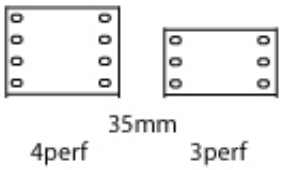
Cutting 35mm 3 perf

This page explains what 35mm 3 perf is and suggests a work around for cutting 3 perf on a regular 35 mm 4 perf synchronizer with **DigiConform**. **DigiConform** works just as well with 3 perf as with 4 perf.

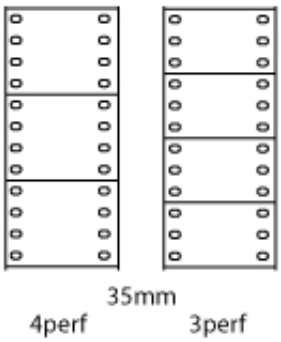
The Format

3 perf uses the very same negative stock as 4 perf. In the camera the film is advanced by only 3 perfs instead of 4 for each frame. That gives you a frame that has 3 perfs instead 4:

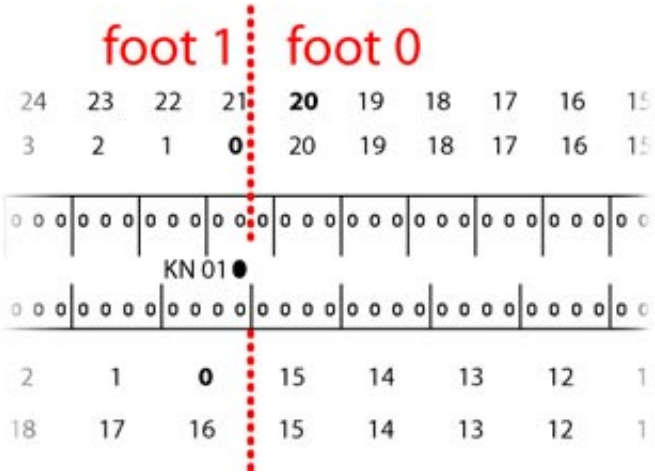


The advantage of 3 perf is that you save one perf per frame, or 25 % overall, in film stock and processing cost. The frame size accommodates the 16:9 aspect ratio quite nicely.

The challenge for negative cutters is that the familiar math behind 35mm 4 perf doesn't work any more. In comparison to 4 perf, the frame line becomes a moving target, because after the first frame 3 perf is 1 perf shorter, 2 perfs after the second, 3 perfs after the third frame, and only after the 4th frame the frame lines match up again between 3 perf and 4 perf. This pattern repeats from there on.



That's bad enough, but it gets worse. Take a look at what happens one foot later:



Note that in all illustrations on this topic the head of the roll is to your right, the tail to your left.

In 4 perf exactly 16 frames have gone by, but in 3 perf it is 21 frames and a little bit. Really, it is 21 frames plus one perf. Look at the math: 4 perf has 16 x 4 perfs per foot, totaling 64 perfs per foot. 64 perfs divided by 3 perfs yields 21 whole frames, but leaves 1 unused perf for each foot. This one perf accumulates to 2 unused perfs after the second foot, and then to 3 perfs, or an entire 3 perf frame, after the third foot.

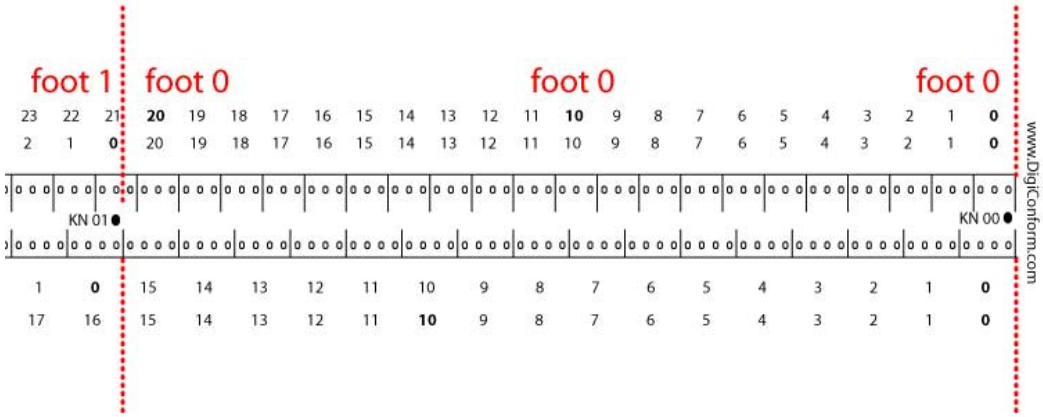
	1 ft	2 ft	3 ft
perf count	64 perfs	128 perfs	192 perfs
4 perf	64 / 4 = 16 fr	128 / 4 = 32 fr	192 / 4 = 48 fr
3 perf	64 / 3 = 21.3333 fr	128 / 3 = 42.6666 fr	192 / 3 = 64 fr
Discrepancy	1 perf	2 perfs	0 perfs
3 perf frames in this foot	**21**	**21**	**22**

This pattern of 21, 21 and 22 frames is commonly referred to as 'short-short-long'.

The accumulation of the one single perf per each foot into one additional frame in every third foot is what makes 3 perf math confusing.

There is no real standard for dealing with this, but most measurements that you will see on cut lists and such will follow a pattern of 2 short feet alternating with 1 long foot. This means the first foot has 21 frames, ignoring the 1 left-over perf, the second foot has 21 perfs again, ignoring the 2 leftover perfs, and the third foot has 22 frames even. At the end of the third foot the 3 perf frame line lines up perfectly with the 4 perf frame line.

Click the image below to get a detailed view.

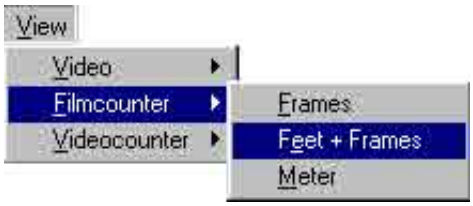


Note that the little dot at the end of the keynumber moves within the 3 perf frame from foot to foot. In this case it goes from the first to the second and the to the third perf within the frame. In Avid cut lists the position of the dot is indicated like this: **KZ 51 2484-7834+19°2**. In this case, the **°2** indicates the dot should fall on the second perf. Rumor has it that this is something that not every list reflects accurately. This is largely due to problems at telecine of the negative before editing even begins.

Frame Counts

The gold standard for dealing with 3 perf measurements is an absolute frame count. Instead of **95+19** you would see **2045** in your cut list. This type of list, however, requires that you use a synchronizer with a frame counter instead of the usual footage counter. Those synchronizers are available from Hollywood Film Company, but they are not exactly cheap.

Avid lists can both be made with frame counts or footages. **DigiConform** can toggle the footage display between absolute frame count and feet + frames at any time in the View Menu.



You can also just right-click into the Filmcounter in the lower-left of the screen.

Work-around

If you don't have a 3 perf synchronizer available on a 3 perf project, you may consider the work-around described below that allows you to use your standard 4 perf synchronizer. Be aware though, that this is somewhat uncharted territory, so proceed

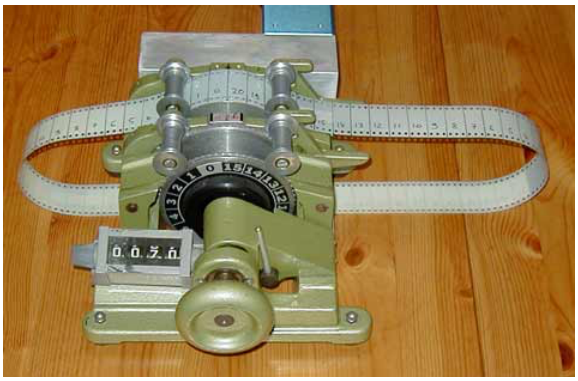
with utter caution.

There are 3 main problems with your 4 perf synchronizer on a 3 perf show:

- The lengths are measured in feet, not in frames.
- The frame lines don't match.
- The frame offset (e.g. **+12**) is not usable on your 4 perf synchronizer.

The solution to the first problem is to ask for a cut list in feet + frames instead of an absolute frame count.

The other two problems can be addressed with a loop of leader that you roll in a spare gang on your synchronizer.

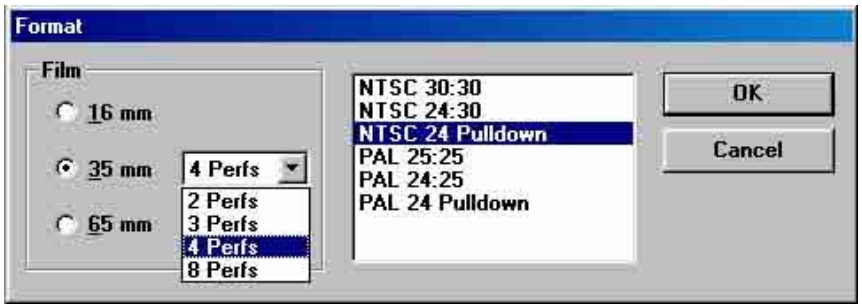


Here is how you make the loop:

- Measure exactly 3 feet of leader. This is exactly 192 perfs, or 48 frames in 4 perf and 64 frames in 3 perf.
- Mark the 3 perf frame line. Draw a line every 3 perfs.
- Number each 3 perf frame with its number within the foot. Go from 0 to 20, then from 0 to 20 for the two first, short feet. Finally, go from 0 to 21 for the third, long foot.
- Join the ends - Done!

Mount the loop in your synchronizer and align frame 0 of the first, short foot with 0+00 on the regular 4 perf count. Roll the loop and make sure that the loop repeats exactly every 3 feet. If it doesn't, the length is not correct, and your cuts will be off.

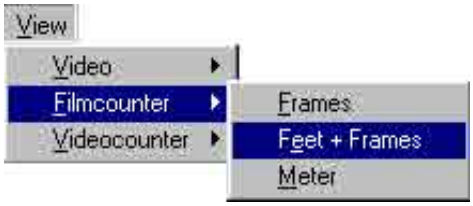
Open your captured video as a 3 perf project.



Leave the synchronizer settings exactly where you had them for 4 perf - it is still the

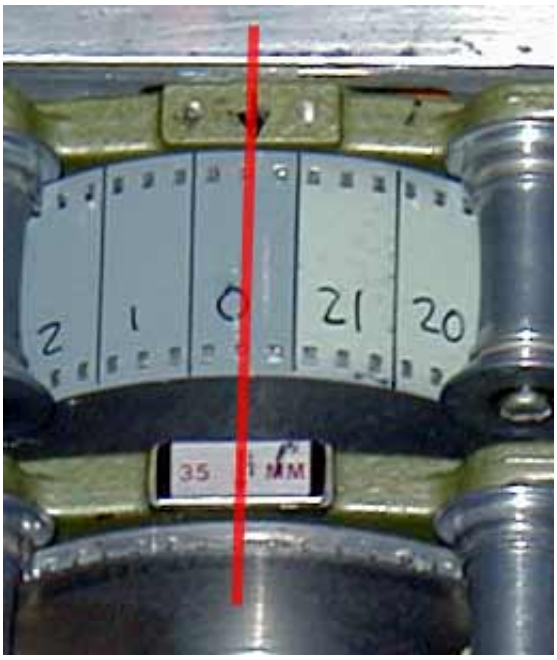
same synchronizer.

Set the **DigiConform** footage counter in the lower left to feet+frames. Use the View menu, or right-click in the counter.

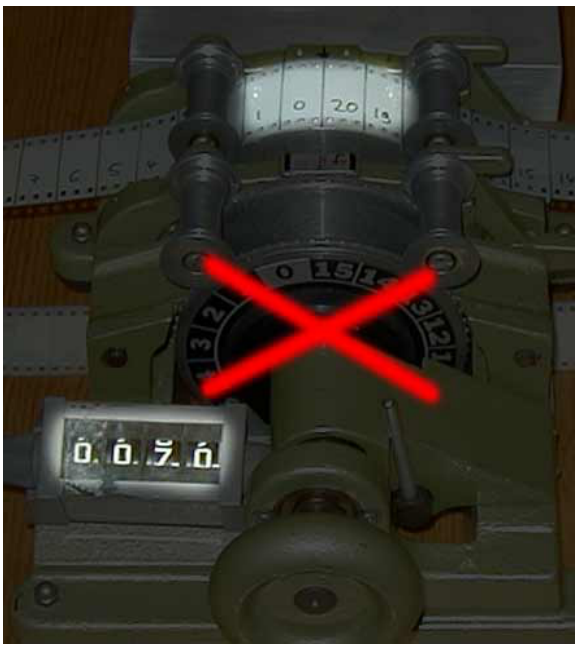


Then proceed just as you would in a 4 perf project and select your reference and redundant frames.

When you select the reference frame, make sure you center the 3 perf frame exactly around the top of the synchronizer, like this:



Read the footage from your 4 perf synchronizer, but look at the frame numbers and frame lines on the loop.



Before you start using this work-around you should double and triple-check the list's footages against the captured video. Also, you should make sure that you don't confuse the frame lines.

It is highly recommended that you use a list in feet+frames. However, if you want to blindly trust that the synchronizer is always in exact sync with **DigiConform** you can switch the footage display in the lower left to frames only. In that case you can also

work with a frame count list.