

HDMI 1.3's Impact On Cables

Steve Venuti, HDMI Licensing, LLC

HDMI was created to complete the digital chain from the source to the display and to provide the high-definition marketplace with an interconnect capable of speeds and functionality that far exceeded the analog connection options. In order to do this, HDMI evolves as it continues to react to the demands of the marketplace. With the introduction of HDMI 1.3 in 2006, HDMI doubled the bandwidth of the specification, and with that, gave manufacturers the ability to design products that can output and receive signals at unprecedented levels of bandwidth. And where there is increased bandwidth, there is increased demand on the cable to deliver the HDMI signal.

Why An Evolving Standard?

There has been confusion about why a standard like HDMI has to evolve. Since the introduction of HDMI 1.0, the HDMI Licensing, LLC has launched HDMI version 1.1, 1.2, and now, most recently, version 1.3. With each version, new capabilities are added to the list of features and functionalities that manufacturers can build into their products. It's important to note that these features are not required as part of any product design. So, for example, version 1.3 of the specification has the capability to pass an unencoded Dolby® TrueHD or DTS®-HD Master Audio bit stream, but 1.3 does not require a manufacturer to build Dolby TrueHD or DTS-HD Master Audio functionality into their products. And so it goes for all of the new capabilities that are part of 1.3 (or 1.2 or 1.1); they are optional, at the discretion of manufacturers who ultimately know how to match product functionality with their customer base.

Why design a standard that evolves? The industry is entering a time where the interconnect is essential for devices to deliver many of the latest new features. The connection is no longer simply a passive player, merely transmitting electrical signals from one component to the next. In this new digital age, the connection is an active player, interpreting data, translating data, and ensuring data integrity, as well as passing data both upstream and downstream.

Because of this, the interconnect must constantly be improved to add capabilities that the market requires. When HDMI 1.0 was first released, the interconnect could accommodate an uncompressed 1080p60 signal, well ahead of any significant 1080p sources or displays in the market. But since that time, the HDMI Licensing, LLC has been working to increasing the bandwidth ceiling and pave the way for future product development. Thus, version 1.3 was announced, to allow manufacturers to design products with even greater video and audio fidelity using more and more bandwidth. Version 1.3 capabilities could never have been included in the first version of HDMI. Concepts like Deep Color and x.v.Color (another name for xvYCC) were barely in development. So, as the market continues to evolve, and as new technologies that require the support of the HDMI interconnect are born, HDMI will also continue to evolve to include these new technical developments.

How Does Version 1.3 Of The HDMI Specification Impact Cables?

With the launch of version 1.3 of the HDMI specification, the bandwidth capacity of HDMI more than doubled, from 4.9 Gbps to 10.2 Gbps. An uncompressed 1080p signal at 60 Hz runs at approximately 4.5 Gbps, so with 10.2 Gbps of bandwidth, HDMI has plenty of bandwidth to deliver even more audio and video data in the never-

ending quest for the highest quality picture and sound possible. New features like Deep Color, which increases the available number of colors on a screen, higher resolutions, and lossless audio formats all demand more bandwidth. With version 1.3 of HDMI, that bandwidth now becomes available. (*Editor's Note: Read "Over The Rainbow: Deep Color And xvYCC" starting on page ## for more on Deep Color and xvYCC.*)

With the advent of HDMI 1.3, and the delivery of higher bandwidth over cables, the HDMI Licensing, LLC has also created two categories of cable testing and performance. Standard HDMI cables (referred to as Category 1 cables in the HDMI specification) are those that are tested at 75 MHz, or the speed required to pass a 1080i60 signal. For applications above 75 MHz, HDMI Licensing created the High Speed Cable category (referred to as Category 2 in the HDMI specification). High-speed

cables are those that have been designed and tested to perform at the highest speeds possible—340 MHz (multiply the 340 times three channels to get the 10.2 Gbps).

But moving from 75 MHz to 340 MHz is no small feat for cables. To make this possible, the version 1.3 of the specification also builds some technical requirements into all 1.3 transmitters and receivers, which assist cables in their ability to deliver a signal at speeds up to 340 MHz. For example, all 1.3 receivers that support over 165 MHz are required to have built-in equalization. In addition, the HDMI Compliance Test Specification requires that all high-speed cables be capable of supporting tighter signaling specification such that all high-speed cables will support any compliant HDMI signal up to 340 MHz.

HDMI is a key component required to achieve the ultimate home theatre entertainment experience. With HDMI 1.3, we have moved into a new era of home theatre possibilities. And with possibilities, come challenges. We are encouraged to see many of the manufacturers featured in this edition of *Widescreen Review* meeting these challenges by designing quality cables that can continue to meet the insatiable desire for the highest quality video and audio experience. **WSR**

The Author

Steve Venuti is Vice President of Marketing for HDMI Licensing, LLC, based in Sunnyvale, California. Please visit www.hdmi.org, or contact Steve at svenuti@hdmi.org or phone 408 616 4000.

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