

The Long Haul

The ability to move hdmi long distances over network cabling has been a revelation. but is it the best solution?

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If we accept the fact that hdmi, the consumer-electronics-driven, awkwardly performing, distance-limited format for transporting high-definition video with audio, is a fact of life in pro AV (and it is for the foreseeable future), the question then becomes, how do we do what AV integrators do best? Namely, switch and route HDMI signals to devices such as digital signs and overhead projectors that are necessarily installed far from their sources? One way is by using HDBaseT technology.



You don't know HDBaseT? No matter, you may be using it anyway. If you've ever deployed some of the latest Crestron's DigitalMedia (DM) 8G gear, or AMX's UTPro family of HDMI matrix switchers or even HDMI extension equipment from companies such as Atlona or Gefen, then chances are you've used HDBaseT. If an equipment manufacturer tells you that it can transmit HDMI up to 330 feet over a single Cat-5 cable, it's probably talking about HDBaseT.

"We hesitated to go out and promote it at first because there's a lot more we layer on top of HDBaseT," says Dan Jackson, Crestron's lead engineer for integrating the technology into its DM line. "We didn't want to get lumped in with everyone who threw a chip down."

HDBaseT is based on chip-technology developed by Valens Semiconductor. With Valens chips at either end of a Cat-5e or Cat-6 cable, you can transmit uncompressed HDMI video and audio, 100Base-T Ethernet, control signals, and power roughly 330 feet at speeds up to 10.2 Gbps. The chips take HDMI 1.4 with HDCP, Ethernet, and other signals, process them as HDBaseT, send them over the wire, then turn them back into HDMI and Ethernet at the receiving end.

An industry body—the HDBaseT Alliance was formed to promote the technology, led primarily by major HDTV manufacturers that want a way to overcome the distance limitations of standard HDMI cabling in the home. The eventual end game is to have devices such as Blu-ray players, media servers, and HDTVs with built-in Valens chips speaking HDBaseT over long distances. So far, no commercially available HDBaseT endpoint exists. But that hasn't stopped makers of switchers and routers from adopting the technology and doing for AV integrators and their clients what today's displays and sources can't—build solutions that put HDBaseT into real-world applications.

"We see the technology being adopted much more in the commercial space than in homes," says Chris Bundy, marketing director for Atlona, which recently added a pair of HDBaseT matrix switchers to its line. "We're working on a digital signage project in Las Vegas using HDBaseT. If you think about digital signage, people these days don't just want to see content, they want to interact with it. And the fact that you can take that much data and control as well as HD video and audio down a single Cat-5 cable is perfect for things like kiosks and touch screens."

In interviews with manufacturers that have adopted HDBaseT, they all tell a very similar story: They were in serious development of their own technology for transmitting HDMI long distances, but they shelved those efforts after they spent time testing the Valens chipset. AMX had been working on a solution using technology that it obtained when it acquired media distribution manufacturer Endeleo in 2006, according to Robert Noble, AMS's chief technology officer.

Then Valens came knocking. "They've really hit a sweet spot," Noble says. "As you move into buildings that already have a network cabling infrastructure, it [HDBaseT] makes a lot of sense."

Early versions of Crestron's DigitalMedia used a technology that the company developed itself to transmit HDMI over twisted-pair wires using Crestron's homegrown DigitalMedia cabling. The company says it still sells a lot of the original DM equipment. (The newer DM 8G products are based on HDBaseT.) The first DM cable was basically three cables in one and could only go about 150 feet. Crestron hooked up with Valens in fall 2009.

"They make the wire itself better," says Crestron's Jackson. "There's a lot of stuff with HDMI, like EDID and HDCP, that they don't touch. As a manufacturer we still need to manage those pieces, because 75 percent of the problems with HDMI are due to incompatibilities between equipment. But Valens has solved the problem of getting a signal a long distance when there's no HDMI cable that can do that in a good way."

Proceed With Caution?

But will HDBaseT be a long-term solution? Some look at the lack of compliant displays and source devices and worry that HDBaseT could go the direction of DisplayPort, which was a good idea at the time, drew development interest from companies that built DisplayPort into their equipment, and then never really took off. (Interestingly, manufacturers are also designing extenders for sending DisplayPort and DVI-D over HDBaseT.)

Another potential problem with current implementations of HDBaseT is that they're proprietary. So, a technology that promoters view as an eventual standard is showing up in devices that can't interoperate.

"We intend to launch a compliancy and logo program," says Micha Risling, marketing chairman of the HDBaseT Alliance. "Eventually, any product that carries the HDBaseT logo will work with products from a different vendors. At the moment, each vendor can choose whether they'd like to do some proprietary solutions. The tricks are more related to controls because they [manufacturers] can use controls in a way that their products won't work with others."

In fact, the Valens chipset offers a slew of ports and capabilities that companies can utilize as they see fit, plus it offers a way for companies to inject their own features, such as proprietary control protocols and commands for managing EDID and HDCP, into the datastream. Similarly, HDBaseT can transmit RS-232, USB, and infrared control, but it doesn't specify how they should be implemented, giving engineers leeway to program their own solutions. Crestron's DM 8G, for instance, sends control signals, including RS-232 and IR, over the Ethernet channel of the Valens chipset. But it uses the actual Valens control channel for other functions. "Whether our implementation can talk to Sony's or someone else's, that's where the HDBaseT Alliance comes in," Jackson says. Plugging in HDBaseT devices from different manufacturers may leave users with some functionality, Jackson says, "But it's not guaranteed."

Moreover, not all manufacturers turn on all the HDBaseT features in their products, including the built-in Ethernet support. And the technology is designed to deliver 100W of power down the wire—substantially more than current Power over Ethernet (PoE) solutions—in order to drive remote displays. But there are trade-offs. Atlona's Chris Bundy says running power can drastically reduce the distance over which HDBase-T is effective.

"If you're going to run power, we recommend runs under 200 feet," Bundy says. "Beyond that, the cable skew starts getting ridiculous."

Regardless of the ways HDBaseT can be integrated into products, not all manufacturers will adopt it. Notably, AV giant Extron does not have an HDBaseT product in the market. The company says that when integrators need to move HDMI over long distances, it recommends using fiber-optic cabling, which has dropped in price. At Integrated Systems Europe in February, the company came out with FoxBox HDMI, a fiber-optic transmitter and receiver set for the long-haul transmission of HDCP-compliant HDMI and RS-232 control signals. Integrators can use it between two points or in conjunction with one of Extron's Fox fiber matrix switchers.

But if promoters of HDBaseT can eventually establish it as an interoperable standard, it may prove to be a powerful, cost-effective solution for moving HD signals in pro AV projects. "Technically we're not far from interoperable HDBaseT systems," Jackson says. "Like with most things in technology, business issues are the limiting factor."