

# APEX CAMERAS FOR OPHTHALMOLOGY IMAGING



## Prism-based 3-CMOS cameras for ophthalmology devices delivering images with high color accuracy, high resolution and high sensitivity.

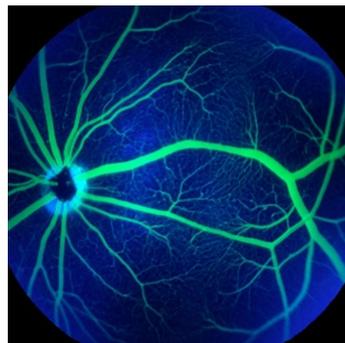
In the medical field of ophthalmology, examination of the retina using digital imaging techniques is an important part of general eye examination. Imaging systems look at interior eye features such as the retina, optic nerve head, the macula, and circulation in the retina's micro blood vessels. Digital color imaging techniques are used for disease diagnostics, monitoring progression of a disease or as part of general screening programs (for example, diabetes screening), as well as in research environments, where applications include basic eye function research, mechanisms of disease process, toxicity studies and pharmacological interventions.

Common to the applications in ophthalmology is the need for high resolution and high quality digital color images with precise spatial resolution and supreme color differentiation, enabling more accurate edge detection and the ability to resolve smaller details (for example the microcirculation system in the eye's retina).

JAI's 3-CMOS prism-based camera technology is designed to deliver exceptionally accurate and detailed color image data, and is therefore an excellent choice for OEM integration into ophthalmology fundus camera devices used not only in eye



diagnostics by health professionals, but also in basic eye research carried out by researchers at larger medical laboratories and at university sites. JAI's Apex Series of 3-CMOS prism-based area scan cameras provides a range of advantages in ophthalmology imaging. Please turn page.



*JAI Apex Series 3-CMOS area scan cameras are an excellent choice for OEM integration into ophthalmology fundus camera devices for health care and interior eye research. Turn page to learn more about the Apex cameras.*



See the possibilities



# Apex Series: 3-CMOS prism-based area scan cameras for life sciences.

JAI's new Apex series cameras are low noise, high sensitivity prism R-G-B color area scan cameras with 3 x 3.2 megapixels resolution (AP-3200T-USB-LS) and 3 x 1.6 megapixel resolution (AP-1600T-USB-LS). They offer a rich feature set for supreme color imaging in various aspects of ophthalmology imaging. The cameras are designed with a three-way prism that uses dichroic filters to separate the incoming light into red, green and blue wavelengths, which are directed to three precisely aligned CMOS sensors. The prism technique provides better R-G-B color accuracy, differentiation, and spatial precision than traditional color cameras based on the Bayer mosaic technique. The full color information provided in every pixel is ideal in demanding ophthalmology imaging where supreme color discrimination (for detecting subtle color nuances) and spatial resolution are key factors in disease diagnostics and research.

## Supreme color differentiation:

Ophthalmology examination often require the ability to distinguish specific color shades in order to better identify smaller abnormalities in eye interiors, for example in the optic nerve, the macula or the micro blood vessel systems. JAI's 3-CMOS prism camera technology provides better color separation than the interpolation/estimation of colors as found in cameras using Bayer color interpolation. Color differentiation is also increased due to the steeper spectral curves of the dichroic prism filters which results in smaller areas of "crosstalk" between color channels and thus, more certainty through the full light spectrum. These higher levels of color differentiation and dynamic range mean better performance in ophthalmology systems.

## High sensitivity:

In most life science imaging applications it is essential that the camera can capture as much light as possible to produce bright images showing all details. While the filter matrix on a traditional Bayer camera blocks two-thirds of the wavelengths falling on each pixel, the JAI three-sensor prism cameras capture the full range of wavelengths on each pixel for better overall sensitivity.

In addition, the prism glass in JAI's microscopy cameras offers better light transmission properties than the polymer filters on a standard Bayer sensor. This further boosts the sensitivity and helps to produce bright images of the eye interior with typical light sources.

## Color Enhancer tool:

Apex Series cameras can be made to "boost" the intensity of a specific color when needed for specific applications. Six different primary/complementary colors (red, green, blue, cyan,

magenta, yellow) are available for enhancement using a built-in Color Enhancer function. Each color can be amplified up to 2 times its normal intensity to make certain items "stand out", such as the red color of blood vs. surrounding tissue.

## Edge Enhancer tool:

This image processing filter can identify the boundaries between contrasting colors and then increase the contrast in those areas, thereby improving edge sharpness and definition of small details in the eye interior.

## Highest levels of dust/FOD suppression:

All Apex LS models provide exceptional image quality for most medical and life sciences applications, but some applications call for an even higher grade of image clarity, and here the LSX models are recommended. The Apex LSX models are all pre-screened to offer minimal levels of image artifacts from dust/FODs, providing maximum image quality for the most demanding life sciences and microscopy applications.



## APEX SERIES:

- ✓ AP-3200T-USB-LS / LSX\*
- ✓ 3 x 3.2 MP CMOS
- ✓ 38 fps over USB3 Vision
- ✓ IMX265
- ✓ AP-1600T-USB-LS / LSX\*
- ✓ 3 x 1.6 MP CMOS
- ✓ 79 fps over USB3 Vision
- ✓ IMX273

\*) Pre-screened "LSX" models offer minimal levels of image artifacts from dust/FODs

**DOWNLOAD WHITE PAPER:**  
Learn how using the unique advantages of 3-CMOS prism technology helps you to achieve superior image quality factors, such as real and full-color depth, improved color contrast, and better color differentiation.

## Camera technology from JAI

JAI offers a broad range of high quality industrial camera technology for integration into our customers' vision inspection systems, serving a wide range of industries such as life science, medical, pharmaceutical, semiconductor, automotive, food, sports/entertainment and more. Please contact JAI for a more detailed discussion of your camera needs for imaging in medical and life sciences applications and read more about JAI and our camera offerings on [www.jai.com](http://www.jai.com)

						
<b>Apex Series</b> 3-CMOS area scan cameras providing better color fidelity and spatial precision than traditional Bayer color cameras.	<b>Go Series</b> Megapixel area scan cameras with small dimensions, high frame rates and cutting edge sensor technology.	<b>Spark Series</b> Advanced area scan cameras delivering high resolution, high frame rates, and high image quality.	<b>Sweep Series</b> Monochrome & trilinear CMOS line scan cameras with high resolution, fast scan rates and high image quality.	<b>Sweep+ Series</b> Prism-based color line scan cameras combining highest color precision, fast line rates and multi-spectral options.	<b>Fusion Series</b> Dual-sensor area scan cameras with unique capabilities for specialized multi-spectral and HDR imaging applications.	<b>Wave Series</b> InGaAs dual-band line scan cameras capable of sensing Short Wave Infra-Red (SWIR) light. (900-1700 nm).

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