

# How TFG Transfer converts film to video:

When commercial broadcast B&W television was invented, the frame rate of the scan was 30 fps or *frames per second*. Each frame made up of 2 fields, an odd and an even. With the introduction of color television, the frame rate had to be adjusted ever so slightly to allow for the intermixing of the 3.58mhz (megacycle) color subcarrier. To do that, the frame rate became 29.97 fps. A difference of one tenth of one percent or  $-.1\%$ .

Therefore, when a motion picture film, shot at 24fps, is transferred to video on an NTSC telecine machine the film is actually running at 23.976 fps. Again, a difference of  $-.1\%$ .

**Example: Film running time is 10 mins  $\times$   $-.1\%$  = 9.99 mins.**

To get the 23.976 frames to fit correctly into the video rate, some frames need to be duplicated during the transfer process. This is known as 3/2 pulldown. This graphic will show you what is taking place.

**3:2 pull-down for interlaced display :**



When you import the film transfer file into your NLE, the project will say "29.97 fps" not 23.976 fps. This should not be of any concern as the length of the film remains the same except for that loss of  $-.1\%$ . Now, you do have the option, in a program like FCP, to do what is called a reverse telecine. This process will remove those duplicate frames created during the film transfer and make your project 23.976 fps. It will not change the length of the film, however. That will remain as it was prior.

If you have recorded lip sync sound on a recorder like a Nagra, you must also slow that file down the same  $-.1\%$  degree or you may notice a loss of sync on longer takes. This can be done easily in Premiere or FCP or most any audio utility.

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