VESA STANDARD
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Standards

By Steve Sechrist, Sr. Analyst at Insight Media

HDCP May Tip the Balance For DisplayPort Connectivity

Boasting multiple advantages over entrenched HDMI connectivity, the new VESA sponsored DisplayPort standard is looking to become the next de facto connection device for PCs, monitors and, eventually, all CE devices including HDTVs. The group took a huge step forward in that direction at CES by announcing HDCP 1.3 support in the new v.1.1 DisplayPort standard. This may just tip the balance in favor of the non-profit VESA offering, over the for-profit (i.e. royalty bearing) Silicon Image HDMI digital connectivity standard.

At CES, VESA revealed DisplayPort v.1.1 and a new roadmap for display connectivity convergence that included HDMI display interoperability and, most importantly, capabilities to support HDCP. The new support allows viewing protected content such as high definition movies on optical media via HDCP version 1.3 for DisplayPort, provided by the Digital Content Protection (DCP) LLC. This version, expected to be finalized in early 2007, will allow products supporting DVI, HDMI, and/or DisplayPort, to share a common encryption key set—moving the standard a long way toward interoperability with existing (and pervasive) connector sets and a suitable option for all PC and CE devices in the long term.

"Using HDCP as the same content protection scheme for HDMI and DisplayPort 1.1 makes for a better user experience and easier implementation" said Brendan Traw, Intel's CTO for the Digital Home Group. Unlike DisplayPort, HDCP requires a license to be

implemented controlling both audio and video signals as it travels over the DisplayPort empowered connection.

VESA's DisplayPort v.1.1 offers some compelling advantages to manufacturers including lower power consumption, low pin count, and most importantly, license free connectivity at over 10.8 Gbps data transfer and WQXGA (2560×1600) resolution over a 15-meter cable. This will help the new standard to gain an edge in subsequent generations of PC and eventually CE products. Alan Kobayashi, director of strategy and architecture, Genesis Microchip said: "DisplayPort uses proven digital components that manufacturers can easily incorporate into their products, adding functionality while simultaneously simplifying the electronics in both the source and display." All with license free connectivity mind you.

DisplayPort (Lt.) vs. HDMI (Rt.) Connectors

One other significant announcement and demo at CES came from chip supplier Analogix who announced the sampling of the first multi-function DisplayPort receiver IC (called the ANX9811), to be paired with the company's ANX9801 DisplayPort transmitter. Analogix also promised delivery of a full family of related DisplayPort devices in the first half of 2007, including a DisplayPort Receiver with integrated content protection that is due to ship by mid-April and is aimed at high-end graphics cards and monitors packaged in certain computer bundles.

Analogix said these receiver chips will initially be used in PC applications where the highest value (ROI) can be realized. Adoption of this standard into other venues is a bit further off.

Beyond Analogix, other chip vendors are on board. Intel, AMD, Genesis, and NVIDIA have all endorsed the standard. Phil Hester, chief technical officer of AMD said, "It's a technology that fits perfectly with future desktop and notebook PCs, while maintaining interoperability with existing monitors and CE devices."

The belief that DisplayPort will initially target PCs was echoed by PC industry leaders Dell, HP, Samsung and Lenovo. Samsung's Brian Berkeley, VP of advanced technology for Samsung's LCD Business, said his company would be "among the first to support" the standard due to its "…all-encompassing interface solution with the bandwidth and flexibility to support display applications from value monitors to high-resolution flat panel displays." Phil McKinney, CTO of HP's personal systems group liked the industry-wide endorsement, saying: "HP is very pleased to have virtually all the leaders of the PC industry on board and working together in supporting a common standard for our all-digital future." And looking forward toward PC / CE connectivity, George He, senior vice president and chief technology officer of Lenovo said, "DisplayPort will change the home digital experience for consumers by allowing seamless operability between PCs and TVs."

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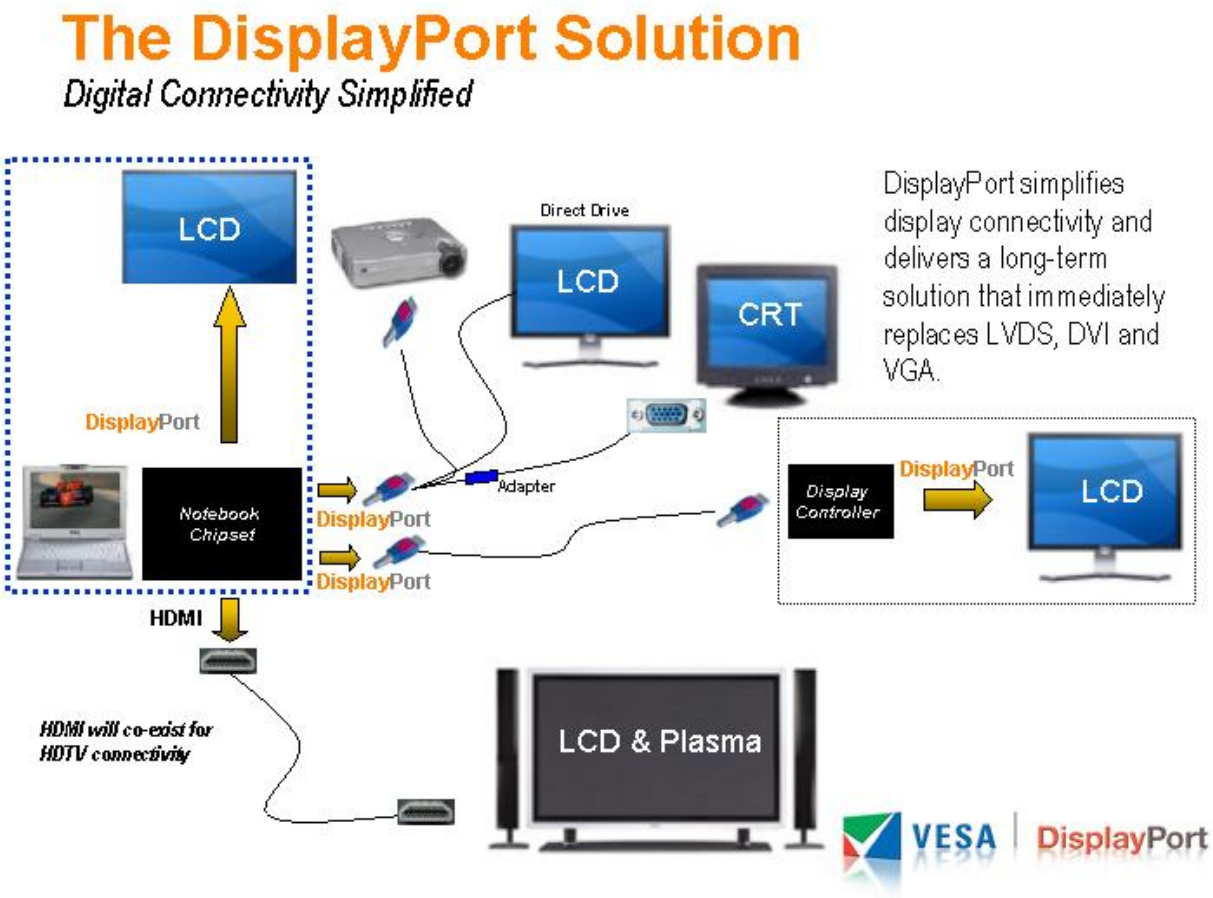

In a VESA sponsored presentation given at CES, the organization emphasized digital connectivity simplicity stating DisplayPort will co-exist with the pervasive HDMI connector set. A notebook chipset supporting the DisplayPort standard was illustrated connecting to LCD/PDP sets via HDMI, but can also connect to other display peripherals like front projectors and LCD monitors, via the DisplayPort connector (see image).

The DisplayPort 1.1 standard is currently under review by VESA membership and a vote is expected by the end of January. The convergence roadmap outlines plans to provide seamless connectivity with new and existing TVs, monitors and projectors via a USB-sized DisplayPort connector, the VESA organization stated. DisplayPort is designed to replace DVI, LVDS and, eventually VGA, making digital display connections easier, more readily available and more functional. With widespread adoption driving high quantities of DisplayPort chips, along with license-free connectivity, the group also believes the solution will eventually be more economical for manufacturers, leading to lower final product costs for consumers. *–SS*

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Wired Connections

John DiLoreto

HomePlug Gains Adherents

The HomePlug Powerline Alliance won the backing of major consumer electronics suppliers LG and TCL. Both companies joined the association board and agreed to implement the power line-based network technology. LG and TCL join existing board member Samsung. The board now includes the top three worldwide TV makers, the association said.

In another HomePlug development, Intellon and Texas Instruments said they will join forces to add Intellon's HomePlug chips to TI's residential gateway platforms. The resulting HomePlug-equipped gateway platforms will be available to service operators, such as telephone companies, to distribute IPTV, phone service, and Internet access through a home's electrical wiring. The platform should be available sometime in Q1'07.

The HomePlug AV standard, developed by the Alliance, handles audio and video at 200Mbps data rates at the physical layer, with an average throughput of 70-100Mbps over power line and 120Mbps over coaxial cable, said Andreas Melder, senior VP of Intellon, an alliance contributor member.

HomePlug AV is better suited for video than HomePlug 1.0, Melder said. This is due to both its greater bandwidth and "heavy forward error correction." Prioritized bandwidth guarantees A/V streams, the use of time division multiplex access (TDMA) technology for A/V streaming, and adaptive band-hopping technology that, in microseconds, diverts from RF noise sources such as refrigerator compressors and hair dryers.

Telephone companies are looking to HomePlug AV to distribute Internet Protocol TV throughout the house, Melder noted. Telcos are fearful of using Wi-Fi in the home, he said, due to its limited reach, robustness and reliability. It's vulnerable to interference from other wireless products in the unlicensed spectrum. For computer users, Wi-Fi is also problematic because of unacceptable latency levels, particularly for Internet gamers. *–JD*

Market Intelligence

John DiLoreto

LCD Panel Growth Accelerates

Latest DisplaySearch (Austin, TX; www.displaysearch.com) data has revised upward the forecasts for global LCD panel shipments, reaching 55.1M units this year and 76.7M units in 2007. The firm also said major panel makers have revised upward their annual targets.

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Global LCD-TV Panel Shipments (M units)			
Company	**2005**	**2006(e)**	**2007(f)**
AUO	4.0	10.4	20.0
LPL	6.4	13.7	18.0
CMO	5.6	9.7	17.0
Samsung	5.6	11.4	15.4
Sharp	5.1	6.2	8.5
CPT	0.7	2.9	6.8
Hitachi/IPS-Alpha	0.3	0.8	2.3
SVA-NEC	0.0	0.2	0.5
HannStar	0.0	0.0	0.2
BOE OT	0.1	0.4	0.1
QDI	0.7	1.6	-
Total	28.5	57.3	88.8
DisplaySearch Forecast	28.5	55.1	76.7
Source: DisplaySearch, compiled by DigiTimes, November 2006			

LG.Philips LCD is forecast to supply 12.6M LCD panels this year, while Taiwan's AU Optronics (AUO) and Samsung Electronics will follow with 11.7M and 11.1M displays, respectively. Chi Mei Optoelectronics (CMO) is expected to ship 9.4M units this year.

On the other hand, PDP shipments have been revised slightly downward for this year. Previously forecast to reach 11.1M in 2006 and 15M for 2007, PDP shipment forecasts total 10.7M units this year and 17M next year. The top three plasma panel providers this year include Matsushita, (at 3.2M units), followed by LG Electronics (up to 3.2M) and Samsung SDI (up to 2.5M).

Looking at LCDs in 2007, AUO is expected to become the world's largest panel supplier at 20M units, outpacing LG.Philips LCD (18M), followed by CMO (17M) and Samsung (15.4M). If this holds, 40-inch or larger LCD panel shipments will surpass that of PDPs next year at around 21M units, Displaysearch said. The world's top five suppliers of LCD-TV panels will continue to capture nearly 90% of the industry in 2007.

However, a panel oversupply may be in the works as LCD-TV panel demand is expected to reach 76.7M units, compared to the 88.8M target calculated by adding up the panel suppliers' forecast, the firm noted.

According to DisplaySearch, 32-inch LCD panel prices have dropped 37% (to nearly $360) in 2006 from the year before. Although the material costs for 32-inch panels have dropped to $141, and depreciation and labor costs have decreased around 30%, the profits for 32-inch panel production have gone down from $22 a year ago to around $5 now, the report said. Based on these numbers, if the ASP of the segment fall to $290, panel makers will have losses.

Prices for 40-inch panels have dropped 33% to $690 in a year. Profits for the segment were as high as $67 in Q3'06, from a loss of $20 in 2005. Higher profits came from cost reductions that outpaced the price declines. Material costs fell 47% and labor and

LCD-TV Street Price Trend, Jan-Nov 2006 ($)			
Size (inch)	Jan	Nov	Change
32	1,486	1,105	(25.6%)
37	2,135	1,531	(28.3%)
40	2,506	1,872	(25.3%)
42	3,588	2,038	(42%)
Source: WitsView, compiled by DigiTimes, December 2006.			

depreciation 23%, Displaybank said. Nevertheless, heated competition between 40- and 42-inch panels may cause profits of only $10 per panel by 2007, it was noted.

The average price of a 42-inch LCD panel was $640 in December, down 43% from a year prior, DisplayBank reported. The decrease in panel prices resulted in a corresponding drop in TV prices, in 2006 dropping on average 40%. Street prices of 42-inch LCD-TVs fell 42% to $2,038 this November, compared to $3,588 in the beginning of 2006, while those for 32-inch models dropped nearly 26% during the period, according to research firm WitsView (Taipei, Taiwan; www.witsview.com). DisplaySearch, on the other hand, said the average price of a 42-inch LCD-TV fell 35% to $2,180 over a 12-month period ending in the third quarter.

Plasma TVs in this 42-inch size range have had a historical price advantage, but that is rapidly eroding. The average price of a 42-inch model fell only 20% to $2,107, during the same period. Until last year, LDC-TVs were almost 50% more expensive than PDP-TVs of the same size, but the price gap has narrowed significantly due to increased panel capacity and resulting efficiencies.

Looking ahead at LCD-TV prices in 2007, *DigiTimes* reported that TV vendors and LCD panel makers may face more pricing pressure, and prices for LCD-TVs will drop 30-40% throughout the year, according their sources. At that rate, a 32-inch LCD-TV could cost $663-774 by the end of 2007.

Based on this (and diminishing marginal returns), Displaybank expects first-tier panel makers to see worsening operating margins in the first half of 2007, and predicts profits will continue to diminish in the second quarter of the year.

Second-tier makers will see their average operational margin at a negative 13% in the second quarter of 2007, reaching a negative 4% in the second half of the year's hot season, the firm added.

Panel makers will need to establish a closer relationship with first-tier TV brands, invest in larger-size panel production and strengthen the global module assembly network to remain competitive.

Source	2006 (e)	2007 (f)	Y/Y
DisplaySearch	45	70	55.6%
iSuppli	40	62.5	56.2%
Displaybank	42.1	64.5	53.2%
Sharp	45	66	46.7%
Compiled by DigiTimes, December 2006.			

DisplaySearch, iSuppli and Displaybank project LCD-TV shipments will grow at least 50% in 2007. The strong demand comes on top of a currently tight supply situation, with limited availability through the end of 2006. Consumer demand will stay seasonally strong through December on top of aggressive price reductions for LCD-TVs and monitors.

Lingering high inventory levels of large-size panels from the first half of 2006 were cleared out by the third quarter. It was also reported that panel suppliers, system manufacturers and channel participants are attempting to hold their inventories to lower-than-usual levels to avoid potential problems, if holiday demand falls short of expectations. Panel makers are decelerating their component demand and delaying expansion plans anticipating the usual seasonal sales slowdown during the first half of 2007.

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TV Unit Share and Average Price ($)				
	Unit Share 2005	Unit Share 2006	ASP 2005	ASP 2006
LCD	26.3%	48.8%	599	558
Projection	7.8%	7%	1,598	1,291
PDP	5.2%	10.1%	2,139	1,451
Tube	46.4%	21%	189	165
TV Combos	11.2%	13%	213	167
Source: NPD, compiled by DigiTimes.com, December 2006.				

With the current low inventories, slow expansion plans and the expected strong holiday demand boosted by low system prices, iSuppli expects tight supply to continue through the first half of 2007.

Monitor and notebook panels are also expected to remain in tight supply through the fourth quarter of 2006. Notebook manufacturers during the holidays are offering highly attractive low-end systems–some selling for less than $400. They're also offering notebooks with new features and increased performance. *–JD*

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LCD Displays

Chris Chinnock, Ken Werner

Samsung Develops First Truly Double-Sided LCD

Samsung Electronics Co. (Seoul, Korea; www.samsung.com) announced it has created the first LCD panel that can produce independent images on each side of a mobile LCD display. Samsung's new double-sided LCD can show two entirely different pictures, or sets of visual data, simultaneously on the front and back of the same screen. Other conventional double-sided LCDs can only show a reverse image of the same video data, or display different off-angle images when viewed from the front.

This new development will replace two display panels with one, thereby reducing overall thickness of mobile products by at least 1mm, the company said.

Executive Vice President Yun Jin-hyuk, in charge of the Mobile Display Division of the Samsung Electronics LCD Business, said the new display accelerates the trend toward slimmer mobile products, and Samsung anticipates high demand when it commences mass production in the first half of 2007.

The breakthrough LCD product makes use of Samsung's new double-gate, thin-film transistor (TFT) architecture. Two gates, not one, operate each pixel so the screen on the front can display different images than the one on the back. And, just as importantly, Samsung

can drive the two displays with the same number of drivers, despite the increase in transistors. Samsung's proprietary Amorphous Silicon Gate (ASG) technology enables this feature.

The new Samsung mobile display requires only one backlight, while competitive double-screen LCDs require two. One side of the panel operates in a transmissive mode, while the other operates in a reflective mode. By using a unique reflective design that utilizes the light trapped in the opposing screen's transmissive mode, the reflective mode does not solely rely on external light sources such as the sun.

We tried to contact Samsung to get more clarity on this architecture, which is not clear to us at all. However, we were unable to get more information by press time.

The new double-sided LCD is 2.6mm thick and 2.22" wide, with QVGA (240 x 320 pixel) resolution, and has brightness values of 250 nits for the front and 100 nits for the rear display. Each display supports 256K colors with the front display offering color saturation of 60% of NTSC, while the rear display achieves only 10% of the NTSC color standard. *–CC*

LCD Shipments for Monitors Rise to Historic High

Best-selling LCD Monitor Categories by Size and Resolution in 3Q

Size/Resolution	Q2'06 Share	Q3'06 Share	Q2/Q3 Unit Growth
17-inch SXGA	52.7%	50.8%	12%
19-inch SXGA	25.7%	24.6%	11%
15-inch XGA	11.8%	10.1%	0 %
19-inch Wide	4.1%	8.1%	129%
20-inch Wide	2.1%	2.2%	23%

In mid-December, DisplaySearch reported LCD monitor-panel shipments had hit an all-time high in Q3, with 34.6M units shipped worldwide. Shipments rose 21.9% year-over-year and 16.3% quarter-to-quarter. Quarter-to-quarter worldwide revenues grew 7.4% to $9.4B, with of the most growth occurring outside the North American market, which grew only 2%, reported Doug Olenick in *TWICE*.

But the large-size, wide-aspect-ratio category did well in North America, with wide 19-inch models growing by 129% quarter-to-quarter, doubling the segment's share to 8.1%, while the wide 20-inch segment grew 23%. Even 17- and 19-inch panels with 4:3 aspect ratio did well, with unit shipments growing 12% and 11%, respectively. Fifteen-inch models experienced zero growth, and DisplaySearch expects the 19W models to outsell the 15-inchers for the first time during the fourth quarter 2006. *-KW*

Wide Monitors Will Surge to 54% by 2010

DisplayBank (Seoul, S. Korea; www.displaybank.com) announced that widescreen LCD monitors will account for 54.1% of worldwide LCD monitors by 2010, soaring up from just 1.3% in 2005 and 11.3% in 2006. The company also forecast growth in widescreen monitors will reach 22.8% in 2007 and 32.1% and 42.4% in '08 and '09, respectively (see chart.)

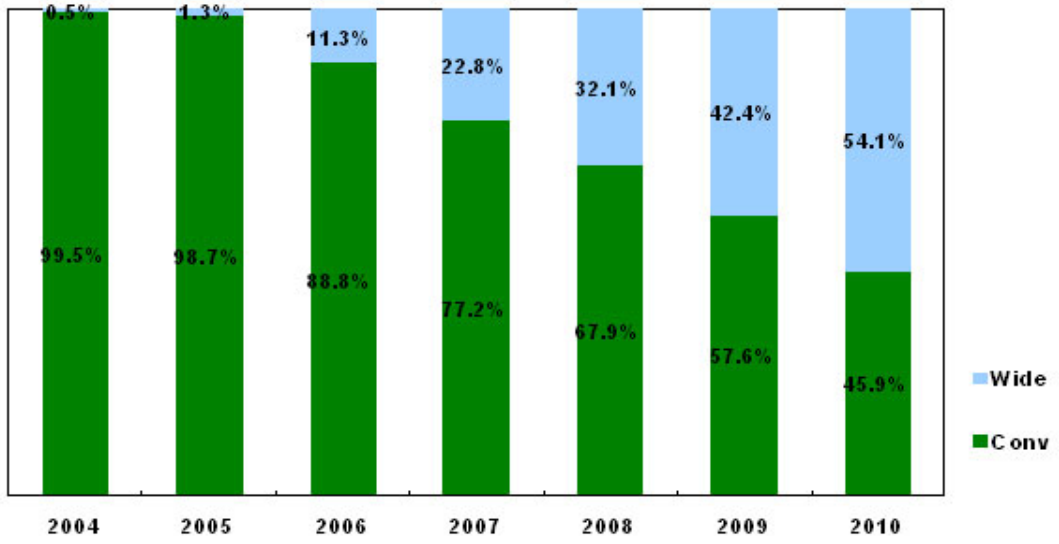
DisplayBank explained that, as a number of companies have joined in launching wide monitors from the second half of 2006, the range of consumer choices has widened and prices have plunged, stimulating

further market demand. The company said, in Korea a 20-inch wide monitor is now priced between $214.73 and $322, a 70% to 80% reduction compared to the price a year ago set at $1,073.

The company believes this growth is due to (1) increased efficiencies in making wide monitor panels, (2) a fast shift to wide designs in the note PC market; (3) the launch of Window Vista; and (4) the enhanced role of monitors as multimedia devices.

DisplayBank also said the proportion of the 20-inch and larger models will surge from 12% in 2007 to 44% by 2010, with 19-inch wide monitors holding the top spot in shipments until 2008. After 2008, 22-inch wide monitors will edge out 19-inch models. *–SS*

LCD Monitor Demand Forecasts by Aspect Ratios



Displaybank, Ricky Park, ricky@displaybank.com

About VESA

VESA is an international non-profit corporation led by a Board of Directors, which represents a voting membership of more than 140 corporate members worldwide. VESA supports and sets industry-wide interface standards for the PC, workstation, and consumer electronics industries. VESA promotes and develops timely, relevant, open standards for the display and display interface industry, ensuring interoperability and encouraging innovation and market growth.

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