Backup of DVD movies

Version 2.0

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1 Background

There are differences in copyright laws in the world, in Sweden it is allowed to make a copy of movies for personal use. Other countries may have different laws.

When I buy a DVD, I buy the right to see the movie with no expire date, and so far they do not have unlimited life time. If the DVD makers could guarantee that it will be possible for me in the future, without costs, get a new copy of the movie if my DVD has become unusable this should not be necessary to do, but I have not seen such guarantees; therefore I find it necessary to make backups (by future I refer to eternal time).
And it is also rather annoying to be forced seeing "trailers" of breaking copyrights laws, particular when I have paid money for it. Should not those trailers be directed and shown to those not paying?

The purpose of this process is to make sure the movies are viewable in the future by making a backup; this is done by converting the movie into the Matroska format (MKV).

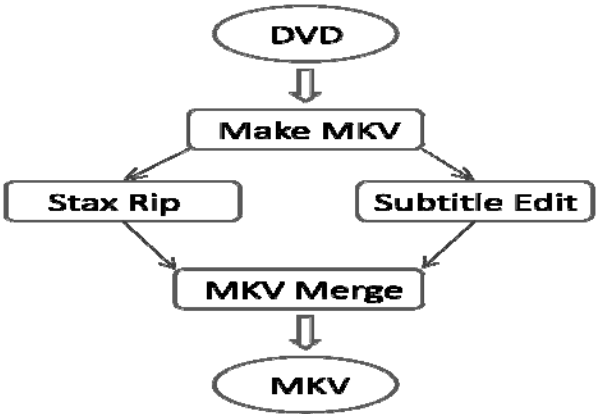
2 Backup Process

This process describes in detail how to convert a movies from DVD:s and make MKV-files of them , this with a decent compress factor and no black borders, but also get sharp subtitles (SRT instead of VobSub).
To follow this process you need the software that are listed in section *"2.1 Software (needed)."*

The process is quite simple, and if you are lazy, have a lot of storage space and accept black borders, then it is possible to skip everything after running Make MKV.

The complete process will shrink the size with 60% without major lost in quality and remove annoying borders.

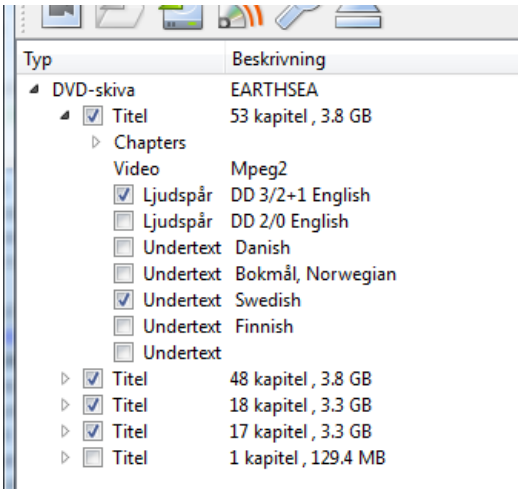
I recommend doing all steps.



2.1 Step 1: MakeMKV.

Use default setting in Make MKV and insert the DVD.
MakeMKV will do a quick analyze of the DVD, then click on the DVD drive in MakeMKV and it start to do a deeper analyze.

When those two steps are finish you will se what Make MKV has found on the DVD.



In some DVD the movie can be in several copies, in that case I recommend you to extract all copies. Uncheck all unwanted sound tracks and subtitles, and all titles that are not the movie (you can identify the movie by size and content).

You will also need to define target folder for the MKV files.

Just press Make MKV and the program will start to extract and create those titles you have marked to be saved. This process than can take some time depending on your computer, you can expect it will take between 5-30 minutes.

2.2 Step 2: Verify the result.

MakeMKV will produce one or more MKV-files, depending of your choices; open them in VLC and verify that you got the expected subtitles and audio tracks. You should also check that the subtitles and audio are in sync with the movies, do this in the end of the movie.

In my example I received four mkv-files, I know that the DVD contains both part 1 and part 2.

```
2013-07-28   12:02      3 946 159 984 title00.mkv
2013-07-28   12:11      3 914 870 717 title01.mkv
2013-07-28   12:18      3 441 661 099 title02.mkv
2013-07-28   12:25      3 386 014 902 title03.mkv
```

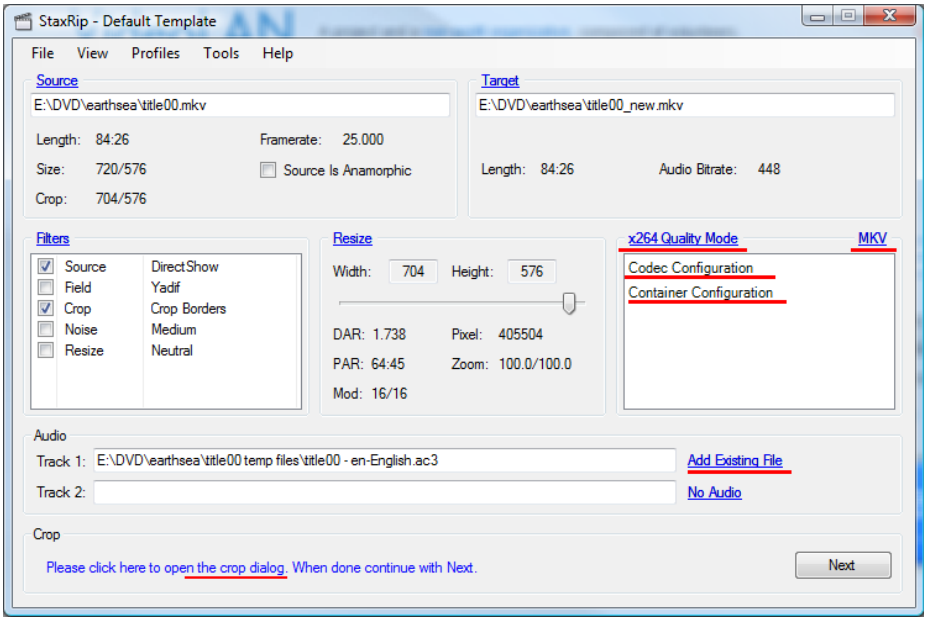
When I took a look I found that title00 and title01 is the same part but title00 is 46 seconds longer (the bigger file). I this case it was the end texts that was not in title01. Both subtitles and audio was present and were in sync with the movie.

In this example it will be title00 and title02 (part 1 and part 2) that will go to next step.

I you are lazy and have a lot of storage space you can just rename the mkv-file and you are finish, for all other go to next step.

2.3 Step 2: Compress with StaxRip.

MakeMKV will not do anything with the different elements in the DVD, it will just move them into a MKV-file (container). The movie stream will therefore most likely be MPEG-1/2 with codec Planer 4:2:0 YUV, this is not a particular compact format and therefore I use StaxRip to convert to H264 decoding with more decent compress factor.
Open the MKV as source (single file); StaxRip will do a quick analyze and extract some parts. When the analysis is done you will get the windows below. Verify and change according to the six bullets.



1. **MKV:**
   Make sure it said MKV
2. **X264 Quality Mode:**
   Change codec to x246 Quality Mode.
3. **Audio Track:**
   Change the Audio track to “Add Existing File”, the default settings gives, according to me, a terrible flat sound. If you got a second audio track you shall add it in this step.
4. **Container Configuration:**
   Subtitles: If you have extract subtitles should those IDX-files be added. Those files are located in the title00_temp_files folder.
   Advanced: Add the name of the movie as Title.
5. **Codec Configuration:**
   I am normally happy with default settings and with Average Quantizer at 23.0, You can not by the eye see any decrease in picture quality with 23.0 from a normal DVD movie.
6. **Crop Dialog:**
   One reasons to run StaxRip is to get rid of the black borders that normal exist on DVD movies. You can verify the cutting in the crop dialog window, but it has just happened once of hundreds that is has cut wrong.

Press next four times and your movie, with your settings, has been placed in StaxRip’s job queue. If you got more movies to convert you can press close and repeat this step to add more jobs to the queue.
When all movies are added then press “Start!”. This step will take a relatively long time depending on your computers performance.

2.4 Step 3: Subtitles.

If you got a big screen (TV) or a projector you will find the subtitles on a DVD to be unshaped with huge pixels. This because subtitles on DVB are in format SubVOB, and those are stored as pictures and not as text.
To have nice subtitles you need to convert those (ORC) with SubTitle Edit into plain text.

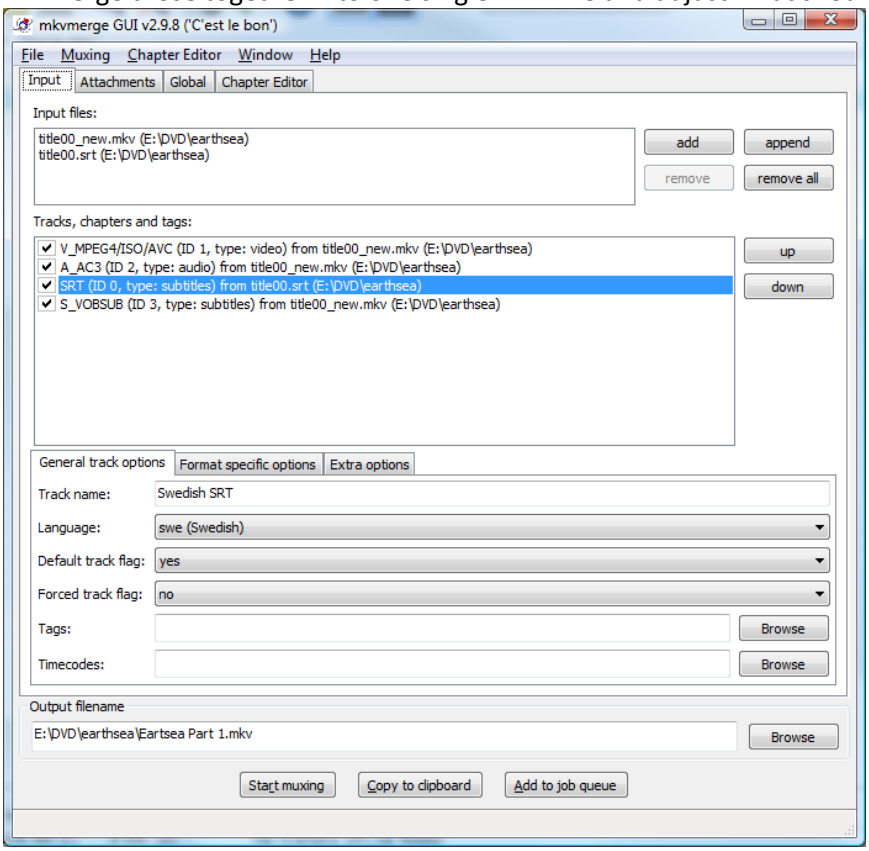
1. Open Subtitle Edit and “Import subtitle from Matroska file…”
2. Language: Swedish (or whatever you got), you may need to add language support according to section “*3.1.3 Subtitle Edit*“
3. “OCR via Tesseract” are working I the most cases, it has just happened once that I got so many errors that it was easier to use “OCR via Image Compare” and type in each character.
4. Try to start OCR
   - Make sure that you got “Prompt for unknown words” checked, else you can end with huge number of errors.
5. If it has problem to identify characters you can try to “Use custom colors”, you can always do abort and go back in the subtitle text list and restart OCR.
6. When retch the end row, do not press OK, go back in the list and check the text and change errors. If you press OK you will have possibility to make changes in the text but you will not se the original images.
7. When you are happy, press OK and then save as Subrip (*.srt).

Overall, SubTitle Edit is easy to use for ORC, but can be quite boring.

If in some reason MakeMKV has missed extracting the subtitle, then it is possible for Subtitle Edit to read directly from the DVD, when doing this it is also possible to save VOB:s (SUB/IDX) that in the nest step can be merged into the MKV-file.

2.5 Step 4: Merge into one MKV.

Now you got one MKV file from StaxRip and one subtitle file from SubTitle Edit. In this step we will merge those together into one single MKV file and adjust what should de default streams.



1. Open MKVMerge GUI
2. Drag the MKV file made by StaxRip and the SRT-filer from Subtitle Edit into MKVMerge input file area. (Example: title00_new.mkv and title 00.srt).
3. Enter track name and language for Audio streams; I use to call them like “English AC3 6ch” and “English DTS 6ch”. If you have more than one then make sure that “default track flag” is yes for your preferred stream.
4. Enter language and name for subtitles, and set default track flag to yes for preferred subtitle. I use to call them”Swedish SRT” and “Swedish VOB” and have SRT as default. The reasons I keep VOB is that some older system and TV:s can not handle SRT but works with VOB:s.
5. If you got any Chapter tracks, you can remove those.
6. Write a fitting name to the Movie as output file name.
7. Press “start Muxing” and in 40-50 seconds later you got your movie in a nice MKV-package ready to store and view.

3 Software

This process is only using freeware software. Below you can find those you need and also some that is nice to have. Latest version is always recommended.

3.1 Software (needed).

There are a huge range of utilities on the net for "ripping" DVD:s, I have tried a lot and finally decide to use the following. So far I have not find any DVD that I was unable to convert to MKV by this process using following software (all freeware).

3.1.1 MakeMKV

MakeMKV is a new and really nice tool. It is a freeware if you are using it for DVD, but will need a license to lock it up to using it for Blu-Rays. The DVD-producer continuously makes changes in their encryptions, therefore you need software in the first step in the backup procedure that are maintained and updated. Other tools I have used only works on older DVD:s. MakeMKV transform the movie into a MKVfile (that act as a container) without change anything else, it will have the same decryption and formats. It will neither do Crop on the movie so any black border will remain. (http://www.makemkv.com/)

3.1.2 StaxRip

StaxRip is an open source video converter GUI. It is a shell for other applications like VSRip, DGIndex, Project X etc. (http://staxmedia.sourceforge.net/)

3.1.3 Subtitle Edit

Used for converting VOBsub (subtitles based on images) to SRT (true text based subtitles). It is a complete kit to manage Subtitles everything from making our own to synchronization. (http://www.nikse.dk/SubtitleEdit/)

You can find additional language data files at the Tesseract Google code project (http://code.google.com/p/tesseract-ocr/downloads/list)

3.1.4 MKVMerge

MKV is a container format and with MKVMerge GUI you can easy attach streams, like subtitles, to the MKV-file. It can also be used to get a quick view of contents in MKV-files. It can be downloaded as part of the package MKVToolNix.
(http://www.bunkus.org/videotools/)

3.1.5 FFDshow

StaxRip is using Audio decoder and Video Decoder during its process.

3.1.6 VLC Media Player

VLC is used for verify the result. You can use other players but in VLC it is very easy to switch sound tracks and subtitles. I recommend using VLC. (http://www.videolan.org/)

3.2 Software (nice to have).

The software listed below is not necessary to install, but there may come a day when you will have use for them. Most of them are utilities that I used before I found MakeMKV.

3.2.1 MKVExtract

Split MKV-files into tits elements. It can be downloaded as part of the package MKVToolNix. (http://www.bunkus.org/videotools/)

3.2.2 MKVInfo

MKVInfo is a simple utility to view all elements in a MKV-file. It can be downloaded as part of the package MKVToolNix. (http://www.bunkus.org/videotools/)