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Technology: Simplified AV Cabling through HDBaseT Using a Single LAN Cable (2/11/2010)

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With the increasing use of HD and 3D displays, the home entertainment market is expanding at an astounding rate. With this growth, the average living room has amassed a huge collection of cables and connectors for multiple devices. Understandably, consumers are looking for a better way to provide point-to-point connectivity and multimedia distribution in the home entertainment environment.

How many cables do you really need?

One HDMI cable is needed for uncompressed video and audio. An additional LAN CAT5e/CAT6 cable is needed to supply Internet to your new, Internet-enabled TV and another cable is needed to carry signals and controls to the games console. What about power? That's another cable.

So you now have four cables. If that seems like a lot, imagine what it takes to install each of these cables and connect them to a Blu-ray player and game console, whether they are located next to the display or hidden in the basement 100 meters away. Add the requirement of conveniently-placed power outlets and the home connectivity challenge is apparent. A new connectivity technology, known as HDBaseT, has set out to resolve this mass-cable challenge by providing a single-cable standard using a connector already installed in many households.

Supported by the HDBaseT Alliance, a cross-industry alliance incorporated on 14 June 2010 by Samsung Electronics, Sony Pictures Entertainment, LG Electronics and Valens Semiconductor, HDBaseT is a consumer electronic (CE) connectivity technology for long-distance transmission of uncompressed high-definition video, audio, 100BaseT Ethernet, high-power over cable and various controls, via a single, 100m CAT5e/6 cable with RJ45 connectors.



Enabling 5Play convergence

HDBaseT is the first technology to enable 5Play convergence - video, audio, Internet, high-power and controls - and allow the home network to cut the cables down to one, all-inclusive, long-reach LAN cable using the standard RJ45 connector, commonly known for Ethernet LAN connections.



HDBaseT 5Play convergence via a single, 100m/328ft CAT5e/6 LAN cable.

Video and audio

HDBaseT supports TV and PC video formats including standard, enhanced, high-definition and 3D video, and also supports all standard audio formats.

HDBaseT delivers Full HD/3D and 2K/4K uncompressed video to a network of devices or as a point-to-point connection. Uncompressed content supports all video sources, including legacy products, accurately renders gaming graphics and features such as electronic program guides (EPGs), and does not degrade video quality or add latency.

100BaseT Ethernet

HDBaseT supports 100Mb Ethernet capabilities, enabling televisions, hi-fi equipment, computers and other CE devices to communicate with each other and access multimedia content, including video, pictures and music stored around the house.

Power over cable

Sending power over the same CAT5e/6 cable gives people the option to forego plugging devices into the wall outlet for power, allowing greater mobility. HDBaseT can power remote TVs and other devices up to 100 watts.

Various control signals

HDBaseT delivers different types of control signals for different purposes, starting from CEC, to RS232/USB and IR that operate remote equipment even when located in a different room.

The technology

HDBaseT uses an asymmetric method, sending video, audio, Ethernet and controls from source to sink, but only 100Mb are transferred back (Ethernet and controls). Unlike conventional data communication which is a symmetrical application by nature, with a required bit error rate (BER) of at least 10 to the minus 12, the asymmetric nature of HDBaseT is based on an innovative DSP engine and an AFE (Application Front End) architecture. A special line coding scheme was developed to provide a better transfer quality to some kinds of data (audio, controls, Ethernet) without the need to 'pay' the protecting overhead for the video content which consumes most of the bandwidth.

HDBaseT also deals with video control signals and the reconstruction of video clocks. These elements are not part of the conventional LAN communication and require deep understanding of uncompressed video interconnects.

The barrier of transferring Full HD over UTP cable is high by any standards, with the additional aspect of video-specific expertise, which doesn't usually exist in classic UTP transceiver vendors. When combined with the special architecture required to achieve the target product cost, this creates a significant barrier for competitors.

As the consumption of and demand for high-quality HD content continues to evolve and increase, so will the interest of the end user in enhancing their entertainment experience. The need for easy access to premium content increases together with the desire to easily distribute, control and consume the content and enjoy a home entertainment experience with an improved look and feel.

HDBaseT answers these needs and delivers significant value to the entire home entertainment ecosystem, from CE/PC equipment manufacturers and audio/video connectivity product suppliers, through systems integrators and retailers, to installers and consumers.

The HDBaseT Alliance is working to drive HDBaseT as the new digital connectivity standard for multimedia distribution. With support from consumer electronics manufacturers, content providers and organisations, HDBaseT is revolutionising the multimedia distribution of uncompressed HD multimedia content in the home entertainment environment via a single LAN cable.



The HDBaseT connected home.

Conclusion

Overcoming the limitations of existing wired connectivity technologies such as HDMI, MoCA, HomePlug and emerging wireless technologies such as 802.11n, WHDI and WirelessHD, HDBaseT is an innovative solution for today's and tomorrow's usage scenarios.

The HDBaseT-enabled home experience allows the consumer to easily push content as desired from a central HDBaseT hub and reap the benefits of fewer cables, enhanced features and freedom from the electrical outlet, all with an inexpensive, long-reach LAN cable.

The HDBaseT 1.0 specification was finalised in June 2010. Since that time, embedded HDBaseT products using Valens Semiconductor VS100 chips have already hit the market, including products from vendors such as Gefen, Crestron Electronics and AMX.

The Alliance invites interested parties to join and to play a pivotal role in defining the future of multimedia transmission and data communication in the consumer electronics and content provider industries. For additional information on HDBaseT Alliance and membership benefits visit the website below.

Micha Risling is the Marketing Chair of the HDBaseT Alliance, the cross-industry alliance formed to promote and standardise the HDBaseT technology for whole-home distribution of uncompressed high-definition multimedia content.

www.HDBaseT.org