High-End

What's New in Design, Technology, and Price

By Andrew Rodney

PEI Technical Editor Andrew Rodney plied the aisles at the recent Photo Marketing Association (PMA) and Seybold Boston trade shows, scouting out the latest digital cameras. This month and next, he shows us what he found. First up: the new high-end models with professional features. Next month: new prosumer models that are quickly finding a niche in both the professional and consumer markets.

The line is definitely blurring between high-end digital cameras and low-end prosumer/consumer models. In recent years, there was a stark difference between high-end and low-end models in both image file size and price tag. Just one year ago MegaVision, Leaf/Scitex, and Phase One all introduced high-end digital cameras that could produce single-shot, instantaneous files of 18MB, with prices beginning at $23,000.

File size is no longer the demarcation it once was, especially in the new generation of prosumer digital cameras. Marketed to serious amateur photographers, these models are capable of creating image files as great as 9MB, and sell for no more than the consumer digital cameras of just a few years ago, which produced resolutions no more than 1,200x1,000 pixels.

Yet for professional photographers, there are still certain features that can make all the difference in critical assignment photography, such as professional camera bodies and interchangeable lenses.

Brand new high-end digital cameras were sparse at the recent trade shows—2000 may be the turning point in the price vs. resolution equation. Just days before PMA opened in Las Vegas, Internet rumors were flying about a breakthrough, high-end digital camera housed in a professional camera body that could produce 18MB digital files with instant capture—nothing earth-shattering in itself. But what had everyone buzzing was the price tag: less than $4,000. Was there really new technology that could allow a manufacturer to produce a high-end digital camera at one-fifth the cost of the competition?

For the answer, turn to page 20.

Fujifilm FinePix S1-Pro

At $4,000, the new Fujifilm FinePix S1-Pro digital camera is one of the most exciting high-end digital cameras to come along in a long time. With Fujifilm's new Super CCD technology (see sidebar page 28), there's much about this camera to both impress buyers and shock the competition. The first amazing statistic is the 6.1 megapixel file size—in real-world terms, 3,040 x 2,016-pixel resolution (18MB files). The full-bore, 35mm SLR FinePix body is based on the Nikon N60, which means you get features like interchangeable lenses, a shooting rate of 1.5 frames per second at the highest resolution, ISO equivalents from 320 to 1600, shutter speeds from 1/2,000 second to 30 seconds, slots for both SmartMedia and Compact Flash type II cards, and the capability to write to the new IBM Microdrive.

Now add USB support, three capture resolutions (3,040 x 2,016, 2,304x1,536, and 1,440x960) and a selection of file formats, including TIFF-RGB, TIFF-YC, and JPEG. If that's not enough, the sensor is just 10 percent smaller than a 35mm film frame (23.3X15.6mm), close enough to significantly reduce the 35mm equivalency factors among lens focal lengths.

The Nikon N60 body affords complete control over exposure, with Auto-Multi Program, Shutter and Aperture Priority, Manual Exposure, and Exposure Compensation (in 1/3 EV increments). The camera has autofocus capabilities and operates with any Nikon F mount lens (AF and AI-P type Nikkor lenses, but not IX-Nikkors).

The 2-inch LCD on the back of the Fujifilm FinePix S1 is for viewing images, controlling camera operations, and evaluating your captured images with the very useful supplied histogram. The video-out connection allows playback on a standard video output device. The camera is powered by four AA batteries and two lithium batteries for the camera control circuit and built-in flash. Unlike other professional 35mm-based digital cameras, the FinePix S1 is small and lightweight—just 29 ounces without batteries and lens. The camera will begin shipping in June, and will come with a SmartMedia card (16MB or larger), four AA alkaline batteries, two lithium batteries, USB and video cables, and software.

A quick inspection indicated that the FinePix S1 has all the features I'd want in a professional digital camera system. The images captured at the DIMA digital camera shoot-out (printed on a Fujifilm Pictrography 4000) looked impressive. You can't really evaluate output quality without hands-on testing the final version of the camera and its processing software, but the FinePix S1 could be the camera that brings professional digital capture quality to the mass market. At the very least, this model will be shaking up the professional digital camera market for some time to come.

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MegaVison T32

The MegaVision T32 actually debuted last fall at PhotoPlus in New York. Recently we had a chance to take a closer look at this new 18MB (3,072x 2,048-pixel), three-shot digital camera back for still photography. The T32 digital back produces 16-bit RGB files using a Philips CCD chip and the PhotoShoot software.

An internal shutter allows you to mount the T32 to any 4x5-inch view camera as you would a film back. It can also operate as a standalone camera with Hasselblad, Nikon, and Canon FD lenses (because they have no electric aperture control). The AutoStop electronic aperture works with large-format lenses ranging from the Schneider 28mm Super Angulon to the 150mm Apo-Symmar; the exposure is controlled in 1/10-stop increments from the computer.

The accompanying MegaVision PhotoShoot software provides a number of features for previewing and composing images from the host computer, such as live video focus, color-coded light meter, mask overlay, electronic aperture control, neutral balance, tone control, automated file preparation, calibrated RGB and gamma, and density range controls. The built-in spot meter and densitometer allow the photographer to determine which areas of the shot need more or less light. Anti-blooming is a feature of the Philips CCD.

Since the camera requires three exposures to produce true, non-interpolated color files, the T32 is meant to capture non-moving images in the studio. Always Macintosh compatible, the T32 professional digital camera back has just been released in a Windows NT compatible version; price, $28,900.

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The image at left, taken by Richard Salas Photography, was captured with the MegaVision T32 RGB three-shot capture.

Better Light Super Models

Better Light, which has long been producing high-quality scanning backs, formally introduced the new Super 6K and Super 8K digital camera backs. Both are designed for 4x5 cameras and offer very high resolution, which is boosted by a one-direction interpolation of the original CCD data. For example, the Better Light Model 6000 captured 6,000x8,000 pixels of data to produce a 137MB RGB file. The Super 6K boosts that 137MB capture to 9,000x12,000 pixels to produce a 309MB image file. The Super 8K produces file sizes as large as 8,000x12,000 pixels (244MB) in standard capture mode, and through interpolation can boost the file to as much as 12,000x15,990 pixels (549MB).

Better Light purports that using the interpolation algorithm at the capture stage produces files that are significantly superior to those interpolated in Photoshop or other image editing programs. While Photoshop has to interpolate over two dimensions, the new Super models can do so over only one axis, and in high-bit format (more than 8 bits per color). The speed of interpolation is reduced when it's done at the actual capture stage, which is another advantage.

At $24,990 for the Super 8K model and $16,990 for the Super 6K (replacing the original 8000 and 6000 models, respectively), these new high-resolution scanning backs are cost-effective options for photographers who use massive digital files for advertising, commercial, or reprographic work. In addition, all Better Light backs can be economically upgraded to yield even higher resolution.

The Super 6K Digital Scanning Back has 12 resolution settings, with an adjustable ISO of 100-1600. It comes with a 4GB internal drive for storing captured images. The Super 8K has 18 resolution settings and an adjustable ISO of 64-1000. It comes with a 6GB internal drive. Both models have a dynamic range of 11 f/stops and can provide 14-bit data to the host imaging application.

Better Light also announced that it will provide warranty and repair for Dicomed Digital Scan Backs. Better Light President Michael Collette was the designer and inventor of much of the technology behind the original Dicomed scanning back.

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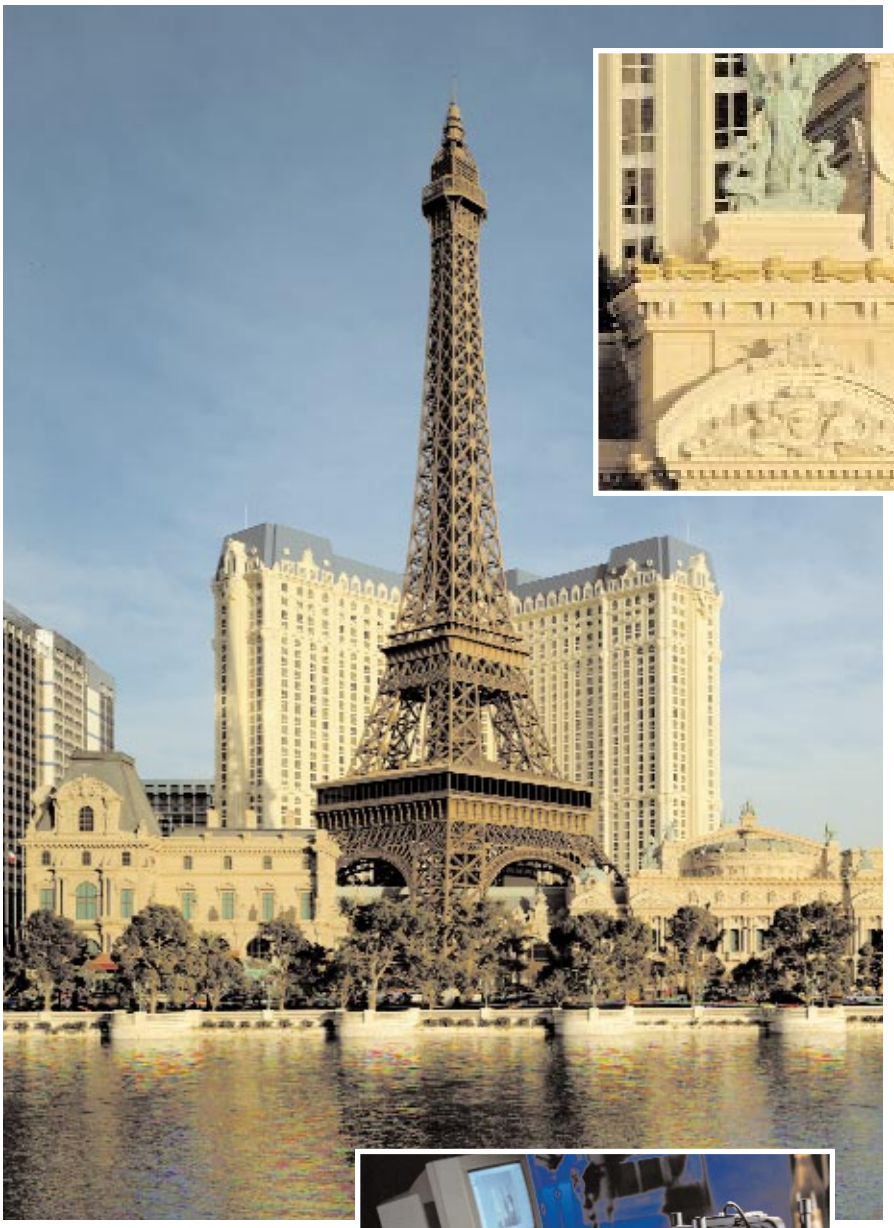

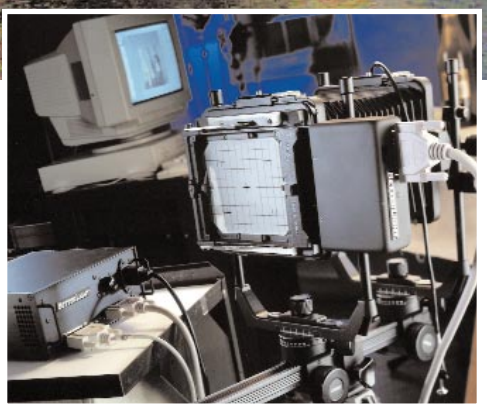

Betterlight image taken with the Super 6K scan back (inset, bottom) of the Paris Hotel in Las Vegas. Cropped area shows the detail as seen in the inset, top.

eyelike MF

The Jenoptik eyelike MF uses a 3,072x2,048 pixel Peltier-cooled CCD in a small digital camera back that supports Hasselblad and Mamiya 645, 645 AF, and RZ medium-format cameras. The eyelike digital back captures up to 14 bits per color, producing 18MB files in 8-bit mode and 36MB files in 14-bit mode. It transfers the data to the host Macintosh over fiber-optic cable at a rate of one shot per second. With the supplied PCI card, the eyelike MF digital back can transmit a continuous live image to the computer, without a mechanical shutter.

The eyelike MF is priced $19,990 and comes with proprietary software for PowerMc and a two-year warranty. A soon-to-be-released upgrade path will enable the eyelike MF to make four-shot captures and use Jenoptik's unique microscanning technology to actually move the CCD during multiple exposures, producing 16 partial exposures with total resolution of 6,144 x 4,096 pixels.

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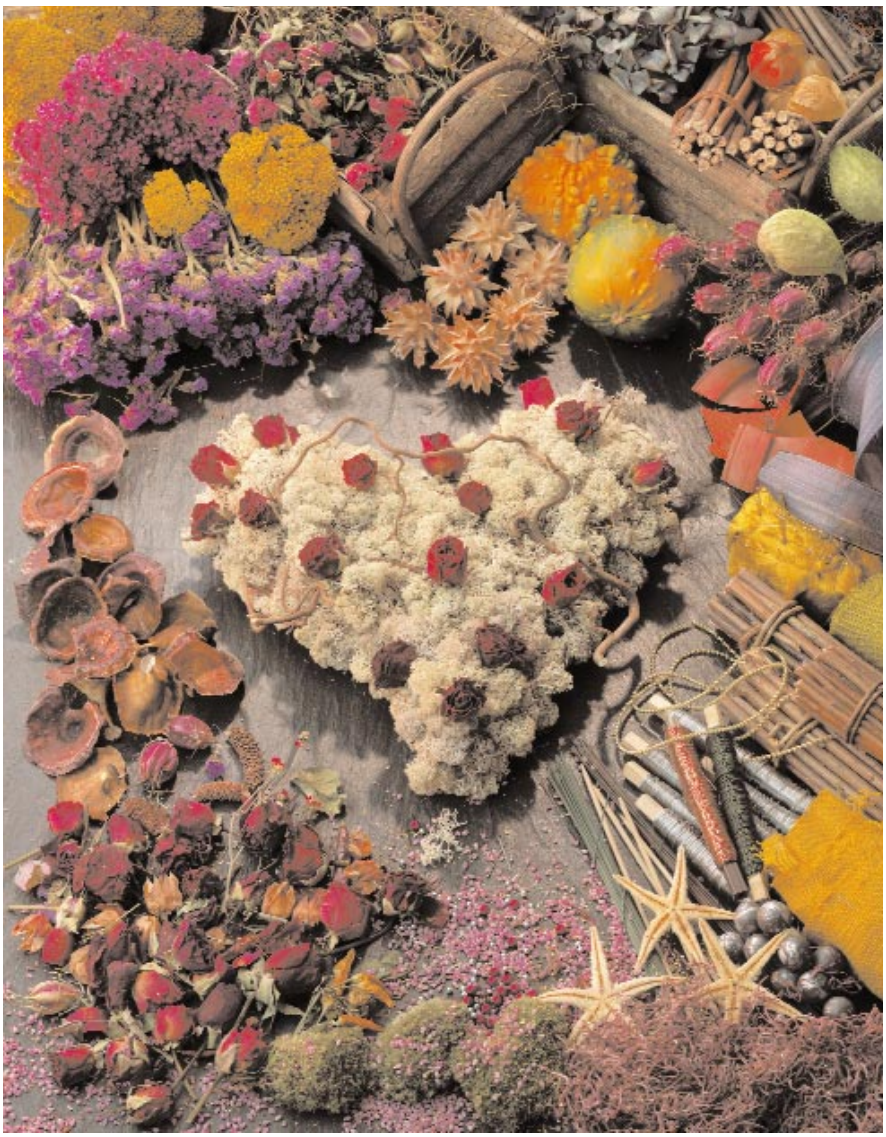
The fashion image ar right was taken with the Jenoptik eyelike MF camera (above), by Rinaldo Reboni, of Milan, Italy.

Phase One PowerPhase FX

The PowerPhase FX scanning back produces an amazing 10,500x12,600-pixel file, making it the big daddy of all digital scanning backs. This uninterpolated mega-scan back produces 380MB 24-bit RGB files or 760MB 48-bit RGB files. Ideally suited for flat art reproduction, the PowerPhase FX is the perfect system for museums and other institutions that require massive digital reproduction of exhibitions, collections, and archives.

The ability to work in low light is one of the new built-in features of the PowerPhase FX. This scanning back can capture images as fast as 1/125 second per scan line with ISO settings of 100-1600. Another innovative technology is the Active Power Stabilizing system that compensates for fluctuations in light intensity during on-the-fly captures. With IEEE 1394 FireWire technology, the FX can move as much as 200 megabits of data during file transfer. The accompanying Phase One Image Capture Software runs on both Macintosh and Windows NT platforms; the system sells for $33,990.

In other Phase One news, the recently released LP48 Move and Stitch adapter enables the LightPhase 2Kx3K digital camera back to stitch together a 48MB (3,000x5,300-pixel) file using three separate captures. The adapter fits the LightPhase back on a 4x5-inch view camera, allowing focus at the exact focal plane on standard ground glass.



The back can be used with wide-angle lenses with full use of swings and tilts. While a built-in knob on the adapter moves the LightPhase between each shot, a supplied Photoshop action automatically stitches the three captures together. The LP48 will operate on location when mated to the optional location kits available for the LightPhase digital camera. The price of the adapter is $1,750.

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Sinarback 23

Based on the Sinarback 22 single-shot or single/four-shot digital camera back, the new Sinarback 23 features a 2,048x3,072-pixel chip, up from 2,048x2,048 pixels in the earlier chip, and captures an 18MB file. The active thermo-electric system cools the chip to produce the best possible 42-bit RGB data with a dynamic range greater than 11 f/stops.

The Sinar CaptureShop 2.0 software with its integrated Sinar ColorCatcher Engine produces excellent detail and color fidelity, and a comes with a supplied plug-in to suppress moiré patterning. The hardware/software combination actually moves the CCD during exposure, allowing the user to control how the chip vibrates with a stepless slider to configure the moiré removal to a very fine degree.

CaptureShop also features live video previewing and focusing with a capture rate as high as seven images per second. The merge function permits multiple exposures to be made directly by drag-and-drop from the contact sheet. The degrees of overlap can be selected at will, and the effect can be viewed immediately on the preview monitor. Image data can be exported in Photoshop, TIFF, HDR, and other common file formats.

With its modular design, the Sinarback can be mated to various Hasselblad, Mamiya, Rolleiflex, and Bronica camera bodies, as well as the Fujifilm GX 680 and, naturally, the Sinar P2 view camera. Data is transferred from the back to the computer over a fiber-optic cable at more than 20MB per second. The software is supported on the Macintosh OS and has a two-year warranty. The single-shot-only version of the Sinarback 23 is priced $23,700 and the single/four-shot version is priced $30,000.

Sinarback 22 camers (left) was used by Red Kite Studio to create the image above. ©Red Kite Studio.

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Foveon Portable Studio Camera

Foveon Inc. introduced an upgraded version of its professional one-shot digital camera. The Foveon Portable Studio Camera, with image processing software integrated within the camera, is designed for photographers who already own a Macintosh imaging workstation and want the portability to take the Foveon on location. The Foveon camera's unique design consists of a camera head (accepts Canon lenses), attached to a notebook computer with a large 14-inch XGA resolution LCD screen for viewing the live image and operating the controls. It also comes with a full keyboard, touch pad, and built-in Ethernet card.

Among the other unique features of the Foveon design is a floating magnifying loupe that works on both the live viewfinder and the review window. The magnifying loupe enables the photographer to examine individual pixels during focusing and after exposure.

The camera's 12 megasensor image assembly consists of a color separation prism and three 2Kx2K patented image sensor arrays, one each for red, green, and blue channels. Images are captured with 12 million sensed values, and then processed into industry standard TIFF files of 3, 6, 12, 24, or 48MB. The sensors are fabricated with a proprietary semiconductor process using mostly standard CMOS processing steps. The chip has a dynamic range of 9.5 to 10 stops.

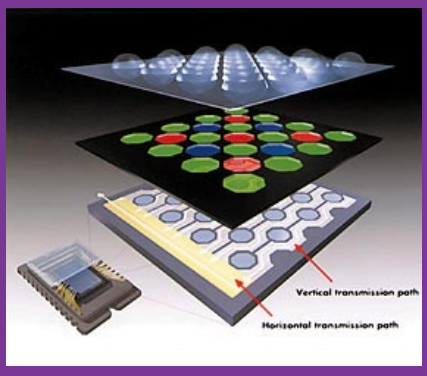
The base price of the Foveon Portable Studio is $27,900, which includes the Foveon Studio Camera, FoveonCam Capture Software, and FoveonLab Processing Software. Foveon offers an optional built-in CD-RW readable/writable CD drive so photographers can store the images to CD before leaving the photo session. The company also offers a dedicated Foveon Sales and Processing Workstation as well as customized studio configurations to meet individual photographers' needs.

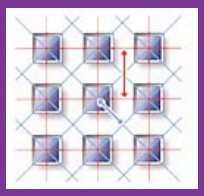
The Fujifilm Super CCD

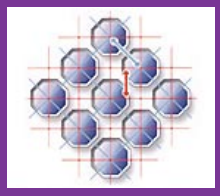
For years, digital camera and back makers have had to resort to using the conventional CCD sensors that were developed for video capture. The cost of producing high-resolution CCD chips is staggering, accounting for the bulk of the $20,000-$30,000 price tag of high-end digital cameras. Fujifilm's completely new Super CCD technology not only radically lowers the cost of producing sensors, but also offers abundant new capabilities.

The photodiodes on the Super CCD are octagonal in shape, and laid out like a honeycomb. The result is higher sensitivity and signal-to-noise ratio and a wider dynamic range than conventional CCDs with the same number of pixels. The advantages are evident when comparing the effective number of pixels in each. According to Fujifilm, the area of the photodiode in the 1/2-inch, two-million-pixel Super CCD is about 1.6 times larger than the area in a conventional two-million-pixel CCD. The area of the photodiode in the 1/2-inch, three-million-pixel Super CCD is about 2.3 times larger than a comparable conventional CCD.

The sensor in the new Fuji FinePix S1 measures 1.1 inches. This does not mean that the actual number of pixels in the Super CCD is 6.1 million, but that the capture produces 6.1 million uninterpolated pixels of usable data. Fujifilm says the production of those 6.1 million pixels is based on extrapolation rather than interpolation, which at this point may be a question of mere semantics.







In conventional CCDs, each pixel has a control path as well as a photodiode and charge transmission path. The Super CCD has no control path, which makes it possible to more densely pack the photodiodes.

The key factor is the final output. The honeycomb pattern of the octagonal photodiodes minimizes the wasted space that is typical of conventional CCDs. According to Fujifilm, the 45-degree layout raises the horizontal and vertical resolutions by 60 percent over conventional CCDs of the same size. The chip is also 40 percent more energy efficient than conventional CCDs, according to Fujifilm. The Super CCD is more light sensitive as well. Fujifilm says that with a 3-million-pixel Super CCD chip, the dynamic range is widened by 130 percent over conventional chips.

The lowest equivalent ISO for the FinePix is 320, while conventional CCDs are usually most effective at ISO ratings of 50- 100. In low light, the FinePix S1-Pro's ISO maximum of 1600 should produce superior files with less noise than with conventional CCDs. The Super CCD structure can be also be adapted to digital cameras with electronic shutters at speeds higher than possible with the conventional CCD.

As you will see in the second installment of this article next month, Fujifilm isn't limiting the Super CCD technology to high-end cameras. I look forward to showing you some of the wonderful new prosumer digital cameras with Super CCDs.

—Andrew Rodney

Leaf C-Most Sensor

The Leaf C-MOST Sensor was announced at PMA in February, although plans to implement this high-resolution sensor technology are still on the drawing board. Based on CMOS technology, the Leaf C-MOST 24x36mm sensor produces a 6.6 megapixel (3,150x1,200-pixel) file. Unique to this new chip is the ultra-thin, 300-micron packaging, which will allow the C-MOST sensor to be positioned in the focal plane of a standard 35mm camera; in other words, photographers will be able to capture high-resolution images with standard 35mm lenses.

According to Leaf, the C-MOST Sensor provides exceptional image quality in comparison to other CMOS sensors, due to a unique active pixel design that results in high sensitivity and low noise. Leaf also says that the image quality the chip produces is comparable to conventional CCD technology.

Because CMOS technology is far less costly to manufacture than conventional CCD technology, this new chip should dramatically reduce the cost of high-resolution cameras. CMOS chips also allow added-on chip processing capabilities, which conventional CCDs do not. (See "CMOS vs. CCD" in *PEI* 1/98.)

The maximum burst rate of the C-MOST sensor is three frames per second. The chip has also been designed to produce a 12-frame-per-second video preview at 512x768 pixels, a feature used for compositing the photo using a standard video signal. Conventional CCDs, says Leaf, can output live video at only four to five frames per second.

How soon will we see a product using this new chip technology? We don't know. But this exciting breakthrough could soon lead to a new price to performance ratio for high-end digital cameras.

Kodak DCS Upgrades

Eastman Kodak Company announced three new upgrades for the DCS line of professional digital cameras: Version 5.9 software, cellular phone connectivity, GPS connectivity, and premium plus NiMH rechargeable batteries. The new software and firmware—either on the host computer (acquire software) or in the camera itself (firmware)—are available on the Kodak Web site at www.kodak.com.

The new acquire software enhancements allow professional photographers to customize camera functions, while the firmware opens up new applications for the camera's PCMCIA slot. The cellular modem transmission firmware will be available to owners of Kodak Professional DCS 330, 500, and 600 series digital cameras later this year.