

## 3D Studio File Format Information (3dsinfo.txt)

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### Introduction

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The information contained in this file is only collected by me. The credits go to the following people (in alphabetical order):

Christophe Chabanois (Wolverine / Apocalypse)  
Jim Pitts  
Niklas Beisert (Pascal / 4711)

I think some more people did a good job in discovering unknown chunks, but I don't know them all. The layout is based on 3dsffo10.txt from Christophe Chabanois. I did not include any source code from this info, because it was of no use to me. I used only the standard character set for compatibility with other operating systems.

My own extensions and corrections are:

- Corrected the hierarchy levels of some chunks, especially the material editor chunk and the spotlight sub-chunks are at the wrong place in some docs
- Documented some spotlight and material sub-chunks
- Documented most tracks
- Made a consistent layout for all chunk descriptions

My reader is written in object oriented C++ and can read the chunks only if they are in the right hierarchy position. It keeps the structure of the 3DS file in memory and does not jam all vertices into one big array. It also can write this structure back to a 3DS file. This gave me the possibility to convert the data of my world-editor into a 3DS file to see where to place the animated objects. If you want to convert a mesh object into a 3DS file, you just need this chunk structure:

0x4D4D	Main chunk
0x3D3D	3D editor chunk
0x4000	Object block (with name of your object)
0x4100	Triangular mesh
0x4110	Your vertices
0x4120	Your faces

The internal reader of 3DS sets all other things to their defaults. The "auto edge" function is good if you don't want to set the face flags.

## Index

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### 1. Fast reference : The chunk tree

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This will help you to find rapidly a chunk number and its description.

### 2. A chunk - What's that ?

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This will explain what a chunk is and help programmers understand the general concept of the 3DS file format.

### 3. Data types

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This short section will describe all data types used.

### 4. Chunks description

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This is the most important part of the document. It describes the chunks.

## 1. Fast reference : The chunk tree

=====

### Color chunks

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0x0010 : Rgb (float)  
0x0011 : Rgb (byte)  
0x0012 : Rgb (byte) gamma corrected  
0x0013 : Rgb (float) gamma corrected

### Percent chunks

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0x0030 : percent (int)  
0x0031 : percent (float)

### 0x4D4D : Main chunk

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0x0002 : 3DS-Version

### 0x3D3D : 3D editor chunk

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0x0100 : One unit  
0x1100 : Background bitmap  
0x1101 : Use background bitmap  
0x1200 : Background color  
0x1201 : Use background color  
0x1300 : Gradient colors

0x1301 : Use gradient  
0x1400 : Shadow map bias  
0x1420 : Shadow map size  
0x1450 : Shadow map sample range  
0x1460 : Raytrace bias  
0x1470 : Raytrace on  
0x2100 : Ambient color

0x2200 : Fog  
    0x2210 : fog background  
0x2201 : Use fog  
0x2210 : Fog background

0x2300 : Distance queue  
    0x2310 : Dim background  
0x2301 : Use distance queue  
0x2302 : Layered fog options  
0x2303 : Use layered fog

0x3D3E : Mesh version

0x4000 : Object block  
-----  
    0x4010 : Object hidden  
    0x4012 : Object doesn't cast  
    0x4013 : Matte object  
    0x4015 : External process on  
    0x4017 : Object doesn't receive shadows

0x4100 : Triangular mesh  
    0x4110 : Vertices list  
    0x4120 : Faces description  
        0x4130 : Faces material list  
    0x4140 : Mapping coordinates list  
        0x4150 : Smoothing group list  
    0x4160 : Local coordinate system  
    0x4165 : Object color in editor

    0x4181 : External process name  
    0x4182 : External process parameters

0x4600 : Light  
    0x4610 : Spotlight  
        0x4627 : Spot raytrace  
        0x4630 : Light shadowed  
        0x4641 : Spot shadow map  
        0x4650 : Spot show cone  
        0x4651 : Spot is rectangular  
        0x4652 : Spot overshoot  
        0x4653 : Spot map  
        0x4656 : Spot roll  
        0x4658 : Spot ray trace bias

0x4620 : Light off  
0x4625 : Attenuation on  
0x4659 : Range start  
0x465A : Range end  
0x465B : Multiplier

0x4700 : Camera

0x7001 : Window settings  
0x7011 : Window description #2 ...  
0x7012 : Window description #1 ...  
0x7020 : Mesh windows ...

0xAFFF : Material block  
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0xA000 : Material name

0xA010 : Ambient color  
0xA020 : Diffuse color  
0xA030 : Specular color

0xA040 : Shininess percent  
0xA041 : Shininess strength percent

0xA050 : Transparency percent  
0xA052 : Transparency falloff percent  
0xA053 : Reflection blur percent

0xA081 : 2 sided  
0xA083 : Add trans  
0xA084 : Self illum  
0xA085 : Wire frame on  
0xA087 : Wire thickness  
0xA088 : Face map  
0xA08A : In trunc  
0xA08C : Soften  
0xA08E : Wire in units

0xA100 : Render type

0xA240 : Transparency falloff percent present  
0xA250 : Reflection blur percent present  
0xA252 : Bump map present (true percent)

0xA200 : Texture map 1  
0xA33A : Texture map 2  
0xA210 : Opacity map  
0xA230 : Bump map  
0xA33C : Shininess map  
0xA204 : Specular map

0xA33D : Self illum. map  
0xA220 : Reflection map  
0xA33E : Mask for texture map 1  
0xA340 : Mask for texture map 2  
0xA342 : Mask for opacity map  
0xA344 : Mask for bump map  
0xA346 : Mask for shininess map  
0xA348 : Mask for specular map  
0xA34A : Mask for self illum. map  
0xA34C : Mask for reflection map

Sub-chunks for all maps:

0xA300 : Mapping filename  
0xA351 : Mapping parameters  
0xA353 : Blur percent  
0xA354 : V scale  
0xA356 : U scale  
0xA358 : U offset  
0xA35A : V offset  
0xA35C : Rotation angle  
0xA360 : RGB Luma/Alpha tint 1  
0xA362 : RGB Luma/Alpha tint 2  
0xA364 : RGB tint R  
0xA366 : RGB tint G  
0xA368 : RGB tint B

0xB000 : Keyframer chunk

-----  
0xB001 : Ambient light information block  
0xB002 : Mesh information block  
0xB003 : Camera information block  
0xB004 : Camera target information block  
0xB005 : Omni light information block  
0xB006 : Spot light target information block  
0xB007 : Spot light information block  
0xB008 : Frames (Start and End)  
0xB010 : Object name, parameters and hierarchy father  
0xB013 : Object pivot point  
0xB015 : Object morph angle  
0xB020 : Position track  
0xB021 : Rotation track  
0xB022 : Scale track  
0xB023 : FOV track  
0xB024 : Roll track  
0xB025 : Color track  
0xB026 : Morph track  
0xB027 : Hotspot track  
0xB028 : Falloff track  
0xB029 : Hide track  
0xB030 : Hierarchy position

## 2. A chunk - What's that ?

=====

### 1 - What is a chunk ?

-----

The 3D studio file format is compounded of several "chunks". What is a "chunk" ? Well, that's quite simple.

Each chunk contains information : for example, it can contain colors, images ... All tools which use the "chunk" method make file formats like this:

```
1st chunk
2nd chunk
3rd chunk
...
nth chunk
```

### 2 - What is a "sub-chunk" ?

-----

But, there are several problems with this format :

- The data are all at same level (an image is as important as the name of an object ...)
- A general concept can't group several things.

This is why there are "sub-chunks".

In fact, each chunk can contain several sub-chunks :

```
1st chunk
  1st sub-chunk
  2nd sub-chunk
2nd chunk
3rd chunk
  1st sub-chunk
    1st sub-sub-chunk
...
Nth chunk
```

### 3 - How to read chunks ?

-----

This is the representation of a chunk :

Offset	Length	Name
0	2	Chunk-ID

2	4	Chunk-length = 6+n+m
6	n	Data
6+n	m	Sub-chunks

So don't forget to read or skip the sub-chunks if the header and data size is less than the chunk-length ( $6+n < \text{chunk-length}$ ).

### 3. Data types

=====

Name	Description
word	2 byte
dword	4 byte
float	4 byte floating point number
strz	zero terminated string (C-string)
vector	3 floats (X,Y,Z)
BOOLEAN chunks	a BOOLEAN chunk acts as a flag and contains no data or sub-chunks
degree	angle from 0 to 360 degree
rad	angle from 0 to 2*pi

Note: If X and Y are the horizontal plane and Z is the height in your world, you don't have to exchange Y and Z. Some other infos say that you have to exchange Y and Z only in the keyframer chunk, but you have to treat all vectors the same way.

### 4. Chunks description

=====

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#### Color chunks

-----

These chunks are used several times in the format, they are "global chunks".

-----  
--

Chunk #	: 0x0010
Name	: Rgb color (float format)
Level	: global chunk
Size	: 12
Format	:

float	red
float	green

float blue

This chunk contains 3 floats : the red, green and blue components of a color. The values range from 0.0 to 1.0 (full intensity).

-----

--

Chunk # : 0x0011  
Name : Rgb color (byte format)  
Level : global chunk  
Size : 3  
Format :

byte red  
byte green  
byte blue

This chunk contains 3 bytes : the red, green and blue components of a color. The values range from 0 to 255 (full intensity).

-----

--

Chunk # : 0x0012  
Name : Rgb color gamma corrected (byte format)  
Level : global chunk  
Size : 3  
Format :

byte red  
byte green  
byte blue

This chunk contains 3 bytes : the red, green and blue components of a gamma corrected color. The values range from 0 to 255 (full intensity).

-----

--

Chunk # : 0x0013  
Name : Rgb color gamma corrected (float format)  
Level : global chunk  
Size : 12  
Format :

float red  
float green  
float blue

This chunk contains 3 floats : the red, green and blue components of a gamma corrected color. The values range from 0.0 to 1.0 (full intensity).

-----

--

Percent chunks

-----  
--  
Chunk # : 0x0030  
Name : percent (int format)  
Level : global chunk  
Size : 2  
Format :  
  
word percent

This chunk contains a word. The values range from 0 to 100.

-----  
--  
Chunk # : 0x0031  
Name : percent (float format)  
Level : global chunk  
Size : 4  
Format :  
  
float percent

This chunk contains a float. The values range from 0 to 100.

=====  
==

M A I N C H U N K  
=====

=====  
==  
Chunk # : 0x4D4D  
Name : Main chunk  
Level : 0  
Size : 0 + sub-chunks  
Father : none  
Format :

-----  
--  
Chunk # : 0x0002  
Name : 3DS-Version  
Level : 1  
Size : 4  
Father : 0x4D4D (Main chunk)  
Format :

dword    Version

This dword specifies the number of your 3DS-Version.

=====  
==

3 D E D I T O R C H U N K  
=====

=====  
==

Chunk #     : 0x3D3D  
Name        : 3D Editor chunk  
Level       : 1  
Size        : 0 + sub-chunks  
Father      : 0x4D4D (Main chunk)  
Format      :

-----  
--

Chunk #     : 0x0100  
Name        : One unit  
Level       : 2  
Size        : 4  
Father      : 3D Editor chunk  
Format      :

float    One unit

-----  
--

Chunk #     : 0x1100  
Name        : Background bitmap  
Level       : 2  
Size        : varying  
Father      : 3D Editor chunk  
Format      :

strz    Name

This chunk contains the name of the background bitmap chosen in 3DS even if not used (i.e. you have selected a bitmap but you choose another thing).

-----  
--

Chunk #     : 0x1101  
Name        : Use background bitmap  
Level       : 2  
Size        : 0  
Father      : 3D Editor chunk  
Format      : BOOLEAN

This chunk is a flag indicating that the background bitmap (see chunk 0x1100) is used. When this chunk is not present, the background bitmap is not used.

---

--  
Chunk # : 0x1200  
Name : Background color  
Level : 2  
Size : 0 + sub-chunks  
Father : 3D Editor chunk  
Format :

This chunk contains the color of the background even if not used. You must read the color sub-chunks. Generally, the format is :

- Background color chunk (0x1200)
- RGB float color chunk (0x0010)
- RGB float gamma corrected color chunk (0x0013)

---

--  
Chunk # : 0x1201  
Name : Use background color  
Level : 2  
Size : 0  
Father : 3D Editor chunk  
Format : BOOLEAN

This chunk is a flag indicating that the background color (see chunk 0x1200) is used. When this chunk is not present, the background color is not used.

---

--  
Chunk # : 0x1300  
Name : Background gradient colors  
Level : 2  
Size : 4 + sub-chunks  
Father : 3D Editor chunk  
Format :

float Gradient position  
color chunk RGBF1  
color chunk RGBFG1  
color chunk RGBF2  
color chunk RGBFG2  
color chunk RGBF3  
color chunk RGBFG3

RGBF = RGB float color CHUNK

RGBFG = RGB gamma corrected float color CHUNK

So, if hexa you have something like that

00 13 76 00 00 00 21 CE 4A 3F 10 00 12 00 00 00 .....

\* 00 13 is the chunk ID (0x1300) and 76 00 00 00 is the length of this chunk.

\* 21 CE 4A 3F are values which contain the "position" of the three gradient colors. It's a float (from 0.0 to 1.0) indicating the position of the middle color.

\* 10 00 is the chunk ID (0x0010) of a rgb float color and 12 00 00 00 is the length of this sub-chunk.

-----  
--

Chunk # : 0x1301  
Name : Use background gradient colors  
Level : 2  
Size : 0  
Father : 3D Editor chunk  
Format : BOOLEAN

This chunk is a flag indicating that the background gradient colors (see chunk 0x1300) are used. When this chunk is not present, the gradient colors are not used.

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--

Chunk # : 0x1400  
Name : Shadow map bias  
Level : 2  
Size : 4  
Father : 3D Editor chunk  
Format :

float Shadow map bias

-----  
--

Chunk # : 0x1420  
Name : Shadow map size  
Level : 2  
Size : 2  
Father : 3D Editor chunk  
Format :

word Shadow map size

-----

--  
Chunk # : 0x1450  
Name : Shadow map sample range  
Level : 2  
Size : 4  
Father : 3D Editor chunk  
Format :

float Shadow map sample range

---

--  
Chunk # : 0x1460  
Name : Raytrace bias  
Level : 2  
Size : 4  
Father : 3D Editor chunk  
Format :

float Raytrace bias

---

--  
Chunk # : 0x1470  
Name : Use raytrace  
Level : 2  
Size : 0  
Father : 3D Editor chunk  
Format : BOOLEAN

This chunk is a flag indicating that raytrace (see chunk 0x1460) is used.  
When this chunk is not present, the raytrace is not used.

---

--  
Chunk # : 0x2100  
Name : Ambient color  
Level : 2  
Size : 0 + sub-chunk  
Father : 3D Editor chunk  
Format :

This chunk contains a color chunk (in general RGB float)

---

--  
0x4000 : OBJECT BLOCK  
-----  
-----  
--

Chunk # : 0x4000  
Name : OBJECT BLOCK  
Level : 2  
Size : varying + sub-chunks  
Father : 0x3D3D (3D Editor chunk)  
Format :

strz Object name

-----

--

Chunk # : 0x4010  
Name : Object hidden  
Level : 3  
Size : 0  
Father : 0x4000 (Object block)  
Format : BOOLEAN

-----

--

Chunk # : 0x4012  
Name : Object doesn't cast  
Level : 3  
Size : 0  
Father : 0x4000 (Object block)  
Format : BOOLEAN

-----

--

Chunk # : 0x4013  
Name : Matte object  
Level : 3  
Size : 0  
Father : 0x4000 (Object block)  
Format : BOOLEAN

-----

--

Chunk # : 0x4015  
Name : External process on  
Level : 3  
Size : 0  
Father : 0x4000 (Object block)  
Format : BOOLEAN

-----

--

Chunk # : 0x4017  
Name : Object doesn't receive shadows  
Level : 3  
Size : 0  
Father : 0x4000 (Object block)

Format : BOOLEAN

-----  
--

0x4100 : Triangular mesh  
-----

-----  
--

Chunk # : 0x4100  
Name : Triangular Mesh  
Level : 3  
Size : 0 + sub-chunks  
Father : 0x4000 (Object block)  
Format :

-----  
--

Chunk # : 0x4110  
Name : Vertices list  
Level : 4  
Size : varying  
Father : 0x4100 (Triangular mesh)  
Format :

word Number of vertices  
  
Then, for each vertex  
vector Position

-----  
--

Chunk # : 0x4120  
Name : Faces description  
Level : 4  
Size : varying + sub-chunks  
Father : 0x4100 (Triangular mesh)  
Format :

word Number of faces  
  
Then, for each face:  
word Vertex for corner A (number reference)  
word Vertex for corner B (number reference)  
word Vertex for corner C (number reference)  
word Face flag  
\* bit 0 : CA visible  
\* bit 1 : BC visible  
\* bit 2 : AB visible

After datas, parse sub-chunks (0x4130, 0x4150).

---

```
--
Chunk #      : 0x4130
Name        : Faces material list
Level       : 5
Size        : varying
Father      : 0x4120 (Faces description)
Format      :
```

```
    strz      Material name
    word      Number of entries
```

```
                Then, for each entry:
    word      Face assigned to this material (number reference)
```

I think the faces of one object can have different materials. Therefore, this chunk can be present more than once.

---

```
--
Chunk #      : 0x4140
Name        : Mapping coordinates list for each vertex
Level       : 4
Size        : varying
Father      : 0x4100 (Triangular mesh)
Format      :
```

```
    word      Number of vertices
```

```
                Then, for each vertex
    float     U coordinate
    float     V coordinate
```

---

```
--
Chunk #      : 0x4150
Name        : Smoothing groups list
Level       : 5
Size        :
Father      : 0x4120 (Faces description)
Format      :
```

---

```
--
Chunk #      : 0x4160
Name        : Local coordinate system
Level       : 4
Size        : 48
Father      : 0x4100 (Triangular mesh)
Format      :
```

```
vector X1
vector X2
vector X3
vector 0
```

X1, X2 and X3 represent the axes, 0 the origin.

---

```
--
Chunk #      : 0x4165
Name         : Object color in 3D Editor
Level        : 4
Size         : 1
Father       : 0x4100 (Triangular mesh)
Format       :

    byte     Color
```

---

```
--
Chunk #      : 0x4600
Name         : Light
Level        : 3
Size         : 12 + sub-chunks
Father       : 0x4000 (Object block)
Format       :

    vector   Position
```

---

```
--
Chunk #      : 0x4610
Name         : Spotlight
Level        : 4
Size         : 20 + sub-chunks
Father       : 0x4600 (Light)
Format       :

    vector   Target
    float    HotSpot
    float    FallOff
```

If this chunk is found, the light is a spot light and not an omni directional light.

---

```
--
Chunk #      : 0x4651
Name         : Spot is rectangular
Level        : 5
Size         : 0
Father       : 0x4610 (Spotlight)
```

Format : BOOLEAN

-----  
--

Chunk # : 0x4653  
Name : Spot map  
Level : 5  
Size : varying  
Father : 0x4610 (Spotlight)  
Format :

strz Filename

-----  
--

Chunk # : 0x4656  
Name : Spot roll  
Level : 5  
Size : 4  
Father : 0x4610 (Spotlight)  
Format :

float Roll (degree)

-----  
--

Chunk # : 0x4700  
Name : CAMERA  
Level : 3  
Size : 32  
Father : 0x4000 (Object block)  
Format :

vector Position  
vector Target  
float Bank (degree)  
float Lens

-----  
--

Chunk # : 0x7001  
Name : Window settings  
Level : 2  
Size : varying  
Father : 0x3D3D (3D editor chunk)  
Format :

-----  
--

Chunk # : 0x3D3E  
Name : Mesh version  
Level : 2

Size : 4  
Father : 0x3D3D (3D editor chunk)  
Format :

dword Version

-----  
--

0xAFFF : Material block  
-----

-----  
--

Chunk # : 0xAFFF  
Name : Material editor chunk  
Level : 2  
Size : 0 + sub-chunks  
Father : 0x3D3D (3D editor chunk)  
Format :

-----  
--

Chunk # : 0xA000  
Name : Material name  
Level : 3  
Size : varying  
Father : 0xAFFF (Material block)  
Format :

strz Material name

-----  
--

Chunk # : 0xA010  
Name : Material ambient color  
Level : 3  
Size : 0 + sub-chunks  
Father : 0xAFFF (Material block)  
Format :

This chunk contains color chunks (in gen. rgb byte & rgb byte gamma)

-----  
--

Chunk # : 0xA020  
Name : Material diffuse color  
Level : 3  
Size : 0 + sub-chunks  
Father : 0xAFFF (Material block)  
Format :

This chunk contains color chunks (in gen. rgb byte & rgb byte gamma)

---

--  
Chunk # : 0xA030  
Name : Material specular color  
Level : 3  
Size : 0 + sub-chunks  
Father : 0xAFFF (Material block)  
Format :

This chunk contains color chunks (in gen. rgb byte & rgb byte gamma)

---

--  
Chunk # : 0xA040  
Name : Material shininess percent  
Level : 3  
Size : 0 + sub-chunk  
Father : 0xAFFF (Material block)  
Format :

This chunk contains a percent chunk (in gen. int format)

---

--  
Chunk # : 0xA041  
Name : Material shininess strength percent  
Level : 3  
Size : 0 + sub-chunk  
Father : 0xAFFF (Material block)  
Format :

This chunk contains a percent chunk (in gen. int format)

---

--  
Chunk # : 0xA200 - 0xA34C  
Name : Map  
Level : 3  
Size : 0 + sub-chunk  
Father : 0xAFFF (Material block)  
Format :

These chunks define the different maps (see chunk tree). They contain the sub-chunks for all maps, such as mapping filename name or U/V scale.

---

--  
Chunk # : 0xA300  
Name : Mapping filename  
Level : 4

Size : varying  
Father : 0xA200 - 0xA34C (Map)  
Format :

strz      Filename

-----  
--

Chunk # : 0xA354  
Name : V scale  
Level : 4  
Size : 4  
Father : 0xA200 - 0xA34C (Map)  
Format :

float     V scale

-----  
--

Chunk # : 0xA356  
Name : U scale  
Level : 4  
Size : 4  
Father : 0xA200 - 0xA34C (Map)  
Format :

float     U scale

-----  
--

Chunk # : 0xA358  
Name : U offst  
Level : 4  
Size : 4  
Father : 0xA200 - 0xA34C (Map)  
Format :

float     U offset

-----  
--

Chunk # : 0xA35A  
Name : V offst  
Level : 4  
Size : 4  
Father : 0xA200 - 0xA34C (Map)  
Format :

float     V offset

-----  
--

Chunk # : 0xA35A  
Name : Rotation angle  
Level : 4  
Size : 4  
Father : 0xA200 - 0xA34C (Map)  
Format :

float Rotation angle

-----  
--

K E Y F R A M E R C H U N K  
-----

-----  
--

Chunk # : 0xB000  
Name : Keyframer  
Level : 1  
Size : 0 + sub-chunks  
Father : 0x4D4D (Main chunk)  
Format :

The goal of the keyframer datas is to describe the move of  
- The objects in the scene (like a cube ...)  
- The lights (ambient, omni or spot)  
- The cameras

-----  
--

Chunk # : 0xB001..0xB007  
Name : Information block  
Level : 2  
Size : 0 + sub-chunks  
Father : 0xB000 (Keyframer chunk)  
Format :

The information block is a chunk constituted of sub-chunks describing the  
move of a particular object, or camera:

- 0xB001 : Ambient light information block
- 0xB002 : Mesh information block
- 0xB003 : Camera information block
- 0xB004 : Camera target information block
- 0xB005 : Omni light information block
- 0xB006 : Spot light target information block
- 0xB007 : Spot light information block

-----  
--

Chunk # : 0xB008

Name : Frames (Start and End)  
Level : 2  
Size : 8  
Father : 0xB000 (Keyframer chunk)  
Format :

dword Start  
dword End

-----

--

Chunk # : 0xB010  
Name : Object name, parameters and hierarchy father  
Level : 3  
Size : varying  
Father : 0xB001..0xB007 Information block  
Format :

strz Object Name  
word Flag1  
\* Bit 11 : Hidden  
word Flag2  
\* Bit 0 : Show path  
\* Bit 1 : Animate smoothing  
\* Bit 4 : Object motion blur  
\* Bit 6 : Morph materials  
word Hierarchy father, link to the parent object (-1 for none)

-----

--

Chunk # : 0xB013  
Name : Object pivot point  
Level : 3  
Size : 12  
Father : 0xB001..0xB007 Information block  
Format :

vector Pivot point

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Chunk # : 0xB020..0xB029  
Name : Track  
Level : 3  
Size : varying  
Father : 0xB001..0xB007 Information block  
Format :

word Flag  
\* Bits 0-1 : 0 = single  
              2 = repeat  
              3 = loop

- \* Bit 3 : lock X
- \* Bit 4 : lock Y
- \* Bit 5 : lock Z
  
- \* Bit 7 : unlink X
- \* Bit 8 : unlink Y
- \* Bit 9 : unlink Z

8 byte Unknown  
 dword Number of keys in this track

Then, for each key:

dword Key number (position in track)  
 word Acceleration data present (flag) Range:  
   \* Bit 0 : Tension follows [-1.0, 1.0]  
   \* Bit 1 : Continuity follows [-1.0, 1.0]  
   \* Bit 2 : Bias follows [-1.0, 1.0]  
   \* Bit 3 : Ease to follows [ 0.0, 1.0]  
   \* Bit 4 : Ease from follows [ 0.0, 1.0]  
 n floats Acceleration data  
 ? Track specific data

Track specific data is:

0xB020 : Position track : 1 vector Position  
 0xB021 : Rotation track : 1 float Angle (rad)  
           1 vector Axis  
 0xB022 : Scale track : 3 floats Size  
 0xB023 : FOV track : 1 float Angle (degree)  
 0xB024 : Roll track : 1 float Angle (degree)  
 0xB025 : Color track :  
 0xB026 : Morph track : 1 strz Object name  
 0xB027 : Hotspot track : 1 float Angle (degree)  
 0xB028 : Falloff track : 1 float Angle (degree)  
 0xB029 : Hide track : nothing

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Chunk # : 0xB030  
 Name : Hierarchy position  
 Level : 3  
 Size : 2  
 Father : 0xB001..0xB007 Information block  
 Format :

word Hierarchy

This word contains a unique value for the object and is used for the hierarchy tree links.

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<end>