

Advanced Substation Alpha Merging and Muxing Guide

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Note: The merging section of this guide uses a largely manual method of merging which is accurate to Aegisub 3.2.2 and Aegisub r8898.

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1. Overview

1.1 What is Merging?

Merging is the process of combining multiple advanced substation alpha files into a single file. This process sounds straight forward and relatively speaking it is. There are however several details that complicate the process.

1.2 What is Muxing?

Muxing is the process of combining various video, audio, and subtitle tracks into the Matroska video container.

1.3 Requisite Programs

Aegisub Subtitle Editor (Required):

<http://www.aegisub.org/>

Aegisub Subtitle Editor Trunk Build (Optional/Replaces above):

<http://plorkyeran.com/aegisub/>

Notepad++ (Required):

<https://notepad-plus-plus.org/>

MKVToolnix (Required):

<https://www.bunkus.org/blog/>

AvsPmod (Optional):

<https://avspmod.github.io/>

MediaInfo (Required):

<https://mediaarea.net/en/MediaInfo>

MKVCleaver (Optional):

<http://www.videohelp.com/software/MKVCleaver>

2. Merging: Color Spaces

2.1 Standardizing Color Spaces

One of the most common problems that an inexperienced project leader will make is not standardizing the color spaces that their staff uses. If a color is created/sampled in the wrong color space, that color will be displayed incorrectly.

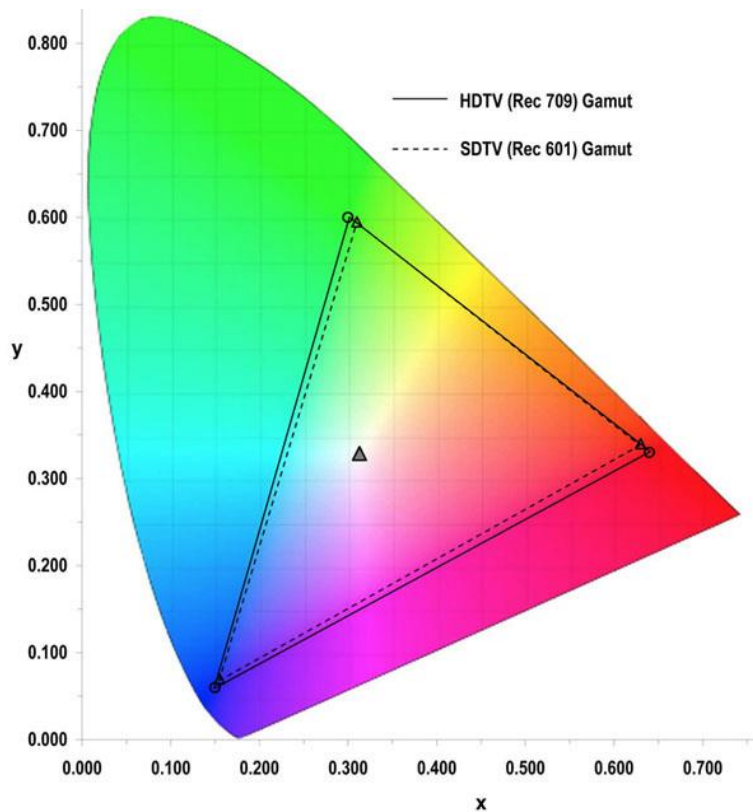


Image 1: Comparison between Rec 601 and Rec 709

2.2 Checking Color Spaces

The color space of the video file can be determined via MediaInfo. Generally speaking most encoders will use PC/TV.709 however Aegisub by default uses PC/TV.601.

To use MediaInfo, right click the video file you want to check and click MediaInfo on the drop-down menu.

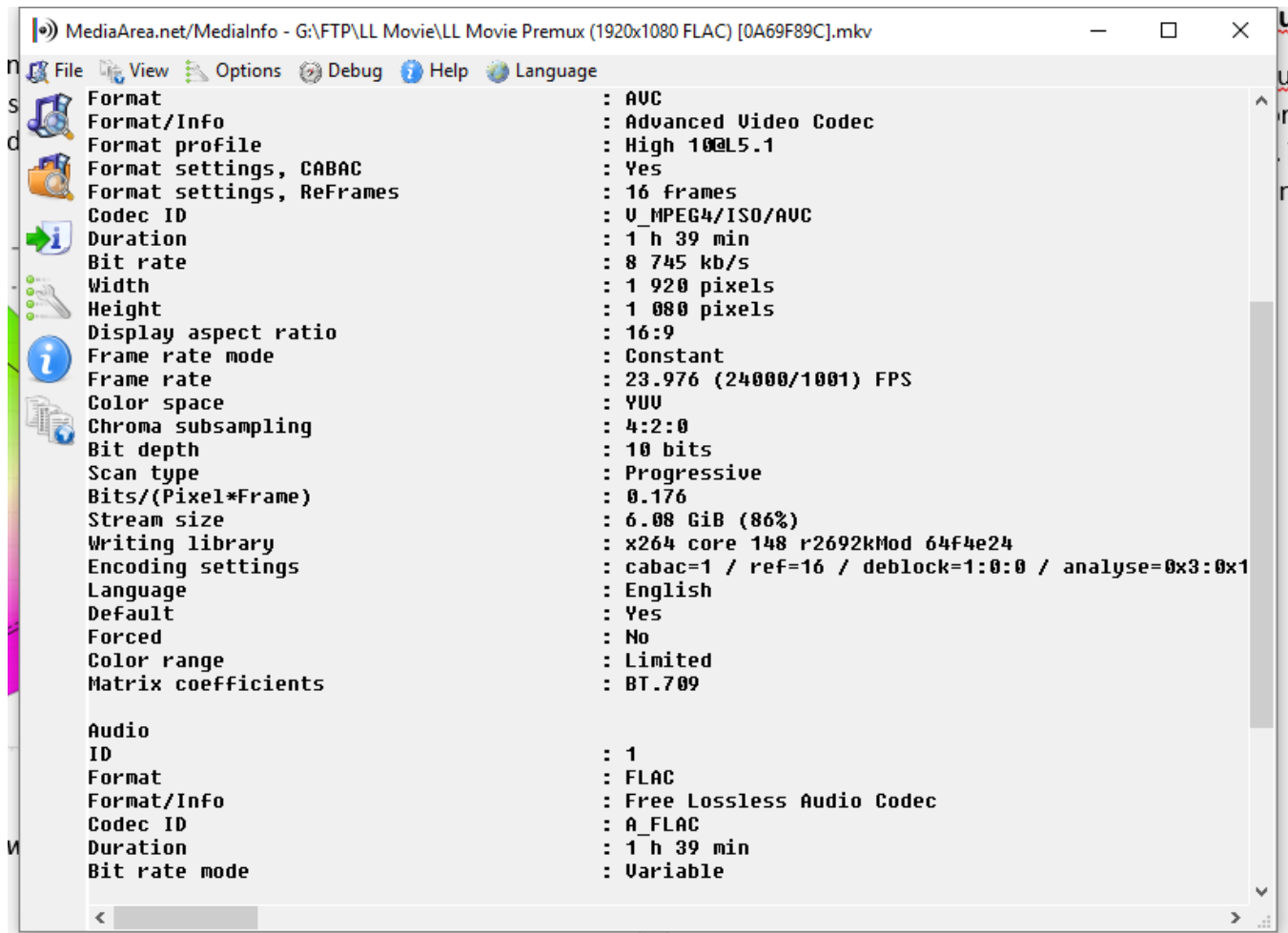


Image 2: Checking video file using MediaInfo

2.3 Assigning Color Spaces in Aegisub

You can change the color space that Aegisub uses by going to File -> Properties -> YCbCr Matrix. Please note that changing the color space after you have created colors will not convert the values to the new color space. To change Aegisub's default behavior, go to View -> Options -> Advanced -> Video -> uncheck Force BT.601.

2.4 Shifting Color Spaces

In the event that a script was created in the wrong color space, you will need to either manually sample the colors in the new color space or shift the color space.

Manually sampling the colors is the best option in terms of accuracy. Manually sampling the colors however may be time consuming and require typesetting knowledge. The other option is to convert between color spaces using Aegisub's built in color conversion. This can be accessed from Subtitle -> Resample Resolution -> YCbCr Matrix.

Older versions of Aegisub do not support conversion between color spaces. If you have an older version of Aegisub and do not want to update, you can use automation scripts such as cmconv.lua to run the color conversion.

Please note that if you use cmconv.lua to convert between color spaces, you will need to manually adjust the project color space to TV.709. Cmconv.lua can be downloaded from here <https://github.com/Daiz/AegisubMacros>.

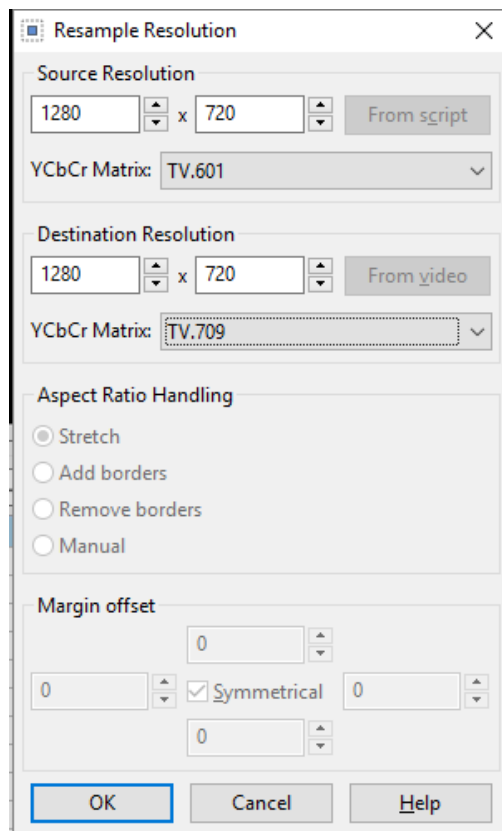


Image 3: Converting between TV.601 and TV.709 using Aegisub's built in conversion

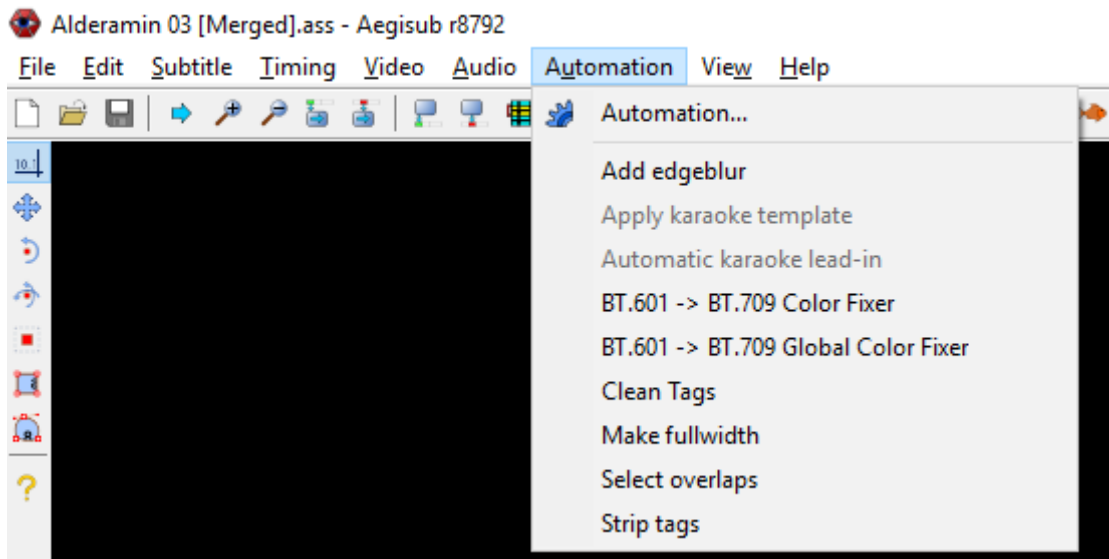


Image 4: Converting between BT.601 and BT.709 using cmconv.lua

3. Merging: Styles & Dialogue

3.1.1 Script Consistency

Before you can start merging any of the various scripts together, you must first standardize all of the properties of the script. The easiest method of doing so is to check the scripts in Notepad++. The main properties that need to be consistent are the PlayRexX/Y and YCbCr Matrix.

```

1 [Script Info]
2 ; Script generated by Aegisub r8792
3 ; http://www.aegisub.org/
4 Title: Default Aegisub file
5 ScriptType: v4.00+
6 WrapStyle: 0
7 ScaledBorderAndShadow: yes
8 YCbCr Matrix: TV.709
9 PlayResX: 1280
10 PlayResY: 720
11
12 [V4+ Styles]
13 Format: Name, Fontname, Fontsize, PrimaryColour, SecondaryColour, OutlineColour, BackColour, Bold, Italic, Underline, StrikeOut, ScaleX, Scal
14 Style: Default,Cabin,50,$H00F3FAFF,$H00100401,$H000F0E0E,$HAA111113,-1,0,0,0,100,100,0.2,0,1,2.2,0,2,130,130,40,1
15 Style: All,Cabin,50,$H00F3FAFF,$H00100401,$H00321664,$HAA111113,-1,0,0,0,100,100,0.2,0,1,2.2,0,2,130,130,40,1
16 Style: Top,Cabin,50,$H00F3FAFF,$H00100401,$H000F0E0E,$HAA111113,-1,0,0,0,100,100,0.2,0,1,2.2,0,8,130,130,40,1
17 Style: signs,Arial,20,$H00FFFFFF,$H000000FF,$H00000000,$H00000000,0,0,0,0,100,100,0,0,1,0,0,5,10,10,10,1
18 Style: OP-R-furigana,Alex,23,$H00FBFBFB,$H00100401,$H00EA7122,$H967E3B36,-1,0,0,0,100,100,0.4,0,1,0.9,0,8,30,30,25,1
19 Style: OP-E-furigana,alex,23,$H00FBFBFB,$H00100401,$H00EA7122,$H967E3B36,-1,0,0,0,100,100,0.4,0,1,0.9,0,2,30,30,25,1
20 Style: OP-E,alex,46,$H00FBFBFB,$H00100401,$H00EA7122,$H967E3B36,-1,0,0,0,100,100,0.4,0,1,1.8,0,2,30,30,25,1
21 Style: OP-R,Alex,46,$H00FBFBFB,$H00100401,$H00EA7122,$H967E3B36,-1,0,0,0,100,100,0.4,0,1,1.8,0,8,30,30,25,1
22 Style: ED-E-furigana,Gill Sans MT,23,$H00FBFBFB,$H00100401,$H00EA7122,$H967E3B36,-1,0,0,0,100,100,0.4,0,1,0.9,0,2,30,30,25,1
23 Style: ED-R-furigana,Gill Sans MT,23,$H00FBFBFB,$H00100401,$H00EA7122,$H967E3B36,-1,0,0,0,100,100,0.4,0,1,0.9,0,8,30,30,25,1
24 Style: ED-R,Designosaux,44,$H00FBFBFB,$H00100401,$H004E1829,$H967E3B36,-1,0,0,0,100,100,0.4,0,1,2,0,8,25,25,25,1
25 Style: ED-E,Designosaux,44,$H00FBFBFB,$H00100401,$H004E1829,$H96845CAA,-1,0,0,0,100,100,0.4,0,1,2,1,2,25,25,25,1
26

```

Image 5: Example script and style information

3.1.2 Adjusting Resolution

Adjusting the resolution should be done using Aegisub's resolution resampling tool. This is the same tool used in section 2.4 and in image 3. Alternatively, you can open up the script in Aegisub and load the video which you want to resize the script to. A window should automatically pop up asking if you want to resample the script.

Please note that some tags such as `\orig` currently do not scale correctly when the resolution is resampled and should be checked after resampling.

3.1.3 Resampling Color Space

Resampling the script color space can be done in Aegisub using the built in color conversion or by using automation scripts. Please refer to section 2.4 and image 3 for more information.

3.2 Style Conflicts

Style conflicts occur when you have styles from multiple scripts that have the same name but not the same properties. Should multiple styles with the same name exist in the same file, the lower style in the file is generally used. The easiest and most straight forward way to fix this is to simply rename one of the duplicate styles and all dependent lines before you merge the scripts.

3.3 Dialogue/TS Overlap

At times, dialogue and typesetting may occupy the same space on the screen. By default, dialogue is automatically assigned layer 0. For some typesetting effects however, additional layers may be used which may cause the dialogue to be displayed under the signs. The easiest way to fix this is to set all of the dialogue lines to a layer above the TS or to set it to an arbitrarily high layer.



Image 6: Typesetting overlapping dialogue

Merging: Additional Considerations

4.1.1 [HorribleSubs] Timings

First things first, [HorribleSubs] should never be used to fine time a show if a different encode will be used for the final mux. Even if the final encode uses [HorribleSubs] as the source, there may still be timing inconsistencies.

4.1.2 [HorribleSubs] Removing Header Information

To date, most [HorribleSubs] releases have incorrect header information in the .mkv container. This usually results in the final encode being one frame off from the original [HorribleSubs] source.

To use a [Horriblesubs] video as a work raw for typesetting and karaoke, you will need to use MKVCleaver to demux the video and audio files. This completely removes the video and audio from the .mkv container. Once demuxed, you can use mkvmerge to remux the video and audio files.

Please note that MKVExtract does not remove the header information from the file.

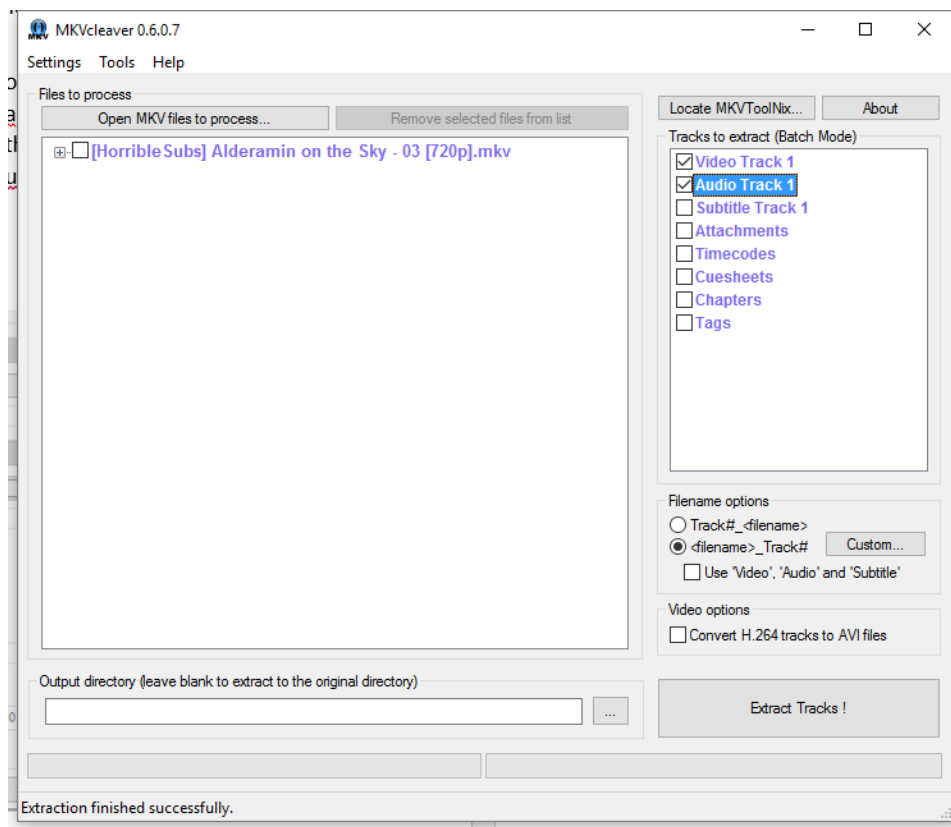


Image 7: Demuxing video and audio files using MKVCleaver

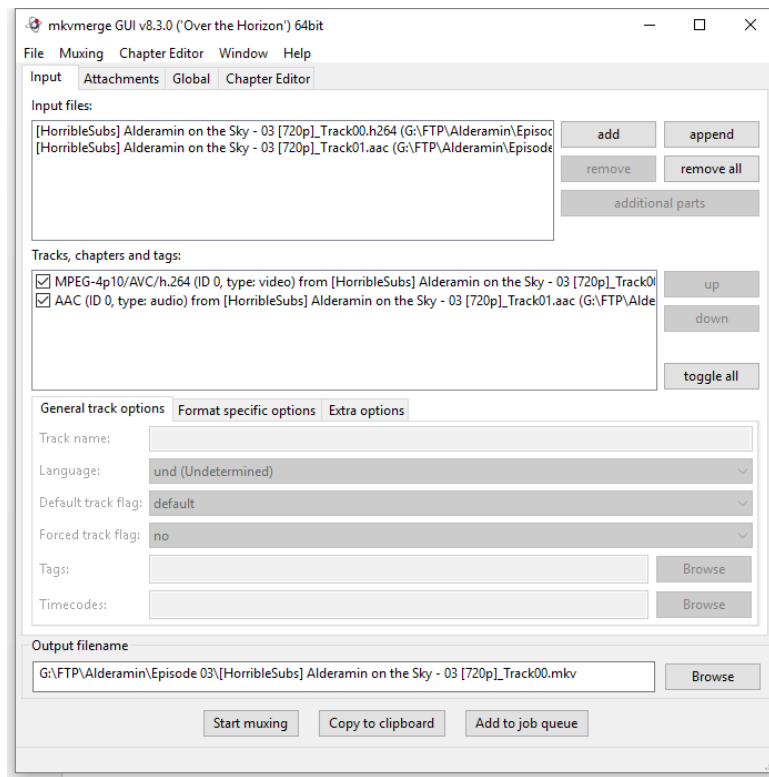


Image 8: Remuxing video and audio track

4.2 Style Overrides

One method to bypass style conflicts at script creation time is to write all style information within each dialogue line as shown below. Style overrides eliminate the problem of having to rename styles however, this method does make it harder to see all the required fonts from the raw file itself.

Please note that while all font information is written in the dialogue line, the original style is still required to be displayed correctly.

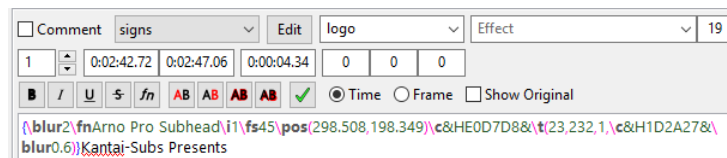


Image 9: Example of a style override

4.3 Using Extracted Files

This section is mainly just to warn about the danger of using extracted files. Some demuxing programs such as MKVExtract have been known to incorrectly extract files. This can lead to some script information being incorrect and fonts becoming corrupted.

5. Merging: Script Cleanup

5.1 Cleaning up Dialogue

Once you have merged the scripts, it is recommended that you clean up the script and remove extraneous comments. One of the easiest methods to do so is to use automation scripts such as unanimated's ScriptCleanup.lua which can be downloaded from here <https://github.com/unanimated/luaegisub>.

Please note that US and JP brackets are not the same character and are treated differently by aegisub and automation scripts.

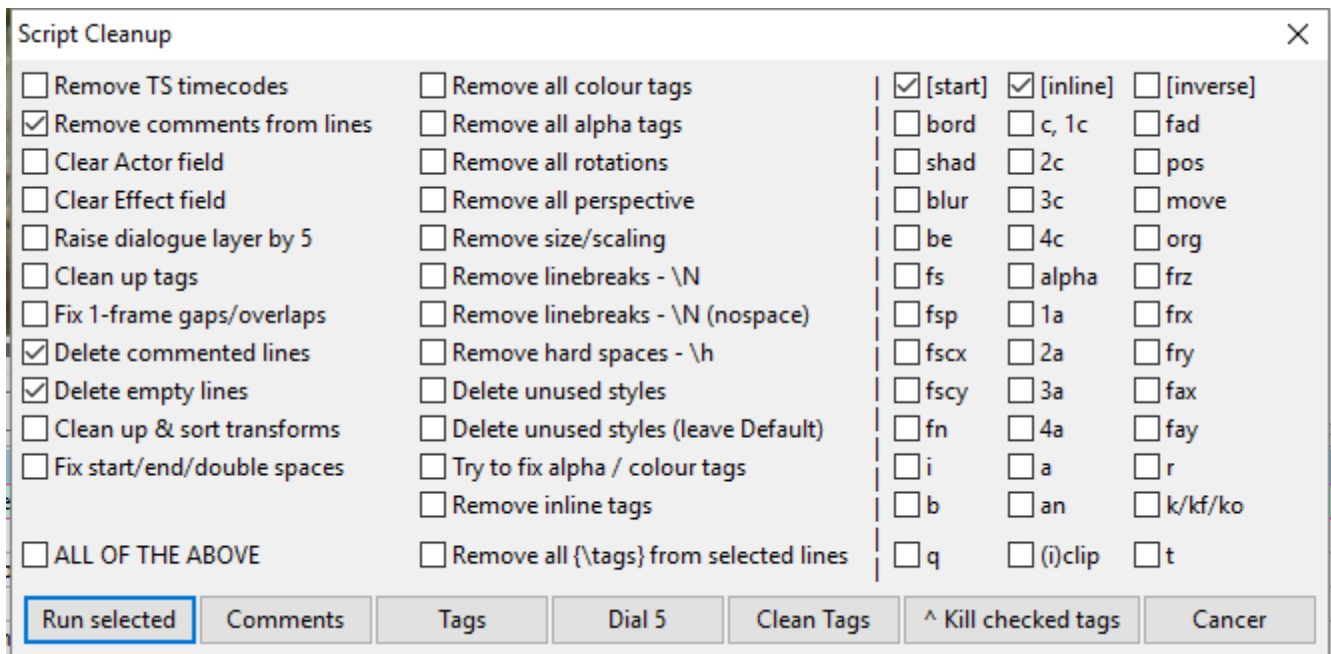


Image 10: Using ScriptCleanup.lua to clean up dialogue

5.2 Removing Garbage Data

It is also recommended that you remove the aegisub garbage data from your script. While this does not impact the subtitles in the final mux, it may contain information about file paths in your computer and other information. Removing it also prevents warnings from popping up if the script is opened by another person.

Please note that if the script is opened with aegisub the garbage data will be created and thus should be the last step in merging process.

```

1 [Script Info]
2 ; Script generated by Aegisub 3.2.2
3 ; http://www.aegisub.org/
4 Title: Kantai - Nejimaki Seirei Senki: Tenkyou no Alderamin Episode 04
5 ScriptType: v4.00+
6 WrapStyle: 0
7 ScaledBorderAndShadow: yes
8 YCbCr Matrix: TV.709
9 PlayResX: 1280
10 PlayResY: 720
11
12 [Aegisub Project Garbage]
13 Audio File: ../../../../Alderamin on the Sky 04.mkv
14 Video File: ../../../../Alderamin on the Sky 04.mkv
15 Video AR Mode: 4
16 Video AR Value: 1.777778
17 Scroll Position: 356
18 Active Line: 361
19 Video Position: 32008
20
21 [V4+ Styles]

```

Image 11: Aegisub garbage data.

5.3 Extradata

Starting with aegisub version 3.2, extradata may be created at the bottom of the file. This information is mostly used for motion tracking and is not required to view the subtitles. It is recommended that you remove the extradata for the final script as it makes the script look cleaner and reduces file size.

```

459
460 [Aegisub Extradata]
461 Data: 2,a-mo,e{"uuid"#3A"2e8b6ef5-53ee-4ccc-84e4-4775a09d5414"#2C"originalText"#3A{"\fs70\fs120\blur0.6\fnIwa
462 Data: 3,a-mo,e{"uuid"#3A"43aed0fc-4b8c-494a-b0ff-98ba1ab56cd7"#2C"originalText"#3A{"\an7\blur1\bord0\shad0\fs
463 Data: 4,a-mo,e{"uuid"#3A"9878458b-75f2-4f68-ac6e-b6650a646305"#2C"originalText"#3A{"\fax0.15\fs32\blur0.6\fnBru
464 Data: 5,a-mo,e{"uuid"#3A"aa688609-946c-48ac-b441-e080b5e420aa"#2C"originalText"#3A{"\fs55\blur0.6\fnBrush Stroke
465 Data: 6,a-mo,e{"uuid"#3A"03724447-2333-47b2-abb0-88a6509d4e76"#2C"originalText"#3A{"\fax-0.13\fs152\blur0.6\fnE
466 Data: 7,a-mo,e{"uuid"#3A"13ccddf-5756-4f3e-b5fc-10c3f8ec1ef6"#2C"originalText"#3A{"\fs30\blur0.75\csH0E1351&\f
467 Data: 8,a-mo,e{"uuid"#3A"6c3769a2-981f-464b-81d2-072e799d20ac"#2C"originalText"#3A{"\an7\blur1\bord0\shad0\p1\
468 Data: 9,a-mo,e{"uuid"#3A"080a7ad2-e8f2-48e6-abb0-dcc424a2f9bb"#2C"originalText"#3A{"\fax-0.48\blur5\fnIwata MinC
469 Data: 10,a-mo,e{"uuid"#3A"e07c8a1f-9915-4f2a-a6c5-64e99a4753d5"#2C"originalText"#3A{"\fax-0.48\blur0.75\fnIwata

```

Image 12: Aegisub extradata

6. Muxing

6.1 Font Collector & Attachments

Once your file is ready for muxing, you should open the file in aegisub and run the font collector to make sure you have all of the required files. This is more reliable than looking at the styles themselves as inline override tags may also specify fonts. To access the font collector, go to File -> Font Collector -> Check fonts for availability. If you have all of the fonts installed, you can also use copy fonts to folder.

To input fonts into mkvmerge, click on the attachment tab and drag the fonts into input files box.

6.2 Input File Order

It is recommended that the video file be loaded into mkvmerge before all subtitle tracks. In the past, there were occasionally playback problems when subtitles were loaded in first.

6.3 Subtitle Information

Once you've added your subtitle track(s) to mkvmerge, click on each subtitle track to edit. Set the language, title, and default track. It is also recommended that you set no forced track as this setting does not always work. Charset should be set to UTF-8 if prompted.

6.4.1 Chapters mkvmerge

To create chapters using mkvmerge, navigate to the Chapter Editor tab and create a new chapter file from Chapter Editor -> New Chapters. Once you've created a new chapter file, click Add Chapter and add the number of subchapters that you need. Each subchapter will be a chapter in the final chapter file. Using Aegisub, find the start time of each chapter and copy that time into the start time for the chapter. You do not need to set the end time of each chapter. You will also need to set the language and name of each chapter. If you will be using ordered chapters, you can also write the Segment UID of the video file. When you are done, save the chapters from Chapter Editor -> save. To load the chapters into mkvmerge, navigate to the Global tab and add the chapter file toward the bottom of the window.

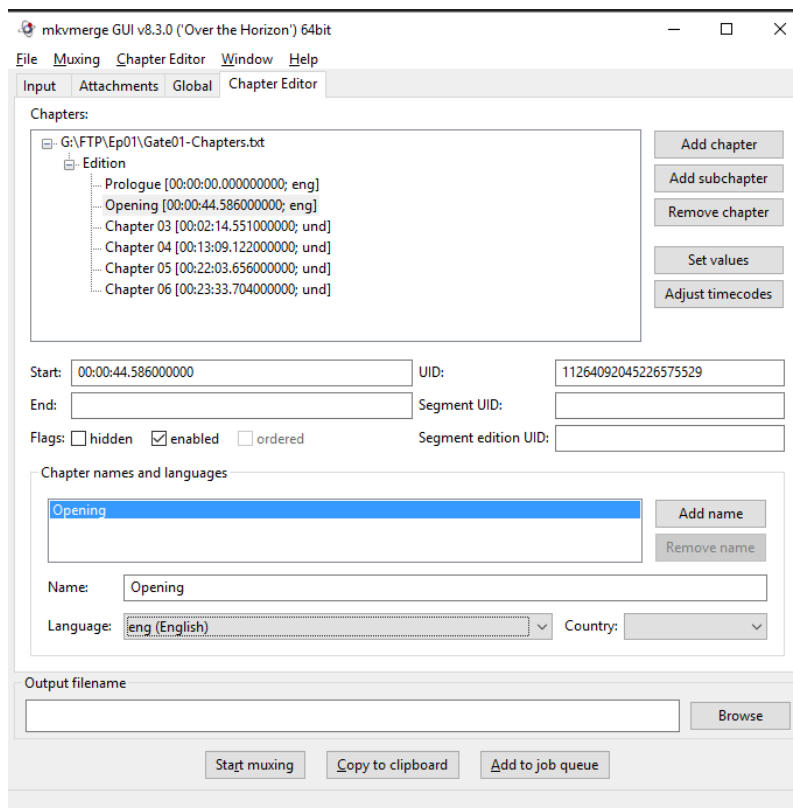


Image 13: Writing chapter data

6.4.2 Chapters Avspmod

You can also create chapters in AvsPmod however you will probably only use this method if you are encoding. To use this method, load in the premux using FFVideoSource. Once loaded, locate the frames where you want to set chapters and bookmark them with ctrl + B. Once all of the bookmarks have been set, convert them to chapters from Macros -> Bookmarks to Chapters.

Once exported, open the .txt file in mkvmerge's Chapter Editor and set the name and language. If you will be using ordered chapters, you can also write the Segment UID of the video file. When you are done, save the chapters from Chapter Editor -> save. To load the chapters into mkvmerge, navigate to the Global tab and add the chapter file toward the bottom of the window.

6.5 Final Checking

Once the video has been muxed, it is recommended that you review the video file in a clean environment. This can be done on a computer or virtual machine without any fonts installed.

7. Checklist

1. Check and adjust script to use the same color space.
2. Check and adjust script resolution.
3. Check for style conflicts.
4. Raise dialogue to a layer above typesetting.
5. Merge.
6. Write script properties.
7. Review timings for inconsistencies.
8. Remove comments and garbage data.
9. Run a spell checker on the dialogue.
10. Remove extradata (optional).
11. Run font collector.
12. Make and check chapters for consistency.
13. Input files in the correct order into mkvmerge.
14. Write CRC and check RC in clean environment.