

Fields and Interlacing

What is an Interlaced Image?

NTSC and PAL video images (US and European standards) are made up of two (2) interlaced fields. This interlacing was necessary in the 1950s to make it possible for the television sets of the day to refresh the screen 30 (NTSC) or 25 (PAL) times per second without there being a noticeable strobing on the monitors. Breaking the image into an odd and even field, drawing one field first, then drawing the other, was the solution to this strobing, but because of backwards compatibility, broadcast images are to this day still limited by these interlaced signals.

Motion Blur and Interlacing

When shooting material with a video camera, most cameras record the video signal as a series of fields (60 per second for NTSC, 50 for PAL). (Note: some of the new super suave DV digital video camcorders and other higher end cameras are capable of "progressive" scanning, which records 30 frames without interlacing but rather by progressing from the top of the image down to the bottom in one pass.) When shooting a static image or one with little movement, the difference between each field recorded is negligible, as in the time between the first field being captured and written to the tape, there is not a tremendous amount of change in the image that is captured and written as the second field.

However, when there is movement in the scene or the camera itself is panning or moving, there can be a dramatic difference between each field in the video signal, since each field represents a different moment in time and the image as seen through the lens of the camera is changing in time.



Please note that this field motion blur will only occur when shooting material with a video camera. If the same scene was filmed with a film camera the results would be totally different. Each time the lens opens on a film camera it must stay open long enough to expose the film; during this exposure time, any movement in the scene will lead to that true "motion blur" effect where different areas of the image are exposed to varying degrees. When footage shot with a film camera is transferred to video, this motion blur will simply show up as different information on each field, but none of the field tearing will occur.



Material Originating at 24fps and interlacing

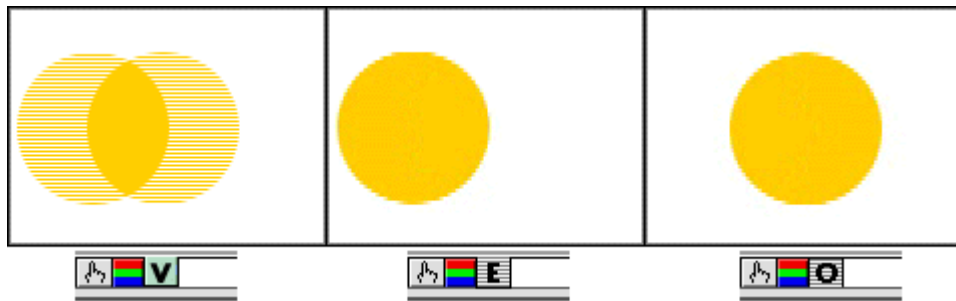
The other interlacing issue that arises in video occurs when transferring material shot on film at 24fps to run properly at 30fps on video. For more on this issue, please refer to the 3:2 Pulldown page.

Working with footage that exhibits field tearing

From the examples above we see that material shot on videotape is particularly problematic for doing effects work, as it is necessary to separate the fields and work on them individually in order to be able to isolate the yellow circle at any given time. Adobe After Effects™ is excellent at separating these fields from one another, blending them together, or rendering motion as field-based data to compensate for field issues. However, to paint on a frame or touch up a matte, the field issues are very different.

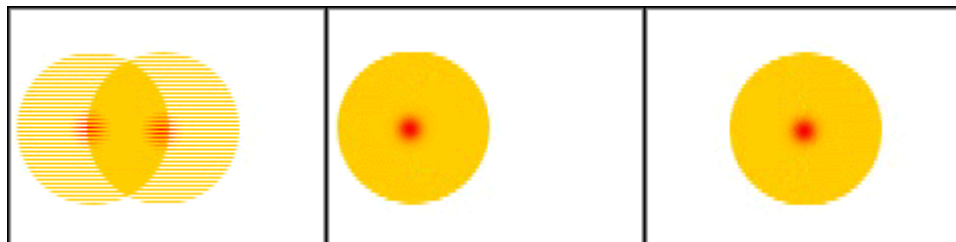
Using Commotion to paint on fields

Commotion is highly effective at painting on video images that exhibit interlacing fields. Commotion has the ability to isolate the even or odd field in an image and paint exclusively on that field. In this way, you can step through a clip's fields, paint on them, play the footage back as fields, or evaluate the interlaced image. In the example of the yellow circle, the video footage looks very torn and interlaced as a frame. If we wanted to paint a red dot in the middle of the yellow circle, it would be impossible to paint directly on the frame as the circle is in a different place on every other line of the frame.



In the Commotion clip window there is a toggleable Frame/F1/F2 status indicator that changes your view of the clip to show you the entire frame (both fields together,) or field 1 or 2 individually. As field 1 or 2 individually would only be half-height (there is half as many lines vertically,) Commotion automatically doubles the lines so as to maintain the correct aspect ratio on the screen.

Any painting done while in this field mode will only be recorded on that field. Notice how the red dot painted on field 1 is only recorded on every other line, which you can see when looking at the painted work back in Frame mode.



By working in this manner, Commotion allows you to flexibly switch between a field specific painting mode and a frame mode without having to actually separate the fields through a rendering process. In this way you can paint on frames whenever possible, and only resort to painting on fields when it is necessary (remember, if you are painting on fields you are going to double the number of images you will be painting on to 60 distinct images for NTSC or 50 for PAL).