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"LCD TV Matters"
Volume 3, Issue 1

"A Great TV in Every Room"

Contents

Chairman's Corner: LED'09…

by Bruce Berkoff

The pace of time and progress marches ever onward… We have moved from big boxy heavy and bulky CRT TVs to slim and light LCD TVs, but innovation knows no rest and the slimmest-yet LCD TVs with LED backlights are going mainstream in a big way. We have seen how LCD TVs have grown from earlier this decade being usually just a 15-inch monitor panel with an added tuner and increased price and spotty video performance at best to go to the more than 12x larger (in area) 55-inch beauties that today also begin to have great new features enabled by LEDs. (See figure 1 below for a subset view of 3 metrics of improvements in the evolution of TVs).
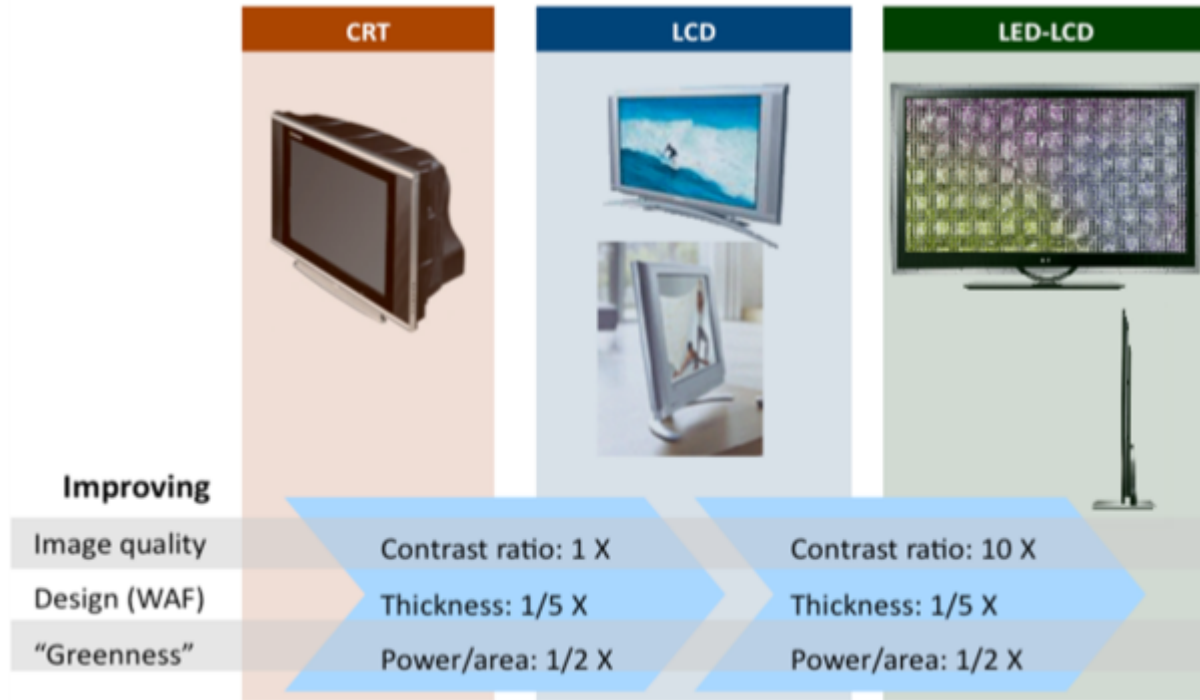
Figure 1: TV Evolution: CRT to LCD to LED-LCD. The evolution in TVs has been from heavy and thick CRTs to thin and light LCD TVs to new LCD TVs with LED BLU's that get better in almost every way!

I have often noted the 3 main categories of "things" I discuss when talking to people about the performance of LCD TVs, 1) IQ, 2) WAF, and 3) "Green". By the 1st of terms I mean, "IQ" or "image quality", which can mean the whole host of "feeds and speeds" or "specs" that people measure as a proxy for some aspect of video performance, such as contrast, dynamic contrast, black level, MPRT (motion picture response time), color gamut, and so many more. The 2nd category is my proxy for "industrial design" and stands for "wife acceptance factor" which means both the obvious things like thin and light but also more subtle factors in bezel width, design quality and a certain "look" that great looking TV products have. The 3rd category here refers to the overall "greenness" of a product, which can mean how much (or little) power it uses, but also other metrics like it's over all carbon footprint (like having a small box which means less packaging and more units shipped per truck and train thus less fuel wasted for each) as well as how little harmful materials are inside (like no heavy metals in the glass, no lead in the solder, safe and small amounts of liquid crystals inside and the overall "footprint" of its manufacturing and usage life cycle). In all of these areas not only are the LCDs of today a vast improvement over the earliest CRT TVs but LCD TVs with LED BLU's (backlight units, even if some are edge-lights) are another big improvement step as well, and getting better quickly!

High up on anyone's shopping list this Xmas season should be some of the great new LCD TVs with LED BLUs, like the ones shown in Figure 2 from LGE.

Figure 2: LED backlights – making great LCD TVs even better. On the left is LGE's SL90, a 47-inch LCD TV with LED backlighting featuring a borderless frame at 120Hz. On the right is LGE's SSLHX, a 55-inch LCD TV featuring "Full LED backlighting" and wireless connectivity at 240Hz.

On the right we see the type of almost "borderless" design enabled by a direct-view LED BLU as well as the seriously talented industrial designers and mechanical engineers at LGE today. On the left we not only see a great new state–of-the-art 55-inch LCD TV with LED enabled regional dimming etc., but this model comes with a "wireless" box for all the video connections, enabling the TV screen to be wall mounted with only the power cable to attach. Even in the stand configuration this enables all of your video peripherals and legacy connectors to be placed far away from the elegant TV, adding greater "WAF" to the entire configuration! What a beautiful set up. This is one of the many things I have been talking about for years, finally getting to market, and which I hope now will show up in even more audio speakers, enabling true "surround sound" in an easy to set up and live with configuration that is missing from almost all sound systems today (and thus most folks get a great new TV and live with sub-par audio for now).

We can see in Figure 3 the technology often behind these types of TVs, an 11.9mm panel LGD showed at CES 2009, and shipped earlier this year. This was a great example of a component designer working closer with the "set" designers to make a better product come to market much more quickly than what had been the 18-24 month standard in the CE/TV space not too long ago (versus the 6-12 months we have become use to in the IT/PC world). This type of complicated system is enabled by ever more intelligent electronics inside the set, which enables new and thinner "smart panels" with the electronics integrated into less boards with less connectors inside the panel, and thus not only better and thinner designs, but less costly and more reliable as well (which less "parts" can achieve, but it takes a great deal of work!). The pace of advancement and improvements seem faster and better than ever.
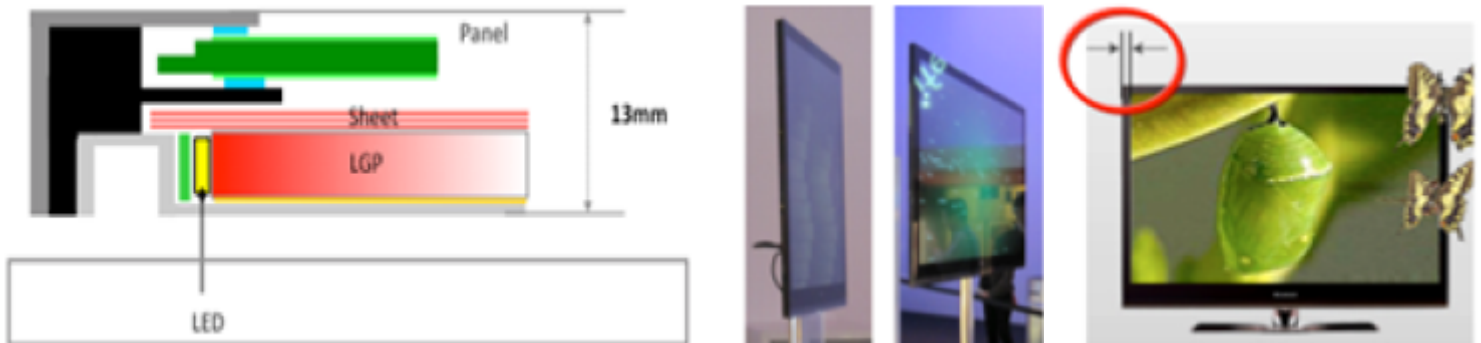

Figure 3: From CES'09 are ultra-slim and narrow white LED backlighting LCD TVs. The edge-backlighting enables slim designs (11.9mm body thickness; 18mm bezel width

Not only did we just see these new slim 11.9mm thick panels in Jan'09 (less than ½ an inch!) but again in May'09 LGD also showed a 42-inch panel that was only about half as thick at 5.9mm, and NOW as we were going to press with this new newsletter, LGD announced on December 21st 2009 a version of a 42-inch FHD (full HD or 2 megapixel 1920x1080) panel that was only 2.6mm thick! (see Mark's coverage in the news section to follow) which I cannot wait to see in a fully wireless sub1/2inch TV with elegant new designs by NEXT years' CES (with less than a 2-inch box/package for green "logistics" too I hope) from what I hope to be a plethora of top brands: from LGE to Toshiba (I will never call them Regza) and from Vizio to Panasonic (same thing for the unnecessary Viera secondary brand: why can't marketing folks like me know a good company brand name when they see it and stick to it) there are many great TV design teams out there and with the tools of their trade getting ever more advanced (from panels to electronics to materials to make the sets out of).

It is surely an exciting time to watch the evolution of the TV (and after wireless connectivity is ubiquitous, wait until you see the software and UI advance just around the corner) and I can barely wait to see it up close and personal in 2010 and ever more so by 2011. This type of product advancement is inspiring! Just think of what we could do to make the planet better, with advanced waste and water treatment, and energy efficient lighting, as well as sustainable energy production via PV and wind etc., if we only put these same talents to work globally on our society's many pressing problems, but that must await another time and another column (though I see more talented engineers from TFT LCDs going into solar and LEDs every day, and it makes me optimistic for our human race).

I wish you all a healthy and happy holiday season and a new year of 2010 filled with joy and peace (even more than what a beautiful new LCD LED BLU TV can bring, but that is a great place to start!)

With warm regards, Bruce

Mr. Berkoff is the chairman of the LCD TV Association, a global not-for-profit marketing trade association dedicated to "informing, promoting, improving and connecting" the entire LCD TV supply chain and their related companies, to help promote "a great LCD TV in every room in the house!" For over six years, residing in Seoul, Korea, Mr. Berkoff was also the executive vice president of marketing and chief marketing officer (CMO) for LG.Philips LCD, a world leading TFT LCD manufacturer. Currently he is Chief Marketing Officer (CMO) for Displays at Applied Materials. He has also been the CMO at Ascent, a thin film flexible solar PV company and CEO of a fabless semi start-up in the video processing space and general manager of Philips Flat Display Systems software and electronics business unit. Prior executive posts include positions at UMAX Computer, Radius, SuperMac, and ZD Labs. Mr. Berkoff is a visionary speaker and author in the display and electronics industry. He has display related patents both granted and pending in the USA and China. He holds an undergraduate degree in physics from Princeton and a graduate degree in biophysics from the University of California Berkeley. Mr. Berkoff has sat on the boards of at least five publicly traded companies, including LG Display (LPL), Unipixel (UNXL) and Infocus (INFS).

LCD TV News

compiled by Veritas et Visus

LG Display unveils ultra-thin LCD TV panel measuring 2.6mm

LG Display announced that it has developed what it claims to the world's thinnest LCD TV panel measuring 2.6mm. The development of extremely slim LCD panels was made possible by applying the company's accumulated "slimming" technologies including the use of an ultra-slim, edge-lit LED backlight system and proprietary optical film technology. The 42-inch panel weighs less than 4 kilograms – making it ideal for wall mounted TVs, LGD said. The new product offers 120Hz refresh rate technology with full HD (1920x1080) resolution. LG Display will showcase the product and its display technologies in a private room at the Bellagio Hotel during the upcoming Consumer Electronics Show (CES) 2010 in Las Vegas.

Display's 2.6mm thick 42-inch full HD LCD TV panel

VIZIO licenses digital TV patent portfolio to Sony

VIZIO announced that Sony has become a licensee under VIZIO's patent portfolio. VIZIO also announced that it has successfully resolved its ongoing patent disputes with Sony, and that VIZIO now is a licensee under Sony's color television patent portfolio. VIZIO continues to expand its IP including the development of new technologies that will be implemented in VIZIO's products available later this year and beyond. http://www.VIZIO.com

Sony to implement Real D technology in "3D Home" strategy

The Wall Street Journal is reporting that Sony is implementing Real D's technology in its desire to bring 3D to the mainstream consumer electronics industry in 2010. The pact includes Sony licensing the stereoscopic Real D Format, know-how in producing active and passive 3D eyewear and other Real D technologies. Sony and Real D have been closely working together to create a better 3D experience at movie theaters for years. The parties will now join forces to deliver a similar premium 3D entertainment experience to the home. The companies are working in partnership to bring to market 3D compatible "BRAVIA" LCD high definition TVs and other consumer products in Sony's current and future portfolio that will support the stereoscopic Real D Format. The Real D Format is a side-by-side 3D format capable of delivering crisp, clear, high-quality 3D utilizing all channels of the existing HD broadcast infrastructure. Apparently the implementation is not exclusive so other manufacturers can use Real D technology as well. http://www.sony.net/united/3D/

Rovi works to integrate TV and video content from the Internet

In an attempt to marry TV and broadband delivery, Rovi is in the early planning stages of designing an interactive program guide for cable operators that would integrate video content from the Internet. That would potentially give subscribers a way to access anything from YouTube clips to Facebook videos or any other Web content through the same guide they use to access linear cable TV and video-on-demand. Rovi currently offers what it calls TotalGuide to consumer-electronics manufacturers. Previously code-named Liquid, the on-screen guide provides access to a user's personal media and Web content through an Internet-connected TV, Blu-ray DVD player or other device. It hasn't announced any CE customers for the product yet, but has lined up several content partners including Blockbuster, YouTube and CinemaNow. To bring Internet-video options to cable, Rovi must consider

broad architectural questions, such as whether video files are downloaded to a set-top box or gateway and stored on a disk or whether video is streamed from a source server. http://www.rovicorp.com

AMD introduces Eyefinity – supports up to 25-megapixels with a single graphics card

AMD recently demonstrated their upcoming Eyefinity technology in which a grouping of six, 30-inch Dell 3008WFP panels as a single display, in a 3x2 arrangement, resulting in an overall resolution of 7680x3200 pixels, (24.6-megapixels). Powering the displays was a single graphics card, with a single GPU. The Windows desktop functioned as one monolithic surface, with all of the resolution available to the user. Reports indicate that even gaming at 7680x3200 with "acceptable" frame rates, worked without problem. Eyefinity is enabled through a combination of hardware and software being developed by AMD. On the hardware front, AMD's upcoming Radeon graphic cards will sport between 3 and 6 display outputs of various types, DisplayPort, DVI, HDMI, etc. And those outputs will be managed by software currently dubbed SLS, or Single Large Surface. Using the SLS tool, users are able to configure a group of monitors to work with Eyefinity and essentially act as a single, large display. http://www.amd.com/us/products/technologies/eyefinity/Pages/eyefinity.aspx

Eyefinity is designed to support configurations such as these… Samsung reportedly plans to introduce a thin-bezel 6-panel multi-monitor solution that will take advantage of the Eyefinity technology.

OpenTV partners with Jinni to bring next-generation functionality to television

OpenTV, a provider of advanced digital television solutions, has collaborated with Jinni to bring next generation search and recommendation functionality to television. These new features will enable viewers to find their desired content quickly and intuitively, and OpenTV says that viewers can expect these features in its soon to be released OpenTV Core2 middleware. OpenTV will combine its Core2 search feature with Jinni's "Mood Based" content discovery to allow viewers to find their desired programs quickly across multiple content sources. Officials claimed that collaboration with Jinni will change the way content is discovered on television. Jinni's approach to search, discovery and recommendations will complement OpenTV's middleware technology. http://www.opentv.com

Samsung to launch 400Hz television

Samsung is to launch a new LCD television boasting 400Hz technology. The new technology is described as a step up from Samsung's existing 200Hz technology, although with a different underlying frame insertion method. Such high frequency TVs use advanced algorithms to insert extra frames in between the images being displayed to create the effect of much smoother motion. The new 400Hz (or 480Hz for the US market) will insert very short black frames between the original picture frames being displayed which will in effect, trick the eye into seeing this smoother result. http://www.samsung.com

Siano powers GPS mobile TVs

Siano Mobile Silicon announced that the world's largest Personal Navigation Device (PND) makers – Garmin, Mio, Navigon and others – have integrated its leading MDTV receiver chips into their latest consumer GPS products. The design wins represent a major penetration of the consumer GPS market for Siano, further enhancing its position as a one-stop shop for MDTV chip solutions in emerging mobile TV markets. Based on Siano's family of high-performing receiver chips, the PND devices will enable TV reception in the most extreme conditions, such as

in tough urban canyons, and when traveling at high speeds. Siano enables all vendors with 'free-to-the-user' mobile TV viewing, transmitting television programs from major terrestrial TV channels. http://www.siano-ms.com

Bang & Olufsen brings out customized BeoVision 4 for $112,000

The BeoVision 4 from Bang & Olufsen spans 103 inches and the screen alone weighs 580 pounds. The floor-standing base adds another 600 pounds; when the BeoVision 4 isn't being viewed the screen lowers itself to the floor via dual gas shocks and actuators, hiding the center speaker; sixteen years of research have gone into it, resulting in a price-tag of $112,000. When not in use BV4 rests a couple of inches off the ground. Given the command to "Let there be light" the screen ascends about 15 inches and the BeoLab 10 center channel speaker emerges, stepping forward to a position flush with the aluminum frame. As the BeoSystem 3 picture and surround sound engine are activated, the ebony screen comes to life, and an electronic curtain is pulled aside to reveal the picture. The BeoVision 4 employs automatic picture control that monitors ambient light in the room and adapts the picture; a robotic arm that drops from the aluminum frame tunes the television at periodic intervals in order to manage color and compensate for an aging plasma screen's tendency to produce increasingly yellow pictures; via the remote, the screen turns up to 20 degrees and tilts up to four degrees. http://www.bang-olufsen.com

The Beovision 4 and accompanying speakers

Envivio announces SilverLiveTV to deliver premium Internet TV to PCs and Macs

Envivio Inc. announced the immediate availability of the first complete encoding and Digital Rights Management (DRM) protected distribution solution optimized for Microsoft Silverlight 3. Designed for evaluating, developing and deploying premium live and on demand video services, Envivio SilverLiveTV provides operators and content owners with a comprehensive solution for delivering high-value, feature-rich video entertainment to consumers. SilverLiveTV enables operators to offer PC and Mac users multiple channels of video content over wired and wireless networks. It ingests analog or digital sources and simultaneously encodes and encrypts the content using Envivio's video processing enhancements and DRM interfaces. Advanced quality of service management maximizes reliability, and embedded Microsoft Windows Media and Silverlight DRM, powered by PlayReady content protection, guards the entire lifecycle of high value streamed content from the head-end to the consumer device over IP networks. As video is encoded, SilverLiveTV automatically protects it with Silverlight DRM, powered by PlayReady. This feature enables secure, encrypted delivery of high value content from the Envivio 4Caster C4-based video head-end to a consumer's playback device over public networks. http://silverlight.net

Samsung selects NXP to power 240Hz LCD HD panels

NXP Semiconductors announced that Samsung Electronics has selected the NXP PNX5120 video co-processor for its 240Hz LCD panels to empower TV OEMs' 240Hz Full HDTV. These panels, currently in mass production by Samsung Electronics, take advantage of NXP's Motion Accurate Picture Processing (MAPP2) technology and full motion compensated up-conversion to deliver high-definition action scenes that are smoother and more realistic. The 240Hz refresh rate is twice the speed of current 120Hz TV sets and quadruple that of standard HDTVs. The NXP PNX5120 video post-processor combines three-frame HD Movie Judder Cancellation (MJC), motion sharpness, and vivid color management to successfully reduce the visible halo and blur in fast-moving scenes,

and deliver an enhanced viewing experience for sports and action films. The Automatic Picture Control (APC) feature dynamically adjusts the processing parameters used to optimize every output frame. http://www.nxp.com

Swinburne University of Technology researchers to create next-generation discs

Futuristic discs with a storage capacity 2,000 times that of current DVDs could be just around the corner, thanks to new research from Swinburne University of Technology in Australia. For the first time researchers from the university's Centre for Micro-Photonics have demonstrated how nanotechnology can enable the creation of "five dimensional" discs with huge storage capacities. Discs currently have three spatial dimensions, but using nanoparticles the Swinburne researchers were able to introduce a spectral dimension as well as a polarization dimension. To create the color dimension, the researchers inserted gold nanorods onto a disc's surface. Because nanoparticles react to light according to their shape, this allowed the researchers to record information in a range of different color wavelengths on the same physical disc location. This is a major improvement on current DVDs that are recorded in a single color wavelength using a laser. The researchers were also able to introduce an extra dimension onto the disc using polarization. When they projected light waves onto the disc, the direction of the electric field contained within them aligned with the gold nanorods. This allowed the researchers to record different layers of information at different angles. The researchers are confident the discs will be commercially available within 5-10 years. http://www.swin.edu.au

Sharp intros HDTVs with built-in 7x Blu-ray recorders

Sharp Japan announced it has added five new HDTVs as part of its AQUOS DX2 lineup, all with built-in Blu-ray disc recorders that are claimed to fit seven times more recorded content on them than a traditional Blu-ray disc without sacrificing picture quality. The new LCD HDTVs are available in 26-, 32-, 40-, 46- and 52-inch sizes, with the top three models sporting 1080p, 15,000:1 contrast ratios and three HDMI inputs, while the 26- and 32-inch models have 720p resolution, 7,000:1 contrast ratios and two HDMI inputs each. All of the TVs connect to the Internet thanks to an Ethernet port and support BD-Live, IPTV and Yahoo Japan. A program guide lets users set automatic recordings for the two digital tuners and a terrestrial one. Recordings can be made in the MPEG-4 AVC/H.264 format and transcoded, with a dual-layer, 50GB Blu-ray disc capable of storing 30 hours of HD video. Sharp was the first to release an HDTV with an integrated Blu-ray recorder back in May, with the introduction of its 20-inch AQUOS DX. Compared to this original DX HDTV, Sharp has introduced a new and built-in light sensor to adjust brightness levels depending on the ambient light. The five new AQUOS DX2 TVs will be released on September 10 in Japan, with the 52-inch LC-52DX2 priced at the equivalent of about $5,000, the 46-inch model at $4,000, the 40-inch model at $3,000. The lower-resolution 32-inch model will cost about $2,000, while the 26-inch model will be priced at $1,800. http://sharp-world.com

Toshiba supports Blu-ray

Toshiba Corp., which lost out to rival Sony in the high-definition DVD standard format war, said it will make products that support the Blu-ray video disc format. In a statement, the Japanese electronics maker said it aims to introduce Blu-ray disc players and laptops with built-in Blu-ray disc drives by the end of this year. It has also applied for membership in the Blu-ray Disc Association. Details such as which markets the products would be sold in are now under consideration, it said. Toshiba had backed another high-definition video format, HD-DVD, but ceded defeat in February last year, saying it would give up making or developing high-definition DVD products. The Blu-ray alliance, backed by Japanese rivals Sony, Panasonic Corp. and others, had been more successful in wooing Hollywood studios. Apart from home entertainment products, Toshiba is also a large maker of PCs, in which Blu-ray drives are slowly supplanting DVD drives. Without Blu-ray drives, Toshiba laptops could have lost out to other manufacturers.

SENSIO launches 2D content broadcast feature in 1080p

SENSIO Technologies presented a premiere of the new functionality offered by SENSIO 3D technology: live broadcasting of 2D content in 1080p60/50. In addition to enabling broadcasting in 3D, SENSIO 3D technology also enables broadcasting of 2D in 1080p on the existing distribution infrastructure, currently limited to 1080i, without adding bandwidth. With a 3D camera system and an encoder and decoder equipped with SENSIO's technology,

viewers can film themselves in front of the cameras and see themselves live in three dimensions on Hyundai IT's LCD HD 3D television. http://www.sensio.tv

Nielsen reports that more than half the homes in the US have three or more TVs

New findings from Nielsen's Television Audience Report show that in 2009 the average American home had 2.86 TV sets, which is roughly 18% higher than in 2000 (2.43 sets per home), and 43% higher than in 1990 (2.0 sets). In addition, there continue to be more TVs per home than people – in 2009 the average US home had only 2.5 people vs. 2.86 television sets. Other key stats from the report are: there are 114.5 million TV homes in the US in 2009; 38% of US TV homes have digital cable; 88% have a DVD player, while VCR fell to 72%; 82% of homes have more than one television set; 11% of US TV homes only have the capability to receive TV reception "over the air". These homes have neither cable nor ADS. http://en-us.nielsen.com
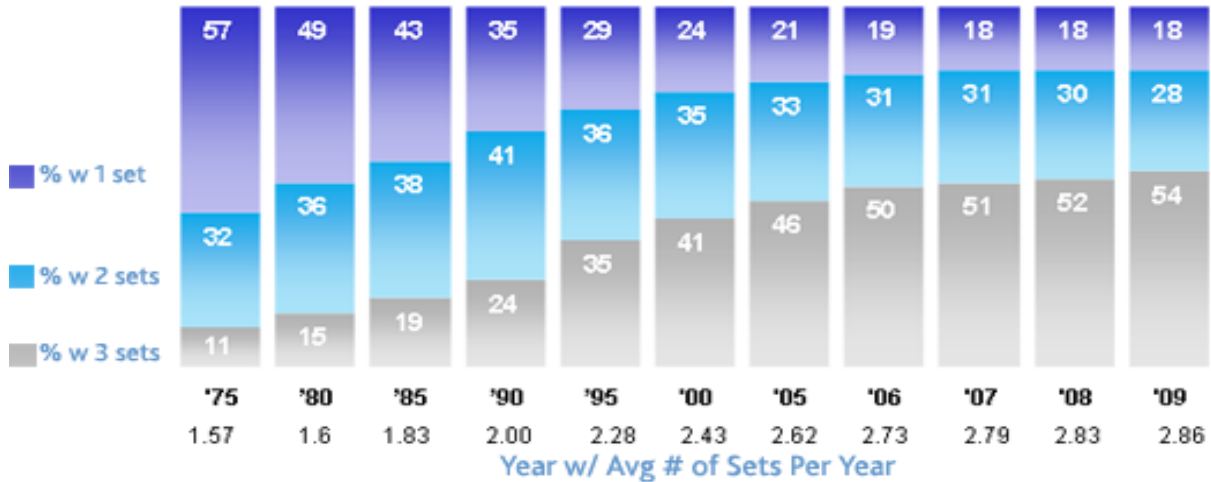
This year about 54% of homes in the US had more than three or more television sets, 28% had two television sets and only 18% had one television set.

ABI Research predicts wireless-networked TV shipments to surge

Annual shipments of televisions with wireless Web connectivity will jump at least fivefold over the next two years as technological advances shrink the cost of adding the feature, according to ABI Research. Television manufacturers will ship about 20 million wireless-networked TVs globally in 2011. That year, wireless-networked TVs will account for about 11% of total flat-screen shipments, up from about 2% this year. The expected jump in Web-connected home-entertainment components reflects both falling TV prices as well as an expanding amount of television and film content available for either downloading or video-streaming from companies such as Netflix, Blockbuster and Amazon.com. Boston-based research firm Yankee Group estimated that annual sales of Web-connected TVs would surge to about 50 million in 2013 from about 6 million this year, with next year's Super Bowl being a key demand catalyst. Although the cost of making a television network-accessible is "relatively low", adding the software necessary for Wi-Fi connectivity could add as much as $100 in costs per television. Consumers will spend about $2.9 billion on video content that's streamed from the Internet to TVs in 2013, up from about $600 million this year, research firm In-Stat said in a report in May. By that year, about 24 million broadband-connected households will watch online videos on their
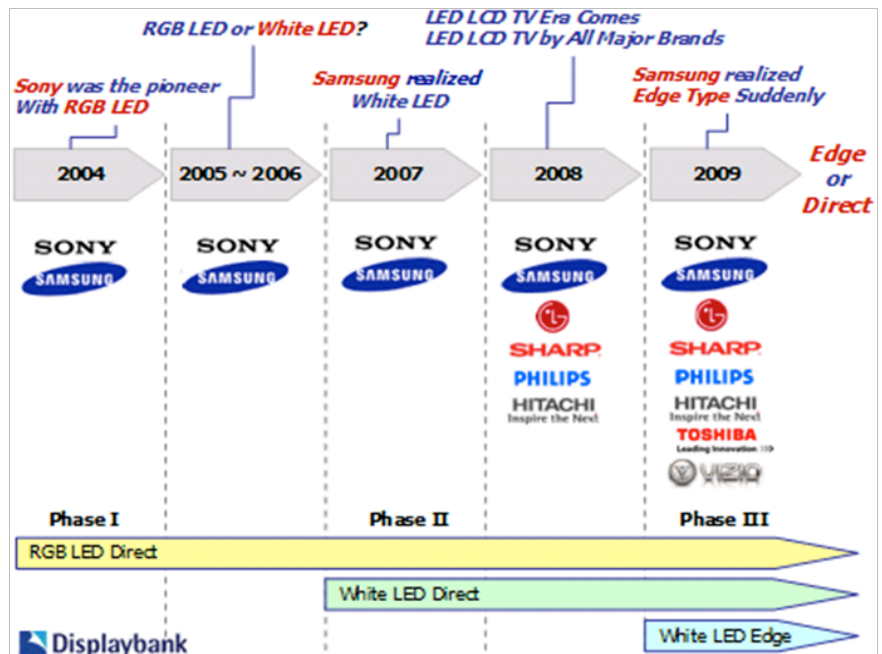
LED LCD TV launching history and technology paradigm

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TVs, up from about 2.5 million this year. http://www.abiresearch.com

Displaybank publishes large-area BLU/LED industrial trend and market forecast

Sony was the first company that launched an LED LCD TV. Then, Samsung entered the market and they proposed a new technological potential as they launched a direct type LED LCD TV, which adopted white LED. In 2008, companies including LG, Sharp, Philips and Hitachi entered the market where Samsung and Sony were leading. That year, every big name in TV entered the LED LCD TV market. Therefore, year 2008 can be regarded as the beginning year of LED LCD TV, says Displaybank. However in 2009, "edge type" was suddenly introduced by Samsung. Direct type was a natural premise, and makers just had a choice between RGB LED and white LED. Then they could not help being embarrassed by the appearance of the new technology. They had an accumulated know-how with their key technology, but they didn't have much information on edge type. Like in all other products, technical reliability is very critical especially in TV. All other brands except Samsung, the inventor of edge type, need a period during which they can establish their technical reliability. Even though other brands were supposed to spur their product development and new product launching from 2008, they encountered a situation where they had to make not only a strategic, but also a technical decision. Once they made a strategic decision with a serious consideration between RGB LED and white LED, they then had to make a choice with an additional choice between edge and direct. http://www.displaybank.com

DisplaySearch says thin margins for TVs have brands look to commercial TVs and digital signage

DisplaySearch indicated in its latest Monthly Large Format Commercial Displays Sell Through Report that large size (26-inch plus) products that are self-classified as consumer TVs but shipped through commercial outlets have continued to significantly outpace their commercial-grade counterparts, despite efforts by flat panel display brands to distinguish commercial- and consumer-grade flat panel displays. These displays are used for out-of-home applications including flight information displays, electronic menu boards, board-room displays, information kiosks, and command and control centers, as well as digital signage and advertising.

Principal Classification	Q1'08	Q2'08	Q3'08	Q4'08	Q1'09	Q2'09
Commercial Grade	22.7%	24.0%	21.7%	12.3%	16.0%	17.5%
Hybrid	10.8%	12.6%	10.9%	5.8%	6.0%	2.8%
Consumer TV	66.5%	63.4%	67.4%	81.9%	78.0%	79.8%

Share of US sell-through of large-format FPD products in commercial channels by classification

A third category, hybrid displays, has been positioned by companies as being appropriate for both out-of-home-commercial use as well as consumer TV. This segment is fading, however, as companies are making a strategic effort to separate their product offerings. Considering the slow economic environment, FPD TV sales remained surprisingly strong in 1H'09 due to continued low price points. The strength in FPD TV sales in the US and China is pushing panel prices up in Q3'09, which many fear will severely impact demand and even eliminate holiday promotional pricing. Brands are thus searching for new markets and channels, beyond fickle consumer channels. Sell-through data of commercial distributors and resellers clearly shows that some brands have more success in commercial channels with their consumer TVs than with their higher-margin commercial lines, which sets these companies up for internal competition between business units. Other companies have very clear lines between product definitions, and also between marketing and distribution of these products. Indeed some TVs shipping through commercial channels may end up in traditional consumer settings (with distribution in this instance just acting as a fulfillment and logistics mechanism), but data shows that most displays shipped through commercial distribution end up as part of a true commercial installation – potentially cannibalizing sales of a brand's higher margin commercial-grade products. http://www.displaysearch.com

LED backlight penetration rate in LCD TVs expected to grow to 40% in 2013, says DisplaySearch

The LED backlight market is expected to continue growing for the next five years, according to DisplaySearch's latest Quarterly LED & CCFL Backlight Report. Specifically, DisplaySearch forecasts the penetration rate of LED backlights for LCD TVs to grow from less than 3% in 2009 to 40% in 2013 and surpass CCFL backlights in 2014 with more than 50% penetration rate. Meanwhile, large-area LED backlight shipments for all applications will grow from 84.9 million units in 2009 to 434.8 million units in 2013, when LED backlights will be used in 54.3% of 10-inch+ TFT LCD panels. Thus, LED backlights will become mainstream in the TFT LCD industry. While LED backlights for LCD TVs are growing rapidly, notebook PCs are the leading application for large-area LED backlight

units, and DisplaySearch forecasts that 100% of all new notebook models will have LED backlights by 2012. The Figure shows the large-area LED backlight penetration in each application. "Edge-lit LED backlight units for LCD TV are a temporary solution to drive costs down to open market acceptance for LED TV as a short-term marketing strategy," noted Luke Yao, DisplaySearch research director. "Consumers want a low-cost solution with acceptable picture quality, but aren't always willing to pay a higher premium – making edge-lit LEDs an ideal near-term solution." For the monitor segment, cost and performance remain bottlenecks for panel manufacturers creating LED backlit monitors. Taiwanese panel makers like AUO and Innolux have been the most aggressive in developing LED monitor panels. Because LED monitor panel sizes (18.5-, 21.5-, 23.6- and 24.0-inch) are also used for TV, DisplaySearch refreshed its forecasted penetration rate for LED monitor backlight units to 21% in 2013. Currently panel makers are putting efforts into shrinking the LED backlight premium to $3-5 for 18.5-inch W panels. http://www.displaysearch.com

	2008	2009	2010	2011	2012	2013	2014	2015
LED Backlight in Notebook	16%	52%	81%	97%	100%	100%	100%	100%
LED Backlight in Monitor	0%	1%	4%	8%	15%	21%	34%	54%
LED Backlight in LCD TV	0%	3%	10%	22%	32%	40%	50%	66%
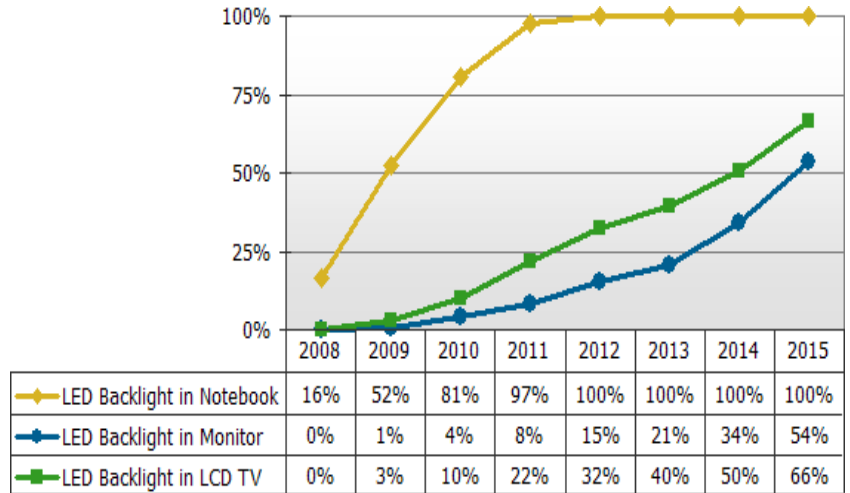
Large-area LED backlight unit penetration rate by application

DisplaySearch says high frame rates to account for half of 40-inch+ LCD TVs in 2009

Double-frame rate (100Hz and 120Hz) and quadruple-frame rate (200Hz and 240Hz) LCD TV panels have quickly become integral to LCD TV panel makers' product roadmaps and shipment plans. In its Quarterly Double Frame Rate TV Panel Shipment & Forecast Report, DisplaySearch reports that 2009 shipments of 40 inch and above 100/120Hz and 200/240Hz LCD TV panels are forecast to reach 16.9 million units and 4.2 million units, respectively, which is 40% and 10%, respectively, of total targets for 40-inch+ units in 2009. In Q2'09, shipments of double- and quadruple-frame rate LCD TV panels reached 6.4 million units, achieving 18.3% penetration, compared to 16.2% penetration in Q1'09. Samsung led shipments with a 29.0% share in 100/120 Hz, followed by LG Display at 18.3% and CMO, AUO, Sharp and IPS-Alpha. In 200/240 Hz panel shipments, Samsung and LG Display dominate the market. In Q2'09, 100/120Hz and 200/240Hz achieved greater than 50% penetration in several sizes like 40 inch, 46 inch, 52 inch and above. DisplaySearch forecasts that Q3'09 penetration of double- and quadruple-frame rate will reach 17.2% and 3.2%, respectively, and Q1'10 penetration will increase to 21.9% and 5.7%, as LCD TV panel makers are aggressively developing upgraded refresh rate panels for additional value. http://www.displaysearch.com

	100/120 Hz	200/240 Hz
Samsung	29.0%	56.6%
LG Display	18.3%	
CMO	16.3%	43.4%
AUO	15.1%	
Sharp	13.7%	
IPS-Alpha	7.5%	

Q2'09 double- and quadruple-frame rate LCD TV panel shipment share (units)

NPD says picture and screen size still driving TV purchases

Screen size and picture quality are the two most important considerations among prospective TV buyers, according to market research company NPD Group's 2009 TV Inventory Study. According to the findings of the online study, one in four consumers will most likely be making a new TV purchase in the next six months. Among those who said they would be making a purchase, screen size was cited by 77% as being extremely or very important. The average screen size being considered by consumers is 40 inches, but one in four consumers are considering a TV 50 inches or larger. Higher resolution was the second most important feature, with 71% of consumers citing it as extremely or very important.NPD said the demand for larger screen sizes is good news as dramatic Declines in average prices over the past year is limiting industry dollar volume. Consumers, meanwhile, can now get more for even less without having to sacrifice the features they want. The average price of 40- and 42-inch flat-panels for the first nine months of 2009 (January through September) was $838, down from $1,150 the

same time last year. The average price of 50- and 52-inch flat-panel TVs dropped from $1,941 during the first nine months of 2008 to $1,409 during the same time this year. http://www.npd.com

In-Stat Looks Forward to Ultra-High Definition TV

While the market for HDTV has hit the mainstream, the industry has already started speculating about the commercialization of Ultra-High Definition (UHD). Market research firm, In-Stat, believes there will be a lengthy time period before the UHD market reaches a critical mass of 5% household penetration. However, as the initial market debuts over the next five to ten years, there will be ample opportunities for technology companies, manufacturers, service providers and media companies to experiment with business models and strategies to make UHD a strong business in the long term. "UHD formats provide between four and sixteen times the resolution of Blu-ray or 1080p high definition as well as 22.2 multichannel three-dimensional sound," says Michelle Abraham, In-Stat analyst. "This is a vast improvement over the currently available end user viewing experience in the home." Recent research by In-Stat found the following:

- The rising popularity of high resolution digital cinema will expose consumers to high resolution content. Then, early UHDTVs will be made available to provide a digital cinema high resolution viewing experience in the home. Ultimately, broadcasters will start offering UHD content to an addressable market of UHDTVs, between 2017 and 2022.
- In-Stat expects the total installed base of UHDTVs Europe to approach 5% household penetration until 2021, and increase to over 28.2% penetration by 2025.
- In Asia-Pacific, Japan will be among the early adopter countries.

The research, "The Market Opportunity for Ultra-High Definition Video", covers the availability of ultra-high definition TV units and of ultra-high definition services around the world. It includes:

- Market and industry drivers for UHD service subscribers and viewers.
- Analysis of how the development of different technologies and business models is impacting the market for UHD services.
- An in-depth look at potential UHD service providers.
- Analysis of the emerging Digital Cinema and 3D Technologies.
- Assessment of the UHD Value Chain, including UHD content creation, cinema distribution, broadcast and in-home technologies.
- Long-term (fifteen-year) forecasts for worldwide UHDTV households by geographic region.

The price is $3,495. http://www.in-stat.com

Displaybank releases Q3'09 large-area TFT-LCD shipment results

After demand radically decreased in Q1'09, it rapidly recovered to record 42.9% and 15.4% quarterly growth in Q2'09 and Q3'09 respectively. The economic recovery progressed worldwide, but it hasn't reached the level of pre-financial crisis. LCD panel demand continuously increased in Q3'09 as well and the panel shipments recorded 30.5% growth Y/Y. The shipment quantity based M/S is explored by maker to find that Samsung Electronics
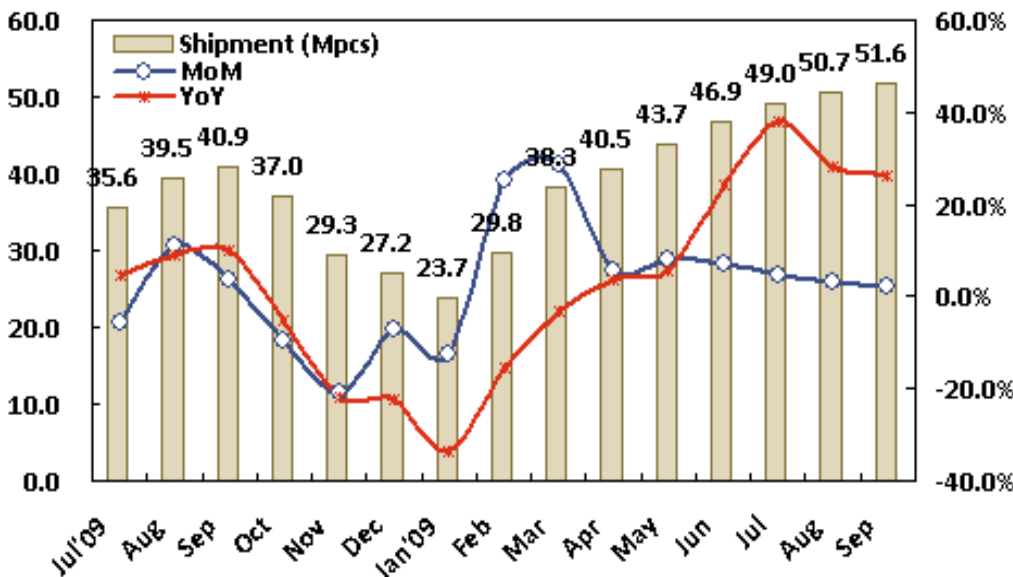
recorded 24.1% to account for the largest market share and was followed by LG Display at 24.0%. AUO recorded 17.6% to account for the third largest market share, whereas CMO recorded 14.3%. The market share of top 4 panel makers has increased from 75.3% in 2008 to 80.0% in 2009. The shipment and revenue recorded growths due to sharp demand increase in Q3'09 after passing the bottom in Q1'09. http://www.displaybank.com

Displaybank reports on adoption of large LED BLUs

As demand for LCD monitor, notebook, and LCD TV panels stays high in the mid-long term, demand for back light units (BLUs) is expected to maintain a growing trend. Demand for BLUs used in large applications is forecasted to

increase from 382 million units in 2007 to 740 million units in 2013. High growth of 11.6% is forecasted for 7 years. The market size of large BLUs is expected to grow from US$12.467 billion in 2007 to US$14.764 billion in 2013. Even though prices for LED BLUs is now much lower than the price during the early stage of adoption, it is still 2 times higher, on average, than existing CCFL BLUs. In 2010, the price for LED BLUs is forecasted to decrease more rapidly as LED BLU adoption gradually increases.

Source: 'Large-size BLU/LED BLU Industry Trend and Analysis', Oct. 2009

Displaybank brings out China TV market analysis

During this year's three-day-long Labor Day holidays (May 1-3), 1.25 million LCD TVs were sold throughout China. Analysis also shows that panel shortage and consequent stock issues have led to preorders from consumers. Entering the second quarter, the global LCD TV market is faced with a cyclical low-point and general economic stagnation. Under these circumstances, the fact that 1.5 million units of LCD TVs were sold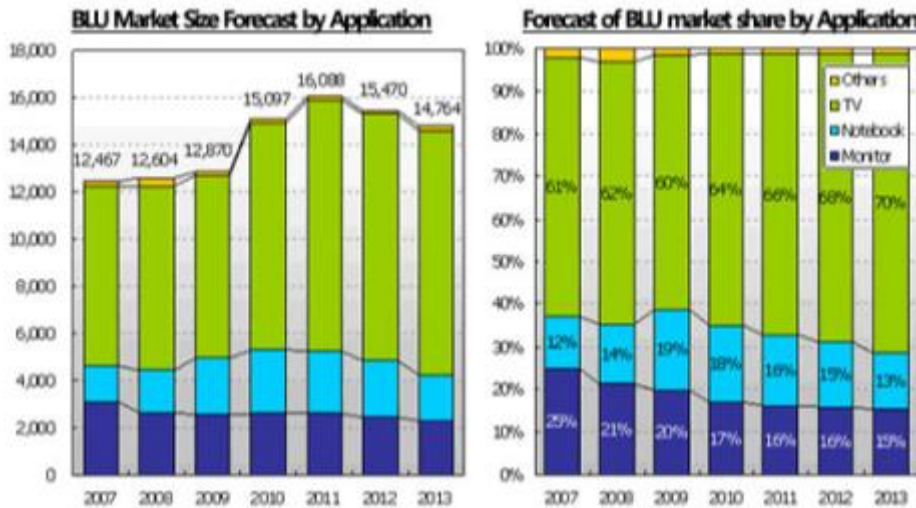 (including preorders) in China during three days gives a strong indication of the further growth potential of China's LCD TV market. According to Displaybank's report "BRICs TV Market Analysis – China", LCD panel makers supplied four major local LCD TV brands in China during the first quarter of 2009 in the order of CMO (41.4%), LGD (19.8%), Samsung (17.9%), and AUO (11.7%). Specifically, overall TV panel shipment to CMO during the quarter accounted for 32% of the entire Chinese market, indicating greater reliance on CMO by panel makers than any other local manufacturers. In terms of size, Taiwanese brands dominated panels 40 inch or less in size and South Korean brands in panels 40 inch and above. Moreover, competition was found to be even fiercer in the crucial 32-inch panel segment. http://www.displaybank.com

LCD TV panel market shares of local brands in China – Q1 2009
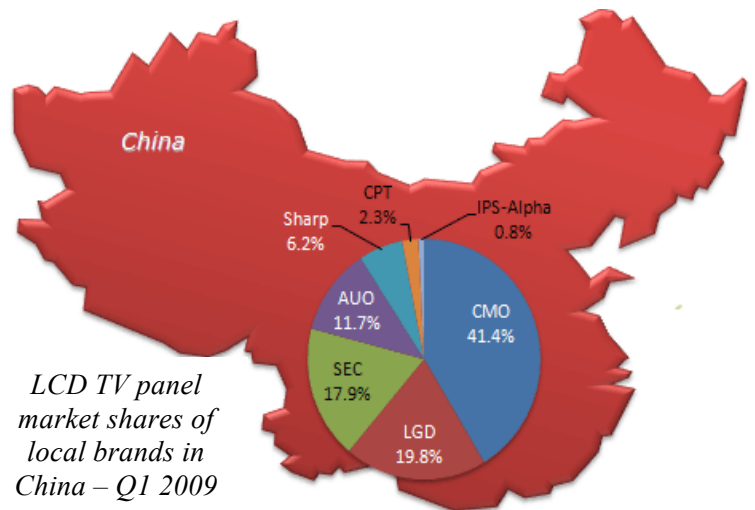
Screen Size	CMO	LGD	SEC	AUO	CPT	Sharp	IPS-Alpha	Total
~22-inch	50.6%	29.2%	4.9%		15.2%			100%
26-inch	65.2%	5.3%	3.3%	26.2%				100%
32-inch	35.8%	18.7%	25.5%	3.9%	1.1%	13.0%	1.9%	100%
37-inch	12.2%	43.5%		20.7%	10.6%	13.0%		100%
40-inch	3.2%		96.8%					100%
42-inch	47.6%	36.2%		16.2%				100%
46-inch			83.5%	16.5%				100%
47-inch	28.4%	71.6%						100%
52-inch	2.9%		97.1%					100%

LCD TV panel market shares of local brands in China by panel size – Q1 2009

Fairchild Semiconductor's integrated video filter is the first to support 1080p high definition

Fairchild Semiconductor's video filter supports the emerging 1080p standard for High Definition LCD TVs, Blu-ray DVD players and set-top boxes. The FMS6303 offers designers of these applications the widest flexibility in an integrated video filter available today by providing selectability from Standard Definition all the way up to 1080p HD. It supports three channels and is selectable to 8MHz, 16MHz, 32MHz, and 65MHZ, accommodating the entire range of video standards. In addition, it offers a robust 8kV of ESD protection to protect applications from adverse electrostatic discharge events and eliminates the need for discrete protection devices. The FMS6303 allows the inputs and outputs to be AC or DC coupled, reducing up to six components and saving as much as 10 percent board space, compared to a discrete implementation. http://www.fairchildsemi.com

Toshiba unveils first Blu-ray player

Soon after announcing its initial entrance into the Blu-ray market, Toshiba has introduced its first player, the BDX2000. It supports BD-Live, as well as Full HD 1080p digital output. Toshiba intends the product to work with the Regza LCD TV line. The player will arrive in November at a suggested retail price of $249.99. http://www.toshiba.com

Silicon Labs introduces high performance single-chip hybrid TV tuner

Silicon Laboratories announced the Si2170, a complete, globally-compliant hybrid TV tuner with analog TV demodulator in a single CMOS IC. Leveraging Silicon Labs' proven digital low-IF architecture, the Si2170 is the industry's first silicon TV tuner to exceed the performance of traditional discrete TV tuners, enabling TV makers to deliver improved picture quality and better reception for both analog and digital broadcasts. The high level of integration eliminates over one hundred discrete components, enabling simpler design, lower manufacturing costs, higher production yields and improved reliability for integrated digital televisions (iDTVs), set-top boxes and PC TV applications. Silicon Labs' patented and proven digital low-IF architecture enables the Si2170 to achieve the highest level of performance and integration while addressing the challenges created by hybrid analog and digital reception and multiple regional standards. The architecture allows many functions typically relying on analog and discrete fixed components to be implemented with cost-effective and programmable digital signal processing. This enables TV manufacturers to optimize system parameters and comply with all worldwide cable and terrestrial broadcast standards including ATSC/QAM, DVB-T/C, ISDB-T/C, NTSC, PAL and SECAM. Additionally, the integrated ATV demodulator creates a universal interface to system ICs further simplifying the customers' design and enabling coordination of tuner and demodulator functions to optimize reception of analog TV signals, eliminating visual beats or artifacts. http://www.silabs.com

Mobile High-Definition Interface Working Group to drive standard for mobile wired connectivity

Nokia, Samsung Electronics, Silicon Image, Sony, and Toshiba announced the formation of a Mobile High-Definition Interface Working Group that intends to create an industry standard for an audio/video interface to connect mobile phones or portable consumer electronics (CE) devices directly to high-definition televisions (HDTVs) and displays. This new mobile connectivity standard, based on Silicon Image's Mobile High-Definition Link (MHL) technology, will be defined, promoted and marketed by the Working Group as an industry standard open to anyone desiring to be an adopter and enable the development of mobile products that adhere to this new standard across a broad connectivity ecosystem. The Working Group's vision for the next generation of mobile connectivity is to provide an easy and cost-effective implementation for manufacturers while offering consumers a simple and reliable mobile connectivity experience. A single-cable with a low pin count interface will be able to support up to 1080p high-definition (HD) digital video and HD audio in addition to delivering power to a portable device. The Working Group is expected to organize a Consortium of founding members who will develop a mobile connectivity technology standard specification that governs transmission and reception of high-definition content between portable devices and display devices, to support connectivity in accordance with the new specification

Marvell debuts family of single chip hybrid demodulators for integrated digital televisions

Marvell announced the Marvell 88DE80xx family of hybrid demodulators. The Marvell 88DE8020 and 88DE8025 are the first in a family of solutions that Marvell is developing for worldwide TV radio frequency (RF) sub-systems. The 88DE8020 and 88DE8025 are single chip hybrid demodulators for digital video broadcasting (DVB) and analog video broadcasting worldwide. The 88DE8020/88DE8025 demodulate intermediate frequency (IF) signals from the hybrid tuner and generates a digital transport stream and analog composite video with sound intermediate frequency (SIF). The Marvell-designed integrated RF sub-system is designed to enable TV makers to develop a single TV controller chassis for worldwide needs and localize it with region specific tuners and demodulators. Measuring only 7x7mm in a 48-pin QFN package, the Marvell 88DE8020 features very high level integration for the demodulation of Digital Video Broadcasting - Cable (DVB-C), Digital Video Broadcasting - Terrestrial (DVB-T) (Annex A and C) and NTSC/PAL/SECAM. The 88DE8025 is a pin-compatible subset of the 88DE8020 supporting analog and DVB-T demodulation for applications that do not require DVB-C. Typically, TV makers need to provide multiple SAW filters, and separate analog and digital demodulators for integrated digital televisions (iDTVs) that support hybrid terrestrial and cable networks in DVB countries. The high level of integration in the Marvell 88DE8020 is designed to enable TV manufacturers to develop RF subsystems that have lower cost, lower power and a slimmer profile. http://www.marvell.com

Disney brings out on-demand viewing from multiple devices

Walt Disney Co. unveiled technology that will allow entertainment companies to reach consumers who increasingly rely on computers and cell phones instead of DVD players and TVs. The technology, code-named Keychest, would allow consumers to pay a single price for permanent access to a movie or TV show across multiple digital platforms and devices – from the Web, to mobile gadgets like iPhones and cable services that allow on-demand viewing. It could also facilitate other services such as online movie subscriptions. Keychest aims to address two of the biggest hurdles blocking widespread consumer adoption of movie downloads: the difficulty of playing a movie back on devices other than a PC or laptop, and limited storage space on computer hard drives. Another initiative, known as the Digital Entertainment Content Ecosystem, or DECE, has similar goals. Keychest uses the same "cloud computing" logic that underlies Web-based applications, such as Google Docs, permitting users to store files and photographs on remote Internet servers and access them from anywhere, rather than keeping them on their own computers. http://disney.go.com

Toshiba brings out LCD TV that can record and display eight channels at once

Toshiba's first TV with the PS3 Cell processor it helped develop has improved specs. The 55-inch LED backlighting divides the 240Hz display into 512 individually controlled areas, and has a dynamic contrast ratio of 5,000,000:1. The Cell processor also provides self-congruency for improved image quality at the edge of the

picture, enhanced color and brightness balance, and a super-high luminance of 1250cd/m². A 7-speaker sound bar is attached underneath the display, and network functionality includes DLNA support, and an HD Web browser based on Opera. The Cell chip is housed in an external box with a 3TB hard disk to allow the TV to time-shift up to 26 hours of programs from up to eight channels simultaneously. 1TB of storage is reserved for longer-term recordings. The 55X1 can also show eight channels on screen at the same time and step through each without the delay common with some HDTVs. The TV will go on sale in Japan in December for 1 million Yen (about $11,115). Toshiba hopes to sell about 1,000 models a month before the 55X1 arrives in the US sometime in 2010. http://www.toshiba.com

AMD launches HDTV-on-PC chip

AMD entered the TV-on-PC market with the release of the ATI Theater HD 750 chip, which provides HDTV capabilities to desktop and mobile PCs. The ATI Theater HD 750 has worldwide compatibility, being able to accept HDTV, DTV, and broadcast signals in the analog NTSC, PAL, SECAM, and digital ATSC, ClearQAM, and DVB-T formats. AMD has also included FM radio into the mix. The chip can also convert TV shows recorded onto PCs into H.264, AVI, MPEG, DivX, WMV, and MPEG4 files for playback on portable media devices. AMD says that PC users will be able to schedule TV recording and watch, pause, and rewind live TV using Windows Vista Media

Center, Windows XP Media Center Edition, and Windows 7. The ATI Theater HD 750 will be available in PCI, PCI Express, and USB implementations from manufacturers later this year. http://www.amd.com

Homegrown CBHD discs outsell Blu-ray by 3-1 margin in China

The HD format war continues in China. Reportedly CBHD, China's home-grown HD media, now is outselling Blu-ray by a factor of 3, owning 30 percent of the Chinese market. Blu-Ray accounts for 10 percent, similar to its penetration in the USA. DVD is responsible for the remaining 60 percent. That China has achieved 30 percent CBHD penetration, the sources say, reflects the strength of the format, as well as the determination of a nationalistic Chinese government and industry seeking to avoid foreign licensing fees on DVD and BD technology and make a greater profit on domestic sales. Retail cost of CBHD discs worked out to about US$7.40, while Blu-Ray discs cost US$29.60 – close to what they do in the USA. The ultimate spread of the new format will be controlled partly by its adoption by American movie studios. Of the six major studios, only Warner Brothers is currently shipping its library on CBHD, leaving WB titles and domestic Chinese films as the only legitimate CBHD content. http://www.chinahda.org.cn

AACS finalizes managed copy for Blu-ray discs

The Advanced Access Content System License Authority (AACSLA) has posted finalized specifications for the digital rights management system to be used on Blu-ray discs, and the final spec allows for so-called "managed copies", whereby consumers will be able to make a pre-determined number of copies of content on Blu-ray media for personal use, although the number of copies is determined by the studios, and the copy is still protected with AACS or Microsoft DRM. All Blu-ray manufacturers have been operating with a provisional, interim licensing agreement from AACS. If they want to continue producing Blu-ray releases, studios and content providers will need to agree to the new licenses by December 4, 2009. Hardware manufacturers aren't required to support managed copy, although many will choose to support the feature in order to meet consumer expectations. Managed copy will require new Blu-ray hardware: existing Blu-ray players (like the PlayStation 3) will not be able to leverage the feature. For managed copy to work, Blu-ray hardware will have to authorize the copy via an online confirmation with an AACSLA server. There is also a provision that could enable a studio to charge consumers to make copies. Once the technology has rolled out, consumers will be able to make copies to either Blu-ray or standard DVD media (protected with AACS DRM) or to Windows Media DRM-compatible files for use on a computer or portable media place. http://www.aacsla.com

Atlona Technologies releases the HDAiR, a wireless USB to HDMI or VGA adapter

Atlona Technologies released the HDAiR, a wireless USB to HDMI or VGA converter. Both XP and Vista compatible, this one of a kind device will allow users to connect any USB enabled computer or laptop wirelessly, to any HDTV or projector via VGA or HDMI. The unit wirelessly transmits high-resolution signals from a small USB adaptor connected to a computer, to a receiver unit placed next to the display. The HDAiR is designed to transmit high-resolution content up to 30 feet. Atlona's AT-HDAiR uses chipsets developed by Wisair to transmit USB protocol over Ultra wide band (UWB) frequencies. http://www.atlona.com

Project Canvas from the BBC bids to develop next-generation TV user interface

The BBC revealed information about their Project Canvas intended to create a single hardware and software reference standard for future net-connected free TV viewing, overseen by a new organization jointly owned by broadcasters and ISPs. The idea is that manufacturers will have a common specification with which to create boxes in time for Xmas 2010. The rationale is that without technical and UI standards, "there is a risk of fragmentation, followed by a concentration of supply within DTT [Digital Terrestrial Television] which in turn lead to

competitive bottlenecks, gatekeepers, and the dilution of the basic FreeView premise of a single, free alternative to pay TV." http://www.bbc.co.uk/bbctrust/

ARM provides technology for LG Electronics digital TVs

ARM announced that LG Electronics, one of the world's largest digital TV brands, has licensed ARM technology to power its digital TV development revolution. The ARM11 MPCore multicore processor provides flexible and cost effective processing in next generation DTVs and enables LG Electronics to target a range of platforms with the same architecture simply by implementing single or multiple SMP cores. ARM Mali-200 and Mali-400 MP graphics processors will open the path to true 1080p resolutions, affording consumers a home cinema experience that includes high-definition graphics, whilst vastly improving the browsing experience on DTV user interfaces. Consumers are looking for a full Web 2.0 experience from their DTVs. With Adobe and Open source software platforms, and the emergence of tru2way technology, consumers can receive interactive cable services, including video-on-demand, voting and polling, games, and e-commerce without the need for a separate set-top box. Additionally, manufacturers are striving to build intelligent AV processing and develop home devices that are truly energy efficient. http://www.arm.com

Fujitsu releases Full HD H.264/MPEG-2 transcoder ICs

Fujitsu Microelectronics announced two transcoder ICs that can convert between Full HD (1920 dots x 1080 lines) MPEG-2 video data and H.264 video data, as well as transcoding between audio formats while featuring a low power consumption of only 1W including the in-package memory. These ICs are targeted at supporting the growing amount of electronic equipment that can record digital broadcasts. By employing Fujitsu's proprietary transcoder technology, Fujitsu Microelectronics realized low power consumption. Combined with the small form-factor packaging, these ICs can be used not only for non-mobile fixed electronic equipment – such as digital video recorders (DVR) – but also in such mobile products such as notebook PCs. In addition to the transcode function, security functions are included on a single chip to make it easy for customers to create their systems. Sample shipment of the new transcoder ICs. http://www.fujitsu.com

Monster introduces "SuperThin Cable for HDMI"

Monster, a manufacturer of cables, AV accessories, and power conditioning products, announced the introduction of a new line of "Powered SuperThin Cables" for HDMI cables specifically designed for use with a wide variety of electronics devices, ranging from today's super-slim flat-panel TVs to digital video cameras, home theater systems, gaming systems or portable computers. The new Monster SuperThin Cables for HDMI are the first fruits of a recently announced collaboration with RedMere, a leader in advanced silicon chip development. Monster Super Thin Cable for HDMI products will be available in 4-, 8-, and 16-foot versions in the DigitalLife line of products (DL HDMI HSMI-4, DL HDMI HSMI-8, DL HDMI HSMI-16). Monster's Core line of cables for HDMI will also offer a SuperThin cable design in 1, 2, 4 and 5 meter lengths. http://www.monstercable.com

Silicon Image introduces first port processor with 3D over HDMI

Silicon Image introduced the SiI9389 port processor incorporating High-Definition Multimedia Interface (HDMI) Specification Version 1.4 features including 3D over HDMI, HDMI Ethernet Channel, Audio Return Channel and Content Type Bits. In addition, the Silicon Image semiconductor product family of transmitters (SiI9334 and SiI9136) and receivers (SiI9223 and SiI9233) has been upgraded to include 3D over HDMI capabilities, resulting in one of the industry's broadest product portfolios incorporating HDMI Specification Version 1.4 features. Manufacturers of DTV, Blu-ray Disc player, set top box, audio/video receiver and other home theatre products are now able to incorporate key features of the HDMI 1.4 Specification Version 1.4 in their next-generation products. Now consumers can experience 3D cinema quality in their home, as well as enhance their gaming experience with 3D games. In addition to 3D over HDMI, the SiI9389 port processor also offers HDMI Ethernet Channel, which simplifies the connectivity infrastructure that enables personal entertainment technologies like LiquidHD to bring new services and applications to the home. Silicon Image's LiquidHD technology is a suite of protocols that runs over standard IP networks such as those that include HDMI Ethernet Channel functionality. Designed to quickly and easily connect TVs, consumer electronics devices, personal computers, portable media devices, and home

theaters into a seamless network, LiquidHD technology lets consumers enjoy their digital content from any LiquidHD-enabled source device on any LiquidHD-enabled display in the home. http://www.siliconimage.com

Molex introduces the next generation HDMI Type D micro-connector

Molex Incorporated announced that it has introduced the next generation HDMI Type D (Micro) connector, which was recently announced by the HDMI Licensing Committee, to meet the digital interface requirements of consumer electronic products. The HDMI Type D (Micro) connector is the industry's first miniaturized connector solution for delivering high definition video and images from mobile devices to flat panel screens. The connector, which meets all the electrical and mechanical specifications of the just released HDMI Specification 1.4, will provide significant benefits to the digital still camera and mobile device markets. The HDMI Type D connector standard was developed by the HDMI Consortium. As an integral part of this team for the HDMI Type D concept, Molex was responsible for proposing the connector design and connector specification. The new Type D (Micro) connector is about half the size of the current Type C (Mini) HDMI connector on the market today. Despite its smaller size, the new Type D version delivers equivalent mechanical strength and electrical characteristics. Mobile phone and consumer customers have expressed strong interest in this new technology that will enable users to display higher definition video, photos and other content from their mobile devices onto full-size flat panel TV screens. http://www.molex.com/product/io/hdmi.html

NXG Technology debuts new HDMI v1.4 cables

NXG Technology announced that they are shipping the industry's first available v1.4 capable HDMI cables. Tim Coakley, VP of Merchandising at DBL Distributing states "Through our exclusive distribution agreement with NXG, DBL Distributing is giving their custom installer community a unique opportunity to be the first in the marketplace to offer this technology to their customers. The addition of Ethernet connectivity online and between devices as well as the addition of return path audio and the highest speed video available will immeasurably enhance the consumer's experience. As v1.4 capable hardware is introduced in Q1-Q2 of next year, the ability to "future-proof" the client's cabling is a huge advantage to the installer." http://www.nxgtechnology.com

Atlona releases new HDMI and DVI cables with swivel connectors designed for mounted HDTVs

HDTV owners placing plasma on the newest slim profile mounts proliferating the market are faced with issues when connecting standard HDMI cables to rear-facing HDMI ports. The average HDMI cable connector combined with limited cable flexibility near the connector ends can extend up to two and a half inches from the HDMI port. This limited distance requires users to either use mounts or risk damaging their cable as well as their television HDMI port. Atlona Technologies has developed a line of HDMI 1.3b cables that cut the distance needed for the HDMI connector ends by more than 50%, extending just over an inch from an HDMI port. Atlona's hew HDMI and DVI to HDMI cables feature a swivel connector end, which allows them to bend 90 degrees in either direction. http://www.atlona.com

Silicon Image introduces first products incorporating HDMI 1.4 features for DTV and home theatre

Silicon Image introduced the SiI9387 port processor and the SiI9334 transmitter, the first semiconductor products to incorporate the latest HDMI 1.4 specification features for digital television and home theatre applications. The new devices offer a richer, more interactive HDMI entertainment experience by enabling new connectivity applications via Ethernet, such as Silicon Image's LiquidHD technology. The SiI9387 port processor and the SiI9334 transmitter support the following HDMI 1.4 specification features: HDMI Ethernet Channel (devices using these chips will be able to transmit and receive full duplex data at 100Mb/sec over an HDMI cable); audio return channel (drives a high quality S/PDIF signal through a single HDMI cable, simplifying connectivity in the home theatre); and content type bits (optimize and enhance the HD viewing experience by automatically matching content type to video mode). http://www.siliconimage.com

NXP introduces intelligent switches supporting HDMI 1.4

NXP Semiconductors unveiled intelligent switches supporting the new HDMI 1.4 specification released in June 2009. The NXP TDA19997 and TDA19998 smart switches support the Audio Return Channel (ARC) feature, a new option introduced in the HDMI 1.4 release, which reduces the number of cables required to deliver audio upstream for processing and playback. The devices also include support for all mandatory 3D over HDMI features. NXP is the one of the first semiconductor companies to deliver silicon supporting HDMI 1.4. The smart switches

also include built-in auto-adaptive equalizers that can handle up to four HDMI 1.4 inputs, automatically maintaining audio-visual quality over HDMI cables up to 30m in length. http://www.nxp.com.

VIZIO ruled not to have infringed Funai patent

The United States Customs and Border Protection agency issued a ruling in agreement with VIZIO that all current models of VIZIO televisions do not infringe US Patent No. 6,115,074 held by Funai Electric Company, enabling VIZIO to continue importing America's fastest selling line of televisions without interruption. VIZIO is the number one selling brand of flat panel HDTVs in the US and distributes flat panel televisions through major retail partners. "We believe that this ruling, along with the US Patent and Trademark Office's Final Rejection of Funai's 074 patent, will allow us to successfully bring this issue to a close," stated Rob Brinkman, vice president of operations and administration. On March 13, 2009 the US Patent and Trademark Office issued a Final Rejection of US Patent 074, the patent that Funai had claimed is infringed. Additionally, VIZIO has filed separate anti-trust and patent infringement claims against Funai for unlawfully and unfairly discriminating against VIZIO in the licensing and enforcement of the 074 patent. http://www.VIZIO.com

New Toshiba Regza HDTVs offer localized-dimming backlights

Toshiba's latest Regza HDTVs feature new FocalLight LED backlighting technology with local dimming for contrast ratios up to 2,000,000:1. The XV468, ZV650, and SV670 in sizes ranging from 40 inches (in the XV646 series) to 55 inches (in all series). The XV646 features a screen coating designed to reduce ambient light reflections for better contrast in bright viewing conditions, while the ZV650 series offers 240Hz refresh and a 100,000:1 contrast ratio. The SV670 Cinema Series features a 2,000,000:1 contrast ratio. All the new Regza sets feature Dolby Volume sound leveling and Audyssey EQ, along with four HDMI inputs, a high-resolution PC input, a USB port, an SD card slot, and support for Toshiba's Regza-Link. http://www.toshiba.com

Silicon Mountain Holdings announces Allio second generation HDTV-PC

Silicon Mountain Holdings, a technology company specializing in high-performance interactive computing solutions, announced their second-generation all-in-one Allio LCD HDTV-PC products. Like their first generation predecessors, Allio 2.0 products will be available in 42-inch and 32-inch high-definition LCD form factors, supporting a broad range of integrated PC configurations. The second generation Allio release comes less than a year after the initial launch. Introduced in November, 2008, response to the Allio all-in-one LCD HDTV PC concept was very strong. Allio products received major attention at the 2009 CES in Las Vegas, where Allio was praised for its pioneering innovation. Demand for the first generation Allio HDTV PCs was so strong that inventories were

completely sold out before the introduction of the new models. Allio and its resellers will be taking pre-orders in September, with the first units scheduled to ship by October 1st, 2009. Like the first generation Allio models, two series are available: all in one Allio Lite and Allio Media Center. Improvements were made to both families. Allio Lite integrates an Intel Atom based PC architecture into the HDTV for a cost-effective point-of-entry into the converged PC TV experience. These basic models offer processing power similar to a netbook and are perfect for surfing the web or performing other lightweight Windows-based computing tasks while watching TV, all at the same time, from the same interface. In addition to the low-cost entry level model, an all-new more powerful version of Allio Lite HDTV PC was also announced, which adds Blu-ray support and an integrated nVidia GeForce 9400 chip for better graphics performance. http://www.slcmholdings.com

Movie studios again demand HDTV disabling powers from FCC

Hollywood's bid to force a yet-to-be-agreed-upon number of households to buy new home theater gear is back in business. The Motion Picture Association of America has once again asked the Federal Communications Commission for the right to selectively control output streams to the TV entertainment systems of consumers. The "pro-consumer purpose" request is to enable movie studios to offer millions of Americans in-home access to high-value, high definition video content, according to the MPAA. Consumer groups, electronics makers, pro-consumer bloggers, and consumers, it should be noted, do not like this idea. The vast majority of consumers would not have to purchase new devices to receive the new, high-value content contemplated by MPAA's request, the group assures the FCC. Critics of the proposed deal want to know why the FCC should let the studios on whose behalf

MPAA is petitioning – Paramount, Sony, Twentieth Century Fox, Universal, Disney, and Warner Brothers – limit the capabilities of home TV systems that consumers have already bought and installed.

BBC wants DRM on HD broadcasts

The BBC has asked a UK regulator for permission to add DRM to their high-definition broadcasts. Apparently, this is at the behest of content providers. The BBC is proposing to encode the TV listings metadata that accompanies all digital TV channels with a simple compression algorithm. The parameters to this algorithm would be kept secret by the BBC: it would ask manufacturers to sign a private agreement in order to receive a copy. This license would require the implementation of pervasive DRM in the equipment they build. DRM watchers say it amounts to a "broadcast flag" to the UK's over-the-air digital Freeview television service. In an attempt to satisfy the fears of powerful rights holders, the BBC will prohibit millions of people from programming their existing set top boxes, it is thought. If implemented, this will make it difficult to view or record HDTV broadcasts with free software.

CrestaTech's new "HDTV Anywhere" chip now ready for sampling to PC OEMs

Reference designs and samples for CrestaTech's new programmable broadband technology are now available, enabling PC manufacturers to pop in one universal chip and support all analog TV and digital TV standards worldwide. The CrestaTV Universal Broadband Receiver technology combines a programmable RF IC and software that will allow PCs to receive live analog or digital TV broadcast, radio and GPS signals in any city, any region and any country around the world. CrestaTV unleashes unprecedented support for the widest variety of broadband frequencies ever. As a result, for the first time, PC manufacturers can ship the same TV tuner module to Barcelona as they ship to Manhattan or St. Petersburg, ultimately streamlining the design and deployment process and reducing costs of the overall system. And PC users can watch the TV they want wherever they travel, picking up local broadcasts or sportscasts by using embedded GPS capabilities to automatically create local channel guides in their area. CrestaTV is comprised of the CTC-200/201 programmable RF and Interface IC and multi-threaded signal processing software. The fully integrated solution eliminates all external filters. Supported frequencies include 45Mhz to 1GHz - and L1 band. OEMs can implement CrestaTV on PCI express cards for desktops and PCI mini-express cards or USB TV modules for laptops. http://www.crestatech.com

Euro broadcasters bring out HbbTV standard for Broadband

Canal+, France Télévision and TF1 are part of a pan-European cross-industry consortium that has launched a new technical standard for connected TVs and set-top boxes delivering both broadcast and broadband content. Hybrid Broadcast Broadband TV (HbbTV) is a pan-European standard for the delivery of content through TVs and set-top boxes with an optional web connection. In addition to the French broadcasters, the consortium includes the German research institute Institut für Rundfunktechnik, the satellite operator SES ASTRA and the software and media solutions providers ANT and OpenTV. HbbTV is based on elements of existing standards and web technologies including OIPF (Open IPTV Forum), CEA, DVB and W3C. Products and services based on the standard promise a "seamless entertainment experience" for consumers, with broadcast and broadband content delivered with one remote control to one screen, including catch-up TV, VOD, interactive advertising, personalization, voting, games, social networking, digital text and EPGs. HbbTV products and services will be developed for all broadcasting technologies including satellite, cable and terrestrial networks. http://www.hbbtv.org

Capella Microsystems brings out ambient light sensor with digital PWM output

The CM3220 from Capella Microsystems is an advanced ambient light sensor, which uses the CMOS process. It offers a convenient controlled method by digital PWM output. The duty cycle of the digital PWM output can be gradually modulated by the ambient light intensity; the modulated PWM signal will simulate real human eye performance for the backlight system. It does not need software development loading for backlight dimming control. It incorporates a photodiode, amplifiers, and analog circuits into a single chip. The best spectral sensitivity is used to closely capture real human eye responses. CM3220 has excellent temperature compensation and the robust refresh rate setting does not need an external RC low pass filter. Shutdown mode is provided, which reduces power consumption to be less than 20µA. CM3220's operating voltage ranges from 2.5V to 5.5V and is able to
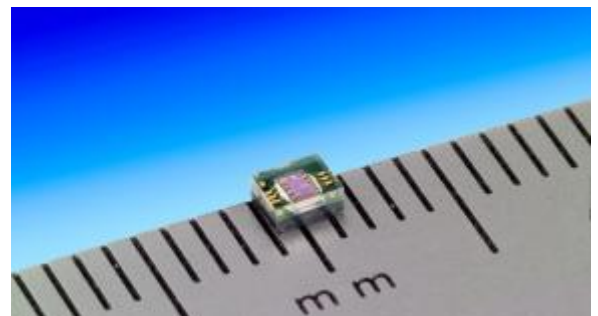
detect low-lit environments. The maximum detecting light strength is 4,000 lux. http://www.capellamicro.com.tw

Mirics and NVIDIA Bring software-based TV to more PC platforms

Mirics announced it has developed a global broadcast TV solution for NVIDIA GPUs. By leveraging the massively parallel NVIDIA CUDA architecture for the Mirics FlexiTV software-based receiver, a universal low-cost TV receiver can now be implemented on entry-level PCs that have CUDA-enabled NVIDIA GPUs. The solution enables low-cost, entry level PCs to support global TV reception using Mirics' FlexiTV technology. Unlike conventional PC TV receivers, FlexiTV offers a single platform which is software reconfigurable to receive free-to-air terrestrial TV regardless of regional variations. http://www.mirics.com

.Analog Devices introduces industry's first HDMI 1.4 transceiver

Analog Devices expanded its Advantiv advanced television portfolio with the introduction of the first HDMI 1.4 transceiver for home and pro AV designs. ADI's ADV7623 HDMI 1.4 transceiver incorporates Xpressview fast switching technology, which enables seamless, automatic switching between HDMI-enabled AV devices in a fraction of a second, eliminating up to 19 seconds of delay required by many AV systems. Designed for home theater-in-a-box systems, AVRs, HBR TV, pro-AV matrix switches, and sound bar speaker systems, the ADV7623 is the only HDMI 1.4 device to integrate a 4:1 multiplexed input HDMI receiver, HDMI transmitter, and CEC buffer and controller into a single platform. Unlike competitive offerings that require multiple components, ADI's single-chip transceiver lowers board costs by 33 percent, while supporting advanced features such as OSD and ARC traditionally reserved for higher priced entertainment systems. By combining the HDMI receiver, HDMI transmitter, CEC, OSD and ARC functions on a single chip, ADI's new transceiver relieves much of the design work involved in interfacing multiple chips together in HDCP repeater designs. http://www.analog.com/pr/advantiv

OSRAM launches efficient light guide for LCD backlights

OSRAM's Oslon LX LEDs pack almost 80% of their light into the light guide. As the smallest 1W LEDs for backlighting LCD displays, the two white versions of the Oslon LX from OSRAM Opto Semiconductors provide strong light that can be very efficiently injected into thin light guides with the aid of an optimized lens. The displays can therefore be made ultra-thin and can be uniformly illuminated even with single-side injection. Thanks to the compact LED format and the high light output of typically 75lm or 90lm at an operating current of 350mA, it is sufficient to inject the light from two sides or even from only one side to provide uniform backlighting for TVs and computer displays with a diagonal of up to 65 inches. The polynomial lens with a beam angle of 125° is designed to achieve an injection efficiency into the light guide of almost 80%. The Oslon LX is available for two color spaces. The multi-white version (High Color Gamut White) covers 100% of the sRGB color space and has a typical light output of 75lm. The ultra-white version of the LED covers 80% of the sRGB color space and is a little brighter with a typical light output of 90lm. Oslon LX is manufactured using the latest ThinGaN chip technology with chip level conversion and provides high optical efficiency and extremely uniform distribution of light. The lens is optimized for maximum light extraction. Its beam characteristic ensures a high injection efficiency of almost 80%. Measuring just 3x3x1.6mm, the LED is perfect for side injection into light guides with a thickness of 2-4mm so the displays can be made with very thin profiles. These properties make the LED a key product for the LCD market. http://www.osram.com

The two versions of Oslon LX produce plenty of light from a small surface. Thanks to the optimized lens the light can be injected into light guides extremely efficiently.

THX study reveals video calibration improves energy efficiency of HDTVs

A research study conducted by THX Ltd. suggests that a secondary benefit to video calibration, beyond improving picture quality, is reducing an HDTV's on-mode energy consumption. The THX study, which evaluated plasma and LCD HDTV performance, revealed video calibration improves energy efficiency up to 50%, depending on the display's technology platform, screen size and model year. The THX research demonstrated in all cases that a calibrated viewing mode consumed less energy than vivid and dynamic modes. The approximate savings for consumers ranged from 15–50%. A properly calibrated HDTV, in some cases, can save consumers up to $40-$50 per year. The annual consumption and cost calculations are based on four hours of use per day and $0.1136 per kilowatt hours (kWh), which is the average residential rate as defined by the US Energy Information

Administration. Savings will change as user behavior shifts. Plasma HDTVs manufactured prior to 2008 achieved the highest levels of energy savings after professional calibration, followed by LCDs. http://www.thx.com

New Energy Star standards for energy-efficient TVs will save 40-65% in electricity

Energy Star, the voluntary energy-efficiency program run by the United States' EPA, has released the final specifications for much more stringent energy levels for TVs, starting in May 1, 2010, with even stricter standards to follow on May 1, 2012. TVs manufactured after those dates must meet the new requirements to bear the Energy Star logo. The new specs for TVs, called versions 4.0 and 5.0, respectively, are focused mainly around on-mode power consumption. The current Energy Star 3.0 specification that went into effect in November 2008 was the first to require TVs to meet maximum on-mode power consumption levels, though most TVs in the market met the standard and the specification has been considered too lenient. According to Energy Star, TVs qualifying for Energy Star under the Version 4.0 specification will offer consumers savings of more than 40%. When the Version 5.0 specification goes into effect, Energy Star-qualified TVs will be as much as 65% more efficient than models currently on the market. http://www.energystar.gov

WHDI 1.0 Specification for multi-room HD streaming is finalized

The Wireless Home Digital Interface (WHDI) consortium finalized its WHDI 1.0 standard for streaming uncompressed 1080p video around a home. Pre-standard WHDI technology already appears in a number of products, including Sony's wireless Bravia Link, Philips SWW1800/27 Wireless HDTV Link, Zinwell and Gefen wireless dongles, an IDX professional video camera, and a wireless endoscopy system approved by the Food and Drug Administration, the group said. The finalized standard would ensure interoperability among different-branded devices that license the technology and bear a WHDI logo. The group, however, said it cannot guarantee the interoperability of 1.0 devices with products incorporating pre-standard WHDI technology. With WHDI 1.0, a set-top box or other video source could transmit a 1080p/60Hz Deep Color video stream more than 100 feet through walls to multiple TVs around the house without running cables, the group said. Likewise, because the technology supports low-power consumption modes for portable devices, battery-operated laptops and cell phones could stream 1080p video to a display or receive 1080p video from a source within the home. WHDI group members are Amimon, Hitachi, LG, Motorola, Samsung, Sharp and Sony. The group, which licenses and promotes the standard, is a wholly owned subsidiary of Amimon. http://www.whdi.org

SMPTE publishes global television standard report

American and European TV standards-setting groups expect to finalize a joint agreement that will unify production and broadcast technology for the digital era. A task force created by the Society of Motion Picture and Television Engineers (SMPTE) and the European Broadcasting Union unveiled its standardization proposal for simplified, cost-effective digital production and transmission processes at the International Broadcasting Conference (IBC) in Amsterdam in September. Among the benefits of the international plan, which has been underway for two years, is a better timing process for pictures and sound – an occasional problem in digital TV programming. The proposed standard will also cater to the emerging business of multi-format facilities and digital post-production operations. The plan will be the first update in 30 years to TV stations' processes for synchronizing and time-labeling shows, systems that were set up in the era of analog video and videotape. It reflects the industry's growing reliance on IT-based systems. The proposal seeks to encourage a single synchronization standard that can address all formats and that minimizes the need for dedicated interfaces. Although no date has been set for adopting the final SMPTE/EBU standard, it is expect to be implemented within the next couple years. http://www.smpte.org

Coalition for Innovative Media Measurement to study TV habits

Fourteen of the USA's largest television programmers, advertisers and ad buyers gave the clearest sign to date that the audience measurement system they depend on, long dominated by Nielsen Media, needs to be overhauled for the digital era, according to *USA Today*. CBS, Disney, NBC Universal, News Corp., Omnicom and Time Warner are among the companies backing the Coalition for Innovative Media Measurement, which will study new ways to

measure TV consumption. Viewers are increasingly watch shows on digital video recorders, the Internet and handheld devices that haven't traditionally factored in to Nielsen's ratings.

Vidabox launches SLIMv3 for video archiving

The SLIMv3 from Vidabox is configurable as a standalone server, or Blu-ray and DVD extender. It archives up to 900+ DVDs or 225+ Blu-rays with up to 6TB. It plays simultaneous streams of movies, music, or pictures as a server. Users get quick, on-demand access to all of their favorite content through an easy-to-use, intuitive on-screen interface. Users can start with as little as 250GB, and easily expand out externally to archive more Blu-rays, DVDs, millions of songs, or thousands of hours of TV via NAS, USB, and FireWire drives. It supports multi-zone AV streams that stream the same or multiple, different movies or videos throughout the home easily with the SLIMv3 and VidaBox extenders over CAT5e/6 with 1080p video and 5.1 surround sound in concert with Dolby TrueHD, DTS-HD, and DTS-MA surround sound formats. http://www.vidabox.com

Motorola launches multi-format encoding platform for 1080p content

Motorola's Home and Networks Mobility business revealed its next generation encoding platform. This video processing platform supports both MPEG-4 and MPEG-2 standard-definition (SD) and high-definition (HD) encoding and transcoding and has been designed to meet future processing demands of both 1080P/50Hz and 1080P/60Hz resolutions using the MPEG-4 format. The compression engine supports all popular video formats including 1080i and 720p and is designed to keep pace with service providers' future video requirements by providing additional processing horsepower to support emerging services such as 3D television and multi-stream output. The new platform, named Motorola SE-6000, accepts baseband SD and HD video, as well as pre-compressed MPEG-4 and MPEG-2 streams to act as both a high performance encoder and transcoder for satellite, cable and Internet Protocol Television (IPTV) applications. http://www.motorola.com/deliveringdigitalvideo

CableLabs provides software resources to grow Tru2way

CableLabs has put several programs in place to support device manufacturers and application developers, important stakeholders within the growing Tru2way and Enhanced TV (ETV) communities. The Tru2way reference implementation is available as a royalty-free download. In June, CableLabs announced the availability of the Tru2way reference implementation (RI) under GPL 2.0 open source terms. Making the tru2way reference implementation widely available at no cost improves the stability of the platform by offering a consistent interpretation of the CableLabs specification. Software developers will also benefit by having a definitive platform to deliver interactive applications such as advanced advertising, e-commerce, and other services. CableLabs' online developer community can be found within Java.net, the Sun Microsystems site for open source projects at opencable.dev.java.net. Within this project, CableLabs is providing a source code reference implementation of the entire tru2way middleware stack-over one million lines of code-for no charge. To provide an alternative licensing model to the GPL 2.0 open source process, CableLabs has announced that it will offer a commercial use license, also at no charge. A test suite for ETV is also being made available for no charge. Like tru2way, Enhanced TV (ETV) enables interactive video services, but is targeted towards legacy set-top boxes with more limited functionality. ETV enables such interactive services as voting, polling, requests for information, telescoping and interactive advertising. Certain of these capabilities will be implemented across a number of cable networks in the fourth quarter of this year. http://www.cablelabs.com

FCC is evaluating HD broadcast spectrum

In a fascinating article published in HDTV magazine, entitled "The end of high definition broadcasting", industry guru Rodolfo La Maestra suggests that the FCC is investigating possibilities of reclaiming unused airwaves to maximize the use of airwave spectrum, which might result in diminished HD broadcasting. La Maestra refers to an article in Washington Post:

> *"Levin (FCC) said last month that the agency was considering, as part of its national broadband plan, a take back of spectrum from broadcaster to meet the exploding demand for wireless network capacity. Wireless carriers have warned of a looming crisis for wireless spectrum as more people using smart phone and other data-intensive devices flood to the mobile Web".*

Here is a link to the Official FCC notice: http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-09-2518A1.pdf

La Maestra suggests that any such action has "potential of a negative effect on HD image quality, on mobile DTV, and on the surviving ability of multicast DTV stations not using the whole capacity of their 6MHz channel slot and

expected to combine their service with other similar SD stations". The full text of La Maestra's article can be read here: http://www.hdtvmagazine.com/articles/2009/12/the_end_of_high_definition_broadcasting.php

Westinghouse debuts 26-inch "greenvue" LCD HDTV

Westinghouse Digital Electronics, one of the top LCD manufacturers in the US, kicks the concept of "going green" up a notch with its new SK-26H640G 26-inch ultra-green LCD HDTV that saves power and money. Westinghouse's greenvue LCD HDTV provides up to a 20% power savings over the Environmental Protection Agency's requirements and Department of Energy's Energy Star 3.0 specification standards for power consumption. Westinghouse's more efficient greenvue HDTV can help consumers reduce their overall power consumption. All new 2009 Westinghouse LCD HDTVs are Energy Star 3.0 compliant or better. The greenvue packaging process is eco efficient. The product box is made of recyclable materials and uses soy based ink, while the distance between the packaging and product factories is only 6.2 miles, which helps to reduce overall product transportation. The Energy Star 3.0 standard tests TVs in "power on" modes versus "standby" modes, which was the case with prior specifications and standards. In order for a TV to meet Energy Star 3.0 specifications, it must operate at or less than strict energy wattage output rates. For example, a 32-inch LCD HDTV must operate at no more than 121 watts in the on mode and a 42-inch LCD TV cannot operate at more than 208 watts in the on mode. As a result of less energy and wattage used, the television's overall power consumption is drastically reduced. http://www.westinghousedigital.com

ITU introduces 'G.hn' standard for smart home networking

The International Telecommunications Union (ITU) has approved a technical standard, called "G.hn," that addresses "smart home" networking systems and applications. The new standard will enable service providers to deploy new offerings, including HDTV and digital Internet Protocol TV more cost effectively. It will also allow consumer electronics manufacturers to seamlessly network all types of home entertainment, home automation and home security products, and greatly simplify consumers' purchasing, and installation processes. G.hn-compliant devices will be capable of handling high-bandwidth rich multimedia content at speeds of up to 1 gigabyte per second over household wiring options, including coaxial cable and standard phone and power lines. The first chipsets employing G.hn will be available in early 2010. The physical layer and architecture portion of the standard were approved by ITU-T Study Group 15 on October 9. The data link layer of the new standard is expected to garner final approval at the group's next meeting in May 2010, the ITU statement said. The Home Grid Forum, a group set up to promote G.hn, is developing a certification program together with the Broadband Forum that will aid semiconductor and systems manufacturers in building and bringing standards-compliant products to market, with products that fully conform to the G.hn standard bearing the HomeGrid-certified logo. Also agreed at the recent ITU meeting was a new standard that focuses on coexistence between G.hn-based products and those using other technologies. Known as G.9972, the standard describes the process by which G.hn devices will work with power line devices that use technologies such as IEEE P1901. In addition, experts say that they will develop extensions to G.hn to support SmartGrid applications. http://www.homegridforum.org

1394 Trade Association adds HANA specifications

The 1394 Trade Association announced that it is formally assuming the assets of the High Definition Audio-Video Network Alliance (HANA) effective immediately. The 1394 Trade Association will manage the copyrights to the Design Guideline for the High Definition Audio/Video Network, the HANA Content Protection Specification, and the HANA Content Services Book, along with all of the organization's trademarks. The HANA reference design includes licensed software from NXP, Texas Instruments, and others. Licenses for optional features including CWave coax networking, DTCP, Dolby Digital audio, and others may also be required. http://www.1394ta.org

Disney suggests new single-license multi-format digital access

Disney announced plans to pilot a new digital distribution model. Codenamed Keychain, the new technology will allow Disney fans to pay a single license fee for a product (such as movies) and then transport copies of that

product across a multitude of different mediums without having to pay additional charges. Few details have been released about the proposal. http://www.disney.com

ATSC adopts mobile digital TV standard

The Advanced Television Systems Committee (ATSC) announced the approval of A/153 ATSC Mobile DTV Standard. The ATSC Mobile DTV Standard defines the technical specifications necessary for broadcasters to provide new services to mobile and handheld devices using their digital television (DTV) transmissions. The new services for mobile and handheld devices are carried along with current DTV services without any adverse impact on legacy receiving equipment. ATSC Mobile DTV was developed to support a variety of services including free (advertiser-supported) television and interactive services delivered in real-time, subscription-based TV, and file-based content download for playback at a later time. The standard can also be used for transmission of new data broadcasting services. The ATSC Mobile DTV Standard will enable broadcasters to provide new services to consumers utilizing a wide array of wireless receiving devices including mobile phones, small handheld DTVs, laptop computers and in-vehicle entertainment systems. ATSC Mobile DTV is built around a highly robust transmission system based on Vestigial Side Band (VSB) modulation, with enhanced error correction and other techniques to improve robustness and reduce power consumption in portable receivers, coupled with a flexible and extensible Internet Protocol (IP) based transport system, efficient MPEG AVC (ISO/IEC 14496-10 or ITU H.264) video, and HE AAC v2 audio (ISO/IEC 14496-3) coding. ATSC Mobile DTV services are carried in existing digital broadcast channels along with current DTV services without any adverse impact on legacy receiving equipment. Formal development of the ATSC Mobile DTV system began in May 2007. http://www.atsc.org

OMVC advises that broadcasters are ready to bring mobile DTV to American consumers

The Open Mobile Video Coalition (OMVC) that with the adoption of a final mobile digital broadcast standard by the ATSC, US broadcasters are poised to roll out an array of digital program services that will be available to consumers on devices ranging from in-car screens to portable DVD players and mobile phones. Mobile DTV technology uses existing 6MHz channels from broadcasters to transmit a mobile stream of programming services that will not interfere with existing high-definition and multicast services. Beyond live broadcasts, the OMVC envisions mobile services such as emergency alerts that can be customized by market or location, live audio feeds, data-casting with traffic maps, closed captioning, "clip casting" sports and news highlights that could be stored in memory on a device, "push" Video On Demand for future viewing, time-shifted television, mobile digital video recording, interactive polling, electronic coupons, targeted advertising, an electronic service guide for ease of tuning. Broadcasters will be able to extend their programming reach to a growing audience of new viewers -- anywhere, anytime, and at any speed (since the new Mobile DTV can even be received in a car that is moving on freeway.) http://www.omvc.org

46.2 million converter boxes sold under coupon program says DTC

Approximately 46.2 million digital-to-analog converter boxes shipped during the period of the government-subsidized TV converter-box coupon program, according to a study released by Digital Tech Consulting (DTC). The National Telecommunications and Information Administration (NTIA) program, which recently saw the last eligible coupon expire, generated more than $2.5 billion in retail revenue, according to DTC. The one-time opportunity generated much-needed cash during recessionary conditions that otherwise would have kept many consumers out of stores. To replace the lost revenue from the low-margined converter boxes, DTC suggested retailers could push stripped-down portable DVD players, many of which are retailing in the $50 to $80 range. Another candidate comes in the form of new small "tea cup" LCD TVs with 7-inch and 9-inch screens and internal ATSC tuners. Some incorporate DVD players. As for the converter-box category, DTC said the market will never see the sales volume of the last 18 months, but limited sales will continue for a couple of years. DTC
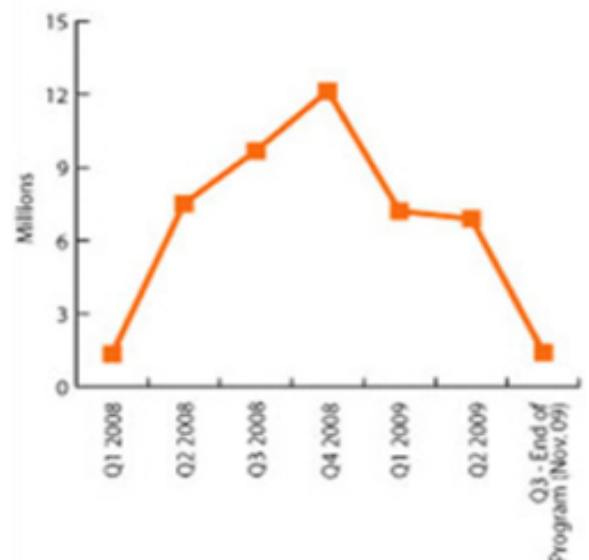
estimated that there will likely be another 2 million units shipped in the next few years. http://www.dtcreports.com

Universal to roll out Blu-ray/DVD "flipper discs"

Universal is set to roll out the first Blu-ray/DVD "flipper discs" – a single, dual-sided disc that contains Blu-ray on one side and DVD on the other. The "Bourne" trilogy will be the first movies to get the dual-sided treatment, with all three discs coming out on January 19, 2010. The flipper discs the disc to be played in an existing DVD player, and not just in a Blu-ray player. It's yet to be seen whether the new flipper discs will be as successful as the increasingly popular Blu-ray-DVD combo packages that include separate discs for both formats, although the flipper discs are likely to be a less expensive implementation since only one disc is involved.

IMS Research predicts quick growth for Internet video access

Preliminary data from the IMS Research study, *Market Opportunities for Internet Video to the TV*, shows that by the end of 2010, nearly 55% of all TV Households in the Americas will have access to Internet video, with 25% of these capable of displaying Internet video onto the TV set. Rebecca Kurlak, an IMS Research consumer electronics analyst, states:

> *"Now that retailers are actively marketing internet-enabled devices, we can expect to see mass market adoption. As Blu-ray players have begun to offer price points that fall below $199, this price reduction will create a domino effect on other CE device prices. This has already been observed by actions taken by the game console market in Q3 2009. We currently estimate that by the end of 2010, 35% of TV shipments in the Americas will have internet connectivity built-in. It will take about five years for the gap to close between connected TVs and other devices. Consumers continue to select devices that offer ease of use, and it just makes it easier for the consumer to seamlessly search for content on one device. Plus, there is no additional set up involved, which continues to be a hurdle for many of the devices on the market."*

In addition to TV and broadband household forecasts, the study provides detailed analysis of retail device shipments and revenues. Equipment forecasts include internet connected devices such as Blu-ray players, game consoles, media extenders, proprietary equipment, retail DTT+IP STB and connected TV sets. A new feature of the report includes a segmentation of households by pay versus ad-supported services. IMS Research is the first to incorporate this segmentation in their reporting. http://www.imsresearch.com

Samsung retakes top spot in U.S. LCD TV market says iSuppli

Samsung Electronics regained the top spot in the U.S. LCD-television market from chief competitor Vizio in the third quarter as it aggressively cut prices of its advanced LED-backlit sets, according to iSuppli. In the fourth quarter, which includes the holiday shopping season, shipments are expected to grow because of aggressive discounts for full-featured LCD-TVs. The research firm expects retailers to offer deals on product bundles, including LCD-TVs sold with Blu-ray players, surround-sound systems, DVRs, game consoles and installation services. In the third quarter, Samsung shipped 1.3 million LCD-TVs in the U.S., for a 17% share of the market, while U.S.-based Vizio had a 16% share with shipments of 1.2 million sets. The South Korean electronics giant last held the top spot in the fourth quarter of 2008. Vizio took the lead in the first and second quarters this year as consumers bought its low-cost, full-featured sets. LED-backlit sets accounted for 3.7% of total U.S. LCD-TV shipments in the third quarter, up from 2.1% in the second. In October, Samsung was selling 55-inch LED-backlit LCD TVs for $2,650, just $325 more than for conventional Cold-Cathode Fluorescent Lamp backlighting technology of the same size. http://www.isuppli.com

Microtune introduces global RF-to-baseband TV receiver solution

Microtune introduced a radio frequency (RF)-to-baseband IC that delivers uncompromised TV receiver performance. The MT3141 single chip enables TV manufacturers to combine the functions of an RF tuner, analog TV demodulator, intermediate frequency (IF) filters, and amplifiers in a tiny 6 mm x 6 mm IC. Microtune claims the new device is the only receiver engineered to exceed the RF performance requirements of worldwide analog/digital broadcast and cable standards, including those for China's new CTTB (also known as DTMB or DMB-T) and Europe's next-generation DVB-T2 requirements. At $2.00 in high volumes, the MT3141 breaks through price, performance and size barriers to enable TV manufacturers to deploy an advanced silicon receiver in an unified high-quality front-end across all next-generation television platforms. http://www.microtune.com

2010 large-area TFT-LCD panel demand expected to increase 12% Y/Y

Displaybank announced that 2010 large-area TFT-LCD panel demand is expected to increase 12% Y/Y. Although monitor panel is expected to show low 3% growth rate as LCD monitor industry enters maturity but notebook PC panels are expected to show 19% growth due to high demand of netbooks and increasing desktop replacement. TV panels are also expected to show 19% growth in 2010 due to the growth in emerging market as well as digital TV transfer that overall large-area panel demand is expected to increase 12% Y/Y and 19% Y/Y in area basis. Makers that are planning to newly add lines are LG Display, CMO, IPS Alpha and BOE. These new lines are expected to increase actual supply capacity (after yields) by 22% Y/Y. http://www.displaybank.com.

Company	Line	Gen	Capacity	Start	Glass
LG Display	P8-1	8	120	Q1'09	2200x2500
LG Display	P6E	6	60	Q2'09	1500x1850
Samsung	T8-2(Ph1)	8	70	Q2'09	2200x2500
Century		5	60	Q2'09	1200x1300
AUO	L8A	8	40	Q2'09	2200x2500
AUO	L7B	7	30	Q3'09	1950x2250
Innolux Display	Fab3	6	60	Q3'09	1500x1850
Sharp	No3	10	36	Q4'09	2880x3130
LG Display	P8-2	8	120	Q2'10	2200x2500
CMO	Fab8	8	30	Q2'10	2200x2500
IPS Alpha		8	70	Q3'10	2200x2500
BOE-OT	B3	6	90	Q4'10	1500x1850
New Line Mass Production Status and Plan Source: Displaybank, 12/09					

TAOS champions ambient light sensing in HDTVs to improve picture quality and conserve energy

Texas Advanced Optoelectronic Solutions (TAOS) announced that the company is providing key technology to the HDTV industry that is directly benefiting consumers who purchase flat panel display HDTVs. TAOS is championing the use of Advanced Light Sensing (ALS) sensors in flat panel TVs (both LCD and plasma) to provide improvements in display picture quality while simultaneously conserving energy by reducing power consumption, thereby reducing the consumer's annual utility bill. As a member of the LCD TV Association, TAOS, Inc. is working closely with its other members to promote ALS sensor use in HDTVs and encourage TV manufacturers to participate in the Association's Green TV logo program. Launched in 2008, this program promotes "green technology" and global energy conservation, currently through the implementation of ALS sensors in LCD TVs to automatically adjust TV set brightness in response to ambient room brightness, thereby reducing system, power consumption by at least 30%. TAOS developed a white paper for consumers titled "Turning HDTVs Green" that provides an overview of the HDTV industry, the changes that are driving the need for increased energy conservation and describes existing technologies such as automatic brightness control which uses the TAOS ALS to provide the dual benefits of improved display picture quality and increased energy-efficiency in flat panels TVs. http://www.taosinc.com/ConsumerWhitePaper/TurningHDTVsGreen.aspx

Insight Media releases Green Display Report

Insight Media announced the release of its *Green Display Report: The Business Threats and Opportunities of Green Displays.* This comprehensive report covers all aspects of display manufacture, use and disposal for laptops, monitors and TVs. This report defines the parameters of green displays and explains the trends in designing, manufacturing, assessing, applying and selling displays that, along with the processes with which they are made, reduce power consumption and minimize impact on the atmospheric and terrestrial environments. Equally important to industry participants, it explores the commercial opportunities and challenges at each step in the display-product life cycle. The report answers a number of key questions, including:

- What makes a display green?
- Why, from a business perspective, should display companies be green?
- Do green display products sell better?
- How will green practices change the display supply chain?
- What should companies do about regulations and labeling programs?
- What is the impact of recycling and recovery programs?

The report is available immediately. http://www.insightmedia.info/reports/2009gdedetails.php

3M launches consumer awareness campaign on TV energy consumption

3M's Optical Systems Division today announced that it has launched a consumer awareness campaign in an effort to raise awareness of household TV energy consumption and what to consider when purchasing an energy efficient TV. Specifically, the company is hoping to provide valuable information to consumers through the media to educate the public about energy efficient TVs and the issues surrounding TV power consumption in the home. As TV sizes get larger and consumers watch more television, energy consumption in these household fixtures has increased dramatically. In fact, with an average of two or more TVs per household turned on for a combined average of 8.2 hours per day, U.S. household TV energy consumption is expected to equal or surpass the amount of energy used to power refrigerators – a figure that could double by 2030. http://www.3m.com 3M offered the following facts about energy-efficient TVs:

- An estimated 10% of an average household's electric bill is now due to TV-related activity, according to the California Energy Commission. http://www.energy.ca.gov/appliances/2009_tvregs/
- There has been a 26% increase in residential TV power consumption from 2005 to 2010. Source: 2008 Annual Energy Outlook, Energy Information Administration
- The average U.S. household spends $1,400 per year on energy bills, with some of the biggest energy hogs in the home being electronics. http://www.energyfederation.org
- In 1985, the average U.S. household had 18 channels compared to more than 100 channels in 2006 – more opportunities to channel surf. *Source:* Nielsen Media Research, National People Meter Sample
- Energy Star-qualified TVs use about 30% less energy than standard units. Some surpass the Energy Star requirements by 30% to 50%, making them even more efficient. Source: Energy Star Televisions: http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=TV
- US households have a TV turned on an average of 8.2 hours per day. Nielsen Media Report Q4'08
- The average number of television sets per home was 2.6 in 2005. In 1980, that number was 1.7. *Statistical Abstract of the United States: 2008* TV ownership in the US averages two set per household. http://www.census.gov/Press-Release/www/releases/archives/facts_for_features_special_editions/012025.html
- The California Energy Commission (CEC) claims that TVs account for 10% of the residential energy use or 2% of the gross electrical use in California, a non-trivial number. The CEC expects this number to increase, as larger TVs are being sold worldwide. http://www.energy.ca.gov/appliances/2009_tvregs/
- It may cost you more to watch TV for eight hours a day (the amount of time a typical American household watches TV) than it does to run a full-size refrigerator 24/7. Environmental Protection Agency, http://www.epa.gov/appdstar/pdf/2007overview.pdf
- By choosing more energy-efficient appliances and electronics – such as Energy Star-qualified products – each household could cut its energy bill by 30%, saving more than $400 each year. In 2007, Americans using Energy Star products saved a total of $16 billion on their electric bills. Green Today Magazine, "How Green is My TV?" http://www.greentodaymagazine.com/how-green-is-my-tv.html
- The Energy Star program encourages manufacturers to produce efficient televisions to achieve an Energy Star label. More than 950 models today meet Energy Star current 3.0 standards with over 230 models meeting the proposed Energy Star 4.0 (the latest standard from Energy Star which launches in May 1, 2010). http://www.energystar.gov
- On average, cathode ray tube (CRT) TVs use 0.23-watts per square inch of the screen, LCDs use 0.27-watts per square inch, and plasmas use 0.36-watts per square inch. For comparisons of the "average size" of each type of television, and the wattage they use, and a comparison of wattage used by a 42-inch LCD versus a 42-inch plasma, visit http://www.energy.ca.gov/appliances/tv_faqs.html A 40-inch (diagonal), direct-view HDTV is the industry's largest direct-view cathode ray tube. It uses 280 watts while in operation and only one watt in stand-by mode. Source: California Energy Commission
- There are about 275 million TVs currently in use in the US, consuming more than 50 billion kWh of energy each year – or 4 percent of all households' electricity use. Source: Energy Star
- 3M's Vikuiti reflective polarizers offer one way to make TVs more energy efficient. Integrated into a TV's backlight, the films increase energy efficiency 32% by recycling light that would otherwise be absorbed. If every LCD television sold in 2008 used 3M's film, the power saved would be enough to power 320,000 households, roughly a city of 800,000 people, like Tulsa, Oklahoma.

CEA slams California TV energy-use mandates

The Consumer Electronics Association said it was "extremely disappointed" by the California Energy Commission's decision to set new energy efficiency standards for TV sets sold in the state. The five-member California Energy Commission voted unanimously in late November to require new TV sets with screen sizes 58 inches and smaller to reduce electricity consumption 33% by 2011 and 49% by 2013. The CEA said the rules will endanger jobs, innovation and consumer choice. Jason Oxman, the CEA's SVP for industry affairs explained:

> *"Simply put, this is bad policy – dangerous for the California economy, dangerous for technology innovation and dangerous for consumer freedom… Instead of allowing customers to choose the products they want, the commission has decided to impose arbitrary standards that will hamper innovation and limit consumer choice. It will result in higher prices for consumers, job losses for Californians, and lost tax revenue for the state."*

According to the CEA, the California Energy Commission has "repeatedly rebuffed" attempts from the consumer-electronics industry to provide input on the regulations. CEA claimed that "energy efficiency is a shared concern for all parties" but then said that "rather than build on these efforts, the CEC chose to create a new regulatory regime and micromanage the design and development of future televisions." The California regulations could set a precedent for other states. Massachusetts is exploring television-efficiency legislation that is largely based on California's new standards, while Washington and Oregon are expected to take up the issue.

Energy Savings Trust report calls for mandatory in home display units

The UK's Energy Savings Trust recently identified that real-time graphics will allow people to see how much power they use and help them cut their consumption. The government announced a plan to install smart meters to monitor electricity and gas consumption in 26 million UK homes earlier this year. However, the Energy Saving Trust says the government's plans do not require energy companies to provide separate energy monitors when they install the new meters. Without visual displays householders will find it harder to benefit from the smart meters. http://www.energysavingtrust.org.uk/

TAOS announces expansion of color sensor solutions portfolio

Texas Advanced Optoelectronic Solutions (TAOS) recently announced the addition of multiple products to its existing Color Management Solutions portfolio. The expanded portfolio now offers increased design flexibility, features and options for manufacturers of products where color is mission critical. The new TAOS programmable color sensors provide more cost-effective, lower-power solutions for color discrimination, determination and measurement in a wide variety of applications such as color-point feedback control in solid-state illumination and RGB backlight systems, color adjustment in printers, industrial process quality controls, portable medical diagnostic systems, paper and product handling, toys, and games. For emerging RGB LED backlighting applications in laptops, monitors and HDTVs, TAOS color sensors can be used not only to control the intensity of the backlight, but also the white point or color temperature of the backlight. In ambient light sensing applications, the white point of the environment can be determined by a color sensor and this data can be used to drive the RGB LED backlight to a white point that compliments the white point of the environment. The resulting richer, deeper and more realistic colors enhance the user experience. Additional packaging and features to include integration of proximity sensing are also planned. http://www.taosinc.com

NXP introduces advanced 3DTV processor

NXP Semiconductors announced the availability of the PNX5130, the industry's first video co-processor enabling 3DTV, frame-rate conversion (FRC) and local backlight dimming in a single chip. By eliminating the need for external FPGA devices to support 3DTV, NXP is providing a highly cost-effective post-processing solution that will enable manufacturers to bring competitively priced 3D-enabled TV sets to the mainstream consumer market. The PNX5130 enables conversion of all popular 3DTV formats to both line and frame interleaved displays, and is designed for maximum flexibility to support emerging 3DTV standards. The high-performance PNX5130 video post-processing platform enables 3DTV with movie judder compensation. Based on the architecture of the PNX5100 platform, which has been widely recognized for its outstanding support of MEMC (Motion Estimation, Motion Compensation), the PNX5130 features the next generation of NXP's proprietary MAPP (Motion Accurate Picture Processing) technology, which combines movie judder cancellation, motion sharpness, and vivid color management in a single device. http://www.nxp.com

Wistron lands 3D TV orders from Vizio

According to *DigiTimes*, Wistron is said to have recently received 3D TV orders from Vizio who plans to launch related products in 2010 with a consumer-friendly price to compete against Japan-based brands. Both Vizio and Wistron declined to comment. Wistron reportedly signed an agreement with Dynamic Digital Depth (DDD) and paid a license fee of NT$43 million (US$1.34 million) for the rights to use its TriDef 3D technology on notebooks and LCD TVs. Wistron has also reportedly invested NT$21 million in DDD and acquired a 15% stake in the company, the sources added. http://www.wistron.com

LG begins mass-producing 3D 1080p displays

LG has begun mass-producing 3D 1080p LCD 23-inch panels. The panel will use the maker's proprietary "high-performance 3D exclusive controller" engineered to enhance resolution and other visual elements, according to LG. The company also said the units will provide more than twice as much image "information" as current 3D LCD models. LG Display reportedly has made a "major breakthrough in the display industry race to deliver the depth and dynamic nature of 3D images." http://www.lge.com

Upgraded glasses from Trioscopics suitable for existing broadcast TV

Following Technicolor's unveiling of their method for showing 3D from standard 35mm release prints, veteran technologist John Lowry demonstrated an improved anaglyph method for 3D. Monikered Trioscopics, the system that can work on any existing digital theater or TV screen, is suitable for existing broadcast TV. It uses green-magenta glasses, a different color combination from previous anaglyph systems, and delivers better color and clarity than most anaglyph systems. Lowry demonstrated the system with throwaway plastic glasses from American Paper Optics and HD clips from "Journey to the Center of the Earth", "My Bloody Valentine" and "Coraline" that had been converted within a matter of days. Noting that "anaglyph is a bad word" in the 3D community, Lowry said, "We may not be perfect yet but we can open markets and help studios make a lot of money today. We will be the cost-effective solution for broadening the 3D base." http://www.trioscopics.com

3DTV shipments set to reach 46 million by 2013 according to GigaOM Pro

While 3DTV has its skeptics, the giants in the consumer electronics industry see huge potential, according to a new report from GigaOM Pro. As HDTV manufacturers face shrinking margins and a maturing market, big players like Sony and Panasonic see 3DTV as the way to rejuvenate their TV business. While the market is only in its infancy today, by 2013 up to 46 million 3DTV capable flat-panel HDTVs will head to consumer homes. As 3D becomes a standard feature with just a slight cost premium in coming years – just as 120 Hz is today – many consumers will opt for 3D-capable TVs even if the majority of the content they watch will be 2D. However, as content owners and pay-TV operators convert large portions of their back-catalogs of content to 3D, it's likely many consumers will watch more and more of their favorite shows and movies in 3D. Another significant factor will be the widespread availability of lower-cost active glasses for 3D viewing. To date, the low number of glasses hasn't yet resulted in necessary scale in manufacturing to lower their average selling price. In the future, however, high-volumes of 3DTVs will result in the need for millions of glasses, driving down the cost of glasses for the home. The report, "3DTV Market Analysis: Making the Transition from Cinema to Living Room" is available at GigaOM Pro. The report includes analysis of the various 3DTV technologies, standards and markets. It examines the HDTV and 3DTV market landscape and includes market forecasts for 3DTV, and strategic recommendations for consumer electronics OEMs, content owners, service providers and retailers. http://pro.gigaom.com

3D@Home Consortium to co-sponsor Experience 3D TechZone at CES 2010

The 3D experience makes content pop, and it's coming to CES. The Experience 3D TechZone features next-gen innovators who make 3D a reality in the home, including content creators, service providers and TV manufacturers. In partnership with 3D@Home Consortium. You do not have to be a member of 3D@Home to join in the fun at this exhibit. http://www.cesweb.org/docs/2010_Experience_3D_TechZone_Sheet.pdf

Sony shows off 3D PlayStation 3

Sony recently showed off a 3D PlayStation 3. According to people who have tested it, the games have a perception of depth not experienced before, all presented in 1080p high-definition and vivid color. And in a year, Sony says it expects to be selling this in Europe. The system uses a standard PS3. All the three-dimensional processing comes not from a modified PlayStation, or even special versions of its games, but from picture-processing technology inside a new Bravia TV (currently a prototype). This means it should work with all existing PlayStation 3 games. At the end of 2010, Sony plans to release this 3D Bravia for use with its games console. But over the following two or three years, we are told, it wants to build the picture-processing technology into the PlayStation itself. That way, gamers will be able to enjoy 3D gaming on any hi-definition TV. Plans to incorporate the system into Blu-ray players, and even VAIO laptops, also exist.

Nagravision set-top box promises to bring 3D to television

3D technology is coming one step closer to home with the development of a new set-top box system that will allow consumers to browse through and access 3D offerings from their cable or satellite TV company. The prototype, developed by digital content security company Nagravision SA, based in Cheseaux, Switzerland, and 3D company 3ality Digital of Burbank, California, is called the Nagra Media Guide for 3D. Although no cable company has yet committed to the set-top technology, the prototype offers a window into the evolution of 3D home technology, which is getting much closer to what is available in movie theaters. Consumers will be able to access 3D programming using today's set-top boxes, but the Nagra Media version will show the information using 3D graphics. Television companies have raced to develop TVs that are 3D compatible, and a handful of such televisions have been sold in the US. But they are mostly used for games. The problem is that there is a dearth of 3D programming on television. The creators of the prototype hope advances like their set-top box will help prompt producers to create 3D programming. http://www.nagravision.com

Panasonic develops 50-inch full-HD 3D PDP and high-precision active shutter glasses

Panasonic developed a 50-inch Full HD 3D compatible plasma display panel and high-precision active shutter glasses that enable the viewing of 3D images. This 50-inch PDP uses Panasonic's newly-developed high-speed 3D drive technology that enables rapid illumination of pixels while maintaining brightness. The panel also incorporates a crosstalk reduction technology allowing for minimizing double-image (ghosting) that occurs when left- and right-eye images are alternately displayed. PDPs have excellent video response with full moving picture resolution. To reproduce 3D images, Panasonic uses the Full HD x 2 frame sequential method that displays time sequential images, alternately reproducing discrete 1920 x 1080 pixel images for the left and right eyes on the display frame by frame. The high-precision active shutter glasses employ Panasonic's technology that precisely controls the timing of opening and closing the shutter in synchronization with the left- and right-eye images alternately shown on the PDP. This technology enables significant reduction of crosstalk that degrades the image

resolution in 3D display. The glasses are designed to fit for a wide range of users from children to the elderly. http://panasonic.net.

Samsung shows 55-inch, 240Hz 3D TV

Samsung recently showed off a prototype 3D HDTV sized at 55 inches. The set uses a 240Hz speed panel for reproducing traditional 2D images at up to 1080p resolution, and sends out 120Hz images to each eye when in 3D mode. Samsung claims there is no ghosting during fast scenes in 3D mode, while no loss of resolution is endured when watching traditional content. Special shutter eyewear is needed to view the 3D images. The prototype was shown off at the IMID show in Seoul, Korea. http://www.samsung.com

Panasonic recently introduced a 50-inch 3D PDP full-HD panel with active shutter glasses; Samsung (on the right), recently showed off a 55-inch 240Hz 3D LCD TV

In-Stat says consumers showing interest in 3D in the home

According to a recent In-Stat survey, consumers are interested in receiving 3D in the home. Those who have seen three or more 3D movies in the theater are more interested than the general respondents as are those who own Blu-ray players. Unfortunately for consumer electronics manufacturers, about 25% of those who are at least somewhat interested in having the ability to view 3D content at home are unwilling to spend extra on a 3D TV.
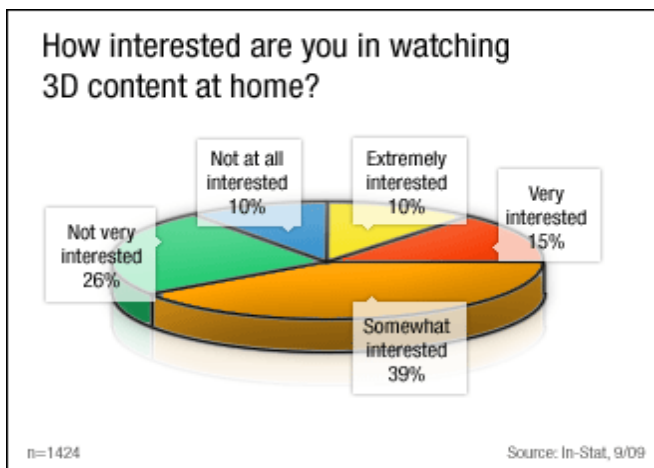
Another 43% want to spend $200 or less on the new TV. The situation is similar with Blu-ray players in that 31% of respondents who were at least somewhat interested did not want to spend more for a 3D Blu-ray player. Another 33% want to spend less than $50 for a 3D Blu-ray player over a 2D player. In-Stat expects the price differential for 3D products will be higher than the aforementioned amounts at product introduction, so fewer consumers are likely to buy 3D equipment until prices decline. Heartening for the movie studios, 67% of respondents at least somewhat interested in 3D at home are willing to pay more for a 3D version of a Blu-ray disc over the 2D version. Most of them want to pay less than $5 but studios are happy that they are at least willing to pay more. http://instat.com/catalog/mmcatalogue.asp?id=288

NEP builds live 3D production truck

NEP Broadcasting has built a live production truck designed specifically for 3D HD. The new Supershooter 3D (SS 3D) truck, which NEP built in partnership with 3D production specialist PACE, was first used by ESPN to produce a live broadcast of the USC-Ohio State college football game. NEP expects it to handle several more 3D jobs over the next six months, including both entertainment and sporting events, though the company isn't yet revealing details. The strategy behind SS 3D was to make a live 3D HD production more affordable. NEP decided to overhaul an older HD truck it had acquired and retrofit it for 3D live production. In doing so, NEP formed a joint

venture with Burbank-based PACE, one of two major U.S. suppliers of 3D HD production technology. The other is 3ality Digital, which is also based in Burbank. http://www.nepinc.com

Research and Markets introduces 2009 Stereoscopic 3D Gameplay Evaluation Report

Research and Markets announced the addition of the "2009 Stereoscopic 3D Gameplay Evaluation Report: An Assessment of the Performance and Usability of 3D Games on 3D Monitors" report to their offering. Close to 400 games are available for gameplay on PC-based platforms and 3D capable monitors. These are all 2D games that are rendered a second time to create a 3D perspective. But what does this do to the gameplay? Are the 3D monitors all the same? Does the driver support for the conversion make a difference? The authors took the perspective of the gamers to evaluate the gameplay for a number of games on three 3D monitors in an effort to determine if this type of gaming is as compelling to gamers as the various companies involved in the 3D market claim it is. The objective of this report is to provide details of gameplay on 24 different video games in stereoscopic 3D and determine if such gameplay is truly immersive and compelling. Highlights of the report include a step-by-step experience of setting up an S-3D gaming system, evaluation of S-3D display monitors (iZ3D, Hyundai, NVIDIA/Samsung), results of extensive play of 24 titles in S-3D, reactions of gamers to S-3D, and an S-3D value proposition summary. http://www.researchandmarkets.com/research/ecc251/2009_stereoscopic

Panasonic launches Full HD 3D home theater truck tour

Panasonic announced the start of a nationwide truck tour, which will give the public their first look at Panasonic's Full HD 3D Home Theater System. The Full HD 3D system, which was first introduced to industry insiders and media in the US at the Consumer Electronics Show in January 2009, utilizes plasma technology and a prototype Blu-ray Disc player to deliver true 1080p Full HD 3D entertainment in the home. The Panasonic Full HD 3D Home Theater Tour will be powered by three custom-built, expandable tractor trailers, each of which will house a Full HD 3D Home Theater environment. Each of the trucks can accommodate between 25 and 35 people per demonstration. The tour will visit corporate headquarters of retailers, trade shows, industry conferences, universities and athletic events. A key part of the Panasonic Full HD 3D Home Theater Tour is to help consumers understand 3D TV technology and the differences between the Full HD 3D experience for the home and other technologies developed for that purpose. http://www.panasonic.com/3D

Blu-ray Disc Association announces final 3D specification

The Blu-ray Disc Association (BDA) announced the finalization and release of the "Blu-ray 3D" specification. The specification, which represents the work of the leading Hollywood studios and consumer electronic and computer manufacturers, will enable the home entertainment industry to bring the 3D experience into consumers' living rooms on Blu-ray Disc. The "Blu-ray 3D" specification allows every Blu-ray 3D player and movie to deliver Full HD 1080p resolution to each eye, thereby maintaining the industry leading image quality to which Blu-ray Disc viewers are accustomed. Moreover, the specification is display agnostic, meaning that Blu-ray 3D products will deliver the 3D image to any compatible 3D display, regardless of whether that display uses LCD, Plasma or other technology and regardless of what 3D technology the display uses to deliver the image to the viewer's eyes. The Blu-ray 3D specification is also designed to allow PS3 game consoles to play back Blu-ray 3D content in 3D. Additionally, the specification supports playback of 2D discs in forthcoming 3D players and can enable 2D playback of Blu-ray 3D discs on the large installed base of Blu-ray Disc players currently in homes around the world. The Blu-ray 3D specification calls for encoding 3D video using the Multiview Video Coding (MVC) codec, an extension to the ITU-T H.264 Advanced Video Coding (AVC) codec currently supported by all Blu-ray Disc players. MPEG4-MVC compresses both left and right eye views with a typical 50% overhead compared to equivalent 2D content, and can provide full 1080p resolution backward compatibility with current 2D Blu-ray Disc players. The specification also incorporates enhanced graphic features for 3D. These features provide a new experience for users, enabling navigation using 3D graphic menus and displaying 3D subtitles positioned in 3D video. The completed specification will be available shortly and provides individual manufacturers and content providers with the

technical information and guidelines necessary to develop, announce and bring products to market pursuant to their own internal planning cycles and timetables. http://www.blu-raydisc.com

Samsung Electronics UK ordered to stop misleading advertising related to "LED TVs"

The UK's Advertising Standards Authority (ASA) recently determined that Samsung's reference to "LED TVs" in TV and magazine ads falsely represented the technologies used in the company's LCD TVs with LED backlights. The company was ordered to ensure that future marketing communications described the technology accurately. The complaints made were about the following ads:

- The voice-over on TV ads stated "Welcome to a whole new world, where Samsung LED technology brings you sharper images, deeper blacks and brighter colors. The ultra slim Samsung LED TV. The next generation of television has arrived". On-screen text stated "Samsung LED TV – Next Generation TV".
- Magazine ads were headlined "The Next Generation of TV has arrived" and stated "Welcome to a whole new world. Where Samsung's revolutionary LED technology redefines all standards of television. Bringing you sharper images, deeper blacks and brighter colors. A stunning, ultra-slim profile. And design with the environment in mind. Search on Google for LED TV". The logo stated "LED TV – Next Generation TV".

Two complainants challenged whether the ads misleadingly implied that the product had an LED (Light Emitting Diode) display, when in fact it merely used LEDs for backlighting.

Samsung responded that the discernible difference between LCD and LED TVs was that the LED TV used light emitting diodes as display backlights or edge-lights, rather than cold cathode fluorescent lamps found on most LCD televisions. They argued that this light source technology enabled them to improve the color, design and energy efficiency of the appliance. Samsung said that the phrase "LED TV" was intended to communicate the type of technology their TVs used in a general way to the consumer and had used the phrase for their edge-lit TVs since December 2008. Although this type of TV was initially referred to as "LED-based LCD TV" or "LED LCD TV" they argued that the term had evolved and they were now called LED TVs by consumers and the industry. Whilst they acknowledged that some informed consumers would be aware of the technological systems used in their product, they believed that this would not be the case for the majority of consumers. In addition, they stated that the phrase "LED TV" was widely used to describe the type of TV they sold and sent evidence to show it had been used by their competitors and the media and was accepted in the industry. Samsung also argued that the ads made clear that the phrase "LED TV" meant that their TV used LED technology to improve the color of the image which clarified the technology of the product to consumers.

The ASA understood that the Samsung TV had an LCD display with a LED edge-lighting and that it did not have a full LED display. The ASA noted Samsung's assertion that the phrase "LED TV" had evolved and that TVs that used this technology in either back-lighting or edge-lighting had adopted the phrase to generically describe the technology. However, they noted that there are LCD TVs for sale that used LED technology in their backlighting or edge-lighting, but which are described as "LED LCD TVs" or similar, and that the phrase "LED TV" was not adopted consistently throughout the industry. The ASA considered that the ad implied the TV displays were comprised totally of LEDs when that was not the case. Because the ads were ambiguous and did not make clear how the TVs utilized the LED technology, the ads were likely to mislead. Accordingly, the ASA ruled:

- The TV ad breached CAP (Broadcast) Code rules 5.1.1 and 5.1.3 (Misleading advertising).
- The magazine ads breached CAP Code clause 7.1 (Truthfulness).

Action: The ads must not appear again in their current form. Samsung is to ensure that future communications described the technology accurately. http://www.asa.org.uk/asa/adjudications/Public/TF_ADJ_46783.htm

Marseille Networks and VaST demonstrate Quad-HD virtualization

VaST and Marseille Networks, will demonstrate a virtual model of Marseille Networks' Quad-HD video processing chip (VTV-1210) at CES in early January. The VTV-1210 featuring Marseille's 4xHD video technology delivers breathtaking quality images in Quad-HD resolution and is the first video processor introduced for Quad-HD home theater systems. Marseille's experience in video processing and virtualization led to the creation of the revolutionary Video Through Virtualization (VTV) platform targeting consumer electronics OEMs. The VTV platform, which combines Marseille's 4xHD technology, Marseille's chip virtualization technology and VaST's

virtual prototyping tools enables Marseille and its customers to explore product concepts, execute concurrent hardware/software development, and validate system performance in real time. http://www.vastsystems.com

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"A Great TV in Every Room"

Three Key TV Trends in 2010

by Paul Gagnon

Paul Gagnon is director of North American TV Research at DisplaySearch. His 10 years of retail and manufacturing experience in the consumer electronics industry adds value and insight to DisplaySearch's leading industry analysis. At DisplaySearch, Gagnon calls upon his expertise in consumer purchasing behavior to provide in-depth analysis of US sell-through trends and sales forecasting. Before joining DisplaySearch, Gagnon served as a senior marketing analyst for Hitachi America LTD's Home Electronics Division. There, his responsibilities included the development and implementation of retail sales incentives as well as the forecasting and analysis of ever-changing TV and video market trends. Gagnon has also been a member of the CEA Video Division Market Research Committee.

We are just a few short weeks away from CES 2010 and one can't help but wonder what must-have technology will be the star of the show. Each year the TV industry debuts one or two standout technologies in TVs, sometimes with great success, and sometimes a little prematurely. 2008 was hailed as the year of the OLED TV with Sony launching their 11" XEL-1 at CES, but few units were sold given the $2500 price and the product is being discontinued with no replacement announced and no competitive models launched. In 2009, LED backlights in LCD TVs were a significant trend, perhaps overshadowed by the calamitous economic conditions, and have proven a key technology innovation for the category, along with 120Hz and 240Hz frame rates, if only available in a limited range of models. High frame rate LCD TVs are also laying a solid foundation for future technologies like 3D. Internet connected TVs were also debuted at the 2009 CES by many manufacturers, but only a handful of models have been released in the marketplace and a good deal of consumer confusion persists about how to connect and use these products.

This brings us to the 2010 CES. We believe that the key trends at the show this year will revolve around the evolution of trends introduced in 2009 (LED and internet connectivity) as well as the wider debut of 3D TVs.

3D TV: One of the most hotly anticipated technologies at the 2010 CES is undoubtedly 3D. With both Panasonic and Sony announcing major plans for 3D TV launches in 2010, along with the expected rollout of a Blu-Ray 3D standard, 3D should be a major topic at CES this year. At DisplaySearch, we've been in production of several reports covering the topic recently, including a dedicated annual report that covers 3D technology across a variety of applications from TVs to mobile devices that will be launching this month.

Although 3D-ready TV's have been in the marketplace for several years now, mostly in the form of DLP rear projection TVs from Mitsubishi and Samsung, none were based on a unified industry standard and required complex PC connections to use. Next generation 3D TVs which will launch in 2010 may use a variety of 3D display technologies, including LCD and Plasma, but will gravitate towards the standardized 3D Blu-Ray interconnectivity. This will allow consumers much easier access to 3D content from common CE devices, including console gaming machines. Sony even announced that existing PS3s will be 3D capable via a firmware upgrade.
Most of the first 3D-ready TVs will use frame-sequential 3D to preserve the highest possible 1080p picture quality. Both Sony and Panasonic have announced their intention to use this technology. An alternative is using a micro-polarizer on the screen and passive polarized glasses, and although picture quality suffers, the overall cost is lower, especially for the glasses. Current active LCD shutter glasses for use with frame-sequential 3D run $100-$150 for one pair of glasses and an IR emitter to sync the glasses to the display. Passive circular or linear polarized glasses run less than $10.

The bulk of the first 3D-ready TVs to be launched in 2010 will probably not be bundled with the necessary glasses to view 3D, mostly to keep the price premium reasonable, perhaps 10% or so. We expect that developing an installed base of 3D capable displays is a top priority, especially given limited content availability initially, and that

these 3D-ready displays can be converted to active 3D use in the future when the cost for active LCD shutter glasses comes down with production scale. We understand that the BOM cost impact on the set side is relatively low, but difficult to quantify at this early stage.

We've put together a forecast for 3D TVs that is based on some basic assumptions:

1. Most of the 3D sets will be sold in the developed regions of North America, Japan and Western Europe.
2. Most sets will be 40"+ initially before trickling down to larger sizes.
3. Retail price premium will be 10% or less over comparable products.
4. In LCD's, 240Hz frame rate will be most common platform for 3D to avoid flicker.
5. Content availability must grow significantly within a few years.

The results of this forecast for 3D LCD TVs, as reported in the DisplaySearch 3D Display Technology and Market Forecast Report, can be seen in figure 1 below. As you can see the market grows from less than 1,000 units in 2008 and 2009 to nearly 1M units by 2010 and more than 6M units by 2012 with the majority of units in the 40-49" range.

Worldwide 3D LCD TV Shipment Forecast
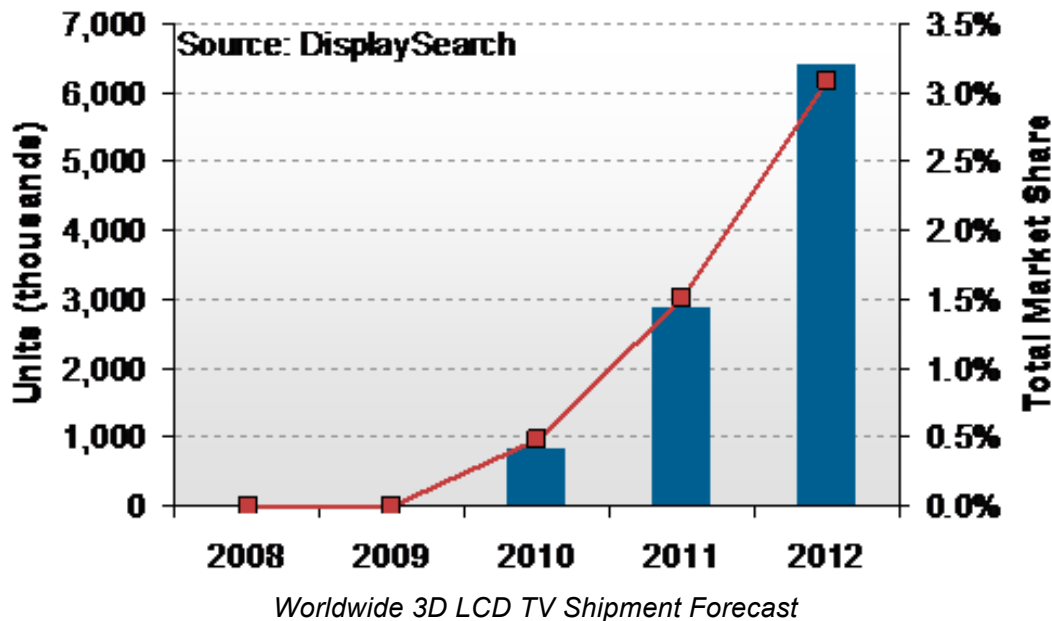
LED Backlit LCD TVs: As eco-friendliness moves from a buzzword to a valued attribute in TVs, and as governments look to increase regulation of energy consumption by home electronics, LEDs have emerged as a critical trend for 2010 and beyond. LED backlit LCD TVs have distinct advantages over CCFL based models. First, they consume less power, substantially less in the case of edge-lit LED models. Second, they contain no mercury. Third, they can be made thinner and lighter which reduces distribution costs and creates more elegant designs. Finally, they can achieve greater contrast levels in the case of locally dimmed direct type models. For all of these advantages, manufacturers will be able to charge a premium, which is especially important considering the high level of average price erosion seen in 2009, falling 2x more Y/Y (-24%) than in 2008. How much of a premium to charge and the impact on unit volume are critical questions. Currently the panel price premium at 40-46" ranges from $120 to $170, but the set price premium is 4 times that, so the margins are great, but the volume is low at less than 5% of the total market.

We now expect a large portion of most major brands LCD TV lineups in 2010 to be comprised of LED backlit models, most of them edge-lit. The edge-lit sets will be available in a wide range of screen sizes next year, from 19" to 60", and will address the volume portion of the market with small premiums over CCFL based sets. In fact, product costs for very small sets may be able to get close to parity next year. Samsung proved in 2009 that rather expensive LED backlit LCD TVs can be sold for a significant premium (30-50%) over CCFL counterparts, although the competition was weak and the volume not substantial, and were quite profitable even after large reductions in

ASP as the year progressed. Samsung, Sharp, LGE, Vizio, Toshiba and many other brands are expected to introduce a broad array of LED models at CES with much smaller premiums and much higher volume expectations.

Direct-type LED backlights employ a larger number of LEDs, as much as 2-3x compared to edge-lit counter parts, and consumer more energy, have a higher cost and are not as thin. But offsetting these negative factors is the ability to do full 3-D local dimming which can substantially boost contrast ratios. Given this, we expect the top tier of home theater LED LCD TVs to use local-dimming backlights for ultimate performance. In the future, the technology could shift to a blend of edge-lit and direct-lit approaches through the use of advanced light diffusers and light guides.

DisplaySearch will begin tracking and forecasting LED backlit LCD TVs in Q1'10 as part of the quarterly Advanced Global TV Shipment and Forecast Report. The report will include breakdowns by brand, region, size, resolution and frame rate complete with cost modeling of LED vs. CCFL models. Looking at the wide range of shipment targets by manufacturers in 2010 for LED backlit LCD TVs, ranging from 18-49 million units, we can see a large amount positional jockeying occurring, both for LED component supply as well as for retail placements. The actual number will be somewhere towards the lower-middle portion of this range and is highly dependent upon supply-side constraints. We are hearing of some dedicated lighting application LED manufacturers paying more attention to the LCD TV market requirements, as opposed to more vertical-integration approaches seen now at Samsung and LG.

Internet Connected TVs: The third major trend is for internet connected TVs. So-called IPTVs or Connected TVs have been around for years, but most have seen limited success. Part of the problem was the "walled garden" approach to content with each TV maker offering up a limited selection of content on proprietary portals, mostly in the form of widget type applications for news, sports, weather and stock quotes. These are more curiosities than powerful demand drivers.

However, in 2009 with the rollout of the Yahoo Widget platform that provides a more open source approach to application and content development, the utility of connected TVs is vastly improved. This is especially true for over-the-top video content delivery through paid providers such as Netflix and Amazon who can provide a huge library of titles for streaming compared to the typical offerings from cable or satellite providers and for a lower cost in many cases. There is also the opportunity for a wider range of free over-the-top video content delivery from sites like Hulu and YouTube. These types content providers can really drive more successful connected TV growth than previous generations.

In the new DisplaySearch quarterly TV Design and Feature Report we are following the rollout of connected TVs worldwide. The connected TV market (defined as having an Ethernet connection, but not necessarily internet access) has seen substantial growth in 2009 due to the rollout of sets using both proprietary portals but also the Yahoo Widget platform. Total units are expected to be up to more than 12M in 2009, from less than 2M in 2008, and exceed 30M worldwide in 2010.

Of course, getting a consumer to use the internet capabilities of a connected TV requires an internet connection, which most homes do not have readily available in a wired form at the set location. To solve this, connected TVs will start to employ wireless internet connectivity in the form of both uncompressed (WirelessHD, WHDI) and compressed (802.11n) versions, although the performance of these products for high-definition streaming has seen mixed results in field deployments. An alternative that is gaining attention for connecting TVs to the internet is Powerline networking, perhaps even integrating those connections into the power cord of the TV itself.

Conclusions" Certainly demand for TVs of all types, especially LCD TVs, has proven extremely robust despite economic headwinds. Most of the highest demand TV segments in 2009 have been for smaller, cheaper sets with limited features and basic performance. But as the world emerges from the Great Recession, we expect pent-up demand for higher performance and higher-utility TVs to be met with a slew of TV innovations in 2010, especially in the areas of 3D, LED and Connected TVs.

How to make MPEG-4 a Disruptive Technology

by Stephen Froehlich

Stephen Froehlich is a senior analyst with IMS Research's Consumer Electronics group, specializing in the markets for semiconductors in consumer electronics. He has in-depth knowledge of the evolution in semiconductor components and software used for digital TV in a variety of devices, including set-top boxes, TV sets, and various mobile TV applications. Before joining IMS Research, Stephen acted as a competitive intelligence analyst and technology consultant in the aerospace and automotive sectors with Technology Strategic Planning, Inc. He has also conducted market research analysis in the healthcare sector and for the US Department of Defense joint recruiting command. Stephen holds bachelors degrees in physics and mathematics and an MBA from The University of Texas at Austin. Stephen is based in the company's Austin, TX, US office and may be contacted at Stephen.Froehlich@imsresearch-usa.com.

The HD MPEG-4 AVC decoder ASSP is becoming an increasingly mainstream feature of today's flat panel TVs. In Europe, this is being driven by French legislation, but in North America, the prospect of generating additional revenues from an internet-connected TV owner that subscribes to Netflix or Blockbuster is also making the increasingly-economical MPEG-4 AVC decoder economically viable.

However, the MPEG-4 AVC decoder is not the humble chip that the MPEG-2 decoders were. It typically has the ability in hardware to enable a fundamental switch from HDMI with HDCP to DLNA with DTCP, replacing a 1500 Mbps HD stream or a 220 Mbps SD stream with a 5-30 Mbps compressed video stream. As a result, the TV (or a Blu-ray player or a game console) can finally become the primary portal the viewer uses to select amongst their various sources of content.

Presently, any premium content must be decoded in a MPEG decoder that supports whichever *proprietary* encryption solution is being used and then delivered to the TV in an uncompressed form, creating a stack of set-top boxes, one for each distribution system, and an attendant nest of wiring. However, if an MPEG-4 chip is also used to implement secure DLNA video it can finally move the stack of set-top boxes into the closet. Not only does this bring value to the customer and help pay-TV operators reduce costs, it also puts the TV in a position to mediate the consumer's source selection experience.

The primary complimentary device (the one in the closet) to a secure DLNA client is a broadband television gateway. The first broadband TV gateways will ship from several gateway and STB manufacturers during 2010. IMS Research expects to see them become the main choice for new STB installations for one or more US cable operators during 2012. Secure DLNA video is also already part of the ARIB TV standards in Japan (where DTCP-IP and Sony Marlin are supported DRM systems). Because of the prevalence of free-to-air TV in Germany, IMS Research expects it to be the first big market for DLNA video (security is not required).

Beyond the presence of a broadband television gateway or some other DLNA server on the home network, there are several complimentary technologies that must be in place to ensure a smooth user experience over the life of the TV.

- **Open-Standard Media Streaming Support:** DLNA is the standard being favored by pay-TV operators. Broader support of UPnP AV, for Windows Media Sharing is also worthy of consideration. The two are related and not mutually exclusive.

- **Open-Standard Link Protection Support:** DTCP-IP is the dominant standard amongst pay-TV deployments. Microsoft PlayReady (a.k.a. WM-DRM) and Sony Marlin are other DRM systems that may be worth supporting.

- **Remote User Interface Support:** Most pay-TV operators will not settle for anything less than full support of their branded interactive interfaces. They would rather have a set-top box next to the TV than relinquish control and branding of their user interface – therefore remote user interface support is an absolute necessity. CEA-2014 is currently the leading candidate for the secure DLNA remote user interface standard, but the final standard (or set thereof) that pay-TV operators will require from clients is far from certain. In terms of hardware, OpenGL ES 2.0 graphics is probably what will be required. OpenGL ES 1.1 *may* prove to be adequate for a while, but at some point during the life of the TV, the customer will instead start using a secure DLNA DMA as their primary decoder.

- **No-new-wire Networking:** While a 100 Mbit or 1 Gbit Ethernet port is definitely a requirement, in many cases the Ethernet port will be the standard interface to a HomePNA, MoCA, or Powerline network transceiver. While Wi-Fi is an excellent way to add no-new-wire networking to your TV, because of the 40 Mbps requirement below the Wi-Fi hardware in a DLNA TV would likely need to be 5GHz 802.11n with multiple radios. Antenna design would also need to be a top priority. Secure DLNA over Wi-Fi needs to reliably (3-4 "9s") support 40 Mbps streams with low latency in an MDU. MPEG-4 is not nearly as tolerant of dropped packets as MPEG-2.

- **40 Mbps Video Stream Support:** One of the most common issues that TVs must overcome to support secure DLNA video is the need to support a maximum-bandwidth Blu-ray stream coming in over a network port. While some TV gateways will include an adaptive-rate transcoding chip, IMS Research expects few operators to favor that added expense in the next five years. Therefore, a HD DLNA client must be prepared to support a 40 Mbps MPEG-4 AVC video stream. In many cases, the data buses on TV circuit boards are only designed to deal with 20 Mbps broadcast streams. Some network modules are connected to the decoder via 12Mbps "Full Speed" USB. While this is adequate for Internet video (at 4 Mbps or less), it clearly cannot handle a broadcast-quality experience.

- **Internet Firmware Update Support:** A flat panel TV will have a service life of 10-15 years. Standards (especially remote UI at the moment) will evolve over that time.

- **Decryption Headroom:** DTCP-IP is currently based on AES-128 encryption. However, by the end of a TVs service life, it is likely that better encryption will be needed. Having a secure processor with room to grow is the most effective way to extend the amount of time that a given device will be able to decrypt the newest content.

The switch from HDMI with HDCP to DLNA with DTCP is in many ways more fundamental than the switch from CVBS composite to HDMI. It will open up a new era of innovation in multi-room and distributed A/V services and substantially reduce the cost of video distribution in the home. With the exception of, Wi-Fi performance, none of these requirements are major cost adders on a per-unit basis. License fees for most of these technologies are nominal.

One major problem is that there is not yet a succinct, common way to communicate support for secure DLNA video for a "box-free" broadband TV gateway setup.

> *IMS Research produces a series of reports on the STB market and will launch a report on the evolution and impact of DLNA in February.*

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INFORM the public on the many benefits of LCD technology (vs. CRT and projection, PDP and the coming set of laser RPTV players). The LCD TV Association will debate the claims of competing technologies, as

well as sponsor, post and distribute white papers on industry research and relevant topics - as determined by LCD TV Association Advisory Board.

Interview with Jerry Koontz of TAOS

Jerry Koontz is responsible for strategic, product and channel marketing efforts at Texas Advanced Optoelectronic Solutions (TAOS, Inc.) targeting the consumer electronics and B2B markets to include flat panel televisions, mobile phones, computers (laptops/netbooks/smart-books) and monitors. Jerry joined TAOS in 2008 after 18 years at Texas Instrument's Semiconductor Group where he held a variety of global marketing management positions and 10 years at Sprint where he led the company's wireless telecommunications marketing efforts targeting the Financial Services, Insurance and Transportation vertical markets in North America.

Please give us some background about TAOS and how you came to be involved in the LCD TV market. TAOS pioneered the industry's first digital ambient light sensor back in 2002 initially   targeting mobile display management applications where controlling the display brightness in order to extend battery life was extremely critical. Since then, TAOS light sensors have been adopted into a wide range of consumer electronics, industrial, medical and automotive products. The LCD TV market was a natural extension for TAOS digital ambient light sensors where the need to reduce power consumption in order to conserve energy while enhancing the picture quality has become increasingly important. TAOS is also a member of the LCD TV Association and is working closely with its member companies to encourage TV manufacturers to participate in the Association's Green TV Logo Program that promotes "green technology" and global energy conservation through the implementation of ambient light sensors in LCD TVs to automatically adjust TV set brightness in response to ambient room brightness thereby reducing system power consumption by at least 30%.

Please tell us a little bit about how ambient light conditions impact TV viewability. If you're watching television in a brightly lit room, you'll probably want your TV set to produce as bright an image as it can. This will help prevent the colors from looking washed out, and will help the dark portions of the images look darker. However, you won't want to have the brightness turned all the way up when you view the same television in a dimly lit room, as it would be too bright.

What is digital ambient light sensing? Digital ambient light sensing refers to the use of an optoelectronic component called an ambient light sensor or "ALS" that measures the amount of light in the room as perceived by the human eye to automatically adjust the display brightness level of a TV flat panel display. Digital ambient light sensors, pioneered by TAOS, transform light intensity to a digital signal output with I^2C interface.

Tell us about the advantages for the LCD TV market with regard to digital ambient light sensing? There are really two primary advantages that really matter to the consumer. First is that it improves the picture quality by automatically adjusting the display brightness based on the amount of ambient light in the room. Second, it reduces power consumption and thus conserves energy and as a result reduces the consumer's utility bill.

Can you quantify the sort of power consumption savings related to the use of ambient light sensors? Use of digital ambient light sensors can reduce display power consumption by as much as 30%.

Please describe the differences in using an ambient light sensor when using CCFL, white LED, and RGB LED backlighting? CCFL and White LED backlighting both use digital ambient light sensors to automatically control the display brightness based on the ambient light levels. Only the manner in which the backlight is controlled differs. However by using RGB LED backlighting you cannot only control the intensity of the backlight, you can control the white point or color temperature of the backlight. By using a color sensor type ALS, you can determine the white point of the environment and with that information drive the RGB LED backlight to a white point that compliments the white point of the environment.

In cases where there is some form of dynamic backlighting control, do your ambient light sensors still realize the same performance improvements as compared to a static backlighting solution? Where some form of local dimming (dynamic backlighting) may also be used to dim select portions of the display based on the video content being displayed, there is still a significant benefit to the user in terms of display quality and power savings by using a digital ambient light sensor for automatically controlling the brightness of the entire backlight.

Do your ambient light sensors (ALS) enable similar power savings to other TV display technologies, (PDP, rear projection, and OLED)? Power savings is greatest using LCD technology where backlighting contributes to a majority of the total display power consumption.

- In the case of OLEDs, the display product life can be extended significantly with ALS. The primary issue with OLEDs remains the lifetime of the blue LED in the display. If the brightness is optimized based on ambient light, the blue LED can be run at optimum levels thus extending the life, when compared to a system with no dynamic backlight control and running the blue LED at full brightness.

- For PDP, since they do not use backlights, the display power savings although still significant, will likely not be as great (versus LCD) since ambient light sensors adjust the brightness of the individual gas cells that make up the plasma display picture, some of which may be turned off where black is being displayed.

- For rear projection TVs, it really depends on the type of technology used which are primarily CRT, LCD or DLP.

Different types of ambient lighting have different properties in terms of things like color temperature, glare, and reflectivity. Can your ambient light sensors compensate for such differences? Ambient light sensors can compensate for glare by automatically increasing the display brightness. For RGB BLU's, TAOS color sensors provide the ability to measure the color temperature of a light source (e.g. fluorescent, incandescent) in order to white-color balance the display panel under various ambient light conditions (over time and temperature). Reflectivity and glare can only be compensated for by TAOS sensors if they are contributing to the overall brightness of the room or affecting the color temperature on the environment.

What does the TV manufacturer need to do in order to incorporate your ambient light sensing solution? The digital ambient light sensor interfaces over the I^2C bus with the main HDTV chipset which requires software drivers (available from TAOS) to enable the system to control the display backlight based on the ambient light reading obtained from the sensor. TAOS uses a two-diode architecture in its ALS products. This architecture along with programmable gain capability allows the TV manufacturer to place the sensor behind ever more popular dark glass or plastic which TV manufacturers are using to create a bezel with a sleek look.

How big in terms of physical size is the typical ambient lighting sensor? A typical ambient light sensor is $4mm^2$ (in FN package) but can be as small as $2mm^2$ (in a chip scale package).

About how much does a typical ambient light sensor cost? For the FN-type package, in high volumes, the price is less than $0.30/device – the smaller chip scale package is slightly higher.

Aside from this relatively small cost, are there are any reasons for LCD TV manufacturers not to incorporate ambient light sensing capabilities? No, given the benefits of improved picture quality and reduced energy consumption to the consumer by implementing ambient light sensing, there should be no reason for LCD TV manufacturers not to incorporate this proven and cost-effective technology..

Can ambient light sensors be used to replace expensive optical performance layers (like brightness enhancement films) to achieve similar overall results, or do you think of ambient light sensors primarily as a further enhancement to display performance? TAOS doesn't see ambient light sensors today replacing other optical performance layers (like brightness enhancement films) but rather as cost-effective, proven complementary technology whose primary purpose is to adjust the display brightness to compensate for changes in ambient lighting.

Is the sensor set at fixed levels by the factory or can each individual user adjust the settings dependent upon personal preferences? Manufactures of end products using ambient light sensors are responsible for calibrating the light sensor to their system specification. Individual users are typically able to disable the ambient light sensing feature in their TV and manually adjust the display brightness to suit their preference. The wide light sensing dynamic range and user programmable interrupts of the TAOS digital ambient light sensors allows for a wide range of user environments to be supported. For PC platforms, Microsoft has a form of both in Windows 7 that will remember optimum screen backlighting specified by the user and ambient lighting conditions and adjust the backlight according to a combination of both (user preferences and ambient lighting). This is a form of adaptive backlighting which blends user personal preferences and dynamic lighting conditions.

Are there differences in terms of optimal brightness control based on the usage model, i.e. do console gamers require something different than someone watching TV versus someone browsing the Internet? Different use models could dictate different brightness levels but this would be up to the manufacturer to define and implement based on the light measurements from the ambient light sensor. Features built into Windows 7 also provide the user with increased flexibility to configure the display brightness to suit their specific use model.

What happens if the sensor is inadvertently blocked? Is there some sort of alert that indicates the TV's backlighting is not being optimized to ambient conditions? In situations where the sensor may be inadvertently blocked or someone walks in front of the sensor, the TAOS ambient light sensor family was designed with a unique programmable interrupt persistence feature that allows the system designer to determine how many consecutive measurements exceeded thresholds (upper or lower) are necessary before it will trigger an interrupt that would then result in the display brightness to be changed. This would only be effective in a temporary blockage situation. If the sensor is permanently blocked, there is no way to determine that with the sensor alone.

What is proximity sensing? Proximity sensing is the ability to detect the presence or absence of an object or person. Light sensors can be used to accomplish this task to turn the TV on or off depending on the detection of the presence or not of a person. It can also be used to accomplish touchless control of the TV.

Can proximity sensing and ambient light sensing be used at the same time? Yes, the TAOS TSL2771 proximity detection and ambient light sensing product family allows proximity sensing and ambient light sensing to be used at the same time and are controlled by an internal state machine where proximity detection is performed by the system between ALS integration cycles..

What's the difference between proximity sensing and the sort of motion recognition technology used in products such as the Wii? TAOS' sensors use optical-based technologies to sense motion and objects, where the Wii and some other devices use MEMS technology like accelerometers (non-optical). TAOS believes however that future proximity detection solutions will enable even more sophisticated touchless display human interface and gesture recognition and that the distinction between this and the sort of motion recognition technology used in products such as the Wii will start to blur.

Any comments about TAOS' studies into the area of motion detection and gesture recognition? TAOS sees motion and gesture recognition as a growing market space that is a natural evolution of its current light sensor and proximity detection product offering.

One of the challenges related to 3DTV is related to brightness, (polarized glasses diminish brightness considerably). Do you have any plans related to optimally adjusting TV brightness upward to help support the emerging 3DTV market? TAOS is continuing to evaluate the needs of emerging market such as 3DTV in order to develop targeted light sensing solutions and believes ambient light sensors will continue to be a relevant technology in this market.

Aside from TVs, do you have plans to incorporate your ambient light sensing and proximity sensing be similarly used in other display-related devices? Today, TAOS ambient light sensing and proximity sensing devices are being designed into a broad range of display-related devices such as laptops, net books, smart books, monitors, mobile phones, kiosks, portable navigation devices, digital cameras, multifunction printers, digital picture frames, games/toys and portable MP3/DVD players.

What sorts of sensing solutions are you looking at for future LCD TVs? Potential future sensing solutions for LCD TV's include enhanced touchless human interface, RGB BLU's and more sophisticated proximity detection.

More behind the glass

Corning is known for providing the LCD industry with a reliable supply of high-quality glass substrates. Yet the advantages we bring to customers extend well beyond the product itself. Our advanced products and technologies are backed by decades of leadership in research and development, extensive technical expertise, a commitment to addressing customer needs, and an ongoing spirit of innovation. At Corning, industry-leading products are just the beginning—there is always more behind the glass.

http://www.corning.com/LTA
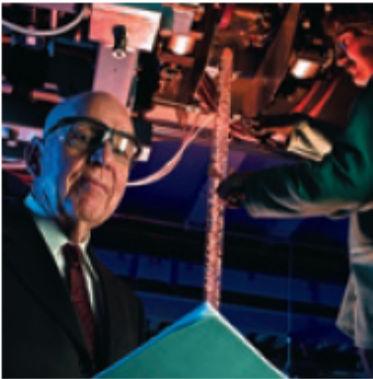
Knowledge

People

Technology

Ecology

CORNING

47

Creating a Greener Display

courtesy of Corning Incorporated

In today's corporate climate, many companies recognize the benefits of integrating environmentally friendly practices and products into their operations. Corning recognized the value of "green" initiatives early on, and pioneered the development of environmentally responsible substrates. Today, Corning's green efforts target everything from research and development and manufacturing processes to delivery systems and waste.

LCD technology has been a major driver for the display industry's ability to offer more earth-friendly products. Compared to cathode-ray tube televisions (CRTs), LCDs are more energy efficient, made with more eco-friendly components and, due to their thin shape, occupy less space in landfills at end-of-life.

According to Bruce Berkoff, chairman, LCD TV Association, "The display industry has become very aware of its responsibilities to the environment, and of the economic benefits that go with it. As LCDs become more energy efficient and their form factors smaller, fewer and thinner materials are used. That translates to not only a greener product, but a less expensive one, too."

One important component of an LCD is the substrate itself. Corning is proud to have been a pioneer in the development of the world's most environmentally friendly glass, EAGLE XG, which is free of added arsenic, antimony, barium and halides. In addition to making the manufacturing process cleaner, removing heavy metals and halides from the glass also makes the set easier to recycle at display end-of-life.

"EAGLE XG has had a significant impact on the display industry by raising the awareness of a component's role in creating an environmentally friendly product, and by establishing a benchmark for what is green in terms of substrates for displays," said Lori Hamilton, director, commercial technology, Corning Display Technologies. "With the success of this product, Corning has redoubled efforts to make our other products more environmentally friendly."

The award-winning glass also demonstrates the competitive advantage that environmentally friendly components bring to the customer. "With EAGLE XG, we created a glass that is not only more environmentally friendly, but also a better product," said John Geniviva, director, marketing, Corning Display Technologies. "EAGLE XG offers industry-leading performance in surface flatness and surface quality, driving enhanced performance and yield for our customers. By moving forward on the environmental front, we arrived at a glass that actually works better in our customers' processes. It's a win-win, for the environment and our customers."

And EAGLE XG was just the beginning for Corning. According to Dr. Peter Bocko, Corning's chief technology officer – East Asia, "The success of EAGLE XG confirmed our strategy to develop innovative products that will continually improve in terms of their impact on the environment."

The CRT Challenge: While the environment has benefited now that more people are now using LCDs than CRTs, the conversion has created a new challenge: how to dispose of unwanted CRTs. "At this point, more TVs are going out of service annually than are being manufactured, making recycling a real challenge," said Geniviva.

CRTs traditionally contain high amounts of lead and other toxic substances; they also tend to be bulky in size. The availability of recycling programs for these sets and their components varies by region, as does consumer participation. For instance, Japan has a number of systems in place for helping consumers recycle their old TVs, but in the United States, a comprehensive disposal/recycling program has not yet been formalized. Many retailers are assuming safe disposal responsibilities for old sets when new ones are purchased.

Increasing Innovation, Decreasing Waste: In addition to making recycling easier, EAGLE XG also offers benefits at the manufacturing stage, by eliminating any glass-related effluent and disposal concerns. Corning has

made other manufacturing improvements as well, installing highly efficient compressors and chillers as well as motion sensors to turn off lights when rooms are not in use. In addition, the water used to wash the glass substrates is recycled.

- Another area where Corning has made considerable progress in improving efficiencies is in the packaging and delivery of products. In order to meet the challenge of increasing the quantity of glass sheets that can be shipped per container, Corning developed a packaging system called DensePak. The DensePak delivery system enables the safe transport, storage, and staging of up to 500 sheets per case, in approximately the same footprint as a 20-substrate case. Because more sheets can be packed per container, transport efficiencies are improved. "In addition to increasing shipping efficiencies, the materials we use in the DensePak system are also more environmentally responsible than materials used in previous packaging methods," said Bocko.

- Another innovative shipping solution is the on-site production model employed at Sharp's new manufacturing complex in Sakai City, Osaka Prefecture, Japan. Sharp's "sky bridge" moves the Gen 10 substrates from Corning's facility, located on the site, directly to Sharp's production floor – eliminating the need for traditional delivery systems. "We expect Sharp's sky bridge to significantly reduce our impact on the environment by dramatically reducing our carbon emissions," said Masayuki Anada, plant manager, Sakai City, Corning Japan. "At the Shizuoka plant, as with all of Corning's facilities, we place a strong emphasis on energy efficiency and environmentally friendly manufacturing," said Tomoyasu Inuzuka, plant manager, Shizuoka plant, Corning Japan K.K. "We switched this year from track transportation between ports to inland shipping for imported materials. Combined with our use of the DensePak system for product shipment, this has helped us to significantly reduce the carbon dioxide exhaust emissions per sheet of glass."

- Corning also adheres to industry and regulatory standards to ensure compliance. "Our manufacturing plants are registered with ISO 14001, which is a complete environmental system measuring how a plant manages its processes and how it promotes awareness of green practices throughout the organization," explained Hamilton.

- To better address customers who are looking for assurances and certifications of the company's green goals and practices, Corning has adjusted its organizational processes to be able to quickly respond to these requests. "Corning has been proactive in the past, but now our customers are making specific demands that the components we supply them with are as green as possible," said Bocko. "We're constantly challenging ourselves so that we can continue to be a leader in this category."

- In the United States, Corning has also participated in the development of ENERGY STAR ratings for LCDs. These ratings, regulated by the government, help consumers understand which products are most energy efficient.

According to Berkoff, it's the proactive approach of large companies like Corning that will bring a true green revolution to the display industry. "The way we've gotten to where we are and the only way we will continue to make LCDs even greener is for the companies that make up the display supply chain to challenge themselves and each other to be stewards of the environment. At the LCD TV Association, we are invested in furthering these efforts and we commend Corning on the leadership role it has taken."

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PROMOTE the industry and technology via speeches, debates, interviews, PR and publicly available white papers on topics that promote these goals. The founder's history with the industry ensures many lively and

engaging interviews on the industry's strategies and will put a human face on this huge and influential industry. The press is constantly seeking validation from neutral, yet knowledgeable industry experts such as those at the LCD TV Association.

2010 HDTV Buying Guide coming soon

Authored by Bruce Berkoff and edited by Alfred Poor, the 2008 edition of the HDTV Buying Guide is newly available. The 68-page paperback book can be ordered at Amazon for $13.45, qualifies for free shipping status, and is available immediately: http://www.amazon.com/HDTV-Buying-Guide-Bruce-Berkoff/dp/0965197530

"After an easy 2-hour read, I was off again to the electronics store to compare the seemingly endless choices of HDTV's. This time I knew the proper size and features of the LCD I wanted to buy for my living room and had a list of meaningful questions to ask the salesperson regarding price guarantee, warranty, and extras (cables and external speakers). The money saved on cables alone offset the cost of the book many times over. I especially found the "myth busting" boxes and "what to look for" paragraphs informative. The title of the book says it all...HDTV Buying Guide".

-- P. Molisani

HDTV Buying Guide

If you're ready to buy an HDTV, this book is all you need to understand the various choices and choose the right one.

This book covers all the bases, but is so easy to understand that I'd give it to anyone in my family who wants to buy an HDTV. It will make holiday gift buying easy.

Alfred Poor, HDTV Almanac

Bruce Berkoff knows just how to explain HDTV so you can put your new understanding to work right away. I think my Mom can benefit from this book, too.

Ross Young, Founder, DisplaySearch

Print edition ISBN 978-0-9651975-3-3: $14.95
E-book edition ISBN 978-0-9651975-4-0: $7.95

Sometimes you think you may know something but then someone explains it in terms you can understand you all of a sudden say, "Oh, I get it now." This is the case with Bruce Berkoff's book about HDTV. Bruce obviously has a command of the subject matter and a talent for explaining it. He tells you what's important and what not to bother with like manufacturers' specs on contrast ratios which are measured under so many different conditions they become a meaningless comparison. I enjoyed this book and learned a few

things about HDTV, I'd recommend it to anyone shopping for HDTV or just wanting to enhance their knowledge of this subject.

-- Andrew Eisner

What Makes HDTV Buyers Tick?

by Andrew Eisner

Andrew Eisner is a former test manager for Ziff Davis Labs and is currently director of content for Retrevo.com a website specializing in consumer electronics. Retrevo has reviews, manuals, and buying information for all popular gear and gadgets.

Black Friday HDTV door-buster deals have come and gone but the demand for TVs appears to remain very strong this holiday season. A recent Pulse report from Retrevo, the consumer electronics shopping site, looked at HDTV buying trends around the holiday season and found some interesting trends that should carry through the first of the year. The study found some surprising results like the fact that almost half of TV buyer respondents (46%) said they would be buying their first HDTV. Such a high percentage of HDTV sales going to first-time HDTV buyers may help explain why small to medium size TVs are so popular.

Small TVs Are Beautiful: An earlier Retrevo report pointed out a shift toward small to medium-sized TVs this year possibly due to the DTV transition motivating consumers to replace their old analog sets.
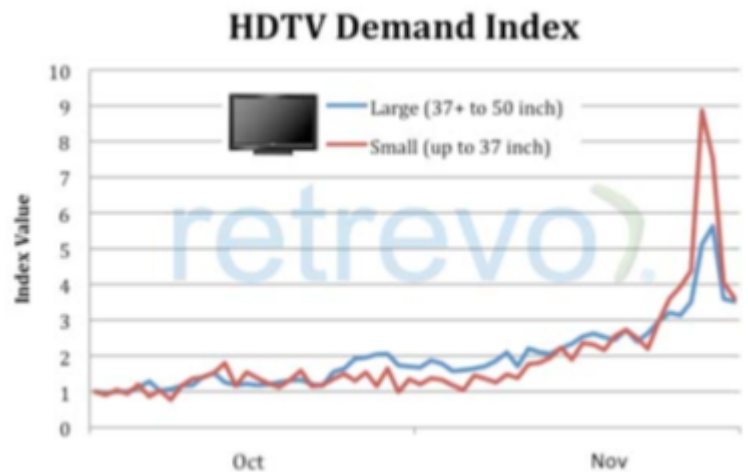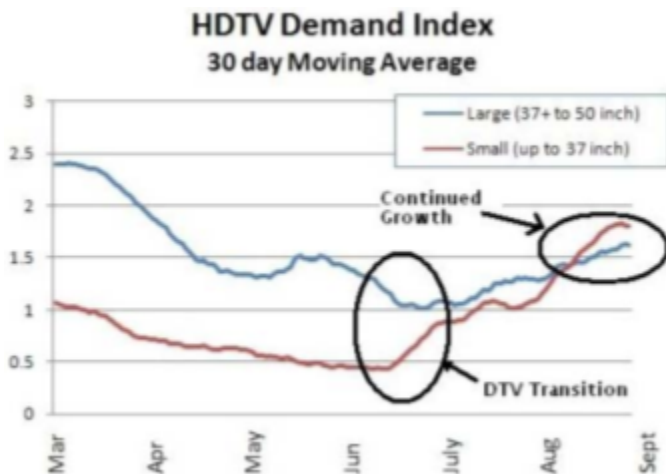
This holiday season the shift to smaller TVs is apparent in a Black Friday spike where small (up to 37") TVs overtook large TVs by a large margin (170%). Retrevo suspects the large number of promotions from retailers like Walmart and others for large TVs, in the weeks leading up to Black Friday fueled interest in those TVs until attractive deals on smaller sets along with the reality of tight budgets caused a shift to smaller TVs.

HDTV Features That Matter Most: In the Retrevo study, LCD TVs appear to dominate the HDTV market with 80% of respondents indicating they were going to buy an LCD TV over other TV technologies. Unlike Rear Projection TVs which are all but out of the picture with 1.5%, Plasma is down but not out, garnering 18% of the respondents. When Retrevo asked which HDTV features mattered most, we were surprised to see such a large percentage of respondents who knew about and cared about the latest HDTV features. It looks like the marketing efforts of HDTV manufacturers have succeeded in creating savvy buyers. Only a small percentage (29%) of TV buyers in the study indicated they didn't know or didn't care about TV features like refresh rate and LED back lighting. We were gratified to see that 43% of the TV buyers think Energy Star is important compared to another 46% who value 120 or 240Hz refresh rate, and 30% who are looking for LED backlighting.

Consumers Okay With Buying TVs Online: With 50% of respondents indicating they didn't care whether they bought a TV online or in a store as long as they got a good deal, Retrevo suspects we are seeing a greater acceptance for buying larger ticket electronics products online. Of those buyers who indicated a preference for

purchasing a TV at a store, 19% said that making a major purchase was the primary reason for not buying a TV online while a much smaller number (9%) were concerned about having a TV shipped to them.
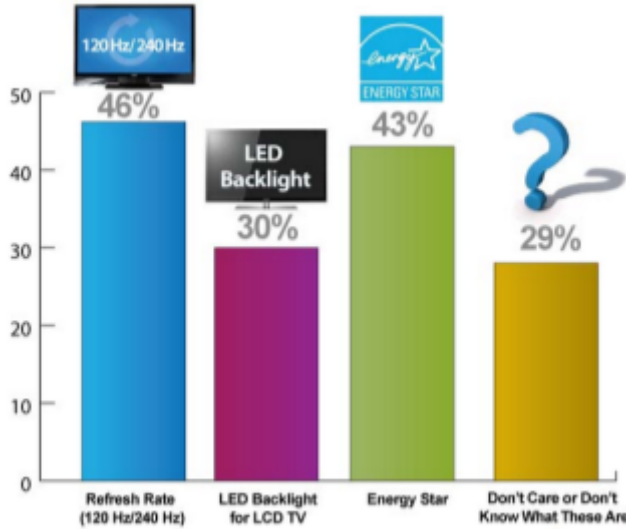
The chart on the left is in response to the question "Which of the following TV features are important to you?"
The chart on the right depicts "Where will you be buying the TV?"

No Need to Kick the Tires: You would think that most buyers would want to look at a TV before they plunked down big bucks for one and that was indeed the case for 58% of TV buyers however, Retrevo was surprised to see that 42% of respondents who said they planned to buy an HDTV, said there was no need to see the TV, citing reasons like they trust reviews and brands enough to buy a TV sight unseen.

Want an Extended Warranty With that HDTV? The market for HDTV add-on products should do well this year. Mounting a flat panel LCD TV on the wall appears to be a popular installation technique with 26% of TV buyers saying they were going to buy a wall mount when they bought their new HDTV. Another 19% indicated they were going to buy speakers and 20% said a cabinet or enclosure. Surprisingly, Retrevo found 20% of TV buyers plan on buying an extended warranty.
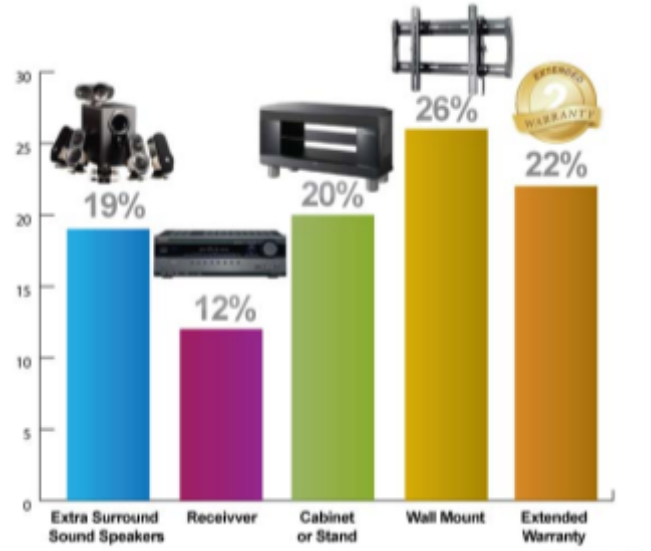
The image on the left depicts motivators related to brand preferences. The image on the right depicts responses to the question "When I buy the TV I also plan on buying?"

The Picture Looks Clear and Bright for HDTV: The picture looks very rosy for HDTV this holiday season and beyond with a large number of savvy consumers looking for, and finding good deals on TVs. Whether it's watching

high definition sports, escaping into a Blu-ray movie, playing 1080p games or just watching their favorite TV shows it's clear that despite a shaky economy, consumers want their HDTV.

The Role of Marketing in Display Industry Success

by Norman Hairston

This is the first recession where TV has meant LCD and not CRT. Norman Hairston is a third generation TV professional in that many of the people that he worked with early in his career had worked with the inventors of color TV set technology. He has held technical, commercial and strategic planning positions in the display industry and has worked with a variety of technologies including CRT, LCD, laser based displays, Telaria and CRT projection. He began his display career at Corning developing their early strategic plans for the LCD substrate business. He has since held display positions at Honeywell, Gemfire, Intel, and as a consultant. He holds both Chemical Engineering and Materials Science degrees from MIT and an MBA from Stanford.

In the winter of 2008, when the US economy was collapsing, I wrote an article originally to be titled "The LCD Shortage of 2010". When the article was eventually published in the LCDTV Association's *LCD TV Matters* as, "The Other side of the Recession, the Coming Boom in TV Set Sales and the Opportunities" I had been talked out of the title. However, in the forward, "Chairman's Corner: Blue Skies on the Horizon" Bruce Berkoff forecasted my assessment "will actually prove conservative over time". Bruce was correct and the LCD shortage of 2010 has turned into the LCD shortage of 2009. With the US economy beginning to recover earlier than I had expected, continuing shortages into 2010 seem inescapable at this point.

I would love to attribute my market assessment, to great genius, or Bruce's even more accurate analysis though this is not speaking for Bruce (who is a genius); the truth is we had both seen this before. Even in the worst US economy since the great depression, the fundamentals of what drive the TV market had not changed. With the ongoing TV boom in China and general global recovery in progress, no doubt there will be some significant announcements of new capacity and investments in new technology in the near future. It would have been difficult to embark on a large capital spending project in the midst of a potential banking meltdown; however, understanding of the market could have enabled funding of many of these projects up to a year earlier. Due to the factors listed in "The Other Side of the Recession…, 2010 may be a period of intense demand growth with two years of pent up postponed TV purchases and the equivalent of a double sized VCR boom layered on top due to the NTSC to HDTV transition.

This article is about the role marketing can play in the success of display investments. In addition to making an accurate forecast of both the near term and long term market, an experienced marketing person can make a realistic assessment of the technology, provide key inputs or be the owner of the business plan, and, when necessary say when to pull the plug and close down a project that no longer makes sense.

An Accurate Market Forecast: There are numerous separate display markets. However the biggest is and will continue to be the TV market. Many display investments are predicated on capturing a share of the TV business or a share of the BOM for a TV. Forecasting the TV business is actually extremely easy. TV sales are driven by a limited set of econometric and demographic factors. The hard part about making an accurate forecast is knowing where you are in the cycle and not being distracted by short term events such as a global economic meltdown. At least in the American market, there is always a sales spurt at the front end of a recession. This frequently leads some to believe that the TV market is recession proof and some ill advised statements and some ill timed investments have been made just when TV sales are about to plummet (at least temporarily). Relying on a forecaster with a track record, a few gray hairs or a few missing hairs, can save considerable heartache and sometimes a few hundred million dollars.

A Realistic Assessment of the Technology: Another area of concern about forecasting is relying on a forecast that is several years out and is predicated on capturing a share of a very large market. These forecasts can sometimes be based on a static view of the competing technology (addressed further below) which usually turn

out to be wrong. Additionally, most display technology developments that are successful tend to be things that are compelling. Consequently, they do not co-exist with the competing or older technology, they take over, especially if they are cost competitive.

Joe Castellano, the founder of Stanford Resources, used to say that if you have an optical effect and an addressing scheme then you have a new display technology; however, that does not mean that the new technology is worthy of investment. For investments in new technology another role of marketing is to recognize the non-starters. It is important to have the technology assessment made by a marketer that is willing to say "No". The reasons for "No" can be varied and, in my experience, "No" should be the usual answer.

New technology usually falls into two categories, Better and Cheaper.   With regard to better, FED technology was supposed to be better than LCD. It promised wider viewing angles and a more energy efficient display. Of course, what happened with FEDs is that LCDs got better. The viewing angle problems of the mid 1990's were solved and the energy efficiency improved. New non-LCD technologies face a double hurdle. First, it is rare that consumers actually pay for "better". Consumers will pay for bigger and they will pay for brighter; but consumer's ability to perceive and consequently want to pay for a better image is limited. Second, as just discussed, LCD technology continues to evolve. Of the dozen or so aspects with which you can characterize a display, LCDs have improved on every one in the last few years and new improvements continue to be developed. The existing LCD manufacturing capacity base provides a large ready market for improvements that is not available to fundamentally new technology.

A variation on "better" is market enabling technology. The Active matrix LCD was invented by Westinghouse and important work for the technology was done at RCA and other TV makers for the purpose of making TVs. However there is a decades long gap between the research that was done then and LCD's final ascendancy into the TV market in the early 2000's. The reason why LCD technology survived and prospered during that period was the enabling of an interim product (Notebooks) that could be made with an LCD and not with the prevailing CRT technology. The notebook enabled the LCD industry to develop its supply base, manufacturing techniques, and to fund further R&D. Without this unassailable market for the technology, we would not have LCD Television today.

Completely new flat screen technology that is not market-enabling no longer has the luxury of just being flat; it must launch with equal or better costs and performance to the LCD or offer something else fundamentally new such as flexibility, extended battery life or otherwise improved power efficiency, or 3D capability. And, it has to contend with the possibility that these features may also be built into future forms of the LCD. Current developments at Unipixel offer the opportunity to move the bar set by LCD technology along all of these fronts. Their Time Multiplexed Optical Shutter (TMOS) technology addresses one of the Holy Grails of LCD technology, improved performance and new capabilities while taking layers out of the LCD stack.

Knowing When to Pull the Plug

> "*You seek a great fortune, you three who are now in chains...... And you will find a fortune -though it will not be the fortune you seek...*" -- The blind prophet from "Oh Brother Where art Thou?"

The last and sometimes most significant role of marketing is knowing when to pull the plug on a display technology investment. Performance objectives may fail to be met, R&D may bring a greater understanding of the difficulty of the project, new competition may emerge, a dozen other things may change that cause a once promising technology development to no longer make sense. To the extent that the marketer's income stream is tied to the ongoing project, they may be reluctant to say "done". However, that is their job. In the mid 1990s, AlliedSignal had a revolutionary new technology for improving the viewing angle of LCDs called SpectraView. SpectraView was a quantum leap forward in LCD technology; however, SpectraView would have come to market as a cost adder to the LCD. At the same time SpectraView was being developed, Hitachi was resurrecting IPS technology (originally developed by RCA). IPS, if anything was a cost reduction (one fewer mask step), so the need for SpectraView went away. However, pieces of the SpectraView technology remain and Honeywell, the successor to AlliedSignal, has a continuing income stream form SpectraView's channel waveguide component.

Summary: The role of marketing in display technology investments firstly includes an accurate market forecast. The "Crystal Cycle" continues with periods of excess supply followed by display shortages. Knowing where you are on the Crystal Cycle and where you will be for product launch will be important for setting expectations and

balancing cash flow. Marketing must not be distracted by short term events such as a sales surge at the head of a recession or the seeming bottomless pit when consumer confidence suddenly collapses. Understanding what the technology really has to offer and comprehending how much you can get paid for it. "Better" in some spec that is not immediately visible to the consumer will not always command a premium and "Better" might not even be better by the time a product reaches market. Better technology that is market enabling depends on the marketer's assessments of both the technology and the new market that does not yet exist.

Where does your Technology Investment Fall?

	Improvement to Existing Technology	New Display Technology
Market Enabling		
Cheaper		
Better		

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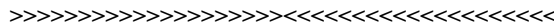
Past Editions of "LCD TV Matters"

You can download prior editions of
"LCD TV Matters" from:

http://www.veritasetvisus.com/lcdtva.htm

Policy/Economy/Technology

Meaningless Differentiation and Market Speculation

by David Barnes

David Barnes brings more than forty years of experience in the capital equipment, semiconductor and TFT LCD markets to bear on client concerns. He introduced market-leading test-repair systems for TFT manufacture (ArrayChecker and ArraySaver lines) in the mid 1990's. Later that decade, he negotiated joint ventures between Philips Electronics and LG Electronics through due diligence, then stayed in Seoul to support the board from conception through the IPO in 2004. After the first dual listing on NYSE and KSE, he provided similar services to more clients as VP of Strategic Analysis for DisplaySearch. Assignments in recent years include IPO, project funding, underwriting, due diligence and debt restructuring. He now provides services through BizWitz, LLC. He attended the University of California at Santa Cruz.

Meaningless differentiation was a term I coined while working with Bruce in Korea. The concept arose from cost-price analysis of AMLCD that showed no meaningful benefit arose from most of the features or specifications the sales department promoted. About the same time, I had the pleasure of hearing a technical presentation by Mitsubishi at International DisplayWorks. Those engineers attempted to find a useful relationship between visual perception (customer judgment) and display specification. They failed, but in a spectacularly detailed way. Taken together, such experiences led me to hypothesize that few display design and promotion efforts created any meaningful product differentiation.

I was reminded of this while reading a Insight Media newsletter summarizing the result of an *LCD Response Time and Motion Blur* shoot-out at DisplayMate Technologies. As you may suspect, scientific measurements and expert opinions agreed: motion blur is not a problem and response time specifications can mislead consumers. The study reported that many mid-priced 60 Hz sets outperformed higher priced 120 Hz sets and that faster response times often produced more video artifacts. Given all the time and attention given to differentiating faster panels in LCD TV sets over the years, I conclude that this is another example of meaningless differentiation.

Some companies may benefit from brand differentiation, however. As exemplified by urban myths and other (incorrect) things that "everyone knows," consumers seem attracted to specs, even meaningless or misleading ones, if the numbers look simple and are easy to brag about: "My TV has 4 ms response time!" In this regard, a company may benefit from establishing itself as the market leader in 120 Hz TV. It may see its brand recognition or its pricing power increase if it tells the story long enough, loud enough. Under ideal conditions, a stronger TV brand position might improve the company's position in related market segments, also.

Still, the question must be asked, "What economic value does product differentiation deliver?" If we look at the history of panel maker results, value is hard to find. The following figure plots the combined sales and cash cost of AU Optronics (AUO) and LG Display (LGD) on a square-meter basis. The two companies have experienced different exchange rate effects in recent years, so these tend to cancel-out when operating results are converted to US dollars. We see sales (revenue/m²) falling faster than the decrease in cash cost (operating cost less depreciation charges). Specifically, prices are falling 22% a year while costs are falling 20% a year, down exponential trend lines. That implies that the cash profit margin of leading panel makers decreases over time. Indeed, the exponential rate of margin decay is 17% a year in this example.

From this, I postulate that most marketing efforts by panel makers serve only to keep them falling down the long-term trend line of diminishing returns to scale. Each year, they generate less cash profit to cover the cost of depreciation arising from capacity expansion.

There are two traditional solutions to such a problem. A producer can slow its rate of reinvestment (in property, plant and equipment) or a producer can reduce its cost of capital. Smaller producers such as HannStar Display (HSD) often choose the first solution. Like smaller Japanese producers before it, HSD stopped expanding and started looking for products and partners that would put its capacity to best use. Larger producers such as LGD and Samsung Electronics (SEC) often choose the second solution. Those companies seek joint ventures in China where their total cost of capital will be less than it would be if they invested in Korea. Still other companies such as Chunghwa Picture Tubes (CPT) choose both solutions. We note that CPT slowed its pace of fab expansion and devised means of raising capital through the Chinese stock market.

Figure 1: Display Area Sales and Cash Cost for AUO + LGD (USD/m²)
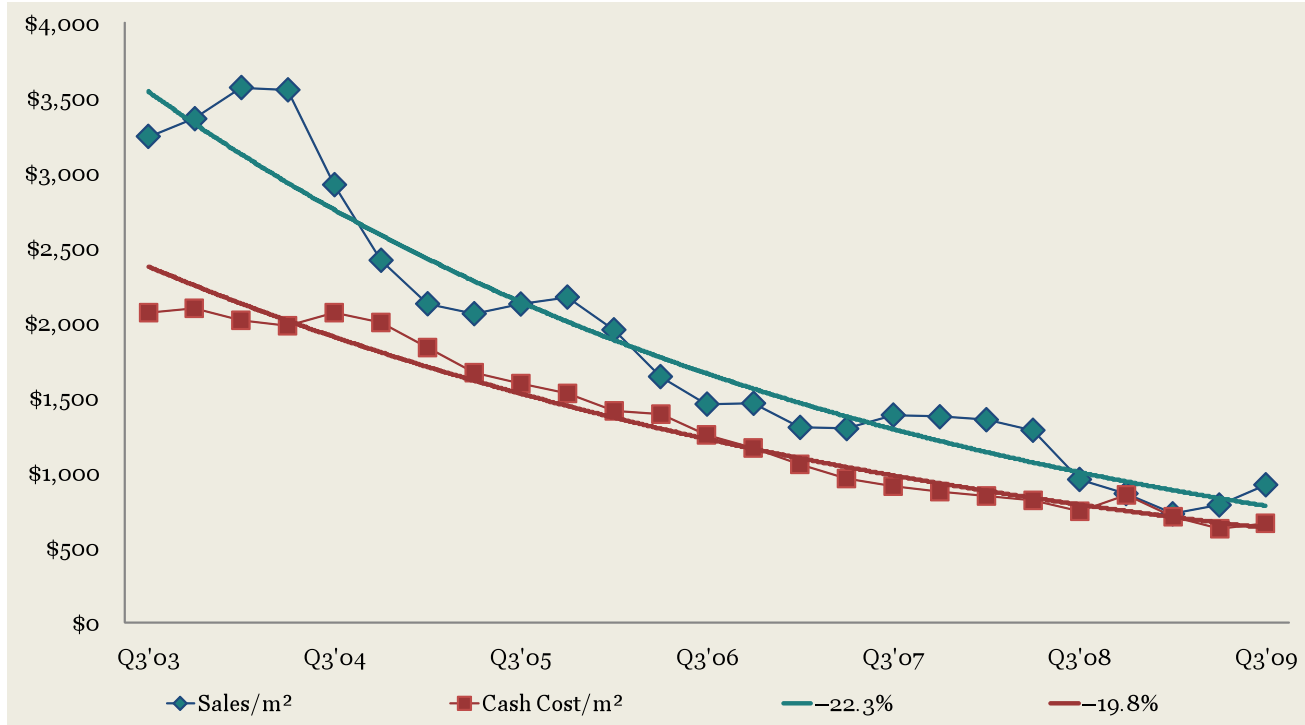
Source: company disclosures

Given such solutions, we expect LCD supply will increase and the market for LCD TV will expand, especially in China. We also expect panel market dynamics will persist, however. That suggests that we will see area-price fluctuations in the future similar to those we have seen in the past. The preceding chart shows that costs increased in Q3'09 but that prices increased more. Panel makers recorded profits after several quarters of losses. Now that producers have increased utilization and leaders have added capacity, we expect prices will weaken through Q1'10. That need not be negative for profits if costs decline, but that is always easier said than done, especially for companies bringing new capacity on-line.

Market Speculation: In an earlier article titled "*What Will We Get for Christmas?*" I used economic data to evaluate the prospects for US consumer spending this holiday season. Since then, stock speculators grew more excited by the prospects for recovery despite occasional indications that consumer spending may remain depressed. Earlier this month, for example, the National Retail Federation (NRF) predicted holiday sales would fall 1% below last year's level. They cited survey evidence that US families planned to spend less on gifts for co-workers or friends. Many of those polled claimed they had tightened their budgets for family gifts also. I suspect that holiday spirits might bust some budgets but the NRF says a significant portion of holiday shopping occurs before Thanksgiving. That gives them some confidence predicting holiday sales using recent figures.

More recently, traders received another shock in the form of retail spending reported by the US Census Bureau and consumer confidence reported by the University of Michigan. While those numbers felt right to me, I could not call myself a professional analyst if I didn't look at them closely. I thought it necessary to ask the question "What is

the correlation between consumer confidence and consumer spending on electronics?" The answer seems to be "Not much, at least in recent years."

Figure 2: Change in U.S. Consumer Confidence and Retail Sales (Y/Y)

Source: seasonally-adjusted time series from Reuters/University of Michigan and US Census Bureau

As shown in the chart above, there was strong (83%) correlation between the annual change of consumer confidence and the annual change of spending at electronics and appliance stores from 1999 through 2004. Since 2005, that correlation decreased to 29%. We can see how the change in confidence went negative in September 2007, twelve months before retail sales growth went negative. Consumer confidence went positive in April this year but electronics spending growth remains depressed. I did not chart the confidence index for October, which was 23% greater than the index last October. It seems difficult to interpret what that means because the index fell 4% M/M (from September). If the twelve-month pattern repeats, the data implies retail sales growth might not go positive until April next year.

Perhaps all that can be said for certain is LCD TV sales may be strong if shoppers believe the specs have value and are willing to buy larger sets. The NRF thinks retailers are being smarter this year and planning early season sales to avoid the need for panic sales later in the season. If so, we may get a good indication what Santa will bring by the end of November.

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About the LCD TV Association

The LCD TV Association is a global, non-for-profit marketing trade association, formed to help the entire LCD supply chain and retail channel through to the end consumer via various communication tools, including speeches, interviews, sponsored research, as well as industry newsletters, meetings and standards settings – resulting in better information and distribution of this information, as well as better understanding of the rapidly changing world of flat TVs and HDTVs for all related parties. Participating at the many industry trade and consumer shows around the world to help promote members' interests, as well as create better LCD TV products for everyone, our goal is to serve both the industry needs and promote the consumers best interests. We encourage and engage in discussions to promote the industry overall, as well as helping foster healthy competition and create better products with higher value propositions for consumers and retailers alike. The LCD TV Association can help fight the growing "specsmanship" in trade publications and refocus conversations on true image quality and understanding for consumers, and help the whole LCD TV ecosystem to improve and thrive. For more information on the LCD TV Association, it's membership, or to join at one of the various levels available, please visit us on the web at http://www.LCDTVAssociation.org.

LED Leads…

by Alfred Poor

Alfred Poor is the editor and publisher of "HDTV Almanac", a free daily service of news and commentary on the HDTV, digital television, and home entertainment electronics markets: http://hdtvprofessor.com/HDTVAlmanac. **This article comprises three recent entries about LEDs and their introduction into the TV space.**

LED LCD TVs: Gaining Ground: The industry analyst firm Displaybank has released a presentation that gives an overview of the flat panel display industry, with some special emphasis on LCD HDTVs with LED backlights. This is the segment of the market that some manufacturers have chosen to call "LED TVs", which is a term that many people find misleading.

LED backlights have a number of advantages over the traditional fluorescent tube backlights. They have better color performance, enable advanced features such as localized dimming, and do not require the use of mercury, which is a hazardous material. LEDs remain more expensive than fluorescent backlights, however.

Displaybank shows that the average LCD TV with an LED backlight sells for about 1.4 to 1.5 times as much as an equivalent model with a fluorescent backlight. Manufacturers are developing ways to cut these costs, through the use of fewer LEDs and more efficient light guides. The light guides are also likely to get thinner – saving material – and they will be fabricated in less expensive ways.

Even with these reductions, however, Displaybank still forecasts that a 46-inch LED backlight LCD TV will still cost nearly one-fourth more than a fluorescent model by the end of 2011. In spite of the price premium, Displaybank still predicts that the share of LED backlights will grow rapidly. Their 2.4% share of the global LCD TV market in 2009 will leap to 16% next year. By 2012, the LED backlight share will be more than 40%, and becoming the dominant design with more than 60% of the market in 2013.

So if you want the improved image quality offered by an LED backlight on your next LCD HDTV, be prepared to pay extra.

LED Backlights Gaining: One detail that came up in the dust-up over the California Energy Commission's new requirements that limit the energy consumption of flat panel TVs is that some existing models already meet the more stringent 2013 limits. And according to DisplaySearch, all but one of these low-power HDTVs were LCDs with LED backlights.

LEDs are more efficient than the cold cathode fluorescent (CCFL) tubes used by most of the LCD TVs and computer monitors on the market today. In addition to being less efficient, the CCFL backlights also contain small amounts of mercury, making them hazardous to the environment. Notebook computers have already started switching over to LED backlights in order to save weight (less battery storage is required) and reduce size (LED backlights can take up less space than CCFL alternatives). LED backlights still command a significant price premium in HDTVs, but are popular because they make extremely thin sets possible, along with providing better color performance. And according to a DisplaySearch report, LED backlights are moving into desktop computer monitors as well; they represented less than 2% of the products in the third quarter of this year, but are expected to grow to nearly one fourth of the market in the third quarter of 2010.

Delta Electronics, a leading producer of CCFL backlights, has announced that it will be exiting the business in March of next year. It already has developed an LED backlight business and foresees that it will grow rapidly. Delta's announcement is particularly interesting because it shows that the shift to solid state LED backlights for all sorts of LCD panel products is having an impact on the supply chain. As the demand increases, we hope to see improvements in the production of the LEDs themselves which should help lower the costs and improve performance even further.

Truth Patrol: Best Buy Explains "LED TV": Most of the Truth Patrol tips are sent in by readers, but this is one that I found myself, thanks to a lead from TWICE eNews Daily. They published a link to a YouTube video (http://www.youtube.com/watch?v=I63Lq1UbHVM) that was apparently created by Best Buy to train its staff about the Samsung "LED TVs". As I and many others have pointed out (including the New York Times), the name is misleading because it implies that it's a display technology different from LCD TVs. So it's informative to see what Best Buy tells its employees to emphasize about these new sets. Here are the main points covered in the video: ultra thin, picture quality, eco-friendly, InfoLink Internet connection, and a soundboard. In the entire four minute video, the onscreen trainer says the word "LCD" exactly twice. And in both cases, the context is ambiguous at best.

The first occurrence comes near the end of the picture quality segment, as the trainer says "That's going to give you the LED LCD at 120 Hz 3D effect." Huh? First, it's a lot of jargon to cram in one phrase, and no, this is not a 3D television. Yes, you can get a 3D impression from some images, but it's not a stereoscopic 3D display. But let's see what leads up to this statement. It comes after discussing the "Clear Panel Display" feature: "There's no barrier between the LEDs and the front of the panel screen. That light will shine through a lot better." No barrier between the LED and the front of the screen? So it must be the LEDs that are making the image, right? No, there is in fact a barrier; the LCD layer between the LED lights and the front of the screen are responsible for blocking the light so that you get an image. No blocking of the light, no picture. And for the record, the clear panel design simply means that they didn't put on an anti-reflective coating or film as a top layer. This layer would diffuse the light from the screen slightly and reduce sharpness a bit, but would also reduce the sharp reflections you see on the screen in the video.

The other mention of "LCD" comes in the eco-friendly section, where the trainer states that "you're going to use about 40% less energy than your traditional LCD TV." Okay, they get partial credit for not being outright misleading by saying "with your LCD TV", but adding the modifier "traditional" does not make it clear that the LED TV and the traditional TV are both LCDs. In fact, I expect that many people would infer from this statement that the LED TV was not an LCD. The bottom line is at no time does the trainer say that LED TVs are a new and improved form of LCD TV, or that they replace the traditional fluorescent backlight with LEDs. Most of the performance claims are credible (though a few stumbles like the 3D statement may raise a few eyebrows), but it is clear that the creators of this video did not want to emphasize that these are in fact LCD TVs. And apparently this is how Samsung and Best Buy want the floor staff to understand these TVs.

Is this video misleading? I'll leave it to you to decide for yourself after you watch the video. These Samsung TVs have some real performance benefits to offer, but I wish these could be marketed without making it sound like it's some new technology that is not LCD. I don't see how this benefits consumers, or in the long run, either Samsung or Best Buy.

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Display Industry Calendar of Events – 2010

A detailed calendar with active URLs is maintained by Veritas et Visus. Please notify mark@veritasetvisus.com to have your future events included in the listing. http://www.veritasetvisus.com/industry_calendar_2010.htm.
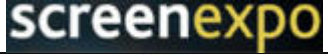
January 2010			
January 5-6	Storage Visions Conference	Las Vegas, Nevada	
January 6-9	Digital Hollywood CES	Las Vegas, Nevada	
January 7-10	2010 International CES	Las Vegas, Nevada	
January 11-13	Display Metrology Short Course	Longmont, Colorado	
January 17-21	Electronic Imaging 2010	San Jose, California	
January 18-20	Stereoscopic Displays and Applications	San Jose, California	
January 20-22	NEPCON World Japan	Tokyo, Japan	
January 23-28	Photonics West 2010	San Francisco, California	
January 25-27	Tangible, Embedded, and embodied Interaction	Boston, Massachusetts	
January 26	Power Saving in Displays	Oxford, England	
January 27	Touch Panels and Overlays for Displays	Oxford, England	
January 27-28	DisplaySearch Japan Forum	Tokyo, Japan	
January 26-28	ATEI 2010	London, England	
February 2010			
February 1-4	Flexible Electronics and Displays Conference	Phoenix, Arizona	
February 2	LED TV 2010	Seoul, Korea	
February 2-4	Integrated Systems Europe	Amsterdam, Netherlands	
February 3-5	Semicon Korea	Seoul, Korea	
February 3-5	LED Korea	Seoul, Korea	
February 5	Technologies for Custom LCD Modules	Costa Mesa, California	
February 7-10	Intelligent User Interfaces	Hong Kong, China	
February 9-13	MacWorld Expo	San Francisco, California	
February 13-18	Medical Imaging	San Diego, California	

February 16-19	Hollywood Post Alliance 2010 Tech Retreat	Rancho Mirage, California	
February 16-18	Broadcast Video Expo	London, England	
February 17-18	Createasphere/EXPLORE	Universal City, California	
February 26-28	Sound & Vision 2010	Bristol, England	
February 19-21	Symposium on Interactive 3D Graphics and Games	Washington, DC	

March 2010			
March 2-3	US FPD Conference	San Diego, California	
March 2-5	LED China 2010	Guangzhou, China	
March 2-6	CeBIT 2010	Hanover, Germany	
March 3-4	Electronic Displays Conference 2010	Nuremberg, Germany	
March 3-4	TV of Tomorrow Show 2010	San Francisco, California	
March 3-5	PV Expo 2010	Tokyo, Japan	
March 5-6	International Thin-Film Transistor Conference 2010	Himeji, Japan	
March 5-7	CEDIA Expo Latin America	Mexico City, Mexico	
March 7-10	Focus on Imaging	Birmingham, England	
March 9-10	National Electronics Week	Johannesburg, South Africa	
March 9-11	Air Traffic Control	Amsterdam, Netherlands	
March 14-17	Lighting Quality and Energy Efficiency Conference	Vienna, Austria	
March 15-18	Showest 2010	Las Vegas, Nevada	
March 16-18	Semicon China	Shanghai, China	
March 16-18	Laser World of Photonics China	Shanghai, China	
March 18-19	Personal Projection and Information Displays	Dresden, Germany	
March 20-21	Symposium on 3D User Interfaces	Waltham, Massachusetts	
March 20-24	Virtual Reality 2010	Waltham, Massachusetts	
March 22-26	2010 Measurement Science Conference	Pasadena, California	
March 23-25	Phosphors Summit	San Diego, California	
March 23-25	Image Sensors Europe	London, England	

March 24	Korea FPD Conference	Seoul, Korea	
March 24-27	EHX Spring	Orlando, Florida	
March 25-26	Symposium on Haptic Interfaces and Virtual Environments	Waltham, Massachusetts	

April 2010

April 7-10	International Sign Expo	Orlando, Florida	
April 8-9	2010 Taiwan FPD Conference	Taipei, Taiwan	
April 10-15	NAB 2010	Las Vegas, Nevada	
April 10-15	CHI 2010	Atlanta, Georgia	
April 12-16	MIPTV	Cannes, France	
April 13-14	Printed Electronics Europe	Dresden, Germany	
April 13-14	Photovoltaics Europe	Dresden, Germany	
April 13-15	Sign UK/Digital Signage Showcase	Birmingham, England	
April 14-15	Digital Signage Show 2010	Las Vegas, Nevada	
April 14-16	FineTech Japan & Display 2010	Tokyo Japan	
April 14-16	Touch Panel Japan	Tokyo, Japan	
April 14-16	Smart Fabrics 2010	Miami, Florida	
April 14-16	LED/OLED Lighting Technology Expo	Tokyo, Japan	
April 20-22	Interactive Displays 2010	San Jose, California	
April 12-14	Digital Holography and Three Dimensional Imaging	Miami, Florida	
April 28-30	Organic Photovoltaics	Philadelphia, Pennsylvania	

May 2010

May 4-7	Digital Hollywood Spring	Santa Monica, California	
May 4-7	International Conference on Animation, Effects, Games, and Digital Media	Stuttgart, Germany	
May 5-6	Screen Expo Europe	London, England	
May 11	FPD Materials and Components Forum	Tokyo, Japan	
May 17-21	International Conference on Imaging Theory and Applications	Angers, France	

May 18-19	National Electronics Week	Birmingham, England	
May 18-20	SGIA Membrane Switch & Printed Electronics Symposium	Phoenix, Arizona	
May 19-21	SEMICON Singapore	Singapore	
May 19-21	Three Dimensional Systems and Applications	Tokyo, Japan	
May 20-21	DisplaySearch China FPD TV and HDTV Conference	Shenzhen, China	
May 23-26	China Optoelectronics & Display Expo	Shenzhen, China	
May 23-28	SID International Symposium	Seattle, Washington	
May 24	SID Business Conference	Seattle, Washington	
May 25-29	Advanced Visual Interfaces	Rome, Italy	
May 31 - June 2	LOPE-C -- Large Area, Organic and Printed Electronics Convention	Frankfurt, Germany	
May 31 - June 2	Graphics Interface 2010	Ottawa, Ontario	

June 2010

June 1-3	Dimension3 Expo	Seine-Saint-Denis, France	
June 1-5	Computex 2010	Taipei, Taiwan	
June 3-6	SIIM 2010	Minneapolis, Minnesota	
June 5-11	InfoComm '10	Las Vegas, Nevada	
June 7-8	Projection Summit	Las Vegas, Nevada	
June 7-9	3DTV-CON 2010	Tampere, Finland	
June 9-10	EuroLED 2010	West Midlands, England	
June 9-11	3DCOMM	Las Vegas, Nevada	
June 9-11	Photonics Festival: OPTO Taiwan , SOLAR, LED Lighting, Optics	Taipei, Taiwan	
June 14-16	SEMICON Russia 2010	Moscow, Russia	
June 15-17	E3 Media and Business Summit	Los Angeles, California	
June 15-17	Digital Signage Expo 2010	Essen, Germany	
June 15-17	CEDIA Expo Europe	London, England	
June 21-24	Solid State and Organic Lighting	Karlsruhe, Germany	

June 21-24	Cinema Expo	Amsterdam, Netherlands	
June 21-25	Nanotech Conference & Expo	Anaheim, California	
June 22-25	OLED Expo 2010	Seoul, Korea	
June 22-25	LED & Solid State Lighting Expo	Seoul, Korea	
June 22-25	International Conference on Organic Electronics	Paris, France	
June 29 - July 1	Plastic Electronics Asia	Osaka, Japan	

July 2010

July 7-9	China International Flat Panel Display Exhibition	Shanghai, China	
July 7-9	China International Touch Screen Exhibition & Seminar	Shanghai, China	
July 7-9	International Symposium on Flexible Organic Electronics	Halkidiki, Greece	
July 8-11	SINOCES	Qingdao, China	
July 11-16	International Liquid Crystal Conference	Krakow, Poland	
July 12-14	Nanosciences & Nanotechnologies	Halkidiki, Greece	
July 13-15	Semicon West 2010	San Francisco, California	
July 13-15	Intersolar North America	San Francisco, California	
July 14-19	National Stereoscopic Association Convention	Huron, Ohio	
July 16	Mobile Display Forum	Taipei, Taiwan	
July 25-29	SIGGRAPH 2010	Los Angeles, California	
July 28-29	Japan Forum	Tokyo, Japan	

August 2010

August 8-10	Australasian Gaming Expo	Sydney, Australia	
August 16-20	Designing Interactive Systems	Arhus, Denmark	
August 17	Digital Signage	San Jose, California	
August 18	TV Ecosystem Conference	San Jose, California	
August 19	Emerging Technologies Conference	San Jose, California	

September 2010			
September 3-8	IFA 2010	Berlin, Germany	
September 6-10	HCI 2010	Dundee, Scotland	
September 7-10	Mobile HCI 2010	Lisbon, Portugal	
September 9-10	China FPD	Shanghai, China	
September 9-14	IBC 2010	Amsterdam, Netherlands	
September 13-16	PLASA '10	London, England	
September 19-23	International Conference on Digital Printing Technologies	Austin, Texas	
September 19-23	Digital Fabrication 2010	Austin, Texas	
September 22-23	Createasphere/EXPLORE	New York, New York	
September 22-26	CEDIA Expo	Atlanta, Georgia	
September 29-30	RFID Europe	Cambridge, England	

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IMPROVE the products and functions of LCD TV products by inventing and promoting new specifications that benefit the whole industry, such as an industry-wide 'Green TV' program. There are many activities that will benefit our members from early compliance and the associated PR. The emphasis is on perceived value for little or no cost, and use this to promote the industry via positive reviews and branding. The founder's experience ensures that these programs will not add cost, but rather help to relieve the relentless pressures on margin for the manufacturer.

CONNECT the industry supply chain with face-to-face meetings and regular communications, via white papers, presentations, quarterly newsletters for members. The Advisory Board members has quarterly meetings – telecon or in person – to facilitate win/win relationships for the industry partners. With better communication we can speed time to market with better features and functions, particularly for members and their customers, with the ultimate goal of creating more value for the TV vendors and their suppliers, while making TVs more attractive to consumers.

"A Great TV in <u>Every</u> Room"

Inform • Promote • Improve • Connect

For more information on the LCD TV Association, membership, or to join, please visit us on the web at www.LCDTVAssociation.org or email membership@LCDTVAssociation.org

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Sustaining Members