

DIGITAL DIRECTIONS



Original positive



Digital internegative



Original positive



Digital internegative



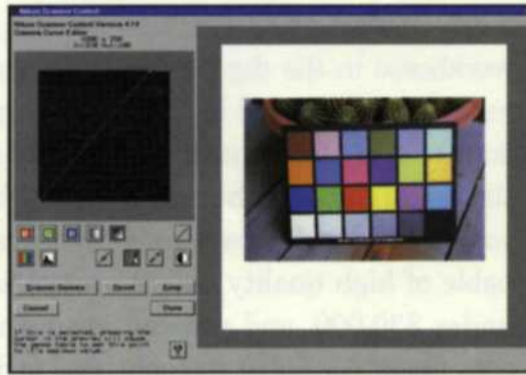
Original positive



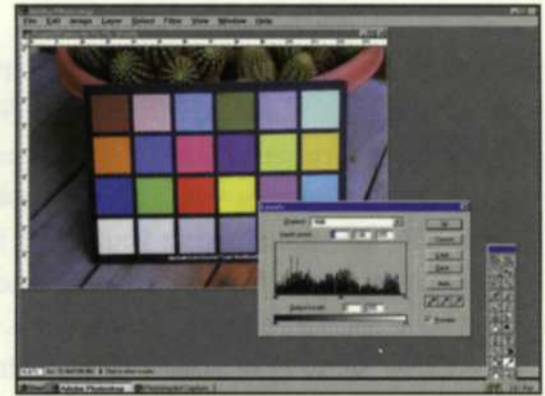
Digital internegative



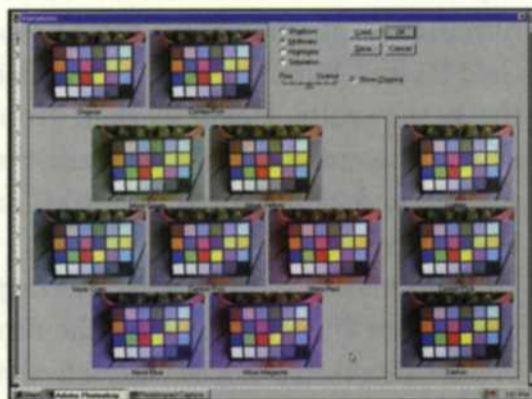
Scanner setup for test chart



Gamma correction for test image



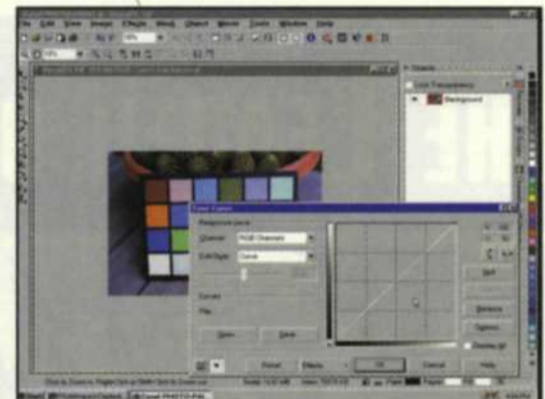
Gamma correction in PhotoShop



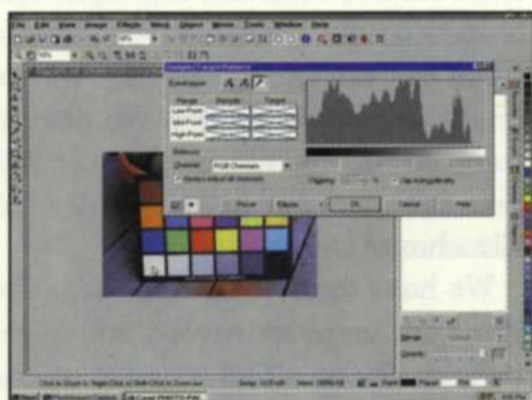
Color correction in PhotoShop



Gamma correction in Painter 3D



Gamma correction in Corel Paint 8



Histogram in Corel Paint 8



Modification of Look-Up Tables in film recorder



Modification of LUTs in film recorder driver software

Digital Internegatives

Jack & Sue Drafahl

In a previous article the Drafahls discussed the benefits of expanding your duplication services using your digital lab. You might have noticed that they did not mention one important lab service; making internegatives. This digital niche has so much profit potential, it deserves it's own separate coverage!

IN A TRADITIONAL lab, the color internegative has always been a workhorse. This copy negative allows us to quickly migrate from transparency to color print. Over the years, several of the film manufacturers have even developed emulsions for creating these special negatives.

The problem in working with this medium has been that these negatives

are extremely critical in exposure and processing—so critical, in fact, that the film is kept in the freezer until it is used, and must be processed immediately upon exposure.

This makes repeatability difficult because of changes in your enlarger system or new filter packs for each internegative film. One solution is to buy large quantities of film, or just deal with the

changes that occur. If you are running a large lab making many internegatives, then the volume makes the process controllable. It's the small labs making an occasional internegative that get into big trouble.

One solution for the small lab is to outlab the job to larger labs that have a larger volume of internegatives. They should be able to stay on top of quality because

their volume dictates it.

Of course, we have run into problems in sending work out to other labs. We don't have problems every time, just when tight schedules won't permit problems. Oh, you are shaking your head in agreement—so we're not the only ones who have gone through this experience.

Another solution is to look at your film recorder as a possible device for creating

a color interneg. Our film recorder is our workhorse in the digital lab. It does so much work, it should be the CEO! If you don't have a film recorder yet, consider it the logical choice as the next purchase for your digital lab. We have seen devices capable of high quality 4x5 internegs for under \$30,000, and you can even find ones under \$20,000 if you only need to do 35mm film.

If you decide to use your film recorder as an interneg device, you will have to set up a film Look-Up-Table (LUT) for the specific internegative film you will be using. We have tried dozens of films and found a couple that seem to work very well with film recorders.

Our film choices were strictly based on how well the film worked in a film recorder, not because we felt obligated to any film manufacturer. In the 35mm film area we found that Kodak Royal Gold 25 and Fuji Superia 100 provided the best results. Reala worked great when we wanted a lower contrast. For our 4x5 and 2 1/4 negatives we settled on Kodak Vericolor III.

Unfortunately, creating good internegs takes more than just loading the film into the film recorder. The critical factors in setting up the LUTs include brightness values, contrast, highlight and shadow density. That may sound like a lot of variables but there is a way to quickly narrow it down. If you plan on using an ISO 100 film in 35mm or 4x5, you can use the preset tables for Ektachrome as a starting point.

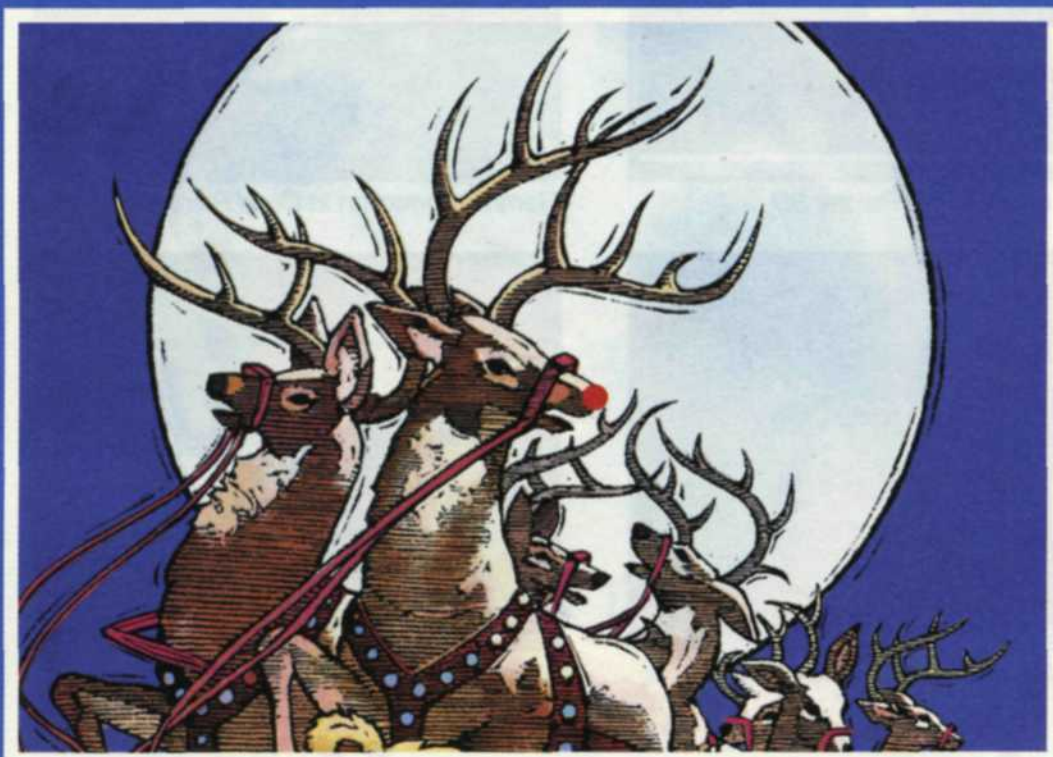
We have found that color negative films are more sensitive than transparency film on a film recorder, so it is best to reduce the brightness (exposure) by 10% to start. When you shoot your test, make sure that you use a bitmap image and not a vector image. They do record differently on most recorders and will provide different information about your LUTs.

If you use a test chart, such as a MacBeth chart, shoot it on a copy stand with the color negative film you plan on using in film recorder. Scan that negative into your system and expose it with the film recorder. Look at the processed image from the film recorder and check the area around the image for blooming beyond the image area. A small amount is okay, but if it is considerable, you will need to reduce the exposure.

Read the original test chart negative on a densitometer and compare it with the readings from the negative out of the film recorder. Adjust the film recorder brightness values for each color until the two film test negatives match.

Eventually, you will get to a point where the curve values match in the

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highlight areas but differ in the shadow areas. Fortunately, with most film recorders you can adjust the shadow areas without having any effect on the rest of the image.

When you think you have a close balance on the film recorder, scan in a variety of the work that would normally require you to make internegs. Try to include portraits, high contrast images, and even a couple of black and white and color negatives. Make prints from both the copy stand negative and the film recorder negatives. Review the results and make any final modifications to exposure and shadow density.

If you want to use the Royal Gold 25 emulsion, your film recorder must have the ability to increase its exposure by 4X to accommodate the lower ISO speed. If it does, the increase in quality is well worth the additional time necessary to image it.

Once you have a good LUT for your film you can make internegs of slides and black-and-white negatives without hav-

ing to make any changes to the film recorder.

Unlike the traditional method where you adjust the original in the enlarger, you now make all your adjustments as the image is scanned into your computer system. You also have the added benefit of being able to make duplicate color negatives, correct defects in the original, or add text and special effects to the new negative.

As you start your digital internegative service, you will find that there are some images that may need more adjustment than your LUT values. If your film recorder driver has an on-the-fly command menu, you're in luck.

With these commands you can run variations to correct the problem images one right after another. For example, with our Agfa Forte film recorder and ZenoGraphics SuperPrint driver, we can run a normal exposure, run 10% less contrast on the next and 10% more contrast on the third image. We can also increase or decrease brightness, and sharp-

en the image as it is being directly sent to the film recorder. The remaining images use the LUT values in the film recorder and are not modified in any way.

When you get your system set up, be sure to make samples for your customers. Digital is a new direction for most of us, and you need to help educate your customers. Make a print from a traditional negative and then one from a digital negative. Compare the cost for each service so you can help your customers make intelligent decisions.

One final note: Be sure to keep a separate log of your film recorder's LUTs. You have spent quite a bit of time and money in this research and you would hate to lose that valuable information. Of course, that would never happen to you—that's what happens to the other guy!

Jack and Sue Drafahl own and operate a custom lab in Portland, Oregon. They are also professional photographers, specializing in underwater photography.

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In effect, we also performed a paper test in the course of this film test. It shows that both films have more accurate and detailed reds when printed on Fuji Crystal Archive paper. (According to the results of a test...)

—Michael J. MacNamara,
"Fuji vs. Kodak"
Popular Photography, April, 1998

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