GDS-Render

v1.2

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Chapter 1

Main Page

This programm converts GDS layout files to

- PDF Files using the Cairo Renderer
- Latex code (TikZ) using the LaTeX / TikZ Renderer

See the Usage page for details and Compilation for building instructions and Version Number for the versioning scheme of this program.

Chapter 2

Compilation

2.1 Preface

GDS-Render is designed for UNIX-like, especially GNU/Linux based systems. It was developed under a Linux system. Therefore, best performance is expected using a Linux operating system.

2.2 Dependencies

The dependencies of GDS-Render are:

2.2.1 Program Dependencies

- GLib2
- GTK3
- Cairographics

2.2.2 Compilation Dependencies

These dependencies are not needed for running the program; just for compilation.

- Build System (GCC + binutils, make, etc...). Most distributions supply a "development" meta-package containing this stuff.
- cmake >= 2.8
- More or less optional: git. Used for extraction of the precise version number. It is strongly recommended to provide git!
- Optional: doxygen for this nice documentation.

The dependency list of GTK3 already includes Cairographics and GLib2. You should be on the safe side with a recent GTK3 version.

Development is done with the following library versions:

Cairographics	GLib2	GTK3
1.17.3	2.60.6-1	3.24.10-1

2.3 Compilation Instructions

2.3.1 General Linux Build Instruction

Go to the build directory you want to compile in. This may be the gds-render project root. Execute
```
cmake -DCMAKE_BUILD_TYPE=Release <Path to gds-render root>
```

for a build in release configuartion. Use `-DCMAKE_BUILD_TYPE=Debug` for debugging. Cmake will check the dependencies.

Once cmake has finished, type
```
make
```

to build the program and
```
make documentation
```

to build the doxygen documentation.

2.3.2 Archlinux Package

The subfolder 'AUR' contains a PKGBUILD file to build an Archlinux/Pacman package.

2.3.3 Compiler Warnings

The compiler will throw the following warnings. Compiled with GCC 8.2.1.

Warning	Assessment
warning: ‘calculate_path_miter_points’ defined but not used [-Wunused-function]	Ignore. Function will be used in later versions.

2.3.4 Compilation for Windows

Warning

> Windows is not a target system for this application, considering that this program converts GDS files which are most likely generated under a Linux system. The tips shown in this section are a guidance for anyone trying to build this application for Windows.
>
> Note that the Windows compatibility may decrease in future releases and a simple compilation like with this version might not be possible anymore.

The current release of 'gds-render' does not compile under a windows system, due to incompatibilities in the external library renderer. It is possible to comment out the code that causes the incompatibility. The external renderer will not be usable after this.

Steps:

- Go to file external-renderer.c
- Remove `#include` <dlfcn.h>
- comment out all code in external_renderer_render_cell

The program should now compile.

Warning

This guide is out of date. The Cairo renderer doesn't compile under windows anymore due to the usage of the fork() system call. It is possible to patch this out in order to restore Windows compatibility.

Chapter 3

Layer Mapping File Specification

File Format

The layer mapping file contains information on how to render the layers. The information is stored in CSV format – *True CSV*; not that rubbish with semicolons that Excel calls CSV.

Each line representing a layer consists of following fields:

```
layer,r,g,b,a,export,name
```

- **layer**: Layer number identifiying this layer.
- **r**,**b**,**g**,**a**: RGBA color value uning double precision float values in the range from 0 to 1.
- **export**: Either '1' or '0'. Defining whether to render this layer into the output file.
- **name**: The name of the layer.

the order of the layers inside the layer mapping file defines the layer stack in the rendered output. The first layer is at the bottom, the last at the top.

Handling Inside the GUI

The layer mapping file can be imported and exported inside the GUI.

Export

During export, all layer configurations are written to the mapping file

Import

During import, all layer configurations are loaded from the mapping file. This overwrites any configuration done to that layer. Layers that are not present in the layer mapping file are appended at the end of the list. This means, they are rendered on top of the other layers. Because the layer mapping file does not contain any information on these layers, their configuration is not reset during import.

Chapter 4

Usage

4.1 Command Line Interface

To use the application on the command line check 'gds-render --help'.

Usage: gds-render [OPTION...] FILE - Convert GDS file <FILE> to graphic

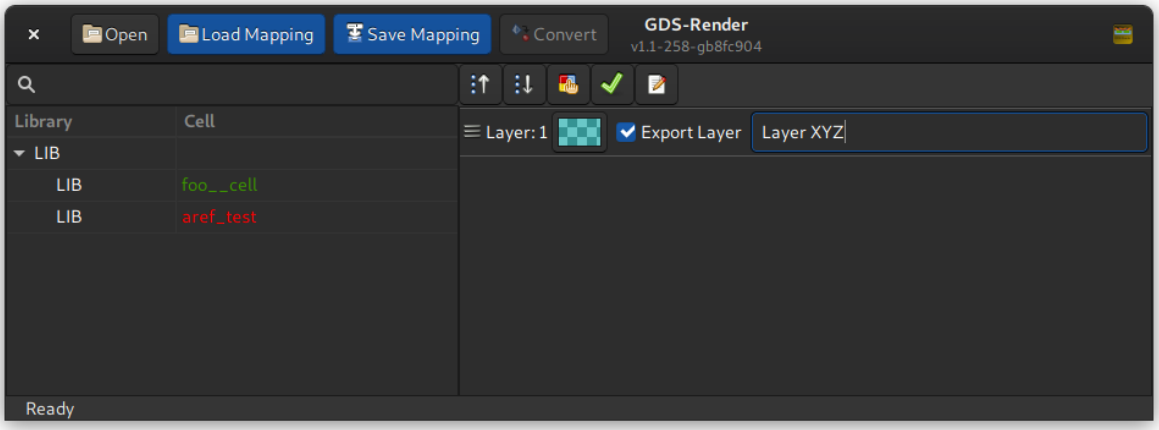
Help Options:
-h, --help Show help options
--help-all Show all help options
--help-gtk Show GTK+ Options

Application Options:
-v, --version Print version
-r, --renderer=pdf|svg|tikz|ext Renderer to use
-s, --scale=<SCALE> Divide output coordinates by <SCALE>
-o, --output-file=PATH Output file path
-m, --mapping=PATH Path for Layer Mapping File
-c, --cell=NAME Cell to render
-a, --tex-standalone Create standalone PDF
-l, --tex-layers Create PDF Layers (OCG)
-P, --custom-render-lib=PATH Path to a custom shared object, that implements the render_cell_to_file function
--display=DISPLAY X display to use

4.2 Graphical User Interface

The graphical user interface (GUI) can be used to open GDS Files, configure the layer rendering (colors, order, transparency etc.), and convert cells.

It is possible to export the layer configurations so they can be used later on. Even in the Command Line Interface



The cell selector on the left shows the GDS Libraries and Cells. The cells are marked green if all references inside the cell could be found. If not all references could be found, the cell is marked orange. This doens't show if child cells have missing childs. Only one level of the hierarchy is checked in order to make it easier to spot an errorneous cell. Cells with missing child cells are still renderable but -- obviously -- faulty. If a cell or any sub-cell contains a reference loop, the cell is marked red. In this case it can't be selected for rendering.

In the above image one cell is green; so everything is okay. And the other one is red, which indicates a reference loop. This cell cannot be selected for rendering!

Chapter 5

Version Number

5.1 Main Versioning Scheme

The version number of this application consists of a given version in the format of 'v1.0'. Where the first number indicates a major release and the second number indicates minor changes.

Versions, including release candidates and path-levels, are tagged in git.

5.1.1 Release Candidates

Release candidates are software versions that seem stable and functional to become a new version but testing is not fully finished. These versions are marked with an '-rcX', where X is the number of the release candidate. The 3rd release candidate of version 4.2 would be '*v4.2-rc3*'. Release candidates are in a frozen state. Only bugfixes that are necessary for functionality are applied to these versions before releasing the final version.

5.1.2 Patch Levels

If an already released version contains bugs that need to be fixed, the version number is not incremented. Insted a new version number with a patch-level is created. The patch-level is appended with a dash directly after the version number. The fist patch-level of version 3.5 would be: 'v3.5-1'.

5.2 Git Based Version Number

The application and this documentation contain a git-based version number. With this version number not only released versions but all development points of the software can be uniquely identified.

An example for such a version number is: *v1.0-rc4-41-gaa41373-dirty*

It consists of the last Main Versioning Scheme (in this case version 1.0 – Release candidate 4) and some other information from the source code management system. The number after the version tag is the commit count after the given version. In this case the specified version is 41 commits after the last tagged version 'v1.0-rc4'. The next section always starts with a 'g' (for git) and after that contains the first letters of the commit ID. In this case an additional '-dirty' is appended, showing that the software version contains unstaged changes.

In tabular form: *v1.0-rc4-41-gaa41373-dirty*

Last tagged version	Commits since that version	Start of commit ID	Unstaged changes?
1.0-rc4	41	aa41373	yes

This git-based version number is automatically put into the application and this documentation during the application's compilation / the documentation's generation. For this *git* is needed. Therefore, it is highly recommended to have 'git' installed for compilation although it is no build dependency. In case of a missing git installation, the string "! version not set !" is compiled into the application.

Chapter 6

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Version 2, June 1991

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Chapter 7

GDS-Render Readme

This software is a rendering programm for GDS2 layout files. The GDS2 format is mainly used in integrated circuit development. This program allows the conversion of a GDS file to a vector graphics file.

Output Formats

- Export GDS Layout to LaTeX (using TikZ).
- Export to PDF (Cairographics).

Features

Note: Due to various size limitations of both TikZ and the PDF export, the layout might not render correctly. In this case adjust the scale value. A higher scale value scales down your design.

- Configurable layer stack-up.
- Layer colors configurable as ARGB color values.
- Command line interface.
- ~~Awesome~~ Somehow usable GUI.

License and Other Stuff

- Free software (GPLv2 *only*)
- Coded in plain C using GTK+3.0, Glib2, and Cairographics

Chapter 8

Module Index

8.1 Modules

Here is a list of all modules:

Chapter 9

Data Structure Index

9.1 Data Structures

Here are the data structures with brief descriptions:

Chapter 10

File Index

10.1 File List

Here is a list of all files with brief descriptions:

Chapter 11

Module Documentation

11.1 Activity Bar

Collaboration diagram for Activity Bar:

Data Structures

- struct _ActivityBar

  Opaque ActivityBar object. Not viewable outside this source file.

Macros

- #define TYPE_ACTIVITY_BAR (activity_bar_get_type())

Functions

- ActivityBar * activity_bar_new ()

  Create new Object ActivityBar.
- void activity_bar_set_ready (ActivityBar *bar)

  Deletes all applied tasks and sets bar to "Ready".
- void activity_bar_set_busy (ActivityBar *bar, const char *text)

  Enable spinner and set `text`. If text is NULL, 'Working...' is displayed.
- static void activity_bar_dispose (GObject *obj)
- static void activity_bar_class_init (ActivityBarClass *klass)
- static void activity_bar_init (ActivityBar *self)

11.1.1 Detailed Description

Activity Status Bar

11.1.2 Macro Definition Documentation

11.1.2.1 TYPE_ACTIVITY_BAR

```
#define TYPE_ACTIVITY_BAR (activity_bar_get_type())
```

Definition at line 42 of file activity-bar.h.

11.1.3 Function Documentation

11.1.3.1 activity_bar_class_init()

```
static void activity_bar_class_init (
            ActivityBarClass * klass )  [static]
```

Definition at line 66 of file activity-bar.c.

Here is the call graph for this function:

11.1.3.2 activity_bar_dispose()

```
static void activity_bar_dispose (
            GObject * obj )  [static]
```

Definition at line 52 of file activity-bar.c.

Here is the caller graph for this function:

11.1.3.3 activity_bar_init()

```
static void activity_bar_init (
            ActivityBar * self )  [static]
```

Definition at line 73 of file activity-bar.c.

11.1.3.4 activity_bar_new()

```
ActivityBar * activity_bar_new ( )
```

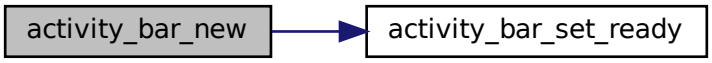
Create new Object ActivityBar.

Returns

New object. In case of error: NULL.

Definition at line 91 of file activity-bar.c.

Here is the call graph for this function:



Here is the caller graph for this function:

11.1.3.5 activity_bar_set_busy()

```
void activity_bar_set_busy (
            ActivityBar * bar,
            const char * text )
```

Enable spinner and set `text`. If text is NULL, 'Working...' is displayed.

Parameters

bar	Activity bar object
text	Text to display, may be NULL

Definition at line 108 of file activity-bar.c.

Here is the caller graph for this function:

11.1.3.6 activity_bar_set_ready()

```
void activity_bar_set_ready (
            ActivityBar * bar )
```

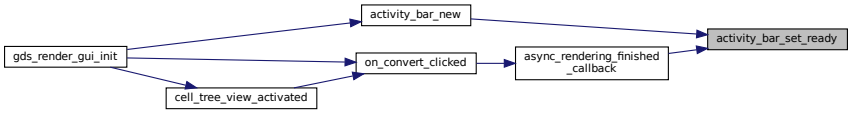
Deletes all applied tasks and sets bar to "Ready".

Parameters

in	*bar*	AcitivityBar object.

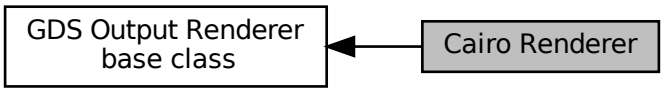
Definition at line 102 of file activity-bar.c.

Here is the caller graph for this function:



11.2 Cairo Renderer

Collaboration diagram for Cairo Renderer:



Data Structures

- struct _CairoRenderer
- struct cairo_layer

  The cairo_layer struct Each rendered layer is represented by this struct.

Macros

- #define GDS_RENDER_TYPE_CAIRO_RENDERER (cairo_renderer_get_type())
- #define MAX_LAYERS (300)

  Maximum layer count the output renderer can process. Typically GDS only specifies up to 255 layers.

Functions

- CairoRenderer * cairo_renderer_new_svg ()

  Create new CairoRenderer for SVG output.
- CairoRenderer * cairo_renderer_new_pdf ()

  Create new CairoRenderer for PDF output.
- static void revert_inherited_transform (struct cairo_layer *layers)

  Revert the last transformation on all layers.
- static void apply_inherited_transform_to_all_layers (struct cairo_layer *layers, const struct gds_point *origin, double magnification, gboolean flipping, double rotation, double scale)

  Applies transformation to all layers.
- static void render_cell (struct gds_cell *cell, struct cairo_layer *layers, double scale)

  render_cell Render a cell with its sub-cells
- static int read_line_from_fd (int fd, char *buff, size_t buff_size)

  Read a line from a file descriptor.
- static int cairo_renderer_render_cell_to_vector_file (GdsOutputRenderer *renderer, struct gds_cell *cell, GList *layer_infos, const char *pdf_file, const char *svg_file, double scale)

  Render `cell` to a PDF file specified by `pdf_file`.
- static void cairo_renderer_init (CairoRenderer *self)
- static int cairo_renderer_render_output (GdsOutputRenderer *renderer, struct gds_cell *cell, double scale)
- static void cairo_renderer_class_init (CairoRendererClass *klass)

11.2.1 Detailed Description

11.2.2 Macro Definition Documentation

11.2.2.1 GDS_RENDER_TYPE_CAIRO_RENDERER

```
#define GDS_RENDER_TYPE_CAIRO_RENDERER (cairo_renderer_get_type())
```

Definition at line 39 of file cairo-renderer.h.

11.2.2.2 MAX_LAYERS

```
#define MAX_LAYERS (300)
```

Maximum layer count the output renderer can process. Typically GDS only specifies up to 255 layers.

Definition at line 41 of file cairo-renderer.h.

11.2.3 Function Documentation

11.2.3.1 apply_inherited_transform_to_all_layers()

```
static void apply_inherited_transform_to_all_layers (
            struct cairo_layer * layers,
            const struct gds_point * origin,
            double magnification,
            gboolean flipping,
            double rotation,
            double scale )  [static]
```

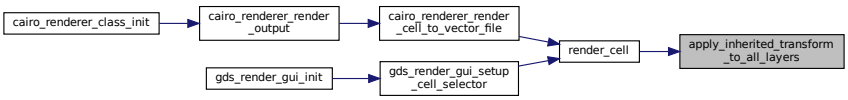
Applies transformation to all layers.

Parameters

layers	Array of layers
origin	Origin translation
magnification	Scaling
flipping	Mirror image on x-axis before rotating
rotation	Rotation in degrees
scale	Scale the image down by. Only used for sclaing origin coordinates. Not applied to layer.

Definition at line 81 of file cairo-renderer.c.

Here is the caller graph for this function:

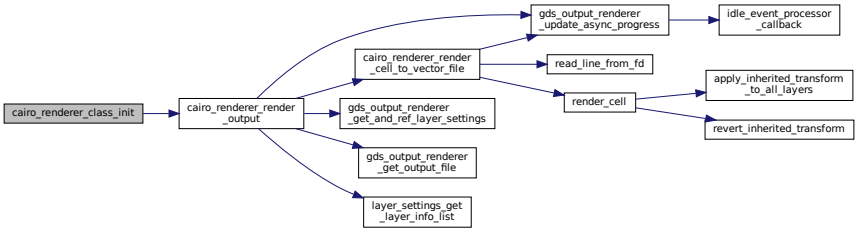


11.2.3.2 cairo_renderer_class_init()

```
static void cairo_renderer_class_init (
            CairoRendererClass * klass )  [static]
```

Definition at line 476 of file cairo-renderer.c.

Here is the call graph for this function:



11.2.3.3 cairo_renderer_init()

```
static void cairo_renderer_init (
            CairoRenderer * self )  [static]
```

Definition at line 434 of file cairo-renderer.c.

11.2.3.4 cairo_renderer_new_pdf()

```
CairoRenderer * cairo_renderer_new_pdf ( )
```

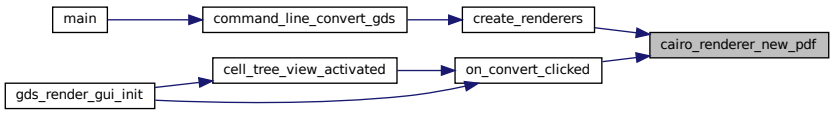
Create new CairoRenderer for PDF output.

Returns

New object

Definition at line 483 of file cairo-renderer.c.

Here is the caller graph for this function:



11.2.3.5 cairo_renderer_new_svg()

```
CairoRenderer * cairo_renderer_new_svg ( )
```

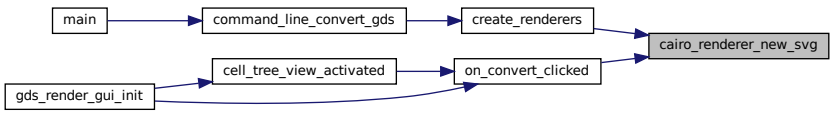
Create new CairoRenderer for SVG output.

Returns

New object

Definition at line 493 of file cairo-renderer.c.

Here is the caller graph for this function:



11.2.3.6 cairo_renderer_render_cell_to_vector_file()

```
static int cairo_renderer_render_cell_to_vector_file (
            GdsOutputRenderer * renderer,
            struct gds_cell * cell,
            GList * layer_infos,
            const char * pdf_file,
            const char * svg_file,
            double scale )  [static]
```

Render `cell` to a PDF file specified by `pdf_file`.

Parameters

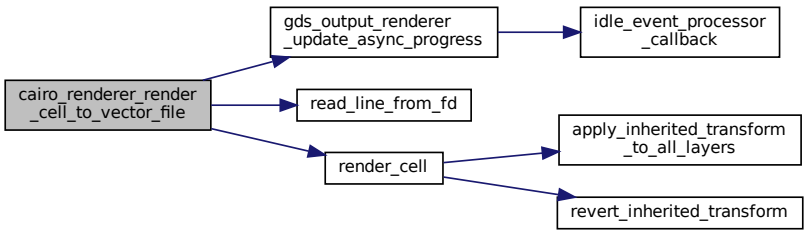
renderer	The current renderer this function is running from
cell	Toplevel cell to Cairo Renderer
layer_infos	List of layer information. Specifies color and layer stacking
pdf_file	PDF output file. Set to NULL if no PDF file has to be generated
svg_file	SVG output file. Set to NULL if no SVG file has to be generated
scale	Scale the output image down by `scale`

Returns

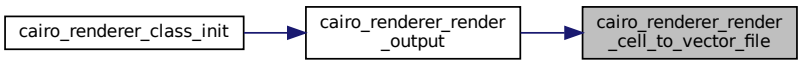
Error

Definition at line 233 of file cairo-renderer.c.

Here is the call graph for this function:



Here is the caller graph for this function:

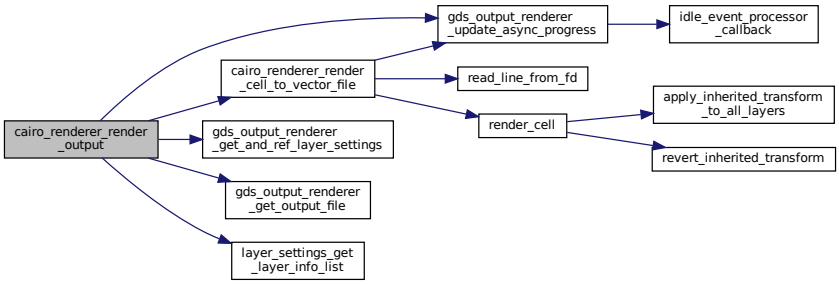


11.2.3.7 cairo_renderer_render_output()

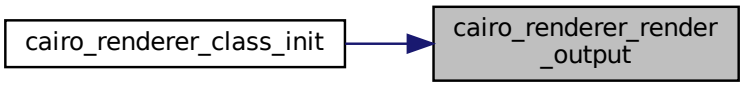
```
static int cairo_renderer_render_output (
            GdsOutputRenderer * renderer,
            struct gds_cell * cell,
            double scale )  [static]
```

Definition at line 440 of file cairo-renderer.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.2.3.8 read_line_from_fd()

```
static int read_line_from_fd (
            int fd,
            char * buff,
            size_t buff_size )  [static]
```

Read a line from a file descriptor.

In case of a broken pipe / closed writing end, it will terminate

Parameters

fd	File descriptor to read from
buff	Buffer to write data in
buff_size	Buffer size

Returns

length of read data

Definition at line 203 of file cairo-renderer.c.

Here is the caller graph for this function:

11.2.3.9 render_cell()

```
static void render_cell (
            struct gds_cell * cell,
            struct cairo_layer * layers,
            double scale )  [static]
```

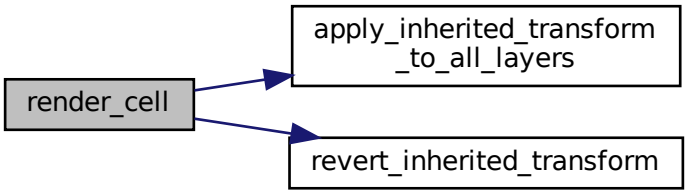
render_cell Render a cell with its sub-cells

Parameters

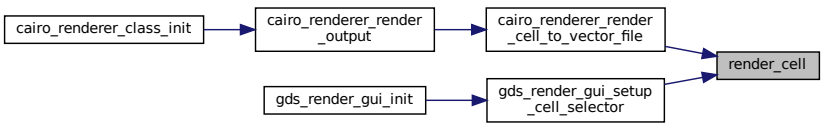
cell	Cell to render
layers	Cell will be rendered into these layers
scale	sclae image down by this factor

Definition at line 111 of file cairo-renderer.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.2.3.10 revert_inherited_transform()

```
static void revert_inherited_transform (
            struct cairo_layer * layers )  [static]
```

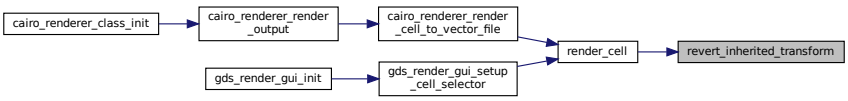
Revert the last transformation on all layers.

Parameters

layers	Pointer to cairo_layer structures

Definition at line 61 of file cairo-renderer.c.

Here is the caller graph for this function:



11.3 Command Line Interface

Data Structures

- struct external_renderer_params

  External renderer paramameters to command line renderer.

Functions

- static int string_array_count (char **string_array)
- static int create_renderers (char **renderers, char **output_file_names, gboolean tex_layers, gboolean tex_standalone, const struct external_renderer_params *ext_params, GList **renderer_list, LayerSettings *layer_settings)
- static struct gds_cell * find_gds_cell_in_lib (struct gds_library *lib, const char *cell_name)
- int command_line_convert_gds (const char *gds_name, const char *cell_name, char **renderers, char **output_file_names, const char *layer_file, struct external_renderer_params *ext_param, gboolean tex_standalone, gboolean tex_layers, double scale)

  Convert GDS according to command line parameters.

11.3.1 Detailed Description

11.3.2 Function Documentation

11.3.2.1 command_line_convert_gds()

```
int command_line_convert_gds (
            const char * gds_name,
            const char * cell_name,
            char ** renderers,
            char ** output_file_names,
            const char * layer_file,
            struct external_renderer_params * ext_param,
            gboolean tex_standalone,
            gboolean tex_layers,
            double scale )
```

Convert GDS according to command line parameters.

Parameters

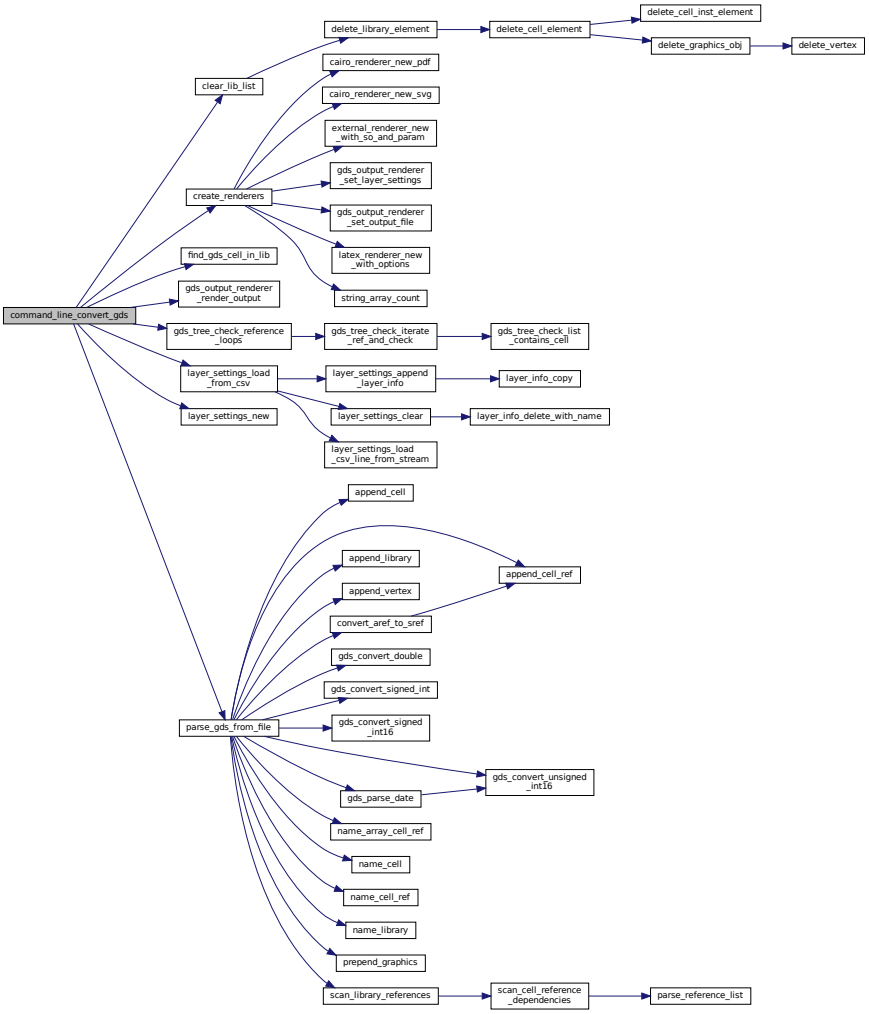
gds_name	Path to GDS File
cell_name	Cell name
renderers	Renderer ids
output_file_names	Output file names
layer_file	Layer mapping file
ext_param	Settings for external library renderer
tex_standalone	Standalone TeX
tex_layers	TeX OCR layers
scale	Scale value

Returns

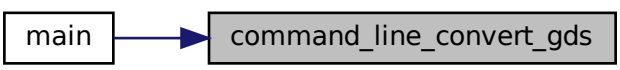
Error code, 0 if successful

Definition at line 138 of file command-line.c.

Here is the call graph for this function:



Here is the caller graph for this function:

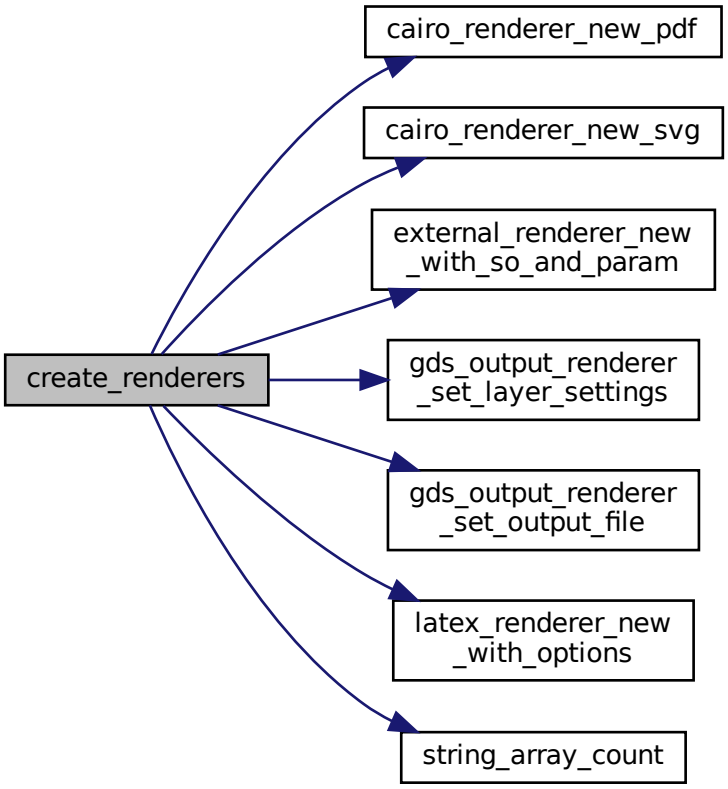


11.3.2.2 create_renderers()

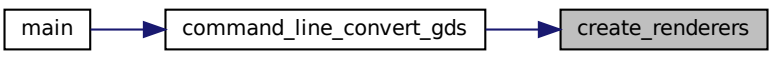
```
static int create_renderers (
            char ** renderers,
            char ** output_file_names,
            gboolean tex_layers,
            gboolean tex_standalone,
            const struct external_renderer_params * ext_params,
            GList ** renderer_list,
            LayerSettings * layer_settings )  [static]
```

Definition at line 55 of file command-line.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.3.2.3 find_gds_cell_in_lib()

```
static struct gds_cell* find_gds_cell_in_lib (
            struct gds_library * lib,
            const char * cell_name )  [static]
```

Definition at line 122 of file command-line.c.

Here is the caller graph for this function:

11.3.2.4 string_array_count()

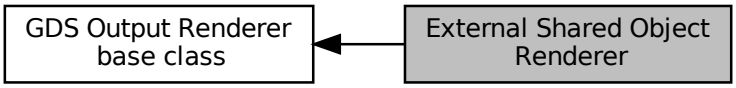
```
static int string_array_count (
            char ** string_array )  [static]
```

Definition at line 42 of file command-line.c.

Here is the caller graph for this function:

11.4 External Shared Object Renderer

Collaboration diagram for External Shared Object Renderer:



Data Structures

- struct _ExternalRenderer

Macros

- #define EXPORT_FUNC __attribute__((visibility("default")))

  This define is used to export a function from a shared object.
- #define EXTERNAL_LIBRARY_RENDER_FUNCTION exported_render_cell_to_file

  Function name expected to be found in external library for rendering.
- #define EXTERNAL_LIBRARY_INIT_FUNCTION exported_init

  Function name expected to be found in external library for initialization.
- #define EXTERNAL_LIBRARY_FORK_REQUEST exported_fork_request

  Global integer specified by an external renderer to signal, that the init and render functions shall be executed in a subprocess.
- #define EXPORTED_FUNC_DECL(FUNC) EXPORT_FUNC FUNC

  Define for declaring the exported functions.
- #define GDS_RENDER_TYPE_EXTERNAL_RENDERER (external_renderer_get_type())
- #define FORCE_FORK 0U

  if != 0, then forking is forced regardless of the shared object's settings

Enumerations

- enum { PROP_SO_PATH = 1, PROP_PARAM_STRING, N_PROPERTIES }

Functions

- ExternalRenderer * external_renderer_new ()

  Create new ExternalRenderer object.
- ExternalRenderer * external_renderer_new_with_so_and_param (const char *so_path, const char *param↩_string)

  Create new ExternalRenderer object with specified shared object path.
- static int external_renderer_render_cell (struct gds_cell *toplevel_cell, GList *layer_info_list, const char *output_file, double scale, const char *so_path, const char *params)

  Execute render function in shared object to render the supplied cell.

- static int external_renderer_render_output (GdsOutputRenderer *renderer, struct gds_cell *cell, double scale)
- static void external_renderer_get_property (GObject *obj, guint property_id, GValue *value, GParamSpec *pspec)
- static void external_renderer_set_property (GObject *obj, guint property_id, const GValue *value, GParamSpec *pspec)
- static void external_renderer_dispose (GObject *self_obj)
- static void external_renderer_class_init (ExternalRendererClass *klass)
- static void external_renderer_init (ExternalRenderer *self)

Variables

- static GParamSpec * external_renderer_properties [N_PROPERTIES] = {NULL}

11.4.1 Detailed Description

11.4.2 Properties

This class inherits all properties from its parent GDS Output Renderer base class. In addition to that, it implements the following properties:

Property Name	Description
shared-object-path	Path to the shared object used for rendering
param-string	Command line parameters passed to external renderer's init function

All these properties have to be set for rendering.

11.4.3 Necessary Functions

The following functions and variables are necessary for an external renderer to implement:

Code Define	Prototype	Description
EXTERNAL_LIBRARY_RENDER_FUNCTION	int EXTERNAL_LIBRARY_RENDER_FUNCTION(struct gds_cell *toplevel, GList *layer_info	Render cell to output file
EXTERNAL_LIBRARY_INIT_FUNCTION	int EXTERNAL_LIBRARY_INIT_FUNCTION(const char *param_string, const char *version_s	Init function. Executed before rendering. This is given the command line parameters specified for the external renderer and the version string of the currently running gds-render program.
EXTERNAL_LIBRARY_FORK_REQUEST	int EXTERNAL_LIBRARY_FOR↩ K_REQUEST;	The pure presence of this integer results in the execution inside a subprocess of hte whole shared object's code

11.4.4 Macro Definition Documentation

11.4.4.1 EXPORT_FUNC

```
#define EXPORT_FUNC __attribute__((visibility("default")))
```

This define is used to export a function from a shared object.

Definition at line 19 of file external-renderer-interfaces.h.

11.4.4.2 EXPORTED_FUNC_DECL

```
#define EXPORTED_FUNC_DECL(
              FUNC ) EXPORT_FUNC FUNC
```

Define for declaring the exported functions.

This not only helps with the declaration but also makes the symbols visible, so they can be called form outside the library

Definition at line 53 of file external-renderer-interfaces.h.

11.4.4.3 EXTERNAL_LIBRARY_FORK_REQUEST

```
#define EXTERNAL_LIBRARY_FORK_REQUEST exported_fork_request
```

Global integer specified by an external renderer to signal, that the init and render functions shall be executed in a subprocess.

The pure presence of this symbol name causes forking. The content of this variable is don't care.

Note

Use this if you mess with the internal structures of gds-render

Definition at line 46 of file external-renderer-interfaces.h.

11.4.4.4 EXTERNAL_LIBRARY_INIT_FUNCTION

```
#define EXTERNAL_LIBRARY_INIT_FUNCTION exported_init
```

Function name expected to be found in external library for initialization.
`int EXTERNAL_LIBRARY_INIT_FUNCTION(const char *option_string, const char *version_string);`

Definition at line 38 of file external-renderer-interfaces.h.

11.4.4.5 EXTERNAL_LIBRARY_RENDER_FUNCTION

```
#define EXTERNAL_LIBRARY_RENDER_FUNCTION exported_render_cell_to_file
```

Function name expected to be found in external library for rendering.

The function has to be defined as follows:

```
int EXTERNAL_LIBRARY_RENDER_FUNCTION(struct gds_cell *toplevel, GList *layer_info_list, const char
      *output_file_name, double scale);
```

Definition at line 29 of file external-renderer-interfaces.h.

11.4.4.6 FORCE_FORK

```
#define FORCE_FORK 0U
```

if != 0, then forking is forced regardless of the shared object's settings

Definition at line 39 of file external-renderer.c.

11.4.4.7 GDS_RENDER_TYPE_EXTERNAL_RENDERER

```
#define GDS_RENDER_TYPE_EXTERNAL_RENDERER (external_renderer_get_type())
```

Definition at line 40 of file external-renderer.h.

11.4.5 Enumeration Type Documentation

11.4.5.1 anonymous enum

```
anonymous enum
```

Enumerator

PROP_SO_PATH	Shared object path property.
PROP_PARAM_STRING	
N_PROPERTIES	Shared object renderer parameter string from CLI. Used to get property count

Definition at line 47 of file external-renderer.c.

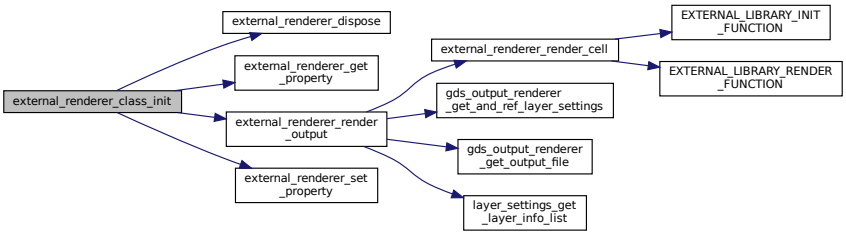
11.4.6 Function Documentation

11.4.6.1 external_renderer_class_init()

```
static void external_renderer_class_init (
            ExternalRendererClass * klass )  [static]
```

Definition at line 232 of file external-renderer.c.

Here is the call graph for this function:



11.4.6.2 external_renderer_dispose()

```
static void external_renderer_dispose (
            GObject * self_obj )  [static]
```

Definition at line 216 of file external-renderer.c.

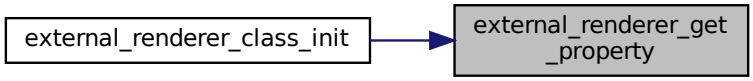
Here is the caller graph for this function:

11.4.6.3 external_renderer_get_property()

```
static void external_renderer_get_property (
            GObject * obj,
            guint property_id,
            GValue * value,
            GParamSpec * pspec )  [static]
```

Definition at line 174 of file external-renderer.c.

Here is the caller graph for this function:



11.4.6.4 external_renderer_init()

```
static void external_renderer_init (
            ExternalRenderer * self )  [static]
```

Definition at line 264 of file external-renderer.c.

11.4.6.5 external_renderer_new()

```
ExternalRenderer * external_renderer_new ( )
```

Create new ExternalRenderer object.

Returns

New object

Definition at line 270 of file external-renderer.c.

11.4.6.6 external_renderer_new_with_so_and_param()

```
ExternalRenderer * external_renderer_new_with_so_and_param (
            const char * so_path,
            const char * param_string )
```

Create new ExternalRenderer object with specified shared object path.

Parameters

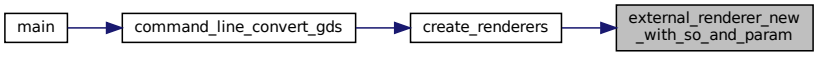
so_path	Path to shared object, the rendering function is searched in
param_string	Command line parameter string passed to external renderer

Returns

New object.

Definition at line 275 of file external-renderer.c.

Here is the caller graph for this function:



11.4.6.7 external_renderer_render_cell()

```
static int external_renderer_render_cell (
            struct gds_cell * toplevel_cell,
            GList * layer_info_list,
            const char * output_file,
            double scale,
            const char * so_path,
            const char * params )  [static]
```

Execute render function in shared object to render the supplied cell.

Parameters

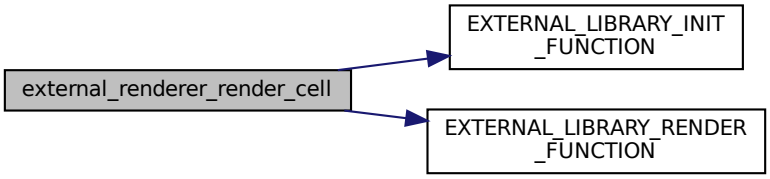
toplevel_cell	Cell to render
layer_info_list	Layer information (Color etc.)
output_file	Destination file
scale	the scaling value to scale the output cell down by.
so_path	Path to shared object
params	Parameters passed to EXTERNAL_LIBRARY_INIT_FUNCTION

Returns

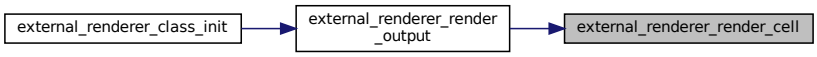
0 if successful

Definition at line 65 of file external-renderer.c.

Here is the call graph for this function:



Here is the caller graph for this function:

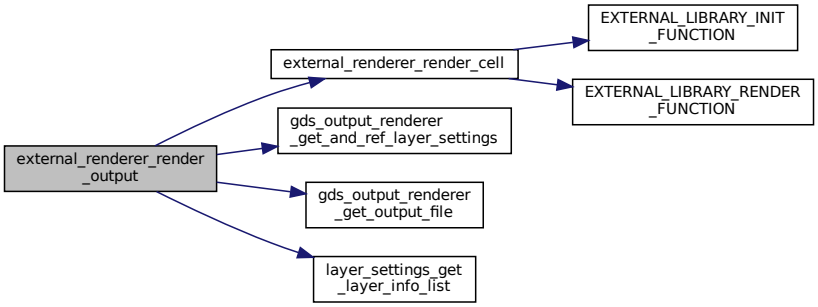


11.4.6.8 external_renderer_render_output()

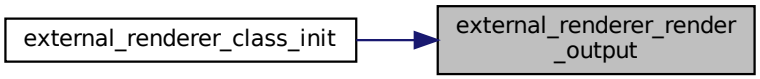
```
static int external_renderer_render_output (
            GdsOutputRenderer * renderer,
            struct gds_cell * cell,
            double scale )  [static]
```

Definition at line 149 of file external-renderer.c.

Here is the call graph for this function:



Here is the caller graph for this function:

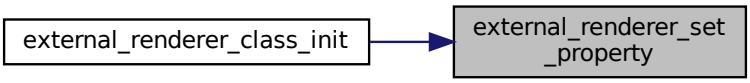


11.4.6.9 external_renderer_set_property()

```
static void external_renderer_set_property (
            GObject * obj,
            guint property_id,
            const GValue * value,
            GParamSpec * pspec )  [static]
```

Definition at line 193 of file external-renderer.c.

Here is the caller graph for this function:



11.4.7 Variable Documentation

11.4.7.1 external_renderer_properties

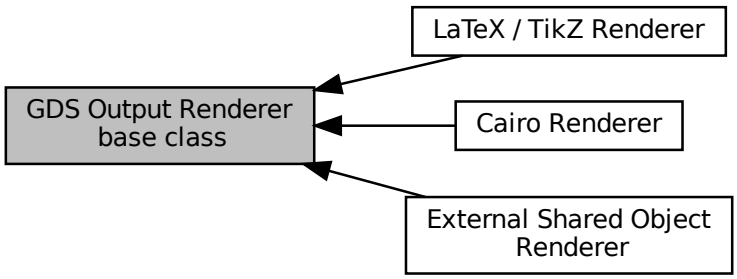
```
GParamSpec* external_renderer_properties[N_PROPERTIES] = {NULL}  [static]
```

Definition at line 230 of file external-renderer.c.

11.5 GDS Output Renderer base class

The renderers are used to convert the cell structures read from the GDS layout file into different output formats.

Collaboration diagram for GDS Output Renderer base class:



Modules

- Cairo Renderer
- External Shared Object Renderer
- LaTeX / TikZ Renderer

Data Structures

- struct _GdsOutputRendererClass

  Base output renderer class structure.
- struct renderer_params
- struct idle_function_params
- struct GdsOutputRendererPrivate

Macros

- #define GDS_RENDER_TYPE_OUTPUT_RENDERER (gds_output_renderer_get_type())

Enumerations

- enum { GDS_OUTPUT_RENDERER_GEN_ERR = -100, GDS_OUTPUT_RENDERER_PARAM_ERR = -200 }
- enum { PROP_OUTPUT_FILE = 1, PROP_LAYER_SETTINGS, N_PROPERTIES }
- enum gds_output_renderer_signal_ids { ASYNC_FINISHED = 0, ASYNC_PROGRESS_CHANGED, GDS_OUTPUT_RENDERER_SIGNAL_COUNT }

Functions

- G_DECLARE_DERIVABLE_TYPE (GdsOutputRenderer, gds_output_renderer, GDS_RENDER, OUTPUT↩ _RENDERER, GObject)
- GdsOutputRenderer ∗ gds_output_renderer_new ()

  Create a new GdsOutputRenderer GObject.
- GdsOutputRenderer ∗ gds_output_renderer_new_with_props (const char ∗output_file, LayerSettings ∗layer_settings)

  Create a new GdsOutputRenderer GObject with its properties.
- int gds_output_renderer_render_output (GdsOutputRenderer ∗renderer, struct gds_cell ∗cell, double scale)

  gds_output_renderer_render_output
- void gds_output_renderer_set_output_file (GdsOutputRenderer ∗renderer, const gchar ∗file_name)

  Convenience function for setting the "output-file" property.
- const char ∗ gds_output_renderer_get_output_file (GdsOutputRenderer ∗renderer)

  Convenience function for getting the "output-file" property.
- LayerSettings ∗ gds_output_renderer_get_and_ref_layer_settings (GdsOutputRenderer ∗renderer)

  Get layer settings.
- void gds_output_renderer_set_layer_settings (GdsOutputRenderer ∗renderer, LayerSettings ∗settings)

  Set layer settings.
- int gds_output_renderer_render_output_async (GdsOutputRenderer ∗renderer, struct gds_cell ∗cell, double scale)

  Render output asynchronously.
- void gds_output_renderer_update_async_progress (GdsOutputRenderer ∗renderer, const char ∗status)

  This function emits the 'progress-changed' in the thread/context that triggered an asynchronous rendering.
- static int gds_output_renderer_render_dummy (GdsOutputRenderer ∗renderer, struct gds_cell ∗cell, double scale)
- static void gds_output_renderer_dispose (GObject ∗self_obj)
- static void gds_output_renderer_get_property (GObject ∗obj, guint property_id, GValue ∗value, GParamSpec ∗pspec)
- static void gds_output_renderer_set_property (GObject ∗obj, guint property_id, const GValue ∗value, G↩ ParamSpec ∗pspec)
- static void gds_output_renderer_class_init (GdsOutputRendererClass ∗klass)
- void gds_output_renderer_init (GdsOutputRenderer ∗self)
- static void gds_output_renderer_async_wrapper (GTask ∗task, gpointer source_object, gpointer task_data, GCancellable ∗cancellable)
- static void gds_output_renderer_async_finished (GObject ∗src_obj, GAsyncResult ∗res, gpointer user_data)
- static gboolean idle_event_processor_callback (gpointer user_data)

Variables

- static guint gds_output_renderer_signals [GDS_OUTPUT_RENDERER_SIGNAL_COUNT]
- static GParamSpec ∗ gds_output_renderer_properties [N_PROPERTIES] = {NULL}

11.5.1 Detailed Description

The renderers are used to convert the cell structures read from the GDS layout file into different output formats.

The GdsOutputRenderer base class is used to derive all renderers from.

Warning

Although the GdsOutputRenderer class provides compatibility for asynchronous rendering, the class is not thread safe / re-entrant. Only use it from a signle context. Not even the rendering function called is allowed to modifiy this object.

A allowed function to be called from the async rendering thread is gds_output_renderer_update_async_progress and the get functions for the properties.

Note

The context that owned the renderer has to ensure that only one rendering is active at a time for a single instance of a renderer.

By default this class implements the following features:

11.5.2 Properties

Property Name	Description
layer-settings	LayerSettings object containing the layer rendering information
output-file	Output file name for rendering

All these properties have to be set for rendering.

11.5.3 Signals / Events

Signal Name	Description	Callback prototype
async-finished	The asynchronous rendering is finished	void callback(GdsOutputRenderer *src, gpointer user_data)
progress-changed	The asynchronous rendering progress changed	void callback(GdsOutputRenderer *src, const char *progress, gpointer user_data)

Note

The `char *progress` supplied to the callback function must not be modified or freed.

11.5.4 Macro Definition Documentation

11.5.4.1 GDS_RENDER_TYPE_OUTPUT_RENDERER

```
#define GDS_RENDER_TYPE_OUTPUT_RENDERER (gds_output_renderer_get_type())
```

Definition at line 41 of file gds-output-renderer.h.

11.5.5 Enumeration Type Documentation

11.5.5.1 anonymous enum

```
anonymous enum
```

Enumerator

GDS_OUTPUT_RENDERER_GEN_ERR	Error set by the _GdsOutputRendererClass::render_output virtual function, if renderer is invalid.
GDS_OUTPUT_RENDERER_PARAM_ERR	Error set by the _GdsOutputRendererClass::render_output virtual function, if parameters are faulty.

Definition at line 61 of file gds-output-renderer.h.

11.5.5.2 anonymous enum

```
anonymous enum
```

Enumerator

PROP_OUTPUT_FILE	
PROP_LAYER_SETTINGS	
N_PROPERTIES	

Definition at line 55 of file gds-output-renderer.c.

11.5.5.3 gds_output_renderer_signal_ids

```
enum gds_output_renderer_signal_ids
```

Enumerator

ASYNC_FINISHED	
ASYNC_PROGRESS_CHANGED	
GDS_OUTPUT_RENDERER_SIGNAL_COUNT	

Definition at line 63 of file gds-output-renderer.c.

11.5.6 Function Documentation

11.5.6.1 G_DECLARE_DERIVABLE_TYPE()

```
G_DECLARE_DERIVABLE_TYPE (
            GdsOutputRenderer ,
            gds_output_renderer ,
            GDS_RENDER ,
            OUTPUT_RENDERER ,
            GObject  )
```

11.5.6.2 gds_output_renderer_async_finished()

```
static void gds_output_renderer_async_finished (
            GObject * src_obj,
            GAsyncResult * res,
            gpointer user_data )  [static]
```

Definition at line 341 of file gds-output-renderer.c.

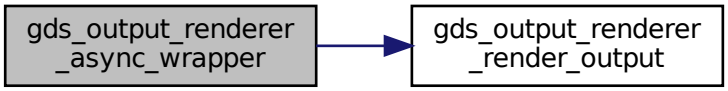
Here is the caller graph for this function:

11.5.6.3 gds_output_renderer_async_wrapper()

```
static void gds_output_renderer_async_wrapper (
            GTask * task,
            gpointer source_object,
            gpointer task_data,
            GCancellable * cancellable )  [static]
```

Definition at line 313 of file gds-output-renderer.c.

Here is the call graph for this function:



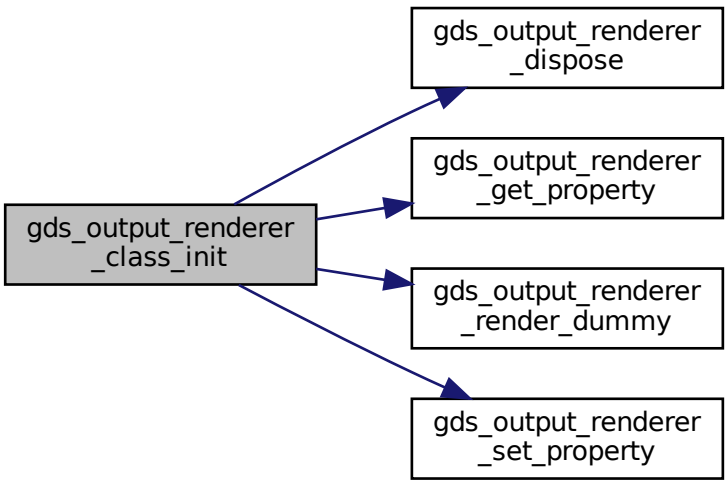
Here is the caller graph for this function:

11.5.6.4 gds_output_renderer_class_init()

```
static void gds_output_renderer_class_init (
            GdsOutputRendererClass * klass )  [static]
```

Definition at line 159 of file gds-output-renderer.c.

Here is the call graph for this function:



11.5.6.5 gds_output_renderer_dispose()

```
static void gds_output_renderer_dispose (
            GObject * self_obj )  [static]
```

Definition at line 78 of file gds-output-renderer.c.

Here is the caller graph for this function:

11.5.6.6 gds_output_renderer_get_and_ref_layer_settings()

```
LayerSettings * gds_output_renderer_get_and_ref_layer_settings (
            GdsOutputRenderer * renderer )
```

Get layer settings.

This is a convenience function for getting the "layer-settings" property. This also references it. This is to prevent race conditions with another thread that might alter the layer settings before they are read out.

Parameters

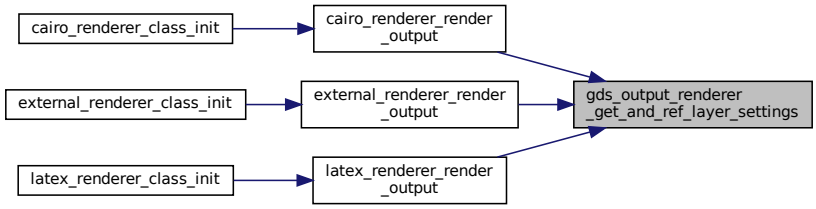
renderer	Renderer

Returns

Layer settings object

Definition at line 250 of file gds-output-renderer.c.

Here is the caller graph for this function:



11.5.6.7 gds_output_renderer_get_output_file()

```
const char * gds_output_renderer_get_output_file (
            GdsOutputRenderer * renderer )
```

Convenience function for getting the "output-file" property.

Parameters

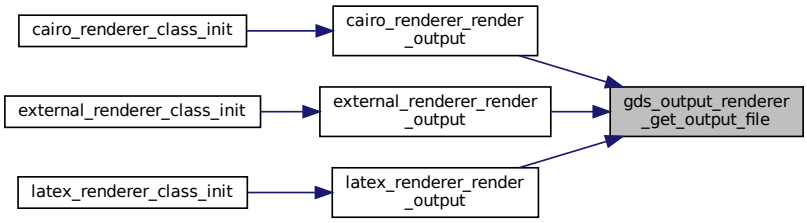
renderer	

Returns

Output file path. This must not be freed

Definition at line 242 of file gds-output-renderer.c.

Here is the caller graph for this function:

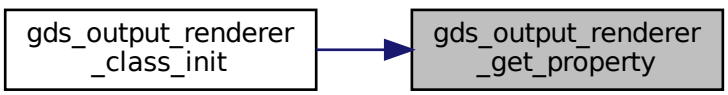


11.5.6.8 gds_output_renderer_get_property()

```
static void gds_output_renderer_get_property (
            GObject * obj,
            guint property_id,
            GValue * value,
            GParamSpec * pspec )  [static]
```

Definition at line 109 of file gds-output-renderer.c.

Here is the caller graph for this function:



11.5.6.9 gds_output_renderer_init()

```
void gds_output_renderer_init (
            GdsOutputRenderer * self )
```

Definition at line 203 of file gds-output-renderer.c.

11.5.6.10 gds_output_renderer_new()

```
GdsOutputRenderer * gds_output_renderer_new ( )
```

Create a new GdsOutputRenderer GObject.

Returns

New object

Definition at line 219 of file gds-output-renderer.c.

11.5.6.11 gds_output_renderer_new_with_props()

```
GdsOutputRenderer * gds_output_renderer_new_with_props (
            const char * output_file,
            LayerSettings * layer_settings )
```

Create a new GdsOutputRenderer GObject with its properties.

Parameters

output_file	Output file of the renderer
layer_settings	Layer settings object

Returns

New object

Definition at line 224 of file gds-output-renderer.c.

11.5.6.12 gds_output_renderer_render_dummy()

```
static int gds_output_renderer_render_dummy (
            GdsOutputRenderer * renderer,
```

```
            struct gds_cell * cell,
            double scale )  [static]
```

Definition at line 66 of file gds-output-renderer.c.

Here is the caller graph for this function:

11.5.6.13 gds_output_renderer_render_output()

```
int gds_output_renderer_render_output (
            GdsOutputRenderer * renderer,
            struct gds_cell * cell,
            double scale )
```

gds_output_renderer_render_output

Parameters

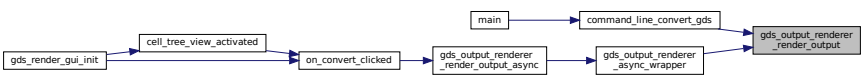
renderer	Renderer object
cell	Cell to render
scale	scale value. The output is scaled *down* by this value

Returns

0 if successful

Definition at line 276 of file gds-output-renderer.c.

Here is the caller graph for this function:



11.5.6.14 gds_output_renderer_render_output_async()

```
int gds_output_renderer_render_output_async (
            GdsOutputRenderer * renderer,
            struct gds_cell * cell,
            double scale )
```

Render output asynchronously.

This function will render in a separate thread. To wait for the completion of the rendering process.

Note

A second async thread cannot be spawned.

Parameters

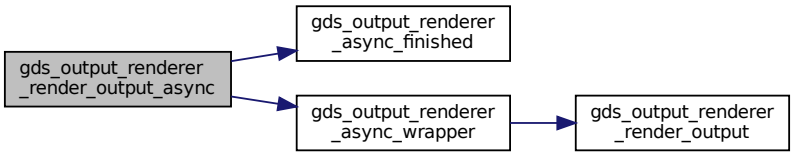
renderer	Output renderer
cell	Cell to render
scale	Scale

Returns

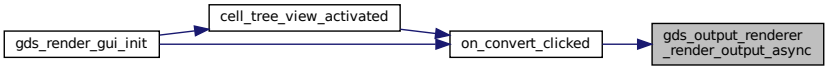
0 if successful. In case no thread can be spawned < 0

Definition at line 358 of file gds-output-renderer.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.5.6.15 gds_output_renderer_set_layer_settings()

```
void gds_output_renderer_set_layer_settings (
            GdsOutputRenderer * renderer,
            LayerSettings * settings )
```

Set layer settings.

This is a convenience function for setting the "layer-settings" property.

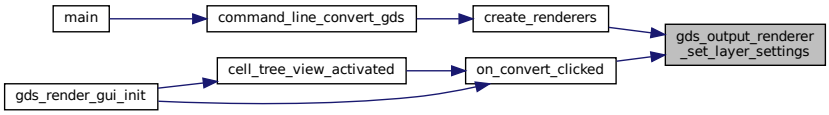
If another Layer settings has previously been supplied, it is unref'd.

Parameters

renderer	Renderer
settings	LayerSettings object

Definition at line 269 of file gds-output-renderer.c.

Here is the caller graph for this function:



11.5.6.16 gds_output_renderer_set_output_file()

```
void gds_output_renderer_set_output_file (
            GdsOutputRenderer * renderer,
            const gchar * file_name )
```

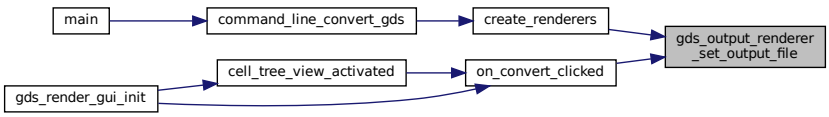
Convenience function for setting the "output-file" property.

Parameters

renderer	Renderer object
file_name	Output file path

Definition at line 232 of file gds-output-renderer.c.

Here is the caller graph for this function:



11.5.6.17 gds_output_renderer_set_property()

```
static void gds_output_renderer_set_property (
            GObject * obj,
            guint property_id,
            const GValue * value,
            GParamSpec * pspec )  [static]
```

Definition at line 129 of file gds-output-renderer.c.

Here is the caller graph for this function:

11.5.6.18 gds_output_renderer_update_async_progress()

```
void gds_output_renderer_update_async_progress (
            GdsOutputRenderer * renderer,
            const char * status )
```

This function emits the 'progress-changed' in the thread/context that triggered an asynchronous rendering.

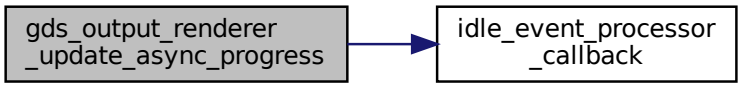
If the rendering is not asynchronous, this function has no effect.

Parameters

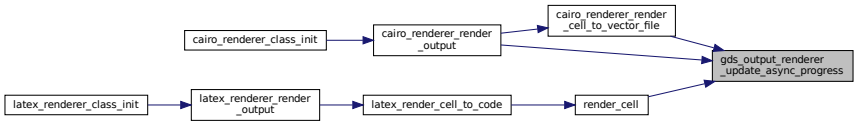
renderer	GdsOutputrenderer object
status	Status to supply to signal emission

Definition at line 417 of file gds-output-renderer.c.

Here is the call graph for this function:



Here is the caller graph for this function:

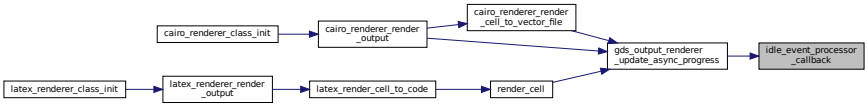


11.5.6.19 idle_event_processor_callback()

```
static gboolean idle_event_processor_callback (
            gpointer user_data )  [static]
```

Definition at line 389 of file gds-output-renderer.c.

Here is the caller graph for this function:



11.5.7 Variable Documentation

11.5.7.1 gds_output_renderer_properties

```
GParamSpec* gds_output_renderer_properties[N_PROPERTIES] = {NULL}  [static]
```

Definition at line 157 of file gds-output-renderer.c.

11.5.7.2 gds_output_renderer_signals

```
guint gds_output_renderer_signals[GDS_OUTPUT_RENDERER_SIGNAL_COUNT]  [static]
```

Definition at line 64 of file gds-output-renderer.c.

11.6 Geometric Helper Functions

The geometric helper function are used to calculate bounding boxes.

Data Structures

- union bounding_box
- struct vector_2d

Macros

- #define MIN(a, b) (((a) < (b)) ? (a) : (b))

  Return smaller number.
- #define MAX(a, b) (((a) > (b)) ? (a) : (b))

  Return bigger number.
- #define ABS_DBL(a) ((a) < 0 ? -(a) : (a))
- #define ABS_DBL(a) ((a) < 0.0 ? -(a) : (a))
- #define DEG2RAD(a) ((a)*M_PI/180.0)

Typedefs

- typedef void(* conv_generic_to_vector_2d_t) (void *, struct vector_2d *)

Functions

- void bounding_box_calculate_polygon (GList *vertices, conv_generic_to_vector_2d_t conv_func, union bounding_box *box)

  Calculate bounding box of polygon.
- void bounding_box_update_box (union bounding_box *destination, union bounding_box *update)

  Update an exisitng bounding box with another one.
- void bounding_box_prepare_empty (union bounding_box *box)

  Prepare an empty bounding box.
- static void calculate_path_miter_points (struct vector_2d *a, struct vector_2d *b, struct vector_2d *c, struct vector_2d *m1, struct vector_2d *m2, double width)

  Calculate path miter points for a pathwith a `width` and the anchors `a b c`.
- void bounding_box_update_with_path (GList *vertices, double thickness, conv_generic_to_vector_2d_t conv_func, union bounding_box *box)

  Calculate the bounding box of a path and update the given bounding box.
- void bounding_box_update_point (union bounding_box *destination, conv_generic_to_vector_2d_t conv_↩ func, void *pt)

  Update bounding box with a point.
- void bounding_box_get_all_points (struct vector_2d *points, union bounding_box *box)

  Return all four corner points of a bounding box.
- void bounding_box_apply_transform (double scale, double rotation_deg, bool flip_at_x, union bounding_box *box)

  Apply transformations onto bounding box.
- static void convert_gds_point_to_2d_vector (struct gds_point *pt, struct vector_2d *vector)
- static void update_box_with_gfx (union bounding_box *box, struct gds_graphics *gfx)

Update the given bounding box with the bounding box of a graphics element.

- void calculate_cell_bounding_box (union bounding_box *box, struct gds_cell *cell)

  calculate_cell_bounding_box Calculate bounding box of gds cell
- double vector_2d_scalar_multipy (struct vector_2d *a, struct vector_2d *b)
- void vector_2d_normalize (struct vector_2d *vec)
- void vector_2d_rotate (struct vector_2d *vec, double angle)
- struct vector_2d * vector_2d_copy (struct vector_2d *opt_res, struct vector_2d *vec)
- struct vector_2d * vector_2d_alloc (void)
- void vector_2d_free (struct vector_2d *vec)
- void vector_2d_scale (struct vector_2d *vec, double scale)
- double vector_2d_abs (struct vector_2d *vec)
- double vector_2d_calculate_angle_between (struct vector_2d *a, struct vector_2d *b)
- void vector_2d_subtract (struct vector_2d *res, struct vector_2d *a, struct vector_2d *b)
- void vector_2d_add (struct vector_2d *res, struct vector_2d *a, struct vector_2d *b)

11.6.1 Detailed Description

The geometric helper function are used to calculate bounding boxes.

Warning

Code is incomplete. Please double check for functionality!

11.6.2 Macro Definition Documentation

11.6.2.1 ABS_DBL [1/2]

```
#define ABS_DBL(
              a ) ((a) < 0.0 ?  -(a) :  (a))
```

Definition at line 36 of file vector-operations.c.

11.6.2.2 ABS_DBL [2/2]

```
#define ABS_DBL(
              a ) ((a) < 0 ?  -(a) :  (a))
```

Definition at line 38 of file bounding-box.c.

11.6.2.3 DEG2RAD

```
#define DEG2RAD(
              a ) ((a)*M_PI/180.0)
```

Definition at line 42 of file vector-operations.h.

11.6.2.4 MAX

```
#define MAX(
              a,
              b ) (((a) > (b)) ?  (a) :  (b))
```

Return bigger number.

Definition at line 37 of file bounding-box.c.

11.6.2.5 MIN

```
#define MIN(
              a,
              b ) (((a) < (b)) ?  (a) :  (b))
```

Return smaller number.

Definition at line 36 of file bounding-box.c.

11.6.3 Typedef Documentation

11.6.3.1 conv_generic_to_vector_2d_t

```
typedef void(* conv_generic_to_vector_2d_t) (void *, struct vector_2d *)
```

Definition at line 47 of file bounding-box.h.

11.6.4 Function Documentation

11.6.4.1 bounding_box_apply_transform()

```
void bounding_box_apply_transform (
            double scale,
            double rotation_deg,
            bool flip_at_x,
            union bounding_box * box )
```

Apply transformations onto bounding box.

All corner points $\vec{P_i}$ of the bounding box are transformed to output points $\vec{P_o}$ by:

$$\vec{P_o} = s \cdot \begin{pmatrix} \cos(\phi) & -\sin(\phi) \\ \sin(\phi) & \cos(\phi) \end{pmatrix} \cdot \begin{pmatrix} 1 & 0 \\ 0 & -1^m \end{pmatrix} \cdot \vec{P_i}, \text{ with:}$$

- s: Scale
- m: 1, if flipped_at_x is True, else 0
- ϕ: Rotation angle in radians. The conversion degrees => radians is done internally

The result is the bounding box generated around all output points

Parameters

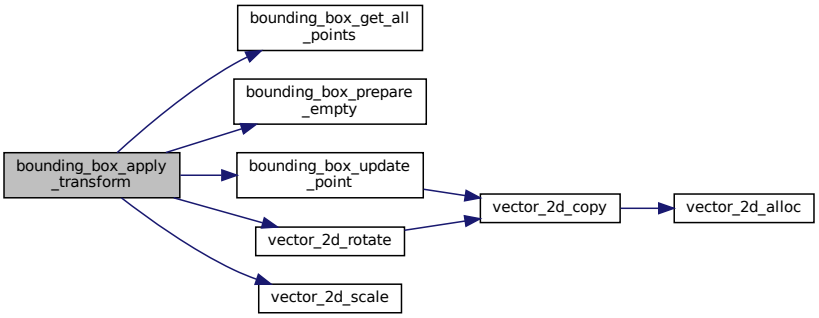
scale	Scaling factor
rotation_deg	Rotation of bounding box around the origin in degrees (counterclockwise)
flip_at_x	Flip the boundig box on the x axis before rotating.
box	Bounding box the operations should be applied to.

Note

Keep in mind, that this bounding boxy is actually the bounding box of the rotated boundig box and not the object itself. It might be too big.

Definition at line 209 of file bounding-box.c.

Here is the call graph for this function:



Here is the caller graph for this function:

11.6.4.2 bounding_box_calculate_polygon()

```
void bounding_box_calculate_polygon (
            GList * vertices,
            conv_generic_to_vector_2d_t conv_func,
            union bounding_box * box )
```

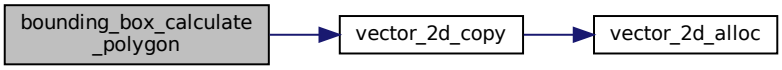
Calculate bounding box of polygon.

Parameters

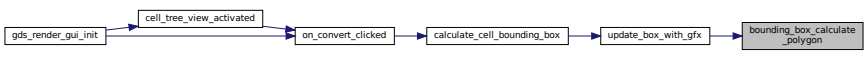
vertices	List of vertices that describe the polygon
conv_func	Conversion function to convert vertices to vector_2d structs.
box	Box to write to. This box is not updated! All previous data is discarded

Definition at line 40 of file bounding-box.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.6.4.3 bounding_box_get_all_points()

```
void bounding_box_get_all_points (
            struct vector_2d * points,
            union bounding_box * box )
```

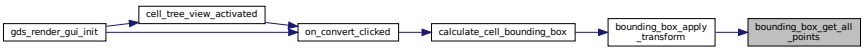
Return all four corner points of a bounding box.

Parameters

out	*points*	Array of 4 vector_2d structs that has to be allocated by the caller
	box	Bounding box

Definition at line 194 of file bounding-box.c.

Here is the caller graph for this function:



11.6.4.4 bounding_box_prepare_empty()

```
void bounding_box_prepare_empty (
            union bounding_box * box )
```

Prepare an empty bounding box.

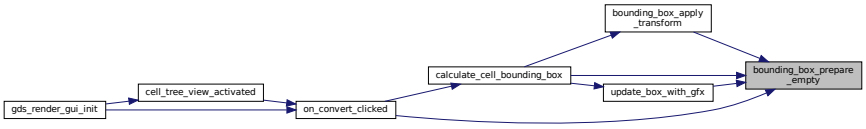
Updating this specially prepared box, results in a bounding box that is the same size as the update

Parameters

box	Box to preapre

Definition at line 86 of file bounding-box.c.

Here is the caller graph for this function:



11.6.4.5 bounding_box_update_box()

```
void bounding_box_update_box (
            union bounding_box * destination,
            union bounding_box * update )
```

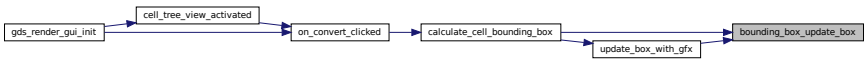
Update an exisitng bounding box with another one.

Parameters

destination	Target box to update
update	Box to update the target with

Definition at line 71 of file bounding-box.c.

Here is the caller graph for this function:



11.6.4.6 bounding_box_update_point()

```
void bounding_box_update_point (
            union bounding_box * destination,
            conv_generic_to_vector_2d_t conv_func,
            void * pt )
```

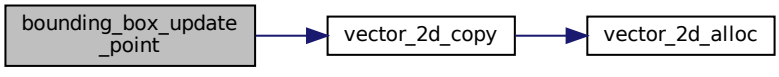
Update bounding box with a point.

Parameters

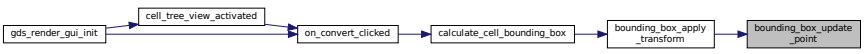
destination	Bounding box to update
conv_func	Conversion function to convert `pt` to a vector_2d. May be NULL
pt	Point to update bounding box with

Definition at line 176 of file bounding-box.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.6.4.7 bounding_box_update_with_path()

```
void bounding_box_update_with_path (
            GList * vertices,
            double thickness,
            conv_generic_to_vector_2d_t conv_func,
            union bounding_box * box )
```

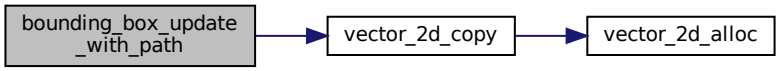
Calculate the bounding box of a path and update the given bounding box.

Parameters

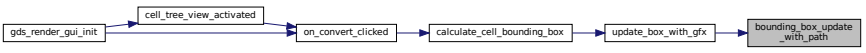
vertices	Vertices the path is made up of
thickness	Thisckness of the path
conv_func	Conversion function for vertices to vector_2d structs
box	Bounding box to write results in.

Definition at line 148 of file bounding-box.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.6.4.8 calculate_cell_bounding_box()

```
void calculate_cell_bounding_box (
            union bounding_box * box,
            struct gds_cell * cell )
```

calculate_cell_bounding_box Calculate bounding box of gds cell

Parameters

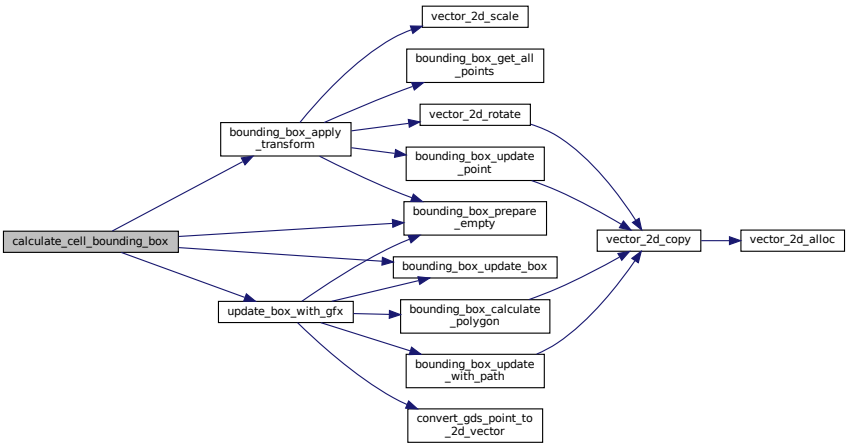
box	Resulting boundig box. Will be uüdated and not overwritten
cell	Toplevel cell

Warning

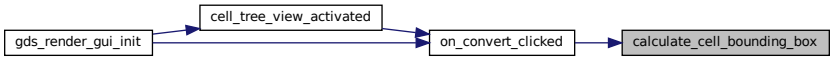
Path handling not yet implemented correctly.

Definition at line 80 of file cell-geometrics.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.6.4.9 calculate_path_miter_points()

```
static void calculate_path_miter_points (
            struct vector_2d * a,
            struct vector_2d * b,
            struct vector_2d * c,
            struct vector_2d * m1,
            struct vector_2d * m2,
            double width )  [static]
```

Calculate path miter points for a pathwith a `width` and the anchors `a b c`.

Parameters

in	*a*	
in	*b*	
in	*c*	
out	*m1*	
out	*m2*	
in	*width*	

Returns

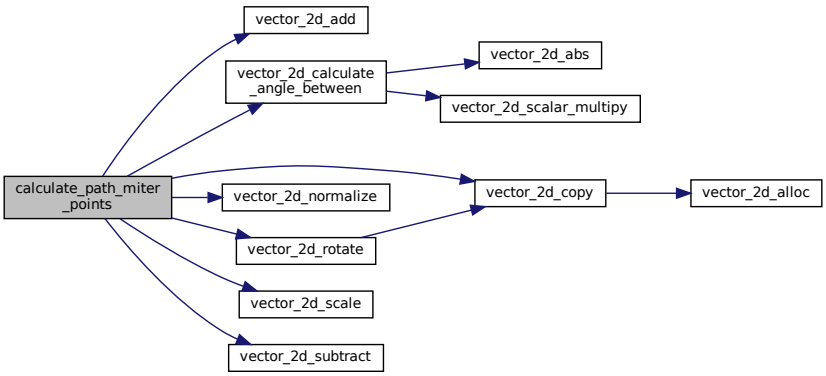
Miter points in `m1` and `m2`

Note

This function is currently unused (and untested). Ignore any compiler warning regarding this function.

Definition at line 105 of file bounding-box.c.

Here is the call graph for this function:

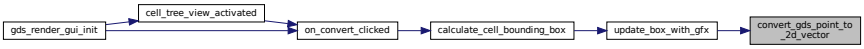


11.6.4.10 convert_gds_point_to_2d_vector()

```
static void convert_gds_point_to_2d_vector (
            struct gds_point * pt,
            struct vector_2d * vector )  [static]
```

Definition at line 35 of file cell-geometrics.c.

Here is the caller graph for this function:



11.6.4.11 update_box_with_gfx()

```
static void update_box_with_gfx (
            union bounding_box * box,
            struct gds_graphics * gfx )  [static]
```

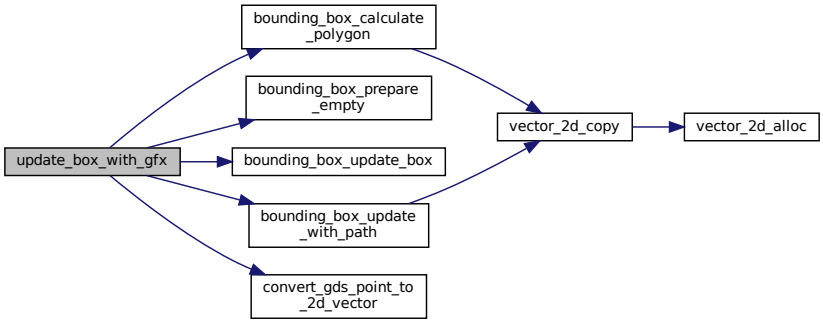
Update the given bounding box with the bounding box of a graphics element.

Parameters

box	box to update
gfx	Graphics element

Definition at line 46 of file cell-geometrics.c.

Here is the call graph for this function:



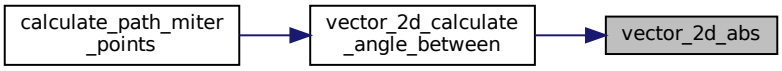
Here is the caller graph for this function:

11.6.4.12 vector_2d_abs()

```
double vector_2d_abs (
            struct vector_2d * vec )
```

Definition at line 114 of file vector-operations.c.

Here is the caller graph for this function:

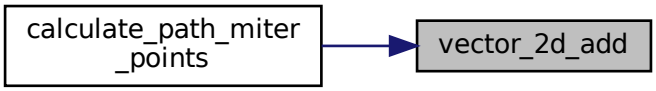


11.6.4.13 vector_2d_add()

```
void vector_2d_add (
            struct vector_2d * res,
            struct vector_2d * a,
            struct vector_2d * b )
```

Definition at line 142 of file vector-operations.c.

Here is the caller graph for this function:

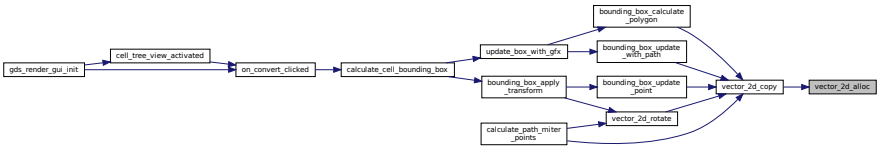


11.6.4.14 vector_2d_alloc()

```
struct vector_2d * vector_2d_alloc (
            void  )
```

Definition at line 94 of file vector-operations.c.

Here is the caller graph for this function:

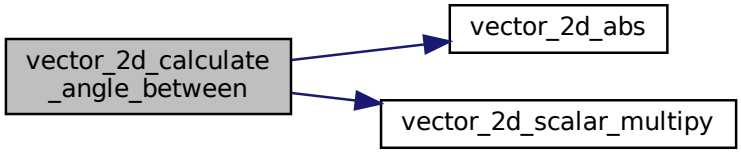


11.6.4.15 vector_2d_calculate_angle_between()

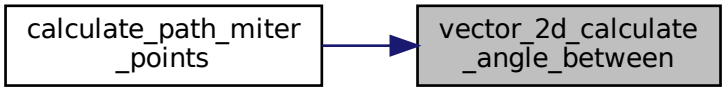
```
double vector_2d_calculate_angle_between (
            struct vector_2d * a,
            struct vector_2d * b )
```

Definition at line 123 of file vector-operations.c.

Here is the call graph for this function:



Here is the caller graph for this function:



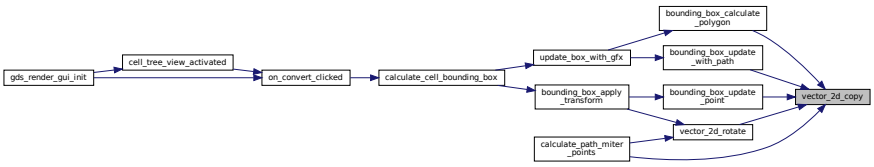
11.6.4.16 vector_2d_copy()

```
struct vector_2d * vector_2d_copy (
            struct vector_2d * opt_res,
            struct vector_2d * vec )
```

Definition at line 75 of file vector-operations.c.

Here is the call graph for this function:

Here is the caller graph for this function:



11.6.4.17 vector_2d_free()

```
void vector_2d_free (
            struct vector_2d * vec )
```

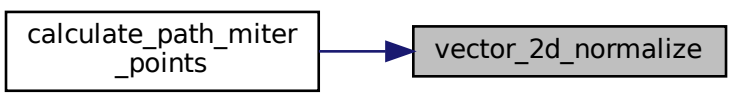
Definition at line 99 of file vector-operations.c.

11.6.4.18 vector_2d_normalize()

```
void vector_2d_normalize (
            struct vector_2d * vec )
```

Definition at line 46 of file vector-operations.c.

Here is the caller graph for this function:

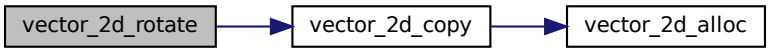


11.6.4.19 vector_2d_rotate()

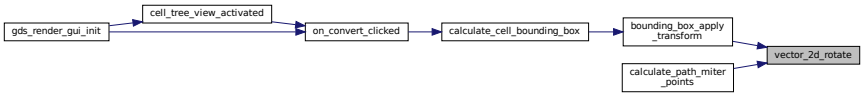
```
void vector_2d_rotate (
            struct vector_2d * vec,
            double angle )
```

Definition at line 57 of file vector-operations.c.

Here is the call graph for this function:



Here is the caller graph for this function:

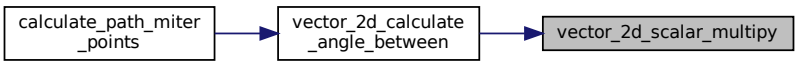


11.6.4.20 vector_2d_scalar_multipy()

```
double vector_2d_scalar_multipy (
            struct vector_2d * a,
            struct vector_2d * b )
```

Definition at line 38 of file vector-operations.c.

Here is the caller graph for this function:

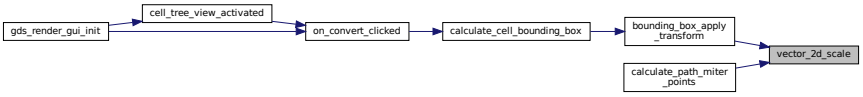


11.6.4.21 vector_2d_scale()

```
void vector_2d_scale (
            struct vector_2d * vec,
            double scale )
```

Definition at line 105 of file vector-operations.c.

Here is the caller graph for this function:

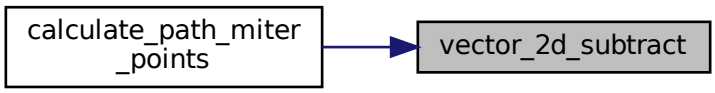


11.6.4.22 vector_2d_subtract()

```
void vector_2d_subtract (
            struct vector_2d * res,
            struct vector_2d * a,
            struct vector_2d * b )
```

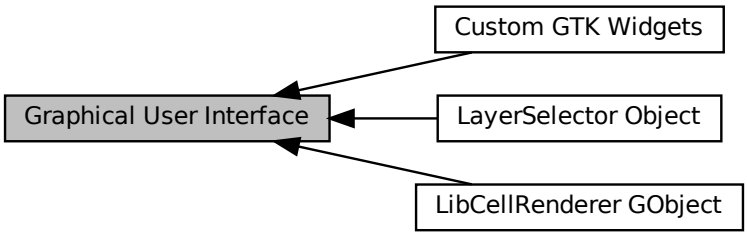
Definition at line 134 of file vector-operations.c.

Here is the caller graph for this function:



11.7 Graphical User Interface

Collaboration diagram for Graphical User Interface:



Modules

- LayerSelector Object
- LibCellRenderer GObject
- Custom GTK Widgets

Data Structures

- struct gui_button_states
- struct _GdsRenderGui

Macros

- #define RENDERER_TYPE_GUI (gds_render_gui_get_type())

Enumerations

- enum cell_store_columns { CELL_SEL_LIBRARY = 0, CELL_SEL_CELL, CELL_SEL_CELL_ERROR_STATE, CELL_SEL_COLUMN_COUNT }

  Columns of selection tree view.
- enum gds_render_gui_signal_sig_ids { SIGNAL_WINDOW_CLOSED = 0, SIGNAL_COUNT }

Functions

- static gboolean on_window_close (gpointer window, GdkEvent *event, gpointer user)

  Main window close event.
- static gboolean tree_sel_func (GtkTreeSelection *selection, GtkTreeModel *model, GtkTreePath *path, gboolean path_currently_selected, gpointer data)

  This function only allows valid cells to be selected.
- static void cell_tree_view_change_filter (GtkWidget *entry, gpointer data)

  Trigger refiltering of cell filter.
- static gboolean cell_store_filter_visible_func (GtkTreeModel *model, GtkTreeIter *iter, gpointer data)

  cell_store_filter_visible_func Decides whether an element of the tree model `model` *is visible.*
- int gds_render_gui_setup_cell_selector (GdsRenderGui *self)

  Setup a GtkTreeView with the necessary columns.
- static void on_load_gds (gpointer button, gpointer user)

  Callback function of Load GDS button.
- static void process_button_state_changes (GdsRenderGui *self)
- static void on_auto_color_clicked (gpointer button, gpointer user)

  Callback for auto coloring button.
- static void async_rendering_finished_callback (GdsOutputRenderer *renderer, gpointer gui)
- static void async_rendering_status_update_callback (GdsOutputRenderer *renderer, const char *status_message, gpointer data)
- static void on_convert_clicked (gpointer button, gpointer user)

  Convert button callback.
- static void cell_tree_view_activated (gpointer tree_view, GtkTreePath *path, GtkTreeViewColumn *column, gpointer user)

  cell_tree_view_activated Callback for 'double click' on cell selector element
- static void cell_selection_changed (GtkTreeSelection *sel, GdsRenderGui *self)

  Callback for cell-selection change event.
- static void sort_up_callback (GtkWidget *widget, gpointer user)
- static void sort_down_callback (GtkWidget *widget, gpointer user)
- static void gds_render_gui_dispose (GObject *gobject)
- static void gds_render_gui_class_init (GdsRenderGuiClass *klass)
- static void on_select_all_layers_clicked (GtkWidget *button, gpointer user_data)

  Callback for the 'select all layers'-button.
- static void auto_naming_clicked (GtkWidget *button, gpointer user_data)
- GtkWindow * gds_render_gui_get_main_window (GdsRenderGui *gui)

  Get main window.
- static void gds_render_gui_init (GdsRenderGui *self)
- GdsRenderGui * gds_render_gui_new ()

  Create new GdsRenderGui Object.
- G_BEGIN_DECLS G_DECLARE_FINAL_TYPE (GdsRenderGui, gds_render_gui, RENDERER, GUI, GObject)

Variables

- static guint gds_render_gui_signals [SIGNAL_COUNT]

11.7.1 Detailed Description

11.7.2 Macro Definition Documentation

11.7.2.1 RENDERER_TYPE_GUI

```
#define RENDERER_TYPE_GUI (gds_render_gui_get_type())
```

Definition at line 40 of file gds-render-gui.h.

11.7.3 Enumeration Type Documentation

11.7.3.1 cell_store_columns

```
enum cell_store_columns
```

Columns of selection tree view.

Enumerator

CELL_SEL_LIBRARY	
CELL_SEL_CELL	
CELL_SEL_CELL_ERROR_STATE	Used for cell color and selectability
CELL_SEL_COLUMN_COUNT	Not a column. Used to determine count of columns.

Definition at line 47 of file gds-render-gui.c.

11.7.3.2 gds_render_gui_signal_sig_ids

```
enum gds_render_gui_signal_sig_ids
```

Enumerator

SIGNAL_WINDOW_CLOSED	
SIGNAL_COUNT	

Definition at line 54 of file gds-render-gui.c.

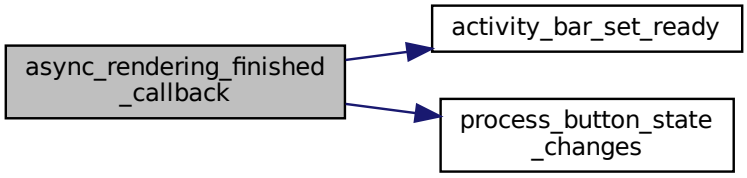
11.7.4 Function Documentation

11.7.4.1 async_rendering_finished_callback()

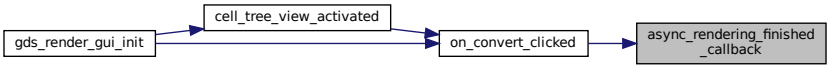
```
static void async_rendering_finished_callback (
            GdsOutputRenderer * renderer,
            gpointer gui )  [static]
```

Definition at line 394 of file gds-render-gui.c.

Here is the call graph for this function:



Here is the caller graph for this function:

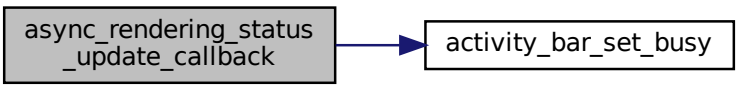


11.7.4.2 async_rendering_status_update_callback()

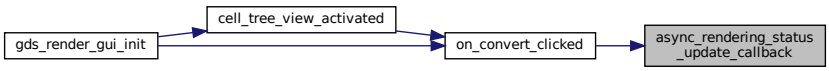
```
static void async_rendering_status_update_callback (
            GdsOutputRenderer * renderer,
            const char * status_message,
            gpointer data )  [static]
```

Definition at line 407 of file gds-render-gui.c.

Here is the call graph for this function:



Here is the caller graph for this function:

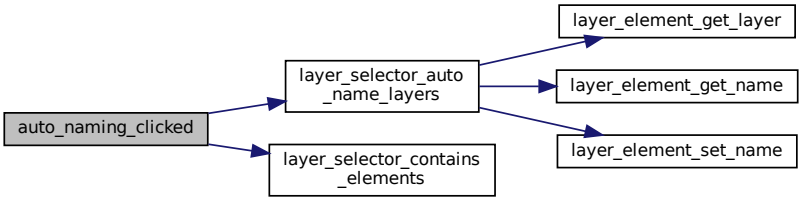


11.7.4.3 auto_naming_clicked()

```
static void auto_naming_clicked (
            GtkWidget * button,
            gpointer user_data )  [static]
```

Definition at line 693 of file gds-render-gui.c.

Here is the call graph for this function:



Here is the caller graph for this function:

11.7.4.4 cell_selection_changed()

```
static void cell_selection_changed (
            GtkTreeSelection * sel,
            GdsRenderGui * self )  [static]
```

Callback for cell-selection change event.

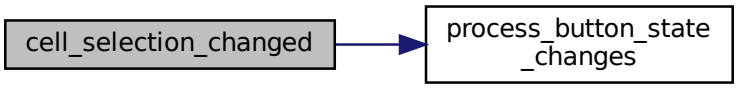
This function activates/deactivates the convert button depending on whether a cell is selected for conversion or not

Parameters

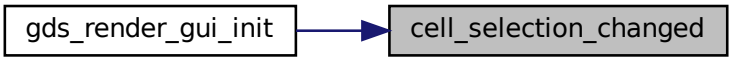
sel	
self	

Definition at line 593 of file gds-render-gui.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.7.4.5 cell_store_filter_visible_func()

```
static gboolean cell_store_filter_visible_func (
            GtkTreeModel * model,
            GtkTreeIter * iter,
            gpointer data )  [static]
```

cell_store_filter_visible_func Decides whether an element of the tree model `model` is visible.

Parameters

model	Tree model
iter	Current element / iter in Model to check
data	Data. Set to static stores variable

Returns

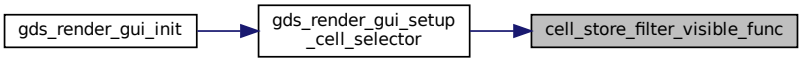
TRUE if visible, else FALSE

Note

TODO: Maybe implement Damerau-Levenshtein distance matching

Definition at line 174 of file gds-render-gui.c.

Here is the caller graph for this function:



11.7.4.6 cell_tree_view_activated()

```
static void cell_tree_view_activated (
             gpointer tree_view,
             GtkTreePath * path,
             GtkTreeViewColumn * column,
             gpointer user )  [static]
```

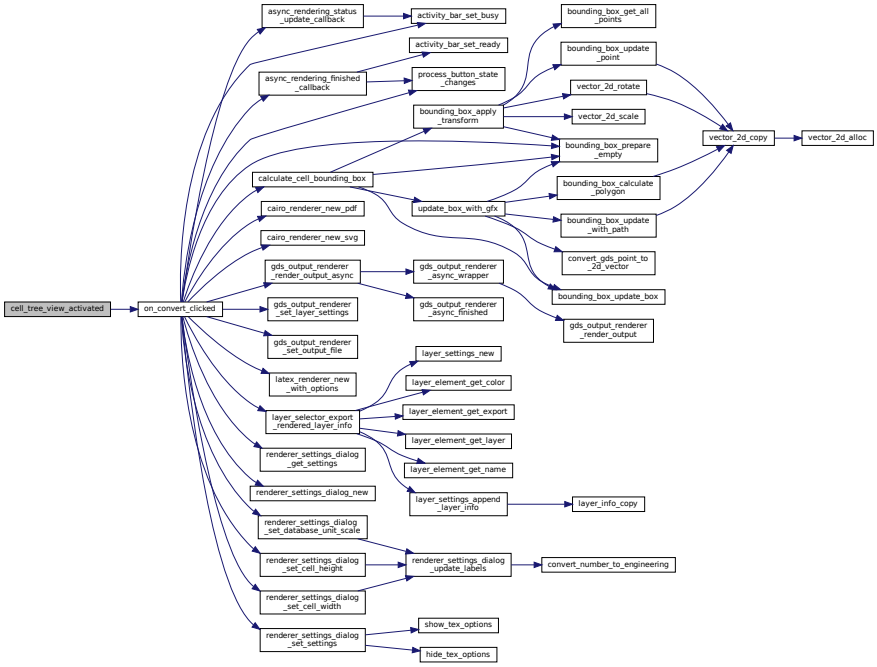
cell_tree_view_activated Callback for 'double click' on cell selector element

Parameters

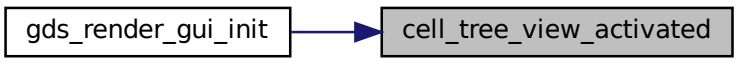
tree_view	The tree view the event occured in
path	path to the selected row
column	The clicked column
user	pointer to GdsRenderGui object

Definition at line 575 of file gds-render-gui.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.7.4.7 cell_tree_view_change_filter()

```
static void cell_tree_view_change_filter (
            GtkWidget * entry,
            gpointer data )  [static]
```

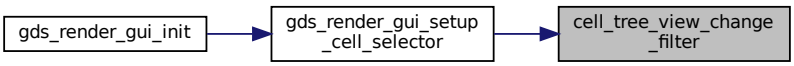
Trigger refiltering of cell filter.

Parameters

entry	Unused widget, that emitted the signal
data	GdsrenderGui self instance

Definition at line 158 of file gds-render-gui.c.

Here is the caller graph for this function:



11.7.4.8 G_DECLARE_FINAL_TYPE()

```
G_BEGIN_DECLS G_DECLARE_FINAL_TYPE (
             GdsRenderGui ,
             gds_render_gui ,
             RENDERER ,
             GUI ,
             GObject  )
```

11.7.4.9 gds_render_gui_class_init()

```
static void gds_render_gui_class_init (
             GdsRenderGuiClass * klass )  [static]
```

Definition at line 661 of file gds-render-gui.c.

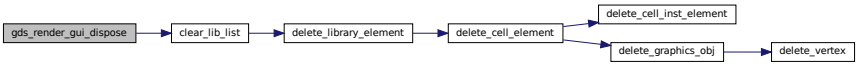
Here is the call graph for this function:

11.7.4.10 gds_render_gui_dispose()

```
static void gds_render_gui_dispose (
            GObject * gobject )  [static]
```

Definition at line 630 of file gds-render-gui.c.

Here is the call graph for this function:



Here is the caller graph for this function:

11.7.4.11 gds_render_gui_get_main_window()

```
GtkWindow * gds_render_gui_get_main_window (
            GdsRenderGui * gui )
```

Get main window.

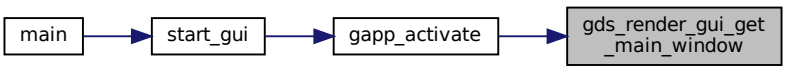
This function returns the main window of the GUI, which can later be displayed. All handling of hte GUI is taken care of inside the GdsRenderGui Object

Returns

The generated main window

Definition at line 725 of file gds-render-gui.c.

Here is the caller graph for this function:

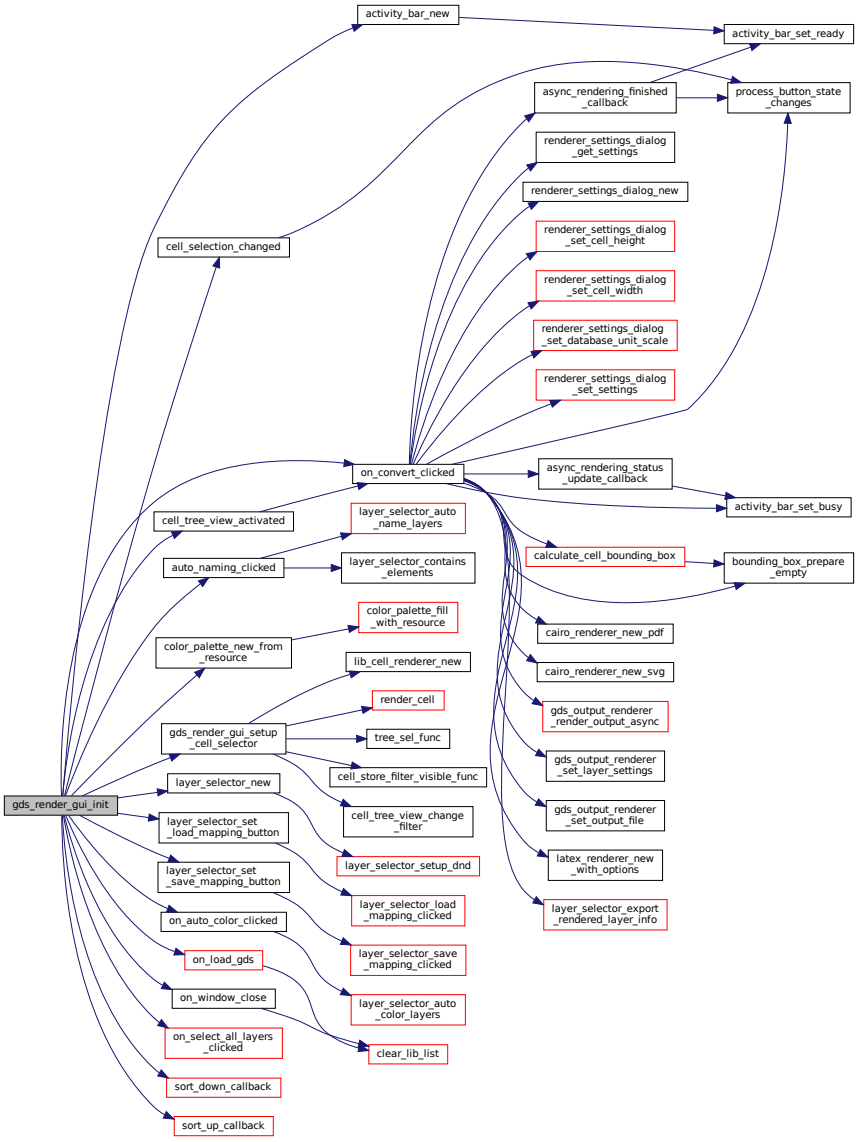


11.7.4.12 gds_render_gui_init()

```
static void gds_render_gui_init (
            GdsRenderGui * self )  [static]
```

Definition at line 730 of file gds-render-gui.c.

Here is the call graph for this function:



11.7.4.13 gds_render_gui_new()

```
GdsRenderGui * gds_render_gui_new ( )
```

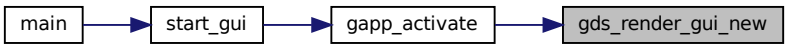
Create new GdsRenderGui Object.

Returns

New object

Definition at line 833 of file gds-render-gui.c.

Here is the caller graph for this function:



11.7.4.14 gds_render_gui_setup_cell_selector()

```
int gds_render_gui_setup_cell_selector (
            GdsRenderGui * self )
```

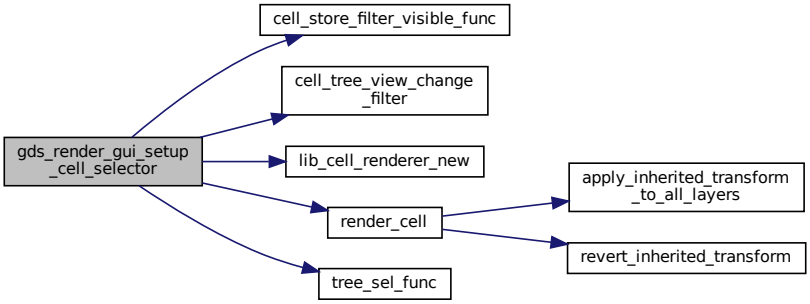
Setup a GtkTreeView with the necessary columns.

Parameters

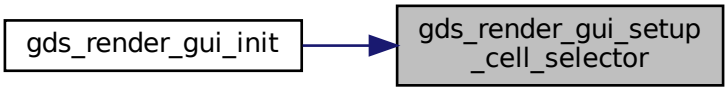
self	Current GUI object

Definition at line 217 of file gds-render-gui.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.7.4.15 on_auto_color_clicked()

```
static void on_auto_color_clicked (
            gpointer button,
            gpointer user )  [static]
```

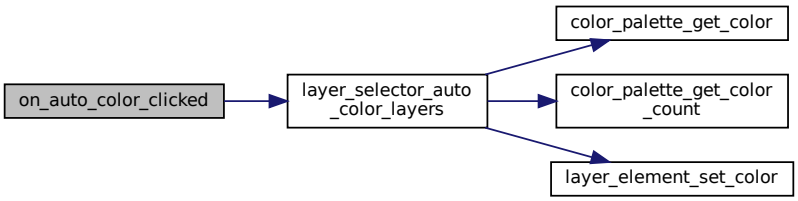
Callback for auto coloring button.

Parameters

button	
user	

Definition at line 385 of file gds-render-gui.c.

Here is the call graph for this function:



Here is the caller graph for this function:

11.7.4.16 on_convert_clicked()

```
static void on_convert_clicked (
            gpointer button,
            gpointer user )  [static]
```

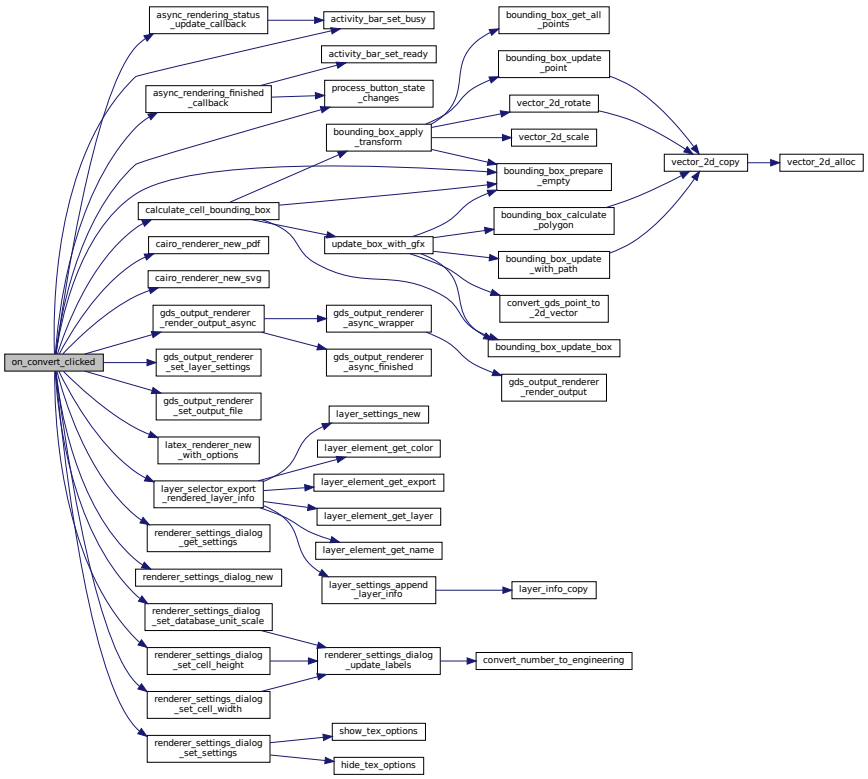
Convert button callback.

Parameters

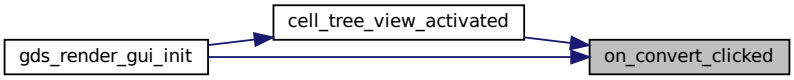
button	
user	

Definition at line 424 of file gds-render-gui.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.7.4.17 on_load_gds()

```
static void on_load_gds (
            gpointer button,
            gpointer user )  [static]
```

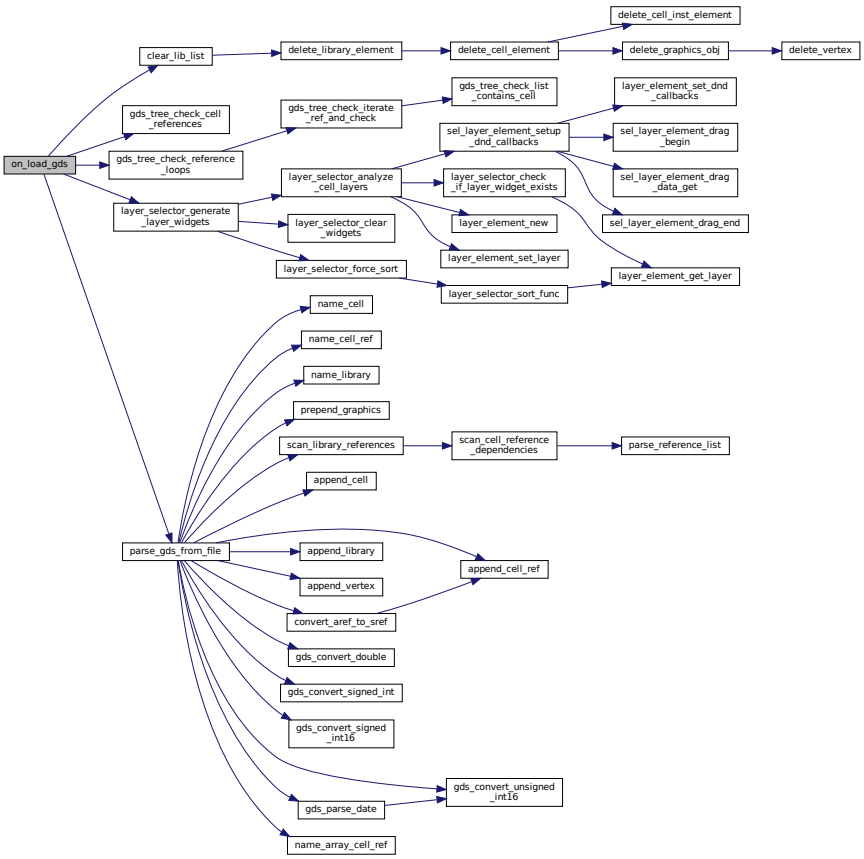
Callback function of Load GDS button.

Parameters

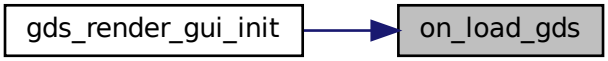
button	
user	GdsRenderGui instance

Definition at line 262 of file gds-render-gui.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.7.4.18 on_select_all_layers_clicked()

```
static void on_select_all_layers_clicked (
            GtkWidget * button,
            gpointer user_data )  [static]
```

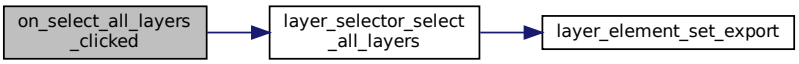
Callback for the 'select all layers'-button.

Parameters

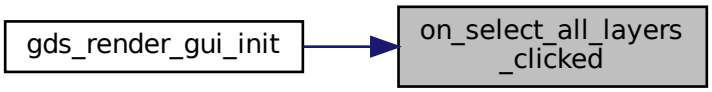
button	Button that triggered the event
user_data	the GdsrenderGui object containing the main-window the button is placed in

Definition at line 684 of file gds-render-gui.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.7.4.19 on_window_close()

```
static gboolean on_window_close (
            gpointer window,
            GdkEvent * event,
            gpointer user )  [static]
```

Main window close event.

Parameters

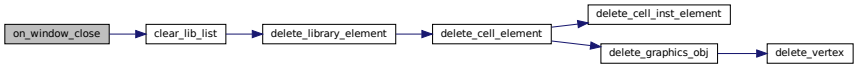
window	GtkWindow which is closed
event	unused event
user	GdsRenderGui instance

Returns

Status of the event handling. Always true.

Definition at line 95 of file gds-render-gui.c.

Here is the call graph for this function:



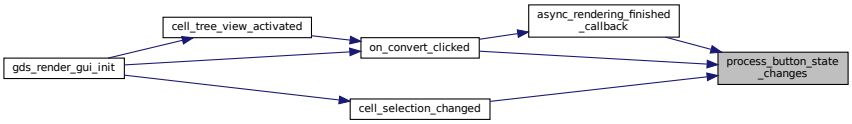
Here is the caller graph for this function:

11.7.4.20 process_button_state_changes()

```
static void process_button_state_changes (
            GdsRenderGui * self )  [static]
```

Definition at line 363 of file gds-render-gui.c.

Here is the caller graph for this function:



11.7.4.21 sort_down_callback()

```
static void sort_down_callback (
            GtkWidget * widget,
            gpointer user )  [static]
```

Definition at line 619 of file gds-render-gui.c.

Here is the call graph for this function:

Here is the caller graph for this function:

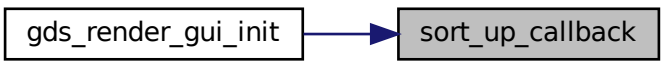
11.7.4.22 sort_up_callback()

```
static void sort_up_callback (
            GtkWidget * widget,
            gpointer user )  [static]
```

Definition at line 608 of file gds-render-gui.c.

Here is the call graph for this function:

Here is the caller graph for this function:



11.7.4.23 tree_sel_func()

```
static gboolean tree_sel_func (
            GtkTreeSelection * selection,
            GtkTreeModel * model,
            GtkTreePath * path,
            gboolean path_currently_selected,
            gpointer data )  [static]
```

This function only allows valid cells to be selected.

Parameters

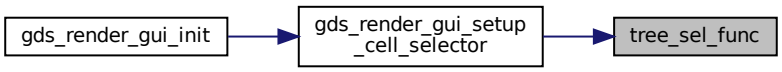
selection	
model	
path	
path_currently_selected	
data	

Returns

TRUE if element is selectable, FALSE if not

Definition at line 126 of file gds-render-gui.c.

Here is the caller graph for this function:



11.7.5 Variable Documentation

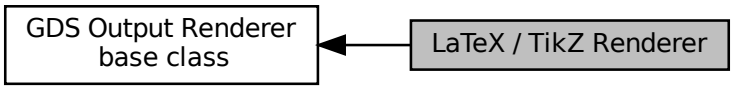
11.7.5.1 gds_render_gui_signals

```
guint gds_render_gui_signals[SIGNAL_COUNT]  [static]
```

Definition at line 56 of file gds-render-gui.c.

11.8 LaTeX / TikZ Renderer

Collaboration diagram for LaTeX / TikZ Renderer:



Data Structures

- struct _LatexRenderer

  Struct representing the LaTeX-Renderer object.

Macros

- #define GDS_RENDER_TYPE_LATEX_RENDERER (latex_renderer_get_type())
- #define LATEX_LINE_BUFFER_KB (10)

  Buffer for LaTeX Code line in KiB.
- #define WRITEOUT_BUFFER(buff) fwrite((buff)->str, sizeof(char), (buff)->len, tex_file)

  Writes a GString `buffer` to the fixed file tex_file.

Enumerations

- enum { PROP_STANDALONE = 1, PROP_PDF_LAYERS, N_PROPERTIES }

Functions

- LatexRenderer * latex_renderer_new ()

  Create new LatexRenderer object.
- LatexRenderer * latex_renderer_new_with_options (gboolean pdf_layers, gboolean standalone)

  Create new LatexRenderer object.
- static void write_layer_definitions (FILE *tex_file, GList *layer_infos, GString *buffer)

  Write the layer declarration to TeX file.
- static gboolean write_layer_env (FILE *tex_file, GdkRGBA *color, int layer, GList *linfo, GString *buffer)

  Write layer Envirmonment.
- static void generate_graphics (FILE *tex_file, GList *graphics, GList *linfo, GString *buffer, double scale)

  Writes a graphics object to the specified tex_file.
- static void render_cell (struct gds_cell *cell, GList *layer_infos, FILE *tex_file, GString *buffer, double scale, GdsOutputRenderer *renderer)

  Render cell to file.
- static int latex_render_cell_to_code (struct gds_cell *cell, GList *layer_infos, FILE *tex_file, double scale, gboolean create_pdf_layers, gboolean standalone_document, GdsOutputRenderer *renderer)
- static int latex_renderer_render_output (GdsOutputRenderer *renderer, struct gds_cell *cell, double scale)
- static void latex_renderer_init (LatexRenderer *self)
- static void latex_renderer_get_property (GObject *obj, guint property_id, GValue *value, GParamSpec *pspec)
- static void latex_renderer_set_property (GObject *obj, guint property_id, const GValue *value, GParamSpec *pspec)
- static void latex_renderer_class_init (LatexRendererClass *klass)

Variables

- static GParamSpec * latex_renderer_properties [N_PROPERTIES] = {NULL}

11.8.1 Detailed Description

This is the class implementing the LaTeX / TikZ output rendering

11.8.2 Properties

This class inherits all properties from its parent GDS Output Renderer base class. In addition to that, it implements the following properties:

Property Name	Description
standalone	Configure output LaTeX document to be standalone compilable (requires standalone documentclass)
pdf-layers	Create OCG layers in LaTeX output

11.8.3 Macro Definition Documentation

11.8.3.1 GDS_RENDER_TYPE_LATEX_RENDERER

```
#define GDS_RENDER_TYPE_LATEX_RENDERER (latex_renderer_get_type())
```

Definition at line 41 of file latex-renderer.h.

11.8.3.2 LATEX_LINE_BUFFER_KB

```
#define LATEX_LINE_BUFFER_KB (10)
```

Buffer for LaTeX Code line in KiB.

Definition at line 46 of file latex-renderer.h.

11.8.3.3 WRITEOUT_BUFFER

```
#define WRITEOUT_BUFFER(
            buff ) fwrite((buff)->str, sizeof(char), (buff)->len, tex_file)
```

Writes a GString `buffer` to the fixed file tex_file.

Note

This is a convinience macro. Do not use this anywhere else. It might change behavior in futurtre releases

Definition at line 60 of file latex-renderer.c.

11.8.4 Enumeration Type Documentation

11.8.4.1 anonymous enum

```
anonymous enum
```

Enumerator

PROP_STANDALONE	
PROP_PDF_LAYERS	
N_PROPERTIES	

Definition at line 50 of file latex-renderer.c.

11.8.5 Function Documentation

11.8.5.1 generate_graphics()

```
static void generate_graphics (
            FILE * tex_file,
            GList * graphics,
            GList * linfo,
            GString * buffer,
            double scale )  [static]
```

Writes a graphics object to the specified tex_file.

This function opens the layer, writes a graphics object and closes the layer

Parameters

tex_file	File to write to
graphics	Object to render
linfo	Layer information
buffer	Working buffer
scale	Scale abject down by this value

Definition at line 166 of file latex-renderer.c.

Here is the call graph for this function:

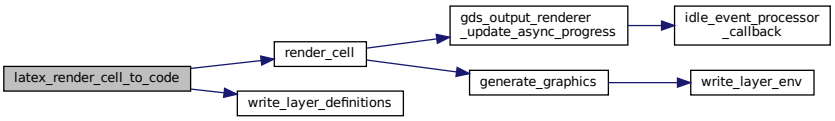
Here is the caller graph for this function:

11.8.5.2 latex_render_cell_to_code()

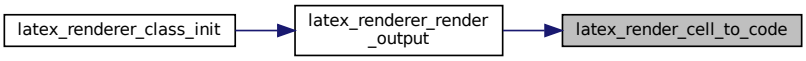
```
static int latex_render_cell_to_code (
            struct gds_cell * cell,
            GList * layer_infos,
            FILE * tex_file,
            double scale,
            gboolean create_pdf_layers,
            gboolean standalone_document,
            GdsOutputRenderer * renderer )  [static]
```

Definition at line 295 of file latex-renderer.c.

Here is the call graph for this function:



Here is the caller graph for this function:

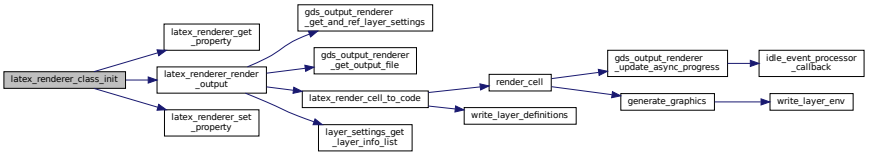


11.8.5.3 latex_renderer_class_init()

```
static void latex_renderer_class_init (
            LatexRendererClass * klass )  [static]
```

Definition at line 424 of file latex-renderer.c.

Here is the call graph for this function:

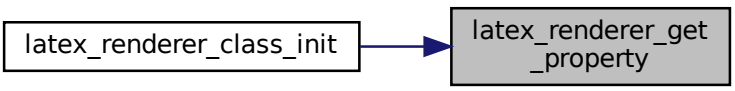


11.8.5.4 latex_renderer_get_property()

```
static void latex_renderer_get_property (
            GObject * obj,
            guint property_id,
            GValue * value,
            GParamSpec * pspec )  [static]
```

Definition at line 388 of file latex-renderer.c.

Here is the caller graph for this function:



11.8.5.5 latex_renderer_init()

```
static void latex_renderer_init (
            LatexRenderer * self )  [static]
```

Definition at line 382 of file latex-renderer.c.

11.8.5.6 latex_renderer_new()

```
LatexRenderer * latex_renderer_new ( )
```

Create new LatexRenderer object.

Returns

New object

Definition at line 452 of file latex-renderer.c.

11.8.5.7 latex_renderer_new_with_options()

```
LatexRenderer * latex_renderer_new_with_options (
            gboolean pdf_layers,
            gboolean standalone )
```

Create new LatexRenderer object.

This function sets the 'pdf-layers' and 'standalone' properties for the newly created object.

They can later be changes by modifying the properties again. On top of that, The options can be changed in the resulting LaTeX output file if needed.

Parameters

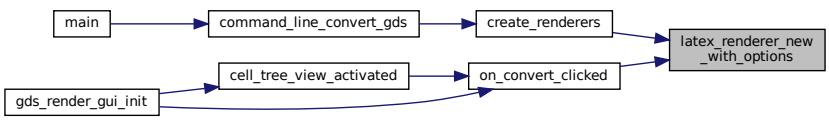
pdf_layers	If PDF OCR layers should be enabled
standalone	If output TeX file should be standalone compilable

Returns

New object

Definition at line 457 of file latex-renderer.c.

Here is the caller graph for this function:

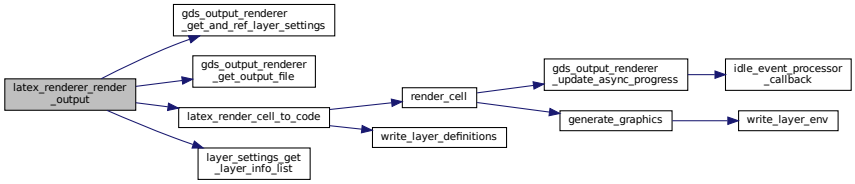


11.8.5.8 latex_renderer_render_output()

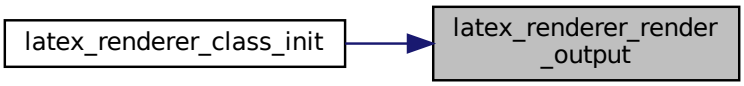
```
static int latex_renderer_render_output (
            GdsOutputRenderer * renderer,
            struct gds_cell * cell,
            double scale )  [static]
```

Definition at line 349 of file latex-renderer.c.

Here is the call graph for this function:



Here is the caller graph for this function:

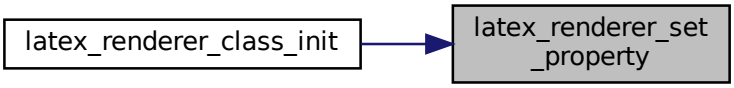


11.8.5.9 latex_renderer_set_property()

```
static void latex_renderer_set_property (
            GObject * obj,
            guint property_id,
            const GValue * value,
            GParamSpec * pspec )  [static]
```

Definition at line 405 of file latex-renderer.c.

Here is the caller graph for this function:



11.8.5.10 render_cell()

```
static void render_cell (
            struct gds_cell * cell,
            GList * layer_infos,
            FILE * tex_file,
            GString * buffer,
            double scale,
            GdsOutputRenderer * renderer )  [static]
```

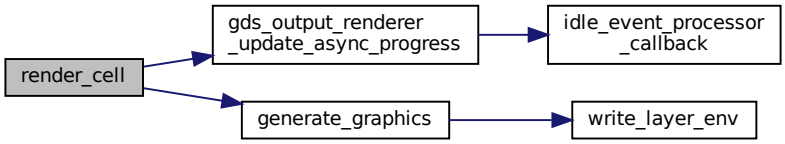
Render cell to file.

Parameters

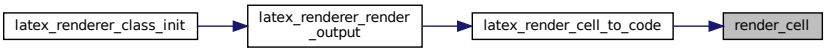
cell	Cell to render
layer_infos	Layer information
tex_file	File to write to
buffer	Working buffer
scale	Scale output down by this value
renderer	The current renderer as GdsOutputRenderer. This is used to emit the status updates to the GUI

Definition at line 245 of file latex-renderer.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.8.5.11 write_layer_definitions()

```
static void write_layer_definitions (
            FILE * tex_file,
```

```
GList * layer_infos,
GString * buffer )  [static]
```

Write the layer declarration to TeX file.

This writes the declaration of the layers and the mapping in which order the layers shall be rendered by TikZ. Layers are written in the order they are positioned inside the `layer_infos` list.

Parameters

tex_file	TeX-File to write to
layer_infos	List containing layer_info structs.
buffer	

Note

The field layer_info::stacked_position is ignored. Stack depends on list order.

Definition at line 74 of file latex-renderer.c.

Here is the caller graph for this function:

11.8.5.12 write_layer_env()

```
static gboolean write_layer_env (
            FILE * tex_file,
            GdkRGBA * color,
            int layer,
            GList * linfo,
            GString * buffer )  [static]
```

Write layer Envirmonment.

If the requested layer shall be rendered, this code writes the necessary code to open the layer. It also returns the color the layer shall be rendered in.

The followingenvironments are generated:

```
\begin{pgfonlayer}{<layer>}
% If pdf layers shall be used also this is enabled:
\begin{scope}[ocg={ref=<layer>, status=visible,name={<Layer Name>}}]
```

If the layer shall not be rendered, FALSE is returned and the color is not filled in and the cod eis not written to the file.

Parameters

tex_file	TeX file to write to
color	Return of the layer's color
layer	Requested layer number
linfo	Layer information list containing layer_info structs
buffer	Some working buffer

Returns

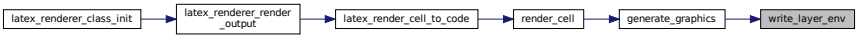
TRUE, if the layer shall be rendered.

Note

The opened environments have to be closed afterwards

Definition at line 133 of file latex-renderer.c.

Here is the caller graph for this function:



11.8.6 Variable Documentation

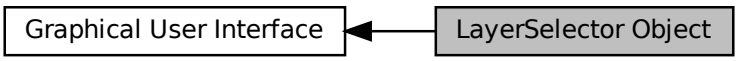
11.8.6.1 latex_renderer_properties

```
GParamSpec* latex_renderer_properties[N_PROPERTIES] = {NULL}  [static]
```

Definition at line 422 of file latex-renderer.c.

11.9 LayerSelector Object

Collaboration diagram for LayerSelector Object:



Data Structures

- struct _LayerSelector

Macros

- #define TYPE_LAYER_SELECTOR (layer_selector_get_type())

Enumerations

- enum layer_selector_sort_algo { LAYER_SELECTOR_SORT_DOWN = 0, LAYER_SELECTOR_SORT_UP }

  Defines how to sort the layer selector list box.

Functions

- G_BEGIN_DECLS G_DECLARE_FINAL_TYPE (LayerSelector, layer_selector, LAYER, SELECTOR, G↩ Object)
- LayerSelector ∗ layer_selector_new (GtkListBox ∗list_box)

  layer_selector_new
- void layer_selector_generate_layer_widgets (LayerSelector ∗selector, GList ∗libs)

  Generate layer widgets in in the LayerSelector instance.
- void layer_selector_set_load_mapping_button (LayerSelector ∗selector, GtkWidget ∗button, GtkWindow ∗main_window)

  Supply button for loading the layer mapping.
- void layer_selector_set_save_mapping_button (LayerSelector ∗selector, GtkWidget ∗button, GtkWindow ∗main_window)

  Supply button for saving the layer mapping.
- LayerSettings ∗ layer_selector_export_rendered_layer_info (LayerSelector ∗selector)

  Get a list of all layers that shall be exported when rendering the cells.
- void layer_selector_force_sort (LayerSelector ∗selector, enum layer_selector_sort_algo sort_function)

  Force the layer selector list to be sorted according to `sort_function`.
- void layer_selector_select_all_layers (LayerSelector ∗layer_selector, gboolean select)

  Set 'export' value of all layers in the LayerSelector to the supplied select value.
- void layer_selector_auto_color_layers (LayerSelector ∗layer_selector, ColorPalette ∗palette, double global↩ _alpha)

Apply colors from palette to all layers. Aditionally set alpha.

- void layer_selector_auto_name_layers (LayerSelector *layer_selector, gboolean overwrite)

  Auto name all layers in the layer selector.
- gboolean layer_selector_contains_elements (LayerSelector *layer_selector)

  Check if the given layer selector contains layer elements.
- static void sel_layer_element_drag_begin (GtkWidget *widget, GdkDragContext *context, gpointer data)
- static void sel_layer_element_drag_end (GtkWidget *widget, GdkDragContext *context, gpointer data)
- static void sel_layer_element_drag_data_get (GtkWidget *widget, GdkDragContext *context, GtkSelection↩ Data *selection_data, guint info, guint time, gpointer data)
- static GtkListBoxRow * layer_selector_get_last_row (GtkListBox *list)
- static GtkListBoxRow * layer_selector_get_row_before (GtkListBox *list, GtkListBoxRow *row)
- static GtkListBoxRow * layer_selector_get_row_after (GtkListBox *list, GtkListBoxRow *row)
- static void layer_selector_drag_data_received (GtkWidget *widget, GdkDragContext *context, gint x, gint y, GtkSelectionData *selection_data, guint info, guint32 time, gpointer data)
- static gboolean layer_selector_drag_motion (GtkWidget *widget, GdkDragContext *context, int x, int y, guint time)
- static void layer_selector_drag_leave (GtkWidget *widget, GdkDragContext *context, guint time)
- static void layer_selector_dispose (GObject *self)
- static void layer_selector_class_init (LayerSelectorClass *klass)
- static void layer_selector_setup_dnd (LayerSelector *self)
- static void layer_selector_init (LayerSelector *self)
- static void layer_selector_clear_widgets (LayerSelector *self)
- static gboolean layer_selector_check_if_layer_widget_exists (LayerSelector *self, int layer)

  Check if a specific layer element with the given layer number is present in the layer selector.
- static void sel_layer_element_setup_dnd_callbacks (LayerSelector *self, LayerElement *element)

  Setup the necessary drag and drop callbacks of layer elements.
- static void layer_selector_analyze_cell_layers (LayerSelector *self, struct gds_cell *cell)

  Analyze `cell` layers and append detected layers to layer selector `self`.
- static gint layer_selector_sort_func (GtkListBoxRow *row1, GtkListBoxRow *row2, gpointer unused)

  sort_func Sort callback for list box
- static LayerElement * layer_selector_find_layer_element_in_list (GList *el_list, int layer)

  Find LayerElement in list with specified layer number.
- static void layer_selector_load_layer_mapping_from_file (LayerSelector *self, const gchar *file_name)

  Load the layer mapping from a CSV formatted file.
- static void layer_selector_load_mapping_clicked (GtkWidget *button, gpointer user_data)

  Callback for Load Mapping Button.
- static void layer_selector_save_layer_mapping_data (LayerSelector *self, const gchar *file_name)

  Save layer mapping of selector `self` to a file.
- static void layer_selector_save_mapping_clicked (GtkWidget *button, gpointer user_data)

  Callback for Save Layer Mapping Button.

Variables

- static const char * dnd_additional_css

11.9.1 Detailed Description

This objects implements the layer selector and displays the layers in a list box. It uses LayerElement objects to display the individual layers inside the list box.

11.9.2 Macro Definition Documentation

11.9.2.1 TYPE_LAYER_SELECTOR

```
#define TYPE_LAYER_SELECTOR (layer_selector_get_type())
```

Definition at line 43 of file layer-selector.h.

11.9.3 Enumeration Type Documentation

11.9.3.1 layer_selector_sort_algo

```
enum layer_selector_sort_algo
```

Defines how to sort the layer selector list box.

Enumerator

LAYER_SELECTOR_SORT_DOWN	
LAYER_SELECTOR_SORT_UP	

Definition at line 48 of file layer-selector.h.

11.9.4 Function Documentation

11.9.4.1 G_DECLARE_FINAL_TYPE()

```
G_BEGIN_DECLS G_DECLARE_FINAL_TYPE (
             LayerSelector ,
             layer_selector ,
             LAYER ,
             SELECTOR ,
             GObject  )
```

11.9.4.2 layer_selector_analyze_cell_layers()

```
static void layer_selector_analyze_cell_layers (
             LayerSelector * self,
             struct gds_cell * cell )  [static]
```

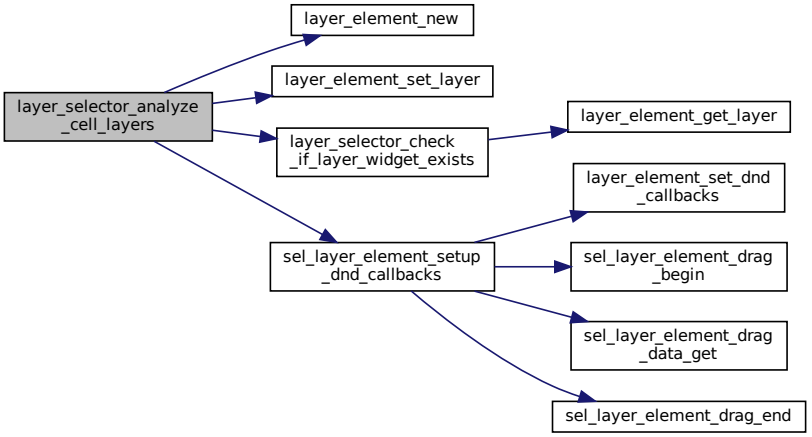
Analyze `cell` layers and append detected layers to layer selector `self`.

Parameters

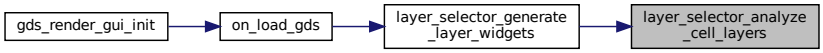
self	LayerSelector instance
cell	Cell to analyze

Definition at line 497 of file layer-selector.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.9.4.3 layer_selector_auto_color_layers()

```
void layer_selector_auto_color_layers (
            LayerSelector * layer_selector,
            ColorPalette * palette,
            double global_alpha )
```

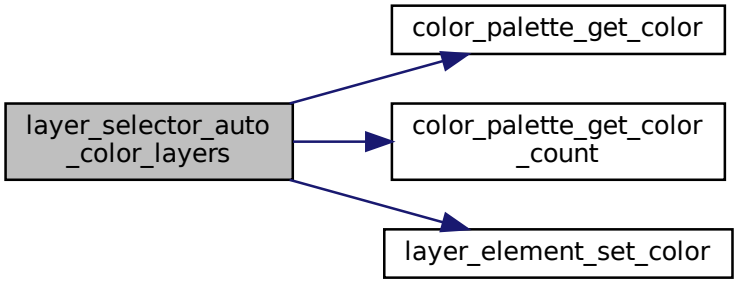
Apply colors from palette to all layers. Aditionally set alpha.

Parameters

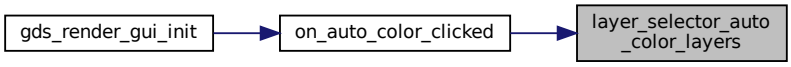
layer_selector	LayerSelector object
palette	Color palette to use
global_alpha	Additional alpha value that is applied to all layers. Must be > 0

Definition at line 816 of file layer-selector.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.9.4.4 layer_selector_auto_name_layers()

```
void layer_selector_auto_name_layers (
            LayerSelector * layer_selector,
            gboolean overwrite )
```

Auto name all layers in the layer selector.

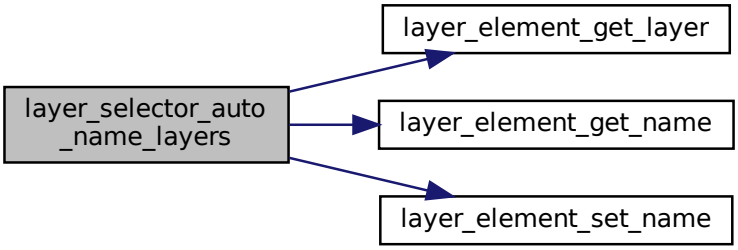
This functions sets the name of the layer equal to its number. The `overwrite` parameter specifies if already set layer names are overwritten.

Parameters

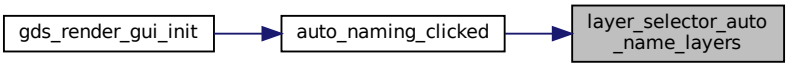
layer_selector	LayerSelector
overwrite	Overwrite existing layer names

Definition at line 856 of file layer-selector.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.9.4.5 layer_selector_check_if_layer_widget_exists()

```
static gboolean layer_selector_check_if_layer_widget_exists (
            LayerSelector * self,
            int layer )  [static]
```

Check if a specific layer element with the given layer number is present in the layer selector.

Parameters

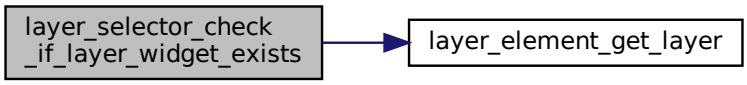
self	LayerSelector instance
layer	Layer number to check for

Returns

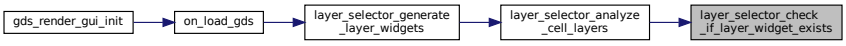
TRUE if layer is present, else FALSE

Definition at line 449 of file layer-selector.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.9.4.6 layer_selector_class_init()

```
static void layer_selector_class_init (
            LayerSelectorClass * klass )  [static]
```

Definition at line 334 of file layer-selector.c.

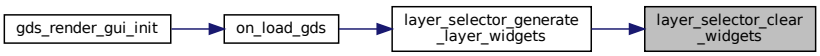
Here is the call graph for this function:

11.9.4.7 layer_selector_clear_widgets()

```
static void layer_selector_clear_widgets (
            LayerSelector * self )  [static]
```

Definition at line 423 of file layer-selector.c.

Here is the caller graph for this function:



11.9.4.8 layer_selector_contains_elements()

```
gboolean layer_selector_contains_elements (
            LayerSelector * layer_selector )
```

Check if the given layer selector contains layer elements.

This function checks whether there are elements present. If an invalid object pointer `layer_selector` is passed, the function returns FALSE

Parameters

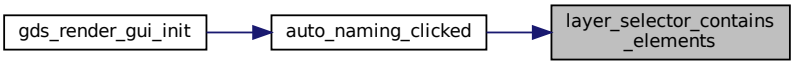
in	*layer_selector*	Selector to check

Returns

True, if there is at least one layer present inside the selector

Definition at line 886 of file layer-selector.c.

Here is the caller graph for this function:



11.9.4.9 layer_selector_dispose()

```
static void layer_selector_dispose (
            GObject * self )  [static]
```

Definition at line 315 of file layer-selector.c.

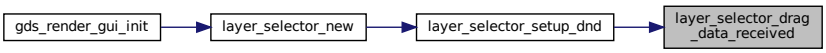
Here is the caller graph for this function:

11.9.4.10 layer_selector_drag_data_received()

```
static void layer_selector_drag_data_received (
            GtkWidget * widget,
            GdkDragContext * context,
            gint x,
            gint y,
            GtkSelectionData * selection_data,
            guint info,
            guint32 time,
            gpointer data )  [static]
```

Definition at line 152 of file layer-selector.c.

Here is the caller graph for this function:

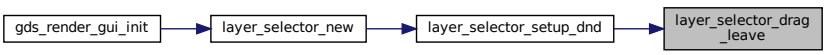


11.9.4.11 layer_selector_drag_leave()

```
static void layer_selector_drag_leave (
            GtkWidget * widget,
            GdkDragContext * context,
            guint time )  [static]
```

Definition at line 259 of file layer-selector.c.

Here is the caller graph for this function:

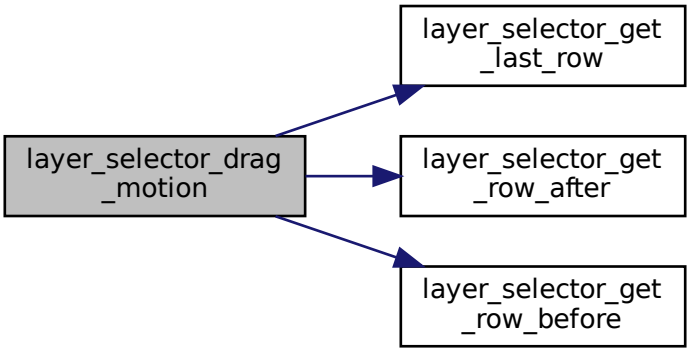


11.9.4.12 layer_selector_drag_motion()

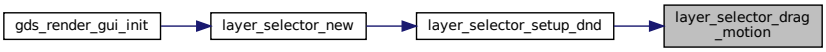
```
static gboolean layer_selector_drag_motion (
            GtkWidget * widget,
            GdkDragContext * context,
            int x,
            int y,
            guint time )  [static]
```

Definition at line 198 of file layer-selector.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.9.4.13 layer_selector_export_rendered_layer_info()

```
LayerSettings * layer_selector_export_rendered_layer_info (
            LayerSelector * selector )
```

Get a list of all layers that shall be exported when rendering the cells.

Parameters

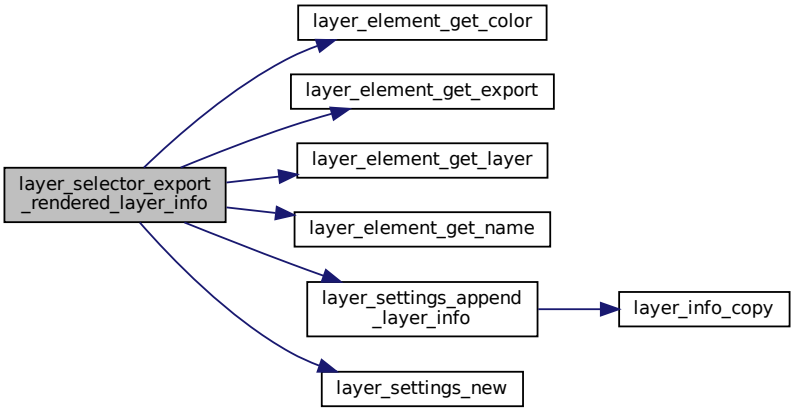
selector	Layer selector instance

Returns

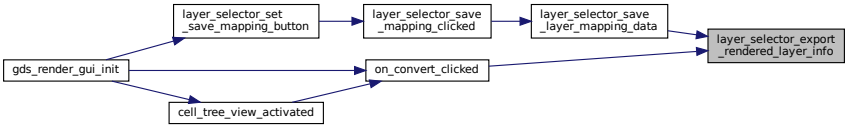
LayerSettings containing the layer information

Definition at line 388 of file layer-selector.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.9.4.14 layer_selector_find_layer_element_in_list()

```
static LayerElement* layer_selector_find_layer_element_in_list (
            GList * el_list,
            int layer )  [static]
```

Find LayerElement in list with specified layer number.

Parameters

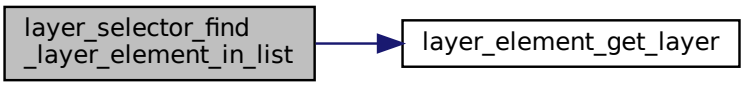
el_list	List with elements of type LayerElement
layer	Layer number

Returns

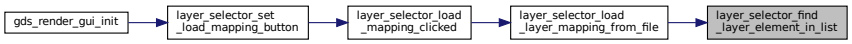
Found LayerElement. If nothing is found, NULL.

Definition at line 578 of file layer-selector.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.9.4.15 layer_selector_force_sort()

```
void layer_selector_force_sort (
            LayerSelector * selector,
            enum layer_selector_sort_algo sort_function )
```

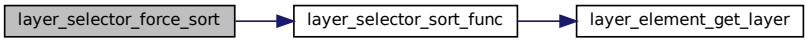
Force the layer selector list to be sorted according to `sort_function`.

Parameters

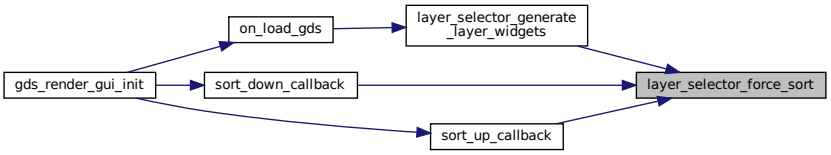
selector	LayerSelector instance
sort_function	The sorting method (up or down sorting)

Definition at line 779 of file layer-selector.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.9.4.16 layer_selector_generate_layer_widgets()

```
void layer_selector_generate_layer_widgets (
            LayerSelector * selector,
            GList * libs )
```

Generate layer widgets in in the LayerSelector instance.

Note

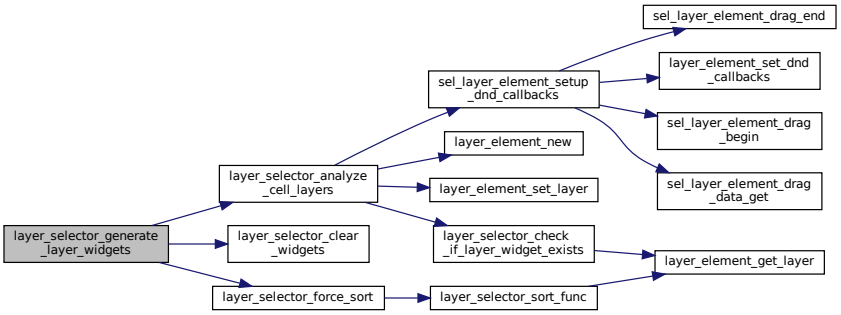
This clears all previously inserted elements

Parameters

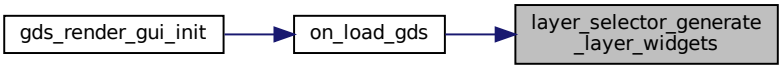
selector	LayerSelector instance
libs	The libraries to add

Definition at line 549 of file layer-selector.c.

Here is the call graph for this function:



Here is the caller graph for this function:

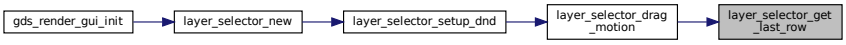


11.9.4.17 layer_selector_get_last_row()

```
static GtkListBoxRow* layer_selector_get_last_row (
            GtkListBox * list )  [static]
```

Definition at line 119 of file layer-selector.c.

Here is the caller graph for this function:

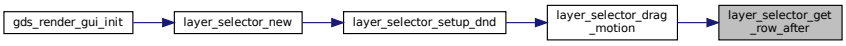


11.9.4.18 layer_selector_get_row_after()

```
static GtkListBoxRow* layer_selector_get_row_after (
            GtkListBox * list,
            GtkListBoxRow * row )  [static]
```

Definition at line 144 of file layer-selector.c.

Here is the caller graph for this function:

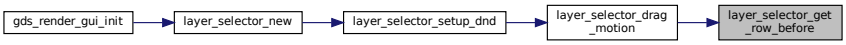


11.9.4.19 layer_selector_get_row_before()

```
static GtkListBoxRow* layer_selector_get_row_before (
            GtkListBox * list,
            GtkListBoxRow * row )  [static]
```

Definition at line 136 of file layer-selector.c.

Here is the caller graph for this function:



11.9.4.20 layer_selector_init()

```
static void layer_selector_init (
            LayerSelector * self )  [static]
```

Definition at line 361 of file layer-selector.c.

11.9.4.21 layer_selector_load_layer_mapping_from_file()

```
static void layer_selector_load_layer_mapping_from_file (
            LayerSelector * self,
            const gchar * file_name )  [static]
```

Load the layer mapping from a CSV formatted file.

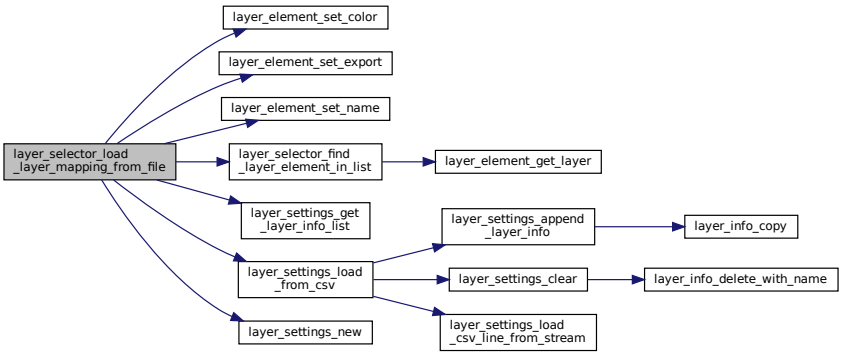
This function imports the layer specification from a file (see Layer Mapping File Specification). The layer ordering defined in the file is kept. All layers present in the current loaded library, which are not present in the layer mapping file are appended at the end of the layer selector list.

Parameters

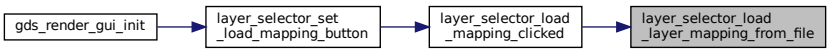
self	LayerSelector instance
file_name	File name to load from

Definition at line 602 of file layer-selector.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.9.4.22 layer_selector_load_mapping_clicked()

```
static void layer_selector_load_mapping_clicked (
            GtkWidget * button,
            gpointer user_data )  [static]
```

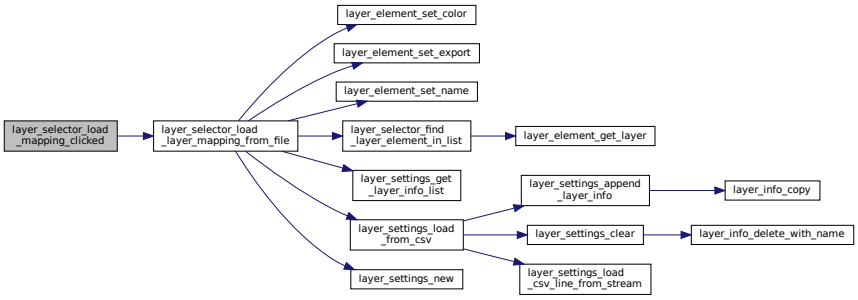
Callback for Load Mapping Button.

Parameters

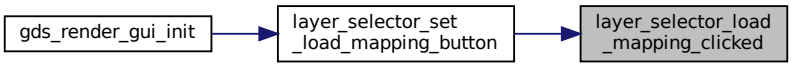
button	
user_data	

Definition at line 685 of file layer-selector.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.9.4.23 layer_selector_new()

```
LayerSelector * layer_selector_new (
            GtkListBox * list_box )
```

layer_selector_new

Parameters

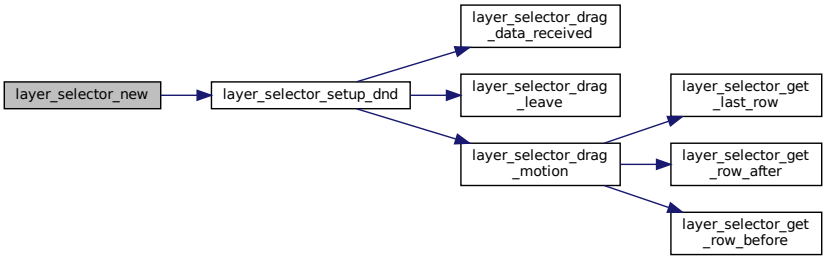
list_box	The associated list box, the content is displayed in

Returns

Newly created layer selector

Definition at line 373 of file layer-selector.c.

Here is the call graph for this function:



Here is the caller graph for this function:

11.9.4.24 layer_selector_save_layer_mapping_data()

```
static void layer_selector_save_layer_mapping_data (
            LayerSelector * self,
            const gchar * file_name )  [static]
```

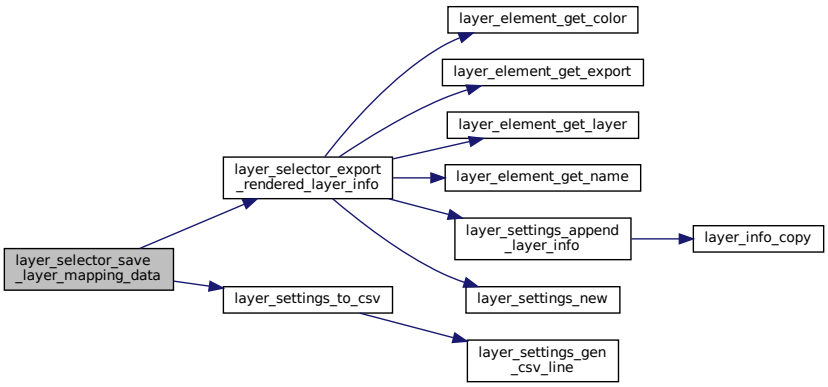
Save layer mapping of selector `self` to a file.

Parameters

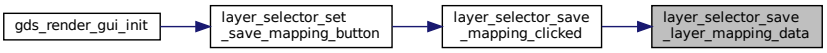
self	LayerSelector instance
file_name	File name to save to

Definition at line 714 of file layer-selector.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.9.4.25 layer_selector_save_mapping_clicked()

```
static void layer_selector_save_mapping_clicked (
            GtkWidget * button,
            gpointer user_data )  [static]
```

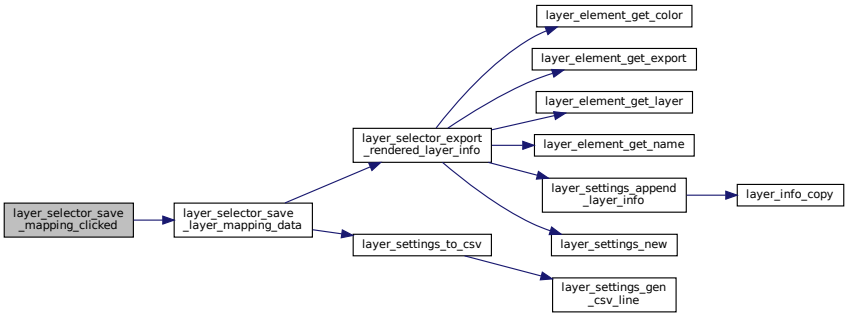
Callback for Save Layer Mapping Button.

Parameters

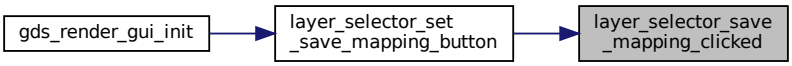
button	
user_data	

Definition at line 731 of file layer-selector.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.9.4.26 layer_selector_select_all_layers()

```
void layer_selector_select_all_layers (
            LayerSelector * layer_selector,
            gboolean select )
```

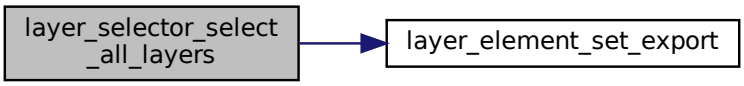
Set 'export' value of all layers in the LayerSelector to the supplied select value.

Parameters

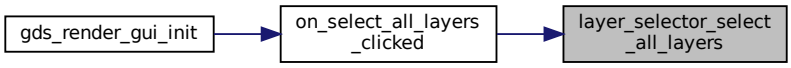
layer_selector	LayerSelector object
select	

Definition at line 796 of file layer-selector.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.9.4.27 layer_selector_set_load_mapping_button()

```
void layer_selector_set_load_mapping_button (
            LayerSelector * selector,
            GtkWidget * button,
            GtkWindow * main_window )
```

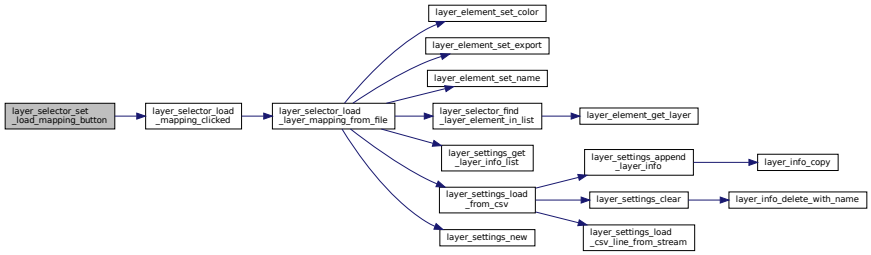
Supply button for loading the layer mapping.

Parameters

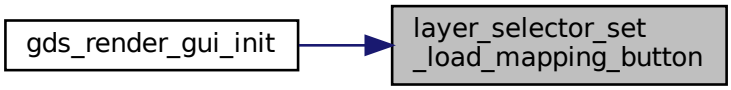
selector	LayerSelector instance
button	Load button. Will be referenced
main_window	Parent window for dialogs. Will be referenced

Definition at line 755 of file layer-selector.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.9.4.28 layer_selector_set_save_mapping_button()

```
void layer_selector_set_save_mapping_button (
            LayerSelector * selector,
            GtkWidget * button,
            GtkWindow * main_window )
```

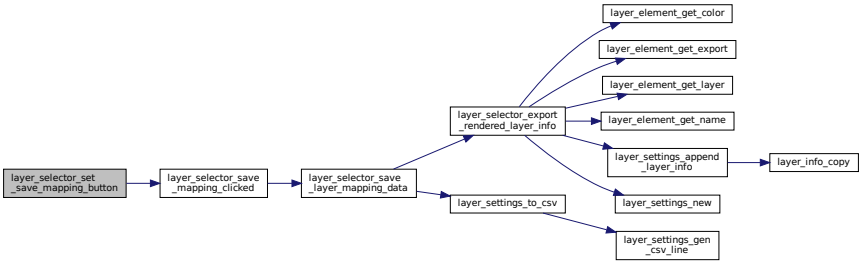
Supply button for saving the layer mapping.

Parameters

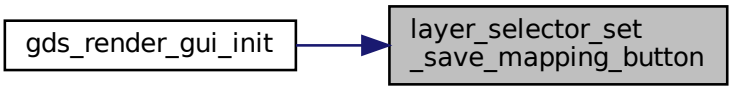
selector	LayerSelector instance
button	Save button. Will be refeneced
main_window	Parent window for dialogs. Will be referenced

Definition at line 767 of file layer-selector.c.

Here is the call graph for this function:



Here is the caller graph for this function:

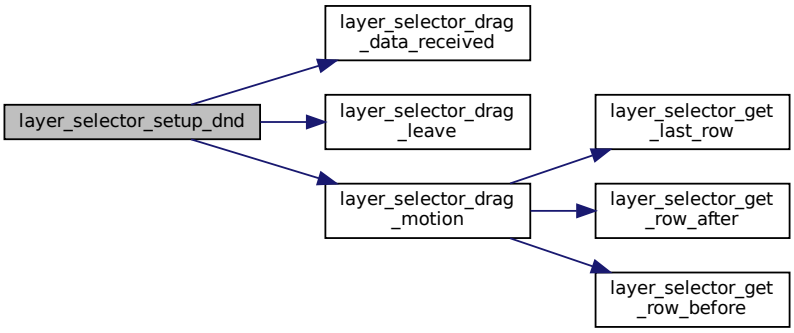


11.9.4.29 layer_selector_setup_dnd()

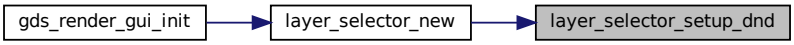
```
static void layer_selector_setup_dnd (
            LayerSelector * self )  [static]
```

Definition at line 350 of file layer-selector.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.9.4.30 layer_selector_sort_func()

```
static gint layer_selector_sort_func (
            GtkListBoxRow * row1,
            GtkListBoxRow * row2,
            gpointer unused )  [static]
```

sort_func Sort callback for list box

Parameters

row1	
row2	
unused	

Note

Do not use this function. This is an internal callback

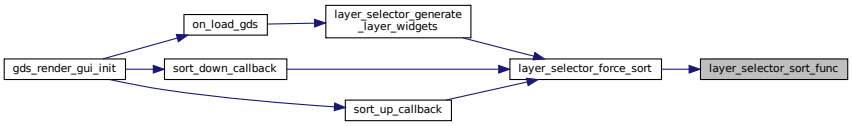
Returns

See sort function documentation of GTK+

Definition at line 525 of file layer-selector.c.

Here is the call graph for this function:

Here is the caller graph for this function:

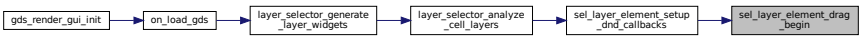


11.9.4.31 sel_layer_element_drag_begin()

```
static void sel_layer_element_drag_begin (
            GtkWidget * widget,
            GdkDragContext * context,
            gpointer data )  [static]
```

Definition at line 62 of file layer-selector.c.

Here is the caller graph for this function:

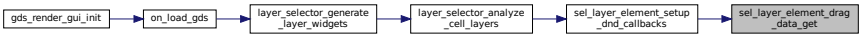


11.9.4.32 sel_layer_element_drag_data_get()

```
static void sel_layer_element_drag_data_get (
            GtkWidget * widget,
            GdkDragContext * context,
            GtkSelectionData * selection_data,
            guint info,
            guint time,
            gpointer data )  [static]
```

Definition at line 103 of file layer-selector.c.

Here is the caller graph for this function:

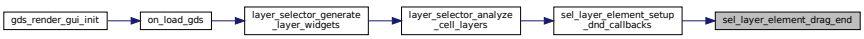


11.9.4.33 sel_layer_element_drag_end()

```
static void sel_layer_element_drag_end (
            GtkWidget * widget,
            GdkDragContext * context,
            gpointer data )  [static]
```

Definition at line 91 of file layer-selector.c.

Here is the caller graph for this function:



11.9.4.34 sel_layer_element_setup_dnd_callbacks()

```
static void sel_layer_element_setup_dnd_callbacks (
            LayerSelector * self,
            LayerElement * element )  [static]
```

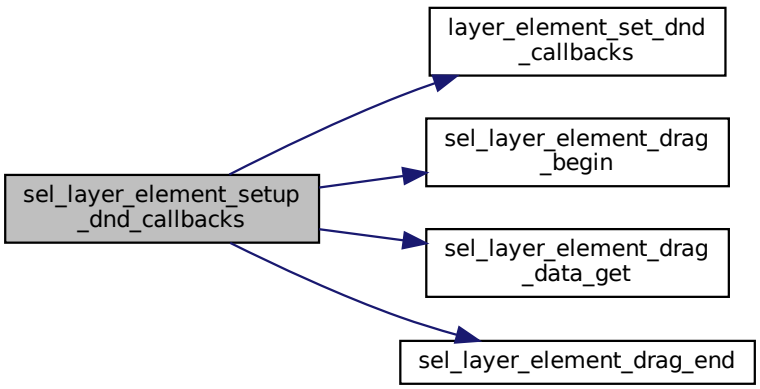
Setup the necessary drag and drop callbacks of layer elements.

Parameters

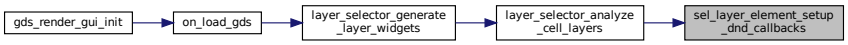
self	LayerSelector instance. Used to get the DnD target entry.
element	LayerElement instance to set the callbacks

Definition at line 476 of file layer-selector.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.9.5 Variable Documentation

11.9.5.1 dnd_additional_css

```
const char* dnd_additional_css  [static]
```

Definition at line 279 of file layer-selector.c.

11.10 LibCellRenderer GObject

Collaboration diagram for LibCellRenderer GObject:

Data Structures

- struct _LibCellRenderer

Macros

- #define TYPE_LIB_CELL_RENDERER (lib_cell_renderer_get_type())
- #define LIB_CELL_RENDERER_ERROR_WARN (1U<<0)
- #define LIB_CELL_RENDERER_ERROR_ERR (1U<<1)

Typedefs

- typedef struct _LibCellRenderer LibCellRenderer

Enumerations

- enum { PROP_LIB = 1, PROP_CELL, PROP_ERROR_LEVEL, PROP_COUNT }

Functions

- void lib_cell_renderer_init (LibCellRenderer *self)
- static void lib_cell_renderer_constructed (GObject *obj)
- static void convert_error_level_to_color (GdkRGBA *color, unsigned int error_level)
- static void lib_cell_renderer_set_property (GObject *object, guint param_id, const GValue *value, GParamSpec *pspec)
- static void lib_cell_renderer_get_property (GObject *object, guint param_id, GValue *value, GParamSpec *pspec)
- void lib_cell_renderer_class_init (LibCellRendererClass *klass)
- GtkCellRenderer * lib_cell_renderer_new (void)

  Create a new renderer for renderering gds_cell and gds_library elements.
- GType lib_cell_renderer_get_type (void)

  lib_cell_renderer_get_type

Variables

- static GParamSpec * properties [PROP_COUNT]

11.10.1 Detailed Description

The LibCellRenderer Object is used to render gds_cell and gds_library elements to a GtkTreeView.

The LibCellRenderer class is derived from a GtkCellRendererText and works the same way. The additinal features are three new properties:

- *gds-lib*: This property can be used to set a gds_library structure. The renderer will render the name of the library.
- *gds-cell*: This property can be used to set a gds_cell structure. The renderer will render the name of the cell.
- *error-level*: Set the error level of the cell/library. This affects the foreground color of hte rendered output.

Internally the class operates by setting the 'text' property, which is inherited form the base class to the library/cell name (gds_library::name and gds_cell::name fields). The error level (LIB_CELL_RENDERER_ERROR_WARN and LIB_CELL_RENDERER_ERROR_ERR) is translated to the inherited 'foreground-rgba' property.

11.10.2 Macro Definition Documentation

11.10.2.1 LIB_CELL_RENDERER_ERROR_ERR

```
#define LIB_CELL_RENDERER_ERROR_ERR (1U<<1)
```

Definition at line 45 of file lib-cell-renderer.h.

11.10.2.2 LIB_CELL_RENDERER_ERROR_WARN

```
#define LIB_CELL_RENDERER_ERROR_WARN (1U<<0)
```

Error levels

Definition at line 44 of file lib-cell-renderer.h.

11.10.2.3 TYPE_LIB_CELL_RENDERER

```
#define TYPE_LIB_CELL_RENDERER (lib_cell_renderer_get_type())
```

Definition at line 39 of file lib-cell-renderer.h.

11.10.3 Typedef Documentation

11.10.3.1 LibCellRenderer

```
typedef struct _LibCellRenderer LibCellRenderer
```

11.10.4 Enumeration Type Documentation

11.10.4.1 anonymous enum

```
anonymous enum
```

Enumerator

PROP_LIB	Library to display the name of.
PROP_CELL	Cell to display the name of.
PROP_ERROR_LEVEL	Error level of cell/library for coloring.
PROP_COUNT	Sentinel.

Definition at line 36 of file lib-cell-renderer.c.

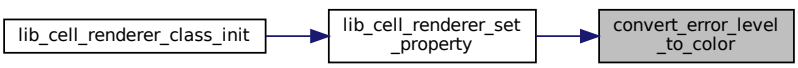
11.10.5 Function Documentation

11.10.5.1 convert_error_level_to_color()

```
static void convert_error_level_to_color (
            GdkRGBA * color,
            unsigned int error_level )  [static]
```

Definition at line 54 of file lib-cell-renderer.c.

Here is the caller graph for this function:

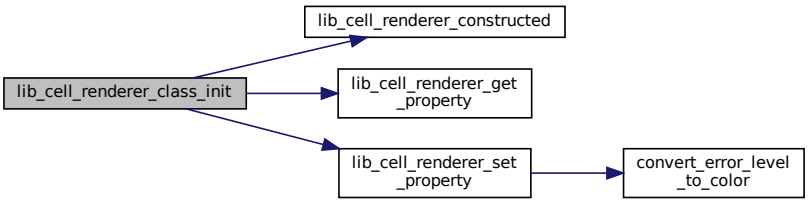


11.10.5.2 lib_cell_renderer_class_init()

```
void lib_cell_renderer_class_init (
            LibCellRendererClass * klass )
```

Definition at line 126 of file lib-cell-renderer.c.

Here is the call graph for this function:



11.10.5.3 lib_cell_renderer_constructed()

```
static void lib_cell_renderer_constructed (
            GObject * obj )  [static]
```

Definition at line 49 of file lib-cell-renderer.c.

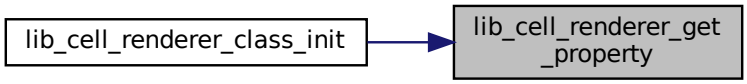
Here is the caller graph for this function:

11.10.5.4 lib_cell_renderer_get_property()

```
static void lib_cell_renderer_get_property (
            GObject * object,
            guint param_id,
            GValue * value,
            GParamSpec * pspec )  [static]
```

Definition at line 110 of file lib-cell-renderer.c.

Here is the caller graph for this function:



11.10.5.5 lib_cell_renderer_get_type()

```
GType lib_cell_renderer_get_type (
            void  )
```

lib_cell_renderer_get_type

Returns

GObject Type

11.10.5.6 lib_cell_renderer_init()

```
void lib_cell_renderer_init (
            LibCellRenderer * self )
```

Definition at line 43 of file lib-cell-renderer.c.

11.10.5.7 lib_cell_renderer_new()

```
GtkCellRenderer * lib_cell_renderer_new (
            void  )
```

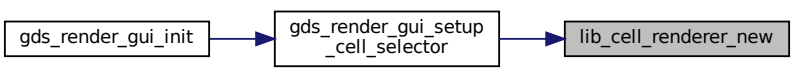
Create a new renderer for renderering gds_cell and gds_library elements.

Returns

New renderer object

Definition at line 146 of file lib-cell-renderer.c.

Here is the caller graph for this function:

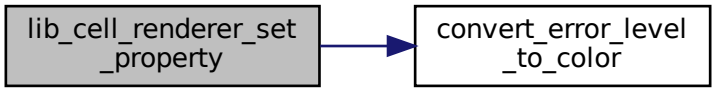


11.10.5.8 lib_cell_renderer_set_property()

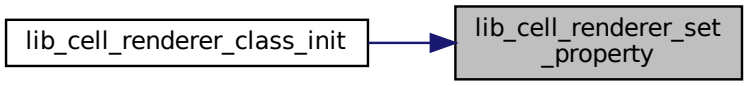
```
static void lib_cell_renderer_set_property (
            GObject * object,
            guint param_id,
            const GValue * value,
            GParamSpec * pspec )  [static]
```

Definition at line 78 of file lib-cell-renderer.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.10.6 Variable Documentation

11.10.6.1 properties

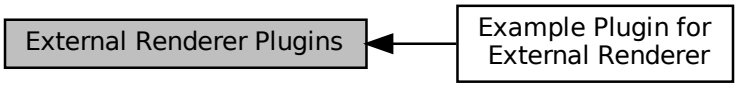
```
GParamSpec* properties[PROP_COUNT]  [static]
```

Definition at line 124 of file lib-cell-renderer.c.

11.11 External Renderer Plugins

These plugins can be loaded with the External Shared Object Renderer.

Collaboration diagram for External Renderer Plugins:



Modules

- Example Plugin for External Renderer

11.11.1 Detailed Description

These plugins can be loaded with the External Shared Object Renderer.

11.12 Custom GTK Widgets

Collaboration diagram for Custom GTK Widgets:

Modules

- Activity Bar
- RendererSettingsDialog
- LayerElement

11.12.1 Detailed Description

11.13 GDS-Utilities

Data Structures

- struct gds_cell_array_instance

  Struct representing an array instantiation.
- struct gds_point

  A point in the 2D plane. Sometimes referred to as vertex.
- struct gds_cell_checks

  Stores the result of the cell checks.
- struct gds_time_field

  Date information for cells and libraries.
- struct gds_graphics

  A GDS graphics object.
- struct gds_cell_instance

  This represents an instanc of a cell inside another cell.
- struct gds_cell

  A Cell inside a gds_library.
- struct gds_library

  GDS Toplevel library.

Macros

- #define GDS_DEFAULT_UNITS (10E-9)

  Default units assumed for library.
- #define GDS_ERROR(fmt, ...) printf("[PARSE_ERROR] " fmt "\n", ##__VA_ARGS__)

  Print GDS error.
- #define GDS_WARN(fmt, ...) printf("[PARSE_WARNING] " fmt "\n", ##__VA_ARGS__)

  Print GDS warning.
- #define GDS_INF(fmt, ...)
- #define GDS_PRINT_DEBUG_INFOS (0)

  1: Print infos, 0: Don't print
- #define CELL_NAME_MAX (100)

  Maximum length of a gds_cell::name or a gds_library::name.
- #define MIN(a, b) (((a) < (b)) ? (a) : (b))

  Return smaller number.
- #define MAX(a, b) (((a) > (b)) ? (a) : (b))

  Return bigger number.

Enumerations

- enum gds_record {
  INVALID = 0x0000, HEADER = 0x0002, BGNLIB = 0x0102, LIBNAME = 0x0206,
  UNITS = 0x0305, ENDLIB = 0x0400, BGNSTR = 0x0502, STRNAME = 0x0606,
  ENDSTR = 0x0700, BOUNDARY = 0x0800, PATH = 0x0900, SREF = 0x0A00,
  ENDEL = 0x1100, XY = 0x1003, MAG = 0x1B05, ANGLE = 0x1C05,
  SNAME = 0x1206, STRANS = 0x1A01, BOX = 0x2D00, LAYER = 0x0D02,
  WIDTH = 0x0F03, PATHTYPE = 0x2102, COLROW = 0x1302, AREF = 0x0B00 }
- enum { GDS_CELL_CHECK_NOT_RUN = -1 }

  Defintion of check counter default value that indicates that the corresponding check has not yet been executed.
- enum graphics_type { GRAPHIC_PATH = 0, GRAPHIC_POLYGON = 1, GRAPHIC_BOX = 2 }

  Types of graphic objects.
- enum path_type { PATH_FLUSH = 0, PATH_ROUNDED = 1, PATH_SQUARED = 2 }

  Defines the line caps of a path.

Functions

- static int name_cell_ref (struct gds_cell_instance *cell_inst, unsigned int bytes, char *data)

  Name cell reference.
- static int name_array_cell_ref (struct gds_cell_array_instance *cell_inst, unsigned int bytes, char *data)

  Name cell reference.
- static double gds_convert_double (const char *data)

  Convert GDS 8-byte real to double.
- static signed int gds_convert_signed_int (const char *data)

  Convert GDS INT32 to int.
- static int16_t gds_convert_signed_int16 (const char *data)

  Convert GDS INT16 to int16.
- static uint16_t gds_convert_unsigned_int16 (const char *data)

  Convert GDS UINT16 String to uint16.
- static GList * append_library (GList *curr_list, struct gds_library **library_ptr)

  Append library to list.
- static GList * prepend_graphics (GList *curr_list, enum graphics_type type, struct gds_graphics **graphics↩ _ptr)

  Prepend graphics to list.
- static GList * append_vertex (GList *curr_list, int x, int y)

  Appends vertext List.
- static GList * append_cell (GList *curr_list, struct gds_cell **cell_ptr)

  append_cell Append a gds_cell to a list
- static GList * append_cell_ref (GList *curr_list, struct gds_cell_instance **instance_ptr)

  Append a cell reference to the reference GList.
- static int name_library (struct gds_library *current_library, unsigned int bytes, char *data)

  Name a gds_library.
- static int name_cell (struct gds_cell *cell, unsigned int bytes, char *data, struct gds_library *lib)

  Names a gds_cell.
- static void parse_reference_list (gpointer gcell_ref, gpointer glibrary)

  Search for cell reference `gcell_ref` in `glibrary`.
- static void scan_cell_reference_dependencies (gpointer gcell, gpointer library)

  Scans cell references inside cell This function searches all the references in `gcell` and updates the gds_cell_instance::cell_ref field in each instance.
- static void scan_library_references (gpointer library_list_item, gpointer user)

  Scans library's cell references.
- static void gds_parse_date (const char *buffer, int length, struct gds_time_field *mod_date, struct gds_time_field *access_date)

  gds_parse_date
- static void convert_aref_to_sref (struct gds_cell_array_instance *aref, struct gds_cell *container_cell)

  Convert AREF to a bunch of SREFs and append them to `container_cell`.
- int parse_gds_from_file (const char *filename, GList **library_array)

  Parse a GDS file.
- static void delete_cell_inst_element (struct gds_cell_instance *cell_inst)

  delete_cell_inst_element
- static void delete_vertex (struct gds_point *vertex)

  delete_vertex
- static void delete_graphics_obj (struct gds_graphics *gfx)

  delete_graphics_obj
- static void delete_cell_element (struct gds_cell *cell)

  delete_cell_element

- static void delete_library_element (struct gds_library *lib)

  delete_library_element
- int clear_lib_list (GList **library_list)

  Deletes all libraries including cells, references etc.
- int gds_tree_check_cell_references (struct gds_library *lib)

  gds_tree_check_cell_references checks if all child cell references can be resolved in the given library
- static int gds_tree_check_list_contains_cell (GList *list, struct gds_cell *cell)

  Check if list contains a cell.
- static int gds_tree_check_iterate_ref_and_check (struct gds_cell *cell_to_check, GList **visited_cells)

  This function follows down the reference list of a cell and marks each visited subcell and detects loops.
- int gds_tree_check_reference_loops (struct gds_library *lib)

  gds_tree_check_reference_loops checks if the given library contains reference loops

11.13.1 Detailed Description

11.13.2 Macro Definition Documentation

11.13.2.1 CELL_NAME_MAX

```
#define CELL_NAME_MAX (100)
```

Maximum length of a gds_cell::name or a gds_library::name.

Definition at line 37 of file gds-types.h.

11.13.2.2 GDS_DEFAULT_UNITS

```
#define GDS_DEFAULT_UNITS (10E-9)
```

Default units assumed for library.

Note

This value is usually overwritten with the value defined in the library.

Definition at line 51 of file gds-parser.c.

11.13.2.3 GDS_ERROR

```
#define GDS_ERROR(
              fmt,
              ...  ) printf("[PARSE_ERROR] " fmt "\n", ##__VA_ARGS__)
```

Print GDS error.

Definition at line 53 of file gds-parser.c.

11.13.2.4 GDS_INF

```
#define GDS_INF(
              fmt,
              ...  )
```

Definition at line 60 of file gds-parser.c.

11.13.2.5 GDS_PRINT_DEBUG_INFOS

```
#define GDS_PRINT_DEBUG_INFOS (0)
```

1: Print infos, 0: Don't print

Definition at line 38 of file gds-parser.h.

11.13.2.6 GDS_WARN

```
#define GDS_WARN(
              fmt,
              ...  ) printf("[PARSE_WARNING] " fmt "\n", ##__VA_ARGS__)
```

Print GDS warning.

Definition at line 54 of file gds-parser.c.

11.13.2.7 MAX

```
#define MAX(
              a,
              b ) (((a) > (b)) ?  (a) :  (b))
```

Return bigger number.

Definition at line 41 of file gds-types.h.

11.13.2.8 MIN

```
#define MIN(
              a,
              b ) (((a) < (b)) ?  (a) :  (b))
```

Return smaller number.

Definition at line 40 of file gds-types.h.

11.13.3 Enumeration Type Documentation

11.13.3.1 anonymous enum

```
anonymous enum
```

Defintion of check counter default value that indicates that the corresponding check has not yet been executed.

Enumerator

GDS_CELL_CHECK_NOT_RUN	

Definition at line 45 of file gds-types.h.

11.13.3.2 gds_record

```
enum gds_record
```

Enumerator

INVALID	
HEADER	
BGNLIB	
LIBNAME	
UNITS	
ENDLIB	
BGNSTR	
STRNAME	
ENDSTR	
BOUNDARY	
PATH	
SREF	
ENDEL	
XY	
MAG	

Enumerator

ANGLE	
SNAME	
STRANS	
BOX	
LAYER	
WIDTH	
PATHTYPE	
COLROW	
AREF	

Definition at line 62 of file gds-parser.c.

11.13.3.3 graphics_type

`enum graphics_type`

Types of graphic objects.

Enumerator

GRAPHIC_PATH	Path. Esentially a line.
GRAPHIC_POLYGON	An arbitrary polygon.
GRAPHIC_BOX	A rectangle. **Warning** Implementation in renderers might be buggy!

Definition at line 48 of file gds-types.h.

11.13.3.4 path_type

`enum path_type`

Defines the line caps of a path.

Enumerator

PATH_FLUSH	
PATH_ROUNDED	
PATH_SQUARED	

Definition at line 58 of file gds-types.h.

11.13.4 Function Documentation

11.13.4.1 append_cell()

```
static GList* append_cell (
            GList * curr_list,
            struct gds_cell ** cell_ptr )  [static]
```

append_cell Append a gds_cell to a list

Usage similar to append_cell_ref().

Parameters

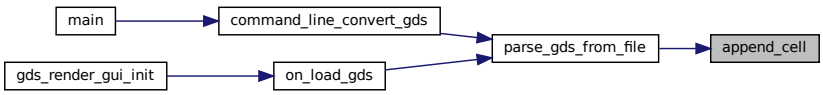
curr_list	List containing gds_cell elements. May be NULL
cell_ptr	newly created cell

Returns

new pointer to list

Definition at line 343 of file gds-parser.c.

Here is the caller graph for this function:



11.13.4.2 append_cell_ref()

```
static GList* append_cell_ref (
            GList * curr_list,
            struct gds_cell_instance ** instance_ptr )  [static]
```

Append a cell reference to the reference GList.

Appends a new gds_cell_instance to `curr_list` and returns the new element via `instance_ptr`

Parameters

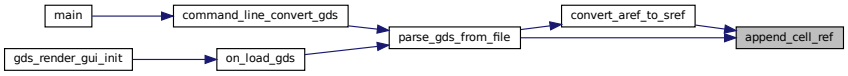
curr_list	List of gds_cell_instance elements. May be NULL
instance_ptr	newly created element

Returns

new GList pointer

Definition at line 372 of file gds-parser.c.

Here is the caller graph for this function:



11.13.4.3 append_library()

```
static GList* append_library (
            GList * curr_list,
            struct gds_library ** library_ptr )  [static]
```

Append library to list.

Parameters

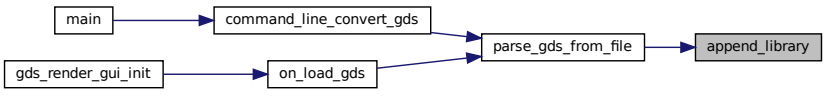
curr_list	List containing gds_library elements. May be NULL.
library_ptr	Return of newly created library.

Returns

Newly created list pointer

Definition at line 268 of file gds-parser.c.

Here is the caller graph for this function:



11.13.4.4 append_vertex()

```
static GList* append_vertex (
            GList * curr_list,
            int x,
            int y )  [static]
```

Appends vertext List.

Parameters

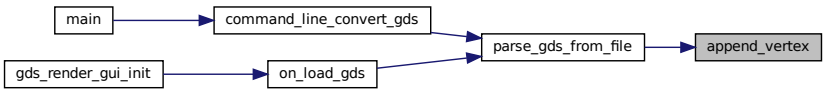
curr_list	List containing gds_point elements. May be NULL.
x	x-coordinate of new point
y	y-coordinate of new point

Returns

new Pointer to List.

Definition at line 322 of file gds-parser.c.

Here is the caller graph for this function:



11.13.4.5 clear_lib_list()

```
int clear_lib_list (
            GList ** library_list )
```

Deletes all libraries including cells, references etc.

Parameters

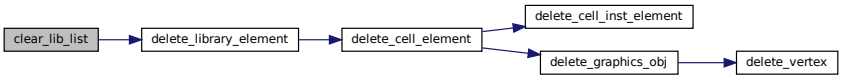
library_list	Pointer to a list of gds_library. Is set to NULL after completion.

Returns

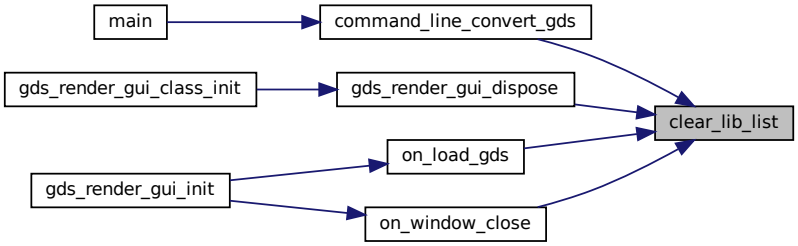
0

Definition at line 1134 of file gds-parser.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.13.4.6 convert_aref_to_sref()

```
static void convert_aref_to_sref (
            struct gds_cell_array_instance * aref,
            struct gds_cell * container_cell )  [static]
```

Convert AREF to a bunch of SREFs and append them to `container_cell`.

This function converts a single array reference (`aref`) to gds_cell_array_instance::rows * gds_cell_array_instance::columns single references (SREFs). See gds_cell_instance.

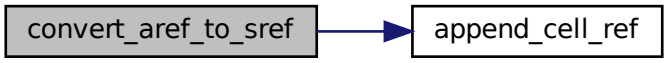
Both gds_cell_array_instance::rows and gds_cell_array_instance::columns must be larger than zero.

Parameters

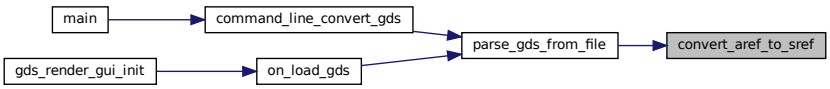
in	*aref*	Array reference to parse
in	*container_cell*	cell to add the converted single references to.

Definition at line 574 of file gds-parser.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.13.4.7 delete_cell_element()

```
static void delete_cell_element (
            struct gds_cell * cell )  [static]
```

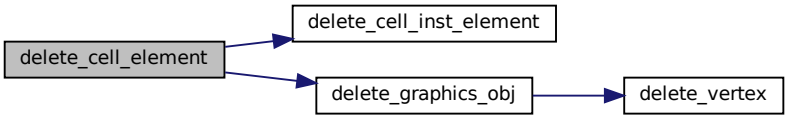
delete_cell_element

Parameters

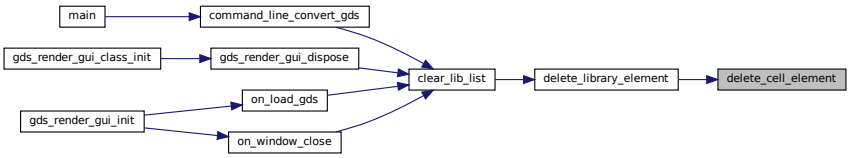
cell	

Definition at line 1110 of file gds-parser.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.13.4.8 delete_cell_inst_element()

```
static void delete_cell_inst_element (
            struct gds_cell_instance * cell_inst )  [static]
```

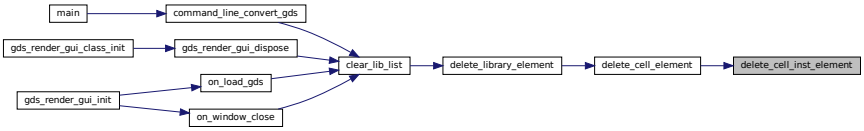
delete_cell_inst_element

Parameters

cell_inst	

Definition at line 1077 of file gds-parser.c.

Here is the caller graph for this function:



11.13.4.9 delete_graphics_obj()

```
static void delete_graphics_obj (
            struct gds_graphics * gfx )  [static]
```

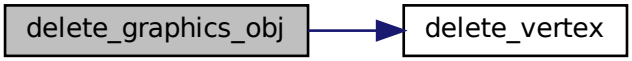
delete_graphics_obj

Parameters

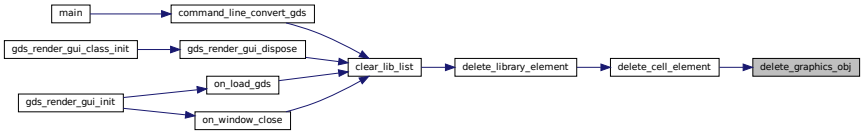
gfx	

Definition at line 1097 of file gds-parser.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.13.4.10 delete_library_element()

```
static void delete_library_element (
            struct gds_library * lib )  [static]
```

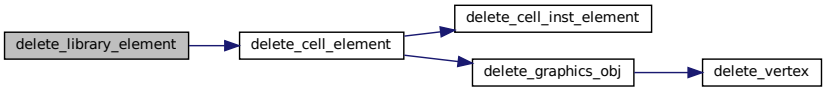
delete_library_element

Parameters

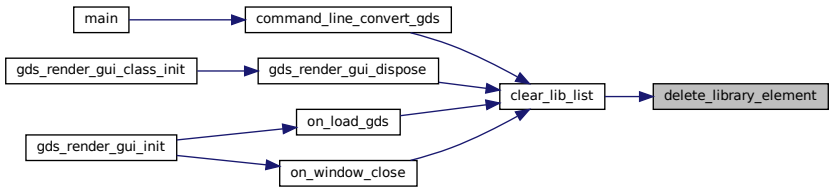
lib	

Definition at line 1124 of file gds-parser.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.13.4.11 delete_vertex()

```
static void delete_vertex (
            struct gds_point * vertex )  [static]
```

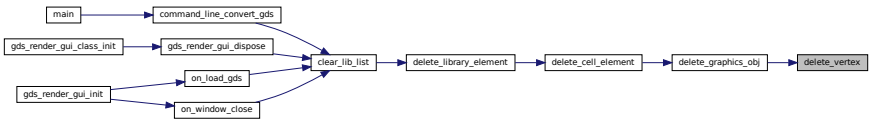
delete_vertex

Parameters

vertex	

Definition at line 1087 of file gds-parser.c.

Here is the caller graph for this function:



11.13.4.12 gds_convert_double()

```
static double gds_convert_double (
            const char * data )  [static]
```

Convert GDS 8-byte real to double.

Parameters

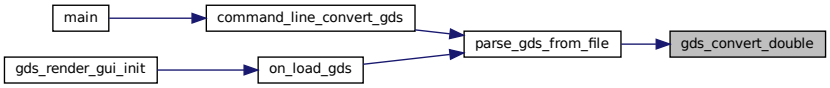
data	8 Byte GDS real

Returns

result

Definition at line 171 of file gds-parser.c.

Here is the caller graph for this function:



11.13.4.13 gds_convert_signed_int()

```
static signed int gds_convert_signed_int (
            const char * data )  [static]
```

Convert GDS INT32 to int.

Parameters

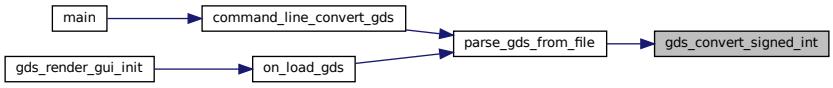
data	Buffer containing the int

Returns

result

Definition at line 216 of file gds-parser.c.

Here is the caller graph for this function:



11.13.4.14 gds_convert_signed_int16()

```
static int16_t gds_convert_signed_int16 (
            const char * data )  [static]
```

Convert GDS INT16 to int16.

Parameters

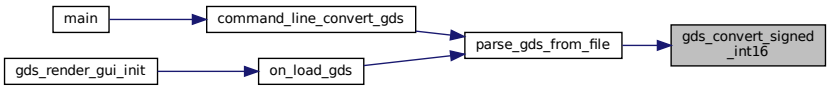
data	Buffer containing the INT16

Returns

result

Definition at line 237 of file gds-parser.c.

Here is the caller graph for this function:



11.13.4.15 gds_convert_unsigned_int16()

```
static uint16_t gds_convert_unsigned_int16 (
            const char * data )  [static]
```

Convert GDS UINT16 String to uint16.

Parameters

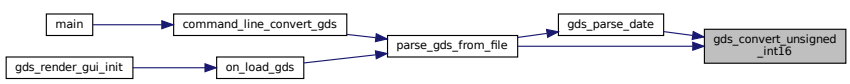
data	Buffer containing the uint16

Returns

result

Definition at line 252 of file gds-parser.c.

Here is the caller graph for this function:



11.13.4.16 gds_parse_date()

```
static void gds_parse_date (
            const char * buffer,
            int length,
            struct gds_time_field * mod_date,
            struct gds_time_field * access_date )  [static]
```

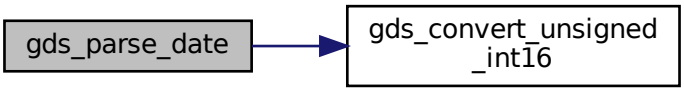
gds_parse_date

Parameters

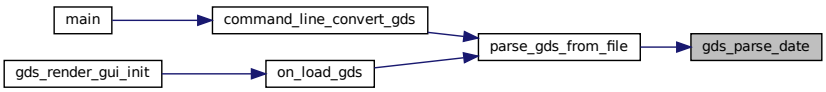
buffer	Buffer that contains the GDS Date field
length	Length of `buffer`
mod_date	Modification Date
access_date	Last Access Date

Definition at line 529 of file gds-parser.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.13.4.17 gds_tree_check_cell_references()

```
int gds_tree_check_cell_references (
            struct gds_library * lib )
```

gds_tree_check_cell_references checks if all child cell references can be resolved in the given library

This function will only mark cells that directly contain unresolved references.

If a cell contains a reference to a cell with unresolved references, it is not flagged.

Parameters

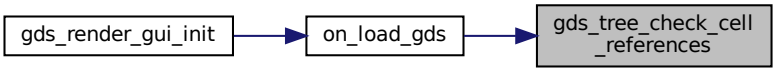
lib	The GDS library to check

Returns

less than 0 if an error occured during processing; 0 if all child cells could be resolved; greater than zero if the processing was successful but not all cell references could be resolved. In this case the number of unresolved references is returned

Definition at line 40 of file gds-tree-checker.c.

Here is the caller graph for this function:



11.13.4.18 gds_tree_check_iterate_ref_and_check()

```
static int gds_tree_check_iterate_ref_and_check (
             struct gds_cell * cell_to_check,
             GList ** visited_cells )  [static]
```

This function follows down the reference list of a cell and marks each visited subcell and detects loops.

Parameters

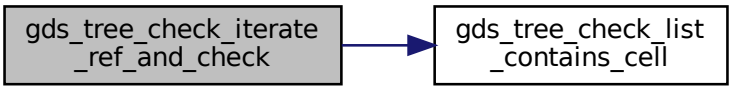
cell_to_check	The cell to check for reference loops
visited_cells	Pointer to list head. May be zero.

Returns

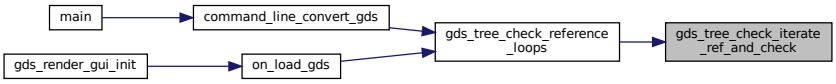
0 if no loops exist; error in processing: <0; loop found: >0

Definition at line 111 of file gds-tree-checker.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.13.4.19 gds_tree_check_list_contains_cell()

```
static int gds_tree_check_list_contains_cell (
            GList * list,
            struct gds_cell * cell )  [static]
```

Check if list contains a cell.

Parameters

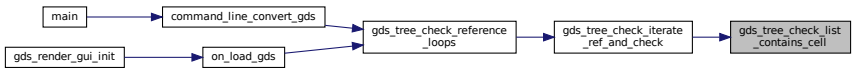
list	GList to check. May be a null pointer
cell	Cell to check for

Returns

0 if cell is not in list. 1 if cell is in list

Definition at line 93 of file gds-tree-checker.c.

Here is the caller graph for this function:



11.13.4.20 gds_tree_check_reference_loops()

```
int gds_tree_check_reference_loops (
            struct gds_library * lib )
```

gds_tree_check_reference_loops checks if the given library contains reference loops

Parameters

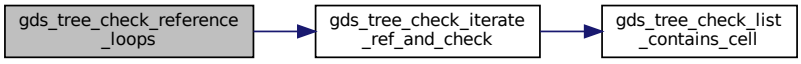
lib	GDS library

Returns

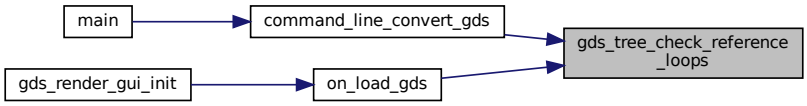
negative if an error occured, zero if there are no reference loops, else a positive number representing the number of affected cells

Definition at line 158 of file gds-tree-checker.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.13.4.21 name_array_cell_ref()

```
static int name_array_cell_ref (
            struct gds_cell_array_instance * cell_inst,
            unsigned int bytes,
            char * data )  [static]
```

Name cell reference.

Parameters

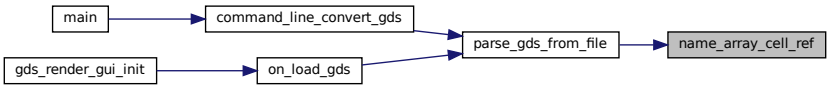
cell_inst	Cell reference
bytes	Length of name
data	Name

Returns

0 if successful

Definition at line 143 of file gds-parser.c.

Here is the caller graph for this function:



11.13.4.22 name_cell()

```
static int name_cell (
             struct gds_cell * cell,
             unsigned int bytes,
             char * data,
             struct gds_library * lib )  [static]
```

Names a gds_cell.

Parameters

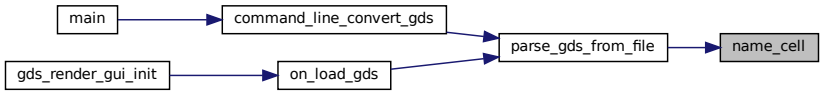
cell	Cell to name
bytes	Length of name
data	Name
lib	Library in which `cell` is located

Returns

0 id successful

Definition at line 431 of file gds-parser.c.

Here is the caller graph for this function:



11.13.4.23 name_cell_ref()

```
static int name_cell_ref (
            struct gds_cell_instance * cell_inst,
            unsigned int bytes,
            char * data )  [static]
```

Name cell reference.

Parameters

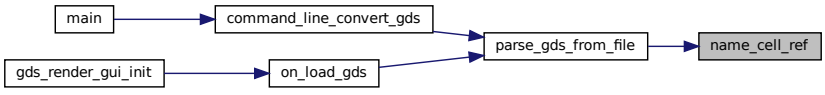
cell_inst	Cell reference
bytes	Length of name
data	Name

Returns

0 if successful

Definition at line 113 of file gds-parser.c.

Here is the caller graph for this function:



11.13.4.24 name_library()

```
static int name_library (
            struct gds_library * current_library,
            unsigned int bytes,
            char * data )  [static]
```

Name a gds_library.

Parameters

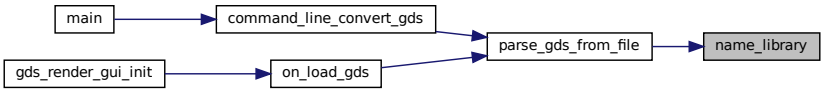
current_library	Library to name
bytes	Lenght of name
data	Name

Returns

0 if successful

Definition at line 400 of file gds-parser.c.

Here is the caller graph for this function:



11.13.4.25 parse_gds_from_file()

```
int parse_gds_from_file (
            const char * filename,
            GList ** library_array )
```

Parse a GDS file.

This function parses a GDS File and creates a list of libraries, which then contain the different cells.

The function appends The detected libraries to the `library_array` list. The library array may be empty, meaning ∗library_list may be NULL.

Parameters

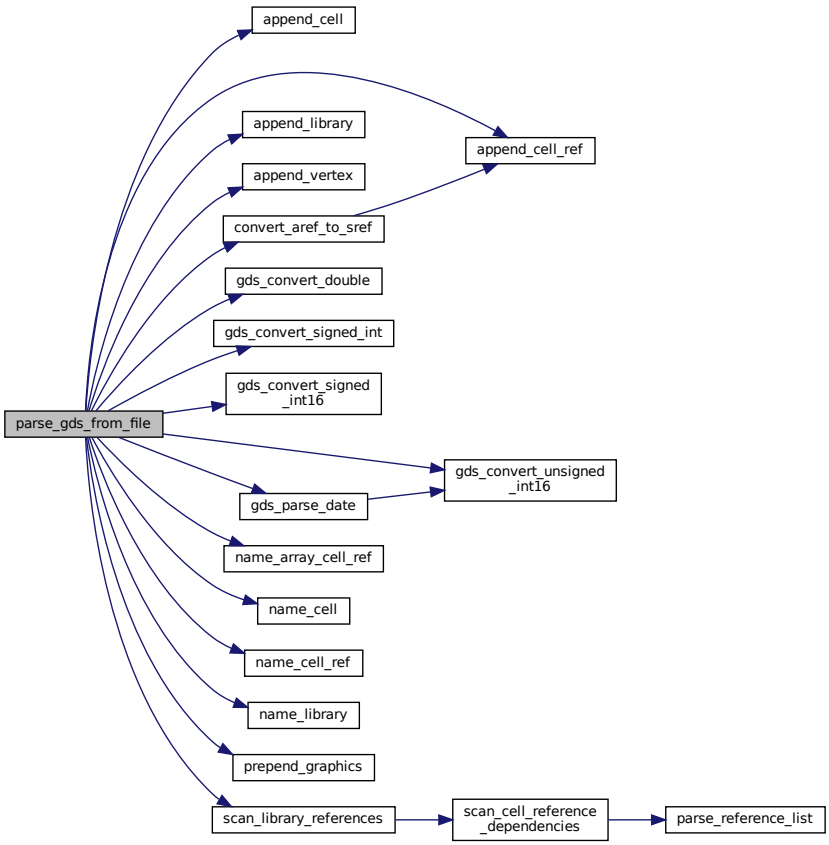
`in`	*filename*	Path to the GDS file
`in,out`	*library_array*	GList Pointer.

Returns

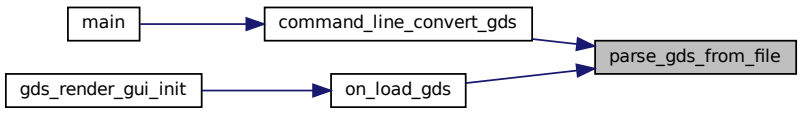
0 if successful

Definition at line 619 of file gds-parser.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.13.4.26 parse_reference_list()

```
static void parse_reference_list (
            gpointer gcell_ref,
            gpointer glibrary )  [static]
```

Search for cell reference `gcell_ref` in `glibrary`.

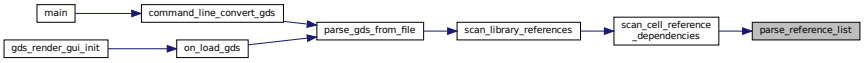
Search cell referenced by `gcell_ref` inside `glibrary` and update gds_cell_instance::cell_ref with found gds_cell

Parameters

gcell_ref	gpointer cast of struct gds_cell_instance *
glibrary	gpointer cast of struct gds_library *

Definition at line 463 of file gds-parser.c.

Here is the caller graph for this function:



11.13.4.27 prepend_graphics()

```
static GList* prepend_graphics (
            GList * curr_list,
            enum graphics_type type,
            struct gds_graphics ** graphics_ptr )  [static]
```

Prepend graphics to list.

Parameters

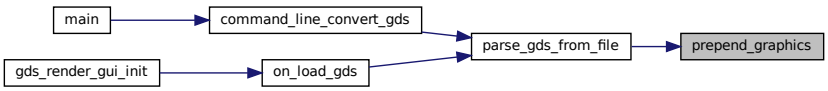
curr_list	List containing gds_graphics elements. May be NULL
type	Type of graphics
graphics_ptr	newly created graphic is written here

Returns

new list pointer

Definition at line 293 of file gds-parser.c.

Here is the caller graph for this function:



11.13.4.28 scan_cell_reference_dependencies()

```
static void scan_cell_reference_dependencies (
            gpointer gcell,
            gpointer library )  [static]
```

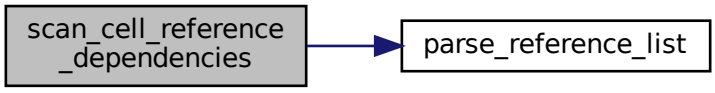
Scans cell references inside cell This function searches all the references in `gcell` and updates the gds_cell_instance::cell_ref field in each instance.

Parameters

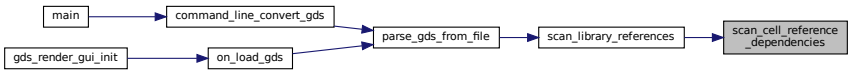
gcell	pointer cast of gds_cell *
library	Library where the cell references are searched in

Definition at line 495 of file gds-parser.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.13.4.29 scan_library_references()

```
static void scan_library_references (
            gpointer library_list_item,
            gpointer user )  [static]
```

Scans library's cell references.

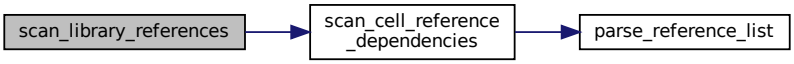
This function searches all the references between cells and updates the gds_cell_instance::cell_ref field in each instance

Parameters

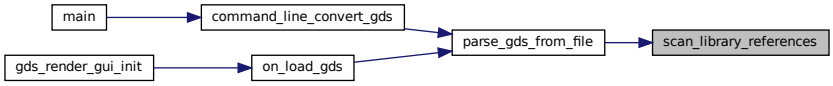
library_list_item	List containing gds_library elements
user	not used

Definition at line 513 of file gds-parser.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.14 Version Number

See Git Based Version Number.

Variables

- const char * _app_version_string
  This string holds the Git Based Version Number of the app.
- const char * _app_git_commit
  This string holds the git commit hash of the current HEAD revision.
- const char * _app_version_string = "! version not set !"
  This string holds the Git Based Version Number of the app.
- const char * _app_git_commit = "! Commit hash not available !"
  This string holds the git commit hash of the current HEAD revision.

11.14.1 Detailed Description

See Git Based Version Number.

11.14.2 Variable Documentation

11.14.2.1 _app_git_commit [1/2]

```
const char* _app_git_commit
```

This string holds the git commit hash of the current HEAD revision.

Definition at line 40 of file version.c.

11.14.2.2 _app_git_commit [2/2]

```
const char* _app_git_commit = "!  Commit hash not available !"
```

This string holds the git commit hash of the current HEAD revision.

Definition at line 40 of file version.c.

11.14.2.3 _app_version_string [1/2]

```
const char* _app_version_string
```

This string holds the Git Based Version Number of the app.

Definition at line 32 of file version.c.

11.14.2.4 _app_version_string [2/2]

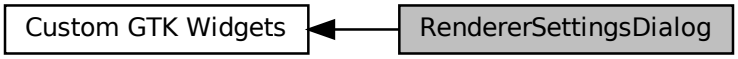
```
const char* _app_version_string = "!  version not set !"
```

This string holds the Git Based Version Number of the app.

Definition at line 32 of file version.c.

11.15 RendererSettingsDialog

Collaboration diagram for RendererSettingsDialog:



Data Structures

- struct render_settings

  This struct holds the renderer configuration.
- struct _RendererSettingsDialog

Macros

- #define RENDERER_TYPE_SETTINGS_DIALOG (renderer_settings_dialog_get_type())

Enumerations

- enum output_renderer { RENDERER_LATEX_TIKZ, RENDERER_CAIROGRAPHICS_PDF, RENDERER_CAIROGRAPHICS_ }

  return type of the RedererSettingsDialog
- enum { PROP_CELL_NAME = 1, PROP_COUNT }

Functions

- RendererSettingsDialog * renderer_settings_dialog_new (GtkWindow *parent)

  Create a new RedererSettingsDialog GObject.
- G_END_DECLS void renderer_settings_dialog_set_settings (RendererSettingsDialog *dialog, struct render_settings *settings)

  Apply settings to dialog.
- void renderer_settings_dialog_get_settings (RendererSettingsDialog *dialog, struct render_settings *settings)

  Get the settings configured in the dialog.
- void renderer_settings_dialog_set_cell_width (RendererSettingsDialog *dialog, unsigned int width)

  renderer_settings_dialog_set_cell_width Set width for rendered cell
- void renderer_settings_dialog_set_cell_height (RendererSettingsDialog *dialog, unsigned int height)

  renderer_settings_dialog_set_cell_height Set height for rendered cell
- void renderer_settings_dialog_set_database_unit_scale (RendererSettingsDialog *dialog, double unit_in_↩ meters)

  renderer_settings_dialog_set_database_unit_scale Set database scale
- static void renderer_settings_dialog_set_property (GObject *object, guint property_id, const GValue *value, GParamSpec *pspec)

- static void renderer_settings_dialog_get_property (GObject *object, guint property_id, GValue *value, G↩ ParamSpec *pspec)
- static void renderer_settings_dialog_class_init (RendererSettingsDialogClass *klass)
- static void show_tex_options (RendererSettingsDialog *self)
- static void hide_tex_options (RendererSettingsDialog *self)
- static void latex_render_callback (GtkToggleButton *radio, RendererSettingsDialog *dialog)
- static gboolean shape_drawer_drawing_callback (GtkWidget *widget, cairo_t *cr, gpointer data)
- static double convert_number_to_engineering (double input, const char **out_prefix)
- static void renderer_settings_dialog_update_labels (RendererSettingsDialog *self)
- static void scale_value_changed (GtkRange *range, gpointer user_data)
- static void renderer_settings_dialog_init (RendererSettingsDialog *self)

Variables

- static GParamSpec * properties [PROP_COUNT]

11.15.1 Detailed Description

11.15.2 Macro Definition Documentation

11.15.2.1 RENDERER_TYPE_SETTINGS_DIALOG

```
#define RENDERER_TYPE_SETTINGS_DIALOG (renderer_settings_dialog_get_type())
```

Definition at line 51 of file conv-settings-dialog.h.

11.15.3 Enumeration Type Documentation

11.15.3.1 anonymous enum

```
anonymous enum
```

Enumerator

PROP_CELL_NAME	
PROP_COUNT	

Definition at line 58 of file conv-settings-dialog.c.

11.15.3.2 output_renderer

```
enum output_renderer
```

return type of the RedererSettingsDialog

Enumerator

RENDERER_LATEX_TIKZ	
RENDERER_CAIROGRAPHICS_PDF	
RENDERER_CAIROGRAPHICS_SVG	

Definition at line 40 of file conv-settings-dialog.h.

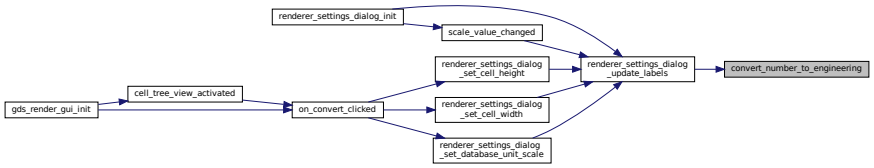
11.15.4 Function Documentation

11.15.4.1 convert_number_to_engineering()

```
static double convert_number_to_engineering (
            double input,
            const char ** out_prefix )  [static]
```

Definition at line 185 of file conv-settings-dialog.c.

Here is the caller graph for this function:

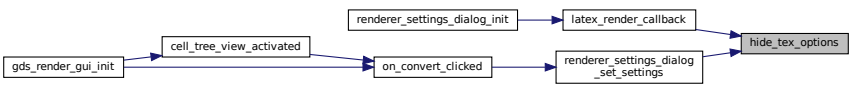


11.15.4.2 hide_tex_options()

```
static void hide_tex_options (
            RendererSettingsDialog * self )  [static]
```

Definition at line 121 of file conv-settings-dialog.c.

Here is the caller graph for this function:

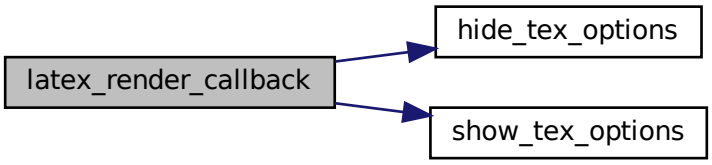


11.15.4.3 latex_render_callback()

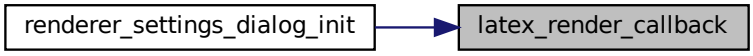
```
static void latex_render_callback (
            GtkToggleButton * radio,
            RendererSettingsDialog * dialog )  [static]
```

Definition at line 127 of file conv-settings-dialog.c.

Here is the call graph for this function:



Here is the caller graph for this function:

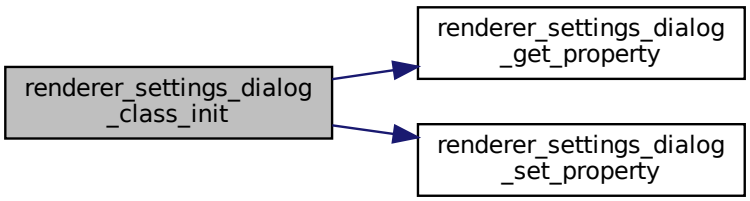


11.15.4.4 renderer_settings_dialog_class_init()

```
static void renderer_settings_dialog_class_init (
            RendererSettingsDialogClass * klass )  [static]
```

Definition at line 98 of file conv-settings-dialog.c.

Here is the call graph for this function:

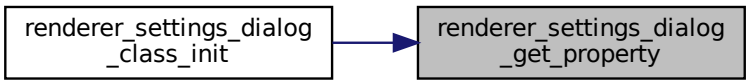


11.15.4.5 renderer_settings_dialog_get_property()

```
static void renderer_settings_dialog_get_property (
            GObject * object,
            guint property_id,
            GValue * value,
            GParamSpec * pspec )  [static]
```

Definition at line 82 of file conv-settings-dialog.c.

Here is the caller graph for this function:



11.15.4.6 renderer_settings_dialog_get_settings()

```
void renderer_settings_dialog_get_settings (
            RendererSettingsDialog * dialog,
            struct render_settings * settings )
```

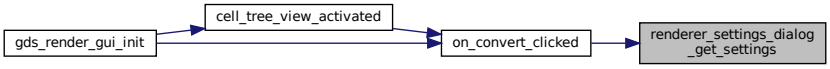
Get the settings configured in the dialog.

Parameters

dialog	
settings	

Definition at line 321 of file conv-settings-dialog.c.

Here is the caller graph for this function:

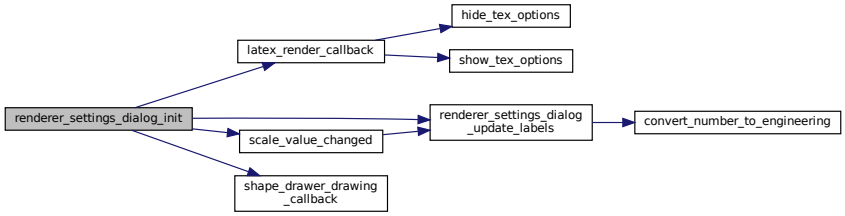


11.15.4.7 renderer_settings_dialog_init()

```
static void renderer_settings_dialog_init (
            RendererSettingsDialog * self )  [static]
```

Definition at line 269 of file conv-settings-dialog.c.

Here is the call graph for this function:



11.15.4.8 renderer_settings_dialog_new()

```
RendererSettingsDialog * renderer_settings_dialog_new (
            GtkWindow * parent )
```

Create a new RedererSettingsDialog GObject.

Parameters

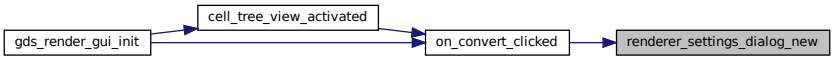
parent	Parent window

Returns

Created dialog object

Definition at line 310 of file conv-settings-dialog.c.

Here is the caller graph for this function:



11.15.4.9 renderer_settings_dialog_set_cell_height()

```
void renderer_settings_dialog_set_cell_height (
            RendererSettingsDialog * dialog,
            unsigned int height )
```

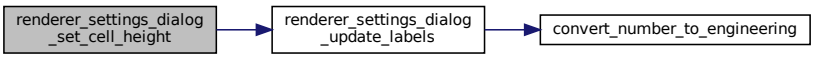
renderer_settings_dialog_set_cell_height Set height for rendered cell

Parameters

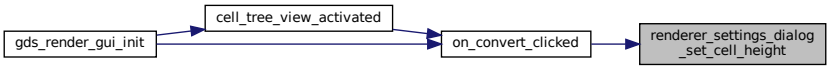
dialog	
height	Height in database units

Definition at line 377 of file conv-settings-dialog.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.15.4.10 renderer_settings_dialog_set_cell_width()

```
void renderer_settings_dialog_set_cell_width (
            RendererSettingsDialog * dialog,
            unsigned int width )
```

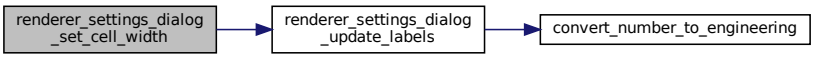
renderer_settings_dialog_set_cell_width Set width for rendered cell

Parameters

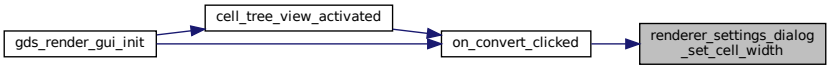
dialog	
width	Width in database units

Definition at line 365 of file conv-settings-dialog.c.

Here is the call graph for this function:



Here is the caller graph for this function:



11.15.4.11 renderer_settings_dialog_set_database_unit_scale()

```
void renderer_settings_dialog_set_database_unit_scale (
            RendererSettingsDialog * dialog,
            double unit_in_meters )
```

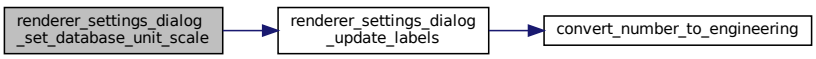
renderer_settings_dialog_set_database_unit_scale Set database scale

Parameters

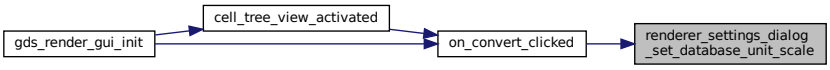
dialog	dialog element
unit_in_meters	Database unit in meters

Definition at line 389 of file conv-settings-dialog.c.

Here is the call graph for this function:



Here is the caller graph for this function:

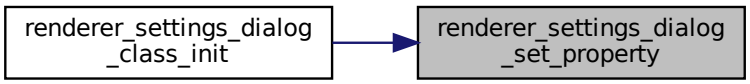


11.15.4.12 renderer_settings_dialog_set_property()

```
static void renderer_settings_dialog_set_property (
            GObject * object,
            guint property_id,
            const GValue * value,
            GParamSpec * pspec )  [static]
```

Definition at line 65 of file conv-settings-dialog.c.

Here is the caller graph for this function:



11.15.4.13 renderer_settings_dialog_set_settings()

```
void renderer_settings_dialog_set_settings (
            RendererSettingsDialog * dialog,
            struct render_settings * settings )
```

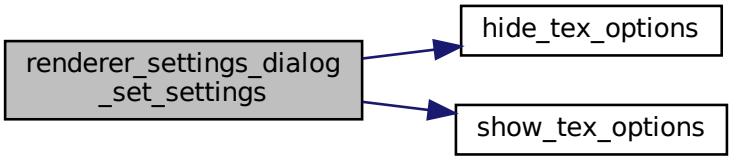
Apply settings to dialog.

Parameters

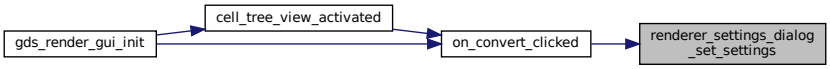
dialog	
settings	

Definition at line 340 of file conv-settings-dialog.c.

Here is the call graph for this function:



Here is the caller graph for this function:

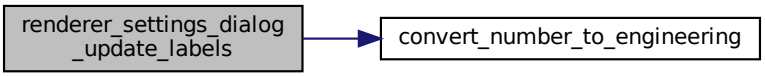


11.15.4.14 renderer_settings_dialog_update_labels()

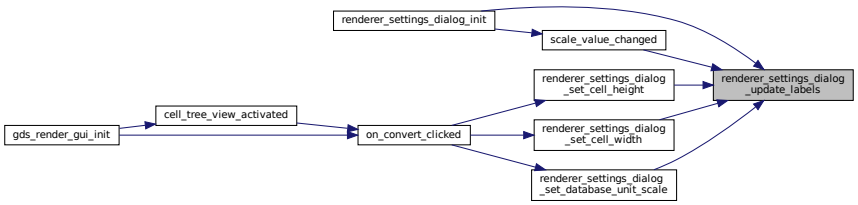
```
static void renderer_settings_dialog_update_labels (
            RendererSettingsDialog * self )  [static]
```

Definition at line 224 of file conv-settings-dialog.c.

Here is the call graph for this function:



Here is the caller graph for this function:

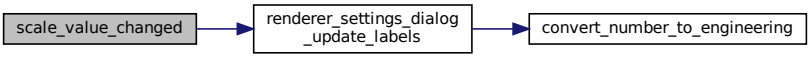


11.15.4.15 scale_value_changed()

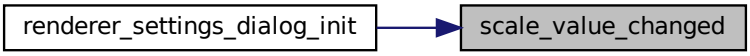
```
static void scale_value_changed (
            GtkRange * range,
            gpointer user_data )  [static]
```

Definition at line 260 of file conv-settings-dialog.c.

Here is the call graph for this function:



Here is the caller graph for this function:

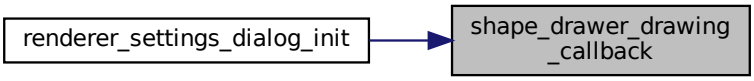


11.15.4.16 shape_drawer_drawing_callback()

```
static gboolean shape_drawer_drawing_callback (
            GtkWidget * widget,
            cairo_t * cr,
            gpointer data )  [static]
```

Definition at line 135 of file conv-settings-dialog.c.

Here is the caller graph for this function:

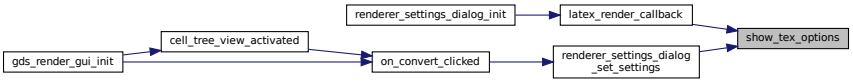


11.15.4.17 show_tex_options()

```
static void show_tex_options (
            RendererSettingsDialog * self )  [static]
```

Definition at line 114 of file conv-settings-dialog.c.

Here is the caller graph for this function:



11.15.5 Variable Documentation

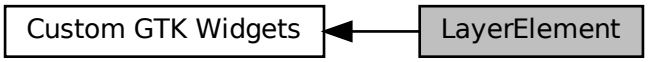
11.15.5.1 properties

```
GParamSpec* properties[PROP_COUNT]  [static]
```

Definition at line 63 of file conv-settings-dialog.c.

11.16 LayerElement

Collaboration diagram for LayerElement:



Data Structures

- struct _LayerElementPriv
- struct _LayerElement
- struct layer_element_dnd_data

  This structure holds the necessary data to set up a LayerElement for Drag'n'Drop.

Macros

- #define TYPE_LAYER_ELEMENT (layer_element_get_type())

Typedefs

- typedef struct _LayerElementPriv LayerElementPriv

Functions

- GtkWidget * layer_element_new (void)

  Create new layer element object.
- const char * layer_element_get_name (LayerElement *elem)

  get name of the layer
- void layer_element_set_name (LayerElement *elem, const char *name)

  layer_element_set_name
- void layer_element_set_layer (LayerElement *elem, int layer)

  Set layer number for this layer.
- int layer_element_get_layer (LayerElement *elem)

  Get layer number.
- void layer_element_set_export (LayerElement *elem, gboolean export)

  Set export flag for this layer.
- gboolean layer_element_get_export (LayerElement *elem)

  Get export flag of layer.
- void layer_element_get_color (LayerElement *elem, GdkRGBA *rgba)

  Get color of layer.
- void layer_element_set_color (LayerElement *elem, GdkRGBA *rgba)

  Set color of layer.
- void layer_element_set_dnd_callbacks (LayerElement *elem, struct layer_element_dnd_data *data)

  Setup drag and drop of `elem` for use in the LayerSelector.
- static void layer_element_dispose (GObject *obj)
- static void layer_element_constructed (GObject *obj)
- static void layer_element_class_init (LayerElementClass *klass)
- static void layer_element_init (LayerElement *self)

11.16.1 Detailed Description

11.16.2 Macro Definition Documentation

11.16.2.1 TYPE_LAYER_ELEMENT

```
#define TYPE_LAYER_ELEMENT (layer_element_get_type())
```

Definition at line 42 of file layer-element.h.

11.16.3 Typedef Documentation

11.16.3.1 LayerElementPriv

```
typedef struct _LayerElementPriv LayerElementPriv
```

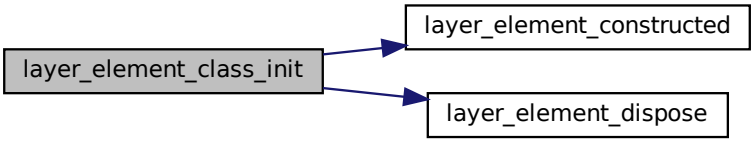
11.16.4 Function Documentation

11.16.4.1 layer_element_class_init()

```
static void layer_element_class_init (
            LayerElementClass * klass )  [static]
```

Definition at line 55 of file layer-element.c.

Here is the call graph for this function:



11.16.4.2 layer_element_constructed()

```
static void layer_element_constructed (
            GObject * obj )  [static]
```

Definition at line 50 of file layer-element.c.

Here is the caller graph for this function:

11.16.4.3 layer_element_dispose()

```
static void layer_element_dispose (
            GObject * obj )  [static]
```

Definition at line 44 of file layer-element.c.

Here is the caller graph for this function:

11.16.4.4 layer_element_get_color()

```
void layer_element_get_color (
            LayerElement * elem,
            GdkRGBA * rgba )
```

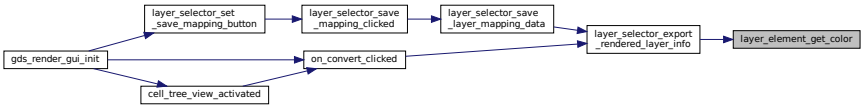
Get color of layer.

Parameters

elem	Layer Element
rgba	RGBA color

Definition at line 123 of file layer-element.c.

Here is the caller graph for this function:



11.16.4.5 layer_element_get_export()

```
gboolean layer_element_get_export (
            LayerElement * elem )
```

Get export flag of layer.

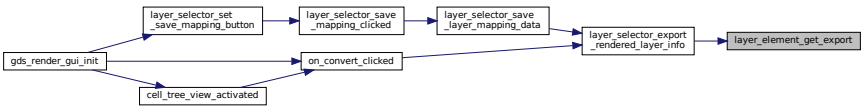
Parameters

elem	Layer Element

Returns

Definition at line 118 of file layer-element.c.

Here is the caller graph for this function:



11.16.4.6 layer_element_get_layer()

```
int layer_element_get_layer (
            LayerElement * elem )
```

Get layer number.

Parameters

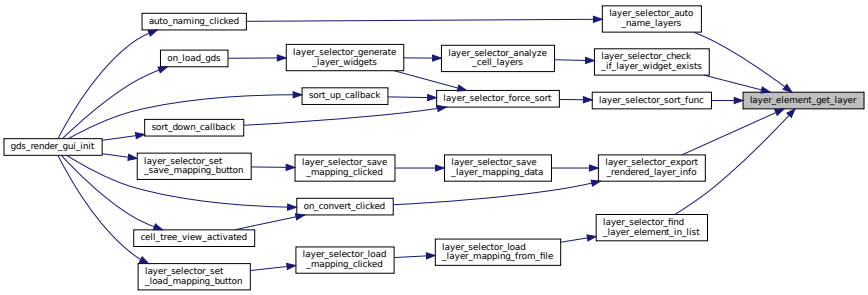
elem	Layer Element

Returns

Number of this layer

Definition at line 108 of file layer-element.c.

Here is the caller graph for this function:



11.16.4.7 layer_element_get_name()

```
const char * layer_element_get_name (
            LayerElement * elem )
```

get name of the layer

Parameters

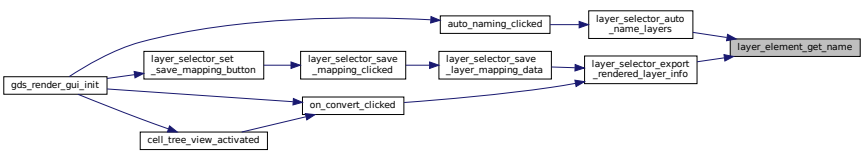
elem	Layer element

Returns

Name. Must not be changed, freed or anything else.

Definition at line 87 of file layer-element.c.

Here is the caller graph for this function:



11.16.4.8 layer_element_init()

```
static void layer_element_init (
            LayerElement * self )  [static]
```

Definition at line 63 of file layer-element.c.

11.16.4.9 layer_element_new()

```
GtkWidget * layer_element_new (
            void  )
```

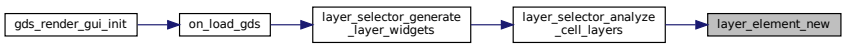
Create new layer element object.

Returns

new object

Definition at line 82 of file layer-element.c.

Here is the caller graph for this function:



11.16.4.10 layer_element_set_color()

```
void layer_element_set_color (
            LayerElement * elem,
            GdkRGBA * rgba )
```

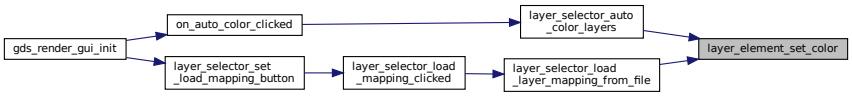
Set color of layer.

Parameters

elem	Layer Element
rgba	RGBA color

Definition at line 131 of file layer-element.c.

Here is the caller graph for this function:



11.16.4.11 layer_element_set_dnd_callbacks()

```
void layer_element_set_dnd_callbacks (
            LayerElement * elem,
            struct layer_element_dnd_data * data )
```

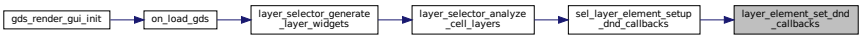
Setup drag and drop of `elem` for use in the LayerSelector.

Parameters

elem	Layer element to set up
data	Data array containing the necessary callbacks etc. for drag and drop.

Definition at line 139 of file layer-element.c.

Here is the caller graph for this function:



11.16.4.12 layer_element_set_export()

```
void layer_element_set_export (
            LayerElement * elem,
            gboolean export )
```

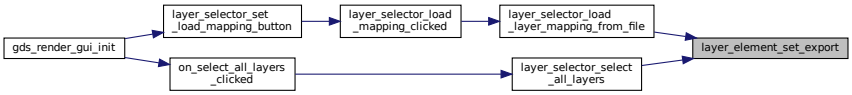
Set export flag for this layer.

Parameters

elem	Layer Element
export	flag

Definition at line 113 of file layer-element.c.

Here is the caller graph for this function:



11.16.4.13 layer_element_set_layer()

```
void layer_element_set_layer (
            LayerElement * elem,
            int layer )
```

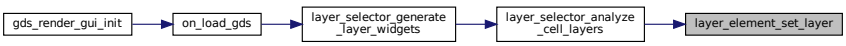
Set layer number for this layer.

Parameters

elem	Layer element
layer	Layer number

Definition at line 97 of file layer-element.c.

Here is the caller graph for this function:



11.16.4.14 layer_element_set_name()

```
void layer_element_set_name (
            LayerElement * elem,
            const char * name )
```

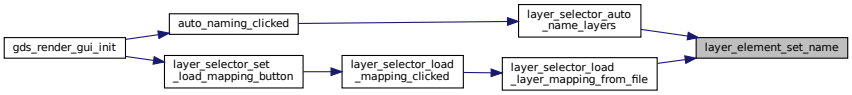
layer_element_set_name

Parameters

elem	set the name of the layer
name	Name. Can be freed after call to this function

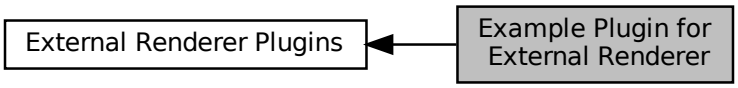
Definition at line 92 of file layer-element.c.

Here is the caller graph for this function:



11.17 Example Plugin for External Renderer

Collaboration diagram for Example Plugin for External Renderer:



Functions

- int EXPORTED_FUNC_DECL() EXTERNAL_LIBRARY_RENDER_FUNCTION (struct gds_cell ∗toplevel, GList ∗layer_info_list, const char ∗output_file_name, double scale)
- int EXPORTED_FUNC_DECL() EXTERNAL_LIBRARY_INIT_FUNCTION (const char ∗params, const char ∗version)

11.17.1 Detailed Description

This is a template / example for an external renderer plugin

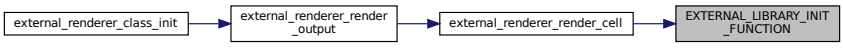
11.17.2 Function Documentation

11.17.2.1 EXTERNAL_LIBRARY_INIT_FUNCTION()

```
int EXPORTED_FUNC_DECL() EXTERNAL_LIBRARY_INIT_FUNCTION (
            const char * params,
            const char * version )
```

Definition at line 43 of file plugin-main.c.

Here is the caller graph for this function:



11.17.2.2 EXTERNAL_LIBRARY_RENDER_FUNCTION()

```
int EXPORTED_FUNC_DECL() EXTERNAL_LIBRARY_RENDER_FUNCTION (
            struct gds_cell * toplevel,
            GList * layer_info_list,
            const char * output_file_name,
            double scale )
```

Definition at line 34 of file plugin-main.c.

Here is the caller graph for this function:

Chapter 12

Data Structure Documentation

12.1 _ActivityBar Struct Reference

Opaque ActivityBar object. Not viewable outside this source file.

Data Fields

- GtkBox super
- GtkWidget * spinner
- GtkWidget * label

12.1.1 Detailed Description

Opaque ActivityBar object. Not viewable outside this source file.

Definition at line 43 of file activity-bar.c.

12.1.2 Field Documentation

12.1.2.1 label

```
GtkWidget* label
```

Definition at line 47 of file activity-bar.c.

12.1.2.2 spinner

```
GtkWidget* spinner
```

Definition at line 46 of file activity-bar.c.

12.1.2.3 super

```
GtkBox super
```

Definition at line 44 of file activity-bar.c.

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

- activity-bar.c

12.2 _CairoRenderer Struct Reference

Data Fields

- GdsOutputRenderer parent
- gboolean svg

  TRUE: SVG output, FALSE: PDF output.

12.2.1 Detailed Description

Definition at line 40 of file cairo-renderer.c.

12.2.2 Field Documentation

12.2.2.1 parent

```
GdsOutputRenderer parent
```

Definition at line 41 of file cairo-renderer.c.

12.2.2.2 svg

```
gboolean svg
```

TRUE: SVG output, FALSE: PDF output.

Definition at line 42 of file cairo-renderer.c.

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

- cairo-renderer.c

12.3 gds_cell_checks::_check_internals Struct Reference

For the internal use of the checker.

```
#include <gds-types.h>
```

Data Fields

- int marker

12.3.1 Detailed Description

For the internal use of the checker.

Warning

Do not use this structure and its contents!

Definition at line 78 of file gds-types.h.

12.3.2 Field Documentation

12.3.2.1 marker

```
int marker
```

Definition at line 79 of file gds-types.h.

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

- gds-types.h

12.4 _ColorPalette Struct Reference

Data Fields

- GObject parent
- GdkRGBA * color_array

  The internal array to store the colors.
- unsigned int color_array_length

  The length of the _ColorPalette::color_array array.
- gpointer dummy [4]

12.4.1 Detailed Description

Definition at line 28 of file color-palette.c.

12.4.2 Field Documentation

12.4.2.1 color_array

```
GdkRGBA* color_array
```

The internal array to store the colors.

Definition at line 34 of file color-palette.c.

12.4.2.2 color_array_length

```
unsigned int color_array_length
```

The length of the _ColorPalette::color_array array.

Definition at line 36 of file color-palette.c.

12.4.2.3 dummy

```
gpointer dummy[4]
```

Definition at line 39 of file color-palette.c.

12.4.2.4 parent

```
GObject parent
```

Definition at line 30 of file color-palette.c.

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

- color-palette.c

12.5 _ExternalRenderer Struct Reference

Data Fields

- GdsOutputRenderer parent
- char * shared_object_path
- char * cli_param_string

12.5.1 Detailed Description

Definition at line 41 of file external-renderer.c.

12.5.2 Field Documentation

12.5.2.1 cli_param_string

```
char* cli_param_string
```

Definition at line 44 of file external-renderer.c.

12.5.2.2 parent

```
GdsOutputRenderer parent
```

Definition at line 42 of file external-renderer.c.

12.5.2.3 shared_object_path

```
char* shared_object_path
```

Definition at line 43 of file external-renderer.c.

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

- external-renderer.c

12.6 _GdsOutputRendererClass Struct Reference

Base output renderer class structure.

```
#include <gds-output-renderer.h>
```

Data Fields

- GObjectClass parent_class
- int(* render_output)(GdsOutputRenderer *renderer, struct gds_cell *cell, double scale)

  Virtual render output function. Overwritten by final class implementation.
- gpointer padding [4]

12.6.1 Detailed Description

Base output renderer class structure.

Note

This structure is only used for internal inheritance of GObjects. Do not use in code outside of these classes.

Definition at line 49 of file gds-output-renderer.h.

12.6.2 Field Documentation

12.6.2.1 padding

```
gpointer padding[4]
```

Definition at line 58 of file gds-output-renderer.h.

12.6.2.2 parent_class

```
GObjectClass parent_class
```

Definition at line 50 of file gds-output-renderer.h.

12.6.2.3 render_output

```
int(* render_output) (GdsOutputRenderer *renderer, struct gds_cell *cell, double scale)
```

Virtual render output function. Overwritten by final class implementation.

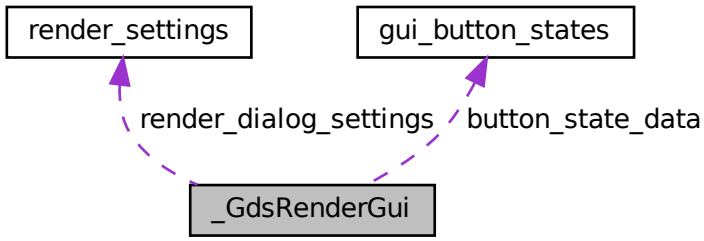
Definition at line 55 of file gds-output-renderer.h.

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

- gds-output-renderer.h

12.7 _GdsRenderGui Struct Reference

Collaboration diagram for _GdsRenderGui:



Data Fields

- GObject parent
- GtkWindow * main_window
- GtkWidget * convert_button
- GtkWidget * open_button
- GtkWidget * load_layer_button
- GtkWidget * save_layer_button
- GtkWidget * select_all_button
- GtkTreeStore * cell_tree_store
- GtkTreeModelFilter * cell_filter
- GtkWidget * cell_search_entry
- LayerSelector * layer_selector
- GtkTreeView * cell_tree_view
- GList * gds_libraries
- ActivityBar * activity_status_bar
- struct render_settings render_dialog_settings
- ColorPalette * palette
- struct gui_button_states button_state_data

12.7.1 Detailed Description

Definition at line 63 of file gds-render-gui.c.

12.7.2 Field Documentation

12.7.2.1 activity_status_bar

```
ActivityBar* activity_status_bar
```

Definition at line 80 of file gds-render-gui.c.

12.7.2.2 button_state_data

```
struct gui_button_states button_state_data
```

Definition at line 83 of file gds-render-gui.c.

12.7.2.3 cell_filter

```
GtkTreeModelFilter* cell_filter
```

Definition at line 75 of file gds-render-gui.c.

12.7.2.4 cell_search_entry

```
GtkWidget* cell_search_entry
```

Definition at line 76 of file gds-render-gui.c.

12.7.2.5 cell_tree_store

```
GtkTreeStore* cell_tree_store
```

Definition at line 74 of file gds-render-gui.c.

12.7.2.6 cell_tree_view

```
GtkTreeView* cell_tree_view
```

Definition at line 78 of file gds-render-gui.c.

12.7.2.7 convert_button

```
GtkWidget* convert_button
```

Definition at line 69 of file gds-render-gui.c.

12.7.2.8 gds_libraries

```
GList* gds_libraries
```

Definition at line 79 of file gds-render-gui.c.

12.7.2.9 layer_selector

```
LayerSelector* layer_selector
```

Definition at line 77 of file gds-render-gui.c.

12.7.2.10 load_layer_button

```
GtkWidget* load_layer_button
```

Definition at line 71 of file gds-render-gui.c.

12.7.2.11 main_window

```
GtkWindow* main_window
```

Definition at line 68 of file gds-render-gui.c.

12.7.2.12 open_button

```
GtkWidget* open_button
```

Definition at line 70 of file gds-render-gui.c.

12.7.2.13 palette

```
ColorPalette* palette
```

Definition at line 82 of file gds-render-gui.c.

12.7.2.14 parent

```
GObject parent
```

Definition at line 65 of file gds-render-gui.c.

12.7.2.15 render_dialog_settings

```
struct render_settings render_dialog_settings
```

Definition at line 81 of file gds-render-gui.c.

12.7.2.16 save_layer_button

```
GtkWidget* save_layer_button
```

Definition at line 72 of file gds-render-gui.c.

12.7.2.17 select_all_button

```
GtkWidget* select_all_button
```

Definition at line 73 of file gds-render-gui.c.

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

- gds-render-gui.c

12.8 _LatexRenderer Struct Reference

Struct representing the LaTeX-Renderer object.

Data Fields

- GdsOutputRenderer parent
- gboolean tex_standalone
- gboolean pdf_layers

12.8.1 Detailed Description

Struct representing the LaTeX-Renderer object.

This struct holds the LaTeX renderer internal data. It is only used inside the LaTeX / TikZ Renderer class.

Definition at line 42 of file latex-renderer.c.

12.8.2 Field Documentation

12.8.2.1 parent

```
GdsOutputRenderer parent
```

Definition at line 43 of file latex-renderer.c.

12.8.2.2 pdf_layers

```
gboolean pdf_layers
```

Definition at line 45 of file latex-renderer.c.

12.8.2.3 tex_standalone

```
gboolean tex_standalone
```

Definition at line 44 of file latex-renderer.c.

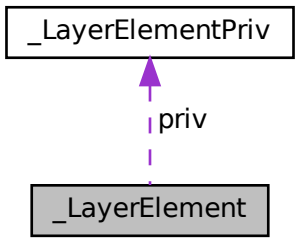
The documentation for this struct was generated from the following file:

- latex-renderer.c

12.9 _LayerElement Struct Reference

`#include <layer-element.h>`

Collaboration diagram for _LayerElement:



Data Fields

- GtkListBoxRow parent
- LayerElementPriv priv

12.9.1 Detailed Description

Definition at line 53 of file layer-element.h.

12.9.2 Field Documentation

12.9.2.1 parent

`GtkListBoxRow parent`

Definition at line 55 of file layer-element.h.

12.9.2.2 priv

`LayerElementPriv priv`

Definition at line 57 of file layer-element.h.

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

- layer-element.h

12.10 _LayerElementPriv Struct Reference

`#include <layer-element.h>`

Data Fields

- GtkEntry * name
- GtkLabel * layer
- int layer_num
- GtkEventBox * event_handle
- GtkColorButton * color
- GtkCheckButton * export

12.10.1 Detailed Description

Definition at line 44 of file layer-element.h.

12.10.2 Field Documentation

12.10.2.1 color

`GtkColorButton* color`

Definition at line 49 of file layer-element.h.

12.10.2.2 event_handle

`GtkEventBox* event_handle`

Definition at line 48 of file layer-element.h.

12.10.2.3 export

`GtkCheckButton* export`

Definition at line 50 of file layer-element.h.

12.10.2.4 layer

```
GtkLabel* layer
```

Definition at line 46 of file layer-element.h.

12.10.2.5 layer_num

```
int layer_num
```

Definition at line 47 of file layer-element.h.

12.10.2.6 name

```
GtkEntry* name
```

Definition at line 45 of file layer-element.h.

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

- layer-element.h

12.11 _LayerSelector Struct Reference

Data Fields

- GObject parent
- GtkWidget * associated_load_button
- GtkWidget * associated_save_button
- GtkWindow * load_parent_window
- GtkWindow * save_parent_window
- GtkListBox * list_box
- GtkTargetEntry dnd_target
- gpointer dummy [4]

12.11.1 Detailed Description

Definition at line 40 of file layer-selector.c.

12.11.2 Field Documentation

12.11.2.1 associated_load_button

```
GtkWidget* associated_load_button
```

Definition at line 44 of file layer-selector.c.

12.11.2.2 associated_save_button

```
GtkWidget* associated_save_button
```

Definition at line 45 of file layer-selector.c.

12.11.2.3 dnd_target

```
GtkTargetEntry dnd_target
```

Definition at line 50 of file layer-selector.c.

12.11.2.4 dummy

```
gpointer dummy[4]
```

Definition at line 52 of file layer-selector.c.

12.11.2.5 list_box

```
GtkListBox* list_box
```

Definition at line 48 of file layer-selector.c.

12.11.2.6 load_parent_window

```
GtkWindow* load_parent_window
```

Definition at line 46 of file layer-selector.c.

12.11.2.7 parent

```
GObject parent
```

Definition at line 42 of file layer-selector.c.

12.11.2.8 save_parent_window

```
GtkWindow* save_parent_window
```

Definition at line 47 of file layer-selector.c.

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

- layer-selector.c

12.12 _LayerSettings Struct Reference

Data Fields

- GObject parent
- GList * layer_infos
- gpointer padding [12]

12.12.1 Detailed Description

Definition at line 29 of file layer-settings.c.

12.12.2 Field Documentation

12.12.2.1 layer_infos

```
GList* layer_infos
```

Definition at line 31 of file layer-settings.c.

12.12.2.2 padding

```
gpointer padding[12]
```

Definition at line 32 of file layer-settings.c.

12.12.2.3 parent

```
GObject parent
```

Definition at line 30 of file layer-settings.c.

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

- layer-settings.c

12.13 _LibCellRenderer Struct Reference

```
#include <lib-cell-renderer.h>
```

Data Fields

- GtkCellRendererText super

12.13.1 Detailed Description

Definition at line 48 of file lib-cell-renderer.h.

12.13.2 Field Documentation

12.13.2.1 super

```
GtkCellRendererText super
```

Definition at line 50 of file lib-cell-renderer.h.

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

- lib-cell-renderer.h

12.14 _RendererSettingsDialog Struct Reference

Data Fields

- GtkDialog parent
- GtkWidget * radio_latex
- GtkWidget * radio_cairo_pdf
- GtkWidget * radio_cairo_svg
- GtkWidget * scale
- GtkWidget * layer_check
- GtkWidget * standalone_check
- GtkDrawingArea * shape_drawing
- GtkLabel * x_label
- GtkLabel * y_label
- GtkLabel * x_output_label
- GtkLabel * y_output_label
- unsigned int cell_height
- unsigned int cell_width
- double unit_in_meters

12.14.1 Detailed Description

Definition at line 35 of file conv-settings-dialog.c.

12.14.2 Field Documentation

12.14.2.1 cell_height

```
unsigned int cell_height
```

Definition at line 51 of file conv-settings-dialog.c.

12.14.2.2 cell_width

```
unsigned int cell_width
```

Definition at line 52 of file conv-settings-dialog.c.

12.14.2.3 layer_check

```
GtkWidget* layer_check
```

Definition at line 42 of file conv-settings-dialog.c.

12.14.2.4 parent

```
GtkDialog parent
```

Definition at line 36 of file conv-settings-dialog.c.

12.14.2.5 radio_cairo_pdf

```
GtkWidget* radio_cairo_pdf
```

Definition at line 39 of file conv-settings-dialog.c.

12.14.2.6 radio_cairo_svg

```
GtkWidget* radio_cairo_svg
```

Definition at line 40 of file conv-settings-dialog.c.

12.14.2.7 radio_latex

```
GtkWidget* radio_latex
```

Definition at line 38 of file conv-settings-dialog.c.

12.14.2.8 scale

```
GtkWidget* scale
```

Definition at line 41 of file conv-settings-dialog.c.

12.14.2.9 shape_drawing

```
GtkDrawingArea* shape_drawing
```

Definition at line 44 of file conv-settings-dialog.c.

12.14.2.10 standalone_check

```
GtkWidget* standalone_check
```

Definition at line 43 of file conv-settings-dialog.c.

12.14.2.11 unit_in_meters

```
double unit_in_meters
```

Definition at line 53 of file conv-settings-dialog.c.

12.14.2.12 x_label

```
GtkLabel* x_label
```

Definition at line 45 of file conv-settings-dialog.c.

12.14.2.13 x_output_label

```
GtkLabel* x_output_label
```

Definition at line 48 of file conv-settings-dialog.c.

12.14.2.14 y_label

```
GtkLabel* y_label
```

Definition at line 46 of file conv-settings-dialog.c.

12.14.2.15 y_output_label

```
GtkLabel* y_output_label
```

Definition at line 49 of file conv-settings-dialog.c.

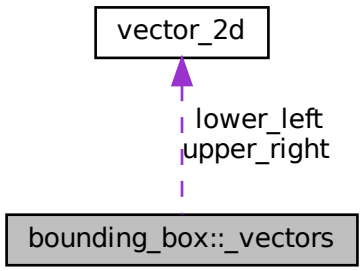
The documentation for this struct was generated from the following file:

- conv-settings-dialog.c

12.15 bounding_box::_vectors Struct Reference

```
#include <bounding-box.h>
```

Collaboration diagram for bounding_box::_vectors:



Data Fields

- struct vector_2d lower_left
- struct vector_2d upper_right

12.15.1 Detailed Description

Coordinate System is (y up | x right)

Definition at line 40 of file bounding-box.h.

12.15.2 Field Documentation

12.15.2.1 lower_left

```
struct vector_2d lower_left
```

Definition at line 41 of file bounding-box.h.

12.15.2.2 upper_right

```
struct vector_2d upper_right
```

Definition at line 42 of file bounding-box.h.

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

- bounding-box.h

12.16 application_data Struct Reference

Structure containing The GtkApplication and a list containing the GdsRenderGui objects.

Data Fields

- GtkApplication * app
- GList * gui_list

12.16.1 Detailed Description

Structure containing The GtkApplication and a list containing the GdsRenderGui objects.

Definition at line 40 of file main.c.

12.16.2 Field Documentation

12.16.2.1 app

```
GtkApplication* app
```

Definition at line 41 of file main.c.

12.16.2.2 gui_list

```
GList* gui_list
```

Definition at line 42 of file main.c.

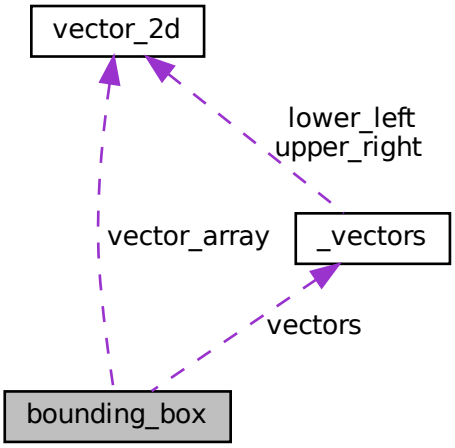
The documentation for this struct was generated from the following file:

- main.c

12.17 bounding_box Union Reference

```
#include <bounding-box.h>
```

Collaboration diagram for bounding_box:



Data Structures

- struct _vectors

Data Fields

- struct bounding_box::_vectors vectors
- struct vector_2d vector_array [2]

12.17.1 Detailed Description

Definition at line 38 of file bounding-box.h.

12.17.2 Field Documentation

12.17.2.1 vector_array

```
struct vector_2d vector_array[2]
```

Definition at line 44 of file bounding-box.h.

12.17.2.2 vectors

```
struct bounding_box::_vectors vectors
```

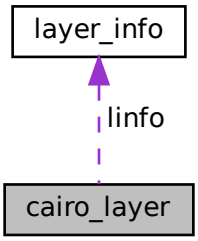
The documentation for this union was generated from the following file:

- bounding-box.h

12.18 cairo_layer Struct Reference

The cairo_layer struct Each rendered layer is represented by this struct.

Collaboration diagram for cairo_layer:



Data Fields

- cairo_t * cr
  cairo context for layer
- cairo_surface_t * rec
  Recording surface to hold the layer.
- struct layer_info * linfo
  Reference to layer information.

12.18.1 Detailed Description

The cairo_layer struct Each rendered layer is represented by this struct.

Definition at line 51 of file cairo-renderer.c.

12.18.2 Field Documentation

12.18.2.1 cr

```
cairo_t* cr
```

cairo context for layer

Definition at line 52 of file cairo-renderer.c.

12.18.2.2 linfo

```
struct layer_info* linfo
```

Reference to layer information.

Definition at line 54 of file cairo-renderer.c.

12.18.2.3 rec

```
cairo_surface_t* rec
```

Recording surface to hold the layer.

Definition at line 53 of file cairo-renderer.c.

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

- cairo-renderer.c

12.19 external_renderer_params Struct Reference

External renderer paramameters to command line renderer.

```
#include <command-line.h>
```

Data Fields

- char * so_path

  Path to shared object.
- char * cli_params

  Command line parameters given.

12.19.1 Detailed Description

External renderer paramameters to command line renderer.

Definition at line 39 of file command-line.h.

12.19.2 Field Documentation

12.19.2.1 cli_params

```
char* cli_params
```

Command line parameters given.

Definition at line 48 of file command-line.h.

12.19.2.2 so_path

```
char* so_path
```

Path to shared object.

Definition at line 43 of file command-line.h.

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

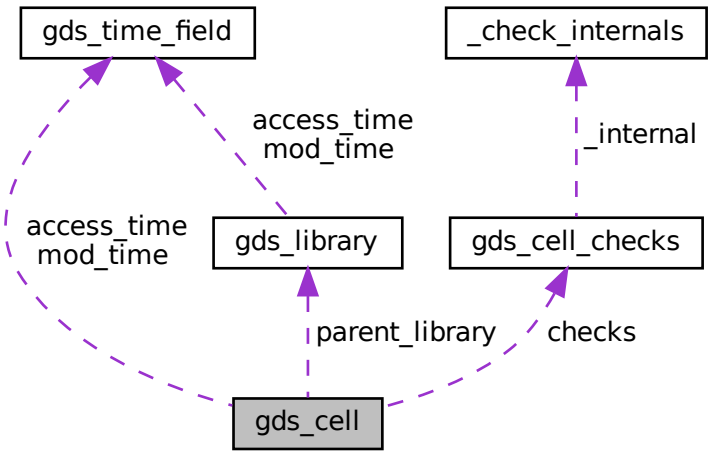
- command-line.h

12.20 gds_cell Struct Reference

A Cell inside a gds_library.

```
#include <gds-types.h>
```

Collaboration diagram for gds_cell:



Data Fields

- char name [CELL_NAME_MAX]
- struct gds_time_field mod_time
- struct gds_time_field access_time
- GList * child_cells

  List of gds_cell_instance elements.
- GList * graphic_objs

  List of gds_graphics.
- struct gds_library * parent_library

  Pointer to parent library.
- struct gds_cell_checks checks

  Checking results.

12.20.1 Detailed Description

A Cell inside a gds_library.

Definition at line 122 of file gds-types.h.

12.20.2 Field Documentation

12.20.2.1 access_time

```
struct gds_time_field access_time
```

Definition at line 125 of file gds-types.h.

12.20.2.2 checks

```
struct gds_cell_checks checks
```

Checking results.

Definition at line 129 of file gds-types.h.

12.20.2.3 child_cells

```
GList* child_cells
```

List of gds_cell_instance elements.

Definition at line 126 of file gds-types.h.

12.20.2.4 graphic_objs

```
GList* graphic_objs
```

List of gds_graphics.

Definition at line 127 of file gds-types.h.

12.20.2.5 mod_time

```
struct gds_time_field mod_time
```

Definition at line 124 of file gds-types.h.

12.20.2.6 name

```
char name[CELL_NAME_MAX]
```

Definition at line 123 of file gds-types.h.

12.20.2.7 parent_library

```
struct gds_library* parent_library
```

Pointer to parent library.

Definition at line 128 of file gds-types.h.

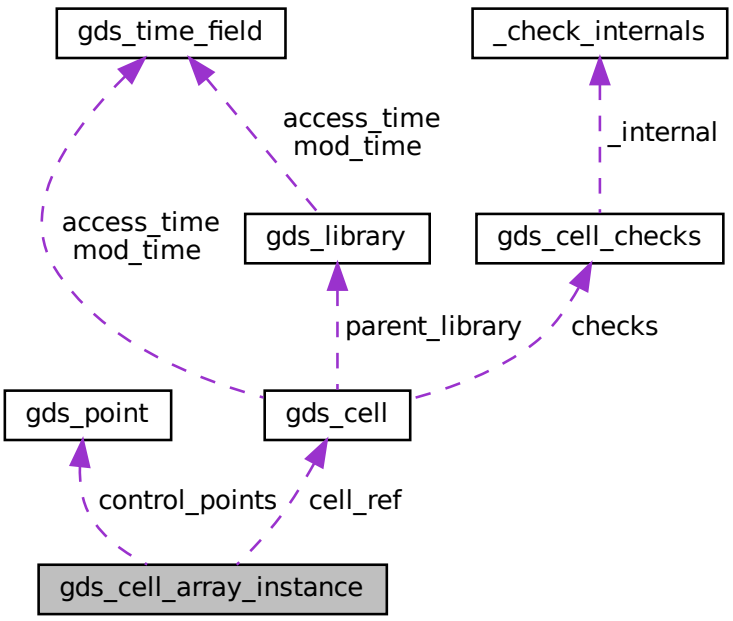
The documentation for this struct was generated from the following file:

- gds-types.h

12.21 gds_cell_array_instance Struct Reference

Struct representing an array instantiation.

Collaboration diagram for gds_cell_array_instance:



Data Fields

- char ref_name [CELL_NAME_MAX]

  Name of referenced cell.
- struct gds_cell * cell_ref

  Referenced gds_cell structure.
- struct gds_point control_points [3]

  The three control points.
- int flipped

  Mirror each instance on x-axis before rotation.
- double angle

  Angle of rotation for each instance (counter clockwise) in degrees.
- double magnification

  Magnification of each instance.
- int columns

  Column count.
- int rows

  Row count.

12.21.1 Detailed Description

Struct representing an array instantiation.

This struct is defined locally because it is not exposed to the outside of the parser. Array references are internally converted to a bunch of standard gds_cell_instance elements.

Definition at line 95 of file gds-parser.c.

12.21.2 Field Documentation

12.21.2.1 angle

```
double angle
```

Angle of rotation for each instance (counter clockwise) in degrees.

Definition at line 100 of file gds-parser.c.

12.21.2.2 cell_ref

```
struct gds_cell* cell_ref
```

Referenced gds_cell structure.

Definition at line 97 of file gds-parser.c.

12.21.2.3 columns

```
int columns
```

Column count.

Definition at line 102 of file gds-parser.c.

12.21.2.4 control_points

```
struct gds_point control_points[3]
```

The three control points.

Definition at line 98 of file gds-parser.c.

12.21.2.5 flipped

```
int flipped
```

Mirror each instance on x-axis before rotation.

Definition at line 99 of file gds-parser.c.

12.21.2.6 magnification

```
double magnification
```

Magnification of each instance.

Definition at line 101 of file gds-parser.c.

12.21.2.7 ref_name

```
char ref_name[CELL_NAME_MAX]
```

Name of referenced cell.

Definition at line 96 of file gds-parser.c.

12.21.2.8 rows

```
int rows
```

Row count.

Definition at line 103 of file gds-parser.c.

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

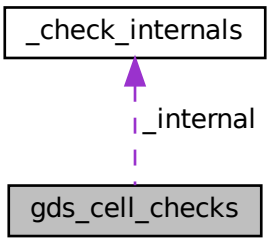
- gds-parser.c

12.22 gds_cell_checks Struct Reference

Stores the result of the cell checks.

```
#include <gds-types.h>
```

Collaboration diagram for gds_cell_checks:



Data Structures

- struct _check_internals

  For the internal use of the checker.

Data Fields

- int unresolved_child_count

  Number of unresolved cell instances inside this cell. Default: GDS_CELL_CHECK_NOT_RUN.
- int affected_by_reference_loop

  1 if the cell is affected by a reference loop and therefore not renderable. Default: GDS_CELL_CHECK_NOT_RUN
- struct gds_cell_checks::_check_internals _internal

12.22.1 Detailed Description

Stores the result of the cell checks.

Definition at line 71 of file gds-types.h.

12.22.2 Field Documentation

12.22.2.1 _internal

```
struct gds_cell_checks::_check_internals _internal
```

12.22.2.2 affected_by_reference_loop

```
int affected_by_reference_loop
```

1 if the cell is affected by a reference loop and therefore not renderable. Default: GDS_CELL_CHECK_NOT_RUN

Definition at line 73 of file gds-types.h.

12.22.2.3 unresolved_child_count

```
int unresolved_child_count
```

Number of unresolved cell instances inside this cell. Default: GDS_CELL_CHECK_NOT_RUN.

Definition at line 72 of file gds-types.h.

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

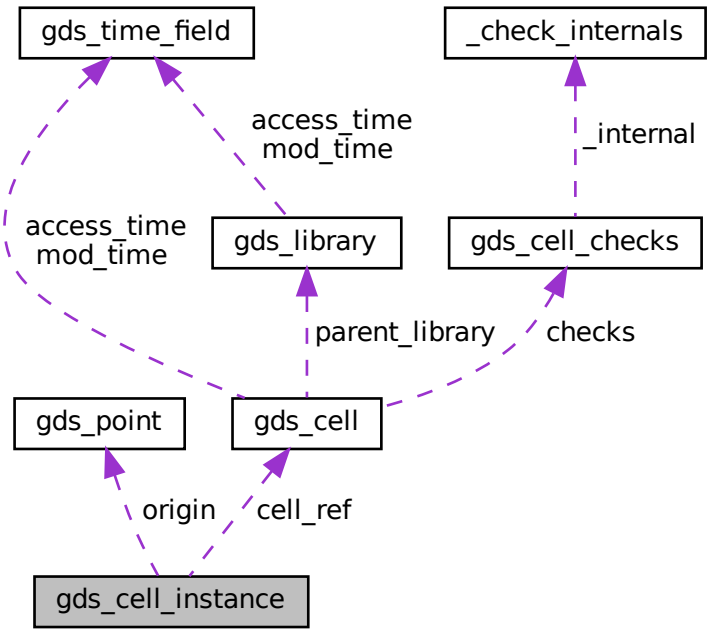
- gds-types.h

12.23 gds_cell_instance Struct Reference

This represents an instanc of a cell inside another cell.

`#include <gds-types.h>`

Collaboration diagram for gds_cell_instance:



Data Fields

- char ref_name [CELL_NAME_MAX]

  Name of referenced cell.
- struct gds_cell * cell_ref

  Referenced gds_cell structure.
- struct gds_point origin

  Origin.
- int flipped

  Mirrored on x-axis before rotation.
- double angle

  Angle of rotation (counter clockwise) in degrees.
- double magnification

  magnification

12.23.1 Detailed Description

This represents an instanc of a cell inside another cell.

Definition at line 110 of file gds-types.h.

12.23.2 Field Documentation

12.23.2.1 angle

```
double angle
```

Angle of rotation (counter clockwise) in degrees.

Definition at line 115 of file gds-types.h.

12.23.2.2 cell_ref

```
struct gds_cell* cell_ref
```

Referenced gds_cell structure.

Definition at line 112 of file gds-types.h.

12.23.2.3 flipped

```
int flipped
```

Mirrored on x-axis before rotation.

Definition at line 114 of file gds-types.h.

12.23.2.4 magnification

```
double magnification
```

magnification

Definition at line 116 of file gds-types.h.

12.23.2.5 origin

```
struct gds_point origin
```

Origin.

Definition at line 113 of file gds-types.h.

12.23.2.6 ref_name

```
char ref_name[CELL_NAME_MAX]
```

Name of referenced cell.

Definition at line 111 of file gds-types.h.

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

- gds-types.h

12.24 gds_graphics Struct Reference

A GDS graphics object.

```
#include <gds-types.h>
```

Data Fields

- enum graphics_type gfx_type
  Type of graphic.
- GList * vertices
  List of gds_point.
- enum path_type path_render_type
  Line cap.
- int width_absolute
  Width. Not used for objects other than paths.
- int16_t layer
  Layer the graphic object is on.
- uint16_t datatype

12.24.1 Detailed Description

A GDS graphics object.

Definition at line 98 of file gds-types.h.

12.24.2 Field Documentation

12.24.2.1 datatype

```
uint16_t datatype
```

Definition at line 104 of file gds-types.h.

12.24.2.2 gfx_type

```
enum graphics_type gfx_type
```

Type of graphic.

Definition at line 99 of file gds-types.h.

12.24.2.3 layer

```
int16_t layer
```

Layer the graphic object is on.

Definition at line 103 of file gds-types.h.

12.24.2.4 path_render_type

```
enum path_type path_render_type
```

Line cap.

Definition at line 101 of file gds-types.h.

12.24.2.5 vertices

```
GList* vertices
```

List of gds_point.

Definition at line 100 of file gds-types.h.

12.24.2.6 width_absolute

```
int width_absolute
```

Width. Not used for objects other than paths.

Definition at line 102 of file gds-types.h.

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

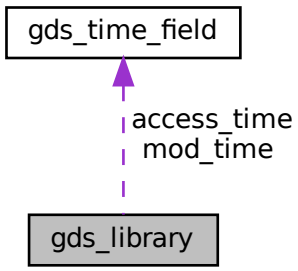
- gds-types.h

12.25 gds_library Struct Reference

GDS Toplevel library.

`#include <gds-types.h>`

Collaboration diagram for gds_library:



Data Fields

- char name [CELL_NAME_MAX]
- struct gds_time_field mod_time
- struct gds_time_field access_time
- double unit_in_meters
- GList * cells
- GList * cell_names

12.25.1 Detailed Description

GDS Toplevel library.

Definition at line 135 of file gds-types.h.

12.25.2 Field Documentation

12.25.2.1 access_time

`struct gds_time_field access_time`

Definition at line 138 of file gds-types.h.

12.25.2.2 cell_names

```
GList* cell_names
```

< List of strings that contains all cell names

Definition at line 141 of file gds-types.h.

12.25.2.3 cells

```
GList* cells
```

List of gds_cell that contains all cells in this library

Definition at line 140 of file gds-types.h.

12.25.2.4 mod_time

```
struct gds_time_field mod_time
```

Definition at line 137 of file gds-types.h.

12.25.2.5 name

```
char name[CELL_NAME_MAX]
```

Definition at line 136 of file gds-types.h.

12.25.2.6 unit_in_meters

```
double unit_in_meters
```

Length of a database unit in meters

Definition at line 139 of file gds-types.h.

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

- gds-types.h

12.26 gds_point Struct Reference

A point in the 2D plane. Sometimes referred to as vertex.

`#include <gds-types.h>`

Data Fields

- int x
- int y

12.26.1 Detailed Description

A point in the 2D plane. Sometimes referred to as vertex.

Definition at line 63 of file gds-types.h.

12.26.2 Field Documentation

12.26.2.1 x

```
int x
```

Definition at line 64 of file gds-types.h.

12.26.2.2 y

```
int y
```

Definition at line 65 of file gds-types.h.

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

- gds-types.h

12.27 gds_time_field Struct Reference

Date information for cells and libraries.

`#include <gds-types.h>`

Data Fields

- uint16_t year
- uint16_t month
- uint16_t day
- uint16_t hour
- uint16_t minute
- uint16_t second

12.27.1 Detailed Description

Date information for cells and libraries.

Definition at line 86 of file gds-types.h.

12.27.2 Field Documentation

12.27.2.1 day

```
uint16_t day
```

Definition at line 89 of file gds-types.h.

12.27.2.2 hour

```
uint16_t hour
```

Definition at line 90 of file gds-types.h.

12.27.2.3 minute

```
uint16_t minute
```

Definition at line 91 of file gds-types.h.

12.27.2.4 month

```
uint16_t month
```

Definition at line 88 of file gds-types.h.

12.27.2.5 second

```
uint16_t second
```

Definition at line 92 of file gds-types.h.

12.27.2.6 year

```
uint16_t year
```

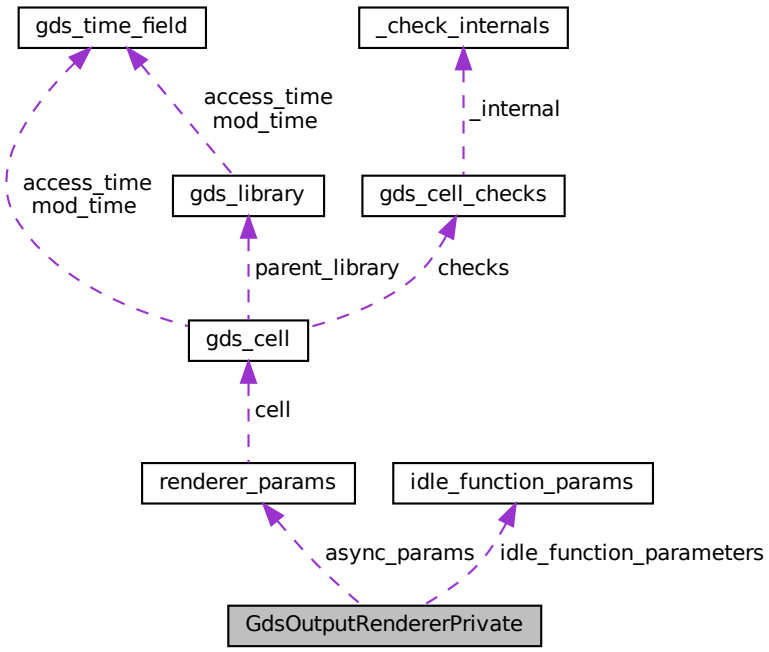
Definition at line 87 of file gds-types.h.

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

- gds-types.h

12.28 GdsOutputRendererPrivate Struct Reference

Collaboration diagram for GdsOutputRendererPrivate:



Data Fields

- gchar * output_file
- LayerSettings * layer_settings
- GMutex settings_lock
- gboolean mutex_init_status
- GTask * task
- GMainContext * main_context
- struct renderer_params async_params
- struct idle_function_params idle_function_parameters
- gpointer padding [11]

12.28.1 Detailed Description

Definition at line 43 of file gds-output-renderer.c.

12.28.2 Field Documentation

12.28.2.1 async_params

```
struct renderer_params async_params
```

Definition at line 50 of file gds-output-renderer.c.

12.28.2.2 idle_function_parameters

```
struct idle_function_params idle_function_parameters
```

Definition at line 51 of file gds-output-renderer.c.

12.28.2.3 layer_settings

```
LayerSettings* layer_settings
```

Definition at line 45 of file gds-output-renderer.c.

12.28.2.4 main_context

```
GMainContext* main_context
```

Definition at line 49 of file gds-output-renderer.c.

12.28.2.5 mutex_init_status

```
gboolean mutex_init_status
```

Definition at line 47 of file gds-output-renderer.c.

12.28.2.6 output_file

```
gchar* output_file
```

Definition at line 44 of file gds-output-renderer.c.

12.28.2.7 padding

```
gpointer padding[11]
```

Definition at line 52 of file gds-output-renderer.c.

12.28.2.8 settings_lock

```
GMutex settings_lock
```

Definition at line 46 of file gds-output-renderer.c.

12.28.2.9 task

```
GTask* task
```

Definition at line 48 of file gds-output-renderer.c.

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

- gds-output-renderer.c

12.29 gui_button_states Struct Reference

Data Fields

- gboolean rendering_active
- gboolean valid_cell_selected

12.29.1 Detailed Description

Definition at line 58 of file gds-render-gui.c.

12.29.2 Field Documentation

12.29.2.1 rendering_active

```
gboolean rendering_active
```

Definition at line 59 of file gds-render-gui.c.

12.29.2.2 valid_cell_selected

```
gboolean valid_cell_selected
```

Definition at line 60 of file gds-render-gui.c.

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

- gds-render-gui.c

12.30 idle_function_params Struct Reference

Data Fields

- GMutex message_lock
- char * status_message

12.30.1 Detailed Description

Definition at line 38 of file gds-output-renderer.c.

12.30.2 Field Documentation

12.30.2.1 message_lock

```
GMutex message_lock
```

Definition at line 39 of file gds-output-renderer.c.

12.30.2.2 status_message

```
char* status_message
```

Definition at line 40 of file gds-output-renderer.c.

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

- gds-output-renderer.c

12.31 layer_element_dnd_data Struct Reference

This structure holds the necessary data to set up a LayerElement for Drag'n'Drop.

```
#include <layer-element.h>
```

Data Fields

- GtkTargetEntry * entries
  Array of target entries for the DnD operation.
- int entry_count
  Count of elements in layer_element_dnd_data::entries array.
- void(* drag_begin)(GtkWidget *, GdkDragContext *, gpointer)
  Callback function for drag_begin event.
- void(* drag_data_get)(GtkWidget *, GdkDragContext *, GtkSelectionData *, guint, guint, gpointer)
  Callback fucktion for data_get event.
- void(* drag_end)(GtkWidget *, GdkDragContext *, gpointer)
  Callback function for drag_end event.

12.31.1 Detailed Description

This structure holds the necessary data to set up a LayerElement for Drag'n'Drop.

Definition at line 63 of file layer-element.h.

12.31.2 Field Documentation

12.31.2.1 drag_begin

```
void(* drag_begin) (GtkWidget *, GdkDragContext *, gpointer)
```

Callback function for drag_begin event.

Definition at line 69 of file layer-element.h.

12.31.2.2 drag_data_get

```
void(* drag_data_get) (GtkWidget *, GdkDragContext *, GtkSelectionData *, guint, guint, gpointer)
```

Callback fucktion for data_get event.

Definition at line 71 of file layer-element.h.

12.31.2.3 drag_end

```
void(* drag_end) (GtkWidget *, GdkDragContext *, gpointer)
```

Callback function for drag_end event.

Definition at line 73 of file layer-element.h.

12.31.2.4 entries

```
GtkTargetEntry* entries
```

Array of target entries for the DnD operation.

Definition at line 65 of file layer-element.h.

12.31.2.5 entry_count

```
int entry_count
```

Count of elements in layer_element_dnd_data::entries array.

Definition at line 67 of file layer-element.h.

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

- layer-element.h

12.32 layer_info Struct Reference

Layer information.

```
#include <layer-settings.h>
```

Data Fields

- int layer
  Layer number.
- char * name
  Layer name.
- int stacked_position
  Position of layer in output.
- GdkRGBA color
  RGBA color used to render this layer.
- int render
  true: Render to output

12.32.1 Detailed Description

Layer information.

This structs contains information on how to render a layer

Note

You probably don't want to use this struct standalone but in combination with a LayerSettings object.

Definition at line 40 of file layer-settings.h.

12.32.2 Field Documentation

12.32.2.1 color

```
GdkRGBA color
```

RGBA color used to render this layer.

Definition at line 45 of file layer-settings.h.

12.32.2.2 layer

```
int layer
```

Layer number.

Definition at line 42 of file layer-settings.h.

12.32.2.3 name

```
char* name
```

Layer name.

Definition at line 43 of file layer-settings.h.

12.32.2.4 render

```
int render
```

true: Render to output

Definition at line 46 of file layer-settings.h.

12.32.2.5 stacked_position

```
int stacked_position
```

Position of layer in output.

Warning

This parameter is not used by any renderer so far

Note

Lower is bottom, higher is top

Definition at line 44 of file layer-settings.h.

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

- layer-settings.h

12.33 render_settings Struct Reference

This struct holds the renderer configuration.

`#include <conv-settings-dialog.h>`

Data Fields

- double scale
  Scale image down by this factor.
- enum output_renderer renderer
- gboolean tex_pdf_layers
- gboolean tex_standalone

12.33.1 Detailed Description

This struct holds the renderer configuration.

Definition at line 56 of file conv-settings-dialog.h.

12.33.2 Field Documentation

12.33.2.1 renderer

`enum output_renderer renderer`

The renderer to use

Definition at line 58 of file conv-settings-dialog.h.

12.33.2.2 scale

`double scale`

Scale image down by this factor.

Note

Used to keep image in bound of maximum coordinate limit

Definition at line 57 of file conv-settings-dialog.h.

12.33.2.3 tex_pdf_layers

```
gboolean tex_pdf_layers
```

Create OCG layers when rendering with TikZ

Definition at line 59 of file conv-settings-dialog.h.

12.33.2.4 tex_standalone

```
gboolean tex_standalone
```

Create a standalone compile TeX file

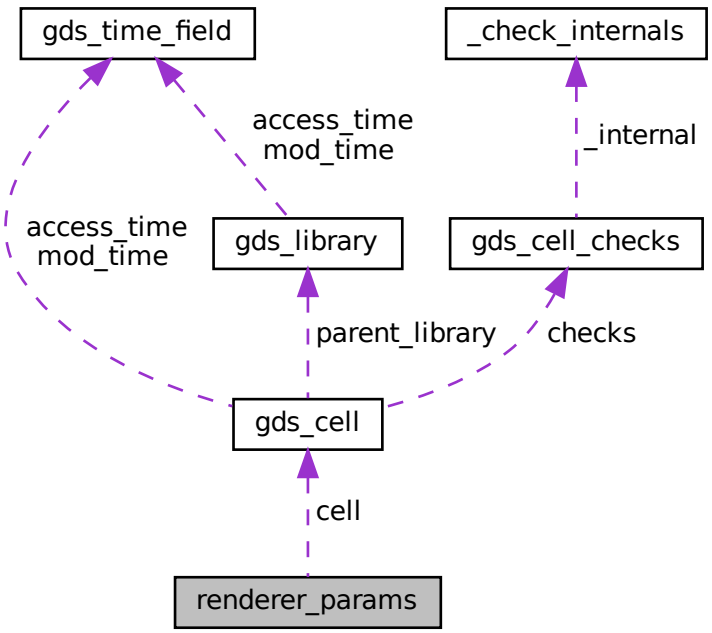
Definition at line 60 of file conv-settings-dialog.h.

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

- conv-settings-dialog.h

12.34 renderer_params Struct Reference

Collaboration diagram for renderer_params:



Data Fields

- struct gds_cell * cell
- double scale

12.34.1 Detailed Description

Definition at line 33 of file gds-output-renderer.c.

12.34.2 Field Documentation

12.34.2.1 cell

```
struct gds_cell* cell
```

Definition at line 34 of file gds-output-renderer.c.

12.34.2.2 scale

```
double scale
```

Definition at line 35 of file gds-output-renderer.c.

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

- gds-output-renderer.c

12.35 vector_2d Struct Reference

```
#include <vector-operations.h>
```

Data Fields

- double x
- double y

12.35.1 Detailed Description

Definition at line 37 of file vector-operations.h.

12.35.2 Field Documentation

12.35.2.1 x

```
double x
```

Definition at line 38 of file vector-operations.h.

12.35.2.2 y

```
double y
```

Definition at line 39 of file vector-operations.h.

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

- vector-operations.h

Chapter 13

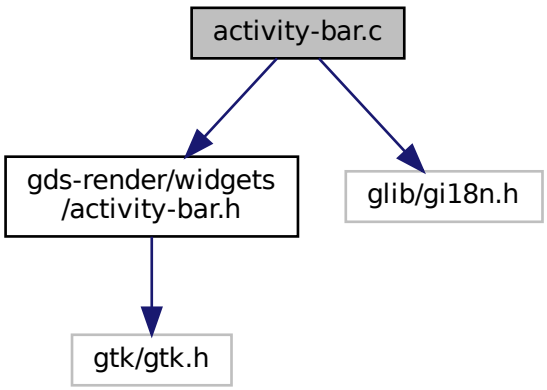
File Documentation

13.1 activity-bar.c File Reference

Status bar indicating activity of the program.

```
#include <gds-render/widgets/activity-bar.h>
#include <glib/gi18n.h>
```

Include dependency graph for activity-bar.c:



Data Structures

- struct _ActivityBar

  Opaque ActivityBar object. Not viewable outside this source file.

Functions

- static void activity_bar_dispose (GObject *obj)
- static void activity_bar_class_init (ActivityBarClass *klass)
- static void activity_bar_init (ActivityBar *self)
- ActivityBar * activity_bar_new ()

  Create new Object ActivityBar.
- void activity_bar_set_ready (ActivityBar *bar)

  Deletes all applied tasks and sets bar to "Ready".
- void activity_bar_set_busy (ActivityBar *bar, const char *text)

  Enable spinner and set `text`. If text is NULL, 'Working...' is displayed.

13.1.1 Detailed Description

Status bar indicating activity of the program.

Author

Mario Hüttel `mario.huettel@gmx.net`

Definition in file activity-bar.c.

13.2 activity-bar.c

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2019  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00020 /*
00021  * The drag and drop implementation is adapted from
00022  * https://gitlab.gnome.org/GNOME/gtk/blob/gtk-3-22/tests/testlist3.c
00023  *
00024  * Thanks to the GTK3 people for creating these examples.
00025  */
00026
00039 #include <gds-render/widgets/activity-bar.h>
00040 #include <glib/gi18n.h>
00041
00043 struct _ActivityBar {
00044         GtkBox super;
00045         /* Private stuff */
00046         GtkWidget *spinner;
00047         GtkWidget *label;
00048 };
00049
00050 G_DEFINE_TYPE(ActivityBar, activity_bar, GTK_TYPE_BOX)
00051
00052 static void activity_bar_dispose(GObject *obj)
00053 {
00054         ActivityBar *bar;
00055
00056         bar = ACTIVITY_BAR(obj);
00057
```

```
00058         /* Clear references on owned objects */
00059         g_clear_object(&bar->label);
00060         g_clear_object(&bar->spinner);
00061
00062         /* Chain up */
00063         G_OBJECT_CLASS(activity_bar_parent_class)->dispose(obj);
00064 }
00065
00066 static void activity_bar_class_init(ActivityBarClass *klass)
00067 {
00068         GObjectClass *oclass = G_OBJECT_CLASS(klass);
00069
00070         oclass->dispose = activity_bar_dispose;
00071 }
00072
00073 static void activity_bar_init(ActivityBar *self)
00074 {
00075         GtkContainer *box = GTK_CONTAINER(self);
00076
00077         /* Create Widgets */
00078         self->label = gtk_label_new("");
00079         self->spinner = gtk_spinner_new();
00080
00081         /* Add to this widget and show */
00082         gtk_container_add(box, self->spinner);
00083         gtk_container_add(box, self->label);
00084         gtk_widget_show(self->label);
00085         gtk_widget_show(self->spinner);
00086
00087         g_object_ref(self->spinner);
00088         g_object_ref(self->label);
00089 }
00090
00091 ActivityBar *activity_bar_new()
00092 {
00093         ActivityBar *bar;
00094
00095         bar = ACTIVITY_BAR(g_object_new(TYPE_ACTIVITY_BAR, "orientation", GTK_ORIENTATION_HORIZONTAL,
      NULL));
00096         if (bar)
00097                 activity_bar_set_ready(bar);
00098
00099         return bar;
00100 }
00101
00102 void activity_bar_set_ready(ActivityBar *bar)
00103 {
00104         gtk_label_set_text(GTK_LABEL(bar->label), _("Ready"));
00105         gtk_spinner_stop(GTK_SPINNER(bar->spinner));
00106 }
00107
00108 void activity_bar_set_busy(ActivityBar *bar, const char *text)
00109 {
00110         gtk_label_set_text(GTK_LABEL(bar->label), (text ? text : _("Working...")));
00111         gtk_spinner_start(GTK_SPINNER(bar->spinner));
00112 }
00113
00114
```

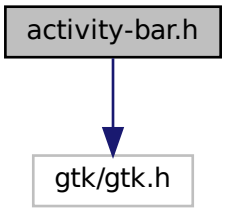
13.3 activity-bar.dox File Reference

13.4 activity-bar.h File Reference

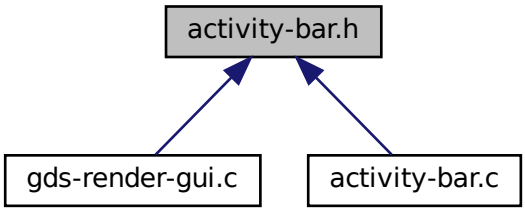
Header file for activity bar widget.

```
#include <gtk/gtk.h>
```

Include dependency graph for activity-bar.h:



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



Macros

- #define TYPE_ACTIVITY_BAR (activity_bar_get_type())

Functions

- ActivityBar * activity_bar_new ()

  Create new Object ActivityBar.
- void activity_bar_set_ready (ActivityBar *bar)

  Deletes all applied tasks and sets bar to "Ready".
- void activity_bar_set_busy (ActivityBar *bar, const char *text)

  Enable spinner and set `text`. If text is NULL, 'Working...' is displayed.

13.4.1 Detailed Description

Header file for activity bar widget.

Author

Mario Hüttel `mario.huettel@gmx.net`

Definition in file activity-bar.h.

13.5 activity-bar.h

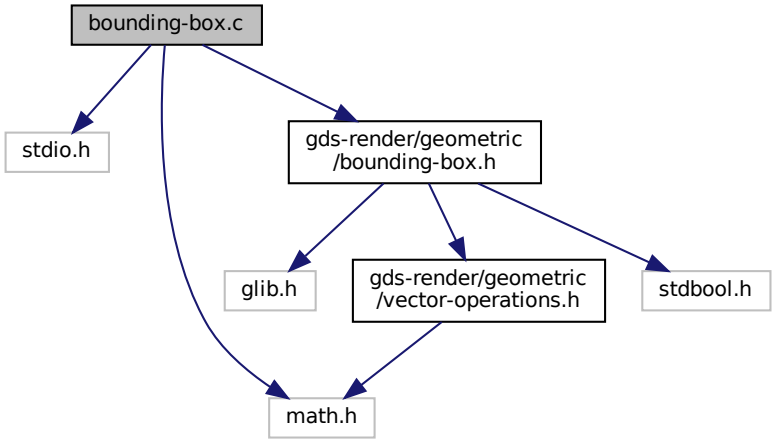
```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2019  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00032 #ifndef __LAYER_ELEMENT_H__
00033 #define __LAYER_ELEMENT_H__
00034
00035 #include <gtk/gtk.h>
00036
00037 G_BEGIN_DECLS
00038
00039 /* Creates Class structure etc */
00040 G_DECLARE_FINAL_TYPE(ActivityBar, activity_bar, ACTIVITY, BAR, GtkBox)
00041
00042 #define TYPE_ACTIVITY_BAR (activity_bar_get_type())
00043
00048 ActivityBar *activity_bar_new();
00049
00054 void activity_bar_set_ready(ActivityBar *bar);
00055
00062 void activity_bar_set_busy(ActivityBar *bar, const char *text);
00063
00064 G_END_DECLS
00065
00066 #endif /* __LAYER_ELEMENT_H__ */
00067
```

13.6 bounding-box.c File Reference

Calculation of bounding boxes.

```
#include <stdio.h>
#include <math.h>
#include <gds-render/geometric/bounding-box.h>
```

Include dependency graph for bounding-box.c:



Macros

- #define MIN(a, b) (((a) < (b)) ? (a) : (b))

  Return smaller number.
- #define MAX(a, b) (((a) > (b)) ? (a) : (b))

  Return bigger number.
- #define ABS_DBL(a) ((a) < 0 ? -(a) : (a))

Functions

- void bounding_box_calculate_polygon (GList *vertices, conv_generic_to_vector_2d_t conv_func, union bounding_box *box)

  Calculate bounding box of polygon.
- void bounding_box_update_box (union bounding_box *destination, union bounding_box *update)

  Update an exisitng bounding box with another one.
- void bounding_box_prepare_empty (union bounding_box *box)

  Prepare an empty bounding box.
- static void calculate_path_miter_points (struct vector_2d *a, struct vector_2d *b, struct vector_2d *c, struct vector_2d *m1, struct vector_2d *m2, double width)

  Calculate path miter points for a pathwith a `width` and the anchors `a b c`.
- void bounding_box_update_with_path (GList *vertices, double thickness, conv_generic_to_vector_2d_t conv_func, union bounding_box *box)

  Calculate the bounding box of a path and update the given bounding box.
- void bounding_box_update_point (union bounding_box *destination, conv_generic_to_vector_2d_t conv_↩ func, void *pt)

  Update bounding box with a point.
- void bounding_box_get_all_points (struct vector_2d *points, union bounding_box *box)

  Return all four corner points of a bounding box.
- void bounding_box_apply_transform (double scale, double rotation_deg, bool flip_at_x, union bounding_box *box)

  Apply transformations onto bounding box.

13.6.1 Detailed Description

Calculation of bounding boxes.

Author

Mario Hüttel mario.huettel@gmx.net

Definition in file bounding-box.c.

13.7 bounding-box.c

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00031 #include <stdio.h>
00032 #include <math.h>
00033
00034 #include <gds-render/geometric/bounding-box.h>
00035
00036 #define MIN(a, b) (((a) < (b)) ? (a) : (b))
00037 #define MAX(a, b) (((a) > (b)) ? (a) : (b))
00038 #define ABS_DBL(a) ((a) < 0 ? -(a) : (a))
00039
00040 void bounding_box_calculate_polygon(GList *vertices, conv_generic_to_vector_2d_t conv_func, union
       bounding_box *box)
00041 {
00042         double xmin = DBL_MAX, xmax = -DBL_MAX, ymin = DBL_MAX, ymax = -DBL_MAX;
00043         struct vector_2d temp_vec;
00044         GList *list_item;
00045
00046         /* Check for errors */
00047         if (!conv_func || !box || !vertices)
00048                 return;
00049
00050         for (list_item = vertices; list_item != NULL; list_item = g_list_next(list_item)) {
00051                 /* Convert generic vertex to vector_2d */
00052                 if (conv_func)
00053                         conv_func((void *)list_item->data, &temp_vec);
00054                 else
00055                         vector_2d_copy(&temp_vec, (struct vector_2d *)list_item->data);
00056
00057                 /* Update bounding coordinates with vertex */
00058                 xmin = MIN(xmin, temp_vec.x);
00059                 xmax = MAX(xmax, temp_vec.x);
00060                 ymin = MIN(ymin, temp_vec.y);
00061                 ymax = MAX(ymax, temp_vec.y);
00062         }
00063
00064         /* Fill bounding box with results */
00065         box->vectors.lower_left.x = xmin;
00066         box->vectors.lower_left.y = ymin;
00067         box->vectors.upper_right.x = xmax;
00068         box->vectors.upper_right.y = ymax;
00069 }
00070
00071 void bounding_box_update_box(union bounding_box *destination, union bounding_box *update)
00072 {
00073         if (!destination || !update)
00074                 return;
00075
```

```
00076         destination->vectors.lower_left.x = MIN(destination->vectors.lower_left.x,
00077                                                 update->vectors.lower_left.x);
00078         destination->vectors.lower_left.y = MIN(destination->vectors.lower_left.y,
00079                                                 update->vectors.lower_left.y);
00080         destination->vectors.upper_right.x = MAX(destination->vectors.upper_right.x,
00081                                                 update->vectors.upper_right.x);
00082         destination->vectors.upper_right.y = MAX(destination->vectors.upper_right.y,
00083                                                 update->vectors.upper_right.y);
00084 }
00085
00086 void bounding_box_prepare_empty(union bounding_box *box)
00087 {
00088         box->vectors.lower_left.x = DBL_MAX;
00089         box->vectors.lower_left.y = DBL_MAX;
00090         box->vectors.upper_right.x = -DBL_MAX;
00091         box->vectors.upper_right.y = -DBL_MAX;
00092 }
00093
00105 static void calculate_path_miter_points(struct vector_2d *a, struct vector_2d *b, struct vector_2d *c,
00106                                         struct vector_2d *m1, struct vector_2d *m2, double width)
00107 {
00108         double angle, angle_sin, u;
00109         struct vector_2d ba, bc, u_vec, v_vec, ba_norm;
00110
00111         if (!a || !b || !c || !m1 || !m2)
00112                 return;
00113
00114         vector_2d_subtract(&ba, a, b);
00115         vector_2d_subtract(&bc, c, b);
00116
00117         angle = vector_2d_calculate_angle_between(&ba, &bc);
00118
00119         if (ABS_DBL(angle) < 0.05 || ABS_DBL(angle - M_PI) < 0.1) {
00120                 /* Specail cases Don*/
00121                 vector_2d_copy(&ba_norm, &ba);
00122                 vector_2d_rotate(&ba_norm, DEG2RAD(90));
00123                 vector_2d_normalize(&ba_norm);
00124                 vector_2d_scale(&ba_norm, width/2.0);
00125                 vector_2d_add(m1, b, &ba_norm);
00126                 vector_2d_subtract(m2, b, &ba_norm);
00127                 return;
00128         }
00129         angle_sin = sin(angle);
00130         u = width/(2*angle_sin);
00131
00132         vector_2d_copy(&u_vec, &ba);
00133         vector_2d_copy(&v_vec, &bc);
00134         vector_2d_normalize(&u_vec);
00135         vector_2d_normalize(&v_vec);
00136         vector_2d_scale(&u_vec, u);
00137         vector_2d_scale(&v_vec, u);
00138
00139         vector_2d_copy(m1, b);
00140         vector_2d_add(m1, m1, &u_vec);
00141         vector_2d_add(m1, m1, &v_vec);
00142
00143         vector_2d_copy(m2, b);
00144         vector_2d_subtract(m2, m2, &u_vec);
00145         vector_2d_subtract(m2, m2, &v_vec);
00146 }
00147
00148 void bounding_box_update_with_path(GList *vertices, double thickness,
00149                                         conv_generic_to_vector_2d_t conv_func, union bounding_box
      *box)
00150 {
00151         GList *vertex_iterator;
00152         struct vector_2d pt;
00153
00154         /* printf("Warning! Function %s not yet implemented correctly!\n", __func__); */
00155
00156         if (!vertices || !box)
00157                 return;
00158
00159         for (vertex_iterator = vertices; vertex_iterator != NULL; vertex_iterator =
      g_list_next(vertex_iterator)) {
00160
00161                 if (conv_func != NULL)
00162                         conv_func(vertex_iterator->data, &pt);
00163                 else
00164                         (void)vector_2d_copy(&pt, (struct vector_2d *)vertex_iterator->data);
00165
00166                 /* These are approximations.
00167                  * Used as long as miter point calculation is not fully implemented
00168                  */
00169                 box->vectors.lower_left.x = MIN(box->vectors.lower_left.x, pt.x - thickness/2);
00170                 box->vectors.lower_left.y = MIN(box->vectors.lower_left.y, pt.y - thickness/2);
00171                 box->vectors.upper_right.x = MAX(box->vectors.upper_right.x, pt.x + thickness/2);
```

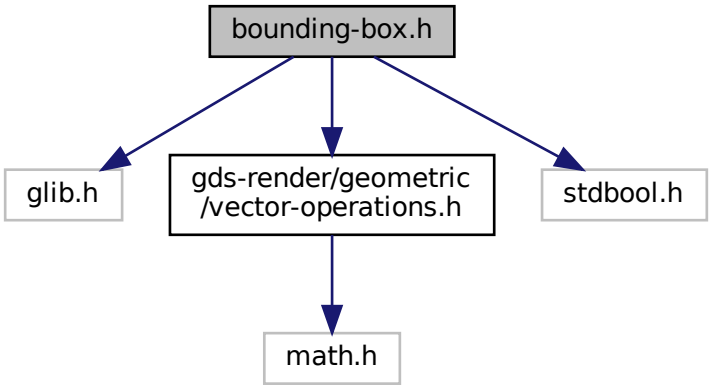
```
00172                 box->vectors.upper_right.y = MAX(box->vectors.upper_right.y, pt.y + thickness/2);
00173         }
00174 }
00175
00176 void bounding_box_update_point(union bounding_box *destination, conv_generic_to_vector_2d_t conv_func,
       void *pt)
00177 {
00178         struct vector_2d point;
00179
00180         if (!destination || !pt)
00181                 return;
00182
00183         if (conv_func)
00184                 conv_func(pt, &point);
00185         else
00186                 (void)vector_2d_copy(&point, (struct vector_2d *)pt);
00187
00188         destination->vectors.lower_left.x = MIN(destination->vectors.lower_left.x, point.x);
00189         destination->vectors.lower_left.y = MIN(destination->vectors.lower_left.y, point.y);
00190         destination->vectors.upper_right.x = MAX(destination->vectors.upper_right.x, point.x);
00191         destination->vectors.upper_right.y = MAX(destination->vectors.upper_right.y, point.y);
00192 }
00193
00194 void bounding_box_get_all_points(struct vector_2d *points, union bounding_box *box)
00195 {
00196         if (!points || !box)
00197                 return;
00198
00199         points[0].x = box->vectors.lower_left.x;
00200         points[0].y = box->vectors.lower_left.y;
00201         points[1].x = box->vectors.upper_right.x;
00202         points[1].y = box->vectors.lower_left.y;
00203         points[2].x = box->vectors.upper_right.x;
00204         points[2].y = box->vectors.upper_right.y;
00205         points[3].x = box->vectors.lower_left.x;
00206         points[3].y = box->vectors.upper_right.y;
00207 }
00208
00209 void bounding_box_apply_transform(double scale, double rotation_deg, bool flip_at_x, union
       bounding_box *box)
00210 {
00211         int i;
00212         struct vector_2d input_points[4];
00213
00214         if (!box)
00215                 return;
00216
00217         bounding_box_get_all_points(input_points, box);
00218
00219         /* Reset box */
00220         bounding_box_prepare_empty(box);
00221
00222         for (i = 0; i < 4; i++) {
00223                 input_points[i].y *= (flip_at_x ? -1 : 1);
00224                 vector_2d_rotate(&input_points[i], rotation_deg * M_PI / 180.0);
00225                 vector_2d_scale(&input_points[i], scale);
00226
00227                 bounding_box_update_point(box, NULL, &input_points[i]);
00228         }
00229 }
00230
```

13.8 bounding-box.h File Reference

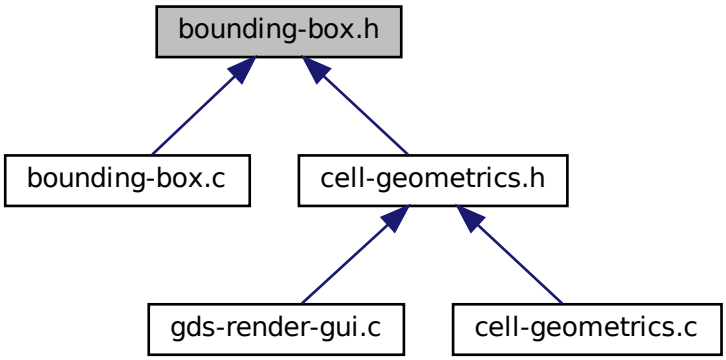
Header for calculation of bounding boxes.

```
#include <glib.h>
#include <gds-render/geometric/vector-operations.h>
#include <stdbool.h>
```

Include dependency graph for bounding-box.h:



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



Data Structures

- union bounding_box
- struct bounding_box::_vectors

Typedefs

- typedef void(∗ conv_generic_to_vector_2d_t) (void ∗, struct vector_2d ∗)

Functions

- void bounding_box_calculate_polygon (GList *vertices, conv_generic_to_vector_2d_t conv_func, union bounding_box *box)

  Calculate bounding box of polygon.
- void bounding_box_update_box (union bounding_box *destination, union bounding_box *update)

  Update an exisitng bounding box with another one.
- void bounding_box_prepare_empty (union bounding_box *box)

  Prepare an empty bounding box.
- void bounding_box_update_point (union bounding_box *destination, conv_generic_to_vector_2d_t conv_↩ func, void *pt)

  Update bounding box with a point.
- void bounding_box_get_all_points (struct vector_2d *points, union bounding_box *box)

  Return all four corner points of a bounding box.
- void bounding_box_apply_transform (double scale, double rotation_deg, bool flip_at_x, union bounding_box *box)

  Apply transformations onto bounding box.
- void bounding_box_update_with_path (GList *vertices, double thickness, conv_generic_to_vector_2d_t conv_func, union bounding_box *box)

  Calculate the bounding box of a path and update the given bounding box.

13.8.1 Detailed Description

Header for calculation of bounding boxes.

Author

Mario Hüttel mario.huettel@gmx.net

Definition in file bounding-box.h.

13.9 bounding-box.h

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00031 #ifndef _BOUNDING_BOX_H_
00032 #define _BOUNDING_BOX_H_
00033
00034 #include <glib.h>
00035 #include <gds-render/geometric/vector-operations.h>
00036 #include <stdbool.h>
00037
00038 union bounding_box {
00040         struct _vectors {
00041                 struct vector_2d lower_left;
```

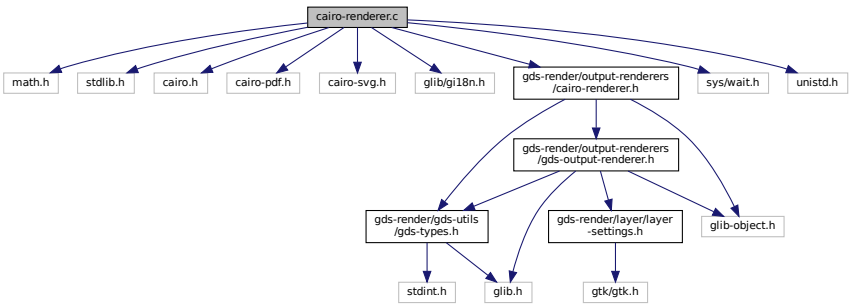
```
00042                 struct vector_2d upper_right;
00043         } vectors;
00044         struct vector_2d vector_array[2];
00045 };
00046
00047 typedef void (*conv_generic_to_vector_2d_t)(void *, struct vector_2d *);
00048
00055 void bounding_box_calculate_polygon(GList *vertices, conv_generic_to_vector_2d_t conv_func, union
       bounding_box *box);
00056
00062 void bounding_box_update_box(union bounding_box *destination, union bounding_box *update);
00063
00071 void bounding_box_prepare_empty(union bounding_box *box);
00072
00079 void bounding_box_update_point(union bounding_box *destination, conv_generic_to_vector_2d_t conv_func,
       void *pt);
00080
00086 void bounding_box_get_all_points(struct vector_2d *points, union bounding_box *box);
00087
00108 void bounding_box_apply_transform(double scale, double rotation_deg, bool flip_at_x, union
       bounding_box *box);
00109
00117 void bounding_box_update_with_path(GList *vertices, double thickness, conv_generic_to_vector_2d_t
       conv_func, union bounding_box *box);
00118
00119 #endif /* _BOUNDING_BOX_H_ */
00120
```

13.10 cairo-renderer.c File Reference

Output renderer for Cairo PDF export.

```
#include <math.h>
#include <stdlib.h>
#include <cairo.h>
#include <cairo-pdf.h>
#include <cairo-svg.h>
#include <glib/gi18n.h>
#include <gds-render/output-renderers/cairo-renderer.h>
#include <sys/wait.h>
#include <unistd.h>
```

Include dependency graph for cairo-renderer.c:



Data Structures

- struct _CairoRenderer
- struct cairo_layer

  The cairo_layer struct Each rendered layer is represented by this struct.

Functions

- static void revert_inherited_transform (struct cairo_layer *layers)

  Revert the last transformation on all layers.
- static void apply_inherited_transform_to_all_layers (struct cairo_layer *layers, const struct gds_point *origin, double magnification, gboolean flipping, double rotation, double scale)

  Applies transformation to all layers.
- static void render_cell (struct gds_cell *cell, struct cairo_layer *layers, double scale)

  render_cell Render a cell with its sub-cells
- static int read_line_from_fd (int fd, char *buff, size_t buff_size)

  Read a line from a file descriptor.
- static int cairo_renderer_render_cell_to_vector_file (GdsOutputRenderer *renderer, struct gds_cell *cell, GList *layer_infos, const char *pdf_file, const char *svg_file, double scale)

  Render `cell` to a PDF file specified by `pdf_file`.
- static void cairo_renderer_init (CairoRenderer *self)
- static int cairo_renderer_render_output (GdsOutputRenderer *renderer, struct gds_cell *cell, double scale)
- static void cairo_renderer_class_init (CairoRendererClass *klass)
- CairoRenderer * cairo_renderer_new_pdf ()

  Create new CairoRenderer for PDF output.
- CairoRenderer * cairo_renderer_new_svg ()

  Create new CairoRenderer for SVG output.

13.10.1 Detailed Description

Output renderer for Cairo PDF export.

Author

Mario Hüttel `mario.huettel@gmx.net`

Definition in file cairo-renderer.c.

13.11 cairo-renderer.c

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00029 #include <math.h>
00030 #include <stdlib.h>
00031 #include <cairo.h>
00032 #include <cairo-pdf.h>
00033 #include <cairo-svg.h>
00034 #include <glib/gi18n.h>
00035
00036 #include <gds-render/output-renderers/cairo-renderer.h>
00037 #include <sys/wait.h>
```

```
00038 #include <unistd.h>
00039
00040 struct _CairoRenderer {
00041         GdsOutputRenderer parent;
00042         gboolean svg;
00043 };
00044
00045 G_DEFINE_TYPE(CairoRenderer, cairo_renderer, GDS_RENDER_TYPE_OUTPUT_RENDERER)
00046
00047
00051 struct cairo_layer {
00052         cairo_t *cr;
00053         cairo_surface_t *rec;
00054         struct layer_info *linfo;
00055 };
00056
00061 static void revert_inherited_transform(struct cairo_layer *layers)
00062 {
00063         int i;
00064
00065         for (i = 0; i < MAX_LAYERS; i++) {
00066                 if (layers[i].cr == NULL)
00067                         continue;
00068                 cairo_restore(layers[i].cr);
00069         }
00070 }
00071
00081 static void apply_inherited_transform_to_all_layers(struct cairo_layer *layers,
00082                                                     const struct gds_point *origin,
00083                                                     double magnification,
00084                                                     gboolean flipping,
00085                                                     double rotation,
00086                                                     double scale)
00087 {
00088         int i;
00089         cairo_t *temp_layer_cr;
00090
00091         for (i = 0; i < MAX_LAYERS; i++) {
00092                 temp_layer_cr = layers[i].cr;
00093                 if (temp_layer_cr == NULL)
00094                         continue;
00095
00096                 /* Save the state and apply transformation */
00097                 cairo_save(temp_layer_cr);
00098                 cairo_translate(temp_layer_cr, (double)origin->x/scale, (double)origin->y/scale);
00099                 cairo_rotate(temp_layer_cr, M_PI*rotation/180.0);
00100                 cairo_scale(temp_layer_cr, magnification,
00101                             (flipping == TRUE ? -magnification : magnification));
00102         }
00103 }
00104
00111 static void render_cell(struct gds_cell *cell, struct cairo_layer *layers, double scale)
00112 {
00113         GList *instance_list;
00114         struct gds_cell *temp_cell;
00115         struct gds_cell_instance *cell_instance;
00116         GList *gfx_list;
00117         struct gds_graphics *gfx;
00118         GList *vertex_list;
00119         struct gds_point *vertex;
00120         cairo_t *cr;
00121
00122         /* Render child cells */
00123         for (instance_list = cell->child_cells; instance_list != NULL; instance_list =
      instance_list->next) {
00124                 cell_instance = (struct gds_cell_instance *)instance_list->data;
00125                 temp_cell = cell_instance->cell_ref;
00126                 if (temp_cell != NULL) {
00127                         apply_inherited_transform_to_all_layers(layers,
00128                                                                 &cell_instance->origin,
00129                                                                 cell_instance->magnification,
00130                                                                 cell_instance->flipped,
00131                                                                 cell_instance->angle,
00132                                                                 scale);
00133                         render_cell(temp_cell, layers, scale);
00134                         revert_inherited_transform(layers);
00135                 }
00136         }
00137
00138         /* Render graphics */
00139         for (gfx_list = cell->graphic_objs; gfx_list != NULL; gfx_list = gfx_list->next) {
00140                 gfx = (struct gds_graphics *)gfx_list->data;
00141
00142                 /* Get layer renderer */
00143                 if (gfx->layer >= MAX_LAYERS)
00144                         continue;
00145
```

```
00146                 cr = layers[gfx->layer].cr;
00147                 if (cr == NULL)
00148                         continue;
00149 
00150                 /* Apply settings */
00151                 cairo_set_line_width(cr, (gfx->width_absolute ? gfx->width_absolute/scale : 1));
00152 
00153                 switch (gfx->path_render_type) {
00154                 case PATH_FLUSH:
00155                         cairo_set_line_cap(cr, CAIRO_LINE_CAP_BUTT);
00156                         break;
00157                 case PATH_ROUNDED:
00158                         cairo_set_line_cap(cr, CAIRO_LINE_CAP_ROUND);
00159                         break;
00160                 case PATH_SQUARED:
00161                         cairo_set_line_cap(cr, CAIRO_LINE_CAP_SQUARE);
00162                         break;
00163                 }
00164 
00165                 /* Add vertices */
00166                 for (vertex_list = gfx->vertices; vertex_list != NULL; vertex_list =
      vertex_list->next) {
00167                         vertex = (struct gds_point *)vertex_list->data;
00168 
00169                         /* If first point -> move to, else line to */
00170                         if (vertex_list->prev == NULL)
00171                                 cairo_move_to(cr, vertex->x/scale, vertex->y/scale);
00172                         else
00173                                 cairo_line_to(cr, vertex->x/scale, vertex->y/scale);
00174                 }
00175 
00176                 /* Create graphics object */
00177                 switch (gfx->gfx_type) {
00178                 case GRAPHIC_PATH:
00179                         cairo_stroke(cr);
00180                         break;
00181                 case GRAPHIC_BOX:
00182                         /* Expected fallthrough */
00183                 case GRAPHIC_POLYGON:
00184                         cairo_set_line_width(cr, 0.1/scale);
00185                         cairo_close_path(cr);
00186                         cairo_stroke_preserve(cr); // Prevent graphic glitches
00187                         cairo_fill(cr);
00188                         break;
00189                 }
00190         } /* for gfx list */
00191 }
00192 
00203 static int read_line_from_fd(int fd, char *buff, size_t buff_size)
00204 {
00205         ssize_t cnt;
00206         char c;
00207         unsigned int buff_cnt = 0;
00208 
00209         while ((cnt = read(fd, &c, 1)) == 1) {
00210                 if (buff_cnt < (buff_size-1)) {
00211                         buff[buff_cnt++] = c;
00212                         if (c == '\n')
00213                                 break;
00214                 } else {
00215                         break;
00216                 }
00217         }
00218 
00219         buff[buff_cnt] = 0;
00220         return (int)buff_cnt;
00221 }
00222 
00233 static int cairo_renderer_render_cell_to_vector_file(GdsOutputRenderer *renderer,
00234                                                      struct gds_cell *cell,
00235                                                      GList *layer_infos,
00236                                                      const char *pdf_file,
00237                                                      const char *svg_file,
00238                                                      double scale)
00239 {
00240         cairo_surface_t *pdf_surface = NULL, *svg_surface = NULL;
00241         cairo_t *pdf_cr = NULL, *svg_cr = NULL;
00242         struct layer_info *linfo;
00243         struct cairo_layer *layers;
00244         struct cairo_layer *lay;
00245         GList *info_list;
00246         int i;
00247         double rec_x0, rec_y0, rec_width, rec_height;
00248         double xmin = INT32_MAX, xmax = INT32_MIN, ymin = INT32_MAX, ymax = INT32_MIN;
00249         pid_t process_id;
00250         int comm_pipe[2];
00251         char receive_message[200];
```

```
00252
00253         if (pdf_file == NULL && svg_file == NULL) {
00254                 /* No output specified */
00255                 return -1;
00256         }
00257
00258         /* Generate communication pipe for status updates */
00259         if (pipe(comm_pipe) == -1)
00260                 return -2;
00261
00262         /* Fork to a new child process. This ensures the memory leaks (see issue #16) in Cairo don't
00263          * brick everything.
00264          *
00265          * And by the way: This now bricks all Windows compatibility. Deal with it.
00266          */
00267         process_id = fork();
00268         //process_id = -1;
00269         if (process_id < 0) {
00270                 /* This should not happen */
00271                 fprintf(stderr, _("Fatal error: Cairo Renderer: Could not spawn child process!"));
00272                 exit(-2);
00273         } else if (process_id > 0) {
00274                 /* Woohoo... Successfully dumped the shitty code to an unknowing victim */
00275                 goto ret_parent;
00276         }
00277
00278         /* Close stdin and (stdout and stderr may live on) */
00279         close(0);
00280         //close(1);
00281         close(comm_pipe[0]);
00282
00283
00284         layers = (struct cairo_layer *)calloc(MAX_LAYERS, sizeof(struct cairo_layer));
00285
00286         /* Clear layers */
00287         for (i = 0; i < MAX_LAYERS; i++) {
00288                 layers[i].cr = NULL;
00289                 layers[i].rec = NULL;
00290         }
00291
00292         /* Create recording surface for each layer */
00293         for (info_list = layer_infos; info_list != NULL; info_list = g_list_next(info_list)) {
00294                 linfo = (struct layer_info *)info_list->data;
00295                 if (linfo->layer < MAX_LAYERS) {
00296                         /* Layer shall not be rendered */
00297                         if (!linfo->render)
00298                                 continue;
00299
00300                         lay = &(layers[(unsigned int)linfo->layer]);
00301                         lay->linfo = linfo;
00302                         lay->rec = cairo_recording_surface_create(CAIRO_CONTENT_COLOR_ALPHA,
00303                                                                   NULL);
00304                         lay->cr = cairo_create(layers[(unsigned int)linfo->layer].rec);
00305                         cairo_scale(lay->cr, 1, -1); // Fix coordinate system
00306                         cairo_set_source_rgb(lay->cr, linfo->color.red, linfo->color.green,
    linfo->color.blue);
00307                 } else {
00308                         printf("Layer number (%d) too high!\n", linfo->layer);
00309                         goto ret_clear_layers;
00310                 }
00311         }
00312
00313         dprintf(comm_pipe[1], "Rendering layers\n");
00314         render_cell(cell, layers, scale);
00315
00316         /* get size of image and top left coordinate */
00317         for (info_list = layer_infos; info_list != NULL; info_list = g_list_next(info_list)) {
00318                 linfo = (struct layer_info *)info_list->data;
00319
00320                 if (linfo->layer >= MAX_LAYERS) {
00321                         printf(_("Layer number too high / outside of spec.\n"));
00322                         continue;
00323                 }
00324
00325                 if (!linfo->render)
00326                         continue;
00327
00328                 /* Print size */
00329                 cairo_recording_surface_ink_extents(layers[linfo->layer].rec, &rec_x0, &rec_y0,
00330                                 &rec_width, &rec_height);
00331                 dprintf(comm_pipe[1], _("Size of layer %d%s%s%s: <%lf x %lf> @ (%lf | %lf)\n"),
00332                         linfo->layer,
00333                         (linfo->name && linfo->name[0] ? " (" : ""),
00334                         (linfo->name && linfo->name[0] ? linfo->name : ""),
00335                         (linfo->name && linfo->name[0] ? ")" : ""),
00336                         rec_width, rec_height, rec_x0, rec_y0);
00337
```

```
00338                 /* update bounding box */
00339                 xmin = MIN(xmin, rec_x0);
00340                 xmax = MAX(xmax, rec_x0);
00341                 ymin = MIN(ymin, rec_y0);
00342                 ymax = MAX(ymax, rec_y0);
00343                 xmin = MIN(xmin, rec_x0+rec_width);
00344                 xmax = MAX(xmax, rec_x0+rec_width);
00345                 ymin = MIN(ymin, rec_y0+rec_height);
00346                 ymax = MAX(ymax, rec_y0+rec_height);
00347
00348         }
00349
00350         /* printf("Cell bounding box: (%lf | %lf) -- (%lf | %lf)\n", xmin, ymin, xmax, ymax); */
00351
00352         if (pdf_file) {
00353                 pdf_surface = cairo_pdf_surface_create(pdf_file, xmax-xmin, ymax-ymin);
00354                 pdf_cr = cairo_create(pdf_surface);
00355         }
00356
00357         if (svg_file) {
00358                 svg_surface = cairo_svg_surface_create(svg_file, xmax-xmin, ymax-ymin);
00359                 svg_cr = cairo_create(svg_surface);
00360         }
00361
00362         /* Write layers to PDF */
00363         for (info_list = layer_infos; info_list != NULL; info_list = g_list_next(info_list)) {
00364                 linfo = (struct layer_info *)info_list->data;
00365
00366                 dprintf(comm_pipe[1], _("Exporting layer %d to file\n"), linfo->layer);
00367
00368                 if (linfo->layer >= MAX_LAYERS) {
00369                         printf(_("Layer outside of spec.\n"));
00370                         continue;
00371                 }
00372
00373                 if (!linfo->render)
00374                         continue;
00375
00376                 if (pdf_file && pdf_cr) {
00377                         cairo_set_source_surface(pdf_cr, layers[linfo->layer].rec, -xmin, -ymin);
00378                         cairo_paint_with_alpha(pdf_cr, linfo->color.alpha);
00379                 }
00380
00381                 if (svg_file && svg_cr) {
00382                         cairo_set_source_surface(svg_cr, layers[linfo->layer].rec, -xmin, -ymin);
00383                         cairo_paint_with_alpha(svg_cr, linfo->color.alpha);
00384                 }
00385         }
00386
00387         if (pdf_file) {
00388                 cairo_show_page(pdf_cr);
00389                 cairo_destroy(pdf_cr);
00390                 cairo_surface_destroy(pdf_surface);
00391         }
00392
00393         if (svg_file) {
00394                 cairo_show_page(svg_cr);
00395                 cairo_destroy(svg_cr);
00396                 cairo_surface_destroy(svg_surface);
00397         }
00398
00399 ret_clear_layers:
00400         for (i = 0; i < MAX_LAYERS; i++) {
00401                 lay = &layers[i];
00402                 if (lay->cr) {
00403                         cairo_destroy(lay->cr);
00404                         cairo_surface_destroy(lay->rec);
00405                 }
00406         }
00407         free(layers);
00408
00409         printf(_("Cairo export finished. It might still be buggy!\n"));
00410
00411         /* Suspend child process */
00412         exit(0);
00413
00414 ret_parent:
00415         close(comm_pipe[1]);
00416
00417         while (read_line_from_fd(comm_pipe[0], receive_message, sizeof(receive_message)) > 0) {
00418                 /* Strip \n from string and replace with ' ' */
00419                 for (i = 0; receive_message[i] != '\0'; i++) {
00420                         if (receive_message[i] == '\n')
00421                                 receive_message[i] = ' ';
00422                 }
00423
00424                 /* Update asyc progress*/
```

```
00425                 gds_output_renderer_update_async_progress(renderer, receive_message);
00426         }
00427
00428         waitpid(process_id, NULL, 0);
00429
00430         close(comm_pipe[0]);
00431         return 0;
00432 }
00433
00434 static void cairo_renderer_init(CairoRenderer *self)
00435 {
00436         /* PDF default */
00437         self->svg = FALSE;
00438 }
00439
00440 static int cairo_renderer_render_output(GdsOutputRenderer *renderer,
00441                                         struct gds_cell *cell,
00442                                         double scale)
00443 {
00444         CairoRenderer *c_renderer = GDS_RENDER_CAIRO_RENDERER(renderer);
00445         const char *pdf_file = NULL;
00446         const char *svg_file = NULL;
00447         LayerSettings *settings;
00448         GList *layer_infos = NULL;
00449         const char *output_file;
00450         int ret;
00451
00452         if (!c_renderer)
00453                 return -2000;
00454
00455         output_file = gds_output_renderer_get_output_file(renderer);
00456         settings = gds_output_renderer_get_and_ref_layer_settings(renderer);
00457
00458         /* Set layer info list. In case of failure it remains NULL */
00459         if (settings)
00460                 layer_infos = layer_settings_get_layer_info_list(settings);
00461
00462         if (c_renderer->svg == TRUE)
00463                 svg_file = output_file;
00464         else
00465                 pdf_file = output_file;
00466
00467         gds_output_renderer_update_async_progress(renderer, _("Rendering Cairo Output..."));
00468         ret = cairo_renderer_render_cell_to_vector_file(renderer, cell, layer_infos, pdf_file,
      svg_file, scale);
00469
00470         if (settings)
00471                 g_object_unref(settings);
00472
00473         return ret;
00474 }
00475
00476 static void cairo_renderer_class_init(CairoRendererClass *klass)
00477 {
00478         GdsOutputRendererClass *renderer_class = GDS_RENDER_OUTPUT_RENDERER_CLASS(klass);
00479
00480         renderer_class->render_output = cairo_renderer_render_output;
00481 }
00482
00483 CairoRenderer *cairo_renderer_new_pdf()
00484 {
00485         CairoRenderer *renderer;
00486
00487         renderer = GDS_RENDER_CAIRO_RENDERER(g_object_new(GDS_RENDER_TYPE_CAIRO_RENDERER, NULL));
00488         renderer->svg = FALSE;
00489
00490         return renderer;
00491 }
00492
00493 CairoRenderer *cairo_renderer_new_svg()
00494 {
00495         CairoRenderer *renderer;
00496
00497         renderer = GDS_RENDER_CAIRO_RENDERER(g_object_new(GDS_RENDER_TYPE_CAIRO_RENDERER, NULL));
00498         renderer->svg = TRUE;
00499
00500         return renderer;
00501 }
00502
```

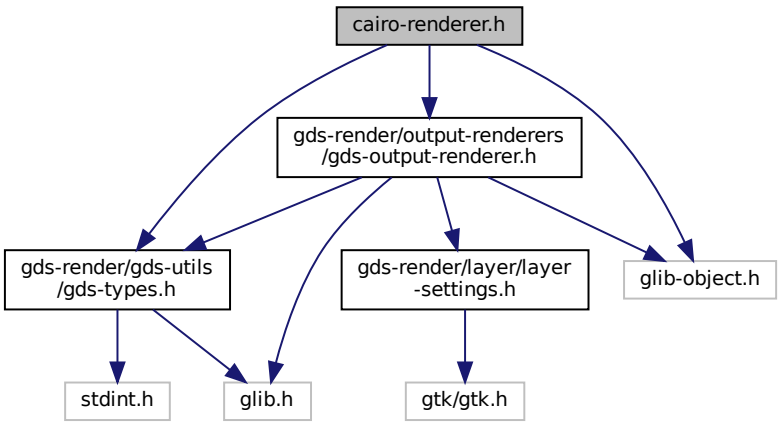
13.12 cairo-renderer.dox File Reference

13.13 cairo-renderer.h File Reference

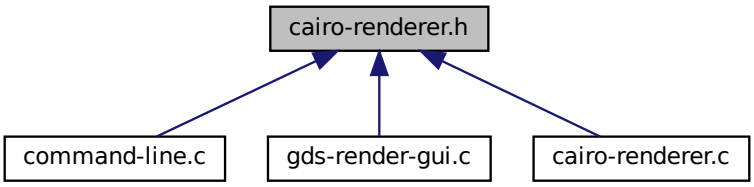
Header File for Cairo output renderer.

```
#include <gds-render/gds-utils/gds-types.h>
#include <gds-render/output-renderers/gds-output-renderer.h>
#include <glib-object.h>
```

Include dependency graph for cairo-renderer.h:



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



Macros

- #define GDS_RENDER_TYPE_CAIRO_RENDERER (cairo_renderer_get_type())
- #define MAX_LAYERS (300)

  Maximum layer count the output renderer can process. Typically GDS only specifies up to 255 layers.

Functions

- CairoRenderer * cairo_renderer_new_svg ()

  Create new CairoRenderer for SVG output.

- CairoRenderer * cairo_renderer_new_pdf ()

  Create new CairoRenderer for PDF output.

13.13.1 Detailed Description

Header File for Cairo output renderer.

Author

Mario Hüttel mario.huettel@gmx.net

Definition in file cairo-renderer.h.

13.14 cairo-renderer.h

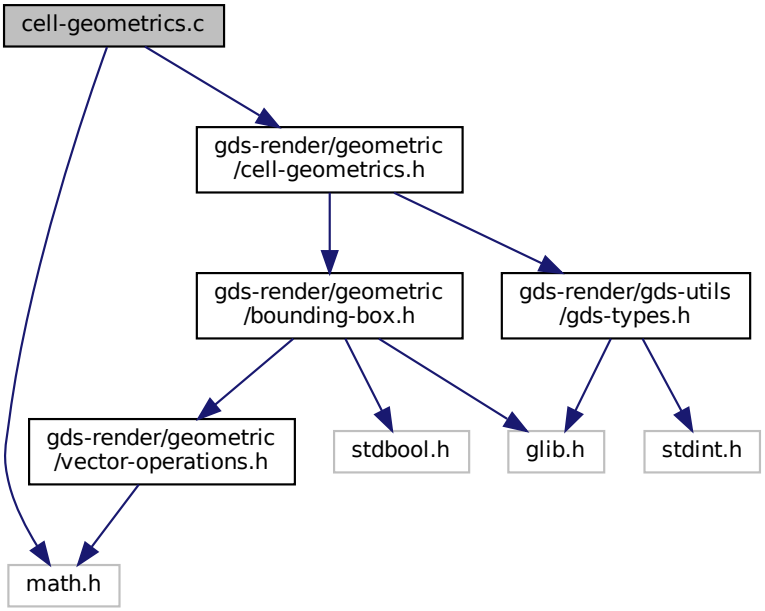
```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00024 #ifndef _CAIRO_OUTPUT_H_
00025 #define _CAIRO_OUTPUT_H_
00026
00027 #include <gds-render/gds-utils/gds-types.h>
00028 #include <gds-render/output-renderers/gds-output-renderer.h>
00029 #include <glib-object.h>
00030
00031 G_BEGIN_DECLS
00032
00037 G_DECLARE_FINAL_TYPE(CairoRenderer, cairo_renderer, GDS_RENDER, CAIRO_RENDERER, GdsOutputRenderer)
00038
00039 #define GDS_RENDER_TYPE_CAIRO_RENDERER (cairo_renderer_get_type())
00040
00041 #define MAX_LAYERS (300)
00047 CairoRenderer *cairo_renderer_new_svg();
00048
00049
00054 CairoRenderer *cairo_renderer_new_pdf();
00055
00058 G_END_DECLS
00059
00060 #endif /* _CAIRO_OUTPUT_H_ */
```

13.15 cell-geometrics.c File Reference

Calculation of gds_cell trigonometrics.

```
#include <math.h>
#include <gds-render/geometric/cell-geometrics.h>
```

Include dependency graph for cell-geometrics.c:



Functions

- static void convert_gds_point_to_2d_vector (struct gds_point *pt, struct vector_2d *vector)
- static void update_box_with_gfx (union bounding_box *box, struct gds_graphics *gfx)

  Update the given bounding box with the bounding box of a graphics element.
- void calculate_cell_bounding_box (union bounding_box *box, struct gds_cell *cell)

  calculate_cell_bounding_box Calculate bounding box of gds cell

13.15.1 Detailed Description

Calculation of gds_cell trigonometrics.

Author

Mario Hüttel mario.huettel@gmx.net

Definition in file cell-geometrics.c.

13.16 cell-geometrics.c

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00026 #include <math.h>
00027
00028 #include <gds-render/geometric/cell-geometrics.h>
00029
00035 static void convert_gds_point_to_2d_vector(struct gds_point *pt, struct vector_2d *vector)
00036 {
00037         vector->x = pt->x;
00038         vector->y = pt->y;
00039 }
00040
00046 static void update_box_with_gfx(union bounding_box *box, struct gds_graphics *gfx)
00047 {
00048         union bounding_box current_box;
00049
00050         bounding_box_prepare_empty(&current_box);
00051
00052         switch (gfx->gfx_type) {
00053         case GRAPHIC_BOX:
00054                 /* Expected fallthrough */
00055         case GRAPHIC_POLYGON:
00056                 bounding_box_calculate_polygon(gfx->vertices,
00057
      (conv_generic_to_vector_2d_t)&convert_gds_point_to_2d_vector,
00058                                                &current_box);
00059                 break;
00060         case GRAPHIC_PATH:
00061                 /*
00062                  * This is not implemented correctly.
00063                  * Please be aware if paths are the outmost elements of your cell.
00064                  * You might end up with a completely wrong calculated cell size.
00065                  */
00066                 bounding_box_update_with_path(gfx->vertices, gfx->width_absolute,
00067
      (conv_generic_to_vector_2d_t)&convert_gds_point_to_2d_vector,
00068                                               &current_box);
00069                 break;
00070         default:
00071                 /* Unknown graphics object. */
00072                 /* Print error? Nah.. */
00073                 break;
00074         }
00075
00076         /* Update box with results */
00077         bounding_box_update_box(box, &current_box);
00078 }
00079
00080 void calculate_cell_bounding_box(union bounding_box *box, struct gds_cell *cell)
00081 {
00082         GList *gfx_list;
00083         struct gds_graphics *gfx;
00084         GList *sub_cell_list;
00085         struct gds_cell_instance *sub_cell;
00086         union bounding_box temp_box;
00087
00088         if (!box || !cell)
00089                 return;
00090
00091         /* Update box with graphic elements */
00092         for (gfx_list = cell->graphic_objs; gfx_list != NULL; gfx_list = gfx_list->next) {
00093                 gfx = (struct gds_graphics *)gfx_list->data;
00094                 update_box_with_gfx(box, gfx);
00095         }
00096
00097         /* Update bounding box with boxes of subcells */
00098         for (sub_cell_list = cell->child_cells; sub_cell_list != NULL;
00099                                                 sub_cell_list = sub_cell_list->next) {
```

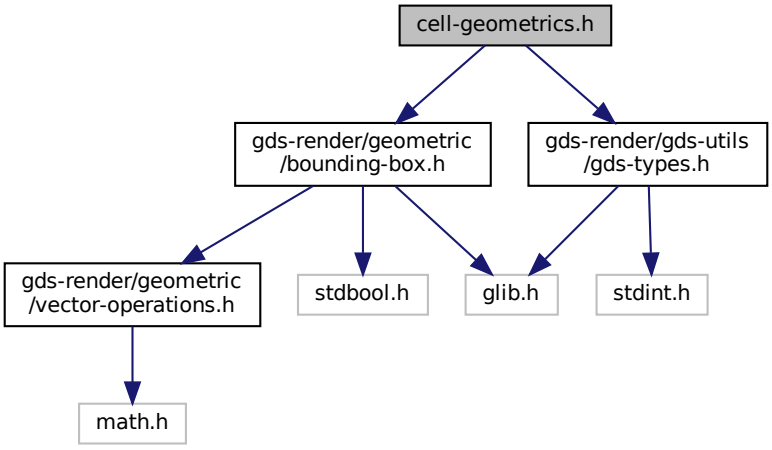
```
00100                 sub_cell = (struct gds_cell_instance *)sub_cell_list->data;
00101                 bounding_box_prepare_empty(&temp_box);
00102                 /* Recursion Woohoo!!  This dies if your GDS is faulty and contains a reference loop
      */
00103                 calculate_cell_bounding_box(&temp_box, sub_cell->cell_ref);
00104
00105                 /* Apply transformations */
00106                 bounding_box_apply_transform(ABS(sub_cell->magnification), sub_cell->angle,
00107                                              sub_cell->flipped, &temp_box);
00108
00109                 /* Move bounding box to origin */
00110                 temp_box.vectors.lower_left.x += sub_cell->origin.x;
00111                 temp_box.vectors.upper_right.x += sub_cell->origin.x;
00112                 temp_box.vectors.lower_left.y += sub_cell->origin.y;
00113                 temp_box.vectors.upper_right.y += sub_cell->origin.y;
00114
00115                 /* update the parent's box */
00116                 bounding_box_update_box(box, &temp_box);
00117         }
00118 }
00119
```

13.17 cell-geometrics.h File Reference

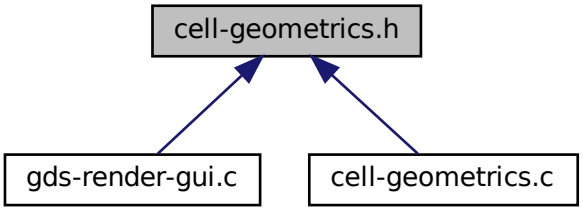
Calculation of gds_cell geometrics.

```
#include <gds-render/geometric/bounding-box.h>
#include <gds-render/gds-utils/gds-types.h>
```

Include dependency graph for cell-geometrics.h:



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



Functions

- void calculate_cell_bounding_box (union bounding_box *box, struct gds_cell *cell)

  calculate_cell_bounding_box Calculate bounding box of gds cell

13.17.1 Detailed Description

Calculation of gds_cell geometrics.

Author

Mario Hüttel mario.huettel@gmx.net

Definition in file cell-geometrics.h.

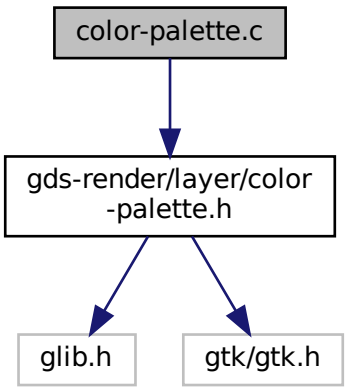
13.18 cell-geometrics.h

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00031 #ifndef _CELL_GEOMETRICS_H_
00032 #define _CELL_GEOMETRICS_H_
00033
00034 #include <gds-render/geometric/bounding-box.h>
00035 #include <gds-render/gds-utils/gds-types.h>
00036
00043 void calculate_cell_bounding_box(union bounding_box *box, struct gds_cell *cell);
00044
00045 #endif /* _CELL_GEOMETRICS_H_ */
00046
```

13.19 color-palette.c File Reference

Class representing a color palette.

`#include <gds-render/layer/color-palette.h>`
Include dependency graph for color-palette.c:



Data Structures

- struct _ColorPalette

Functions

- static int count_non_empty_lines_in_array (const char *data, size_t length)

  Return the number of non empty lines in array.
- static int color_palette_fill_with_resource (ColorPalette *palette, char *resource_name)

  color_palette_fill_with_resource
- ColorPalette * color_palette_new_from_resource (char *resource_name)

  Create a new object with from a resource containing the html hex color scheme.
- GdkRGBA * color_palette_get_color (ColorPalette *palette, GdkRGBA *color, unsigned int index)

  Get the n-th color in the palette identified by the index.
- unsigned int color_palette_get_color_count (ColorPalette *palette)

  Return amount of stored colors in `palette`.
- static void color_palette_dispose (GObject *gobj)
- static void color_palette_class_init (ColorPaletteClass *klass)
- static void color_palette_init (ColorPalette *self)

13.19.1 Detailed Description

Class representing a color palette.

Author

Mario Hüttel `mario.huettel@gmx.net`

Definition in file color-palette.c.

13.19.2 Function Documentation

13.19.2.1 color_palette_class_init()

```
static void color_palette_class_init (
            ColorPaletteClass * klass )  [static]
```

Definition at line 247 of file color-palette.c.

Here is the call graph for this function:

13.19.2.2 color_palette_dispose()

```
static void color_palette_dispose (
            GObject * gobj )  [static]
```

Definition at line 233 of file color-palette.c.

Here is the caller graph for this function:

13.19.2.3 color_palette_fill_with_resource()

```
static int color_palette_fill_with_resource (
            ColorPalette * palette,
            char * resource_name )  [static]
```

color_palette_fill_with_resource

Parameters

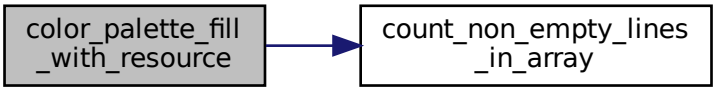
palette	
resource_name	

Returns

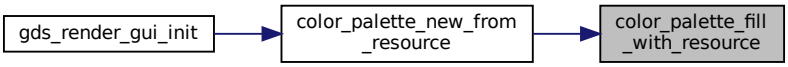
0 if successful

Definition at line 84 of file color-palette.c.

Here is the call graph for this function:



Here is the caller graph for this function:



13.19.2.4 color_palette_get_color()

```
GdkRGBA* color_palette_get_color (
            ColorPalette * palette,
            GdkRGBA * color,
            unsigned int index )
```

Get the n-th color in the palette identified by the index.

This function fills the nth color into the supplied `color`. `color` is returned.

If `color` is NULL, a new GdkRGBA is created and returned. This element must be freed afterwards.

Parameters

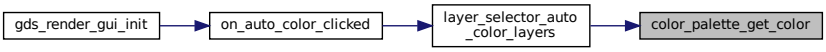
palette	Color palette
color	GdkRGBA struct to fill data in. May be NULL.
index	Index of color. Starts at 0

Returns

GdkRGBA color. If `color` is NULL, the returned color must be freed afterwards

Definition at line 199 of file color-palette.c.

Here is the caller graph for this function:



13.19.2.5 color_palette_get_color_count()

```
unsigned int color_palette_get_color_count (
            ColorPalette * palette )
```

Return amount of stored colors in `palette`.

Parameters

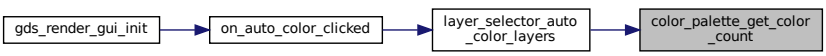
palette	Color palette

Returns

Count of colors

Definition at line 223 of file color-palette.c.

Here is the caller graph for this function:



13.19.2.6 color_palette_init()

```
static void color_palette_init (
            ColorPalette * self )  [static]
```

Definition at line 255 of file color-palette.c.

13.19.2.7 color_palette_new_from_resource()

```
ColorPalette* color_palette_new_from_resource (
            char * resource_name )
```

Create a new object with from a resource containing the html hex color scheme.

Parameters

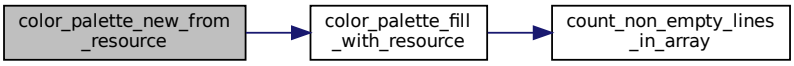
resource_name	Name of the resource

Returns

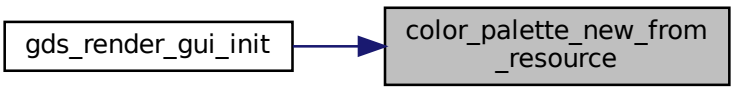
New object

Definition at line 188 of file color-palette.c.

Here is the call graph for this function:



Here is the caller graph for this function:



13.19.2.8 count_non_empty_lines_in_array()

```
static int count_non_empty_lines_in_array (
            const char * data,
            size_t length )  [static]
```

Return the number of non empty lines in array.

This function returns the number of non empty lines in an array. The scanning is either terminated by the given length or if a \0 terminator is found.

Parameters

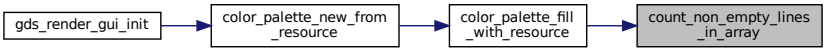
in	*data*	Array to count lines in
in	*length*	Length of `data`

Returns

< 0: Error, >=0: Lines

Definition at line 55 of file color-palette.c.

Here is the caller graph for this function:



13.20 color-palette.c

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2019  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00026 #include <gds-render/layer/color-palette.h>
00027
00028 struct _ColorPalette {
00029                 /* Inheritance */
00030                 GObject parent;
00031
00032                 /* Custom fields */
00034                 GdkRGBA *color_array;
00036                 unsigned int color_array_length;
00037
00038                 /* Dummy bytes to ensure ABI compatibility in future versions */
00039                 gpointer dummy[4];
```

```
00040 };
00041
00042 G_DEFINE_TYPE(ColorPalette, color_palette, G_TYPE_OBJECT)
00043
00044
00055 static int count_non_empty_lines_in_array(const char *data, size_t length)
00056 {
00057         unsigned int idx;
00058         int non_empty_lines = 0;
00059         char last_char = '\n';
00060
00061         if (!data)
00062                 return -1;
00063
00064         /* Count each '\n' as a new line if it is not directly preceded by another '\n' */
00065         for (idx = 0; idx < length && data[idx]; idx++) {
00066                 if (data[idx] == '\n' && last_char != '\n')
00067                         non_empty_lines++;
00068                 last_char = data[idx];
00069         }
00070
00071         /* Count the last line in case the data does not end with a '\n' */
00072         if (data[idx-1] != '\n')
00073                 non_empty_lines++;
00074
00075         return non_empty_lines;
00076 }
00077
00084 static int color_palette_fill_with_resource(ColorPalette *palette, char *resource_name)
00085 {
00086         GBytes *data;
00087         char line[10];
00088         int line_idx;
00089         unsigned int color_idx;
00090         int idx;
00091         const char *char_array;
00092         gsize byte_count;
00093         int lines;
00094         GRegex *regex;
00095         GMatchInfo *mi;
00096         char *match;
00097
00098         if (!palette || !resource_name)
00099                 return -1;
00100
00101         data = g_resources_lookup_data(resource_name, 0, NULL);
00102
00103         if (!data)
00104                 return -2;
00105
00106         char_array = (const char *)g_bytes_get_data(data, &byte_count);
00107
00108         if (!char_array || !byte_count)
00109                 goto ret_unref_data;
00110
00111         /* Get maximum lenght of color palette, assuming all entries are valid */
00112         lines = count_non_empty_lines_in_array(char_array, byte_count);
00113
00114         if (lines <= 0)
00115                 goto ret_unref_data;
00116
00117         palette->color_array = (GdkRGBA *)malloc(sizeof(GdkRGBA) * (unsigned int)lines);
00118
00119         /* Setup regex for hexadecimal RGB colors like 'A0CB3F' */
00120         regex =
      g_regex_new("^(?<red>[0-9A-Fa-f][0-9A-Fa-f])(?<green>[0-9A-Fa-f][0-9A-Fa-f])(?<blue>[0-9A-Fa-f][0-9A-Fa-f])$",
00121                                 0, 0, NULL);
00122
00123         /* Reset line */
00124         line_idx = 0;
00125         line[0] = '\0';
00126
00127         /* Set color index */
00128         color_idx = 0;
00129
00130         /* interate over lines and match */
00131         for (idx = 0 ; (unsigned int)idx < byte_count; idx++) {
00132                 /* Fillup line. */
00133                 line[line_idx] = char_array[idx];
00134
00135                 /* If end of line/string is reached, process */
00136                 if (line[line_idx] == '\n' || line[line_idx] == '\0') {
00137                         line[line_idx] = '\0';
00138
00139                         /* Match the line */
00140                         g_regex_match(regex, line, 0, &mi);
00141                         if (g_match_info_matches(mi) && color_idx < (unsigned int)lines) {
```

```
00142                                   match = g_match_info_fetch_named(mi, "red");
00143                                   palette->color_array[color_idx].red =
00144                                           (double)g_ascii_strtoll(match, NULL, 16) / 255.0;
00145                                   g_free(match);
00146                                   match = g_match_info_fetch_named(mi, "green");
00147                                   palette->color_array[color_idx].green =
00148                                           (double)g_ascii_strtoll(match, NULL, 16) / 255.0;
00149                                   g_free(match);
00150                                   match = g_match_info_fetch_named(mi, "blue");
00151                                   palette->color_array[color_idx].blue =
00152                                           (double)g_ascii_strtoll(match, NULL, 16) / 255.0;
00153                                   g_free(match);
00154
00155                                   /* Only RGB supported so far. Fix alpha channel to 1.0 */
00156                                   palette->color_array[color_idx].alpha = 1.0;
00157
00158                                   color_idx++;
00159                           }
00160
00161                           g_match_info_free(mi);
00162
00163                           /* End of string */
00164                           if (char_array[idx] == '\0')
00165                                   break;
00166
00167                           line_idx = 0;
00168                           continue;
00169                   }
00170
00171                   /* increment line index. If end is reached write all bytes  to the line end.
00172                    * Line is longer than required for parsing. This ensures, that everything works as
     expected
00173                    */
00174                   line_idx += ((unsigned int)line_idx < sizeof(line)-1 ? 1 : 0);
00175           }
00176
00177           /* Data read; Shrink array in case of invalid lines */
00178           palette->color_array = realloc(palette->color_array, (size_t)color_idx * sizeof(GdkRGBA));
00179           palette->color_array_length = color_idx;
00180
00181           g_regex_unref(regex);
00182   ret_unref_data:
00183           g_bytes_unref(data);
00184
00185           return 0;
00186   }
00187
00188   ColorPalette *color_palette_new_from_resource(char *resource_name)
00189   {
00190           ColorPalette *palette;
00191
00192           palette = GDS_RENDER_COLOR_PALETTE(g_object_new(TYPE_GDS_RENDER_COLOR_PALETTE, NULL));
00193           if (palette)
00194                   (void)color_palette_fill_with_resource(palette, resource_name);
00195
00196           return palette;
00197   }
00198
00199   GdkRGBA *color_palette_get_color(ColorPalette *palette, GdkRGBA *color, unsigned int index)
00200   {
00201           GdkRGBA *c = NULL;
00202
00203           if (!palette)
00204                   goto ret_c;
00205
00206           if (index >= palette->color_array_length)
00207                   goto ret_c;
00208
00209           if (color)
00210                   c = color;
00211           else
00212                   c = (GdkRGBA *)malloc(sizeof(GdkRGBA));
00213
00214           /* Copy color */
00215           c->red = palette->color_array[index].red;
00216           c->green = palette->color_array[index].green;
00217           c->blue = palette->color_array[index].blue;
00218           c->alpha = palette->color_array[index].alpha;
00219   ret_c:
00220           return c;
00221   }
00222
00223   unsigned int color_palette_get_color_count(ColorPalette *palette)
00224   {
00225           unsigned int return_val = 0;
00226
00227           if (palette)
```

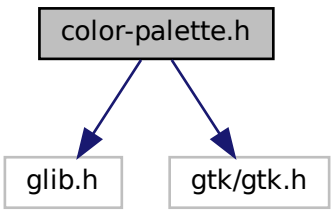
```
00228                 return_val = palette->color_array_length;
00229
00230         return return_val;
00231 }
00232
00233 static void color_palette_dispose(GObject *gobj)
00234 {
00235         ColorPalette *palette;
00236
00237         palette = GDS_RENDER_COLOR_PALETTE(gobj);
00238         if (palette->color_array) {
00239                 palette->color_array_length = 0;
00240                 free(palette->color_array);
00241         }
00242
00243         /* Chain up to parent class */
00244         G_OBJECT_CLASS(color_palette_parent_class)->dispose(gobj);
00245 }
00246
00247 static void color_palette_class_init(ColorPaletteClass *klass)
00248 {
00249         GObjectClass *gclass;
00250
00251         gclass = G_OBJECT_CLASS(klass);
00252         gclass->dispose = color_palette_dispose;
00253 }
00254
00255 static void color_palette_init(ColorPalette *self)
00256 {
00257         self->color_array = NULL;
00258         self->color_array_length = 0;
00259 }
```

13.21 color-palette.h File Reference

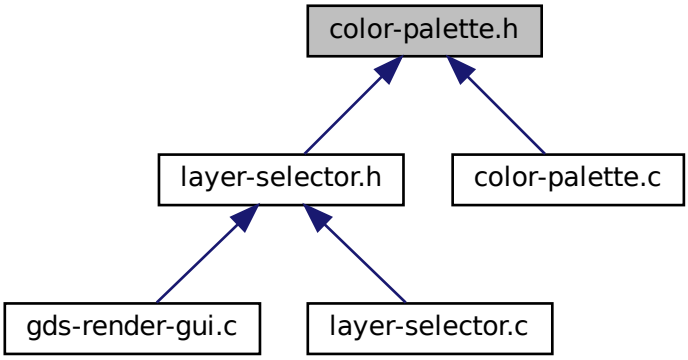
Class representing a color palette.

```
#include <glib.h>
#include <gtk/gtk.h>
```

Include dependency graph for color-palette.h:



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



Macros

- #define TYPE_GDS_RENDER_COLOR_PALETTE (color_palette_get_type())

Functions

- G_BEGIN_DECLS G_DECLARE_FINAL_TYPE (ColorPalette, color_palette, GDS_RENDER, COLOR_P↩ ALETTE, GObject)
- ColorPalette ∗ color_palette_new_from_resource (char ∗resource_name)

  Create a new object with from a resource containing the html hex color scheme.
- GdkRGBA ∗ color_palette_get_color (ColorPalette ∗palette, GdkRGBA ∗color, unsigned int index)

  Get the n-th color in the palette identified by the index.
- unsigned int color_palette_get_color_count (ColorPalette ∗palette)

  Return amount of stored colors in `palette`.

13.21.1 Detailed Description

Class representing a color palette.

Author

Mario Hüttel `mario.huettel@gmx.net`

Definition in file color-palette.h.

13.21.2 Macro Definition Documentation

13.21.2.1 TYPE_GDS_RENDER_COLOR_PALETTE

```
#define TYPE_GDS_RENDER_COLOR_PALETTE (color_palette_get_type())
```

Definition at line 36 of file color-palette.h.

13.21.3 Function Documentation

13.21.3.1 color_palette_get_color()

```
GdkRGBA* color_palette_get_color (
            ColorPalette * palette,
            GdkRGBA * color,
            unsigned int index )
```

Get the n-th color in the palette identified by the index.

This function fills the nth color into the supplied `color`. `color` is returned.

If `color` is NULL, a new GdkRGBA is created and returned. This element must be freed afterwards.

Parameters

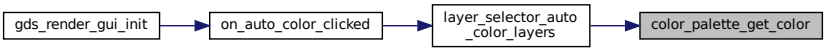
palette	Color palette
color	GdkRGBA struct to fill data in. May be NULL.
index	Index of color. Starts at 0

Returns

GdkRGBA color. If `color` is NULL, the returned color must be freed afterwards

Definition at line 199 of file color-palette.c.

Here is the caller graph for this function:



13.21.3.2 color_palette_get_color_count()

```
unsigned int color_palette_get_color_count (
            ColorPalette * palette )
```

Return amount of stored colors in `palette`.

Parameters

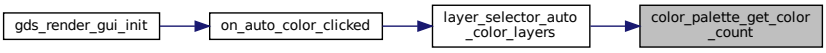
palette	Color palette

Returns

Count of colors

Definition at line 223 of file color-palette.c.

Here is the caller graph for this function:



13.21.3.3 color_palette_new_from_resource()

```
ColorPalette* color_palette_new_from_resource (
            char * resource_name )
```

Create a new object with from a resource containing the html hex color scheme.

Parameters

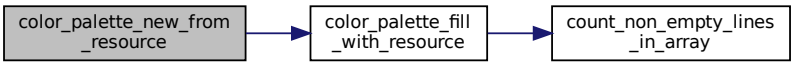
resource_name	Name of the resource

Returns

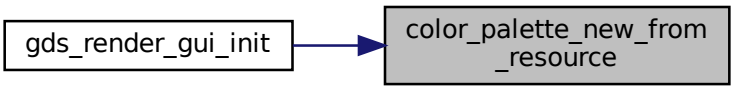
New object

Definition at line 188 of file color-palette.c.

Here is the call graph for this function:



Here is the caller graph for this function:



13.21.3.4 G_DECLARE_FINAL_TYPE()

```
G_BEGIN_DECLS G_DECLARE_FINAL_TYPE (
             ColorPalette ,
             color_palette ,
             GDS_RENDER ,
             COLOR_PALETTE ,
             GObject  )
```

13.22 color-palette.h

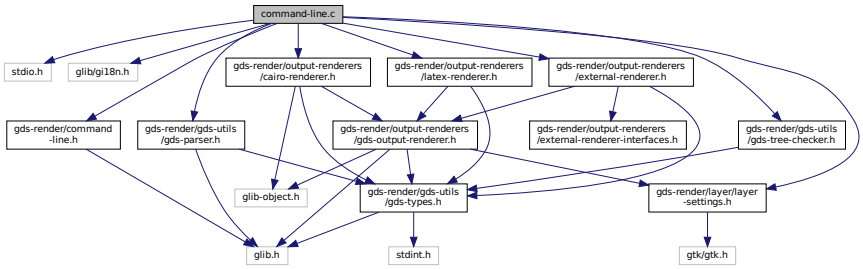
```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2019  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00026 #ifndef _COLOR_PALETTE_H_
00027 #define _COLOR_PALETTE_H_
00028
00029 #include <glib.h>
00030 #include <gtk/gtk.h>
00031
00032 G_BEGIN_DECLS
00033
00034 G_DECLARE_FINAL_TYPE(ColorPalette, color_palette, GDS_RENDER, COLOR_PALETTE, GObject);
00035
00036 #define TYPE_GDS_RENDER_COLOR_PALETTE (color_palette_get_type())
00037
00043 ColorPalette *color_palette_new_from_resource(char *resource_name);
00044
00059 GdkRGBA *color_palette_get_color(ColorPalette *palette, GdkRGBA *color, unsigned int index);
00060
00066 unsigned int color_palette_get_color_count(ColorPalette *palette);
00067
00068 G_END_DECLS
00069
00070 #endif /* _COLOR_PALETTE_H_ */
```

13.23 command-line.c File Reference

Function to render according to command line parameters.

```
#include <stdio.h>
#include <glib/gi18n.h>
#include <gds-render/command-line.h>
#include <gds-render/gds-utils/gds-parser.h>
#include <gds-render/layer/layer-settings.h>
#include <gds-render/output-renderers/cairo-renderer.h>
#include <gds-render/output-renderers/latex-renderer.h>
#include <gds-render/output-renderers/external-renderer.h>
#include <gds-render/gds-utils/gds-tree-checker.h>
```

Include dependency graph for command-line.c:



Functions

- static int string_array_count (char **string_array)
- static int create_renderers (char **renderers, char **output_file_names, gboolean tex_layers, gboolean tex_standalone, const struct external_renderer_params *ext_params, GList **renderer_list, LayerSettings *layer_settings)
- static struct gds_cell * find_gds_cell_in_lib (struct gds_library *lib, const char *cell_name)
- int command_line_convert_gds (const char *gds_name, const char *cell_name, char **renderers, char **output_file_names, const char *layer_file, struct external_renderer_params *ext_param, gboolean tex↩ _standalone, gboolean tex_layers, double scale)

  Convert GDS according to command line parameters.

13.23.1 Detailed Description

Function to render according to command line parameters.

Author

Mario Hüttel mario.huettel@gmx.net

Definition in file command-line.c.

13.24 command-line.c

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00031 #include <stdio.h>
00032 #include <glib/gi18n.h>
00033
00034 #include <gds-render/command-line.h>
00035 #include <gds-render/gds-utils/gds-parser.h>
00036 #include <gds-render/layer/layer-settings.h>
00037 #include <gds-render/output-renderers/cairo-renderer.h>
00038 #include <gds-render/output-renderers/latex-renderer.h>
00039 #include <gds-render/output-renderers/external-renderer.h>
00040 #include <gds-render/gds-utils/gds-tree-checker.h>
00041
00042 static int string_array_count(char **string_array)
00043 {
00044         int count;
00045
00046         if (!string_array)
00047                 return 0;
00048
00049         for (count = 0; *string_array; string_array++)
00050                 count++;
00051
00052         return count;
00053 }
00054
00055 static int create_renderers(char **renderers,
00056                             char **output_file_names,
00057                             gboolean tex_layers,
00058                             gboolean tex_standalone,
00059                             const struct external_renderer_params *ext_params,
00060                             GList **renderer_list,
00061                             LayerSettings *layer_settings)
00062 {
00063         char **renderer_iter;
00064         char *current_renderer;
00065         int idx;
00066         char *current_out_file;
00067         int count_render, count_out;
00068         GdsOutputRenderer *output_renderer;
00069
00070         if (!renderer_list)
00071                 return -1;
00072
00073         if (!renderers || !output_file_names) {
00074                 fprintf(stderr, _("Please specify renderers and file names\n"));
00075                 return -1;
00076         }
00077
00078         count_render = string_array_count(renderers);
00079         count_out = string_array_count(output_file_names);
00080         if (count_render != count_out) {
00081                 fprintf(stderr, _("Count of renderers %d does not match count of output file names
      %d\n"),
00082                         count_render, count_out);
00083                 return -1;
00084         }
00085
00086         /* Parse cmd line parameters */
00087         for (renderer_iter = renderers, idx = 0; *renderer_iter; renderer_iter++, idx++) {
00088                 current_renderer = *renderer_iter;
00089                 current_out_file = output_file_names[idx];
00090
00091                 /* File valid ? */
00092                 if (!current_out_file || !current_out_file[0])
00093                         continue;
00094
00095                 if (!strcmp(current_renderer, "tikz")) {
```

```
00096                         output_renderer =
      GDS_RENDER_OUTPUT_RENDERER(latex_renderer_new_with_options(tex_layers,
00097
      tex_standalone));
00098                 } else if (!strcmp(current_renderer, "pdf")) {
00099                         output_renderer = GDS_RENDER_OUTPUT_RENDERER(cairo_renderer_new_pdf());
00100                 } else if (!strcmp(current_renderer, "svg")) {
00101                         output_renderer = GDS_RENDER_OUTPUT_RENDERER(cairo_renderer_new_svg());
00102                 } else if (!strcmp(current_renderer, "ext")) {
00103                         if (!ext_params->so_path) {
00104                                 fprintf(stderr, _("Please specify shared object for external renderer.
      Will ignore this renderer.\n"));
00105                                 continue;
00106                         }
00107                         output_renderer = GDS_RENDER_OUTPUT_RENDERER(
00108
      external_renderer_new_with_so_and_param(ext_params->so_path,
00109
      ext_params->cli_params));
00110                 } else {
00111                         continue;
00112                 }
00113
00114                 gds_output_renderer_set_output_file(output_renderer, current_out_file);
00115                 gds_output_renderer_set_layer_settings(output_renderer, layer_settings);
00116                 *renderer_list = g_list_append(*renderer_list, output_renderer);
00117         }
00118
00119         return 0;
00120 }
00121
00122 static struct gds_cell *find_gds_cell_in_lib(struct gds_library *lib, const char *cell_name)
00123 {
00124         GList *cell_list;
00125         struct gds_cell *return_cell = NULL;
00126         struct gds_cell *temp_cell;
00127
00128         for (cell_list = lib->cells; cell_list; cell_list = g_list_next(cell_list)) {
00129                 temp_cell = (struct gds_cell *)cell_list->data;
00130                 if (!strncmp(temp_cell->name, cell_name, CELL_NAME_MAX)) {
00131                         return_cell = temp_cell;
00132                         break;
00133                 }
00134         }
00135         return return_cell;
00136 }
00137
00138 int command_line_convert_gds(const char *gds_name,
00139                              const char *cell_name,
00140                              char **renderers,
00141                              char **output_file_names,
00142                              const char *layer_file,
00143                              struct external_renderer_params *ext_param,
00144                              gboolean tex_standalone,
00145                              gboolean tex_layers,
00146                              double scale)
00147 {
00148         int ret = -1;
00149         GList *libs = NULL;
00150         int res;
00151         GList *renderer_list = NULL;
00152         GList *list_iter;
00153         struct gds_library *first_lib;
00154         struct gds_cell *toplevel_cell = NULL;
00155         LayerSettings *layer_sett;
00156         GdsOutputRenderer *current_renderer;
00157
00158         /* Check if parameters are valid */
00159         if (!gds_name || !cell_name || !output_file_names || !layer_file || !renderers) {
00160                 printf(_("Probably missing argument. Check --help option\n"));
00161                 return -2;
00162         }
00163
00164         /* Load layer_settings */
00165         layer_sett = layer_settings_new();
00166         layer_settings_load_from_csv(layer_sett, layer_file);
00167
00168         /* Create renderers */
00169         if (create_renderers(renderers, output_file_names, tex_layers, tex_standalone,
00170                              ext_param, &renderer_list, layer_sett))
00171                 goto ret_destroy_layer_mapping;
00172
00173
00174         /* Load GDS */
00175         clear_lib_list(&libs);
00176         res = parse_gds_from_file(gds_name, &libs);
00177         if (res)
```

```
00178                 goto ret_destroy_library_list;
00179
00180         /* find_cell in first library. */
00181         if (!libs)
00182                 goto ret_clear_renderers;
00183
00184         first_lib = (struct gds_library *)libs->data;
00185         if (!first_lib) {
00186                 fprintf(stderr, _("No library in library list. This should not happen.\n"));
00187                 /* This is safe. Library destruction can handle an empty list element */
00188                 goto ret_destroy_library_list;
00189         }
00190
00191         /* Find cell in first library */
00192         toplevel_cell = find_gds_cell_in_lib(first_lib, cell_name);
00193
00194         if (!toplevel_cell) {
00195                 printf(_("Couldn't find cell in first library!\n"));
00196                 goto ret_destroy_library_list;
00197         }
00198
00199         /* Check if cell passes vital checks */
00200         res = gds_tree_check_reference_loops(toplevel_cell->parent_library);
00201         if (res < 0) {
00202                 fprintf(stderr, _("Checking library %s failed.\n"), first_lib->name);
00203                 goto ret_destroy_library_list;
00204         } else if (res > 0) {
00205                 fprintf(stderr, _("%d reference loops found.\n"), res);
00206
00207                 /* do further checking if the specified cell and/or its subcells are affected */
00208                 if (toplevel_cell->checks.affected_by_reference_loop == 1) {
00209                         fprintf(stderr, _("Cell is affected by reference loop. Abort!\n"));
00210                         goto ret_destroy_library_list;
00211                 }
00212         }
00213
00214         if (toplevel_cell->checks.affected_by_reference_loop == GDS_CELL_CHECK_NOT_RUN)
00215                 fprintf(stderr, _("Cell was not checked. This should not happen. Please report this
      issue. Will continue either way.\n"));
00216
00217         /* Note: unresolved references are not an abort condition.
00218          * Deal with it.
00219          */
00220
00221         /* Execute all rendererer instances */
00222         for (list_iter = renderer_list; list_iter; list_iter = list_iter->next) {
00223                 current_renderer = GDS_RENDER_OUTPUT_RENDERER(list_iter->data);
00224                 gds_output_renderer_render_output(current_renderer, toplevel_cell, scale);
00225         }
00226
00227 ret_destroy_library_list:
00228         clear_lib_list(&libs);
00229 ret_clear_renderers:
00230         for (list_iter = renderer_list; list_iter; list_iter = list_iter->next)
00231                 g_object_unref(list_iter->data);
00232 ret_destroy_layer_mapping:
00233         g_object_unref(layer_sett);
00234         return ret;
00235 }
00236
```

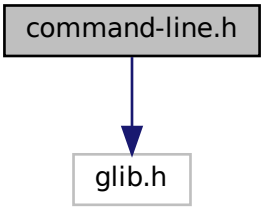
13.25 command-line.dox File Reference

13.26 command-line.h File Reference

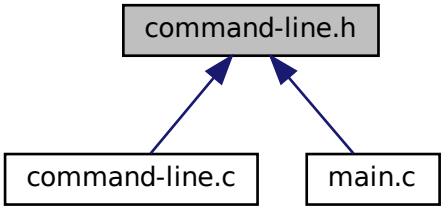
Render according to command line parameters.

```
#include <glib.h>
```

Include dependency graph for command-line.h:



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



Data Structures

- struct external_renderer_params

  External renderer paramameters to command line renderer.

Functions

- int command_line_convert_gds (const char *gds_name, const char *cell_name, char **renderers, char **output_file_names, const char *layer_file, struct external_renderer_params *ext_param, gboolean tex↩ _standalone, gboolean tex_layers, double scale)

  Convert GDS according to command line parameters.

13.26.1 Detailed Description

Render according to command line parameters.

Author

Mario Hüttel mario.huettel@gmx.net

Definition in file command-line.h.

13.27 command-line.h

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00031 #ifndef _COMMAND_LINE_H_
00032 #define _COMMAND_LINE_H_
00033
00034 #include <glib.h>
00035
00039 struct external_renderer_params {
00043         char *so_path;
00044
00048         char *cli_params;
00049 };
00050
00064 int command_line_convert_gds(const char *gds_name,
00065                              const char *cell_name,
00066                              char **renderers,
00067                              char **output_file_names,
00068                              const char *layer_file,
00069                              struct external_renderer_params *ext_param,
00070                              gboolean tex_standalone,
00071                              gboolean tex_layers,
00072                              double scale);
00073
00074 #endif /* _COMMAND_LINE_H_ */
00075
```

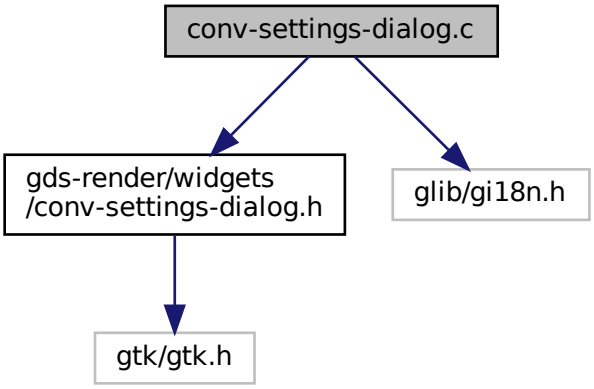
13.28 compilation.dox File Reference

13.29 conv-settings-dialog.c File Reference

Implementation of the setting dialog.

```
#include <gds-render/widgets/conv-settings-dialog.h>
#include <glib/gi18n.h>
```

Include dependency graph for conv-settings-dialog.c:



Data Structures

- struct _RendererSettingsDialog

Enumerations

- enum { PROP_CELL_NAME = 1, PROP_COUNT }

Functions

- static void renderer_settings_dialog_set_property (GObject *object, guint property_id, const GValue *value, GParamSpec *pspec)
- static void renderer_settings_dialog_get_property (GObject *object, guint property_id, GValue *value, G↩ ParamSpec *pspec)
- static void renderer_settings_dialog_class_init (RendererSettingsDialogClass *klass)
- static void show_tex_options (RendererSettingsDialog *self)
- static void hide_tex_options (RendererSettingsDialog *self)
- static void latex_render_callback (GtkToggleButton *radio, RendererSettingsDialog *dialog)
- static gboolean shape_drawer_drawing_callback (GtkWidget *widget, cairo_t *cr, gpointer data)
- static double convert_number_to_engineering (double input, const char **out_prefix)
- static void renderer_settings_dialog_update_labels (RendererSettingsDialog *self)
- static void scale_value_changed (GtkRange *range, gpointer user_data)
- static void renderer_settings_dialog_init (RendererSettingsDialog *self)
- RendererSettingsDialog * renderer_settings_dialog_new (GtkWindow *parent)

  Create a new RedererSettingsDialog GObject.
- void renderer_settings_dialog_get_settings (RendererSettingsDialog *dialog, struct render_settings *settings)

  Get the settings configured in the dialog.
- G_END_DECLS void renderer_settings_dialog_set_settings (RendererSettingsDialog *dialog, struct render_settings *settings)

Apply settings to dialog.

- void renderer_settings_dialog_set_cell_width (RendererSettingsDialog *dialog, unsigned int width)

  renderer_settings_dialog_set_cell_width Set width for rendered cell
- void renderer_settings_dialog_set_cell_height (RendererSettingsDialog *dialog, unsigned int height)

  renderer_settings_dialog_set_cell_height Set height for rendered cell
- void renderer_settings_dialog_set_database_unit_scale (RendererSettingsDialog *dialog, double unit_in_↩ meters)

  renderer_settings_dialog_set_database_unit_scale Set database scale

Variables

- static GParamSpec * properties [PROP_COUNT]

13.29.1 Detailed Description

Implementation of the setting dialog.

Author

Mario Hüttel mario.huettel@gmx.net

Definition in file conv-settings-dialog.c.

13.30 conv-settings-dialog.c

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00032 #include <gds-render/widgets/conv-settings-dialog.h>
00033 #include <glib/gi18n.h>
00034
00035 struct  _RendererSettingsDialog {
00036                 GtkDialog parent;
00037                 /* Private loot */
00038                 GtkWidget *radio_latex;
00039                 GtkWidget *radio_cairo_pdf;
00040                 GtkWidget *radio_cairo_svg;
00041                 GtkWidget *scale;
00042                 GtkWidget *layer_check;
00043                 GtkWidget *standalone_check;
00044                 GtkDrawingArea *shape_drawing;
00045                 GtkLabel *x_label;
00046                 GtkLabel *y_label;
00047
00048                 GtkLabel *x_output_label;
00049                 GtkLabel *y_output_label;
00050
00051                 unsigned int cell_height;
00052                 unsigned int cell_width;
```

```
00053                 double unit_in_meters;
00054 };
00055
00056 G_DEFINE_TYPE(RendererSettingsDialog, renderer_settings_dialog, GTK_TYPE_DIALOG)
00057
00058 enum {
00059         PROP_CELL_NAME = 1,
00060         PROP_COUNT
00061 };
00062
00063 static GParamSpec *properties[PROP_COUNT];
00064
00065 static void renderer_settings_dialog_set_property(GObject *object, guint property_id,
00066                                                   const GValue *value, GParamSpec *pspec)
00067 {
00068         const gchar *title = NULL;
00069
00070         switch (property_id) {
00071         case PROP_CELL_NAME:
00072                 title = g_value_get_string(value);
00073                 if (title)
00074                         gtk_window_set_title(GTK_WINDOW(object), title);
00075                 break;
00076         default:
00077                 G_OBJECT_WARN_INVALID_PROPERTY_ID(object, property_id, pspec);
00078                 break;
00079         }
00080 }
00081
00082 static void renderer_settings_dialog_get_property(GObject *object, guint property_id,
00083                                                   GValue *value, GParamSpec *pspec)
00084 {
00085         const gchar *title;
00086
00087         switch (property_id) {
00088         case PROP_CELL_NAME:
00089                 title = gtk_window_get_title(GTK_WINDOW(object));
00090                 g_value_set_string(value, title);
00091                 break;
00092         default:
00093                 G_OBJECT_WARN_INVALID_PROPERTY_ID(object, property_id, pspec);
00094                 break;
00095         }
00096 }
00097
00098 static void renderer_settings_dialog_class_init(RendererSettingsDialogClass *klass)
00099 {
00100         GObjectClass *oclass = G_OBJECT_CLASS(klass);
00101
00102         /* Override virtual functions */
00103         oclass->set_property = renderer_settings_dialog_set_property;
00104         oclass->get_property = renderer_settings_dialog_get_property;
00105
00106         properties[PROP_CELL_NAME] = g_param_spec_string(N_("cell-name"),
00107                                                          N_("cell-name"),
00108                                                          N_("Cell name to be displayed in header
      bar"),
00109                                                          "",
00110                                                          G_PARAM_READWRITE);
00111         g_object_class_install_properties(oclass, PROP_COUNT, properties);
00112 }
00113
00114 static void show_tex_options(RendererSettingsDialog *self)
00115 {
00116         gtk_widget_show(self->layer_check);
00117         gtk_widget_show(self->standalone_check);
00118
00119 }
00120
00121 static void hide_tex_options(RendererSettingsDialog *self)
00122 {
00123         gtk_widget_hide(self->layer_check);
00124         gtk_widget_hide(self->standalone_check);
00125 }
00126
00127 static void latex_render_callback(GtkToggleButton *radio, RendererSettingsDialog *dialog)
00128 {
00129         if (gtk_toggle_button_get_active(radio))
00130                 show_tex_options(dialog);
00131         else
00132                 hide_tex_options(dialog);
00133 }
00134
00135 static gboolean shape_drawer_drawing_callback(GtkWidget *widget, cairo_t *cr, gpointer data)
00136 {
00137         int width;
00138         int height;
```

```
00139         GtkStyleContext *style_context;
00140         GdkRGBA foreground_color;
00141         RendererSettingsDialog *dialog = (RendererSettingsDialog *)data;
00142         double usable_width;
00143         double usable_height;
00144         double height_scale;
00145         double width_scale;
00146         double final_scale_value;
00147 
00148         style_context = gtk_widget_get_style_context(widget);
00149         width = gtk_widget_get_allocated_width(widget);
00150         height = gtk_widget_get_allocated_height(widget);
00151 
00152         gtk_render_background(style_context, cr, 0, 0, width, height);
00153 
00154         gtk_style_context_get_color(style_context, gtk_style_context_get_state(style_context),
00155                                     &foreground_color);
00156 
00157         gdk_cairo_set_source_rgba(cr, &foreground_color);
00158 
00159         cairo_save(cr);
00160 
00161         /* Tranform coordiante system */
00162         cairo_scale(cr, 1, -1);
00163         cairo_translate(cr, (double)width/2.0, -(double)height/2.0);
00164 
00165         /* Define usable drawing area */
00166         usable_width = (0.95*(double)width) - 15.0;
00167         usable_height = (0.95*(double)height) - 15.0;
00168 
00169         width_scale = usable_width/(double)dialog->cell_width;
00170         height_scale = usable_height/(double)dialog->cell_height;
00171 
00172         final_scale_value = (width_scale < height_scale ? width_scale : height_scale);
00173 
00174         cairo_rectangle(cr,
00175                         -(double)dialog->cell_width * final_scale_value / 2.0,
00176                         -(double)dialog->cell_height * final_scale_value / 2.0,
00177                         (double)dialog->cell_width * final_scale_value,
00178                         (double)dialog->cell_height * final_scale_value);
00179         cairo_stroke(cr);
00180         cairo_restore(cr);
00181 
00182         return FALSE;
00183 }
00184 
00185 static double convert_number_to_engineering(double input, const char **out_prefix)
00186 {
00187         const char *selected_prefix = NULL;
00188         double return_val = 0.0;
00189         int idx;
00190         static const char * const prefixes[] = {"y", "z", "a", "f", "p", "n", "u", "m", "c", "d", /* <
      1 */
00191                                                 "", /* 1 */
00192                                                 "h", "k", "M", "G", "T", "P", "E", "Z", "Y"}; /* > 1
      */
00193         static const double scale[] = {1E-24, 1E-21, 1E-18, 1E-15, 1E-12, 1E-9, 1E-6, 1E-3, 1E-2,
      1E-1,
00194                                        1,
00195                                        1E2, 1E3, 1E6, 1E9, 1E12, 1E15, 1E18, 1E21, 1E24};
00196         const int prefix_count = (int)(sizeof(prefixes)/sizeof(char *));
00197 
00198         /* If pointer is invalid, return NaN */
00199         if (!out_prefix)
00200                 return (0.0 / 0.0);
00201 
00202         /* Start with the 2nd smallest prefix */
00203         for (idx = 1; idx < prefix_count; idx++) {
00204                 if (input < scale[idx]) {
00205                         /* This prefix is bigger than the number. Take the previous one */
00206                         selected_prefix = prefixes[idx-1];
00207                         return_val = input / scale[idx-1];
00208                         break;
00209                 }
00210         }
00211 
00212         /* Check if prefix was set by loop. Else take the largest in the list */
00213         if (selected_prefix == NULL) {
00214                 selected_prefix = prefixes[prefix_count-1];
00215                 return_val = input / scale[prefix_count-1];
00216         }
00217 
00218         if (out_prefix)
00219                 *out_prefix = selected_prefix;
00220 
00221         return return_val;
00222 }
```

```
00223
00224 static void renderer_settings_dialog_update_labels(RendererSettingsDialog *self)
00225 {
00226         char default_buff[100];
00227         double scale;
00228         double width_meters;
00229         double height_meters;
00230         double width_engineering;
00231         const char *width_prefix;
00232         double height_engineering;
00233         const char *height_prefix;
00234
00235         if (!self)
00236                 return;
00237
00238         width_meters = (double)self->cell_width * self->unit_in_meters;
00239         height_meters = (double)self->cell_height * self->unit_in_meters;
00240
00241         width_engineering = convert_number_to_engineering(width_meters, &width_prefix);
00242         height_engineering = convert_number_to_engineering(height_meters, &height_prefix);
00243
00244         snprintf(default_buff, sizeof(default_buff), _("Width: %.3lf %sm"), width_engineering,
      width_prefix);
00245         gtk_label_set_text(self->x_label, default_buff);
00246         snprintf(default_buff, sizeof(default_buff), _("Height: %.3lf %sm"), height_engineering,
      height_prefix);
00247         gtk_label_set_text(self->y_label, default_buff);
00248
00249         scale = gtk_range_get_value(GTK_RANGE(self->scale));
00250
00251         /* Set the pixel sizes */
00252         snprintf(default_buff, sizeof(default_buff), _("Output Width: %u px"),
00253                  (unsigned int)((double)self->cell_width / scale));
00254         gtk_label_set_text(self->x_output_label, default_buff);
00255         snprintf(default_buff, sizeof(default_buff), _("Output Height: %u px"),
00256                  (unsigned int)((double)self->cell_height / scale));
00257         gtk_label_set_text(self->y_output_label, default_buff);
00258 }
00259
00260 static void scale_value_changed(GtkRange *range, gpointer user_data)
00261 {
00262         (void)range;
00263         RendererSettingsDialog *dialog;
00264
00265         dialog = RENDERER_SETTINGS_DIALOG(user_data);
00266         renderer_settings_dialog_update_labels(dialog);
00267 }
00268
00269 static void renderer_settings_dialog_init(RendererSettingsDialog *self)
00270 {
00271         GtkBuilder *builder;
00272         GtkWidget *box;
00273         GtkDialog *dialog;
00274
00275         dialog = &self->parent;
00276
00277         builder = gtk_builder_new_from_resource("/gui/dialog.glade");
00278         box = GTK_WIDGET(gtk_builder_get_object(builder, "dialog-box"));
00279         self->radio_latex = GTK_WIDGET(gtk_builder_get_object(builder, "latex-radio"));
00280         self->radio_cairo_pdf = GTK_WIDGET(gtk_builder_get_object(builder, "cairo-pdf-radio"));
00281         self->radio_cairo_svg = GTK_WIDGET(gtk_builder_get_object(builder, "cairo-svg-radio"));
00282         self->scale = GTK_WIDGET(gtk_builder_get_object(builder, "dialog-scale"));
00283         self->standalone_check = GTK_WIDGET(gtk_builder_get_object(builder, "standalone-check"));
00284         self->layer_check = GTK_WIDGET(gtk_builder_get_object(builder, "layer-check"));
00285         self->shape_drawing = GTK_DRAWING_AREA(gtk_builder_get_object(builder, "shape-drawer"));
00286         self->x_label = GTK_LABEL(gtk_builder_get_object(builder, "x-label"));
00287         self->y_label = GTK_LABEL(gtk_builder_get_object(builder, "y-label"));
00288         self->x_output_label = GTK_LABEL(gtk_builder_get_object(builder, "x-output-label"));
00289         self->y_output_label = GTK_LABEL(gtk_builder_get_object(builder, "y-output-label"));
00290
00291         gtk_dialog_add_buttons(dialog, _("Cancel"), GTK_RESPONSE_CANCEL, _("OK"), GTK_RESPONSE_OK,
      NULL);
00292         gtk_container_add(GTK_CONTAINER(gtk_dialog_get_content_area(dialog)), box);
00293         gtk_window_set_title(GTK_WINDOW(self), _("Renderer Settings"));
00294
00295         g_signal_connect(self->radio_latex, "toggled", G_CALLBACK(latex_render_callback),
      (gpointer)self);
00296         g_signal_connect(G_OBJECT(self->shape_drawing),
00297                          "draw", G_CALLBACK(shape_drawer_drawing_callback), (gpointer)self);
00298
00299         g_signal_connect(self->scale, "value-changed", G_CALLBACK(scale_value_changed),
      (gpointer)self);
00300
00301         /* Default values */
00302         self->cell_width = 1;
00303         self->cell_height = 1;
00304         self->unit_in_meters = 1E-6;
```

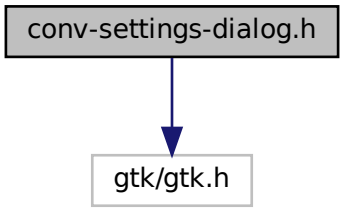
```
00305         renderer_settings_dialog_update_labels(self);
00306
00307         g_object_unref(builder);
00308 }
00309
00310 RendererSettingsDialog *renderer_settings_dialog_new(GtkWindow *parent)
00311 {
00312         RendererSettingsDialog *res;
00313
00314         res = RENDERER_SETTINGS_DIALOG(g_object_new(RENDERER_TYPE_SETTINGS_DIALOG, NULL));
00315         if (res && parent)
00316                 gtk_window_set_transient_for(GTK_WINDOW(res), parent);
00317
00318         return res;
00319 }
00320
00321 void renderer_settings_dialog_get_settings(RendererSettingsDialog *dialog, struct render_settings
       *settings)
00322 {
00323
00324         if (!settings || !dialog)
00325                 return;
00326         settings->scale = gtk_range_get_value(GTK_RANGE(dialog->scale));
00327
00328         /* Get active radio button selection */
00329         if (gtk_toggle_button_get_active(GTK_TOGGLE_BUTTON(dialog->radio_latex)) == TRUE)
00330                 settings->renderer = RENDERER_LATEX_TIKZ;
00331         else if (gtk_toggle_button_get_active(GTK_TOGGLE_BUTTON(dialog->radio_cairo_pdf)) == TRUE)
00332                 settings->renderer = RENDERER_CAIROGRAPHICS_PDF;
00333         else if (gtk_toggle_button_get_active(GTK_TOGGLE_BUTTON(dialog->radio_cairo_svg)) == TRUE)
00334                 settings->renderer = RENDERER_CAIROGRAPHICS_SVG;
00335
00336         settings->tex_pdf_layers =
       gtk_toggle_button_get_active(GTK_TOGGLE_BUTTON(dialog->layer_check));
00337         settings->tex_standalone =
       gtk_toggle_button_get_active(GTK_TOGGLE_BUTTON(dialog->standalone_check));
00338 }
00339
00340 void renderer_settings_dialog_set_settings(RendererSettingsDialog *dialog, struct render_settings
       *settings)
00341 {
00342         if (!settings || !dialog)
00343                 return;
00344
00345         gtk_range_set_value(GTK_RANGE(dialog->scale), settings->scale);
00346         gtk_toggle_button_set_active(GTK_TOGGLE_BUTTON(dialog->layer_check),
       settings->tex_pdf_layers);
00347         gtk_toggle_button_set_active(GTK_TOGGLE_BUTTON(dialog->standalone_check),
       settings->tex_standalone);
00348
00349         switch (settings->renderer) {
00350         case RENDERER_LATEX_TIKZ:
00351                 gtk_toggle_button_set_active(GTK_TOGGLE_BUTTON(dialog->radio_latex), TRUE);
00352                 show_tex_options(dialog);
00353                 break;
00354         case RENDERER_CAIROGRAPHICS_PDF:
00355                 hide_tex_options(dialog);
00356                 gtk_toggle_button_set_active(GTK_TOGGLE_BUTTON(dialog->radio_cairo_pdf), TRUE);
00357                 break;
00358         case RENDERER_CAIROGRAPHICS_SVG:
00359                 hide_tex_options(dialog);
00360                 gtk_toggle_button_set_active(GTK_TOGGLE_BUTTON(dialog->radio_cairo_svg), TRUE);
00361                 break;
00362         }
00363 }
00364
00365 void renderer_settings_dialog_set_cell_width(RendererSettingsDialog *dialog, unsigned int width)
00366 {
00367         if (!dialog)
00368                 return;
00369
00370         if (width == 0)
00371                 width = 1;
00372
00373         dialog->cell_width = width;
00374         renderer_settings_dialog_update_labels(dialog);
00375 }
00376
00377 void renderer_settings_dialog_set_cell_height(RendererSettingsDialog *dialog, unsigned int height)
00378 {
00379         if (!dialog)
00380                 return;
00381
00382         if (height == 0)
00383                 height = 1;
00384
00385         dialog->cell_height = height;
```

```
00386         renderer_settings_dialog_update_labels(dialog);
00387 }
00388
00389 void renderer_settings_dialog_set_database_unit_scale(RendererSettingsDialog *dialog, double
       unit_in_meters)
00390 {
00391         if (!dialog)
00392                 return;
00393
00394         if (unit_in_meters < 0)
00395                 unit_in_meters *= -1;
00396
00397         dialog->unit_in_meters = unit_in_meters;
00398         renderer_settings_dialog_update_labels(dialog);
00399 }
00400
```

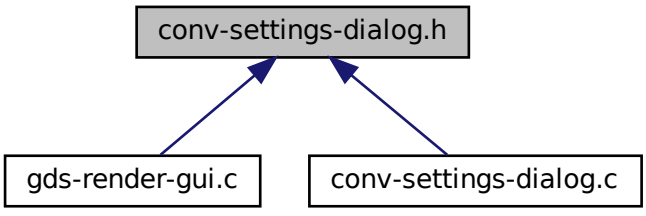
13.31 conv-settings-dialog.h File Reference

Header file for the Conversion Settings Dialog.

`#include <gtk/gtk.h>`
Include dependency graph for conv-settings-dialog.h:



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



Data Structures

- struct render_settings

  This struct holds the renderer configuration.

Macros

- #define RENDERER_TYPE_SETTINGS_DIALOG (renderer_settings_dialog_get_type())

Enumerations

- enum output_renderer { RENDERER_LATEX_TIKZ, RENDERER_CAIROGRAPHICS_PDF, RENDERER_CAIROGRAPHICS_ }

  return type of the RedererSettingsDialog

Functions

- RendererSettingsDialog * renderer_settings_dialog_new (GtkWindow *parent)

  Create a new RedererSettingsDialog GObject.
- G_END_DECLS void renderer_settings_dialog_set_settings (RendererSettingsDialog *dialog, struct render_settings *settings)

  Apply settings to dialog.
- void renderer_settings_dialog_get_settings (RendererSettingsDialog *dialog, struct render_settings *settings)

  Get the settings configured in the dialog.
- void renderer_settings_dialog_set_cell_width (RendererSettingsDialog *dialog, unsigned int width)

  renderer_settings_dialog_set_cell_width Set width for rendered cell
- void renderer_settings_dialog_set_cell_height (RendererSettingsDialog *dialog, unsigned int height)

  renderer_settings_dialog_set_cell_height Set height for rendered cell
- void renderer_settings_dialog_set_database_unit_scale (RendererSettingsDialog *dialog, double unit_in_↩ meters)

  renderer_settings_dialog_set_database_unit_scale Set database scale

13.31.1 Detailed Description

Header file for the Conversion Settings Dialog.

Author

Mario.Huettel@gmx.net mario.huettel@gmx.net

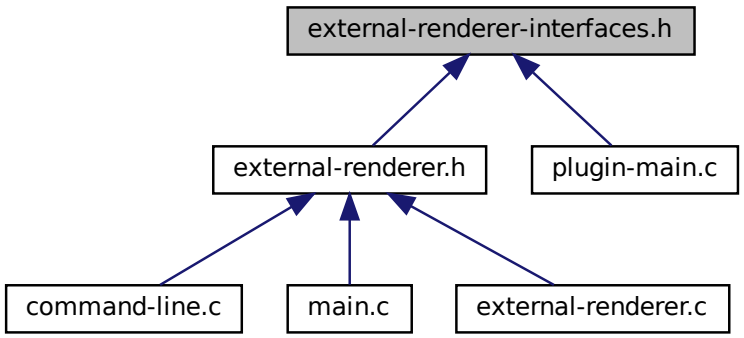
Definition in file conv-settings-dialog.h.

13.32 conv-settings-dialog.h

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00032 #ifndef __CONV_SETTINGS_DIALOG_H__
00033 #define __CONV_SETTINGS_DIALOG_H__
00034
00035 #include <gtk/gtk.h>
00036
00037 G_BEGIN_DECLS
00038
00040 enum output_renderer {RENDERER_LATEX_TIKZ, RENDERER_CAIROGRAPHICS_PDF, RENDERER_CAIROGRAPHICS_SVG};
00041
00042 G_DECLARE_FINAL_TYPE(RendererSettingsDialog, renderer_settings_dialog, RENDERER, SETTINGS_DIALOG,
      GtkDialog)
00043
00044
00049 RendererSettingsDialog *renderer_settings_dialog_new(GtkWindow *parent);
00050
00051 #define RENDERER_TYPE_SETTINGS_DIALOG (renderer_settings_dialog_get_type())
00052
00056 struct render_settings {
00057         double scale;
00058         enum output_renderer renderer;
00059         gboolean tex_pdf_layers;
00060         gboolean tex_standalone;
00061 };
00062
00063 G_END_DECLS
00064
00070 void renderer_settings_dialog_set_settings(RendererSettingsDialog *dialog, struct render_settings
      *settings);
00071
00077 void renderer_settings_dialog_get_settings(RendererSettingsDialog *dialog, struct render_settings
      *settings);
00078
00084 void renderer_settings_dialog_set_cell_width(RendererSettingsDialog *dialog, unsigned int width);
00085
00091 void renderer_settings_dialog_set_cell_height(RendererSettingsDialog *dialog, unsigned int height);
00092
00098 void renderer_settings_dialog_set_database_unit_scale(RendererSettingsDialog *dialog, double
      unit_in_meters);
00099
00100 #endif /* __CONV_SETTINGS_DIALOG_H__ */
00101
```

13.33 external-renderer-interfaces.h File Reference

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



Macros

- #define xstr(a) str(a)
- #define str(a) #a
- #define EXPORT_FUNC __attribute__((visibility("default")))

  This define is used to export a function from a shared object.
- #define EXTERNAL_LIBRARY_RENDER_FUNCTION exported_render_cell_to_file

  Function name expected to be found in external library for rendering.
- #define EXTERNAL_LIBRARY_INIT_FUNCTION exported_init

  Function name expected to be found in external library for initialization.
- #define EXTERNAL_LIBRARY_FORK_REQUEST exported_fork_request

  Global integer specified by an external renderer to signal, that the init and render functions shall be executed in a subprocess.
- #define EXPORTED_FUNC_DECL(FUNC) EXPORT_FUNC FUNC

  Define for declaring the exported functions.

13.33.1 Macro Definition Documentation

13.33.1.1 str

```
#define str(
              a ) #a
```

Definition at line 7 of file external-renderer-interfaces.h.

13.33.1.2 xstr

```
#define xstr(
             a ) str(a)
```

Definition at line 6 of file external-renderer-interfaces.h.

13.34 external-renderer-interfaces.h

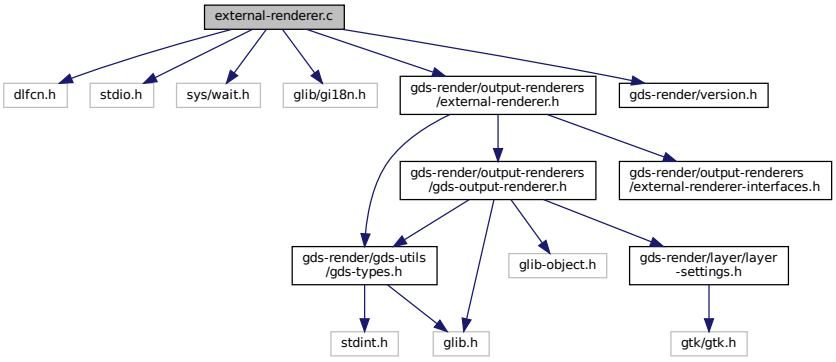
```
00001 #ifndef __EXTERNAL_RENDERER_INTERFACES_H__
00002 #define __EXTERNAL_RENDERER_INTERFACES_H__
00003
00004 #ifndef xstr
00005
00006 #define xstr(a) str(a)
00007 #define str(a) #a
00008
00009 #endif /* xstr */
00010
00019 #define EXPORT_FUNC __attribute__((visibility("default")))
00020
00029 #define EXTERNAL_LIBRARY_RENDER_FUNCTION exported_render_cell_to_file
00030
00038 #define EXTERNAL_LIBRARY_INIT_FUNCTION exported_init
00039
00046 #define EXTERNAL_LIBRARY_FORK_REQUEST exported_fork_request
00047
00053 #define EXPORTED_FUNC_DECL(FUNC) EXPORT_FUNC FUNC
00054
00057 #endif /* __EXTERNAL_RENDERER_INTERFACES_H__ */
```

13.35 external-renderer.c File Reference

This file implements the dynamic library loading for the external rendering feature.

```
#include <dlfcn.h>
#include <stdio.h>
#include <sys/wait.h>
#include <glib/gi18n.h>
#include <gds-render/output-renderers/external-renderer.h>
#include <gds-render/version.h>
```

Include dependency graph for external-renderer.c:



Data Structures

- struct _ExternalRenderer

Macros

- #define FORCE_FORK 0U

  if != 0, then forking is forced regardless of the shared object's settings

Enumerations

- enum { PROP_SO_PATH = 1, PROP_PARAM_STRING, N_PROPERTIES }

Functions

- static int external_renderer_render_cell (struct gds_cell *toplevel_cell, GList *layer_info_list, const char *output_file, double scale, const char *so_path, const char *params)

  Execute render function in shared object to render the supplied cell.
- static int external_renderer_render_output (GdsOutputRenderer *renderer, struct gds_cell *cell, double scale)
- static void external_renderer_get_property (GObject *obj, guint property_id, GValue *value, GParamSpec *pspec)
- static void external_renderer_set_property (GObject *obj, guint property_id, const GValue *value, GParamSpec *pspec)
- static void external_renderer_dispose (GObject *self_obj)
- static void external_renderer_class_init (ExternalRendererClass *klass)
- static void external_renderer_init (ExternalRenderer *self)
- ExternalRenderer * external_renderer_new ()

  Create new ExternalRenderer object.
- ExternalRenderer * external_renderer_new_with_so_and_param (const char *so_path, const char *param_string)

  Create new ExternalRenderer object with specified shared object path.

Variables

- static GParamSpec * external_renderer_properties [N_PROPERTIES] = {NULL}

13.35.1 Detailed Description

This file implements the dynamic library loading for the external rendering feature.

Author

Mario Hüttel mario.huettel@gmx.net

Definition in file external-renderer.c.

13.36 external-renderer.c

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00031 #include <dlfcn.h>
00032 #include <stdio.h>
00033 #include <sys/wait.h>
00034 #include <glib/gi18n.h>
00035
00036 #include <gds-render/output-renderers/external-renderer.h>
00037 #include <gds-render/version.h>
00038
00039 #define FORCE_FORK 0U
00041 struct _ExternalRenderer {
00042         GdsOutputRenderer parent;
00043         char *shared_object_path;
00044         char *cli_param_string;
00045 };
00046
00047 enum {
00048         PROP_SO_PATH = 1,
00049         PROP_PARAM_STRING,
00050         N_PROPERTIES
00051 };
00052
00053 G_DEFINE_TYPE(ExternalRenderer, external_renderer, GDS_RENDER_TYPE_OUTPUT_RENDERER)
00054
00055
00065 static int external_renderer_render_cell(struct gds_cell *toplevel_cell, GList *layer_info_list,
00066                                          const char *output_file, double scale,  const char *so_path, const
       char *params)
00067 {
00068         int (*so_render_func)(struct gds_cell *, GList *, const char *, double) = NULL;
00069         int (*so_init_func)(const char *, const char *) = NULL;
00070         void *so_handle = NULL;
00071         char *error_msg;
00072         int forking_req;
00073         int ret = 0;
00074         pid_t fork_pid = 0;
00075         int forked_status;
00076
00077         if (!so_path) {
00078                 fprintf(stderr, _("Path to shared object not set!\n"));
00079                 return -3000;
00080         }
00081
00082         /* Check parameter sanity */
00083         if (!output_file || !toplevel_cell || !layer_info_list)
00084                 return -3000;
00085
00086         /* Load shared object */
00087         so_handle = dlopen(so_path, RTLD_LAZY);
00088         if (!so_handle) {
00089                 fprintf(stderr, _("Could not load external library '%s'\nDetailed error is:\n%s\n"),
       so_path, dlerror());
00090                 return -2000;
00091         }
00092
00093         /* Load rendering symbol from library */
00094         so_render_func = (int (*)(struct gds_cell *, GList *, const char *, double))
00095                                  dlsym(so_handle, xstr(EXTERNAL_LIBRARY_RENDER_FUNCTION));
00096         error_msg = dlerror();
00097         if (error_msg != NULL) {
00098                 fprintf(stderr, _("Rendering function not found in library:\n%s\n"), error_msg);
00099                 goto ret_close_so_handle;
00100         }
00101
00102         /* Load the init function */
00103         so_init_func = (int (*)(const char *, const char *))dlsym(so_handle,
       xstr(EXTERNAL_LIBRARY_INIT_FUNCTION));
```

```
00104         error_msg = dlerror();
00105         if (error_msg != NULL) {
00106                 fprintf(stderr, _("Init function not found in library:\n%s\n"), error_msg);
00107                 goto ret_close_so_handle;
00108         }
00109
00110         /* Check if forking is requested */
00111         if (dlsym(so_handle, xstr(EXTERNAL_LIBRARY_FORK_REQUEST)))
00112                 forking_req = 1;
00113         else if (FORCE_FORK)
00114                 forking_req = 1;
00115         else
00116                 forking_req = 0;
00117
00118         /* Execute */
00119
00120         g_message(_("Calling external renderer."));
00121
00122         if (forking_req)
00123                 fork_pid = fork();
00124         if (fork_pid != 0)
00125                 goto end_forked;
00126
00127         ret = so_init_func(params, _app_version_string);
00128         if (!ret)
00129                 ret = so_render_func(toplevel_cell, layer_info_list, output_file, scale);
00130
00131         /* If we are in a separate process, terminate here */
00132         if (forking_req)
00133                 exit(ret);
00134
00135         /* The forked paths end here */
00136 end_forked:
00137         if (forking_req) {
00138                 waitpid(fork_pid, &forked_status, 0);
00139                 ret = WEXITSTATUS(forked_status);
00140         }
00141
00142         g_message(_("External renderer finished."));
00143
00144 ret_close_so_handle:
00145         dlclose(so_handle);
00146         return ret;
00147 }
00148
00149 static int external_renderer_render_output(GdsOutputRenderer *renderer,
00150                                            struct gds_cell *cell,
00151                                            double scale)
00152 {
00153         ExternalRenderer *ext_renderer = GDS_RENDER_EXTERNAL_RENDERER(renderer);
00154         LayerSettings *settings;
00155         GList *layer_infos = NULL;
00156         const char *output_file;
00157         int ret;
00158
00159         output_file = gds_output_renderer_get_output_file(renderer);
00160         settings = gds_output_renderer_get_and_ref_layer_settings(renderer);
00161
00162         /* Set layer info list. In case of failure it remains NULL */
00163         if (settings)
00164                 layer_infos = layer_settings_get_layer_info_list(settings);
00165
00166         ret = external_renderer_render_cell(cell, layer_infos, output_file, scale,
      ext_renderer->shared_object_path,
00167                                             ext_renderer->cli_param_string);
00168         if (settings)
00169                 g_object_unref(settings);
00170
00171         return ret;
00172 }
00173
00174 static void external_renderer_get_property(GObject *obj, guint property_id, GValue *value, GParamSpec
      *pspec)
00175 {
00176         ExternalRenderer *self;
00177
00178         self = GDS_RENDER_EXTERNAL_RENDERER(obj);
00179
00180         switch (property_id) {
00181         case PROP_SO_PATH:
00182                 g_value_set_string(value, self->shared_object_path);
00183                 break;
00184         case PROP_PARAM_STRING:
00185                 g_value_set_string(value, self->cli_param_string);
00186                 break;
00187         default:
00188                 G_OBJECT_WARN_INVALID_PROPERTY_ID(obj, property_id, pspec);
```

```
00189                 break;
00190         }
00191 }
00192
00193 static void external_renderer_set_property(GObject *obj, guint property_id, const GValue *value,
      GParamSpec *pspec)
00194 {
00195         ExternalRenderer *self;
00196
00197         self = GDS_RENDER_EXTERNAL_RENDERER(obj);
00198
00199         switch (property_id) {
00200         case PROP_SO_PATH:
00201                 if (self->shared_object_path)
00202                         g_free(self->shared_object_path);
00203                 self->shared_object_path = g_value_dup_string(value);
00204                 break;
00205         case PROP_PARAM_STRING:
00206                 if (self->cli_param_string)
00207                         g_free(self->cli_param_string);
00208                 self->cli_param_string = g_value_dup_string(value);
00209                 break;
00210         default:
00211                 G_OBJECT_WARN_INVALID_PROPERTY_ID(obj, property_id, pspec);
00212                 break;
00213         }
00214 }
00215
00216 static void external_renderer_dispose(GObject *self_obj)
00217 {
00218         ExternalRenderer *self;
00219
00220         self = GDS_RENDER_EXTERNAL_RENDERER(self_obj);
00221
00222         if (self->shared_object_path) {
00223                 g_free(self->shared_object_path);
00224                 self->shared_object_path = NULL;
00225         }
00226
00227         G_OBJECT_CLASS(external_renderer_parent_class)->dispose(self_obj);
00228 }
00229
00230 static GParamSpec *external_renderer_properties[N_PROPERTIES] = {NULL};
00231
00232 static void external_renderer_class_init(ExternalRendererClass *klass)
00233 {
00234         GdsOutputRendererClass *inherited_parent_class;
00235         GObjectClass *oclass;
00236
00237         inherited_parent_class = GDS_RENDER_OUTPUT_RENDERER_CLASS(klass);
00238         oclass = G_OBJECT_CLASS(klass);
00239
00240         /* Override virtual function */
00241         inherited_parent_class->render_output = external_renderer_render_output;
00242
00243         /* Setup Gobject callbacks */
00244         oclass->set_property = external_renderer_set_property;
00245         oclass->get_property = external_renderer_get_property;
00246         oclass->dispose = external_renderer_dispose;
00247
00248         /* Setup properties */
00249         external_renderer_properties[PROP_SO_PATH] =
00250                         g_param_spec_string(N_("shared-object-path"),
00251                                             N_("Shared object file path"),
00252                                             N_("Path to the shared object to search rendering function
      in."),
00253                                             NULL,
00254                                             G_PARAM_READWRITE);
00255         external_renderer_properties[PROP_PARAM_STRING] =
00256                         g_param_spec_string(N_("param-string"),
00257                                             N_("Shared object renderer parameter string"),
00258                                             N_("Command line arguments passed to the external shared
      object renderer"),
00259                                             NULL,
00260                                             G_PARAM_READWRITE);
00261         g_object_class_install_properties(oclass, N_PROPERTIES, external_renderer_properties);
00262 }
00263
00264 static void external_renderer_init(ExternalRenderer *self)
00265 {
00266         self->shared_object_path = NULL;
00267         self->cli_param_string = NULL;
00268 }
00269
00270 ExternalRenderer *external_renderer_new()
00271 {
00272         return g_object_new(GDS_RENDER_TYPE_EXTERNAL_RENDERER, NULL);
```

```
00273 }
00274
00275 ExternalRenderer *external_renderer_new_with_so_and_param(const char *so_path, const char
       *param_string)
00276 {
00277         return g_object_new(GDS_RENDER_TYPE_EXTERNAL_RENDERER, N_("shared-object-path"), so_path,
00278                             N_("param-string"), param_string, NULL);
00279 }
00280
```

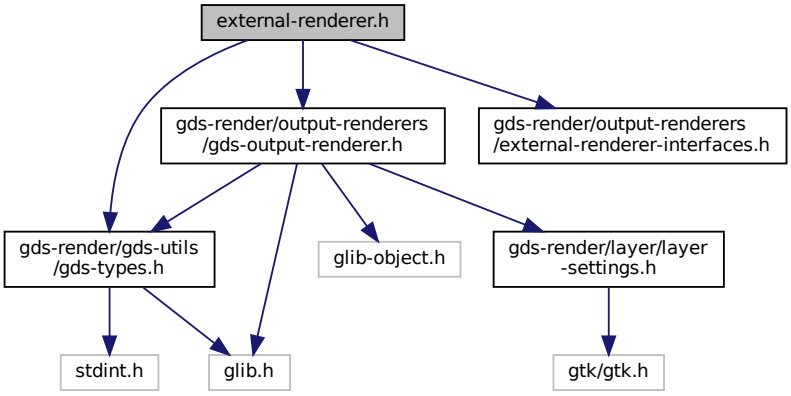
13.37 external-renderer.dox File Reference

13.38 external-renderer.h File Reference

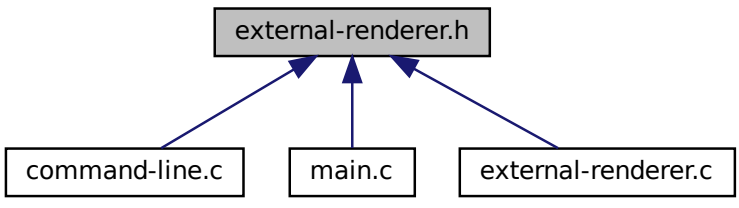
Render according to command line parameters.

```
#include <gds-render/output-renderers/gds-output-renderer.h>
#include <gds-render/gds-utils/gds-types.h>
#include <gds-render/output-renderers/external-renderer-interfaces.h>
```

Include dependency graph for external-renderer.h:



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



Macros

- #define GDS_RENDER_TYPE_EXTERNAL_RENDERER (external_renderer_get_type())

Functions

- ExternalRenderer * external_renderer_new ()

  Create new ExternalRenderer object.
- ExternalRenderer * external_renderer_new_with_so_and_param (const char *so_path, const char *param_string)

  Create new ExternalRenderer object with specified shared object path.

13.38.1 Detailed Description

Render according to command line parameters.

Author

Mario Hüttel mario.huettel@gmx.net

Definition in file external-renderer.h.

13.39 external-renderer.h

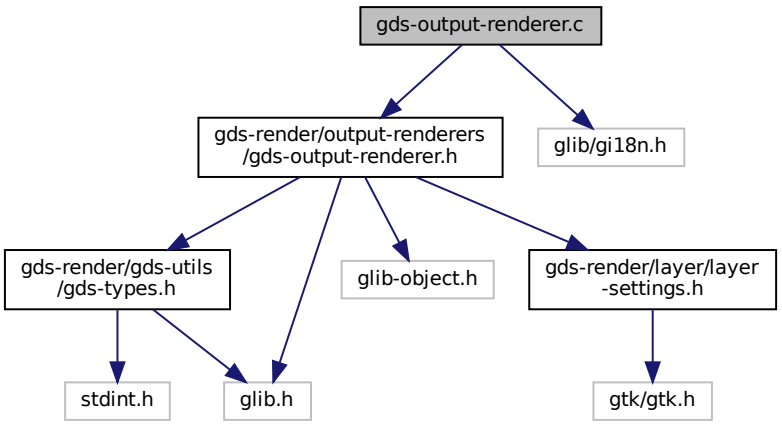
```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00031 #ifndef _EXTERNAL_RENDERER_H_
00032 #define _EXTERNAL_RENDERER_H_
00033
00034 #include <gds-render/output-renderers/gds-output-renderer.h>
00035 #include <gds-render/gds-utils/gds-types.h>
00036 #include <gds-render/output-renderers/external-renderer-interfaces.h>
00037
00038 G_BEGIN_DECLS
00039
00040 #define GDS_RENDER_TYPE_EXTERNAL_RENDERER (external_renderer_get_type())
00041
00042 G_DECLARE_FINAL_TYPE(ExternalRenderer, external_renderer, GDS_RENDER, EXTERNAL_RENDERER,
       GdsOutputRenderer)
00043
00044
00048 ExternalRenderer *external_renderer_new();
00049
00056 ExternalRenderer *external_renderer_new_with_so_and_param(const char *so_path, const char
       *param_string);
00057
00058 G_END_DECLS
00059
00060 #endif /* _EXTERNAL_RENDERER_H_ */
00061
```

13.40 gds-output-renderer.c File Reference

Base GObject class for output renderers.

```
#include <gds-render/output-renderers/gds-output-renderer.h>
#include <glib/gi18n.h>
```

Include dependency graph for gds-output-renderer.c:



Data Structures

- struct renderer_params
- struct idle_function_params
- struct GdsOutputRendererPrivate

Enumerations

- enum { PROP_OUTPUT_FILE = 1, PROP_LAYER_SETTINGS, N_PROPERTIES }
- enum gds_output_renderer_signal_ids { ASYNC_FINISHED = 0, ASYNC_PROGRESS_CHANGED, GDS_OUTPUT_RENDERER_SIGNAL_COUNT }

Functions

- static int gds_output_renderer_render_dummy (GdsOutputRenderer *renderer, struct gds_cell *cell, double scale)
- static void gds_output_renderer_dispose (GObject *self_obj)
- static void gds_output_renderer_get_property (GObject *obj, guint property_id, GValue *value, GParamSpec *pspec)
- static void gds_output_renderer_set_property (GObject *obj, guint property_id, const GValue *value, G↩ ParamSpec *pspec)
- static void gds_output_renderer_class_init (GdsOutputRendererClass *klass)
- void gds_output_renderer_init (GdsOutputRenderer *self)
- GdsOutputRenderer * gds_output_renderer_new ()

  Create a new GdsOutputRenderer GObject.

- GdsOutputRenderer * gds_output_renderer_new_with_props (const char *output_file, LayerSettings *layer_settings)

  Create a new GdsOutputRenderer GObject with its properties.
- void gds_output_renderer_set_output_file (GdsOutputRenderer *renderer, const gchar *file_name)

  Convenience function for setting the "output-file" property.
- const char * gds_output_renderer_get_output_file (GdsOutputRenderer *renderer)

  Convenience function for getting the "output-file" property.
- LayerSettings * gds_output_renderer_get_and_ref_layer_settings (GdsOutputRenderer *renderer)

  Get layer settings.
- void gds_output_renderer_set_layer_settings (GdsOutputRenderer *renderer, LayerSettings *settings)

  Set layer settings.
- int gds_output_renderer_render_output (GdsOutputRenderer *renderer, struct gds_cell *cell, double scale)

  gds_output_renderer_render_output
- static void gds_output_renderer_async_wrapper (GTask *task, gpointer source_object, gpointer task_data, GCancellable *cancellable)
- static void gds_output_renderer_async_finished (GObject *src_obj, GAsyncResult *res, gpointer user_data)
- int gds_output_renderer_render_output_async (GdsOutputRenderer *renderer, struct gds_cell *cell, double scale)

  Render output asynchronously.
- static gboolean idle_event_processor_callback (gpointer user_data)
- void gds_output_renderer_update_async_progress (GdsOutputRenderer *renderer, const char *status)

  This function emits the 'progress-changed' in the thread/context that triggered an asynchronous rendering.

Variables

- static guint gds_output_renderer_signals [GDS_OUTPUT_RENDERER_SIGNAL_COUNT]
- static GParamSpec * gds_output_renderer_properties [N_PROPERTIES] = {NULL}

13.40.1 Detailed Description

Base GObject class for output renderers.

Author

Mario Hüttel mario.huettel@gmx.net

Definition in file gds-output-renderer.c.

13.41 gds-output-renderer.c

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2019  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
```

```
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00030 #include <gds-render/output-renderers/gds-output-renderer.h>
00031 #include <glib/gi18n.h>
00032
00033 struct renderer_params {
00034                 struct gds_cell *cell;
00035                 double scale;
00036 };
00037
00038 struct idle_function_params {
00039         GMutex message_lock;
00040         char *status_message;
00041 };
00042
00043 typedef struct {
00044         gchar *output_file;
00045         LayerSettings *layer_settings;
00046         GMutex settings_lock;
00047         gboolean mutex_init_status;
00048         GTask *task;
00049         GMainContext *main_context;
00050         struct renderer_params async_params;
00051         struct idle_function_params idle_function_parameters;
00052         gpointer padding[11];
00053 } GdsOutputRendererPrivate;
00054
00055 enum {
00056         PROP_OUTPUT_FILE = 1,
00057         PROP_LAYER_SETTINGS,
00058         N_PROPERTIES
00059 };
00060
00061 G_DEFINE_TYPE_WITH_PRIVATE(GdsOutputRenderer, gds_output_renderer, G_TYPE_OBJECT)
00062
00063 enum gds_output_renderer_signal_ids {ASYNC_FINISHED = 0, ASYNC_PROGRESS_CHANGED,
       GDS_OUTPUT_RENDERER_SIGNAL_COUNT};
00064 static guint gds_output_renderer_signals[GDS_OUTPUT_RENDERER_SIGNAL_COUNT];
00065
00066 static int gds_output_renderer_render_dummy(GdsOutputRenderer *renderer,
00067                                             struct gds_cell *cell,
00068                                             double scale)
00069 {
00070         (void)renderer;
00071         (void)cell;
00072         (void)scale;
00073
00074         g_warning(_("Output renderer does not define a render_output function!"));
00075         return 0;
00076 }
00077
00078 static void gds_output_renderer_dispose(GObject *self_obj)
00079 {
00080         GdsOutputRenderer *renderer = GDS_RENDER_OUTPUT_RENDERER(self_obj);
00081         GdsOutputRendererPrivate *priv;
00082
00083         priv = gds_output_renderer_get_instance_private(renderer);
00084
00085         if (priv->mutex_init_status) {
00086                 /* Try locking the mutex, to test if it's free */
00087                 g_mutex_lock(&priv->settings_lock);
00088                 g_mutex_unlock(&priv->settings_lock);
00089                 g_mutex_clear(&priv->settings_lock);
00090
00091                 g_mutex_lock(&priv->idle_function_parameters.message_lock);
00092                 g_mutex_unlock(&priv->idle_function_parameters.message_lock);
00093                 g_mutex_clear(&priv->idle_function_parameters.message_lock);
00094
00095                 priv->mutex_init_status = FALSE;
00096         }
00097
00098         g_clear_object(&priv->task);
00099
00100         if (priv->output_file)
00101                 g_free(priv->output_file);
00102
00103         g_clear_object(&priv->layer_settings);
00104
00105         /* Chain up to parent class */
00106         G_OBJECT_CLASS(gds_output_renderer_parent_class)->dispose(self_obj);
00107 }
00108
00109 static void gds_output_renderer_get_property(GObject *obj, guint property_id, GValue *value,
       GParamSpec *pspec)
00110 {
```

```
00111         GdsOutputRenderer *self = GDS_RENDER_OUTPUT_RENDERER(obj);
00112         GdsOutputRendererPrivate *priv;
00113 
00114         priv = gds_output_renderer_get_instance_private(self);
00115 
00116         switch (property_id) {
00117         case PROP_OUTPUT_FILE:
00118                 g_value_set_string(value, priv->output_file);
00119                 break;
00120         case PROP_LAYER_SETTINGS:
00121                 g_value_set_object(value, priv->layer_settings);
00122                 break;
00123         default:
00124                 G_OBJECT_WARN_INVALID_PROPERTY_ID(obj, property_id, pspec);
00125                 break;
00126         }
00127 }
00128 
00129 static void gds_output_renderer_set_property(GObject *obj, guint property_id, const GValue *value,
      GParamSpec *pspec)
00130 {
00131         GdsOutputRenderer *self = GDS_RENDER_OUTPUT_RENDERER(obj);
00132         GdsOutputRendererPrivate *priv;
00133 
00134         priv = gds_output_renderer_get_instance_private(self);
00135 
00136         switch (property_id) {
00137         case PROP_OUTPUT_FILE:
00138                 g_mutex_lock(&priv->settings_lock);
00139                 if (priv->output_file)
00140                         g_free(priv->output_file);
00141                 priv->output_file = g_strdup(g_value_get_string(value));
00142                 g_mutex_unlock(&priv->settings_lock);
00143                 break;
00144         case PROP_LAYER_SETTINGS:
00145                 g_mutex_lock(&priv->settings_lock);
00146                 g_clear_object(&priv->layer_settings);
00147                 priv->layer_settings = g_value_get_object(value);
00148                 g_object_ref(priv->layer_settings);
00149                 g_mutex_unlock(&priv->settings_lock);
00150                 break;
00151         default:
00152                 G_OBJECT_WARN_INVALID_PROPERTY_ID(obj, property_id, pspec);
00153                 break;
00154         }
00155 }
00156 
00157 static GParamSpec *gds_output_renderer_properties[N_PROPERTIES] = {NULL};
00158 
00159 static void gds_output_renderer_class_init(GdsOutputRendererClass *klass)
00160 {
00161         GObjectClass *oclass = G_OBJECT_CLASS(klass);
00162         GType progress_changed_param_types[1] = {G_TYPE_POINTER};
00163 
00164         klass->render_output = gds_output_renderer_render_dummy;
00165 
00166         oclass->dispose = gds_output_renderer_dispose;
00167         oclass->set_property = gds_output_renderer_set_property;
00168         oclass->get_property = gds_output_renderer_get_property;
00169 
00170         /* Setup properties */
00171         gds_output_renderer_properties[PROP_OUTPUT_FILE] =
00172                         g_param_spec_string(N_("output-file"), N_("output file"), N_("Output file for
      renderer"),
00173                                             NULL, G_PARAM_READWRITE);
00174         gds_output_renderer_properties[PROP_LAYER_SETTINGS] =
00175                         g_param_spec_object(N_("layer-settings"), N_("Layer Settings object"),
00176                                             N_("Object containing the layer rendering information"),
00177                                             GDS_RENDER_TYPE_LAYER_SETTINGS, G_PARAM_READWRITE);
00178         g_object_class_install_properties(oclass, N_PROPERTIES, gds_output_renderer_properties);
00179 
00180         /* Setup output signals */
00181         gds_output_renderer_signals[ASYNC_FINISHED] =
00182                         g_signal_newv(N_("async-finished"), GDS_RENDER_TYPE_OUTPUT_RENDERER,
00183                                       G_SIGNAL_RUN_LAST | G_SIGNAL_NO_RECURSE,
00184                                       NULL,
00185                                       NULL,
00186                                       NULL,
00187                                       NULL,
00188                                       G_TYPE_NONE,
00189                                       0,
00190                                       NULL);
00191         gds_output_renderer_signals[ASYNC_PROGRESS_CHANGED] =
00192                         g_signal_newv(N_("progress-changed"), GDS_RENDER_TYPE_OUTPUT_RENDERER,
00193                                       G_SIGNAL_RUN_LAST | G_SIGNAL_NO_RECURSE,
00194                                       NULL,
00195                                       NULL,
```

```
00196                                       NULL,
00197                                       NULL,
00198                                       G_TYPE_NONE,
00199                                       1,
00200                                       progress_changed_param_types);
00201 }
00202
00203 void gds_output_renderer_init(GdsOutputRenderer *self)
00204 {
00205         GdsOutputRendererPrivate *priv;
00206
00207         priv = gds_output_renderer_get_instance_private(self);
00208
00209         priv->layer_settings = NULL;
00210         priv->output_file = NULL;
00211         priv->task = NULL;
00212         priv->mutex_init_status = TRUE;
00213         priv->main_context = NULL;
00214         priv->idle_function_parameters.status_message = NULL;
00215         g_mutex_init(&priv->settings_lock);
00216         g_mutex_init(&priv->idle_function_parameters.message_lock);
00217 }
00218
00219 GdsOutputRenderer *gds_output_renderer_new()
00220 {
00221         return GDS_RENDER_OUTPUT_RENDERER(g_object_new(GDS_RENDER_TYPE_OUTPUT_RENDERER, NULL));
00222 }
00223
00224 GdsOutputRenderer *gds_output_renderer_new_with_props(const char *output_file, LayerSettings
      *layer_settings)
00225 {
00226         return GDS_RENDER_OUTPUT_RENDERER(g_object_new(GDS_RENDER_TYPE_OUTPUT_RENDERER,
00227                                                        N_("layer-settings"), layer_settings,
00228                                                        N_("output-file"), output_file,
00229                                                        NULL));
00230 }
00231
00232 void gds_output_renderer_set_output_file(GdsOutputRenderer *renderer, const gchar *file_name)
00233 {
00234         g_return_if_fail(GDS_RENDER_IS_OUTPUT_RENDERER(renderer));
00235
00236         /* Check if the filename is actually filled */
00237         if (!file_name || !file_name[0])
00238                 return;
00239         g_object_set(renderer, N_("output-file"), file_name, NULL);
00240 }
00241
00242 const char *gds_output_renderer_get_output_file(GdsOutputRenderer *renderer)
00243 {
00244         const char *file = NULL;
00245
00246         g_object_get(renderer, N_("output-file"), &file, NULL);
00247         return file;
00248 }
00249
00250 LayerSettings *gds_output_renderer_get_and_ref_layer_settings(GdsOutputRenderer *renderer)
00251 {
00252         LayerSettings *ret = NULL;
00253         GdsOutputRendererPrivate *priv;
00254
00255         priv = gds_output_renderer_get_instance_private(renderer);
00256
00257         /* Acquire settings lock */
00258         g_mutex_lock(&priv->settings_lock);
00259
00260         /* This function seems to already reference the LayerSettings object */
00261         g_object_get(renderer, N_("layer-settings"), &ret, NULL);
00262
00263         /* It is now safe to clear the lock */
00264         g_mutex_unlock(&priv->settings_lock);
00265
00266         return ret;
00267 }
00268
00269 void gds_output_renderer_set_layer_settings(GdsOutputRenderer *renderer, LayerSettings *settings)
00270 {
00271         g_return_if_fail(GDS_RENDER_IS_LAYER_SETTINGS(settings));
00272
00273         g_object_set(renderer, N_("layer-settings"), settings, NULL);
00274 }
00275
00276 int gds_output_renderer_render_output(GdsOutputRenderer *renderer, struct gds_cell *cell, double
      scale)
00277 {
00278         int ret;
00279         GdsOutputRendererClass *klass;
00280         GdsOutputRendererPrivate *priv = gds_output_renderer_get_instance_private(renderer);
```

```
00281
00282         if (GDS_RENDER_IS_OUTPUT_RENDERER(renderer) == FALSE) {
00283                 g_error(_("Output Renderer not valid."));
00284                 return GDS_OUTPUT_RENDERER_GEN_ERR;
00285         }
00286
00287         if (!priv->output_file || !priv->output_file[0]) {
00288                 g_error(_("No/invalid output file set."));
00289                 return GDS_OUTPUT_RENDERER_GEN_ERR;
00290         }
00291
00292         if (!priv->layer_settings) {
00293                 g_error(_("No layer specification supplied."));
00294                 return GDS_OUTPUT_RENDERER_GEN_ERR;
00295         }
00296
00297         if (!cell) {
00298                 g_error(_("Output renderer called without cell to render."));
00299                 return GDS_OUTPUT_RENDERER_PARAM_ERR;
00300         }
00301
00302         klass = GDS_RENDER_OUTPUT_RENDERER_GET_CLASS(renderer);
00303         if (klass->render_output == NULL) {
00304                 g_critical(_("Output Renderer: Rendering function broken. This is a bug."));
00305                 return GDS_OUTPUT_RENDERER_GEN_ERR;
00306         }
00307
00308         ret = klass->render_output(renderer, cell, scale);
00309
00310         return ret;
00311 }
00312
00313 static void gds_output_renderer_async_wrapper(GTask *task,
00314                                               gpointer source_object,
00315                                               gpointer task_data,
00316                                               GCancellable *cancellable)
00317 {
00318         GdsOutputRenderer *renderer;
00319         GdsOutputRendererPrivate *priv;
00320         int ret;
00321         (void)task_data;
00322         (void)cancellable;
00323
00324         renderer = GDS_RENDER_OUTPUT_RENDERER(source_object);
00325         priv = gds_output_renderer_get_instance_private(renderer);
00326         if (!priv) {
00327                 ret = -1000;
00328                 goto ret_from_task;
00329         }
00330         if (!priv->mutex_init_status) {
00331                 ret = -1001;
00332                 goto ret_from_task;
00333         }
00334
00335         ret = gds_output_renderer_render_output(renderer, priv->async_params.cell,
      priv->async_params.scale);
00336
00337 ret_from_task:
00338         g_task_return_int(task, ret);
00339 }
00340
00341 static void gds_output_renderer_async_finished(GObject *src_obj, GAsyncResult *res, gpointer
      user_data)
00342 {
00343         GdsOutputRendererPrivate *priv;
00344         (void)user_data;
00345         (void)res; /* Will hopefully be destroyed later */
00346
00347         priv = gds_output_renderer_get_instance_private(GDS_RENDER_OUTPUT_RENDERER(src_obj));
00348
00349         priv->main_context = NULL;
00350
00351         g_signal_emit(src_obj, gds_output_renderer_signals[ASYNC_FINISHED], 0);
00352         g_clear_object(&priv->task);
00353
00354         /* Clear reference set in gds_output_renderer_render_output_async() */
00355         g_object_unref(src_obj);
00356 }
00357
00358 int gds_output_renderer_render_output_async(GdsOutputRenderer *renderer, struct gds_cell *cell, double
      scale)
00359 {
00360         GdsOutputRendererPrivate *priv;
00361         int ret = -1;
00362
00363         priv = gds_output_renderer_get_instance_private(renderer);
00364         if (priv->task) {
```

```
00365                 g_warning(_("Renderer already started asynchronously"));
00366                 return -2000;
00367         }
00368
00369         priv->task = g_task_new(renderer, NULL, gds_output_renderer_async_finished, NULL);
00370
00371         /* This function is not available on current debian distros. */
00372         /* g_task_set_name(priv->task, "Rendering Thread"); */
00373
00374         g_mutex_lock(&priv->settings_lock);
00375         priv->async_params.cell = cell;
00376         priv->async_params.scale = scale;
00377         priv->main_context = g_main_context_default();
00378         g_mutex_unlock(&priv->settings_lock);
00379
00380         /* Self reference. This could end up being nasty... */
00381         g_object_ref(renderer);
00382
00383         /* Do the magic */
00384         g_task_run_in_thread(priv->task, gds_output_renderer_async_wrapper);
00385
00386         return ret;
00387 }
00388
00389 static gboolean idle_event_processor_callback(gpointer user_data)
00390 {
00391         GdsOutputRenderer *renderer;
00392         GdsOutputRendererPrivate *priv;
00393         char *status_message;
00394
00395         /* If the rendering is finished before the mainloop gets to this point
00396          * the renderer is already disposed. Catch this!
00397          */
00398         if (!GDS_RENDER_IS_OUTPUT_RENDERER(user_data))
00399                 return FALSE;
00400
00401         renderer = GDS_RENDER_OUTPUT_RENDERER(user_data);
00402         priv = gds_output_renderer_get_instance_private(renderer);
00403
00404         if (g_mutex_trylock(&priv->idle_function_parameters.message_lock)) {
00405                 status_message = priv->idle_function_parameters.status_message;
00406                 g_signal_emit(renderer, gds_output_renderer_signals[ASYNC_PROGRESS_CHANGED], 0,
      status_message);
00407                 g_free(priv->idle_function_parameters.status_message);
00408                 priv->idle_function_parameters.status_message = NULL;
00409                 g_mutex_unlock(&priv->idle_function_parameters.message_lock);
00410         } else {
00411                 return TRUE;
00412         }
00413
00414         return FALSE;
00415 }
00416
00417 void gds_output_renderer_update_async_progress(GdsOutputRenderer *renderer, const char *status)
00418 {
00419         GSource *idle_event_processor;
00420         GdsOutputRendererPrivate *priv;
00421         gboolean skip_source = FALSE;
00422
00423         g_return_if_fail(GDS_RENDER_IS_OUTPUT_RENDERER(renderer));
00424         if (!status)
00425                 return;
00426
00427         priv = gds_output_renderer_get_instance_private(renderer);
00428
00429         /* If rendering is not async */
00430         if (!priv->main_context)
00431                 return;
00432
00433         g_mutex_lock(&priv->idle_function_parameters.message_lock);
00434         if (priv->idle_function_parameters.status_message) {
00435                 g_free(priv->idle_function_parameters.status_message);
00436
00437                 /* Skip adding new idle source because there's already an active one */
00438                 skip_source = TRUE;
00439         }
00440         priv->idle_function_parameters.status_message = g_strdup(status);
00441         g_mutex_unlock(&priv->idle_function_parameters.message_lock);
00442
00443         if (!skip_source) {
00444                 idle_event_processor = g_idle_source_new();
00445                 g_source_set_callback(idle_event_processor, idle_event_processor_callback,
      (gpointer)renderer, NULL);
00446                 g_source_attach(idle_event_processor, priv->main_context);
00447         }
00448 }
00449
```

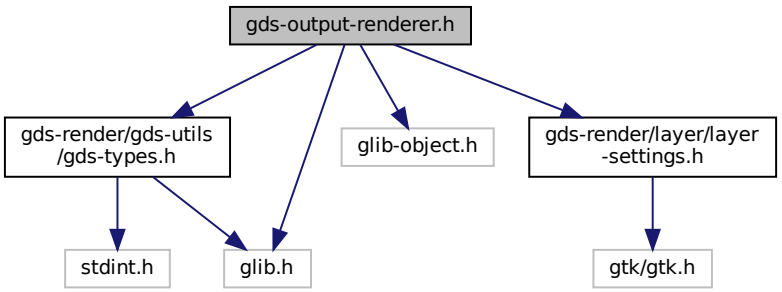
13.42 gds-output-renderer.dox File Reference

13.43 gds-output-renderer.h File Reference

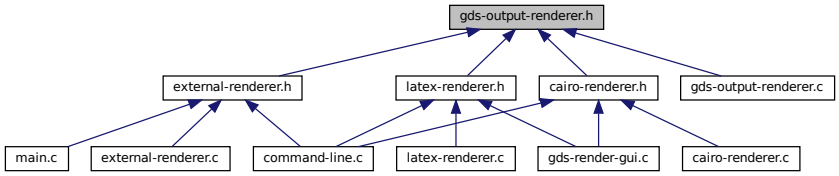
Header for output renderer base class.

```
#include <gds-render/gds-utils/gds-types.h>
#include <glib-object.h>
#include <glib.h>
#include <gds-render/layer/layer-settings.h>
```

Include dependency graph for gds-output-renderer.h:



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



Data Structures

- struct _GdsOutputRendererClass

  Base output renderer class structure.

Macros

- #define GDS_RENDER_TYPE_OUTPUT_RENDERER (gds_output_renderer_get_type())

Enumerations

- enum { GDS_OUTPUT_RENDERER_GEN_ERR = -100, GDS_OUTPUT_RENDERER_PARAM_ERR = -200 }

Functions

- G_DECLARE_DERIVABLE_TYPE (GdsOutputRenderer, gds_output_renderer, GDS_RENDER, OUTPUT↩ _RENDERER, GObject)
- GdsOutputRenderer * gds_output_renderer_new ()

  Create a new GdsOutputRenderer GObject.
- GdsOutputRenderer * gds_output_renderer_new_with_props (const char *output_file, LayerSettings *layer_settings)

  Create a new GdsOutputRenderer GObject with its properties.
- int gds_output_renderer_render_output (GdsOutputRenderer *renderer, struct gds_cell *cell, double scale)

  gds_output_renderer_render_output
- void gds_output_renderer_set_output_file (GdsOutputRenderer *renderer, const gchar *file_name)

  Convenience function for setting the "output-file" property.
- const char * gds_output_renderer_get_output_file (GdsOutputRenderer *renderer)

  Convenience function for getting the "output-file" property.
- LayerSettings * gds_output_renderer_get_and_ref_layer_settings (GdsOutputRenderer *renderer)

  Get layer settings.
- void gds_output_renderer_set_layer_settings (GdsOutputRenderer *renderer, LayerSettings *settings)

  Set layer settings.
- int gds_output_renderer_render_output_async (GdsOutputRenderer *renderer, struct gds_cell *cell, double scale)

  Render output asynchronously.
- void gds_output_renderer_update_async_progress (GdsOutputRenderer *renderer, const char *status)

  This function emits the 'progress-changed' in the thread/context that triggered an asynchronous rendering.

13.43.1 Detailed Description

Header for output renderer base class.

Author

Mario Hüttel mario.huettel@gmx.net

Definition in file gds-output-renderer.h.

13.44 gds-output-renderer.h

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00031 #ifndef _GDS_OUTPUT_RENDERER_H_
00032 #define _GDS_OUTPUT_RENDERER_H_
00033
```

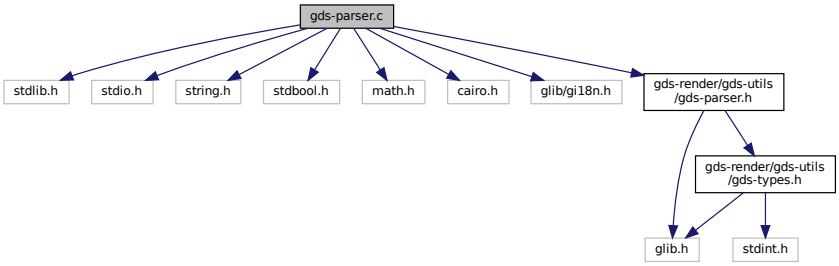
```
00034 #include <gds-render/gds-utils/gds-types.h>
00035 #include <glib-object.h>
00036 #include <glib.h>
00037 #include <gds-render/layer/layer-settings.h>
00038
00039 G_BEGIN_DECLS
00040
00041 #define GDS_RENDER_TYPE_OUTPUT_RENDERER (gds_output_renderer_get_type())
00042
00043 G_DECLARE_DERIVABLE_TYPE(GdsOutputRenderer, gds_output_renderer, GDS_RENDER, OUTPUT_RENDERER,
       GObject);
00044
00049 struct _GdsOutputRendererClass {
00050         GObjectClass parent_class;
00051
00055         int (*render_output)(GdsOutputRenderer *renderer,
00056                              struct gds_cell *cell,
00057                              double scale);
00058         gpointer padding[4];
00059 };
00060
00061 enum {
00062         GDS_OUTPUT_RENDERER_GEN_ERR = -100,
00063         GDS_OUTPUT_RENDERER_PARAM_ERR = -200
00064 };
00065
00070 GdsOutputRenderer *gds_output_renderer_new();
00071
00078 GdsOutputRenderer *gds_output_renderer_new_with_props(const char *output_file, LayerSettings
       *layer_settings);
00079
00087 int gds_output_renderer_render_output(GdsOutputRenderer *renderer,
00088                                       struct gds_cell *cell,
00089                                       double scale);
00090
00096 void gds_output_renderer_set_output_file(GdsOutputRenderer *renderer, const gchar *file_name);
00097
00103 const char *gds_output_renderer_get_output_file(GdsOutputRenderer *renderer);
00104
00116 LayerSettings *gds_output_renderer_get_and_ref_layer_settings(GdsOutputRenderer *renderer);
00117
00130 void gds_output_renderer_set_layer_settings(GdsOutputRenderer *renderer, LayerSettings *settings);
00131
00145 int gds_output_renderer_render_output_async(GdsOutputRenderer *renderer, struct gds_cell *cell, double
       scale);
00146
00155 void gds_output_renderer_update_async_progress(GdsOutputRenderer *renderer, const char *status);
00156
00157 G_END_DECLS
00158
00159 #endif /* _GDS_OUTPUT_RENDERER_H_ */
00160
```

13.45 gds-parser.c File Reference

Implementation of the GDS-Parser.

```
#include <stdlib.h>
#include <stdio.h>
#include <string.h>
#include <stdbool.h>
#include <math.h>
#include <cairo.h>
#include <glib/gi18n.h>
#include <gds-render/gds-utils/gds-parser.h>
```

Include dependency graph for gds-parser.c:



Data Structures

- struct gds_cell_array_instance

  Struct representing an array instantiation.

Macros

- #define GDS_DEFAULT_UNITS (10E-9)

  Default units assumed for library.
- #define GDS_ERROR(fmt, ...) printf("[PARSE_ERROR] " fmt "\n", ##__VA_ARGS__)

  Print GDS error.
- #define GDS_WARN(fmt, ...) printf("[PARSE_WARNING] " fmt "\n", ##__VA_ARGS__)

  Print GDS warning.
- #define GDS_INF(fmt, ...)

Enumerations

- enum gds_record {
  INVALID = 0x0000, HEADER = 0x0002, BGNLIB = 0x0102, LIBNAME = 0x0206,
  UNITS = 0x0305, ENDLIB = 0x0400, BGNSTR = 0x0502, STRNAME = 0x0606,
  ENDSTR = 0x0700, BOUNDARY = 0x0800, PATH = 0x0900, SREF = 0x0A00,
  ENDEL = 0x1100, XY = 0x1003, MAG = 0x1B05, ANGLE = 0x1C05,
  SNAME = 0x1206, STRANS = 0x1A01, BOX = 0x2D00, LAYER = 0x0D02,
  WIDTH = 0x0F03, PATHTYPE = 0x2102, COLROW = 0x1302, AREF = 0x0B00 }

Functions

- static int name_cell_ref (struct gds_cell_instance *cell_inst, unsigned int bytes, char *data)

  Name cell reference.
- static int name_array_cell_ref (struct gds_cell_array_instance *cell_inst, unsigned int bytes, char *data)

  Name cell reference.
- static double gds_convert_double (const char *data)

  Convert GDS 8-byte real to double.
- static signed int gds_convert_signed_int (const char *data)

  Convert GDS INT32 to int.

- static int16_t gds_convert_signed_int16 (const char *data)

  Convert GDS INT16 to int16.
- static uint16_t gds_convert_unsigned_int16 (const char *data)

  Convert GDS UINT16 String to uint16.
- static GList * append_library (GList *curr_list, struct gds_library **library_ptr)

  Append library to list.
- static GList * prepend_graphics (GList *curr_list, enum graphics_type type, struct gds_graphics **graphics_ptr)

  Prepend graphics to list.
- static GList * append_vertex (GList *curr_list, int x, int y)

  Appends vertext List.
- static GList * append_cell (GList *curr_list, struct gds_cell **cell_ptr)

  append_cell Append a gds_cell to a list
- static GList * append_cell_ref (GList *curr_list, struct gds_cell_instance **instance_ptr)

  Append a cell reference to the reference GList.
- static int name_library (struct gds_library *current_library, unsigned int bytes, char *data)

  Name a gds_library.
- static int name_cell (struct gds_cell *cell, unsigned int bytes, char *data, struct gds_library *lib)

  Names a gds_cell.
- static void parse_reference_list (gpointer gcell_ref, gpointer glibrary)

  Search for cell reference `gcell_ref` in `glibrary`.
- static void scan_cell_reference_dependencies (gpointer gcell, gpointer library)

  Scans cell references inside cell This function searches all the references in `gcell` and updates the gds_cell_instance::cell_ref field in each instance.
- static void scan_library_references (gpointer library_list_item, gpointer user)

  Scans library's cell references.
- static void gds_parse_date (const char *buffer, int length, struct gds_time_field *mod_date, struct gds_time_field *access_date)

  gds_parse_date
- static void convert_aref_to_sref (struct gds_cell_array_instance *aref, struct gds_cell *container_cell)

  Convert AREF to a bunch of SREFs and append them to `container_cell`.
- int parse_gds_from_file (const char *filename, GList **library_array)

  Parse a GDS file.
- static void delete_cell_inst_element (struct gds_cell_instance *cell_inst)

  delete_cell_inst_element
- static void delete_vertex (struct gds_point *vertex)

  delete_vertex
- static void delete_graphics_obj (struct gds_graphics *gfx)

  delete_graphics_obj
- static void delete_cell_element (struct gds_cell *cell)

  delete_cell_element
- static void delete_library_element (struct gds_library *lib)

  delete_library_element
- int clear_lib_list (GList **library_list)

  Deletes all libraries including cells, references etc.

13.45.1 Detailed Description

Implementation of the GDS-Parser.

Author

Mario Hüttel mario.huettel@gmx.net

What's missing? - A lot: Support for 4 Byte real Support for pathtypes Support for datatypes (only layer so far) etc...

Definition in file gds-parser.c.

13.46 gds-parser.c

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00037 #include <stdlib.h>
00038 #include <stdio.h>
00039 #include <string.h>
00040 #include <stdbool.h>
00041 #include <math.h>
00042 #include <cairo.h>
00043 #include <glib/gi18n.h>
00044
00045 #include <gds-render/gds-utils/gds-parser.h>
00046
00051 #define GDS_DEFAULT_UNITS (10E-9)
00052
00053 #define GDS_ERROR(fmt, ...) printf("[PARSE_ERROR] " fmt "\n", ##__VA_ARGS__)
00054 #define GDS_WARN(fmt, ...) printf("[PARSE_WARNING] " fmt "\n", ##__VA_ARGS__)
00056 #if GDS_PRINT_DEBUG_INFOS
00057
00058         #define GDS_INF(fmt, ...) printf(fmt, ##__VA_ARGS__)
00059 #else
00060         #define GDS_INF(fmt, ...)
00061 #endif
00062 enum gds_record {
00063         INVALID = 0x0000,
00064         HEADER = 0x0002,
00065         BGNLIB = 0x0102,
00066         LIBNAME = 0x0206,
00067         UNITS = 0x0305,
00068         ENDLIB = 0x0400,
00069         BGNSTR = 0x0502,
00070         STRNAME = 0x0606,
00071         ENDSTR = 0x0700,
00072         BOUNDARY = 0x0800,
00073         PATH = 0x0900,
00074         SREF = 0x0A00,
00075         ENDEL = 0x1100,
00076         XY = 0x1003,
00077         MAG = 0x1B05,
00078         ANGLE = 0x1C05,
00079         SNAME = 0x1206,
00080         STRANS = 0x1A01,
00081         BOX = 0x2D00,
00082         LAYER = 0x0D02,
00083         WIDTH = 0x0F03,
00084         PATHTYPE = 0x2102,
```

```
00085         COLROW = 0x1302,
00086         AREF = 0x0B00
00087 };
00088
00095 struct gds_cell_array_instance {
00096         char ref_name[CELL_NAME_MAX];
00097         struct gds_cell *cell_ref;
00098         struct gds_point control_points[3];
00099         int flipped;
00100         double angle;
00101         double magnification;
00102         int columns;
00103         int rows;
00104 };
00105
00113 static int name_cell_ref(struct gds_cell_instance *cell_inst,
00114                          unsigned int bytes, char *data)
00115 {
00116         int len;
00117
00118         if (cell_inst == NULL) {
00119                 GDS_ERROR("Naming cell ref with no opened cell ref");
00120                 return -1;
00121         }
00122         data[bytes] = 0; // Append '0'
00123         len = (int)strlen(data);
00124         if (len > CELL_NAME_MAX-1) {
00125                 GDS_ERROR("Cell name '%s' too long: %d\n", data, len);
00126                 return -1;
00127         }
00128
00129         /* else: */
00130         strcpy(cell_inst->ref_name, data);
00131         GDS_INF("\tCell referenced: %s\n", cell_inst->ref_name);
00132
00133         return 0;
00134 }
00135
00143 static int name_array_cell_ref(struct gds_cell_array_instance *cell_inst,
00144                                unsigned int bytes, char *data)
00145 {
00146         int len;
00147
00148         if (cell_inst == NULL) {
00149                 GDS_ERROR("Naming array cell ref with no opened cell ref");
00150                 return -1;
00151         }
00152         data[bytes] = 0; // Append '0'
00153         len = (int)strlen(data);
00154         if (len > CELL_NAME_MAX-1) {
00155                 GDS_ERROR("Cell name '%s' too long: %d\n", data, len);
00156                 return -1;
00157         }
00158
00159         /* else: */
00160         strcpy(cell_inst->ref_name, data);
00161         GDS_INF("\tCell referenced: %s\n", cell_inst->ref_name);
00162
00163         return 0;
00164 }
00165
00171 static double gds_convert_double(const char *data)
00172 {
00173         bool sign_bit;
00174         int i;
00175         double ret_val;
00176         char current_byte;
00177         int bit = 0;
00178         int exponent;
00179
00180         sign_bit = ((data[0] & 0x80) ? true : false);
00181
00182         /* Check for real 0 */
00183         for (i = 0; i < 8; i++) {
00184                 if (data[i] != 0)
00185                         break;
00186                 if (i == 7) {
00187                         /* All 8 bytes are 0 */
00188                         return 0.0;
00189                 }
00190         }
00191
00192         /* Value is other than 0 */
00193         ret_val = 0.0;
00194         for (i = 8; i < 64; i++) {
00195                 current_byte = data[i/8];
00196                 bit = i % 8;
```

```
00197                 /* isolate bit */
00198                 if ((current_byte & (0x80 >> bit)))
00199                         ret_val += pow(2, ((double)(-i+7)));
00200
00201         }
00202
00203         /* Parse exponent and sign bit */
00204         exponent = (int)(data[0] & 0x7F);
00205         exponent -= 64;
00206         ret_val *= pow(16, exponent) * (sign_bit == true ? -1 : 1);
00207
00208         return ret_val;
00209 }
00210
00216 static signed int gds_convert_signed_int(const char *data)
00217 {
00218         int ret;
00219
00220         if (!data) {
00221                 GDS_ERROR("Conversion from GDS data to signed int failed.");
00222                 return 0;
00223         }
00224
00225         ret =   (signed int)(((((int)data[0]) & 0xFF) << 24) |
00226                         ((((int)data[1]) & 0xFF) << 16) |
00227                         (((int)(data[2]) & 0xFF) <<  8) |
00228                         (((int)(data[3]) & 0xFF) <<  0));
00229         return ret;
00230 }
00231
00237 static int16_t gds_convert_signed_int16(const char *data)
00238 {
00239         if (!data) {
00240                 GDS_ERROR("This should not happen");
00241                 return 0;
00242         }
00243         return (int16_t)((((int16_t)(data[0]) & 0xFF) <<  8) |
00244                         (((int16_t)(data[1]) & 0xFF) <<  0));
00245 }
00246
00252 static uint16_t gds_convert_unsigned_int16(const char *data)
00253 {
00254         if (!data) {
00255                 GDS_ERROR("This should not happen");
00256                 return 0;
00257         }
00258         return (uint16_t)((((uint16_t)(data[0]) & 0xFF) <<  8) |
00259                         (((uint16_t)(data[1]) & 0xFF) <<  0));
00260 }
00261
00268 static GList *append_library(GList *curr_list, struct gds_library **library_ptr)
00269 {
00270         struct gds_library *lib;
00271
00272         lib = (struct gds_library *)malloc(sizeof(struct gds_library));
00273         if (lib) {
00274                 lib->cells = NULL;
00275                 lib->name[0] = 0;
00276                 lib->unit_in_meters = GDS_DEFAULT_UNITS; // Default. Will be overwritten
00277                 lib->cell_names = NULL;
00278         } else
00279                 return NULL;
00280         if (library_ptr)
00281                 *library_ptr = lib;
00282
00283         return g_list_append(curr_list, lib);
00284 }
00285
00293 static __attribute__((warn_unused_result)) GList *prepend_graphics(GList *curr_list, enum
     graphics_type type,
00294                                 struct gds_graphics **graphics_ptr)
00295 {
00296         struct gds_graphics *gfx;
00297
00298         gfx = (struct gds_graphics *)malloc(sizeof(struct gds_graphics));
00299         if (gfx) {
00300                 gfx->datatype = 0;
00301                 gfx->layer = 0;
00302                 gfx->vertices = NULL;
00303                 gfx->width_absolute = 0;
00304                 gfx->gfx_type = type;
00305                 gfx->path_render_type = PATH_FLUSH;
00306         } else
00307                 return NULL;
00308
00309         if (graphics_ptr)
00310                 *graphics_ptr = gfx;
```

```
00311
00312         return g_list_prepend(curr_list, gfx);
00313 }
00314
00322 static GList *append_vertex(GList *curr_list, int x, int y)
00323 {
00324         struct gds_point *vertex;
00325
00326         vertex = (struct gds_point *)malloc(sizeof(struct gds_point));
00327         if (vertex) {
00328                 vertex->x = x;
00329                 vertex->y = y;
00330         } else
00331                 return NULL;
00332         return g_list_append(curr_list, vertex);
00333 }
00334
00343 static GList *append_cell(GList *curr_list, struct gds_cell **cell_ptr)
00344 {
00345         struct gds_cell *cell;
00346
00347         cell = (struct gds_cell *)malloc(sizeof(struct gds_cell));
00348         if (cell) {
00349                 cell->child_cells = NULL;
00350                 cell->graphic_objs = NULL;
00351                 cell->name[0] = 0;
00352                 cell->parent_library = NULL;
00353                 cell->checks.unresolved_child_count = GDS_CELL_CHECK_NOT_RUN;
00354                 cell->checks.affected_by_reference_loop = GDS_CELL_CHECK_NOT_RUN;
00355         } else
00356                 return NULL;
00357         /* return cell */
00358         if (cell_ptr)
00359                 *cell_ptr = cell;
00360
00361         return g_list_append(curr_list, cell);
00362 }
00363
00372 static GList *append_cell_ref(GList *curr_list, struct gds_cell_instance **instance_ptr)
00373 {
00374         struct gds_cell_instance *inst;
00375
00376         inst = (struct gds_cell_instance *)
00377                         malloc(sizeof(struct gds_cell_instance));
00378         if (inst) {
00379                 inst->cell_ref = NULL;
00380                 inst->ref_name[0] = 0;
00381                 inst->magnification = 1.0;
00382                 inst->flipped = 0;
00383                 inst->angle = 0.0;
00384         } else
00385                 return NULL;
00386
00387         if (instance_ptr)
00388                 *instance_ptr = inst;
00389
00390         return g_list_append(curr_list, inst);
00391 }
00392
00400 static int name_library(struct gds_library *current_library,
00401                         unsigned int bytes, char *data)
00402 {
00403         int len;
00404
00405         if (current_library == NULL) {
00406                 GDS_ERROR("Naming cell with no opened library");
00407                 return -1;
00408         }
00409
00410         data[bytes] = 0; // Append '0'
00411         len = (int)strlen(data);
00412         if (len > CELL_NAME_MAX-1) {
00413                 GDS_ERROR("Library name '%s' too long: %d\n", data, len);
00414                 return -1;
00415         }
00416
00417         strcpy(current_library->name, data);
00418         GDS_INF("Named library: %s\n", current_library->name);
00419
00420         return 0;
00421 }
00422
00431 static int name_cell(struct gds_cell *cell, unsigned int bytes,
00432                      char *data, struct gds_library *lib)
00433 {
00434         int len;
00435
```

```
00436         if (cell == NULL) {
00437                 GDS_ERROR("Naming library with no opened library");
00438                 return -1;
00439         }
00440         data[bytes] = 0; // Append '0'
00441         len = (int)strlen(data);
00442         if (len > CELL_NAME_MAX-1) {
00443                 GDS_ERROR("Cell name '%s' too long: %d\n", data, len);
00444                 return -1;
00445         }
00446
00447         strcpy(cell->name, data);
00448         GDS_INF("Named cell: %s\n", cell->name);
00449
00450         /* Append cell name to lib's list of names */
00451         lib->cell_names = g_list_append(lib->cell_names, cell->name);
00452
00453         return 0;
00454 }
00455
00463 static void parse_reference_list(gpointer gcell_ref, gpointer glibrary)
00464 {
00465         struct gds_cell_instance *inst = (struct gds_cell_instance *)gcell_ref;
00466         struct gds_library *lib = (struct gds_library *)glibrary;
00467         GList *cell_item;
00468         struct gds_cell *cell;
00469
00470         GDS_INF("\t\t\tReference: %s: ", inst->ref_name);
00471         /* Find cell */
00472         for (cell_item = lib->cells; cell_item != NULL;
00473              cell_item = cell_item->next) {
00474
00475                 cell = (struct gds_cell *)cell_item->data;
00476                 /* Check if cell is found */
00477                 if (!strcmp(cell->name, inst->ref_name)) {
00478                         GDS_INF("found\n");
00479                         /* update reference link */
00480                         inst->cell_ref = cell;
00481                         return;
00482                 }
00483         }
00484
00485         GDS_INF("MISSING!\n");
00486         GDS_WARN("referenced cell could not be found in library");
00487 }
00488
00495 static void scan_cell_reference_dependencies(gpointer gcell, gpointer library)
00496 {
00497         struct gds_cell *cell = (struct gds_cell *)gcell;
00498
00499         GDS_INF("\tScanning cell: %s\n", cell->name);
00500
00501         /* Scan all library references */
00502         g_list_foreach(cell->child_cells, parse_reference_list, library);
00503
00504 }
00505
00513 static void scan_library_references(gpointer library_list_item, gpointer user)
00514 {
00515         struct gds_library *lib = (struct gds_library *)library_list_item;
00516         (void)user;
00517
00518         GDS_INF("Scanning Library: %s\n", lib->name);
00519         g_list_foreach(lib->cells, scan_cell_reference_dependencies, lib);
00520 }
00521
00529 static void gds_parse_date(const char *buffer, int length, struct gds_time_field *mod_date, struct
       gds_time_field *access_date)
00530 {
00531
00532         struct gds_time_field *temp_date;
00533
00534         if (!access_date || !mod_date) {
00535                 GDS_WARN("Date structures invalid");
00536                 return;
00537         }
00538
00539         if (length != (2*6*2)) {
00540                 GDS_WARN("Could not parse date field! Not the specified length");
00541                 return;
00542         }
00543
00544         for (temp_date = mod_date; 1; temp_date = access_date) {
00545                 temp_date->year = gds_convert_unsigned_int16(buffer);
00546                 buffer += 2;
00547                 temp_date->month = gds_convert_unsigned_int16(buffer);
00548                 buffer += 2;
```

```
00549                 temp_date->day = gds_convert_unsigned_int16(buffer);
00550                 buffer += 2;
00551                 temp_date->hour = gds_convert_unsigned_int16(buffer);
00552                 buffer += 2;
00553                 temp_date->minute = gds_convert_unsigned_int16(buffer);
00554                 buffer += 2;
00555                 temp_date->second = gds_convert_unsigned_int16(buffer);
00556                 buffer += 2;
00557 
00558                 if (temp_date == access_date)
00559                         break;
00560         }
00561 }
00562 
00574 static void convert_aref_to_sref(struct gds_cell_array_instance *aref, struct gds_cell
      *container_cell)
00575 {
00576         struct gds_point origin;
00577         struct gds_point row_shift_vector;
00578         struct gds_point col_shift_vector;
00579         struct gds_cell_instance *sref_inst = NULL;
00580         int col;
00581         int row;
00582 
00583         if (!aref || !container_cell)
00584                 return;
00585 
00586         if (aref->columns == 0 || aref->rows == 0) {
00587                 GDS_ERROR("Conversion of array instance aborted. No rows / columns.");
00588                 return;
00589         }
00590         origin.x = aref->control_points[0].x;
00591         origin.y = aref->control_points[0].y;
00592 
00593         row_shift_vector.x = (aref->control_points[2].x - origin.x) / aref->rows;
00594         row_shift_vector.y = (aref->control_points[2].y - origin.y) / aref->rows;
00595         col_shift_vector.x = (aref->control_points[1].x - origin.x) / aref->columns;
00596         col_shift_vector.y = (aref->control_points[1].y - origin.y) / aref->columns;
00597 
00598         /* Iterate over columns and rows */
00599         for (col = 0; col < aref->columns; col++) {
00600                 for (row = 0; row < aref->rows; row++) {
00601                         /* Create new instance for this row/column and configure data */
00602                         container_cell->child_cells = append_cell_ref(container_cell->child_cells,
      &sref_inst);
00603                         if (!sref_inst) {
00604                                 GDS_ERROR("Appending cell ref failed!");
00605                                 continue;
00606                         }
00607 
00608                         sref_inst->angle = aref->angle;
00609                         sref_inst->magnification = aref->magnification;
00610                         sref_inst->flipped = aref->flipped;
00611                         strncpy(sref_inst->ref_name, aref->ref_name, CELL_NAME_MAX);
00612                         sref_inst->origin.x = origin.x + row_shift_vector.x * row + col_shift_vector.x
      * col;
00613                         sref_inst->origin.y = origin.y + row_shift_vector.y * row + col_shift_vector.y
      * col;
00614                 }
00615         }
00616         GDS_INF("Converted AREF to SREFs\n");
00617 }
00618 
00619 int parse_gds_from_file(const char *filename, GList **library_list)
00620 {
00621         char *workbuff;
00622         int read;
00623         int i;
00624         int run = 1;
00625         FILE *gds_file = NULL;
00626         uint16_t rec_data_length;
00627         enum gds_record rec_type;
00628         struct gds_library *current_lib = NULL;
00629         struct gds_cell *current_cell = NULL;
00630         struct gds_graphics *current_graphics = NULL;
00631         struct gds_cell_instance *current_s_reference = NULL;
00632         struct gds_cell_array_instance *current_a_reference = NULL;
00633         struct gds_cell_array_instance temp_a_reference;
00634         int x, y;
00636         GList *lib_list;
00637 
00638         lib_list = *library_list;
00639 
00640         /* Allocate working buffer */
00641         workbuff = (char *)malloc(sizeof(char)*128*1024);
00642 
00643         if(!workbuff)
```

```
00644                   return -100;
00645
00646           /* open File */
00647           gds_file = fopen(filename, "rb");
00648           if (gds_file == NULL) {
00649                   GDS_ERROR("Could not open File %s", filename);
00650                   return -1;
00651           }
00652
00653           /* Record parser */
00654           while (run == 1) {
00655                   rec_type = INVALID;
00656                   read = fread(workbuff, sizeof(char), 2, gds_file);
00657                   if (read != 2 && (current_cell != NULL ||
00658                                     current_graphics != NULL ||
00659                                     current_lib != NULL ||
00660                                     current_s_reference != NULL)) {
00661                           GDS_ERROR("End of File. with openend structs/libs");
00662                           run = -2;
00663                           break;
00664                   } else if (read != 2) {
00665                           /* EOF */
00666                           run = 0;
00667                           break;
00668                   }
00669
00670                   rec_data_length = gds_convert_unsigned_int16(workbuff);
00671
00672                   if (rec_data_length < 4) {
00673                           /* Possible Zero-Padding: */
00674                           run = 0;
00675                           GDS_WARN("Zero Padding detected!");
00676                           if (current_cell != NULL ||
00677                                           current_graphics != NULL ||
00678                                           current_lib != NULL ||
00679                                           current_s_reference != NULL) {
00680                                   GDS_ERROR("Not all structures closed");
00681                                   run = -2;
00682                           }
00683                           break;
00684                   }
00685                   rec_data_length -= 4;
00686
00687                   read = fread(workbuff, sizeof(char), 2, gds_file);
00688                   if (read != 2) {
00689                           run = -2;
00690                           GDS_ERROR("Unexpected end of file");
00691                           break;
00692                   }
00693                   rec_type = gds_convert_unsigned_int16(workbuff);
00694
00695
00696                   /* if begin: Allocate structures */
00697                   switch (rec_type) {
00698                   case BGNLIB:
00699                           lib_list = append_library(lib_list, &current_lib);
00700                           if (lib_list == NULL) {
00701                                   GDS_ERROR("Allocating memory failed");
00702                                   run = -3;
00703                                   break;
00704
00705                           }
00706                           GDS_INF("Entering Lib\n");
00707                           break;
00708                   case ENDLIB:
00709                           if (current_lib == NULL) {
00710                                   run = -4;
00711                                   GDS_ERROR("Closing Library with no opened library");
00712                                   break;
00713                           }
00714
00715                           /* Check for open Cells */
00716                           if (current_cell != NULL) {
00717                                   run = -4;
00718                                   GDS_ERROR("Closing Library with opened cells");
00719                                   break;
00720                           }
00721                           current_lib = NULL;
00722                           GDS_INF("Leaving Library\n");
00723                           break;
00724                   case BGNSTR:
00725                           if (current_lib == NULL) {
00726                                   GDS_ERROR("Defining Cell outside of library!\n");
00727                                   run = -4;
00728                                   break;
00729                           }
00730                           current_lib->cells = append_cell(current_lib->cells, &current_cell);
```

```
00731                           if (current_lib->cells == NULL) {
00732                                   GDS_ERROR("Allocating memory failed");
00733                                   run = -3;
00734                                   break;
00735                           }
00736
00737                           current_cell->parent_library = current_lib;
00738
00739                           GDS_INF("Entering cell\n");
00740                           break;
00741                   case ENDSTR:
00742                           if (current_cell == NULL) {
00743                                   run = -4;
00744                                   GDS_ERROR("Closing cell with no opened cell");
00745                                   break;
00746                           }
00747                           /* Check for open Elements */
00748                           if (current_graphics != NULL || current_s_reference != NULL) {
00749                                   run = -4;
00750                                   GDS_ERROR("Closing cell with opened Elements");
00751                                   break;
00752                           }
00753                           current_cell = NULL;
00754                           GDS_INF("Leaving Cell\n");
00755                           break;
00756                   case BOX:
00757                   case BOUNDARY:
00758                           if (current_cell == NULL) {
00759                                   GDS_ERROR("Boundary/Box outside of cell");
00760                                   run = -3;
00761                                   break;
00762                           }
00763                           current_cell->graphic_objs = prepend_graphics(current_cell->graphic_objs,
00764                                                                         (rec_type == BOUNDARY
00765                                                                            ? GRAPHIC_POLYGON
00766                                                                            : GRAPHIC_BOX),
00767                                                                         &current_graphics);
00768                           if (current_cell->graphic_objs == NULL) {
00769                                   GDS_ERROR("Memory allocation failed");
00770                                   run = -4;
00771                                   break;
00772                           }
00773                           GDS_INF("\tEntering boundary/Box\n");
00774                           break;
00775                   case SREF:
00776                           if (current_cell == NULL) {
00777                                   GDS_ERROR("Cell Reference outside of cell");
00778                                   run = -3;
00779                                   break;
00780                           }
00781                           current_cell->child_cells = append_cell_ref(current_cell->child_cells,
00782                                                                       &current_s_reference);
00783                           if (current_cell->child_cells == NULL) {
00784                                   GDS_ERROR("Memory allocation failed");
00785                                   run = -4;
00786                                   break;
00787                           }
00788
00789                           GDS_INF("\tEntering reference\n");
00790                           break;
00791                   case PATH:
00792                           if (current_cell == NULL) {
00793                                   GDS_ERROR("Path outside of cell");
00794                                   run = -3;
00795                                   break;
00796                           }
00797                           current_cell->graphic_objs = prepend_graphics(current_cell->graphic_objs,
00798                                                                         GRAPHIC_PATH, &current_graphics);
00799                           if (current_cell->graphic_objs == NULL) {
00800                                   GDS_ERROR("Memory allocation failed");
00801                                   run = -4;
00802                                   break;
00803                           }
00804                           GDS_INF("\tEntering Path\n");
00805                           break;
00806                   case ENDEL:
00807                           if (current_graphics != NULL) {
00808                                   GDS_INF("\tLeaving %s\n", (current_graphics->gfx_type ==
      GRAPHIC_POLYGON ? "boundary" : "path"));
00809                                   current_graphics = NULL;
00810                           }
00811                           if (current_s_reference != NULL) {
00812                                   GDS_INF("\tLeaving Reference\n");
00813                                   current_s_reference = NULL;
00814                           }
00815                           if (current_a_reference != NULL) {
00816                                   GDS_INF("\tLeaving Array Reference\n");
```

```
00817                                   convert_aref_to_sref(current_a_reference, current_cell);
00818                                   current_a_reference = NULL;
00819                           }
00820
00821                           break;
00822                   case XY:
00823                           if (current_graphics) {
00824
00825                           } else if (current_s_reference) {
00826                                   if (rec_data_length != 8) {
00827                                           GDS_WARN("Instance has weird coordinates. Rendered output
      might be screwed!");
00828                                   }
00829                           } else if (current_a_reference) {
00830                                   if (rec_data_length != (3*(4+4)))
00831                                           GDS_WARN("Array instance has weird coordinates. Rendered
      output might be screwed!");
00832                           }
00833                           break;
00834                   case AREF:
00835                           if (current_cell == NULL) {
00836                                   GDS_ERROR("Cell array reference outside of cell");
00837                                   run = -3;
00838                                   break;
00839                           }
00840
00841                           if (current_a_reference != NULL) {
00842                                   GDS_ERROR("Recursive cell array reference");
00843                                   run = -3;
00844                                   break;
00845                           }
00846
00847                           GDS_INF("Entering Array Reference\n");
00848
00849                           /* Array references are coverted after fully declared. Therefore,
00850                            * only a static buffer is needed
00851                            */
00852                           current_a_reference = &temp_a_reference;
00853                           current_a_reference->ref_name[0] = '\0';
00854                           current_a_reference->angle = 0.0;
00855                           current_a_reference->magnification = 1.0;
00856                           current_a_reference->flipped = 0;
00857                           current_a_reference->rows = 0;
00858                           current_a_reference->columns = 0;
00859                           break;
00860                   case COLROW:
00861                   case MAG:
00862                   case ANGLE:
00863                   case STRANS:
00864                   case WIDTH:
00865                   case PATHTYPE:
00866                   case UNITS:
00867                   case LIBNAME:
00868                   case SNAME:
00869                   case LAYER:
00870                   case STRNAME:
00871                           break;
00872                   default:
00873                           GDS_INF("Unhandled Record: %04x, len: %u\n", (unsigned int)rec_type, (unsigned
      int)rec_data_length);
00874                           break;
00875                   } /* switch(rec_type) */
00876
00877
00878                   /* No Data -> No Processing, go back to top */
00879                   if (!rec_data_length || run != 1) continue;
00880
00881                   read = fread(workbuff, sizeof(char), rec_data_length, gds_file);
00882
00883                   if (read != rec_data_length) {
00884                           GDS_ERROR("Could not read enough data: requested: %u, read: %u | Type:
      0x%04x\n",
00885                                   (unsigned int)rec_data_length, (unsigned int)read, (unsigned
      int)rec_type);
00886                           run = -5;
00887                           break;
00888                   }
00889
00890                   switch (rec_type) {
00891                   case AREF:
00892                   case HEADER:
00893                   case ENDLIB:
00894                   case ENDSTR:
00895                   case BOUNDARY:
00896                   case PATH:
00897                   case SREF:
00898                   case ENDEL:
```

```
00899                 case BOX:
00900                 case INVALID:
00901                         break;
00902
00903                 case COLROW:
00904                         if (!current_a_reference) {
00905                                 GDS_ERROR("COLROW record defined outside of array instance");
00906                                 break;
00907                         }
00908                         if (rec_data_length != 4 || read != 4) {
00909                                 GDS_ERROR("COLUMN/ROW count record contains too few data. Won't set
      column and row counts (%d, %d)",
00910                                                 rec_data_length, read);
00911                                 break;
00912                         }
00913                         current_a_reference->columns = (int)gds_convert_signed_int16(&workbuff[0]);
00914                         current_a_reference->rows = (int)gds_convert_signed_int16(&workbuff[2]);
00915                         GDS_INF("\tRows: %d\n\tColumns: %d\n", current_a_reference->rows,
      current_a_reference->columns);
00916                         break;
00917                 case UNITS:
00918                         if (!current_lib) {
00919                                 GDS_WARN("Units defined outside of library!\n");
00920                                 break;
00921                         }
00922
00923                         if (rec_data_length != 16) {
00924                                 GDS_WARN("Unit define incomplete. Will assume database unit of %E
      meters\n", current_lib->unit_in_meters);
00925                                 break;
00926                         }
00927
00928                         current_lib->unit_in_meters = gds_convert_double(&workbuff[8]);
00929                         GDS_INF("Length of database unit: %E meters\n", current_lib->unit_in_meters);
00930                         break;
00931                 case BGNLIB:
00932                         /* Parse date record */
00933                         gds_parse_date(workbuff, read, &current_lib->mod_time,
      &current_lib->access_time);
00934                         break;
00935                 case BGNSTR:
00936                         gds_parse_date(workbuff, read, &current_cell->mod_time,
      &current_cell->access_time);
00937                         break;
00938                 case LIBNAME:
00939                         name_library(current_lib, (unsigned int)read, workbuff);
00940                         break;
00941                 case STRNAME:
00942                         name_cell(current_cell, (unsigned int)read, workbuff, current_lib);
00943                         break;
00944                 case XY:
00945                         if (current_s_reference) {
00946                                 /* Get origin of reference */
00947                                 current_s_reference->origin.x = gds_convert_signed_int(workbuff);
00948                                 current_s_reference->origin.y = gds_convert_signed_int(&workbuff[4]);
00949                                 GDS_INF("\t\tSet origin to: %d/%d\n", current_s_reference->origin.x,
00950                                                 current_s_reference->origin.y);
00951                         } else if (current_graphics) {
00952                                 for (i = 0; i < read/8; i++) {
00953                                         x = gds_convert_signed_int(&workbuff[i*8]);
00954                                         y = gds_convert_signed_int(&workbuff[i*8+4]);
00955                                         current_graphics->vertices =
00956                                                         append_vertex(current_graphics->vertices, x,
      y);
00957                                         GDS_INF("\t\tSet coordinate: %d/%d\n", x, y);
00958
00959                                 }
00960                         } else if (current_a_reference) {
00961                                 for (i = 0; i < 3; i++) {
00962                                         x = gds_convert_signed_int(&workbuff[i*8]);
00963                                         y = gds_convert_signed_int(&workbuff[i*8+4]);
00964                                         current_a_reference->control_points[i].x = x;
00965                                         current_a_reference->control_points[i].y = y;
00966                                         GDS_INF("\tSet control point %d: %d/%d\n", i, x, y);
00967                                 }
00968                         }
00969                         break;
00970                 case STRANS:
00971                         if (current_s_reference) {
00972                                 current_s_reference->flipped = ((workbuff[0] & 0x80) ? 1 : 0);
00973                         } else if (current_a_reference) {
00974                                 current_a_reference->flipped = ((workbuff[0] & 0x80) ? 1 : 0);
00975                         } else {
00976                                 GDS_ERROR("Transformation defined outside of instance");
00977                                 break;
00978                         }
00979                         break;
```

```
00980                 case SNAME:
00981                         if (current_s_reference) {
00982                                 name_cell_ref(current_s_reference, (unsigned int)read, workbuff);
00983                         } else if (current_a_reference) {
00984                                 name_array_cell_ref(current_a_reference, (unsigned int)read,
      workbuff);
00985                         } else {
00986                                 GDS_ERROR("Reference name set outside of cell reference");
00987                         }
00988                         break;
00989                 case WIDTH:
00990                         if (!current_graphics) {
00991                                 GDS_WARN("Width defined outside of path element");
00992                         }
00993                         current_graphics->width_absolute = gds_convert_signed_int(workbuff);
00994                         break;
00995                 case LAYER:
00996                         if (!current_graphics) {
00997                                 GDS_WARN("Layer has to be defined inside graphics object. Probably
      unknown object. Implement it yourself!");
00998                                 break;
00999                         }
01000                         current_graphics->layer = gds_convert_signed_int16(workbuff);
01001                         if (current_graphics->layer < 0) {
01002                                 GDS_WARN("Layer negative!\n");
01003                         }
01004                         GDS_INF("\t\tAdded layer %d\n", (int)current_graphics->layer);
01005                         break;
01006                 case MAG:
01007                         if (rec_data_length != 8) {
01008                                 GDS_WARN("Magnification is not an 8 byte real. Results may be wrong");
01009                         }
01010                         if (current_graphics != NULL && current_s_reference != NULL) {
01011                                 GDS_ERROR("Open Graphics and Cell Reference\n\tMissing ENDEL?");
01012                                 run = -6;
01013                                 break;
01014                         }
01015                         if (current_s_reference != NULL) {
01016                                 current_s_reference->magnification = gds_convert_double(workbuff);
01017                                 GDS_INF("\t\tMagnification defined: %lf\n",
      current_s_reference->magnification);
01018                         }
01019                         if (current_a_reference != NULL) {
01020                                 current_a_reference->magnification = gds_convert_double(workbuff);
01021                                 GDS_INF("\t\tMagnification defined: %lf\n",
      current_a_reference->magnification);
01022                         }
01023                         break;
01024                 case ANGLE:
01025                         if (rec_data_length != 8) {
01026                                 GDS_WARN("Angle is not an 8 byte real. Results may be wrong");
01027                         }
01028                         if (current_graphics != NULL && current_s_reference != NULL &&
      current_a_reference != NULL) {
01029                                 GDS_ERROR("Open Graphics and Cell Reference\n\tMissing ENDEL?");
01030                                 run = -6;
01031                                 break;
01032                         }
01033                         if (current_s_reference != NULL) {
01034                                 current_s_reference->angle = gds_convert_double(workbuff);
01035                                 GDS_INF("\t\tAngle defined: %lf\n", current_s_reference->angle);
01036                         }
01037                         if (current_a_reference != NULL) {
01038                                 current_a_reference->angle = gds_convert_double(workbuff);
01039                                 GDS_INF("\t\tAngle defined: %lf\n", current_a_reference->angle);
01040                         }
01041                         break;
01042                 case PATHTYPE:
01043                         if (current_graphics == NULL) {
01044                                 GDS_WARN("Path type defined outside of path. Ignoring");
01045                                 break;
01046                         }
01047                         if (current_graphics->gfx_type == GRAPHIC_PATH) {
01048                                 current_graphics->path_render_type = (enum
      path_type)gds_convert_signed_int16(workbuff);
01049                                 GDS_INF("\t\tPathtype: %d\n", current_graphics->path_render_type);
01050                         } else {
01051                                 GDS_WARN("Path type defined inside non-path graphics object.
      Ignoring");
01052                         }
01053                         break;
01054
01055                 }
01056
01057         } /* while(run == 1) */
01058
01059         fclose(gds_file);
```

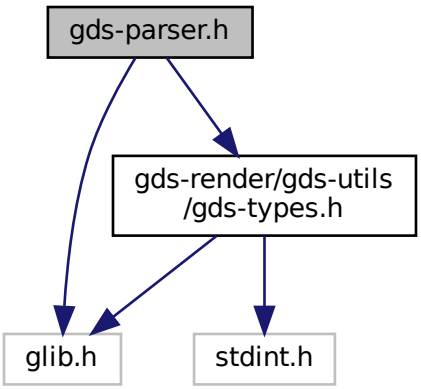
```
01060
01061         if (!run) {
01062                 /* Iterate and find references to cells */
01063                 g_list_foreach(lib_list, scan_library_references, NULL);
01064         }
01065
01066         *library_list = lib_list;
01067
01068         free(workbuff);
01069
01070         return run;
01071 }
01072
01077 static void delete_cell_inst_element(struct gds_cell_instance *cell_inst)
01078 {
01079         if (cell_inst)
01080                 free(cell_inst);
01081 }
01082
01087 static void delete_vertex(struct gds_point *vertex)
01088 {
01089         if (vertex)
01090                 free(vertex);
01091 }
01092
01097 static void delete_graphics_obj(struct gds_graphics *gfx)
01098 {
01099         if (!gfx)
01100                 return;
01101
01102         g_list_free_full(gfx->vertices, (GDestroyNotify)delete_vertex);
01103         free(gfx);
01104 }
01105
01110 static void delete_cell_element(struct gds_cell *cell)
01111 {
01112         if (!cell)
01113                 return;
01114
01115         g_list_free_full(cell->child_cells, (GDestroyNotify)delete_cell_inst_element);
01116         g_list_free_full(cell->graphic_objs, (GDestroyNotify)delete_graphics_obj);
01117         free(cell);
01118 }
01119
01124 static void delete_library_element(struct gds_library *lib)
01125 {
01126         if (!lib)
01127                 return;
01128
01129         g_list_free(lib->cell_names);
01130         g_list_free_full(lib->cells, (GDestroyNotify)delete_cell_element);
01131         free(lib);
01132 }
01133
01134 int clear_lib_list(GList **library_list)
01135 {
01136         if (!library_list)
01137                 return 0;
01138
01139         if (*library_list == NULL)
01140                 return 0;
01141
01142         g_list_free_full(*library_list, (GDestroyNotify)delete_library_element);
01143         *library_list = NULL;
01144         return 0;
01145 }
01146
```

13.47 gds-parser.h File Reference

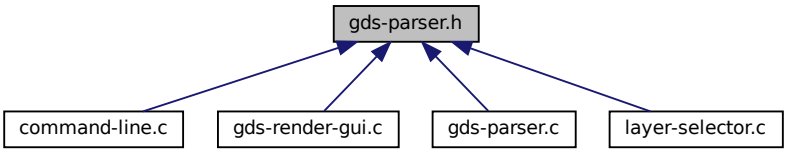
Header file for the GDS-Parser.

```
#include <glib.h>
#include <gds-render/gds-utils/gds-types.h>
```

Include dependency graph for gds-parser.h:



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



Macros

- #define GDS_PRINT_DEBUG_INFOS (0)
  1: Print infos, 0: Don't print

Functions

- int parse_gds_from_file (const char *filename, GList **library_array)
  Parse a GDS file.
- int clear_lib_list (GList **library_list)
  Deletes all libraries including cells, references etc.

13.47.1 Detailed Description

Header file for the GDS-Parser.

Author

Mario Hüttel mario.huettel@gmx.net

Definition in file gds-parser.h.

13.48 gds-parser.h

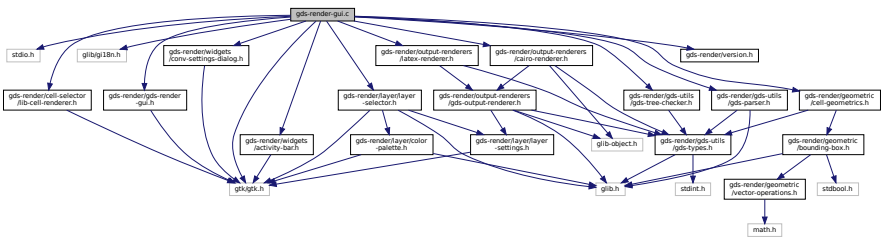
```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00026 #ifndef _GDSPARSER_H_
00027 #define _GDSPARSER_H_
00028
00034 #include <glib.h>
00035
00036 #include <gds-render/gds-utils/gds-types.h>
00037
00038 #define GDS_PRINT_DEBUG_INFOS (0)
00053 int parse_gds_from_file(const char *filename, GList **library_array);
00054
00060 int clear_lib_list(GList **library_list);
00061
00064 #endif /* _GDSPARSER_H_ */
```

13.49 gds-render-gui.c File Reference

Handling of GUI.

```
#include <stdio.h>
#include <gtk/gtk.h>
#include <glib/gi18n.h>
#include <gds-render/gds-render-gui.h>
#include <gds-render/gds-utils/gds-parser.h>
#include <gds-render/gds-utils/gds-tree-checker.h>
#include <gds-render/layer/layer-selector.h>
#include <gds-render/widgets/activity-bar.h>
#include <gds-render/cell-selector/lib-cell-renderer.h>
#include <gds-render/output-renderers/latex-renderer.h>
#include <gds-render/output-renderers/cairo-renderer.h>
#include <gds-render/widgets/conv-settings-dialog.h>
#include <gds-render/geometric/cell-geometrics.h>
#include <gds-render/version.h>
```

Include dependency graph for gds-render-gui.c:



Data Structures

- struct gui_button_states
- struct _GdsRenderGui

Enumerations

- enum cell_store_columns { CELL_SEL_LIBRARY = 0, CELL_SEL_CELL, CELL_SEL_CELL_ERROR_STATE, CELL_SEL_COLUMN_COUNT }

  Columns of selection tree view.
- enum gds_render_gui_signal_sig_ids { SIGNAL_WINDOW_CLOSED = 0, SIGNAL_COUNT }

Functions

- static gboolean on_window_close (gpointer window, GdkEvent *event, gpointer user)

  Main window close event.
- static gboolean tree_sel_func (GtkTreeSelection *selection, GtkTreeModel *model, GtkTreePath *path, gboolean path_currently_selected, gpointer data)

  This function only allows valid cells to be selected.
- static void cell_tree_view_change_filter (GtkWidget *entry, gpointer data)

  Trigger refiltering of cell filter.
- static gboolean cell_store_filter_visible_func (GtkTreeModel *model, GtkTreeIter *iter, gpointer data)

  cell_store_filter_visible_func Decides whether an element of the tree model `model` is visible.
- int gds_render_gui_setup_cell_selector (GdsRenderGui *self)

  Setup a GtkTreeView with the necessary columns.
- static void on_load_gds (gpointer button, gpointer user)

  Callback function of Load GDS button.
- static void process_button_state_changes (GdsRenderGui *self)
- static void on_auto_color_clicked (gpointer button, gpointer user)

  Callback for auto coloring button.
- static void async_rendering_finished_callback (GdsOutputRenderer *renderer, gpointer gui)
- static void async_rendering_status_update_callback (GdsOutputRenderer *renderer, const char *status_↩ message, gpointer data)
- static void on_convert_clicked (gpointer button, gpointer user)

  Convert button callback.
- static void cell_tree_view_activated (gpointer tree_view, GtkTreePath *path, GtkTreeViewColumn *column, gpointer user)

  cell_tree_view_activated Callback for 'double click' on cell selector element
- static void cell_selection_changed (GtkTreeSelection *sel, GdsRenderGui *self)

  Callback for cell-selection change event.
- static void sort_up_callback (GtkWidget *widget, gpointer user)
- static void sort_down_callback (GtkWidget *widget, gpointer user)
- static void gds_render_gui_dispose (GObject *gobject)
- static void gds_render_gui_class_init (GdsRenderGuiClass *klass)
- static void on_select_all_layers_clicked (GtkWidget *button, gpointer user_data)

  Callback for the 'select all layers'-button.
- static void auto_naming_clicked (GtkWidget *button, gpointer user_data)
- GtkWindow * gds_render_gui_get_main_window (GdsRenderGui *gui)

  Get main window.
- static void gds_render_gui_init (GdsRenderGui *self)
- GdsRenderGui * gds_render_gui_new ()

  Create new GdsRenderGui Object.

Variables

- static guint gds_render_gui_signals [SIGNAL_COUNT]

13.49.1 Detailed Description

Handling of GUI.

Author

Mario Hüttel mario.huettel@gmx.net

Definition in file gds-render-gui.c.

13.50 gds-render-gui.c

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00030 #include <stdio.h>
00031 #include <gtk/gtk.h>
00032 #include <glib/gi18n.h>
00033
00034 #include <gds-render/gds-render-gui.h>
00035 #include <gds-render/gds-utils/gds-parser.h>
00036 #include <gds-render/gds-utils/gds-tree-checker.h>
00037 #include <gds-render/layer/layer-selector.h>
00038 #include <gds-render/widgets/activity-bar.h>
00039 #include <gds-render/cell-selector/lib-cell-renderer.h>
00040 #include <gds-render/output-renderers/latex-renderer.h>
00041 #include <gds-render/output-renderers/cairo-renderer.h>
00042 #include <gds-render/widgets/conv-settings-dialog.h>
00043 #include <gds-render/geometric/cell-geometrics.h>
00044 #include <gds-render/version.h>
00045
00047 enum cell_store_columns {
00048         CELL_SEL_LIBRARY = 0,
00049         CELL_SEL_CELL,
00050         CELL_SEL_CELL_ERROR_STATE,
00051         CELL_SEL_COLUMN_COUNT
00052 };
00053
00054 enum gds_render_gui_signal_sig_ids {SIGNAL_WINDOW_CLOSED = 0, SIGNAL_COUNT};
00055
00056 static guint gds_render_gui_signals[SIGNAL_COUNT];
00057
00058 struct gui_button_states {
00059         gboolean rendering_active;
00060         gboolean valid_cell_selected;
00061 };
00062
00063 struct _GdsRenderGui {
00064         /* Parent GObject */
00065         GObject parent;
00066
00067         /* Custom fields */
00068         GtkWindow *main_window;
```

```
00069         GtkWidget *convert_button;
00070         GtkWidget *open_button;
00071         GtkWidget *load_layer_button;
00072         GtkWidget *save_layer_button;
00073         GtkWidget *select_all_button;
00074         GtkTreeStore *cell_tree_store;
00075         GtkTreeModelFilter *cell_filter;
00076         GtkWidget *cell_search_entry;
00077         LayerSelector *layer_selector;
00078         GtkTreeView *cell_tree_view;
00079         GList *gds_libraries;
00080         ActivityBar *activity_status_bar;
00081         struct render_settings render_dialog_settings;
00082         ColorPalette *palette;
00083         struct gui_button_states button_state_data;
00084 };
00085
00086 G_DEFINE_TYPE(GdsRenderGui, gds_render_gui, G_TYPE_OBJECT)
00087
00088
00095 static gboolean on_window_close(gpointer window, GdkEvent *event, gpointer user)
00096 {
00097         GdsRenderGui *self;
00098         (void)event;
00099
00100         self = RENDERER_GUI(user);
00101         /* Don't close window in case of error */
00102         if (!self)
00103                 return TRUE;
00104
00105         /* Close Window. Leads to termination of the program/the current instance */
00106         g_clear_object(&self->main_window);
00107         gtk_widget_destroy(GTK_WIDGET(window));
00108
00109         /* Delete loaded library data */
00110         clear_lib_list(&self->gds_libraries);
00111
00112         g_signal_emit(self, gds_render_gui_signals[SIGNAL_WINDOW_CLOSED], 0);
00113
00114         return TRUE;
00115 }
00116
00126 static gboolean tree_sel_func(GtkTreeSelection *selection,
00127                               GtkTreeModel *model,
00128                               GtkTreePath *path,
00129                               gboolean path_currently_selected,
00130                               gpointer data)
00131 {
00132         GtkTreeIter iter;
00133         struct gds_cell *cell;
00134         unsigned int error_level;
00135         gboolean ret = FALSE;
00136         (void)selection;
00137         (void)path_currently_selected;
00138         (void)data;
00139
00140         gtk_tree_model_get_iter(model, &iter, path);
00141         gtk_tree_model_get(model, &iter, CELL_SEL_CELL, &cell, CELL_SEL_CELL_ERROR_STATE,
      &error_level, -1);
00142
00143         /* Allow only rows with _valid_ cell to be selected */
00144         if (cell) {
00145                 /* Cell available. Check if it passed the critical checks */
00146                 if (!(error_level & LIB_CELL_RENDERER_ERROR_ERR))
00147                         ret = TRUE;
00148         }
00149
00150         return ret;
00151 }
00152
00158 static void cell_tree_view_change_filter(GtkWidget *entry, gpointer data)
00159 {
00160         GdsRenderGui *self = RENDERER_GUI(data);
00161         (void)entry;
00162
00163         gtk_tree_model_filter_refilter(self->cell_filter);
00164 }
00165
00174 static gboolean cell_store_filter_visible_func(GtkTreeModel *model, GtkTreeIter *iter, gpointer data)
00175 {
00176         GdsRenderGui *self;
00177         struct gds_cell *cell;
00178         struct gds_library *lib;
00179         gboolean result = FALSE;
00180         const char *search_string;
00181
00182         self = RENDERER_GUI(data);
```

```
00183         g_return_val_if_fail(RENDERER_IS_GUI(self), FALSE);
00184
00185         if (!model || !iter)
00186                 goto exit_filter;
00187
00188         gtk_tree_model_get(model, iter, CELL_SEL_CELL, &cell, CELL_SEL_LIBRARY, &lib, -1);
00189
00190         if (lib) {
00191                 result = TRUE;
00192                 goto exit_filter;
00193         }
00194
00195         if (!cell)
00196                 goto exit_filter;
00197
00198         search_string = gtk_entry_get_text(GTK_ENTRY(self->cell_search_entry));
00199
00200         /* Show all, if field is empty */
00201         if (!strlen(search_string))
00202                 result = TRUE;
00203
00204         if (strstr(cell->name, search_string))
00205                 result = TRUE;
00206
00207         gtk_tree_view_expand_all(self->cell_tree_view);
00208
00209 exit_filter:
00210         return result;
00211 }
00212
00217 int gds_render_gui_setup_cell_selector(GdsRenderGui *self)
00218 {
00219         GtkCellRenderer *render_cell;
00220         GtkCellRenderer *render_lib;
00221         GtkTreeViewColumn *column;
00222
00223         self->cell_tree_store = gtk_tree_store_new(CELL_SEL_COLUMN_COUNT, G_TYPE_POINTER,
00224                                         G_TYPE_POINTER, G_TYPE_UINT);
00225
00226         /* Searching */
00227         self->cell_filter = GTK_TREE_MODEL_FILTER(
00228                                 gtk_tree_model_filter_new(GTK_TREE_MODEL(self->cell_tree_store),
      NULL));
00229
00230         gtk_tree_model_filter_set_visible_func(self->cell_filter,
00231
      (GtkTreeModelFilterVisibleFunc)cell_store_filter_visible_func,
00232                                                 self, NULL);
00233         g_signal_connect(GTK_SEARCH_ENTRY(self->cell_search_entry), "search-changed",
00234                         G_CALLBACK(cell_tree_view_change_filter), self);
00235
00236         gtk_tree_view_set_model(self->cell_tree_view, GTK_TREE_MODEL(self->cell_filter));
00237
00238         render_cell = lib_cell_renderer_new();
00239         render_lib = lib_cell_renderer_new();
00240
00241         column = gtk_tree_view_column_new_with_attributes(_("Library"), render_lib, "gds-lib",
      CELL_SEL_LIBRARY, NULL);
00242         gtk_tree_view_append_column(self->cell_tree_view, column);
00243
00244         column = gtk_tree_view_column_new_with_attributes(_("Cell"), render_cell, "gds-cell",
      CELL_SEL_CELL,
00245                                                                 "error-level", CELL_SEL_CELL_ERROR_STATE,
      NULL);
00246         gtk_tree_view_append_column(self->cell_tree_view, column);
00247
00248         /* Callback for selection
00249          * This prevents selecting a library
00250          */
00251         gtk_tree_selection_set_select_function(gtk_tree_view_get_selection(self->cell_tree_view),
00252                                                 tree_sel_func, NULL, NULL);
00253
00254         return 0;
00255 }
00256
00262 static void on_load_gds(gpointer button, gpointer user)
00263 {
00264         GList *cell;
00265         GtkTreeIter libiter;
00266         GtkTreeIter celliter;
00267         GList *lib;
00268         struct gds_library *gds_lib;
00269         struct gds_cell *gds_c;
00270         GdsRenderGui *self;
00271         GtkWidget *open_dialog;
00272         GtkFileChooser *file_chooser;
00273         GtkFileFilter *filter;
```

```
00274         GtkStyleContext *button_style;
00275         gint dialog_result;
00276         int gds_result;
00277         char *filename;
00278         unsigned int cell_error_level;
00279 
00280         self = RENDERER_GUI(user);
00281         if (!self)
00282                 return;
00283 
00284         open_dialog = gtk_file_chooser_dialog_new(_("Open GDSII File"), self->main_window,
00285                                                   GTK_FILE_CHOOSER_ACTION_OPEN,
00286                                                   _("Cancel"), GTK_RESPONSE_CANCEL,
00287                                                   _("Open GDSII"), GTK_RESPONSE_ACCEPT,
00288                                                   NULL);
00289         file_chooser = GTK_FILE_CHOOSER(open_dialog);
00290 
00291         /* Add GDS II Filter */
00292         filter = gtk_file_filter_new();
00293         gtk_file_filter_add_pattern(filter, "*.gds");
00294         gtk_file_filter_set_name(filter, _("GDSII-Files"));
00295         gtk_file_chooser_add_filter(file_chooser, filter);
00296 
00297         dialog_result = gtk_dialog_run(GTK_DIALOG(open_dialog));
00298 
00299         if (dialog_result != GTK_RESPONSE_ACCEPT)
00300                 goto end_destroy;
00301 
00302         /* Get File name */
00303         filename = gtk_file_chooser_get_filename(file_chooser);
00304 
00305         gtk_tree_store_clear(self->cell_tree_store);
00306         clear_lib_list(&self->gds_libraries);
00307 
00308         /* Parse new GDSII file */
00309         gds_result = parse_gds_from_file(filename, &self->gds_libraries);
00310 
00311         /* Delete file name afterwards */
00312         g_free(filename);
00313         if (gds_result)
00314                 goto end_destroy;
00315 
00316         /* remove suggested action from Open button */
00317         button_style = gtk_widget_get_style_context(GTK_WIDGET(button));
00318         gtk_style_context_remove_class(button_style, "suggested-action");
00319 
00320         for (lib = self->gds_libraries; lib != NULL; lib = lib->next) {
00321                 gds_lib = (struct gds_library *)lib->data;
00322                 /* Create top level iter */
00323                 gtk_tree_store_append(self->cell_tree_store, &libiter, NULL);
00324 
00325                 gtk_tree_store_set(self->cell_tree_store, &libiter,
00326                                    CELL_SEL_LIBRARY, gds_lib,
00327                                    -1);
00328 
00329                 /* Check this library. This might take a while */
00330                 (void)gds_tree_check_cell_references(gds_lib);
00331                 (void)gds_tree_check_reference_loops(gds_lib);
00332 
00333                 for (cell = gds_lib->cells; cell != NULL; cell = cell->next) {
00334                         gds_c = (struct gds_cell *)cell->data;
00335                         gtk_tree_store_append(self->cell_tree_store, &celliter, &libiter);
00336 
00337                         /* Get the checking results for this cell */
00338                         cell_error_level = 0;
00339                         if (gds_c->checks.unresolved_child_count)
00340                                 cell_error_level |= LIB_CELL_RENDERER_ERROR_WARN;
00341 
00342                         /* Check if it is completely b0rken */
00343                         if (gds_c->checks.affected_by_reference_loop)
00344                                 cell_error_level |= LIB_CELL_RENDERER_ERROR_ERR;
00345 
00346                         /* Add cell to tree store model */
00347                         gtk_tree_store_set(self->cell_tree_store, &celliter,
00348                                            CELL_SEL_CELL, gds_c,
00349                                            CELL_SEL_CELL_ERROR_STATE, cell_error_level,
00350                                            CELL_SEL_LIBRARY, gds_c->parent_library,
00351                                            -1);
00352                 } /* for cells */
00353         } /* for libraries */
00354 
00355         /* Create Layers in Layer Box */
00356         layer_selector_generate_layer_widgets(self->layer_selector, self->gds_libraries);
00357 
00358 end_destroy:
00359         /* Destroy dialog and filter */
00360         gtk_widget_destroy(open_dialog);
```

```
00361 }
00362
00363 static void process_button_state_changes(GdsRenderGui *self)
00364 {
00365         gboolean convert_button_state = FALSE;
00366         gboolean open_gds_button_state = FALSE;
00367
00368         /* Calculate states */
00369         if (!self->button_state_data.rendering_active) {
00370                 open_gds_button_state = TRUE;
00371                 if (self->button_state_data.valid_cell_selected)
00372                         convert_button_state = TRUE;
00373         }
00374
00375         /* Apply states */
00376         gtk_widget_set_sensitive(self->convert_button, convert_button_state);
00377         gtk_widget_set_sensitive(self->open_button, open_gds_button_state);
00378 }
00379
00385 static void on_auto_color_clicked(gpointer button, gpointer user)
00386 {
00387         GdsRenderGui *self;
00388         (void)button;
00389
00390         self = RENDERER_GUI(user);
00391         layer_selector_auto_color_layers(self->layer_selector, self->palette, 1.0);
00392 }
00393
00394 static void async_rendering_finished_callback(GdsOutputRenderer *renderer, gpointer gui)
00395 {
00396         GdsRenderGui *self;
00397
00398         self = RENDERER_GUI(gui);
00399
00400         self->button_state_data.rendering_active = FALSE;
00401         process_button_state_changes(self);
00402         activity_bar_set_ready(self->activity_status_bar);
00403
00404         g_object_unref(renderer);
00405 }
00406
00407 static void async_rendering_status_update_callback(GdsOutputRenderer *renderer,
00408                                                    const char *status_message,
00409                                                    gpointer data)
00410 {
00411         GdsRenderGui *gui;
00412         (void)renderer;
00413
00414         gui = RENDERER_GUI(data);
00415
00416         activity_bar_set_busy(gui->activity_status_bar, status_message);
00417 }
00418
00424 static void on_convert_clicked(gpointer button, gpointer user)
00425 {
00426         (void)button;
00427         GdsRenderGui *self;
00428         GtkTreeSelection *selection;
00429         GtkTreeIter iter;
00430         GtkTreeModel *model;
00431         struct gds_cell *cell_to_render;
00432         GtkWidget *dialog;
00433         RendererSettingsDialog *settings;
00434         GtkFileFilter *filter;
00435         gint res;
00436         char *file_name;
00437         union bounding_box cell_box;
00438         unsigned int height, width;
00439         struct render_settings *sett;
00440         LayerSettings *layer_settings;
00441         GdsOutputRenderer *render_engine;
00442
00443         self = RENDERER_GUI(user);
00444
00445         if (!self)
00446                 return;
00447
00448         /* Abort if rendering is already active */
00449         if (self->button_state_data.rendering_active == TRUE)
00450                 return;
00451
00452         sett = &self->render_dialog_settings;
00453
00454         /* Get selected cell */
00455         selection = gtk_tree_view_get_selection(self->cell_tree_view);
00456         if (gtk_tree_selection_get_selected(selection, &model, &iter) == FALSE)
00457                 return;
```

```
00458
00459         gtk_tree_model_get(model, &iter, CELL_SEL_CELL, &cell_to_render, -1);
00460
00461         if (!cell_to_render)
00462                 return;
00463
00464         /* Get layers that are rendered */
00465         layer_settings = layer_selector_export_rendered_layer_info(self->layer_selector);
00466
00467         /* Calculate cell size in DB units */
00468         bounding_box_prepare_empty(&cell_box);
00469         calculate_cell_bounding_box(&cell_box, cell_to_render);
00470
00471         /* Calculate size in database units
00472          * Note that the results are bound to be positive,
00473          * so casting them to unsigned int is absolutely valid
00474          */
00475         height = (unsigned int)(cell_box.vectors.upper_right.y - cell_box.vectors.lower_left.y);
00476         width = (unsigned int)(cell_box.vectors.upper_right.x - cell_box.vectors.lower_left.x);
00477
00478         /* Show settings dialog */
00479         settings = renderer_settings_dialog_new(GTK_WINDOW(self->main_window));
00480         renderer_settings_dialog_set_settings(settings, sett);
00481         renderer_settings_dialog_set_database_unit_scale(settings,
      cell_to_render->parent_library->unit_in_meters);
00482         renderer_settings_dialog_set_cell_height(settings, height);
00483         renderer_settings_dialog_set_cell_width(settings, width);
00484         g_object_set(G_OBJECT(settings), "cell-name", cell_to_render->name, NULL);
00485
00486         res = gtk_dialog_run(GTK_DIALOG(settings));
00487         if (res == GTK_RESPONSE_OK) {
00488                 renderer_settings_dialog_get_settings(settings, sett);
00489                 gtk_widget_destroy(GTK_WIDGET(settings));
00490         } else {
00491                 gtk_widget_destroy(GTK_WIDGET(settings));
00492                 goto ret_layer_destroy;
00493         }
00494
00495         /* save file dialog */
00496         dialog = gtk_file_chooser_dialog_new((sett->renderer == RENDERER_LATEX_TIKZ
00497                                               ? "Save LaTeX File" : "Save PDF"),
00498                                              GTK_WINDOW(self->main_window),
      GTK_FILE_CHOOSER_ACTION_SAVE,
00499                                              "Cancel", GTK_RESPONSE_CANCEL, "Save",
      GTK_RESPONSE_ACCEPT, NULL);
00500         /* Set file filter according to settings */
00501         filter = gtk_file_filter_new();
00502         switch (sett->renderer) {
00503         case RENDERER_LATEX_TIKZ:
00504                 gtk_file_filter_add_pattern(filter, "*.tex");
00505                 gtk_file_filter_set_name(filter, "LaTeX-Files");
00506                 break;
00507         case RENDERER_CAIROGRAPHICS_PDF:
00508                 gtk_file_filter_add_pattern(filter, "*.pdf");
00509                 gtk_file_filter_set_name(filter, "PDF-Files");
00510                 break;
00511         case RENDERER_CAIROGRAPHICS_SVG:
00512                 gtk_file_filter_add_pattern(filter, "*.svg");
00513                 gtk_file_filter_set_name(filter, "SVG-Files");
00514                 break;
00515         }
00516
00517         gtk_file_chooser_add_filter(GTK_FILE_CHOOSER(dialog), filter);
00518
00519         gtk_file_chooser_set_do_overwrite_confirmation(GTK_FILE_CHOOSER(dialog), TRUE);
00520
00521         res = gtk_dialog_run(GTK_DIALOG(dialog));
00522         if (res == GTK_RESPONSE_ACCEPT) {
00523                 file_name = gtk_file_chooser_get_filename(GTK_FILE_CHOOSER(dialog));
00524                 gtk_widget_destroy(dialog);
00525
00526                 switch (sett->renderer) {
00527                 case RENDERER_LATEX_TIKZ:
00528                         render_engine =
00529
      GDS_RENDER_OUTPUT_RENDERER(latex_renderer_new_with_options(sett->tex_pdf_layers,
00530
      sett->tex_standalone));
00531                         break;
00532                 case RENDERER_CAIROGRAPHICS_SVG:
00533                         render_engine = GDS_RENDER_OUTPUT_RENDERER(cairo_renderer_new_svg());
00534                         break;
00535                 case RENDERER_CAIROGRAPHICS_PDF:
00536                         render_engine = GDS_RENDER_OUTPUT_RENDERER(cairo_renderer_new_pdf());
00537                         break;
00538                 default:
00539                         /* Abort rendering */
```

```
00540                           render_engine = NULL;
00541                           break;
00542                   }
00543
00544                   if (render_engine) {
00545                           gds_output_renderer_set_output_file(render_engine, file_name);
00546                           gds_output_renderer_set_layer_settings(render_engine, layer_settings);
00547                           /* Prevent user from overwriting library or triggering additional conversion
    */
00548                           self->button_state_data.rendering_active = TRUE;
00549                           process_button_state_changes(self);
00550
00551                           g_signal_connect(render_engine, "async-finished",
    G_CALLBACK(async_rendering_finished_callback),
00552                                            self);
00553
00554                           activity_bar_set_busy(self->activity_status_bar, _("Rendering cell..."));
00555
00556                           g_signal_connect(render_engine, "progress-changed",
00557                                            G_CALLBACK(async_rendering_status_update_callback), self);
00558                           gds_output_renderer_render_output_async(render_engine, cell_to_render,
    sett->scale);
00559                   }
00560                   g_free(file_name);
00561           } else {
00562                   gtk_widget_destroy(dialog);
00563           }
00564 ret_layer_destroy:
00565           g_object_unref(layer_settings);
00566 }
00567
00575 static void cell_tree_view_activated(gpointer tree_view, GtkTreePath *path,
00576                                      GtkTreeViewColumn *column, gpointer user)
00577 {
00578           (void)tree_view;
00579           (void)path;
00580           (void)column;
00581
00582           on_convert_clicked(NULL, user);
00583 }
00584
00593 static void cell_selection_changed(GtkTreeSelection *sel, GdsRenderGui *self)
00594 {
00595           GtkTreeModel *model = NULL;
00596           GtkTreeIter iter;
00597
00598           if (gtk_tree_selection_get_selected(sel, &model, &iter)) {
00599                   /* Node selected. Show button */
00600                   self->button_state_data.valid_cell_selected = TRUE;
00601           } else {
00602                   self->button_state_data.valid_cell_selected = FALSE;
00603           }
00604
00605           process_button_state_changes(self);
00606 }
00607
00608 static void sort_up_callback(GtkWidget *widget, gpointer user)
00609 {
00610           (void)widget;
00611           GdsRenderGui *self;
00612
00613           self = RENDERER_GUI(user);
00614           if (!self)
00615                   return;
00616           layer_selector_force_sort(self->layer_selector, LAYER_SELECTOR_SORT_UP);
00617 }
00618
00619 static void sort_down_callback(GtkWidget *widget, gpointer user)
00620 {
00621           (void)widget;
00622           GdsRenderGui *self;
00623
00624           self = RENDERER_GUI(user);
00625           if (!self)
00626                   return;
00627           layer_selector_force_sort(self->layer_selector, LAYER_SELECTOR_SORT_DOWN);
00628 }
00629
00630 static void gds_render_gui_dispose(GObject *gobject)
00631 {
00632           GdsRenderGui *self;
00633
00634           self = RENDERER_GUI(gobject);
00635
00636           clear_lib_list(&self->gds_libraries);
00637
00638           g_clear_object(&self->cell_tree_view);
```

```
00639         g_clear_object(&self->convert_button);
00640         g_clear_object(&self->layer_selector);
00641         g_clear_object(&self->cell_tree_store);
00642         g_clear_object(&self->cell_filter);
00643         g_clear_object(&self->cell_search_entry);
00644         g_clear_object(&self->activity_status_bar);
00645         g_clear_object(&self->palette);
00646         g_clear_object(&self->load_layer_button);
00647         g_clear_object(&self->save_layer_button);
00648         g_clear_object(&self->open_button);
00649         g_clear_object(&self->select_all_button);
00650
00651         if (self->main_window) {
00652                 g_signal_handlers_destroy(self->main_window);
00653                 gtk_widget_destroy(GTK_WIDGET(self->main_window));
00654                 self->main_window = NULL;
00655         }
00656
00657         /* Chain up */
00658         G_OBJECT_CLASS(gds_render_gui_parent_class)->dispose(gobject);
00659 }
00660
00661 static void gds_render_gui_class_init(GdsRenderGuiClass *klass)
00662 {
00663         GObjectClass *gobject_class = G_OBJECT_CLASS(klass);
00664
00665         gds_render_gui_signals[SIGNAL_WINDOW_CLOSED] =
00666                         g_signal_newv("window-closed", RENDERER_TYPE_GUI,
00667                                       G_SIGNAL_RUN_LAST | G_SIGNAL_NO_RECURSE,
00668                                       NULL,
00669                                       NULL,
00670                                       NULL,
00671                                       NULL,
00672                                       G_TYPE_NONE,
00673                                       0,
00674                                       NULL);
00675
00676         gobject_class->dispose = gds_render_gui_dispose;
00677 }
00678
00684 static void on_select_all_layers_clicked(GtkWidget *button, gpointer user_data)
00685 {
00686         GdsRenderGui *gui;
00687         (void)button;
00688
00689         gui = RENDERER_GUI(user_data);
00690         layer_selector_select_all_layers(gui->layer_selector, TRUE);
00691 }
00692
00693 static void auto_naming_clicked(GtkWidget *button, gpointer user_data)
00694 {
00695         GdsRenderGui *gui;
00696         GtkDialog *dialog;
00697         gboolean overwrite;
00698         int dialog_result;
00699         (void)button;
00700
00701         gui = RENDERER_GUI(user_data);
00702
00703         /* Don't do anything if the selector is empty. */
00704         if (!layer_selector_contains_elements(gui->layer_selector))
00705                 return;
00706
00707         /* Ask for overwrite */
00708         dialog = GTK_DIALOG(gtk_message_dialog_new(gui->main_window, GTK_DIALOG_USE_HEADER_BAR,
      GTK_MESSAGE_QUESTION,
00709                                                    GTK_BUTTONS_YES_NO, "Overwrite existing layer
      names?"));
00710         dialog_result = gtk_dialog_run(dialog);
00711         switch (dialog_result) {
00712         case GTK_RESPONSE_YES:
00713                 overwrite = TRUE;
00714                 break;
00715         case GTK_RESPONSE_NO: /* Expected fallthrough */
00716         default:
00717                 overwrite = FALSE;
00718                 break;
00719         }
00720         gtk_widget_destroy(GTK_WIDGET(dialog));
00721
00722         layer_selector_auto_name_layers(gui->layer_selector, overwrite);
00723 }
00724
00725 GtkWindow *gds_render_gui_get_main_window(GdsRenderGui *gui)
00726 {
00727         return gui->main_window;
00728 }
```

```
00729
00730 static void gds_render_gui_init(GdsRenderGui *self)
00731 {
00732         GtkBuilder *main_builder;
00733         GtkWidget *listbox;
00734         GtkHeaderBar *header_bar;
00735         GtkWidget *sort_up_button;
00736         GtkWidget *sort_down_button;
00737         GtkWidget *activity_bar_box;
00738         GtkWidget *auto_color_button;
00739         GtkWidget *auto_naming_button;
00740
00741         main_builder = gtk_builder_new_from_resource("/gui/main.glade");
00742
00743         self->cell_tree_view = GTK_TREE_VIEW(gtk_builder_get_object(main_builder, "cell-tree"));
00744         self->cell_search_entry = GTK_WIDGET(gtk_builder_get_object(main_builder, "cell-search"));
00745
00746         gds_render_gui_setup_cell_selector(self);
00747
00748         self->main_window = GTK_WINDOW(gtk_builder_get_object(main_builder, "main-window"));
00749         self->open_button = GTK_WIDGET(gtk_builder_get_object(main_builder, "button-load-gds"));
00750         g_signal_connect(self->open_button,
00751                          "clicked", G_CALLBACK(on_load_gds), (gpointer)self);
00752
00753         self->convert_button = GTK_WIDGET(gtk_builder_get_object(main_builder, "convert-button"));
00754         g_signal_connect(self->convert_button, "clicked", G_CALLBACK(on_convert_clicked),
      (gpointer)self);
00755
00756         listbox = GTK_WIDGET(gtk_builder_get_object(main_builder, "layer-list"));
00757         /* Create layer selector */
00758         self->layer_selector = layer_selector_new(GTK_LIST_BOX(listbox));
00759
00760         activity_bar_box = GTK_WIDGET(gtk_builder_get_object(main_builder, "activity-bar"));
00761
00762         /* Callback for selection change of cell selector */
00763         g_signal_connect(G_OBJECT(gtk_tree_view_get_selection(self->cell_tree_view)), "changed",
00764                          G_CALLBACK(cell_selection_changed), self);
00765         g_signal_connect(self->cell_tree_view, "row-activated", G_CALLBACK(cell_tree_view_activated),
      self);
00766
00767         /* Set version in main window subtitle */
00768         header_bar = GTK_HEADER_BAR(gtk_builder_get_object(main_builder, "header-bar"));
00769         gtk_header_bar_set_subtitle(header_bar, _app_version_string);
00770
00771         /* Get layer sorting buttons and set callbacks */
00772         sort_up_button = GTK_WIDGET(gtk_builder_get_object(main_builder, "button-up-sort"));
00773         sort_down_button = GTK_WIDGET(gtk_builder_get_object(main_builder, "button-down-sort"));
00774
00775         g_signal_connect(sort_up_button, "clicked", G_CALLBACK(sort_up_callback), self);
00776         g_signal_connect(sort_down_button, "clicked", G_CALLBACK(sort_down_callback), self);
00777
00778         /* Set buttons for loading and saving */
00779         self->load_layer_button = GTK_WIDGET(gtk_builder_get_object(main_builder,
      "button-load-mapping"));
00780         self->save_layer_button = GTK_WIDGET(gtk_builder_get_object(main_builder,
      "button-save-mapping"));
00781         layer_selector_set_load_mapping_button(self->layer_selector, self->load_layer_button,
      self->main_window);
00782         layer_selector_set_save_mapping_button(self->layer_selector, self->save_layer_button,
      self->main_window);
00783
00784         /* Connect delete-event */
00785         g_signal_connect(GTK_WIDGET(self->main_window), "delete-event",
00786                          G_CALLBACK(on_window_close), self);
00787
00788         /* Create and apply ActivityBar */
00789         self->activity_status_bar = activity_bar_new();
00790         gtk_container_add(GTK_CONTAINER(activity_bar_box), GTK_WIDGET(self->activity_status_bar));
00791         gtk_widget_show(GTK_WIDGET(self->activity_status_bar));
00792
00793         /* Create color palette */
00794         self->palette = color_palette_new_from_resource("/data/color-palette.txt");
00795         auto_color_button = GTK_WIDGET(gtk_builder_get_object(main_builder, "auto-color-button"));
00796         g_signal_connect(auto_color_button, "clicked", G_CALLBACK(on_auto_color_clicked), self);
00797
00798
00799         /* Set default conversion/rendering settings */
00800         self->render_dialog_settings.scale = 1000;
00801         self->render_dialog_settings.renderer = RENDERER_LATEX_TIKZ;
00802         self->render_dialog_settings.tex_pdf_layers = FALSE;
00803         self->render_dialog_settings.tex_standalone = FALSE;
00804
00805         /* Get select all button and connect callback */
00806         self->select_all_button = GTK_WIDGET(gtk_builder_get_object(main_builder,
      "button-select-all"));
00807         g_signal_connect(self->select_all_button, "clicked", G_CALLBACK(on_select_all_layers_clicked),
      self);
```

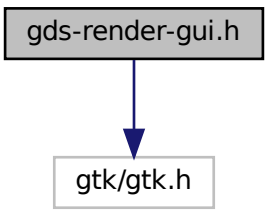
```
00808
00809         /* Setup auto naming button */
00810         auto_naming_button = GTK_WIDGET(gtk_builder_get_object(main_builder, "button-auto-name"));
00811         g_signal_connect(auto_naming_button, "clicked", G_CALLBACK(auto_naming_clicked), self);
00812
00813         g_object_unref(main_builder);
00814
00815         /* Setup default button sensibility data */
00816         self->button_state_data.rendering_active = FALSE;
00817         self->button_state_data.valid_cell_selected = FALSE;
00818
00819         /* Reference all objects referenced by this object */
00820         g_object_ref(self->activity_status_bar);
00821         g_object_ref(self->main_window);
00822         g_object_ref(self->cell_tree_view);
00823         g_object_ref(self->convert_button);
00824         /* g_object_ref(self->layer_selector); <= This is already referenced by the _new() function */
00825         g_object_ref(self->cell_search_entry);
00826         /* g_object_ref(self->palette); */
00827         g_object_ref(self->open_button);
00828         g_object_ref(self->load_layer_button);
00829         g_object_ref(self->save_layer_button);
00830         g_object_ref(self->select_all_button);
00831 }
00832
00833 GdsRenderGui *gds_render_gui_new()
00834 {
00835         return RENDERER_GUI(g_object_new(RENDERER_TYPE_GUI, NULL));
00836 }
00837
```

13.51 gds-render-gui.h File Reference

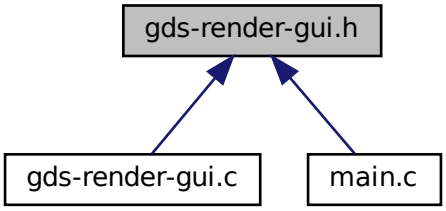
Header for GdsRenderGui Object.

```
#include <gtk/gtk.h>
```

Include dependency graph for gds-render-gui.h:



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



Macros

- #define RENDERER_TYPE_GUI (gds_render_gui_get_type())

Functions

- G_BEGIN_DECLS G_DECLARE_FINAL_TYPE (GdsRenderGui, gds_render_gui, RENDERER, GUI, G↩ Object)
- GdsRenderGui ∗ gds_render_gui_new ()

  Create new GdsRenderGui Object.
- GtkWindow ∗ gds_render_gui_get_main_window (GdsRenderGui ∗gui)

  Get main window.

13.51.1 Detailed Description

Header for GdsRenderGui Object.

Author

Mario Hüttel mario.huettel@gmx.net

Definition in file gds-render-gui.h.

13.52 gds-render-gui.h

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
```

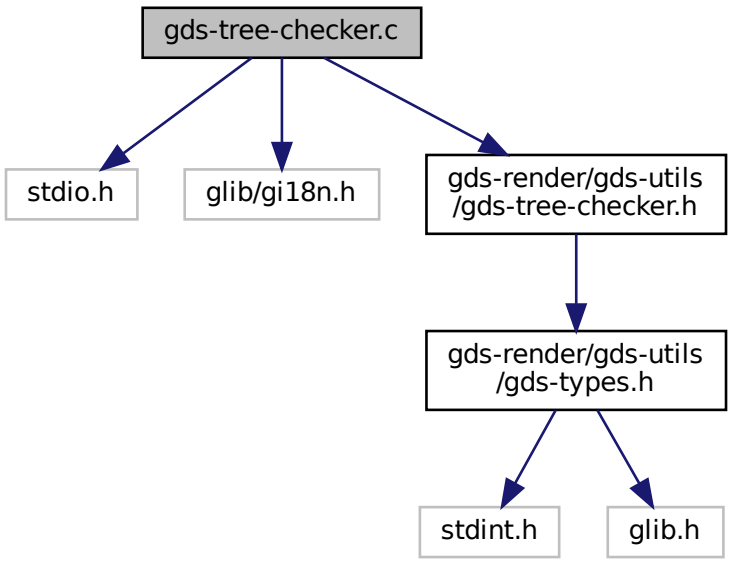
```
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00026 #ifndef _GDS_RENDER_GUI_
00027 #define _GDS_RENDER_GUI_
00028
00034 #include <gtk/gtk.h>
00035
00036 G_BEGIN_DECLS
00037
00038 G_DECLARE_FINAL_TYPE(GdsRenderGui, gds_render_gui, RENDERER, GUI, GObject);
00039
00040 #define RENDERER_TYPE_GUI (gds_render_gui_get_type())
00041
00046 GdsRenderGui *gds_render_gui_new();
00047
00055 GtkWindow *gds_render_gui_get_main_window(GdsRenderGui *gui);
00056
00057 G_END_DECLS
00058
00061 #endif /* _GDS_RENDER_GUI_ */
```

13.53 gds-tree-checker.c File Reference

Checking functions of a cell tree.

```
#include <stdio.h>
#include <glib/gi18n.h>
#include <gds-render/gds-utils/gds-tree-checker.h>
```

Include dependency graph for gds-tree-checker.c:



Functions

- int gds_tree_check_cell_references (struct gds_library *lib)

gds_tree_check_cell_references checks if all child cell references can be resolved in the given library

- static int gds_tree_check_list_contains_cell (GList *list, struct gds_cell *cell)

  Check if list contains a cell.

- static int gds_tree_check_iterate_ref_and_check (struct gds_cell *cell_to_check, GList **visited_cells)

  This function follows down the reference list of a cell and marks each visited subcell and detects loops.

- int gds_tree_check_reference_loops (struct gds_library *lib)

  gds_tree_check_reference_loops checks if the given library contains reference loops

13.53.1 Detailed Description

Checking functions of a cell tree.

This file contains checking functions for the GDS cell tree. These functions include checks if all child references could be resolved, and if the cell tree contains loops.

Author

Mario Hüttel mario.huettel@gmx.net

Definition in file gds-tree-checker.c.

13.54 gds-tree-checker.c

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2019  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00036 #include <stdio.h>
00037 #include <glib/gi18n.h>
00038 #include <gds-render/gds-utils/gds-tree-checker.h>
00039
00040 int gds_tree_check_cell_references(struct gds_library *lib)
00041 {
00042         GList *cell_iter;
00043         struct gds_cell *cell;
00044         GList *instance_iter;
00045         struct  gds_cell_instance *cell_inst;
00046         int total_unresolved_count = 0;
00047
00048         if (!lib)
00049                 return -1;
00050
00051         /* Iterate over all cells in library */
00052         for (cell_iter = lib->cells; cell_iter != NULL; cell_iter = g_list_next(cell_iter)) {
00053                 cell = (struct gds_cell *)cell_iter->data;
00054
00055                 /* Check if this list element is broken. This should never happen */
00056                 if (!cell) {
00057                         fprintf(stderr, _("Broken cell list item found. Will continue.\n"));
00058                         continue;
00059                 }
00060
00061                 /* Reset the unresolved cell reference counter to 0 */
```

```
00062                 cell->checks.unresolved_child_count = 0;
00063
00064                 /* Iterate through all child cell references and check if the references are set */
00065                 for (instance_iter = cell->child_cells; instance_iter != NULL;
00066                                         instance_iter = g_list_next(instance_iter)) {
00067                         cell_inst = (struct gds_cell_instance *)instance_iter->data;
00068
00069                         /* Check if broken. This should not happen */
00070                         if (!cell_inst) {
00071                                 fprintf(stderr, _("Broken cell list item found in cell %s. Will
      continue.\n"),
00072                                                         cell->name);
00073                                 continue;
00074                         }
00075
00076                         /* Check if instance is valid; else increment "error" counter of cell */
00077                         if (!cell_inst->cell_ref) {
00078                                 total_unresolved_count++;
00079                                 cell->checks.unresolved_child_count++;
00080                         }
00081                 }
00082         }
00083
00084         return total_unresolved_count;
00085 }
00086
00093 static int gds_tree_check_list_contains_cell(GList *list, struct gds_cell *cell)
00094 {
00095         GList *iter;
00096
00097         for (iter = list; iter != NULL; iter = g_list_next(iter)) {
00098                 if ((struct gds_cell *)iter->data == cell)
00099                         return 1;
00100         }
00101
00102         return 0;
00103 }
00104
00111 static int gds_tree_check_iterate_ref_and_check(struct gds_cell *cell_to_check, GList **visited_cells)
00112 {
00113         GList *ref_iter;
00114         struct gds_cell_instance *ref;
00115         struct gds_cell *sub_cell;
00116         int res;
00117
00118         if (!cell_to_check)
00119                 return -1;
00120
00121         /* Check if this cell is already contained in visited cells. This indicates a loop */
00122         if (gds_tree_check_list_contains_cell(*visited_cells, cell_to_check))
00123                 return 1;
00124
00125         /* Add cell to visited cell list */
00126         *visited_cells = g_list_append(*visited_cells, (gpointer)cell_to_check);
00127
00128         /* Mark references and process sub cells */
00129         for (ref_iter = cell_to_check->child_cells; ref_iter != NULL; ref_iter =
      g_list_next(ref_iter)) {
00130                 ref = (struct gds_cell_instance *)ref_iter->data;
00131
00132                 if (!ref)
00133                         return -1;
00134
00135                 sub_cell = ref->cell_ref;
00136
00137                 /* If cell is not resolved, ignore. No harm there */
00138                 if (!sub_cell)
00139                         continue;
00140
00141                 res = gds_tree_check_iterate_ref_and_check(sub_cell, visited_cells);
00142                 if (res < 0) {
00143                         /* Error. return. */
00144                         return -3;
00145                 } else if (res > 0) {
00146                         /* Loop in subcell found. Propagate to top */
00147                         return 1;
00148                 }
00149         }
00150
00151         /* Remove cell from visted cells */
00152         *visited_cells = g_list_remove(*visited_cells, cell_to_check);
00153
00154         /* No error found in this chain */
00155         return 0;
00156 }
00157
00158 int gds_tree_check_reference_loops(struct gds_library *lib)
```

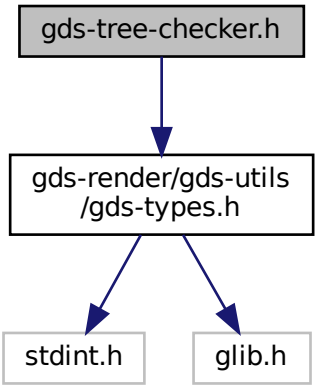
```
00159 {
00160         int res;
00161         int loop_count = 0;
00162         GList *cell_iter;
00163         struct gds_cell *cell_to_check;
00164         GList *visited_cells = NULL;
00165
00166
00167         if (!lib)
00168                 return -1;
00169
00170         for (cell_iter = lib->cells; cell_iter != NULL; cell_iter = g_list_next(cell_iter)) {
00171                 cell_to_check = (struct gds_cell *)cell_iter->data;
00172
00173                 /* A broken cell reference will be counted fatal in this case */
00174                 if (!cell_to_check)
00175                         return -2;
00176
00177                 /* iterate through references and check if loop exists */
00178                 res = gds_tree_check_iterate_ref_and_check(cell_to_check, &visited_cells);
00179
00180                 if (visited_cells) {
00181                         /*
00182                          * If  cell contains no loop, print error when list not empty.
00183                          * In case of a loop, it is completely normal that the list is not empty,
00184                          * due to the instant return from gds_tree_check_iterate_ref_and_check()
00185                          */
00186                         if (res == 0)
00187                                 fprintf(stderr,
00188                                         _("Visited cell list should be empty. This is a bug. Please
      report this.\n"));
00189                         g_list_free(visited_cells);
00190                         visited_cells = NULL;
00191                 }
00192
00193                 if (res < 0) {
00194                         /* Error */
00195                         return res;
00196                 } else if (res > 0) {
00197                         /* Loop found: increment loop count and flag cell */
00198                         cell_to_check->checks.affected_by_reference_loop = 1;
00199                         loop_count++;
00200                 } else if (res == 0) {
00201                         /* No error found for this cell */
00202                         cell_to_check->checks.affected_by_reference_loop = 0;
00203                 }
00204
00205         }
00206
00207
00208         return loop_count;
00209 }
00210
```

13.55 gds-tree-checker.h File Reference

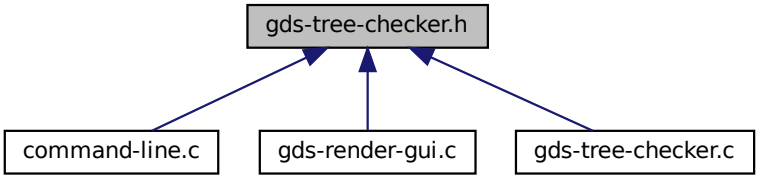
Checking functions of a cell tree (Header)

```
#include <gds-render/gds-utils/gds-types.h>
```

Include dependency graph for gds-tree-checker.h:



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



Functions

- int gds_tree_check_cell_references (struct gds_library *lib)

  gds_tree_check_cell_references checks if all child cell references can be resolved in the given library
- int gds_tree_check_reference_loops (struct gds_library *lib)

  gds_tree_check_reference_loops checks if the given library contains reference loops

13.55.1 Detailed Description

Checking functions of a cell tree (Header)

Author

Mario Hüttel mario.huettel@gmx.net

Definition in file gds-tree-checker.h.

13.56 gds-tree-checker.h

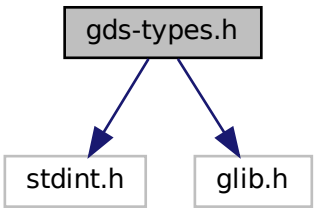
```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2019  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00031 #ifndef _GDS_TREE_CHECKER_H_
00032 #define _GDS_TREE_CHECKER_H_
00033
00034 #include <gds-render/gds-utils/gds-types.h>
00035
00049 int gds_tree_check_cell_references(struct gds_library *lib);
00050
00057 int gds_tree_check_reference_loops(struct gds_library *lib);
00058
00059 #endif /* _GDS_TREE_CHECKER_H_ */
00060
```

13.57 gds-types.h File Reference

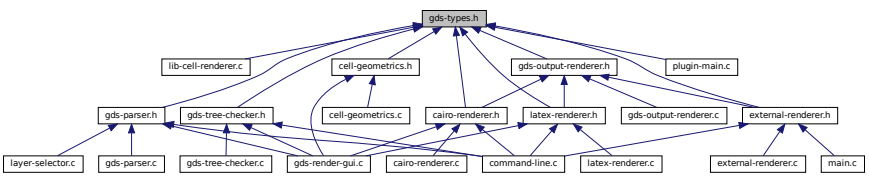
Defines types and macros used by the GDS-Parser.

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

Include dependency graph for gds-types.h:



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



Data Structures

- struct gds_point

  A point in the 2D plane. Sometimes referred to as vertex.
- struct gds_cell_checks

  Stores the result of the cell checks.
- struct gds_cell_checks::_check_internals

  For the internal use of the checker.
- struct gds_time_field

  Date information for cells and libraries.
- struct gds_graphics

  A GDS graphics object.
- struct gds_cell_instance

  This represents an instanc of a cell inside another cell.
- struct gds_cell

  A Cell inside a gds_library.
- struct gds_library

  GDS Toplevel library.

Macros

- #define CELL_NAME_MAX (100)

  Maximum length of a gds_cell::name or a gds_library::name.
- #define MIN(a, b) (((a) < (b)) ? (a) : (b))

  Return smaller number.
- #define MAX(a, b) (((a) > (b)) ? (a) : (b))

  Return bigger number.

Enumerations

- enum { GDS_CELL_CHECK_NOT_RUN = -1 }

  Defintion of check counter default value that indicates that the corresponding check has not yet been executed.
- enum graphics_type { GRAPHIC_PATH = 0, GRAPHIC_POLYGON = 1, GRAPHIC_BOX = 2 }

  Types of graphic objects.
- enum path_type { PATH_FLUSH = 0, PATH_ROUNDED = 1, PATH_SQUARED = 2 }

  Defines the line caps of a path.

13.57.1 Detailed Description

Defines types and macros used by the GDS-Parser.

Author

Mario Hüttel mario.huettel@gmx.net

Definition in file gds-types.h.

13.58 gds-types.h

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00031 #ifndef __GDS_TYPES_H__
00032 #define __GDS_TYPES_H__
00033
00034 #include <stdint.h>
00035 #include <glib.h>
00036
00037 #define CELL_NAME_MAX (100)
00039 /* Maybe use the macros that ship with the compiler? */
00040 #define MIN(a,b) (((a) < (b)) ? (a) : (b))
00041 #define MAX(a,b) (((a) > (b)) ? (a) : (b))
00045 enum {GDS_CELL_CHECK_NOT_RUN = -1};
00046
00048 enum graphics_type
00049 {
00050                     GRAPHIC_PATH = 0,
00051                     GRAPHIC_POLYGON = 1,
00052                     GRAPHIC_BOX = 2
00053 };
00054
00058 enum path_type {PATH_FLUSH = 0, PATH_ROUNDED = 1, PATH_SQUARED = 2};
00063 struct gds_point {
00064         int x;
00065         int y;
00066 };
00067
00071 struct gds_cell_checks {
00072         int unresolved_child_count;
00073         int affected_by_reference_loop;
00078         struct _check_internals {
00079                 int marker;
00080         } _internal;
00081 };
00082
00086 struct gds_time_field {
00087         uint16_t year;
00088         uint16_t month;
00089         uint16_t day;
00090         uint16_t hour;
00091         uint16_t minute;
00092         uint16_t second;
00093 };
00094
00098 struct gds_graphics {
00099         enum graphics_type gfx_type;
00100         GList *vertices;
00101         enum path_type path_render_type;
00102         int width_absolute;
00103         int16_t layer;
00104         uint16_t datatype;
00105 };
00106
00110 struct gds_cell_instance {
00111         char ref_name[CELL_NAME_MAX];
00112         struct gds_cell *cell_ref;
00113         struct gds_point origin;
00114         int flipped;
00115         double angle;
00116         double magnification;
00117 };
00118
00122 struct gds_cell {
00123         char name[CELL_NAME_MAX];
00124         struct gds_time_field mod_time;
00125         struct gds_time_field access_time;
00126         GList *child_cells;
00127         GList *graphic_objs;
```

```
00128         struct gds_library *parent_library;
00129         struct gds_cell_checks checks;
00130 };
00131
00135 struct gds_library {
00136         char name[CELL_NAME_MAX];
00137         struct gds_time_field mod_time;
00138         struct gds_time_field access_time;
00139         double unit_in_meters;
00140         GList *cells;
00141         GList *cell_names ;
00142 };
00143
00146 #endif /* __GDS_TYPES_H__ */
```

13.59 geometric.dox File Reference

13.60 gpl-2.0.md File Reference

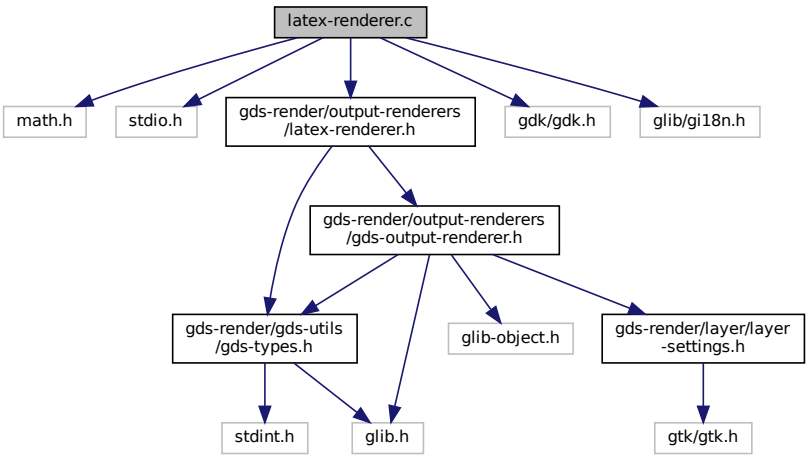
13.61 gui.dox File Reference

13.62 latex-renderer.c File Reference

LaTeX Output Renderer.

```
#include <math.h>
#include <stdio.h>
#include <gds-render/output-renderers/latex-renderer.h>
#include <gdk/gdk.h>
#include <glib/gi18n.h>
```

Include dependency graph for latex-renderer.c:



Data Structures

- struct _LatexRenderer

  Struct representing the LaTeX-Renderer object.

Macros

- #define WRITEOUT_BUFFER(buff) fwrite((buff)->str, sizeof(char), (buff)->len, tex_file)

  Writes a GString `buffer` to the fixed file tex_file.

Enumerations

- enum { PROP_STANDALONE = 1, PROP_PDF_LAYERS, N_PROPERTIES }

Functions

- static void write_layer_definitions (FILE *tex_file, GList *layer_infos, GString *buffer)

  Write the layer declarration to TeX file.
- static gboolean write_layer_env (FILE *tex_file, GdkRGBA *color, int layer, GList *linfo, GString *buffer)

  Write layer Envirmonment.
- static void generate_graphics (FILE *tex_file, GList *graphics, GList *linfo, GString *buffer, double scale)

  Writes a graphics object to the specified tex_file.
- static void render_cell (struct gds_cell *cell, GList *layer_infos, FILE *tex_file, GString *buffer, double scale, GdsOutputRenderer *renderer)

  Render cell to file.
- static int latex_render_cell_to_code (struct gds_cell *cell, GList *layer_infos, FILE *tex_file, double scale, gboolean create_pdf_layers, gboolean standalone_document, GdsOutputRenderer *renderer)
- static int latex_renderer_render_output (GdsOutputRenderer *renderer, struct gds_cell *cell, double scale)
- static void latex_renderer_init (LatexRenderer *self)
- static void latex_renderer_get_property (GObject *obj, guint property_id, GValue *value, GParamSpec *pspec)
- static void latex_renderer_set_property (GObject *obj, guint property_id, const GValue *value, GParamSpec *pspec)
- static void latex_renderer_class_init (LatexRendererClass *klass)
- LatexRenderer * latex_renderer_new ()

  Create new LatexRenderer object.
- LatexRenderer * latex_renderer_new_with_options (gboolean pdf_layers, gboolean standalone)

  Create new LatexRenderer object.

Variables

- static GParamSpec * latex_renderer_properties [N_PROPERTIES] = {NULL}

13.62.1 Detailed Description

LaTeX Output Renderer.

Author

Mario Hüttel `mario.huettel@gmx.net`

Definition in file latex-renderer.c.

13.63 latex-renderer.c

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00026 #include <math.h>
00027 #include <stdio.h>
00028 #include <gds-render/output-renderers/latex-renderer.h>
00029 #include <gdk/gdk.h>
00030 #include <glib/gi18n.h>
00031
00042 struct _LatexRenderer {
00043         GdsOutputRenderer parent;
00044         gboolean tex_standalone;
00045         gboolean pdf_layers;
00046 };
00047
00048 G_DEFINE_TYPE(LatexRenderer, latex_renderer, GDS_RENDER_TYPE_OUTPUT_RENDERER)
00049
00050 enum {
00051         PROP_STANDALONE = 1,
00052         PROP_PDF_LAYERS,
00053         N_PROPERTIES
00054 };
00055
00060 #define WRITEOUT_BUFFER(buff) fwrite((buff)->str, sizeof(char), (buff)->len, tex_file)
00061
00074 static void write_layer_definitions(FILE *tex_file, GList *layer_infos, GString *buffer)
00075 {
00076         GList *list;
00077         struct layer_info *lifo;
00078
00079         for (list = layer_infos; list != NULL; list = list->next) {
00080                 lifo = (struct layer_info *)list->data;
00081
00082                 if (!lifo->render)
00083                         continue;
00084
00085                 g_string_printf(buffer,
      "\\pgfdeclarelayer{l%d}\n\\definecolor{c%d}{rgb}{%lf,%lf,%lf}\n",
00086                                 lifo->layer, lifo->layer,
00087                                 lifo->color.red, lifo->color.green, lifo->color.blue);
00088                 WRITEOUT_BUFFER(buffer);
00089         }
00090
00091         g_string_printf(buffer, "\\pgfsetlayers{");
00092         WRITEOUT_BUFFER(buffer);
00093
00094         for (list = layer_infos; list != NULL; list = list->next) {
00095                 lifo = (struct layer_info *)list->data;
00096
00097                 if (!lifo->render)
00098                         continue;
00099
00100                 g_string_printf(buffer, "l%d,", lifo->layer);
00101                 WRITEOUT_BUFFER(buffer);
00102         }
00103         g_string_printf(buffer, "main}\n");
00104         WRITEOUT_BUFFER(buffer);
00105 }
00106
00133 static gboolean write_layer_env(FILE *tex_file, GdkRGBA *color, int layer, GList *linfo, GString
      *buffer)
00134 {
00135         GList *temp;
00136         struct layer_info *inf;
00137
00138         for (temp = linfo; temp != NULL; temp = temp->next) {
00139                 inf = (struct layer_info *)temp->data;
00140                 if (inf->layer == layer && inf->render) {
00141                         color->alpha = inf->color.alpha;
```

```
00142                         color->red = inf->color.red;
00143                         color->green = inf->color.green;
00144                         color->blue = inf->color.blue;
00145                         g_string_printf(buffer,
00146
      "\\begin{pgfonlayer}{l%d}\n\\ifcreatepdflayers\n\\begin{scope}[ocg={ref=%d,
      status=visible,name={%s}}]\n\\fi\n",
00147                                         layer, layer, inf->name);
00148                         WRITEOUT_BUFFER(buffer);
00149                         return TRUE;
00150                 }
00151         }
00152         return FALSE;
00153 }
00154
00166 static void generate_graphics(FILE *tex_file, GList *graphics, GList *linfo, GString *buffer, double
      scale)
00167 {
00168         GList *temp;
00169         GList *temp_vertex;
00170         struct gds_graphics *gfx;
00171         struct gds_point *pt;
00172         GdkRGBA color;
00173         static const char * const line_caps[] = {"butt", "round", "rect"};
00174
00175         for (temp = graphics; temp != NULL; temp = temp->next) {
00176                 gfx = (struct gds_graphics *)temp->data;
00177                 if (write_layer_env(tex_file, &color, (int)gfx->layer, linfo, buffer) == TRUE) {
00178
00179                         /* Layer is defined => create graphics */
00180                         if (gfx->gfx_type == GRAPHIC_POLYGON || gfx->gfx_type == GRAPHIC_BOX) {
00181                                 g_string_printf(buffer,
00182                                                 "\\draw[line width=0.00001 pt, draw={c%d}, fill={c%d},
      fill opacity={%lf}] ",
00183                                                 gfx->layer, gfx->layer, color.alpha);
00184                                 WRITEOUT_BUFFER(buffer);
00185                                 /* Append vertices */
00186                                 for (temp_vertex = gfx->vertices;
00187                                      temp_vertex != NULL;
00188                                      temp_vertex = temp_vertex->next) {
00189                                         pt = (struct gds_point *)temp_vertex->data;
00190                                         g_string_printf(buffer, "(%lf pt, %lf pt) -- ",
00191                                                         ((double)pt->x)/scale,
00192                                                         ((double)pt->y)/scale);
00193                                         WRITEOUT_BUFFER(buffer);
00194                                 }
00195                                 g_string_printf(buffer, "cycle;\n");
00196                                 WRITEOUT_BUFFER(buffer);
00197                         } else if (gfx->gfx_type == GRAPHIC_PATH) {
00198
00199                                 if (g_list_length(gfx->vertices) < 2) {
00200                                         printf("Cannot write path with less than 2 points\n");
00201                                         break;
00202                                 }
00203
00204                                 if (gfx->path_render_type < 0 || gfx->path_render_type > 2) {
00205                                         printf("Path type unrecognized. Setting to 'flushed'\n");
00206                                         gfx->path_render_type = PATH_FLUSH;
00207                                 }
00208
00209                                 g_string_printf(buffer, "\\draw[line width=%lf pt, draw={c%d},
      opacity={%lf}, cap=%s] ",
00210                                                 gfx->width_absolute/scale, gfx->layer, color.alpha,
00211                                                 line_caps[gfx->path_render_type]);
00212                                 WRITEOUT_BUFFER(buffer);
00213
00214                                 /* Append vertices */
00215                                 for (temp_vertex = gfx->vertices;
00216                                      temp_vertex != NULL;
00217                                      temp_vertex = temp_vertex->next) {
00218                                         pt = (struct gds_point *)temp_vertex->data;
00219                                         g_string_printf(buffer, "(%lf pt, %lf pt)%s",
00220                                                         ((double)pt->x)/scale,
00221                                                         ((double)pt->y)/scale,
00222                                                         (temp_vertex->next ? " -- " : ""));
00223                                         WRITEOUT_BUFFER(buffer);
00224                                 }
00225                                 g_string_printf(buffer, ";\n");
00226                                 WRITEOUT_BUFFER(buffer);
00227                         }
00228
00229                         g_string_printf(buffer,
      "\\ifcreatepdflayers\n\\end{scope}\n\\fi\n\\end{pgfonlayer}\n");
00230                         WRITEOUT_BUFFER(buffer);
00231                 }
00232
00233         } /* For graphics */
```

```
00234 }
00235
00245 static void render_cell(struct gds_cell *cell, GList *layer_infos, FILE *tex_file, GString *buffer,
       double scale,
00246                         GdsOutputRenderer *renderer)
00247 {
00248         GString *status;
00249         GList *list_child;
00250         struct gds_cell_instance *inst;
00251
00252         status = g_string_new(NULL);
00253         g_string_printf(status, _("Generating cell %s"), cell->name);
00254         gds_output_renderer_update_async_progress(renderer, status->str);
00255         g_string_free(status, TRUE);
00256
00257         /* Draw polygons of current cell */
00258         generate_graphics(tex_file, cell->graphic_objs, layer_infos, buffer, scale);
00259
00260         /* Draw polygons of childs */
00261         for (list_child = cell->child_cells; list_child != NULL; list_child = list_child->next) {
00262                 inst = (struct gds_cell_instance *)list_child->data;
00263
00264                 /* Abort if cell has no reference */
00265                 if (!inst->cell_ref)
00266                         continue;
00267
00268                 /* generate translation scope */
00269                 g_string_printf(buffer, "\\begin{scope}[shift={(%lf pt,%lf pt)}]\n",
00270                                 ((double)inst->origin.x) / scale, ((double)inst->origin.y) / scale);
00271                 WRITEOUT_BUFFER(buffer);
00272
00273                 g_string_printf(buffer, "\\begin{scope}[rotate=%lf]\n", inst->angle);
00274                 WRITEOUT_BUFFER(buffer);
00275
00276                 g_string_printf(buffer, "\\begin{scope}[yscale=%lf, xscale=%lf]\n",
00277                                 (inst->flipped ? -1*inst->magnification : inst->magnification),
00278                                 inst->magnification);
00279                 WRITEOUT_BUFFER(buffer);
00280
00281                 render_cell(inst->cell_ref, layer_infos, tex_file, buffer, scale, renderer);
00282
00283                 g_string_printf(buffer, "\\end{scope}\n");
00284                 WRITEOUT_BUFFER(buffer);
00285
00286                 g_string_printf(buffer, "\\end{scope}\n");
00287                 WRITEOUT_BUFFER(buffer);
00288
00289                 g_string_printf(buffer, "\\end{scope}\n");
00290                 WRITEOUT_BUFFER(buffer);
00291         }
00292
00293 }
00294
00295 static int latex_render_cell_to_code(struct gds_cell *cell, GList *layer_infos, FILE *tex_file, double
       scale,
00296                                 gboolean create_pdf_layers, gboolean standalone_document,
       GdsOutputRenderer *renderer)
00297 {
00298         GString *working_line;
00299
00300
00301         if (!tex_file || !layer_infos || !cell)
00302                 return -1;
00303
00304         /* 10 kB Line working buffer should be enough */
00305         working_line = g_string_new_len(NULL, LATEX_LINE_BUFFER_KB*1024);
00306
00307         /* standalone foo */
00308         g_string_printf(working_line, "\\newif\\iftestmode\n\\testmode%s\n",
00309                         (standalone_document ? "true" : "false"));
00310         WRITEOUT_BUFFER(working_line);
00311         g_string_printf(working_line, "\\newif\\ifcreatepdflayers\n\\createpdflayers%s\n",
00312                         (create_pdf_layers ? "true" : "false"));
00313         WRITEOUT_BUFFER(working_line);
00314         g_string_printf(working_line, "\\iftestmode\n");
00315         WRITEOUT_BUFFER(working_line);
00316         g_string_printf(working_line,
00317
       "\\documentclass[tikz]{standalone}\n\\usepackage{xcolor}\n\\usetikzlibrary{ocgx}\n\\begin{document}\n");
00318         WRITEOUT_BUFFER(working_line);
00319         g_string_printf(working_line, "\\fi\n");
00320         WRITEOUT_BUFFER(working_line);
00321
00322         /* Write layer definitions */
00323         write_layer_definitions(tex_file, layer_infos, working_line);
00324
00325         /* Open tikz Pictute */
```

```
00326         g_string_printf(working_line, "\\begin{tikzpicture}\n");
00327         WRITEOUT_BUFFER(working_line);
00328
00329         /* Generate graphics output */
00330         render_cell(cell, layer_infos, tex_file, working_line, scale, renderer);
00331
00332
00333         g_string_printf(working_line, "\\end{tikzpicture}\n");
00334         WRITEOUT_BUFFER(working_line);
00335
00336         g_string_printf(working_line, "\\iftestmode\n");
00337         WRITEOUT_BUFFER(working_line);
00338         g_string_printf(working_line, "\\end{document}\n");
00339         WRITEOUT_BUFFER(working_line);
00340         g_string_printf(working_line, "\\fi\n");
00341         WRITEOUT_BUFFER(working_line);
00342
00343         fflush(tex_file);
00344         g_string_free(working_line, TRUE);
00345
00346         return 0;
00347 }
00348
00349 static int latex_renderer_render_output(GdsOutputRenderer *renderer,
00350                                         struct gds_cell *cell,
00351                                         double scale)
00352 {
00353         LatexRenderer *l_renderer = GDS_RENDER_LATEX_RENDERER(renderer);
00354         FILE *tex_file;
00355         int ret = -2;
00356         LayerSettings *settings;
00357         GList *layer_infos = NULL;
00358         const char *output_file;
00359
00360         output_file = gds_output_renderer_get_output_file(renderer);
00361         settings = gds_output_renderer_get_and_ref_layer_settings(renderer);
00362
00363         /* Set layer info list. In case of failure it remains NULL */
00364         if (settings)
00365                 layer_infos = layer_settings_get_layer_info_list(settings);
00366
00367         tex_file = fopen(output_file, "w");
00368         if (tex_file) {
00369                 ret = latex_render_cell_to_code(cell, layer_infos, tex_file, scale,
00370                                                 l_renderer->pdf_layers, l_renderer->tex_standalone,
      renderer);
00371                 fclose(tex_file);
00372         } else {
00373                 g_error(_("Could not open LaTeX output file"));
00374         }
00375
00376         if (settings)
00377                 g_object_unref(settings);
00378
00379         return ret;
00380 }
00381
00382 static void latex_renderer_init(LatexRenderer *self)
00383 {
00384         self->pdf_layers = FALSE;
00385         self->tex_standalone = FALSE;
00386 }
00387
00388 static void latex_renderer_get_property(GObject *obj, guint property_id, GValue *value, GParamSpec
      *pspec)
00389 {
00390         LatexRenderer *self = GDS_RENDER_LATEX_RENDERER(obj);
00391
00392         switch (property_id) {
00393         case PROP_STANDALONE:
00394                 g_value_set_boolean(value, self->tex_standalone);
00395                 break;
00396         case PROP_PDF_LAYERS:
00397                 g_value_set_boolean(value, self->pdf_layers);
00398                 break;
00399         default:
00400                 G_OBJECT_WARN_INVALID_PROPERTY_ID(obj, property_id, pspec);
00401                 break;
00402         }
00403 }
00404
00405 static void latex_renderer_set_property(GObject *obj, guint property_id, const GValue *value,
      GParamSpec *pspec)
00406 {
00407         LatexRenderer *self = GDS_RENDER_LATEX_RENDERER(obj);
00408
00409         switch (property_id) {
```

```
00410         case PROP_STANDALONE:
00411                 self->tex_standalone = g_value_get_boolean(value);
00412                 break;
00413         case PROP_PDF_LAYERS:
00414                 self->pdf_layers = g_value_get_boolean(value);
00415                 break;
00416         default:
00417                 G_OBJECT_WARN_INVALID_PROPERTY_ID(obj, property_id, pspec);
00418                 break;
00419         }
00420 }
00421
00422 static GParamSpec *latex_renderer_properties[N_PROPERTIES] = {NULL};
00423
00424 static void latex_renderer_class_init(LatexRendererClass *klass)
00425 {
00426         GdsOutputRendererClass *render_class = GDS_RENDER_OUTPUT_RENDERER_CLASS(klass);
00427         GObjectClass *oclass = G_OBJECT_CLASS(klass);
00428
00429         /* Overwrite virtual function */
00430         render_class->render_output = latex_renderer_render_output;
00431
00432         /* Property stuff */
00433         oclass->get_property = latex_renderer_get_property;
00434         oclass->set_property = latex_renderer_set_property;
00435
00436         latex_renderer_properties[PROP_STANDALONE] =
00437                         g_param_spec_boolean("standalone",
00438                                              N_("Standalone TeX file"),
00439                                              N_("Generate a standalone LaTeX file."),
00440                                              FALSE,
00441                                              G_PARAM_READWRITE);
00442         latex_renderer_properties[PROP_PDF_LAYERS] =
00443                         g_param_spec_boolean("pdf-layers",
00444                                              N_("PDF OCR layers"),
00445                                              N_("Generate OCR layers"),
00446                                              FALSE,
00447                                              G_PARAM_READWRITE);
00448
00449         g_object_class_install_properties(oclass, N_PROPERTIES, latex_renderer_properties);
00450 }
00451
00452 LatexRenderer *latex_renderer_new()
00453 {
00454         return GDS_RENDER_LATEX_RENDERER(g_object_new(GDS_RENDER_TYPE_LATEX_RENDERER, NULL));
00455 }
00456
00457 LatexRenderer *latex_renderer_new_with_options(gboolean pdf_layers, gboolean standalone)
00458 {
00459         GObject *obj;
00460
00461         obj = g_object_new(GDS_RENDER_TYPE_LATEX_RENDERER, "standalone", standalone, "pdf-layers",
      pdf_layers, NULL);
00462         return GDS_RENDER_LATEX_RENDERER(obj);
00463 }
00464
```

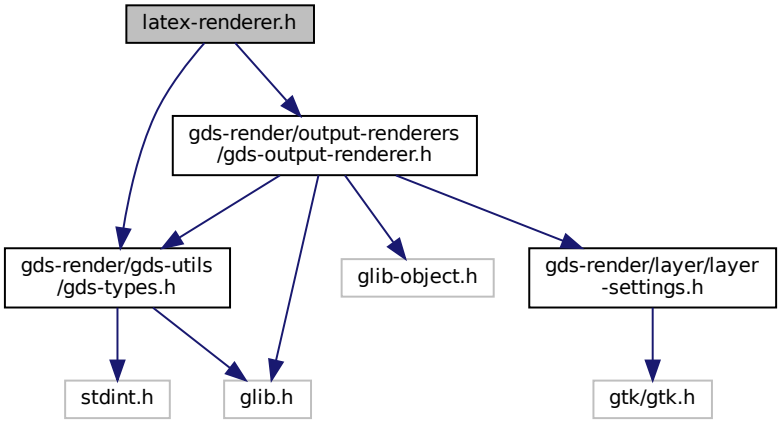
13.64 latex-renderer.dox File Reference

13.65 latex-renderer.h File Reference

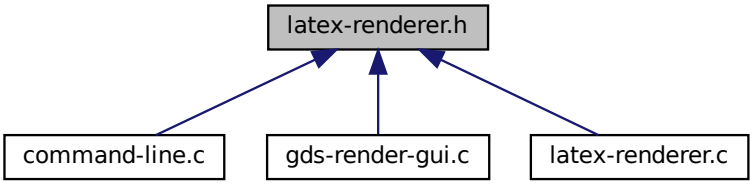
LaTeX output renderer.

```
#include <gds-render/output-renderers/gds-output-renderer.h>
#include <gds-render/gds-utils/gds-types.h>
```

Include dependency graph for latex-renderer.h:



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



Macros

- #define GDS_RENDER_TYPE_LATEX_RENDERER (latex_renderer_get_type())
- #define LATEX_LINE_BUFFER_KB (10)

  Buffer for LaTeX Code line in KiB.

Functions

- LatexRenderer * latex_renderer_new ()

  Create new LatexRenderer object.
- LatexRenderer * latex_renderer_new_with_options (gboolean pdf_layers, gboolean standalone)

  Create new LatexRenderer object.

13.65.1 Detailed Description

LaTeX output renderer.

Author

Mario Hüttel mario.huettel@gmx.net

Definition in file latex-renderer.h.

13.66 latex-renderer.h

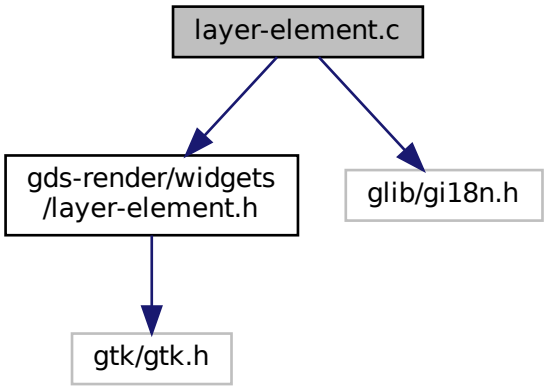
```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00031 #ifndef _LATEX_OUTPUT_H_
00032 #define _LATEX_OUTPUT_H_
00033
00034 #include <gds-render/output-renderers/gds-output-renderer.h>
00035 #include <gds-render/gds-utils/gds-types.h>
00036
00037 G_BEGIN_DECLS
00038
00039 G_DECLARE_FINAL_TYPE(LatexRenderer, latex_renderer, GDS_RENDER, LATEX_RENDERER, GdsOutputRenderer)
00040
00041 #define GDS_RENDER_TYPE_LATEX_RENDERER (latex_renderer_get_type())
00042
00046 #define LATEX_LINE_BUFFER_KB (10)
00047
00052 LatexRenderer *latex_renderer_new();
00053
00068 LatexRenderer *latex_renderer_new_with_options(gboolean pdf_layers, gboolean standalone);
00069
00070 G_END_DECLS
00071
00072 #endif /* _LATEX_OUTPUT_H_ */
00073
```

13.67 layer-element.c File Reference

Implementation of the layer element used for configuring layer colors etc.

```
#include <gds-render/widgets/layer-element.h>
#include <glib/gi18n.h>
```

Include dependency graph for layer-element.c:



Functions

- static void layer_element_dispose (GObject *obj)
- static void layer_element_constructed (GObject *obj)
- static void layer_element_class_init (LayerElementClass *klass)
- static void layer_element_init (LayerElement *self)
- GtkWidget * layer_element_new (void)

  Create new layer element object.
- const char * layer_element_get_name (LayerElement *elem)

  get name of the layer
- void layer_element_set_name (LayerElement *elem, const char *name)

  layer_element_set_name
- void layer_element_set_layer (LayerElement *elem, int layer)

  Set layer number for this layer.
- int layer_element_get_layer (LayerElement *elem)

  Get layer number.
- void layer_element_set_export (LayerElement *elem, gboolean export)

  Set export flag for this layer.
- gboolean layer_element_get_export (LayerElement *elem)

  Get export flag of layer.
- void layer_element_get_color (LayerElement *elem, GdkRGBA *rgba)

  Get color of layer.
- void layer_element_set_color (LayerElement *elem, GdkRGBA *rgba)

  Set color of layer.
- void layer_element_set_dnd_callbacks (LayerElement *elem, struct layer_element_dnd_data *data)

  Setup drag and drop of `elem` for use in the LayerSelector.

13.67.1 Detailed Description

Implementation of the layer element used for configuring layer colors etc.

Author

Mario Hüttel mario.huettel@gmx.net

Definition in file layer-element.c.

13.68 layer-element.c

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00020 /*
00021  * The drag and drop implementation is adapted from
00022  * https://gitlab.gnome.org/GNOME/gtk/blob/gtk-3-22/tests/testlist3.c
00023  *
00024  * Thanks to the GTK3 people for creating these examples.
00025  */
00026
00039 #include <gds-render/widgets/layer-element.h>
00040 #include <glib/gi18n.h>
00041
00042 G_DEFINE_TYPE(LayerElement, layer_element, GTK_TYPE_LIST_BOX_ROW)
00043
00044 static void layer_element_dispose(GObject *obj)
00045 {
00046         /* destroy parent container. This destroys all widgets inside */
00047         G_OBJECT_CLASS(layer_element_parent_class)->dispose(obj);
00048 }
00049
00050 static void layer_element_constructed(GObject *obj)
00051 {
00052         G_OBJECT_CLASS(layer_element_parent_class)->constructed(obj);
00053 }
00054
00055 static void layer_element_class_init(LayerElementClass *klass)
00056 {
00057         GObjectClass *oclass = G_OBJECT_CLASS(klass);
00058
00059         oclass->dispose = layer_element_dispose;
00060         oclass->constructed = layer_element_constructed;
00061 }
00062
00063 static void layer_element_init(LayerElement *self)
00064 {
00065         GtkBuilder *builder;
00066         GtkWidget *glade_box;
00067
00068         builder = gtk_builder_new_from_resource("/gui/layer-widget.glade");
00069         glade_box = GTK_WIDGET(gtk_builder_get_object(builder, "box"));
00070         gtk_container_add(GTK_CONTAINER(self), glade_box);
00071
00072         /* Get Elements */
00073         self->priv.color = GTK_COLOR_BUTTON(gtk_builder_get_object(builder, "color"));
00074         self->priv.export = GTK_CHECK_BUTTON(gtk_builder_get_object(builder, "export"));
00075         self->priv.layer = GTK_LABEL(gtk_builder_get_object(builder, "layer"));
00076         self->priv.name = GTK_ENTRY(gtk_builder_get_object(builder, "entry"));
00077         self->priv.event_handle = GTK_EVENT_BOX(gtk_builder_get_object(builder, "event-box"));
```

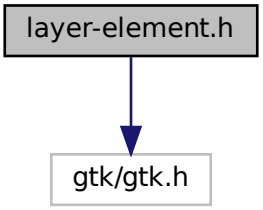
```
00078
00079         g_object_unref(builder);
00080 }
00081
00082 GtkWidget *layer_element_new(void)
00083 {
00084         return GTK_WIDGET(g_object_new(TYPE_LAYER_ELEMENT, NULL));
00085 }
00086
00087 const char *layer_element_get_name(LayerElement *elem)
00088 {
00089         return gtk_entry_get_text(elem->priv.name);
00090 }
00091
00092 void layer_element_set_name(LayerElement *elem, const char *name)
00093 {
00094         gtk_entry_set_text(elem->priv.name, name);
00095 }
00096
00097 void layer_element_set_layer(LayerElement *elem, int layer)
00098 {
00099         GString *string;
00100
00101         string = g_string_new_len(NULL, 100);
00102         g_string_printf(string, _("Layer: %d"), layer);
00103         gtk_label_set_text(elem->priv.layer, (const gchar *)string->str);
00104         elem->priv.layer_num = layer;
00105         g_string_free(string, TRUE);
00106 }
00107
00108 int layer_element_get_layer(LayerElement *elem)
00109 {
00110         return elem->priv.layer_num;
00111 }
00112
00113 void layer_element_set_export(LayerElement *elem, gboolean export)
00114 {
00115         gtk_toggle_button_set_active(GTK_TOGGLE_BUTTON(elem->priv.export), export);
00116 }
00117
00118 gboolean layer_element_get_export(LayerElement *elem)
00119 {
00120         return gtk_toggle_button_get_active(GTK_TOGGLE_BUTTON(elem->priv.export));
00121 }
00122
00123 void layer_element_get_color(LayerElement *elem, GdkRGBA *rgba)
00124 {
00125         if (!rgba)
00126                 return;
00127
00128         gtk_color_chooser_get_rgba(GTK_COLOR_CHOOSER(elem->priv.color), rgba);
00129 }
00130
00131 void layer_element_set_color(LayerElement *elem, GdkRGBA *rgba)
00132 {
00133         if (!elem || !rgba)
00134                 return;
00135
00136         gtk_color_chooser_set_rgba(GTK_COLOR_CHOOSER(elem->priv.color), rgba);
00137 }
00138
00139 void layer_element_set_dnd_callbacks(LayerElement *elem, struct layer_element_dnd_data *data)
00140 {
00141         if (!elem || !data)
00142                 return;
00143
00144         /* Setup drag and drop */
00145         gtk_style_context_add_class(gtk_widget_get_style_context(GTK_WIDGET(elem)), "row");
00146         gtk_drag_source_set(GTK_WIDGET(elem->priv.event_handle), GDK_BUTTON1_MASK,
00147                             data->entries, data->entry_count, GDK_ACTION_MOVE);
00148         g_signal_connect(elem->priv.event_handle, "drag-begin", G_CALLBACK(data->drag_begin), NULL);
00149         g_signal_connect(elem->priv.event_handle, "drag-data-get", G_CALLBACK(data->drag_data_get),
      NULL);
00150         g_signal_connect(elem->priv.event_handle, "drag-end", G_CALLBACK(data->drag_end), NULL);
00151
00152 }
00153
```

13.69 layer-element.h File Reference

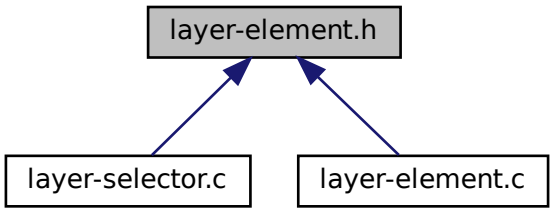
Implementation of the layer element used for configuring layer colors etc.

```
#include <gtk/gtk.h>
```

Include dependency graph for layer-element.h:



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



Data Structures

- struct _LayerElementPriv
- struct _LayerElement
- struct layer_element_dnd_data

  This structure holds the necessary data to set up a LayerElement for Drag'n'Drop.

Macros

- #define TYPE_LAYER_ELEMENT (layer_element_get_type())

Typedefs

- typedef struct _LayerElementPriv LayerElementPriv

Functions

- GtkWidget * layer_element_new (void)

  Create new layer element object.
- const char * layer_element_get_name (LayerElement *elem)

  get name of the layer
- void layer_element_set_name (LayerElement *elem, const char *name)

  layer_element_set_name
- void layer_element_set_layer (LayerElement *elem, int layer)

  Set layer number for this layer.
- int layer_element_get_layer (LayerElement *elem)

  Get layer number.
- void layer_element_set_export (LayerElement *elem, gboolean export)

  Set export flag for this layer.
- gboolean layer_element_get_export (LayerElement *elem)

  Get export flag of layer.
- void layer_element_get_color (LayerElement *elem, GdkRGBA *rgba)

  Get color of layer.
- void layer_element_set_color (LayerElement *elem, GdkRGBA *rgba)

  Set color of layer.
- void layer_element_set_dnd_callbacks (LayerElement *elem, struct layer_element_dnd_data *data)

  Setup drag and drop of `elem` for use in the LayerSelector.

13.69.1 Detailed Description

Implementation of the layer element used for configuring layer colors etc.

Author

Mario Hüttel `mario.huettel@gmx.net`

Definition in file layer-element.h.

13.70 layer-element.h

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00032 #ifndef __LAYER_ELEMENT_H__
00033 #define __LAYER_ELEMENT_H__
00034
00035 #include <gtk/gtk.h>
00036
```

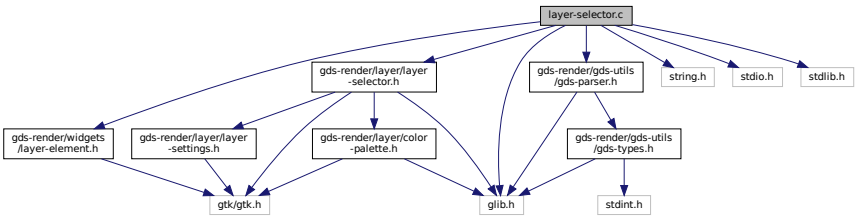
```
00037 G_BEGIN_DECLS
00038
00039 /* Creates Class structure etc */
00040 G_DECLARE_FINAL_TYPE(LayerElement, layer_element, LAYER, ELEMENT, GtkListBoxRow)
00041
00042 #define TYPE_LAYER_ELEMENT (layer_element_get_type())
00043
00044 typedef struct _LayerElementPriv {
00045         GtkEntry *name;
00046         GtkLabel *layer;
00047         int layer_num;
00048         GtkEventBox *event_handle;
00049         GtkColorButton *color;
00050         GtkCheckButton *export;
00051 } LayerElementPriv;
00052
00053 struct _LayerElement {
00054         /* Inheritance */
00055         GtkListBoxRow parent;
00056         /* Custom Elements */
00057         LayerElementPriv priv;
00058 };
00059
00063 struct layer_element_dnd_data {
00065         GtkTargetEntry *entries;
00067         int entry_count;
00069         void (*drag_begin)(GtkWidget *, GdkDragContext *, gpointer);
00071         void (*drag_data_get)(GtkWidget *, GdkDragContext *, GtkSelectionData *, guint, guint,
      gpointer);
00073         void (*drag_end)(GtkWidget *, GdkDragContext *, gpointer);
00074 };
00075
00080 GtkWidget *layer_element_new(void);
00081
00087 const char *layer_element_get_name(LayerElement *elem);
00088
00094 void layer_element_set_name(LayerElement *elem, const char* name);
00095
00101 void layer_element_set_layer(LayerElement *elem, int layer);
00102
00108 int layer_element_get_layer(LayerElement *elem);
00109
00115 void layer_element_set_export(LayerElement *elem, gboolean export);
00116
00122 gboolean layer_element_get_export(LayerElement *elem);
00123
00129 void layer_element_get_color(LayerElement *elem, GdkRGBA *rgba);
00130
00136 void layer_element_set_color(LayerElement *elem, GdkRGBA *rgba);
00137
00143 void layer_element_set_dnd_callbacks(LayerElement *elem, struct layer_element_dnd_data *data);
00144
00145 G_END_DECLS
00146
00147 #endif /* __LAYER_ELEMENT_H__ */
00148
```

13.71 layer-selector.c File Reference

Implementation of the layer selector.

```
#include <glib.h>
#include <string.h>
#include <stdio.h>
#include <stdlib.h>
#include <gds-render/layer/layer-selector.h>
#include <gds-render/gds-utils/gds-parser.h>
#include <gds-render/widgets/layer-element.h>
```

Include dependency graph for layer-selector.c:



Data Structures

- struct _LayerSelector

Functions

- static void sel_layer_element_drag_begin (GtkWidget ∗widget, GdkDragContext ∗context, gpointer data)
- static void sel_layer_element_drag_end (GtkWidget ∗widget, GdkDragContext ∗context, gpointer data)
- static void sel_layer_element_drag_data_get (GtkWidget ∗widget, GdkDragContext ∗context, GtkSelection↩ Data ∗selection_data, guint info, guint time, gpointer data)
- static GtkListBoxRow ∗ layer_selector_get_last_row (GtkListBox ∗list)
- static GtkListBoxRow ∗ layer_selector_get_row_before (GtkListBox ∗list, GtkListBoxRow ∗row)
- static GtkListBoxRow ∗ layer_selector_get_row_after (GtkListBox ∗list, GtkListBoxRow ∗row)
- static void layer_selector_drag_data_received (GtkWidget ∗widget, GdkDragContext ∗context, gint x, gint y, GtkSelectionData ∗selection_data, guint info, guint32 time, gpointer data)
- static gboolean layer_selector_drag_motion (GtkWidget ∗widget, GdkDragContext ∗context, int x, int y, guint time)
- static void layer_selector_drag_leave (GtkWidget ∗widget, GdkDragContext ∗context, guint time)
- static void layer_selector_dispose (GObject ∗self)
- static void layer_selector_class_init (LayerSelectorClass ∗klass)
- static void layer_selector_setup_dnd (LayerSelector ∗self)
- static void layer_selector_init (LayerSelector ∗self)
- LayerSelector ∗ layer_selector_new (GtkListBox ∗list_box)

  layer_selector_new
- LayerSettings ∗ layer_selector_export_rendered_layer_info (LayerSelector ∗selector)

  Get a list of all layers that shall be exported when rendering the cells.
- static void layer_selector_clear_widgets (LayerSelector ∗self)
- static gboolean layer_selector_check_if_layer_widget_exists (LayerSelector ∗self, int layer)

  Check if a specific layer element with the given layer number is present in the layer selector.
- static void sel_layer_element_setup_dnd_callbacks (LayerSelector ∗self, LayerElement ∗element)

  Setup the necessary drag and drop callbacks of layer elements.
- static void layer_selector_analyze_cell_layers (LayerSelector ∗self, struct gds_cell ∗cell)

  Analyze `cell` layers and append detected layers to layer selector `self`.
- static gint layer_selector_sort_func (GtkListBoxRow ∗row1, GtkListBoxRow ∗row2, gpointer unused)

  sort_func Sort callback for list box
- void layer_selector_generate_layer_widgets (LayerSelector ∗selector, GList ∗libs)

  Generate layer widgets in in the LayerSelector instance.
- static LayerElement ∗ layer_selector_find_layer_element_in_list (GList ∗el_list, int layer)

  Find LayerElement in list with specified layer number.

- static void layer_selector_load_layer_mapping_from_file (LayerSelector *self, const gchar *file_name)

  Load the layer mapping from a CSV formatted file.
- static void layer_selector_load_mapping_clicked (GtkWidget *button, gpointer user_data)

  Callback for Load Mapping Button.
- static void layer_selector_save_layer_mapping_data (LayerSelector *self, const gchar *file_name)

  Save layer mapping of selector `self` to a file.
- static void layer_selector_save_mapping_clicked (GtkWidget *button, gpointer user_data)

  Callback for Save Layer Mapping Button.
- void layer_selector_set_load_mapping_button (LayerSelector *selector, GtkWidget *button, GtkWindow *main_window)

  Supply button for loading the layer mapping.
- void layer_selector_set_save_mapping_button (LayerSelector *selector, GtkWidget *button, GtkWindow *main_window)

  Supply button for saving the layer mapping.
- void layer_selector_force_sort (LayerSelector *selector, enum layer_selector_sort_algo sort_function)

  Force the layer selector list to be sorted according to `sort_function`.
- void layer_selector_select_all_layers (LayerSelector *layer_selector, gboolean select)

  Set 'export' value of all layers in the LayerSelector to the supplied select value.
- void layer_selector_auto_color_layers (LayerSelector *layer_selector, ColorPalette *palette, double global_alpha)

  Apply colors from palette to all layers. Aditionally set alpha.
- void layer_selector_auto_name_layers (LayerSelector *layer_selector, gboolean overwrite)

  Auto name all layers in the layer selector.
- gboolean layer_selector_contains_elements (LayerSelector *layer_selector)

  Check if the given layer selector contains layer elements.

Variables

- static const char * dnd_additional_css

13.71.1 Detailed Description

Implementation of the layer selector.

Author

Mario Hüttel `mario.huettel@gmx.net`

Definition in file layer-selector.c.

13.72 layer-selector.c

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00031 #include <glib.h>
00032 #include <string.h>
00033 #include <stdio.h>
00034 #include <stdlib.h>
00035
00036 #include <gds-render/layer/layer-selector.h>
00037 #include <gds-render/gds-utils/gds-parser.h>
00038 #include <gds-render/widgets/layer-element.h>
00039
00040 struct _LayerSelector {
00041         /* Parent */
00042         GObject parent;
00043         /* Own fields */
00044         GtkWidget *associated_load_button;
00045         GtkWidget *associated_save_button;
00046         GtkWindow *load_parent_window;
00047         GtkWindow *save_parent_window;
00048         GtkListBox *list_box;
00049
00050         GtkTargetEntry dnd_target;
00051
00052         gpointer dummy[4];
00053 };
00054
00055 G_DEFINE_TYPE(LayerSelector, layer_selector, G_TYPE_OBJECT)
00056
00057 /*
00058  * Drag and drop code
00059  * Original code from https://blog.gtk.org/2017/06/01/drag-and-drop-in-lists-revisited/
00060  */
00061
00062 static void sel_layer_element_drag_begin(GtkWidget *widget, GdkDragContext *context, gpointer data)
00063 {
00064         GtkWidget *row;
00065         GtkAllocation alloc;
00066         cairo_surface_t *surface;
00067         cairo_t *cr;
00068         int x, y;
00069         (void)data;
00070
00071         row = gtk_widget_get_ancestor(widget, GTK_TYPE_LIST_BOX_ROW);
00072         gtk_widget_get_allocation(row, &alloc);
00073         surface = cairo_image_surface_create(CAIRO_FORMAT_ARGB32, alloc.width, alloc.height);
00074         cr = cairo_create(surface);
00075
00076         gtk_style_context_add_class(gtk_widget_get_style_context(row), "drag-icon");
00077         gtk_widget_draw(row, cr);
00078         gtk_style_context_remove_class(gtk_widget_get_style_context(row), "drag-icon");
00079
00080         gtk_widget_translate_coordinates(widget, row, 0, 0, &x, &y);
00081         cairo_surface_set_device_offset(surface, -x, -y);
00082         gtk_drag_set_icon_surface(context, surface);
00083
00084         cairo_destroy(cr);
00085         cairo_surface_destroy(surface);
00086
00087         g_object_set_data(G_OBJECT(gtk_widget_get_parent(row)), "drag-row", row);
00088         gtk_style_context_add_class(gtk_widget_get_style_context(row), "drag-row");
00089 }
00090
00091 static void sel_layer_element_drag_end(GtkWidget *widget, GdkDragContext *context, gpointer data)
00092 {
00093         GtkWidget *row;
00094         (void)context;
00095         (void)data;
00096
```

```
00097         row = gtk_widget_get_ancestor(widget, GTK_TYPE_LIST_BOX_ROW);
00098         g_object_set_data(G_OBJECT(gtk_widget_get_parent(row)), "drag-row", NULL);
00099         gtk_style_context_remove_class(gtk_widget_get_style_context(row), "drag-row");
00100         gtk_style_context_remove_class(gtk_widget_get_style_context(row), "drag-hover");
00101 }
00102
00103 static void sel_layer_element_drag_data_get(GtkWidget *widget, GdkDragContext *context,
00104                                             GtkSelectionData *selection_data,
00105                                             guint info, guint time, gpointer data)
00106 {
00107         (void)context;
00108         (void)info;
00109         (void)time;
00110         (void)data;
00111         GdkAtom atom;
00112
00113         atom = gdk_atom_intern_static_string("GTK_LIST_BOX_ROW");
00114
00115         gtk_selection_data_set(selection_data, atom,
00116                                32, (const guchar *)&widget, sizeof(gpointer));
00117 }
00118
00119 static GtkListBoxRow *layer_selector_get_last_row(GtkListBox *list)
00120 {
00121         int i;
00122         GtkListBoxRow *row;
00123         GtkListBoxRow *tmp;
00124
00125         row = NULL;
00126         for (i = 0; ; i++) {
00127                 tmp = gtk_list_box_get_row_at_index(list, i);
00128                 if (tmp == NULL)
00129                         break;
00130                 row = tmp;
00131         }
00132
00133         return row;
00134 }
00135
00136 static GtkListBoxRow *layer_selector_get_row_before(GtkListBox *list, GtkListBoxRow *row)
00137 {
00138         int pos;
00139
00140         pos = gtk_list_box_row_get_index(row);
00141         return gtk_list_box_get_row_at_index(list, pos - 1);
00142 }
00143
00144 static GtkListBoxRow *layer_selector_get_row_after(GtkListBox *list, GtkListBoxRow *row)
00145 {
00146         int pos;
00147
00148         pos = gtk_list_box_row_get_index(row);
00149         return gtk_list_box_get_row_at_index(list, pos + 1);
00150 }
00151
00152 static void layer_selector_drag_data_received(GtkWidget *widget, GdkDragContext *context, gint x, gint
      y,
00153                                               GtkSelectionData *selection_data, guint info, guint32
      time,
00154                                               gpointer data)
00155 {
00156         GtkWidget *row_before, *row_after;
00157         GtkWidget *row;
00158         GtkWidget *source;
00159         int pos;
00160
00161         /* Handle unused parameters */
00162         (void)context;
00163         (void)x;
00164         (void)y;
00165         (void)info;
00166         (void)time;
00167         (void)data;
00168
00169         row_before = GTK_WIDGET(g_object_get_data(G_OBJECT(widget), "row-before"));
00170         row_after = GTK_WIDGET(g_object_get_data(G_OBJECT(widget), "row-after"));
00171
00172         g_object_set_data(G_OBJECT(widget), "row-before", NULL);
00173         g_object_set_data(G_OBJECT(widget), "row-after", NULL);
00174
00175         if (row_before)
00176                 gtk_style_context_remove_class(gtk_widget_get_style_context(row_before),
      "drag-hover-bottom");
00177         if (row_after)
00178                 gtk_style_context_remove_class(gtk_widget_get_style_context(row_after),
      "drag-hover-top");
00179
```

```
00180         row = (gpointer) *((gpointer *)gtk_selection_data_get_data(selection_data));
00181         source = gtk_widget_get_ancestor(row, GTK_TYPE_LIST_BOX_ROW);
00182
00183         if (source == row_after)
00184                 return;
00185
00186         g_object_ref(source);
00187         gtk_container_remove(GTK_CONTAINER(gtk_widget_get_parent(source)), source);
00188
00189         if (row_after)
00190                 pos = gtk_list_box_row_get_index(GTK_LIST_BOX_ROW(row_after));
00191         else
00192                 pos = gtk_list_box_row_get_index(GTK_LIST_BOX_ROW(row_before)) + 1;
00193
00194         gtk_list_box_insert(GTK_LIST_BOX(widget), source, pos);
00195         g_object_unref(source);
00196 }
00197
00198 static gboolean layer_selector_drag_motion(GtkWidget *widget, GdkDragContext *context, int x, int y,
      guint time)
00199 {
00200         GtkAllocation alloc;
00201         GtkWidget *row;
00202         int hover_row_y;
00203         int hover_row_height;
00204         GtkWidget *drag_row;
00205         GtkWidget *row_before;
00206         GtkWidget *row_after;
00207         (void)context;
00208         (void)x;
00209         (void)y;
00210         (void)time;
00211
00212         row = GTK_WIDGET(gtk_list_box_get_row_at_y(GTK_LIST_BOX(widget), y));
00213
00214         drag_row = GTK_WIDGET(g_object_get_data(G_OBJECT(widget), "drag-row"));
00215         row_after = GTK_WIDGET(g_object_get_data(G_OBJECT(widget), "row-after"));
00216         row_before = GTK_WIDGET(g_object_get_data(G_OBJECT(widget), "row-before"));
00217
00218         gtk_style_context_remove_class(gtk_widget_get_style_context(drag_row), "drag-hover");
00219         if (row_before)
00220                 gtk_style_context_remove_class(gtk_widget_get_style_context(row_before),
      "drag-hover-bottom");
00221         if (row_after)
00222                 gtk_style_context_remove_class(gtk_widget_get_style_context(row_after),
      "drag-hover-top");
00223
00224         if (row) {
00225                 gtk_widget_get_allocation(row, &alloc);
00226                 hover_row_y = alloc.y;
00227                 hover_row_height = alloc.height;
00228
00229                 if (y < hover_row_y + hover_row_height/2) {
00230                         row_after = row;
00231                         row_before = GTK_WIDGET(layer_selector_get_row_before(GTK_LIST_BOX(widget),
00232                                                                               GTK_LIST_BOX_ROW(row)));
00233                 } else {
00234                         row_before = row;
00235                         row_after = GTK_WIDGET(layer_selector_get_row_after(GTK_LIST_BOX(widget),
00236                                                                             GTK_LIST_BOX_ROW(row)));
00237                 }
00238         } else {
00239                 row_before = GTK_WIDGET(layer_selector_get_last_row(GTK_LIST_BOX(widget)));
00240                 row_after = NULL;
00241         }
00242
00243         g_object_set_data(G_OBJECT(widget), "row-before", row_before);
00244         g_object_set_data(G_OBJECT(widget), "row-after", row_after);
00245
00246         if (drag_row == row_before || drag_row == row_after) {
00247                 gtk_style_context_add_class(gtk_widget_get_style_context(drag_row), "drag-hover");
00248                 return FALSE;
00249         }
00250
00251         if (row_before)
00252                 gtk_style_context_add_class(gtk_widget_get_style_context(row_before),
      "drag-hover-bottom");
00253         if (row_after)
00254                 gtk_style_context_add_class(gtk_widget_get_style_context(row_after),
      "drag-hover-top");
00255
00256         return TRUE;
00257 }
00258
00259 static void layer_selector_drag_leave(GtkWidget *widget, GdkDragContext *context, guint time)
00260 {
00261         GtkWidget *drag_row;
```

```
00262         GtkWidget *row_before;
00263         GtkWidget *row_after;
00264         (void)context;
00265         (void)time;
00266 
00267         drag_row = GTK_WIDGET(g_object_get_data(G_OBJECT(widget), "drag-row"));
00268         row_before = GTK_WIDGET(g_object_get_data(G_OBJECT(widget), "row-before"));
00269         row_after = GTK_WIDGET(g_object_get_data(G_OBJECT(widget), "row-after"));
00270 
00271         gtk_style_context_remove_class(gtk_widget_get_style_context(drag_row), "drag-hover");
00272         if (row_before)
00273                 gtk_style_context_remove_class(gtk_widget_get_style_context(row_before),
       "drag-hover-bottom");
00274         if (row_after)
00275                 gtk_style_context_remove_class(gtk_widget_get_style_context(row_after),
       "drag-hover-top");
00276 
00277 }
00278 
00279 static const char *dnd_additional_css =
00280         ".row:not(:first-child) { "
00281         "  border-top: 1px solid alpha(gray,0.5); "
00282         "  border-bottom: 1px solid transparent; "
00283         "}"
00284         ".row:first-child { "
00285         "  border-top: 1px solid transparent; "
00286         "  border-bottom: 1px solid transparent; "
00287         "}"
00288         ".row:last-child { "
00289         "  border-top: 1px solid alpha(gray,0.5); "
00290         "  border-bottom: 1px solid alpha(gray,0.5); "
00291         "}"
00292         ".row.drag-icon { "
00293         "  background: #282828; "
00294         "  border: 1px solid blue; "
00295         "}"
00296         ".row.drag-row { "
00297         "  color: gray; "
00298         "  background: alpha(gray,0.2); "
00299         "}"
00300         ".row.drag-row.drag-hover { "
00301         "  border-top: 1px solid #4e9a06; "
00302         "  border-bottom: 1px solid #4e9a06; "
00303         "}"
00304         ".row.drag-hover image, "
00305         ".row.drag-hover label { "
00306         "  color: #4e9a06; "
00307         "}"
00308         ".row.drag-hover-top {"
00309         "  border-top: 1px solid #4e9a06; "
00310         "}"
00311         ".row.drag-hover-bottom {"
00312         "  border-bottom: 1px solid #4e9a06; "
00313         "}";
00314 
00315 static void layer_selector_dispose(GObject *self)
00316 {
00317         LayerSelector *sel = LAYER_SELECTOR(self);
00318 
00319         g_clear_object(&sel->list_box);
00320         g_clear_object(&sel->load_parent_window);
00321         g_clear_object(&sel->save_parent_window);
00322         g_clear_object(&sel->associated_load_button);
00323         g_clear_object(&sel->associated_save_button);
00324 
00325         if (sel->dnd_target.target) {
00326                 g_free(sel->dnd_target.target);
00327                 sel->dnd_target.target = NULL;
00328         }
00329 
00330         /* Chain up to parent's dispose function */
00331         G_OBJECT_CLASS(layer_selector_parent_class)->dispose(self);
00332 }
00333 
00334 static void layer_selector_class_init(LayerSelectorClass *klass)
00335 {
00336         GObjectClass *object_class = G_OBJECT_CLASS(klass);
00337         GtkCssProvider *provider;
00338 
00339         /* Implement handles to virtual functions */
00340         object_class->dispose = layer_selector_dispose;
00341 
00342         /* Setup the CSS provider for the drag and drop animations once */
00343         provider = gtk_css_provider_new();
00344         gtk_css_provider_load_from_data(provider, dnd_additional_css, -1, NULL);
00345         gtk_style_context_add_provider_for_screen(gdk_screen_get_default(),
       GTK_STYLE_PROVIDER(provider), 800);
```

```
00346
00347         g_object_unref(provider);
00348 }
00349
00350 static void layer_selector_setup_dnd(LayerSelector *self)
00351 {
00352         gtk_drag_dest_set(GTK_WIDGET(self->list_box), GTK_DEST_DEFAULT_MOTION | GTK_DEST_DEFAULT_DROP,
00353                           &self->dnd_target, 1, GDK_ACTION_MOVE);
00354         g_signal_connect(self->list_box, "drag-data-received",
       G_CALLBACK(layer_selector_drag_data_received), NULL);
00355         g_signal_connect(self->list_box, "drag-motion", G_CALLBACK(layer_selector_drag_motion), NULL);
00356         g_signal_connect(self->list_box, "drag-leave", G_CALLBACK(layer_selector_drag_leave), NULL);
00357 }
00358
00359 /* Drag and drop end */
00360
00361 static void layer_selector_init(LayerSelector *self)
00362 {
00363         self->load_parent_window = NULL;
00364         self->save_parent_window = NULL;
00365         self->associated_load_button = NULL;
00366         self->associated_save_button = NULL;
00367
00368         self->dnd_target.target = g_strdup_printf("LAYER_SELECTOR_DND_%p", self);
00369         self->dnd_target.info = 0;
00370         self->dnd_target.flags = GTK_TARGET_SAME_APP;
00371 }
00372
00373 LayerSelector *layer_selector_new(GtkListBox *list_box)
00374 {
00375         LayerSelector *selector;
00376
00377         if (GTK_IS_LIST_BOX(list_box) == FALSE)
00378                 return NULL;
00379
00380         selector = LAYER_SELECTOR(g_object_new(TYPE_LAYER_SELECTOR, NULL));
00381         selector->list_box = list_box;
00382         layer_selector_setup_dnd(selector);
00383         g_object_ref(G_OBJECT(list_box));
00384
00385         return selector;
00386 }
00387
00388 LayerSettings *layer_selector_export_rendered_layer_info(LayerSelector *selector)
00389 {
00390         LayerSettings *layer_settings;
00391         struct layer_info linfo;
00392         GList *row_list;
00393         GList *iterator;
00394         LayerElement *le;
00395         int i;
00396
00397         layer_settings = layer_settings_new();
00398         if (!layer_settings)
00399                 return NULL;
00400
00401         row_list = gtk_container_get_children(GTK_CONTAINER(selector->list_box));
00402
00403         for (i = 0, iterator = row_list; iterator != NULL; iterator = g_list_next(iterator), i++) {
00404                 le = LAYER_ELEMENT(iterator->data);
00405
00406                 /* Get name from layer element. This must not be freed */
00407                 linfo.name = (char *)layer_element_get_name(le);
00408
00409                 layer_element_get_color(le, &linfo.color);
00410                 linfo.render = (layer_element_get_export(le) ? 1 : 0);
00411                 linfo.stacked_position = i;
00412                 linfo.layer = layer_element_get_layer(le);
00413
00414                 /* This function copies the entire layer info struct including the name string.
00415                  * Therefore, using the same layer_info struct over and over is safe.
00416                  */
00417                 layer_settings_append_layer_info(layer_settings, &linfo);
00418         }
00419
00420         return layer_settings;
00421 }
00422
00423 static void layer_selector_clear_widgets(LayerSelector *self)
00424 {
00425         GList *list;
00426         GList *temp;
00427
00428         list = gtk_container_get_children(GTK_CONTAINER(self->list_box));
00429         for (temp = list; temp != NULL; temp = temp->next)
00430                 gtk_container_remove(GTK_CONTAINER(self->list_box), GTK_WIDGET(temp->data));
00431
```

```
00432         /* Widgets are already destroyed when removed from box because they are only referenced inside
       the container */
00433
00434         g_list_free(list);
00435
00436         /* Deactivate buttons */
00437         if (self->associated_load_button)
00438                 gtk_widget_set_sensitive(self->associated_load_button, FALSE);
00439         if (self->associated_save_button)
00440                 gtk_widget_set_sensitive(self->associated_save_button, FALSE);
00441 }
00442
00449 static gboolean layer_selector_check_if_layer_widget_exists(LayerSelector *self, int layer)
00450 {
00451         GList *list;
00452         GList *temp;
00453         LayerElement *widget;
00454         gboolean ret = FALSE;
00455
00456         list = gtk_container_get_children(GTK_CONTAINER(self->list_box));
00457
00458         for (temp = list; temp != NULL; temp = temp->next) {
00459                 widget = LAYER_ELEMENT(temp->data);
00460                 if (layer_element_get_layer(widget) == layer) {
00461                         ret = TRUE;
00462                         break;
00463                 }
00464         }
00465
00466         g_list_free(list);
00467
00468         return ret;
00469 }
00470
00476 static void sel_layer_element_setup_dnd_callbacks(LayerSelector *self, LayerElement *element)
00477 {
00478         struct layer_element_dnd_data dnd_data;
00479
00480         if (!self || !element)
00481                 return;
00482
00483         dnd_data.entries = &self->dnd_target;
00484         dnd_data.entry_count = 1;
00485         dnd_data.drag_end = sel_layer_element_drag_end;
00486         dnd_data.drag_begin = sel_layer_element_drag_begin;
00487         dnd_data.drag_data_get = sel_layer_element_drag_data_get;
00488
00489         layer_element_set_dnd_callbacks(element, &dnd_data);
00490 }
00491
00497 static void layer_selector_analyze_cell_layers(LayerSelector *self, struct gds_cell *cell)
00498 {
00499         GList *graphics;
00500         struct gds_graphics *gfx;
00501         int layer;
00502         GtkWidget *le;
00503
00504         for (graphics = cell->graphic_objs; graphics != NULL; graphics = graphics->next) {
00505                 gfx = (struct gds_graphics *)graphics->data;
00506                 layer = (int)gfx->layer;
00507                 if (layer_selector_check_if_layer_widget_exists(self, layer) == FALSE) {
00508                         le = layer_element_new();
00509                         sel_layer_element_setup_dnd_callbacks(self, LAYER_ELEMENT(le));
00510                         layer_element_set_layer(LAYER_ELEMENT(le), layer);
00511                         gtk_list_box_insert(self->list_box, le, -1);
00512                         gtk_widget_show(le);
00513                 }
00514         }
00515 }
00516
00525 static gint layer_selector_sort_func(GtkListBoxRow *row1, GtkListBoxRow *row2, gpointer unused)
00526 {
00527         LayerElement *le1, *le2;
00528         gint ret;
00529         static const enum layer_selector_sort_algo default_sort = LAYER_SELECTOR_SORT_DOWN;
00530         const enum layer_selector_sort_algo *algo = (const enum layer_selector_sort_algo *)unused;
00531
00532         /* Assume downward sorting */
00533         /* TODO: This is nasty. Find a better way */
00534         if (!algo)
00535                 algo = &default_sort;
00536
00537         le1 = LAYER_ELEMENT(row1);
00538         le2 = LAYER_ELEMENT(row2);
00539
00540         /* Determine sort fow downward sort */
00541         ret = layer_element_get_layer(le1) - layer_element_get_layer(le2);
```

```
00542
00543         /* Change order if upward sort is requested */
00544         ret *= (*algo == LAYER_SELECTOR_SORT_DOWN ? 1 : -1);
00545
00546         return ret;
00547 }
00548
00549 void layer_selector_generate_layer_widgets(LayerSelector *selector, GList *libs)
00550 {
00551         GList *cell_list = NULL;
00552         struct gds_library *lib;
00553
00554         layer_selector_clear_widgets(selector);
00555
00556         for (; libs != NULL; libs = libs->next) {
00557                 lib = (struct gds_library *)libs->data;
00558                 for (cell_list = lib->cells; cell_list != NULL; cell_list = cell_list->next)
00559                         layer_selector_analyze_cell_layers(selector, (struct gds_cell
       *)cell_list->data);
00560         } /* For libs */
00561
00562         /* Sort the layers */
00563         layer_selector_force_sort(selector, LAYER_SELECTOR_SORT_DOWN);
00564
00565         /* Activate Buttons */
00566         if (selector->associated_load_button)
00567                 gtk_widget_set_sensitive(selector->associated_load_button, TRUE);
00568         if (selector->associated_save_button)
00569                 gtk_widget_set_sensitive(selector->associated_save_button, TRUE);
00570 }
00571
00578 static LayerElement *layer_selector_find_layer_element_in_list(GList *el_list, int layer)
00579 {
00580         LayerElement *ret = NULL;
00581
00582         for (; el_list != NULL; el_list = el_list->next) {
00583                 if (layer_element_get_layer(LAYER_ELEMENT(el_list->data)) == layer) {
00584                         ret = LAYER_ELEMENT(el_list->data);
00585                         break;
00586                 }
00587         }
00588         return ret;
00589 }
00590
00602 static void layer_selector_load_layer_mapping_from_file(LayerSelector *self, const gchar *file_name)
00603 {
00604         GFile *file;
00605         GFileInputStream *stream;
00606         GDataInputStream *dstream;
00607         LayerElement *le;
00608         GList *rows;
00609         GList *temp;
00610         GList *layer_infos;
00611         int status;
00612         LayerSettings *layer_settings;
00613         struct layer_info *linfo;
00614
00615         file = g_file_new_for_path(file_name);
00616         stream = g_file_read(file, NULL, NULL);
00617
00618         if (!stream)
00619                 goto destroy_file;
00620
00621         dstream = g_data_input_stream_new(G_INPUT_STREAM(stream));
00622
00623         rows = gtk_container_get_children(GTK_CONTAINER(self->list_box));
00624
00625         /* Reference and remove all rows from box */
00626         for (temp = rows; temp != NULL; temp = temp->next) {
00627                 le = LAYER_ELEMENT(temp->data);
00628                 /* Referencing protects the widget from being deleted when removed */
00629                 g_object_ref(G_OBJECT(le));
00630                 gtk_container_remove(GTK_CONTAINER(self->list_box), GTK_WIDGET(le));
00631         }
00632
00633         /* Load Layer settings. No need to check pointer, will be checked by load csv func. */
00634         layer_settings = layer_settings_new();
00635
00636         status = layer_settings_load_from_csv(layer_settings, file_name);
00637         if (status)
00638                 goto abort_layer_settings;
00639
00640         layer_infos = layer_settings_get_layer_info_list(layer_settings);
00641         if (!layer_infos)
00642                 goto abort_layer_settings;
00643
00644         /* Loop over all layer infos read from the CSV file */
```

```
00645         for (; layer_infos; layer_infos = g_list_next(layer_infos)) {
00646                 linfo = (struct layer_info *)layer_infos->data;
00647                 le = layer_selector_find_layer_element_in_list(rows, linfo->layer);
00648                 if (!le)
00649                         continue;
00650
00651                 layer_element_set_name(le, linfo->name);
00652                 layer_element_set_export(le, (linfo->render ? TRUE : FALSE));
00653                 layer_element_set_color(le, &linfo->color);
00654                 gtk_container_add(GTK_CONTAINER(self->list_box), GTK_WIDGET(le));
00655                 rows = g_list_remove(rows, le);
00656         }
00657
00658 abort_layer_settings:
00659         /* Destroy layer settings. Not needed for adding remaining elements */
00660         g_object_unref(layer_settings);
00661
00662         /* Add remaining elements */
00663         for (temp = rows; temp != NULL; temp = temp->next) {
00664                 le = LAYER_ELEMENT(temp->data);
00665                 /* Referencing protets the widget from being deleted when removed */
00666                 gtk_list_box_insert(self->list_box, GTK_WIDGET(le), -1);
00667                 g_object_unref(G_OBJECT(le));
00668         }
00669
00670         /* Delete list */
00671         g_list_free(rows);
00672
00673         /* read line */
00674         g_object_unref(dstream);
00675         g_object_unref(stream);
00676 destroy_file:
00677         g_object_unref(file);
00678 }
00679
00685 static void layer_selector_load_mapping_clicked(GtkWidget *button, gpointer user_data)
00686 {
00687         LayerSelector *sel;
00688         GtkWidget *dialog;
00689         gint res;
00690         gchar *file_name;
00691         (void)button;
00692
00693         sel = LAYER_SELECTOR(user_data);
00694
00695         dialog = gtk_file_chooser_dialog_new("Load Mapping File", GTK_WINDOW(sel->load_parent_window),
00696                                              GTK_FILE_CHOOSER_ACTION_OPEN,
00697                                              "Cancel", GTK_RESPONSE_CANCEL, "Load Mapping",
      GTK_RESPONSE_ACCEPT, NULL);
00698         res = gtk_dialog_run(GTK_DIALOG(dialog));
00699         if (res == GTK_RESPONSE_ACCEPT) {
00700                 file_name = gtk_file_chooser_get_filename(GTK_FILE_CHOOSER(dialog));
00701                 layer_selector_load_layer_mapping_from_file(sel, file_name);
00702                 g_free(file_name);
00703         }
00704         gtk_widget_destroy(dialog);
00705 }
00706
00707
00708
00714 static void layer_selector_save_layer_mapping_data(LayerSelector *self, const gchar *file_name)
00715 {
00716         LayerSettings *layer_settings;
00717
00718         g_return_if_fail(LAYER_IS_SELECTOR(self));
00719         g_return_if_fail(file_name);
00720
00721         /* Get layer settings. No need to check return value. to_csv func is safe */
00722         layer_settings = layer_selector_export_rendered_layer_info(self);
00723         (void)layer_settings_to_csv(layer_settings, file_name);
00724 }
00725
00731 static void layer_selector_save_mapping_clicked(GtkWidget *button, gpointer user_data)
00732 {
00733         GtkWidget *dialog;
00734         gint res;
00735         gchar *file_name;
00736         LayerSelector *sel;
00737         (void)button;
00738
00739         sel = LAYER_SELECTOR(user_data);
00740
00741         dialog = gtk_file_chooser_dialog_new("Save Mapping File", GTK_WINDOW(sel->save_parent_window),
00742                                              GTK_FILE_CHOOSER_ACTION_SAVE,
00743                                              "Cancel", GTK_RESPONSE_CANCEL, "Save Mapping",
      GTK_RESPONSE_ACCEPT, NULL);
00744         gtk_file_chooser_set_do_overwrite_confirmation(GTK_FILE_CHOOSER(dialog), TRUE);
```

```
00745
00746         res = gtk_dialog_run(GTK_DIALOG(dialog));
00747         if (res == GTK_RESPONSE_ACCEPT) {
00748                 file_name = gtk_file_chooser_get_filename(GTK_FILE_CHOOSER(dialog));
00749                 layer_selector_save_layer_mapping_data(sel, file_name);
00750                 g_free(file_name);
00751         }
00752         gtk_widget_destroy(dialog);
00753 }
00754
00755 void layer_selector_set_load_mapping_button(LayerSelector *selector, GtkWidget *button, GtkWindow
       *main_window)
00756 {
00757         g_clear_object(&selector->load_parent_window);
00758         g_clear_object(&selector->associated_load_button);
00759
00760         g_object_ref(G_OBJECT(button));
00761         g_object_ref(G_OBJECT(main_window));
00762         selector->associated_load_button = button;
00763         selector->load_parent_window = main_window;
00764         g_signal_connect(button, "clicked", G_CALLBACK(layer_selector_load_mapping_clicked),
       selector);
00765 }
00766
00767 void layer_selector_set_save_mapping_button(LayerSelector *selector, GtkWidget *button,  GtkWindow
       *main_window)
00768 {
00769         g_clear_object(&selector->save_parent_window);
00770         g_clear_object(&selector->associated_save_button);
00771
00772         g_object_ref(G_OBJECT(button));
00773         g_object_ref(G_OBJECT(main_window));
00774         selector->associated_save_button = button;
00775         selector->save_parent_window = main_window;
00776         g_signal_connect(button, "clicked", G_CALLBACK(layer_selector_save_mapping_clicked),
       selector);
00777 }
00778
00779 void layer_selector_force_sort(LayerSelector *selector, enum layer_selector_sort_algo sort_function)
00780 {
00781         GtkListBox *box;
00782
00783         if (!selector)
00784                 return;
00785
00786         box = selector->list_box;
00787         if (!box)
00788                 return;
00789
00790         /* Set sorting function, sort, and disable sorting function */
00791         gtk_list_box_set_sort_func(box, layer_selector_sort_func, (gpointer)&sort_function, NULL);
00792         gtk_list_box_invalidate_sort(box);
00793         gtk_list_box_set_sort_func(box, NULL, NULL, NULL);
00794 }
00795
00796 void layer_selector_select_all_layers(LayerSelector *layer_selector, gboolean select)
00797 {
00798         GList *le_list;
00799         GList *iter;
00800         LayerElement *le;
00801
00802         g_return_if_fail(LAYER_IS_SELECTOR(layer_selector));
00803         g_return_if_fail(GTK_IS_LIST_BOX(layer_selector->list_box));
00804
00805         le_list = gtk_container_get_children(GTK_CONTAINER(layer_selector->list_box));
00806
00807         for (iter = le_list; iter != NULL; iter = g_list_next(iter)) {
00808                 le = LAYER_ELEMENT(iter->data);
00809                 if (LAYER_IS_ELEMENT(le))
00810                         layer_element_set_export(le, select);
00811         }
00812
00813         g_list_free(le_list);
00814 }
00815
00816 void layer_selector_auto_color_layers(LayerSelector *layer_selector, ColorPalette *palette, double
       global_alpha)
00817 {
00818         GList *le_list;
00819         GList *le_list_ptr;
00820         LayerElement *le;
00821         unsigned int color_index = 0;
00822         unsigned int color_count;
00823         GdkRGBA color;
00824
00825         if (GDS_RENDER_IS_COLOR_PALETTE(palette) == FALSE || LAYER_IS_SELECTOR(layer_selector) ==
       FALSE)
```

```
00826                 return;
00827         if (global_alpha <= 0)
00828                 return;
00829         if (GTK_IS_LIST_BOX(layer_selector->list_box) == FALSE)
00830                 return;
00831
00832         le_list = gtk_container_get_children(GTK_CONTAINER(layer_selector->list_box));
00833
00834         /* iterate over layer elements and fill colors */
00835         color_index = 0;
00836         color_count = color_palette_get_color_count(palette);
00837         if (color_count == 0)
00838                 goto ret_free_le_list;
00839
00840         for (le_list_ptr = le_list; le_list_ptr != NULL; le_list_ptr = le_list_ptr->next) {
00841                 le = LAYER_ELEMENT(le_list_ptr->data);
00842                 if (le) {
00843                         color_palette_get_color(palette, &color, color_index++);
00844                         color.alpha *= global_alpha;
00845                         layer_element_set_color(le, &color);
00846
00847                         if (color_index >= color_count)
00848                                 color_index = 0;
00849                 }
00850         }
00851
00852 ret_free_le_list:
00853         g_list_free(le_list);
00854 }
00855
00856 void layer_selector_auto_name_layers(LayerSelector *layer_selector, gboolean overwrite)
00857 {
00858         GList *le_list;
00859         GList *le_list_ptr;
00860         LayerElement *le;
00861         const char *old_layer_name;
00862         GString *new_layer_name;
00863
00864         g_return_if_fail(LAYER_IS_SELECTOR(layer_selector));
00865
00866         new_layer_name = g_string_new_len(NULL, 10);
00867         le_list = gtk_container_get_children(GTK_CONTAINER(layer_selector->list_box));
00868
00869         for (le_list_ptr = le_list; le_list_ptr != NULL; le_list_ptr = g_list_next(le_list_ptr)) {
00870                 le = LAYER_ELEMENT(le_list_ptr->data);
00871                 if (!le)
00872                         continue;
00873                 old_layer_name = layer_element_get_name(le);
00874
00875                 /* Check if layer name is empty or may be overwritten */
00876                 if (!old_layer_name || *old_layer_name == '\0' || overwrite) {
00877                         g_string_printf(new_layer_name, "Layer %d", layer_element_get_layer(le));
00878                         layer_element_set_name(le, new_layer_name->str);
00879                 }
00880         }
00881
00882         g_string_free(new_layer_name, TRUE);
00883         g_list_free(le_list);
00884 }
00885
00886 gboolean layer_selector_contains_elements(LayerSelector *layer_selector)
00887 {
00888         GList *layer_element_list;
00889
00890         /* Check objects */
00891         g_return_val_if_fail(LAYER_IS_SELECTOR(layer_selector), FALSE);
00892         g_return_val_if_fail(GTK_IS_LIST_BOX(layer_selector->list_box), FALSE);
00893
00894         /* Get a list of the child elements inside the list boy associated with this selector */
00895         layer_element_list = gtk_container_get_children(GTK_CONTAINER(layer_selector->list_box));
00896
00897         /* Return TRUE if there is an element in the list, else return FALSE */
00898         return (layer_element_list ? TRUE : FALSE);
00899 }
00900
```

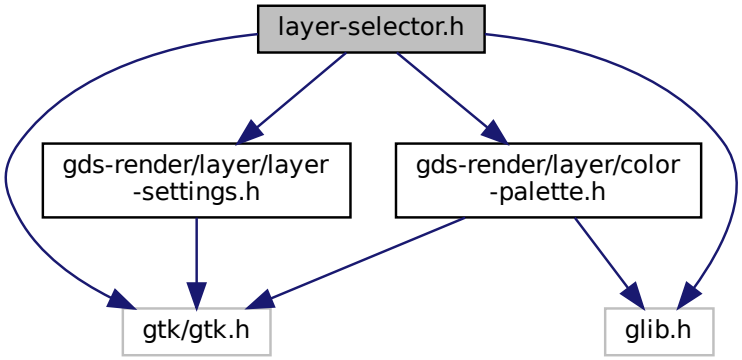
13.73 layer-selector.dox File Reference

13.74 layer-selector.h File Reference

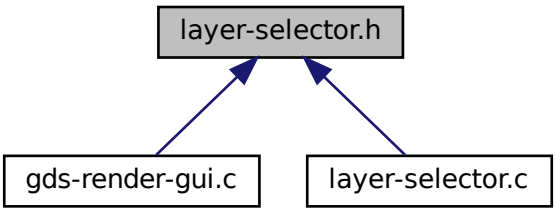
Implementation of the Layer selection list.

```
#include <gtk/gtk.h>
#include <glib.h>
#include <gds-render/layer/color-palette.h>
#include <gds-render/layer/layer-settings.h>
```

Include dependency graph for layer-selector.h:



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



Macros

- #define TYPE_LAYER_SELECTOR (layer_selector_get_type())

Enumerations

- enum layer_selector_sort_algo { LAYER_SELECTOR_SORT_DOWN = 0, LAYER_SELECTOR_SORT_UP }

  Defines how to sort the layer selector list box.

Functions

- G_BEGIN_DECLS G_DECLARE_FINAL_TYPE (LayerSelector, layer_selector, LAYER, SELECTOR, G↩ Object)
- LayerSelector * layer_selector_new (GtkListBox *list_box)

  layer_selector_new
- void layer_selector_generate_layer_widgets (LayerSelector *selector, GList *libs)

  Generate layer widgets in in the LayerSelector instance.
- void layer_selector_set_load_mapping_button (LayerSelector *selector, GtkWidget *button, GtkWindow *main_window)

  Supply button for loading the layer mapping.
- void layer_selector_set_save_mapping_button (LayerSelector *selector, GtkWidget *button, GtkWindow *main_window)

  Supply button for saving the layer mapping.
- LayerSettings * layer_selector_export_rendered_layer_info (LayerSelector *selector)

  Get a list of all layers that shall be exported when rendering the cells.
- void layer_selector_force_sort (LayerSelector *selector, enum layer_selector_sort_algo sort_function)

  Force the layer selector list to be sorted according to `sort_function`.
- void layer_selector_select_all_layers (LayerSelector *layer_selector, gboolean select)

  Set 'export' value of all layers in the LayerSelector to the supplied select value.
- void layer_selector_auto_color_layers (LayerSelector *layer_selector, ColorPalette *palette, double global↩ _alpha)

  Apply colors from palette to all layers. Aditionally set alpha.
- void layer_selector_auto_name_layers (LayerSelector *layer_selector, gboolean overwrite)

  Auto name all layers in the layer selector.
- gboolean layer_selector_contains_elements (LayerSelector *layer_selector)

  Check if the given layer selector contains layer elements.

13.74.1 Detailed Description

Implementation of the Layer selection list.

Author

Mario Hüttel `mario.huettel@gmx.net`

Definition in file layer-selector.h.

13.75 layer-selector.h

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
```

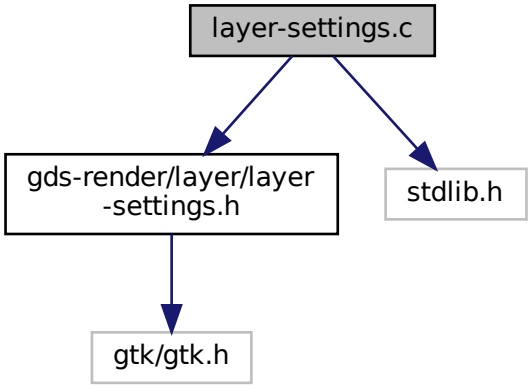
```
00018  */
00019
00031 #ifndef __LAYER_SELECTOR_H__
00032 #define __LAYER_SELECTOR_H__
00033
00034 #include <gtk/gtk.h>
00035 #include <glib.h>
00036 #include <gds-render/layer/color-palette.h>
00037 #include <gds-render/layer/layer-settings.h>
00038
00039 G_BEGIN_DECLS
00040
00041 G_DECLARE_FINAL_TYPE(LayerSelector, layer_selector, LAYER, SELECTOR, GObject);
00042
00043 #define TYPE_LAYER_SELECTOR (layer_selector_get_type())
00044
00048 enum layer_selector_sort_algo {LAYER_SELECTOR_SORT_DOWN = 0, LAYER_SELECTOR_SORT_UP};
00049
00055 LayerSelector *layer_selector_new(GtkListBox *list_box);
00056
00063 void layer_selector_generate_layer_widgets(LayerSelector *selector, GList *libs);
00064
00071 void layer_selector_set_load_mapping_button(LayerSelector *selector, GtkWidget *button, GtkWindow
       *main_window);
00072
00079 void layer_selector_set_save_mapping_button(LayerSelector *selector, GtkWidget *button, GtkWindow
       *main_window);
00080
00086 LayerSettings *layer_selector_export_rendered_layer_info(LayerSelector *selector);
00087
00093 void layer_selector_force_sort(LayerSelector *selector, enum layer_selector_sort_algo sort_function);
00094
00100 void layer_selector_select_all_layers(LayerSelector *layer_selector, gboolean select);
00101
00108 void layer_selector_auto_color_layers(LayerSelector *layer_selector, ColorPalette *palette, double
       global_alpha);
00109
00119 void layer_selector_auto_name_layers(LayerSelector *layer_selector, gboolean overwrite);
00120
00131 gboolean layer_selector_contains_elements(LayerSelector *layer_selector);
00132
00133 G_END_DECLS
00134
00135 #endif /* __LAYER_SELECTOR_H__ */
00136
```

13.76 layer-settings.c File Reference

Implementation of the LayerSettings class.

```
#include <gds-render/layer/layer-settings.h>
#include <stdlib.h>
```

Include dependency graph for layer-settings.c:



Data Structures

- struct _LayerSettings

Functions

- static void layer_settings_init (LayerSettings *self)
- static void layer_info_delete_with_name (struct layer_info *const info)
- static void layer_settings_dispose (GObject *obj)
- static void layer_settings_class_init (LayerSettingsClass *klass)
- static struct layer_info * layer_info_copy (const struct layer_info *const info)

  Copy layer_info struct.
- LayerSettings * layer_settings_new ()

  New LayerSettings object.
- int layer_settings_append_layer_info (LayerSettings *settings, struct layer_info *info)

  layer_settings_append_layer_info
- void layer_settings_clear (LayerSettings *settings)

  Clear all layers in this settings object.
- int layer_settings_remove_layer (LayerSettings *settings, int layer)

  Remove a specific layer number from the layer settings.
- GList * layer_settings_get_layer_info_list (LayerSettings *settings)

  Get a GList with layer_info structs.
- static void layer_settings_gen_csv_line (GString *string, struct layer_info *linfo)

  Generate a layer mapping CSV line for a given layer_info struct.
- int layer_settings_to_csv (LayerSettings *settings, const char *path)

  Write layer settings to a CSV file.
- static int layer_settings_load_csv_line_from_stream (GDataInputStream *stream, struct layer_info *linfo)

  Load a line from `stream` and parse try to parse it as layer information.
- int layer_settings_load_from_csv (LayerSettings *settings, const char *path)

  Load new layer Settings from CSV.

13.76.1 Detailed Description

Implementation of the LayerSettings class.

Author

Mario Hüttel mario.huettel@gmx.net

Definition in file layer-settings.c.

13.76.2 Function Documentation

13.76.2.1 layer_info_copy()

```
static struct layer_info* layer_info_copy (
            const struct layer_info *const info )  [static]
```

Copy layer_info struct.

This function copies a layer info struct.

Note

Be aware, that it does not only copy the pointer to the layer name, but instead duplicates the string.

Parameters

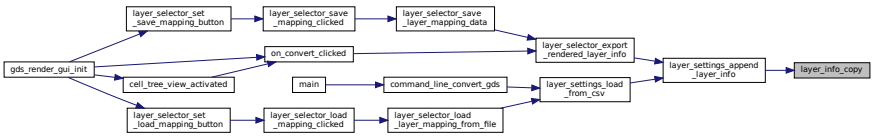
info	Info to copy

Returns

new layer_info struct

Definition at line 86 of file layer-settings.c.

Here is the caller graph for this function:

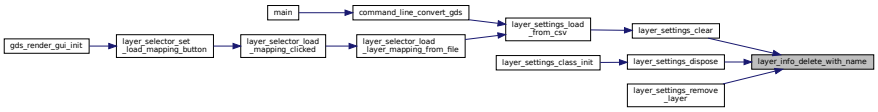


13.76.2.2 layer_info_delete_with_name()

```
static void layer_info_delete_with_name (
            struct layer_info *const info )  [static]
```

Definition at line 42 of file layer-settings.c.

Here is the caller graph for this function:



13.76.2.3 layer_settings_append_layer_info()

```
int layer_settings_append_layer_info (
            LayerSettings * settings,
            struct layer_info * info )
```

layer_settings_append_layer_info

Parameters

settings	LayerSettings object.
info	Info to append

Returns

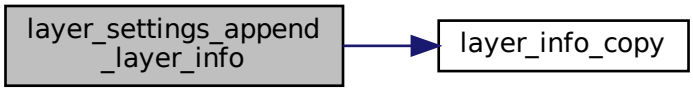
Error code. 0 if successful

Note

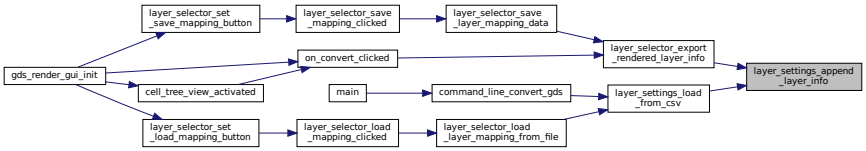
`info` is copied internally. You can free this struct afterwards.

Definition at line 111 of file layer-settings.c.

Here is the call graph for this function:



Here is the caller graph for this function:

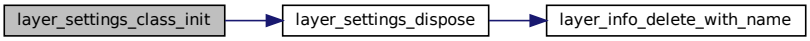


13.76.2.4 layer_settings_class_init()

```
static void layer_settings_class_init (
            LayerSettingsClass * klass )  [static]
```

Definition at line 66 of file layer-settings.c.

Here is the call graph for this function:



13.76.2.5 layer_settings_clear()

```
void layer_settings_clear (
            LayerSettings * settings )
```

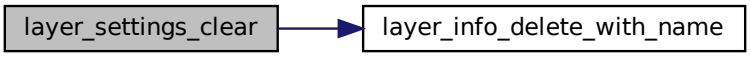
Clear all layers in this settings object.

Parameters

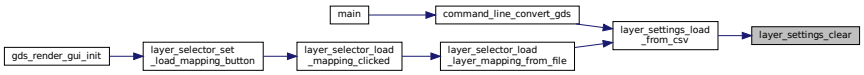
settings	LayerSettings object

Definition at line 128 of file layer-settings.c.

Here is the call graph for this function:



Here is the caller graph for this function:

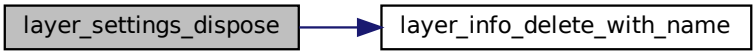


13.76.2.6 layer_settings_dispose()

```
static void layer_settings_dispose (
            GObject * obj )  [static]
```

Definition at line 52 of file layer-settings.c.

Here is the call graph for this function:



Here is the caller graph for this function:

13.76.2.7 layer_settings_gen_csv_line()

```
static void layer_settings_gen_csv_line (
            GString * string,
            struct layer_info * linfo )  [static]
```

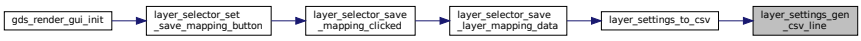
Generate a layer mapping CSV line for a given layer_info struct.

Parameters

string	Buffer to write to
linfo	Layer information

Definition at line 177 of file layer-settings.c.

Here is the caller graph for this function:



13.76.2.8 layer_settings_get_layer_info_list()

```
GList* layer_settings_get_layer_info_list (
            LayerSettings * settings )
```

Get a GList with layer_info structs.

This function returns a GList with all layer_info structs in rendering order (bottom to top) that shall be rendered.

Parameters

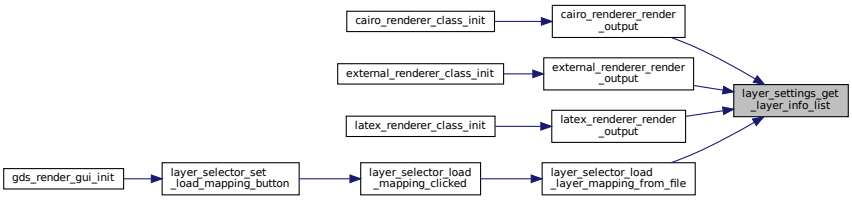
settings	LayerSettings object

Returns

GList with struct layer_info elements.

Definition at line 166 of file layer-settings.c.

Here is the caller graph for this function:



13.76.2.9 layer_settings_init()

```
static void layer_settings_init (
            LayerSettings * self )  [static]
```

Definition at line 37 of file layer-settings.c.

13.76.2.10 layer_settings_load_csv_line_from_stream()

```
static int layer_settings_load_csv_line_from_stream (
            GDataInputStream * stream,
            struct layer_info * linfo )  [static]
```

Load a line from `stream` and parse try to parse it as layer information.

Parameters

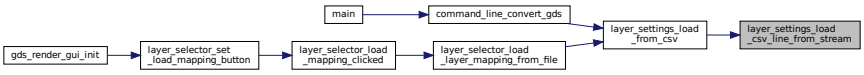
stream	Input data stream
linfo	Layer info struct to fill

Returns

1 if malformatted line, 0 if parsing was successful and parameters are valid, -1 if file end

Definition at line 247 of file layer-settings.c.

Here is the caller graph for this function:



13.76.2.11 layer_settings_load_from_csv()

```
int layer_settings_load_from_csv (
            LayerSettings * settings,
            const char * path )
```

Load new layer Settings from CSV.

This function loads the layer information from a CSV file. All data inside the `settings` is cleared beforehand.

Parameters

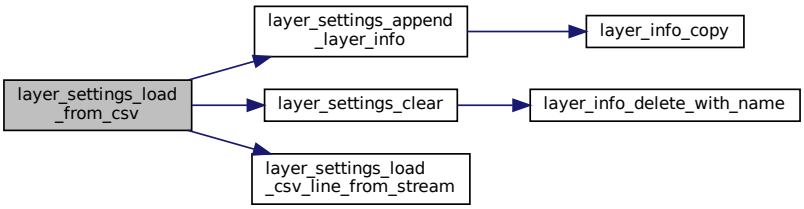
settings	Settings to write to.
path	CSV file path

Returns

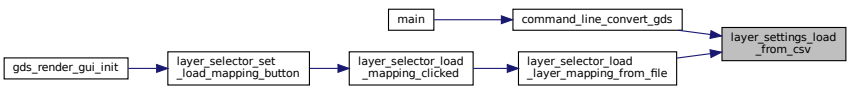
0 if successful

Definition at line 310 of file layer-settings.c.

Here is the call graph for this function:



Here is the caller graph for this function:



13.76.2.12 layer_settings_new()

```
LayerSettings* layer_settings_new ( )
```

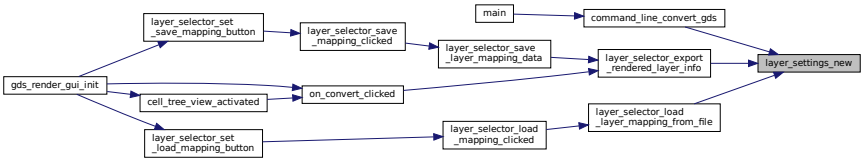
New LayerSettings object.

Returns

New object

Definition at line 106 of file layer-settings.c.

Here is the caller graph for this function:



13.76.2.13 layer_settings_remove_layer()

```
int layer_settings_remove_layer (
            LayerSettings * settings,
            int layer )
```

Remove a specific layer number from the layer settings.

Parameters

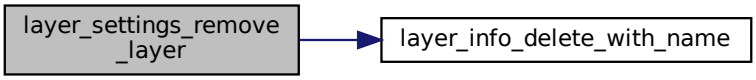
settings	LayerSettings object
layer	Layer number

Returns

Error code. 0 if successful

Definition at line 137 of file layer-settings.c.

Here is the call graph for this function:



13.76.2.14 layer_settings_to_csv()

```
int layer_settings_to_csv (
            LayerSettings * settings,
            const char * path )
```

Write layer settings to a CSV file.

This function writes the layer settings to a CSV file according to the layer mapping specification (Layer Mapping File Specification)

Parameters

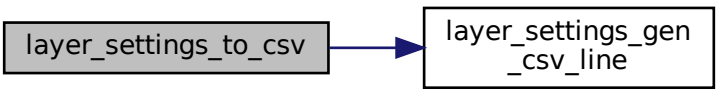
settings	LayerSettings object
path	Output path for CSV file.

Returns

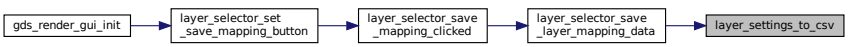
0 if successful

Definition at line 196 of file layer-settings.c.

Here is the call graph for this function:



Here is the caller graph for this function:



13.77 layer-settings.c

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2019  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00026 #include <gds-render/layer/layer-settings.h>
00027 #include <stdlib.h>
00028
00029 struct _LayerSettings {
00030         GObject parent;
00031         GList *layer_infos;
00032         gpointer padding[12];
00033 };
00034
00035 G_DEFINE_TYPE(LayerSettings, layer_settings, G_TYPE_OBJECT)
00036
00037 static void layer_settings_init(LayerSettings *self)
00038 {
00039         self->layer_infos = NULL;
00040 }
00041
00042 static void layer_info_delete_with_name(struct layer_info *const info)
00043 {
00044         if (!info)
00045                 return;
00046
00047         if (info->name)
00048                 free(info->name);
00049         free(info);
00050 }
00051
00052 static void layer_settings_dispose(GObject *obj)
00053 {
00054         LayerSettings *self;
00055
00056         self = GDS_RENDER_LAYER_SETTINGS(obj);
00057
00058         if (self->layer_infos) {
00059                 g_list_free_full(self->layer_infos, (GDestroyNotify)layer_info_delete_with_name);
00060                 self->layer_infos = NULL;
00061         }
00062
00063         G_OBJECT_CLASS(layer_settings_parent_class)->dispose(obj);
00064 }
00065
00066 static void layer_settings_class_init(LayerSettingsClass *klass)
00067 {
00068         GObjectClass *oclass;
00069
00070         oclass = G_OBJECT_CLASS(klass);
00071         oclass->dispose = layer_settings_dispose;
00072
00073         return;
00074 }
00075
00086 static struct layer_info *layer_info_copy(const struct layer_info * const info)
00087 {
00088         struct layer_info *copy;
00089
00090         if (!info)
00091                 return 0;
00092
00093         copy = (struct layer_info *)malloc(sizeof(struct layer_info));
00094         if (!copy)
00095                 return 0;
00096
00097         /* Copy data */
00098         memcpy(copy, info, sizeof(struct layer_info));
00099         /* Duplicate string */
00100         if (info->name)
00101                 copy->name = strdup(info->name);
```

```
00102
00103         return copy;
00104 }
00105
00106 LayerSettings *layer_settings_new()
00107 {
00108         return g_object_new(GDS_RENDER_TYPE_LAYER_SETTINGS, NULL);
00109 }
00110
00111 int layer_settings_append_layer_info(LayerSettings *settings, struct layer_info *info)
00112 {
00113         struct layer_info *info_copy;
00114
00115         g_return_val_if_fail(GDS_RENDER_IS_LAYER_SETTINGS(settings), -1);
00116         if (!info)
00117                 return -2;
00118
00119         /* Copy layer info */
00120         info_copy = layer_info_copy(info);
00121
00122         /* Append to list */
00123         settings->layer_infos = g_list_append(settings->layer_infos, info_copy);
00124
00125         return (settings->layer_infos ? 0 : -3);
00126 }
00127
00128 void layer_settings_clear(LayerSettings *settings)
00129 {
00130         g_return_if_fail(GDS_RENDER_IS_LAYER_SETTINGS(settings));
00131
00132         /* Clear list and delete layer_info structs including the name field */
00133         g_list_free_full(settings->layer_infos, (GDestroyNotify)layer_info_delete_with_name);
00134         settings->layer_infos = NULL;
00135 }
00136
00137 int layer_settings_remove_layer(LayerSettings *settings, int layer)
00138 {
00139         GList *list_iter;
00140         GList *found = NULL;
00141         struct layer_info *inf;
00142
00143         g_return_val_if_fail(GDS_RENDER_IS_LAYER_SETTINGS(settings), -1);
00144
00145         /* Find in list */
00146         for (list_iter = settings->layer_infos; list_iter; list_iter = list_iter->next) {
00147                 inf = (struct layer_info *)list_iter->data;
00148
00149                 if (!inf)
00150                         continue;
00151                 if (inf->layer == layer)
00152                         found = list_iter;
00153         }
00154
00155         if (found)  {
00156                 /* Free the layer_info struct */
00157                 layer_info_delete_with_name((struct layer_info *)found->data);
00158                 /* Delete the list element */
00159                 settings->layer_infos = g_list_delete_link(settings->layer_infos, found);
00160                 return 0;
00161         }
00162
00163         return -2;
00164 }
00165
00166 GList *layer_settings_get_layer_info_list(LayerSettings *settings)
00167 {
00168         g_return_val_if_fail(GDS_RENDER_IS_LAYER_SETTINGS(settings), NULL);
00169         return settings->layer_infos;
00170 }
00171
00177 static void layer_settings_gen_csv_line(GString *string, struct layer_info *linfo)
00178 {
00179         int i;
00180
00181         g_string_printf(string, "%d:%lf:%lf:%lf:%lf:%d:%s\n",
00182                         linfo->layer, linfo->color.red, linfo->color.green,
00183                         linfo->color.blue, linfo->color.alpha, (linfo->render ? 1 : 0), linfo->name);
00184         /* Fix broken locale settings */
00185         for (i = 0; string->str[i]; i++) {
00186                 if (string->str[i] == ',')
00187                         string->str[i] = '.';
00188         }
00189
00190         for (i = 0; string->str[i]; i++) {
00191                 if (string->str[i] == ':')
00192                         string->str[i] = ',';
00193         }
```

```
00194 }
00195
00196 int layer_settings_to_csv(LayerSettings *settings, const char *path)
00197 {
00198         GFile *file;
00199         GOutputStream *w_fstream;
00200         GString *string;
00201         GList *info_iter;
00202         struct layer_info *linfo;
00203         int ret = 0;
00204
00205         file = g_file_new_for_path(path);
00206         w_fstream = G_OUTPUT_STREAM(g_file_replace(file, NULL, FALSE, G_FILE_CREATE_NONE, NULL,
      NULL));
00207         if (!w_fstream) {
00208                 ret = -1;
00209                 goto ret_unref_file;
00210         }
00211
00212         /* Allocate new working buffer string. A size bigger than 200 is unexpected, but possible
00213          * 200 is a tradeoff between memory usage and preventing the necessity of realloc'ing the
      string
00214          */
00215         string = g_string_new_len(NULL, 200);
00216         if (!string) {
00217                 ret = -2;
00218                 goto ret_close_file;
00219         }
00220
00221         /* Loop over layers and write CSV lines */
00222         for (info_iter = settings->layer_infos; info_iter; info_iter = info_iter->next) {
00223                 linfo = (struct layer_info *)info_iter->data;
00224
00225                 layer_settings_gen_csv_line(string, linfo);
00226                 g_output_stream_write(w_fstream, string->str, string->len * sizeof(gchar), NULL,
      NULL);
00227         }
00228
00229         /* Delete string */
00230         g_string_free(string, TRUE);
00231 ret_close_file:
00232         g_output_stream_flush(w_fstream, NULL, NULL);
00233         g_output_stream_close(w_fstream, NULL, NULL);
00234         g_object_unref(w_fstream);
00235 ret_unref_file:
00236         g_object_unref(file);
00237
00238         return ret;
00239 }
00240
00247 static int layer_settings_load_csv_line_from_stream(GDataInputStream *stream, struct layer_info
      *linfo)
00248 {
00249         int ret;
00250         gsize len;
00251         gchar *line;
00252         GRegex *regex;
00253         GMatchInfo *mi;
00254         char *match;
00255
00256         if (!linfo) {
00257                 ret = 1;
00258                 goto ret_direct;
00259         }
00260
00261         regex =
      g_regex_new("^(?<layer>[0-9]+),(?<r>[0-9\\.]+),(?<g>[0-9\\.]+),(?<b>[0-9\\.]+),(?<a>[0-9\\.]+),(?<export>[01]),(?<name>
      0, 0, NULL);
00262
00263         line = g_data_input_stream_read_line(stream, &len, NULL, NULL);
00264         if (!line) {
00265                 ret = -1;
00266                 goto destroy_regex;
00267         }
00268
00269         /* Match line in CSV */
00270         g_regex_match(regex, line, 0, &mi);
00271         if (g_match_info_matches(mi)) {
00272                 /* Line is valid */
00273                 match = g_match_info_fetch_named(mi, "layer");
00274                 linfo->layer = (int)g_ascii_strtoll(match, NULL, 10);
00275                 g_free(match);
00276                 match = g_match_info_fetch_named(mi, "r");
00277                 linfo->color.red = g_ascii_strtod(match, NULL);
00278                 g_free(match);
00279                 match = g_match_info_fetch_named(mi, "g");
00280                 linfo->color.green = g_ascii_strtod(match, NULL);
```

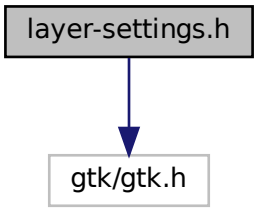
```
00281                 g_free(match);
00282                 match = g_match_info_fetch_named(mi, "b");
00283                 linfo->color.blue = g_ascii_strtod(match, NULL);
00284                 g_free(match);
00285                 match = g_match_info_fetch_named(mi, "a");
00286                 linfo->color.alpha = g_ascii_strtod(match, NULL);
00287                 g_free(match);
00288                 match = g_match_info_fetch_named(mi, "export");
00289                 linfo->render = ((!strcmp(match, "1")) ? 1 : 0);
00290                 g_free(match);
00291                 match = g_match_info_fetch_named(mi, "name");
00292                 linfo->name = match;
00293
00294                 ret = 0;
00295         } else {
00296                 /* Line is malformatted */
00297                 printf("Could not recognize line in CSV as valid entry: %s\n", line);
00298                 ret = 1;
00299         }
00300
00301         g_match_info_free(mi);
00302         g_free(line);
00303 destroy_regex:
00304         g_regex_unref(regex);
00305 ret_direct:
00306         return ret;
00307
00308 }
00309
00310 int layer_settings_load_from_csv(LayerSettings *settings, const char *path)
00311 {
00312         GFile *file;
00313         int ret = 0;
00314         GInputStream *in_stream;
00315         GDataInputStream *data_stream;
00316         int parser_ret;
00317         int stacked_pos;
00318         struct layer_info linfo;
00319
00320         file = g_file_new_for_path(path);
00321         in_stream = G_INPUT_STREAM(g_file_read(file, NULL, NULL));
00322
00323         g_return_val_if_fail(GDS_RENDER_IS_LAYER_SETTINGS(settings), -2);
00324
00325         if (!in_stream) {
00326                 ret = -1;
00327                 goto ret_destroy_file;
00328         }
00329         /* Delete old settings */
00330         layer_settings_clear(settings);
00331
00332         data_stream = g_data_input_stream_new(in_stream);
00333
00334         stacked_pos = 0;
00335         while ((parser_ret = layer_settings_load_csv_line_from_stream(data_stream, &linfo)) >= 0) {
00336                 /* Line broken */
00337                 if (parser_ret == 1)
00338                         continue;
00339
00340                 linfo.stacked_position = stacked_pos++;
00341
00342                 layer_settings_append_layer_info(settings, &linfo);
00343                 /* Clear name to prevent memory leak */
00344                 if (linfo.name)
00345                         g_free(linfo.name);
00346         }
00347
00348         g_object_unref(data_stream);
00349         g_object_unref(in_stream);
00350 ret_destroy_file:
00351         g_object_unref(file);
00352
00353         return ret;
00354 }
```

13.78 layer-settings.h File Reference

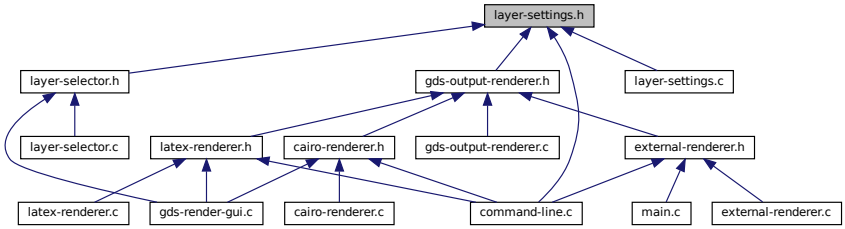
LayerSettings class header file.

```
#include <gtk/gtk.h>
```

Include dependency graph for layer-settings.h:



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



Data Structures

- struct layer_info

  Layer information.

Macros

- #define GDS_RENDER_TYPE_LAYER_SETTINGS (layer_settings_get_type())
- #define CSV_LINE_MAX_LEN (1024)

  Maximum length of a layer mapping CSV line.

Functions

- LayerSettings * layer_settings_new ()

  New LayerSettings object.
- int layer_settings_append_layer_info (LayerSettings *settings, struct layer_info *info)

  layer_settings_append_layer_info
- void layer_settings_clear (LayerSettings *settings)

  Clear all layers in this settings object.
- int layer_settings_remove_layer (LayerSettings *settings, int layer)

Remove a specific layer number from the layer settings.

- GList * layer_settings_get_layer_info_list (LayerSettings *settings)

  Get a GList with layer_info structs.
- int layer_settings_to_csv (LayerSettings *settings, const char *path)

  Write layer settings to a CSV file.
- int layer_settings_load_from_csv (LayerSettings *settings, const char *path)

  Load new layer Settings from CSV.

13.78.1 Detailed Description

LayerSettings class header file.

Author

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Definition in file layer-settings.h.

13.78.2 Macro Definition Documentation

13.78.2.1 CSV_LINE_MAX_LEN

```
#define CSV_LINE_MAX_LEN (1024)
```

Maximum length of a layer mapping CSV line.

Definition at line 56 of file layer-settings.h.

13.78.2.2 GDS_RENDER_TYPE_LAYER_SETTINGS

```
#define GDS_RENDER_TYPE_LAYER_SETTINGS (layer_settings_get_type())
```

Definition at line 51 of file layer-settings.h.

13.78.3 Function Documentation

13.78.3.1 layer_settings_append_layer_info()

```
int layer_settings_append_layer_info (
            LayerSettings * settings,
            struct layer_info * info )
```

layer_settings_append_layer_info

Parameters

settings	LayerSettings object.
info	Info to append

Returns

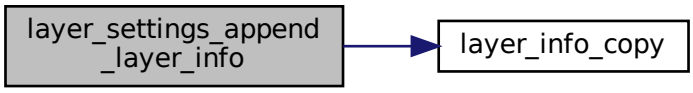
Error code. 0 if successful

Note

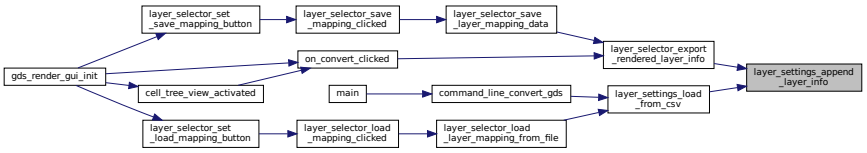
`info` is copied internally. You can free this struct afterwards.

Definition at line 111 of file layer-settings.c.

Here is the call graph for this function:



Here is the caller graph for this function:



13.78.3.2 layer_settings_clear()

```
void layer_settings_clear (
            LayerSettings * settings )
```

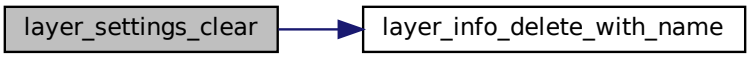
Clear all layers in this settings object.

Parameters

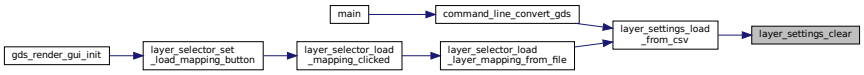
settings	LayerSettings object

Definition at line 128 of file layer-settings.c.

Here is the call graph for this function:



Here is the caller graph for this function:



13.78.3.3 layer_settings_get_layer_info_list()

```
GList* layer_settings_get_layer_info_list (
            LayerSettings * settings )
```

Get a GList with layer_info structs.

This function returns a GList with all layer_info structs in rendering order (bottom to top) that shall be rendered.

Parameters

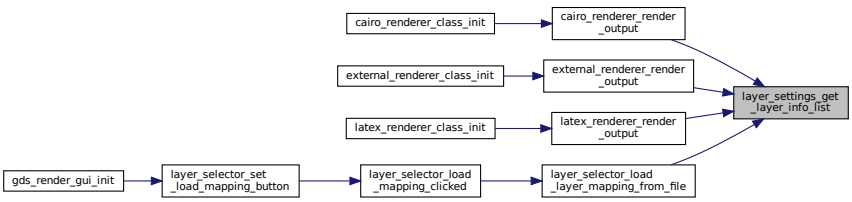
settings	LayerSettings object

Returns

GList with struct layer_info elements.

Definition at line 166 of file layer-settings.c.

Here is the caller graph for this function:



13.78.3.4 layer_settings_load_from_csv()

```
int layer_settings_load_from_csv (
            LayerSettings * settings,
            const char * path )
```

Load new layer Settings from CSV.

This function loads the layer information from a CSV file. All data inside the `settings` is cleared beforehand.

Parameters

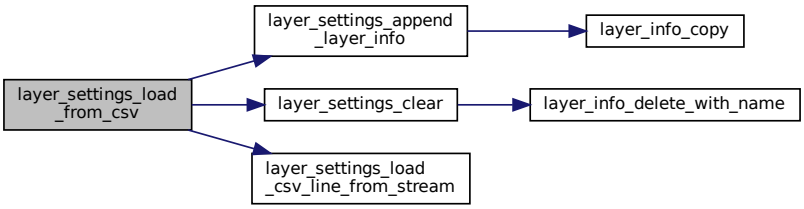
settings	Settings to write to.
path	CSV file path

Returns

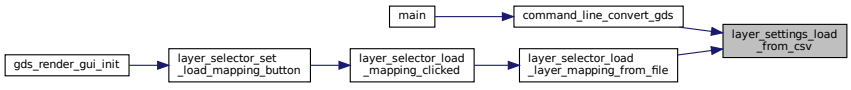
0 if successful

Definition at line 310 of file layer-settings.c.

Here is the call graph for this function:



Here is the caller graph for this function:



13.78.3.5 layer_settings_new()

```
LayerSettings* layer_settings_new ( )
```

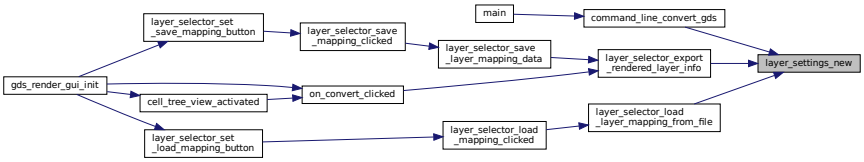
New LayerSettings object.

Returns

New object

Definition at line 106 of file layer-settings.c.

Here is the caller graph for this function:



13.78.3.6 layer_settings_remove_layer()

```
int layer_settings_remove_layer (
            LayerSettings * settings,
            int layer )
```

Remove a specific layer number from the layer settings.

Parameters

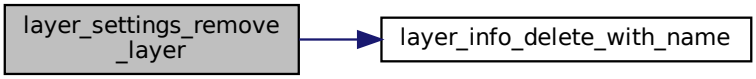
settings	LayerSettings object
layer	Layer number

Returns

Error code. 0 if successful

Definition at line 137 of file layer-settings.c.

Here is the call graph for this function:



13.78.3.7 layer_settings_to_csv()

```
int layer_settings_to_csv (
            LayerSettings * settings,
            const char * path )
```

Write layer settings to a CSV file.

This function writes the layer settings to a CSV file according to the layer mapping specification (Layer Mapping File Specification)

Parameters

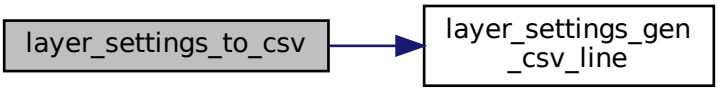
settings	LayerSettings object
path	Output path for CSV file.

Returns

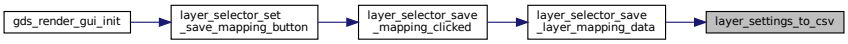
0 if successful

Definition at line 196 of file layer-settings.c.

Here is the call graph for this function:



Here is the caller graph for this function:



13.79 layer-settings.h

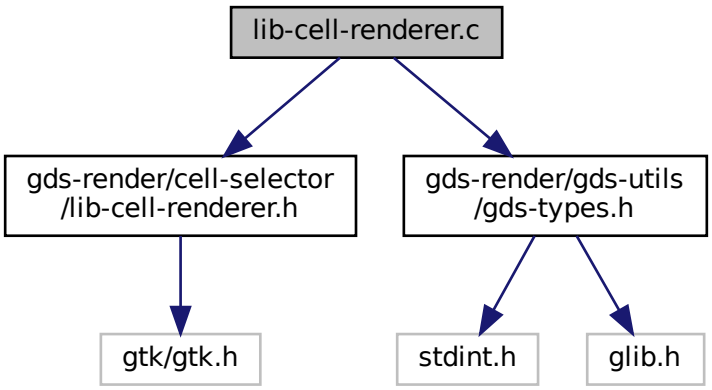
```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2019  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00026 #ifndef _LAYER_INFO_H_
00027 #define _LAYER_INFO_H_
00028
00029 #include <gtk/gtk.h>
00030
00031 G_BEGIN_DECLS
00032
00040 struct layer_info
00041 {
00042         int layer;
00043         char *name;
00044         int stacked_position;
00045         GdkRGBA color;
00046         int render;
00047 };
00048
00049 G_DECLARE_FINAL_TYPE(LayerSettings, layer_settings, GDS_RENDER, LAYER_SETTINGS, GObject)
00050
00051 #define GDS_RENDER_TYPE_LAYER_SETTINGS (layer_settings_get_type())
00052
00056 #define CSV_LINE_MAX_LEN (1024)
00057
00062 LayerSettings *layer_settings_new();
00063
00071 int layer_settings_append_layer_info(LayerSettings *settings, struct layer_info *info);
00072
00077 void layer_settings_clear(LayerSettings *settings);
00078
00085 int layer_settings_remove_layer(LayerSettings *settings, int layer);
00086
00096 GList *layer_settings_get_layer_info_list(LayerSettings *settings);
00097
00107 int layer_settings_to_csv(LayerSettings *settings, const char *path);
00108
00119 int layer_settings_load_from_csv(LayerSettings *settings, const char *path);
00120
00121 G_END_DECLS
00122
00123 #endif // _LAYER_INFO_H_
```

13.80 lib-cell-renderer.c File Reference

LibCellRenderer GObject Class.

```
#include <gds-render/cell-selector/lib-cell-renderer.h>
#include <gds-render/gds-utils/gds-types.h>
```

Include dependency graph for lib-cell-renderer.c:



Enumerations

- enum { PROP_LIB = 1, PROP_CELL, PROP_ERROR_LEVEL, PROP_COUNT }

Functions

- void lib_cell_renderer_init (LibCellRenderer *self)
- static void lib_cell_renderer_constructed (GObject *obj)
- static void convert_error_level_to_color (GdkRGBA *color, unsigned int error_level)
- static void lib_cell_renderer_set_property (GObject *object, guint param_id, const GValue *value, GParamSpec *pspec)
- static void lib_cell_renderer_get_property (GObject *object, guint param_id, GValue *value, GParamSpec *pspec)
- void lib_cell_renderer_class_init (LibCellRendererClass *klass)
- GtkCellRenderer * lib_cell_renderer_new (void)

  Create a new renderer for renderering gds_cell and gds_library elements.

Variables

- static GParamSpec * properties [PROP_COUNT]

13.80.1 Detailed Description

LibCellRenderer GObject Class.

Author

Mario Hüttel mario.huettel@gmx.net

Definition in file lib-cell-renderer.c.

13.81 lib-cell-renderer.c

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00031 #include <gds-render/cell-selector/lib-cell-renderer.h>
00032 #include <gds-render/gds-utils/gds-types.h>
00033
00034 G_DEFINE_TYPE(LibCellRenderer, lib_cell_renderer, GTK_TYPE_CELL_RENDERER_TEXT)
00035
00036 enum {
00037         PROP_LIB = 1,
00038         PROP_CELL,
00039         PROP_ERROR_LEVEL,
00040         PROP_COUNT
00041 };
00042
00043 void lib_cell_renderer_init(LibCellRenderer *self)
00044 {
00045         (void)self;
00046         /* Nothing to do */
00047 }
00048
00049 static void lib_cell_renderer_constructed(GObject *obj)
00050 {
00051         G_OBJECT_CLASS(lib_cell_renderer_parent_class)->constructed(obj);
00052 }
00053
00054 static void convert_error_level_to_color(GdkRGBA *color, unsigned int error_level)
00055 {
00056
00057         /* Always use no transparency */
00058         color->alpha = 1.0;
00059
00060         if (error_level & LIB_CELL_RENDERER_ERROR_ERR) {
00061                 /* Error set. Color cell red */
00062                 color->red = 1.0;
00063                 color->blue = 0.0;
00064                 color->green = 0.0;
00065         } else if (error_level & LIB_CELL_RENDERER_ERROR_WARN) {
00066                 /* Only warning set; orange color */
00067                 color->red = 1.0;
00068                 color->blue = 0.0;
00069                 color->green = 0.6;
00070         } else {
00071                 /* Everything okay; green color */
00072                 color->red = (double)61.0/(double)255.0;
00073                 color->green = (double)152.0/(double)255.0;
00074                 color->blue = 0.0;
00075         }
00076 }
00077
00078 static void lib_cell_renderer_set_property(GObject      *object,
00079                                            guint        param_id,
00080                                            const GValue *value,
00081                                            GParamSpec   *pspec)
00082 {
00083         GValue val = G_VALUE_INIT;
00084         GdkRGBA color;
00085
00086         switch (param_id) {
00087         case PROP_LIB:
00088                 g_value_init(&val, G_TYPE_STRING);
00089                 g_value_set_string(&val, ((struct gds_library *)g_value_get_pointer(value))->name);
00090                 g_object_set_property(object, "text", &val);
00091                 break;
00092         case PROP_CELL:
00093                 g_value_init(&val, G_TYPE_STRING);
00094                 g_value_set_string(&val, ((struct gds_cell *)g_value_get_pointer(value))->name);
00095                 g_object_set_property(object, "text", &val);
00096                 break;
```

```
00097         case PROP_ERROR_LEVEL:
00098                 /* Set cell color according to error level */
00099                 g_value_init(&val, GDK_TYPE_RGBA);
00100                 convert_error_level_to_color(&color, g_value_get_uint(value));
00101                 g_value_set_boxed(&val, &color);
00102                 g_object_set_property(object, "foreground-rgba", &val);
00103                 break;
00104         default:
00105                 G_OBJECT_WARN_INVALID_PROPERTY_ID(object, param_id, pspec);
00106                 break;
00107         }
00108 }
00109
00110 static void lib_cell_renderer_get_property(GObject      *object,
00111                                            guint        param_id,
00112                                            GValue       *value,
00113                                            GParamSpec   *pspec)
00114 {
00115         (void)value;
00116
00117         switch (param_id) {
00118         default:
00119                 G_OBJECT_WARN_INVALID_PROPERTY_ID(object, param_id, pspec);
00120                 break;
00121         }
00122 }
00123
00124 static GParamSpec *properties[PROP_COUNT];
00125
00126 void lib_cell_renderer_class_init(LibCellRendererClass *klass)
00127 {
00128         GObjectClass *oclass = G_OBJECT_CLASS(klass);
00129
00130         oclass->constructed = lib_cell_renderer_constructed;
00131         oclass->set_property = lib_cell_renderer_set_property;
00132         oclass->get_property = lib_cell_renderer_get_property;
00133
00134         properties[PROP_LIB] = g_param_spec_pointer("gds-lib", "gds-lib",
00135                                                     "Library reference to be displayed",
00136                                                     G_PARAM_WRITABLE);
00137         properties[PROP_CELL] = g_param_spec_pointer("gds-cell", "gds-cell",
00138                                                      "Cell reference to be displayed",
00139                                                      G_PARAM_WRITABLE);
00140         properties[PROP_ERROR_LEVEL] = g_param_spec_uint("error-level", "error-level",
00141                                                          "Error level of this cell", 0, 255, 0,
      G_PARAM_WRITABLE);
00142
00143         g_object_class_install_properties(oclass, PROP_COUNT, properties);
00144 }
00145
00146 GtkCellRenderer *lib_cell_renderer_new()
00147 {
00148         return GTK_CELL_RENDERER(g_object_new(TYPE_LIB_CELL_RENDERER, NULL));
00149 }
00150
```

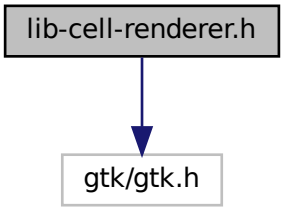
13.82 lib-cell-renderer.dox File Reference

13.83 lib-cell-renderer.h File Reference

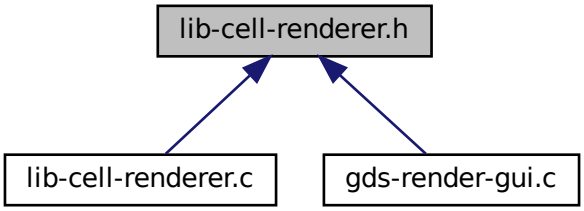
Header file for the LibCellRenderer GObject Class.

```
#include <gtk/gtk.h>
```

Include dependency graph for lib-cell-renderer.h:



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



Data Structures

- struct _LibCellRenderer

Macros

- #define TYPE_LIB_CELL_RENDERER (lib_cell_renderer_get_type())
- #define LIB_CELL_RENDERER_ERROR_WARN (1U<<0)
- #define LIB_CELL_RENDERER_ERROR_ERR (1U<<1)

Typedefs

- typedef struct _LibCellRenderer LibCellRenderer

Functions

- GType lib_cell_renderer_get_type (void)

  lib_cell_renderer_get_type
- GtkCellRenderer * lib_cell_renderer_new (void)

  Create a new renderer for renderering gds_cell and gds_library elements.

13.83.1 Detailed Description

Header file for the LibCellRenderer GObject Class.

Author

Mario Hüttel mario.huettel@gmx.net

Definition in file lib-cell-renderer.h.

13.84 lib-cell-renderer.h

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00031 #ifndef __LIB_CELL_RENDERER_H__
00032 #define __LIB_CELL_RENDERER_H__
00033
00034 #include <gtk/gtk.h>
00035
00036 G_BEGIN_DECLS
00037
00038 G_DECLARE_FINAL_TYPE(LibCellRenderer, lib_cell_renderer, LIB_CELL, RENDERER, GtkCellRendererText)
00039 #define TYPE_LIB_CELL_RENDERER (lib_cell_renderer_get_type())
00040
00044 #define LIB_CELL_RENDERER_ERROR_WARN (1U<<0)
00045 #define LIB_CELL_RENDERER_ERROR_ERR (1U<<1)
00046
00048 typedef struct _LibCellRenderer {
00049         /* Inheritance */
00050         GtkCellRendererText super;
00051         /* Custom Elements */
00052 } LibCellRenderer;
00053
00058 GType lib_cell_renderer_get_type(void);
00059
00064 GtkCellRenderer *lib_cell_renderer_new(void);
00065
00066 G_END_DECLS
00067
00068 #endif /* __LIB_CELL_RENDERER_H__ */
00069
```

13.85 lmf-spec.dox File Reference

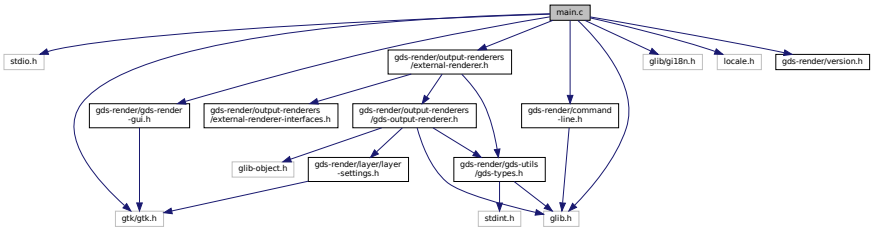
13.86 main-page.dox File Reference

13.87 main.c File Reference

main.c

```
#include <stdio.h>
#include <gtk/gtk.h>
#include <glib.h>
#include <glib/gi18n.h>
#include <locale.h>
#include <gds-render/gds-render-gui.h>
#include <gds-render/command-line.h>
#include <gds-render/output-renderers/external-renderer.h>
#include <gds-render/version.h>
```

Include dependency graph for main.c:



Data Structures

- struct application_data

  Structure containing The GtkApplication and a list containing the GdsRenderGui objects.

Functions

- static void app_quit (GSimpleAction ∗action, GVariant ∗parameter, gpointer user_data)

  Callback for the menu entry 'Quit'.
- static void app_about (GSimpleAction ∗action, GVariant ∗parameter, gpointer user_data)

  Callback for the 'About' menu entry.
- static void gui_window_closed_callback (GdsRenderGui ∗gui, gpointer user_data)

  Called when a GUI main window is closed.
- static void gapp_activate (GApplication ∗app, gpointer user_data)

  Activation of the GUI.
- static int start_gui (int argc, char ∗∗argv)

  Start the graphical interface.
- static void print_version (void)

  Print the application version string to stdout.
- int main (int argc, char ∗∗argv)

  The "entry point" of the application.

Variables

- static const GActionEntry app_actions [ ]

  Contains the application menu entries.

13.87.1 Detailed Description

main.c

Author

Mario Hüttel mario.huettel@gmx.net

Definition in file main.c.

13.87.2 Function Documentation

13.87.2.1 app_about()

```
static void app_about (
            GSimpleAction * action,
            GVariant * parameter,
            gpointer user_data )  [static]
```

Callback for the 'About' menu entry.

This function shows the about dialog.

Parameters

action	GSimpleAction, unused
parameter	Unused.
user_data	Unused

Definition at line 85 of file main.c.

13.87.2.2 app_quit()

```
static void app_quit (
            GSimpleAction * action,
            GVariant * parameter,
            gpointer user_data )  [static]
```

Callback for the menu entry 'Quit'.

Destroys all GUIs contained in the application_data structure provided by `user_data`.

The complete suspension of all main windows leads to the termination of the GApplication.

Parameters

action	unused
parameter	unused
user_data	application_data structure

Definition at line 58 of file main.c.

13.87.2.3 gapp_activate()

```
static void gapp_activate (
            GApplication * app,
            gpointer user_data )  [static]
```

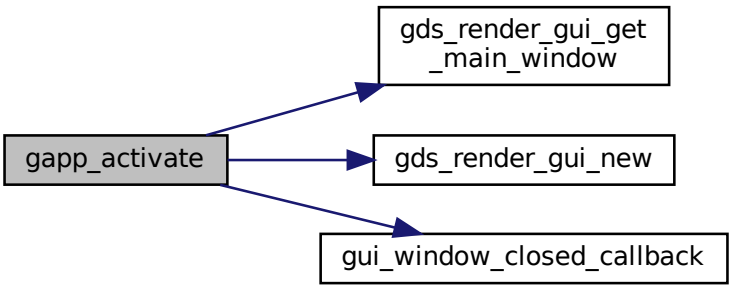
Activation of the GUI.

Parameters

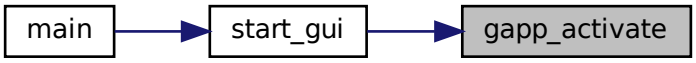
app	The GApplication reference
user_data	Used to store the individual GUI instances.

Definition at line 157 of file main.c.

Here is the call graph for this function:



Here is the caller graph for this function:



13.87.2.4 gui_window_closed_callback()

```
static void gui_window_closed_callback (
            GdsRenderGui * gui,
            gpointer user_data )  [static]
```

Called when a GUI main window is closed.

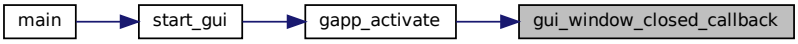
The GdsRenderGui object associated with the closed main window is removed from the list of open GUIs (`user_data`) and dereferenced.

Parameters

gui	The GUI instance the closed main window belongs to
user_data	List of GUIs

Definition at line 143 of file main.c.

Here is the caller graph for this function:



13.87.2.5 main()

```
int main (
            int argc,
            char ** argv )
```

The "entry point" of the application.

Parameters

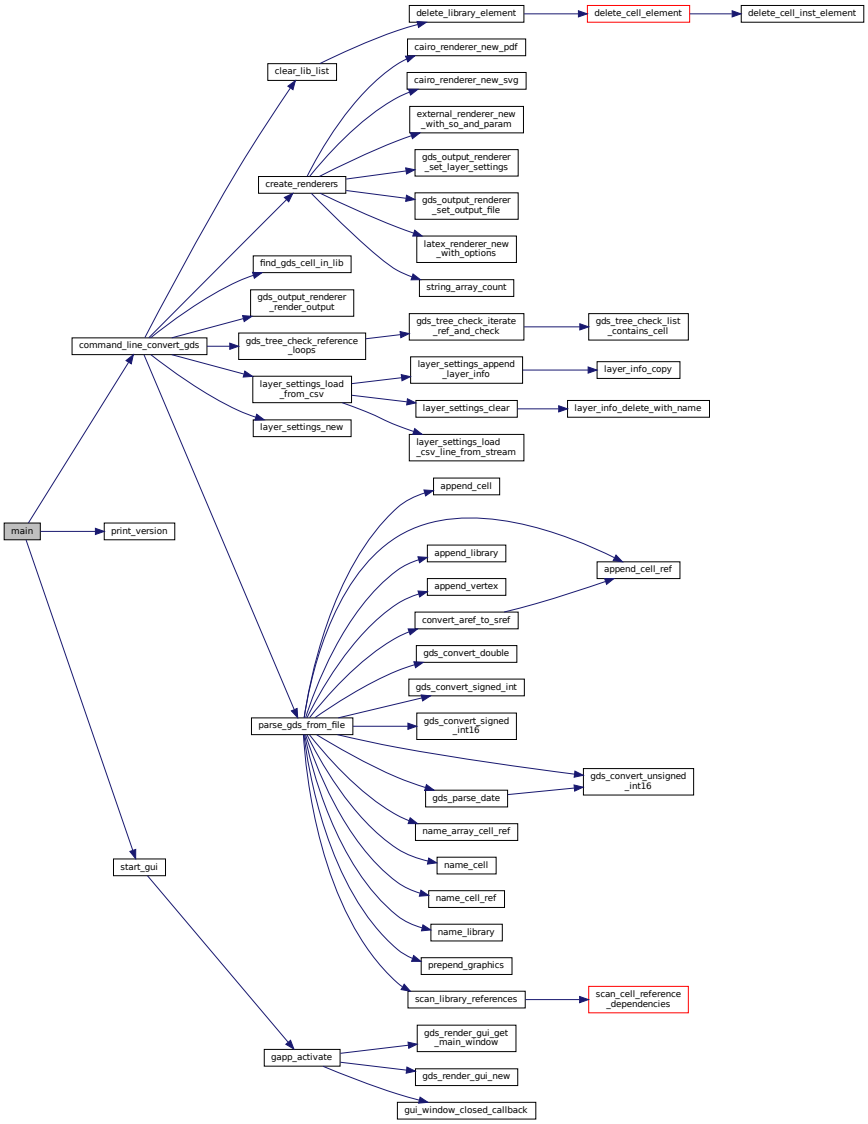
argc	Number of command line parameters
argv	Command line parameters

Returns

Execution status of the application

Definition at line 254 of file main.c.

Here is the call graph for this function:



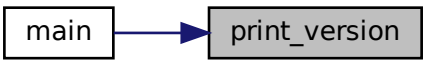
13.87.2.6 print_version()

```
static void print_version (
             void  )  [static]
```

Print the application version string to stdout.

Definition at line 242 of file main.c.

Here is the caller graph for this function:



13.87.2.7 start_gui()

```
static int start_gui (
             int argc,
             char ** argv )  [static]
```

Start the graphical interface.

This function starts the GUI. If there's already a running instance of this program, a second window will be created in that instance and the second one is terminated.

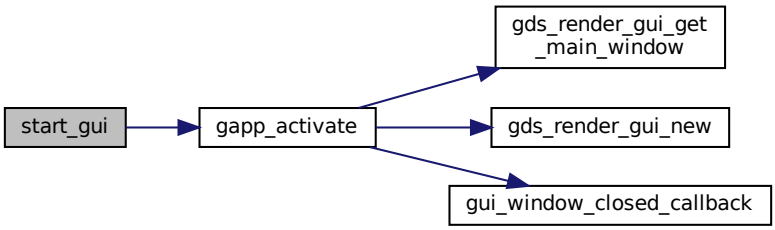
Parameters

argc	
argv	

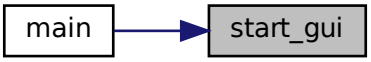
Returns

Definition at line 185 of file main.c.

Here is the call graph for this function:



Here is the caller graph for this function:



13.87.3 Variable Documentation

13.87.3.1 app_actions

```
const GActionEntry app_actions[]  [static]
```

Initial value:

```
= {
        { "quit", app_quit, NULL, NULL, NULL, {0} },
        { "about", app_about, NULL, NULL, NULL, {0} },
}
```

Contains the application menu entries.

Definition at line 129 of file main.c.

13.88 main.c

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00026 #include <stdio.h>
00027 #include <gtk/gtk.h>
00028 #include <glib.h>
00029 #include <glib/gi18n.h>
00030 #include <locale.h>
00031
00032 #include <gds-render/gds-render-gui.h>
00033 #include <gds-render/command-line.h>
00034 #include <gds-render/output-renderers/external-renderer.h>
00035 #include <gds-render/version.h>
00036
00040 struct application_data {
00041                 GtkApplication *app;
00042                 GList *gui_list;
00043 };
00044
00058 static void app_quit(GSimpleAction *action, GVariant *parameter, gpointer user_data)
00059 {
00060         struct application_data * const appdata = (struct application_data *)user_data;
00061         (void)action;
00062         (void)parameter;
00063         GList *list_iter;
00064         GdsRenderGui *gui;
00065
00066         /* Dispose all GUIs */
00067         for (list_iter = appdata->gui_list; list_iter != NULL; list_iter = g_list_next(list_iter)) {
00068                 gui = RENDERER_GUI(list_iter->data);
00069                 g_object_unref(gui);
00070         }
00071
00072         g_list_free(appdata->gui_list);
00073         appdata->gui_list = NULL;
00074 }
00075
00085 static void app_about(GSimpleAction *action, GVariant *parameter, gpointer user_data)
00086 {
00087         GtkBuilder *builder;
00088         GtkDialog *dialog;
00089         GdkPixbuf *logo_buf;
00090         GError *error = NULL;
00091         (void)user_data;
00092         (void)action;
00093         (void)parameter;
00094         GString *comment_text;
00095
00096         comment_text = g_string_new(_("gds-render is a free tool for rendering GDS2 layout files into
      vector graphics."));
00097         g_string_append_printf(comment_text, _("\n\nFull git commit: %s"), _app_git_commit);
00098
00099         builder = gtk_builder_new_from_resource("/gui/about.glade");
00100         dialog = GTK_DIALOG(gtk_builder_get_object(builder, "about-dialog"));
00101         gtk_window_set_transient_for(GTK_WINDOW(dialog), NULL);
00102         gtk_about_dialog_set_version(GTK_ABOUT_DIALOG(dialog), _app_version_string);
00103         gtk_about_dialog_set_comments(GTK_ABOUT_DIALOG(dialog), comment_text->str);
00104
00105         g_string_free(comment_text, TRUE);
00106
00107         /* Load icon from resource */
00108         logo_buf = gdk_pixbuf_new_from_resource_at_scale("/images/logo.svg", 100, 100, TRUE, &error);
00109         if (logo_buf) {
00110                 /* Set logo */
00111                 gtk_about_dialog_set_logo(GTK_ABOUT_DIALOG(dialog), logo_buf);
00112
00113                 /* Pixbuf is now owned by about dialog. Unref */
00114                 g_object_unref(logo_buf);
00115         } else if (error) {
```

```
00116                 fprintf(stderr, _("Logo could not be displayed: %s\n"), error->message);
00117                 g_error_free(error);
00118         }
00119
00120         gtk_dialog_run(dialog);
00121
00122         gtk_widget_destroy(GTK_WIDGET(dialog));
00123         g_object_unref(builder);
00124 }
00125
00129 static const GActionEntry app_actions[] = {
00130         { "quit", app_quit, NULL, NULL, NULL, {0} },
00131         { "about", app_about, NULL, NULL, NULL, {0} },
00132 };
00133
00143 static void gui_window_closed_callback(GdsRenderGui *gui, gpointer user_data)
00144 {
00145         GList **gui_list = (GList **)user_data;
00146
00147         /* Dispose of Gui element */
00148         *gui_list = g_list_remove(*gui_list, gui);
00149         g_object_unref(gui);
00150 }
00151
00157 static void gapp_activate(GApplication *app, gpointer user_data)
00158 {
00159         GtkWindow *main_window;
00160         GdsRenderGui *gui;
00161         struct application_data * const appdata = (struct application_data *)user_data;
00162
00163         gui = gds_render_gui_new();
00164         appdata->gui_list = g_list_append(appdata->gui_list, gui);
00165
00166         g_signal_connect(gui, "window-closed", G_CALLBACK(gui_window_closed_callback),
      &appdata->gui_list);
00167
00168         main_window = gds_render_gui_get_main_window(gui);
00169
00170         gtk_application_add_window(GTK_APPLICATION(app), main_window);
00171         gtk_widget_show(GTK_WIDGET(main_window));
00172 }
00173
00185 static int start_gui(int argc, char **argv)
00186 {
00187         GtkApplication *gapp;
00188         GString *application_domain;
00189         int app_status;
00190         static struct application_data appdata = {
00191                 .gui_list = NULL
00192         };
00193         GMenu *menu;
00194         GMenu *m_quit;
00195         GMenu *m_about;
00196
00197         /*
00198          * Generate version dependent application id
00199          * This allows running the application in different versions at the same time.
00200          */
00201         application_domain = g_string_new(NULL);
00202         g_string_printf(application_domain, "de.shimatta.gds_render_%s", _app_git_commit);
00203
00204         gapp = gtk_application_new(application_domain->str, G_APPLICATION_FLAGS_NONE);
00205         g_string_free(application_domain, TRUE);
00206
00207         g_application_register(G_APPLICATION(gapp), NULL, NULL);
00208         g_signal_connect(gapp, "activate", G_CALLBACK(gapp_activate), &appdata);
00209
00210         if (g_application_get_is_remote(G_APPLICATION(gapp)) == TRUE) {
00211                 g_application_activate(G_APPLICATION(gapp));
00212                 printf(_("There is already an open instance. Will open second window in that
      instance.\n"));
00213                 return 0;
00214         }
00215
00216         menu = g_menu_new();
00217         m_quit = g_menu_new();
00218         m_about = g_menu_new();
00219         g_menu_append(m_quit, _("Quit"), "app.quit");
00220         g_menu_append(m_about, _("About"), "app.about");
00221         g_menu_append_section(menu, NULL, G_MENU_MODEL(m_about));
00222         g_menu_append_section(menu, NULL, G_MENU_MODEL(m_quit));
00223         g_action_map_add_action_entries(G_ACTION_MAP(gapp), app_actions,
00224                                         G_N_ELEMENTS(app_actions), &appdata);
00225         gtk_application_set_app_menu(GTK_APPLICATION(gapp), G_MENU_MODEL(menu));
00226
00227         g_object_unref(m_quit);
00228         g_object_unref(m_about);
```

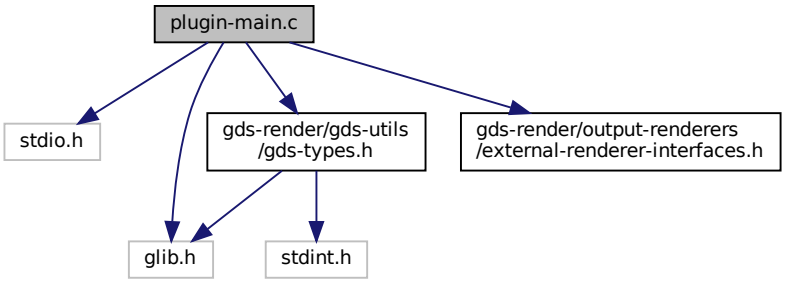
```
00229         g_object_unref(menu);
00230
00231         app_status = g_application_run(G_APPLICATION(gapp), argc, argv);
00232         g_object_unref(gapp);
00233
00234         g_list_free(appdata.gui_list);
00235
00236         return app_status;
00237 }
00238
00242 static void print_version(void)
00243 {
00244         printf(_("This is gds-render, version: %s\n\nFor a list of supported commands execute with
      --help option.\n"),
00245                _app_version_string);
00246 }
00247
00254 int main(int argc, char **argv)
00255 {
00256         int i;
00257         GError *error = NULL;
00258         GOptionContext *context;
00259         gchar *gds_name;
00260         gchar **output_paths = NULL;
00261         gchar *mappingname = NULL;
00262         gchar *cellname = NULL;
00263         gchar **renderer_args = NULL;
00264         gboolean version = FALSE, pdf_standalone = FALSE, pdf_layers = FALSE;
00265         int scale = 1000;
00266         int app_status = 0;
00267         struct external_renderer_params so_render_params;
00268
00269         so_render_params.so_path = NULL;
00270         so_render_params.cli_params = NULL;
00271
00272         bindtextdomain(GETTEXT_PACKAGE, LOCALEDATADIR "/locale");
00273         bind_textdomain_codeset(GETTEXT_PACKAGE, "UTF-8");
00274         textdomain(GETTEXT_PACKAGE);
00275
00276         GOptionEntry entries[] = {
00277                 {"version", 'v', 0, G_OPTION_ARG_NONE, &version, _("Print version"), NULL},
00278                 {"renderer", 'r', 0, G_OPTION_ARG_STRING_ARRAY, &renderer_args,
00279                         _("Renderer to use. Can be used multiple times."), "pdf|svg|tikz|ext"},
00280                 {"scale", 's', 0, G_OPTION_ARG_INT, &scale, _("Divide output coordinates by <SCALE>"),
      "<SCALE>" },
00281                 {"output-file", 'o', 0, G_OPTION_ARG_FILENAME_ARRAY, &output_paths,
00282                         _("Output file path. Can be used multiple times."), "PATH" },
00283                 {"mapping", 'm', 0, G_OPTION_ARG_FILENAME, &mappingname, _("Path for Layer Mapping
      File"), "PATH" },
00284                 {"cell", 'c', 0, G_OPTION_ARG_STRING, &cellname, _("Cell to render"), "NAME" },
00285                 {"tex-standalone", 'a', 0, G_OPTION_ARG_NONE, &pdf_standalone, _("Create standalone
      TeX"), NULL },
00286                 {"tex-layers", 'l', 0, G_OPTION_ARG_NONE, &pdf_layers, _("Create PDF Layers (OCG)"),
      NULL },
00287                 {"custom-render-lib", 'P', 0, G_OPTION_ARG_FILENAME, &so_render_params.so_path,
00288                         _("Path to a custom shared object, that implements the necessary rendering
      functions"), "PATH"},
00289                 {"render-lib-params", 'W', 0, G_OPTION_ARG_STRING, &so_render_params.cli_params,
00290                         _("Argument string passed to render lib"), NULL},
00291                 {NULL, 0, 0, 0, NULL, NULL, NULL}
00292         };
00293
00294         context = g_option_context_new(_(" FILE - Convert GDS file <FILE> to graphic"));
00295         g_option_context_add_main_entries(context, entries, NULL);
00296         g_option_context_add_group(context, gtk_get_option_group(TRUE));
00297
00298         if (!g_option_context_parse(context, &argc, &argv, &error)) {
00299                 g_print(_("Option parsing failed: %s\n"), error->message);
00300                 exit(1);
00301         }
00302
00303         g_option_context_free(context);
00304
00305         if (version) {
00306                 print_version();
00307                 goto ret_status;
00308         }
00309
00310         if (argc >= 2) {
00311                 if (scale < 1) {
00312                         printf(_("Scale < 1 not allowed. Setting to 1\n"));
00313                         scale = 1;
00314                 }
00315
00316                 /* Get gds name */
00317                 gds_name = argv[1];
00318
```

```
00319                 /* Print out additional arguments as ignored */
00320                 for (i = 2; i < argc; i++)
00321                         printf(_("Ignored argument: %s"), argv[i]);
00322
00323                 app_status =
00324                         command_line_convert_gds(gds_name, cellname, renderer_args, output_paths,
      mappingname,
00325                                                  &so_render_params, pdf_standalone, pdf_layers,
      scale);
00326
00327         } else {
00328                 app_status = start_gui(argc, argv);
00329         }
00330
00331 ret_status:
00332         /* If necessary, free command line parameters.
00333          * This is only really necessary for automated mem-leak testing.
00334          * Omitting these frees would be perfectly fine.
00335          */
00336         if (output_paths)
00337                 g_strfreev(output_paths);
00338         if (renderer_args)
00339                 g_strfreev(renderer_args);
00340         if (mappingname)
00341                 g_free(mappingname);
00342         if (cellname)
00343                 free(cellname);
00344         if (so_render_params.so_path)
00345                 free(so_render_params.so_path);
00346         if (so_render_params.cli_params)
00347                 g_free(so_render_params.cli_params);
00348
00349         return app_status;
00350 }
```

13.89 plugin-main.c File Reference

```
#include <stdio.h>
#include <glib.h>
#include <gds-render/gds-utils/gds-types.h>
#include <gds-render/output-renderers/external-renderer-interfaces.h>
```

Include dependency graph for plugin-main.c:



Functions

- int EXPORTED_FUNC_DECL() EXTERNAL_LIBRARY_RENDER_FUNCTION (struct gds_cell *toplevel, GList *layer_info_list, const char *output_file_name, double scale)
- int EXPORTED_FUNC_DECL() EXTERNAL_LIBRARY_INIT_FUNCTION (const char *params, const char *version)

13.90 plugin-main.c

```
00001 /*
00002  * GDSII-Converter example plugin
00003  * Copyright (C) 2019  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00029 #include <stdio.h>
00030 #include <glib.h>
00031 #include <gds-render/gds-utils/gds-types.h>
00032 #include <gds-render/output-renderers/external-renderer-interfaces.h>
00033
00034 int EXPORTED_FUNC_DECL(EXTERNAL_LIBRARY_RENDER_FUNCTION)(struct gds_cell *toplevel, GList
       *layer_info_list, const char *output_file_name, double scale)
00035 {
00036         if (!toplevel)
00037                 return -1000;
00038
00039         printf("Rendering %s\n", toplevel->name);
00040         return 0;
00041 }
00042
00043 int EXPORTED_FUNC_DECL(EXTERNAL_LIBRARY_INIT_FUNCTION)(const char *params, const char *version)
00044 {
00045         printf("Init with params: %s\ngds-render version: %s\n", params, version);
00046         return 0;
00047 }
00048
```

13.91 plugins.dox File Reference

13.92 README.MD File Reference

13.93 README.MD

```
00001 # GDS-Render Readme
00002
00003 This software is a rendering programm for GDS2 layout files.
00004 The GDS2 format is mainly used in integrated circuit development.
00005 This program allows the conversion of a GDS file to a vector graphics file.
00006
00007 ## Output Formats
00008 * Export GDS Layout to LaTeX (using TikZ).
00009 * Export to PDF (Cairographics).
00010
00011 # Features
00012 Note: Due to various size limitations of both TikZ and the PDF export, the layout might not render
       correctly. In this case adjust the scale value. A higher scale value scales down your design.
00013
00014 * Configurable layer stack-up.
00015 * Layer colors configurable as ARGB color values.
00016 * Command line interface.
00017 *   Awesome   Somehow usable GUI.
00018
00019 # License and Other Stuff
00020 * Free software (GPLv2 _only_)
00021 * Coded in plain C using GTK+3.0, Glib2, and Cairographics
```

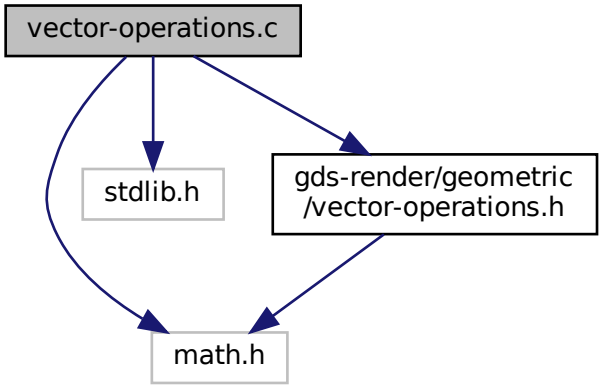
13.94 usage.dox File Reference

13.95 vector-operations.c File Reference

2D Vector operations

```
#include <math.h>
#include <stdlib.h>
#include <gds-render/geometric/vector-operations.h>
```

Include dependency graph for vector-operations.c:



Macros

- #define ABS_DBL(a) ((a) < 0.0 ? -(a) : (a))

Functions

- double vector_2d_scalar_multipy (struct vector_2d *a, struct vector_2d *b)
- void vector_2d_normalize (struct vector_2d *vec)
- void vector_2d_rotate (struct vector_2d *vec, double angle)
- struct vector_2d * vector_2d_copy (struct vector_2d *opt_res, struct vector_2d *vec)
- struct vector_2d * vector_2d_alloc (void)
- void vector_2d_free (struct vector_2d *vec)
- void vector_2d_scale (struct vector_2d *vec, double scale)
- double vector_2d_abs (struct vector_2d *vec)
- double vector_2d_calculate_angle_between (struct vector_2d *a, struct vector_2d *b)
- void vector_2d_subtract (struct vector_2d *res, struct vector_2d *a, struct vector_2d *b)
- void vector_2d_add (struct vector_2d *res, struct vector_2d *a, struct vector_2d *b)

13.95.1 Detailed Description

2D Vector operations

Author

Mario Hüttel mario.huettel@gmx.net

Definition in file vector-operations.c.

13.96 vector-operations.c

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00031 #include <math.h>
00032 #include <stdlib.h>
00033
00034 #include <gds-render/geometric/vector-operations.h>
00035
00036 #define ABS_DBL(a) ((a) < 0.0 ? -(a) : (a))
00037
00038 double vector_2d_scalar_multipy(struct vector_2d *a, struct vector_2d *b)
00039 {
00040         if (a && b)
00041                 return (a->x * b->x) + (a->y * b->y);
00042         else
00043                 return 0.0;
00044 }
00045
00046 void vector_2d_normalize(struct vector_2d *vec)
00047 {
00048         double len;
00049
00050         if (!vec)
00051                 return;
00052         len = sqrt(pow(vec->x, 2) + pow(vec->y, 2));
00053         vec->x = vec->x/len;
00054         vec->y = vec->y/len;
00055 }
00056
00057 void vector_2d_rotate(struct vector_2d *vec, double angle)
00058 {
00059         double sin_val, cos_val;
00060         struct vector_2d temp;
00061
00062         if (!vec)
00063                 return;
00064
00065         sin_val = sin(angle);
00066         cos_val = cos(angle);
00067
00068         vector_2d_copy(&temp, vec);
00069
00070         /* Apply rotation matrix */
00071         vec->x = (cos_val * temp.x) - (sin_val * temp.y);
00072         vec->y = (sin_val * temp.x) + (cos_val * temp.y);
00073 }
00074
00075 struct vector_2d *vector_2d_copy(struct vector_2d *opt_res, struct vector_2d *vec)
00076 {
```

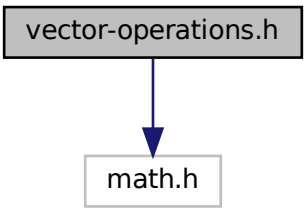
```
00077         struct vector_2d *res;
00078
00079         if (!vec)
00080                 return NULL;
00081
00082         if (opt_res)
00083                 res = opt_res;
00084         else
00085                 res = vector_2d_alloc();
00086
00087         if (res) {
00088                 res->x = vec->x;
00089                 res->y = vec->y;
00090         }
00091                 return res;
00092 }
00093
00094 struct vector_2d *vector_2d_alloc(void)
00095 {
00096         return (struct vector_2d *)malloc(sizeof(struct vector_2d));
00097 }
00098
00099 void vector_2d_free(struct vector_2d *vec)
00100 {
00101         if (vec)
00102                 free(vec);
00103 }
00104
00105 void vector_2d_scale(struct vector_2d *vec, double scale)
00106 {
00107         if (!vec)
00108                 return;
00109
00110         vec->x *= scale;
00111         vec->y *= scale;
00112 }
00113
00114 double vector_2d_abs(struct vector_2d *vec)
00115 {
00116         double len = 0.0;
00117
00118         if (vec)
00119                 len = sqrt(pow(vec->x, 2) + pow(vec->y, 2));
00120         return len;
00121 }
00122
00123 double vector_2d_calculate_angle_between(struct vector_2d *a, struct vector_2d *b)
00124 {
00125         double cos_angle;
00126
00127         if (!a || !b)
00128                 return 0.0;
00129
00130         cos_angle = ABS_DBL(vector_2d_scalar_multipy(a, b)) / (vector_2d_abs(a) * vector_2d_abs(b));
00131         return acos(cos_angle);
00132 }
00133
00134 void vector_2d_subtract(struct vector_2d *res, struct vector_2d *a, struct vector_2d *b)
00135 {
00136         if (res && a && b) {
00137                 res->x = a->x - b->x;
00138                 res->y = a->y - b->y;
00139         }
00140 }
00141
00142 void vector_2d_add(struct vector_2d *res, struct vector_2d *a, struct vector_2d *b)
00143 {
00144         if (res && a && b) {
00145                 res->x = a->x + b->x;
00146                 res->y = a->y + b->y;
00147         }
00148 }
00149
```

13.97 vector-operations.h File Reference

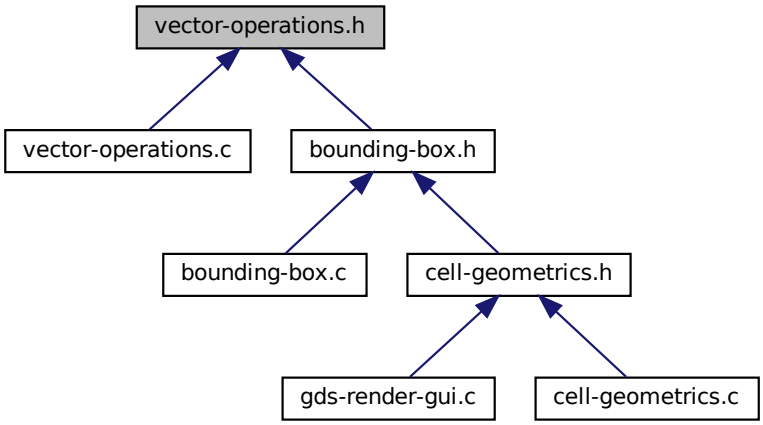
Header for 2D Vector operations.

```
#include <math.h>
```

Include dependency graph for vector-operations.h:



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



Data Structures

- struct vector_2d

Macros

- #define DEG2RAD(a) ((a)∗M_PI/180.0)

Functions

- double vector_2d_scalar_multipy (struct vector_2d ∗a, struct vector_2d ∗b)
- void vector_2d_normalize (struct vector_2d ∗vec)

- void vector_2d_rotate (struct vector_2d *vec, double angle)
- struct vector_2d * vector_2d_copy (struct vector_2d *opt_res, struct vector_2d *vec)
- struct vector_2d * vector_2d_alloc (void)
- void vector_2d_free (struct vector_2d *vec)
- void vector_2d_scale (struct vector_2d *vec, double scale)
- double vector_2d_abs (struct vector_2d *vec)
- double vector_2d_calculate_angle_between (struct vector_2d *a, struct vector_2d *b)
- void vector_2d_subtract (struct vector_2d *res, struct vector_2d *a, struct vector_2d *b)
- void vector_2d_add (struct vector_2d *res, struct vector_2d *a, struct vector_2d *b)

13.97.1 Detailed Description

Header for 2D Vector operations.

Author

Mario Hüttel mario.huettel@gmx.net

Definition in file vector-operations.h.

13.98 vector-operations.h

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00032 #ifndef _VECTOR_OPERATIONS_H_
00033 #define _VECTOR_OPERATIONS_H_
00034
00035 #include <math.h>
00036
00037 struct vector_2d {
00038     double x;
00039     double y;
00040 };
00041
00042 #define DEG2RAD(a) ((a)*M_PI/180.0)
00043
00044 double vector_2d_scalar_multipy(struct vector_2d *a, struct vector_2d *b);
00045 void vector_2d_normalize(struct vector_2d *vec);
00046 void vector_2d_rotate(struct vector_2d *vec, double angle);
00047 struct vector_2d *vector_2d_copy(struct vector_2d *opt_res, struct vector_2d *vec);
00048 struct vector_2d *vector_2d_alloc(void);
00049 void vector_2d_free(struct vector_2d *vec);
00050 void vector_2d_scale(struct vector_2d *vec, double scale);
00051 double vector_2d_abs(struct vector_2d *vec);
00052 double vector_2d_calculate_angle_between(struct vector_2d *a, struct vector_2d *b);
00053 void vector_2d_subtract(struct vector_2d *res, struct vector_2d *a, struct vector_2d *b);
00054 void vector_2d_add(struct vector_2d *res, struct vector_2d *a, struct vector_2d *b);
00055
00056 #endif /* _VECTOR_OPERATIONS_H_ */
00057
```

13.99 version.c File Reference

Variables

- const char * _app_version_string = "! version not set !"

  This string holds the Git Based Version Number of the app.
- const char * _app_git_commit = "! Commit hash not available !"

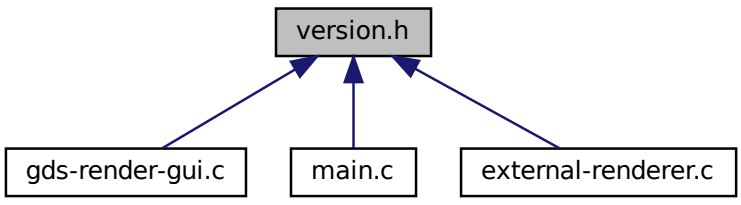
  This string holds the git commit hash of the current HEAD revision.

13.100 version.c

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
00014  * GNU General Public License for more details.
00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00027 #ifdef PROJECT_GIT_VERSION
00028 #define xstr(a) str(a)
00029 #define str(a) #a
00030 const char *_app_version_string = xstr(PROJECT_GIT_VERSION);
00031 #else
00032 const char *_app_version_string = "! version not set !";
00033 #endif
00034
00035 #ifdef PROJECT_GIT_COMMIT
00036 #define xstr(a) str(a)
00037 #define str(a) #a
00038 const char *_app_git_commit = xstr(PROJECT_GIT_COMMIT);
00039 #else
00040 const char *_app_git_commit = "! Commit hash not available !";
00041 #endif
00042
```

13.101 version.h File Reference

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



Variables

- const char * _app_version_string

  This string holds the Git Based Version Number of the app.
- const char * _app_git_commit

  This string holds the git commit hash of the current HEAD revision.

13.102 version.h

```
00001 /*
00002  * GDSII-Converter
00003  * Copyright (C) 2018  Mario Hüttel <mario.huettel@gmx.net>
00004  *
00005  * This file is part of GDSII-Converter.
00006  *
00007  * GDSII-Converter is free software: you can redistribute it and/or modify
00008  * it under the terms of the GNU General Public License version 2 as
00009  * published by the Free Software Foundation.
00010  *
00011  * GDSII-Converter is distributed in the hope that it will be useful,
00012  * but WITHOUT ANY WARRANTY; without even the implied warranty of
00013  * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
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00015  *
00016  * You should have received a copy of the GNU General Public License
00017  * along with GDSII-Converter.  If not, see <http://www.gnu.org/licenses/>.
00018  */
00019
00026 extern const char *_app_version_string;
00027
00029 extern const char *_app_git_commit;
```

13.103 versioning.dox File Reference

13.104 widgets.dox File Reference

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