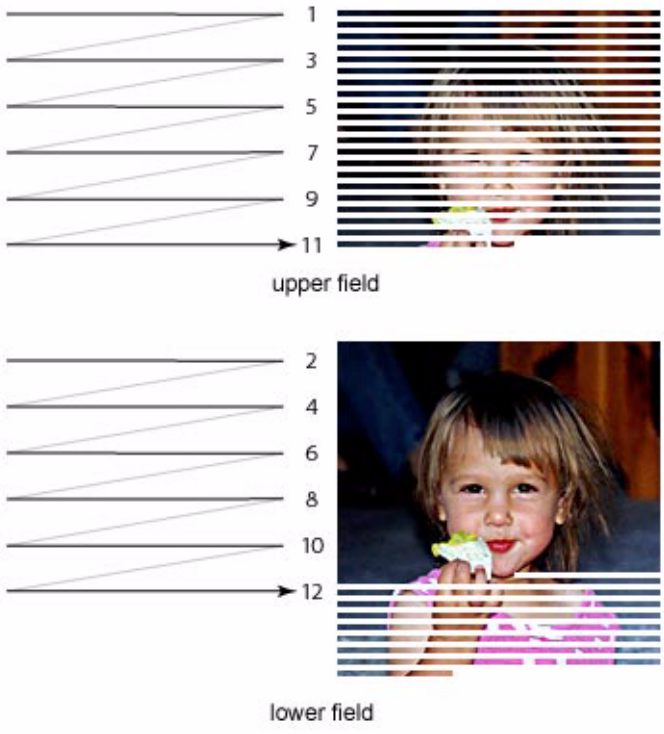
Adobe Premiere Technical Guides

Interlaced and non-interlaced video

Analog or digital video can be classified as interlaced or non-interlaced (progressive scan). Video programs using the NTSC, PAL, and SECAM standards are *interlaced*: Each frame consists of two fields displayed in two passes. Most personal computers display using *progressive scan*, in which all lines in a frame are displayed in one pass from top to bottom before the next frame appears.

In interlaced video, a frame is divided into two *fields*. Each field contains every other horizontal line in the frame. A TV displays the first field of alternating lines over the entire screen, and then displays the second field to fill in the alternating gaps left by the first field. One NTSC video frame, displayed approximately every 1/30th of a second, contains two interlaced fields, displayed approximately every 1/60th of a second each. PAL and SECAM video frames display at 1/25 of a second and contain two interlaced fields displayed 1/50th of a second each. The field that contains the topmost scan line in the frame is called the *upper field*, and the other field is called the *lower field*. When playing back or exporting to interlaced video, make sure the field order you specify matches the receiving system, otherwise motion may appear stuttered, and edges of objects in the frame may break up with a comb-like appearance.



Interlaced video describes a frame with two passes of alternating scan lines.

Progressive-scan vi deo describes a frame with one pass of sequential scan lines.

Television signals are interlaced because of the nature of early televison sets and the nature of human vision. When a series of frames are presented, the frame rate (the time interval between frames) has to be high enough to achieve persistence of vision, a continuous image without noticeable flicker. The United States uses a 60Hz power cycle, but early television sets were only able to display at a 30 fps frame rate. Interlacing two 30 fps fields achieved an effective 60 fps frame rate, which solved the problem of low bandwidth and was high enough to provide adequate persistence of vision. This early solution has made interlacing at 30 fps the US standard. Now that technology can produce higher frames rates, interlacing is still preferred due to its ability to provide persistence of vision at lower bandwidths than progressive scanning.

Note: The European standards PAL and SEACAM use interlacing at 25 fps to achieve n effective 50 fps frame rate because Europe uses a 50Hz power cycle.

By the time computers began using video monitors, the problems with phosphor fading and display rates had been solved, making progressive scan practical for computer monitors. Motion-picture film, while not technically video, is similar to progressive scan because it displays an entire frame at once.

Interlacing is a characteristic of capturing and displaying clips, not a structural component of file formats or media. For example, it is possible to play back a digitized NTSC movie (interlaced) on a Mac OS or Windows monitor (progressive scan), or display a scanned 35mm film frame (progressive scan) on an NTSC video monitor (interlaced). However, progressive-scan video provides better final picture quality when editing with filters and effects that affect motion, including rotating a frame or compositing live-action video with special effects. In addition, thin lines and small text are more likely to flicker on an interlaced display. When you diagnose problems related to interlaced fields, view the clips on an interlaced television display, because diagnosing field problems on a progressive-scan monitor is unreliable.

If you plan to slow down or hold a frame in a clip, you may want to prevent flickering or visual stuttering by *deinterlacing* its frames, which converts the interlaced fields into complete frames. In the opposite case, if you're using progressive-scan source clips (such as motion-picture film or computer animation) in a program intended for an interlaced medium such as television, you can separate frames into fields using a process known as *field rendering* so that motion and effects are properly interlaced. For information about deinterlacing, see the following topic in the Adobe® Premiere® 6.0 online Help: Editing Video > Editing clips > Freezing a video frame. Premiere can play back or export video as interlaced fields while maintaining quality. For information about modifying, playing back, or exporting interlaced fields, see the following topics in online Help:

- Editing Video > Editing clips > Processing interlaced video fields
- Working with Projects > Specifying project settings > Keyframe and rendering options
- Producing Final Video > Exporting a video