NAME

PEXViewMappingMatrix - utility function

SYNTAX

int PEXViewMappingMatrix(PEXCoord2D **frame*, PEXNPCSubVolume **viewport*, int *perspective*, PEXCoord **prp*, double *view_plane*, double *back_plane*, double *front_plane*, PEXMatrix *matrix_return*)

PARAMETERS

frame	Array of 2 2D VRC locations which mark a rectangle in the view plane.
viewport	NPC viewport into which the frame gets mapped.
perspective	Flag to indicate whether a perspective view is desired, a value of **True.** Requests that perspective be applied.
prp	Projection reference point.
view_plane	VRC position of view plane w.r.t. the VRP.
back_plane	VRC position of the back plane w.r.t. the VRP.
front_plane	VRC position of the front plane w.r.t. the VRP.
matrix_return	Matrix into which result is stored.

RETURNS

Zero if successful; otherwise, one of the following:

PEXBadLimits
PEXBadViewport
PEXBadPlanes
PEXBadPRP

DESCRIPTION

This function creates a view mapping matrix that transforms a volume specified in view reference coordinates (VRC) to a volume in normalized projection coordinates (NPC). This matrix is used in conjunction with a view orientation matrix as the viewing matrices for a designated view.

The axes of VRC form a right-handed coordinate system. The z axis is along the VPN (view plane normal, see The Y axis is fixed by VUP, and the X axis is determined so that the three axes form a right-handed coordinate system.

The front plane, back plane, and view plane all define planes in VRC parallel to the VRC x-y plane. The location of *front_plane* and *back_plane* along the z axis of VRC defines the front and back of the volume of VRC that will be mapped to the specified NPC viewport. The view plane locates the view frame or "window" on the VRC z axis. The two points in frame determine the size of the view window by specifying lower left (frame[0]) and upper right (frame[1]) x and y VRC points of the window on the view plane. These values taken together establish the volume of VRC space that is mapped into the NPC viewport.

The type of projection may be parallel or perspective. The projection reference point (PRP) orients the projectors defining the surfaces of the view volume. If perspective indicator is **False,** then the projection type is parallel and the projectors are all parallel to the vector joining the projection reference point and the center of the view window (located on the view plane). If perspective is **True,** then the projectors all converge at the projection reference point. Thus, the view volume is a parallelpiped for parallel views, and a truncated pyramid for perspective views.

When specifying NPC, the X, Y and Z limits must be as follows:

xmin < xmax , ymin < ymax , zmin <= zmax

DATA STRUCTURES

```
typedef struct {
        PEXCoord        min;
        PEXCoord        max;
} PEXNPCSubVolume;
```

See **PEXlib.h.**

ERRORS

None

SEE ALSO

PEXViewMappingMatrix2D(3)
PEXViewOrientationMatrix(3)
PEXViewOrientationMatrix2D(3)