DTV App

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Module Documentation

4.1 Configuration file interface

Functions and structures for retrieveing configuration options.

Data Structures

- struct config_init_ch_info

  A structure that holds the initial dtv settings.

Functions

- struct config_init_ch_info config_get_init_ch_info (FILE ∗f)

  Reads the initial settings from the specified file.

4.1.1 Detailed Description

Functions and structures for retrieveing configuration options.

4.1.2 Function Documentation

4.1.2.1 struct config_init_ch_info config_get_init_ch_info (FILE ∗ *f*)

Reads the initial settings from the specified file.

Reads the initial settings from the specified file.

4.2 Drawing interface

Functions and structures for drawing.

Data Structures

- struct draw_interface

  Basic interface necessary to display graphics elements.

Functions

- int32_t draw_init (struct draw_interface *draw_i, int *argc, char ***argv)

  Initialize drawing interface.
- int32_t draw_channel_info (struct draw_interface *draw_i, struct graphics_channel_info info)

  Draw channel_info graphics element.
- int32_t draw_init_message (struct draw_interface *draw_i)

  Draw initializing message.
- int32_t draw_time (struct draw_interface *draw_i, struct tm tm)

  Draw time graphics element.
- int32_t draw_volume (struct draw_interface *draw_i, uint8_t vol)

  Draw volume graphics element.
- int32_t draw_no_channel (struct draw_interface *draw_i)

  Draw no channel display.
- int32_t draw_audio_only (struct draw_interface *draw_i)

  Draw radio graphics.
- int32_t draw_channel_number (struct draw_interface *draw_i, uint16_t ch_num)

  Draw channel number.
- int32_t draw_blackscreen (struct draw_interface *draw_i)

  Draw a black rectangle.
- int32_t draw_clear (struct draw_interface *draw_i)

  Clear the screen.
- int32_t draw_refresh (struct draw_interface *draw_i)

  Refresh display.
- int32_t draw_deinit (struct draw_interface *draw_i)

  Deinitialize drawing interface.

4.2.1 Detailed Description

Functions and structures for drawing.

4.3 DTV interface

Functions and structures for controling DTV functionality.

Data Structures

- struct dtv_channel_info

  Contains basic channel info.

Functions

- void dtv_init (struct config_init_ch_info init_info)

  Function that initializes internal DTV state.
- struct dtv_channel_info dtv_switch_channel (uint16_t ch_num)

  Tries to switch to the desired channel.
- t_Error dtv_set_volume (uint8_t vol)

  Tries to set the volume to the desired value.
- struct tm dtv_get_time ()

  Gets the time information.
- struct sdt dtv_get_info (uint16_t ch_num)

  Gets the SDT information for the specified channel.
- void dtv_deinit ()

  Deinitializes the internal DTV state.

4.3.1 Detailed Description

Functions and structures for controling DTV functionality.

4.3.2 Function Documentation

4.3.2.1 t_Error dtv_set_volume (uint8_t *vol*)

Tries to set the volume to the desired value.

Parameters

vol	Desired volume, should be [0-10].

4.4 Graphics interface

Functions and structures for graphics interaction.

Data Structures

- struct graphics_channel_info

  A struct that contains some basic channel info.

Functions

- void graphics_show_channel_info (struct graphics_channel_info info)

  Displays some basic information about a channel on the screen.
- void graphics_show_init ()

  Displays initializing message.
- void graphics_hide_init ()

  Removes initializing message.
- void graphics_show_time (struct tm tm)

  Displays current time.
- void graphics_show_volume (uint8_t vol)

  Displays volume information on the screen.
- void graphics_show_mute ()

  Displays mute symbol.
- void graphics_hide_mute ()

  Removes mute symbol.
- void graphics_show_channel_number (uint16_t ch_num)

  Displays selected channel number.
- void graphics_blackscreen ()

  Puts a black screen on the screen.
- void graphics_clear ()

  Clears all graphics elements from screen.
- void graphics_start_render (int *argc, char ***argv)

  Starts rendering graphic elements on screen.
- void graphics_stop ()

  Stops graphics rendering loop.

4.4.1 Detailed Description

Functions and structures for graphics interaction.

4.4.2 Function Documentation

4.4.2.1 void graphics_show_volume (uint8_t *vol*)

Displays volume information on the screen.

Parameters

vol	Must be [0-10].

4.5 Table parsing interface

Functions and structures for parsing DVB tables into internal form.

Data Structures

- struct pat

  Contains important info from the PAT table.
- struct pmt

  Contains important info from the PMT table.
- struct sdt

  Contains important info from the SDT table.

Functions

- struct pat parse_pat (const uint8_t ∗buffer)

  Parses the given buffer as a PAT table.
- struct pmt parse_pmt (const uint8_t ∗buffer)

  Parses the given buffer as a PMT table.
- struct tm parse_tot (const uint8_t ∗buffer)

  Parses the given buffer as a TOT table and converts its info to C representation of time.
- struct sdt parse_sdt (const uint8_t ∗buffer, uint16_t ch_num)

  Parses the given buffer as a SDT table and extracts information about the specified channel.

4.5.1 Detailed Description

Functions and structures for parsing DVB tables into internal form.

4.6 Remote-control interface

Functions and structures for remote control interaction.

Typedefs

- typedef void(∗ rc_key_callback) (int key_no)

  A callback that should take action on key press.

Functions

- void rc_start_loop (const char ∗dev, rc_key_callback callback)

  A function that starts the loop that waits for input events from the remote control.
- void rc_stop_loop ()

  Stops the event loop.

4.6.1 Detailed Description

Functions and structures for remote control interaction.

4.6.2 Function Documentation

4.6.2.1 void rc_start_loop (const char ∗ *dev*, rc_key_callback *callback*)

A function that starts the loop that waits for input events from the remote control.

Parameters

dev	Name of the device to capture events from.

4.7 DVB table retrieval interface

These functions retrieve the corresponding structures from the stream, performing the needed network-to-host conversions.

Data Structures

- struct table_header
  Header that is part of all tables.
- struct pat_header
  Represents PAT header.
- struct pat_body
  Represents PAT body.
- struct pmt_header
  Represents PMT header.
- struct pmt_body
  Represents PMT body.
- struct teletext_descriptor_header
  Represents the teletext descriptor header.
- struct sdt_header
  Represents SDT header.
- struct sdt_body
  Represents SDT body.
- struct sdt_descriptor1
  Represents the first half of the service descriptor.
- struct sdt_descriptor2
  Represents the second half of the service descriptor.
- struct tot_header
  Represents TOT header.
- struct tot_descriptor_header
  Represents TOT descriptor header.
- struct tot_descriptor_body
  Represents TOT descriptor body.

Functions

- struct table_header **__attribute__** ((packed))
- struct pat_header get_pat_header (const uint8_t *buffer)
  Retrieves pat_header from the stream.
- struct pat_body get_pat_body (const uint8_t *buffer)
  Retrieves pat_body from the stream.
- struct pmt_header get_pmt_header (const uint8_t *buffer)
  Retrieves pmt_header from the stream.
- struct pmt_body get_pmt_body (const uint8_t *buffer)
  Retrieves pmt_body from the stream.
- struct teletext_descriptor_header get_teletext_descriptor_header (const uint8_t *buffer)
  Retrieves teletext_descriptor_header from the stream.
- struct sdt_header get_sdt_header (const uint8_t *buffer)
  Retrieves sdt_header from the stream.

- struct sdt_body get_sdt_body (const uint8_t *buffer)

  Retrieves sdt_body from the stream.
- struct sdt_descriptor1 get_sdt_descriptor1 (const uint8_t *buffer)

  Retrieves sdt_descriptor1 from the stream.
- struct sdt_descriptor2 get_sdt_descriptor2 (const uint8_t *buffer)

  Retrieves sdt_descriptor2 from the stream.
- struct tot_header get_tot_header (const uint8_t *buffer)

  Retrieves tot_header from the stream.
- struct tot_descriptor_header get_tot_descriptor_header (const uint8_t *buffer)

  Retrieves tot_descriptor_header from the stream.
- struct tot_descriptor_body get_tot_descriptor_body (const uint8_t *buffer)

  Retrieves tot_descriptor_body from the stream.

Variables

- struct teletext_descriptor_header **__attribute__**

4.7.1 Detailed Description

These functions retrieve the corresponding structures from the stream, performing the needed network-to-host conversions.

Chapter 5

Data Structure Documentation

5.1 config_init_ch_info Struct Reference

A structure that holds the initial dtv settings.

`#include <config.h>`

Data Fields

- uint32_t freq
  Tuner frequency.
- uint32_t bandwidth
  Tuner bandwidth.
- enum t_Module module
  Whether the channel uses DTB-T or DTB-T2.
- uint16_t vpid
  pid of the initial video stream.
- uint16_t apid
  pid of the initial audio stream.
- enum t_StreamType vtype
  type of the inital video stream.
- enum t_StreamType atype
  type of the initial audio stream.
- uint32_t ch_num
  Channel number.
- int teletext
  Whether the channel has teletext.

5.1.1 Detailed Description

A structure that holds the initial dtv settings.

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

- include/config.h

5.2 draw_interface Struct Reference

Basic interface necessary to display graphics elements.

`#include <drawing.h>`

Data Fields

- IDirectFBSurface * surface
  Surface on which to draw.
- IDirectFB * dfb_interface
  Main DFB interface.
- int32_t screen_width
  The width of the screen.
- int32_t screen_height
  The height of the screen.
- IDirectFBSurface * vol_surfaces [12]
  Preloaded volume images.
- IDirectFBFont * font_interface
  Preloaded font.

5.2.1 Detailed Description

Basic interface necessary to display graphics elements.

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

- include/drawing.h

5.3 dtv_channel_info Struct Reference

Contains basic channel info.

`#include <dtv.h>`

Data Fields

- uint16_t ch_num
  Channel number.
- uint16_t vpid
  PID of the video stream.
- uint16_t apid
  PID of the audio stream.
- bool teletext
  Specifies whether the channel has teletext.

5.3.1 Detailed Description

Contains basic channel info.

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

- include/dtv.h

5.4 graphics_args Struct Reference

A shim structure to pass main arguments to DirectFB.

Data Fields

- int * **argcx**
- char *** **argvx**

5.4.1 Detailed Description

A shim structure to pass main arguments to DirectFB.

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

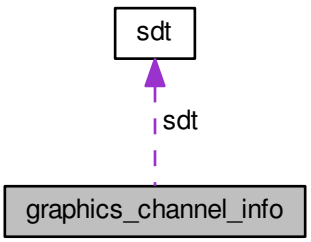
- src/graphics.c

5.5 graphics_channel_info Struct Reference

A struct that contains some basic channel info.

`#include <graphics.h>`

Collaboration diagram for graphics_channel_info:



Data Fields

- uint16_t ch_num

  The number of the channel.
- bool teletext

  Whether the channel has teletext.
- uint16_t vpid

  The video PID of the channel.
- uint16_t apid

  The audio PID of the channel.
- struct sdt sdt

  Channel type and name.
- struct tm tm

  Time information.

5.5.1 Detailed Description

A struct that contains some basic channel info.

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

- include/graphics.h

5.6 graphics_flags Struct Reference

A struct that keeps the state of what should be displayed.

Data Fields

- bool info

  Specifies whether the info panel should be displayed.
- bool volume

  Specifies whether the volume panel should be displayed.
- bool blackscreen

  Specifies whether the screen should be filled with black.
- bool no_channel

  Specifies whether the "NO CHANNEL" message should be displayed.
- bool audio_only

  Specifies whether the "AUDIO ONLY" message should be displayed.
- bool ch_num

  Specifies whether the top left channel number should be displayed.
- bool time

  Specifies whether the time should be displayed.
- bool init

  Specifies whether the "INITIALIZING" message should be displayed.
- bool mute

  Specifies whether the mute symbol should be displayed. Takes precedence over volume.

5.6.1 Detailed Description

A struct that keeps the state of what should be displayed.

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

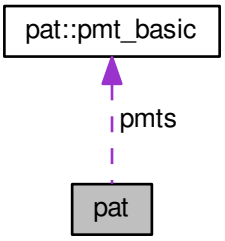
- src/graphics.c

5.7 pat Struct Reference

Contains important info from the PAT table.

`#include <parsing.h>`

Collaboration diagram for pat:



Data Structures

- struct pmt_basic

  Contains enough info to identify a PMT table.

Data Fields

- uint16_t tsi

  Transport stream id.
- size_t pmt_len

  How many PMTs exist in the stream.
- struct pat::pmt_basic * pmts

  Array of PMTs that exist in the stream.

5.7.1 Detailed Description

Contains important info from the PAT table.

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

- include/parsing.h

5.8 pat_body Struct Reference

Represents PAT body.

`#include <structures.h>`

Data Fields

- uint16_t ch_num
  Channel number of the current PMT.
- union {
  struct {
  uint16_t pid: 13
  PID of the PMT table.
  uint16_t **res**: 3
  } **b1s**
  uint16_t **bitfield1**
  } **b1u**

5.8.1 Detailed Description

Represents PAT body.

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

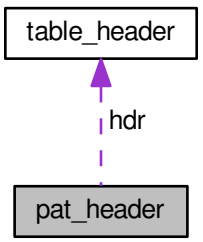
- include/structures.h

5.9 pat_header Struct Reference

Represents PAT header.

`#include <structures.h>`

Collaboration diagram for pat_header:



Data Fields

- struct table_header **hdr**
- uint16_t **tsi**
- struct {
  uint8_t **cni**: 1
  uint8_t **version**: 5
  uint8_t **res**: 2
  } **b1s**

- uint8_t **sec**
- uint8_t **lsn**

5.9.1 Detailed Description

Represents PAT header.

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

- include/structures.h

5.10 pmt Struct Reference

Contains important info from the PMT table.

```
#include <parsing.h>
```

Data Fields

- uint16_t pid
  The pid of the PMT table.
- uint16_t ch_num
  The channel number of the PMT table.
- uint16_t video_pid
  PID of the video stream. It is -1 if it doesn't exist.
- uint16_t audio_pid
  PID of the audio stream. It is -1 if it doesn't exist.
- bool teletext
  Specifies whether the channel has teletext.

5.10.1 Detailed Description

Contains important info from the PMT table.

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

- include/parsing.h

5.11 pat::pmt_basic Struct Reference

Contains enough info to identify a PMT table.

`#include <parsing.h>`

Data Fields

- uint16_t pid
  The PID of the PMT table.
- uint16_t ch_num
  The channel number of the PMT table.

5.11.1 Detailed Description

Contains enough info to identify a PMT table.

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

- include/parsing.h

5.12 pmt_body Struct Reference

Represents PMT body.

`#include <structures.h>`

Data Fields

- uint8_t type
  Type of stream.
- union {
  struct {
  uint16_t pid: 13
  PID of the PS.
  uint16_t **res**: 3
  } **b1s**
  uint16_t **bitfield1**
  } **b1u**

- union {
  struct {
  uint16_t esilen: 12
  Length of the descriptor section.
  uint16_t **res2**: 4
  } **b2s**
  uint16_t **bitfield2**
  } **b2u**

5.12.1 Detailed Description

Represents PMT body.

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

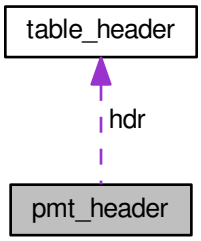
- include/structures.h

5.13 pmt_header Struct Reference

Represents PMT header.

`#include <structures.h>`

Collaboration diagram for pmt_header:



Data Fields

- struct table_header **hdr**
- uint16_t ch_num

  Channel number.
- struct {
  uint8_t **cni**: 1
  uint8_t **version**: 5
  uint8_t **res**: 2
  } **b**

- uint8_t **sec**
- uint8_t **lsn**
- union {
  struct {
  uint16_t **pcr_pid**: 13
  uint16_t **res2**: 3
  } **b1s**
  uint16_t **bitfield1**
  } **b1u**

- union {
  struct {
  uint16_t pilen: 12
  Length of the pmt_body section.
  uint16_t **res3**: 4
  } **b2s**
  uint16_t **bitfield2**
  } **b2u**

5.13.1 Detailed Description

Represents PMT header.

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

- include/structures.h

5.14 rc_args Struct Reference

A shim structure to pass arguments to event thread.

Data Fields

- int **fd**
- rc_key_callback **kc**

5.14.1 Detailed Description

A shim structure to pass arguments to event thread.

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

- src/rc.c

5.15 sdt Struct Reference

Contains important info from the SDT table.

```
#include <parsing.h>
```

Data Fields

- uint8_t st
  Service type.
- char name [100]
  Channel name.

5.15.1 Detailed Description

Contains important info from the SDT table.

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

- include/parsing.h

5.16 sdt_body Struct Reference

Represents SDT body.

`#include <structures.h>`

Data Fields

- uint16_t sid
  Service id (same as channel number).
- struct {
  uint8_t **epff**: 1
  uint8_t **esf**: 1
  uint8_t **res**: 6
  } **b1s**

- union {
  struct {
  uint16_t dlen: 12
  Length of the descriptor section.
  uint16_t **fcm**: 1
  uint16_t **rs**: 3
  } **b2s**
  uint16_t **bitfield2**
  } **b2u**

5.16.1 Detailed Description

Represents SDT body.

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

- include/structures.h

5.17 sdt_descriptor1 Struct Reference

Represents the first half of the service descriptor.

`#include <structures.h>`

Data Fields

- uint8_t **tag**
- uint8_t len

  Length of the descriptor.
- uint8_t type

  Type of service (channel).
- uint8_t spnlen

  Length of the service provider name.

5.17.1 Detailed Description

Represents the first half of the service descriptor.

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

- include/structures.h

5.18 sdt_descriptor2 Struct Reference

Represents the second half of the service descriptor.

`#include <structures.h>`

Data Fields

- uint8_t snlen

  Length of the service name.

5.18.1 Detailed Description

Represents the second half of the service descriptor.

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

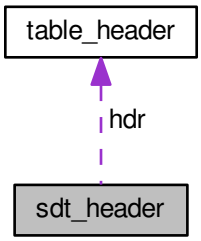
- include/structures.h

5.19 sdt_header Struct Reference

Represents SDT header.

`#include <structures.h>`

Collaboration diagram for sdt_header:



Data Fields

- struct table_header **hdr**
- uint16_t **tsi**
- struct {
  uint8_t **cni**: 1
  uint8_t **version**: 5
  uint8_t **res**: 2
  } **b1s**

- uint8_t **sec**
- uint8_t **lsn**
- uint16_t **oni**
- uint8_t **res2**

5.19.1 Detailed Description

Represents SDT header.

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

- include/structures.h

5.20 table_header Struct Reference

Header that is part of all tables.

`#include <structures.h>`

Data Fields

- uint8_t tid

  Table id.
- union {
  struct {
  uint16_t len: 12
  Length of the rest of the table.
  uint16_t **res**: 2
  uint16_t **zero**: 1
  uint16_t **ssi**: 1
  } **b1s**
  uint16_t **bitfield1**
  } **b1u**

5.20.1 Detailed Description

Header that is part of all tables.

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

- include/structures.h

5.21 teletext_descriptor_header Struct Reference

Represents the teletext descriptor header.

`#include <structures.h>`

Data Fields

- uint8_t tag

  Tag, should be 0x56.
- uint8_t len

  Length of the descriptor.

5.21.1 Detailed Description

Represents the teletext descriptor header.

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

- include/structures.h

5.22 tot_descriptor_body Struct Reference

Represents TOT descriptor body.

`#include <structures.h>`

Data Fields

- union {
  struct {
  uint32_t **cc**: 24
  uint32_t **regid**: 6
  uint32_t **res**: 1
  uint32_t **pol**: 1
  } **b1s**
  uint32_t **bitfield1**
  } **b1u**
- uint16_t lto
  Local time offset.
- uint8_t **toc** [5]
- uint16_t **nto**

5.22.1 Detailed Description

Represents TOT descriptor body.

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

- include/structures.h

5.23 tot_descriptor_header Struct Reference

Represents TOT descriptor header.

`#include <structures.h>`

Data Fields

- uint8_t **tag**
- uint8_t len
  Length of the descriptor body.

5.23.1 Detailed Description

Represents TOT descriptor header.

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

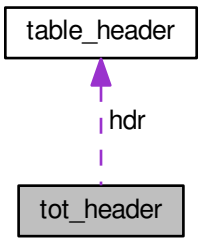
- include/structures.h

5.24 tot_header Struct Reference

Represents TOT header.

`#include <structures.h>`

Collaboration diagram for tot_header:



Data Fields

- struct table_header **hdr**
- uint8_t time [5]

  Brain-dead encoded time information.
- union {
  struct {
  uint16_t dlen: 12

  Length of the descriptor section.

  uint16_t **res**: 4
  } **b1s**
  uint16_t **bitfield1**
  } **b1u**

5.24.1 Detailed Description

Represents TOT header.

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

- include/structures.h

Chapter 6

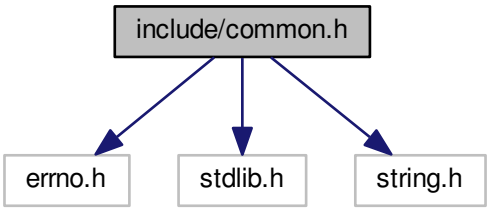
File Documentation

6.1 include/common.h File Reference

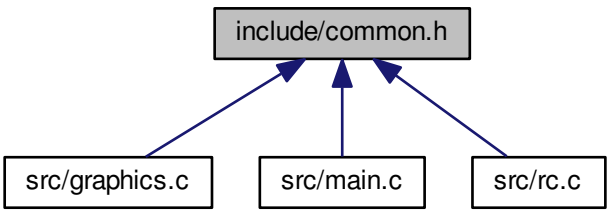
Contains functions that all modules use.

```
#include <errno.h>
#include <stdlib.h>
#include <string.h>
```

Include dependency graph for common.h:



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



Macros

- #define nameof(x) #x

  Gets the string representation of its parameter.
- #define FAIL(fmt, ...)

  Prints an error message to stderr and exits the program.
- #define FAIL_STD(fmt, ...) FAIL("%s: "fmt, strerror(errno), ##__VA_ARGS__)

  Same as FAIL, except that it also prints the string representation of errno.
- #define LOG(module, fmt, ...)

  Prints out a log message.

6.1.1 Detailed Description

Contains functions that all modules use.

6.1.2 Macro Definition Documentation

6.1.2.1 #define FAIL(*fmt, ...*)

Value:

```
do \
    { \
        fprintf(stderr, "%s:%d:%s: Error: "fmt, \
            __FILE__, __LINE__, __func__, ##__VA_ARGS__); \
        exit(EXIT_FAILURE); \
    } while (0)
```

Prints an error message to stderr and exits the program.

Parameters

fmt	A printf-like format string.
...	printf-like arguments to print.

6.1.2.2 #define FAIL_STD(*fmt, ...*) FAIL("%s: "fmt, strerror(errno), ##__VA_ARGS__)

Same as FAIL, except that it also prints the string representation of errno.

Parameters

fmt	A printf-like format string.
...	printf-like arguments to print.

6.1.2.3 #define LOG(*module, fmt, ...*)

Value:

```
do \
    { \
        printf(module": "fmt, ##__VA_ARGS__); \
    } while (0)
```

Prints out a log message.

Parameters

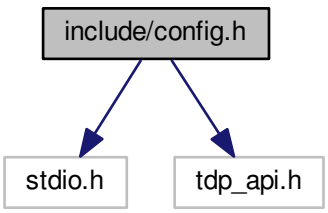
module	A string that identifies the module in which LOG is called.
fmt	A printf-like format string.
...	printf-like arguments to print.

6.2 include/config.h File Reference

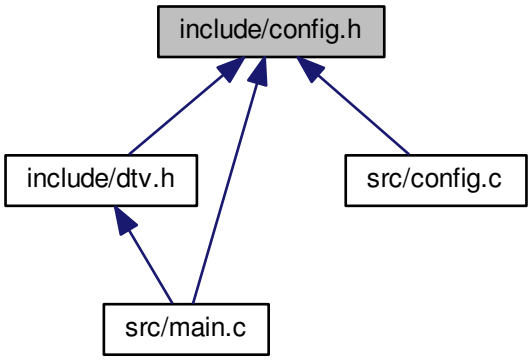
Contains configuration file API.

```
#include <stdio.h>
#include "tdp_api.h"
```

Include dependency graph for config.h:



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



Data Structures

- struct config_init_ch_info

  A structure that holds the initial dtv settings.

Functions

- struct config_init_ch_info config_get_init_ch_info (FILE *f)

  Reads the initial settings from the specified file.

6.2.1 Detailed Description

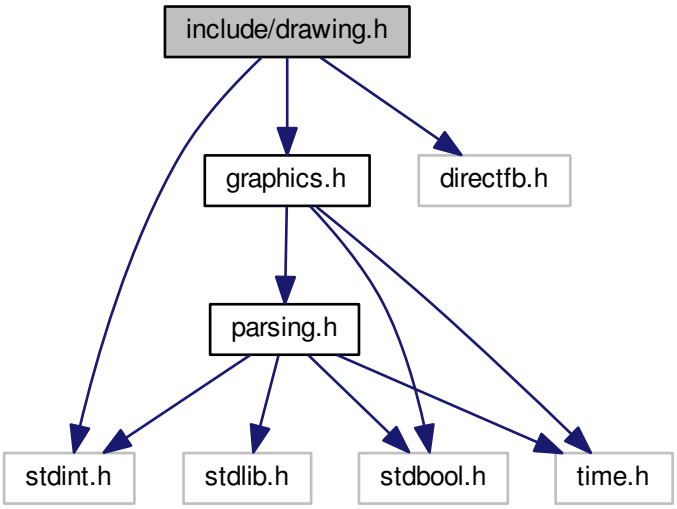
Contains configuration file API.

6.3 include/drawing.h File Reference

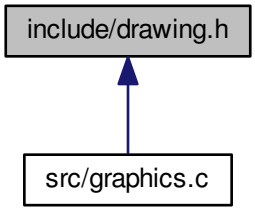
Contains API for drawing graphics elements.

```
#include <stdint.h>
#include <directfb.h>
#include "graphics.h"
```

Include dependency graph for drawing.h:



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



Data Structures

- struct draw_interface

  Basic interface necessary to display graphics elements.

Functions

- int32_t draw_init (struct draw_interface *draw_i, int *argc, char ***argv)

  Initialize drawing interface.
- int32_t draw_channel_info (struct draw_interface *draw_i, struct graphics_channel_info info)

Draw channel_info graphics element.

- int32_t draw_init_message (struct draw_interface *draw_i)

  Draw initializing message.
- int32_t draw_time (struct draw_interface *draw_i, struct tm tm)

  Draw time graphics element.
- int32_t draw_volume (struct draw_interface *draw_i, uint8_t vol)

  Draw volume graphics element.
- int32_t draw_no_channel (struct draw_interface *draw_i)

  Draw no channel display.
- int32_t draw_audio_only (struct draw_interface *draw_i)

  Draw radio graphics.
- int32_t draw_channel_number (struct draw_interface *draw_i, uint16_t ch_num)

  Draw channel number.
- int32_t draw_blackscreen (struct draw_interface *draw_i)

  Draw a black rectangle.
- int32_t draw_clear (struct draw_interface *draw_i)

  Clear the screen.
- int32_t draw_refresh (struct draw_interface *draw_i)

  Refresh display.
- int32_t draw_deinit (struct draw_interface *draw_i)

  Deinitialize drawing interface.

6.3.1 Detailed Description

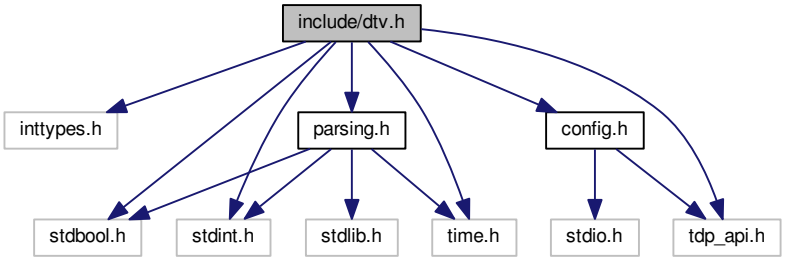
Contains API for drawing graphics elements.

6.4 include/dtv.h File Reference

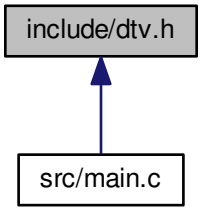
Contains DTV API.

```
#include <inttypes.h>
#include <stdbool.h>
#include <stdint.h>
#include <time.h>
#include "config.h"
#include "parsing.h"
#include "tdp_api.h"
```

Include dependency graph for dtv.h:



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



Data Structures

- struct dtv_channel_info

  Contains basic channel info.

Functions

- void dtv_init (struct config_init_ch_info init_info)

  Function that initializes internal DTV state.
- struct dtv_channel_info dtv_switch_channel (uint16_t ch_num)

  Tries to switch to the desired channel.
- t_Error dtv_set_volume (uint8_t vol)

  Tries to set the volume to the desired value.
- struct tm dtv_get_time ()

  Gets the time information.
- struct sdt dtv_get_info (uint16_t ch_num)

  Gets the SDT information for the specified channel.
- void dtv_deinit ()

  Deinitializes the internal DTV state.

6.4.1 Detailed Description

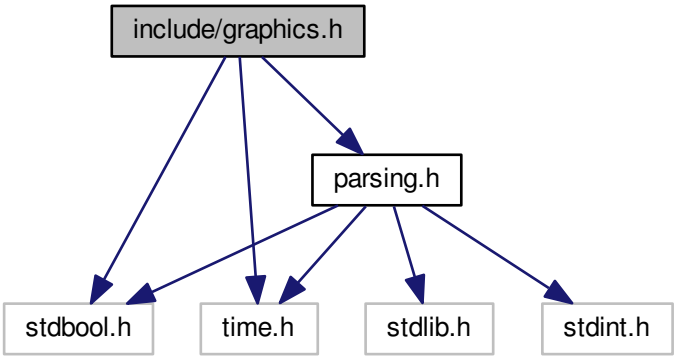
Contains DTV API.

6.5 include/graphics.h File Reference

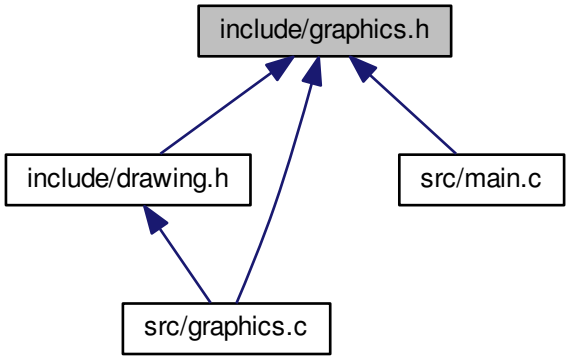
Contains the graphics API.

```
#include <stdbool.h>
#include <time.h>
#include "parsing.h"
```

Include dependency graph for graphics.h:



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



Data Structures

- struct graphics_channel_info

  A struct that contains some basic channel info.

Functions

- void graphics_show_channel_info (struct graphics_channel_info info)
  Displays some basic information about a channel on the screen.
- void graphics_show_init ()
  Displays initializing message.
- void graphics_hide_init ()
  Removes initializing message.
- void graphics_show_time (struct tm tm)
  Displays current time.
- void graphics_show_volume (uint8_t vol)
  Displays volume information on the screen.
- void graphics_show_mute ()
  Displays mute symbol.
- void graphics_hide_mute ()
  Removes mute symbol.
- void graphics_show_channel_number (uint16_t ch_num)
  Displays selected channel number.
- void graphics_blackscreen ()
  Puts a black screen on the screen.
- void graphics_clear ()
  Clears all graphics elements from screen.
- void graphics_start_render (int *argc, char ***argv)
  Starts rendering graphic elements on screen.
- void graphics_stop ()
  Stops graphics rendering loop.

6.5.1 Detailed Description

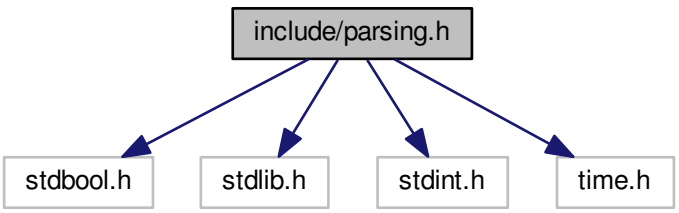
Contains the graphics API.

6.6 include/parsing.h File Reference

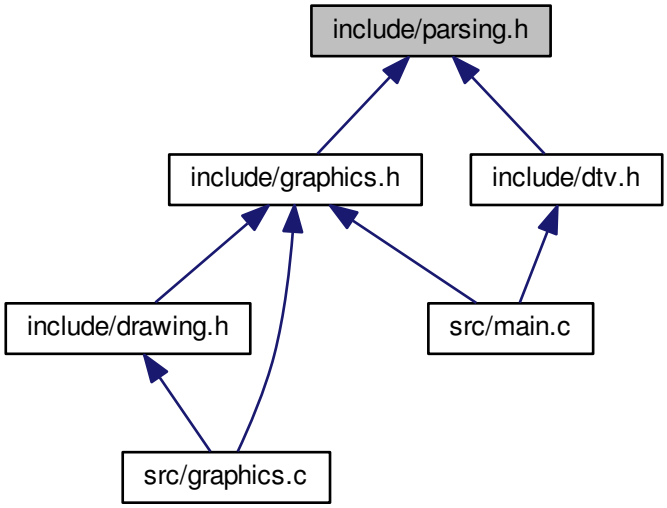
Contains streamlined internal representations of tables.

```
#include <stdbool.h>
#include <stdlib.h>
#include <stdint.h>
#include <time.h>
```

Include dependency graph for parsing.h:



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



Data Structures

- struct pat
  Contains important info from the PAT table.
- struct pat::pmt_basic
  Contains enough info to identify a PMT table.
- struct pmt
  Contains important info from the PMT table.
- struct sdt
  Contains important info from the SDT table.

Functions

- struct pat parse_pat (const uint8_t ∗buffer)
  Parses the given buffer as a PAT table.
- struct pmt parse_pmt (const uint8_t ∗buffer)
  Parses the given buffer as a PMT table.
- struct tm parse_tot (const uint8_t ∗buffer)
  Parses the given buffer as a TOT table and converts its info to C representation of time.
- struct sdt parse_sdt (const uint8_t ∗buffer, uint16_t ch_num)
  Parses the given buffer as a SDT table and extracts information about the specified channel.

6.6.1 Detailed Description

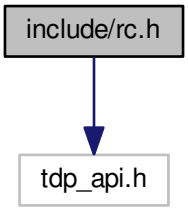
Contains streamlined internal representations of tables.

6.7 include/rc.h File Reference

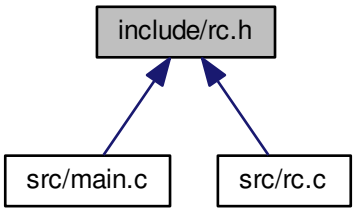
Contains Remote Control API.

```
#include "tdp_api.h"
```

Include dependency graph for rc.h:



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



Macros

- #define KEY_BACK 1

  Specifies the code of the back key.
- #define KEY_1 2

  Specifies the code of the 1 key.
- #define KEY_0 11

  Specifies the code of the 0 key.
- #define KEY_MUTE 60

  Specifies the code of the mute key.
- #define KEY_CHANNEL_DOWN 61

  Specifies the code of the channel down key.
- #define KEY_CHANNEL_UP 62

  Specifies the code of the channelup key.

- #define KEY_VOLUME_UP 63

  Specifies the code of the volume up key.
- #define KEY_VOLUME_DOWN 64

  Specifies the code of the volume down key.
- #define KEY_INFO 358

  Specifies the code of the info key.

Typedefs

- typedef void(∗ rc_key_callback) (int key_no)

  A callback that should take action on key press.

Functions

- void rc_start_loop (const char ∗dev, rc_key_callback callback)

  A function that starts the loop that waits for input events from the remote control.
- void rc_stop_loop ()

  Stops the event loop.

6.7.1 Detailed Description

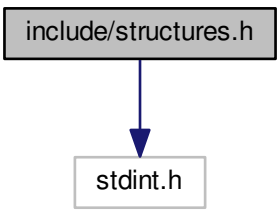
Contains Remote Control API.

6.8 include/structures.h File Reference

Contains nitty-gritty DVB details.

```
#include <stdint.h>
```

Include dependency graph for structures.h:



Data Structures

- struct table_header

  Header that is part of all tables.
- struct pat_header

  Represents PAT header.
- struct pat_body

  Represents PAT body.
- struct pmt_header

  Represents PMT header.
- struct pmt_body

  Represents PMT body.
- struct teletext_descriptor_header

  Represents the teletext descriptor header.
- struct sdt_header

  Represents SDT header.
- struct sdt_body

  Represents SDT body.
- struct sdt_descriptor1

  Represents the first half of the service descriptor.
- struct sdt_descriptor2

  Represents the second half of the service descriptor.
- struct tot_header

  Represents TOT header.
- struct tot_descriptor_header

  Represents TOT descriptor header.
- struct tot_descriptor_body

  Represents TOT descriptor body.

Functions

- struct table_header **__attribute__** ((packed))
- struct pat_header get_pat_header (const uint8_t *buffer)

  Retrieves pat_header from the stream.
- struct pat_body get_pat_body (const uint8_t *buffer)

  Retrieves pat_body from the stream.
- struct pmt_header get_pmt_header (const uint8_t *buffer)

  Retrieves pmt_header from the stream.
- struct pmt_body get_pmt_body (const uint8_t *buffer)

  Retrieves pmt_body from the stream.
- struct teletext_descriptor_header get_teletext_descriptor_header (const uint8_t *buffer)

  Retrieves teletext_descriptor_header from the stream.
- struct sdt_header get_sdt_header (const uint8_t *buffer)

  Retrieves sdt_header from the stream.
- struct sdt_body get_sdt_body (const uint8_t *buffer)

  Retrieves sdt_body from the stream.
- struct sdt_descriptor1 get_sdt_descriptor1 (const uint8_t *buffer)

  Retrieves sdt_descriptor1 from the stream.
- struct sdt_descriptor2 get_sdt_descriptor2 (const uint8_t *buffer)

  Retrieves sdt_descriptor2 from the stream.

- struct tot_header get_tot_header (const uint8_t *buffer)

  Retrieves tot_header from the stream.
- struct tot_descriptor_header get_tot_descriptor_header (const uint8_t *buffer)

  Retrieves tot_descriptor_header from the stream.
- struct tot_descriptor_body get_tot_descriptor_body (const uint8_t *buffer)

  Retrieves tot_descriptor_body from the stream.

Variables

- uint8_t tid

  Table id.
- union {
  struct {
  uint16_t len: 12
  Length of the rest of the table.
  uint16_t **res**: 2
  uint16_t **zero**: 1
  uint16_t **ssi**: 1
  } **b1s**
  uint16_t **bitfield1**
  } **b1u**

- struct table_header **hdr**
- uint16_t **tsi**
- uint8_t **sec**
- uint8_t **lsn**
- uint16_t ch_num

  Channel number of the current PMT.
- struct {
  uint8_t **cni**: 1
  uint8_t **version**: 5
  uint8_t **res**: 2
  } **b**

- union {
  struct {
  uint16_t pilen: 12
  Length of the pmt_body section.
  uint16_t **res3**: 4
  } **b2s**
  uint16_t **bitfield2**
  } **b2u**

- uint8_t type

  Type of stream.
- struct teletext_descriptor_header **__attribute__**
- uint16_t **oni**
- uint16_t sid

  Service id (same as channel number).
- uint8_t **tag**
- uint8_t spnlen

  Length of the service provider name.
- uint8_t snlen

  Length of the service name.

- uint8_t time [5]

  Brain-dead encoded time information.
- uint16_t lto

  Local time offset.
- uint8_t **toc** [5]
- uint16_t **nto**

6.8.1 Detailed Description

Contains nitty-gritty DVB details.

6.8.2 Variable Documentation

6.8.2.1 uint16_t ch_num

Channel number of the current PMT.

Channel number.

6.8.2.2 uint8_t len

Length of the rest of the table.

Length of the descriptor body.

Length of the descriptor.

6.8.2.3 uint16_t pid

PID of the PMT table.

PID of the PS.

6.8.2.4 uint8_t type

Type of stream.

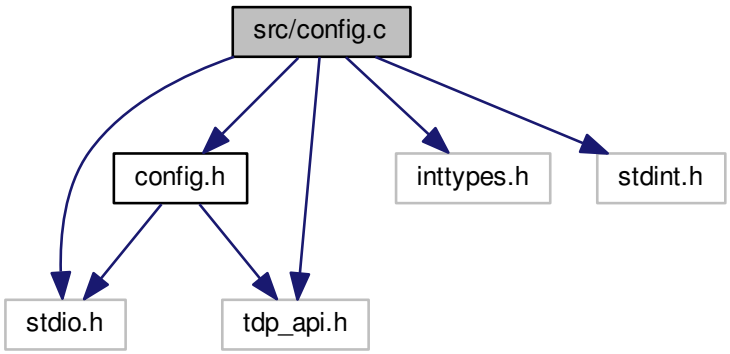
Type of service (channel).

6.9 src/config.c File Reference

Implementation for the configuration file interface.

```
#include "config.h"
#include <inttypes.h>
#include <stdio.h>
#include <stdint.h>
#include "tdp_api.h"
```

Include dependency graph for config.c:



Macros

- #define BUF_SIZE 100
- #define MAKE_GETTER(TYPE, NAME, NOT_FOUND, CONVERSION)

  Creates a getter function for a field. The generated function is named get_NAME, and searches through the file, for the field NAME, with type TYPE, and input conversion CONVERSION.

Functions

- MAKE_GETTER (uint32_t, frequency, NO_FREQUENCY,"%"SCNu32)

  Attempts to load frequency from file.
- MAKE_GETTER (uint32_t, bandwidth, NO_BANDWIDTH,"%"SCNu32)

  Attempts to load bandwidth from file.
- MAKE_GETTER (uint16_t, video_pid, NO_VIDEO_PID,"%"SCNu16)

  Attempts to load video PID from file.
- MAKE_GETTER (uint16_t, audio_pid, NO_AUDIO_PID,"%"SCNu16)

  Attempts to load audio PID from file.
- MAKE_GETTER (uint16_t, ch_num, NO_CH_NUM,"%"SCNu16)

  Attempts to load channel number from file.
- MAKE_GETTER (int, module, NO_MODULE,"%d")

  Attempts to load module type from file.
- MAKE_GETTER (int, video_type, NO_VIDEO_TYPE,"%d")

Attempts to load video type from file.

- MAKE_GETTER (int, audio_type, NO_AUDIO_TYPE,"%d")

  Attempts to load audio type from file.
- MAKE_GETTER (int, teletext, NO_TELETEXT,"%d")

  Attempts t oload teletext from file.
- struct config_init_ch_info config_get_init_ch_info (FILE *f)

  Attempts to load all fields from the file.

6.9.1 Detailed Description

Implementation for the configuration file interface.

6.9.2 Macro Definition Documentation

6.9.2.1 #define BUF_SIZE 100

Parameters

Buffer	size for reading the file.

6.9.2.2 #define MAKE_GETTER(*TYPE, NAME, NOT_FOUND, CONVERSION*)

Value:

```
static TYPE get_##NAME(FILE *f) \
{ \
    rewind(f); \
 \
    while (!feof(f)) \
    { \
        char buf[BUF_SIZE]; \
        fgets(buf, BUF_SIZE, f); \
 \
        TYPE ret; \
        if (sscanf(buf, #NAME" = "CONVERSION, &ret) == 1) \
            return ret; \
    } \
 \
    return NOT_FOUND; \
}
```

Creates a getter function for a field. The generated function is named get_NAME, and searches through the file, for the field NAME, with type TYPE, and input conversion CONVERSION.

Parameters

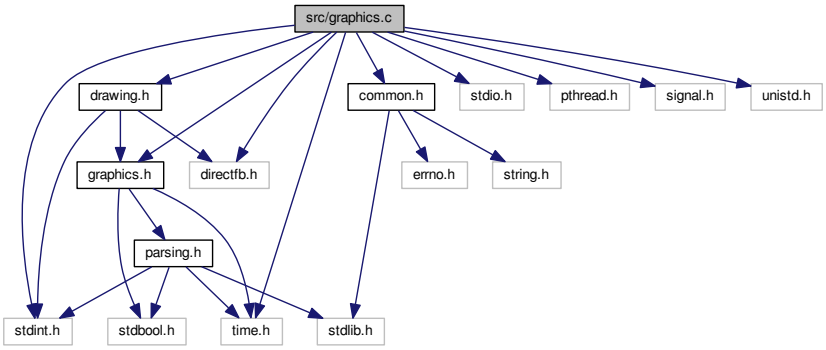
TYPE	type of the field, and also return type of the function.
NAME	name of the field, which is also part of the function name.
NOT_FOUND	value of type TYPE, to be returned if field was not found.
CONVERSION	A compile-time string that specifies the input conversion à la scanf.

6.10 src/graphics.c File Reference

Contains implementation for graphics interface.

```
#include <stdint.h>
#include <stdio.h>
#include <time.h>
#include <pthread.h>
#include <signal.h>
#include <unistd.h>
#include <directfb.h>
#include "common.h"
#include "drawing.h"
#include "graphics.h"
```

Include dependency graph for graphics.c:



Data Structures

- struct graphics_flags

  A struct that keeps the state of what should be displayed.
- struct graphics_args

  A shim structure to pass main arguments to DirectFB.

Macros

- #define **_POSIX_C_SOURCE** 200809L
- #define **LOG_GRAPHICS**(fmt, ...) LOG("Graphics", fmt, ##__VA_ARGS__)
- #define **DRAWCHECK**(err)

Enumerations

- enum g_error { G_ERROR = -1, G_NO_ERROR }

  Error codes to be used for internal graphics functions.

Functions

- void graphics_show_channel_info (struct graphics_channel_info info)

  Displays some basic information about a channel on the screen.
- void graphics_show_time (struct tm tm)

  Displays current time.
- void graphics_show_volume (uint8_t vol)

  Displays volume information on the screen.
- void graphics_show_init ()

  Displays initializing message.
- void graphics_hide_init ()

  Removes initializing message.
- void graphics_show_mute ()

  Displays mute symbol.
- void graphics_hide_mute ()

  Removes mute symbol.
- void graphics_show_channel_number (uint16_t ch_num)

  Displays selected channel number.
- void graphics_blackscreen ()

  Puts a black screen on the screen.
- void graphics_clear ()

  Clears all graphics elements from screen.
- enum g_error graphics_render (int *argc, char ***argv)

  Function that continuously refreshes graphics display according to the current state of graphics_flags.
- void graphics_start_render (int *argc, char ***argv)

  Starts rendering graphic elements on screen.
- void graphics_stop ()

  Stops graphics rendering loop.

6.10.1 Detailed Description

Contains implementation for graphics interface.

6.10.2 Macro Definition Documentation

6.10.2.1 #define DRAWCHECK(*err*)

Value:

```
{ \
    if (err != EXIT_SUCCESS) \
    { \
        fprintf(stderr, "%s:%d:%s\n", __FILE__, __LINE__, __func__); \
        release(); \
        return G_ERROR; \
    } \
}
```

6.10.3 Enumeration Type Documentation

6.10.3.1 enum g_error

Error codes to be used for internal graphics functions.

Enumerator

G_ERROR Specifies that a graphics error has occurred.

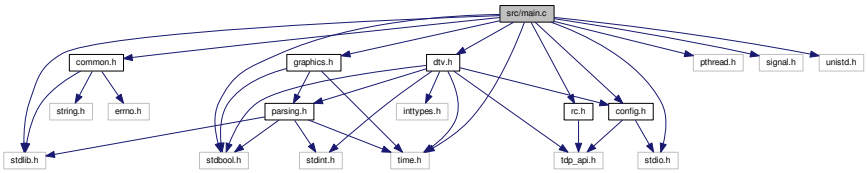
G_NO_ERROR Specifies that a graphics_error has *not* occurred.

6.11 src/main.c File Reference

Contains the implementation that glues other modules together.

```
#include <stdbool.h>
#include <stdlib.h>
#include <stdio.h>
#include <time.h>
#include <pthread.h>
#include <signal.h>
#include <unistd.h>
#include "common.h"
#include "graphics.h"
#include "config.h"
#include "dtv.h"
#include "rc.h"
```

Include dependency graph for main.c:



Macros

- #define **_POSIX_C_SOURCE** 200809L
- #define **LOG_MAIN**(fmt, ...) LOG("Main", fmt, ##__VA_ARGS__)

Functions

- void handle_signal (int signum)

  Function that handles SIGINT and SIGTERT, by ensuring graceful exit.
- void calculate_time ()

  Function that calculates the amount of time that has passed since TOT table was received, and adjusts the time to be displayed accordingly.
- void confirm_channel (union sigval s)

  Function that switches channels once the change has been confirmed.
- void react_to_keypress (int key_code)

  Function that reacts to a keypress from the remote control.
- int **main** (int argc, char **argv)

6.11.1 Detailed Description

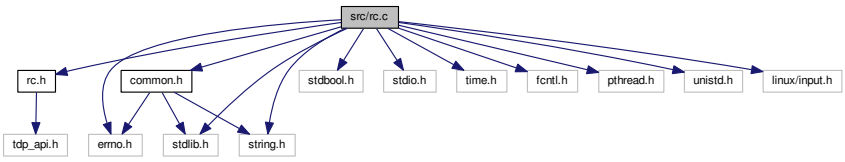
Contains the implementation that glues other modules together.

6.12 src/rc.c File Reference

Contains the implementation of the remote control interface.

```
#include "rc.h"
#include <errno.h>
#include <stdbool.h>
#include <stdlib.h>
#include <stdio.h>
#include <string.h>
#include <time.h>
#include <fcntl.h>
#include <pthread.h>
#include <unistd.h>
#include <linux/input.h>
#include "common.h"
```

Include dependency graph for rc.c:



Data Structures

- struct rc_args

  A shim structure to pass arguments to event thread.

Macros

- #define **_POSIX_C_SOURCE** 200809L
- #define **LOG_RC**(fmt, ...) LOG("RC", fmt, ##__VA_ARGS__)
- #define EVENT_KEY_PRESS 1

  Specifies that a key press has occurred.

Functions

- void rc_start_loop (const char *dev, rc_key_callback kc)

  A function that starts the loop that waits for input events from the remote control.
- void rc_stop_loop ()

  Stops the event loop.

6.12.1 Detailed Description

Contains the implementation of the remote control interface.

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