

3D Converter

V 1.03

Overview of features and settings

(short description)

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3D converter is a program for batch conversion of stereoscopic and 2D video files (or pictures) from one to another video format.

1 Requirements for using 3D converter

Required tools (please, use **32-bits** versions!) for using 3D Converter (note that Avisynth requires installation):

Avisynth 2.5.8 (freeware): <http://www.videohelp.com/tools/AVIsynth>
<https://sourceforge.net/projects/avisynth2/files/AviSynth%202.5/AviSynth%202.5.8/>

Avisynth is a scripting language for video files. 3D Converter will make avisynth scripts which can be read by FFmpeg, VirtualDub or some converters, like RipBot and similar.

FFmpeg 2.5.2 (freeware): <https://ffmpeg.zeranoe.com/blog/?p=394>

FFmpeg is converter which is capable of converting the input video file (in our case avisynth script) into different video and audio files, like avi, mp4, ... Its advantage is that it can work on UHD files and the speed of conversion is usually higher than with VirtualDub.

VirtualDub 1.4.13 (freeware): <http://virtualdub.sourceforge.net/>

VirtualDub is a program which converts input avi file or Avisynth script into another video format, similar to FFmpeg. It also offers many interesting video filters. VirtualDub can have problems with UHD files, so in this case FFmpeg might be better solution. Version 1.4.13 is slightly preferred due to some stability issues, but newer version can be used as well in most of cases.

FFDShow (freeware): <https://sourceforge.net/projects/ffdshow-tryout/files/SVN%20builds%20by%20clsid/generic%20builds/>

Install it by right-clicking the file and choosing "Run as Administrator"

Optional tools:

For converting files from JVC 3D Cameras: **MVC To AVI converter** (29 EUR):

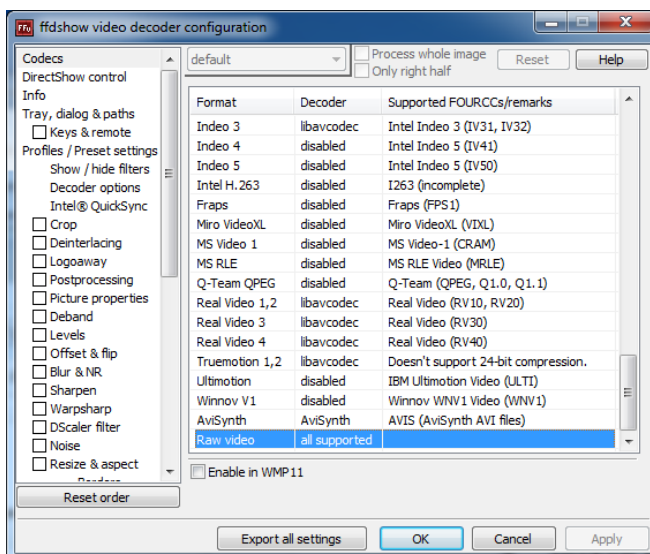
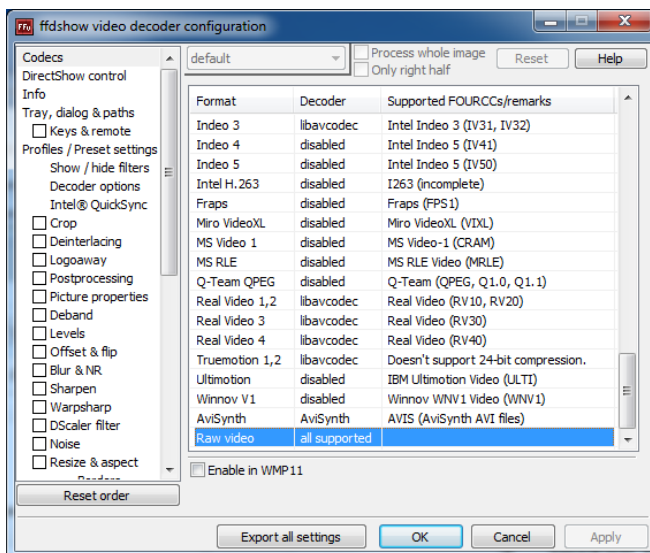
http://www.3dtv.at/Downloads/Index_en.aspx

Suitable Codec if required (e.g. for VirtualDub), e.g. **UT codec** (freeware):

<http://www.videohelp.com/tools/Ut-Video-Codec-Suite>

1. Install Avisynth (32-bit version) by right-clicking the file and choosing "Run as Administrator". Place unpack FFmpeg and VirtualDub files into suitable directories.

- Download required Avisynth and VirtualDub **filters**, so as given in **Appendix** (sub-section 3.1.)
- Install FFDshow (if it is not already installed) by using Administrator privileges. Then open "VFW Configuration" window and under Tab "Decoder" find "Raw video" and set Decoder as "all supported". Then open "Video decoder configuration" window and under Codecs (left up) find "Raw video" on the list on the right side and set Decoder as "all supported".

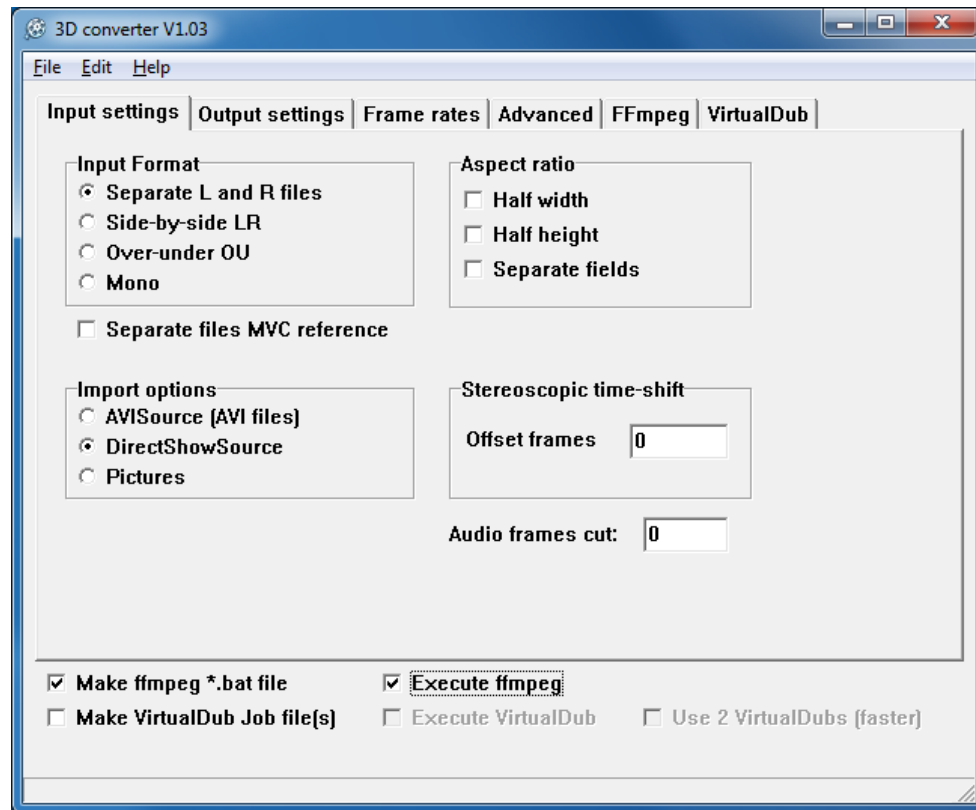


- Create main 3D converter's directory (with write permission) and **unzip 3D converter zipped file into this directory**. Leave *.exe and *.prs files into this directory.
- From the same zipped file **move *.vcf files** to VirtualDub's main directory (where VirtualDub.exe is placed).
- Run 3D converter (e.g. Converter3D_V103.exe).

2 Description of 3D Converter

The main program is "Converter3D_V099.exe", while "Converter3D_V099.prs" contains preset parameters for FFmpeg converter. File "Converter3D_V099.ini" is created after closing the program, since it saves last screen settings.

When starting 3D converter, the following screen appears:



It consists of several tabs, where you can change input and output settings, frame-rates, add advanced conversions and set FFmpeg and VirtualDub parameters. **The actual conversion of files is performed after selecting (File | Convert files).**

Note that 3D converter always produces Avisynth (*.avs) files after selection of input files (File | Convert files). The *.avs files will be created in the same directory as input video files. Whether 3D converter will produce VirtualDub job files or FFmpeg *.bat file depends on selections at the bottom of the program window. The job or *.bat files can significantly reduce time required for making final video clips. Moreover, by selecting "Execute ffmpeg" or "Execute VirtualDub", the FFmpeg or VirtualDub program will be automatically executed and conversions will start. More detailed options for FFmpeg and VirtualDub will be explained later.

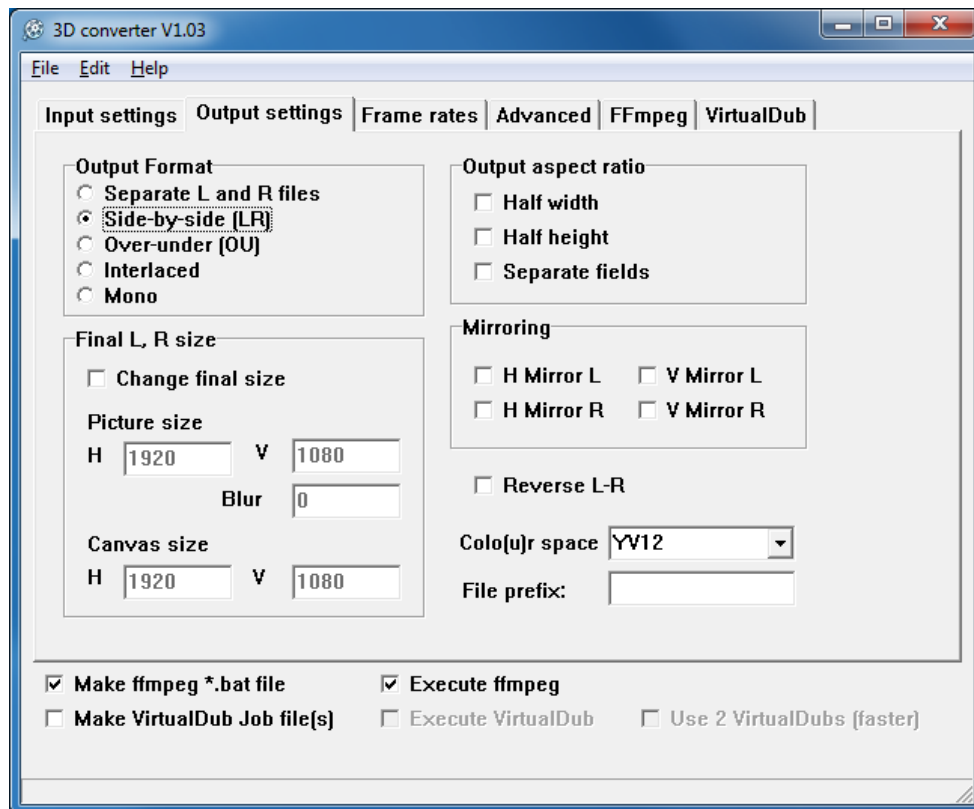
2.1 Input settings

Here you choose:

- **Input format:** stereoscopic format of input video files (whether they are separate left and right files, side-by-side video, over-under video or simple 2D file). If separate left and right *.avi files are created by MVC 2 AVI converter from *.MVC type of files (e.g. from JVC 3D cameras), then by clicking "Separate files MVC reference", you simply select the original *.mvc files instead of selecting separately left and right *.avi files during conversion stage (File | Convert files).
- **Aspect ratio:** whether the input file is horizontally squeezed (Half width), vertically squeezed (Half height) or the video file consists of video fields instead of video frames (Separate fields – in this case the video is having double frame-rate and is vertically squeezed).
- **Import options:** Depends on the type of input files. If they are avi files, use "AVISource", otherwise use "DirectShowSouce". If there are any problem when importing *.avi files, use "DirectShowSouce". If importing sequence of pictures instead of video file (e.g. pictures from time-lapse), select "Pictures". When selecting pictures, a selection of input frame-rate will appear below. Note that pictures should be numbered sequentially without any missing number in between.
- **Stereoscopic time shift/Offset frames:** You can time-shift left or right clips for denoted number of frames in order to synch them together when needed. The function can be also used for making 3D video from simple 2D video when the camera is continuously moving horizontally and perpendicular to lens axis. Positive value mens that right clip will be advanced by denoted number of frames and negative value means that left clip will be advanced for given number of frames.
- **Audio frames cut:** The positive value means that audio will be cut for written number of video frames at the end of video clip. Silly, isn't it? Not when the input file is frame-served video via DebugMode Frame Server, which produces some audio problems/glitches in the last second of the video. By selecting 1 frame more than the video frame-rate (e.g. 26 for 25FPS video), the glitches will dissappear (in this case, the original audio should become silent at least 1 second before the end of the clip).

2.2 Output settings

Output settings are used for setting the output stereoscopic/video format.



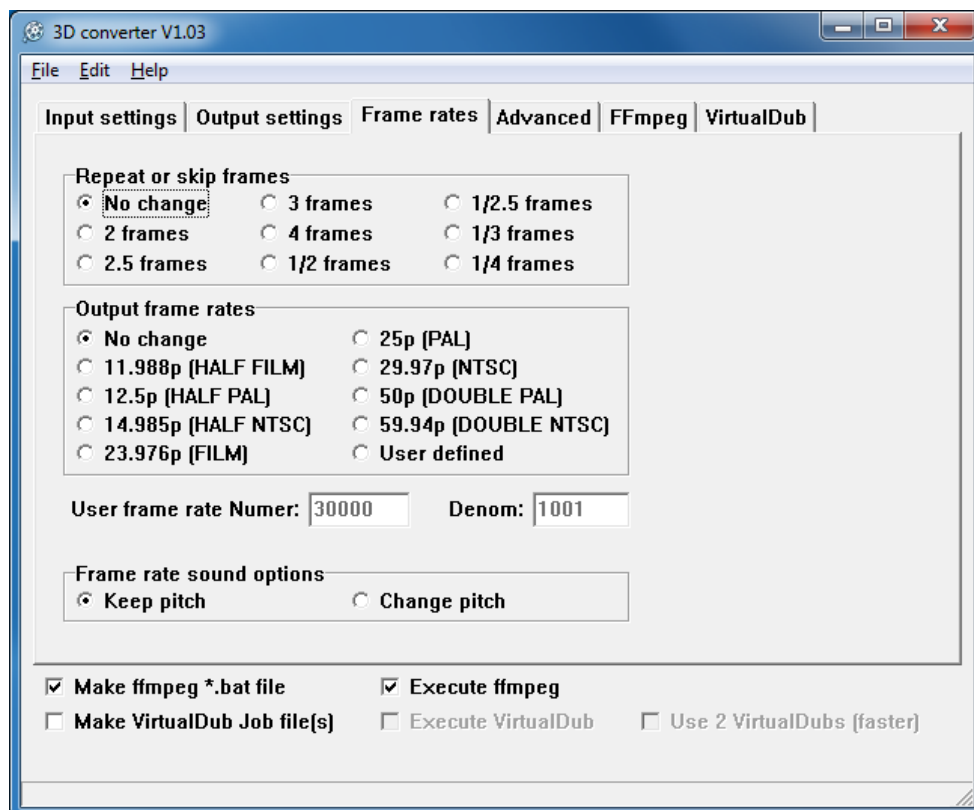
Here you choose:

- **Output Format:** stereoscopic output format (separate left and right files, side-by-side format, over-under format, interlaced format or simple 2D/mono file – in this case left video).
- **Output aspect ratio:** whether the output file should be horizontally squeezed (Half width), vertically squeezed (Half height) or that the video frames are divided into fields (the video frame rate is doubled and vertical resolution is divided by 2)
- **Change final size:** Forcing output final size (dimensions are for the **individual** left and right picture). When selected, the *Horizontal and Vertical resolution* input field for picture size and canvas size become active. For example, when selecting 1920x1080 means the *left and right video* will be 1920x1080. Therefore, output side-by-side video will be 3840x1080 or output over-under video will be 1920x2160. Usually the final size is not needed to be set up except when exact output resolution is required. When smaller output size is required, it is recommended to add some amount of **Blur** (try values around 1).
Note that “Picture size” resizes the input left and right picture to that particular size. After that “Canvas size” adds black borders or crops the picture to desired final size. For example, when resizing full side-by side 2800x1050 video (1400x1050 per eye) into full side-by-side 3840x1080 video (1920x1080 per eye), Picture size should be 1440x1080 and Canvas size should be 1920x1080.
- **Mirroring:** The left or right video can be mirrored horizontally (H mirror) or vertically (V mirror).

- **Reverse L-R:** The output file will have reversed left and right pictures. E.g. left picture will be at the right side when choosing side-by-side output. When using Mono output option, the right video is exported (instead of the left one).
- **File prefix:** File prefix is a string which will be added in front of the output filename. If blank, the output filename will be the same as the input filename, except, possibly, with different extension. Note that when creating LR or OU videos from separate L and R videos, the end of the filename before extension can be modified into "_LR" or "_OU".
- **Colo(u)r space:** Force output colour space if needed. Very useful for some of FFmpeg coding settings. For example, **choose YV12 in most of the cases** (many of FFmpeg coding presets will not work with other colour space). In some cases change of Colour space will change encoder in FFmpeg (e.g. when choosing UT video codec preset).

2.3 Frame rates

Frame rates settings are used for repeating/skipping frames and changing output frame rates.

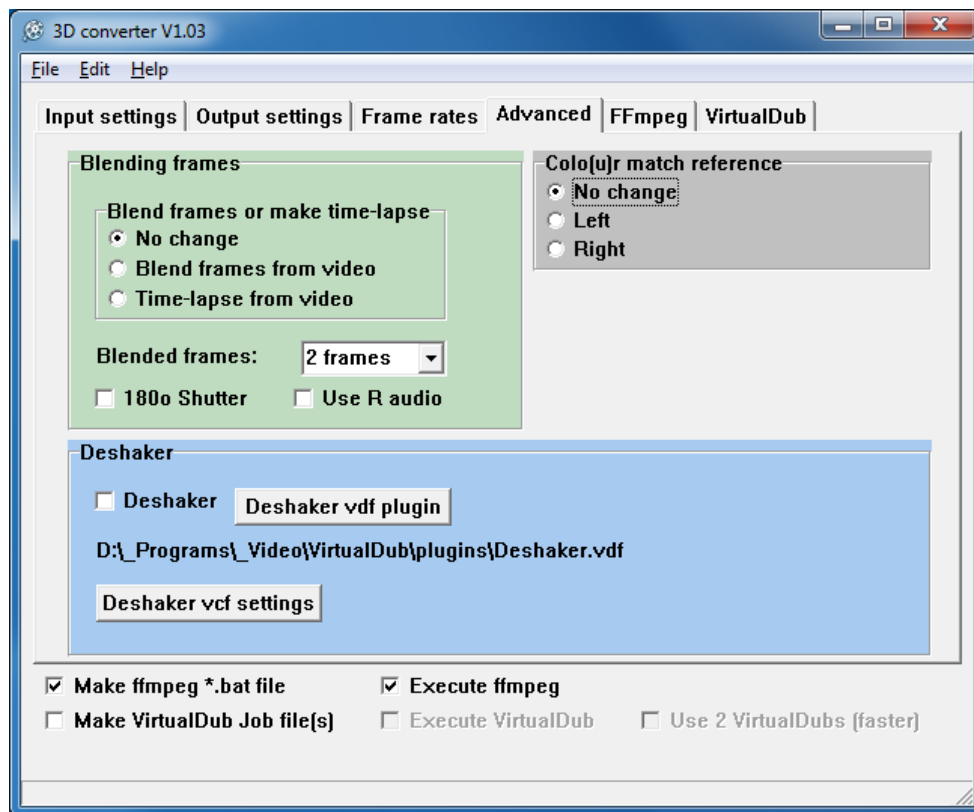


Here you choose:

- **Repeat or skip frames:** If you want to show the same frame several times, choose values larger than 1. For example, "2 frames" means that each frame will be shown twice. The video will therefore become two-times slower and motion would become less fluid. "2.5 frames" option is useful for converting 24 FPS (frames per second) video into 60 FPS video (of course, 59.94p should be selected as output frame rate as well!). "1/3 frames" means that every third frame is going to be used in video. This means that the video will play 3-times faster.
- **Output frame rates:** The selection will force output frame-rate to desired FPS. It is useful to use this option when applying some "Repeat or skip frames". Moreover, it can be used for making slow-motion video if selecting e.g. "25p (PAL)" option and the input video is 50 FPS. Below are user-defined frame rate numerator and denominator (FR = Numer/Denom).
- **Frame rate sound options:** What happens to the sound when changing frame-rates? The sound can be stretched/squeezed as well, when using "Change pitch" option.

2.4 Advanced

Advanced settings are used for special effects and colo(u)r match. Please, use only one such option max. at the same time (at least Colour match reference and Deshaker won't work together).



Blending frames

Blending frames is used for blending several adjacent frames together or making time-lapse video from input video. For the best results use video shutter speeds which are the same or similar to the video frame-rate (e.g. 1/25s for 24p or 25p video, 1/30s for 30p video, etc.). Blending will produce video with the same apparent speed as the original video, but with blended frames. Any motion would become extremely blurred. It might be useful for some waterfall/fountain shots, etc.

Time-lapse will average/blur several frames together and create a new frame. The length of the final video will become significantly shorter and the movement will become more rapid, like with time-lapses.

- **Blend frames or make time-lapse:** Choose between blending frames (the motion speed and video length will remain the same) or time-lapse (much faster motion and shorter video length)
- **Blended frames:** Number of blended frames in blend or time-lapse option. In time-lapse it also means how much faster will be the final video.
- **180o Shutter:** It will simulate faster shutter speed on the final video, so it won't be blurred so much as without this option. This also means that half of the original video frames will not be used in the final video.
- **Use R audio:** Use audio from the right view instead of the left (the audio will not be stretched!)

Colo(u)r match reference

Colour match reference is used for making left and right videos more similar concerning brightness and colour. It creates two Avisynth files. One for making histograms of the individual files and the other one which corrects the colour in selected (left or right) clips. First, the histogram avisynth file should be opened in VirtualDub (or some video player) and played inside. When it plays entire avisynth file, it creates some *.txt files containing histogram information. After that the second Avisynth file can be used.

When selecting "Make ffmpeg *.bat file" and "Execute ffmpeg" at the bottom of the main window, both steps will be automatically performed and colour matched output video will be generated. It does not work in conjunction with VirtualDub (Make VirtualDub job files).

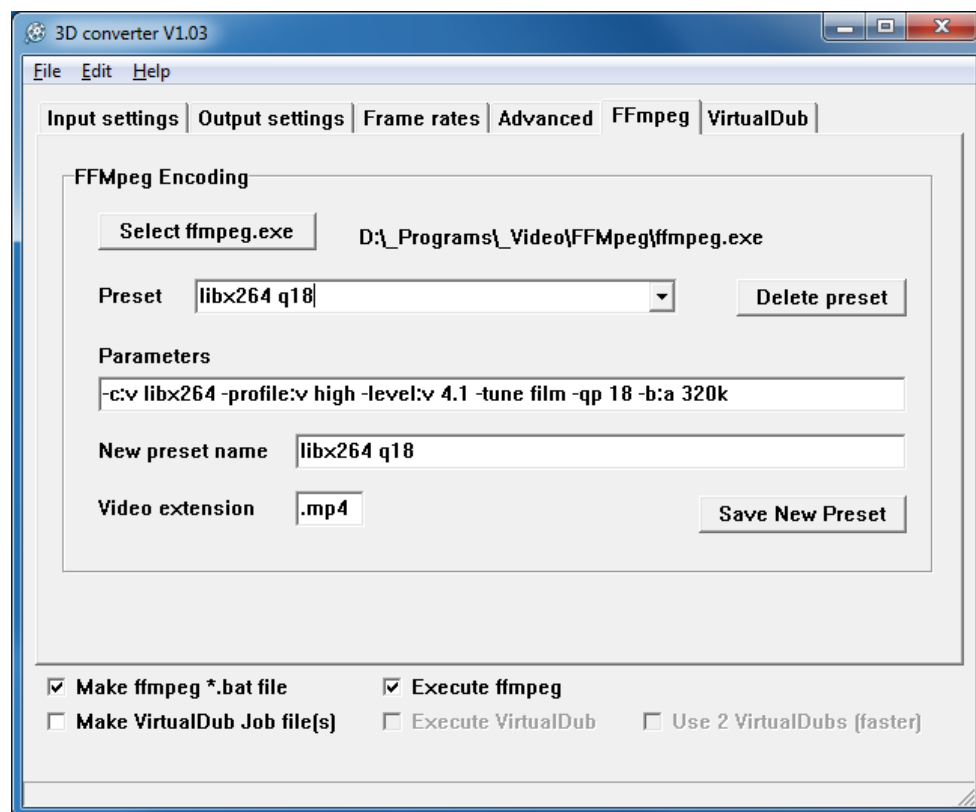
- **Colo(u)r match reference:** If "Left" is chosen, then the right video will match the left video brightness and colour. It's vice-versa for "Right".

Deshaker

Deshaker is based on VirtualDub plugin which deshakes video. The mentioned VirtualDub filter is very useful and can produce quite stable and sharp video in many circumstances. The current version of the 3D Converter has only implemented deshaker in conjunction with ffmpeg and not with VirtualDub.

- **Deshaker:** Choose whether to use this filter or not.
- **Deshaker vdf plugin:** with click on the button we select deshaker.vdf file, which is placed in VirtualDub's pluggins directory. The chosen file is displayed below the button.
- **Deshaker vcf settings:** with click on the button we select VirtualDub's *.vcf file with deshaker settings which was created by VirtualDub as given in appendix.

2.5 FFmpeg



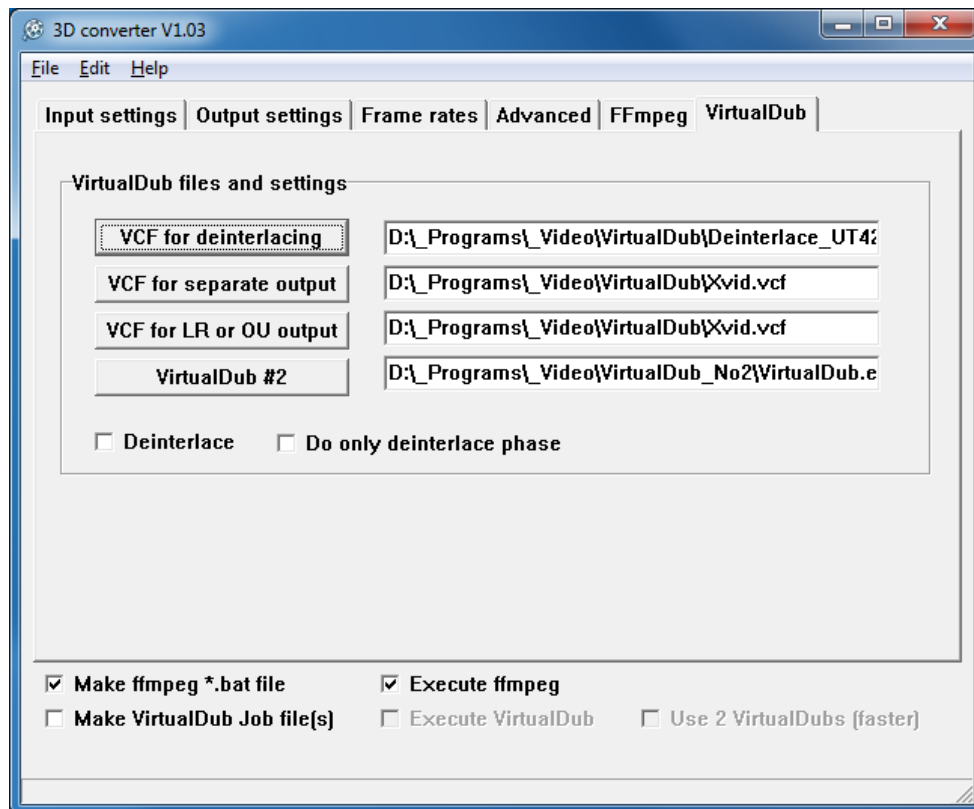
FFmpeg tab offers parameters for setting FFmpeg encoder to make batch conversion of video files. It reads created avisynth files and makes the final video files. The 3D converter can make either only *.bat file which can batch-execute video conversion later by the user or can make *.bat file and execute it immediately. This is one of the most useful feature of 3D converter.

In FFmpeg tab you can choose:

- **Select ffmpeg.exe:** Choose the location of ffmpeg.exe file. The recommended version is 2.5.2., but other versions might be used as well (not 100% sure they will work for 4K 3D files).
- **Preset:** Choose encoding presets for output video files. Some presets are "preloaded" and they are available in *.prs file which was zipped together with 3D converter exe file. Note that some presets, especially with H.264 files, are limited to YV12 colour space, so don't forget to choose YV12 as output colour space in "Output settings" tab. Note that Preset should not include input and output file names.
- **Delete preset:** Delete the chosen preset (on the left). Use it only if you really want to delete the preset.
- **Parameters:** FFmpeg parameters for the chosen preset. You can modify those parameters and save them (with the same or other preset name). The feature is extremely useful, since the user can make his/her own large set of presets. Note that some included presets offer **deinterlacing at nominal or double frame-rate!** For more info on parameters, read: <https://ffmpeg.org/ffmpeg.html>
- **New preset name:** The name of the new preset. If the name is the same as the already existing preset, the new parameters will be saved instead of the old.
- **Video extension:** The resulting output file will have the extension given herein. Naturally, the extension depends on the encoder used in parameters field. Don't forget to add dot in front of extension (e.g. ".avi").
- **Save New Preset:** Save the new preset with the new preset name, parameters and extension.
- **Make ffmpeg *.bat file:** Produce *.bat file which will contain all the commands for executing batch operation (to batch convert the files).
- **Execute ffmpeg:** After making *.bat file, 3D converter will start batch conversion. The option is grayed-out and won't be active if " Make ffmpeg *.bat file " is not checked.

2.6 VirtualDub

VirtualDub tab offers parameters for setting some encoders and the second VirtualDub for faster processing (still think that FFmpeg is faster and better). Besides, we can choose that the video should be deinterlaced first before making any video/stereoscopic conversions (note that deinterlacing works *much slower* than with FFmpeg). Note that some options won't work in conjunction with VirtualDub.



The following parameters can be selected:

- **VCF for deinterlacing:** Choose created VirtualDub processing settings *.vcf file for deinterlacing stage. The file contains VirtualDub processing settings for deinterlacing including the chosen encoder settings. Note that some *.vcf files are attached to the 3D converter program, but the user can create the new ones by the procedure given in appendix.
- **VCF for separate output:** Choose created VirtualDub processing settings *.vcf file when creating separate left and right files. The file contains VirtualDub processing settings (chosen encoder settings).
- **VCF for LR or OU output:** Choose created VirtualDub processing settings *.vcf file when creating side-by-side or over-under files. The *.vcf file contains VirtualDub processing settings (chosen encoder settings). It is usually the same as "VCF for separate output".
- **VirtualDub #2:** When encoding the files via VirtualDub, the processor CPU usage is usually relatively low (about 50%). In order to increase the speed of batch processing, 3D converter can execute the second VirtualDub as well. This parameter is obligatory only if choosing to use 2 VirtualDubs. Note that you can make another instance of VirtualDub simply by copying entire VirtualDub directory with subdirectories into another directory.

- **Deinterlace:** The input files will be first deinterlaced and after that the deinterlaced files will be used as input files and will be converted accordingly to output and other settings. Note that this setting is valid *only when using VirtualDub* for encoding. If ffmpeg is used, there are already presets which include deinterlacing!
- **Do only deinterlace phase:** Only deinterlace of the input files will be performed. Note that this setting is valid *only when using VirtualDub* for encoding.
- **Make VirtualDub Job file(s):** The VirtualDub jobs file will be created and placed in VirtualDub directory (along with creating Avisynth files). In order to start all jobs in the batch, the user should open VirtualDub and start jobs (In VirtualDub: File | Job control) or select "Execute VirtualDub"
- **Execute VirtualDub:** After making VirtualDub, the VirtualDub is automatically called and conversion process is started (if "Make VirtualDub Job file" is checked).
- **Use 2 VirtualDubs:** Two VirtualDubs will be executed if "Make VirtualDub Job files" and "Execute VirtualDub" are checked.

2.7 Other options

Note that the last screen layout is automatically saved (into e.g. Converter3D_V099.ini) when closing the program. When starting the program again, the last settings are, therefore, automatically shown. However, the current layout settings can be saved and later loaded as well by selecting (File | Load Layout) or (File | Save Layout). This might be useful when dealing with different input and output file types or using specific frame-rate conversions and advanced options. Loading suitable layout file is much faster than going through all the tabs and changing appropriate options.

2.8 Batch conversion

Batch conversion of input files is performed by selecting (File | Convert files). If input files are separate left and right files, you will have to select separately left files and then right files. Be careful to select them in the same order!

By default, Avisynth files are created which can be used to make final video files by using some appropriate tools, like VirtualDub or RipBot264. However, the final files can be made automatically by selecting "Make ffmpeg *.bat file" and "Execute ffmpeg" at the bottom of the program window (or "Make VirtualDub Job files" and "Execute VirtualDub"). See sub-sections 2.5 and 2.6 about the settings.

3 Appendix

3.1 Avisynth and VirtualDub filter files

The Avisynth and VirtualDub require few filter files in order to get use of all available options in 3D converter program. First, download ColourLike_230505.dll from the following site:

http://www.avisynth.nl/users/warpenterprises/files/colourlike_5F25_dll_20050825.zip

or maybe here:

<http://forum.videohelp.com/threads/369118-Automatic-Color-Timing-plugins-for-Premiere>

(see one post before the last one) and place dll file in Avisynth plugins directory (probably in C:\Program Files (x86)\AviSynth 2.5\plugins).

Another two files, which should be downloaded are the following:

Deshaker filter (32-bit version):

<http://www.guthspot.se/video/deshaker.htm>

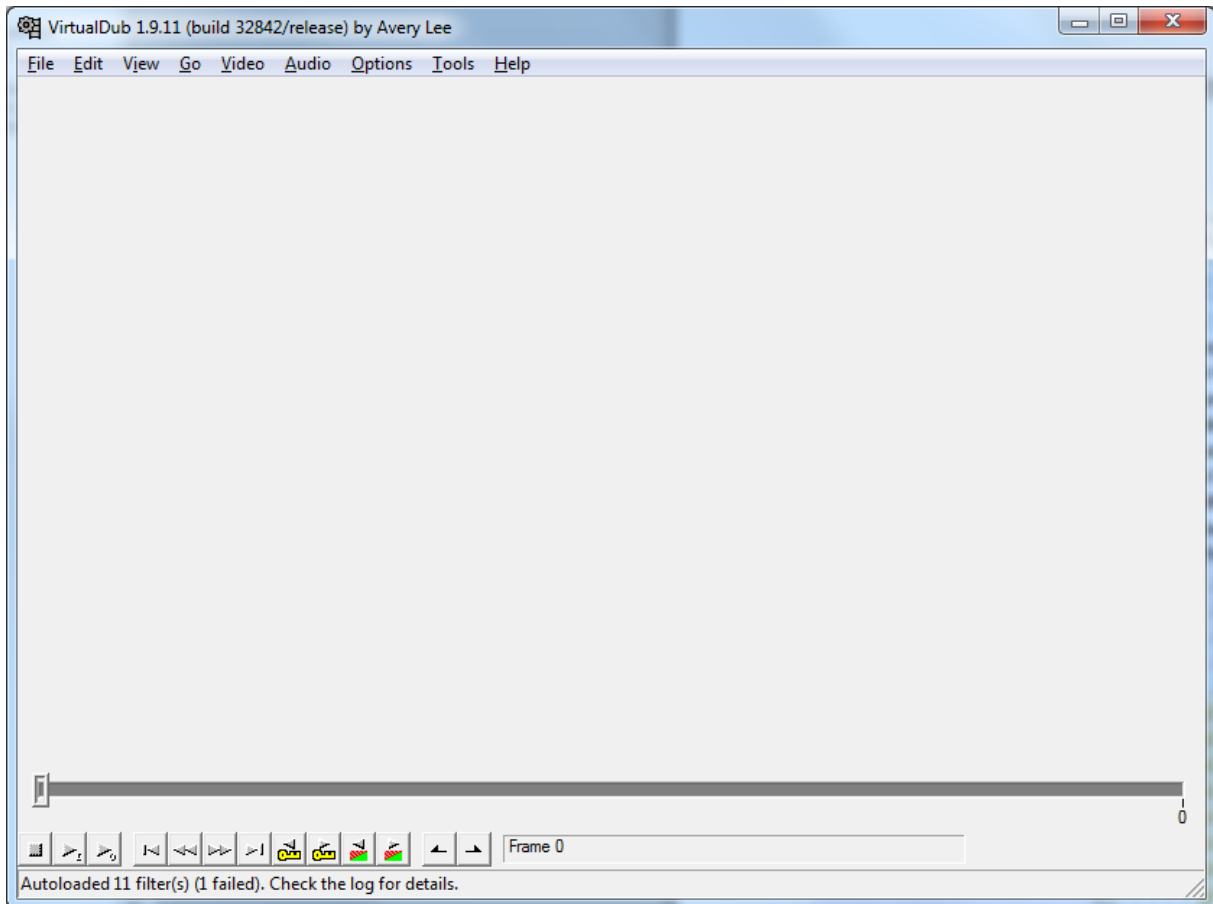
MSU Deinterlacer:

http://compression.ru/video/deinterlacer/index_en.html

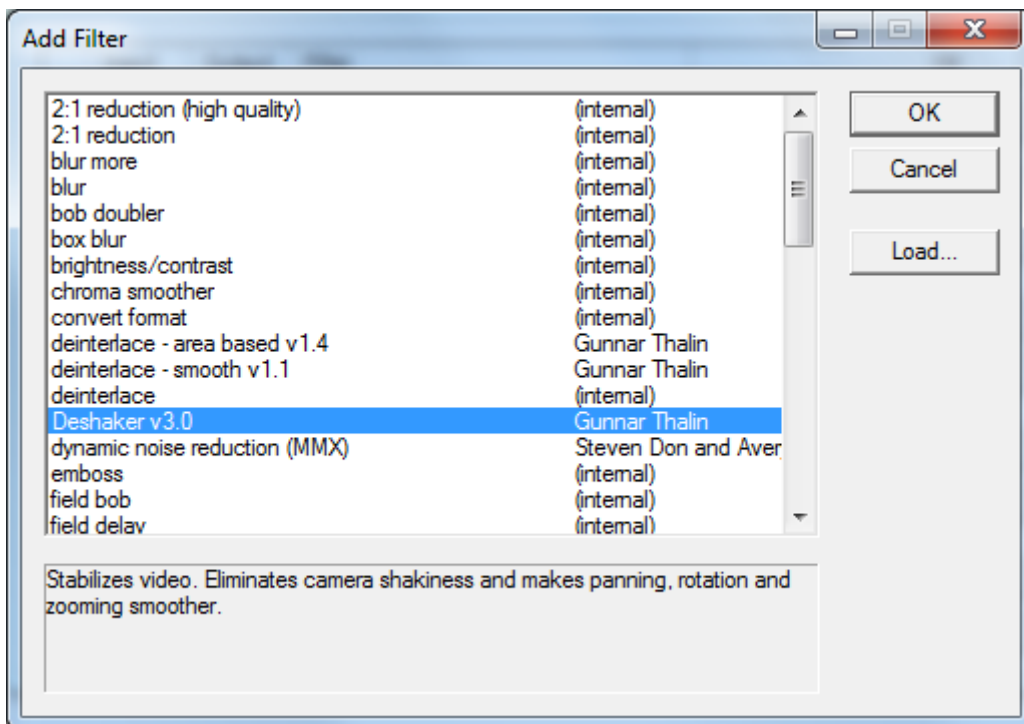
Unzip the files and put them (at least Deshaker.vdf and MSU_Deinterlacer.vdf) in VirtualDub's sub-directory **plugins**.

3.2 Changing and saving Deshaker settings.

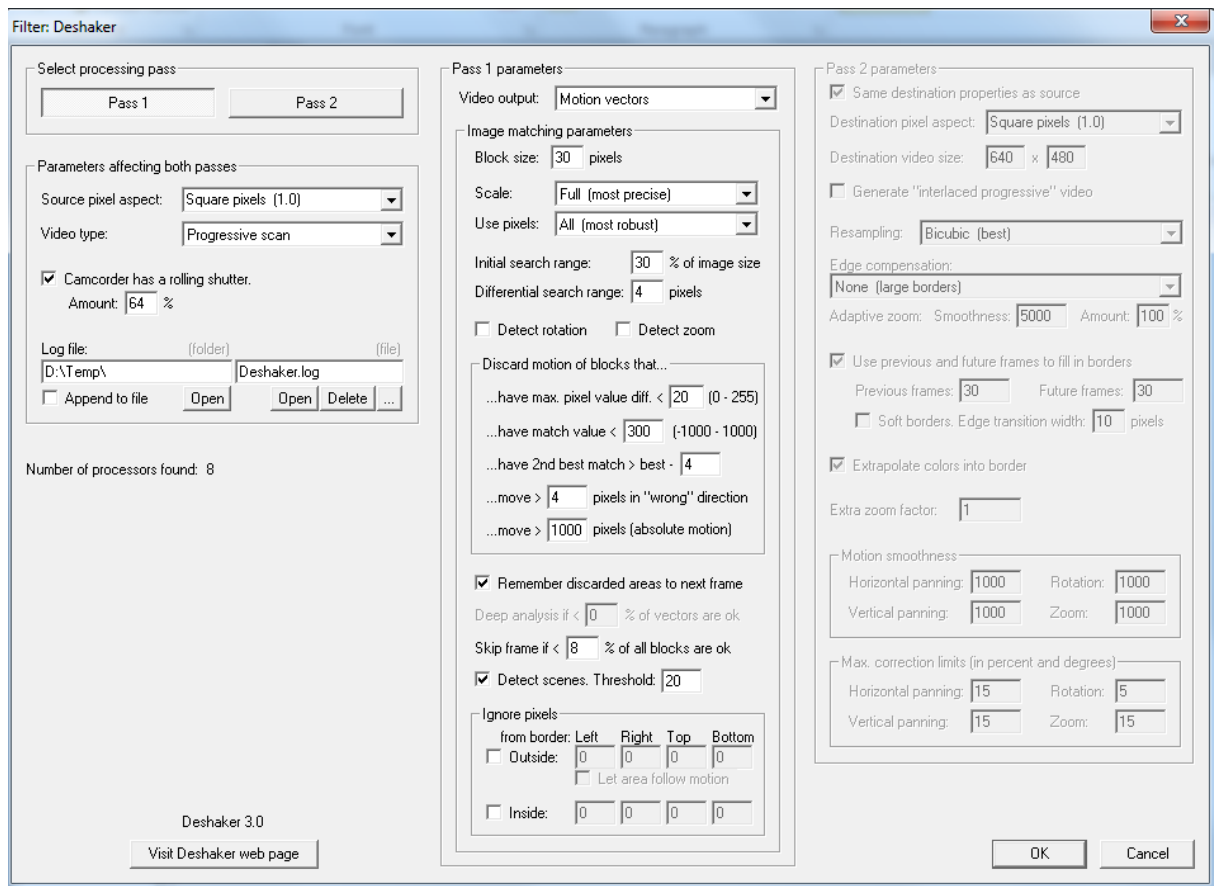
Start VirtualDub



and choose (File | Filters | Add filter):



Select Deshaker v 3.0 and click OK. The following screen with Deshaker's parameters appears:



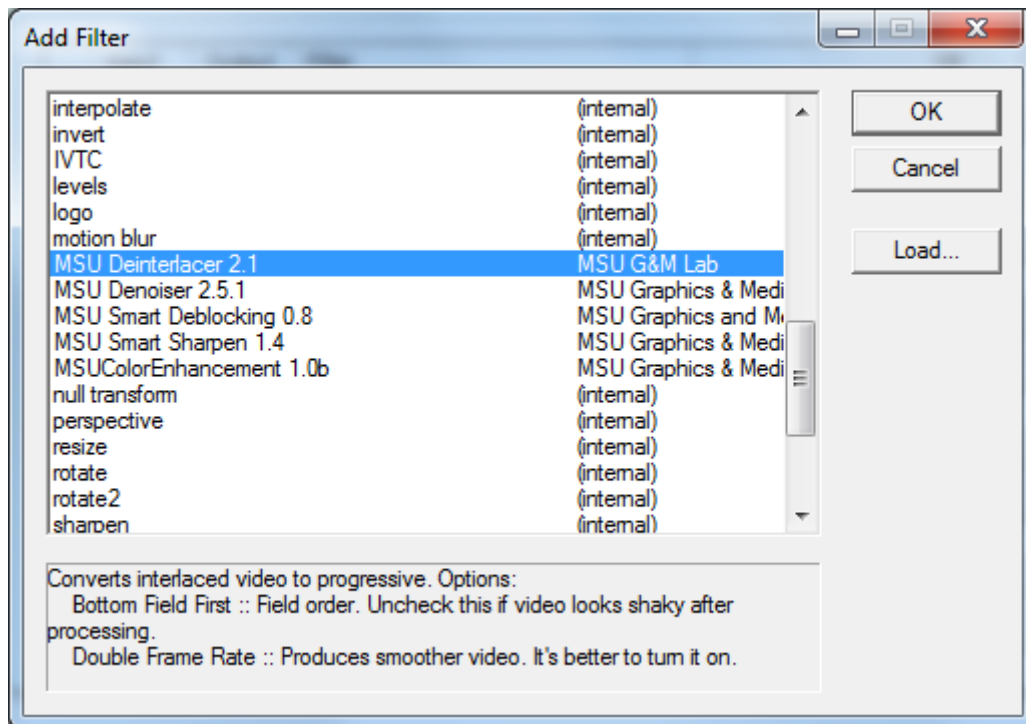
You can change the parameters as appropriate, according to the following guide:

<http://www.guthspot.se/video/deshaker.htm>

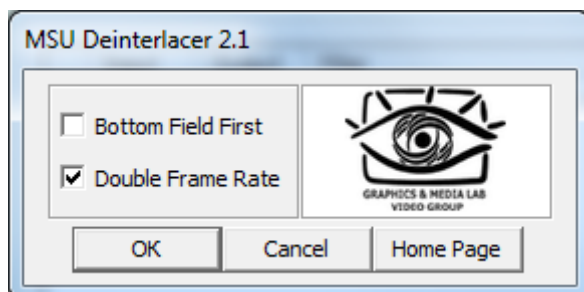
Don't forget to select the parameters for the second phase as well by clicking button "Pass 2". After setting all parameters, click button OK, close filters window and choose (File | Save processing settings). Type the appropriate vcf file name and save it. This would be the file which should be selected after pressing button "Deshaker vcf settings" in 3D converter. Note that it does not matter whether you saved vcf settings with "Pass1" or "Pass 2" active.

3.3 Saving vcf settings for deinterlacing.

Start VirtualDub and choose (File | Filters | Add filter):

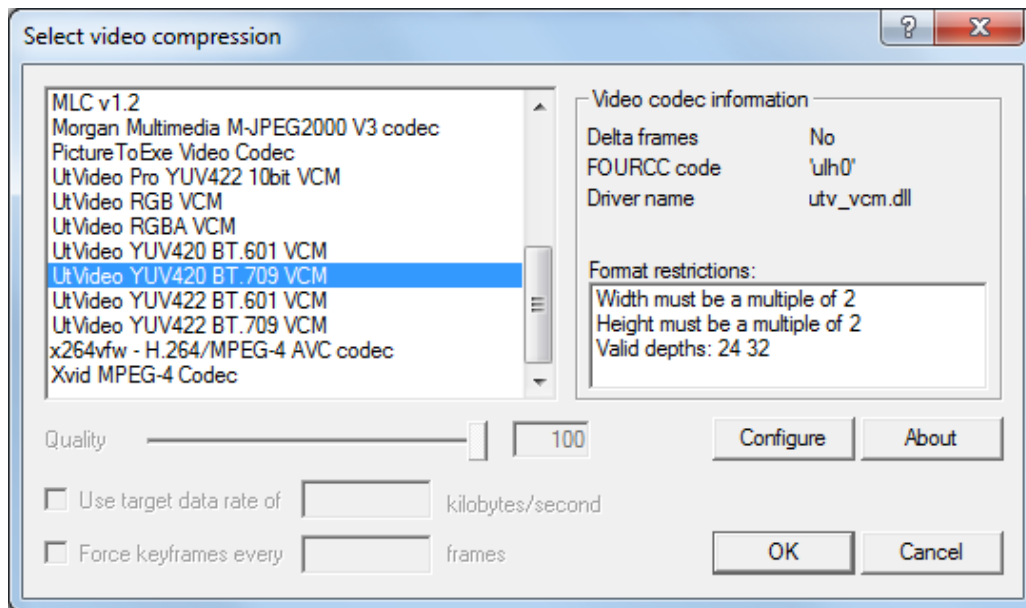


Select MSU Deinterlacer 2.1 and click OK. The following screen with MSU Deinterlacer parameters appears:



For High-definition video uncheck Bottom Field First (Bottom Field First is usually used in DV video).

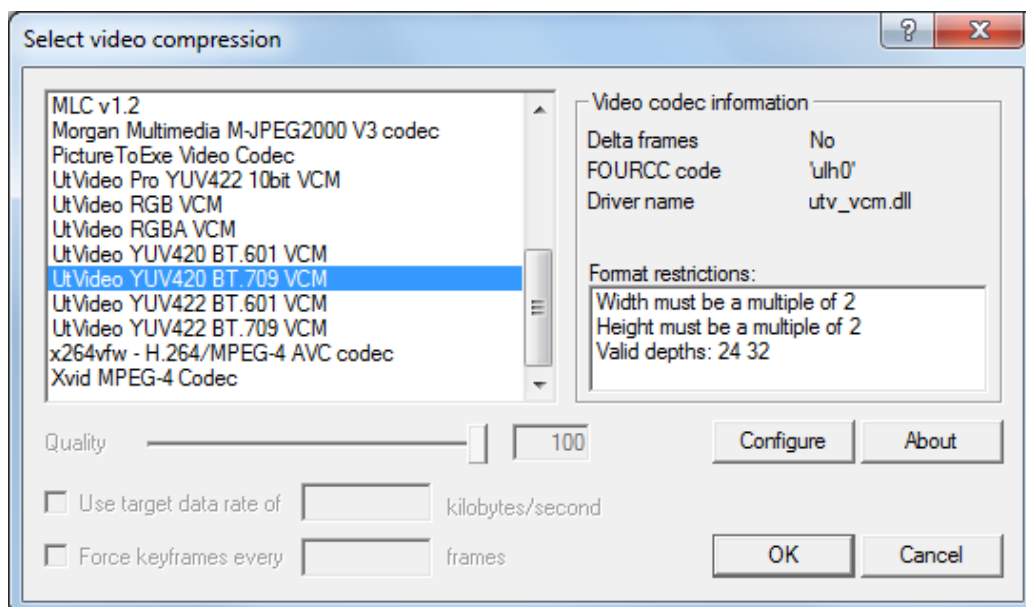
Click OK (2-times). In the main VirtualDub screen choose (Video | Compression). Choose appropriate video encoder:



Click OK and in the main VirtualDub window choose (File | Save processing settings) and save vcf file with appropriate name.

3.4 Saving vcf settings for separate L and R files, for LR and OU files

Start VirtualDub and choose (Video | Compression). Choose appropriate video encoder:



Click OK and in the main VirtualDub window choose (File | Save processing settings) and save vcf file with appropriate name.