

## »» Television

# THE FUTURE IS BRIGHT

**HDTV wasn't nearly the big step forward everyone thought it was. But all that's about to change, and the keyword is brightness...**

Other than two new resolutions and the addition of 24 Hz support, there's not an awful lot HDTV brought to the table over and above what was already offered by SDTV. The real revolution came in the form of digital flat panel technology, a technology for which the HDTV standard was not originally intended.

That's about to change in a big way: a new and very forward-thinking standard for TV is on its way. Called Ultra HD, it's not to be confused with the "4K"/UHD TV manufacturers have been pushing the last few years.

These current displays adhere to the HDTV picture standard, the same colour gamut, and the same 256 video levels — they only differ in

resolution (although there are a few premium current sets that will offer Ultra HD compatibility via a firmware upgrade).

Manufacturers have known Ultra HD was on the horizon for some time, but rather than wait for a final specification, they decided to get the ball rolling early to push sales. This will of course cause a lot of consumer confusion as we transition to the new standard (not to mention some less than impressed early adopters).

For this reason, major Hollywood studios, consumer electronics brands, content distributors, and post-production and technology companies have banded together to form the Ultra HD Alliance (UHDA) in the hope of clearing up the confusion by presenting the consumer with a consolidated Ultra HD brand.

To this end, the UHDA will be issuing a logo, much like the "Full HD" logo we have today, when Ultra HD launches in 2016, to communicate to consumers that the device is a true Ultra HDTV and compliant with the specifications set for the standard.

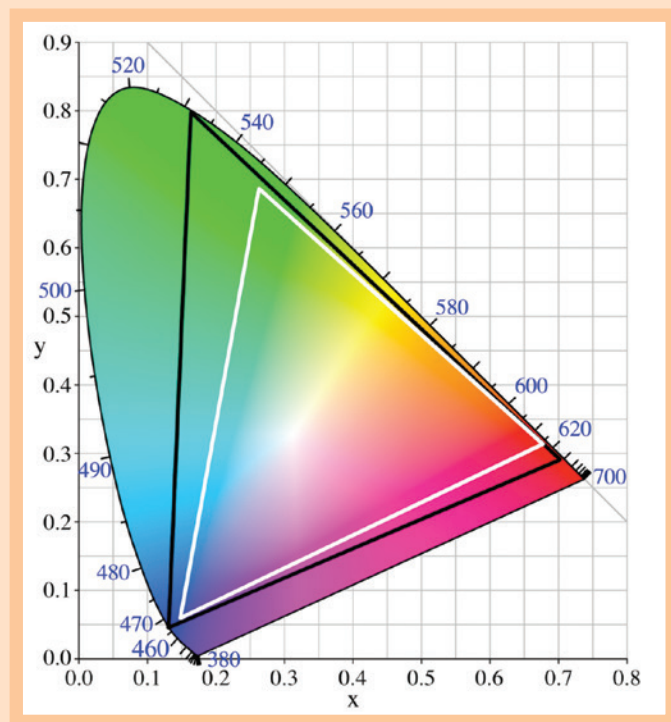


Ultra HD is a complete overhaul of our decades-old video system, designed from the ground up to take advantage of the current and future capabilities of digital displays. It offers far more than just new refresh rates and resolutions, though it has those too — the two new resolutions it introduces are 3840 x 2160 or “4K” and 7680 x 4320 or “8K”.

“8K” is considered to be beyond the human eye’s ability to fully resolve when viewing the image as a whole, so we can reasonably expect this to mark an end to the resolution arms race.

The standard for Ultra HD, BT.2020, specifies a much wider colour gamut than that of the current HDTV standard. It’s so wide in fact that current panel technology can’t meet it yet. Instead, the full gamut is to be considered headroom, which we’ll be working our way toward as flat panel technology progresses. For now it seems most likely that the cinema standard DCI-P3 will rest within this gamut as our colour target.

Never before has this level of colour fidelity and picture depth been available to the consumer. Due to the limitations of our current system, colourists run into problems converting cinema releases for home viewing, since certain saturations are just not available to them: a crisp blue sky might end up a milky blue-ish grey, to cite an example. Colour banding is another issue due to the limited video levels of our current system, but with DCI-P3 this conversion process can be skipped entirely.



White: DCI-P3  
Black: BT.2020

With the level range greatly expanded (giving us gradations in the thousands to work with), significant boosts in resolution and a far wider colour gamut, we can expect unprecedented detail and nuance from our Ultra HD displays.

But this also gives us the ability to push the single most important performance metric of a display: contrast. TVs are about to get bright, very bright. The HDTV standard calls for a brightness of 100 nits, but today’s displays equipped with full-array LED backlighting can manage as high as 1000 nits. Ultra HD specifies a brightness of 10 000 nits!

While this may sound uncomfortably bright, that’s because you’re thinking in terms of how light is distributed across video levels by TVs today. Ultra HD sees the introduction of a new type of perceptually based gamma, one not beholden to the electro-optical transfer function of the CRT, but based on our own visual perception, made possible by the digital nature of displays today. It’s an exciting new system capable of rendering images in true-to-life fashion.

This technology currently goes by the name of HDR, although it’s not to be confused with the HDR associated with photography and video games. It isn’t a method of downsampling a wide dynamic range image to fit within a video system, but a video system capable of displaying true-to-life dynamic range.

It will take some time for our displays to reach these light output levels, but a solution has been integrated into the standard. Initially, Ultra HD content will be authored with target output levels of between 1 000 and 4 000 nits. These targets will be contained within the content metadata, which the display will be capable of reading and applying to its own output characteristics. It’s a great idea and a great step forward in picture accuracy for the consumer in general.

When HDTV was first introduced, it was hyped as producing images so real you’d think you were looking through a window. Ultra HD looks set to turn that ideal into a reality.

**Jason Roos**