

UNDERSTANDING 4K SPECS FOR REAL-WORLD INSTALLATIONS

Providing customers a great viewing experience means addressing the various individual aspects in the 4K Ultra HD electronics chain. *by Stephanie Casimiro*

THE A/V INDUSTRY knew it was coming when the first 4K Ultra HD television was released and now it's here — access to 4K content, affordable 4K TVs and 4K Blu-ray players. However, understanding the Ultra HD system's specifications in order to use the right cables and accessories that support this new technology has been a challenge. The 4K specification is actually a range set that has to be compatible for the entire system; from the display to the source, all of its cables and even the accessories.

One weak link in your system design can result in connection errors or a picture that displays far less than its full 4K potential.

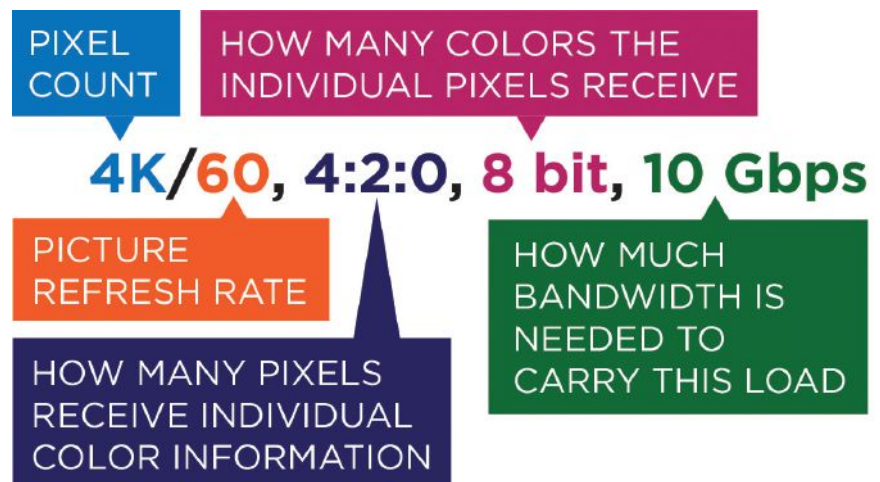
Unreliable claims on accessory packaging and confusion over 4K specifications have left many installers scratching their heads. To understand where and how these issues occur, here's an overview of the most important 4K topics — the specification, televisions, content and cable certification.

UNDERSTANDING THE 4K SPECIFICATION

Let's break down this sample 4K spec: 4K/60, 4:2:0, 8 bit, 10 Gbps.

Now let's define each of these components:

4K — The number of pixels in the screen (in the case of 4K representing the roughly 4,000 horizontal pixels — for UHD TV the standard is 3840 x 2160, while the DCI movie



The 4K specification addresses several areas of which integrators should increase familiarity.

spec is 4096 x 2160). These pixels are counted across and down, and in total comprise approximately 8 million. Theoretically, the more pixels, the higher quality picture.

4K/60 — The frame refresh rate per second, represented in Hz (you'll commonly see 4K/60Hz or 4K@60Hz), is how many individual frames are displayed during a one-second period of time. A higher number theoretically means a smoother transition in the picture.

4K/60, 4:2:0 — Without getting too technical, this color sampling or sub-sampling figure represents the number of pixels receiving color information (see *more on page 22*). The most common versions for consumer electronics are:

▶ **4:2:0** — one in four pixels getting

color information

▶ **4:4:4** — four in four pixels getting color information

Bit rate — Usually rated as 8, 10, 12 or 16, refers to the number of colors available to each pixel. The higher the bit number, the more color options the pixels have. This table shows the big difference in colors available when you go from 8 bit to 12 bit:

▶ **8 bit** — has 16,777,216 different colors available

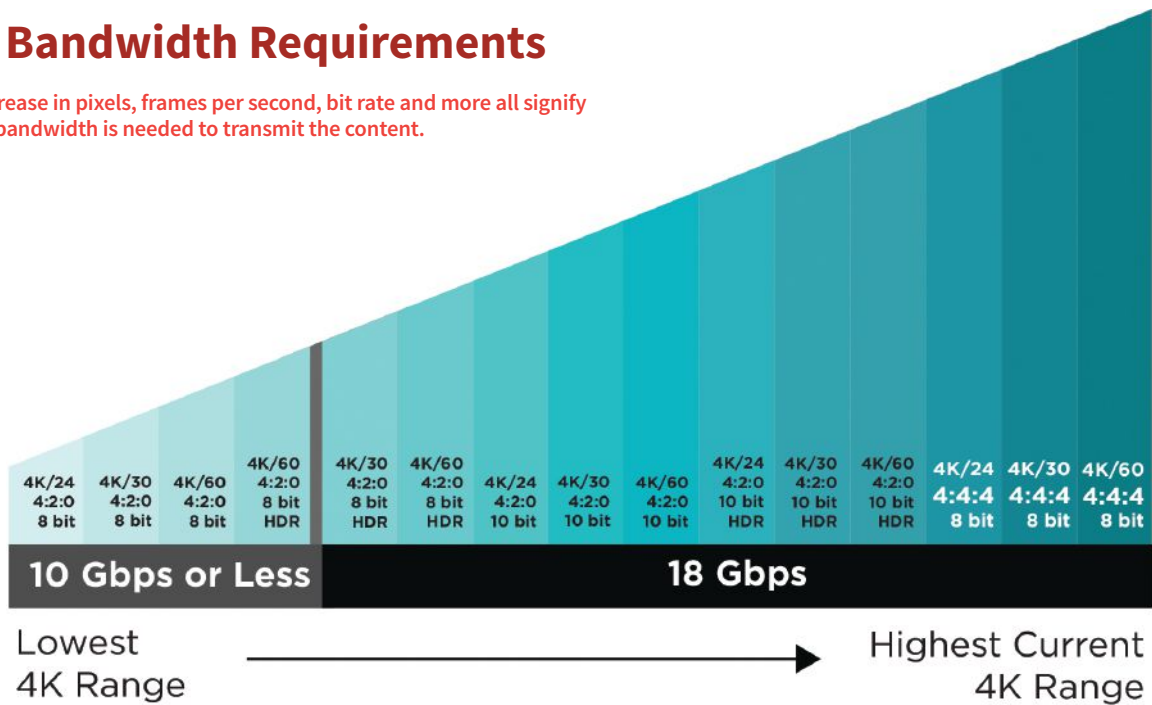
▶ **10 bit** — has 1,073,741,824 different colors available

▶ **12 bit** — has 68,719,476,736 different colors available

Gbps — The data bandwidth needed to carry all the pixel data, refresh rate, color and luminance necessary to create

4K Bandwidth Requirements

An increase in pixels, frames per second, bit rate and more all signify more bandwidth is needed to transmit the content.



the picture, measured in gigabits per second. An increase in pixels, frames per second, bit rate, and other specs means more bandwidth is needed to deliver the content. Refer to the chart showing the 4K range.

The picture on the screen reflects the lowest spec in the entire 4K system, making the specs for each piece of equipment in the system crucial to its final output.

For example, a high-performance 4K TV with a 16 bit rate using a lower range 4K spec source with an 8 bit rate will display an 8 bit picture, resulting in considerably less color information for each pixel. In this scenario, the picture will look less impressive as it did in the showroom when you were demonstrating it for potential customers.

UNDERSTANDING 4K TELEVISIONS

The first release of 4K TVs brought to light important issues. HDCP 2.2 compatibility is now required as the latest security for viewing 4K content. The television's HDMI inputs need to support HDR (high dynamic range) and HDCP 2.2. In addition, new UHD Blu-ray play-

ers for viewing disc-based 4K content will not work if the HDMI inputs will not support 4K.

Check the display's manual when setting up the new system to locate the correct input to use. Using the wrong HDMI input will give you an error message resulting in no picture on the source.

UNDERSTANDING WHERE TO GET 4K CONTENT

Streaming options are available for 4K content on Netflix, Amazon, Ultrafix, YouTube, Vudu and various apps (Sony's Ultra 4K; the company also has a 4K server-type media player). 4K televisions may support internal apps to stream this content, however Wi-Fi broadband needs to support a 4K video stream. A UHD Blu-ray player uses lasers of a different wavelength than regular Blu-ray players. (For more on content, see page 18.)

When connecting these sources to the TV, the correct spec needs to be engineered in the cables, or as previously stated, the content will only be as good as the weakest link in the system. Which brings us to our next topic.

UNDERSTANDING CABLE CERTIFICATION

Be cautious of manufacturer claims and misleading packaging. Many cables and accessories will state "4K" on the packaging, but as explained, there is a big variation within the 4K spec range. Others have spec claims that are blatantly incorrect. Not all cables are manufactured with the same technology and their quality can vary significantly.

DPL Labs conducts independent testing during various times of the production year to guarantee the quality and validity of manufacturer claims. Since the length of the cable changes the 4K specs, each length is tested to assure that the claims for even the longer runs will work as marketed. Look for this trusted certification on products being used for 4K installs to ensure the final picture displays at its full 4K potential (also, see more from HDMI and UL groups on page 17).

The A/V industry is constantly evolving with the release of each new piece of technology, so continue to stay educated! ■

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