
TAPE-TO-FILM

BLOW-UP

TAPE-TO-FILM BLOW-UP

As our entertainment technology matures, there are more and more options for showing finished product. Will it be VHS (as long as the format lasts), DVD, broadcast or cable TV, the Internet, or movie theaters? Will your video be treated with a process that makes it look more like film? If you go for a tape-to-film blow up, will it be 16mm or 35mm?

Where it's going to play, and in what format, are decisions that should be made before or in Pre-Production, because once a particular path is taken, it has consequences all along the way, in terms of shooting, editing and especially budget.

This section is about one of those paths, the tape-to-film blow up. If money was no object, most producers would shoot in 35mm. It looks great, and it's still what's projected in movie theaters. But the beauty of tape-to-film is that you've saved an enormous amount of money by shooting in video. It's often the difference between wishing you could make a movie if only you had the money, and actually doing it because with digital filmmaking, it's affordable. Then, when you've finished your movie, you can decide if it's good enough to spend the hunk of cash you'll need for tape-to-film.

We're assuming here that you want to show your finished product in movie theaters, whether they're in festivals (some 16mm, mostly 35mm) or in 35mm at the local movieplex, and you're going for a tape-to-film transfer, or blow up.

There are several methods of tape-to-film transfer, and each has its supporters (and detractors). Plus, new technologies are cropping up. It's a dynamic field, and the filmmaker should take the time to research the various possibilities, meet the people at different companies, and most importantly, go see their work. Ask to screen examples of projects as similar as possible to yours in shooting style, lighting, and camera equipment. Compare prices, service, and whether or not you get to keep your negative and optical print. In short, you're about to spend a lot of money, so become an expert.

Types of tape-to-film transfers

The technology is moving fast, but at present there are three general

types: Kinescopes, Electronic Beam Recorders (EBR), and Film Recorders. Without getting overly technical, here's a brief rundown on each method. For more information, check the list at the end of this section for a few companies that do tape-to-film transfers.

Kinescopes

"Kinnies," as they are often called, are the simplest and oldest of tape-to-film transfer processes. A special film camera records the video off a high quality monitor, and in the process, reduces video's 30 frames per second (fps) to film's 24fps.

A descendant of the "Kinnie" is the Trinescope, which uses the same basic process, but divides the video into three monitors, each with one of the primary colors (red, green, blue, or RGB). This makes for better color on the film than achieved with a Kinescope.

Prices for Kinescopes and Trinescopes are in the \$50 to \$75/minute range for 16mm and around \$190 - \$240/minute for 35mm.

Note: Prices for all types of tape-to-film transfer are currently in flux, so judge all the prices quoted in this chapter with many pinches of salt.

Electronic Beam Recorders (EBR)

The classic EBR method converts the video signal into separate electronic beams, one for each primary color. The beams etch the image onto three rolls of black and white film, which are then printed onto color negative. From there, the lab prints the optical sound track with the color negative and comes up with the final Composite Print. Additional Release Prints for exhibition are made from that print and the sound track.

At present there are two different EBR systems, one transfers the videotape master to a 16mm positive, and then prints to a 35mm color negative. The other (a proprietary process from Sony High Definition) converts the videotape master to High Definition (HD) video, then goes to a 35mm black and white positive for color separation of RGB, and finally to a 35mm color negative.

The two processes can have marked differences in quality, so ask your EBR transfer house which method they use and see some samples for yourself, including other features done with this process.

\$\$\$

Prices for EBR where the tape is transferred first to 16mm are \$150 to \$200/min. for 16mm, and \$400 - \$650/min. for 35mm.

Sony's EBR prices are currently \$720/minute, which includes the 35mm b/w separation, the 35mm color negative and a one light print. The optical sound print is extra at \$74/min.

Film Recorders

These are machines that use computers to individually scan each frame of video. There are at present two methods that use film recorders, a laser system and a cathode ray tube (CRT) system. They are substantially different in technique and how they look on screen. The laser system has a red, green, blue (RGB) laser and writes RGB lines across the film. The CRT method displays each color (RGB) one at a time through a monitor and photographs onto a single frame of color film, somewhat like trinescopes, but of a higher quality.

Some Film Recorder systems run the video through a standards converter to PAL format, and then to 35mm.

When Film Recorders are used, the resolution is significantly increased. This is good if the picture has been lit well and the video is clean from excess gain or other "noise." But it can be bad if the filmmaker was in a rush and video quality was sacrificed in the name of time and money...or for whatever reason. Interestingly, it's hard to prejudge bad video before it goes to film...sometimes it can look ok or even good, sometimes it looks messy. That's why tests prior to shooting are highly recommended.

\$\$\$

Prices for using the Film Recorder system are in the \$200/min. range for 16mm, and the \$400 to \$750/min. range for 35mm, depending on length.

Other Technologies

People are developing new technologies for tape-to-film all the time. One process we know of is from Digital Film Technologies in Los Angeles, 310/399-5947; email: digitalfilm@aol.com. They use a proprietary process which originates on the family of 35mm Kodak Vision Film Stock. with individual attention to the "right" amount of grain for each project. The customer shows up with the DigiBeta master and the DA88's with the sound, synced to the master.

\$\$\$

Digital Film Technologies charges \$350 per minute, which includes one answer print with Dolby SR Sound and ownership of the negative and optical sound track negative.

Now that you have a brief overview of some of the tape-to-film technologies, let's look into some of the considerations we need to keep in mind when planning, shooting, and editing for a tape-to-film blow up.

Aspect ratio

Aspect ratio is the relationship between the width and height of a picture. Standard television pictures are squarish, and have an aspect ratio that is referred to as 1.33:1. That number, just in case you were curious, is achieved by dividing the width of the picture by its height. Standard television has a ratio of 4 units wide by 3 units tall, or 4:3. This ratio is then presented as 1.33:1 because 4 divided by 3 is 1.33. So the aspect ratio of standard TV is 1.33 to 1... expressed as 1.33:1.

Digital televisions, and High Definition (HD) TV's, have a wider screen with a ratio of 16:9 (1.78:1). Most 35mm movies are slightly more rectangular, and have an aspect ratio of 1.85:1.

The point of all this is that once the final format is decided (standard TV, 16:9 TV, 16mm, 35mm etc.), the Producer, Director, and DP have to agree on how to compose the shots to best fit the aspect ratio of the final format.

If shots were composed with 35mm (1.85:1) in mind, and care was taken to stay within Safe Action limits, then only a little bit (less than 5%) of

the top and bottom on the screen will be cropped when the video is transferred to 35mm. If, however, the picture was shot with full screen video in mind (4:3, or 1.33:1), it will either have to fit inside a wider aspect ratio, and there will be black borders on the left and right sides, or the house can enlarge the video frame to fill the movie screen aspect ratio, and crop the image to fit. In the latter scenario, about 26% of the image may be lost. Most DP's and Directors hate to see that much of their hard work get lopped off.

16:9 Cameras

Most DP's recommend shooting in useable 16:9 cameras. We say "useable" because some cameras don't have true 16:9, they use a 4:3 chip with a 16:9 switch, so even though you're shooting in a 16:9 aspect ratio, you're not gaining any resolution, in fact you're losing some. There are, however, true 16:9 professional cameras (probably true 16:9 prosumers soon to come), and anamorphic lenses for 4:3 prosumer cameras, which can be attached to the 4:3 camera to squeeze the image optically into a 16:9 aspect ratio (but the video must be played on a 16:9 monitor or the image will look stretched).

Ask your transfer house if they've had problems with specific cameras. If you have the time and money, test a few of the different cameras you may be considering with blow ups to 35mm.

Letterbox

It is possible to compose shots for 35mm, that is, shoot with a 16:9 camera, and then play that image on a 4:3 monitor, but then the image is "letterboxed." Letterbox puts the 16:9 image in the 4:3 format by placing black bands across the top and bottom. Letterboxing is quite common nowadays, but obviously the 16:9 image is most accurately watched on a monitor that has 16:9 capability.

Choosing the Tape-to-Film Blow-Up company

Before you shoot, check a few prospective companies. Ask to look at films that are comparable to your project. Ask what equipment was used in shooting and what systems were used in the transfer. Compare current prices and service, (ask whether you get your negative and optical print as part of the deal). Get and check out recommendations. Allow plenty of time for this process; there's a lot of money involved, and after

all your hard work, you'll want to sit in a movie theater and know that you did all you could to get the best picture quality possible.

After you've made your decision, get their specs and suggestions for what will work best for your shoot with their particular method. And then do some tests,

Shooting for a Tape-to-Film Blow Up

There are some shooting considerations to keep in mind when you know you'll have a tape-to-film blow up. Most, but not all tape-to-film transfer companies recommend these specifications, so check with your company for details.

- First, use the best camera you can afford, and become thoroughly familiar with it before shooting begins. (This is only a rule of thumb. Some filmmakers may choose a lower end camera for aesthetic reasons.)
- If you're shooting in 16:9, have a 16:9 monitor on the set with an underscan feature.
- Consider using a PAL format. The difference between PAL and NTSC is especially noted in the lower end cameras. PAL is particularly helpful in films with lots of fast action. Many filmmakers prefer PAL format over NTSC because it has more lines of resolution and a shooting rate of 25 fps which is closer to film's 24 fps. The problem with PAL for North American filmmakers has been the scarcity of the gear, not only cameras but decks as well, although the situation is now improving. Most editing systems are switchable between PAL and NTSC. And some transfer companies charge less to transfer PAL-based projects.
- Pay attention to the aspect ratio (see discussion above).
- Use normal electronic shutter speed, not faster or slower.
- Don't up the gain on the camera, it only causes visual "noise." Instead, pump more light into the scene.
- Don't sharpen the detail on the camera, it will only increase the sharp video look on the film.
- Check with the company doing your blow up about how well (or poorly) their process deals with hand-held movement with the camera and fast action in the frame. Ask to see some samples. Do some tests.
- Also check to see how well their process handles computer effects done in editing. Sometimes there are problems.

- Finally, make some tests where you replicate the shooting and lighting conditions and styles that you want to use. It may cost some time and a little money, but you'll get much better results. Talk with the company you're using for the tape-to-film blow up for details. One transfer company expert with whom we spoke said, "The test is the single most important gift filmmakers can give themselves before beginning production. You will have different questions after a test. You may decide to change the camera you're using. Or change the shooting technique, or the lighting. Or shoot in PAL."

Video Treatment Processes

There are several video treatment processes that can make your video look more like film. Probably the best known of these is a company in southern California called FILMLOOK, Inc. (818) 845-9200 (Filmlook.com). Typically, these processes create the motion characteristics and gray scale of film, and can even simulate the grain of film. If the picture has been shot according to their suggested specs, the result will look better, and in many cases it gets pretty close to the look of film. The process is done before you have a color-corrected edited master on video, but good levels scene to scene. Some basic color correction is done as part of the process, but any truly intense color correction or pushing of color limits should be done afterwards. Again, if you are considering this process, get the recommended shooting specs before you shoot.

Be warned, however, that if you plan to do a tape-to-film transfer, do not use your video treated master; you'll get a film with visible video artifacts. Instead, create two masters (preferably on DigiBeta or HD), one for tape-to-film, and another for Filmlook®, or whoever you choose.

\$\$\$

The prices for Filmlook® are charged by the running minute at \$95/min. for the first 30 min., then to \$80/min. thereafter. There is a minimum of 10 minutes.

If you want to save money and if time is not too much of an issue, you might want to do video treatment on a computer using one of several software programs. Adobe After Effects can do it. So can the DigiEffects Cinelook plug in.

Reel breaks

Reel breaks are the places in the movie where the projectionist may have to start the next reel of your film. (Some splice all the reels together and run it through one projector.) Generally, when you screen your movie, you must supply the theater with the separate 35mm reels. A 90 minute feature will usually go onto five 35mm reels.

So how should you deliver your video master to the tape-to-film company for blow up? Ask them before you edit. Some companies want you to make individual video cassettes that match the exact length of each 35mm camera reel, with audio and visual sync points at the top. Others will do that for you, but you'll need to tell them at what time code you want your 35mm reel breaks.

Try to make your reel breaks at a point where somebody stops talking, or even better, at a break in the story where it fades to black or makes a simple transition. Breaks where there's overlapping dialogue, music or sound effects will be more noticeable. The rule of thumb is: reel breaks should be at picture breaks and sound breaks.

Sound

Some tape-to-film companies accept the sound as mixed onto the edited master, while others want it separately, on time code DAT or DA88, properly synced to picture. In any case, the mix should be a "theatrical mix," meaning it is made for use in movie theaters, not on television or home video, which has different requirements. Discuss what kind of mix you need with your Sound Editor or Mixer. (For a discussion of a theatrical mix, please see the Digital Feature Budget, 34-00 Post Production Sound.)

We've heard transfer experts complain that some people don't put a "2 pop" onto all the picture and sound elements for sync. A 2 pop is a countdown to 2 on the picture and a pop or beep sound that lasts 1/24th of a second, 2 seconds before action starts. Mixers in Post know this. but sometimes need reminders.

Conclusion

We think it's fair to say that given a clean, well-lit piece of video, most of these higher-end technologies can give the filmmaker excellent quality tape-to-film transfer. So like the golfers say, "It aint' the clubs baby,

its the Tiger Woods swinging 'em." In technical terms, the quality of standard definition video (meaning everything but High Definition) is much lower than the ability of the machines to transfer. Consequently, the manipulation of the image and the machine works best with skilled and talented people. The moral of the story is: meet the people, see their work, and test.

For more information check with:

- Swiss Effects in New York, NY and Zurich, Switzerland, (212)727-3695
www.swisseeffects.ch
- Sony High Def Center, in Culver City, CA (310) 244-7433 www.sphdc.com
- Cineric in New York, NY (212) 586-4822 www.cineric.com
- FotoKem in Burbank, CA (818)846-3102 fotokem.com
- Digital Image (Four Media Corporation) in Burbank, CA (818)840-7106
www.4mc.com

Tape-to-Film Blow Up Sequence and Expense

What follows is a case study of one Producer's journey through tape-to-film blow up. She's the same Producer depicted in the Digital Feature Budget chapter.

During her Pre-Production phase, the Producer carefully researches and compares the various tape-to-film processes and prices, and chooses the company she wants to use. Her decision is partly based on the willingness of the staff to work with her to get the look she and the Director want.

She has decided on an Electronic Beam Recorder process primarily because it will do a nice job and it's within her budget range.

She, the Director, and the Director of Photography have chosen to work with a 16:9 Digibeta camera that is NTSC. The tape-to-film company tells her she'll get a better blow-up with a PAL camera, but that means going PAL all the way through post, and she doesn't want to hassle finding the gear or paying extra for it. She's thinking though, that next time she will shoot PAL.

The DP and Director meet with the tape-to-film company to see examples of footage similar to what theirs will be, talk about the limits of dolly shots, pans, or any moving camera shots, and review the shooting specs that will give them the best possible 35mm picture. These include using normal shutter speed, no extra gain, no extra detail, and no computer effects.

Shooting in 16:9 gives an aspect ratio that blows up better than standard 4:3, because the film equivalent of 16:9 is 1.78:1, which is very close to 35mm's 1.85:1. In composing their shots, they'll stay within the safe action area, and will not crowd the top and bottom of the frame, because they know that the height of the 16:9 image is slightly taller than 35mm., and will therefore be lost in the blow-up. (The width of the two images is the same.)

The next step is to shoot some tests. The DP makes sure he is completely familiar with the camera. The Producer, Director and DP set up some scenes that typify the conditions and style of the picture, including exteriors, interiors, close-ups, medium shots etc. Ideally, she tests before the official shooting schedule begins, or if that's not possible, at the top of the schedule. She also tells the actors and crew that these are camera tests, and that certain scenes may need re-shooting. They only need to shoot two to three minutes of tests, at a cost of about \$500 for 35mm. In this case, the company will credit that back to her when she pays for the final blow-up. Again, service is important when dealing with filmmakers. The companies just want to avoid people who test and test and then never show up for the party.

Now that everyone is satisfied that they can get the look they want, and that it will show up as a thing of beauty on 35mm, the team goes off to shoot and edit the picture. The Post Sound edit is equalized for a theatrical mix in Dolby SR (see this discussion in the Digital Feature Budget 34-00 Post Production Sound).

There was one thing that happened during the shoot. The Director wanted a dolly shot tracking an actor running beside a building. The building was only about three feet from the actor, and when the Director looked at the shot, it strobed a bit. They took the tape into their blow up company and analyzed how to reshoot to make the shot

work with no strobing, which would have shown up in the blow up. Another example of good service.

During On-Line editing, they are careful to follow their blow up company's advice to not crush blacks or whites, but work with Gamma levels instead. The Producer is also following advice by working in an editing system where the video signal is uncompressed and component.

In the Post Sound, after the picture is mixed and laid back to the DigiBeta master, a copy of the sound track, synced to picture, is laid off to DA88.

Before they lay it off to the DigiBeta master, however, they check with the blow up company to see how they want the video...in one piece, or already broken into reel breaks. If in one piece, then the company needs to know the time code of where the Producer wants the reel breaks to occur. For 35mm, the reel breaks should be roughly every 18 to 20 minutes, and not where there's music, overlapping dialogue, or in the middle of an actor's sentence.

Up to this point, all the expenses are included in the Producer's original budget (see Digital Film Budget). Now she heads into Tape-to-Film territory, and she's ready to spend some serious money.

She takes her sound track on DA88, and goes to a lab, where she has an optical sound track negative made.

\$\$\$

Cost: \$3,300

She then delivers her DigiBeta Master to the tape-to-film blow up company. They do the blow up, and she now has a 35mm (silent) negative and a one-light print to check it.

\$\$\$

Cost: \$27,000

She goes back to the lab, where they sync the optical sound track negative to the 35mm.

\$\$\$

Cost: \$190 for 5 reels

She also has a magnetic sound track made to test the sync. This is an optional step, but the lab advises her that projects shot on NTSC video with its 30fps rate (versus PAL's 25fps) sometimes have sync problems. So before she goes to the expense of her Answer Print, final color correction, and Composite Print, she tests the sync.

\$\$\$

Cost: \$1,500

Now she asks the lab to make an Answer Print, which she and the Director color correct scene to scene. The final step...the lab makes the Composite Print.

\$\$\$

Cost: .35 cents per foot, or about \$3,000

Additional Release Prints will cost about \$1,600 each.

Her total expense is \$ 35,000, or about \$389/minute. She owns all her elements, and she's done and ready for Sundance!

Note: Prices vary widely for both lab work and tape-to-film blow up. Some companies say to figure on about \$35,000 out the door, others say \$50,000 or even \$80,000. Some require the sound on a separate element, such as DA88, others take your edited master on DigiBeta or DVCAM or whatever, and strip the sound off themselves or go through a lab. It's the wild west. We suggest you check out the different companies, take the tours, see their films, get their bids, and then make up your mind.