

Appendix B

Vertex Flags

```
#define pluginVertexColorFlag    31          /* Set when a group has vertex colors */
#define pluginVertexNormalFlag  30          /* Set when a group has vertex normals */
#define pluginVertexTextureFlag 29          /* Set when a group has vertex texture
positions */
#define pluginVertexBlurFlag     28          /* Set when a group has vertex motion blur
positions */
```

The vertex flags are used by the host to keep track of which additional values are stored with each vertex. Every vertex record contains x, y and z position coordinates. A vertex record may also contain an ARGB color value, a 3D surface normal, a 3D texture position and a 3D motion blur position. If a model plug-in creates its own custom groups, it will usually use the vertex flags supplied by the host in the `PluginModelSetup` command. It can override any of the vertex flags by enabling or disabling the respective bit in the `theGroupVertexFlags` field of the `HostModelAddGroup` command record.

Vertex colors may be used to smoothly blend between colors across the model's surface. The Mr. Nitro plug-in sets vertex colors so that the model appears to change color as it explodes. Other applications for vertex colors would be pre-computed radiosity shading and finite element analysis.

Vertex normals are used to smoothly shade a polygon surface. If a plug-in is generating its own model data, it will need to compute a surface normal for each vertex if it wishes the model to have smooth appearance when rendered. If a group's vertex normal flag is not set, it will have a faceted appearance when rendered.

Vertex texture positions can be used to create animated models with textures which 'stick' to their surfaces. The Mesh plug-in creates vertex texture positions which allow a flat textured plane to warp into a sphere. A model which has texture vertices has two different shapes, one in the camera's space and one in its texture's space. At a particular frame, the mesh appears to have some intermediate shape between a flat plane and a sphere. In texture space, however, the mesh remains as a flat grid. This trick allows the texture to remain 'stuck' to the mesh regardless of how the vertices change in relation to the camera. Vertex texture positions can also be used to create custom texture applications. If every facet had its texture vertex positions set to the corners of a unit square, the texture applied to the group would appear to be mapped to each individual facet.

Vertex motion blur positions are used to store the vertex position at the previous frame of the animation. This information is used while rendering to produce motion blur streaks.