Foveon Inc., a technology leader in high quality digital photography has announced the introduction and immediate availability of its new Foveon® X3™ image sensor. The Foveon X3 represents a true breakthrough in digital photography, bringing significant advantages over all other CCD and CMOS image sensors. Foveon X3 image sensors dramatically improve photographs from digital cameras by capturing three times the color resolution of comparable image sensors found in today's digital cameras. The use of Foveon X3 image sensors will lead to digital cameras that are simpler to design for manufacturers and that provide more image quality and performance value to customers. "The Foveon X3 represents the most significant breakthrough in digital camera technology since the invention of CCDs over 30 years ago. This new technology combines the immediacy and excitement of the digital photography experience with the quality that exceeds what consumers have previously come to expect only from film," says Jim Lau, Foveon's CEO.

In addition to increased color resolution, the new technology integrates high-resolution still photography with professional-quality full-motion video within a single image sensor enabling a new class of dual mode still/video digital cameras. "Current image sensor technology has not enabled digital cameras to realize their full potential. We believe the breakthroughs of the Foveon X3 technology will form the foundation of a new generation of digital cameras in all classes.", continued Lau.

The Foveon X3 is the world’s first color image sensor that captures red, green and blue light at each pixel, resulting in brilliantly sharper images, enhanced color, and freedom from unwanted "color rainbow" artifacts common in photographs from today's digital cameras. Foveon X3 image sensors detect color in a manner similar to that of color film. With film, different colors of light penetrate to different layers of photosensitive material, with each layer detecting a specific color. Using a similar concept, Foveon X3 image sensors consist of three layers of photo detectors embedded in silicon and are the first to detect three colors at every pixel location. The name X3 comes from a unique capability that the Foveon X3 technology brings - the ability to capture three colors at each single pixel location.

The Foveon X3 technology is highly scalable and will be used in designs for small, mid-range and large size image sensors. Foveon's first image sensors are targeted for professional, advanced amateur and high-end point-and-shoot camera users. Additional Foveon X3 image sensors are being designed that are suitable for a wide range of cameras including digital still/video cameras, PDA's, cell phones, security cameras, and fingerprint-recognition systems.

Higher Quality Photographs, Smaller File Sizes

Today's CCD and CMOS image sensors detect only one color of the three required colors at each pixel and must mathematically estimate the remaining two colors not detected. This limits the range and accuracy of the color captured thereby increasing the possibility of unwanted color artifacts in the photograph. By capturing three colors at every pixel instead of just one, Foveon X3 based cameras have measured information for all three colors. This results in high quality photographs with fewer numbers of pixels because the pixels are based on real measurements. Fewer pixels results in smaller file sizes allowing digital camera users to send a higher quality photograph more quickly through e-mail. It also means that more digital photos can be stored on a digital camera storage card.
The first camera that will use the Foveon X3 chip is the SD9 SLR digital camera made by Sigma Corporation. Photographs from the SD9 can be enlarged up to 30 inches, exceeding the quality of 35 mm film. Sigma Corporation will demonstrate the SD9 camera at the Photo Marketing Association convention, Booth # 1635 in Orlando, Florida on Feb 24-27, 2002.

High-Quality, Low-Cost Solutions for Dual Mode Digital Cameras

In addition to the breakthrough in color resolution, Foveon X3 image sensors are the first to incorporate a capability known as Variable Pixel Size (VPS). Foveon X3 full-color pixels can be grouped together to create larger, full-color "super pixels" ushering in a new class of dual capability still/video cameras. The size of the pixel groups is variable and can be configured instantaneously on the camera. VPS technology allows a Foveon X3 enabled digital camera to capture high-resolution still photographs and full-motion video that offers photo quality superior to 35 mm film, and video quality that rivals high-end digital camcorders.

Parents for example, could use this new type of camera to capture video of their child playing soccer. Mid-way through video recording they could press a shutter button, capture a high-resolution photograph and then seamlessly continue recording video. Security applications could also benefit from this high-quality dual-mode capture capability. Foveon X3 enabled airport security cameras could record video for general surveillance and capture high-resolution still photographs targeting suspected individuals or at timed intervals. "The photographic detail and color that can be achieved with this technology is unsurpassed," said Lau. "Pixel for pixel, Foveon X3 based digital cameras will deliver higher quality images than any other image sensor."

About Foveon

Foveon, Inc. was founded in 1997 by Dr. Carver Mead, a pioneer in solid-state electronics and VLSI design. Foveon's mission is to develop innovative products and technology that allow photographers to fully realize the potential of digital photography. The company's recent accomplishments include: the world's highest quality professional studio portrait camera, the world's first 16.8 million pixel CMOS image sensor and Foveon X3, the world's first full color image sensor. Foveon is a privately held company. Investors include: National Semiconductor Inc., Synaptics Inc. and New Enterprise Associates.

PERFORMANCE ADVANCES OF FOVEON X3 TECHNOLOGY

1. **Image sensors with Foveon X3 technology are much less susceptible to digital artifacts and create sharper images.**
   Current color image sensors (CCD and CMOS) contain just one layer of monochromatic photo detectors, with one photo detector per pixel. To capture color, the pixels in the image sensor are organized in a mosaic pattern resembling a three-color checkerboard. As a result, each pixel captures just one color-red, green or blue. The use of mosaic color filters in image sensors has inherent drawbacks, no matter how many pixels a mosaic-based image sensor might contain. Image sensors with Foveon X3 technology produce accurate color every time because it captures three colors at every pixel instead of one.

2. **VPS: Video Performance and High Resolution in a single chip.**
   Foveon X3 sensors come with a new feature known as Variable Pixel Size (VPS), bringing the benefits of small and large pixels together into a single image sensor.
Smaller pixels offer higher resolution and sharper images demanded by still photography. Larger pixels promote higher light sensitivity that is needed for low light situations, faster auto focus systems and video applications. The changing of pixel sizes can be accomplished instantaneously and is only achieved with the full-color capture of the **Foveon X3** technology.

3. **The only image sensors that capture color images by taking advantage of the natural color-separating properties of silicon.**

   **Foveon X3** image sensors are the world’s first to use silicon as a color filter. It is a well-known property of silicon that light of different colors is absorbed at different depths in the silicon. Each **Foveon X3** pixel consists of three photo detectors located at different depths within the sensor to detect the absorption of the red, green and blue light that has penetrated the silicon. Foveon is the first and only company to use silicon color separation for designing color image sensors for digital cameras.

4. **Less Complex, Lower Cost.**

   **Foveon X3** image sensors will streamline the electronic designs of digital cameras. Today's digital cameras use mosaic color filters and require complex mathematical algorithms to estimate the red, green and blue value of pixel, since only one color per pixel is being truly measured. To accomplish this interpolation, dedicated processing hardware and software are required inside the camera. Color interpolation adds cost and complexity to a camera while increasing delays between clicking the shutter button and capturing a picture, which can result in the difference between capturing a great picture or missing an important moment. By capturing all three colors at every pixel, **Foveon X3**-based image sensors eliminate the need for costly, complex and error-prone color interpolation. **Foveon X3** enables improved image quality, simplified camera designs and increased click-to-capture performance.