

SOD Files

What is an SOD?

[Star Trek: Armada](#) is based on the [Storm3D Engine](#) which was introduced with [Battlezone](#). As such it uses basically the same technology. *Storm3D Object Definition* files, or SODs for short, are Battlezone's/Armada's means of defining three dimensional objects, including their texture/material use, [mesh](#) definition and [model hierarchy](#). In essence, they form the models of units, stations and other 3D objects of the game.

Location and Contents of SODs

They are placed in *SOD* folder of the game installation folder. They do not come with the texture files included in themselves. Those are still placed in folder *Textures\RGB* in form of TGA files. But their names are referenced by the SODs. Together with [sprites](#) and [emitters](#) they form the full model, that can then be used by [ODF Files](#).

The 3D mesh part of the model must be created/modified with some sort of 3D modeling tool, such as [Storm3D Tool](#), [Milkshape 3D](#) or [3DS Max](#). But usually they require some sort of importer and exporter to make SODs usable. The application of textures is also very often done with the same tools, while the creation of such textures is done with graphics programs such as [GIMP](#).

The node hierarchy is also applied by the modeling tools, but depending on which you use, you might need another one to get it working properly. (E.g. *Milkshape 3D* is not particularly well suited for the directing of nodes, but at least you can create and place them.) The sprites and emitters are described somewhere else, but must be made referenced by the hierarchy by name.

Format of SODs

The following is taken from the document created by Steve Williams. You can find this original source in section [Web Links](#).

Data Types Used

SODs are for the most part binary content files. This article describes version 1.8 of the SOD format. To understand how SODs work, you need to know the following data types:

Datatype Name	Format
UINT8	unsigned 8 bit integer
UINT16	unsigned 16 bit integer
UINT32	unsigned 32 bit integer
FLOAT	4 bit floating point number
VECTOR2	two FLOATs, u and v

Datatype Name	Format
VECTOR3	three FLOATs, x, y and z
MATRIX34	four VECTOR3s, Right, Up, Front, Position, note: Matrices must be orthogonal
COLOR	three FLOATs, red, green and blue, each with values between 0.0 and 1.0
TYPE ARRAY(<i>number</i>)	An array of <i>number</i> values of type <i>TYPE</i>
IDENTIFIER	one UINT16, making up the length of the following string, then UINT8 ARRAY(<i>length of the string</i>), the actual string. Note: The length of the string is mandatory, but for a string of length 0 the contents following were of course of length zero (nothing). So the shortest IDENTIFIER you may encounter is of 2 bytes length.

File Structure

An SOD consists of five sections:

1. File header,
2. list of lighting materials
3. node hierarchy definition (recursively, starting with the *root* node).
4. animation channels and
5. animation references.

File Header

Every SOD starts with the ASCII string `Storm3D_SW`, followed by the version of the used format in form of one FLOAT value. So the header always has the length of 14 bytes. For *Star Trek: Armada* the version is 1.8, making the 4 version bytes always be `0x66 0x66 0xE6 0x3D`.

Lighting Materials

The second section of an SOD contains the characteristics of the vertex lighting materials. To understand this, we need some more definitions.

The surface lighting can use [Phong reflectivity model](#) or [Lambertian reflectance](#). The model used can be one of the following three:

LIGHTING_MODEL:

Type	Number
Constant	0
Lambert	1
Phong	2

Each surface can use a lighting material, which is defined like this:

LIGHTING_MATERIAL:

Data Type	Meaning
IDENTIFIER	Name of the lighting material

Data Type	Meaning
COLOR	Ambient lighting component
COLOR	Diffuse lighting component
COLOR	Specular lighting component (using Phong reflection model]]])
FLOAT	Specular power exponent, the »shinyness« of the Phong reflection material
UINT8	LIGHTING_MODEL

The full list of lighting materials consists of the following information:

1. UINT16: The number of materials defined in the SOD.
2. LIGHTING_MATERIAL ARRAY(<number of materials>).

Web Links

- [Storm3D Object Definition \(SOD\) File Format on Armada Files](#)
- [Storm3D Object Definition \(SOD\) File Format on DS-Servers](#)
- [Storm3D Object Definition \(SOD\) File Format on GameFront](#)

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