



Times are changing. Wiring a smart home today isn't just about making sure there's a coax cable in the wall so one can watch a football game or cooking show anymore. It's about connecting with the web and downloading real-time stats of your sunday football games or cooking show recipes. It's now about seamless control of our HD media with iPhones or Pads. It's now about 3D video support and 7.2 surround sound. It's now about being able to put the majority of your audio video gear living in various rooms into a "vacation mode" or "green mode" so as to minimize phantom power usage and reduce your carbon footprint. Some could argue that as life and technology seem to become more and more intertwined, the wiring for such a reality has become more confusing and expensive than ever.

As a custom electronics design/build firm, we always try our best to "future-proof" a smart home for "what's hot now" and also for "what's to come". However, up until the last few years, wiring for present and future trends had at times been a very expensive undertaking involving plenty of cables for technology. Well, some newcomers have popped up in the past year or two that are making this a much more affordable option now. One of these newcomers has been HDbaseT technology.

What is HDbaseT?

HDbaseT is a transport technology for the distribution of HD multimedia content via a Cat5e [or better] cable. It was developed by the privately-held company, Valens Semiconductor, in Israel; they have offices in Tokyo, Japan, Hong Kong, and the U.S. They are touting it as a potential cost-effective standard in advanced digital media distribution. And based on some of the features of this technology, their claims are not going unnoticed in the consumer electronics [CE] market.

The feature set of HDbaseT can be summed up by what Valens likes to call a "5Play Convergence" over a 100m/328ft Cat5e cable.

- 1080p Video
- Dolby Digital Audio
- Internet - 100baseT Speeds
- Power Channel
- Control Channel

We'll talk about some of these bullet points in more detail a little later. Valens sells the technology to several vendors who then rebrand it under their own label.

Why the Need for Something Like HDbaseT?

Any custom electronics integration company like ours can tell you of the many challenges of distributing HD media over long distances - especially when having a centralized equipment head-end.

Think about everything you need to get an HD image and sound to that remote television in that far-away room. First, you need a HD audio and a HD video cable. Well, HDMI could fit the bill for both, but we all know that HDMI cables can be plagued with signal-integrity issues over long distances. The cable isn't always easy to run through the walls while maintaining proper bend radiuses. And beyond that very expensive 50ft. cable-run, 1080p signals can be suspect. Second, you need a Cat5e/Cat6 cable for an internet connection to the TV for RSS feeds or internet apps. Third, you need to make sure that there's electrical power at the location where the TV is proposed to be installed. Fourth, if you're not planning on using the small speakers built into the monitor but opting for those upgraded speakers in the ceiling or walls instead, you'll need an audio path back to your equipment head-end. Fifth, you need another cable from the equipment rack in order to provide some form of reliable control for the TV set [we still need to turn it on/off and switch to the proper video input]. The solution can be a 4-to-5 cable solution at minimum, plus coordinating efforts from both high-voltage and low-voltage trades.

This is where perhaps utilizing HDbaseT technology in the media architecture could simplify things. Valen's technology could potentially solve all these issues with the use of one inexpensive Cat5e cable. Now, let's talk about those bullet points.

HDMI Digital Video and Audio

First of all, it should be said that HDbaseT is not a replacement of HDMI. It speaks HDMI, that's all. HDbaseT is native HDMI 1.4 and does not do any key generation; they're agnostic to the HDCP. As you can imagine, it's one of the reasons why the MPAA [Motion Picture Association of America] loves this technology since they're not messing with keys.

HDBaseT can pass uncompressed HD video. 1080p, 60Hz, 48Bit per pixel video, to be exact. 4K/2K, 3D, HDCP compliant. And keep in mind, HDBaseT supports multiple hops [up to 8], but even at a distance run of 328 feet before the use of a hop, most residential runs could be easily wired for HD distribution.

There's not much to be said about the digital audio transport, other than the fact that the technology can send it. The HDBaseT chipset does not support the audio-return channel natively. However, some manufacturers are putting in additional chips in their HDBaseT-enabled black boxes that will. So, don't worry about that. It's possible to get that digital audio track back to the headend. HDBaseT's delay end-to-end is less than 10 microseconds—very insignificant for whole house audio systems.

Internet

HDBaseT provides a bidirectional connection to the internet and is capable of transporting 100baseT speeds. Perfect for those Hulu or Pandora-enabled sets! I hate to say the word "ethernet" when speaking of the internet capabilities of HDBaseT since some may form the misconception that the whole HDBaseT technology is an ethernet-based technology at its core. And this isn't true. You cannot create a simple HDBaseT distribution system with your existing network switch. There are manufacturers developing HDBaseT-specific matrix switchers; however we're probably a year out before seeing them.

Power Over Cable

HDBaseT technology coexists with power extremely well. It's not the first category-cable to have this ability, but it seems to up the ante on power limits. Normal POE technology—common in network switches—has a power limitation of about 24-25 Watts when passed over a Cat5e cable. HDBaseT has the capability of carrying 100 Watts of power when carried over a Cat5e cable. HDBaseT can also send higher voltages as well, while still remaining safe under the high-voltage classification. How do they do this? By actually utilizing all 4 pairs of the Cat5e cable and special signal technology to keep it separate from everything else going on over the cable.

What's a real-world application where this ability could be useful? Well, be aware that one of the current goals in the CE industry is, thankfully, to provide lower-wattage equipment. Most LCD and LED TV manufacturers are already developing and prototyping monitors that average about 1 Watt per inch. Now, imagine a 50" monitor that only uses 50 Watts of power. With HDBaseT technology, we could one day have a true 1-cable solution to the TV. This could reduce the installation time for retrofitting a new television into an existing home. It could also simplify the engineering and design of retail video walls. The ability to put equipment anywhere and not just where electrical power is located is huge!

Control Signal Channel

The control signal channel in HDBaseT is open, meaning its use can be defined by the purchasing manufacturer [the box designer]. Many of these box designers—like [Crestron](#), [AMX](#), Zektor, [Gefen](#), and Vaddio—are using the channel mainly for IR, RS232, or some other proprietary protocol.

Is There a Bright Future for HDBaseT?

About a year ago, a HDBaseT alliance was formed, with the founding members being LG, Samsung, and Sony. So, expect to start seeing some CE components from these guys in 2011 with embedded HDBaseT technology. Like we mentioned earlier, it'll probably be a year before we see other manufacturers releasing HDBaseT media hubs, extenders, repeaters, and matrix switchers. There are, however, some existing point-to-point balun solutions out right now which [Cinemafect](#) has used with success. In fact, almost every major player in the custom electronics video distribution arena has either already released their version of a HDBaseT-powered balun or is planning on releasing one soon.

With CES2011 right around the corner, it will be interesting if LG, Samsung, or Sony will shine the spotlight on any new product in this area. At last year's CES, LG showed a 3x3 HDBaseT media hub—all controlled by a cell phone. And Funai displayed an "[Air Mount TV](#)", using thin cables and HDBaseT technology in order to provide power to the monitor.

[Cinemafect](#) anticipates that this technology will continue to gain more momentum throughout 2011, and we look forward to finally seeing its embedded use in set-top boxes, DVDs, and professional monitors. In many ways, HDBaseT is a better transport than a HDMI cable itself. Cheaper media; much longer distances—these two points alone will continue to drive this market.

To learn more about HDBaseT, you can visit the [Valens](#) or [HDBaseT Alliance](#) website. [Cinemafect](#) has cost-effective solutions today that utilize this technology, so give us a call at 877.426.9511 and let's discuss how we can get that HD media distributed throughout your home or commercial space.

About Cinemafect

Located in Northern California, Cinemaaffect is a custom electronics design/build firm that integrates home cinema, multi-room music and video, communications, energy management solutions, networking, automation systems and various other components to enhance your living environment and lifestyle. Our Silicon Valley clients include ambitious home-owners, contractors, architects, cabinetmakers and similar trades professionals who desire assistance & collaboration on their projects.