

## Sensor Superiority:

It's why the Sigma SD14 captures the best color detail of any DSLR!

The heart of any digital camera is the image sensor—an amazing device that converts photons, bundles of light energy, into electrons, which are then collected, analyzed, and transformed into a visible image. Unlike all other digital SLRs on the market, the new Sigma SD14 incorporates a 3-layer, 14-megapixel Foveon X3 sensor that is, quite literally, cutting edge. Because this unique sensor captures full color data in all three primary colors at each pixel location, it can resolve finer details in color images than conventional sensors that only capture one color per pixel location. The result: The Sigma SD14 delivers superior real-world performance whenever you shoot high resolution pictures in color—an enormous practical edge you can easily see for yourself in comparison pictures of color test targets as well as in your own colorful digital images.

What makes the SD14's sensor better?

To really understand why the Foveon X3 sensor in the Sigma SD14 is inherently superior to conventional image sensors that use a standard color filter array, let's take a close look at how each type works.

### The conventional image sensor

A conventional CCD or CMOS image sensor detects color by means of a specific checkerboard pattern of blue, green, and red color filters added on top of the light-sensitive silicon layer of the sensor chip at the end of the manufacturing process. As a result of this design, there is only one color filter for each pixel location. While the best conventional sensors can take very sharp pictures and provide high color accuracy, their ability to resolve very fine details in color diminishes dramatically as the color details get smaller and smaller. In other words, you may not be able to see some of some very fine color details that are visible in the actual subject reproduced in the final image.

### The Foveon X3 image sensor

The Foveon X3 CMOS image sensor, like color film, incorporates three separate light-sensitive layers placed directly above one another—in effect a

separate color layer for each primary color. As a result, the Foveon X3 image sensor, unlike the conventional sensor, captures full color data in blue, green, and red at each pixel location. Ultimately, having more and better color information is why the Sigma SD14 can outperform other DSLR cameras in being able to accurately reproduce finer details in color images.

Why does the Foveon X3 outperform conventional sensors?

Since a completed full-color image requires information in all three primary colors for each pixel location, which image sensors using the conventional color filter array doesn't provide the image data must be processed using a method called using color interpolation—essentially an educated guess at what the missing colors should be. This guesswork works reasonably well for large areas of color like the sky or an expanse of grass, but it breaks down when areas of different colors get smaller, like the fine stripes on a necktie or the pattern on a multicolored scarf. Due to the inherent limitations of a one-color-per-pixel-location grid there is no perfect solution to the knotty problem of providing the data needed to reproduce fine color details accurately at the edges where colors change. Foveon X3 sensors bypass all these problems by fully measuring all three primary colors using a stack of three color pixels at each pixel location. No interpolation is needed, so there is no guesswork.

Counting pixels

Because of their unique structure, there has been some controversy in how to specify the number of pixels in Foveon sensors. While international standards bodies such as the ISO have not yet issued specific guidelines on pixel counting in either multi-chip or multi-channel sensors like the Foveon X3, the pixel numbers presented by Foveon and Sigma are consistent with the present ISO standards and with the CIPA (Camera & Imaging Products Association) guidelines. In any case, the 14-megapixel Foveon X3 sensor in the Sigma SD14 outperforms many leading DSLRs in terms of color resolution and overall image quality according to published tests.

Putting it all in perspective

Neither Sigma nor Foveon, the U.S.-based manufacturer of the 14-megapixel X3 sensor used in the new Sigma SD14 DSLR, claims that the

Bayer-pattern sensors used in all the leading DSLRs made by other reputable manufacturers are not capable of delivering excellent picture quality. As a result of constant development, careful design and manufacture, and improved software, their performance has been brought up to a very high standard indeed. Nevertheless, we must point out that the overwhelming majority of pictures taken with DSLRs and other digital cameras are shot in color. Optimizing the capture of fine color detail is therefore a crucial design parameter, and here the Foveon X3 14-megapixel sensor provides photographers with a distinct edge in delivering images of surpassing quality. It is perhaps most significant that those who have had the highest praise for Sigma cameras and their Foveon sensors are the testers, professionals, and serious enthusiasts who have actually used them.

## Sidebar

The Sigma SD14: It's got a lot more than just a great image sensor!

While the cutting-edge 14MP Foveon X3 image sensor is the centerpiece of the new top-of-the-line Sigma SD14 that sets it apart from every other serious pro-caliber DSLR on the market, there's a lot more to the SD14 that makes it a natural choice for professionals and serious enthusiasts who want to take their DSLR photography to another level. Here's a rundown of its exciting new features:

1. Choice of RAW or JPEG files. With a total effective 14.06MP pixel count, the SD14 lets you capture 12-bit RAW files of approximately 13.3MB and Super High/Fine JPEGs of 7.5MB. Sigma's exclusive Photo Pro 3.0 software will even let you delicately tweak the colors and textural tones of RAW image data using a single intuitive color wheel control.
2. Dust Protector. A standard feature of all Sigma SD cameras, it prevents external dust and debris from adhering to the image sensor. In the SD 14 it can be installed and removed for easy cleaning with a single action. Removing the dust protector also enhances the SD14's performance when it's used for infrared photography.
3. 5-Point Distance Measurement AF. It's a superior autofocus system based on measuring the subject distance at 5 points, left, right, top, and bottom, for maximum ease of use, and provides central crosshairs for improved accuracy and manual or automatic point selection.

4. Big LCD, powerful built-in flash, mirror lockup. With a 2.5-inch, 150,000-pixel TFT LCD with new simplified control pad, powerful (ISO100 GN in feet 44) built-in flash, Quick Set Button for easy control access, and easy-to-use mirror lockup function, the SD14 is the most convenient and capable SD camera yet—a real pro.
5. Great lenses and accessories. With a full line of world class Sigma zoom and prime lenses ranging from 8mm fisheye to 800mm super telephoto, and a full range of dedicated Sigma accessories including the Power Grip PG-21, Remote Controller RS-31, and high powered flash units including the top-of-the-line Sigma EF-500 DG Super with auto-zoom, and S-TTL automatic flash metering with high-speed sync, the sleek, rugged Sigma SD14 is ready to meet any challenge and deliver topnotch imaging performance that sets a new standard for the industry.