

Electronic **EVIDENCE**

JORDAN S. GRUBER

**Cumulative Supplement
by The Publisher's Editorial Staff**

INSERT this cumulative supplement into pocket located on the
inside cover of your volume.

Issued August 2001



§ 11:22 Basic Video Editing Procedure

Conventional post-production or "out-of-camera" (as opposed to "in-camera")⁷⁸ video editing primarily consists of imposing order on the sequence of scenes or shots already recorded. Thus, "[v]ideotape editing is based on selectively recording material from a source videotape to a destination videotape called the master tape."⁷⁹ This is done by rerecording or "dubbing" sequences from the actual, original videotape as recorded, known as the "camera master," "field tape," "field original," or simply "source," onto another videotape known as the "edit master," "master tape," or simply "the master."

The equipment needed for basic editing includes: (1) a "source" videotape deck, also known as a "VTP" (Videotape Transport Player), a "feeder," or "playback" deck;⁸⁰ (2) an "edit" deck, also called a "recorder," a "record VTR," or simply "VTR" (videotape transport recorder)⁸¹ that is edit controllable; (3) a television monitor (in some cases several); (4) an edit controller that can be a separate device or can be built-in to either the VTP or VTR; and (5) the necessary connection cables. Video segments and their attendant audio components are first reviewed and using timecode or control track, their locations are exactly noted. They are then copied in the desired order onto the edit Mck's videotape.⁸²

Basic editing equipment can be augmented with increasingly sophisticated, specifically designed editing decks, controllers, audio mixers, synchronizers, monitors, electronic color enhances, character generators, special effects generators, post-production switchers, and numerous audio and video devices such as audio cassettes, CD players, turntables, still stores, and digital disc

78. See § 11:2 as to editing generally.

79. T. Ohanian, *Digital Nonlinear Editing 17* (Focal Press, Butterworth-Heinemann Ltd., Stoneham, MA, 1993).

80. The playback deck can also be a camcorder, if it is edit-control capable. The picture that results from an edit using a camcorder as the playback deck, however, will be unstable unless an external timebase corrector or frame synchronizer is used.

81. A "VCR" should not be confused with a "VTR." A VCR is specifically a videocassette recorder, and is thereby distinguished from a reel-to-reel machine.

82. For a clear description of the mechanics of the actual editing process, see Heller, *Day-In-The-Life Video*, 39 *Am Jur Trials* 324-26 (1990).

recorders. This sophisticated equipment enables the editor to precisely and automatically control, down to the level of the individual frame, the starting and stopping points of sequences that are to be recorded, both as they come off the source tape and as they are rerecorded onto the "edit master." It also enables "seamless" editing, that is, editing that is usually not detectable to the untrained eye since it produces a finished program with few or no distortions, glitches, or jarring cuts.

The two primary forms of videotape editing systems are "cutonly systems" and "A/B roll systems." In a cuts-only system, there is a source machine (which can be a player only) and a record machine. The only possible transition that can be made is a straight "cut," that is, an abrupt switch from one video segment to another. In an A/B roll system there are at least three machines: Two source machines and one record machine. Such three-machine systems were developed in the 1980s by television news "magazines" to increase the speed of program production. A/B roll systems, which allow for transitions such as rolls and wipes, use a video switcher, timecode (usually SMPTE timecode), and an edit controller. The edit controller, which is usually a computer, coordinates the various playback and record machines, keeps track of timecode, and creates an edit decision list.⁸³

Currently, most video editing systems are "linear." With linear systems, once a segment has been edited by rerecording source material onto a master tape, it is not possible to reorder, delete, or insert sequences without starting over. Thus, linear editing systems have "preview" functions that allow edits to be rehearsed without actually rerecording or dubbing onto the "edit master."

The editing process in a linear system can be summed up as follows:

The editor chooses a point on the master tape where the next edit will occur. This is marked as an in point, [known as R-in] and the timecode for this point is entered into the edit controller. Then the source machine is played, and another in point [known as P-in] is chosen for the new material to be copied to the master

83. T. Ohanian, *Digital Nonlinear* Heinemann Ltd., Stoneham, MA, *Editing* 17 (Focal Press, Butterworth- 1993).

tape. Next, the editor can either directly edit the material onto the master, or more likely, the preview function will be used.⁸⁴

Whether working on a cuts-only system or an *A/B* roll system, the editor hits the preview button on the edit controller, and the machines rewind to a preroll point (usually three to five seconds before the edit point) and then roll forward to display the edit. Preroll enables all devices to gain full operating speed before recording.⁸⁵ Since the timecode is a perfect reference for each frame, previews can be done over and over with the same result. There will be no change regardless of how many times the preview button is hit.⁸⁶

An important distinction in the editing domain is the difference between "online editing" and "offline editing." In offline editing, what is essentially a "practice edit" is made using relatively inexpensive video equipment. The results of the relatively low-quality and low-cost editing done in the offline suite can then be used to make decisions, as well as a final list of edits to be made, with respect to the online editing phase. In online editing, typically performed in an online editing suite, much higher quality equipment is used and the finished product is ready for professional use.⁸⁷ A small legal video services provider might use its own in-house equipment for the offline editing state, but would then need to go to a post-production house in order to finish a project. The need to go out-of-house to finish a project has the obvious disadvantages of possible scheduling and delay problems. Additionally, general purpose post-production houses are not set up to service the legal profession and do not have the specific personnel and equipment needed for intensive litigation support.

§ 11:23 Digital Editing, Generally

Digital editing, alteration, and perhaps even the fabrication of

84. *Id.* at 17.

More precisely, one can (1) directly edit the material onto the master; (2) preview the edit; or (3) locate and enter an R-out or P-out and then either preview or edit the material.

85. More precisely, preroll enables all of the devices to be properly synchronized prior to the in point of the edit.

86. Previews will only work in the reliable and predictable manner described if the timecode on the tape is good, and if the VTRs, edit controller, and peripheral equipment are properly set up and in good working order.

87. P. Utz, *Today's Video* 2nd Ed. 442 (prentice Hall, 1992).

video evidence has been made increasingly possible by the enormous advances of the past ten years in computer speed, computer memory capacity, computer software, and electronic imaging.⁸⁸ Before the development of digital systems, it was more difficult to change—specifically, to add to or subtract from—pieces of the individual frames of video. To the extent that such modifications were possible, they were relatively easily detectable.⁸⁹ Thus, while it was possible to rearrange the order of video images, even down to the level of changing the sequence of individual frames, it was not possible to move, change, or alter, the actual picture elements, or "pixels," that constituted the video image. However, once a video segment is digitized through analog-to-digital conversion (or if it is originally recorded in digital form), it is then possible to manipulate the individual pixels that constitute the image in a manner analogous to a painter's control of the individual type, form, size, shape, and color of paint that is applied to a canvas.⁹⁰

An important attribute of digital video editing is its ability to produce further generations of video recordings from a master tape without any generational signal degradation.⁹¹ With conventional analog editing, there is always some degradation of the quality of the signal that is transferred when the waveforms comprising the video signal are rerecorded from a camera master onto an "edit master." That is, there is some loss of signal integrity and the signal-to-noise ratio is lowered.⁹² Therefore, each subsequent generation of a video recording has a lower quality, and eventually the video component becomes unusable. In contrast, with digital videotape (or other noncompressed digital storage systems) there is, at least theoretically, no generational loss because the original signal is not transferred from one tape to another but, instead, with digital technology, each successive recording constitutes a *recreation* of the information on the

88. See generally Chapter 5.

89. See Tomlinson, *One Technological Step Forward and Two Legal Steps Back: Digitalization and Television Newspictures as Evidence and as Libel*, 9 *Loyola Ent. L. J.* 237, 249 (1989).

90. See J. Larish, *Understanding Electronic Photography*, 229 (TAB Books, Inc., 1990).

91. See Tomlinson, *One Technological Step Forward and Two Legal Steps Back: Digitalization and Television Newspictures as Evidence and as Libel*, 9 *Loyola Ent. L. J.* 237, 243 (1989).

92. See *Id.* at 249.

preceding tape, not a copy of it.⁹³ Moreover, as a "recreation," instead of a copy, the digital video recording, whether on a tape or nontape format, can be readily, radically, and perhaps undetectably, altered during the editing process.⁹⁴ Taken together, they represent a shift that is analogous to the shift from typewriters to word processors or accounting ledgers to electronic spreadsheets.⁹⁵

§ 11:24 Digital Falsification, Fabrication, and Detection

Using digital editing technology, individuals have the potential to falsify and even fabricate,⁹⁶ both still video and motion video. With respect to still video images, digital falsification is more of a problem than conventional photographic falsification methods because of the speed with which such editing and manipulation can be done,⁹⁷ the unlimited number of attempts that may be made to achieve the precisely desired effect, the widespread and growing availability of the necessary equipment, and the relative lack of artistic talent (as compared with the physical skill needed to use a knife, airbrush, or other equipment used for conventional tampering) needed to alter an image. It is quite clear that by using current digital technology, still photographs, either of documents or of other materials, can be retouched in scientifically undetectable ways.

With respect to motion video, the processes, technology, and skill necessary to apply digital editing techniques have been pioneered by the motion picture, television, and advertising industries, and are becoming increasingly available to all levels of computer users. There are, of course, several significant differences between modifying a single image and modifying motion video footage. To have a professional substantially alter or "rotoscope" each of the 29.97 frames that make up one second of a

93. See *Id.* at 250.

94. *Id.* These same two attributes, complete signal flexibility and no generational signal degradation, also apply to digital audio editing, as described in Chapter 9.

95. See Nulty, "The New Look Of Photography," *Fortune* (July 1, 1991) pp. 36, 37.

96. See §§ 11:3, 11:6, respectively, for the meanings of "falsify" and "fabricate."

97. See Nulty, "The New Look Of Photography," *Fortune* (July 1, 1991) pp. 36, 37.

video recording can cost as little as \$4,000 per second,⁹⁸ or more than \$1,000 per frame or \$30,000 per second for high-quality, professional work. These figures, however, may drop depending on who is doing the rotoscoping, for what purpose 'it is being done, how quickly the overall technology improves and spreads, and the quality that is desired.

In addition to the expense, it is technically difficult to rotoscope a "pixel perfect" modification if any type of movement or motion has been recorded. In other words, changing one element of an image against a solid, stable background, such as changing the facial features of a person who had stopped to use an automated teller, is much easier than changing the features of a talking face that is set against a background of scenery visible from a moving car. Even the image of a paved parking space can appear to "crawl" or otherwise be "alive" if an automatic zoom lens was used to focus on the motion of a car pulling into that parking space. It is expected, however, that modeling techniques developed in the motion picture and film industries, along with computer algorithms that are capable of generating synthesized motion or filling in, averaging, or otherwise correcting gaps in the density and color of the pixels necessary to make a moving image believable, will continue to improve and will become increasingly practical and available.

Outright fabrication is, of course, more difficult than simple altering or modification. Relatively little equipment or skill would be needed to change the color of a traffic light or the license plate of a car; more equipment and skill would be needed to change a fleeting glimpse of the features of an individual's face, or to change a few words spoken by an individual and the attendant facial muscular movements needed to correspond with those words. Even more equipment and skill would be necessary to have someone give a detailed fabricated speech, or to place someone in a scene where they weren't and make them appear to do something that they didn't do, such as commit a crime.⁹⁹ Though very expensive, the technology to achieve all of these results either presently exist or will soon be available.

98. "Video Vigilantes," Newsweek (July 22, 1991) pp. 42, 45,

99. "Video Vigilantes," Newsweek (July 22, 1991) pp. 42-45,

A related, and relatively simple

method, however, would be to use a double to perform most of the action and then rotoscope the face of the target onto the double's face during any close shots.

Although complete fabrication of a "target" performing actions or speaking based on a limited number of preexisting video images of the target is not yet possible, according to the entertainment industry it may, by the turn of the century, be possible to have movie stars from the 1930s starring with modern actors. The first steps in this direction have already been taken. In the 1994 film "Forrest Gump," the lead character, played by Tom Hanks, was in several scenes shown interacting with various U.S. Presidents and other historical figures long-since deceased. In fact, Hanks was electronically inserted into the scenes.¹

E. PRACTICAL AND LEGAL RAMIFICATIONS OF EDITING

§ 11:25 Effect of Different Types of Editing and Falsification / on Admissibility

It is possible for a litigant to alter a recording without acknowledging the changes made or actions taken to the court or opposing counsel, and for these changes to then have a material impact on the case. Such conduct is, of course, egregiously unethical and constitutes the subversion of justice. If discovered, 'Such editing or falsification will not only usually result in the evidence being barred, but may also bring charges of perjury, forgery, or spoliation of evidence, and can even result in sanctions or disbarment. Thus, the material alteration of potential evidence should be avoided at all times, and if found or suspected it should be disclosed by the party who discovers it as soon as possible.

Material alterations are sometimes unintentional or accidental,² and then freely admitted to the court and opposing counsel. In such E1; case, assuming that the alteration is accidental and is sufficiently explained so that its presence does not affect

1. The mouths of the historical figures were electronically animated to synch up with dialogue spoken by modern voice impersonators. See K. Carmichael, "Lip-Sync Animation," *Camcorder Magazine* 116 (November, 1994).

2. Although it is possible to uninten

tionally or accidentally erase or damage a videotape recording, it is not possible to unintentionally add to a videotape recording (increase its overall length). It is possible, though, to mistakenly record over a previously existing potential item of video evidence. However, these distinctions may not hold in the digital domain.

the reliability and trustworthiness of the evidence, the recording can still be admitted.³ The principal factors are how material the alterations have been, and to what degree the evidence is sufficiently more probative and useful to the jury than it' is prejudicial.

In addition to the widespread use of editing with respect to video depositions and video deposition summaries, specific additions, deletions, or other changes to other types of video recordings may be allowed or even requested by the court. Examples include the elimination of prejudicial, irrelevant, privileged, incompetent, or technically deficient segments; the electronic enhancement of recordings to improve image quality and intelligibility; and the rerecording and rearrangement of recorded materials to improve access and make them more understandable to the finder of fact. If such editing is done in cooperation with opposing counsel and the court, then even if the impact of the editing is substantially material, it will not affect the admissibility of the evidence, although it may affect its weight. In order to ensure admissibility the proponent may wish to notify and reach agreement with opposing counsel and (when appropriate) the court as to the type or types of editing that will be done.

If any changes from surreptitious editing, alteration, or other falsification will not have a material impact on the case, then it will be within the discretion⁴ of the court to allow the evidence to be admitted (assuming the discovery of the clandestine editing) according to the harmless error doctrine. Similarly, it will be within the discretion of an appellate court to refuse to overturn a decision or even grant an appeal based on this fact alone. Nevertheless, because any intentional attempt at falsification is *malum in se*, it will also probably be within the discretion of a court to bar such intentionally falsified evidence and to decide on other appropriate sanctions. As a practical matter, intentional alteration of potential evidence, whether material to a case or not, is looked upon very unfavorably by the vast majority of judges and bar associations.

3. See *Quinones v State* (1980, Tex Crim) 592 SW2d 933, 10 ALR4th 1067, cert den 449 US 893, 66 L Ed 2d 121, 101 S Ct 256, reh den 449 US 1027, 66 L Ed 2d 490, 101 S Ct 600 .

4. Generally speaking, trial judges have very broad discretion regarding all questions as to the admissibility of video recordings. See Chapter 8.

§ 11:26 Addition of Narration or Titles

The general appropriateness and legal effect of adding titles and narration to video evidence have been previously discussed. Narration and titles are not appropriate for most types of video evidence, but used correctly they can add a great deal to the finished "feel" and overall persuasiveness of what has been recorded⁵ without having a negative impacting upon admissibility.

Narration can be added during a video's original recording by using a "narration mike," a small built-in microphone located near the rear of the camcorder and close to the videographer's mouth. Use of the narration mike typically does not prevent other sounds from being recorded; instead, anything spoken by the videographer is recorded along with the ambient sound level. More typically, narration is added subsequent to a videotape's original recording. Narration can replace the existing sound on either or both of the videotape's two audio tracks, or "sound-on-sound" dubbing,⁶ which allows for verbal commentary to be added to existing sound on either one or both of the videotape's two audio tracks, can be done. If there is any doubt as to the intended narration's potential effect on admissibility, it is best to record the narration on a separate audio track so that it can be subsequently removed with relative ease.⁷

Titles can likewise be added either during the original recording process or subsequent to it, and the titles themselves can come from several different sources. The old-fashioned way is to make "title cards" with magic marker or colored paper on poster-board. These "title cards" are either recorded in the sequence desired during the original making of the video recording or they are recorded all at once and then added during the postproduction process. Many camcorders now come with built-in character generators or "titlers," consisting of a miniature keyboard and the ability to store a number of titles in the camcorder's memory. The videographer can then insert these titles between scenes or superimpose them onto what is actually being recorded as it is being recorded. There are also separate stand

5. See Heller, *Day-In-The-Life Video*, 39 Am Jur Trials 280-81 (1990).
7. See Heller, *Day-In-The-Life Video*, 40 Am Jur Trials 279 (1990).

6. See C. Scott, *Photographic Evidence* 2d ed., § 714.5 (West Publishing Company, 1991).

alone character generators that are, in many cases, more convenient to use, and have many more features, than the built-in ones.⁸ Finally, desktop video has greatly expanded the ability to generate high-resolution titles in a wide variety of letter sizes, fonts, colors, etc., along with special effects such as the ability to make titles "roll" down or "scroll" across the screen at variable speeds. High-resolution titles and special effects are expected to become commonplace as camcorder and desktop video technologies continue to evolve.

8. See C. Scott, *Photographic Evidence* 2d ed § 714.5. (West Publishing Company, 1991).