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Innovations in Film and Video Conversion Approaches

Converters are needed because NTSC uses 30 frames (pictures) per second and PAL uses 25 frames per second. First video standard converter was the Analog one. That was a special professional video camera that used a video camera tube pointed at a cathode ray tube video monitor. Both the camera and the monitor could be switched to either NTSC or PAL, to convert both ways.

In converting the film frame rate of 24 per-second to video's 30 frame per-second rate there is a slightmaths problem: there is no quick and easy way to convert 24 into 30. Every second film frame that is scanned consists of an extra video field. In other words, four film frames are converted into five TV frames by double-scanning a field every-other film frame.

This conversion process is referred to as the NTSC 3/2 pull down because of the three-field, two-field sequence required to convert the 24 fps film rate to 30 fps for video. This high-speed "double-take" also creates a one of the artifacts that appears to be almost subliminally associated with film on TV.

It should be noted that some LCD HDTVs are capable of displaying 120 frames per-second. Since 120 is a multiple of both 24 and 30, films with 24 fps can be played back as smoothly as they were filmed. This is important to for new technologies such as Blu-ray Discs™.

The presence of different broadcast TV standards means that the exchange of international programming is made more difficult. Videotapes made in the U.S. cannot be played in England, for example, without going through electronic standards conversion.

This used to be a major problem. With today's digital technology, the process of converting from one international video standard to another is rather simple (assuming you can afford the cost of professional equipment needed).

Video standards conversion is not unlike the NTSC 3/2 pull down used for film conversion. It is based on changing the 60-fields per second (NTSC system) to the 50 fields per second (PAL and SECAM systems) and vice-versa. The solution is either to repeat or skip fields at regular intervals.

Today, there are multi-standard TV sets and VCRs available that switch from one standard to another.