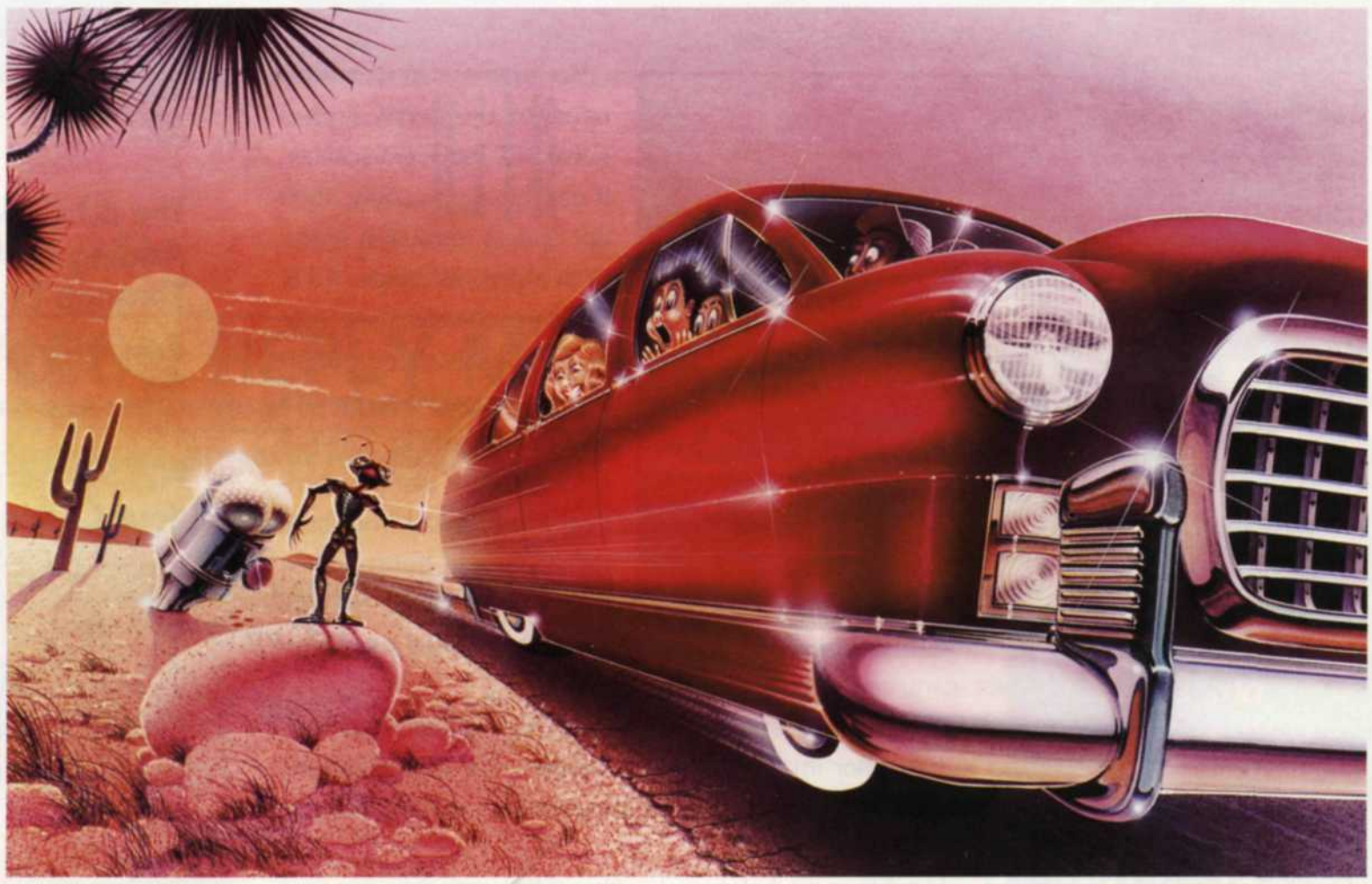
Digital Cameras in the Lab

Jack and Sue Drafahl



The Kodak DCS 660 was used to copy this offset printing document.

In order to understand the full image qualities of a digital camera, a color chart test is done. This test is from the Kodak DCS660 with 105mm macro.

Nikon D1 digital camera mounted on a Beseler slide duplicator. Images from 35mm up to 4 x 5 can be digitized with this system.

Kodak DCS660 uses a firewire cable to communicate with the computer. Images are shot and directly sent over this cable to hard disk.

It's hard to believe, but it has been more than a year since our last look at digital cameras in the lab. It's about time to take a second look, since so much has changed. There are now thousands of these filmless wonders that come in all prices, with various levels of quality and modes of operation. We had several digital cameras in our lab for product reviews, so we thought it would be a great time for this update.

CONSUMER CAMERAS that we tested for this article were the Nikon 990, Kodak DC 290, Fuji 4700, Agfa 1680, and the Ricoh 5700. We were also fortunate enough to have professional level Nikon D1 and Kodak DCS 660 interchangeable lens SLR digital cameras for our tests.

Before we look at specific applications for these digital cameras in the photo lab, we need to discuss the cameras themselves. You can talk all day about camera body size, lens design or preview screens, but the one item that really distinguishes one digital camera from the next is resolution. The image resolution of these electronic marvels needs to be numero uno when selecting a digital camera.

The main problem is really *understanding* resolution. Megapixel is the new term for defining digital camera resolution. The higher the megapixel resolution, the higher the image quality. Sounds pretty cut and dried, right? If only it were that simple. Unfortunately, there is no standard for labeling digital cameras, and many manufacturers have devised methods for boosting the megapixel resolution of a camera.

Interpolation, pixel shifting, and extrapolation are some of the software and firmware methods for increasing resolution beyond the actual pixel resolution of the CCD chip inside the camera.

When shopping for a digital camera, make sure you look at the camera specifications and find the actual pixel size of the CCD chip. This ensures that you are comparing apples to apples. If you want to equate megapixel resolution to scan image resolution, multiply 3 times the megapixel number to get the approximate file size of the digital file. A three megapixel camera provides a 9 megabyte file which has 2000 lines on the longest side.

The difference between the consumer and professional digital camera presents several points to consider. Interchangeable lenses allow you to use all those wonderful lenses you bought for your professional film cameras—and when looking through the viewfinder, what you see is exactly what you will get. The resolution is usually higher with the SLR digital cameras, but as with most SLR cameras, the bodies are bigger, and more expensive.

With the SLR digital cameras, dust can enter the camera body and create artifacts in the digital image. You must check for dust often, and the camera may need cleaning on a regular basis.

Most of the consumer digital cameras are sealed, and do not offer interchangeable lenses. Therefore, dust does not seem to be a problem, but their flexibility is limited. They usually sport a more reasonable price tag, but do not offer all the features the professional digital cameras do.

There are two methods of image storage when using digital cameras. Most digital cameras come with a communication soft-

Fuji FinePix S1 PRO camera back

Nikon D1 digital camera has all the controls found on a traditional film camera, and additional controls for digital images.

Nikon D1 and Kodak DCS660 both can take interchangeable lenses and can operate anywhere in the lab that a traditional film camera can.

The back of the Kodak DCS660 has two preview screens for camera control and image preview.

ware package and cable. When you are ready to download your pictures, simply plug in the cable and transmit the pictures to the computer. Once they are saved on your computer hard disk, you can delete them from the camera.

A second more popular method uses a special device called a card reader. All digital cameras feature an internal, removable image storage device like the SmartMedia or FlashCard. When you have maxed out your storage capability, take the card out of the camera and place it into the card reader.

The card reader comes up on your computer as a drive letter, so you can drag and drop your images into your main storage directory. We use a Microtech USB card reader in our lab as it takes either SmartMedia or FlashCards. We tried both cable and card readers, and found the card reader to be very fast and easy to use.

The only exception we found was the Kodak DCS 660. This camera operates via a firewire cable, and is totally controlled through the computer and cable. Depending on the lab application assigned to the 660, this feature can be a timesaving device or a hindrance.

Now let's update you on what we see as some digital camera applications in the photo lab. We have been using digital cameras in our lab for quite some time now, and have found that they provide considerable cost savings on specific tasks. See what you think.

Troubleshooting

Since the photo lab requires the integration of intricate computer and mechanical equipment, it is not hard to imagine that equipment failure occurs. Every moment of down time is money lost, so you need to fix things quickly. Since most manufacturers offer technical support via the Web, we have found the digital camera a great help in expediting the repair.

Digital cameras are the perfect solution for showing tech support a hardware problem via an image transferred over the Net. Most consumer digital cameras now can shoot close-ups and often allow the use of an external flash, so they are a great way to quickly send images to help the technician troubleshoot the situation.

Using compression programs reduces the image file size, so it takes less time to email technical support. In most cases you can reduce the image down to 600 x 800, so most any consumer digital camera is perfect for this type of work.

New Construction

When we built our new office building last year, we took a digital camera and photographed all the wiring and wall construction before the sheet rock went up. Sad to say, we recently had a small problem with a water leak.

We quickly resurrected our building photos and found the source of the problem—a bad seal around an outside electrical outlet. The original pictures took only a couple of minutes to shoot, but the time saved locating the source of the problem was a big help.

Equipment Inventory

Digital cameras make it easy to inventory the equipment in your photo lab. Shoot closeups if necessary and verify the image using the digital display back before moving on to the next product. When photographing camera bodies and lenses, take an overall image to identify the actual product, and then zoom in to show the serial number.

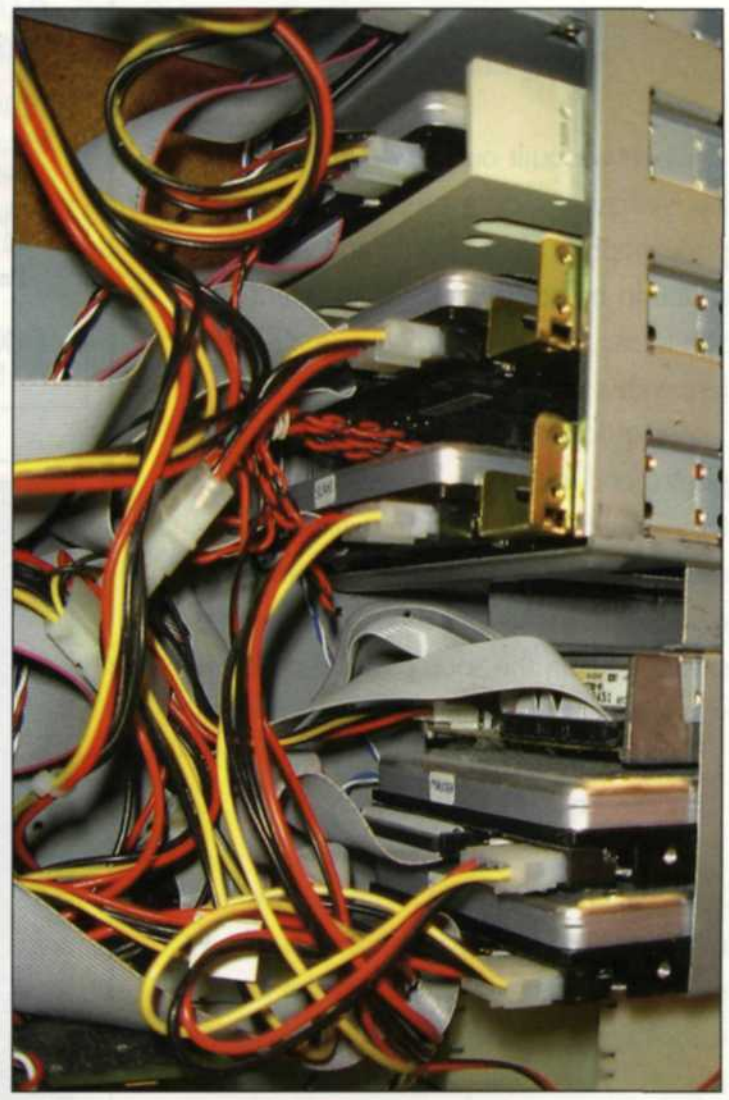
Since electrons cost much less than silver halide crystals, you can shoot as many images as you need to insure good documentation without an increase in cost. For insurance companies and the IRS, a picture can be worth thousands of dollars.

Shipping

Many large companies now use digital cameras to shoot pictures of a package's shipping contents before sealing it up. We recently received an order that was shorted, so we called the company and the clerk asked us to hold a second. She came back with, "Just looked at the image of the shipping box and confirmed that it indeed was shorted." Wow, isn't technology great?

We use this documentation procedure to shoot pages of slides on a light box before they are shipped to a magazine. This ensures that what goes out, really comes back. Many of the camera manufacturers supply us with new cameras to review. No,

Top: Three digital images taken of large artwork (3 megapixels each). Bottom: Images can be stiched together with PowerStich and saved as a single large digital file.



Digital cameras can be used to shoot the inside of your computer workstations for future reference.

we really don't get to keep them.

When it's time to return the equipment, we grab our Agfa 1680 or Nikon 990 to document the shipping contents. So, it's not just big companies that are sophisticated, you can do it, too. The digital camera also works great to document a damaged shipment.

Flat Art Copy Work

This is one area where the digital camera can really do some great work in your lab. You are able to take the photo and verify immediately that you have the shot. No more waiting for the film to be processed, only to find you misframed something.

With the various resolutions found in the digital cameras, you can easily match your camera quality to the required output quality. In many cases, the flat art copy is shot for a small output copy print. If that is the case, then many of the consumer digital cameras will do a great job since only a medium resolution is necessary. If you require a higher resolution, you can use one of the digital SLRs ,such as the Nikon D1 (3 megapixel) or Kodak DCS 660 (6 megapixel).

There is even software that can help you expand your digital camera resolution limitations. Fractal Print Pro can save your digital file out into a special format, that when reloaded, it appears at a much higher resolution. Sounds like magic!

Well, it really works and is great if you need a large print, because it reduces the pixelation that occurs with increased enlargement. We have taken a 3 megapixel image from the Nikon D1 up to 16x20 inkjet print with impressive image quality using this method. A raw file from the Kodak DCS 660 will go up to 16x20, but now it can be enlarged even further with Fractal Print Pro.

If you have a flat art copy job that includes offset printing, you will have Moire patterns when scanned on a flatbed scanner. Most scanners can correct for some of the problem, but not nearly as well as a digital camera image of the same artwork.

Scanning offset printing on a flatbed scanner can often take from 1-4 minutes per scan, while a digital camera can digitize it in less than a second. It doesn't take very many scanned images to pay for that digital camera when you compare minutes to seconds, does it?

We decided to archive the more than 500 articles we have done for various magazines over the past 25+ years. This was an internal project, so naturally we didn't want to expend the hours necessary to undertake this project on our flatbed scanner. In four hours, we photographed more than 1000 magazine pages and archived them to CD.

We used the Kodak 660 digital camera for this task, and attached it directly to the computer via a firewire cable. We controlled the camera from with a Photoshop plug-in, and pressed the shutter with the mouse button. Each image was previewed on the screen and then saved to hard disk. We decided that the same project using a SCSI flatbed scanner would have taken a minimum of 30 hours of scanning. Wow, what a difference in time expended!

Slide Duplication

In our original article (September '99) we talked about attaching a digital camera to your traditional slide duplicator for digitizing transparencies. After further testing, we have found that the duplicator works well when copying 2 1/4 and larger sheet film, but has a few problems with 35mm. We found that a 35mm slide scanner will give better results, even though it operates slower.

If you just want low resolution versions of your slides for building a database, digital slide shows or a quick newsletter layout, then using the traditional slide duplicator works great. It is a workhorse that allows you to pump out visuals almost faster than you can load them.

We tried both the Nikon D1 and Kodak 660 for this test, and found that we could digitize more than 500 images in an hour. It required that we first set up the duplicator by using the manual mode on everything and running test shots on a well balanced image. Fortunately, we could see our results in seconds, so it only took a couple of minutes to adjust the entire setup.

In order to decide which digital camera is the perfect employee for your photo lab, you have to analyze its job description. Will it be required only to perform simple, low resolution tasks? Or will it be faced with the challenges of high resolution jobs?

In the real world, time is money and that is especially important when operating a photo lab. Sit down and take a few minutes to evaluate your digital directions. You may just find that a digital camera, consumer or professional, may just be the best investment you could ever make.

Postcript: The Fuji FinePix S1Pro did not arrive in time for this article, due to production delays. However, we did some quick tests, and following are a few facts about this newest addition to potential digital cameras in the lab.

The S1 is smaller than the Nikon D1 and Kodak 660, and is more fragile than the other two cameras. However, it does take both smartmedia, and flashcards for storing images, and has additional controls for color saturation and image contrast. The actual resolution is about the same as the Nikon D1, and less than the Kodak DCS 660.

We did find that images captured with the Super CCD chip could be sharpen than the Nikon D1 and did a great job with offset printing.

We tried the S1 Pro on several applications in the lab, and it was very similar to the Nikon D1 and Kodak 660. We did find that, like the other two digital SLR cameras, it did not perform any better duplicating slides on the slide duplicator. It worked well with larger format copying, flat art, paintings, and small products in the lab. Of the three SLR cameras we reviewed, the street price of the S1 Pro is the lowest of the three.

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