

## HDMI 1.3 Solution

In June of 2006, HDMI Licensing, a wholly owned subsidiary of [Silicon Image](#) issued a major extension of its HDMI standard known popularly as HDMI v1.3. Forward reaching in its scope, few times in the history of the consumer-electronics industry has the introduction of a display standard created more interest and confusion among consumers.

Consumer interest is driven by the rich palette of new capabilities that HDMI v1.3 offers:

- Support for higher resolution—up to 1440p/W-QXGA (2560×1600)
- Support for higher refresh rates—for gaming applications
- Enables deep color—higher color bit depths up to 48 bits per color (> 2.8 trillion colors)
- Support for new xvYCC color space standard—broader color gamut
- Support for new Dolby and DTS lossless digital audio formats
- Enables automatic lip sync correction
- Introduction of the smaller HDMI Type C connector

The confusion lies in the fact that, once announced, consumers expected to be able to acquire these new capabilities as easily as they'd pick up a six-pack at the grocery store. Unfortunately, that's where HDMI starts getting a little more complicated.

When HDMI v1.3 was first announced in June of 2006, there were no chipsets to support the new standard's broad array of possibilities. Without chips, there could be no products: something that had to be explained to eager consumers over and over again. By the end of 2006 and into 2007 there were several companies that were delivering "HDMI v1.3" chips. However, these chips (and the products that use them) fall short of delivering the full possibilities that HDMI v1.3 offers.

In 2006, 1080p displays started appearing en masse as flatpanel manufacturers were able to produce full-HD displays economically.

For the first time, consumers had access to the holy grail of HDTV resolutions, which display engineers had only dreamed of for decades. In computer terms, 1080p can be expressed as 1920x1080 pixels at 60Hz refresh. Defined originally in the SMPTE 274M standard with 8-bits per color, 1080p has a digital bit rate of 1.485Gbps (per color, RGB) or 4.455Gbps aggregate.

So why all the fuss about "speed" and bit rates in the first place? Picture quality is greatly improved by higher resolutions and higher color depth (more onscreen colors). Both of these factors necessitate higher bit rates, aka "speed." Let's take a deeper look.



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In the analog world, the smallest component of a video image is the pixel, but in the digital world, it takes many bits to faithfully represent one pixel; therefore, the bit is the smallest component of a digital video image. The beauty of a digital signal is that, in the end, it is nothing more than a long stream of bits—each one being either a “1” or a “0”.

The job of a digital cable is to faithfully get every bit from the transmitter in the signal source to the receiver in the display without changing the value of any single bit. As long as the bit integrity is maintained, the displayed digital image will look identical to the image originating from the source. In contrast, an analog signal can often suffer from a variety of errors (ringing, reflections, smearing, etc.) that cumulatively can have a serious degrading effect on the picture quality.



All cables, analog and digital, have problems with speed and distance. As the resolution and color depth (speed) of the signal gets higher, and the length of the cable gets longer, there are increasing problems caused by the capacitance of copper cables. Cable capacitance acts like a low-pass filter that blocks higher-frequency components of the signal from passing. In an analog system this can result in a soft or noisy picture that lacks sharpness and detail. In a DVI or HDMI system, this can result in an image with random or excessive “sparkles,” a flashing picture, or even no picture at all.

Considering that in most home theater systems, video cabling is only 3 percent to 5 percent of the total system budget, this point seems like a no-brainer. Unfortunately, most users consider a cable to be just a cable. In reality, DVI and HDMI cables should be regarded as digital pipelines that operate at very high speeds. This is because every pixel of the image must be converted into a 10-bit digital word. For this reason, DVI and HDMI signals typically operate at speeds 10X higher than their analog equivalents. When these “digital pipes” must run long distances, as is required in some home theater installations, cables with very special characteristics are needed to do the job reliably.

### **Cable capacitance**

As mentioned earlier, cable capacitance is a big problem, especially for long cables. This capacitance problem is largely responsible for what cable engineers call insertion loss. The higher the speed (frequency), the greater the insertion loss, as can be seen in the dark blue line (top trace) of Figure 3.

The most common way to deal with excessive insertion loss is to use active cable-compensation circuitry. This circuitry is basically an equalizer in that it restores the lost high-frequency signal components that are attenuated by the cable.



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Using active electronics in conjunction with otherwise passive copper cables results in a new type of cable known as an Active Cable. A passive cable is generally pretty reliable, perhaps only succumbing to outright physical abuse. On the other hand, an active cable uses electronics, and it is therefore susceptible to electronic failures.

For most cable manufacturers, controlling intra-pair skew is exceedingly difficult. It requires a high degree of precision in the manufacturing of the raw cable material. Because skew can vary greatly even within a given production run, it is essential to use a careful control and selection process during the final cable assembly. In the future, electronic means to control intra-pair skew will allow further advances in long length HDMI cable quality.

For engineers designing high-speed DVI and HDMI cables, there are many crucial parameters that must be tested, measured, and improved upon. Insertion loss and Intra-pair skew are the most crucial, but there are dozens of other factors that influence cable performance.

So how do you put all of this techno babble to work for your new home theater? Basketball legend Bill Russell once said, "Knowing your enemy is half the battle." First, keep in mind these important points:

- Protected (copyrighted) digital content is increasingly restricted to DVI and HDMI playback devices that are HDCP-encrypted.
- In general, shorter video cables are more forgiving. Due to insertion loss and skew, longer cables can suffer performance problems as the length is increased, and the resolution and/or color depth gets higher. This is because the higher-bandwidth (analog cables) and speed (bit rate for digital cables) place additional demands on the cable.
- Unlike analog cables, DVI and HDMI video cables will usually either be 100 percent perfect, or have obvious problems that make them unusable, that is to say that their acceptability is also "digital". Analog signals can suffer from a wide variety of subtle problems that can additively result in a visible but unacceptable picture.
- Avoid installing cables that have internal electronics inside within a wall or ceiling. If the electronics internal to the cable should fail, replacing the cable may not be easy. If you need active DVI or HDMI cables for longer cable runs, use a type with easy-to-replace electronic modules so that you don't need to do extra drywall work if your cable should fail.
- When it comes to cabling, don't skimp, but buying the most expensive cable is not always the right solution either. Instead look for cable manufacturers that provide performance guarantees that are easy to understand.
- In order to minimize future obsolescence, use HDMI cables that are guaranteed to support resolutions up to 1080p/12-bit color (2.25Gbps) or higher.

Above all, choose a cable supplier that will provide you with the knowledge, personal attention and support you need to tackle any issues that may arise both during the initial installation, as well as with subsequent changes or upgrades. Following these tips may cost a few extra dollars up front, but it will be well worth the effort in the long run.

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**NORDOST's – WYREWIZARD HDMI Cable**

Wyrewizard HDMI Cable is a high performance digital Multimedia cable. This cable is the perfect solution for those who require optimum picture quality. Definition, color information and superb detail is the hallmark of this award winning cable. It is triple shielded with silver plated OFC conductors. The cable is terminated with a proprietary connection system to gold plated HDMI connectors. This cable will transmit signals up to 15 meters with no information loss.

- **Insulation:** Propylene
- **UL Rating:** CL3
- **Conductors:** Silver Plated OFC 26 AWG to HDMI Specification
- **Shield:** 100% Triple Shielded
- **Capacitance:** 25.0pF/ft
- **Signal Loss:** HDMI 1.3 Compliant to 15 meters



**ATLONA - HDMI TYPE C (MINI) TO HDMI TYPE A (STANDARD) DIGITAL CABLE**  
- HDMI 1.3a



**Connect HDMI type C multimedia sources ( such as HDTV camera`s and camcorders to a display that utilizes this type of connection ) standard HDMI type A displays.**

Atlona`s HDMI type C ( also called mini ) to HDMI type A ( standard hdmi cable ) cable is a perfect solution for those who want to get the best performance out of their HDMI type C compatible digital sources. HDMI mini is new type of a connection which will be widely used by Digital Camera and Camcorder manufactures. **Atlona mini HDMI cables are certified for HDMI 1.3a** compatibility and therefore are compatible to all possible video resolutions and digital audio standards that are available via HDMI type C connection.

For any enquiries you can reach The Soundsmiths at: [info@thesoundsmiths.com](mailto:info@thesoundsmiths.com) or call

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### Product Features:

This mini HDMI type C to type A cable is designed to ensure perfect transfer of digital video and multi-channel audio signals. Made of High-Purity Oxygen Free Copper (OFC), the conductor has a very high conductivity, low signal loss and degradation and low electric resistance. All of these result in great signal transmission. Superior High-Density triple shielding technology will reject EM and RF interference, while gold plated connectors will ensure a tight grip. **Atlona mini HDMI to standard HDMI cable is capable of supporting resolutions up to 1440p or most common 1080p ( 1920 x 1200 )**



### Applications:

Ideal for connecting mini HDMI type C equipment, such as HDTV camcorders, digital cameras and game console's to digital displays which utilize standard HDMI type A connection.

### How is HDMI type C (mini) vs HDMI type A (standard):

HDMI Type C cables are very interesting in construction. They are much smaller than HDMI Type A, but carry absolutely the same Audio/Video specs as HDMI Type A. This clearly defines that HDMI Type C will be widely used in portable electronics and such. It is also rumored that televisions will have this kind of port on the front panel. HDMI type C and Type A are backwards compatible.

### Features & Specs:

- Atlona HDMI type C ( mini )
- **HDMI 1.3a certified ( ATC certified )**
- Resolution supported: up to 1440p or most common up to 1080p ( 1920 x 1200)
- HDMI twisted pair cable construction
- 24k Gold plated connectors
- UL listed
- 1m ( 3ft ) High-Purity Oxygen free copper conductors ( 30AWG )
- High-density triple shielding for maximum rejection of EMI and RFI
- Made by Atlona Technologies

For any enquiries you can reach The Soundsmiths at: [info@thesoundsmiths.com](mailto:info@thesoundsmiths.com) or call

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