*
- void setBaudRate ()

  *Set the baud rate.*
- void gfx_CalculateOrbit (int angle, int distance, int *x, int *y)

  *Calculate the (x,y) pos (orbit) from angle and distance.*
- void gfx_DrawCircle (int x, int y, int radius, int color)

  *Draw a circle.*
- void gfx_DrawLine (int x1, int y1, int x2, int y2, int color)

  *Draw a line.*
- void gfx_ScreenMode (int mode)

  *Screen mode (portrait/landscape)*
- void gfx_MoveOrigin (int x, int y)

  *Move to origin to a position.*
- void gfx_Rectangle (int x1, int y1, int x2, int y2, int color)

  *Draw a rectangle.*
- void txt_Width (int multi)

  *Set the width of the text.*
- void txt_FGColor (int color)

  *Set the text color.*
- void txt_BGColor (int color)

  *Set the text background color.*
- void initOLED ()

  *Configure OLED for proper using.*
- void displayMainMenu ()

  *Display menu.*
- void updateMenu ()

  *Update the menu with currently selected.*
- void displayMessage (char *string)

  *Display a string in the center of the screen.*
- void displayCompass ()

  *Display the compass.*
- void displayHeader ()

  *Display message header.*
- char * calculateDirection ()

  *Calculate the direction (N, S, NE, etc.)*
- void ftoa (char *p, float x)

  *Float to string conversion.*

### Variables

- unsigned int modeDisplay
- unsigned int oldModeDisplay
- int displayHasBeenUpdated

## 5.8.1 Detailed Description

File containing the OLED functions.

**Author**

Gaël Foppolo (gaelfoppolo)

## 5.8.2 Function Documentation

### 5.8.2.1 char* calculateDirection ( )

Calculate the direction (N, S, NE, etc.)

**Returns**

The direction.

Here is the caller graph for this function:

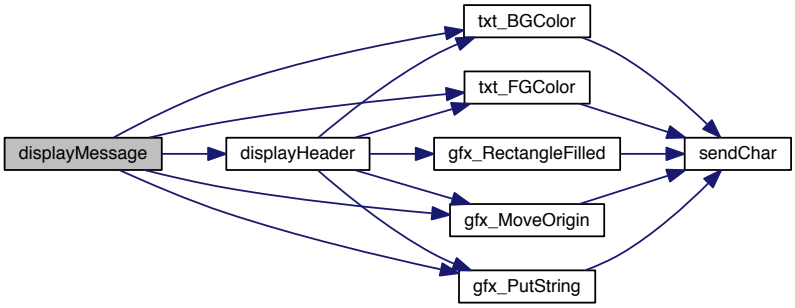

### 5.8.2.2 void displayMessage ( char * *string* )

Display a string in the center of the screen.

**Parameters**

| | |
|---|---|
| *string* | The string to display |

Here is the call graph for this function:




Here is the caller graph for this function:


#### 5.8.2.3 void ftoa ( char * p, float x )

Float to string conversion.

**Parameters**

| | | |
|---|---|---|
| | *p* | The buffer (string) |
| in | *x* | The float |

Here is the caller graph for this function:

#### 5.8.2.4 void gfx_BGcolour ( int *color* )

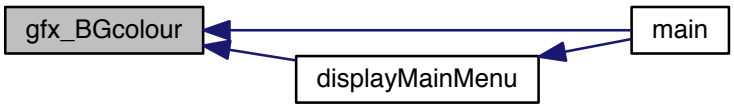
Set the background color.

**Parameters**

| | | |
|---|---|---|
| in | *color* | The color |

Here is the call graph for this function:


Here is the caller graph for this function:



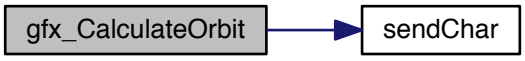

#### 5.8.2.5 void gfx_CalculateOrbit ( int *angle*, int *distance*, int * *x*, int * *y* )

Calculate the (x,y) pos (orbit) from angle and distance.

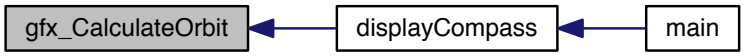
**Parameters**

| | | |
|---|---|---|
| in | *angle* | The angle |
| in | *distance* | The distance |
| | *x* | The x pos computed |
| | *y* | The y pos computed |

Here is the call graph for this function:




Here is the caller graph for this function:



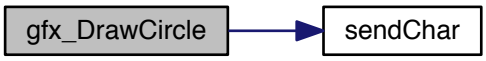

#### 5.8.2.6 void gfx_DrawCircle ( int *x*, int *y*, int *radius*, int *color* )

Draw a circle.

**Parameters**

| | | |
|---|---|---|
| in | *x* | x pos of center of the circle |
| in | *y* | y pos of center of the circle |
| in | *radius* | The radius |
| in | *color* | The color |

Here is the call graph for this function:



Here is the caller graph for this function:

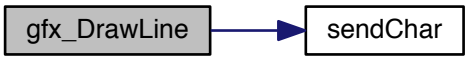

#### 5.8.2.7 void gfx_DrawLine ( int *x1,* int *y1,* int *x2,* int *y2,* int *color* )

Draw a line.

**Parameters**

| | | |
|---|---|---|
| in | *x1* | The x pos of the beginning of the line |
| in | *y1* | The y pos of the beginning of the line |
| in | *x2* | The x pos of the ending of the line |
| in | *y2* | The y pos of the ending of the line |
| in | *color* | The color |

Here is the call graph for this function:




Here is the caller graph for this function:

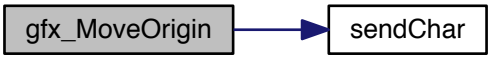

#### 5.8.2.8 void gfx_MoveOrigin ( int *x,* int *y* )

Move to origin to a position.

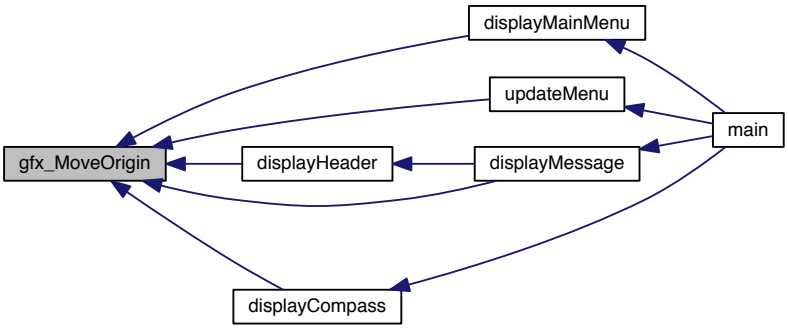
**Parameters**

| | | |
|---|---|---|
| in | *x* | The new x pos |
| in | *y* | The new y pos |

Here is the call graph for this function:




Here is the caller graph for this function:




#### 5.8.2.9 void gfx_PutString ( char * *string* )

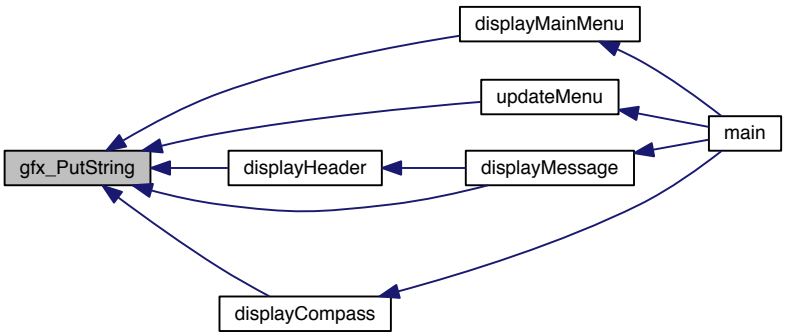
Put a string on the screen.

**Parameters**

| | |
|---|---|
| *string* | The string |

Here is the call graph for this function:


Here is the caller graph for this function:



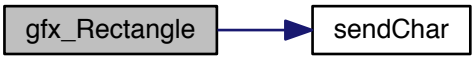

#### 5.8.2.10 void gfx_Rectangle ( int *x1*, int *y1*, int *x2*, int *y2*, int *color* )

Draw a rectangle.

**Parameters**

| | | |
|---|---|---|
| in | *x1* | The x pos of the top left corner |
| in | *y1* | The y pos of the top left corner |
| in | *x2* | The x pos of the bottom right corner |
| in | *y2* | The y pos of the bottom right corner |
| in | *color* | The color |

Here is the call graph for this function:




Here is the caller graph for this function:

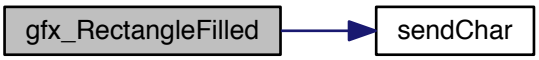

#### 5.8.2.11 void gfx_RectangleFilled ( int *x1*, int *y1*, int *x2*, int *y2*, int *color* )

Draw a rectangle filled with a color.

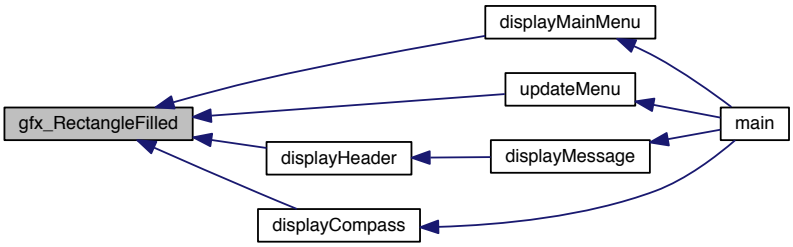
**Parameters**

| | | |
|---|---|---|
| in | *x1* | The x pos of the top left corner |
| in | *y1* | The y pos of the top left corner |
| in | *x2* | The x pos of the bottom right corner |
| in | *y2* | The y pos of the bottom right corner |
| in | *color* | The color |

Here is the call graph for this function:



Here is the caller graph for this function:



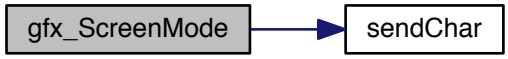

#### 5.8.2.12 void gfx_ScreenMode ( int *mode* )

Screen mode (portrait/landscape)

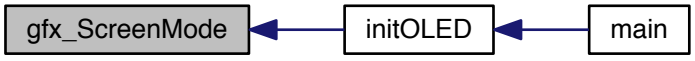
**Parameters**

| | | |
|---|---|---|
| in | *mode* | The mode |

Here is the call graph for this function:




Here is the caller graph for this function:



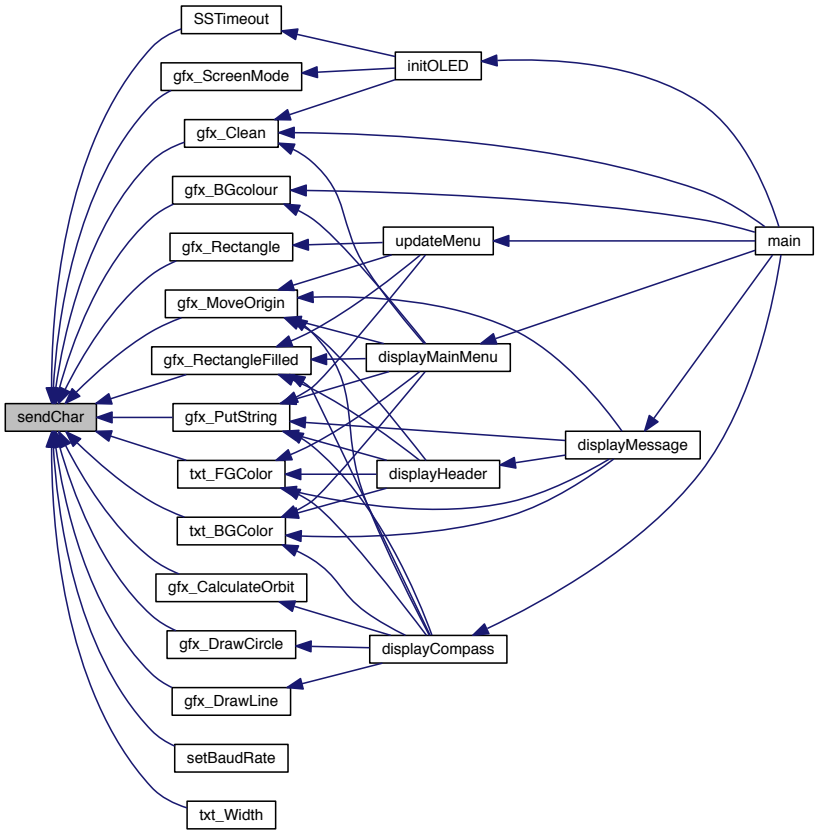

#### 5.8.2.13 void sendChar ( int *c* )

Send char.

**Parameters**

| | |
|---|---|
| *c* | The int to send |

Here is the caller graph for this function:




#### 5.8.2.14 void SSTimeout ( int *t* )

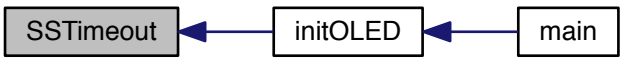
Screensave mode.

**Parameters**

| | | |
|---|---|---|
| in | *t* | The mode |

Here is the call graph for this function:


Here is the caller graph for this function:




#### 5.8.2.15 void toggleOLEDInterrupt ( unsigned int *state* )

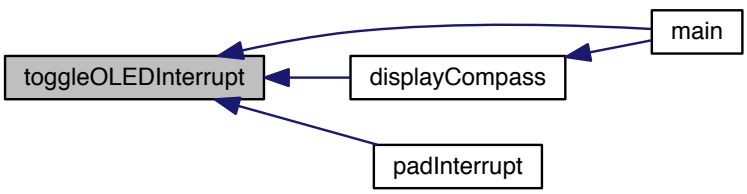
Toggle OLED interrupt.

1 = interrupt enable for OLED, 0 = disable

**Parameters**

| | |
|---|---|
| *state* | The new state |

Here is the caller graph for this function:



#### 5.8.2.16 void txt_BGColor ( int *color* )

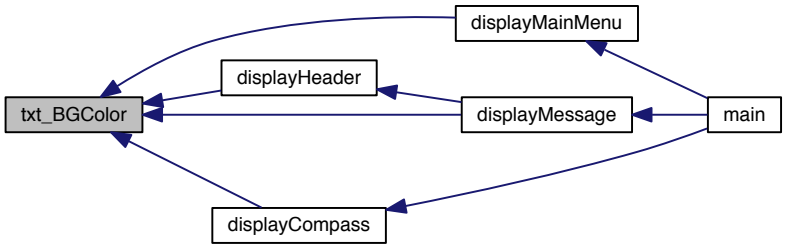
Set the text background color.

**Parameters**

| | | |
|---|---|---|
| in | *color* | The color |

Here is the call graph for this function:


Here is the caller graph for this function:




#### 5.8.2.17 void txt_FGColor ( int *color* )

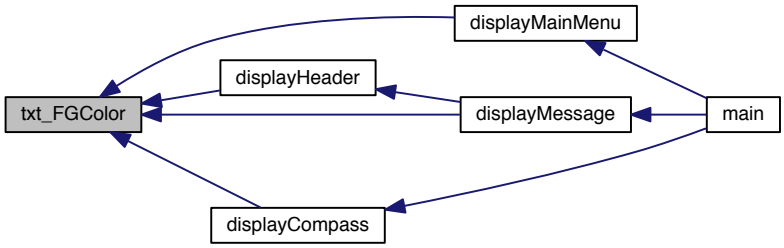
Set the text color.

**Parameters**

| | | |
|---|---|---|
| in | *color* | The color |

Here is the call graph for this function:


Here is the caller graph for this function:




#### 5.8.2.18 void txt_Width ( int *multi* )

Set the width of the text.

**Parameters**

| | | |
|---|---|---|
| in | *multi* | The multi |

Here is the call graph for this function:


### 5.8.3 Variable Documentation

#### 5.8.3.1 int displayHasBeenUpdated

Is the display has been updated, aka needed

#### 5.8.3.2 unsigned int modeDisplay

What mode is selected right now

#### 5.8.3.3 unsigned int oldModeDisplay

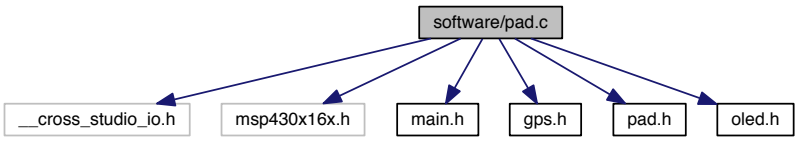
What mode was selected just before

## 5.9 software/pad.c File Reference

File containing the PAD functions.

```
#include <__cross_studio_io.h>
#include <msp430x16x.h>
#include "main.h"
#include "gps.h"
#include "pad.h"
#include "oled.h"
```

Include dependency graph for pad.c:




### Functions

- void initPAD (void)

  *Init LED (P2.0 -> P2.4)*
- void padInterrupt (void)

  *Interrupt function for PAD.*

### 5.9.1 Detailed Description

File containing the PAD functions.

**Author**

Gaël Foppolo (gaelfoppolo)

### 5.9.2 Function Documentation

#### 5.9.2.1 void initPAD ( void )

Init LED (P2.0 -> P2.4)

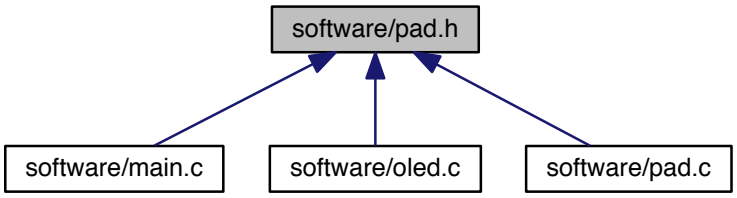
All ready to use and state cleared

Here is the caller graph for this function:


## 5.10 software/pad.h File Reference

File containing the PAD functions.

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




### Macros

- #define PUSH 0x1E
  *PUSH position.*
- #define TOP 0x1D
  *TOP position.*
- #define RIGHT 0x0F
  *RIGHT position.*
- #define BOTTOM 0x1B
  *BOTTOM position.*
- #define LEFT 0x17
  *LEFT position.*

### Functions

- void initPAD (void)

  *Init LED (P2.0 -> P2.4)*
- void padInterrupt (void)

  *Interrupt function for PAD.*

#### 5.10.1 Detailed Description

File containing the PAD functions.

**Author**

Gaël Foppolo (gaelfoppolo)

#### 5.10.2 Function Documentation

##### 5.10.2.1 void initPAD ( void )

Init LED (P2.0 -> P2.4)

All ready to use and state cleared

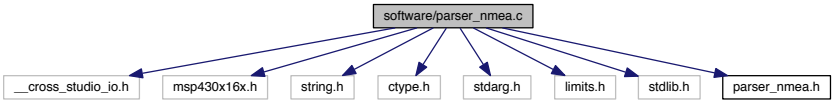
Here is the caller graph for this function:


## 5.11 software/parser_nmea.c File Reference

File containing the NMEA parser functions.

```
#include <__cross_studio_io.h>
#include <msp430x16x.h>
#include <string.h>
#include <ctype.h>
#include <stdarg.h>
#include <limits.h>
#include <stdlib.h>
#include "parser_nmea.h"
```

Include dependency graph for parser_nmea.c:



## Functions

- int hex2int (char c)

  *Transform hexa to integer.*
- enum nmea_sentence_id nmea_sentence_id (char ∗sentence)

  *Determine sentence identifier.*
- int nmea_isfield (char c)

  *Check if the char is part of the field.*
- int nmea_scan (const char ∗sentence, const char ∗format,...)

  *Scanf-like processor for NMEA sentences.*
- int nmea_parse_rmc (struct nmea_sentence_rmc ∗frame, const char ∗sentence)

  *Parse a RMC sentence.*
- int nmea_parse_gga (struct nmea_sentence_gga ∗frame, const char ∗sentence)

  *Parse a GGA sentence.*
- int nmea_check (const char ∗sentence, int strict)

  *Check sentence validity and checksum.*

### 5.11.1 Detailed Description

File containing the NMEA parser functions.

**Author**

Gaël Foppolo (gaelfoppolo)

### 5.11.2 Function Documentation

#### 5.11.2.1 int hex2int ( char *c* )

Transform hexa to integer.

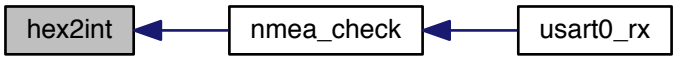
**Parameters**

| | | |
|---|---|---|
| in | *c* | An integer (char) |

**Returns**

An integer (hex)

Here is the caller graph for this function:



#### 5.11.2.2 int nmea_check ( const char * *sentence*, int *strict* )

Check sentence validity and checksum.

Calculate checksum and compare it

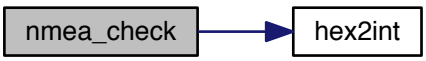
**Parameters**

| | |
|---|---|
| *sentence* | The sentence to test |
| *strict* | Accept or not sentence with checksum |

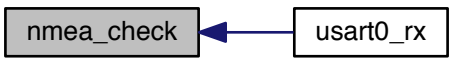
**Returns**

1 for valid sentences.

Here is the call graph for this function:




Here is the caller graph for this function:




#### 5.11.2.3 int nmea_isfield ( char *c* )

Check if the char is part of the field.

Aka char isn't a comma or star

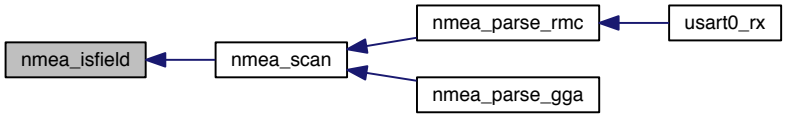
**Parameters**

| | |
|---|---|
| *c* | The char to test |

**Returns**

1 is valid, 0 if not

Here is the caller graph for this function:




#### 5.11.2.4 int nmea_parse_gga ( nmea_sentence_gga * *frame*, const char * *sentence* )

Parse a GGA sentence.

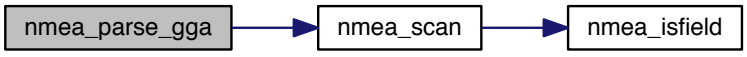
**Parameters**

| | |
|---|---|
| *frame* | The struct where to put the parsed data |
| *sentence* | The sentence to parse |

**Returns**

1 on success

Here is the call graph for this function:




#### 5.11.2.5 int nmea_parse_rmc ( nmea_sentence_rmc * *frame*, const char * *sentence* )

Parse a RMC sentence.

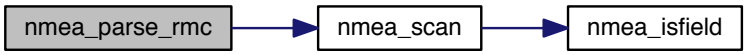
**Parameters**

| | |
|---|---|
| *frame* | The struct where to put the parsed data |
| *sentence* | The sentence to parse |

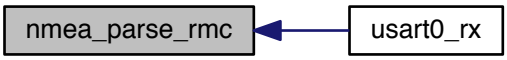
**Returns**

1 on success

Here is the call graph for this function:




Here is the caller graph for this function:




#### 5.11.2.6 int nmea_scan ( const char * *sentence,* const char * *format,* ... )

Scanf-like processor for NMEA sentences.

Supports the following formats: c - single character (char *) d - direction, returned as 1/-1, default 0 (int *) f - float (float *) o - longitude value, transform all in degrees (float *) a - latitude value, transform all in degrees (float *) i - decimal (integer), default zero (int *) s - string (char *) t - talker identifier and type (char *)

**Parameters**

| | |
|---|---|
| *sentence* | The sentence to parse |
| *format* | The format of the sentence |

**See also**

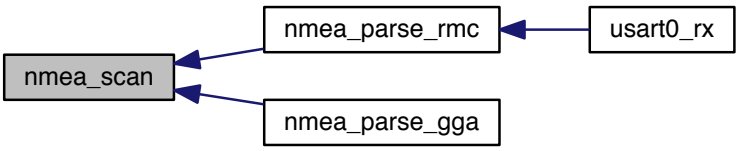
nmea_parse_*** functions for further explanations

**Returns**

1 on success, 1 if not

Here is the call graph for this function:


Here is the caller graph for this function:




#### 5.11.2.7 enum nmea_sentence_id nmea_sentence_id ( char * *sentence* )

Determine sentence identifier.

**Parameters**

| | |
|---|---|
| *sentence* | Then sentence to test |

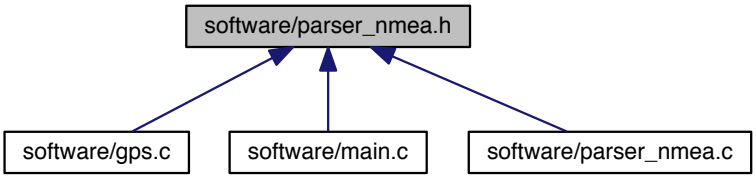
**Returns**

The type of sentence

## 5.12 software/parser_nmea.h File Reference

File containing the NMEA parser functions.

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




## Data Structures

- struct nmea_sentence_rmc
- struct nmea_sentence_gga

## Macros

- #define NMEA_MAX_LENGTH 100

  *Maximum length for NMEA sentences.*

## Typedefs

- typedef struct nmea_sentence_rmc nmea_sentence_rmc
- typedef struct nmea_sentence_gga nmea_sentence_gga

## Enumerations

- enum nmea_sentence_id {
  **NMEA_INVALID** = -1, **NMEA_UNKNOWN** = 0, **NMEA_SENTENCE_RMC**, **NMEA_SENTENCE_GGA**,
  **NMEA_SENTENCE_GSA**, **NMEA_SENTENCE_GLL**, **NMEA_SENTENCE_GST**, **NMEA_SENTENCE_G↩SV**,
  **NMEA_SENTENCE_VTG** }

## Functions

- int hex2int (char c)

  *Transform hexa to integer.*
- int nmea_scan (const char ∗sentence, const char ∗format,...)

  *Scanf-like processor for NMEA sentences.*
- int nmea_isfield (char c)

  *Check if the char is part of the field.*
- enum nmea_sentence_id nmea_sentence_id (char ∗sentence)

  *Determine sentence identifier.*
- int nmea_check (const char ∗sentence, int strict)

  *Check sentence validity and checksum.*
- int nmea_parse_rmc (nmea_sentence_rmc ∗frame, const char ∗sentence)

  *Parse a RMC sentence.*
- int nmea_parse_gga (nmea_sentence_gga ∗frame, const char ∗sentence)

  *Parse a GGA sentence.*

### 5.12.1 Detailed Description

File containing the NMEA parser functions.

**Author**

Gaël Foppolo (gaelfoppolo)

### 5.12.2 Typedef Documentation

#### 5.12.2.1 typedef struct nmea_sentence_gga nmea_sentence_gga

The structure that contains the data of GGA sentences

#### 5.12.2.2 typedef struct nmea_sentence_rmc nmea_sentence_rmc

The structure that contains the data of RMC sentences

### 5.12.3 Enumeration Type Documentation

#### 5.12.3.1 enum nmea_sentence_id

The sentence identifier

### 5.12.4 Function Documentation

#### 5.12.4.1 int hex2int ( char *c* )

Transform hexa to integer.

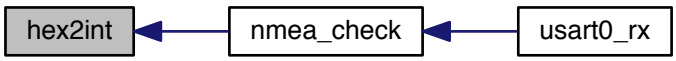
**Parameters**

| | | |
|---|---|---|
| in | *c* | An integer (char) |

**Returns**

An integer (hex)

Here is the caller graph for this function:




#### 5.12.4.2 int nmea_check ( const char * *sentence*, int *strict* )

Check sentence validity and checksum.

Calculate checksum and compare it

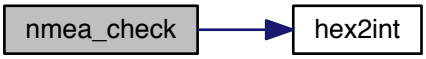
**Parameters**

| | |
|---|---|
| *sentence* | The sentence to test |
| *strict* | Accept or not sentence with checksum |

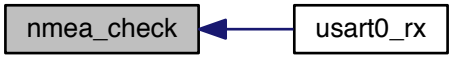
**Returns**

1 for valid sentences.

Here is the call graph for this function:




Here is the caller graph for this function:



#### 5.12.4.3 int nmea_isfield ( char *c* )

Check if the char is part of the field.

Aka char isn't a comma or star

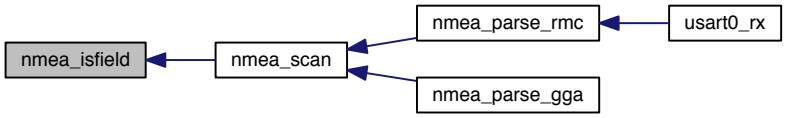
**Parameters**

| | |
|---|---|
| *c* | The char to test |

**Returns**

1 is valid, 0 if not

Here is the caller graph for this function:




#### 5.12.4.4 int nmea_parse_gga ( nmea_sentence_gga * *frame,* const char * *sentence* )

Parse a GGA sentence.

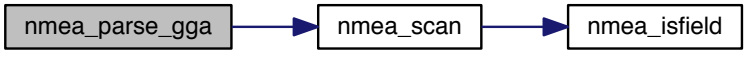
**Parameters**

| | |
|---|---|
| *frame* | The struct where to put the parsed data |
| *sentence* | The sentence to parse |

**Returns**

1 on success

Here is the call graph for this function:



#### 5.12.4.5 int nmea_parse_rmc ( nmea_sentence_rmc * *frame*, const char * *sentence* )

Parse a RMC sentence.

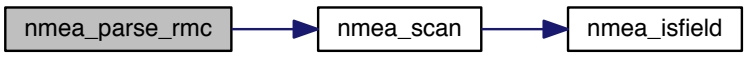
**Parameters**

| | |
|---|---|
| *frame* | The struct where to put the parsed data |
| *sentence* | The sentence to parse |

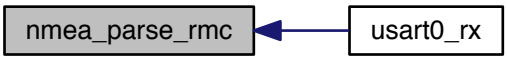
**Returns**

1 on success

Here is the call graph for this function:




Here is the caller graph for this function:




#### 5.12.4.6 int nmea_scan ( const char * *sentence*, const char * *format*, ... )

Scanf-like processor for NMEA sentences.

Supports the following formats: c - single character (char *) d - direction, returned as 1/-1, default 0 (int *) f - float (float *) o - longitude value, transform all in degrees (float *) a - latitude value, transform all in degrees (float *) i - decimal (integer), default zero (int *) s - string (char *) t - talker identifier and type (char *)

**Parameters**

| | |
|---|---|
| *sentence* | The sentence to parse |
| *format* | The format of the sentence |

**See also**

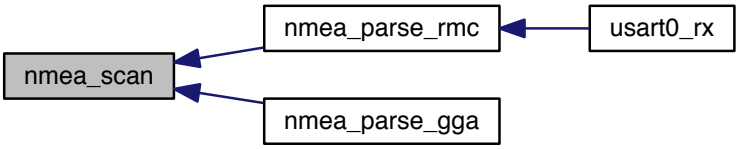
nmea_parse_∗∗∗ functions for further explanations

**Returns**

1 on success, 1 if not

Here is the call graph for this function:


Here is the caller graph for this function:




#### 5.12.4.7 enum nmea_sentence_id nmea_sentence_id ( char ∗ *sentence* )

Determine sentence identifier.

**Parameters**

| | |
|---|---|
| *sentence* | Then sentence to test |

**Returns**

The type of sentence

# Index