

## Improvements In Blu-ray™ Source Components Demonstrate The Need For Speed In HDMI Cables

By Demian Martin and Barb Gonzalez

*Editor's Note: Demian Martin and Barb Gonzalez are both employees of Monster Cable®. We have decided to print this article because it demonstrates a real-world complication and solution. While Monster is not the only manufacturer that sells cables capable of delivering high data rates, they have used their own cables as examples in this article.*

Imagine that you have just put together a state-of-the-art home theatre and gaming system. You selected a PlayStation®3 because it is among the best Blu-ray Disc™ players available and because it's an amazing gaming console with video capabilities unheard of elsewhere. You got a big screen 50-inch LCD with 1080p resolution and added an A/V receiver with HDMI. You patched this all together with what you believed were decent

buy as well. In the process of repeating some tests that had been working fine, suddenly Chicken Little's sky really was falling. There was snow, video dropouts, and other picture errors. What would make a perfectly wonderful, high-quality video system like this crash?

### Investigation Points To PS3

The answer wasn't readily evident, and a lot of exploration ensued to isolate the cause of the degraded video. It began with the basics—remove everything that may be optional and see if the video returned to its normal high quality. When connected directly to the display, the video was fine. It was tried again on another system and seemed to work with a direct Monster HDMI connection to the HDTV. In an attempt to re-create the problem, the

video output of the PlayStation 3. With this new update, the game console was automatically switching from 8-bit color video output to 12-bit Deep Color™, using a Deep Color-compatible display. It was doing this, despite the fact that the content was not encoded with 12-bit color and that the HDMI 1.3 display was not actually capable of reproducing 12-bit color. This change, when combined with a link not capable of the 6.68 Gbps requirement of 1080p video with Deep Color, resulted in a visible degradation of picture quality and even a loss of all video. The video would have dropouts, sparkles, and other errors with lesser cables, which really highlights the need for speed in any high-performance HDMI cables, especially over long lengths. Much has been said that digital connections are



PS3 displayed on HDMI 1.3 monitor with 8-bit color video (OK video)



PS3 displayed on HDMI 1.3 monitor with 12-bit color and bandwidth limited connection

cables. You get it all home and it gives you stunning video and a fantastic experience. What more could you ask for? Well, you could be in for a surprise that you never would have imagined—when a periodic update, meant to unleash the full power of the PS3, causes your carefully crafted video experience to crash into a blurry mess.

Essentially, this happened to an engineer in Monster Cable's Lab while testing some new leading-edge video devices. Monster does extensive real-world connectivity testing to make sure its products work not only on specialized state-of-the-art test systems, but more importantly, on the actual hardware people

investigation continued by replacing each variable and troubleshooting. The PS3 was swapped for a different one, and the picture was back. However, the PS3 was asking for an update. After the update, the picture failed again. When the display was connected to a 1080p upscaling DVD player, the video was back again. There were no electronic failures, out-of-specification components, nor overheating. Everything had worked fine until the PlayStation 3 update was accepted. At this point it became evident that the PS3 update included new firmware.

Further investigation of the problem revealed that the firmware update affected

all or nothing, but here was an indisputable example of how errors in the video transfer can degrade the on-screen picture quality.

Components will continue to upgrade performance, just as the PlayStation 3 did going from 4.9 Gbps to 6.68 Gbps, a 30 percent increase in data rate!

### Automatic Switching To Deep Color Mode

Using a Quantum Video Generator, the change from 8-bit color to 12-bit Deep Color can be forced and evaluated. Repeated tests confirmed that this change

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PS3 displayed on HDMI 1.3 monitor with full bandwidth connection



Quantum Data generator on HDMI 1.3 Monitor at 8-bit color 1080p (4.95 Gbps)

caused errors and dramatic loss in video quality (as illustrated in the pictures here). HDMI 1.2 displays would not show a picture at all; they are not equipped to decode 12-bit color. HDMI 1.3 displays with advanced receiver chips can decode the 12-bit video, but cannot display all 12 bits, leaving visible banding on the display. However if a "slower" link is in the chain (a repeater, an HDMI switch, or an AV receiver), a number of picture problems will destroy the image quality. Snow, dropouts, and incorrect color information were common. These problems went away when an advanced Monster high-speed link

specification—ideally a Cat2 specification cable, one that supports a cable data rate of 6.68 Gbps or higher. That's more than six billion bits per second, six times the data rate required for standard DVD playback and 34 percent higher than 1080p with 8-bit color, which requires "only" 4.95 Gbps. This speed is what's required for Simplay HD verification. In other words, just because a cable has a Simplay HD logo on the packaging doesn't necessarily mean it supports advanced Deep Color. You need to be sure that you are connecting with an HDMI cable that is rated to pass the increased information. While Monster

technologies. From 1080p resolution, and now to Deep Color, it is clear that these advances will continue at a fast pace.

The best recommendation is to put together your home theatre using a display and components that have the most advanced features available. In particular, when looking for an A/V receiver, repeater, or other accessory that requires video passthrough, it is important that it has HDMI 1.3a with Deep Color capabilities. And it is important that you don't skimp on HDMI cables to connect your home theatre. Look for cables with a verified speed rating above 6.68 Gbps or



Quantum Data generator on HDMI 1.3 Monitor at 12-bit color 1080p (6.68 Gbps) with bandwidth limited connection



Quantum Data generator on HDMI 1.3 Monitor at 12-bit color 1080p (6.68 Gbps) with full bandwidth connection

(6.68 Gbps-certified capable) was substituted for cables and devices that didn't meet the performance requirements.

## Need For Verified Speed-Rated HDMI Cables

This all points to the need for speed when choosing which HDMI cable to use. To insure that you continue to receive the best high-definition performance after an update or when you upgrade components, it is recommended to connect your home theatre with an HDMI cable that exceeds the requirements of the HDMI 1.3a, Cat1

is not the only manufacturer making cables capable of these speeds, Monster's speed-rated HDMI cables can assure you that the cable can pass all of the information. Monster's Advanced High Speed Rated Advanced for HDMI cable has been verified by Simplay Labs to pass the 6.68 Gbps bit rate of 1080p with 12-bit color depth.

## Technology Moving Faster Than Expected

Home theatre TV and component manufacturers are constantly working to create better picture and sound quality with new

faster to accommodate today's higher data transfer rates. Better yet, choose the fastest speed-rated cable available so you are ready when future technologies require even higher data rates, such as 10.2 Gbps or even over 14 Gbps (it's possible, given that there are already 2K projectors). Opting to update the firmware on your game console or component may leave you vulnerable to picture loss, due to the inability to transfer at fast enough data rates to carry increased video information. Getting the best components and cables available can ensure that you have not only the maximum performance today but into the future as well. [WSR](#)