DivX®

Quick Start Guide

The OFFICIAL Guide

Quick Start Guide

Introducing VirtualDub

Working with video requires a variety of tools to achieve the best possible results. There are some processes for which dedicated-purpose tools can be invaluable in the world of digital video. Most notable of these tools by far is *VirtualDub*.

VirtualDub is a free dubbing application that lets you cut, splice, dub, convert between video formats, and apply filtering effects.. Although it lacks some functionality typically associated with commercial video editing applications (easy DVD conversion, programmable digital VCR, video transition effects, etc.), it is an essential tool in anyone's arsenal: powerful, yet remarkably easy to use.

This Quick Start Guide will teach the basics of VirtualDub and walk you through creating your very first DivX videos. For now, resist the urge to explore and simply follow the instructions.

Download VirtualDub before we start. It’s a small download, open-source, and entirely free (although the author does accept donations!).

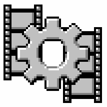
http://virtualdub.sourceforge.net

Extract the .zip file to a new folder on your hard drive. No formal installation procedure is required. This guide uses VirtualDub version 1.5.4, but the interface of later versions should remain similar.

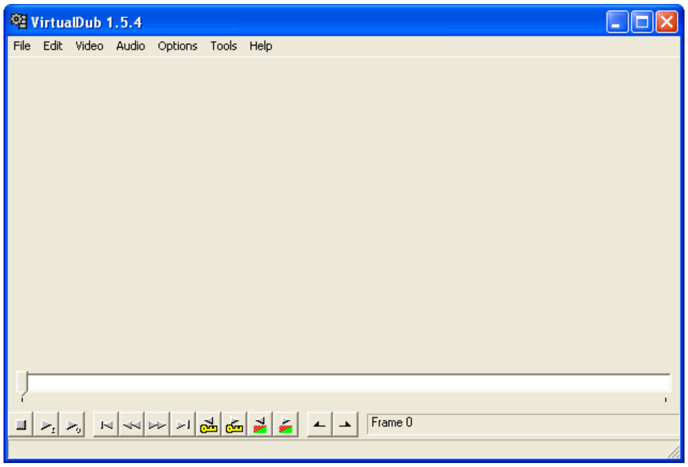
Your first DivX

To begin we will use VirtualDub to open an MPEG 1 video file and convert it to DivX format. For the purposes of simplicity our video will not include an audio track at this point.

1. Load VirtualDub by double-clicking on the VirtualDub program icon.



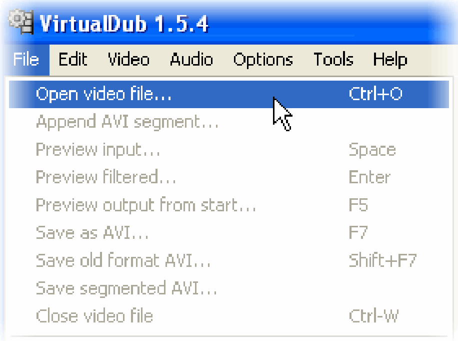
VirtualDub Program Icon



VirtualDub Main Window

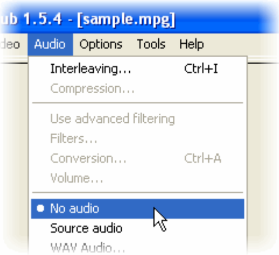
In the VirtualDub main window (from top to bottom): *Program menus, Video display area (currently empty), Timeline and seek control, Timeline control buttons, Tool tips bar*.

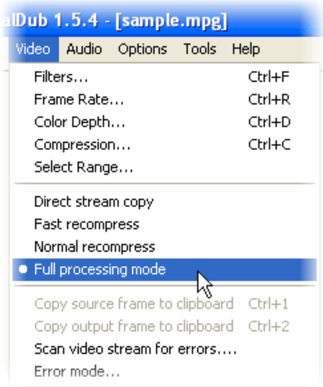
From left to right the timeline control buttons are: *Stop, Play input, Play output, Go to start, Backward, Forward, Go to end, Previous key-frame, Next key-frame, Find last scene change, Find next scene change, Set mark-in, Set mark-out*.



2. From the *File* menu choose *Open* and select your sample file.

3. From the *Audio* menu set *No Audio*. This instructs VirtualDub that even if the source file contains audio data we do not want to process it or copy it into our output file.



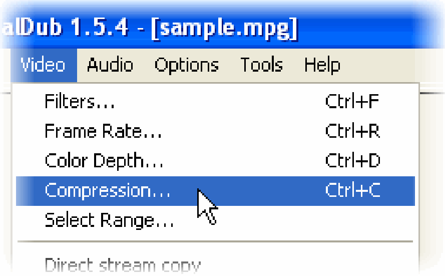


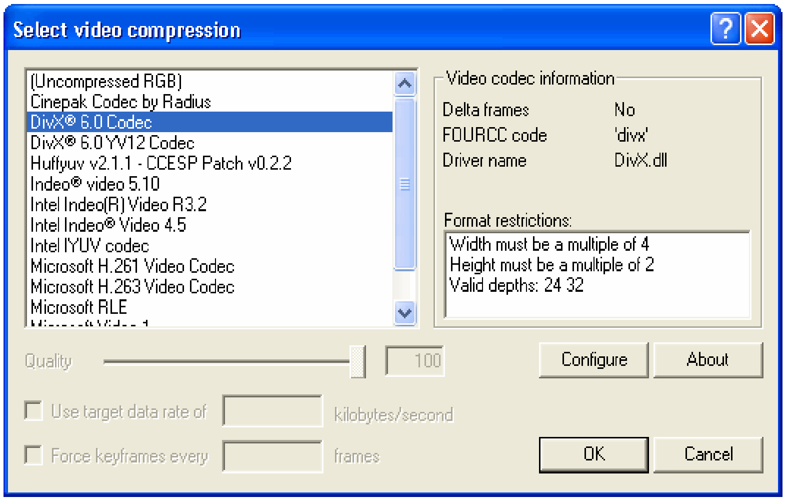
4. From the *Video* menu set *Full Processing Mode*. In this mode VirtualDub allows us both to recompress the video (here we will be going from MPEG1 to DivX) and also apply any filters should we choose to do so.

Because we will not be applying filtering here *Normal Recompress* might give us better performance. *Fast recompress* gives the best performance but may not work in all circumstances.

For the present time leave the video mode set to *Full Processing Mode*.

5. Now we want to configure DivX as the video compressor. Select the *Compression* option from the *Video* menu to open the compressors list.





Video codec information

Delta frames No
FOURCC code 'divx'
Driver name DivX.dll

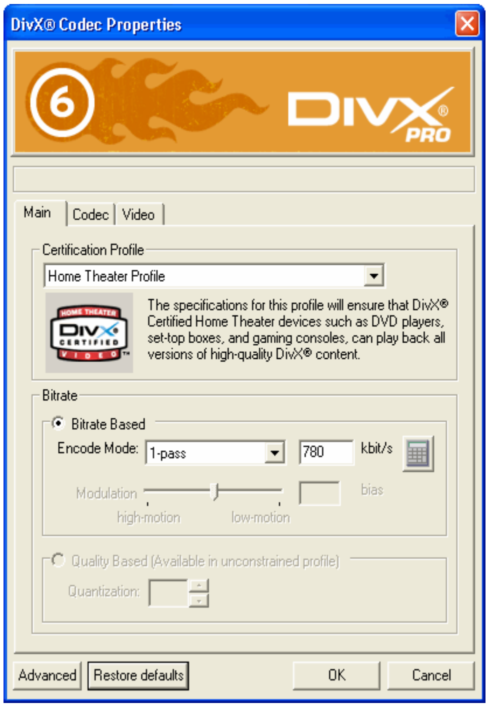
Format restrictions:
Width must be a multiple of 4
Height must be a multiple of 2
Valid depths: 24 32

Select *DivX® 6.0 Codec* and click the *Configure* button to bring up the encoder configuration dialogue.

6. Congratulations!

If you made it this far, this is the first time you will have seen the DivX encoder. At this point we simply want to configure the encoder with the default settings using the *Restore Defaults,* button but you might want to take this opportunity to explore the encoder configuration dialogue before continuing.

When you are ready, click *Restore Defaults* and then *OK*.



Certification Profile: Home Theater Profile

The specifications for this profile will ensure that DivX® Certified Home Theater devices such as DVD players, set-top boxes, and gaming consoles, can play back all versions of high-quality DivX® content.

Bitrate

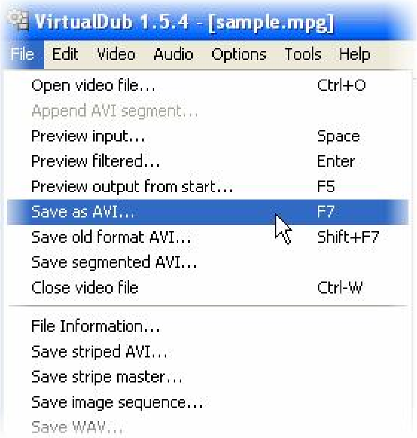
● Bitrate Based

Encode Mode: 1-pass 780 kbit/s

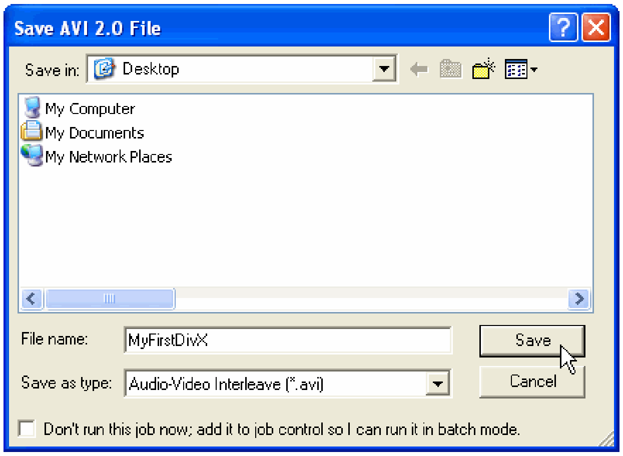
Modulation high-motion low-motion bias

○ Quality Based (Available in unconstrained profile)

Quantization:



7. All that remains is to instruct VirtualDub to save the AVI file. When you do this VirtualDub will begin processing the video and writing the encoded data to file.



File name: MyFirstDivX

Save as type: Audio-Video Interleave (*.avi)

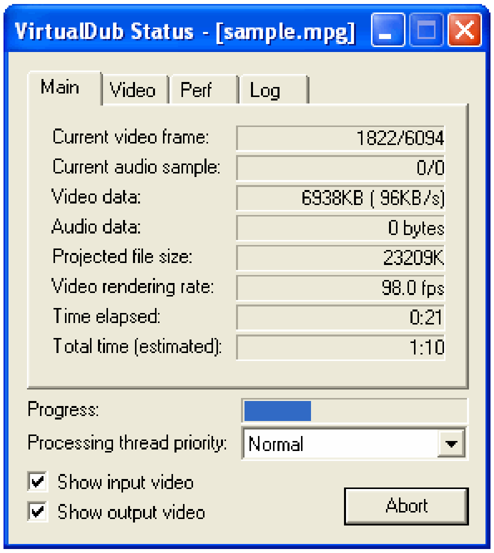
☐ Don't run this job now; add it to job control so I can run it in batch mode.

Enter a suitable filename and click *Save* to commence processing.

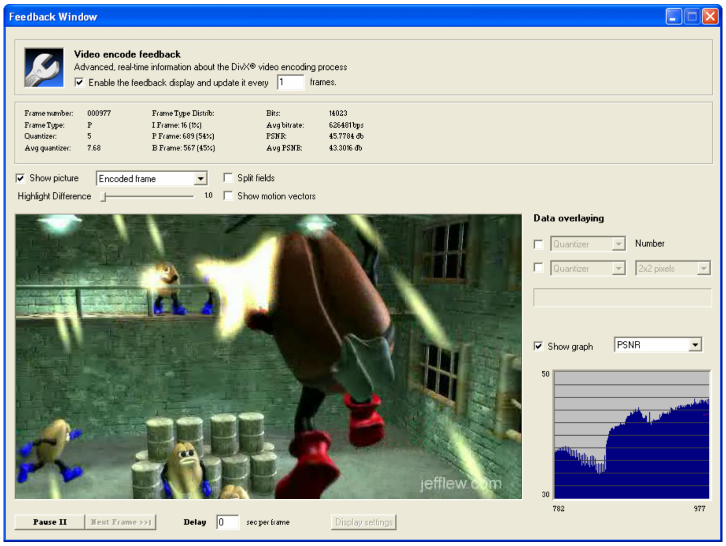
8. The VirtualDub Status window should pop up and allow you to monitor the encoding progress.

Here you see the progress bar, how much video and audio data has been encoded, and a projection of the final file size. The projection is a *very* rough estimate because DivX may choose to vary the bitrate throughout the file.

If the estimated time is quite long and you would like to work in other applications while encoding set *Processing thread priority* to *lowest*. This will make Windows share more CPU time with other applications but will also result in longer encoding times.


VirtualDub Status - [sample.mpg]

Current video frame: 1822/6094
Current audio sample: 0/0
Video data: 6938KB (96KB/s)
Audio data: 0 bytes
Projected file size: 23209K
Video rendering rate: 98.0 fps
Time elapsed: 0:21
Total time (estimated): 1:10
Progress:
Processing thread priority: Normal
☑ Show input video
☑ Show output video


Feedback Window

Video encode feedback
Advanced, real-time information about the DivX® video encoding process
☑ Enable the feedback display and update it every 1 frames.

Frame number: 000977
Frame Type: P
Quantizer: 5
Avg quantizer: 7.68
Frame Type Distrib:
I Frame: 16 (1%)
P Frame: 689 (54%)
B Frame: 567 (45%)
Bits: 14023
Avg bitrate: 626481 bps
PSNR: 45.7784 db
Avg PSNR: 43.3016 db

☑ Show picture: Encoded frame
□ Split fields
Highlight Difference 1.0
□ Show motion vectors

Data overlaying
□ Quantizer Number
□ Quantizer 2x2 pixels
☑ Show graph: PSNR

Delay 0 sec per frame

The *Feedback Window*, first introduced in DivX 5.1, lets you monitor and manipulate the inner-workings of the DivX encoder in real-time.

You will see the feedback window unless it is disabled under the *Settings* button, located in the bottom-left corner of the encoder configuration dialogue (see illustration for step 6).

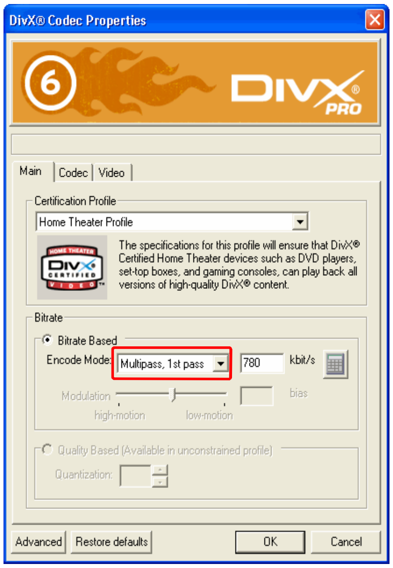
You might like to explore some of the display options shown here while your video encodes, but for now avoid altering the options in the bar at the very bottom of the window.

With regards to performance, the feedback window may reduce the rate at which your video is encoded. To reduce overhead, increase the update interval so that the feedback display is not updated every single frame.

The feedback and status windows will close automatically after encoding. You should then be able to play your first DivX movie using the *DivX Player* (bundled free with DivX 6), or any other media player.

Your first Multipass

While 1-pass mode is fast and particularly suited to certain situations, Multipass encoding offers more consistent quality by allowing the encoder to first analyze the entire video before encoding it.



DivX® Codec Properties

Main | Codec | Video

Certification Profile: Home Theater Profile

The specifications for this profile will ensure that DivX® Certified Home Theater devices such as DVD players, set-top boxes, and gaming consoles, can play back all versions of high-quality DivX® content.

Bitrate

● Bitrate Based

Encode Mode: Multipass, 1st pass | 780 kbit/s

Modulation: high-motion – low-motion | bias

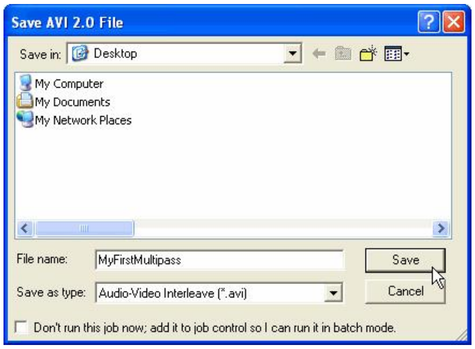
○ Quality Based (Available in unconstrained profile)

Quantization:

Advanced | Restore defaults | OK | Cancel

1. Load VirtualDub and configure it as you did in *Your first DivX* steps 1 through 5 but this time set the *Variable bitrate mode* to “*Multipass, 1st pass*”.

When you save a video in *Multipass, 1st pass* mode the encoder will generate a log file that contains an analysis of the video but no actual video output will be generated.



Save AVI 2.0 File

Save in: Desktop

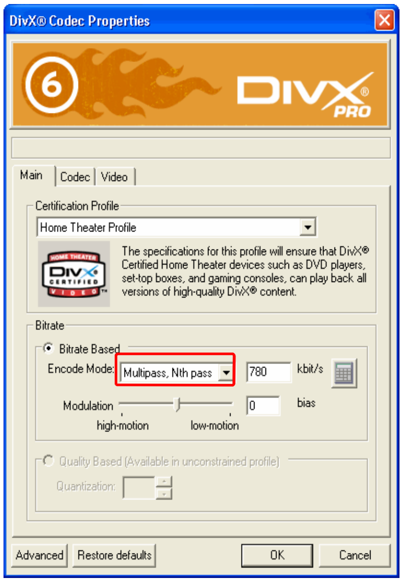
My Computer
My Documents
My Network Places

File name: MyFirstMultipass | Save

Save as type: Audio-Video Interleave (*.avi) | Cancel

□ Don't run this job now; add it to job control so I can run it in batch mode.

2. Save your AVI file using a suitable file name. You don’t need to use a separate file name for every pass that you perform, so as before simply choose a name that fits the video.



DivX® Codec Properties

Main | Codec | Video

Certification Profile: Home Theater Profile

The specifications for this profile will ensure that DivX® Certified Home Theater devices such as DVD players, set-top boxes, and gaming consoles, can play back all versions of high-quality DivX® content.

Bitrate

● Bitrate Based

Encode Mode: Multipass, Nth pass | 780 kbit/s

Modulation: high-motion – low-motion | 0 bias

○ Quality Based (Available in unconstrained profile)

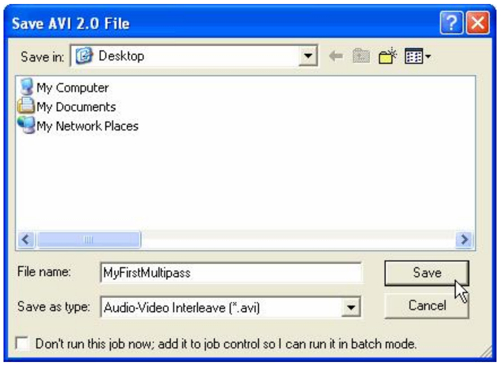
Quantization:

Advanced | Restore defaults | OK | Cancel

3. Without closing VirtualDub re-configure the encoder by setting *Variable bitrate mode* to “*Multipass, nth pass*”.

When you save a video in *Multipass, nth pass* mode the encoder will use the analysis log from the previous pass to help it encode the video with a consistent quality but still targeting the bitrate you have specified.

The encoder will record an analysis of this nth pass with respect to the decisions it makes based on the previous analysis from the log file. This lets you feeds the analysis log from one nth pass into successive nth passes and refines the encoding process toward the optimal quality level.



Save AVI 2.0 File

Save in: Desktop

My Computer
My Documents
My Network Places

File name: MyFirstMultipass

Save as type: Audio-Video Interleave (*.avi)

☐ Don't run this job now; add it to job control so I can run it in batch mode.

4. Save the AVI file using the same file name as you used for the 1st pass. It is normal practice in Multipass encoding to overwrite the output from the previous pass every time you save.

After completing your nth pass encoding, play the AVI file to see the output.

5. Without changing any settings try saving the AVI file one more time, again choosing to overwrite the previous file. The encoder will use the log file we updated in the last nth pass to create an even higher quality video.

Although you might be tempted to continue running nth pass after nth pass there is of course a limit on the quality attainable at any given bitrate. Typically 98-99% of the optimal quality will be realized after 2 passes (1st, nth).

Notes on audio

DivX is a video codec. As such it does not handle audio in any way and we will not cover the very broad topic of audio in detail. Most likely, you will want audio with your DivX video, so we will briefly cover a few important points.

1. There are many audio formats and codecs that can be used in combination with an AVI container, each with different properties and features. DivX AVI files generally use Constant Bitrate MPEG1-Layer 3 Audio, or *CBR MP3* for short. CBR MP3 is the recommended audio format for DivX video and has a number of benefits:

   ►MP3 audio is supported natively by most operating systems

   ►MP3 audio is supported by DivX Certified hardware players

   ►CBR MP3 audio is least likely to introduce de-synchronization between audio and video.

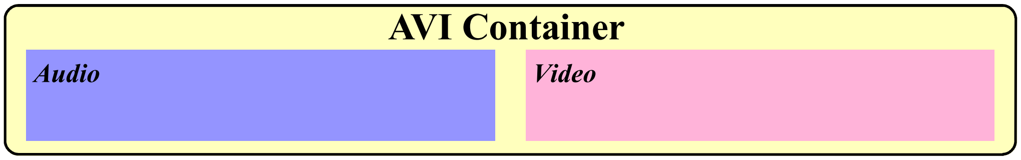
   The MP3 codec distributed with Windows is the *Fraunhofer IIS MPEG Layer-3 Codec (advanced)*. This codec is capable of decoding high-bitrate MP3 format audio but is limited to low-bitrate encoding.

   VirtualDub works only with audio codecs designed for Microsoft's *Audio Compression Manager*, or *ACM*, and thus you will need to install an ACM MP3 encoder.

   As a rough guide: 128 kbps is generally considered *close to* CD quality when encoding to CBR MP3, but bitrates 112 kbps and up are generally acceptable for stereo sound. Halve the bitrates for mono sound.

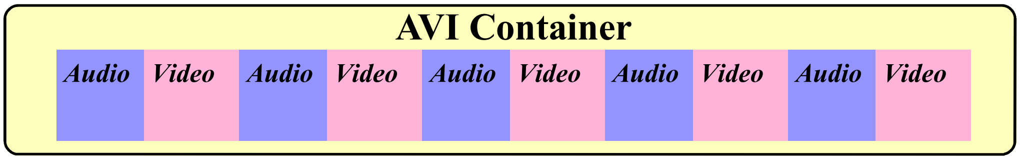
2. Audio contained in an AVI file must be correctly interleaved for stable playback performance—particularly when content is to be stored on optical media (such as CD-R or DVD-R), or other media with high seek times.

Consider this AVI container with one video and one audio stream:

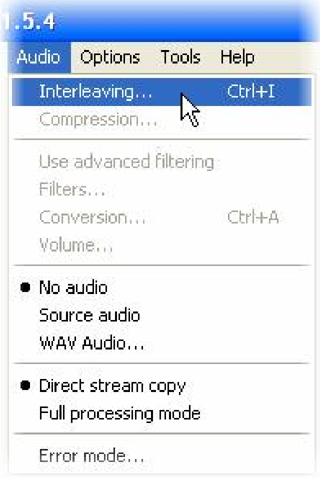


This represents the worst possible situation with regards to interleaving. During playback the system will need to seek back and forth within the file continuously in order to load the audio associated with the video as time progresses. If the viewer were to jump to a specific point in the video it might be hard for the media player to quickly locate the corresponding point in the audio stream, causing an undesirably high seek recovery time.

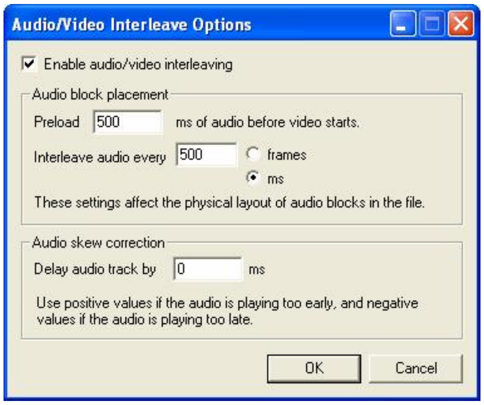
Now consider the corresponding correctly interleaved file:



Here audio chunks are interleaved within the file so they fall closely alongside the related sequence of video. As playback progresses seeking within the file is minimized, and in fact with appropriate buffering as provided by most devices seeking will not even take place. This leads to smoother playback performance. Because audio chunks are stored alongside the corresponding video chunks if a viewer skips to a particular point in the video the media player will likely locate the associated audio and resume playback more promptly.



Using VirtualDub, you can access the *Interleaving* options from the *Audio* menu.


Audio/Video Interleave Options

☑ Enable audio/video interleaving

Audio block placement

Preload 500 ms of audio before video starts.

Interleave audio every 500 ○ frames ● ms

These settings affect the physical layout of audio blocks in the file.

Audio skew correction

Delay audio track by 0 ms

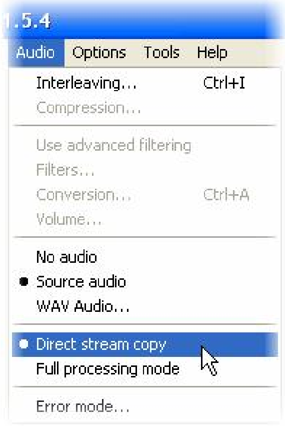
Use positive values if the audio is playing too early, and negative values if the audio is playing too late.

Ensure "*Enable audio/video interleaving*" is enabled. The recommended audio preload is the default 500 ms. The recommended audio interleave is every 1 frames.

Note that the interleave options also present a method of adjusting audio/ video sync by adjusting the "*Audio skew correction*" value, either positively or negatively in milliseconds.

For example: If the audio was running two seconds behind the video a value of –2000 ms would correct for the delay. Conversely if the audio was running one and a half seconds ahead of the video a value of 1500 ms would be required.

3. VirtualDub contains two audio processing modes, "*Direct stream copy*" and "*Full processing mode*".



In *direct stream copy* mode no processing (other than interleaving) is performed on the audio stream. If you wanted to manipulate only the AVI file's video stream, configure the audio mode as *Direct stream copy* in conjunction with "*Source audio*". When you save the new AVI file, the original audio stream is copied from the source.

In *Full processing mode* the given audio stream is decompressed and fully processed when saving, including the application of any filters or compressors you have selected.

Both *Direct stream copy* and *Full processing mode* have exactly the same meaning when applied to the video stream as opposed to the audio stream.

Tip: Using the *Audio skew correction* (see note 2) in combination with *Direct Stream Copy* mode for both audio and video streams allows you to correct the audio/video sync of any pre-existing AVI file without requiring recompression of either stream.

4. You can save a lot of time when performing Multipass encoding if you enable audio processing only during the last pass you intend to save. It is wasteful to process audio on every pass because the AVI file, including any audio track, is overwritten each time.