MEDIA SERVER & RIPPING

What is a media server, and how to rip CD's, DVD's, Blu-ray's and UHD.

Welcome

- Who am I?
    - Jonathan A Burt BSc Cert Mgmt HND FIAP IEng MBCS CITP
        - Batchelor of Science Degree (Open)
        - Professional Certificate in Management
        - Higher National Diploma in Computing
        - Fellow of the Institute of Analysts and Programmers
        - Incorporated Engineer with the Engineering Council
        - Member of the British Computer Society
        - Charted IT Professional
        - PRINCE2 Practitioner
        - Certified Novell Administrator (v5.x)
    - 25+ years experience of working in IT, now retired.
    - Long time member of the Isle of Wight PC User Group!

Warning!

- As with all my talks, I recommend that you do you own research before making any changes to your PC.

- Also, please ensure you have backed up all of your data before you make changes to your PC.

- The legality of ripping is a grey area, and is done at your own risk.

Blue Peter Effect!

- Due to time restraints, and the fact that Ripping and Transcoding can take many hours, some aspects of this talk will have the Blue Peter "Here's one I made earlier!" effect.
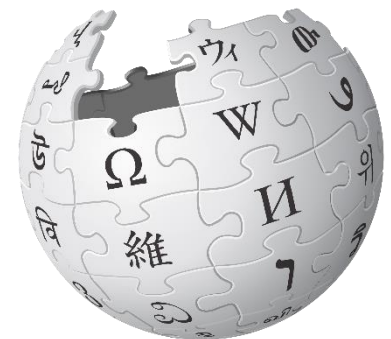
What is a Media Server?

- Playing UHD, Blu-ray, DVDs, and CDs as well as streaming from the Internet are some of the ways you can enjoy music and video on your TV and home theatre setup.

- However, you can also take advantage of other sources, such as media files stored on compatible devices in a home network (i.e. a Media Server).

What is a Media Server?

- From Wikipedia:

  - A media server refers either to a dedicated computer appliance or to a specialised application software, ranging from an enterprise class machine providing video on demand, to, more commonly, a small personal computer or NAS (Network Attached Storage) for the home, dedicated for storing various digital media (meaning digital videos/movies, audio/music, and picture files). This can also mean that these servers are specialised for media streaming.

Media Server Software

- There are many software solutions to operate and run a Media Server:
  - Jellyfin
  - Kodi
  - MediaPortal
  - MythTV
  - Plex   ← This is what I use!
  - Serviio
  - Subsonic
  - TVersity Media Server
  - Universal Media Server
  - etc…

Plex

- "Your favourite movies, TV, music, web shows, podcasts, and more, all streamed to your favourite screens."

  - Plex works by connecting your media, the Plex Media Server, and the various apps for all your devices—browsers, mobile devices, game consoles, streaming devices, home theatre PCs—but, what parts are free to use and what parts are paid for?

  - The basic functionality of Plex is completely free, which includes playback of anything on your server, as well as podcasts, news, and web shows. Plex mobile apps require being unlocked (through an in-app purchase or a Plex Pass subscription), and premium features are restricted to those with an active Plex Pass subscription.

Plex - Features

- The Plex Pass subscription includes free use of the paid-for apps as well as other features and benefits (Plex Pass subscriptions are generally intended/beneficial to the Plex account that is running the Plex Media Server):
  - Activate all of our mobile apps (Android, iOS, Windows, Windows Phone) simply by signing into your Plex account within the app.
  - Live TV & DVR: Watch and record over-the-air broadcasts available in your area, using a compatible tuner and digital antenna.
  - Stream trailers and extras (interviews, behind the scenes, etc.) for content in your movie library.
  - Add lyrics from LyricFind to your music libraries to follow along whenever you want.
  - Set up a Plex Home for your family to allow easy switching between accounts and restrict what content you share from your server.
  - Get early preview access to new apps and features.
  - And even more!
- As mentioned above, apps for some devices have in-app purchases that unlock the app to remove playback limitations when streaming from a Plex Media Server:
  - Android (mobile), iOS (iPhone and iPad), Windows, and Windows Phone apps have one-time, in-app purchases.
  - Again, a Plex Pass subscription will activate these features without additional purchase.
- In addition, streaming music through our partner, TIDAL, requires an active TIDAL subscription—either billed/managed through us or elsewhere, with the TIDAL subscription linked to your Plex account.

- Home
- Audio Books
- Films
- Music
- Timothy's Films
- TV programmes
- Playlists

MORE >

Home

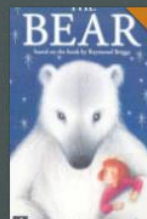**RECENTLY ADDED MOVIES** — jaburt.iw

Fast & Furious #... 2003
Fast & Furious #... 2001
Wonder Woman ... 2017
Suicide Squad (T... 2016
The Bear 1998
Merry Madagascar 2009
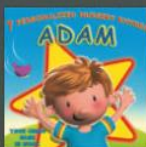Pop Party 14 2015
Frozen II 2019

RECENTLY ADDED MUSIC — jaburt.iw

Ballerina Magic
Ballerina Magic
Various Artists
My Favourite Chr...
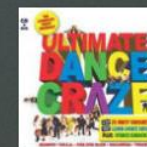Mcasso Music
Personalized Nu...
Martin Waddell
Farmer Duck
Northwood Prim...
Songs Of All Times
Wight Harmony
Over the Rainbow
HMV
Orchestra Moods
Various Artists
Ultimate Dance ...

RECENTLY ADDED TV — jaburt.iw

The Secret Garden
Season 1
Walking with Din...
2 seasons
Firefly [HD]
Adam Baldwin "
Little Britain
Specials
Good Omens [HD]
In the Beginning
Ultimate Force
Specials
CI5: The New Pro...
Specials
The IT Crowd
Specials

What is Ripping?

- Ripping is the art of extracting all or parts of digital contents from a container.
  - Originally it meant to rip music out of Amiga games. Later the term was used to extract WAV or MP3 format files from audio CDs, later on, it became the standard "word" for extracting the contents of any media, most notably DVD and Blu-ray discs.

- Despite the name, neither the media nor the data is damaged after extraction. Ripping is often used to shift formats, and to edit, duplicate or back up media content. A rip is the extracted content, in its destination format.

What is Ripping?

- To rip the contents out of a container is different from simply copying the whole container or a file.

- When creating a copy, nothing looks into the transferred file, nor checks if there is any encryption or not, and a raw copy is also not aware of any file format.

- One can copy a DVD byte by byte via software onto a hard disk, and play the resulting ISO file just as one would play the original DVD; however this hasn't "ripped" the DVD, just "copied" it.

Transcoding
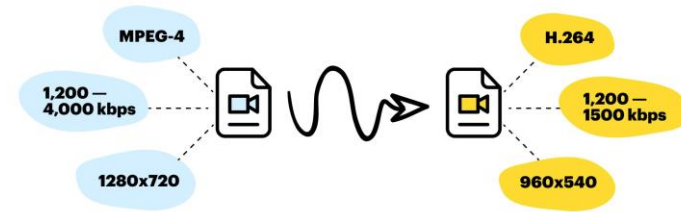
- Transcoding is the direct digital-to-digital conversion of one encoding format to another, such as for movie data files (e.g. MPEG2, MPEG4) and audio files (e.g. WAV, MP3).
  - This is usually done in cases where a target device does not support the format or has limited storage capacity that mandates a reduced file size, or to convert incompatible or obsolete data to a better-supported or modern format.
- Transcoding is commonly a lossy process, introducing generation loss; however, transcoding can be lossless if the output is either losslessly compressed or uncompressed.
  - The process of transcoding into a lossy format introduces varying degrees of generation loss.

File Formats - Audio

- When you rip Audio CD's, the output file is first stored in a RAW (uncompressed lossless) format before you transcode it.

- There are numerous formats available, and some of these are as follows:

Format Type	Formats
RAW	AIFF, PCM, RAW, SAM, WAV
Lossy	AA3, AAC, AC3, MP3, MPC, OGG, WMA
Lossless	ALAC, FLAC, APE, SHN, TTA, WV

Ripping Audio CDs

- There are numerous tools out there for ripping Audio CD's, but I believe that the best is Exact Audio Copy:

  - It is free (for non-commercial purposes).
  - It works with a technology, which reads audio CDs almost perfectly. If there are any errors that can't be corrected, it will tell you on which time position the (possible) distortion occurred, so you could easily control it with e.g. the media player.
  - Extremely popular among audiophiles for its accuracy and ability to rip slightly damaged audio compact discs.
  - Exact Audio Copy is used to convert the tracks on standard audio CD's to WAV files, which can then be transcoded into other formats (lossy or lossless).

Ripping Audio CDs

- You will also need an transcoder to convert the WAV file to the format you want to use, in my case MP3.
- I use LAME which is a high quality MPEG Audio Layer III (MP3) transcoder licensed under the LGPL (i.e. free).

  - Today, LAME is considered the best MP3 encoder at mid-high and variable bitrates, mostly thanks to the dedicated work of its developers and the open source licensing model that allowed the project to tap into engineering resources from all around the world. Both quality and speed improvements are still happening, probably making LAME the only MP3 encoder still being actively developed.
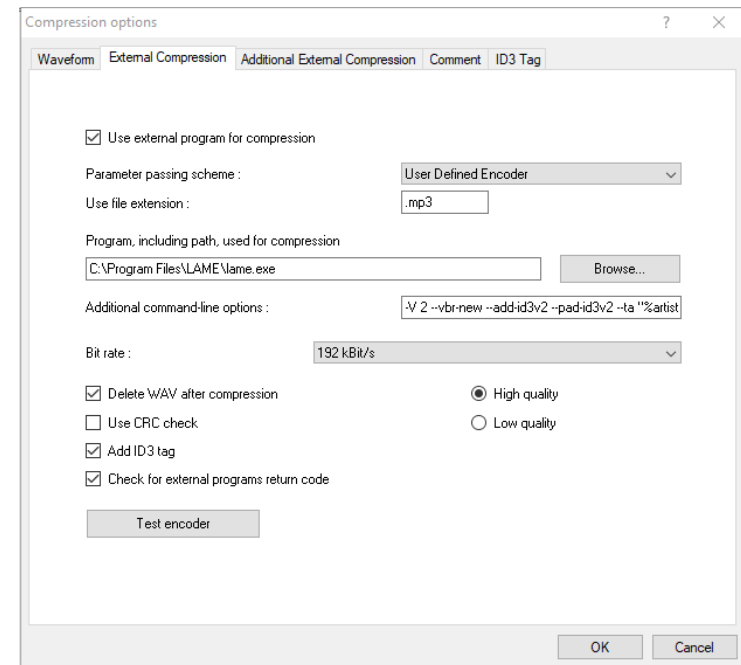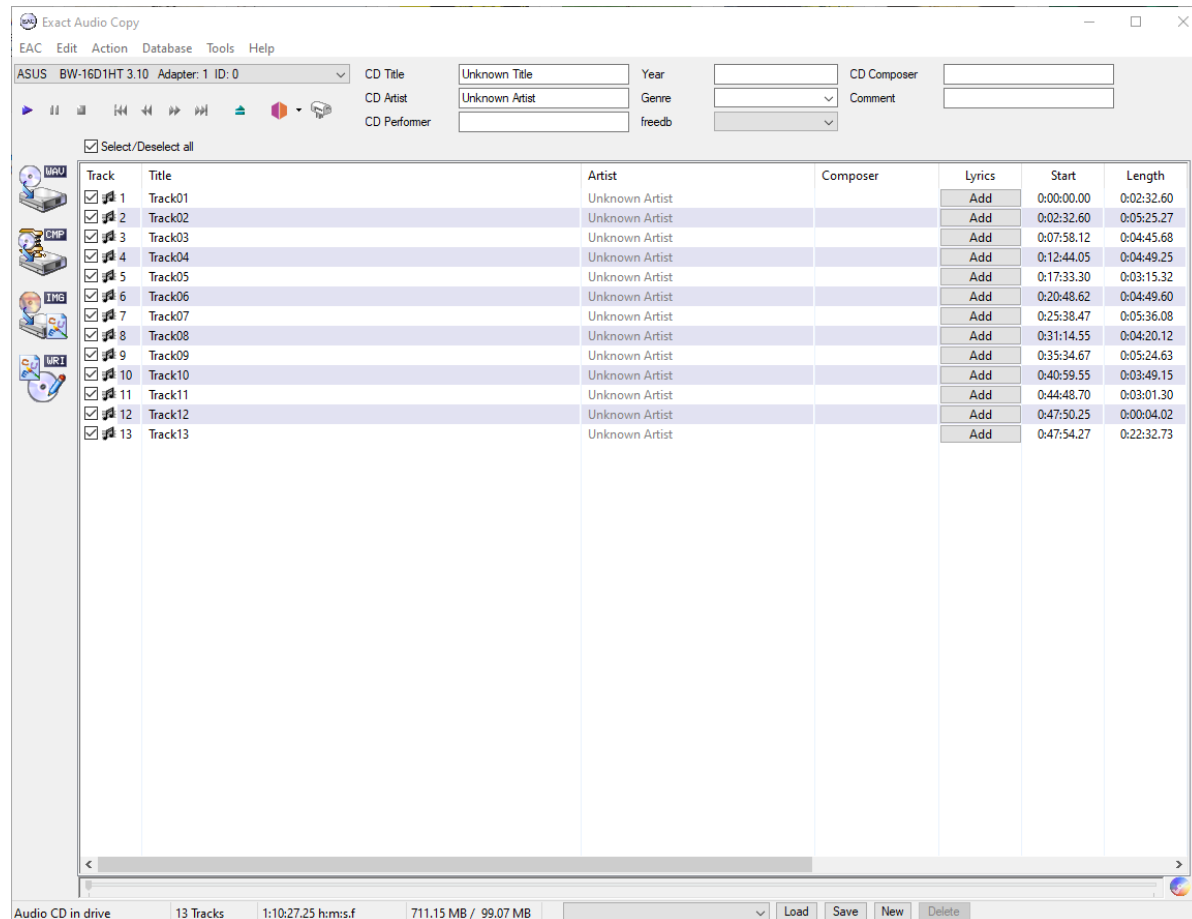
Using Exact Audio Copy - Setup

- Exact Audio Copy is very easy to you, the first time you use it, it will want to do some tests on your CD/DVD drive, to determine optimal speed and quality.

- Once those tests are done you need to configure it use to use LAME (or the transcoder you wish to use).

There are many guides online which will help you in determining the optimal command-line variables you wish to use with LAME (or your preferred transcoder).
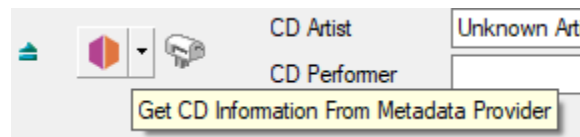
Using Exact Audio Copy

- When you first put a CD in to be ripped, Exact Audio Copy will interrogate the disk and identify how many tracks it has, for example:
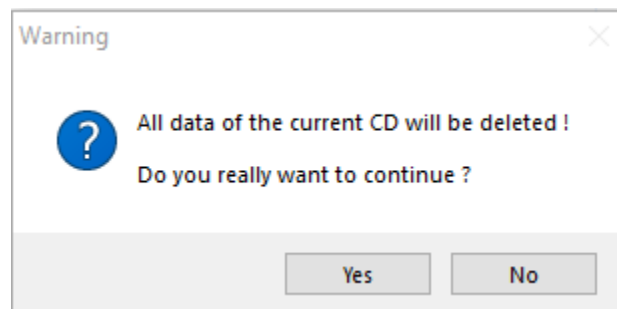
Using Exact Audio Copy

- You then tell Exact Audio Copy to search for the CD on a Metadata Provider, I use https://musicbrainz.org/.

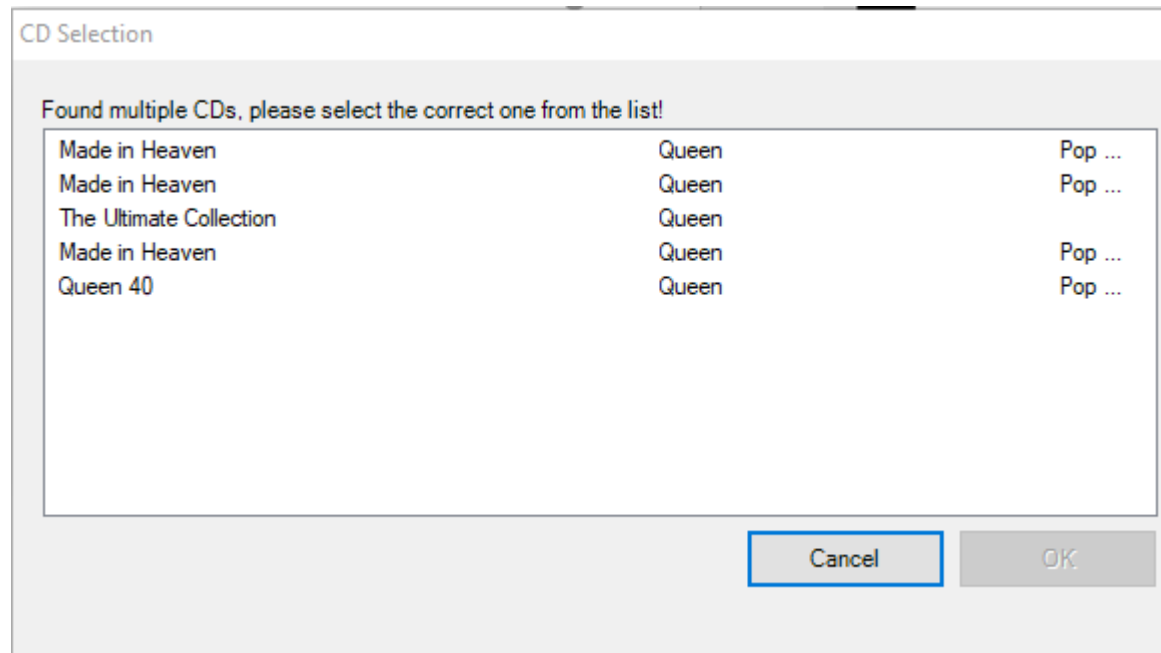 - So I press the "Get CD Information From Metadata Provider" button:

  - Which then warns me:

Using Exact Audio Copy

- You are then presented with a selection box from which to select your CD from:

CD Selection

Found multiple CDs, please select the correct one from the list!

Made in Heaven	Queen	Pop ...
Made in Heaven	Queen	Pop ...
The Ultimate Collection	Queen	
Made in Heaven	Queen	Pop ...
Queen 40	Queen	Pop ...

Cancel   OK

- Once selected, you will be asked if you want to download covers, which I don't bother with.
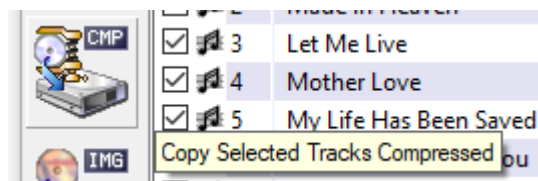
Using Exact Audio Copy

- As you can see, the Metadata has been found and the CD data has been updated:
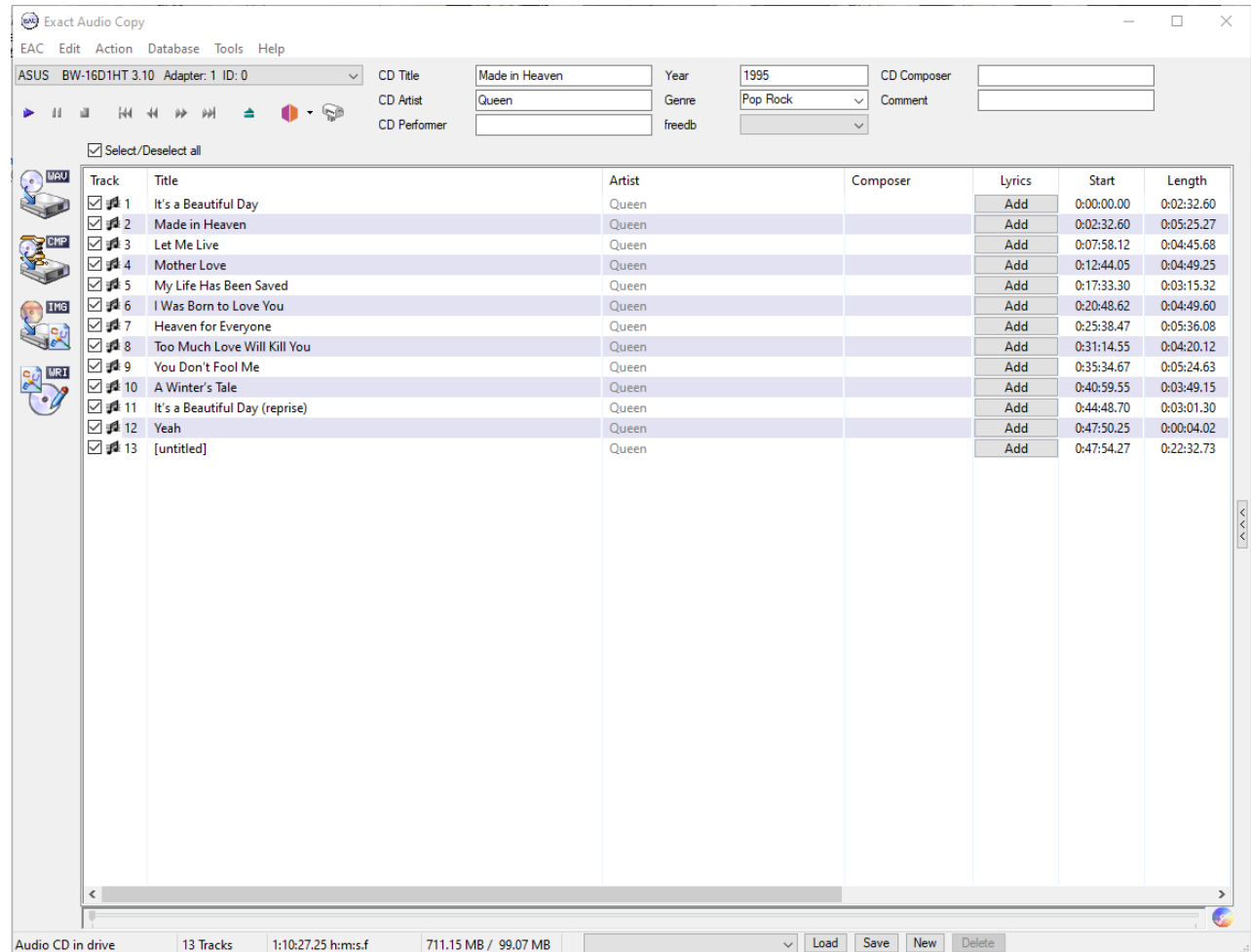
Using Exact Audio Copy

- Now, I just need to tell Exact Audio Copy to copy and compress (i.e. for this example, transcode to mp3 and flac formats) the tracks by pressing the CMP button:

Track	WAV	FLAC	MP3
01-It's a Beautiful Day	26,270KB	13,180KB	3,401KB
02-Made in Heaven	56,030KB	42,461KB	7,486KB
03-Let Me Live	49,142KB	34,903KB	6,354KB
04-Mother Love	49,284KB	30,680KB	6,576LB
07-Heaven for Everyone	57,900KB	38,575KB	7,848KB
12-Yeah	694KB	255KB	92KB
13-[untitled]	233,000KB	78,655KB	28,656KB

Ripping Audio CD's – MP3TAG

- Finally, when managing your Audio CD rips, at times you may wish to edit the metadata held within the music files, a good tool for this is MP3TAG:

  - Mp3tag is free (donations accepted)!
  - Mp3tag is a powerful and easy-to-use tool to edit metadata of audio files.
  - It supports batch tag-editing of ID3v1, ID3v2.3, ID3v2.4, iTunes MP4, WMA, Vorbis Comments and APE Tags for multiple files at once covering a variety of audio formats.
  - Furthermore, it supports online database lookups from, e.g., Discogs, MusicBrainz or freedb, allowing you to automatically gather proper tags and download cover art for your music library.

File Formats - Video

- Ripping DVD's, Blu-Rays, and UHD Discs is slightly different that Audio CD's, this is because video discs have Audio, Video, Chapters, Subtitle and Picture tracks.
- Therefore video files are stored in containers with multiple parts (think .zip file), and each part has its own transcoding (lossy and lossless) format.
- Some common containers are:
  - AVI, DIVX, FLV, MP2, MP4, MPG, MKV, MOV, VOB, etc.
- Some common video encoding (Codecs):
  - AV1, DivX, H.263, H.264 (AVC), H.265 (HEVC), H.266 (VVC), MPEG4, Quicktime, RealVideo, VP9, WME, XVID, etc.
- Some common subtitle formats:
  - HDMV PGS, SBV, SRT, SSA, STL, TTML, VTT

File Formats – Video (MKV)

- One of the most popular for ripping is the Matroska Multimedia Container (MKV), which is a free, open-standard container format, a file format that can hold an unlimited number of video, audio, picture, or subtitle tracks in one file.

- For example, "film.mkv" can be made up as follows:

Type	Track	Language	"Name"	Default	Forced
Audio	TrueHD Atmos	eng	Surround 7.1	Yes	No
Audio	AC-3	eng	Surround 5.1	No	No
Audio	AC-3	eng	Commentary	No	No
Subtitles	HDMV PGS	eng		No	No
Subtitles	SRT	eng	Foreign	No	Yes
Video	MPEG-4p10/AVC/H.264	eng		Yes	No
Chapters	12 entries				

Ripping DVD, Blu-ray, UHD discs

- Just like with ripping Audio CD's, there are numerous tools out there for ripping DVD, Blu-ray and UHD discs. However, most are paid for!

- The reason why a lot are "paid for" is because DVD, Blu-ray and UHD discs have copy protection and region locks, which the software has to work around; and as they change regularly the developers have to routinely update their software.

Ripping DVD, Blu-ray, UHD discs

- Also, its worth noting that like Audio CD's, ripping DVD, Blu-ray and UHD discs is also a two stage process;
  - Ripping the disk
  - Transcoding the files

- Some software packages can perform both stages, but I prefer to have control over each stage, hence why I use separate software packages to do the jobs.

Ripping DVD, Blu-ray, UHD discs

- There are four software packages that I use:

- MakeMKV
  - The software to rip the disc into MKV formatted files.

- HandBrake
  - The software to transcode the video (and if needed audio) tracks of the MKV file.

- MKVToolNix
  - This is a set of tools to create, alter and inspect Matroska files.

- Subtitle Edit
  - Subtitle Edit is a free (open source) editor for video subtitles.

MakeMKV

- MakeMKV is your one-click solution to convert video that you own into free and patents-unencumbered format that can be played everywhere.

- It converts the video clips from proprietary (and usually encrypted) disc into a set of MKV files, preserving most information but not changing it in any way.

- MakeMKV is free to use for ripping DVD's, but requires a license to rip Blu-ray and UHD disc – however this feature is "free during the beta".

HandBrake

- HandBrake is a tool for converting video from nearly any format to a selection of modern, widely supported codecs.

- Free and Open Source.

- Supports:
  - File Containers: .MP4(.M4V) and .MKV
  - Video Encoders: H.265 (x265 and QuickSync), H.264(x264 and QuickSync), H.265 MPEG-4 and MPEG-2, VP8, VP9 and Theora
  - Audio Encoders: AAC / HE-AAC, MP3, Flac, AC3, or Vorbis
  - Audio Pass-thru: AC-3, E-AC3, DTS, DTS-HD, TrueHD, AAC and MP3 tracks

MKVToolNix

- MKVToolNix is a set of free and opensourced tools to create, alter and inspect Matroska files. It is made up of four different tools:

  - **mkvmerge**: This program takes the input from several media files and joins their streams (all of them or just a selection) into a Matroska file.
  - **mkvinfo**: This program lists all elements contained in a Matroska. The output can be limited to a list of tracks in the file including information about the codecs used.
  - **mkvextract**: This program extracts specific parts from a Matroska file to other useful formats.
  - **mkvpropedit**: This program analyses an existing Matroska file and modifies some of its properties. Then it writes those modifications to the existing file.

Using MakeMKV

- MakeMKV is very easy to use, load the software, place a disc in the drive, and go!

- However, you do need to name the files and tracks manually as there is no metadata auto naming facility like in Exact Audio Copy.

- You also need to do some minor testing and investigation in identifying tracks, as you will not want to keep all of them, for example:
  - Audio tracks could be:
    - Film Audio, Audio Commentary, Audio Description (for the blind).
  - Video tracks could be:
    - The Film, Deleted Scenes, Featurettes, Adverts, Piracy Warnings, etc.

Using MakeMKV - Setup

- The only set-up that MakeMKV needs is with regard to setting the default "Preferred language". This means that MakeMKV will only select and copy tracks that have the matching language.
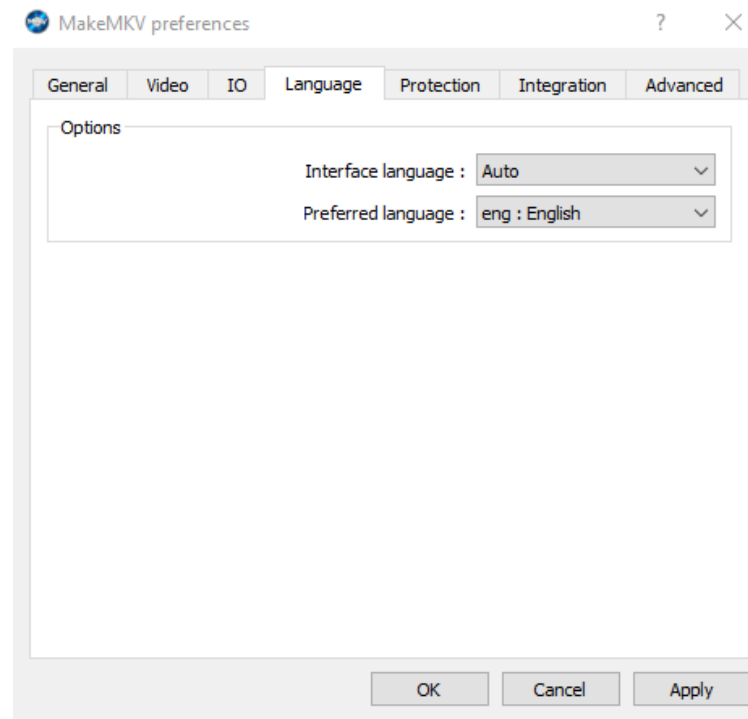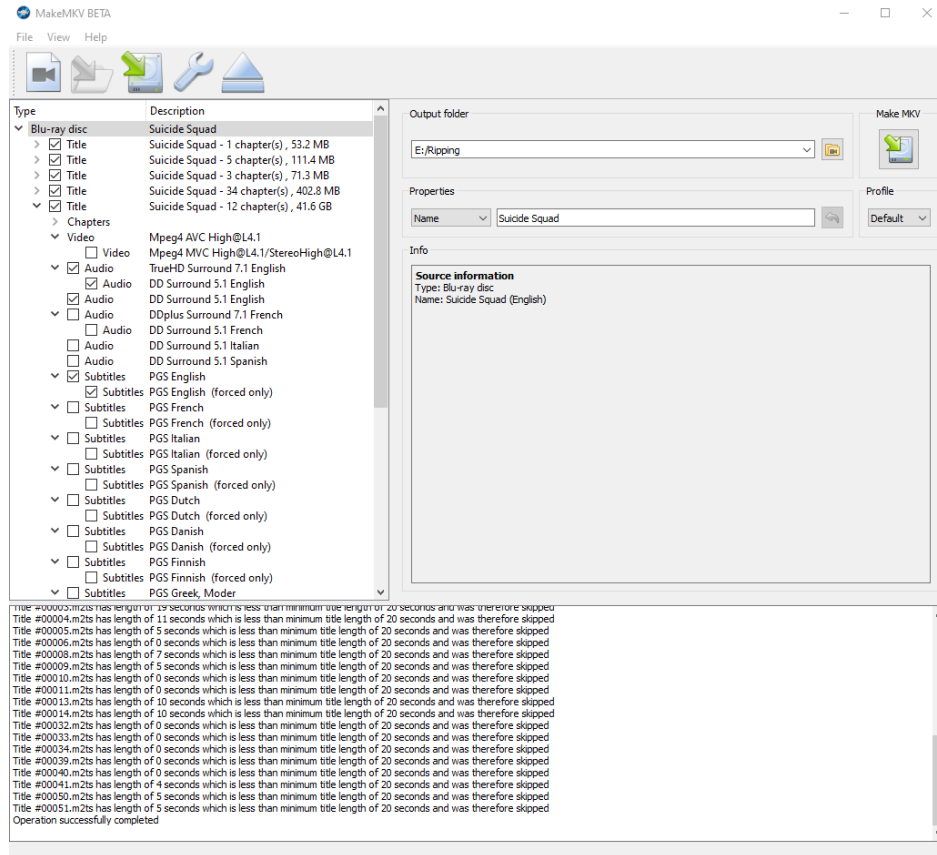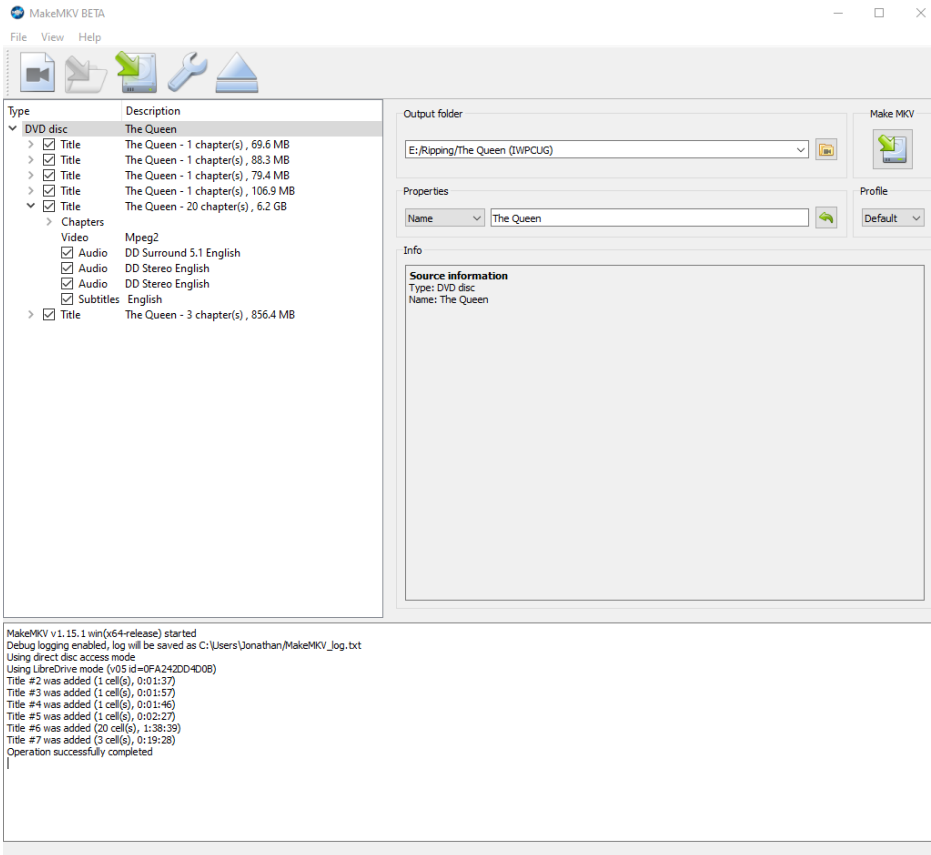
Using MakeMKV

- Starting MakeMKV:
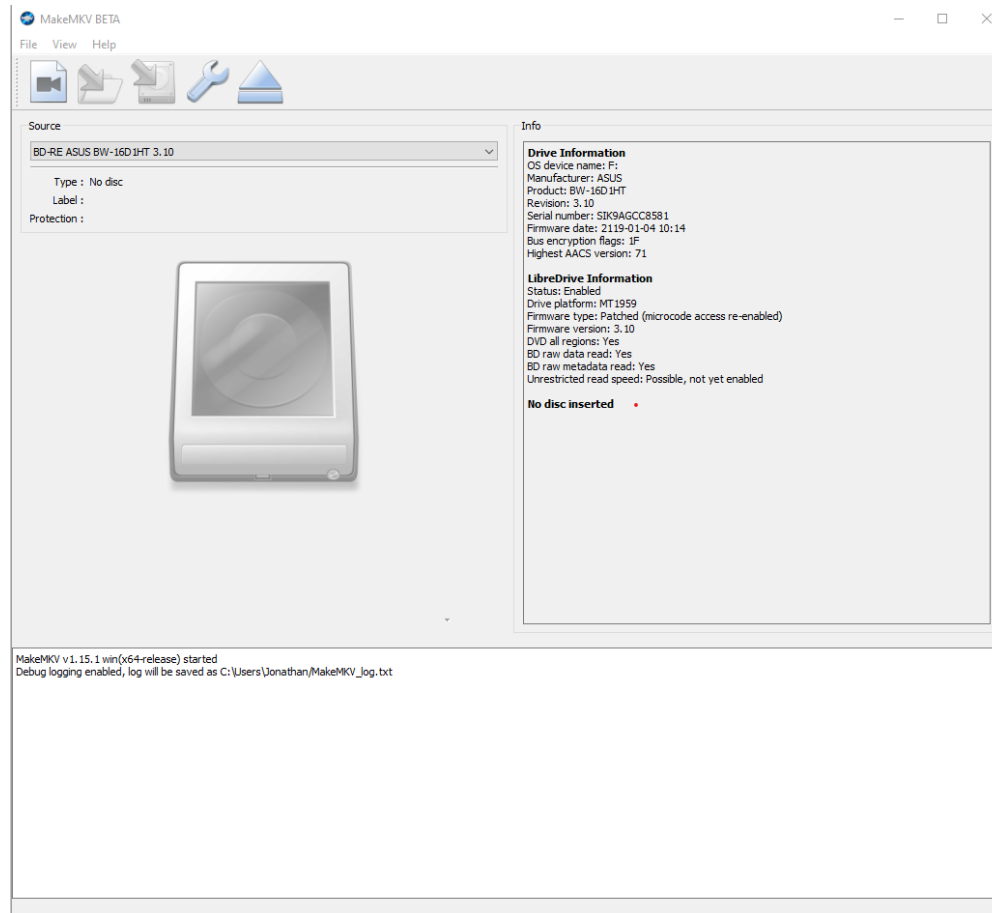
Using MakeMKV

- Inserting a disc:
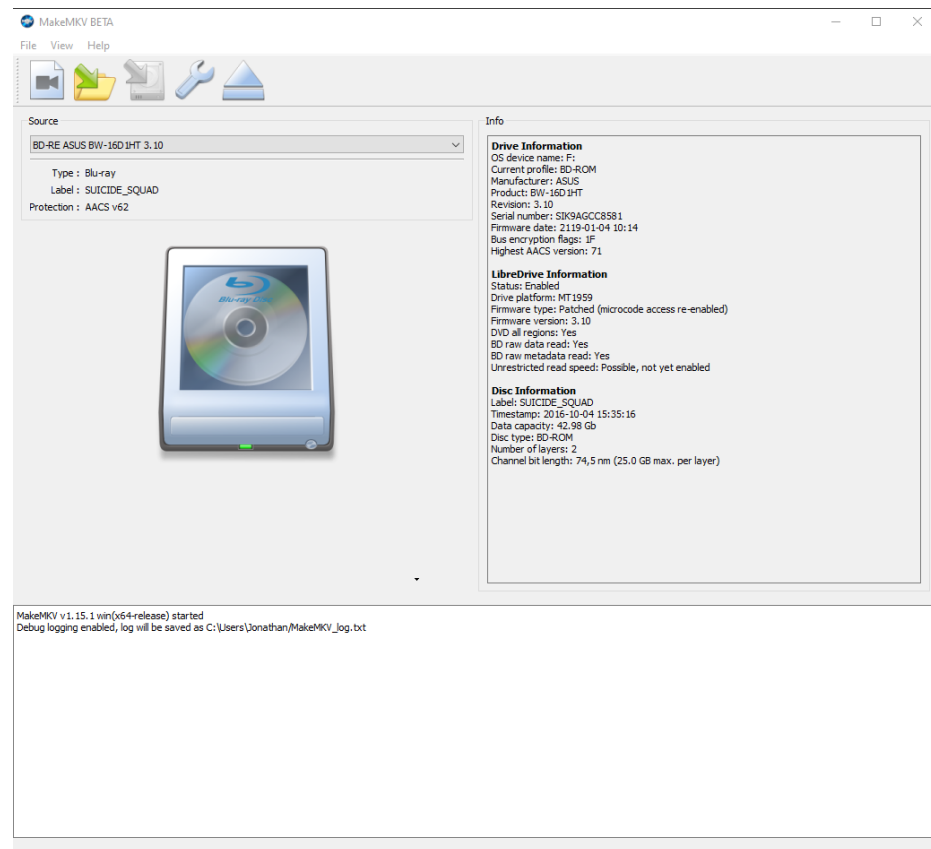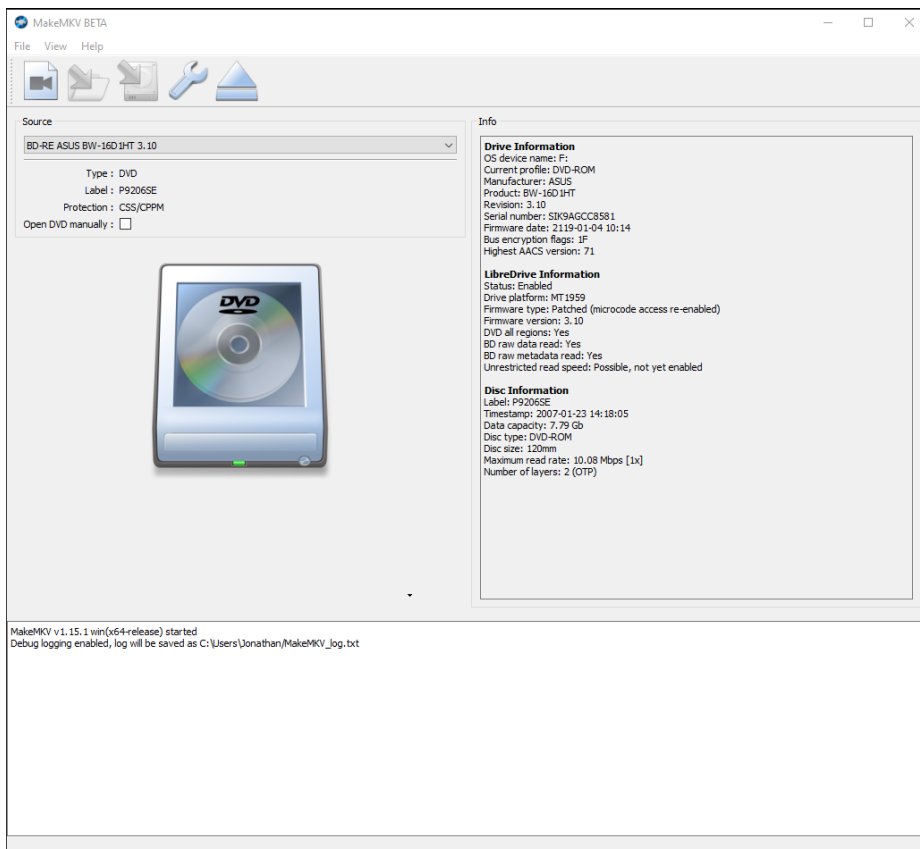
Using MakeMKV

- Select what you want, enter in the name of the film, and make the MKV file(s):

Using HandBrake

- Now you have finished extracting the films from your disc, you will want to transcode the video tracks. HandBrake can also transcode audio tracks, but I prefer to keep them in their original format.

- If your hardware supports it, HandBrake will use specific hardware encoding features (for faster transcoding), i.e.
    - Intel QuickSync   ← Certain Intel CPUs
    - AMD VCE   ← Certain AMD Video Cards
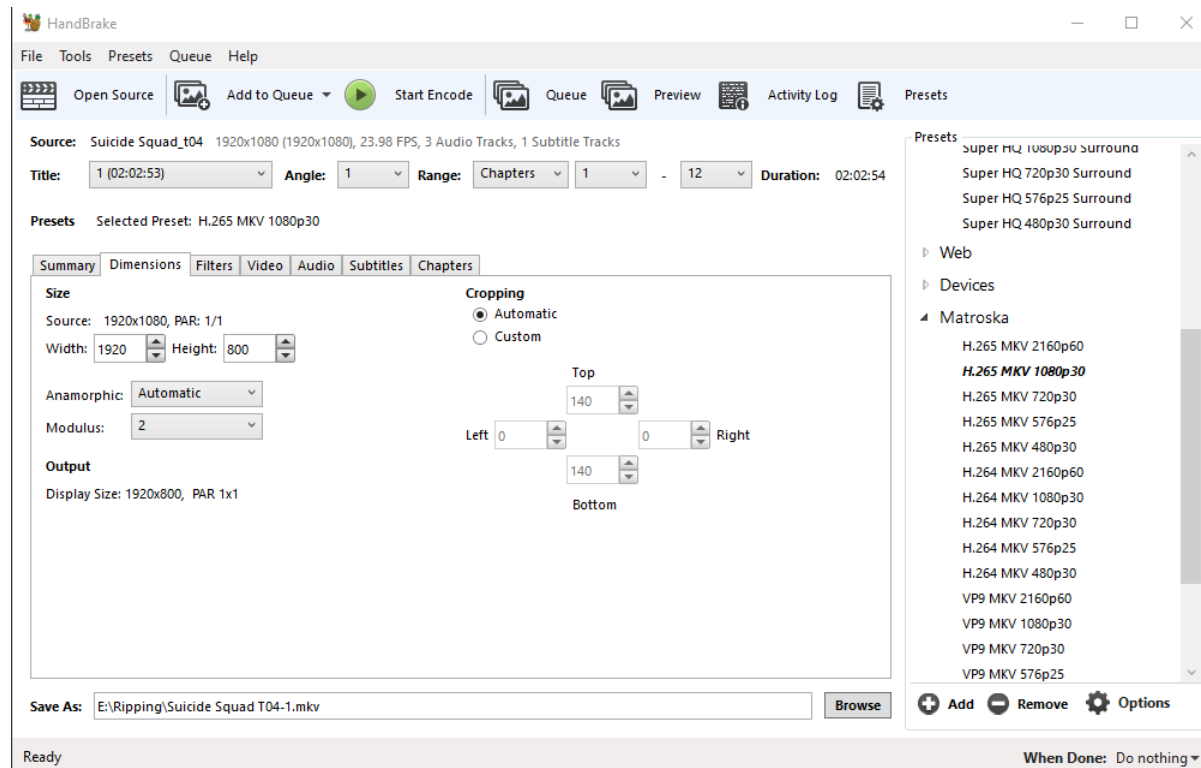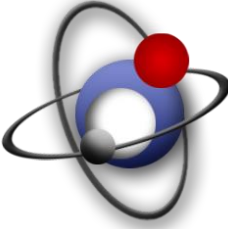   - Nvidia NVENC   ← Certain Nvidia Video Cards

Using HandBrake

- HandBrake is an extremely feature rich software package, however it is quite a simple to use; just load a MKV file and select your preset:
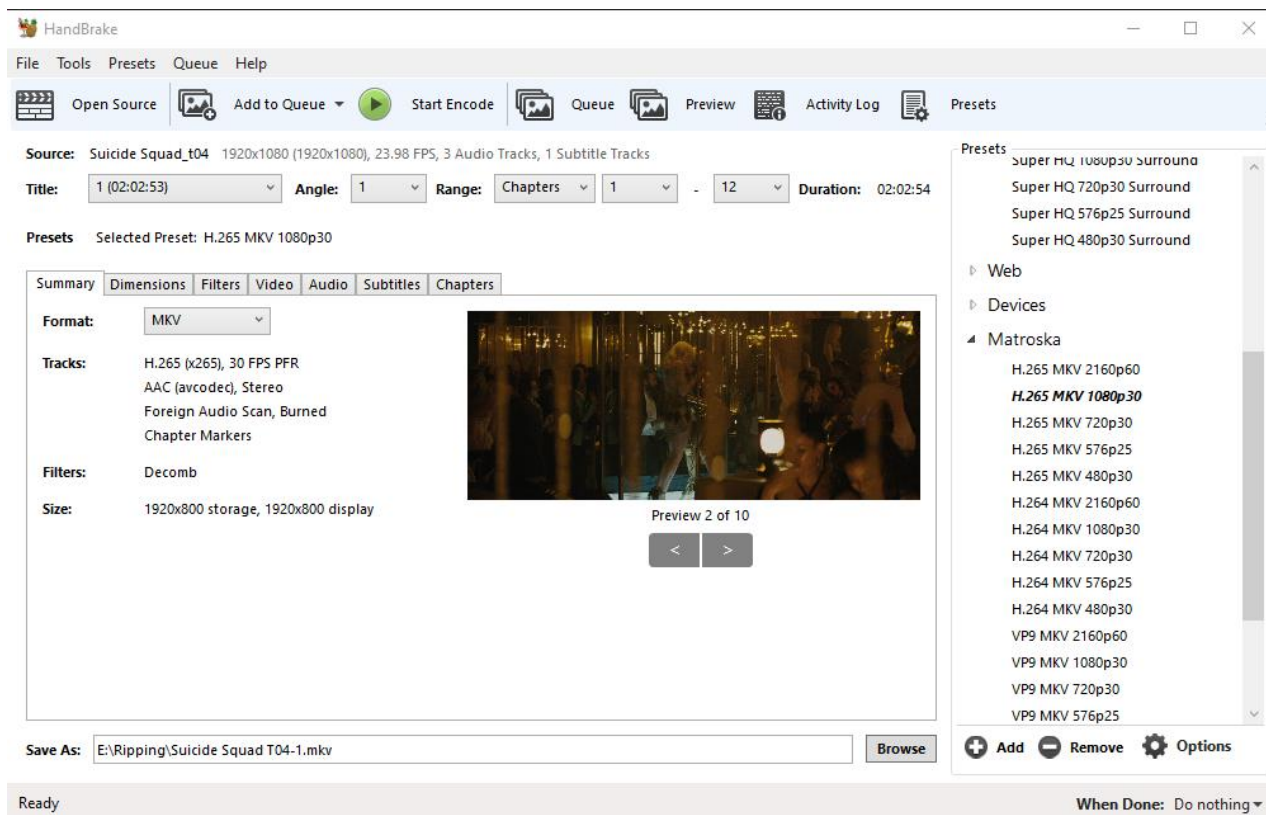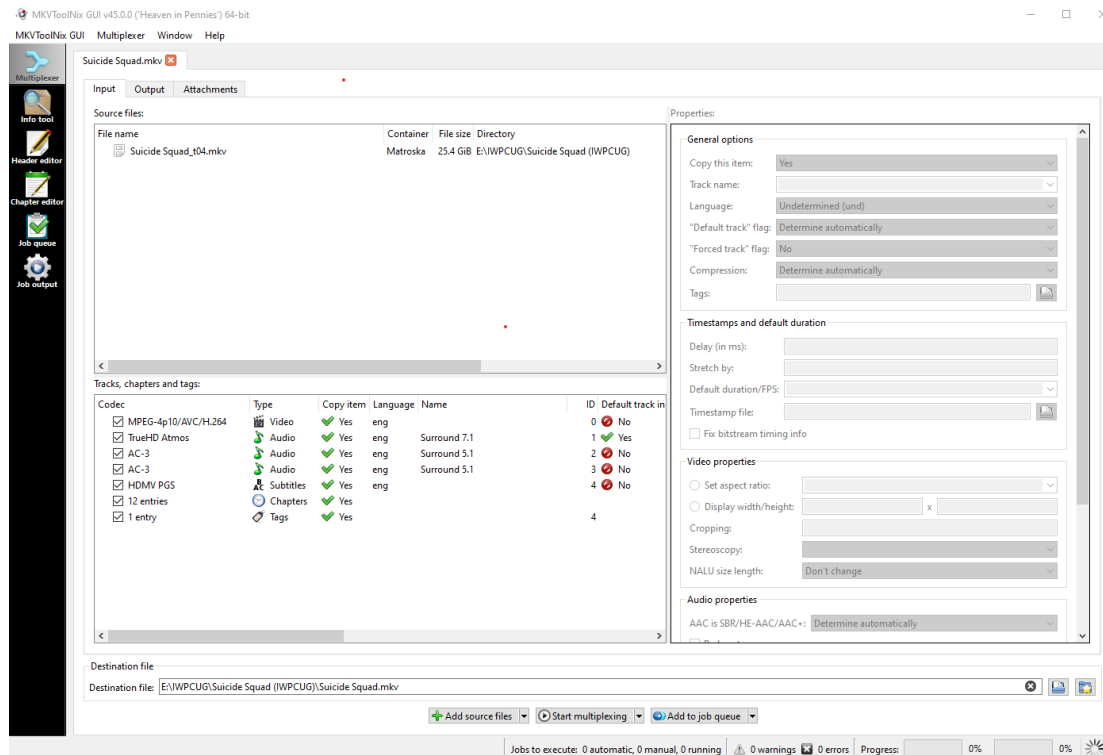
Using HandBrake

- You will also want to review the Dimensions tab. One of the things HandBrake can do is remove the black bands you can get on discs.
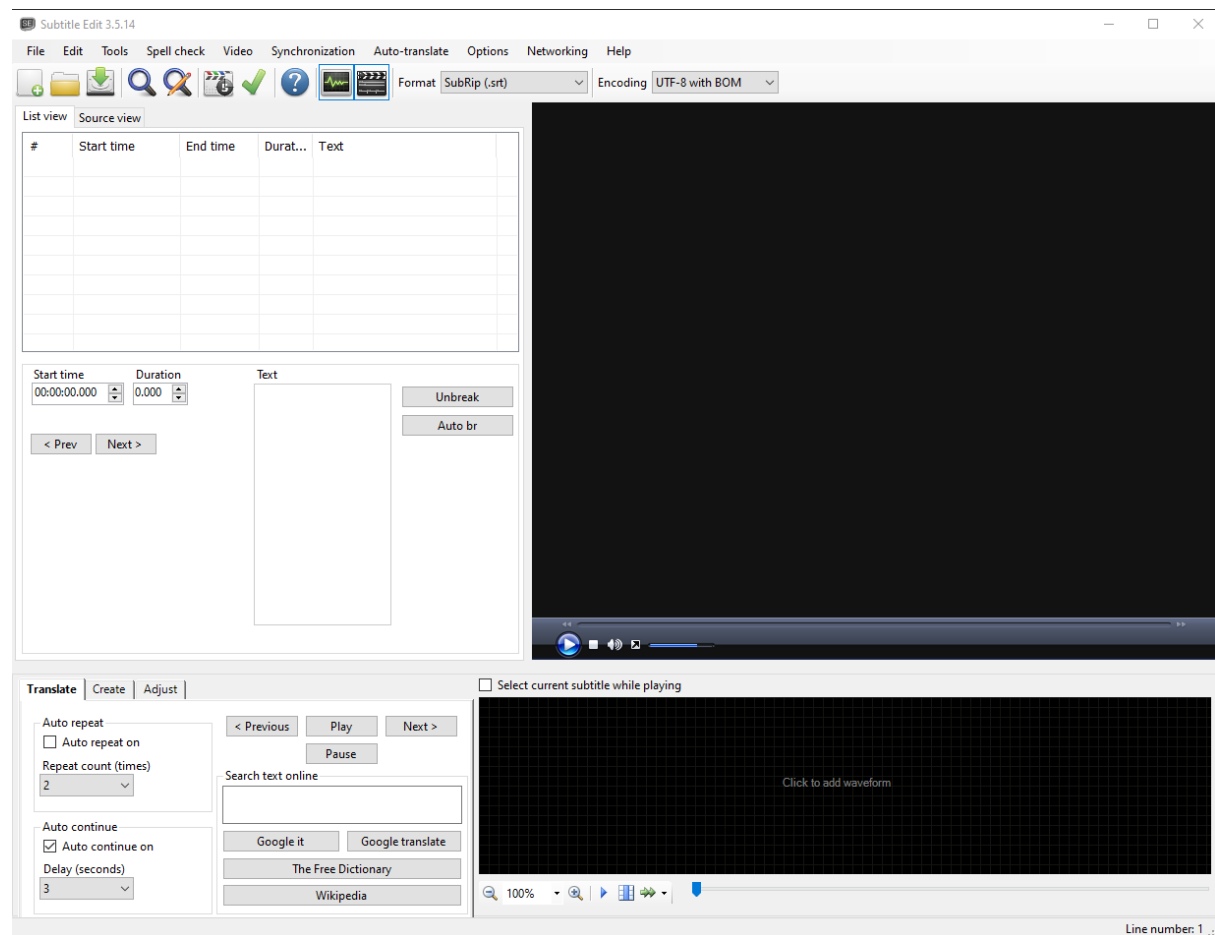
Using MKVToolNix

- Once you have extracted and transcoded your video file, you will want to put them back together in one container, as well as tidy up/remove some of the tracks you don't need. This is what MKVToolNix is for!

Using Subtitle Edit

- Sometimes I need to edit subtitles, and this is the tool I use.

Audio CD Software

- Exact Audio Copy
  - http://www.exactaudiocopy.de/en/

- LAME
  - https://lame.sourceforge.io/
  - https://www.rarewares.org/mp3-lame-bundle.php
- FLAC
  - https://xiph.org/flac/

- MP3TAG
  - https://www.mp3tag.de/en/

DVD, Blu-ray, UHD Software

- MakeMKV
  - https://www.makemkv.com/

- Handbrake
  - https://handbrake.fr/

- MKVToolNix
  - https://mkvtoolnix.download/index.html

- Subtitle Edit
  - https://www.nikse.dk/subtitleedit

Further Information

- Wikipedia
  - https://en.wikipedia.org/

- Lots of useful tutorials
  - http://www.howtogeek.com/

- TechRadar has a good selection of reviews.
  - http://www.techradar.com/

Questions?

Does anyone have any questions?