TECH NEWS

A&B Roll Assembly Techniques

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Over the years since videotape recording was invented, highly sophisticated methods of editing have been developed in an effort to make program production on videotape at least as easy to work with as film. A major difficulty with videotape is that the machine playing back a recording must be running, and at exactly the right speed, before coherent picture images will appear on the picture monitors. Professional television program production is normally carried on with 2-in. quadruplex recorders, and two of these machines are needed to make a simple edit. The cost of the recording equipment and associated electronic facilities is so great that time spent by production people making editing decisions must be reduced to a minimum.

In attempts to alleviate these problems, off-line editing methods have been devised, utilizing computer-controlled equipment. Once the original 2-in. quadruplex recordings have been made, the originals are transferred to 3/4-in. video cassettes or some other low cost helical scan format, with the SMPTE time code identifying each frame by numbers inserted into the pictures. Editing decision-making can in this way proceed in a less hectic environment, away from the main video-tape recording centre. Then the editing decisions can be punched into a paper tape in coded form, or recorded on a magnetic (floppy) disc, and used to automatically assemble portions of the original recordings onto the master program tape.

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Film Use in Television Program Post-Production.

In the last two or three years a great deal of this kind of work has been taken over from television broadcasting organizations by independent post-production companies, set up to exploit the videotape medium. As a rule, the people involved in videotape post-production are for the most part television oriented. When portions of a program are on film, it is customary to first transfer the film scenes to videotape and then proceed with program editing and assembly in the usual way, by electronic editing.

Sometimes all of the originals for a program may have been made on film, and all of the film may be transferred to tape as the first step in the assembly of the program, in order to take advantage of available electronic editing and assembly facilities. An over-riding consideration in taking this course may be the ability to put in electronic effects easily and economically. While this may appear at the time to be the obvious way to put the program together, it may turn out in the end to be the most complicated and costly method.

In the July 1978 issue of **SMPTE Journal,** Nicholas Spies of television station WQED, Pittsburgh, Pa., described some of the problems encountered in attempting to produce finished program material (promos for the Carter presidential campaign) on videotape in the manner just mentioned. Not the least of these problems was reconciling the film frame counts (used in making the editing decisions) with the SMPTE time and control code —television frame numbers — recorded on the videotape and used to assemble the finished materials with automated videotape equipment.

Advantages of Editing Films Before Transfer.

A much more attractive and less costly method for assembling film programs on videotape is to do as much as possible of the editing on the film before the transfers to tape are made. To begin with, it is much easier and far less time consuming to remove unwanted takes before transfer, instead of transferring all of the original film footage to tape and then having to run back and forth through all of the transfer recordings looking for a few wanted scenes to be edited into the program master tape.

Film editing offers the advantage that it is so easy to find exactly the right frames where cuts must be made or effects put in, utilizing extremely simple and inexpensive equipment. A flat bed editing table can be

used to cycle the films backwards and forwards at any desired speed while the visual action is observed, down to still frame, on a small rear projection screen.

A common practice when 16mm. reversal film is used for the original photography is to cut and splice the originals on an editing table to make up complete programs. Usually sound is recorded single system on a magnetic stripe on the reversal originals, and a magnetic head reproduces the sound on a small speaker mounted on the editing table.

When negative film is used for the camera originals, it is customary to first make uncorrected prints (rushes) from the originals and then edit this print footage to make up a program of the designed length in the form of a workprint. After editing of the workprint has been completed, footage numbers on the edge of the originals and the workprint can be used to cut and splice (conform) the originals to match the workprint. Then any desired number of timed and color-corrected release prints can be made from the negative master. Alternatively, the edited originals, either reversal and negative, can be transferred to videotape to make up a program master tape.

Usually, sound is recorded on a separate 1/4-in. magnetic tape when negative film is used to make the camera originals. This gives the film editor and program producer much greater scope and flexibility since picture and sound can be cut and spliced separately, while at the same time synchronization is maintained by the simple expedient of the film perforations engaging the teeth in the sprocket wheels on the editing table.

Program Assembly in A&B Film Rolls.

Splicing together original camera films, whether reversals or negatives, to make up complete programs has the disadvantage that only straight cuts between scenes are possible. One quite simple way to get around this problem is to separate alternate scenes where effects such as fades and dissolves are wanted, into two rolls with black leader interspersed between the scenes in the opposite rolls. This technique, known as A&B roll printing, has been used extensively for many years in the motion picture industry. When the prints are being made, the print film is exposed first with the A roll, and then from common start marks, in a second printing operation, with the B roll. To put in fades and dissolves, a printer fitted with a fader shutter is used, actuated by metallic cue dots on the edge of the originals, or controlled by a punched paper tape or by frame counts and a computer.

A&B roll editing of film originals, employed so successfully for so many years in motion picture printing, can be applied also very effectively in assembling programs on videotape. By following this route, all of the decision-making takes place while the film is being edited, and by assembling the film originals in A&B rolls for transfer to videotape, all of the available electronically generated television effects can be added. This can be done either during the transfer of the A&B rolls to tape, or in a subsequent dubbing operation.

Assembling the edited originals in A&B rolls and transferring these rolls to videotape to make up complete programs with optical effects, is simpler, quicker and less costly than making film prints from the A&B rolls and then transferring the finished prints to videotape. Of course, if release prints as well as videotapes are needed for distribution, the edited A&B rolls can be used just as well for both purposes.

Assembling Programs on Videotape from A&B Film Rolls.

Because so much attention has been directed by television production people towards improving videotape editing, and so little has been done to take advantage of film editing techniques, available facilities for film post-production on videotape are still quite primitive, and a good deal of ingenuity and resourcefulness is still needed to accomplish even quite simple assembly operations.

For example, the film projectors in almost all currently available telecine chains are driven by synchronous motors, and slight variations in power line frequency will cause the motors to vary a little in speed over a period of time. If it is the intention to transfer the A&B film rolls, one after the other, onto two separate videotapes, from a telecine projector driven by a synchronous motor, quite likely frame accuracy between the scenes in the two rolls

will be lost when the videotapes are played back, and an attempt is made to integrate the scenes in a master program tape. Fortunately film transports driven from the television synchronizing generator are now becoming available, and many post-production companies are installing these machines.

Of course, both the A&B rolls could be transferred to videotape at the same time, using two telecine chains, with the A roll on one and the B roll on the other, giving two simultaneous video outputs. However, telecine projectors may not run up to speed at the same rate; these machines are not normally equipped to start up and run synchronously, with frame accuracy. To make successful, simultaneous A&B roll transfers, the film projectors shoud be capable of being locked together and started from a single push button. Then transfers could begin from common start marks placed on the film by the editor, say, five seconds ahead of the first picture frame.

Density and Color Corrections.

When film release prints are being made from A&B rolls, it is customary for a film timer to prepare a punched paper tape, or some other device, for controlling the printer and correcting for variations in density and color balance in the originals. There is no comparable method for controlling the operation of telecines in television stations. Although most telecines were designed for automatic operation, it should be possible to disable these controls, so as to enable a video operator to make corrections manually. However, it is simply not possible for an operator to make the necessary corrections on the first frame in a scene. Now equipment is becoming available to make the task of the video operator much easier. In a rehearsal session corrections can be stored in a computer memory and applied automatically when the transfer to tape is being made.

Inserting Electronic Effects.

After the A&B rolls have been transferred to two separate videotapes, effects such as fades and dissolves can be added by playing back the two videotapes into two inputs of a video switcher-mixer. A fade can be produced by slowly moving the A roll attenuator lever from the full-on to the full-off position as the end of a scene approaches, while the B roll attenuator is moved from the full-off to the full-on position as the next scene appears. For a mix or dissolve, the two levers are moved as a unit, fading out the first scene in the A roll as the next scene in the B roll is being faded in. These effects, as well as cuts between the A&B rolls can be put in automatically by computer control, used routinely in videotape post-production.

One could easily visualize an even more sophisticated and far more efficient program assembly method, in which the entire assembly operation on videotape would be accomplished with automatic machine control while the transfers from telecine are being made. A single start button would then initiate the operation, producing a finished program on tape in a continuous machine run.