

GLStereo

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Chapter 1

Overview

Introduction

GLStereo is a simple OpenGL stereo-view library written in C.

Build

To build the whole project, Code::Blocks is required.

Author

Sk. Mohammadul Haque

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Chapter 2

Data Structure Index

2.1 Data Structures

Here are the data structures with brief descriptions:

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--	---

Chapter 3

File Index

3.1 File List

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

glstereo.h	This file contains declarations of GLStereo structures and functions	11
glstereoerror.h	This file contains declarations of GLStereo error structures and functions	17
glstereomath.h	This file contains declarations of GLStereo math structures and functions	19
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Chapter 4

Data Structure Documentation

4.1 glstereoview Struct Reference

Data Fields

- float [baseline](#)
- float [refdepth](#)
- float [fov](#)
- float [nplane](#)
- float [fplane](#)
- float [aratio](#)
- [mat4f lfrustum](#)
- [mat4f rfrustum](#)
- [mat4f modelview](#)
- [vec4i lcmask](#)
- [vec4i rcmask](#)
- int [mono](#)

4.1.1 Field Documentation

4.1.1.1 aratio

```
float glstereoview::aratio
```

Camera aspect ratio

4.1.1.2 baseline

```
float glstereoview::baseline
```

Stereo baseline

4.1.1.3 fov

```
float glstereoview::fov
```

Camera field of view

4.1.1.4 fplane

```
float glstereoview::fplane
```

Camera far plane

4.1.1.5 lcmask

```
vec4i glstereoview::lcmask
```

Left colour mask

4.1.1.6 lfrustum

```
mat4f glstereoview::lfrustum
```

Left frustum matrix

4.1.1.7 modelview

```
mat4f glstereoview::modelview
```

Modelview matrix

4.1.1.8 mono

```
int glstereoview::mono
```

Whether monoview?

4.1.1.9 nplane

```
float glstereoview::nplane
```

Camera near plane

4.1.1.10 rcmask

```
vec4i glstereoview::rcmask
```

Right colour mask

4.1.1.11 refdepth

```
float glstereoview::refdepth
```

Stereo reference depth

4.1.1.12 rfrustum

```
mat4f glstereoview::rfrustum
```

Right frustum matrix

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

- [glstereo.h](#)

Chapter 5

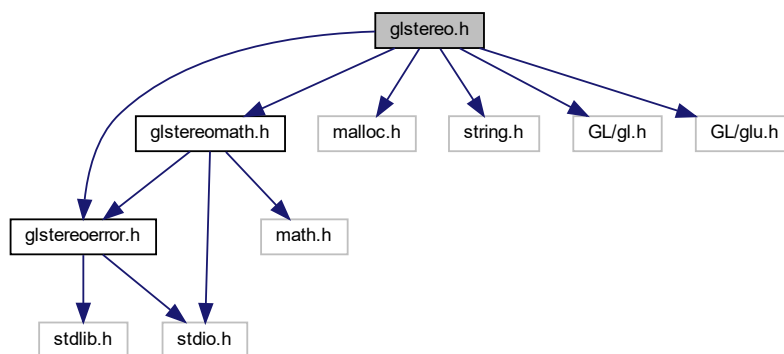
File Documentation

5.1 glstereo.h File Reference

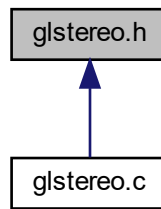
This file contains declarations of GLStereo structures and functions.

```
#include "glstereoerror.h"  
#include "glstereomath.h"  
#include <malloc.h>  
#include <string.h>  
#include <GL/gl.h>  
#include <GL/glu.h>
```

Include dependency graph for glstereo.h:



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



Data Structures

- struct [glstereoview](#)

Macros

- #define **_CRT_SECURE_NO_DEPRECATED**
- #define **GLSTEREO_RED_CYAN** (0)
- #define **GLSTEREO_GREEN_MAGENTA** (1)
- #define **GLSTEREO_MONO** (2)
- #define **__glstereo_set_frustum** ([glstereo_set_frustum](#))

Typedefs

- typedef struct [glstereoview](#) **glstereoview**
- typedef [glstereoview](#) * **GLSTEREOVIEW**

Functions

- [GLSTEREOVIEW glstereo_new](#) (float baseline, float refdepth, float fov, float nplane, float fplane, float aratio, int type)
Creates a new GLStereo structure.
- void [glstereo_delete](#) ([GLSTEREOVIEW](#) sv)
Deletes a given GLStereo structure.
- void [glstereo_set_frustum](#) ([mat4f](#) fst, float left, float right, float top, float bottom, float nplane, float fplane)
Sets a given frustum.
- void [glstereo_set_modelview](#) ([GLSTEREOVIEW](#) sv, [mat3f](#) R, [vec3f](#) t)
Sets a modelview to a given GLStereo structure.
- void [glstereo_load_modelview](#) ([GLSTEREOVIEW](#) sv, [mat4f](#) mv)
Loads a modelview from a given GLStereo structure.
- void [glstereo_left](#) ([GLSTEREOVIEW](#) sv)
Assigns left view as current to a given GLStereo structure.
- void [glstereo_right](#) ([GLSTEREOVIEW](#) sv)
Assigns right view as current to a given GLStereo structure.

5.1.1 Detailed Description

This file contains declarations of GLStereo structures and functions.

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Version

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5.1.2 Function Documentation

5.1.2.1 glstereo_delete()

```
void glstereo_delete (
    GLSTEREOVIEW sv )
```

Deletes a given GLStereo structure.

Parameters

in	sv	Given GLStereostructure
----	----	-------------------------

5.1.2.2 glstereo_left()

```
void glstereo_left (
    GLSTEREOVIEW sv )
```

Assigns left view as current to a given GLStereo structure.

Parameters

in	sv	Given GLStereostructure
----	----	-------------------------

5.1.2.3 glstereo_load_modelview()

```
void glstereo_load_modelview (
    GLSTEREOVIEW sv,
    mat4f mv )
```

Loads a modelview from a given GLStereo structure.

Parameters

in	sv	Given GLStereostructure
out	mv	Modelview matrix

5.1.2.4 glstereo_new()

```
GLSTEREOVIEW glstereo_new (
    float baseline,
    float refdepth,
    float fov,
    float nplane,
    float fplane,
    float aratio,
    int type )
```

Creates a new GLStereo structure.

Parameters

in	<i>baseline</i>	Stereo baseline
in	<i>refdepth</i>	Reference depth plane
in	<i>fov</i>	Camera field of view
in	<i>nplane</i>	Camera near plane
in	<i>fplane</i>	Camera far plane
in	<i>aratio</i>	Camera aspect-ratio
in	<i>type</i>	Stereo type (GLSTEREO_RED_CYAN/GLSTEREO_GREEN_MAGENTA/GLSTEREO_MONO)

Returns

Pointer to GLStereoview structure

5.1.2.5 glstereo_right()

```
void glstereo_right (
    GLSTEREOVIEW sv )
```

Assigns right view as current to a given GLStereo structure.

Parameters

in	sv	Given GLStereoview structure
----	----	------------------------------

5.1.2.6 glstereo_set_frustum()

```
void glstereo_set_frustum (
    mat4f fst,
    float left,
    float right,
    float top,
    float bottom,
    float nplane,
    float fplane )
```

Sets a given frustum.

Parameters

out	<i>fst</i>	Given frustum
in	<i>left</i>	Left plane
in	<i>right</i>	Right plane
in	<i>top</i>	Top plane
in	<i>bottom</i>	Bottom plane
in	<i>nplane</i>	Near plane
in	<i>fplane</i>	Far plane

5.1.2.7 glstereo_set_modelview()

```
void glstereo_set_modelview (
    GLSTEREOVIEW sv,
```

```
mat3f R,
vec3f t )
```

Sets a modelview to a given GLStereo structure.

Parameters

out	sv	Given GLStereostructure
in	R	Rotation matrix
in	t	Translation vector

5.2 glstereo.h

[Go to the documentation of this file.](#)

```
1
34 #ifndef __GLSTEREO_H__
35 #define __GLSTEREO_H__
36
37 #define _CRT_SECURE_NO_DEPRECATED
38 #ifdef __cplusplus
39 #define __GLSTEREO__CPP__
40 extern "C"
41 {
42 #endif
43
44 #include "glstereoerror.h"
45 #include "glstereomath.h"
46 #include <malloc.h>
47 #include <string.h>
48 #ifdef _MSC_VER
49 #include <windows.h>
50 #endif
51 #include <GL/gl.h>
52 #include <GL/glu.h>
53
54
55 #define GLSTEREO_RED_CYAN (0)
56 #define GLSTEREO_GREEN_MAGENTA (1)
57 #define GLSTEREO_MONO (2)
58
59
60 typedef struct glstereostructure
61 {
62     float baseline;
63     float refdepth;
64     float fov;
65     float nplane;
66     float fplane;
67     float aratio;
68     mat4f lfrustum;
69     mat4f rfrustum;
70     mat4f modelview;
71     vec4i lmask;
72     vec4i rmask;
73     int mono;
74 } glstereostructure;
75 typedef glstereostructure* GLSTEREOVIEW;
76
77 GLSTEREOVIEW glstereo_new(float baseline, float refdepth, float fov, float nplane, float fplane, float
    aratio, int type);
78
79 void glstereo_delete(GLSTEREOVIEW sv);
80
81 #define __glstereo_set_frustum (glstereo_set_frustum)
82
83 void glstereo_set_frustum(mat4f fst, float left, float right, float top, float bottom, float nplane,
    float fplane);
84
85
86 void glstereo_set_modelview(GLSTEREOVIEW sv, mat3f R, vec3f t);
87
88 void glstereo_load_modelview(GLSTEREOVIEW sv, mat4f mv);
89
90 void glstereo_left(GLSTEREOVIEW sv);
```

```
143
150 void glstereo_right(GLSTEREOVIEW sv);
151
152
153
154
155 #ifdef __cplusplus
156 }
157 #endif
158
159 #endif
160
```

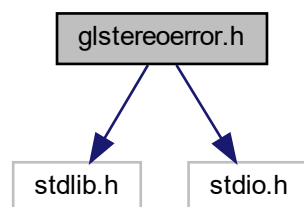
5.3 glstereoerror.h File Reference

This file contains declarations of GLStereo error structures and functions.

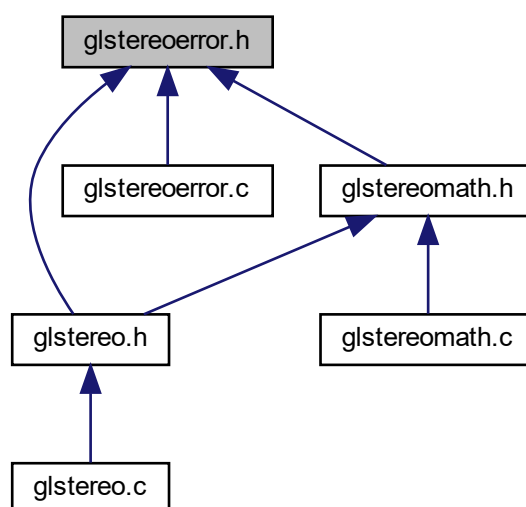
```
#include <stdlib.h>
```

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

Include dependency graph for glstereoerror.h:



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



Macros

- `#define GLSTEREO_ERROR_MALLOC 0`
- `#define GLSTEREO_ERROR_MATH 1`
- `#define GLSTEREO_ERROR_TYPE 2`
- `#define GLSTEREO_ERROR_UNKNOWN 3`

Functions

- void `glstereo_error` (int type)
Generates an error.

5.3.1 Detailed Description

This file contains declarations of GLStereo error structures and functions.

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Version

1.0.0.0

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5.3.2 Function Documentation

5.3.2.1 `glstereo_error()`

```
void glstereo_error (  
    int type )
```

Generates an error.

Parameters

in	type	error type (GLSTEREO_ERROR_MALLOC/GLSTEREO_ERROR_MATH/GLSTEREO_ERROR_TYPE/GLSTEREO_ERROR_UNKNOWN)
----	------	---

5.4 glstereoerror.h

[Go to the documentation of this file.](#)

```

1
34 #ifndef __GLSTEREOERROR_H__
35 #define __GLSTEREOERROR_H__
36
37 #include <stdlib.h>
38 #include <stdio.h>
39
40 #define GLSTEREO_ERROR_MALLOC 0
41 #define GLSTEREO_ERROR_MATH 1
42 #define GLSTEREO_ERROR_TYPE 2
43 #define GLSTEREO_ERROR_UNKNOWN 3
44
51 void glstereo_error(int type);
52
53 #endif
54

```

5.5 glstereomath.h File Reference

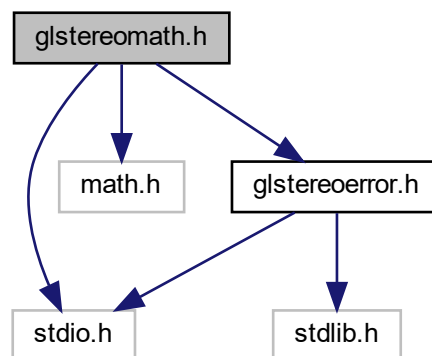
This file contains declarations of GLStereo math structures and functions.

```

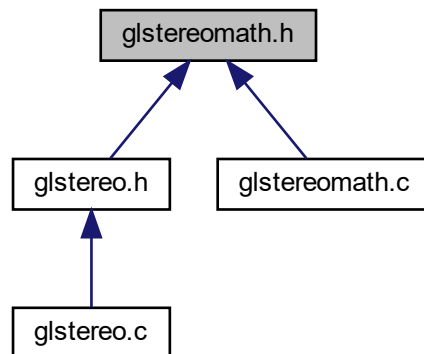
#include <stdio.h>
#include <math.h>
#include "glstereoerror.h"

```

Include dependency graph for glstereomath.h:



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



Macros

- #define `GLSTEREO_PI` (3.14159265359)

Typedefs

- typedef int `vec3i`[3]
- typedef int `vec4i`[4]
- typedef int `mat3i`[9]
- typedef int `mat4i`[16]
- typedef float `vec3f`[3]
- typedef float `vec4f`[4]
- typedef float `mat3f`[9]
- typedef float `mat4f`[16]

Functions

- void `glstereo_mat4_mul` (`mat4f` a, `mat4f` b, `mat4f` c)
Computes matrix-multiplication given two matrices.
- void `glstereo_mat4_transpose` (`mat4f` a)
Computes in-place matrix-transposition given a matrix.
- void `glstereo_mat4_disp` (`mat4f` a)
Displays a given matrix.
- void `glstereo_mat4_inv` (`mat4f` a, `mat4f` b)
Computes matrix-inverse given a matrix.
- void `glstereo_rot_vec3_to_mat4` (`mat4f` r, `vec3f` axis, float ang)
Computes matrix-representation given a rotation axis and a magnitude in degrees.

5.5.1 Detailed Description

This file contains declarations of GLStereo math structures and functions.

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5.5.2 Macro Definition Documentation

5.5.2.1 GLSTEREO_PI

```
#define GLSTEREO_PI (3.14159265359)
```

π

5.5.3 Typedef Documentation

5.5.3.1 mat3f

```
typedef float mat3f[9]
```

3x3-float matrix

5.5.3.2 mat3i

```
typedef int mat3i[9]
```

3x3-integer matrix

5.5.3.3 mat4f

```
typedef float mat4f[16]
```

4x4-float matrix

5.5.3.4 mat4i

```
typedef int mat4i[16]
```

4x4-integer matrix

5.5.3.5 vec3f

```
typedef float vec3f[3]
```

3-float vector

5.5.3.6 vec3i

```
typedef int vec3i[3]
```

3-integer vector

5.5.3.7 vec4f

```
typedef float vec4f[4]
```

4-float vector

5.5.3.8 vec4i

```
typedef int vec4i[4]
```

4-integer vector

5.5.4 Function Documentation

5.5.4.1 glstereo_mat4_disp()

```
void glstereo_mat4_disp (  
    mat4f a )
```

Displays a given matrix.

Parameters

in	<i>a</i>	Given matrix
----	----------	--------------

5.5.4.2 glstereo_mat4_inv()

```
void glstereo_mat4_inv (
    mat4f a,
    mat4f b )
```

Computes matrix-inverse given a matrix.

Parameters

in	<i>a</i>	Given matrix
out	<i>b</i>	Output inverse matrix

5.5.4.3 glstereo_mat4_mul()

```
void glstereo_mat4_mul (
    mat4f a,
    mat4f b,
    mat4f c )
```

Computes matrix-multiplication given two matrices.

Parameters

in	<i>a</i>	First given matrix
in	<i>b</i>	Second given matrix
out	<i>c</i>	Output result matrix

5.5.4.4 glstereo_mat4_transpose()

```
void glstereo_mat4_transpose (
    mat4f a )
```

Computes in-place matrix-transposition given a matrix.

Parameters

in	<i>a</i>	Given matrix
----	----------	--------------

5.5.4.5 glstereo_rot_vec3_to_mat4()

```
void glstereo_rot_vec3_to_mat4 (
    mat4f r,
    vec3f axis,
    float ang )
```

Computes matrix-representation given a rotation axis and a magnitude in degrees.

Parameters

out	<i>r</i>	Output transformation matrix
in	<i>axis</i>	Given rotation axis
in	<i>ang</i>	Given rotation angle in degrees

5.6 glstereomath.h

[Go to the documentation of this file.](#)

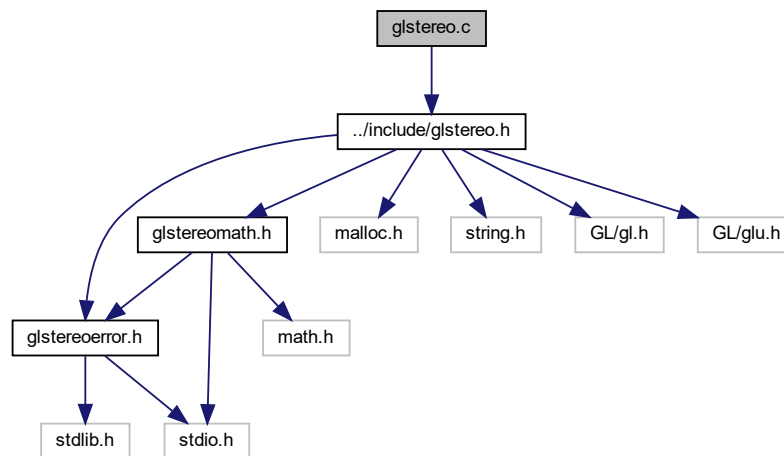
```
1
34 #ifndef __GLMATH_H__
35 #define __GLMATH_H__
36
37 #include <stdio.h>
38 #include <math.h>
39 #include "glstereoerror.h"
40
41 #define GLSTEREO_PI (3.14159265359)
42 typedef int vec3i[3];
43 typedef int vec4i[4];
44 typedef int mat3i[9];
45 typedef int mat4i[16];
46 typedef float vec3f[3];
47 typedef float vec4f[4];
48 typedef float mat3f[9];
49 typedef float mat4f[16];
50 void glstereo_mat4_mul(mat4f a, mat4f b, mat4f c);
51
52 void glstereo_mat4_transpose(mat4f a);
53
54 void glstereo_mat4_disp(mat4f a);
55
56 void glstereo_mat4_inv(mat4f a, mat4f b);
57
58 void glstereo_rot_vec3_to_mat4(mat4f r, vec3f axis, float ang);
59
60 #endif
```

5.7 glstereo.c File Reference

This file contains definitions of GLStereo structures and functions.

```
#include "../include/glstereo.h"
```

Include dependency graph for glstereo.c:



Functions

- [GLSTEREOVIEW glstereo_new](#) (float baseline, float refdepth, float fov, float nplane, float fplane, float aratio, int type)
Creates a new GLStereo structure.
- void [glstereo_delete](#) (GLSTEREOVIEW sv)
Deletes a given GLStereo structure.
- void [glstereo_set_frustum](#) (mat4f fst, float left, float right, float top, float bottom, float nplane, float fplane)
Sets a given frustum.
- void [glstereo_set_modelview](#) (GLSTEREOVIEW sv, mat3f R, vec3f t)
Sets a modelview to a given GLStereo structure.
- void [glstereo_load_modelview](#) (GLSTEREOVIEW sv, mat4f mv)
Loads a modelview from a given GLStereo structure.
- void [glstereo_left](#) (GLSTEREOVIEW sv)
Assigns left view as current to a given GLStereo structure.
- void [glstereo_right](#) (GLSTEREOVIEW sv)
Assigns right view as current to a given GLStereo structure.

5.7.1 Detailed Description

This file contains definitions of GLStereo structures and functions.

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Version

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5.7.2 Function Documentation

5.7.2.1 glstereo_delete()

```
void glstereo_delete (
    GLSTEREOVIEW sv )
```

Deletes a given GLStereo structure.

Parameters

in	sv	Given GLStereostructure
----	----	-------------------------

5.7.2.2 glstereo_left()

```
void glstereo_left (
    GLSTEREOVIEW sv )
```

Assigns left view as current to a given GLStereo structure.

Parameters

in	sv	Given GLStereostructure structure
----	----	-----------------------------------

5.7.2.3 glstereo_load_modelview()

```
void glstereo_load_modelview (
    GLSTEREOVIEW sv,
    mat4f mv )
```

Loads a modelview from a given GLStereo structure.

Parameters

in	sv	Given GLStereostructure structure
out	mv	Modelview matrix

5.7.2.4 glstereo_new()

```
GLSTEREOVIEW glstereo_new (
    float baseline,
    float refdepth,
    float fov,
    float nplane,
    float fplane,
    float aratio,
    int type )
```

Creates a new GLStereo structure.

Parameters

in	<i>baseline</i>	Stereo baseline
in	<i>refdepth</i>	Reference depth plane
in	<i>fov</i>	Camera field of view
in	<i>nplane</i>	Camera near plane
in	<i>fplane</i>	Camera far plane
in	<i>aratio</i>	Camera aspect-ratio
in	<i>type</i>	Stereo type (GLSTEREO_RED_CYAN/GLSTEREO_GREEN_MAGENTA/GLSTEREO_MONO)

Returns

Pointer to GLStereostructure structure

5.7.2.5 glstereo_right()

```
void glstereo_right (
    GLSTEREOVIEW sv )
```

Assigns right view as current to a given GLStereo structure.

Parameters

in	sv	Given GLStereostructure
----	----	-------------------------

5.7.2.6 glstereo_set_frustum()

```
void glstereo_set_frustum (
    mat4f fst,
    float left,
    float right,
    float top,
    float bottom,
    float nplane,
    float fplane )
```

Sets a given frustum.

Parameters

out	<i>fst</i>	Given frustum
in	<i>left</i>	Left plane
in	<i>right</i>	Right plane
in	<i>top</i>	Top plane
in	<i>bottom</i>	Bottom plane
in	<i>nplane</i>	Near plane
in	<i>fplane</i>	Far plane

5.7.2.7 glstereo_set_modelview()

```
void glstereo_set_modelview (
    GLSTEREOVIEW sv,
    mat3f R,
    vec3f t )
```

Sets a modelview to a given GLStereo structure.

Parameters

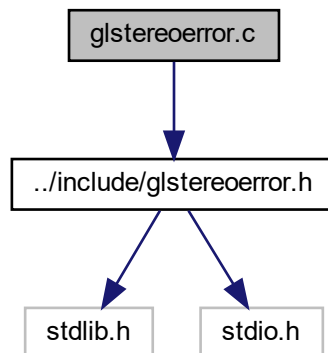
out	sv	Given GLStereostructure
in	<i>R</i>	Rotation matrix
in	<i>t</i>	Translation vector

5.8 glstereoerror.c File Reference

This file contains definitions of GLStereo error structures and functions.

```
#include "../include/glstereoerror.h"
```

Include dependency graph for glstereoerror.c:



Functions

- void `glstereo_error` (int type)
Generates an error.

5.8.1 Detailed Description

This file contains definitions of GLStereo error structures and functions.

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5.8.2 Function Documentation

5.8.2.1 glstereo_error()

```
void glstereo_error (
    int type )
```

Generates an error.

Parameters

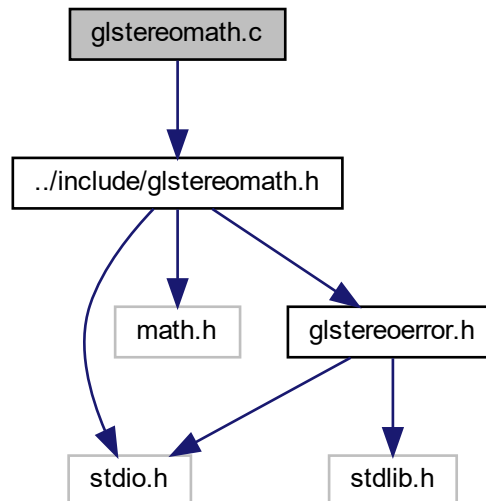
in	type	error type (GLSTEREO_ERROR_MALLOC/GLSTEREO_ERROR_MATH/GLSTEREO_ERROR_TYPE/GLSTEREO_ERROR_UNKNOWN)
----	------	---

5.9 glstereomath.c File Reference

This file contains definitions of GLStereo math structures and functions.

```
#include "../include/glstereomath.h"
```

Include dependency graph for glstereomath.c:



Functions

- void [glstereo_mat4_mul](#) ([mat4f](#) a, [mat4f](#) b, [mat4f](#) c)
Computes matrix-multiplication given two matrices.
- void [glstereo_mat4_transpose](#) ([mat4f](#) a)
Computes in-place matrix-transposition given a matrix.
- void [glstereo_mat4_disp](#) ([mat4f](#) a)
Displays a given matrix.
- void [glstereo_mat4_inv](#) ([mat4f](#) a, [mat4f](#) b)
Computes matrix-inverse given a matrix.
- void [glstereo_rot_vec3_to_mat4](#) ([mat4f](#) r, [vec3f](#) axis, float ang)
Computes matrix-representation given a rotation axis and a magnitude in degrees.

5.9.1 Detailed Description

This file contains definitions of GLStereo math structures and functions.

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5.9.2 Function Documentation

5.9.2.1 glstereo_mat4_disp()

```
void glstereo_mat4_disp (  
    mat4f a )
```

Displays a given matrix.

Parameters

in	<i>a</i>	Given matrix
----	----------	--------------

5.9.2.2 glstereo_mat4_inv()

```
void glstereo_mat4_inv (  
    mat4f a,  
    mat4f b )
```

Computes matrix-inverse given a matrix.

Parameters

in	<i>a</i>	Given matrix
out	<i>b</i>	Output inverse matrix

5.9.2.3 glstereo_mat4_mul()

```
void glstereo_mat4_mul (
    mat4f a,
    mat4f b,
    mat4f c )
```

Computes matrix-multiplication given two matrices.

Parameters

in	<i>a</i>	First given matrix
in	<i>b</i>	Second given matrix
out	<i>c</i>	Output result matrix

5.9.2.4 glstereo_mat4_transpose()

```
void glstereo_mat4_transpose (
    mat4f a )
```

Computes in-place matrix-transposition given a matrix.

Parameters

in	<i>a</i>	Given matrix
----	----------	--------------

5.9.2.5 glstereo_rot_vec3_to_mat4()

```
void glstereo_rot_vec3_to_mat4 (
    mat4f r,
    vec3f axis,
    float ang )
```

Computes matrix-representation given a rotation axis and a magnitude in degrees.

Parameters

out	<i>r</i>	Output transformation matrix
in	<i>axis</i>	Given rotation axis
in	<i>ang</i>	Given rotation angle in degrees

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