

Chapter 9b - Video Filters

This chapter is broken into two parts. Part A covers the Blur and Adaptive Noise Reduction Filter. Part B covers Deinterlace, Gamma, and Talking Heads Filter.

Gamma Adjustment

You may adjust the brightness of your image with the Gamma option in the Processing subsection of the Advanced settings. Adjusting the gamma of your image modifies the gray values in a non-linear fashion while leaving the black and white values unmodified.

Gamma adjustment is useful for lightening movies to compensate for the darker monitors of Windows machines. The number you type in to the Gamma box changes the gamma curve of the final image - numbers greater than 1 make the image lighter, numbers less than 1 make it darker. Generally, 1.2 - 1.5 will compensate for a normal PC monitor. Make sure to check that the result is still acceptable for your Macintosh platform as well.

NOTE: Gamma adjustment changes the actual brightness of each pixel and cannot be changed later. QuickTime 2.1 or earlier does not allow for dynamic gamma changing - there is no way to tell QuickTime to play the same movie lighter on a PC and darker on a Macintosh.

Cross-Platform Issues: If you are authoring a cross-platform CD-ROM, and don't want to have different versions of the movies for the PC and Mac, you need to select a gamma setting that looks acceptable on both machines. Usually, this means your Mac movies end up looking a little light, and your PC movies look a little dark. However, this is often better than the alternative of your Mac movies looking perfect and the PC movies looking significantly too dark.

A better, but more complicated solution exists if your movies will be played back from within

your own application (Director, etc.). Your application can, at startup, adjust the monitor's gamma to compensate for the platform being used. For example, there is a Director XCMD for changing the gamma of the monitor. Everything on the screen, including your movies, will then be shown at the gamma to which you have set the monitor. Unfortunately, this solution does not work if you aren't controlling the application that plays the movies.

Hopefully there will be a better solution to this cross-platform issue with future releases of QuickTime.

Deinterlace

If you are capturing full screen at 60 fields per second you may need to deinterlace your image to remove the video's interlacing. If you are capturing half screen video, or your hardware only captures at 30 fields per second, you normally won't need to deinterlace the image.

What is Interlacing? Interlacing is an artifact that arises from the fact that one video frame consists of two super-imposed images, each with only half of the lines drawn, and the other half of the lines black. Every 1/60th of a second, the television redraws the alternating set of lines. Our eyes put the alternating images together, so we don't notice the effect while watching TV.

Interlacing was originally done so that early televisions wouldn't "flicker" (they had a hard time keeping up with redrawing the whole screen fast enough). When most full-screen capture cards translate the analog 60 field per second interlaced video signal into a 30 frame per second non-interlaced signal, they simply combine ("interleave") the even and odd fields to create a single image for each frame.

Why is it a Problem?

The problem arises from the fact that the two fields that make one video frame have slight differences between them because they were taken 1/60th of a second apart. Areas that have a large amount of movement often become separated into alternating lines. This is effectively a motion blur, except that the even and odd lines are apparent. Interlacing artifacts look strange on a computer monitor, and they hinder compression, so you normally should remove them.

Deinterlacing Options

Movie Cleaner Pro gives you three different methods of deinterlacing your video:

Even: The "Even" option removes every even line of the original source, and interpolates the remaining odd lines to create new even lines.

Odd: Not surprisingly, the "Odd" option removes every odd line of the original source, and interpolates new ones from the even lines. In every other way it is identical to "Even."

Blend: The "Blend" option blurs together the odd and even fields to produce a smooth, combined field. This is very useful to preserve the interlacing "motion blur" effect. Fast motion will appear smoother with the "Blend" option, but not as sharp as with a "Even" or "Odd" option. "Blend" is also the best way to deal with content that was shot on film and then translated to video - see the section below for more details.

When to use blend vs. Odd or Even

Video Source: If your source was shot on video, and is relatively static, you generally should use "Even" or "Odd", as this gives you a sharper image. If your video has lots of fast motion, the "Blend" option may be more appropriate. You should experiment to find the best setting.

Film Source: If your source was originally shot on film, and then translated to video, you should use "Blend" to minimize the "Telecine frames". Since film is 24 fps and video is 30 fps, 6 extra frames were added per second to make the final video a full 30 fps. These new frames are usually created by a method called "Telecine", which combines two adjacent frames together to make a new frame that is a combination of the two.

In video, this new frame has strong interlace lines in areas of rapid movement. The effect is similar to normal interlacing, only much more pronounced. On a television screen this is not noticeable, but in a desktop video, this telecine frame looks strange, and should be removed. "Blend" blurs the interlace lines to create a smooth blurred image that looks acceptable in the final movie. Using a "Odd" or "Even" option will create duplicate frames, because the telecine frame is half of the previous and half of the next frame - removing half of it makes the telecine frame all of the previous or next frame, so you get two identical frames in a row.

Video "Stutter": If you use "Odd" or "Even" and get a slight "stutter" in the video, try the "Blend" option to see if it fixes this frame duplication. You can double-check to see if you have frame duplication by stepping through the video one frame at a time to look for identical frames.

NOTE: Due to some math tricks, "Accurate" scaling is faster with the "Even" or "Odd" options than with the "Blend" option.

"Talking Heads" Filter

How does it work?

The "Talking Heads" filter decreases the amount of information which must be saved for each frame of video by keeping defined areas completely static. It allows you to specify which parts of the image do not need to change from one frame to another, and eliminates the duplication of that information. For example, if your movie contained an image of a newscaster against a static background, there would be no need to re-save the data for the background in the frames where the information did not change. The "Talking Heads" filter cuts down on the final size of your compressed movie and/or improves the quality of the more "important" parts of the video image by removing this redundant information.

The zone you define with the "Talking Heads" filter never updates during the movie - this area will stay the same throughout the entire movie.

Why use it?

A common question about the "Talking Heads" filter is since it is intended to be used on static areas, why bother if the area wasn't changing in the first place? The answer is that even static parts of the video are actually changing to some degree due to video noise. Depending on how noisy the signal is, this updating of supposedly "unchanging" areas can be very significant. The "Talking Heads" filter makes defined areas completely static, which greatly improves the codec's ability to compress the overall image.

Mask Image: To use the filter, you must create a black and white mask image. It is recommended that you do this in a dedicated image editing program. To make sure the mask lines up with the movie, copy a sample frame from the movie and paste it into a new file in your image software. If your program supports layers, like Adobe Photoshop, simply create a new layer and paint with black the areas that you don't want to change. Save the mask layer only, as a PICT file, and open it from within the "Talking Heads" part of the Video section.

For this image

Make this Mask

(Both overlaid for reference)

"Talking Heads" Tips

Don't make a mask that is too close to the changing subject - if the subject moves into the static zone, they will be "cut off". Also, if you create a feathered edge between the zones the transition will be less noticeable than if the mask has a hard edge.

Movie Cleaner will open any PICT file (color, greyscale, 1-bit) but will reduce it to 1-bit with a 50% threshold. If you set a blur in the Processing sub-section of the Video section, the sharp edges and dithering of the mask will be minimized.

Check out Appendix D - Tips and Tricks for more ideas on how to use the "Talking Heads" filter.

NOTE: Make sure to turn off the "Compare Compressed Frames" option in the Movie section of the Advanced Settings to take full advantage of the "Talking Heads" filter.