



Protect Your Product Line with VastLane HDMI 1.3

If you're building HD devices without HDMI™ 1.3, you may be putting your product's competitive future at risk. DTVs and PC displays, DVD and high-definition disc players, A/V receivers, set-top boxes, gaming consoles, even PCs and mobile devices – all these products and more can reap immediate benefits from the high-performance features of HDMI 1.3.

As a founding developer of the HDMI specification, Silicon Image™ continues to develop leading edge products that deliver digital quality to mass-market home theater systems. By designing in Silicon Image's new VastLane™ HDMI 1.3 transmitters and receivers now, manufacturers can take advantage of a market opportunity that is less crowded, generates higher margin, and further enhances brand awareness and loyalty among consumers and retailers. If HDMI 1.3 capabilities are not in your product road map, or if you're thinking of it as a "nice to have" rather than a "must have," you need to take another look at the competitive landscape. Delaying your transition to HDMI 1.3 could compromise a product line's long-term competitive advantage, reducing your overall profit and placing you in a catch-up position relative to your competition.

HDMI – Revolution and Evolution

Since its introduction in 2002, HDMI has become the de facto standard digital interface for high-definition devices. Over 500 manufacturers have now adopted the technology for their CE, PC, and mobile products, and the growth trend is expected to continue. By 2010, it is estimated that there will be more than one billion HDMI devices worldwide.

The HDMI standard has consistently evolved to anticipate the needs of the consumer. HDMI 1.3, the latest specification advance, is a major revision that reflects the commitment of the HDMI founders to meet the current and future needs of consumers. HDMI 1.3 represents a huge leap forward in interconnect technology, enabling all kinds of HD-capable devices to transmit and render content, both audio and visual, with unprecedented vividness and accuracy.

HDMI 1.3 – Better Video, Better Audio, More Connectivity Options

New features in HDMI 1.3 are designed to provide consumers with the highest quality home theater, gaming, and mobile experience. The low incremental cost to design in HDMI 1.3, coupled with its scalable bandwidth and performance improvements, provide a clear development path for converging consumer electronics, PC and mobile devices. HDMI 1.3 allows manufacturers to build the highest performing devices that are best suited for the audio/visual rendering of HD content, while ensuring backward compatibility with existing HDMI devices. This market opportunity is immediate and ensures a product's future usability as more HD content and devices are developed.

PS3: Leading the Way

"By introducing the next-generation HDMI 1.3 technology, with its high speed and Deep Color capabilities, PS3 will push the boundaries of audiovisual quality to the next level of more natural and smoother expression on the latest large flat panel displays"

Ken Kutaragi
Chairman and Group CEO,
Sony Computer Entertainment, Inc. (SCEI)

HDMI 1.3 Features and Benefits at a Glance

Display Improvements

| <i>Feature</i> | <i>Technical Information</i> | <i>Consumer Benefit</i> |
|---|--|--|
| Deep Color Eliminates banding effects by rendering each pixel color more accurately | 10/12/16-bit per pixel plane 4:4:4 video | More accurate reproduction of original material produces a true cinema-like experience |
| Extended Color Gamut Expanded color palette represents every color perceptible to the human eye | xvYCC standard supported (IEC 61966-2-4) | More lifelike, natural colors, particularly in the reds and greens |
| Faster Frame Rates | Up to 120Hz (1080p), 240Hz (720p or 1080i) | Smoother motion particularly evident in gaming and sporting events |
| Higher resolution | Support for resolutions up to 4K by 2K | Sharper pictures with resolutions equivalent to digital cinema systems |

Audio Improvements

| <i>Feature</i> | <i>Technical Information</i> | <i>Consumer Benefit</i> |
|---|--|--|
| Support for High-Definition Multi-Channel Audio Formats Dolby® TrueHD™ and DTS-HD™ Master Audio formats | Up to eight channels of 24-bit/96 kHz audio with lossless compression | Supports approved Blu-ray Disc and HD-DVD audio formats for exact bit for bit reproduction of the original studio master recording |
| Lip Sync Enables compensation for latency between audio and video | Audio/video delay transmitted by each device to other devices enabling each device to compensate for the latency | Audio and video stay temporally aligned with no distracting artifacts |

Connector Improvements

| <i>Feature</i> | <i>Technical Information</i> | <i>Consumer Benefit</i> |
|---|------------------------------|---|
| Type C connector Smaller form factor connector option available for mobile applications | 10.5 mm (W) x 2.5mm (H) | Seamless connectivity from camcorders, digital cameras, and personal media players to HDTVs |

HDMI 1.3 and High-Definition Displays

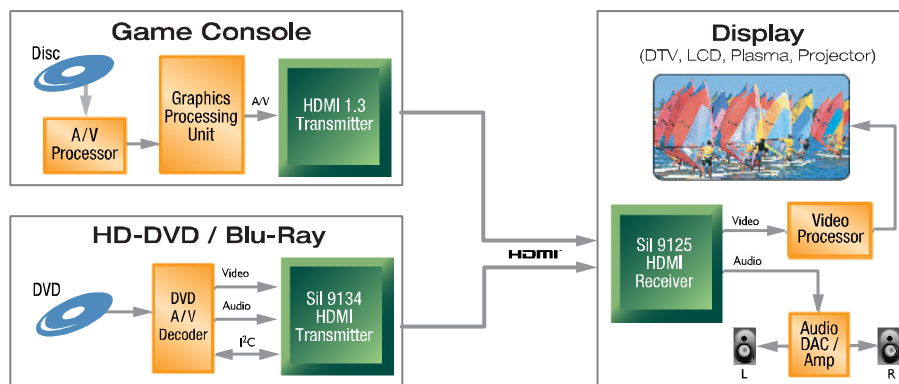
Display manufacturers are in the most obvious position to showcase Deep Color, higher refresh rates, expanded gamut, higher resolution and lip sync improvements that HDMI 1.3 enables. TV manufacturers can deliver a significantly better picture and improved audio quality for low-to-moderate incremental cost.

To accomplish this, manufacturers can immediately move to Silicon Image's VastLane Sil9125, HDMI 1.3 receiver, an advanced, dual-input HDMI receiver that fits directly into digital televisions, including rear projection microdisplays (DLP™, LCoS, LCD-RP), LCD-TVs and plasma displays. In addition, the Sil9125 is backward compatible with the Sil9023, which can reduce manufacturers' design time and shorten their overall time-to-market.

The Sil9125 includes two HDMI input ports for connecting the many different types of HDMI devices, such as DVD players, set-top boxes, game consoles, PC and camcorders directly to an HDTV. The Sil9125 supports both SACD and DVD Audio, including 7.1-surround audio at 96 kHz and stereo audio at 192 kHz. The Sil9125 also supports full HDCP repeater functionality.

The built-in High-bandwidth Digital Content Protection (HDCP) decryption engine secures the digital link for transmission of valuable high-definition video and audio. Each Sil9125 is pre-programmed with unique HDCP keys, providing an extremely high level of security while reducing manufacturing complexity and cost.

System Diagram - VastLane HDMI Receiver



Whether choosing to focus on Deep Color, extended color gamut, higher resolution, or higher refresh rates, Silicon Image's VastLane HDMI 1.3 receivers enable display manufacturers to have multiple options for creating product differentiators and protecting their market share. In the immediate term, designing in HDMI 1.3 accurately preserves the true 10-bit content that is output from Sony's™ Playstation 3™, and numerous A/V receivers shipping in 2007. Many other devices with 8-bit content can also benefit from the new features in HDMI 1.3, as we will explain in a moment. It is also possible for HDTVs with 8-bit displays to benefit from HDMI 1.3, especially by incorporating Deep Color all the way up to the display engine. First, let's review some of the newest display trends that make HDMI 1.3 a must have feature for HDTVs of all varieties.

RPTV — True 10-bit and Deep Color

All RPTVs (DLP, LCD-RP and LCoS), which already have higher-end light engines and 10- and 12-bit panels, can design in a VastLane Sil9125 receiver (see above) to create a true end-to-end 10-bit color experience. RPTV manufacturers can also realize immediate advantages by promoting their ability to receive higher quality Deep Color images from the PS3™.

LCD — Higher Refresh Rates

LCD manufacturers can design in VastLane Sil9125 receivers to create displays with faster frame rates, making them an attractive option to the gaming audience as well as home-theater users who are looking for displays with the smoothest possible motion rendering. As response times of LCD panels improve, it is becoming feasible to build HDTVs or PC monitors that can offer higher frame rates. New 10-bit LCD panels are going to production shortly, and those manufacturers that implement HDMI 1.3 Deep Color will have a distinct advantage.

PDP — Deep Color & Higher Refresh Rates

With true 10-bit panels coming into the market, plasma display manufacturers can take advantage of VastLane Sil9125 receiver's Deep Color and higher refresh rate functionality to create a true end-to-end HD system with a theater-like visual and audio experience.

The big win for HDTV manufacturers may come to those that take advantage of HDMI 1.3 Deep Color with existing 8-bit displays. The argument for HDMI 1.3 with 8-bit panels is subtle, but straightforward. State-of-the-art HDTV processors use 10-bit video processing to provide superior video quality. Market leading HDTVs manufacturers have moved from traditional 8-bit processors to 10-bit processors to gain this advantage at a low incremental cost. By including an HDMI 1.3 receiver, such as the Sil9125, it is possible to implement a complete 10-bit processing path and provide truly stunning video quality. If you consider that you have already invested in all the cost a 10-bit video processor with its associated memory, the small cost of an HDMI 1.3 receiver in your HDTV is definitely worth the investment.

HDMI 1.3 and High Definition Source Devices

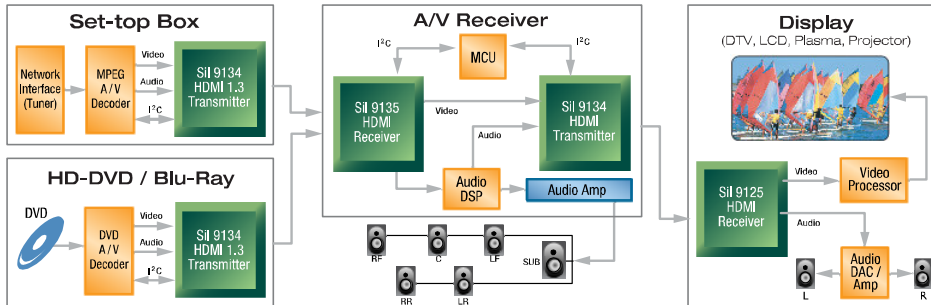
If you are developing a device that can output HD content, you should have HDMI 1.3 functionality on your product roadmap. Some of these new capabilities, such as Deep Color, automatic Lip Sync correction and support for lossless audio, have extremely low implementation costs and very high ROI potential.

Silicon Image's VastLane Sil9134 HDMI 1.3 Transmitter is designed for next generation Blu-ray Disc and HD DVD players and recorders that require high-definition audio. The Sil9134 supports up to 1080p resolution at 60Hz and 12-bit color depth and Dolby True HD and DTS Master Audio high bit-rate audio formats to deliver a rich digital audio experience. In addition, the Sil9134 will fit directly into home theater products such as DVD players and recorders, A/V receivers, digital set-top boxes, media PCs, and personal video recorders (PVRs) that wish to take advantage of lip sync correction and Deep Color capabilities. The Sil9134 is fully backward compatible with first and second-generation HDMI transmitters. To reduce system cost, the Sil9134 includes an additional I2C master port to control the DDC bus.

In addition to supporting advanced HDMI 1.3 video features, the Sil9134 supports 8-channel High Bit Rate audio up to 192 kHz, 24-bit formats including DVD audio with 7.1-surround at 192 kHz, the SACD audio standard and stereo audio at 192 kHz.

The built-in High-bandwidth Digital Content Protection (HDCP) encryption engine secures the digital link for transmission of valuable high-definition video and audio. Each SiI9134 is pre-programmed with unique HDCP keys, providing an extremely high level of security while reducing manufacturing complexity and cost.

System Diagram - VastLane HDMI Transmitter



HD DVD, Blu-ray Disc, and DVD Players

The first HD DVD and Blu-ray players are already shipping. Simply put, HDMI 1.3 features are a “must have” to stay competitive. The lossless audio formats are standard on HD DVD and Blu-ray Disc DVDs, and require HDMI 1.3.

As discussed, using an advanced 10-bit scaling device, such as the SiI8010 in conjunction with the SiI9134, both HD and standard DVD players can take advantage of HDMI 1.3 Deep Color today. These devices were designed to give disc player and recorder manufacturers the competitive advantage of high quality Deep Color today.

A/V Receivers

A/V receivers that can decode DTS Master Audio and Dolby TrueHD will be available for sale in early 2007. As with DVD players, consumer and retailer demand will likely make HDMI 1.3 features a market necessity for A/V receivers. Along with lossless audio support, automatic Lip Sync correction is another strong differentiator that can be implemented without much incremental cost.

By implementing the SiI9135 HDMI receiver and SiI9134 HDMI transmitter, A/V Receivers manufacturers can guarantee that their products are future proof and support HD audio, Deep Color, lip sync correction, and the many other important features of HDMI 1.3.

Media PCs

HDMI adoption is growing rapidly in the PC space, and HDMI 1.3 functionality can be added for little incremental cost to ensure seamless integration of PC and CE devices. With more and more users of media PCs hooking up their machines to HDTVs for big-screen experiences like gaming and movie-watching, it only make sense to design in Deep Color, Lip Sync, and other advanced capabilities made possible by HDMI 1.3.



Digital Cameras & Camcorders

The new Type C mini-connector specified in HDMI 1.3 makes it even easier to design HDMI into handheld and mobile devices. HDMI is a natural fit for digital still cameras. Consumers have grown tired of viewing their high-resolution digital photographs through inferior standard-definition interfaces at low resolutions. HDMI solves this problem for digital camera manufacturers with HD quality image rendering.

With the market shifting from DV camcorders to HDV and HD AVC camcorders, manufacturers need to consider implementing HDMI to provide consumers with a rich experience when they connect their camcorder to an HDTV. HDMI is the one interface that has both low implementation cost and a small form-factor connector that fits the needs of the digital photography market.

VastLane HDMI 1.3 Receivers and Transmitters from Silicon Image

As an original HDMI founder, Silicon Image continues to lead the market in advanced HDMI-enabled semiconductors, including the company's recent introduction of its HDMI 1.3-enabled transmitters and receivers. Since the introduction of the first HDMI specification in December 2002, Silicon Image has shipped over 50 million HDMI semiconductors to the world's leading consumer electronics and PC manufacturers. Silicon Image is currently the first and only manufacturer shipping semiconductors that deliver the benefits of the HDMI 1.3 specification, allowing leading edge companies to be first-to-market with innovative home entertainment products.

HDMI 1.3 – The Key to Competitive Advantage

Visit the HDMI 1.3 resource center to learn more: <http://www.hdmi.org/resourcecenter/index.asp> Download the HDMI 1.3 specification, and start incorporating HDMI 1.3 into your product planning cycles now. For more information on Silicon Image VastLane HDMI 1.3 transmitters and receivers, starter kits or evaluation requests, please visit <http://www.siliconimage.com/hdmi13/>.

©2006 Silicon Image, Inc. All rights reserved. Silicon Image, the Silicon Image logo, and VastLane are trademarks or registered trademarks of Silicon Image, Inc. in the United States and other countries. HDMI, the HDMI logo and High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI Licensing, LLC. Other trademarks are the property of their respective holders. Product specifications are subject to change without notice.

