Whitepaper

SHARP / NEC

4K UHD projectors aren't all the same

Cinema-quality imaging now available for business, higher ed and other uses

You may have heard about 4K projectors and their ability to produce images with incredibly high resolution and superior color accuracy. What you may not have heard is that the vivid, detailed images that 4K projection technology provides aren't just for cinemas anymore. They can be the perfect solution for a variety of corporate, higher education and other needs, particularly where unsurpassed detail, true color rendition or cinema-quality video is required.

For example, NEC's new PX1005QL laser projector offers outstanding picture quality and easy, customizable installation. Its maintenance-free, 10,000-lumens laser light source provides up to 20,000 hours of life with a significantly lower total cost of ownership than comparable lamp-based projectors.

A wide variety of 4K projector models are available, but choosing the right solution can be challenging because of the confusion about what 4K actually is, plus subtle – but crucial – differences exist among the many projectors that are advertised as 4K.

What is 4K?

To meet the Consumer Technology Association's 4K standard, a projector, large format display or TV must have a minimum of 8.3 million active pixels, with at least 3840 horizontally and at least 2160 vertically. Pixels (short for "picture element") are the dots that make up the images shown on a screen. The more active (also known as addressable) pixels displayed on the screen, the more realistic and detailed the image will be.

This level of resolution is called "4K" because it has approximately 4,000 horizontal pixels. ("K" is a common abbreviation for "1000," thus "4K.") To be certified as 4K, the physical pixels must be "individually addressable such that the horizontal and vertical resolution can be demonstrated over the full range of colors provided by the display," according to the Association.

Does it make a difference?

There's a good reason for all of the hype surrounding 4K: It delivers four times as many pixels than are found in full HD (high definition). This higher pixel density means that images appear lifelike because they have more texture and detail, as well as unsurpassed color reproduction. 4K ensures that you won't be able to see individual pixels, even if you sit close to the screen. 4K displays also allow users to take full advantage of 4K inputs, such as Ultra HD Blu-ray and Neflix's 4K streaming content, for the ultimate in screen clarity.

The different types of 4K projectors

There are three basic types of 4K projectors: native 4K, 4K UHD (ultra high definition), and enhanced or supported 4K. Let's take a look at each of these categories and highlight the differences among them.

Native 4K

These projectors produce 8.8 million pixels to create a native DCI (4096 x 2160) image. Traditionally developed for the Digital Cinema industry and premium large format screens they have become increasingly popular for the large venue space. They're known as "native" because they use three 4K DMD chips (imaging device) to produce more than the required 8.8 million pixels on the screen – without any pixel shifting (explained below).

4K UHD

A 4K UHD projector has a single DLP chip that produces 4K resolution by using an innovative pixel-shifting technology developed by Texas Instruments. A DLP chip has a digital mirror device with 4.15 million mirrors, and when the chip produces an image, each of these mirrors shifts slightly – the distance of half a pixel – to project two pixels in quick succession, thus delivering 8.3 million pixels to the screen.. Because this pixel shift is so miniscule and fast, viewers perceive the same level of resolution and color accuracy as a native 4K image.

Benefits of these pixel-shifting 4K UHD projectors include a smaller form factor, less weight and lower prices – when compared to native 4K projectors. Even better, the single chip means there's no risk of chip alignment problems.

Although 4K UHD projectors from all manufacturers use TI's DLP chip and pixel-shifting technology, significant differences exist between them. Some 4K UHD models, aimed primarily at home theater users, have relatively low brightness (measured in lumens). Critical differences also emerge in several other areas – including the quality of optics and the capacities of their 4K engine and imaging software – all of which have a significant effect on the image seen on a screen.

Enhanced or supported 4K

Several manufacturers use their own pixel-shifting technologies to increase the number of pixels on the screen. To approximate 4K, these projectors produce 4.15 addressable million pixels. That's an obvious improvement over Full HD (2.07 million pixels), but it falls well short of the 4K standard of 8.3 million pixels. As a result, enhanced or supported 4K projectors deliver noticeably sharper images than Full HD projectors but lack the unrivaled details and color accuracy of native 4K or 4K UHD projectors.

4K UHD Projectors: Pixels Tell the Story

	Total number of pixels	Number of addressable pixels	Result
Native 4K	8.8 million	8.8 million	unrivaled details and color accuracy
4K UHD	8.3 million	8.3 million	four times the resolution of Full HD
Enhanced/ Supported UHD	4.15 million	4.15 million	increased pixel density
Full HD	2.07 million	2.07 million	better than standard definition

4K UHD projectors in corporate, higher education and other environments

Because they deliver outstanding image quality at a much lower cost than native 4K projectors, 4K UHD projectors are ideal for many uses in corporate, higher education and other environments. Auditoriums, museums, theaters, classrooms, sanctuaries, network operation centers are among the venues in which the advantages of 4K UHD projectors may be realized. These projectors are particularly well-suited for video, artwork, photos, and other color-critical applications, as well as for images that require the maximum amount of detail.

For example, NEC's 10,000 lumens PX1005QL laser projector delivers seamlessly smooth high-resolution 4K images, perfect for when unsurpassed fine detail, accurate colors or cinema-quality video is needed. As a sample use case, this high-brightness projector is a great fit for displaying detailed CAD images – either in an architectural firm's meeting room or in a classroom at an architecture school. As an added bonus, its multi-picture capabilities enable a user to display four separate 1080p images at once, creating the ultimate presentation and collaboration experience.

The right solution

When considering whether a 4K projector is the right solution for your needs, keep in mind the differences between native 4K, 4K UHD, and enhanced or supported 4K. The good news is that 4K UHD projectors have made 4K projection an affordable option for corporate, higher education, and other users – bringing cinema-quality projection to boardrooms and classrooms and presenting images in a whole new light.

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