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New Technology: Kodak's ERI JPEG Technology by Jack & Sue Drafaht



This is the elusive ERI menu on the Kodak DCS 720x. Pressing this will advance you to the menu that controls how files are saved and automatically deleted.

The world of digital photography just got better with the introduction of a new type of plug-in format that provides the quality of a raw file format, but the size of JPEG files. Now you can take your digital images in the raw file format and convert them to Kodak's proprietary ERI-JPEG Technology (Extended Range Imaging—Joint Photographic Electronics Group) with almost no change in image quality.

One of the biggest complaints by professional photographers has been the limited exposure range of files converted to JPEG from raw data format. In the past, conversions from 36-bit raw format to the 24-bit RGB-JPEG tossed out important data in both the highlights and shadows. Even if exposures were dead on, the range of the 24-bit conversion would lose highlight detail in the final image.

The simplest solution would be to keep the files in the raw format, but that is not always practical. The raw files are about four times larger than JPEGs. Besides, they are not always easy to handle in editing programs, as some programs don't even recognize various types of raw data formats.



This image was taken early in the morning with the DCS 720x without flash at ISO 6400, at 1/2500 at f/9. Yes, ISO 6400! It kind of makes you wonder where digital is going in the next few years?

Kodak's solution was to incorporate some of the new features of the digital camera's JPEG EXIF 2.1 file format. With this format a special area in the file called metadata is set aside for information about the camera settings. Kodak took advantage of this feature and stored information about the file's dynamic range and color gamut.

When Kodak's ERI-JPEG file is opened in Adobe Photoshop, a special window appears to provide a thumbnail and a scale showing just how much extra data is stored in the metadata section. When the red bar extends to the right side of the scale (high), there is plenty of stored data, but if the red bar hardly shows, then the range is about the same in both 24-bit and 36-bit, so no ERI processing is necessary.

For images displaying high Extended Range content, select the (enable) button and the plug-in will add the metadata information to your image. After the processing is completed, simply press the exposure compensation button (+/- 2 stops) and the magic of ERI goes to work. Data you thought wasn't captured by the camera, visibly appears before your eyes.

The balance menu allows you various methods for color balancing the photo from Auto, where the computer makes the decisions, to the eyedropper, where you can manually select specific points. After making all the necessary ERI corrections, you then press the (OK) button and the final ERI image is loaded in Photoshop. All the information that you captured in the 36-bit format is now visible in the 24-bit format.

Our first introduction to this Extended Range Technology was when a loaner Kodak DCS 720x digital camera arrived on our doorstep. The body is based on the Nikon F5 camera except that it is taller to accommodate the image processor, batteries, and memory card slots. We were surprised to see that chip resolution was only two megapixels, which by today's standards is a little on the low side. We figured there must be something else that made this camera so special, but what was it? When we pushed the shutter and found that the



The camera was mounted on a tripod with pan/tilt head so that camera could be repositioned for correct framing of the hummingbird. This image was taken with the Kodak DCS 720x at 1/8000 second shutter speed and an aperture of f/5.6.

Features

Four Seasons

Things to Consider

The Rf Cookbook:
Bambi Cantrell

The Rf Cookbook:
Larry Peters

Columns

Insight/On the
Cover

First Exposure:
ApplePowerbook
G4

Tech Review

New Technology

Departments

Industry News

Problems and
Solutions

Education Spotlight

Archives

motor drive could operate at 4.3 frames a second for up to 25 frames in a burst rate, we had our answer.



The Kodak DCS 760 and a 14mm lens were used to photograph a group of people at the Portland Zoo aquarium. The ERI technology allowed us to expand the range of the detail from inside the room out into the water in the tank.

That was impressive, but when we checked out the ISO, we were in shock. It had a rating of ISO 6400. For the next few days we put this camera to the test and tried our luck at the high ISO speeds. Even in the wee hours of the morning, we had shutter speeds up to 1/8000 when we photographed dew on flowers. It was a strange feeling taking pictures at 1/2000 and 1/4000 second at f/8 and f/11 in such low light conditions.

A couple of weeks later, we exchanged the DCS 720x for the DCS 760. Both cameras looked identical except for the small identification number on the front. The biggest difference inside the camera was that the resolution of the 760 increased to six megapixels. The ISO rating ranged from 80–400, and the frame rate dropped to 1.5 frames a second due to the higher resolution chip. We continued testing the camera on various subjects that would lend themselves to the ERI technology.

This brings up a problem we had in using the ERI Technology. At first, we couldn't find it! There was no hint anywhere in the camera, so we resorted to calling Kodak. They told us to look under a heading in a camera menu called processing. Don't you love engineers? They come up with a great technology, but forget to tell you how to access it. Well, once we found it, this ERI Technology turned out to be better than we even imagined.

Here's how it works. The camera normally shoots in Kodak's DCR format raw camera files. Using a special Kodak plug-in, you can open these DCR files in Photoshop. The problem is that raw format files take up a lot of space, so you can only save 120 files on a 1 gigabyte card in the DCS 760 camera before it is full.

When you really needed the space, you can activate the processing function and the camera will convert the DCR files to the new ERI-JPEG when the camera isn't in use. When you start shooting, the camera stops processing and waits until the camera is free to continue the processing.

Most of the time the camera can keep up with the conversion, and it only gets behind only when you shoot a 10–25 image burst. If you turn off the camera, it will finish processing the image it is working on and then shut off. So, be sure to verify that the camera has terminated processing and turned itself off before removing the memory card or batteries. We also found that processing used more power, so if you are on location, take the 120 Volt car lighter charger with you.



Comparisons of the same file—no ERI on the left, Photoshop correction in the center, and with ERI technology on the right. Notice the increased detail in the white blouse in the ERI version.



Comparison of the same file—no ERI on the left, Photoshop correction in the center, and ERI technology applied on the right. Two stops over becomes normal!

When you shoot very fast, the memory card will fill up with DCR files and the counter may quickly reach zero. If you have the processing turn on and wait a couple of minutes, the counter magically starts increasing as the DCR files are deleted after being converted to ERI.

At the time we tested the camera and the ERI technology, we could only process images to the ERI format within the DCS camera. We suggested that Kodak come up with a proprietary software for converting DCR raw files to the ERI format in the computer, after the fact. That way if battery power is a concern and space isn't, you could shoot entirely in the DCR format, copy them to the hard disk and convert them later. This is just a suggestion, Kodak.

We did not realize how well the ERI Technology worked until we started to review some of our work. In shooting some images for our new digital camera book, we had bracketed 1–2 stops on some critical images. Normally we delete those overexposed images, but instead we thought we would try a couple using the ERI Technology.

In one photo we took of a young couple in a park (above left), the exposure appeared to be burned out, especially in the area of the white blouse. We opened the file in Photoshop, and the ERI menu appeared showing the red Extended Range content to be high. We activated the ERI technology and then compared it to the same image without the use of the technology. Wow! There was a tremendous increase in detail in the white blouse. We tried to fix the non-ERI version in Photoshop, but the repair never came close. The final ERI version looked great, with no hint of overexposure.



Mirror lenses on digital camera require manual exposure,



Same image with the ERI applied. Notice that a considerable



Menu screen after ERI was applied. A minus two stop

so a bracket exposure series was made. This is one of the most overexposed images amount of correction was made in the off-white areas. exposure was necessary to correct the image.

This revelation that overexposures might not be destined for the trash can, prompted us to review all our images taken with the DCS 720x and DCS 760 cameras. We found that images incorrectly exposed were salvageable if less than two stops off. Ones with greater error had no hope.

This Extended Range Imaging Technology is truly a phenomenal technology breakthrough, but it presented us with a new problem—Kodak wants their cameras back! This Kodak groundbreaking technology is only available in the DCS 720x, DCS 760, DCS Pro Back Plus and the DCS Pro Back 645... at least for now. Right Kodak?

For further information on this and other Kodak innovations, check out www.kodak.com.

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