h264Offset3D

h264Offset3D is command-line utility for manipulation of "**offset-metadata**" information stored in dependent stream of H.264 MVC-3D encoded video.

Concept

To assure comfortable subtitle reading experience while watching 3D movie it is necessary to display subtitles properly in stereoscopic space. Subtitles shall be presented in front of all other objects of each scene or even each frame. This subtitle "distance" information needs to be carried together with the 3D movie.

Blu-ray 3D uses for this distance information specific object: **offset-plane** with **offset-value**s.

Offset-plane is a numerical sequence of **offset-value**s which define for each video-frame a distance of the subtitle from the presentation screen.

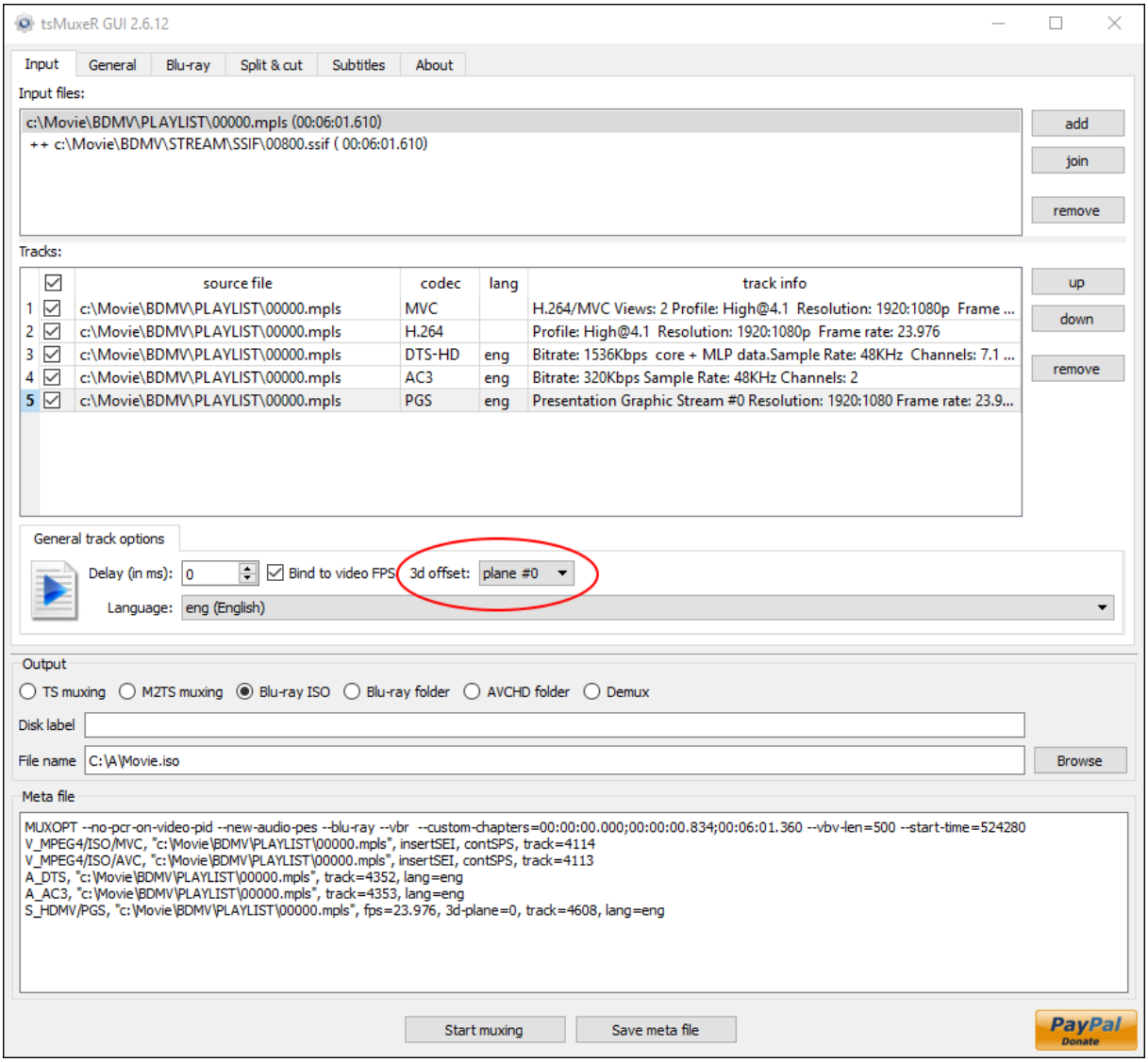
Offset-value can be either

positive value – subtitles are presented in front of the screen, or
zero – subtitles are presented on the screen, or
negative value – subtitles are presented behind the screen.

Offset-value can be in range [-127; 127]. Small values mean that subtitles will be near by the screen while high values (50 and more) will present subtitles far from screen and close to viewer. However such presentation would be very uncomfortable: it will be difficult to read subtitles and watch movie itself together. Practically, for subtitles are used only positive or zero offset values, typically between 0 and 30 (as there is no point to display subtitles behind presentation screen).

Blu-ray 3D can define up to 32 offset-planes. For subtitles would be sufficient to use only one offset-plane. Having and using more than one offset-plane is part of wider info-graphics concept of Blu-ray system.

Each subtitle stream can be associated with just one offset-plane.
Following picture demonstrates this association in tsMuxer GUI (English subtitles are associated with offset-plane #0).


tsMuxeR GUI 2.6.12
Input
General
Blu-ray
Split & cut
Subtitles
About
Input files:
c:\Movie\BDMV\PLAYLIST\00000.mpls (00:06:01.610)
++ c:\Movie\BDMV\STREAM\SSIF\00800.ssif (00:06:01.610)
add
join
remove
Tracks:
source file
codec
lang
track info
1 c:\Movie\BDMV\PLAYLIST\00000.mpls MVC H.264/MVC Views: 2 Profile: High@4.1 Resolution: 1920:1080p Frame ...
2 c:\Movie\BDMV\PLAYLIST\00000.mpls H.264 Profile: High@4.1 Resolution: 1920:1080p Frame rate: 23.976
3 c:\Movie\BDMV\PLAYLIST\00000.mpls DTS-HD eng Bitrate: 1536Kbps core + MLP data.Sample Rate: 48KHz Channels: 7.1 ...
4 c:\Movie\BDMV\PLAYLIST\00000.mpls AC3 eng Bitrate: 320Kbps Sample Rate: 48KHz Channels: 2
5 c:\Movie\BDMV\PLAYLIST\00000.mpls PGS eng Presentation Graphic Stream #0 Resolution: 1920:1080 Frame rate: 23.9...
up
down
remove
General track options
Delay (in ms): 0
Bind to video FPS
3d offset: plane #0
Language: eng (English)
Output
TS muxing
M2TS muxing
Blu-ray ISO
Blu-ray folder
AVCHD folder
Demux
Disk label
File name C:\A\Movie.iso
Browse
Meta file
MUXOPT --no-pcr-on-video-pid --new-audio-pes --blu-ray --vbr --custom-chapters=00:00:00.000;00:00:00.834;00:06:01.360 --vbv-len=500 --start-time=524280
V_MPEG4/ISO/MVC, "c:\Movie\BDMV\PLAYLIST\00000.mpls", insertSEI, contSPS, track=4114
V_MPEG4/ISO/AVC, "c:\Movie\BDMV\PLAYLIST\00000.mpls", insertSEI, contSPS, track=4113
A_DTS, "c:\Movie\BDMV\PLAYLIST\00000.mpls", track=4352, lang=eng
A_AC3, "c:\Movie\BDMV\PLAYLIST\00000.mpls", track=4353, lang=eng
S_HDMV/PGS, "c:\Movie\BDMV\PLAYLIST\00000.mpls", fps=23.976, 3d-plane=0, track=4608, lang=eng
Start muxing
Save meta file
PayPal
Donate

Offset-planes are stored as so called **offset-metadata** in SEI messages in the dependent view elementary stream. Offset-metadata are optional. If they are presented Blu-ray 3D player will use them and display subtitles in proper distance from the screen accordingly. If they are omitted then Blu-ray 3D player will display subtitles on the screen (or possibly in small constant distance in front of the screen).

Finally, offset-metadata can be presented as textual file which is used with **h264Offset3D** utility. Example with four offset-planes (numbered #0 to #3):

```
;plane   #0,  #1,  #2,  #3
;frame:-----------------------------
     0:   0,   0,   0,   0
     1:   0,   0,   0,   0
     2:   0,   0,   0,   0
…
  4365:  14,  13,  13,   0
  4366:  14,  13,  13,   0
  4367:  14,  13,  13,   0
  4368:  14,  13,  13,   0
…
120872:   6,   4,   6,   8
120873:   6,   4,   6,   8
120874:   6,   4,   6,   8
```

Each line of offset-metadata file contains frame number followed (after colon ':' separator) by comma separated list of offset-values of given video-frame for all offset-planes.
Frame numbers shall constitute growing sequence starting with 0.
Empty line or line starting with semicolon ';' is considered as comment and ignored during processing with **h264Offset3D** utility.

h264Offset3D is utility which allows to **extract**, **delete**, **replace** and **insert** offset-metadata information from/into dependent view elementary stream of H.264 MVC-3D encoded video.

Use cases:

1. **Displaying help**

   ```
   h264Offset3D
   ```

   Without any other parameters will display simple help how to use h264Offset3D.

2. **Extracting "offset-metadata" from dependent MVC-stream**

   ```
   h264Offset3D –extract input.mvc  output_ofmd.txt
   ```

   where `input.mvc` can be depended stream of MVC-encoded video, or combined (AVC+MVC) stream.

3. **Deleting "offset-metadata" from dependent MVC-stream**

   ```
   h264Offset3D –delete input.mvc  output.mvc
   ```

   where `input.mvc` can be dependent stream of MVC-encoded video, or combined (AVC+MVC) stream. Modified stream (i.e. without any offset-metadata information) is stored in `output.mvc`.

4. **Replace existing "offset-metadata" in dependent MVC-stream**

   ```
   h264Offset3D –replace input.mvc  input_ofmd.txt output.mvc
   ```

   where `input.mvc` can be dependent stream of MVC-encoded video, or combined (AVC+MVC) stream containing dependent view information. `input_ofmd.txt` is actual new offset-metadata content. Modified stream with replaced offset-metadata information is stored in `output.mvc`.
   This operation doesn't change location of the offset-metadata in the stream, and modifies only the actual content (i.e. plane values). If by coincidence `input.mvc` doesn't contain any offset-metadata information then resulting `output.mvc` will also not contain any new offset-metadata information.

5. **Insert new "offset-metadata" into dependent MVC-stream**

   ```
   h264Offset3D –insert input.avc  input.mvc input_ofmd.txt
   output.mvc
   ```

where `input.avc` is base stream of MVC-encoded video, `input.mvc` is dependent stream of MVC-encoded video, `input_ofmd.txt` is new offset-metadata definition. Modified stream with completely new offset-metadata information is stored in `output.mvc`.

Alternatively:

```
h264Offset3D -insert input.h264 input_ofmd.txt output.mvc
```

where `input.h264` is combined (AVC+MVC) stream, `input_ofmd.txt` is new offset-metadata definition. Modified stream with completely new offset-metadata information is stored in `output.mvc`.

All original offset-metadata information is deleted and new from `input_ofmd.txt` is inserted.

6. **Display H.264 GOP information** (I-frame and GOP length)

```
h264Offset3D -gop input.avc
```

where `input.avc` is base stream of MVC-encoded video.
Displays I-frame number and GOP length in tab-separated format.
Example:

```
0     20
20    14
34    14
48    24
72    24
96    24
120   24
144   17
…
```

This information can be useful for further GOP analysis.

Practical examples

Notation assumptions:

00800.m2ts	– original base view transport stream
00801.m2ts	– original dependent view transport stream
00000.avc	– re-encoded base view elementary stream
00001.mvc	– re-encoded dependent view elementary stream
ofmd_org.txt	– original offset metadata
ofmd_mod.txt	– modified offset metadata

Modification of plane values in existing BD-3D

1. Extract offset-metadata from original BD-3D

```
h264Offset3D -ts -extract 00801.m2ts  ofmd_org.txt
```

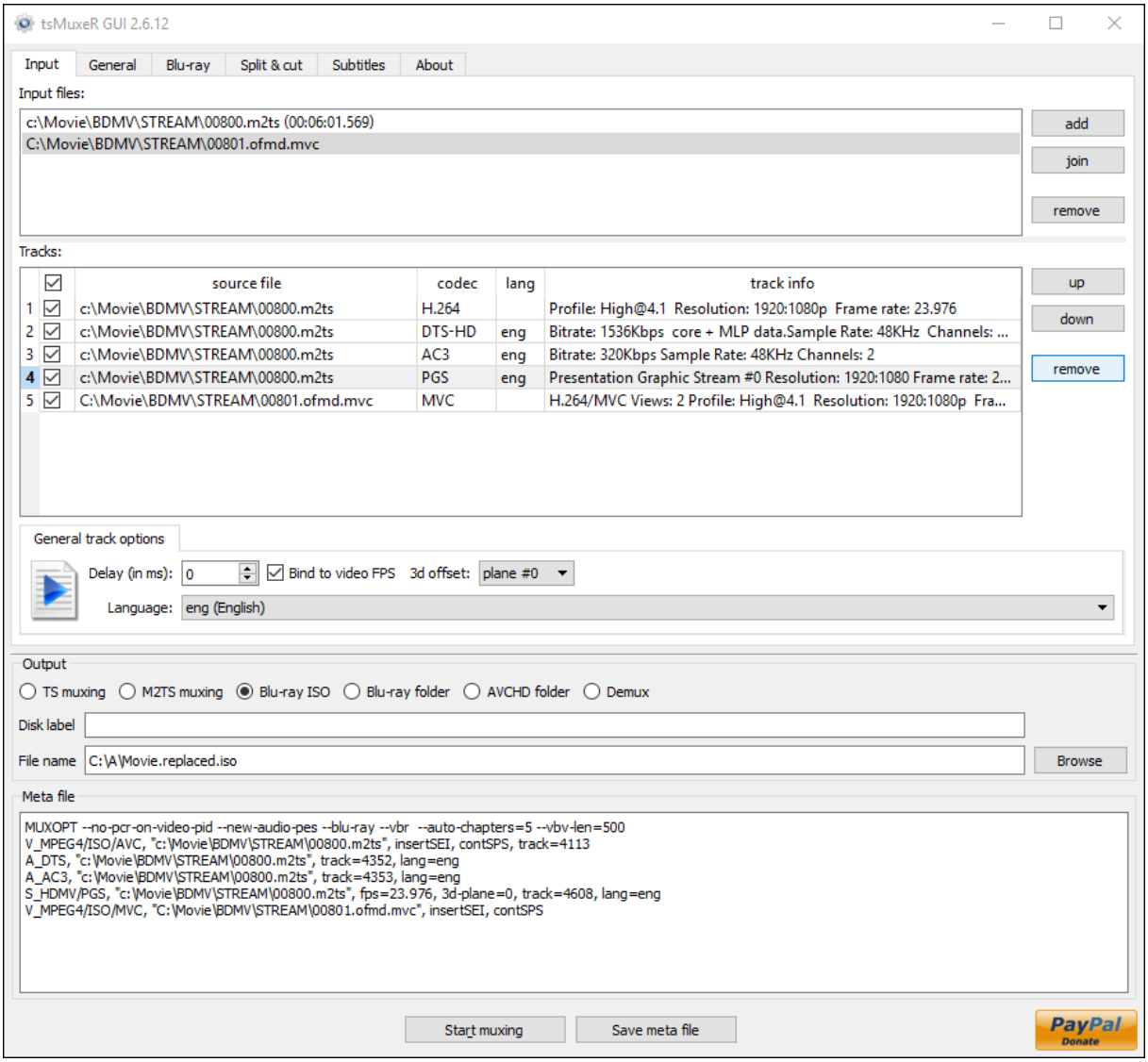
2. Modify offset-metadata (`ofmd_org.txt` → `ofmd_mod.txt`)
   using suitable editing tools, e.g. notepad, any type of plain-text editor, etc.

3. Replace offset-metadata in BD-3D

```
h264Offset3D -ts -replace ^
             00801.m2ts  ofmd_mod.txt  00801.ofmd.mvc
```

4. Multiplex BD-3D using tsMuxer:

   Streams: `00800.m2ts`
   `00801.ofmd.mvc`
   and associate all subtitles in `00801.m2ts` with relevant offset plane (most often #0)



Insertion of offset-metadata after BD-3D re-encoding

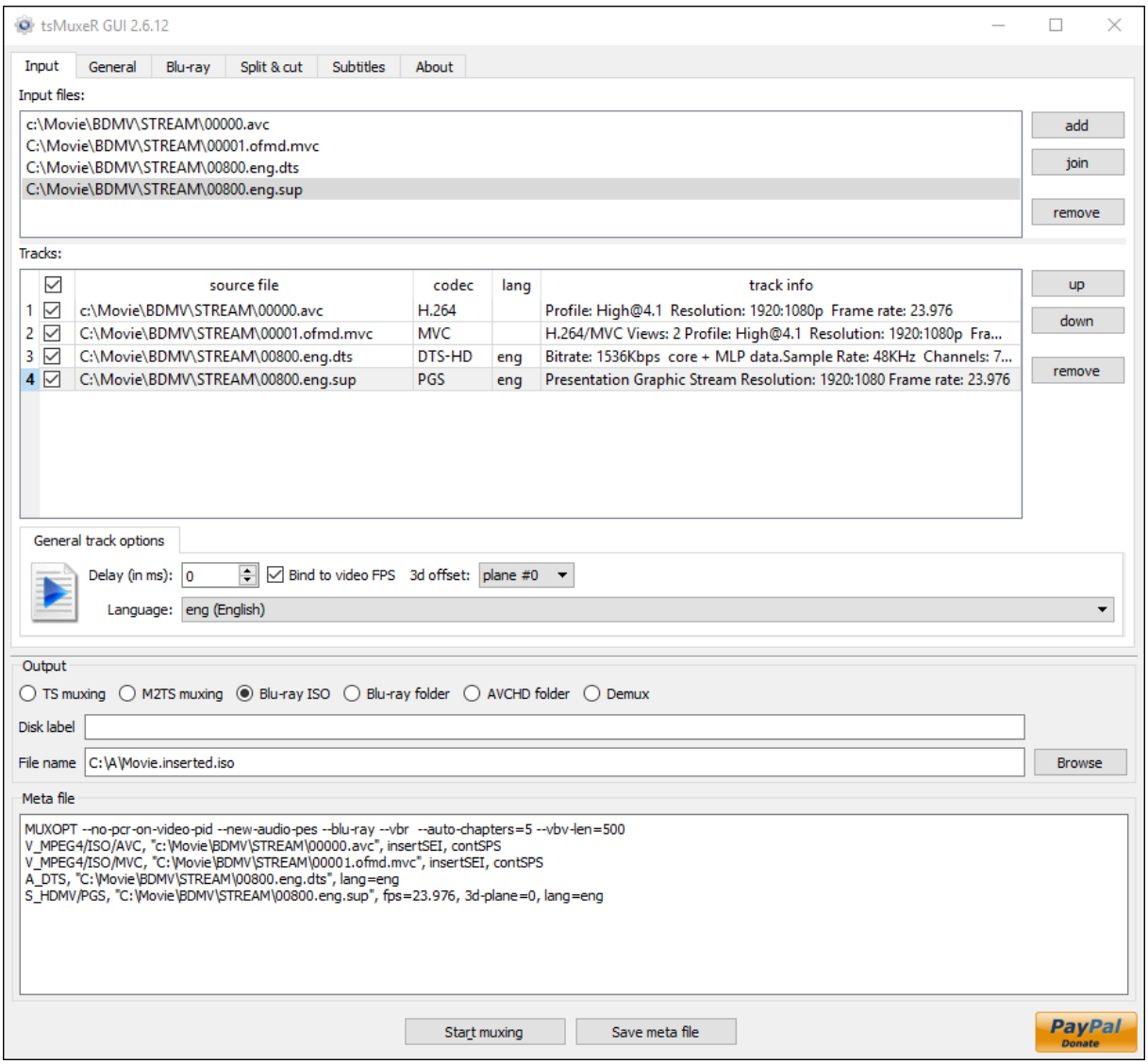
1. Extract offset-metadata from original BD-3D

```
h264Offset3D -ts -extract 00801.m2ts  ofmd_org.txt
```

2. Insert offset-metadata into new re-encoded BD-3D

```
h264Offset3D -insert ^
             00000.avc 00001.mvc ofmd_org.txt 00001.ofmd.mvc
```

3. Multiplex BD-3D using tsMuxer

Streams: `00000.avc`
`00001.ofmd.mvc`
`00800.eng.dts`
`00800.eng.sup`

and associate all subtitles `*.sup` with relevant offset-plane (most often #0)