

# How to Convert Blu-ray Discs for Audio File Playback

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HINT: Click on a Topic in Table of Contents to hyperlink to that topic

## Table of Contents

How to Convert Blu-ray Discs for Audio File Playback .....	1
Overview:.....	3
Requirements: .....	3
Step 1: Use MakeMKV to rip your disc to an MKV file: .....	4
Step 2: Deciding what File format you want to use for Multichannel Playback:.....	6
Haphazard File Navigation: .....	6
Audio Library: .....	6
Playback Devices/Software:.....	6
Gapless Playback:.....	6
Step 3: Use Music Media Helper to Extract Audio from new MKVs to wav or FLAC files:.....	7
Functionality: .....	7
Extract Audio from MKV/MKA dialog description:.....	8
Tagging Tracks from Musicbrainz (online music database):.....	11
Copying all the Track Titles from the clipboard: .....	12
Edit Grid Data manually:.....	14
Tagging Album Cover Art from Fanart.tv (online artwork database): .....	16
Playback Software Discussion/Recommendations: .....	17
Kodi 19:.....	17
Kodi 18 and earlier:.....	17
JRiver (Audio library):.....	17
JRiver (Video Library):.....	17
Foobar2000:.....	17
VLC:.....	17
Using a Blu-ray Player (Oppo etc): .....	17
Original MKV file without splitting into separate song/chapter files using a CUE file:.....	17
Using MKVToolNix to create MKA files on Apple MAC OS: .....	18
Appendix: Using MMH's Channel Volume tool to adjust channel levels: .....	21

## Overview:

This 'how to' will show how to convert a Blu-ray disc contents to file(s) that can be played back on computers and media players, with a focus on creating lossless surround files. This can also be applied to DVDV discs (as opposed to DVD-A disc).

Blu-ray and DVDs have copy protection/encryption and disc drives are very slow. Step 1 is to decrypt the disc and copy the video and audio streams to your hard disc for further processing from much faster hard drives.

Once we have decrypted the disc, we can then convert the audio to a file format that best suits how we wish to play the contents and device/software intended to use. Often this will be FLAC but there may be a requirement to keep the original codec, such as TrueHD/Atmos, so it can be decoded by an AVR during playback.

## Requirements:

You will need the following to decrypt your disc and copy to your hard drive:

- A Blu-ray drive in your PC or MAC
- MakeMKV software (free – donationware)

MakeMKV can create a copy of the original disc's video and audio stream in a Matroska MKV video file format. MKV can be played back on most devices.

You will need the following to manipulate and tag your ripped disc:

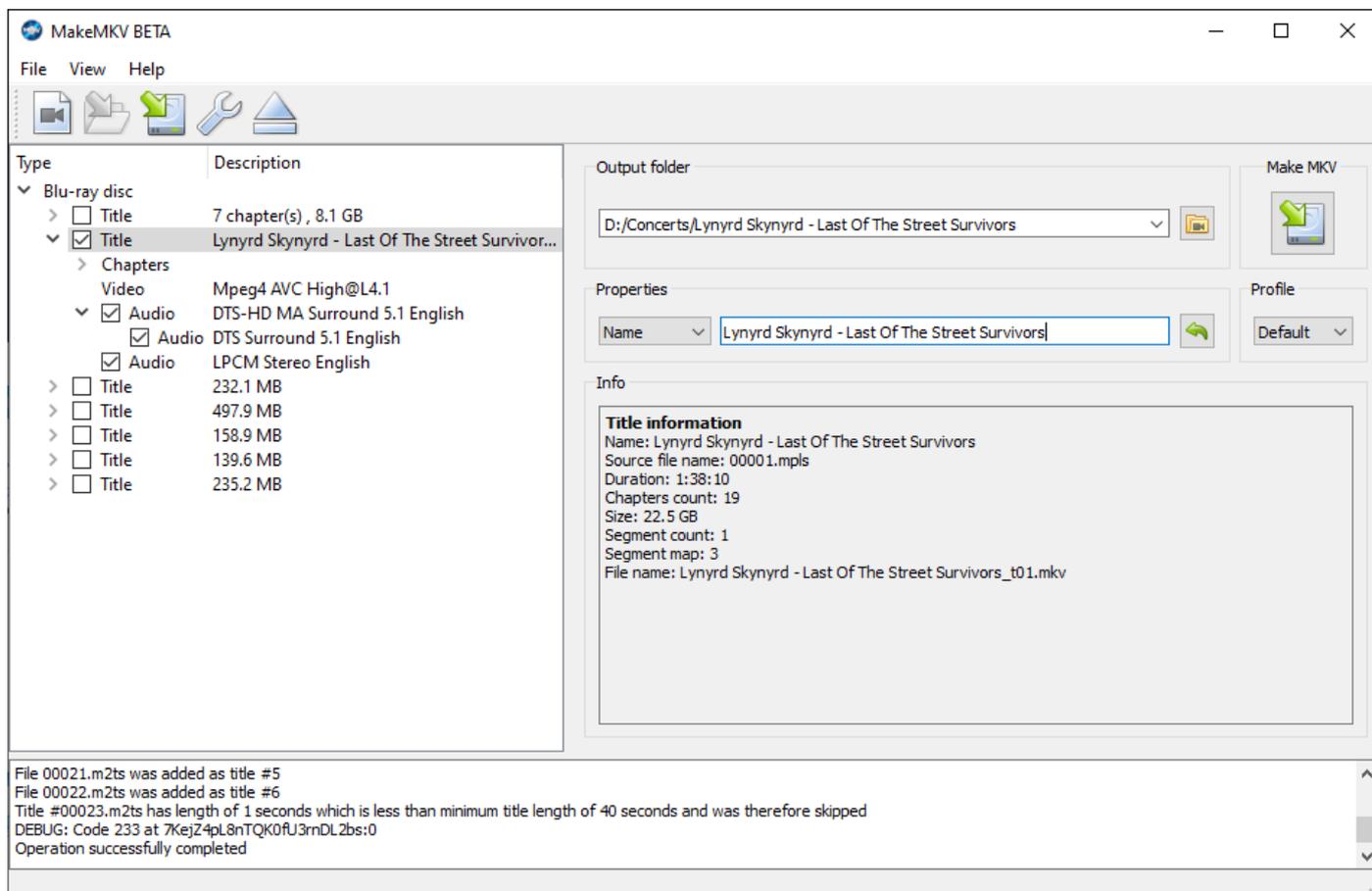
This 'How To' will use Music Media Helper (MMH) to Extract Audio from your MKV file to audio files. MMH is free but currently runs on Windows only.

For MAC users, MKVToolNix (free) can be used to split the MKV video file to individual MKV song files or to create MKA (Matroska Audio files). I'll eventually cover this topic too.

## Step 1: Use MakeMKV to rip your disc to an MKV file:

Create a working folder on your computer for your project and then Run MakeMKV, which will load the disc contents after a decryption process.

MakeMKV will show the titles on your disc in a Treeview with nodes for each title showing the various video and audio streams in each title in the left pane:

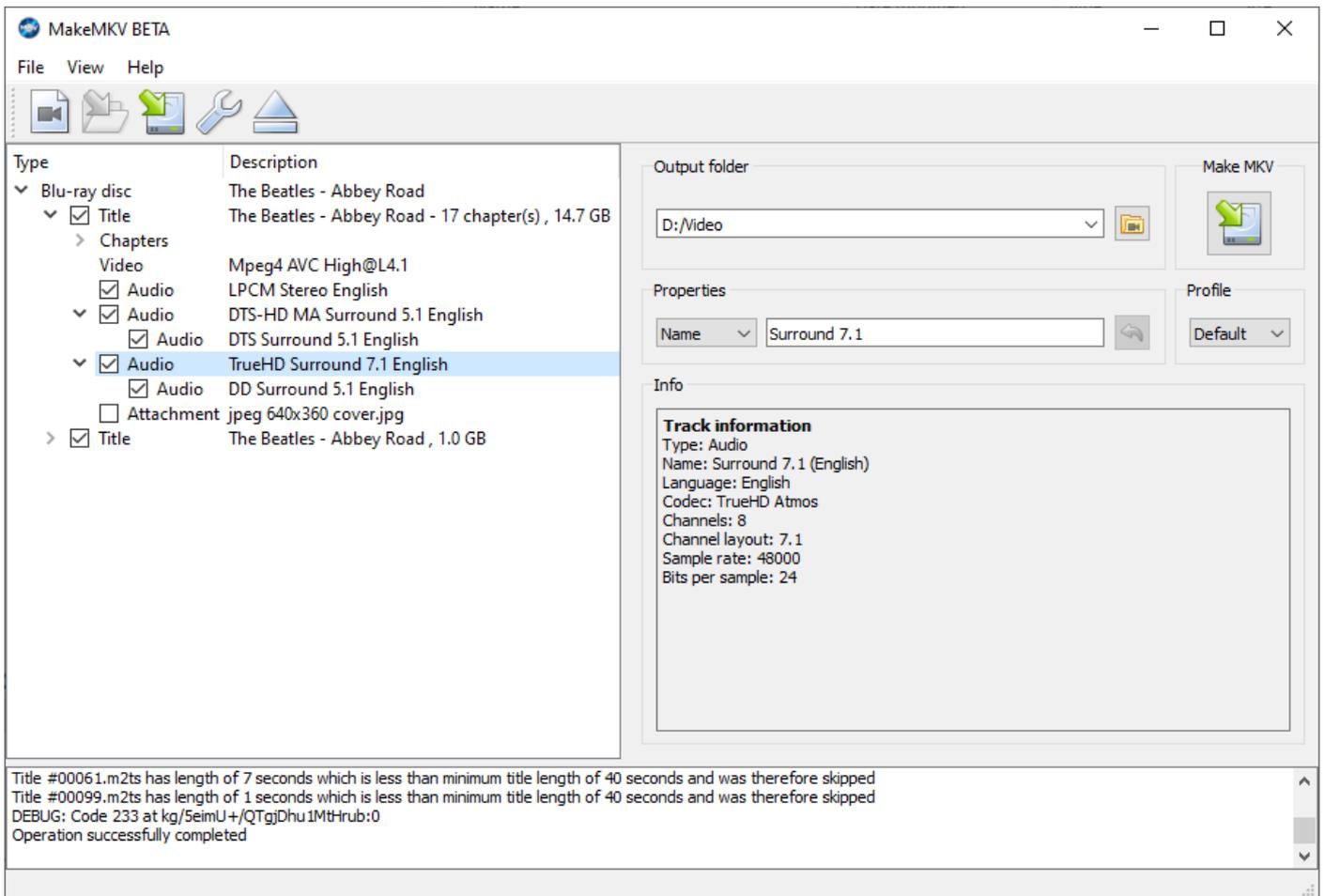


You can work out which title contains the album (or concert) as it usually is the largest size (see the Title Information panel on right). Also opening the Chapters node on the left will show a list of the chapters which will closely match the number of songs listed for the disc (on your disc cover or label). Usually, for a concert the number of chapters is one or two more as concert discs often have an Intro chapter at beginning and a Credits at the end. Often there is a small 'stray' chapter at the end (less than a second or so).

Clicking on an Audio node displays more information about the audio stream highlighted in the right Title Information pane.

In the next figure the TrueHD audio node has been clicked on an Atmos release and the right panel shows 'Atmos'.

**NOTE:** For some audio codecs (DTS and TrueHD) there are sub-nodes displayed. These are the 'core' extension sub-streams. DTS-HDMA lossless contains a DTS lossy stream. TrueHD contains a Dolby Digital lossy stream.



**Audio Streams:** Without further processing, if you select all the audio streams, the Default audio stream remains as authored on the disc. That is, the audio stream that plays by default in your BD player is the same as on the rip. Many discs are authored with the stereo stream as the default. To change this, you can just select one stream (say, TrueHD/Atmos) or you can edit the MKV with multiple streams later in MMH or MKVToolNix (free) to define a new default stream.

For this exercise, just select a single title and the Audio streams you wish to copy into the MKV output file. In the above figure all the Audio streams are selected to retain an exact copy of the disc Title contents (for the first Title).

Select the Output folder (your working folder you created) and give the output a Name that is meaningful. To create the MKV file:

click: 'Make MKV' at top right.

MakeMKV goes ahead and copies the selected audio streams (and video and chapters) to the new decrypted MKV file in your selected working folder.

**NOTE:** If you have previously used MakeMKV or another disc ripping program to create a full backup of your disc, you can open the backup file ISO or its disc folder structure backup by running MakeMKV, then using the 'File' toolbar command, then 'Open Files' option to navigate to the ISO file or the 'index.bdmv' file in your disc folder.

## Step 2: Deciding what File format you want to use for Multichannel Playback:

At this point you have an MKV file containing both video and the selected audio streams that you can play on a computer or media player. MKV is a video format.

### Haphazard File Navigation:

If you are a casual listener and just store your files in folders and navigate to an album folder and select files to play, then you can easily just go ahead and copy your MKV file to your music collection and play.

### Audio Library:

Many users already have a dedicated collection of audio files by song that are tagged with artist and album information and disc cover art in an Audio Library. If you wish to play your blu-ray files as song files (one file per song) and tag them with metadata to have a consistent audio library experience I recommend splitting your MKV files into Chapter files in a format where you can tag.

This 'How To' will next show how you can easily Split and Extract an MKV audio stream to output types: FLAC, WAV, M4A (Mpeg audio file) and MKA (Matroska audio file):

- **FLAC:** Lossless, supported on all players, limited to 8 channels (7.1), Tagging widely supported.
- **WAV:** Same as FLAC. Disadvantage is files are much larger than the FLAC.
- **M4A:** Lossless, supported on very few players (Kodi 19, Foobar with ffmpeg add-on), Can contain Atmos and DTS-HDMA streams, Tagging widely supported.
- **MKA:** Lossless, supported on most players, can contain Atmos and DTS-HDMA streams, Tagging not well supported.
- **CUE Files:** It's possible to create a CUE file which contains 'tag data' to play MKV and MKA files with 'tags' (a single CUE file per album appears as multiple tracks in your player with metadata).

Only M4A and MKA audio containers and MKV files can hold TrueHD/Atmos and DTS-HDMA/DTS:X streams. If you wish to play these codecs, as originally mixed, you must choose M4A or MKA output and you must use HDMI passthrough to your Atmos/DTS-HDMA capable AVR or Processor to decode.

### Playback Devices/Software:

Most devices and media player software will play MKV files. But to decode Atmos you must use HDMI to pass-through to an AVR with Atmos decoder to get all channels and objects. Without this your player will play the TrueHD 8 channel 'core stream' only, with the height and extra channels and objects folded down into the mix.

When playing 8 channel streams (7.1) converted to FLAC, WAV, M4A, MKA etc on a 5.1 system your decoder will automatically combine sides and rear channels into a single pair. No audio is lost.

### Gapless Playback:

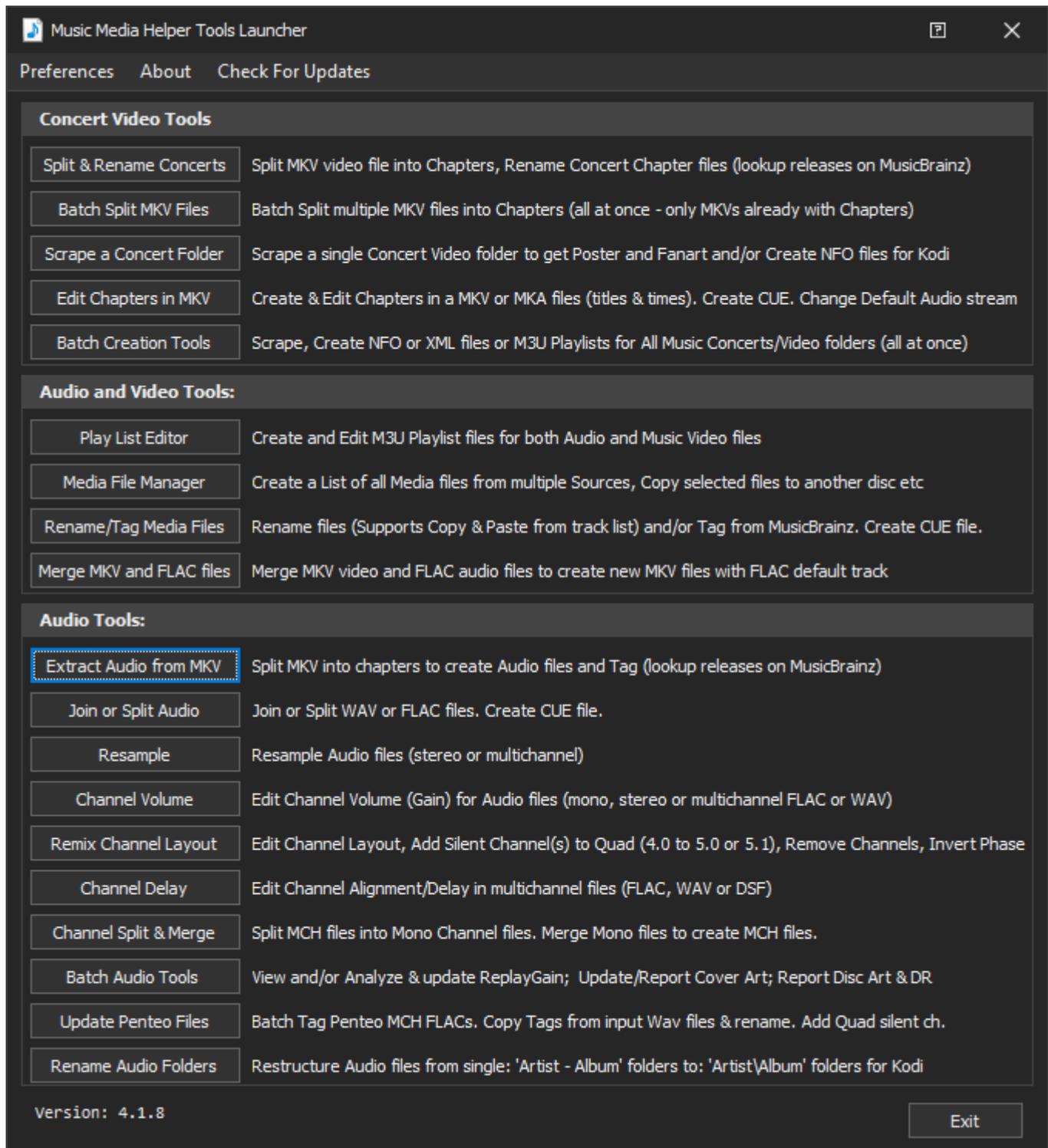
Additionally, some albums are recorded with continuous music (no gaps between tracks: Abbey Road, Dark Side of the Moon come to mind). Ideally, you would want to play these in 'gapless' mode. Unfortunately, gapless playback depends on both output type and the player/device. You may need to experiment or ask for feedback online.

This is what we know: FLAC and WAV gapless is standard in most all players/devices. CUE files to MKV and MKA files not split into chapter files is usually gapless. M4A in Kodi 19 is gapless on some devices (Intel NUCs) but not others.

### Step 3: Use Music Media Helper to Extract Audio from new MKVs to wav or FLAC files:

From the MMH tool Launcher dialog:

Click: 'Extract Audio from MKV'



The Extract Audio from MKV tool appears:

#### Functionality:

This tool enables you to do the following:

- Split an MKV or MKA file containing High Resolution Audio into lossless FLAC, M4A, WAV, MKV, MKA or MP4 files (multichannel and lossless DTS-HDMA, TrueHD and Atmos supported and any sample rate including 192/24 from BD ripped to MKV/MKA and DTS 96/24 from DVDV ripped to MKV/MKA)

- Automatically Rename and Tag the FLAC, M4A, WAV, MKV, MKA and MP4 output files based on Artist and Album lookup to MusicBrainz online database or copy and paste tracks from a copied list.
- For JRiver users, optionally create JRiver XML sidecar files to add tags for MKV files (if output is set to MKV)

If selecting a single MKV/MKA file it should contain chapters and at least one Audio stream. This tool automatically uses the only audio stream to extract to FLAC if the MKV contains just a single audio stream, otherwise the user is asked to select which audio stream to use to create the output files.

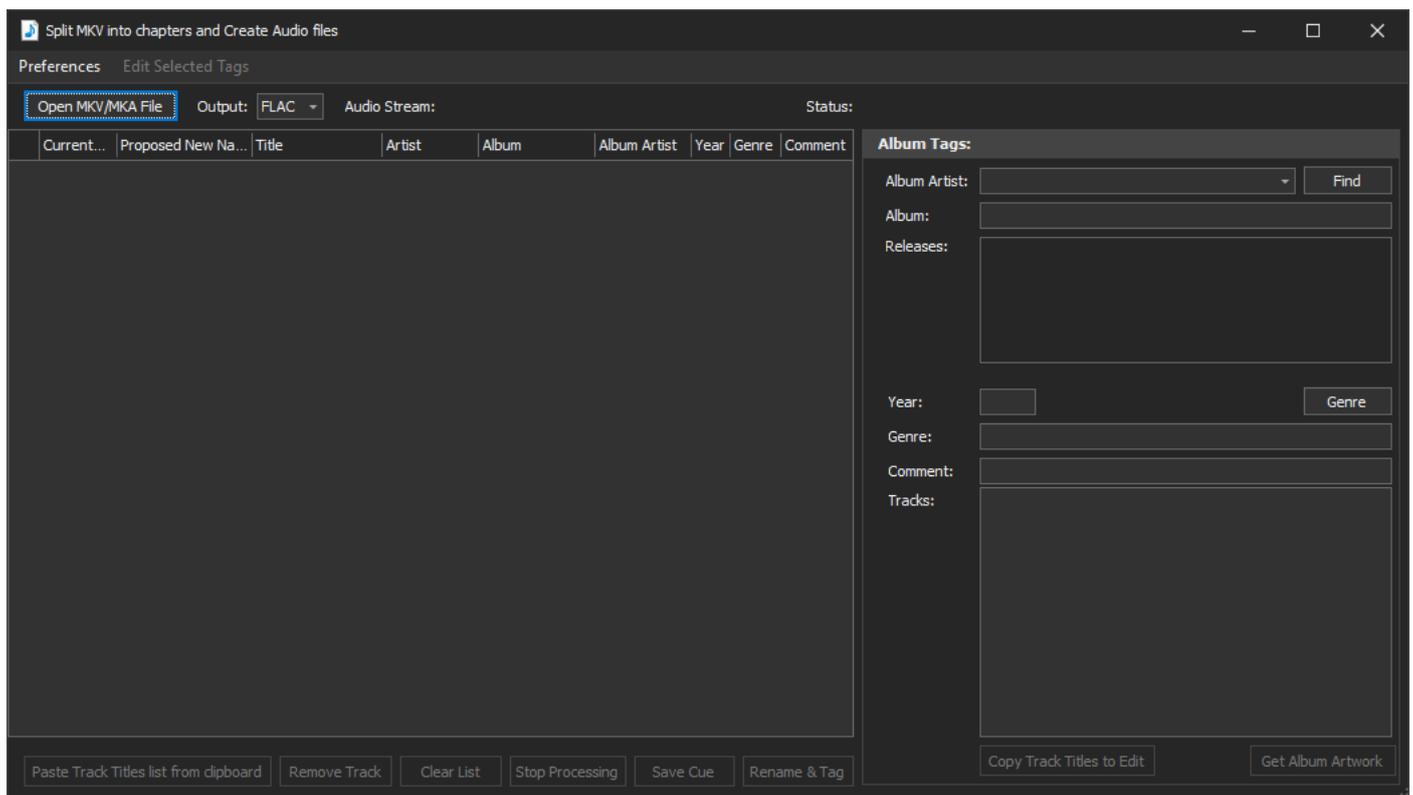
If you select MKV or MP4 as the output MMH copies both the video and all Audio streams to the output MKV or MP4 files, making the Selected Audio stream the default audio stream.

**HINT:** When you create an MKV or MKA from your Blu-ray, DVD or other source you can pre-select the audio track(s) to include in the MKV file in MakeMKV prior to using this tool.

### Extract Audio from MKV/MKA dialog description:

Click 'Extract Audio from MKV' from the *Launcher* dialog.

This displays the Extract Audio from MKV Tool dialog:

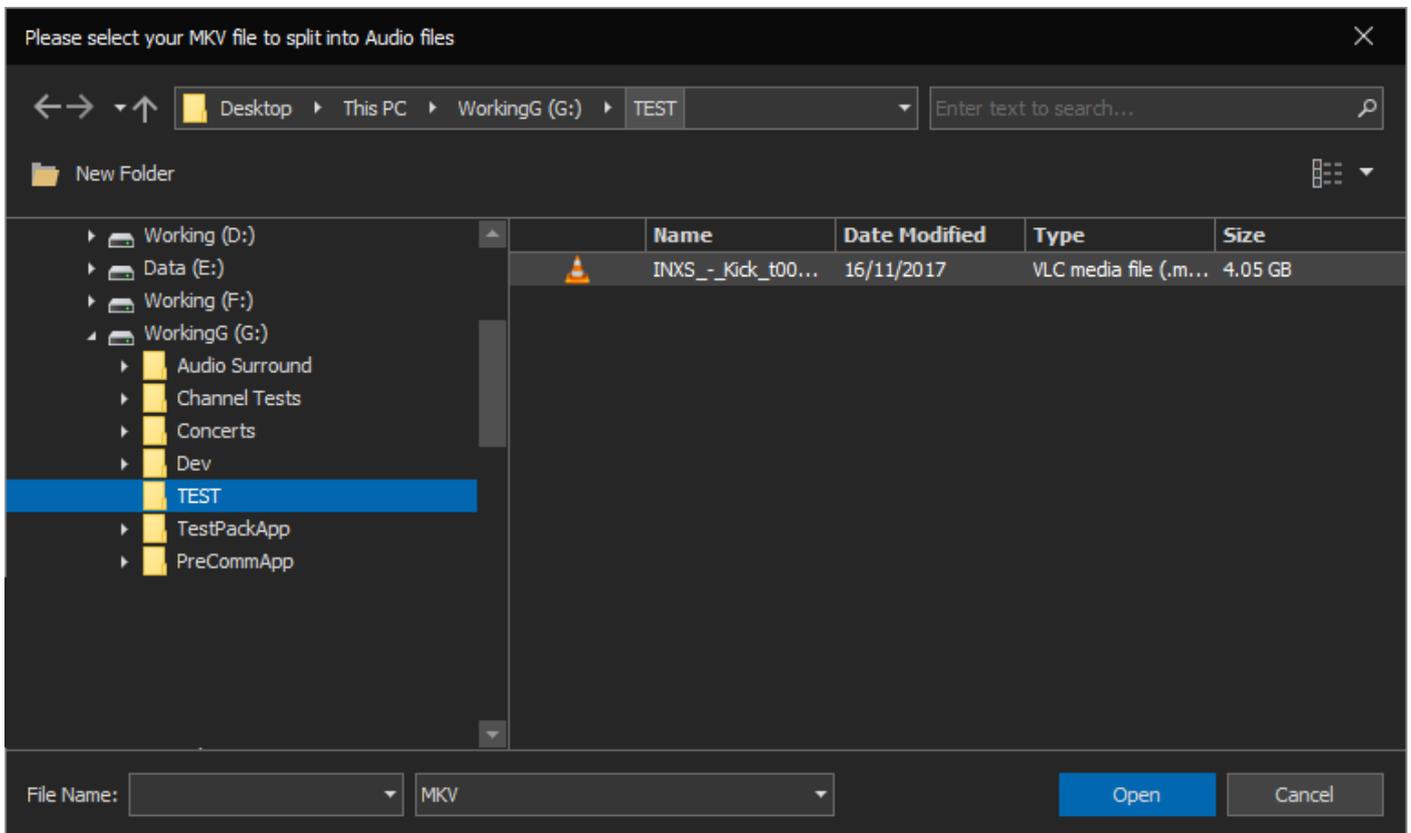


**BEFORE** opening your input MKV or MKA file, **first select the Audio Output format** (FLAC, WAV, M4A, MKV, MKA or MP4) from the Output dropdown list at top left, the default is FLAC. NOTE: M4A is a MPEG container that can hold lossless audio codecs and be tagged and used in Kodi's Music Library and other media players.

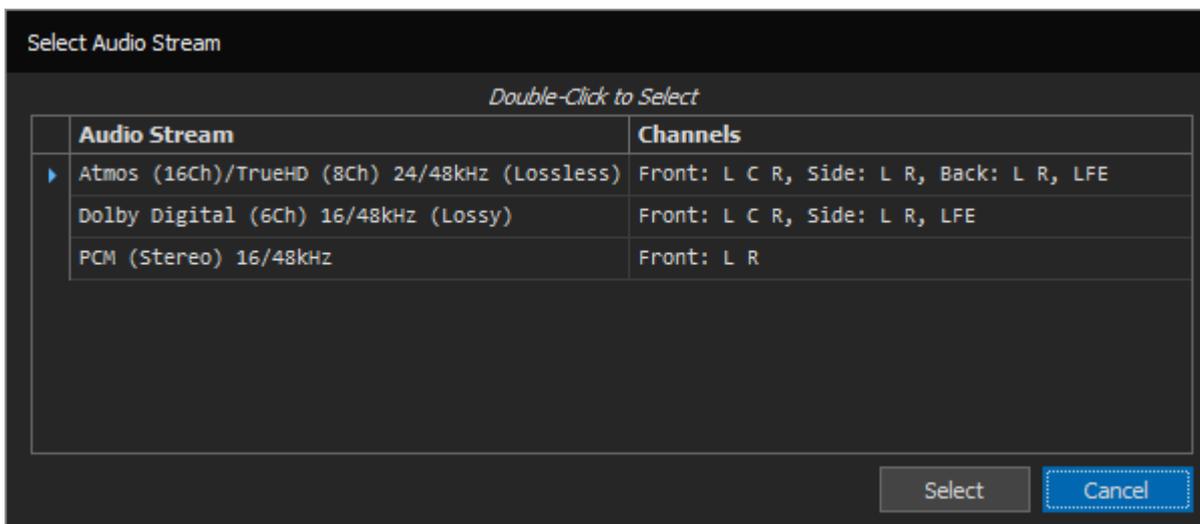
You can then go ahead and select your input MKV (or MKA file) using the tool menu (highlighted above at top left):

Click: 'Open MKV/MKA File'

The next screen shot shows a File Selection dialogue used to select the MKV file:



MMH will pop up the ‘Select Audio Stream’ dialog, allow you to choose which audio stream to convert to your already selected Output format (FLAC or WAV) or stream to copy to M4A, MKV, MKA or MP4 output files:

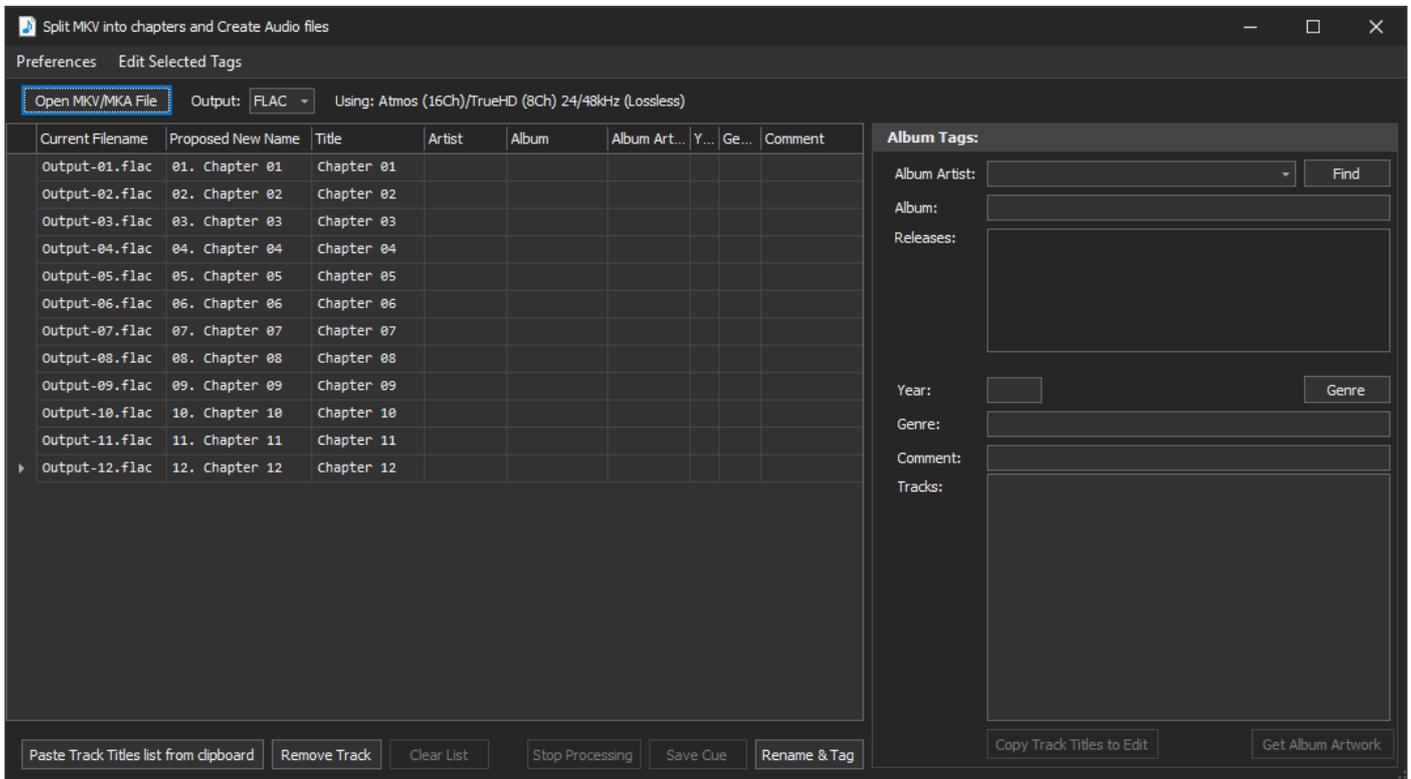


Go ahead and *double-click* on the Audio Stream to select (or select and click: ‘Select’).

**NOTE:** If you select an Atmos stream its TrueHD 7.1 core lossless stream will be used for FLAC and WAV. If you select a DTS:X stream its core lossless DTS-HDMA stream will be used for FLAC and WAV. Atmos and DTS:X are object-based audio streams, FLAC is limited to 8 channels and furthermore, there is no direct relationship between ‘objects’ and ‘channels’. You can playback Atmos or DTS:X in MKV, MP4 and M4A file as well as Matroska audio (MKA) files.

After selecting an MKV file, MMH processes the MKV, splitting into chapters and converting the selected audio track to FLAC or other output type selected. The output audio files are saved to the same folder as your source MKV file initially selected.

When completed the dialogue will contain all the chapters (output files) as seen in the next figure:



Now we need to rename the files to their song titles and tag for use in our media player software.

Please see the sections that follow on methods to get the track names into this grid.

When you are happy with the file and tag data.

Click: 'Rename & Tag'

MMH will go ahead and rename the extracted audio files and tag with the appropriate data fields (either the values in the grid for song specific tag data or the 'Album Tags' text boxes and Track List (on right) for Album specific tag data.

**HINT:** If the folder that contains the source MKV file has a file named **folder.jpg** or **cover.jpg** (the album cover art saved from the Artwork download dialog or manually copied) MMH will tag each audio file with the cover art jpg automatically.

## Tagging Tracks from Musicbrainz (online music database):

Once the MKV conversion to FLAC files is completed, you can now search for the album details by manually entering the Album Artist and Album text boxes (if they have not already been added) and click: 'Find' to get do a search for the album on the MusicBrainz online music database server.

**NOTE:** Please ensure you have the EXACT artist and album names. In MMH 4.0.11 the album name search was changed to a 'fuzzy search' so album names don't have to be an exact match, example: 'Division Bell' vs. 'The Division Bell'.

**NOTE:** If there is more than one matching 'Album Artist' name found in the Musicbrainz database, MMH will ask you to select the correct artist from the Album Artist dropdown list. Once selected, MMH will then search for your entered Album Name by the Album Artist chosen.

If you enter valid names the 'Releases' list will be populated with all known releases. Click on any release to see its track names.

If the selected release (from the Releases list) contains multiple discs, MMH displays a Disc list on the left. Selecting a Disc updates the Track List to the selected disc. If a single disc release the Disc list is not displayed.

Artist, Album, Year, Genre and Comment values from the text boxes are used for tagging the audio files.

The next screenshot shows the Extract Audio from MKV dialogue after a MusicBrainz search has located the album. The selected Release is populated into the grid views tag fields after the 4<sup>th</sup> disc in the release is selected from the 'Discs list' at bottom right (The selected release is a 4 disc set):

Split MKV into chapters and Create Audio files

Preferences Edit Selected Tags

Open MKV/MKA File Output: **FLAC** Using: Atmos (16Ch)/TrueHD (8Ch) 24/48kHz (Lossless)

Current Filename	Proposed New Name	Title	Artist	Album	Album Art...	Y...	Ge...	Comment
Output-01.flac	01. Guns in the...	Guns in the...	INXS	Kick	INXS	1_	Alt...	
Output-02.flac	02. New Sensation	New Sensation	INXS	Kick	INXS	1_	Alt...	
Output-03.flac	03. Devil Inside	Devil Inside	INXS	Kick	INXS	1_	Alt...	
Output-04.flac	04. Need You Ton...	Need You Ton...	INXS	Kick	INXS	1_	Alt...	
Output-05.flac	05. Mediate	Mediate	INXS	Kick	INXS	1_	Alt...	
Output-06.flac	06. The Loved One	The Loved One	INXS	Kick	INXS	1_	Alt...	
Output-07.flac	07. Wild Life	Wild Life	INXS	Kick	INXS	1_	Alt...	
Output-08.flac	08. Never Tear U...	Never Tear U...	INXS	Kick	INXS	1_	Alt...	
Output-09.flac	09. Mystify	Mystify	INXS	Kick	INXS	1_	Alt...	
Output-10.flac	10. Kick	Kick	INXS	Kick	INXS	1_	Alt...	
Output-11.flac	11. Calling All...	Calling All...	INXS	Kick	INXS	1_	Alt...	
Output-12.flac	12. Tiny Daggers	Tiny Daggers	INXS	Kick	INXS	1_	Alt...	

**Album Tags:**

Album Artist: **INXS** Find

Album: **Kick**

Releases:

- Kick | 2017 LP
- Kick | N/A CD
- Kick 30 | 1987 3xDigital Medi
- Kick 30 | 2017 3xCD Blu-ray

Year: **1987** Genre

Genre: **Alternative Rock**

Comment:

Tracks:

- Guns in the Sky
- New Sensation
- Devil Inside
- Need You Tonight
- Mediate
- The Loved One
- Wild Life
- Never Tear Us Apart
- Mystify
- Kick

Discs:

- 2 CD
- 3 CD
- 4 Blu-ray**

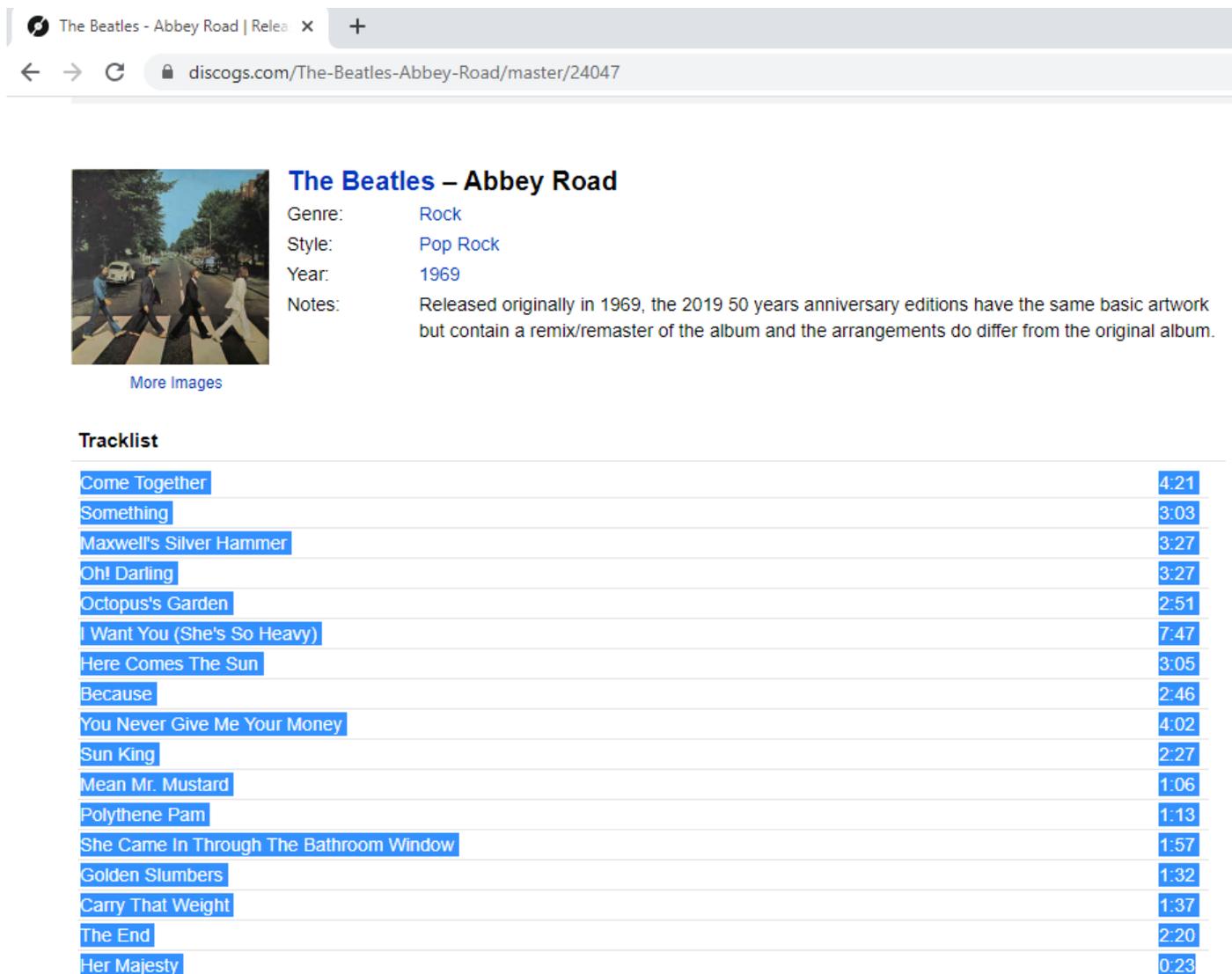
Paste Track Titles list from clipboard Remove Track Clear List Stop Processing Save Cue Rename & Tag Copy Track Titles to Edit Get Album Artwork

## Copying all the Track Titles from the clipboard:

Sometimes the Musicbrainz lookup won't find the release (maybe it doesn't yet exist in the database or you search names entered aren't a close enough match to find the entry). In this case you can copy a list of track name from a text list.

If you do not already have a list of all the titles that you can copy, use your favourite web browser, search for your Concert or Album in Google, find a web page that lists the songs, select all the list text and 'copy' (CTRL-C) to your clipboard.

The next figure shows a webpage from Discogs where a mouse was dragged over the track list (ready to copy):



The screenshot shows a web browser window with the address bar displaying "discogs.com/The-Beatles-Abbey-Road/master/24047". The page title is "The Beatles - Abbey Road". Below the title, there is a small image of the album cover and a "More Images" link. To the right of the image, the following information is displayed:

- Genre: Rock
- Style: Pop Rock
- Year: 1969
- Notes: Released originally in 1969, the 2019 50 years anniversary editions have the same basic artwork but contain a remix/remaster of the album and the arrangements do differ from the original album.

Below this information is a section titled "Tracklist" containing a list of 14 tracks with their durations:

Track Title	Duration
Come Together	4:21
Something	3:03
Maxwell's Silver Hammer	3:27
Oh! Darling	3:27
Octopus's Garden	2:51
I Want You (She's So Heavy)	7:47
Here Comes The Sun	3:05
Because	2:46
You Never Give Me Your Money	4:02
Sun King	2:27
Mean Mr. Mustard	1:06
Polythene Pam	1:13
She Came In Through The Bathroom Window	1:57
Golden Slumbers	1:32
Carry That Weight	1:37
The End	2:20
Her Majesty	0:23

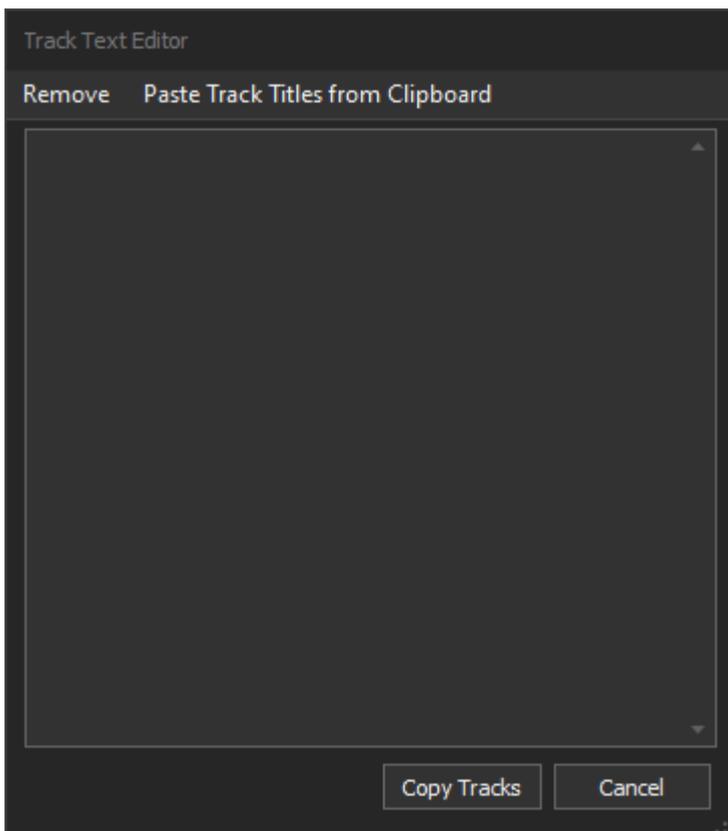
After highlighting (selecting) the track list press CTRL-C to copy the selected text to your clipboard

**NOTE:** If you do have the titles already in a file then open the file, select all the track list text and 'copy' (CTRL-C) to your clipboard.

**HINT:** Sometimes the published concert Track List does not include the introduction chapter or the credits chapter, so sometimes the number of chapters (hence the number of chapter files) is not the same as the number of track list songs. In this case you may wish to first copy your clipboard selection to a temporary text file and manually add an intro at the beginning and/or credit at the end. You can remove the first and/or last chapters from the Rename dialog's list by selecting the file and clicking 'Remove'. Once you have your updated Track List copy that to your clipboard and you are ready to continue.

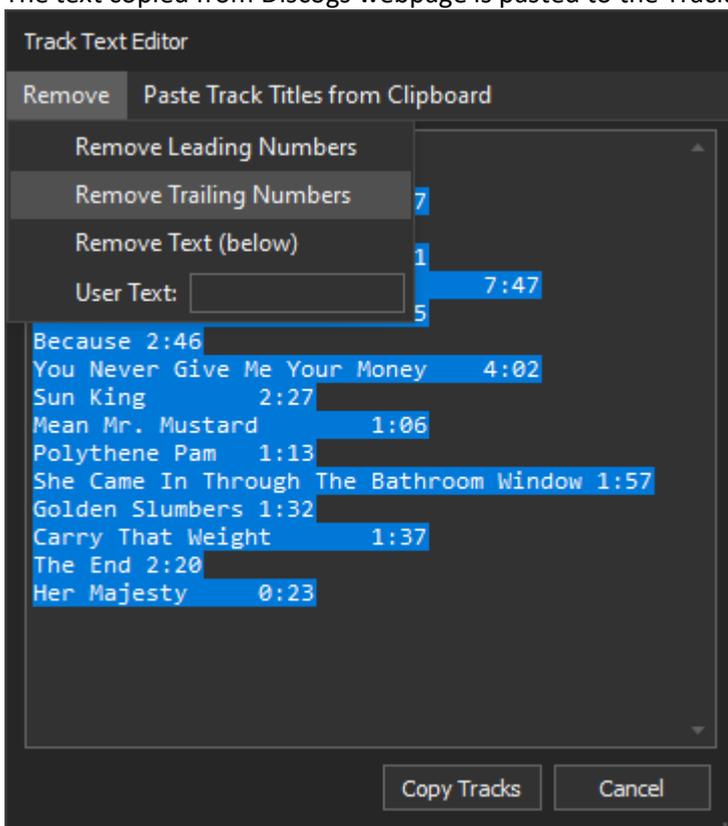
Now click: 'Paste from clipboard' command in the main MMH dialog:

This pops up the MMH Track Editor:



Click: 'Paste Track Titles from Clipboard' (top toolbar above)

The text copied from Discogs webpage is pasted to the Track Text Editor, but it includes the track lengths:



To remove the track lengths, use the Track Text Editor's Remove menu option 'Remove Trailing Numbers' as shown above. This removes the unwanted trailing numbers:



Click: 'Copy Tracks' to update the titles and proposed new file names on the main MMH dialog grid.

### Edit Grid Data manually:

You can edit any cell in the grid at any time or do a multi-column (bulk) edit and change all the values of all the selected rows with a single edit.

### To do a multi-column edit (bulk edit):

First select the rows you wish to edit (clicking on a row select that single row), CTRL + A key selects all rows, holding the CTRL key down while clicking rows selects the rows clicked. CTL + SHIFT after selecting a single row selects all rows from the first row selected to the last and every row in between. (typical Windows selection methods)

Click: Edit Selected Tags from the tool

MMH pops up the Multi Edit tags dialog:

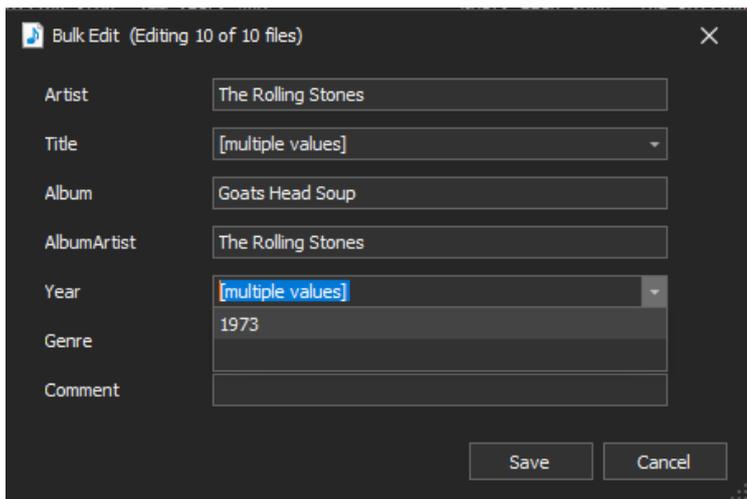
In the next figure CTRL-A was used to select all the rows (tracks). MMH shows every column that is editable and checked the current values of each column's cells for every selected row.

If all the values for the column are identical MMH displays that value.

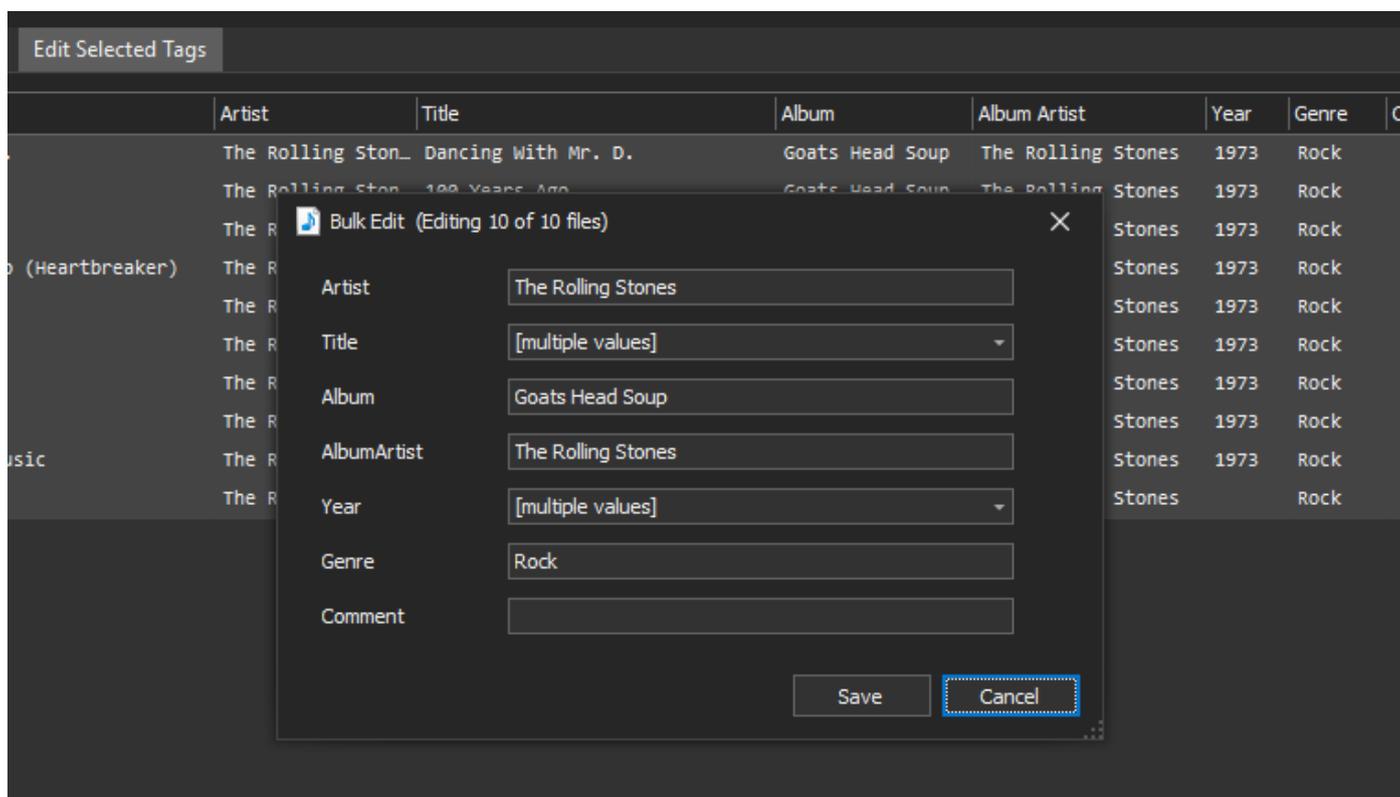
If all the values for the column are NOT identical MMH displays '[multiple values]' and then loads the unique values into a drop-down list. You can easily open the drop-down list to see the different values currently in that column. You can either enter a new value or select one of the existing values to use for all rows.

The figure below shows an example where two columns display '[multiple values]' (Title and Year) with their values in drop-down lists. Each of the other columns have the same values shown in text boxes. The Year has its drop-down

list open displaying the two values in the Year column of the grid (values 1973 and empty). You can select '1973' and the value of the drop-down list will show 1973 (replacing [multiple values]).



The next figure shows the grid behind the Multi Edit dialog so you can see the Year column with one track with no year value:



To save the dialog data to every column of every selected row in the grid: Click 'Save'

**NOTE:** MMH never saves to any column if its dialog column value is '[multiple values]'. The original values remain in the grid.

For all other values: For each column, its value for every selected row is updated to the value in this dialog for its column.

In the example above: The Artist textbox value is saved to the Artist column in the grid. No data is saved to the Title column in the grid.

When you are happy with the file name and tag metadata data using one of the methods just described:

Click: 'Rename & Tag'

MMH will go ahead and rename the extracted audio files and tag with the appropriate data fields (either the values in the grid for song specific tag data or the 'Album Tags' text boxes and Track List (on right) for Album specific tag data.

**HINT:** If the folder that contains the source MKV file has a file named **folder.jpg** or **cover.jpg** (the album cover art saved from the Artwork download dialog or manually copied) MMH will tag each audio file with the cover art jpg automatically.

### Tagging Album Cover Art from Fanart.tv (online artwork database):

After searching the Musicbrainz database for tags a new feature introduced in MMH 3.8.2 that allows users to find and download album art images from the Fanart.tv website.

Click: Show Artwork

This pops out the MMH Album artwork gallery. MMH will always attempt to download all cover art and disc art on the Fanart.tv website for the release selected in the Release list box from the Musicbrainz lookup:



To save any album artwork to the current working folder (with FLACs): *Double-Click* on the art image.

After closing this Artwork dialog:

You can manually edit the file grid and change the proposed file names and tags.

## Playback Software Discussion/Recommendations:

This section will discuss various methods to best get your audio files into audio libraries for Kodi and JRiver (initially).

**Kodi 19:** I recommend FLAC for everything except Atmos streams, where I use M4A files as they can be tagged easily and appear in the Kodi audio library just like any other audio file.

**Kodi 18 and earlier:** I recommend FLAC for everything except Atmos streams, where I used MKA files. Kodi can't read MKA tags so create a CUE file for your MKA files after creation and renaming.

**JRiver (Audio library):** I recommend FLAC for everything except Atmos streams, where I'd recommend MKA files. JRiver can't read MKA tags so create XML sidecar files or a CUE file for your MKA files after creation and renaming. Use a single MKV or MKA file with chapters with a CUE file for gapless playback.

**JRiver (Video Library):** Use a single MKV file a CUE file for gapless playback.

**Foobar2000:** I recommend FLAC for everything except Atmos streams, where I use M4A files as they can be tagged easily and appear with metadata just like any other audio file played in Foobar.

**VLC:** I recommend FLAC for everything except Atmos streams, where I'd use MKA files.

**Using a Blu-ray Player (Oppo etc):** TBA – I need some feedback from users please?

### TO DO: Complete these topics:

Setting up Foobar2000 to play MKA and m4A audio files.

### Original MKV file without splitting into separate song/chapter files using a CUE file:

For gapless playback in most media software players you can use an MKV file with chapters (the original MKV created in MakeMKV) with a CUE file generated by Music Media Helper. Refer to the first post in this thread:

<https://www.quadrasonicquad.com/forums/threads/mmh-how-to-create-cue-files-for-mkv-files.30206/>

## Using MKVToolNix to create MKA files on Apple MAC OS:

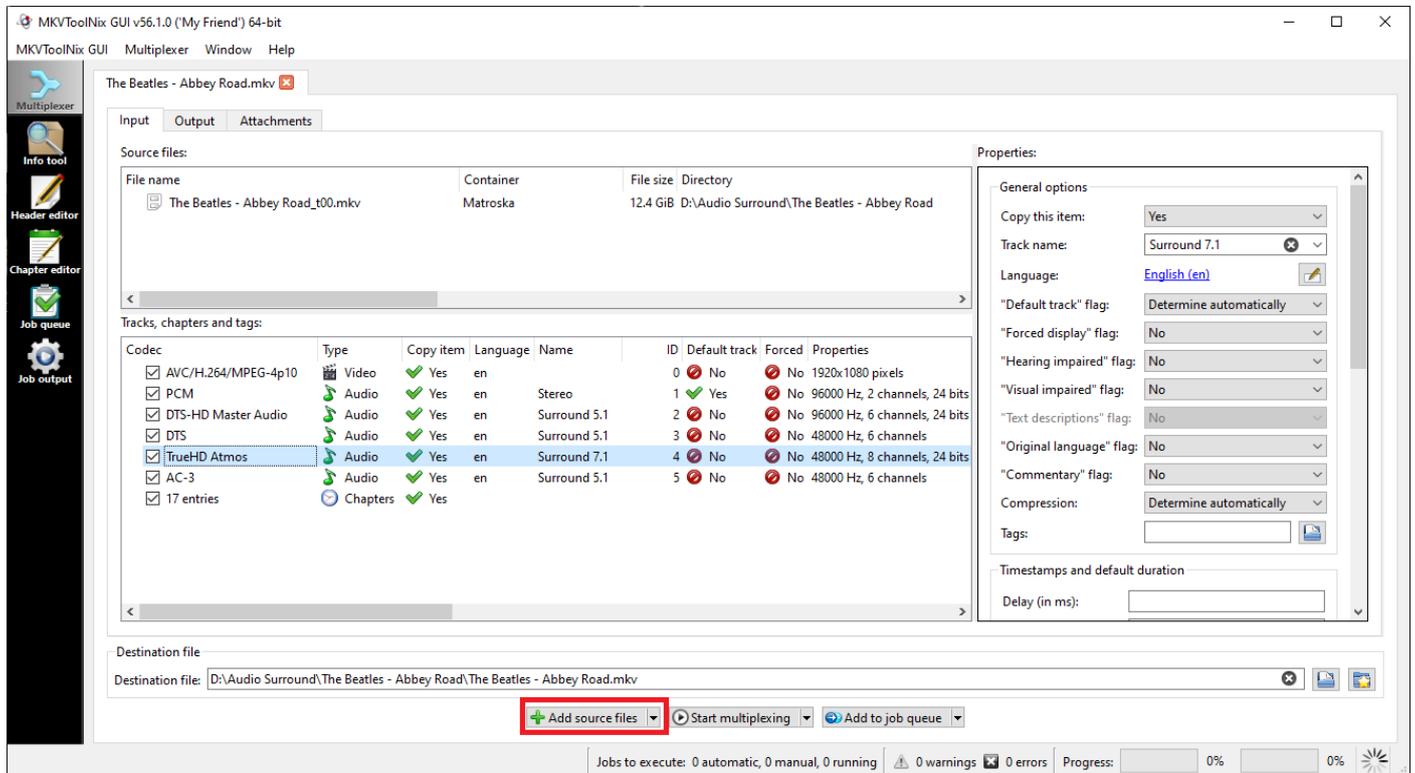
On MAC OS (and Windows) you can use MKVToolNix to split an MKV file created with MakeMKV in Step 1 of this 'How To' to create MKA (Matroska Audio files) that can be played back in VLC and other media pleyer software.

Get MKVToolNix from: <https://mkvtoolnix.download/downloads.html>

Choose your Operating System and install.

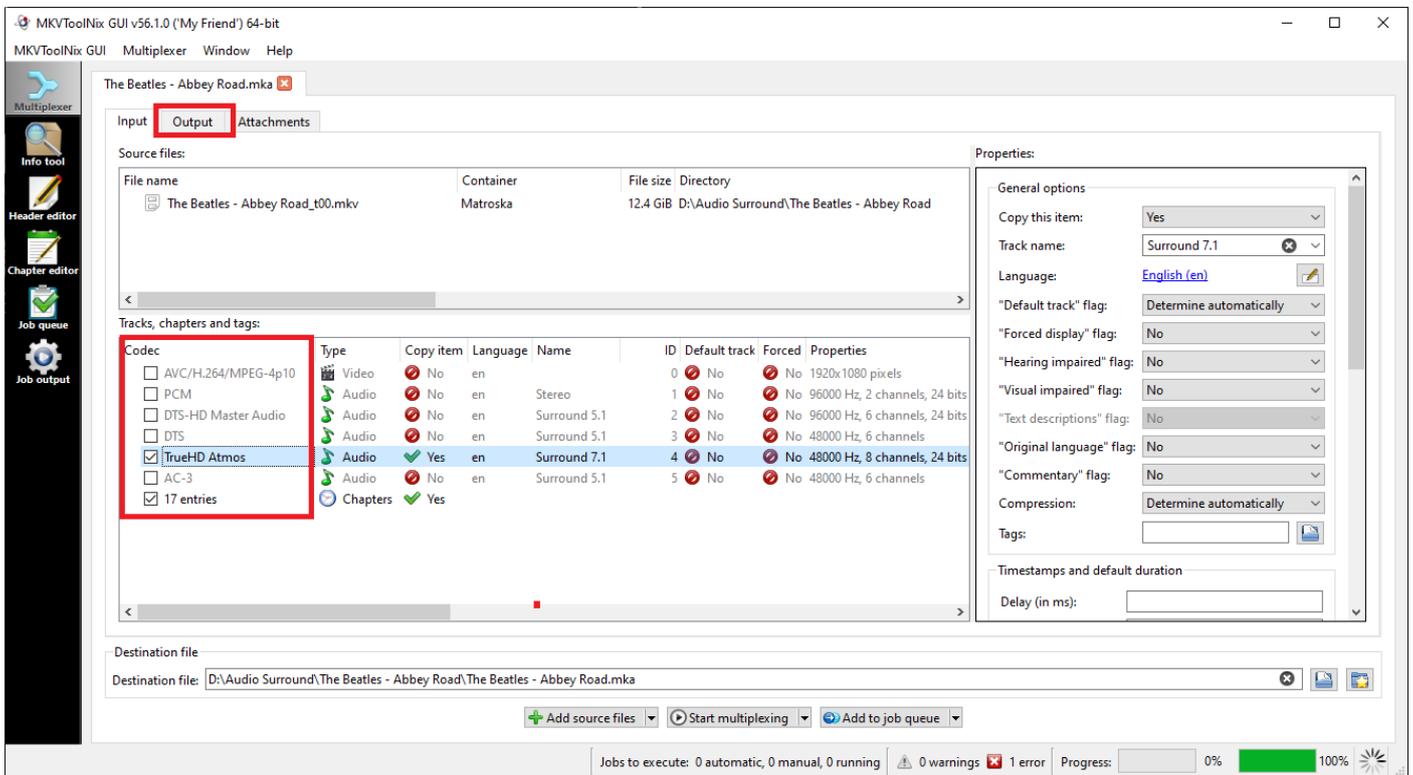
Run: mkvtoolnix-gui.exe

The main window looks like this after using command 'Add Source Files' at the bottom of the dialog and selecting an MKV file created by MakeMKV:



Initially, the dialog displays all the video and audio streams and their properties. On the right you can set an audio stream as the new default stream. There is no need to set a default audio stream if you select only one audio stream.

To create an MKA, simply deselect all video streams and select the audio stream you want in the output MKA file(s) as shown in the next figure.

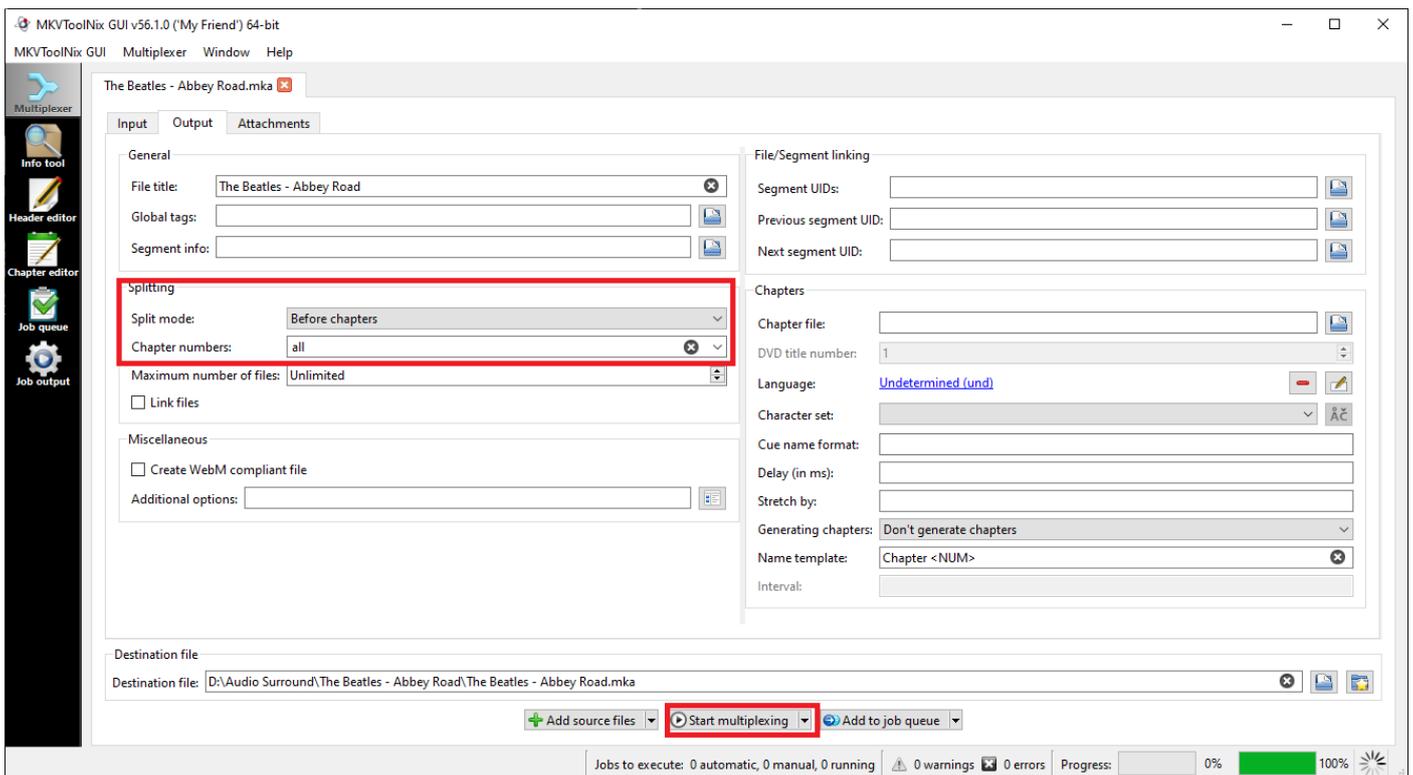


If you click: 'Start Multiplexing' now, you will get a new MKA file containing all the chapters (since the '17 Chapter entries' checkbox is enabled).

To Split the input MKV into multiple output files by Chapter (Song):

Click: 'Output' tab near the top left of the dialog

You will now see this Output screen:



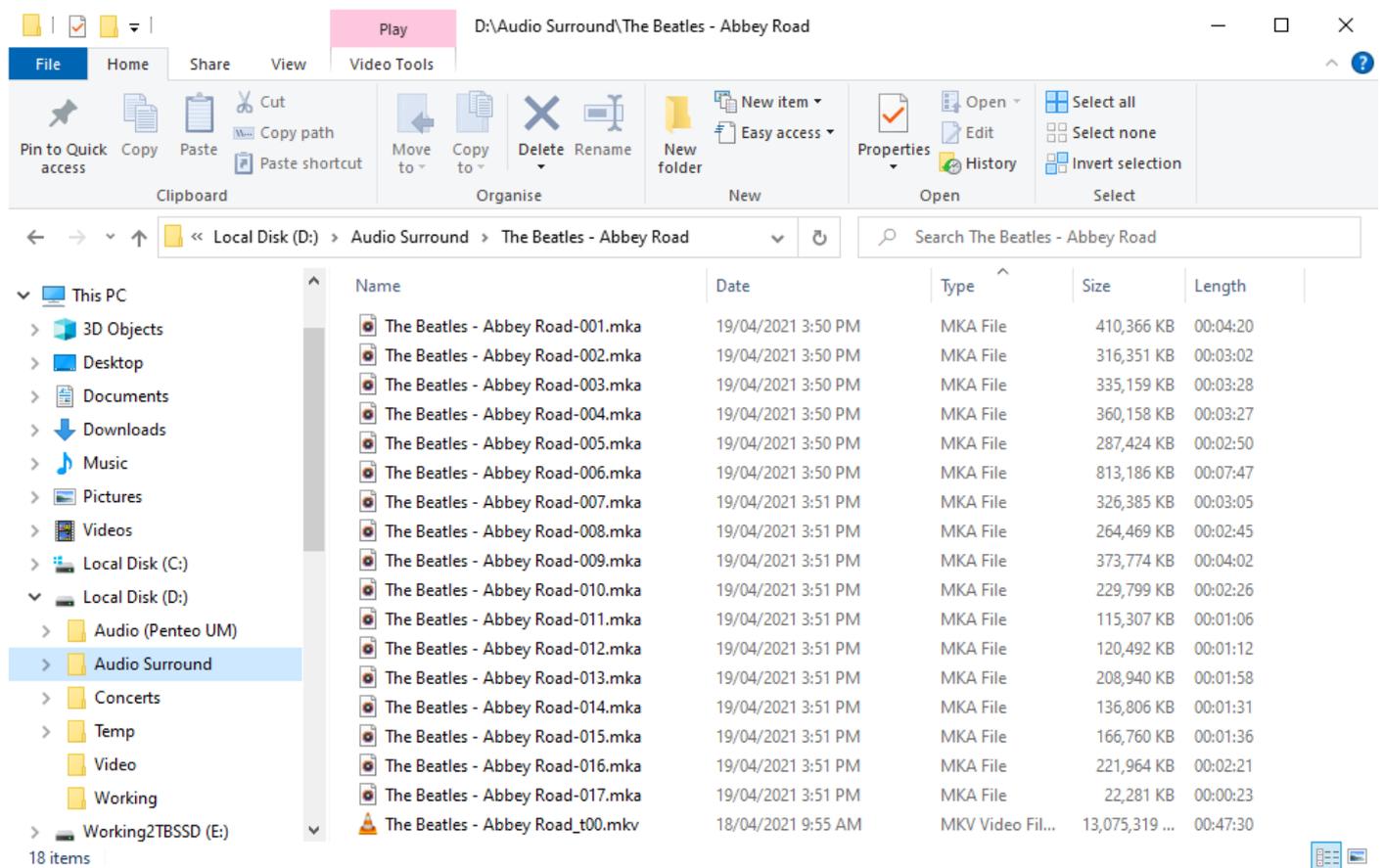
In the 'Splitting' panel select (centre left):

Split mode: 'Before Chapters'

Chapter numbers: Enter the text 'all'

Now click: 'Start Multiplexing'

MKVToolNix processes the multiplexing command and creates a new MKA file for every chapter:



The files should now be renamed so you can recognise which song is in each file.

Copy the files to your final music folder for the album or concert disc and play your files. For Atmos you'll need an HDMI output to an AVR with an Atmos decoder. Your media player software needs to support HDMI pass-through as an output option and be configured to use that option.

**NOTE:** If you leave a video stream selected, MKVToolNix will Split the source MKV into chapters and create MKV files.

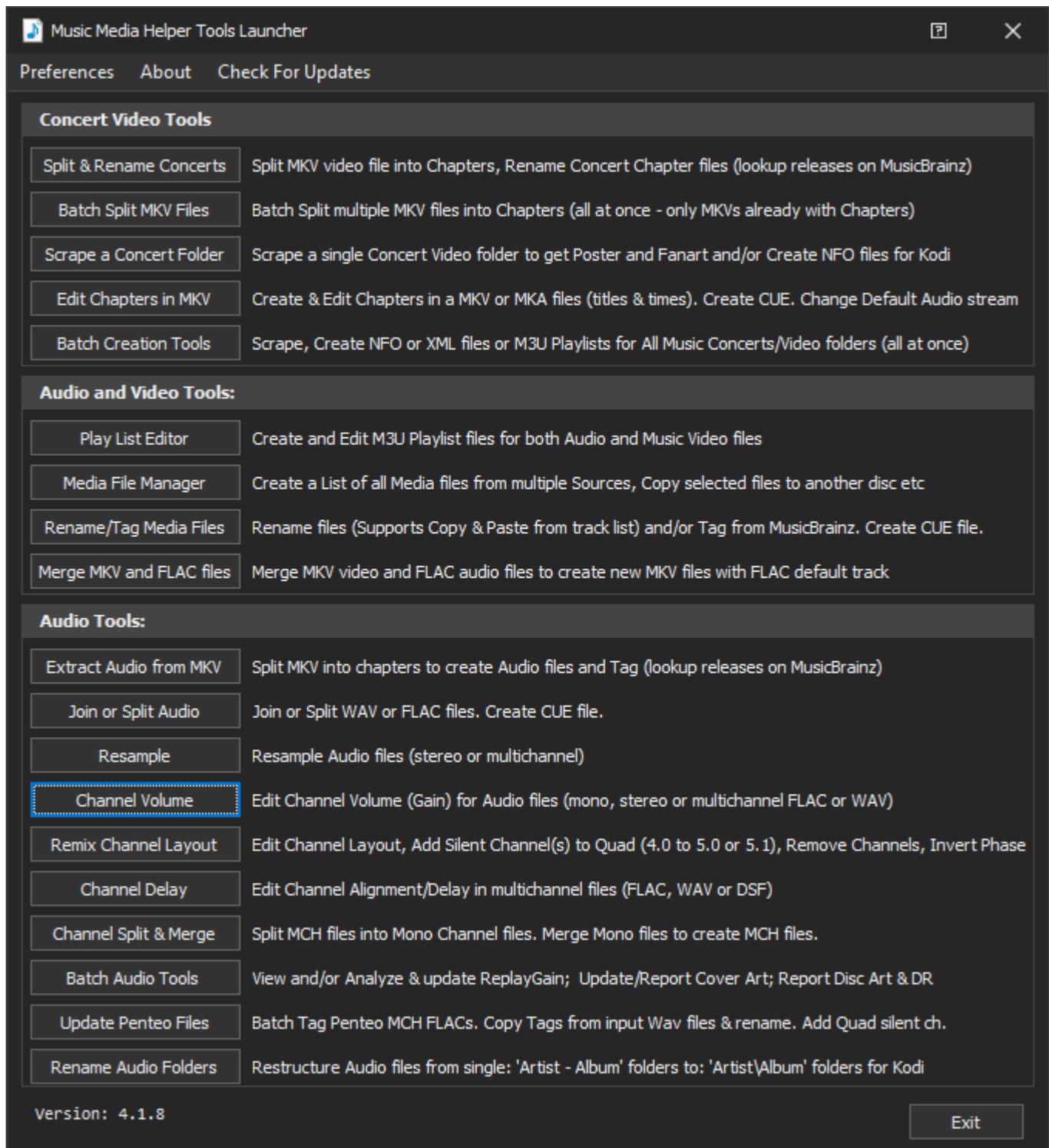
## Appendix: Using MMH's Channel Volume tool to adjust channel levels:

Sometimes you can improve the surround experience by increasing the rear channel volume by 3db or so, or changing the Centre or LFE volume can also improve the mix.

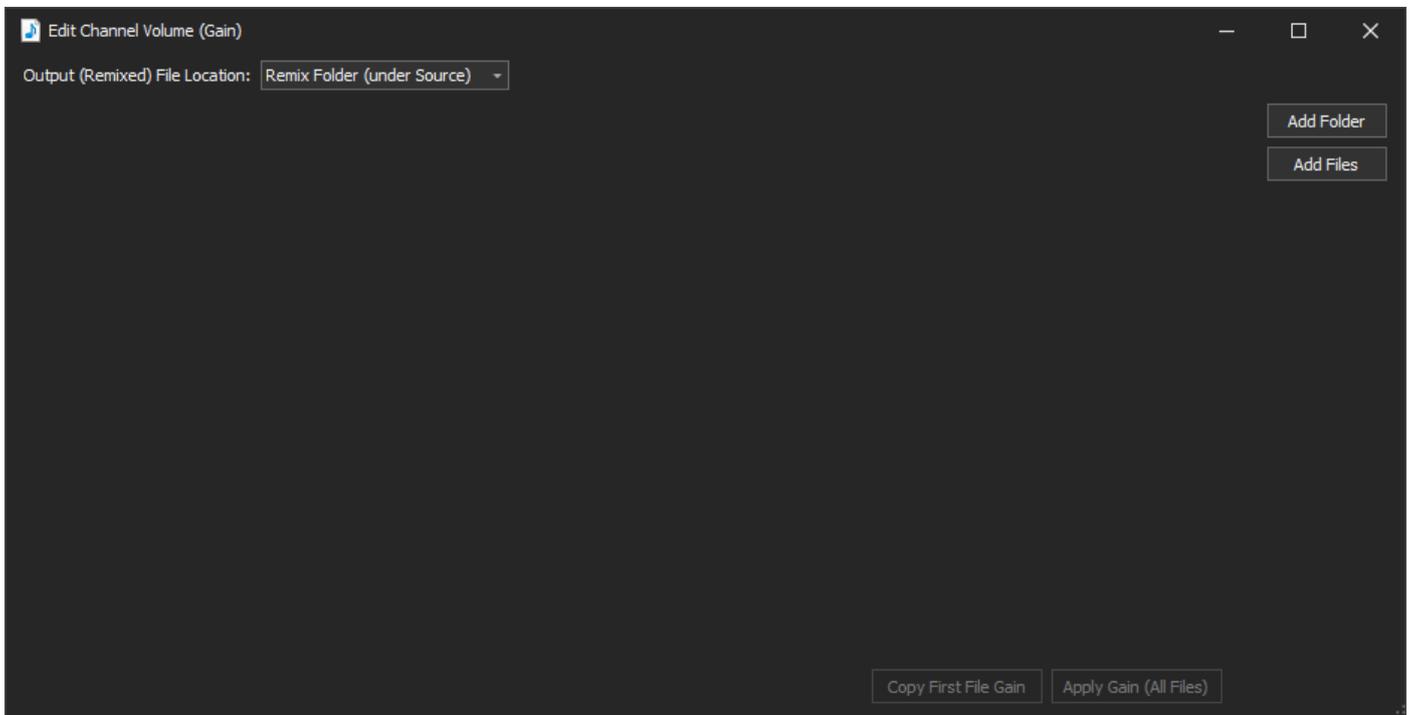
If you have FLAC or WAV files MMH's Channel Volume tool can help out

From the MMH tool Launcher dialog:

Click: 'Channel Volume'

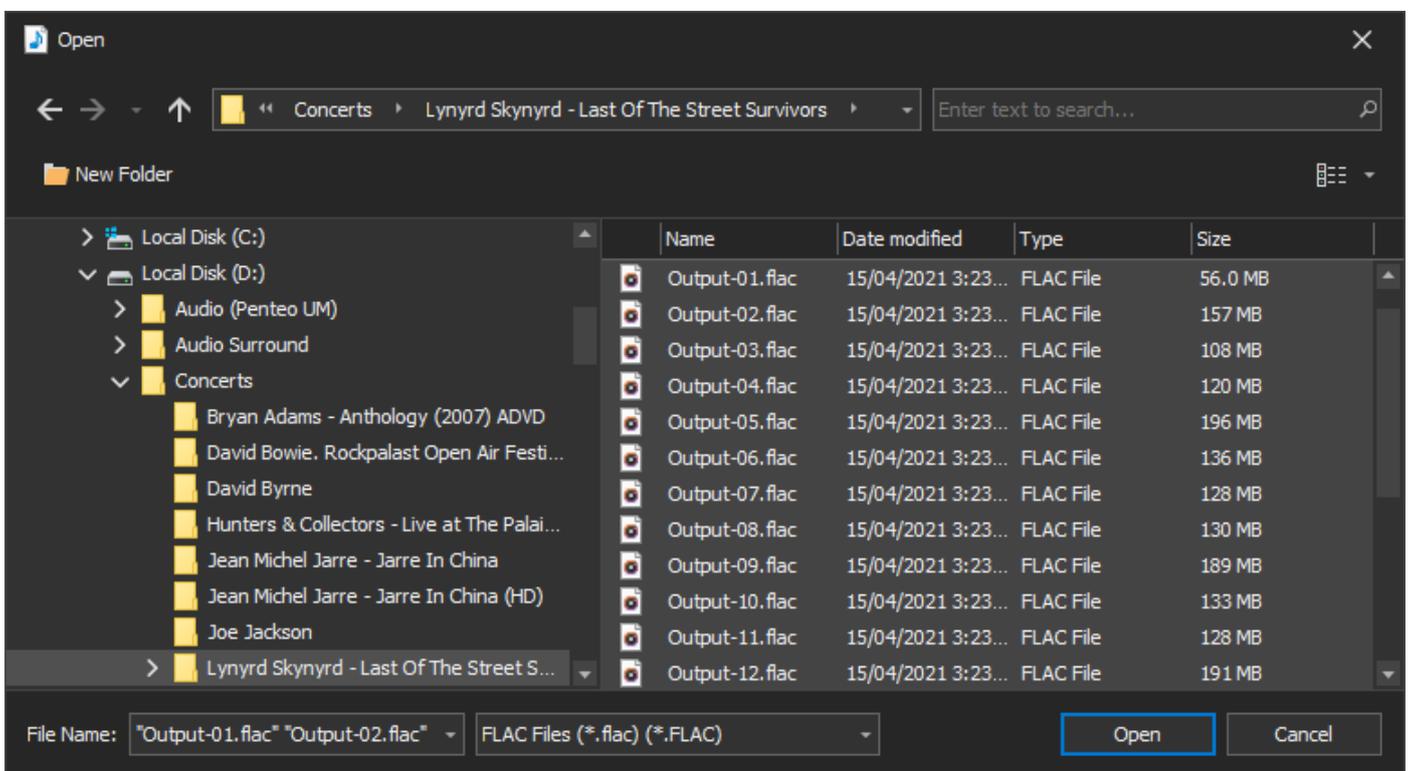


The Channel Volume tool dialog appears:

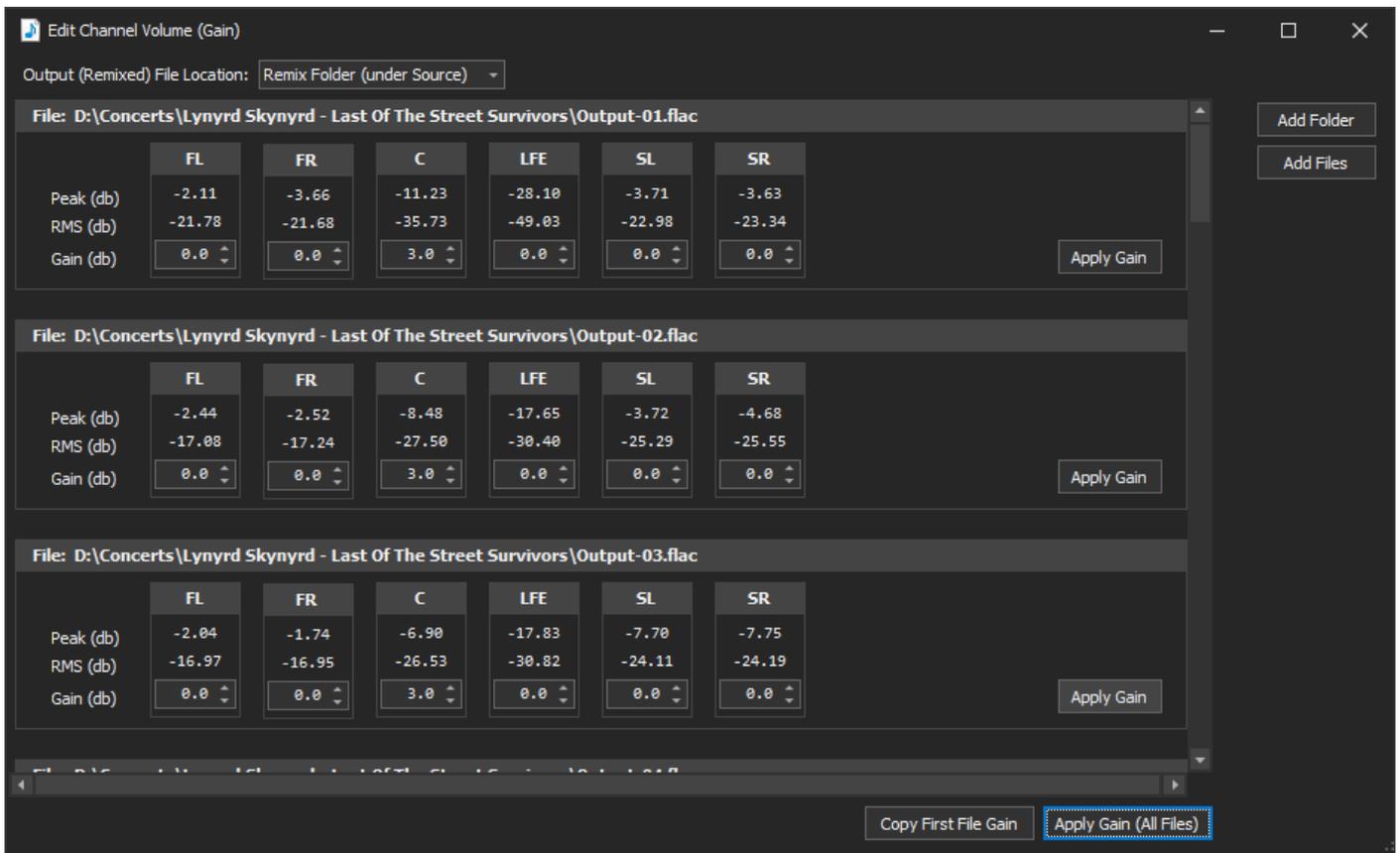


Click: 'Add Folder' or 'Add files'

The next figure shows 'Add Files', after navigating to the multichannel FLACs prior to Merging with MKVs:



Select the FLACs and click: Open



The dialog list each selected file and displays audio statistics for each file for each channel.

Simply edit the gain to adjust each channel up or down.

Click: 'Apply Gain (All Files)' at the bottom of the dialog to batch update all files

Or

Click: 'Apply Gain' next to each file to update each file individually