

# It's All About the K's



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Gary Olson reviews the challenges and wisdom of moving to an 8K infrastructure.

I was all set to write my next chapter on standards and terminology when the [The Broadcast Bridge](#) published an article quoting the Olympic Broadcast Service (OBS) that said, 4K is just a Bus Stop to 8K (along with 22.2 audio channels).

Now for the fine print. First you need to be one of the select few in Japan with an 8K/22.2 screening room. Second you must arrange for a special feed from NHK. Even NBC will be getting 4K as a down convert because there will be no native 4K OBS cameras. Remember when SDI was a down convert from HD? We haven't even gotten to down converting to HD from 4K yet and here we are going from 8K to 4K.

Recently a letter signed by a group of broadcasters, integrators, rental houses and mobile guys asked the entire manufacturing community to produce a single coax 12Gb/s solution to handle 4K. It seems the industry doesn't have much interest in getting their collective IP act together. Because 8K will require a 48Gb/s pipe, what does that mean for the single cable request?

Larry Thorpe, Canon's Guru includes in his presentations a statement that you need an 84-inch screen to appreciate 4K. WOW, so what size screen do you need for 8K and what size room do you need for 24 speakers? There would be a real battle at my home if I suggested we needed to sell our house and get a bigger one to support a 20-foot screen, a 22.2 channel sound system complete with 24 correctly placed speakers all designed to create what OBS calls the "...immersive and absorbing experience[s]" ...of 8K.

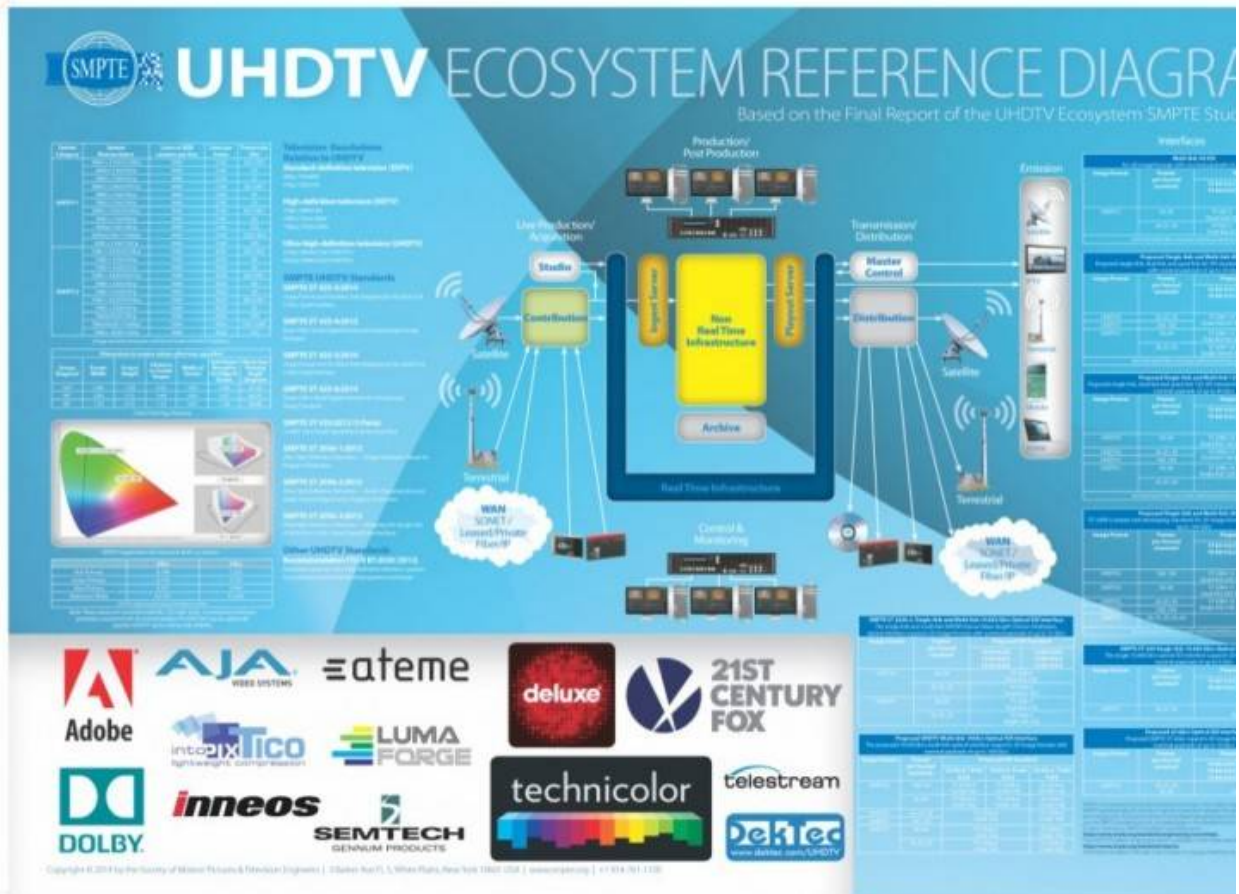
## **Standards**

Ah, you thought I'd forget. SMPTE has a UHD Standard for all. There's even an eye chart, I mean wall chart to help follow the every changing world of UHD.

For those of you who wonder about the K's, UHD TV (Ultra High Definition TV) reduces the need to introduce more K's. UHD covers them all. It's also easier to market a UHD TV that is 4K, 8K or some other K – TV.

## **File sizes and transport**

Let's have some fun. Uncompressed 8K is 48Gb/s. But, how does one transport the camera image to anything? And what is needed to backhaul the completed show to the broadcast center for commercial integration? Because there is no current transport infrastructure for this at Super Bowl 50 NHK needed 8-3Gb/s SDI channels bonded to handle it. The audio alone runs at 50Mb/s.



This chart summarizes some of the players, paths and standards being tossed around by today's leaders.

Now let's talk production. A typical 100 minute UHD movie would be about 15TB in size. Is ATSC 3.0 or OTT technology ready for this? No. But don't worry, if the signal is compressed at H265HEVC then the file size is only 225GB, but as purists we would never compress.

There's a whole somewhat [new transmission schema](#). [Multiple-Input Multiple-Output](#) (MIMO) and Orthogonal Frequency Division Multiplexing (OFDM). When combined, they enable terrestrial delivery along with 802.11ac accessibility over Wi-Fi. Could this be the new OTT?

### Can we hit pause?

So the first thing I did after reading the above article was forward it to my mobile friend and get his thoughts. We both agree it's a bit of insanity to make a statement like that (4K is a bus stop to 8K) while the industry is still struggling to settle on the next generation of technologies, IP and 4K.

Also, manufacturers will need to retool for these innovations. And, they will have to do so while supporting both old and new business models—and continuing to support both legacy and new technologies. But their customers, broadcast and production facilities, have limited capital and are deeply concerned that any investment in the next generation of tools may not last more than 15 minutes.



Is 8K really needed when the industry has yet to solve many of the 4K issues?

Let's pause and focus on that "Dear Industry" letter looking for a single cable 12Gb/s solution for 4K or UHDTV1 that will replace the current many different multi-cable 4K solutions. Can we hold off the 8K gorilla until more immediate problems are solved?

And then there's IP. All this would be so much easier in IP. Yes, the roadmaps to more bandwidth are increasing. But, could cameras be an unfortunate casualty and remain an SDI island even though production switches are already computer systems? IP is currently the only technology ecosystem that can scale to support the seemingly never ending increase in bitrates and bandwidth requirements without needing a fork lift overhaul to every device and system each time the wind blows.

We live in a coax-based video world where the industry went down the 3G path. Now 4K needs a single cable 12G path. What about 8K @ 48G does it need four (4) 12G paths? All this will require new test, measurement and monitoring technologies. And remember, the signals still need to be encoded for recording, editing and library/archive.

Trade shows and industry conventions is where most technology is highlighted. The IBC show is just around the corner and the Summer Olympics will have a lot of 8K in use. But, will those two events be sufficient to help industry leaders truthfully tell our community what kind of buying decisions should be made? Will that advice become obsolete or the wrong choice by the time the gear shows up on our doorstep?

### **A dose of reality**

Traditional capital financial models use 3-year repair or replace and 5-year amortization cycles. Now it's an 18 month product sunset and 3 year obsolescence cycle, regardless of the depreciation- amortization cycle.

More attention needs to be paid to how fast and how practical some of the technology advances really are. Each new idea should be thought out thoroughly with all the considerations and ramification across the entire media production and delivery ecosystem. Industry leaders need to understand that the majority of organizations cannot invest in entire new infrastructures and devices each time a new format is suggested.

Interoperability, standards and respect for the decisions that need to be made at each change is an important consideration.



Editor's Note: Gary Olson has a book on IP technology, "Planning and Designing the IP Broadcast Facility – A New Puzzle to Solve", which is available at bookstores and online.

#### **Other related articles posted on The Broadcast Bridge.**

- Understanding the Terminology Behind IP Standards
- Olympic Broadcasting: 4K is a 'Bus Stop' en Route to 8K
- Why the Move to IP Is So Hard
- The Last Mile Is The Hardest—Getting To Live IP