4K Signal Management

DEXON USA

4K is Here!

Years ago, the first commercial 4K displays came to market with five-figure price tags. Today, you can buy an Ultra HD television (3840x2160) for as little as $300, and display panel manufacturers are rapidly shifting production from beyond 4K resolution. 4K is now the standard resolution for both display monitors and televisions, and 8K is lurking on the horizon.

What you need to know:

- 4K@60
- UHD
- RGB and YUV color spaces
- 4:2:2,4:2:0 and 4:4:4 color sampling
- Custom resolutions in regards to inputs and scaled outputs (necessary to match LED wall custom configurations)
- HDCP 2.2

What is 4K?

4K resolution is the next evolution in visual quality for screens of all varieties, from smartphones up to impressive in-home entertainment setups to movie screens. Where "HD", or high definition"used to be the gold standard for image quality at 1280 x 720 pixels-per-square-inch (sometimes called 720p for short), or 1920 x 1080 (1080p), 4K resolution has now assumed the crown. At 3840 x 2160 pixels-per-square-inch, it's also referred to commercially as UHD, or ultra high definition. A greater pixel density means that images are shown in greater clarity, and mimic the abilities of the healthy human eye more closely: it's no mystery why this resolution in some computer monitors are sold under the term "retina display." In television and consumer media, 3840×2160 (4K UHD) is the dominant 4K standard.

Industry Transition to 4K

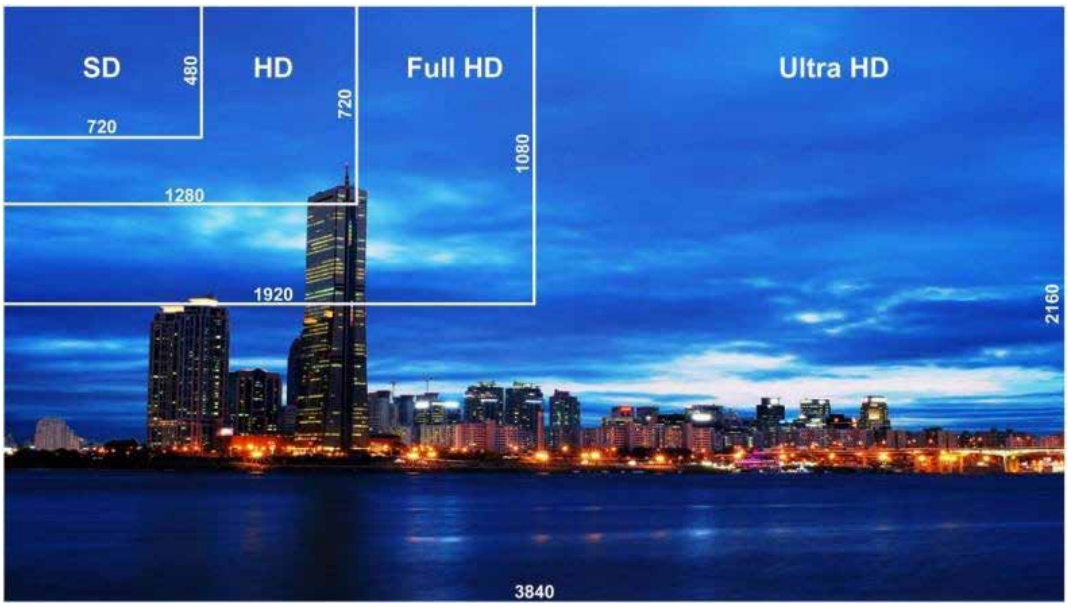
As 4k-branded screens are overtaking their full HD counterparts in the open market, the view from outside-in can feel dizzying. While it's only natural for consumers to want bigger-better products for their use and entertainment, the driving factors go far beyond a familiar interest in new tech. Much like tech battles reaching back to the VHS-versus-Betamax (or HD DVD-versus-Bluray more recently), consumer adoption is driven largely by available content. With new gaming systems like the XBox One and Playstation 4 releasing titles in 4k resolution, and movies following suit, it's not hard to see the writing on the marquee wall: where Hollywood and the gaming industry goes, so does market share.

Beyond a simple follow-the-leader mentality, there's the underlying concern of being closed off due to outdated tech. If all the new games and movies are embracing 4K, a fan without the requisite systems to interface and display it properly is a fan left unsatisfied. In order to continue serving these eager tech fans, manufacturers will have to take cues from the entertainment industry, rather than remaining mired in outdated resolution sets.

UHD

Ultra High Definition, or UHD for short, is the next step up from what's called full HD, the official name for the display resolution of 1,920 by 1,080. UHD quadruples the resolution to 3,840 by 2,160.

There's no doubt about it: 4K Ultra HD is now the industry standard for television panels, with the increased detail bearing even more fruit at larger television sizes where you're able to see the difference more clearly.



Switching and Distributing of 4K Signals

We know that enhancements for 4K imaging will drive up clock rates considerably. Even a basic 4K image with normal color and dynamic range will double the clock frequency as it has four times the resolution of a Full HD image (2x horizontal and 2x vertical).

Need to calculate the data rate? Here's a tip: With two different versions of "4K" resolution to consider – plus 5K and unusual superwide screen pixel counts – don't focus on the image resolution. Instead, calculate the required data rate (total pixels (x) refresh rate (x) color bit depth (x) color mode). If your signal management gear is fast enough to pass the calculated data rate, then it also will pass the desired resolution.

Why is 4K Signal Management Crucial?

No matter how new and powerful tech is, it's always vulnerable to at least one factor: time. As movies and video games adapt and embrace 4K, it's only a matter of time before they begin pushing those limits as well. Securing the internal and external bandwidth to manage those increasingly-demanding titles is the job of 4K signal management: without it, flickering, "jumping" and a less-than-optimal viewing experience will frustrate a 4K base that's spent a good deal to avoid these issues.

While incredible clarity and realism is a laudable goal for 4K, it absolutely must have the support to sustain it over time. Movies are turning to marathons, streaming services are putting more demands than ever before on in-home screens, and video games are evolving exponentially as well. The right signal management is what will differentiate 4K from its hardworking 1080p predecessor, as will smart manufacturing balances between power and capability from the frame up.

The transition to 4K and beyond is well underway. While there will be abundant choices for 4K displays and 4K content, the biggest remaining challenge for designers,installers, and facility managers is to build a 4K signal management infrastructure that has sufficient bandwidth to transport, switch, and distribute 4K signals that also use new, more secure copy protection systems. Dexon USA is ready when you are with a fast-growing portfolio of 4K signal management products to meet your needs, from basic to advanced solutions.

About DEXON Systems

DEXON Systems Ltd. is the developer and manufacturer of advanced videowall controllers for multi-screen video display products. The company has grown to be a leading videowall technology and solution supplier since its establishment in 1990. DEXON Systems works in close cooperation with system integrator partners having thousands of 24/7 operating mission critical control rooms all over the world.

DEXON USA is the North American partner providing sales, support, system design and training for DEXON Systems' projects. DEXON USA brings to the table deep technical experience in video processors, matrix routers and AV control systems along with extensive applications development and design resources.

Check out dexonusa.com for more industry relevant resources.