GLStereo

Generated by Doxygen 1.9.4

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:

Chapter 3

File Index

3.1 File List

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

Chapter 4

Data Structure Documentation

4.1 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

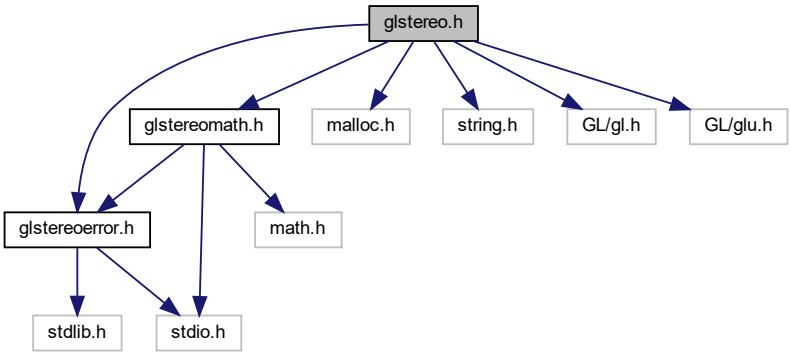
File Documentation

5.1 glstereo.h File Reference

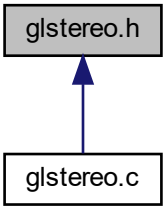
This file contains declarations of GLStereo structures and functions.

```
#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_DEPRECATE**
- #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.

Author

Sk. Mohammadul Haque

Version

1.0.0.0

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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 GLStereoview structure

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 GLStereoview structure

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 GLStereoview structure
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	*baseline*	Stereo baseline
in	*refdepth*	Reference depth plane
in	*fov*	Camera field of view
in	*nplane*	Camera near plane
in	*fplane*	Camera far plane
in	*aratio*	Camera aspect-ratio
in	*type*	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	*fst*	Given frustum
in	*left*	Left plane
in	*right*	Right plane
in	*top*	Top plane
in	*bottom*	Bottom plane
in	*nplane*	Near plane
in	*fplane*	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 GLStereoview structure
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_DEPRECATE
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 glstereoview
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 lcmask;
72     vec4i rcmask;
73     int mono;
74 } glstereoview;
75 typedef glstereoview* GLSTEREOVIEW;
76
90 GLSTEREOVIEW glstereo_new(float baseline, float refdepth, float fov, float nplane, float fplane, float
       aratio, int type);
91
98 void glstereo_delete(GLSTEREOVIEW sv);
99
100 #define __glstereo_set_frustum (glstereo_set_frustum)
101
114 void glstereo_set_frustum(mat4f fst, float left, float right, float top, float bottom, float nplane,
       float fplane);
115
116
125 void glstereo_set_modelview(GLSTEREOVIEW sv, mat3f R, vec3f t);
126
134 void glstereo_load_modelview(GLSTEREOVIEW sv, mat4f mv);
135
142 void glstereo_left(GLSTEREOVIEW sv);
```

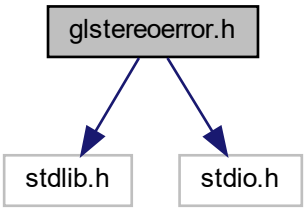
```
143
150 void glstereo_right(GLSTEREOVIEW sv);
151
152
153
154
155 #ifdef __cplusplus
156 }
157 #endif
158
159 #endif
160
```

5.3 glstereoerror.h File Reference

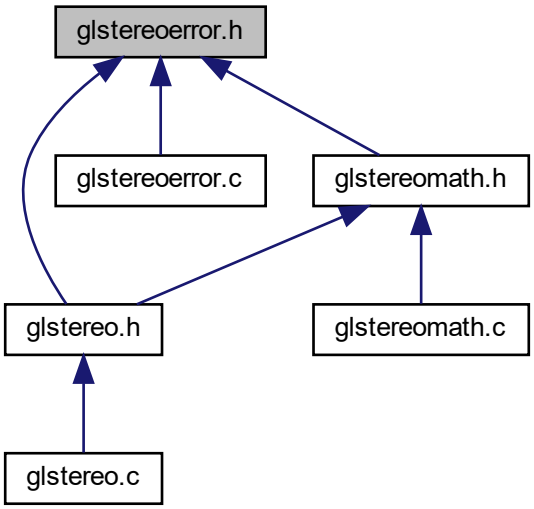
This file contains declarations of GLStereo error structures and functions.

```
#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.

Author

Sk. Mohammadul Haque

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.

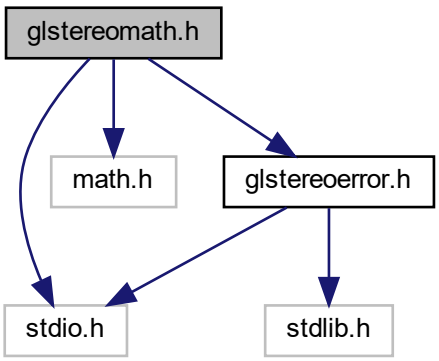
```
1
34 #ifndef __GLSTEREOERROR_H__
35 #define __GLSTEREOERROR_H__
36
37 #include <stdlib.h>
38 #include <stdio.h>
39
40 #define GLSTEREO_ERROR_MALLOC 0
41 #define GLSTEREO_ERROR_MATH 1
42 #define GLSTEREO_ERROR_TYPE 2
43 #define GLSTEREO_ERROR_UNKNOWN 3
44
51 void glstereo_error(int type);
52
53 #endif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

5.5 glstereomath.h File Reference

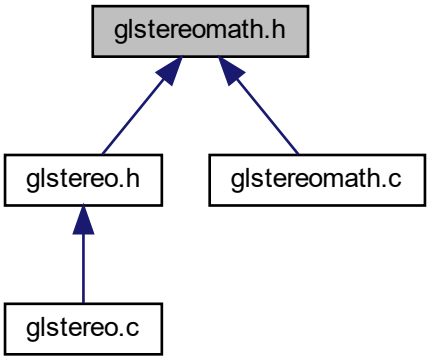
This file contains declarations of GLStereo math structures and functions.

```
#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.

Author

Sk. Mohammadul Haque

Version

1.0.0.0

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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	*a*	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	*a*	Given matrix
out	*b*	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	*a*	First given matrix
in	*b*	Second given matrix
out	*c*	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	*a*	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	*r*	Output transformation matrix
in	*axis*	Given rotation axis
in	*ang*	Given rotation angle in degrees

5.6 glstereomath.h

Go to the documentation of this file.

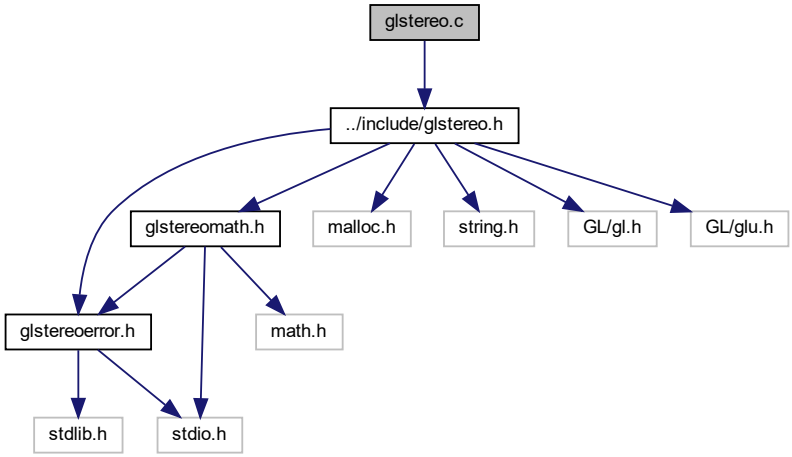
```
1
34 #ifndef __GLMATH_H__
35 #define __GLMATH_H__
36
37 #include <stdio.h>
38 #include <math.h>
39 #include "glstereoerror.h"
40
41 #define GLSTEREO_PI (3.14159265359)
44 typedef int vec3i[3];
45 typedef int vec4i[4];
46 typedef int mat3i[9];
47 typedef int mat4i[16];
48 typedef float vec3f[3];
49 typedef float vec4f[4];
50 typedef float mat3f[9];
51 typedef float mat4f[16];
61 void glstereo_mat4_mul(mat4f a, mat4f b, mat4f c);
62
69 void glstereo_mat4_transpose(mat4f a);
70
77 void glstereo_mat4_disp(mat4f a);
78
86 void glstereo_mat4_inv(mat4f a, mat4f b);
87
96 void glstereo_rot_vec3_to_mat4(mat4f r, vec3f axis, float ang);
97
98 #endif
99
```

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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Author

Sk. Mohammadul Haque

Version

1.0.0.0

Copyright

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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 GLStereoview structure

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

Returns

Pointer to GLStereoview 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 GLStereoview structure

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	*fst*	Given frustum
in	*left*	Left plane
in	*right*	Right plane
in	*top*	Top plane
in	*bottom*	Bottom plane
in	*nplane*	Near plane
in	*fplane*	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

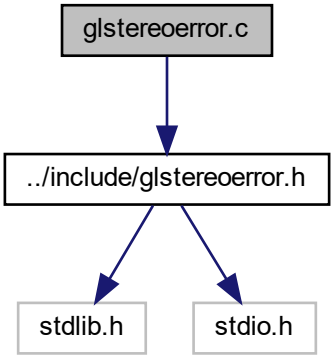
out	*sv*	Given GLStereoview structure
in	*R*	Rotation matrix
in	*t*	Translation vector

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.

Author

Sk. Mohammadul Haque

Version

1.0.0.0

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5.8.2 Function Documentation

5.8.2.1 glstereo_error()

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

Generates an error.

Parameters

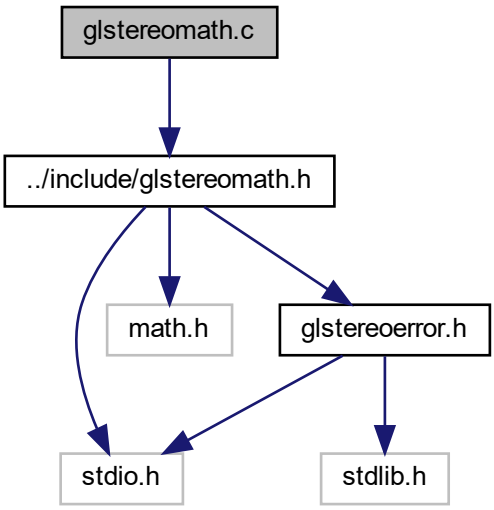
in	*type*	error type (GLSTEREO_ERROR_MALLOC/GLSTEREO_ERROR_MATH/GLSTEREO_↩ ERROR_TYPE/GLSTEREO_ERROR_UNKNOWN)

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.

Author

Sk. Mohammadul Haque

Version

1.0.0.0

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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	*a*	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	*a*	Given matrix
out	*b*	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	*a*	First given matrix
in	*b*	Second given matrix
out	*c*	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	*a*	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	*r*	Output transformation matrix
in	*axis*	Given rotation axis
in	*ang*	Given rotation angle in degrees

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