

“The Trouble IS in your Set...or”

“Why Your Video May Not Work after 2013.”

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Do you ever show Blu-ray discs in your planetarium? DVDs? NASA select? Other HD programs? PowerPoints? Computer graphics and computer-based lessons?

News Flash. December 8, 2010. AMD, Dell, Intel Corporation, Lenovo, Samsung Electronics LCD and LG Display have come to an agreement to phase out computer RGBHV (VGA) connections beginning in 2013 and expect the technology to be off all their product lines by 2015. These computer video outputs will be replaced by HDMI and DisplayPort.

Translation: Your next computer or DVD/Blu ray player will probably not have a “VGA” connection.



News Flash. December 31, 2013. AACS Adopter Agreement of June 2009: 2.2.2.1 Analog Sunset – 2010. All BlueRay players, HDTV tuners, etc have utilities burned into their chipset that will automatically turn off the component, composite, VGA and S-video outputs on December 31, 2013. This is a Federal law that all manufacturers must adhere to. That means they will only output HDMI or another digital format...basically HDMI, DisplayPort or in very rare cases DVI.

Translation: This simply means the end of higher res component video and S video in your dome. Not just on the computer, but also soon on the switchers, scalars, projectors, etc



Yup...it is true. Recently two of us at BT were among 60 national system designers invited to full day workshop on this topic in Chicago. Manufacturers have moved very fast to address this, and already we are seeing the elimination of a lot of hardware that you may currently be using. We first discussed this in workshops at GLPA 2010, MAPS 2011, SEPA 2011 and GLPA 2011.

The following report is a little oversimplified for the purpose of brevity, but we have a detailed PowerPoint available for download on our web site at www.bowentechnovation.com/planetarium/MAPS2011.htm. It has many more photos and much more information than we can devote to this article.

Into the Lab:

Now that we “understand” the issues and theories, let’s explore some real world case studies.

Problem A. You purchased a new DVD player, Blu-ray player, HDTV tuner, or computer.

1. Your new video device will have either digital HDMI or DataPort connections on it. For the rest of this discussion I will call these HDMI/DP to save some page space. New DVD and Blu-ray players with “VGA”, S-video and component outputs are practically not available in stores. *Read the December 31 News Flash above before you run out and buy a bunch of the “remaining” players that still have those outputs.* They go dead on Dec 31, 2013.

Please see Table 1 for photos of various connectors we will discuss.

Table 1.

Video Type	Future?	Distance Limitation (per official specification)	Female Connector	Male Connector	Audio
RGBHV (VGA)	Obsolete Now	1.8 meters or 6-feet			Not on this cable. Run separate cable and connector.
DVI	Industry Plans Obsolescence of this ASAP.	1.8 meters or 6-feet			Not on this cable. Run separate cable and connector.
Display Port	A hot ticket. Not much signal chain support at this time	15 meters or 49-feet			Stereo, 5.1, 7.1 audio supported on one cable and connector.
HDMI	The hottest ticket at this time. Tons of hardware available.	9.1 meters or 30-feet			Stereo, 5.1, 7.1 audio supported on one cable and connector.

- a. You will be tempted to purchase a little adapter to convert your HDMI/DP port to VGA.
- b. Oops! Won't work. The reason is HDCP ^{Footnote 1}, which is federally mandated legal copy protection. If an HDMI/DP device does not see an HDCP equipped receiving device that "handshakes" and says "I, too, am HDCP equipped (compliant)...well, the screen will just go blank.
- c. SO this means EVERY DEVICE in your video signal path MUST handshake with HDCP...or...
- d. The minute any HDCP compliant device sees a device that is not compliant...blanko...no video.
- e. So if you try to put a VGA to HDMI converter in front of the HDMI input on a projector or switcher...or if you try to put an HDMI to VGA converter in front of the HDMI input on the projector...blanko...no picture.

Solution A. Make sure every video device in your signal chain is HDCP compliant. Computer, video server, DVD player, Blu-ray, switcher, projector, even your computer monitor! This is not difficult. You just need to talk with a professional that know what works and what doesn't. Or research it on your own. Now understand that web sites are often incorrect and that not all HDMI or DataPort devices are HDCP compliant.

BTW...it doesn't matter if you made the video file or burned the disc yourself. It still won't play back. This is a function of the hardware...not the media. Your computer will probably output computer graphics through HDMI/DP fine until you put in a disc of any sort.

Problem B. You want to use your cool-o new all-dome projection system for your auxiliary computer/HDTV/video sources.

1. Well, first off, very few of these systems have an external video input of any sort.
2. The ones that do might only give you a poor quality composite or s-video input. Note that in our first paragraph we explained the disappearance of these sources. Plus their image quality is terrible.
3. So maybe there IS an HDMI input on your all-dome system. Is it HDCP compliant?

4. Also, the brightness and resolution of most all-dome projection systems is far lower than you need for detailed instructional video such as PowerPoints, HDTV, text, quizzes, etc. Suppose you use a 6K Lumen projector with 1920 x 1080 pixels to project a 10-25 foot wide image on your dome. The majority of all-dome projection systems use this resolution projector or less to cover 50% or the entire dome Footnote 2. So if you try to jam your instructional video into the all-dome system you are giving up tremendous image and text quality for classroom work.
5. Plus you are putting precious hours on your expensive all-dome projection system servers, projectors and lamps.

Solution B. Use a dedicated, less costly projector and video signal chain for classroom applications. It probably can be even lower brightness than those really nice all-dome projectors. But don't give up the resolution!

Problem C. You have a document camera with S-video...an old computer with only VGA...a Pioneer DVD player with component outputs. Do you need to order a dumpster?

1. That's not a bad idea and would allow you to properly modernize with the best video quality available, but this is not environmentally sound nor financially sensible.

Solution C. Add a video source converter or scaler/switcher. Here is how it works...

1. Single source units are available that will convert any of these video sources to an HDMI output....while generating the HDCP compliant handshake! Not all of these units add the HDCP data and thus become almost useless for the long term. Or better yet...
2. You can use floating scaling interface that supports ALL these formats and even has switcher built in. So on one box you can have composite, S-video, component, VGA, HDMI all converted up to HDMI and "upscaled" to one output that perfectly matches the resolution of your projector or display. Not all of these units add the HDCP data and thus become almost useless for the long term.



Problem D. You have a computer HDMI output split between a 1024 x 768 monitor on your desk and your fabulous new expensive 1920 x 1080 video projector. The image on the projector will not go above 1024 x 768. If you unplug the desktop monitor the projector displays full resolution. What's up?

Enter EDID. **E**xtended **D**isplay **I**dentification **d**ata (EDID) is automatically provided by a display to describe its capabilities to a video source (computer, DVD player, switcher, etc). It is what enables a modern device to know what kinds of monitors are connected to it, product type, refresh rate of the display, display size, luminance data and pixel count and aspect ratio data. It cannot be defeated.

If you have multiple monitors connected to a source or even to a switcher, all the EDID info for any connected devices is read by all other devices, even if they are not the device selected on the switcher. The system will "correct" to the lowest resolution device in the system.

This is a big deal in our exhibit work where we might design an exhibit with a large 65-inch display and small touch screen or multiple smaller displays driven by the same source or computer.

Solution D.

1. To fix this...match ALL the display and signal chain resolutions to one common denominator. In this day and age that is usually 1920 x 1080. And don't forget to make sure all the devices are HDCP compliant. Or...
2. Install a "smart EDID" switcher. These units let you use different resolutions and types of displays with various types of sources. So you can program the switcher to accept various EDID source device info AND can program the outputs for



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various EDID display/projector device info. The smart switcher does all the re-calculations and re-communication between the devices.

In ...Conclusion?

Well, we really need to discuss more. I think another article in an upcoming issue could address the following:

1. Preventing loss of HDMI, DisplayPort and HDMI video quality between the source and the display/projector.
2. When to use CAT5 or CAT6 cable....CAT 6 is not "better".
3. Dealing with and solving the distance limitations illustrated in Table 1. These are real and are serious.
4. Routing and breaking out stereo, 5.1 and 7.1 audio streams from HDMI and DisplayPort.
5. And you did everything right...still no video. Might be the deep color setting on your source machine.

Remember...you can go to www.bowentechnovation.com/planetarium/MAPS2011.htm and download the PowerPoint I mentioned earlier in the article.

Also feel free to email or call for advice. I'll be sure to include your questions and comments in Part 2.

Footnote 1 High-bandwidth Digital Content Protection, or HDCP. Protects copyright holders from illegal copying. Also can keep discs you make yourself from being played.

Footnote 2 Mark Trotter did really nice page on this subject in the afore mentioned PowerPoint. One of his calcs is: All-dome HD Projector = 0.1M pixels delivered on a 12' wide image in 40 foot dome = 1.1 K pixels per ft². Dedicated HD Projector = 2.3M pixels delivered on a 12' wide image in 40 foot dome = 25.5K pixels per ft².