

4K-UHD – LET’S MAKE SOMETHING CLEAR!

Making the case for DLP 4K-UHD laser projectors.



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The introduction of 4K-UHD projectors bring a remarkably bright, highly detailed solution for discerning large-screen applications. Installations where both image detail and image stability are critical will directly benefit from the 4K-UHD advanced resolution, together with a solid-state illumination platform. Additionally, applications where image uniformity is critical, such as venues employing the same content across numerous screens simultaneously, will immediately realise value from the 4K-UHD laser's consistent solid-state illumination performance. In environments where the projector will be installed in hard-to-access locations, the impressive, limited maintenance

4K-UHD RESOLUTION

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requirements of the range of 4K-UHD laser projectors will save both time and money - an often-overlooked, but significant benefit of DLP with solid state illumination.

What exactly is 4K-UHD? Is it the same as 4K-Enhanced?

Firstly, let's look at 4K-UHD. Put simply, The Consumer Technology Association (CTA)⁽²⁾ definition of 4K Ultra HD resolution states the display must have **at least 8 million active pixels on screen**. This is because 4K-UHD content can **only** be enjoyed as accurately as intended **if** all 8M pixels are displayed. But not all "4K" projectors are equal.

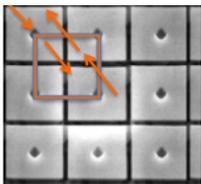
All 4K-UHD DLP projectors from Digital Projection overachieve the CTA criteria, with a guaranteed 8.3M pixels being displayed on screen. Conversely, so-called "4K-Enhanced" projectors are not capable of displaying the minimum 8 million pixels on screen and therefore the viewer will not see 4K-UHD content as it was intended.

Simply put: 4K-Enhanced is NOT the same as 4K-UHD. In fact, it is not 4K at all!

How is 4K-UHD achieved from a native HD imaging device?

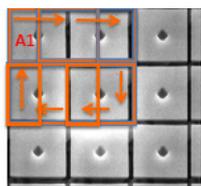
This is where things get a bit technical. There are 2 methods of DLP Pixel Shifting technology that allow for full 4K-UHD resolution to be displayed onscreen – Two-Phase and Four-Phase pixel shift.

Two-Phase (or two-way) pixel shift



This is a diagonal shift method and is used on our E-Vision 4K-UHD models. The E-Vision 4K-UHD's native resolution is 2716 x 1528. Each pixel is displaced diagonally, and the length of the diagonal movement is 1.414 of a pixel (calculated using Pythagoras theory – see ⁽¹⁾ for explanation). Therefore $2716 \times 1.414 = 3840$ and $1528 \times 1.414 = 2160$. Or in other words: 4K-UHD!

To ensure the 4K-UHD image is as smooth possible, the two-way shift method generally uses a display rate that is two times the incoming signal rate – for example, a 60Hz input is displayed at 120Hz. This results in beautiful, accurate 4K-UHD images.

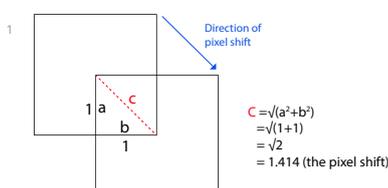


Four-Phase (or four-way) pixel shift

This method uses a four-position shift and is found in our TITAN models. The Titan 4K-UHD's native resolution is 1920 x 1200, but in 4K-UHD mode it only uses 1920x1080 of the native pixels. Each pixel is displaced by half a pixel horizontally and vertically. Here, we double the pixel display as we have two positions horizontally and two position vertically. Therefore $1920 \times 2 = 3840$ and $1080 \times 2 = 2160$.

Again, to ensure that the 4K-UHD image is as smooth possible, four-way shift systems generally feature a display rate that is four times the incoming signal rate – for example, a 60Hz input is displayed at 240Hz. As with the two-way shifting method, this also ensures stunning, natural 4K-UHD images can be enjoyed by the viewer.

In summary: If you want or need 4K-UHD resolution, you can be assured that Digital Projection will always display enough pixels to give you true 4K Ultra High Definition. Don't be fooled by cheap imitations!



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² CTA 4K-UHD Definition: <https://cdn.cta.tech/cta/media/media/membership/pdfs/video-technology-consumer-definitions.pdf>