

MenuShrink V. 2.3 User Guide

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Introduction

MenuShrink is a small utility for shrinking DVD motion menus to still frames, either with or without audio. By doing this, users backing up their DVDs to a DVD-5 can usually save hundreds of Mb and prune the menu to about 5% of its original size.

DVDShrink also allows compressing menus into still frames, but the space saving is far smaller, and the resulting menu unappealing, aesthetically.

MenuShrink is very flexible: you can select whether to keep the audio or not, and preview the image to use as a still background to the menu. You can also keep parts of your menus animated, and still others.

Where to get MenuShrink

You can download MenuShrink free of charge [here](#).

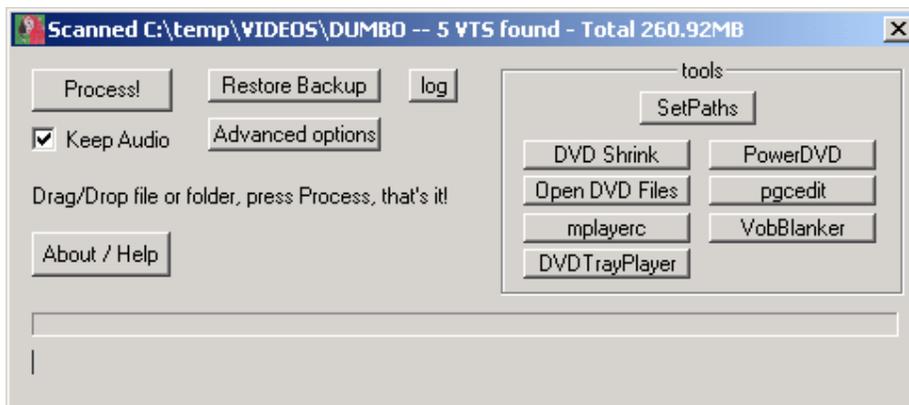
Usage instructions

Use MenuShrink **after ripping your DVD but before using DVD Shrink**.

MenuShrink will be able to free a significant amount of space in the DVD, which DVD Shrink can put to good use to improve the quality of your backup.

Here's the procedure:

1. **Rip your DVD to your hard drive** with DVD Decrypter or similar
2. Open MenuShrink
3. Drag the folder which contains your ripped files over to the MenuShrink window. You can also drag a file from that folder to the MenuShrink window.
4. MenuShrink will load the DVD and report how many titlesets (VTS – video title set) it found and the overall size of all menus (260.92MB in this case).

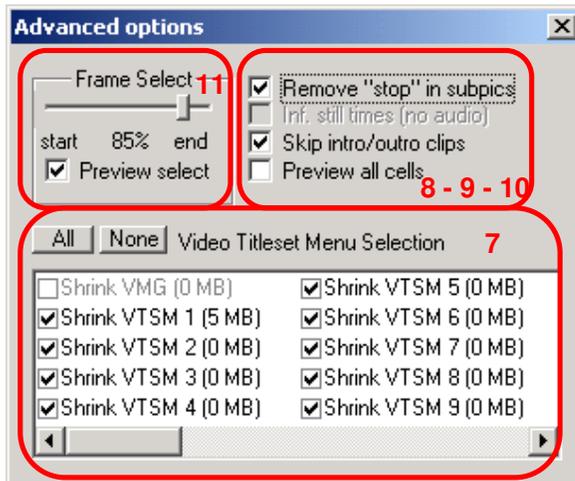


5. Decide if you wish to keep the audio or not - naturally, eliminating the audio will cause the greatest space savings

6. You can then hit the Process button and MenuShrink will shrink down all the menus using default options. In that case, go to step 13 below. Or you can use advanced options if you want more control over the process.

Advanced Options

This is where you can adjust which frames to select for the still menus, and make more advanced adjustments:

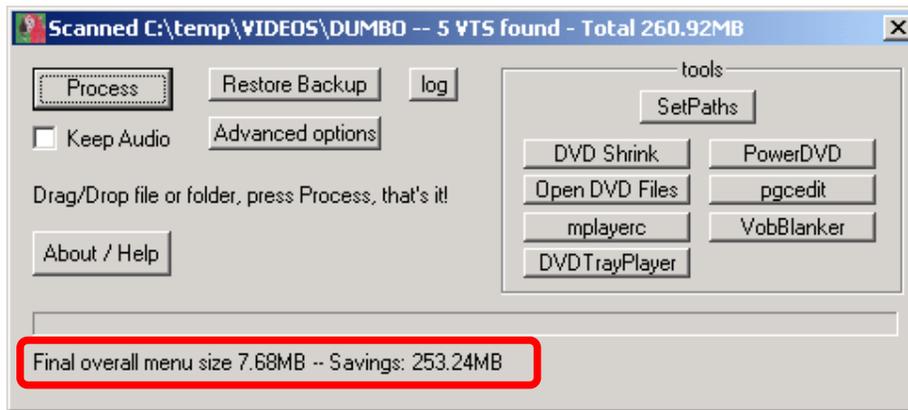


7. All available menus (titlesets) are ticked by default. If you only wish to process certain menus, untick the ones you want MenuShrink to leave intact or click “None” and then select only the ones you’d like to process. The menu sizes are in MB and they’ll help you identify which titlesets the large menus are in...
8. You should leave the “Remove stop in subpics” option **checked** (see the [details](#) below).
9. Decide whether you want the still menus to be displayed indefinitely (no-audio mode only). It’s best to leave this option unchecked in which case the menus will play for the same amount of time as they did originally (see the [details](#) below).
10. You also have an option to skip menu intro/outro clips. These are the short video clips that are sometimes played before and after menus. Skipping them makes for a nicer smoother playback so you should select this option. See the [details](#) below. See below for the option **Preview all cells**.
11. You can use the Frame Select slider to decide where the still image should be taken from in the original menu. Move it all the way to the left to select the first image in the menu, all the way to the right to select the last image. The default position is 85%, which means the image is taken at 85% of the menu duration. Sometimes, the first or last images will be the clearest. Other times, the first image is black (fade-in) or the last one is (fade-out). Just experiment. If you don’t like your output, just try it again with different settings or switch to [Preview-Select](#) mode. You don’t even need to restore your backup as MenuShrink works on the files in its own special backup folder. If you use PowerDVD 6.0 or media player classic, this is where the “Soft DVD Player” [button](#) comes handy!

If you prefer, you can **select the still image by hand** using the [Preview](#). Check the “Preview Select” box to do that. When you click the Process button in the main window, a preview panel will popup to let you chose the image for each menu cell. If you select **Preview all cells**, every cell that has more than 2 I-frames in it will open for you to preview it and select whether you want to kill it, shrink it or keep it animated. More on this [here...](#)

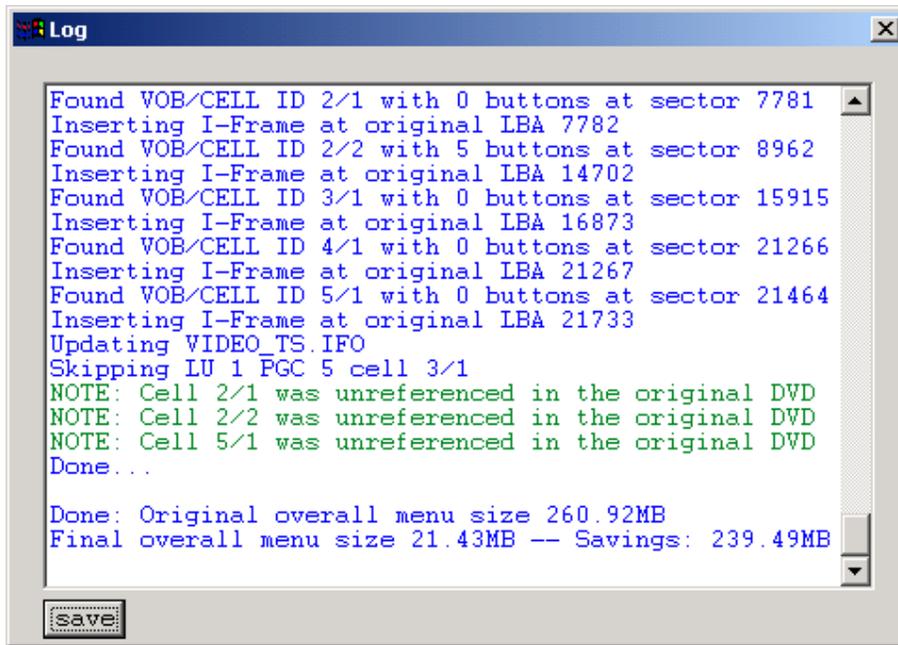
12. Back in the main MenuShrink window, click Process!

MenuShrink will very quickly (within a few seconds) process the menu, extracting a still frame at the selected location for each cell in the menus and tell you the resultant menu size and how much space you have saved



In this case, you can see without audio, the menu ended up at just 7.7Mb, a savings of 97% (the same DVD with audio resulted in 21.5Mb, still a savings of 91% - the “with audio” feature usually varies between 65% and 90% saved, depending, of course, on the length of the menu)

13. You can view the output of the shrink by looking at the log. This contains useful information if you’re interested in the [gory details](#)! Warnings are marked in green, while errors are marked in red.

A screenshot of a 'Log' window with a blue title bar and a close button. The window contains a list of log entries in blue and green text. The entries describe finding VOB/CELL IDs, inserting I-frames, updating VIDEO_TS.IFO, and skipping a cell. It also includes three green 'NOTE' lines and a summary of menu size savings. A 'save' button is visible at the bottom left of the window.

```
Found VOB/CELL ID 2/1 with 0 buttons at sector 7781
Inserting I-Frame at original LBA 7782
Found VOB/CELL ID 2/2 with 5 buttons at sector 8962
Inserting I-Frame at original LBA 14702
Found VOB/CELL ID 3/1 with 0 buttons at sector 15915
Inserting I-Frame at original LBA 16873
Found VOB/CELL ID 4/1 with 0 buttons at sector 21266
Inserting I-Frame at original LBA 21267
Found VOB/CELL ID 5/1 with 0 buttons at sector 21464
Inserting I-Frame at original LBA 21733
Updating VIDEO_TS.IFO
Skipping LU 1 PGC 5 cell 3/1
NOTE: Cell 2/1 was unreferenced in the original DVD
NOTE: Cell 2/2 was unreferenced in the original DVD
NOTE: Cell 5/1 was unreferenced in the original DVD
Done...

Done: Original overall menu size 260.92MB
Final overall menu size 21.43MB -- Savings: 239.49MB
```

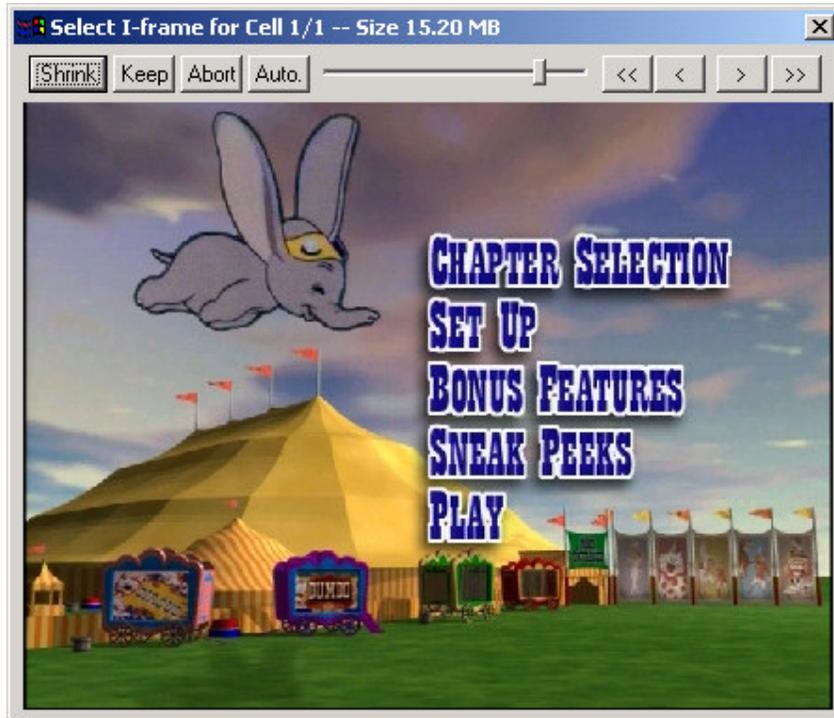
14. **Test your menu in a software player** (e.g. media player classic) before proceeding to do any further operations on the DVD (eg DVD Shrink). To do that, if your [path](#) to your soft player is correct and it can open a DVD from the command line, simply click on the appropriate button.
15. If your [path](#) to DVD Shrink is correct, you can then hit the “DVD Shrink” button to open DVD shrink on the processed files and start your normal shrinking session. Or you can open the processed DVD files with any other backup program. Remember, MenuShrink processes *in place*. This means the processed files will be in the original folder.
16. **If you goof up, don't worry.** Just click Restore Backup and all will be back as it was in a flash. You can do this at any time, even after the program has been closed and re-opened.

Preview-Select mode.

In the Preview-Select mode, after you click Process, a preview dialog pops up for each menu cell *that has buttons and has more than a couple images in it*. This is to minimize the number of cells for which you need to manually select the frame. However, if you selected “Preview all cells” in the advanced options panel, even cells without buttons will be opened in the preview.

The preview panel will be slightly different depending on whether the cell you're previewing should normally be killed (because it's a menu intro/outro and has no buttons, or only has NOP commands etc) or it's a normal menu cell.

Here's an example of a normal menu cell:



You can use the slider and the arrows to select which image you would like to use for this menu.

Clicking Shrink (or hitting Return) will validate the selection and let MenuShrink process the next cell. If you click **Keep**, the cell will not be shrunk and will remain animated (unprocessed). This is useful if you want to keep part of your menus animated, but shrink other parts to still menus. The size of the cell is indicated in the title bar (15.20 MB in this example) so you can decide whether or not it's worth it to keep the cell.

If you click **Abort**, processing stops right here. If you click **Auto**, you will no longer be prompted to select the image for menus *in the current Video TitleSet*. In other words, if you were processing VTS 1 and you click Auto, the frame selection dialog will not open until VTS 2 is processed. This is useful if you just want to manually select the frame for a specific menu for which the default didn't work well. Once the frame is selected, click Auto to get the default frames for the rest of the menus in that VTS (and Auto again for other VTS if needed). The keyboard shortcut for Auto is the A key.

MenuShrink remembers which frames you selected manually. When you close MenuShrink, it will remember the selected I-frames of the last DVD you processed manually, so if you reload that DVD (for example using the shortcut O), your selections will show by default in the preview dialog. In this case, when you click Auto, your previous selections will be used, (or the default slider selection if you didn't select any frames).

Note: If you don't click "Preview Select" in the advanced options panel, you get the default frames selected by the advanced options frame slider, *not* the frames you might have selected in a previous Preview-selection.

The preview dialog also offers a **Kill** option for advanced users. If you know that a specific cell is not a useful menu and that you can safely discard it, you can press **CTRL-K**. MenuShrink will ask you to confirm and then strip the audio from the cell,

shrink it, and attempt to skip its playback, as it normally does for any cell that does not have buttons. Be careful though! If you kill a “good” menu by mistake, the DVD will not play normally. (You can always check that with the soft player button and of course, restore backup if you make a mistake).

Here’s an example of the preview panel for a menu intro:



As you can see, the button names have changed: For these types of cells, you have the option to kill the cell (the default option, what would have happened if you hadn’t selected to preview all cells), or to keep it animated. In both cases, the slider is useless, except to let you see what’s in the menu. The preview allows you to also keep animated menu intos/outros, or other videos that might have been put in the menu domain (interviews for example) and would normally have been killed by MenuShrink in automatic mode.

The Path panel

MenuShrink lets you define 7 buttons which you can link to your favorite tools using the Path panel. The two first buttons are normally for [DVD Shrink](#) and your Software DVD. The Path panel will show the default Shrink path. If that is not where DVD Shrink is located, change the path. Setting the path to your favorite software DVD player will enable the second button on the main MenuShrink window. Note that for this to work, the player application has to be able to open a DVD from its command line (MenuShrink passes VIDEO_TS.IFO as an argument). [Media player classic](#) (free!) can do that and so can [PowerDVD 6.0](#) but PowerDVD 5.0 can’t and neither can WinDVD 5.0.

You can also set 5 additional tools which will open the VIDEO_TS.IFO file when you click on the corresponding button on the main window. I like to have PgcEdit, IfoEdit, and a

second DVD player (just to check things work normally). These tools can also be launched via the F1-F5 keys.

The main MenuShrink window also has a button "Open DVD Files" to open the DVD folder in explorer (shortcut F).

Keyboard shortcuts

MenuShrink offers a few keyboard shortcuts listed below:

- F1 through F5 to launch the tools defined in the Path panel.
- O to open the last DVD you processed.
- F to open the current DVD folder in explorer.
- E to open the INI file (with all your preferences) in the default text editor. This is for advanced users (see [this](#)). **Close MenuShrink** before you save the INI file if you want your modifications to be saved (otherwise MenuShrink will overwrite the file).
- In the Preview Select panel, A to switch to Auto mode, and CTRL-K to kill playback, arrow keys to navigate.

Known Issues and Limitations

At this point MenuShrink is not always able to skip playback of intro and outro clips (see [below](#)). You might notice that as very brief flashes of video in between menus, or you might not, as this seems to be player-dependent.

Also, on rare occasions, skipping intro and outro clips can cause a menu to not work exactly as it did before (see [below](#)).

Technical discussion (for those who are interested)

Some background

MPEG2 image coding is done in groups of pictures (GOPs) made up of I, B and P frames. I (intra) frames are the only ones that can be decoded by a DVD player on their own. Both B and P (predictive) frames require at least one other frame to be decoded. This is why it's much easier to use an I-frame to turn a motion menu into a still: keeping a single I-frame will yield a full image. (This is not entirely true for interlaced video, as each image is made up of two fields, one of which might be coded as an I-frame, and the other as a P-frame).

MenuShrink always selects the first I-frame after a NAV Pack (and possibly the next frame if the video is interlaced) to use as a still. In theory, any such I-frame is a good candidate, but some may be better than others (for example, the first I-frame in the cell might be black, and the last one too, in case of a fade-out). It is best for users to experiment.

The hierarchy in the VOB file, starting at the lowest level, is:

- A **frame** is part of a **GOP**. The GOP always starts with an I-Frame
- A GOP is part of a **Video Object Unit (VOBU)**. There is usually 1 GOP per VOB (lasting 0.4 seconds long), but there can be more (up to 1.2 seconds). A VOB always starts with a **NAV Pack** and ends at the next NAV Pack.
- Several VOBs make up a **cell**. A cell is characterized by being made up of VOBs that have the same VOB/CELL IDs (a pair of numbers that are declared in the NAV Packs). MenuShrink operates on individual cells (it loads the first cell, processes it, forgets about it, and then loads the next one etc).
- Several cells make up a **VOB**, characterized by being made up of cells that have the same VOB ID (the first number in the pair of numbers mentioned above). Often times, there's only 1 cell per VOB, for example 1/1, 2/1, 3/1 etc.
- A **VOB file** (e.g. VTS_01_0.VOB) usually contains several VOBs, but may contain just one (the menus we will be dealing with will always contain many VOBs).

A VOB always starts with a NAV Pack, then the first video pack of an I-Frame. Following that, there can be more video packs, audio packs and subpicture (subpic) packs. The subpic packs contain all the information about the button highlights and need to be preserved to keep the menu functional. The audio packs can be kept or discarded, depending on user preferences. As mentioned above, there can be more than 1 GOP in a given VOB but MenuShrink will only consider the first one as a candidate for a still I-frame.

In order to turn an I-Frame into a 1 frame GOP, a few things need to be done:

- A sequence-end-code needs to be added to the end of the I-frame, along with a packing stream (since we probably removed lots of stuff from subsequent video frames). This is especially true if we don't keep audio packs.
- The NAV Pack's "End PTM of VOB if sequence-end-code" (offset 0x41) must be set to indicate the presentation end time of the I-Frame.
- Although it is not strictly necessary for a single I-frame, it is probably safer to set the "closed GOP" flag and it's necessary to reset the "Broken GOP" flag. The Closed GOP flag indicates that a B-frame that's coming right after the I-frame does not require the previous GOP to be decoded. B-frames can reference frames before and after them and these frames are then required to decode the B-frame. The flag indicates that this GOP does not require the preceding one to be decoded. In our case, there is no B-frame after processing, so the flag is useless. The Broken GOP flag indicates that the GOP is not closed (a B-frame requires the previous GOP for decoding) but some editing made the previous GOP unavailable. The flag can be used by a player to cheat during playback, for example by repeating a frame instead of attempting to decode the B-frame. In our case, it must be reset.
- Several other pointers in the NAV Pack must also be updated to reflect the fact that some video (and maybe some audio) packs were dropped, most notably in the SYNCI and VOBU_SR areas. The SYNCI area indicates where the audio and subpic packs are to be found in the VOB (relative to the current NAV Pack) for each audio and subpic stream. VOBU_SRI is the search information table, which is normally used for fast-forwarding through the video. It contains offset (in sectors) to video packs located at various time lags from the current NAV Pack (0.5 seconds, 1 second ... up to 120 seconds before and after the current time). Since we've removed many packs, most of these offsets are now off and must be corrected or flagged as invalid.

Creating the shrunk-down cell

Version 2.1 of MenuShrink uses the first input VOBU as the first output VOBU (instead of the first input VOBU with buttons). However, MenuShrink can insert an I-frame from another location in the cell (the largest one for example). To do this, MenuShrink removes the original I-frame in that first VOBU, then inserts the new I-Frame. All the Subpic packs found in the cell (even if they appeared much later) are then inserted directly after the first video pack (which is the second pack). Finally, if the audio is to be kept, the audio packs that were present in the first VOBU are inserted according to their SCR (system clock reference). Each pack has an SCR value attached to it, which indicates at which time (in a 90 kHz reference clock) the pack should be extracted from the medium and sent for decoding. Software players most likely ignore this value because they have large amounts of memory available to store packs in advance. This is not the case for standalone players which have minimal amounts of memory. As a result, it is crucial to preserve SCR values so the player does not run out of audio or video. Audio is the most important aspect (a gap in the audio is immediately noticeable, whereas a gap in the video isn't), and in MenuShrink, the audio packs keep their original SRC values, which ensure the same smooth playback as in the original cell.

The still time option

When retaining the audio, MenuShrink keeps the first VOBU, and inserts the selected I-frame. Then subsequent subpic and audio packs are added, along with their NAV Packs. The same applies in No-Audio mode, but none of the audio packs are kept and the resulting cell only has 1 VOBU. In that case, a still time is set in the IFO file, to indicate that the cell should play for a certain amount of time. MenuShrink can make the cell play for exactly the same amount of time as it originally did, or it can set the still time to an infinite value.

Some menus are made up of three parts (for example most of the Star Wars menus):

- There is a short menu intro clip (no buttons), followed by
- a first menu cell with buttons (A), which does not loop, but leads into
- a second one (B) that loops.

MenuShrink will shrink the intro clip (and attempt to bypass it, see below), but will keep the first and second cells A and B fully functional. If you select an infinite still time, cell A will pause until you select one of the menu options, or select Next, which will take you to cell B. By contrast, if you select the default of a still time that matches the original duration, cell A will pause for as many seconds as it was originally, then go into cell B, as the original DVD did.

Another example is that of a DVD where a menu plays for about 30 seconds, then goes on into a default action (for example, starting the movie). The menu cell does not loop in that case. MenuShrink will preserve this behavior if you use a still time that matches the original duration. By contrast, if you select an infinite still time, the menu will pause forever, until you hit a button.

Bypassing menus intros/outros

When MenuShrink encounters a cell with no buttons, it will shrink it to a single frame, dropping the audio to make the cell as tiny as possible. MenuShrink is able to entirely skip many such cells. In the example above, this means the intro clip will not play at all and the navigation will go straight to menu (A). This makes menus play in a much smoother manner in general.

In some rare cases, previous versions of MenuShrink (before 2.3) could cause a menu to repeat itself once: For example you can make a selection and find yourself in the same menu. The next time you make the selection the menu will behave normally. Starting at

version 2.3, MenuShrink is smarter about that and will avoid bypassing an intro if that would cause a menu to repeat itself.

The gory technical details are as follows: if the menu intro (specifically a cell with no buttons) has no cell command and is followed by another cell in the PGC (program chain), say cell A, we know for sure that cell A plays immediately after the intro. Entirely removing the intro is very difficult because the cell numbers would change and some of the DVD commands in the PGC or in the menus themselves would need to be updated, not an easy task. Instead, we can copy the information from cell A into the menu intro, which then behaves exactly as the menu A. In your PGC you end up with Cell A repeated twice, but that's usually not a problem. The net result is that the menu intro no longer plays and you go to menu A directly. If the intro resides in its own Program Chain Number or if it has a cell command, MenuShrink can't bypass it, but makes sure the playback is as brief as possible (not noticeable on my settop player).

The problem with stop commands in the subpic streams

Subpic packs contain all the highlight information for the buttons, along with commands controlling the display of the highlights. The commands are located at the very end of the subpic data. In some cases, for example, the Star Wars DVDs, the subpic data includes a "stop" command that's executed after a delay. That stop command causes the highlights to disappear. Usually, this is done in a menu that loops, and the timing of the stop command (also coded in the subpic data) coincides with the duration of the menu, so the highlights disappear, but reappear again when the menu loops.

It is not clear to me what the benefit of these stop commands is. The fact is that they pose a problem when turning a motion menu into a still, in no-audio mode. If the menu is turned into an infinite still time, the stop command will still execute after the encoded delay, and the highlights will disappear, never to reappear due to the infinite still time. If the still time is 4 seconds and the menu loops, the highlights will reappear 4 seconds after they disappear. Both cases are bad, and MenuShrink removes such timed stop commands from the subpic data to avoid the problem entirely. A message is sent to the log if a timed stop command is detected and removed. The procedure is normally safe, but an option is provided to disable the stop removal in case the subpic data would get messed.

So, if you test your DVD and the button highlights behave strangely, you should check in the log whether stop commands were removed and disable the option to see if the highlights are normal without it. However, chances are that having the option turned off will make highlights disappear after a delay. (Note that all this only applies to no-audio mode. If you keep the audio, then there's no problem keeping these stop commands around).

The "Tiny buttons" warning

In some DVDs, transition clips (menu intros and outros) have *non-functional buttons* (you can verify this by looking at the particular menu cell in PgcEdit's superb menu viewer) and it isn't clear why they are used at all. For example, the buttons might be extremely small, and piled up in the top left corner. The "real" buttons usually appear in the next cell. If there is no "forced action" button in the cell (i.e. a button command that's executed automatically at the end of the cell display) MenuShrink will issue a note "Note: buttons are tiny" and automatically "kill" the cell: it will strip the audio, select a small I-frame and attempt to skip playback as it normally does for cells that don't have buttons. If this causes a problem in your output DVD, you can disable this behavior by setting the MinButtonSize key to 0 in the INI file (the easiest way is to start MenuShrink, press the "E" key which will show the INI file in the default text editor, then **exit MenuShrink** before saving the INI file). The default value is 5, meaning that if all the buttons are smaller than 5 by x or x by 5, and there are no forced action buttons, the cell will be skipped.

IFO Processing

Finally, the various IFO files must be updated to reflect the changes that were made to the VOB files. In particular the VTSM_VOBU_ADMAP table holds a list of all the VOBUs in the VOB file with their starting sectors. Since we've removed lots of data from the VOB files, there are usually fewer VOBUs than originally (except with the "keep audio" option) and the starting sectors are no longer the same and must be corrected. The VTSM_C_ADT table must also be updated. It keeps track of all the VOB/CELL ids in the VOB file, with their start and end sectors. The VTSM_PGCI_UT table holds all the information on the PGC (program chains) in the VOB file. The cell durations, still times, start and end sectors must also be updated in this table. There are a few more pointers that need to be updated in all the IFO files, finishing with the VIDEO_TS.IFO file which keeps pointers pertaining to the layout of VOB, IFO and BUP files on the disc. MenuShrink implements its own "Get VTS Sectors" (thanks again to r0IZ and jsoto for lots of explanations on how to do that!).

Questions and comments

Questions and comments can be directed to doom9's forums in [the IFO/VOB Editors forum](#) or sent directly to jeanldvd(at)free(dot)fr.

Written/edited by blutach and jeanl.