All Cables Are *NOT* the Same.

Learn The Truth About 4K HDMI® Cables and Bandwidth

Metra® HOME THEATER GROUP

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If you're investing in a 4K/ HDR display or home theater system, you'll need to also invest in the right 4K cables. Otherwise, you'll never actually experience the true potential of 4K / HDR because the amount of data necessary to produce this high level of picture won't be able to reach your 4K device. You'll end up seeing a reduced quality image that might not be much better than what you were getting before your upgrade.

In this whitepaper, we'll explain why and how this happens.

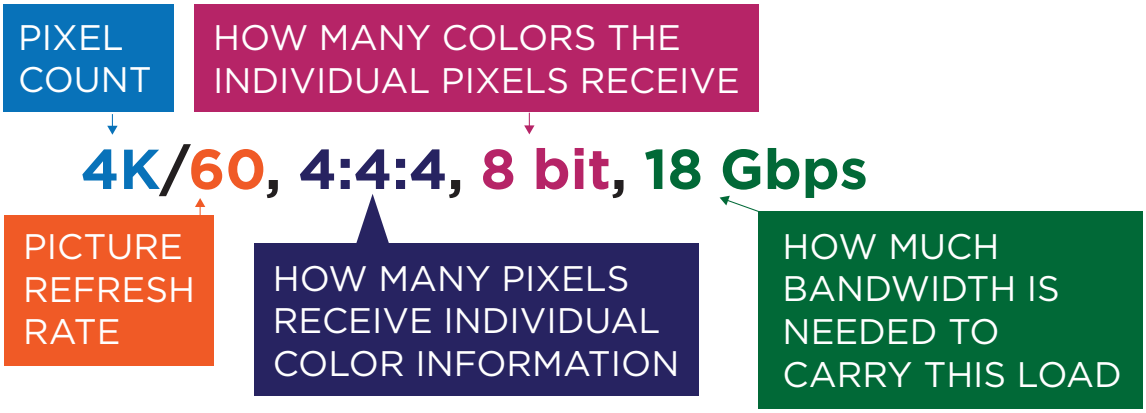
What is 4K and HDR?

The term 4K is used to describe a higher resolution display, and higher pixel count - roughly four times greater than the standard HD televisions of the past.

The higher resolution results in images with better definition, greater clarity, more depth, expanded color, and a significantly more realistic appearance. HDR relates to color, brightness, contrast and the spectrum of each that is displayed on screen.

4K is a Range, Not Just a Number

Although 4K has become a catchall term for high-quality video displays that boast a 4K pixel count, there are actually several other factors that are taken into consideration before a TV can earn a true 4K specification.



Pixel Count

The higher the density of pixels, the more detailed and lifelike the picture will be. 4K is currently the highest rating available, and equates to about 8.3 million pixels.

Picture Refresh Rate

Refresh rate is how often the picture is completely rebuilt on the screen. A higher picture refresh rate results in a smoother, less jerky viewing experience.

Number of Pixels That Receive Individual Color Information

A digital image is made up of data - numbers indicating variations of red, green, and blue at a particular location on a grid of pixels. Some of these pixels 'work' harder than others, providing vivid colors – while others simply help define the edges of the picture, or provide light.

Bit Rate

Number of different colors each of the individual pixels receive - Known as the 'bit rate,' the number of colors available to each pixel makes a big difference in the quality of the finished image.

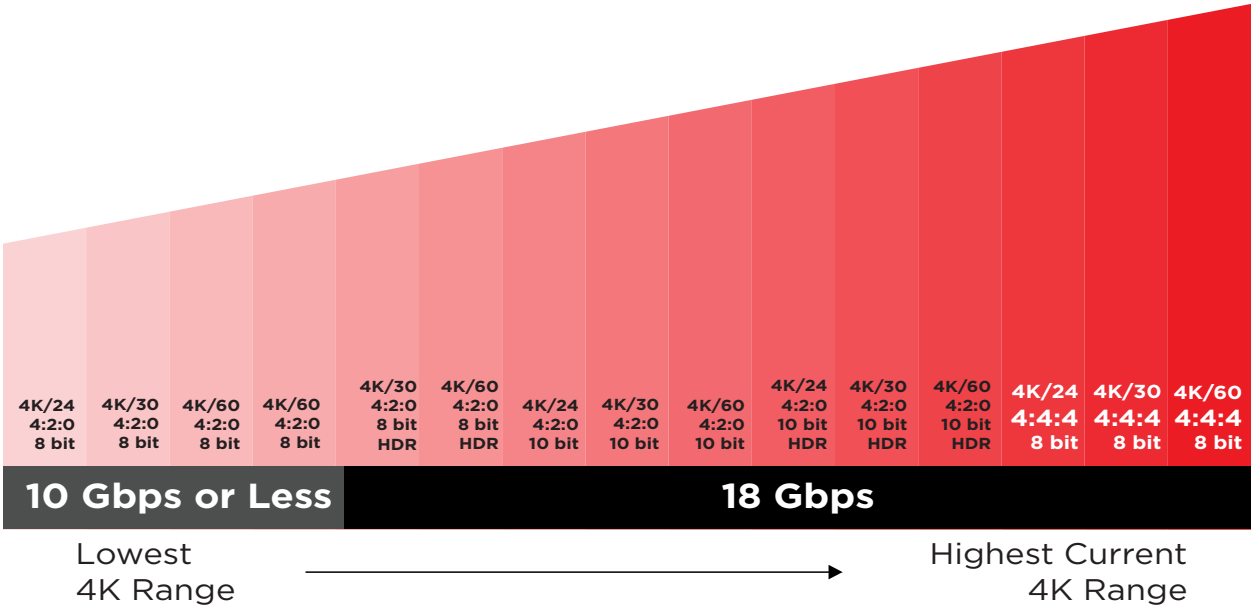
8 Bit – 16.777.216 colors
10 Bit – 1.073.741.824 colors
12 Bit - 68.719.476.736 colors

Bandwidth

Measured in gigabits per second (Gbps), the data bandwidth refers to the capacity to transmit all of this information to create the picture. As any one of the aforementioned components is increased, a higher bandwidth is needed. Prior to 4K advancements, the standard bandwidth requirement for HDMI® cables was 10.2Gbps. However, an 18Gbps cable is required to adequately transmit true 4K data.

The 4K Spectrum

Since each of the elements that make up the 4K specification vary, 4K ends up being a range rather than one specific number.



Cables claiming to be 4K but have less than 18Gbps bandwidth are on the low end range of the 4K spectrum, and won't be capable of transmitting the full amount of data to provide the desired picture for higher 4K spec displays.

However, if you're upgrading your home theater, 4K isn't the only feature to consider...

High Dynamic Range (HDR)

Dynamic range relates to color, brightness, contrast and the spectrum of each that is displayed on screen.

A higher dynamic range helps to broaden the spectrum to ensure that the image shown on your television is closer to real life; reaching the full potential of what your eyes have the ability to perceive. HDR is a premium feature that goes hand in hand with 4K video. *If you're looking to make the jump to 4K, HDR is a recommended, "must-have" feature.*

An example of HDR versus non-HDR picture quality

Contrast: This is the difference between the brightest white and the darkest, deepest black. Contrast is one of the most important factors in TV picture quality, and HDR provides more shades in between the brightest white to grey to pitch black.

Color: HDR-capable displays can show images built by using a richer color palette than TVs of the past. In order to be considered HDR, a TV must be capable of processing at minimum a 10-bit or 'deep color'. Displaying over a billion individual colors, 10-bit color is an improvement over 8-bit color, which used to be the standard. As a point of reference, 8-bit color displayed roughly 16 million colors.

When you invest in a high-end display or home theater system, you must also invest in the ***correct cable connections***. Cheap or poorly engineered cables can compress your data, which means that none of your top-of-the-line video equipment will be able to reach its full potential to provide the true 4K / HDR experience.

The Truth About HDMI Cables

There is a myth that all HDMI® cables are the same, from the $5 cables to the $500 cables. But that's not the case. Since 4K pertains to a range rather than a single specification, this has left the door open for misleading claims.

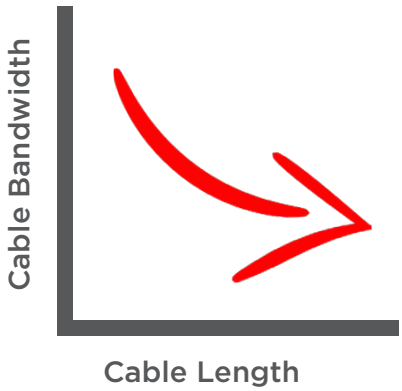
A manufacturer can claim that their cable is "4K", even if it only supports the lower range of the 4K spectrum – ***even as low as 7Gbps!***

This means that cables labeled at 4K may not be capable of 18Gbps, some can't even make it to 10.2Gbps. In fact, many copper HDMI® cable claims are flat out lies. Some of the cheaper cables on the market are composed of inferior materials – a mixture of metals instead of pure copper – and don't deliver full 18Gbps bandwidth. Many active cables do not have the right technology to allow for compatibility with many of the popular 4K TVs, projectors or Blu-Ray players.

While they may pass an initial HDMI® certification test, they could still fail once plugged into specific home theater setups due to conflicts between the devices. Defective cables, even those that have an HDMI® certification label on the packaging, can occur due to manufacturers changing their "sources" or moving to cheaper components after their initial prototype was tested and approved through the traditional HDMI® certification process.

Bandwidth and Length

As the length of a copper HDMI® cable increases, its data bandwidth decreases. While a low-end cable may deliver 4K at 1 meter, it could start to struggle as length increases. This is a common challenge for manufacturers, which requires research, development, and the best materials, construction and technology in order to deliver full, uncompressed data in longer cable lengths. For 4K / HDR home theater systems requiring more than 100 feet of cable, optical fiber HDMI® cables are recommended, but do come at a higher price tag than copper HDMI® cables.



While copper HDMI® cables provide a great value, the cheapest ones usually won't cut it.

Why Metra Home Theater Group Cables?

Metra Home Theater Group is the leader in developing high definition HDMI® cables and solutions that deliver the ultimate 4K/HDR performance. You can rest assured that you're actually getting a 4K cable that can deliver the best, true performance. Don't just take our word for it – we've sent all of our products to independent testing company, DPL Labs, to earn their seal of approval.

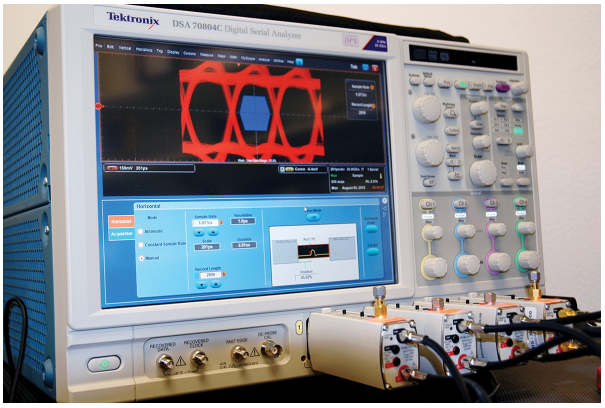
- We engineer cables with our latest, cutting edge technology, and use only the highest grade materials.
- We have a history of being first to market for HDMI® solutions and are proudly known to have NO defective products.
- Metra Home Theater Group's 4K HDMI® cables have been approved by DPL's New Expanded 4K Product Certification Program.

Metra HOME THEATER GROUP

Metra's HDMI® cables not only provide full 4K performance, but will exceed your expectations in both quality and long-term reliability.

The Seal of Approval from DPL Labs

Located in Ormond Beach, FL, DPL Labs is a world-class state-of-the-art digital technology testing laboratory. Their Digital Performance Level (DPL) Program enables manufacturers of HD Digital products to measure their performance and reliability in real-world scenarios. Through hundreds of case studies and thousands of hours of research, DPL Labs developed a testing program that puts each product through a rigorous torture test to ensure that it not only works as claimed, but will work with a variety of sources and devices when it's actually put to use in the field.



Testing equipment at DPL Labs.

Only products that meet the strict DPL performance criteria are given the DPL Seal of Approval.

Beyond Traditional Certification Programs

The torture testing at DPL Labs goes beyond traditional certification programs, which usually only test to make sure a product is "up to spec". Most certification testing does not provide real world testing scenarios to ensure compatibility of the product with other devices. Throughout the year, DPL Labs will also pull products directly from a manufacturer's warehouse for further testing, to confirm that they are still meeting the performance criteria for approval. This prevents a manufacturer from submitting a product for testing that is not the actual product being used out in the market – and yes, this does happen! As of today, DPL Labs is the only HDMI® testing facility that does this.

This testing process is a direct response to complaints and frustrations expressed by installers who were experiencing difficulties in the field. Quite often, installers and integrators would set up an entire home entertainment system, with HDMI® cables run through walls or ceilings, only to discover that the 4K devices that they'd connected were not compatible. Thanks to DPL's certification program, installers can now feel confident that the HDMI® cables that they are installing offer sufficient bandwidth, durability, and mechanical construction – and work well with a multitude of 4K devices.