



# VESA STANDARD

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## Standards

*Chris Chinnock, John DiLoreto*

### EDID 1.4 – A Needed Update to Support TVs and PC Displays

The EDID (Extended Display Identification Data) standard is the one that helps enable you to plug a monitor into your PC and have the PC recognize attributes of the monitor. It is the structure behind Plug and Play and allows the handshaking between the display and the host to occur. But the current 1.3 standard was last updated in 1999, before HDTVs became so popular and before other advances in colorimetry, TV-centric interfaces and other factors became important.

As a result, the VESA organization has just ratified an updated E-EDID Standard (dubbed Release A, Revision 2, September 25, 2006). The new E-EDID Standard includes the EDID 1.4 (version 1, revision 4) data structure definition, which proponents believe should provide room for growth for another 5 to 8 years or so.

This update is important not only for IT-focused companies, but for CE companies as well. Already the displays for PCs and TVs have begun to converge. EDID 1.4 will help ensure this convergence progresses more smoothly. The goal is to make connections with displays simple and easy, so consumers are not frustrated – a situation no one wants.

#### *The Times They are a’Changin*

Historically, the EDID specification has been a PC-centric standard geared toward making sure PCs could identify the characteristics of monitors to provide the best signals. Displays embed a table containing information about the display, which is read by the host.

The TV industry has adopted EDID 1.3 by embedding TV information in the set itself, while DVD, set top box and other source devices have added the interrogation/decoding firmware to help ensure a good Plug and Play experience. This has also helped with the connection of PCs to TV displays too.

The CE industry concluded that EDID 1.3 was a proven way to accomplish the identification goal. As a result, EDID 1.3 was incorporated into the CEA-861 standard.

Since 1999 however, there have been additional advancements that should be integrated into an updated EDID standard. This includes new digital video interface VESA standards like MDDI and DisplayPort and other interface standards like HDMI or DVI. Expanded color bit depth is also now possible with options up to 16 bits per primary now feasible. In addition, we have a wider variety of color encoding schemes available.

Finally, there were some “errors, misinformation, confusing information and incomplete aspects of the EDID 1.3 spec released in 2000,” noted Alain d’Hautecourt, the EDID 1.4 Task Group Leader and Document Editor. “These aspects, plus additional items became the main drivers behind the revision upgrade.”

### ***What’s New***

Since the 1.4 version was meant to further solidify the convergence of PC and IT displays, it was important to get both PC and TV companies involved in the standardization process. Companies like Dell, HP and Viewsonic stepped up on the PC side while Philips, Sony and Samsung represented the TV side. In addition, chip set vendors like ATI, nVidia, Tech Source and Chronitel also participated.

One of the key revisions was the creation of a generic data structure that will allow for more flexibility, but just as importantly, will save costs on the manufacturing line. In the EDID 1.3 structure, the data fields were fixed and it was required for manufacturers to put in the serial number and other product ID information. This meant each display device had to be individually programmed on the manufacturing line.

With the generic data structure, the serial number is optional, with only a code for the series of display needed. This means one EDID table can be used for each series of displays with no individual programming for each device - a manufacturing cost savings. In addition, only the model year, not the year of manufacture needs to be specified – a bow to the desires of CE makers.

Another valuable input from the CE side came with the redefinition of the screen size. Previously, the EDID 1.3 standard called for specifying the horizontal and vertical screen size. But what happens when a 480i or 480p signal can be delivered in either 4:3 or 16:9 aspect ratio? Confusion. Therefore, the screen size parameters were modified to include the ability to aspect ratio or the horizontal and vertical screen size. In addition, another field can be used to specify if the display is being used in landscape or

### ***What’s in the EDID 1.3 Data Structure?***

- Manufacturer’s ID
- Product ID
- Serial Number
- Manufacture or Model Date
- Display Parameters and Features
- Color Characteristics
- Supported Video Timing Modes
- More



portrait mode. Portrait mode displays are popular in digital signage, for example – another market and usage mode not envisioned in 1999.

Expanded color bit processing was added to support displays that can process at 6, 8, 10, 12, 14 or even 16 bits per primary color. In the past, it was assumed the incoming signal was 8 bits of color per primary. Now display with greater bit depth processing can make themselves known to the source so signals are matched to the display as closely as possible.

Another assumption in the 1.3 standard was the color encoding scheme, which was assumed to be RGB 4:4:4. Now, the display can specify which encoding schemes it supports: RGB 4:4:4, YCrCb 4:4:4 or YCrCb 4:2:2.

There is also a feature that allows the display manufacturers to specify the “best image quality” mode. This remains a somewhat loose category with each manufacturer free to define exactly what this means for its display, but in general, it is likely to be the native resolution and optimal refresh rate of the display. This is designed to give a mode that should provide the least scaling and other artifacts.

Additional registers specify which standards the display will support: DVI, HDMI-a, HDMI-b, DisplayPort, etc.

### ***Prospects for Success***

After a two-year, multi-company effort to update the E-EDID specification standard, VESA has finally ratified the agreement. According to d’Hautecourt, the transition from the 1.2 standard to 1.3 occurred in a relatively rapid 1 to 1.5 year time frame. “However, this was significantly aided by Microsoft when they mandated that any software carrying the Microsoft approved logo support the EDID 1.3 standard. As the convergence of PC and IT displays accelerates, we think it likely that a similar short time period will be needed to adopt the 1.4 revision.”

The move to the EDID 1.4 data structure will not have an impact on the silicon used in display systems. It just means there is a new structure to the data, which needs to be implemented via a software change. On the source side, the graphics firmware also needs to be rewritten to support decoding of either EDID 1.3 and EDID 1.4 data structures. Support for EDID 1.3 is needed to be sure the installed base of displays can still be read.

You can download and review the EDID 1.4 Data Structure Definition in VESA Enhanced Extended Display Identification Data (E-EDID) Standard, Release A, Revision 2, dated September 25, 2006 at [www.vesa.org](http://www.vesa.org). -CC

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## **Freescale Withdraws from 1394-over-coax**

Freescale Semiconductor Inc. is withdrawing its proposed 1394-over-coax solution to the 1394 Trade Association, leaving the field to a competing technology being developed by Pulse-Link Inc. (San Diego, CA), a representative for the association said in *EE Times*.

Freescale proposed a physical (PHY) layer approach to 1394-over-coax, but then decided that it would not expend the engineering resources needed to develop the technology. The 1394 trade

association of about 170 members expects the standard to coalesce around the Pulse-link solution, which includes a chipset and supporting software, he said.

Freescall's retreat that clears the way for Pulse-Link to enter the market next year, the association said. Other silicon vendors may then choose to develop 1394-over-coax silicon and software, based on the standard, he added.

Pulse-Link chief technology officer John Santhoff said Pulse-Link would demonstrate its solution at the upcoming Consumer Electronics Show in January 2007. Those Gbit-per-second links will support both 1394 and Ethernet transmission, using the type of coaxial cable widely used in households. Cable providers favor the approach because it leverages their installed base of coax in customer's homes.

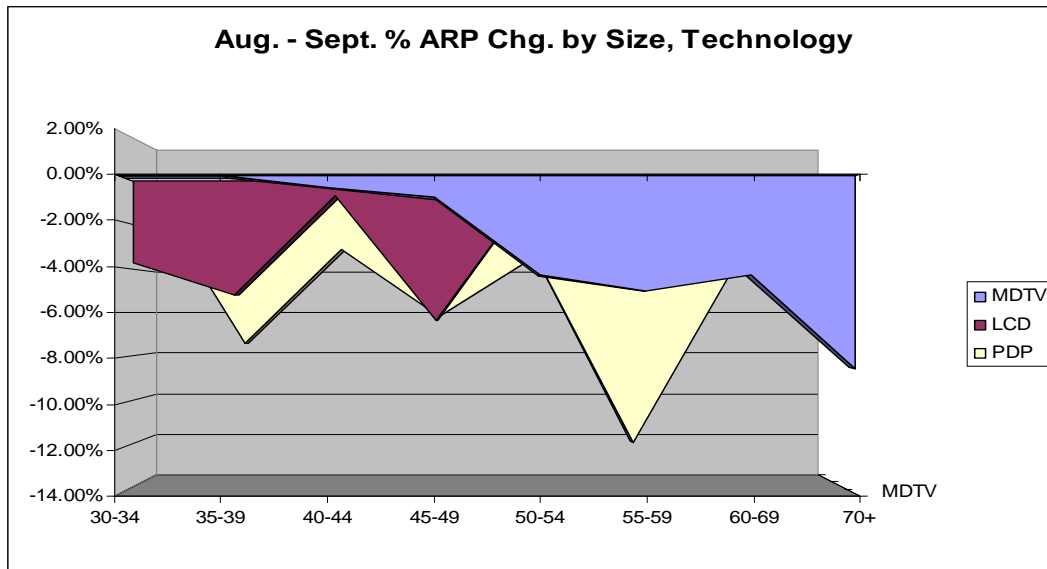
The technology promises to feed into a large market, due to a mandate by the Federal Communications Commission requiring 1394 links in future high-definition digital televisions. *-JD*

## Trend Analysis

*Ken Tompkins*

### All Model Analysis

This month's pricing analysis revealed that MDTV average retail pricing (ARP) declined rapidly in sizes of 70 inches and larger, with an 8.5% fall from the previous month. Flat-panel television (FP-TV)



Aug. to Sept. % Change in ARP by Size, Technology								
	30-34	35-39	40-44	45-49	50-54	55-59	60-69	70+
<b>MDTV</b>			-0.49%	-0.95%	-4.35%	-5.03%	-4.37%	-8.46%
<b>LCD</b>	-3.70%	-5.18%	-0.68%	-6.38%		-1.76%	-2.58%	
<b>PDP</b>	-	-7.50%	-3.00%	-6.20%	-3.28%	-12.23%	-4.19%	0.05%

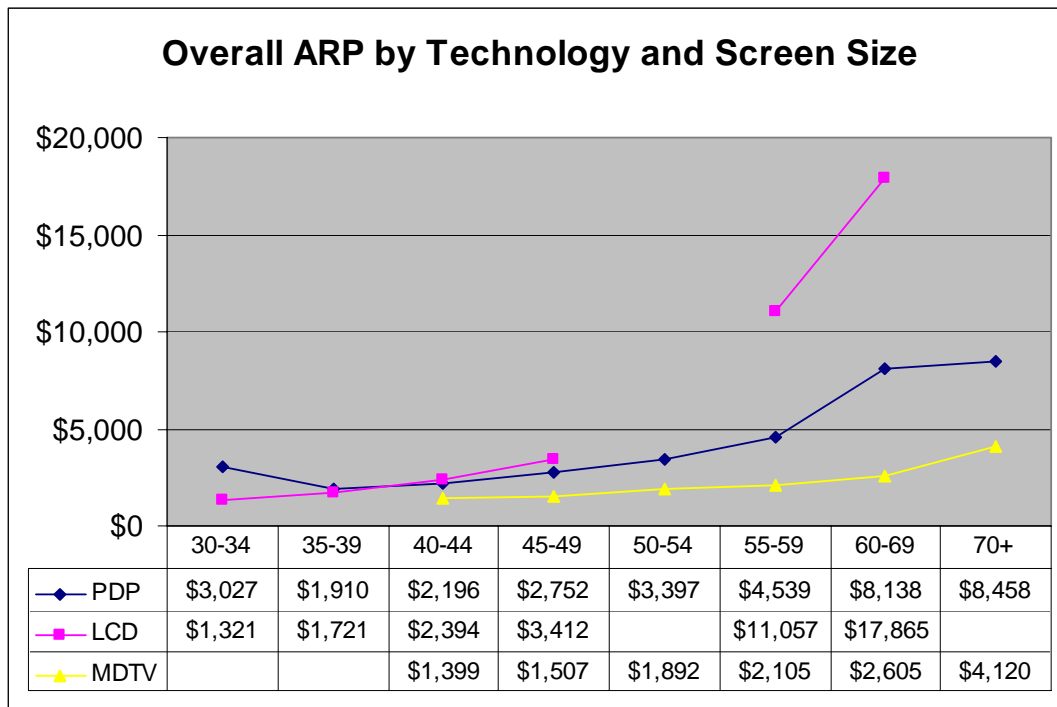
technologies both witnessed ARP drops of approximately 6.3% in the 45-49” range. Our survey also shows that, of the major technologies by size, 55-59” PDP-TV ARP dropped the most (12.2%).

Perhaps most surprising is the relative lack of ARP change in the FP-TV battlefield segment of 40-44 inches. The only ARP fall greater than 1% in this category was that of PDP-TV, which dropped by 3%.

The ARP decline of 8.5% for MDTVs of 70 inches and larger resulted in the segment’s falling under a new average advertised pricing milestone and nearing a new one in a single month: consumers shopping for 70+ MDTVs in August found advertised prices of just over \$4.5K on average. In September, consumers found prices falling much closer to \$4K, with an MDTV ARP of \$4,120 in the 70+ size segment.

This fall in average retail price for the largest MDTVs makes the flat ARP curve for MDTVs even flatter. In other words, the “volume discount” that consumers can get on square inches of MDTV vis-à-vis the other HDTV technologies is better than it has ever been.

The 12.2% ARP fall for 55-59” PDP-TVs has also resulted in new records as the average retail price fell from \$5,172 to \$4,539 in a single month. This PDP-TV ARP, while still twice as expensive of MDTVs of the same size range (\$2.1K), is still much less than comparable LCD-TVs (over \$11K).



In the case of the 40-44”, all the major HDTV categories reflect the sheer number of models available in sizes of between 40 and 44 inches. LCD-TV is maintaining a slight premium over PDP-TV in terms of 40-44” average advertised prices.

*Note: other coverage in Insight Media’s newsletter reports LCD-TV pricing being lower than PDP-TVs in this size range. These other reports may balance ASPs by unit volumes, but this is never specified*

*or described. Nor do they note what missing data has been estimated. In our reporting methodology, we average the pricing noted in our basket of web sites, selecting web sites to provide a balanced representation of the various channels of delivery. No method is perfect, however.*

While expecting 40-44" LCD-TV average price to shortly fall below that of PDP-TV, we find the moderate ARP declines in FP-TVs by size in this survey to be the channels' taking a respite after the torrid pace of ARP falls in the lead up to the holiday season. LCD-TV is also able to maintain a premium based on higher average resolutions. -KT

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## Wireless

John DiLoreto

### Wireless Data Has Arrived

CTIA – The Wireless Association ([www.ctia.org](http://www.ctia.org)) announced its Semi-Annual Wireless Industry Survey at CTIA WIRELESS I.T & Entertainment 2006 in Los Angeles. Data service revenues for the first half of 2006 were \$6.5B, a 70% increase over the first half of 2005. Such revenues now total almost 11% of all wireless services. The survey also found that wireless carriers reached record total service revenues of \$60.5B for the first six months of 2006.

“Data is no longer on the horizon; it is here today,” said CTIA – The Wireless Association President and CEO Steve Largent.

The 219M wireless users as of June 2006 represents a year-over-year increase of 25M subscribers, just shy of the industry's 12-month record reached in 2005, when 25.7M new users came online.

Wireless carriers also reported delivering more than 12.5B text messages in June 2006, up 72% over the 7.3B messages for June 2005. The reported number of MMS messages delivered in the first half of 2006 was 1.1B, equal to the total number of MMS messages reported for all of 2005.

Other highlights of the survey include: wireless customers using more than 850B minutes in the first half of 2006, up 27% over the first half of 2005, and a \$10B increase in capital investment. -JD

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### Wireless HDMI Standard Proposed

Chip manufacturers TZero Technologies and Analog Devices have joined forces to create a wireless HDMI standard to hook up to three HD streams from 10 meters away using ultrawideband (UWB) technology. Alleging that prior implementations of wireless HDMI haven't been up to acceptable levels, TZero has built their current prototype on the standards set forth by Panasonic, Philips, Samsung, Sharp and Sony in July 2003.

TZero manufactures chips for ultrawideband technology that hopes to act as a wireless replacement for USB. The wireless HDMI system claims speeds of 500Mbps and resistance to common interference such as microwaves and cordless telephones. In addition, the standard is calling for a high level of reliability with “less than one in one hundred million” packets having an error or being lost.

While TZero is providing their TZ7000 chipset, Analog Devices is providing their JPEG2000 codec for use in lossless mode. Encryption will secure the transmissions, but specifications on the algorithm have not been disclosed. The hardware will be fully HDCP compliant, so all existing HDMI devices should function compatibly.

In addition to the simple point-to-point “cable replacement” usage, TZero also hopes to create a “distribution model” for high-definition content, where a single transmitter can drive up to three individual receivers, each receiving a different content stream. The wireless interface doesn’t need a line of sight between any of the devices.

The current device, a large “black box” design, has a few stages of revamping ahead of it before it is ready for release, but TZero hopes to be able to reduce the receiver to the size where it can be integrated into televisions, projectors, or even portable media devices. A showing is expected at next January’s Consumer Electronics Show with top-tier HDTV embedding a TZero receiver.

Pricing has not been announced, but TZero claims it will be “comparable to other wireless technologies.” –*JD*

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## Business and Strategic

*Chris Chinnock*

### Competitors Form Consortium to Promote MDTV

Finally realizing they had more to gain than lose by banding together, three of the major forces in microdisplay-based technology, JVC, Texas Instruments and Seiko Epson, have formed a consortium to promote the microdisplay TV (MDTV) category to consumers. Glaringly absent however, is Sony.

The Micro Device Display Consortium (MDDPC) also includes major component suppliers like Arisawa Mfg. Co., which is a founding member, and supporting member companies like SCRAM Technologies, 3M Corporation, Luminus Devices and Samsung Japan Corporation.

The formation of the consortium, long a goal of some of the members, is clearly needed to blunt the dramatic growth of flat panel TVs, where sales momentum seems to have shifted. MDDPC will widely publicize the features and advantages of MDTVs to consumer, retailers, industry experts and the mass media in a bid to boost awareness of the technology. The technology actually consists of three technologies (DLP, LCOS and HTPS), but the consortium will downplay these individual technology options to promote the category instead.

MDDPC plans to prepare marketing materials for consortium members to share in promoting the common advantages of MDDP and will launch a new Web site (<http://www.md-display.com>) to provide information on the technology. The consortium also plans to sponsor product demonstrations.

Since MDTVs offer much lower power consumption compared to flat panel TVs, the consortium will also seek to acquire labeling for energy-efficient performance, and add products to energy-efficient catalogs (for electric home appliances).

The consortium is also interested in signing up new consortium members, so contact them if interested ([inquire@md-display.com](mailto:inquire@md-display.com)).

The MDTV category is forecast to grow to 3.5M units in 2006, according to Techno Systems Research. Since 2004, about 4.1M MDTV sets have been sold worldwide – the vast majority in North America. Directors include:

- Shintaro Nakagaki, Associate Director, Victor Company of Japan, Limited (JVC), General Manager, Display Unit, Technology Development Division, JVC
- Takakazu Hayashi, Technical Marketing Manager, 3M APAC
- Masahide Iesaka, Executive Operating Officer, Arisawa Mfg. Co., Ltd.
- Mikiya Kuroda, Senior Manager, Samsung Japan Corporation, Business Development Department
- Satofumi Koike, General Manager, Seiko Epson Corporation TFT Design & Engineering Department, TFT Operations Division,
- Kazuhiro Ohara DLP Products, Senior Manager, Product Marketing & Technical Support Center, Texas Instruments Japan Limited --CC

## LCD Panel Manufacturing

*Steve Sechrist*

### Sharp's Gen 8 LCDs Built with Solar Power

The main headline at Sharp's press conference last week at CEDIA focused on the fact that the company's new Gen8 plant will start making 42-, 46- and 52- inch Full-HD (1080p) LCD-TVs in October at plasma-killing prices of \$2,400, \$3,499 and \$4,799 respectively. But Sharp has another card up its sleeve. A brief video presentation revealed the company's strategic plan to excel in large panel manufacturing - but to do so using the highest eco-tech methods employed to date at its groundbreaking Kameyama No.2 plant.



According to the company, the plant is the most environmentally friendly factory in the world. For example, Sharp employs a world-class solar generation system that produces 5,150 KW of power (enough to power 1,300 average US households). An additional 1,000 KW fuel cell is the largest in Japan and is used exclusively for in-house power. This along with its co-generation system, that supplies electricity and heat (from hot wastewater) cuts CO2 emissions by 40% according to the company web site. Sharp also emphasizes that 100% of its waste water (over 28,000 cubic meters per day) is recycled and even the air conditioning employs a natural cooling system, positioned to harvest the cool winds off Mt. Suzuka to the Northwest of the factory.

The most amazing fact emerged when Sharp CEO and COB, Toshihiko Fujimoto was questioned about the added costs to the panels for all this eco-technology. He said that Sharp built the factory because it is the right thing to do for the environment, but when it all added up the cost delta compared to conventional energy sources was negligible.

Our take: The Sharp Gen8 Aquos TVs can claim both the highest production efficiencies in the industry and the fastest response times at 6- and 4ms. Most importantly, these Aquos sets produced some of the best Full-HD images we've seen. So with the new announced pricing, they offer perhaps the best value on the shelf.

The fact that the panels are made at the highest eco-tech factory on the planet is a claim that Sharp can leverage all the way to the bank. Even if a side-by-side comparison with-say the Sony Bravia reveals very close image quality, eco conscious US buyers will have yet one more reason to buy the environmentally friendly Sharp set. Kudos to the Sharp team for putting the environment high on the priority list-showing other manufacturers the way. -SS

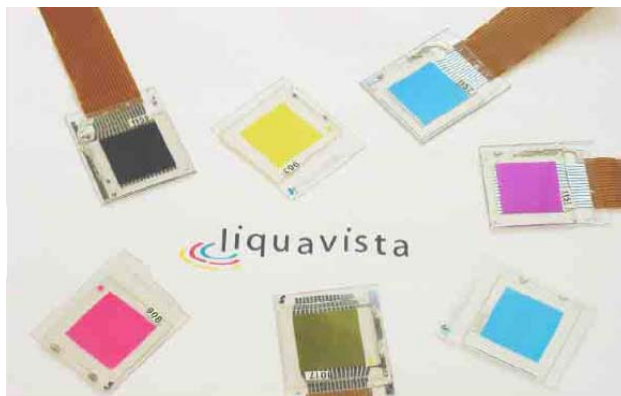
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## Alternative Displays

*Matt Brennesholtz*

### Liquavista to Build Development Line

Liquavista BV (Eindhoven, The Netherlands; <http://www.liquavista.com/>) is planning to invest 2 million euro (about \$2.5M) in a process development line for its electrowetting display technology.



Liquavista was formed in April 2006 (see the May MDR) by Philips Research Labs and New Venture Partners to commercialize display technology invented by company founders Rob Hayes and Johan Feenstra in 2002. The electrowetting display is based on the fact that a water droplet in contact with a water-repellent surface will begin to spread out in the presence of an electric field. Hayes and Feenstra showed a 3 by 5 array of pixels built on a glass substrate in October 2003.

Since the technology can produce daylight viewable color images with fast enough response times to show video content, Liquavista is aiming its display technology at portable and mobile applications such as MP3 players, watches, cameras, phones, DVD players and automotive applications.

"Having successfully launched the first series of prototype displays — ColorMatch and ColorBright — in June, the Liquavista team is now working hard to install a process development line. The number of employees in the company has also grown significantly and we have made three critical hires across the UK and The Netherlands," said Mark Gostick, chief executive officer of Liquavista, in a statement.

Liquavista has appointed Martin Stephenson as chief financial officer. Two veterans in the display industry, Harrie Hermens and Eric Derckx, have joined the engineering team. Hermens will oversee Liquavista's planned manufacturing process development line.

Derckx, appointed as director of development engineering, will lead the development of system aspects for Liquavista's products including modularization, optics, mechanics, electronics, as well as overseeing the development of the product range. —MB

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## Mobile Displays

*Matt Brennesholtz*

### A 7-inch HDTV Display?

VP Dynamics Labs (Hong Kong, China; [www.vp-dynamics.com](http://www.vp-dynamics.com)) plans to be at the FPD International 2006 in Yokohama on Oct 18-20 to show off their 7" and 10" HDTV LCD displays. Our first reaction was "Who are they kidding -- HDTV on a 7" display?"

Upon further reflection, the idea isn't so bizarre after all. These displays are intended for automotive and aviation applications, not for use at home. You would be looking at these displays from 20" away, if you are lucky, not the 9 feet that would be considered about the minimum HDTV viewing distance in the home. Many of you have probably been annoyed by the poor contrast, poor colors and poor resolution of the display in the seat back on an airplane. It is close, too close for comfort, and some of us need to put on reading glasses to see it.

Looking at the specs on the VP Dynamics panels, they do not have even 1280 x 720 native resolution. They use resolution-enhancing techniques, including non-standard pixel arrangements, to give virtual resolution that they claim is up to HDTV standards.

VP Dynamics talks about automotive Blu-ray or HD-DVD. These formats are new -- it is likely to be several years before penetration of either format is significant. On the other hand, the target audience for this product at FPD International would be automakers and airplane builders, not consumers. Automakers look several years ahead and for a product like an installed HDTV entertainment system, they would be looking at displays for the 2010 model year and beyond. The aftermarket for the automotive market has a shorter design cycle and it would be possible to see HDTV aftermarket systems for cars in a year or so.

Even if you can't see the extra resolution of HDTV in your automotive system, you may still want to have a HD-DVD or Blu-Ray player in your car, with a 16:9 HDTV screen. Who would want to watch

letterboxed video on a 7" screen? Besides, people won't want to buy two disks of a movie, one HDTV to watch at home and a DVD to watch in the car.

There has been a lot of talk in the industry about home theater and mobile video, but there is likely to be another topic to talk about in the coming years: mobile HDTV. -MB

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## CEATEC 2006 Show Coverage

*Steve Sechrist*

CEATEC Japan kicked off the first week of October with 200K visitors pouring over all eight halls, filling the famous Makuhari Messe in Chiba, Japan with more than 800 exhibits. This is the largest Consumer Electronics show in the nation, and it did not disappoint with lots to see and some surprises. Below we summarize some of the larger panel innovations we saw. Other, smaller panel coverage is in our sister publication *Mobile Display Report*.



### Toshiba-Canon Show 55-inch SED



The biggest news came from the show floor with the presence of the long absent SED technology. The 55-inch screens were shown to ticket holders only and standing in line, even for the patient Japanese was the rule of the day at SED Inc. But the wait was rewarded with a 50K:1 contrast picture at 450 cd/m<sup>2</sup> brightness that was truly eye popping. The primary reason for the technology delay was dramatic price declines in traditional LCD and PDP flat panel technology, which required a business plan revisit on more than one occasion. Look for these sets to start mass production in the 2008 time frame starting with the high-end CEDIA channel.

## Sharp Shows 4X-HD and Mega Contrast LCDs

Another pair of stunning prototype displays at CEATEC came from the Sharp booth where a 37-inch Mega contrast LCD boasts 1,000,000:1 (yes one million to one) contrast ratio display (also shown last year), and a 64-inch LCD with 4096 x 2160 resolution, able to display four full HD (1080p) images simultaneously on a single screen.

The ultra high contrast also includes a 500 cd/m2 brightness rating. The company is being tight lipped about how it gets to the high contrast level beyond stating, “an accumulation of unique one-of-a-kind technologies nurtured over long years of experience in the field of LCD.” We did manage to determine the company is boosting the display refresh from 60 Hz to 120 Hz, however.

Sharp said it would target master control monitor applications in professional broadcast and cinema markets as a first use for the technology – the same market that SED technology is said to be



targeting. A press release stated this new LCD enables filmmakers and video producers to check video images to the most demanding levels of clarity and color reproduction.

The ultra-high resolution display boasts what it called a true motion picture resolution quality that the company also plans to launch into the high-end broadcast market.

Sharp also showed a 37-inch prototype LCD with a blazing 4ms fast response rate (what Sharp calls “Moving Technology”). Specs for the unit include 1366x 768 resolution (XGA), a 176- (h) / 176-degree (v) viewing angle, 500 cd/m2 brightness, 1200:1 contrast. The 4ms speed rating was also shown on a 46-inch Full-HD model



(1920 x 1080) resolution at 500 cd/m2 and 2000:1 contrast ratio. -SS



## 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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