

HDMI 1.4: Bringing 3D Video Home

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When HDMI version 1.4 was publicly released in October 2009, it included a number of new features. Most of the new features are barely moving the needle on the consumer electronics industry's Richter scale. But one new HDMI 1.4 feature -- the implementation of 3D video mode -- is about to buckle the pavement of the status quo.

Engineers have been experimenting with 3D technology for more than a century. The first 3D movie patent was filed in the late 1890s, and the first commercial 3D movie debuted in movie theaters in 1922. The technology was crude by today's standards, and the anaglyph glasses viewers had to wear tended to give them headaches. After a brief flurry of 3D movies hit the market, the fad fizzled. Over the years, other 3D movie fads have waxed and waned, but always in movie theaters -- never in the homes of television and film aficionados, much less average consumers.

HDMI 1.4 is likely to dislodge the roadblocks that have kept 3D out of the home market.

Until now, there's been a "chicken or egg" dilemma with in-home 3D that is similar to the dilemma posed by other emerging technologies: Why would someone buy a 3D TV set if there is no 3D content available for them to watch? And if consumers don't have an incentive to buy 3D sets, why would manufacturers invest in bringing them to market? On the other hand, if there are no 3D TV sets available, why would producers bother investing in generating 3D content?

However, once you have established a transmission standard, equipment manufacturers and content producers can both get down to business, confident their efforts will not be in vain. Establishing a transmission standard is the key to enabling new technologies to take off.

And once 3D video hits the consumer market, the increased bandwidth demands will send shockwaves reverberating throughout the electronics industry. 3D content requires twice the amount of data to be transferred for the same resolution and image quality, so we'll have huge quantities of data to move over already overloaded pipelines. Imagine what will happen when YouTube starts delivering videos in 3D formats.

Other HDMI 1.4 features

In addition to defining a 3D transmission standard, HDMI 1.4 added new color spaces to improve the ability of electronic devices to represent colors as precisely as possible. It's unclear whether this feature will have much impact on the market, since most viewers are not overly picky about color representation. How many people do you know who calibrate their monitors?

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Another new feature in 1.4 is an Ethernet channel and an audio return channel. This feature gives consumers an Ethernet connection through the HDMI cable that runs between their TV monitors and receivers. The HDMI Consortium thinks consumers will be glad to eliminate the need for a separate Ethernet cable. It makes the HDMI standard more competitive with alternate technologies like DisplayPort and DIIVA, but it remains to be seen whether consumers will yawn or applaud.

The HDMI 1.4 standard also defined several new connectors, including a micro connector intended for mobile devices such as cell phones or cameras. While I see the value of a small connector, I am not confident cell phone manufacturers will want to change their designs and add yet another connector to their phones, considering the added cost and the constant pressure they face to reduce the size of their devices. There are alternative ways to transmit high-definition video out of a portable device into a TV set. For example, Silicon Image has introduced Mobile HD technology that uses a phone's existing USB connector to transmit HD video.

Even though 3D video is the only new HDMI 1.4 feature that is likely to cause real excitement, HDMI is the video transfer standard that has managed to bridge the gap between consumer electronics devices and the PC world, which so far, no other standard has managed to do. If you buy a midrange to high-end laptop, it will have an HDMI interface on it. You can't buy a TV set without HDMI. If you buy a game console or a Blu-Ray player – anything that produces video – it will have an HDMI connector.

HDMI 1.4 test challenges

Testing 3D-capable devices will present a few new challenges for engineers. They will need a signal generator that can generate 3D content and that gives them the ability to analyze their results (such as the Agilent N5998A protocol analyzer/generator).

The new Ethernet and audio return functionality requires twisted-pair wires, so the HDMI Consortium defined new cables. Engineers will need to perform new tests, both for these new cables as well as for the source devices, such as TV sets and receivers, that support the Ethernet functionality.

The role of T&M companies in standardization

Test and measurement companies like Agilent are critical to the process of enabling new technologies and ensuring interoperability. We provide the methodologies and the instruments to ensure engineers can characterize their components and devices according to the standard. In many cases, we are asked to write the test and characterization specification for an industry standard. When we do so, we contribute to the standardization of a technology using our decades-long experience and expertise in testing.

For example, we contributed to the HDMI 1.4 Compliance Test Specification (CTS) and provided input to the HDMI Consortium, the standardization body for HDMI. That takes a whole different level of commitment and expertise than merely selling test instruments.

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Our involvement in creating these standards gives computing and communication component design engineers two main advantages:

- First, it enables us to bring the right products to the market when engineers need them.
- Second, with Agilent's involvement in plug-fests, workshops and seminars, we are in the unique position to develop solutions that evolve with the standards, giving engineers the ability to design their products with the highest confidence.

Establishing the HDMI 1.4 transmission standard is an important step in opening the door to viewing 3D video in the comfort of your living room. I suspect it will change our lives in many ways, both predictable and unanticipated, subtle and profound. Personally, I'm looking into popcorn futures.

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