

DoStudio Authoring Edition – 3D Module

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Version 2.3

*NetBlender Press*

DoStudio Authoring Edition 2.3  
By The NetBlender Press Team

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## Version 2.3

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## ***Introduction***

This manual introduces you to NetBlender's DoStudio Authoring (DSA), which is a complete Blu-ray Disc authoring application.

The information in this manual is designed for beginning to intermediate users, especially users who are unfamiliar with a few or all of the concepts of Blu-ray Disc authoring. Don't be fooled by the simple and straightforward nature of the application, however. DSA is a powerful, BD-ROM specification compliant authoring system with full AAC3 support, BDCMF formatting, BD-J support, and more. The power of DSA lies in its ease-of-use.

This manual assumes that the author has a fundamental understanding of the graphics formats used for Blu-ray Disc menus such as PSDs, PNGs and the like. It also assumes that the author is reasonably skilled in the use of Adobe Photoshop, or has access to someone who does. Blu-ray disc menus are graphics-intensive and much of the success of your Blu-ray project will depend on the quality of your graphic design.

## **Terminology**

This manual uses some terminology that is commonplace in Blu-ray parlance but may seem peculiar or confusing if you are new to Blu. This manual also uses some terminology that is specific to DoStudio. We explain a few of them here before you get too far.

### *Base View*

The base view is the left eye's MVC file. This MVC file is a full resolution AVC file with additional information that can be used by a Blu-ray 3D player.

### *Dependent View*

The dependent view is the right eye's MVC file. This MVC file does not work without the base view file.

# Chapter 1: Setting up your 3D Segments and Playlists

This chapter will describe the steps to setup your 3D Segments and create a 3D playlist.

## Section 1: The 3D Segment

### Adding a 3D Segment

To begin, right mouse click on the Audio Video Segments and select “Add 3D Segment”. A 3D segment can have audio and subtitles added to it.

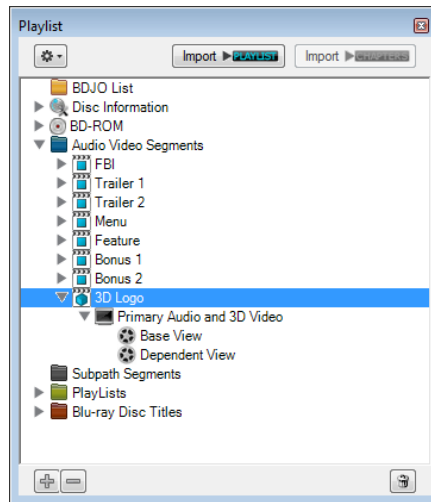


Figure 1 - A 3D Segment Tree Node Expanded

### 3D Segment Properties

When you select a 3D Segment in the Playlist tree its properties are displayed in the Control Panel. You may rename the segment by typing a new name in the “Name Field.”

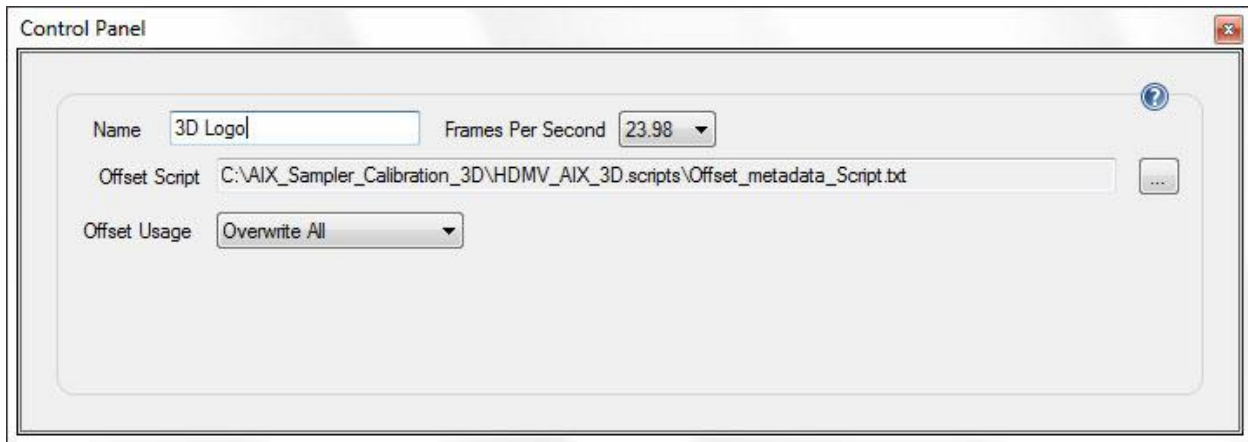


Figure 2 - Editing a 3D Segment's Settings

You assign the frame rate of the video in your segment using the “Frames Per Second” combo box. The frame rate options for Blu-ray 3D are: 23.98, 50, 59.94. Each Segment in a Blu-ray disc can have a different frame rate.

3D segments also contain a path to an optional offset script. This script can be used to define the z-depth of the menu when they appear on screen. This offset script can define a constant z-depth for the entire length of the segment, or it can change the z-depth of the menu over the duration of the segment.

The Offset Usage combo box contains the following options:

1. Keep Original – if your MVC file contains offset data it will take priority over the offset data in the Offset Script
2. Overwrite All – the offset data in the Offset Script will take priority over any offset data embedded in the MVC file
3. Update PTS Only – Updates the PTS values with values from the script file but maintains the offset data in the MVC stream

### **Primary Video for 3D**

3D segments require 2 video files. When you add a 3D segment you will see two empty video nodes in the tree called “Base View” and “Dependent View.”

Blu-ray 3D only accepts one video codec called Multiview Video codec, or MVC (.mvc). In layman’s terms, the MVC format includes a full-frame 2D AVC stream, called the Base View, and a secondary offset stream called the Dependent View. MVC streams are backward compatible with H.264/AVC, which allows standard 2D Blu-ray players and software to decode stereoscopic video streams. They play the Base View and simply ignore the additional information contained in the Dependent View.

The MVC format is highly efficient and the Dependent View only adds about 50% extra file size to the overall stream.

## ***Section 2: The 3D Playlist***

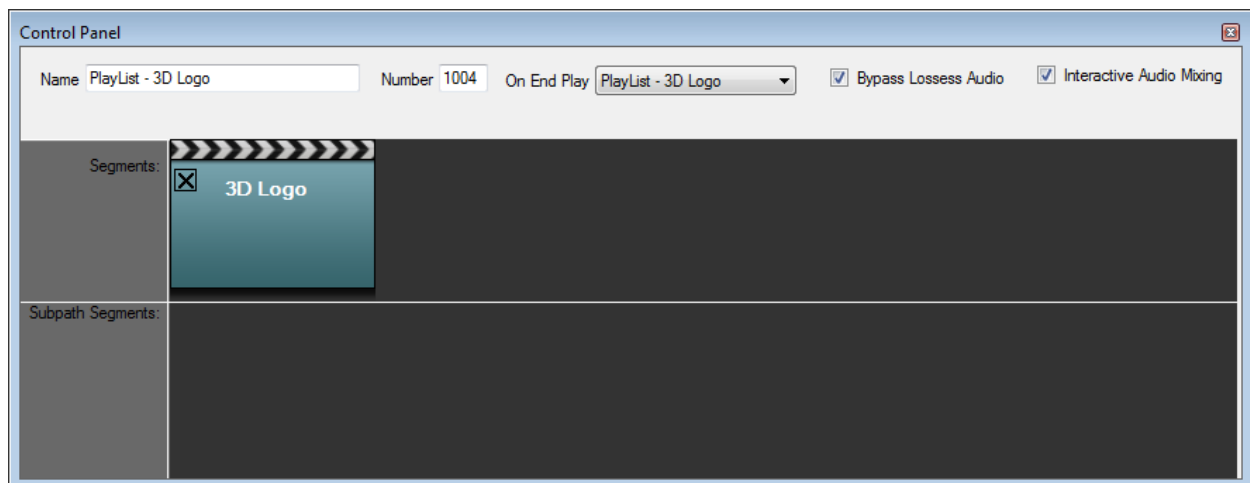
### *Creating a 3D Playlist*

To create a 3D Playlist you use the same process as you would for a 2D segment. You can right mouse click on the 3D segment to create a 3D Playlist using the selected 3D segment or you can create an empty playlist then drag a 3D segment into it.

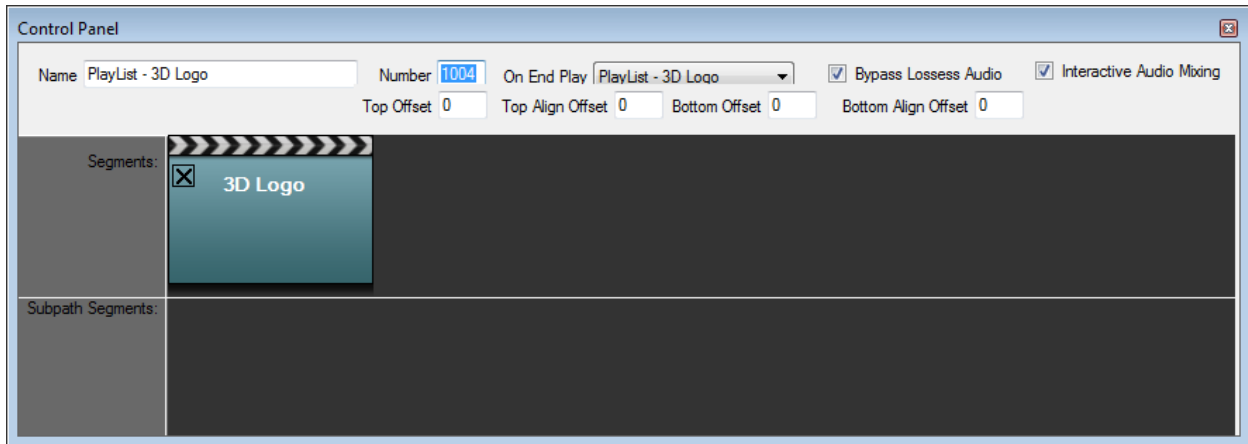
Once a playlist has a 3D segment on it, then only 3D segments can be added. To change the playlist to a 2D playlist remove all of the 3D segments and then add a 2D segment. If you have a 2D playlist then only 2D and slideshow segments can be added. To change it to a 3D playlist remove all the 2D segments and slideshow segments then add your 3D segment.

### The 3D Playlist Properties

When you have a 3D playlist that does not have subtitles the playlist properties will look and work just like a 2D playlist. This is demonstrated in the figure below:



A 3D playlist with subtitles will show you four new properties that are related to your 3D playlist.



3D subtitles can be over the video or they can be place in the upper or lower 3rds. Using the Top Offset or Bottom Offset allows you to position the 3D subtitles. If all of the values are 0 then the subtitles will appear over the screen.

**Top Offset:** This field is used to derive the *TopOffset*. *TopOffset* is the vertical pixel value of the video window from the top of the frame.

**Top Align Offset:** This field is used to derive the *AlignOffset* for presentation of the Top Aligned PG textST stream with the subtitle aligned toward the top of the frame. *AlignOffset* is the vertical coordinate of the output video frame where the active video window shall be aligned. The top samples contained in the video window are positioned at the vertical coordinate *AlignOffset* in the output video frame.

**Bottom Offset:** This field is used to derive the *BottomOffset*. *BottomOffset* is the vertical pixel of the video window from bottom of the frame.

**Bottom Align Offset:** This field is used to derive the *AlignOffset* for presentation of the Bottom Aligned PG textST stream with the subtitle aligned toward the bottom of the frame. *AlignOffset* is the vertical coordinate of the output video frame where the active video window shall be aligned. The top samples contained in the active video window are positioned at the vertical coordinate *AlignOffset* in the output video frame.

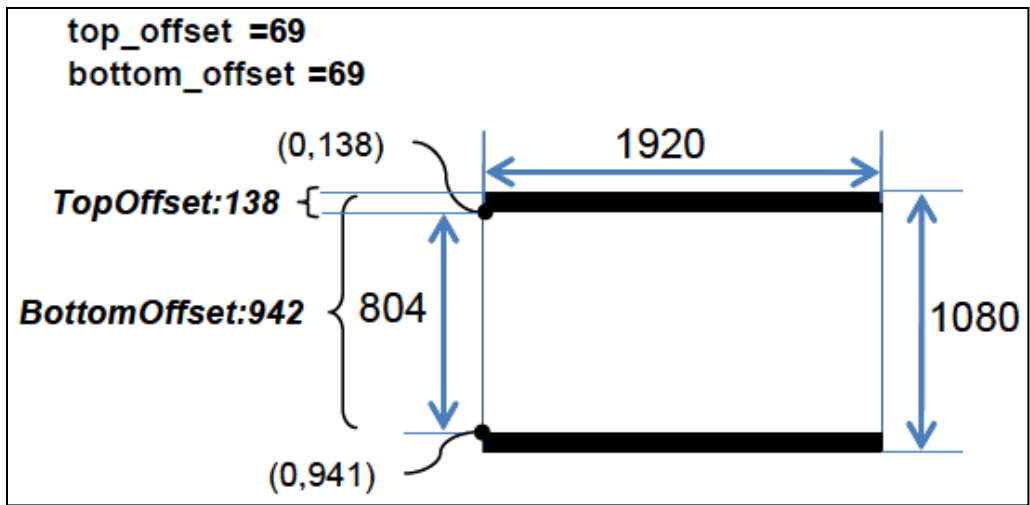


Figure 3 - Example of TopOffset and BottomOffset

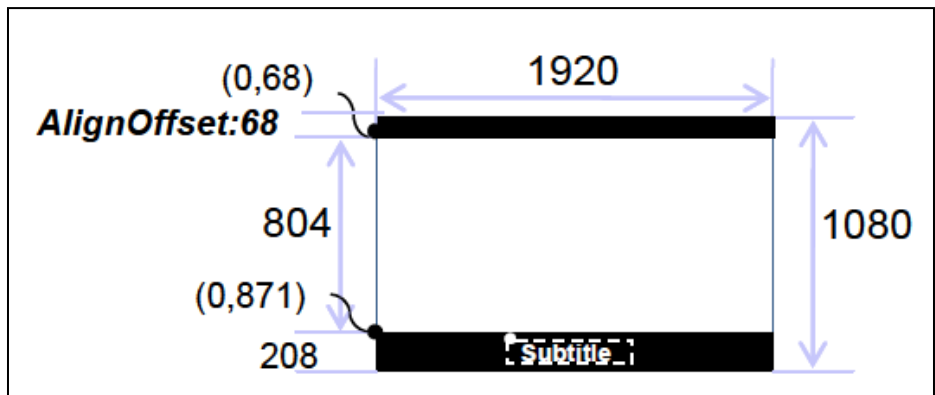


Figure 4 - Example of a bottom offset subtitle

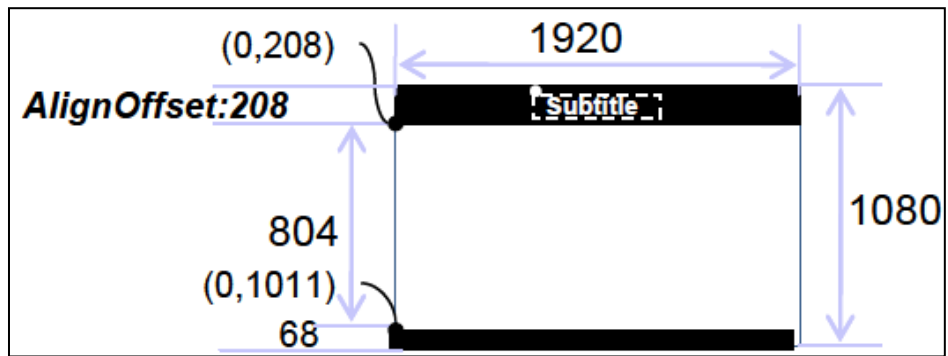


Figure 5 - Example of a top offset subtitle

## Chapter 2: Completing the 3D Disc

To set up your disc so it will play your 3D titles correctly you will need to setup the default settings correctly. To do this select Blu-ray Disc Titles in the Playlist tree. Then select the Blu-ray Title Setup Tab.

## ***BD3D Information***

These settings only pertain to discs made with the 3D module. These settings tell the Blu-ray player what type of 3D video your disc contains and whether the disc should play in 3D mode on startup.

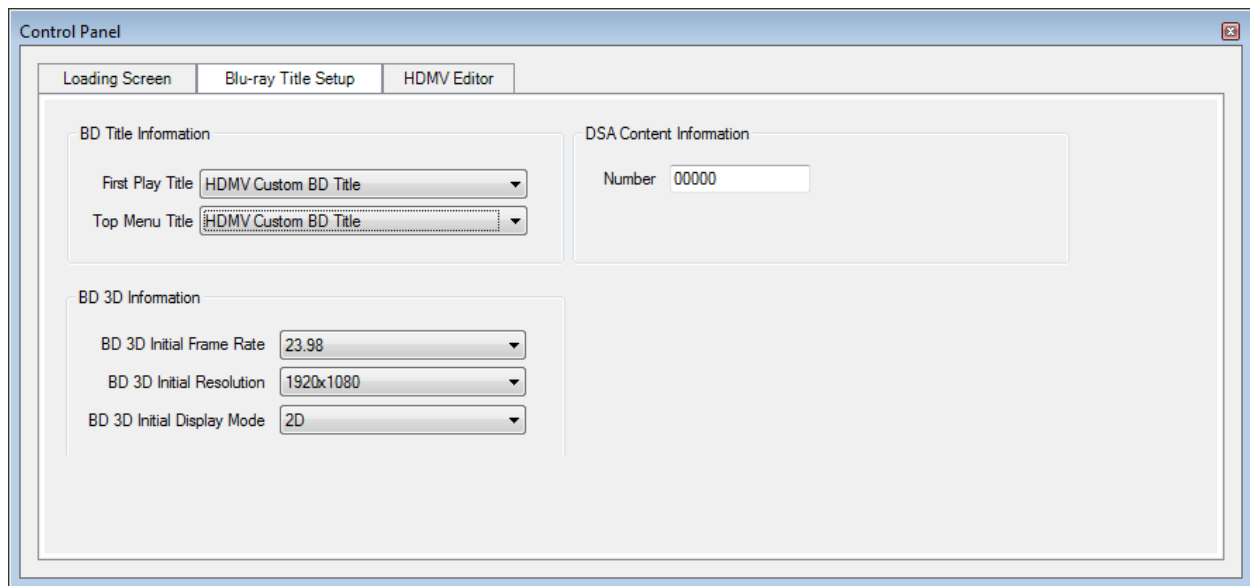


Figure 6 - BD 3D Information Settings

### ***BD3D Initial Frame rate***

This should match the frame rate of your video. The three options for BD3D are

- 23.98 (your video must be 1920x1080)
- 50 (your video must be 1280x720)
- 59.94 (your video must be 1280x720)

### ***BD3D Initial Resolution***

This should match the frame resolution of your video. The two options for BD3D are:

- 1920x1080 (your frame rate must be 23.98)
- 1280x720 (your frame rate can be either 50 or 59.94)

### ***BD3D Initial Display Mode***

In most cases, if you are making a BD3D you will want the start up mode to be 3D. If this is set to 2D your 3D video will display in 2D.

## ***3D Player Registers (PSRs)***

### **PSR21: Output Mode Preference**

The PSR21 contains the Output Mode preference of the user. The user can set their player's setting to play a movie in 3D or 2D by default. Navigation commands and BD-J application cannot change the value in PSR21.

#### **Output Mode**

0 = 2D Output Mode for the user's preference

1 = 3D Output Mode for the user's preference

### **PSR22: Stereoscopic status**

The PSR22 represents the current Output Mode and Subtitle Alignment of the BD-ROM Player. When the value of Output Mode contained in PSR22 is changed, video output from the Blu-ray player shall be changed correspondingly. When the value of Subtitle Alignment contained in PSR22 is changed, the Subtitle Alignment shall be changed correspondingly.

#### **Output Mode**

0 = 2D Output Mode for the user's preference

1 = 3D Output Mode for the user's preference

#### **Subtitle Alignment**

0 = Not Aligned Subtitle Alignment

2 = Top Aligned Subtitle Alignment

3 = Bottom Aligned

### **PSR23: Display Capability**

PSR23 represents characteristic values of the display connected to the Blu-ray Player. Navigation commands and BD-J applications cannot change the values contained in PSR23. These values may be automatically set by the Blu-ray Player before starting playback if the display device can provide them through the interface. If these values cannot be obtained automatically, they may be set by the user. So far EVERY Blu-ray 3D player sets these values for the user. You can rely on these values to be set correctly.

#### **Stereoscopic Display Capability**

The Connected TV is

**0** = Incapable of displaying Stereoscopic 1920x1080/23.976Hz Progressive video and Stereoscopic 1280x720/59.94Hz Progressive video

**1** = Capable of displaying Stereoscopic 1920x1080/23.976Hz Progressive video and Stereoscopic 1280x720/59.94Hz Progressive video

#### **Stereoscopic 1280x720 50p video Display Capability**

The Connected TV is

**0** = Incapable of displaying Stereoscopic 1280x720/50Hz Progressive video

1 = Capable of displaying Stereoscopic 1280x720/50Hz Progressive video

### **No glasses required for stereoscopic display**

Connected TV is

0 = needs glasses to watch Stereoscopic Output mode

1 = does not need glasses to watch Stereoscopic Output mode

### **Horizontal display size**

Connected display's horizontal size in centimeters

0x000 = Undefined

0x001 to 0xFFE = Connected display's horizontal size in centimeters (0xFFE means horizontal 4094 centimeter display)

0xFFF = horizontal 255 centimeter or bigger displays

## ***PSR24: 3D Capability***

The PSR24 represents the 3D capability of the BD-ROM Player. Navigation commands and BD-J application cannot change the value contained in PSR24.

### **Stereoscopic 1280x720 50p video Capability**

0 = Stereoscopic 1280x720/50Hz Progressive videopresentation incapable

1 = Stereoscopic 1280x720/50Hz Progressive video presentation capable

### **Stereoscopic 1280x720 CABAC decoding Capability**

0 = Incapable of decoding Stereoscopic 1280x720/59.94Hz and Stereoscopic 1280x720/50Hz with the entropy\_coding\_mode\_flag indicating CABAC

1 = Capable of decoding Stereoscopic 1280x720/59.94Hz and Stereoscopic 1280x720/50Hz with the entropy\_coding\_mode\_flag indicating CABAC

### **Stereoscopic PG Capability**

0 = Stereoscopic PG presentation incapable

1 = Stereoscopic PG presentation capable

### **Stereoscopic IG Capability**

0 = Stereoscopic IG presentation incapable

1 = Stereoscopic IG presentation capable

### **Dialog region offset Capability**

0 = Incapable of presentation function of dialog\_region\_offset of Stereoscopic TextST

1 = Capable of presentation function of dialog\_region\_offset of Stereoscopic TextST

## **BD-J Capability during Stereoscopic Output Mode**

0 = BD-J incapable during Stereoscopic Output Mode  
1 = BD-J capable during Stereoscopic Output Mode

## **Secondary audio Capability during Stereoscopic Output Mode**

0 = Secondary audio incapable during Stereoscopic Output Mode  
1 = Secondary audio capable during Stereoscopic Output Mode

### ***PSR Example***

```
Move gpr55 psr31  
And gpr55 1245760 (or 0x130240)  
If gpr55 == 1245760 (then this is a 3D player)
```

```
Move gpr55 psr23  
And gpr55 1 (or 0x1)  
If gpr55 == 1 (then the TV can play 23.976 1920 in 3D)
```

If your glasses are not connected normally psr23 returns 0

## **3D Commands**

### **SetOutputMode**

The SetOutputMode command sets Output Mode between 2D Output Mode and 3D Output Mode in the PSR 22 (see PSR section). This Command shall not be used within the IG Editor. Always check if the player is a 3D player before using this command.

0 = 2D Output Mode  
1 = 3D Output Mode

Example (  
SetOutputMode 1

### **SetStreamSS**

The SetStreamSS Command has the same function as SetStream Command. Thus the SetStreamSS Command sets values for any or all of the Primary audio stream, Subtitle stream, Angle and IG stream to be presented. In addition to the functions, the SetStreamSS Command sets values for Subtitle Alignment. This Command can be used only when *Output Mode* in PSR22 is set to 3D Mode. This Command shall be ignored or treated as Nop Command when *Output Mode* in PSR22 is set to 2D Output Mode. Always check if the player is a 3D player before using this command.

## ***Compiling and formatting your 3D Disc***

### ***Compiling***

When you compile your Blu-ray disc with a 3D Playlist, DSA will automatically create an ISO that you can burn to a BD-R/RE or mount and play back on a softplayer. The ISO will be found in your .BD folder's 3DISO folder.

### ***Formating***

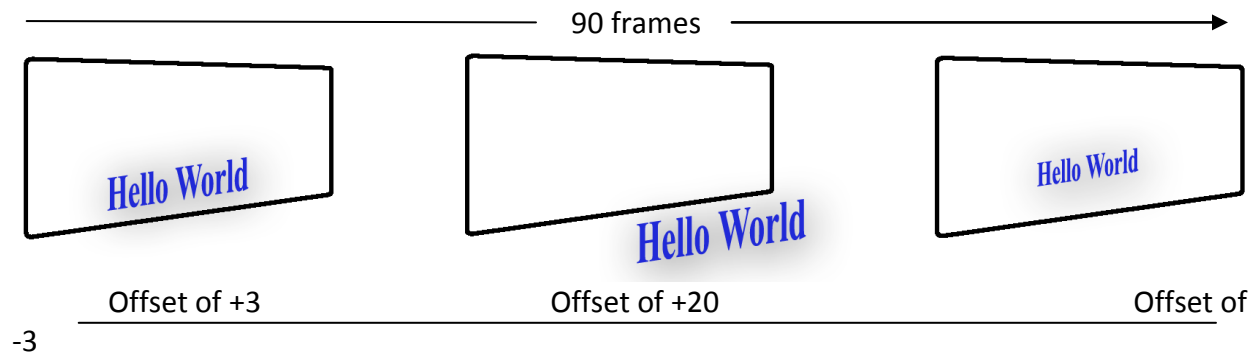
When you are ready to format your disc for replication DSA will not create the ISO and will do the same steps as a 2D disc.

## Appendix A – Metadata Offset File

### 3D Meta Text File \*.do3d

The Do3D ASCII text file is used to position the subtitles on the screen so they can be a fixed 3D depth or they can move in 3D space as the video plays. Each line is treated as separate input line, blank lines are allowed and comments are allowed at the START of the line by using the pound key (#).

The .do3D Text file is based on a sequence of depth offsets for duration of frames as seen in below.



For every duration of frames (DOF) there must be the same number of offset sequences (NOS). In the above picture there are 3 offsets. This means that it is important to group the various changes in depth into equal numbers. For example; if we have a 2 minute video at 24fps and there are 100 different offset depth values. I can group them into 10 NOS every 288 frames. (In all likelihood this wouldn't work out so evenly and the DOF will vary). Each NOS is a positive or negative number indicated by + or – without a space between the number. For example +1 or -3.

The .do3D file doesn't have any information that points directly to the .dost file. The reason for this is that the two are completely independent allowing for the CE players to play back the subtitles on both 2D and 3D players.

The .do3D file is also used to create a depth map for the BD-J and HDMV menus. This allows the menus to move with the 3D video.

### The .Do3D HEADER

The header is very basic with just three important values:

```
#Version must be set to 1.00
Version 1.00
```

```
#NumrOfOffsetSequence will indicate the number of NOS per DOF.
#This means that EVERY DOF will have this number.
#In this case every DOF will have 10 NOS
NumOfOffsetSequence 10
```

```
# Default offset direction used for those frame not described in
this script.
# Number of offset should be the same as NumOfSequence
DefaultOffset +1 +5 +10 +15 -1 -5 +15 +2 +10 +4
```

## **The .Do3D Body**

The body is a list of DOF NOS per line and each line is based on the previous DOF. Using our example of 10 NOS every 288 DOF we would have the first DOF be 288 and the next DOF 288 and so on. After the DOF have a tab character and then the NOS. For example:

```
#DOF NOS
0 +288 +12 -5 + 14 -7 +1 +5 +15 -5 -15 -30
289 +288 +5 -7 +1 -5 +5 -15 +2 -30 -4 +5
577 +288 +12 -5 + 14 -7 +1 +5 +15 -5 -15 -30
```

If the DOF isn't even then we'd have the following

```
#DOF(tab)NOS
# This indicate starting at 0 to 30 frames in the DOF
0 +30 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

# This indicate starting at 31 to 120 frames in the DOF
31 +89 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

# This indicate starting at 121 to 150 frames in the DOF
121 +29 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10
```