LCD TV Association

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“LCD TV Matters”

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"A Great TV in Every Room"

Contents

Chairman's Corner: Changing Face of LCD TVs

by Bruce Berkoff

"The more things change, the more they stay the same" – LCD TVs are large and growing.

Source: DisplaySearch March 2010

Who wants thinner, lighter TVs based on a cool new technology? We do. Always. We did in the 1990s when I saw my first LCD TV, and we do today. And unlike many- I do NOT mean OLED, but for now LCD TVs with LED lighting! "LED TV" growth is going strong, limited by the supply chain of LEDs for now.

The historical trend of the display industry is defined by the "crystal cycle"; there is always a cluster of investment during profitable periods, leading to too much supply altogether, but then ASPs drop to a "clearing price" and demand catches up to capacity, then exceeds it, then the cycle repeats. In this context, I do not believe large investments in China are a special problem for the industry's supply-demand balance. If anything, the focus on China capacity investments, along with the relatively slow approval process of China government, may stretch out the current upturn causing a longer, shallower peak compared to past upturns. Any new price points quickly lead to new applications, like the new "4th screen": eReaders like the iPad and Kindle (everyone already had 3 screens; a PC, a TV, and a phone).

In addition to the simple supply/demand/cost/price market parameters, there are also new TV product trends, such as LED backlights and 3D that stimulate demand. In previous blogs, I've discussed why LED backlights are stimulating new demand for more and larger LCD TVs, however, 3-D is probably a longer-term story, and a 2D/3D switchable, non-glasses (auto-stereoscopic) type of 3-D will probably be required for mass adoption (although "3D ready" TVs will proliferate starting this year).

The business of LCD TV forecasting has been a story of forecasts which were called "overly optimistic", "too aggressive", or "crazy" at the time they were published, but which then turned out to be too conservative and were exceeded by the actual market demand. In 2005, Samsung suggested that LCD TVs would pass 100M units by 2010. Some called them "nuts". Not to be outdone, we at LG Philips LCD at the time said LCD TVs would exceed 100M by 2009. I was also called "nuts". The actual demand exceeded 100M units in 2008, and will be almost 200M this year, so our "aggressive" forecasts were more "conservative" than reality.

The combination of continual cost reductions for LCD TVs, the crystal cycle oversupply periods, and product innovation is likely to drive continued demand growth of LCD TVs. In fact, it is reasonable to expect that unit demand could exceed 400M units in the next five years or so. And as larger sizes become less expensive, thinner and lighter, we can expect average size growth to occur and help LCD area growth even faster.

Who will benefit from this amazing LCD TV growth? Companies throughout the value chain can benefit if their technologies support innovative end product features, and cost per area reduction. TV set makers will thrive as long as they can sustain profitability through cost reduction and by adding more high-value capabilities and

features (like connectivity and wireless). Panel makers will also benefit if they continue cost per area reduction and feature integration. And equipment, materials, and component suppliers will benefit if their technologies support advanced features such as thin form factors, 3D capability, touch capability, wireless connectivity, intrinsic support for even larger and hi-res displays, and of course continued cost per area reduction.

If this picture of the industry sounds familiar, it should. Other than some of the specific technology trends and the fact that generation scaling will be slower going forward, the future of the industry looks much like the past. LCD TV volumes are growing, sizes are growing, and consumers and industry players will continue to reap benefits from this fantastic technology. The more things change, the more they stay the same.

VIZIO's XVTPRO720SV, on the left, a LED-backlit LCD TV was announced in January (but is not yet shipping commercially) and measures a whopping 72-inches, features 480Hz 3D capabilities; Samsung's 65-inch Series 6 Black LED Flat Panel LCD HDTV - UN65C6500 (center) is shipping at an MRSP of $3999; Sharp introduced an RGB-LED backlit LCD TV (right image) in 2008 that measured 65-inches.

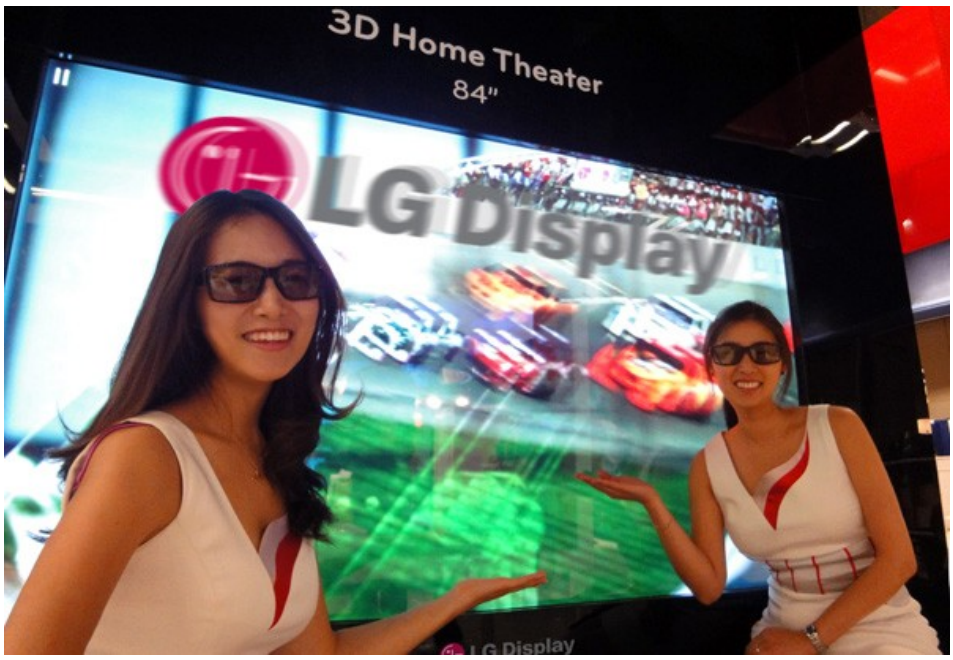
Mr. Berkoff is the chairman of the LCD TV Association, a global not-for-profit marketing trade association dedicated to "informing, promoting, improving and connecting" the entire LCD TV supply chain and their related companies, to help promote "a great LCD TV in every room in the house!" For over six 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 shows off 84-inch 3840×2160 touch-enabled 3DTV

LG Display showcased an 84-inch 3DTV with a pixel format of 3840×2160 (also called UHD -- Ultra High Definition at SID 2010. UHD has four times the number of pixels compared to 1920×1080 and the additional pixels are quite necessary, both due to the size of the display and because of the 3D format. When going from 2D to 3D you effectively lose about half of the display's resolution capability. So 3D on an UHD display will get you more detail resolution than 2D on 1920×1080. What LG Display did not highlight at the event is that the SID demonstrator was also touch-enabled, providing an easy interface for showcasing many of the extremely high-resolution images on display. http://www.lgdisplay.com



First over-air 3DTV in Korea took place in May

Testing of the first land-based 3DTV broadcasts commenced May 19, with trial broadcasts planned in the coming days by all four of Korea's broadcast TV stations – KBS, MBC, SBS and EBS. Korea Communications Commission (KCC) will offer three hours of live 3D programs per day from May 19 to June 10, beginning with the stereoscopic 3D broadcast of the 2010 Colorful Daegu Pre-Championships Meeting on KBS, which precedes the International Association of Athletics Federations (IAAF) World Championships next year, according to the *Korea Times*. The live 3D coverage will reach households in Seoul and its neighboring metropolitan area. SBS owns exclusive broadcasting rights for the live 3D broadcasts of the 2010 FIFA World Cup beginning June 11. Other satellite and cable services around the globe and in the US have delivered 3DTV programming in recent weeks and months, but this would be the first ground-based over-the-air broadcasts provided free of charge.

Taiwan's LCD makers move to 3D

Taiwan's display makers are gearing up to develop panels capable of three-dimensional images as interest in the technology builds along with growth in volume, likely driving down prices. The island's LCD makers, including AU Optronics Corp., ChiMei Innolux Corp. and Chunghwa Picture Tubes Ltd., have fallen behind their Korean and Japanese rivals in upgrading their panel production technologies over the past few years. But the Taiwan companies are shifting focus to 3D panels, looking to boost their value in the TV supply chain, where margins are tightening due to falling set prices. As flat-panel makers ramp up production of 3D panels and shipments of these panels increase, their average selling prices could fall 5% by the end of this year, and as much as 10% in 2011, said Jason Yang, an analyst at market research firm DigiTimes Inc. TV brands such as Samsung Electronics Co., Sony Corp. and Sharp Corp. don't outsource production of 3D panels to other companies because they prefer to rely on in-house technology to ensure quality control. But analysts said that as 3D products become more mainstream and gain ground with consumers, panel makers such AU Optronics and ChiMei Innolux may start reaping benefits as soon as they can provide cheaper 3D-enabled panels. Global sales of 3DTVs will likely reach 78 million units by 2015, up from 4.2 million this year, according to research firm iSuppli Corp., with industry revenue expected to reach $64.3 billion in 2015 from an estimated $7.4 billion this year.

DEG forms 3D working group

The Digital Entertainment Group (DEG) has created a 3D Working Group to promote developments in 3D home entertainment. The working group's members include representatives from Microsoft, Panasonic, Samsung Electronics, Sony, 20th Century Fox Home Entertainment, Walt Disney Studios Home Entertainment and Warner Home Entertainment Group. It will be tasked with communicating and promoting "all of the 3D-compatible products and content that will soon be available via a number of platforms, including Blu-ray 3D, cable, satellite and the Internet," the DEG said in a statement. "This will enable both retailers and consumers to better understand each platform's benefits, while creating a united messaging strategy that properly positions and promotes 3D at home." The new Working Group will coordinate consumer messaging with the DEG Communications Committee and create consumer education materials, including a glossary of 3D terminology. It will also help to merchandise 3D at retail and explore potential connectivity issues and audio enhancements with other industry groups. The DEG will host a special 3D Forum on June 2 in Los Angeles, where it will focus on the key factors affecting 3D development, distribution and deployment over consumer electronics and IT devices. http://www.degonline.org

Imagine Communications unveils 3D and TV anywhere video processing solutions

Imagine Communications announced the ICE Broadcast System version 4.0, the next generation of Imagine ICE Video Platform solutions for advanced video processing over any distribution network. In the new world of PersonalizedTV on demand to any device, the control over content viewing time and location is shifting to the consumer. Imagine's solutions enable service providers to deliver the highest video quality while maintaining control over their video delivery infrastructure and providing subscribers with more choice, convenience and flexibility. Imagine's core technology (ICE) enables real-time encoding, multi-codec transcoding, statistical multiplexing and adaptive streaming. http://www.imaginecommunications.com

Sonic Solutions says consumers are ready for home-based 3DTV

Significant consumer interest exists for home-based 3D entertainment ranging from movies to home videos and photos according to the results of a new Web-based survey compiled for Sonic Solution's Roxio Division. The informal Roxio 3D survey was conducted in March 2010 and collected responses from almost 2,000 Roxio software users residing in the US. Of those polled, 84% indicated they are interested in viewing Hollywood 3D movies in the home, while almost 80% believe they will be taking 3D video or capturing 3D photos of family events within the next five years, Roxio said. "The results of the Web survey reaffirm our conviction that the dramatic impact 3D is having on the big screen will translate to the small screen and reshape how consumers interact with personal media and premium entertainment in the home," stated Mark Ely, Sonic Solutions strategy executive VP. "We look forward to the year ahead and using our complete Hollywood-to-Home 3D products, services and technologies to help fuel the market for home 3D." In personal video entertainment, the survey found that the almost 80% who said they believe they will be taking 3D video or capturing 3D photos within the next five years, 75% indicated they would be interested in converting some of their existing 2D personal videos into 3D content. http://www.sonic.com

CBS and Sony Electronics unveil new 3D consumer research center

Sony Electronics and CBS unveiled "The Sony 3D Experience." This research center and screening facility will focus on consumer preferences and perceptions toward 3D programming, as well as how broadcasters and studios can best deliver 3D content for viewing both in and out of the home. The Sony 3D Experience will be located within the expanded CBS Television City research facility at MGM Grand Hotel & Casino in Las Vegas.

The new center is also being supported by Real D, which is providing its advanced 3D filters and eyewear to help complete the 3D experience. The facility is divided into two primary zones: 3D theatrical entertainment; which will preview and promote the latest 3D motion picture releases; and 3D home entertainment, which will highlight and demonstrate the newest trends for 3D in the home, including 3D compatible HDTVs, PlayStation3 systems and upcoming Blu-ray 3D players and titles. Additionally, consumers will be able to learn about the latest 3D developments, such as the upcoming launch of the ESPN 3D Network and the new 3D channel resulting from a joint venture among Discovery Communications, IMAX and Sony. The Sony 3D Experience is one of several recent Sony initiatives in the 3D arena. The company also just unveiled its new 3D Technology Center on the Sony Pictures Entertainment lot in Culver City, Calif., which will offer industry professionals the opportunity to learn more about the techniques and equipment for 3D production and content creation. http://www.sony.com

WirelessHD Consortium brings out 1.1 spec adding 3D and portables

The WirelessHD Consortium finalized the next generation of its WirelessHD in-room cable-replacement technology. The original 4Gbps-throughput standard, designed as an in-room HDMI cable-replacement technology, streams uncompressed, copy-protected high-definition video up to 1080p. The 1.1 spec accelerates throughput to more than 15Gbps to a maximum theoretical 28Gbps, adding enough bandwidth to stream all 3D video formats outlined in the HDMI 1.4a specification, the consortium said. The spec also adds support for 2K and 4K resolutions at 1080p video and high-speed point-to-point transfers of multi-gigabtye files from battery-operated portable devices in wireless personal area networks (WPANs). The 1.1 spec also supports A/V streaming of uncompressed 1080p video from battery-powered portables. When operating on batteries, portable devices must stream video and transfer files at a minimum 1Gbps when not plugged into household AC. About 4Gbps is required for 1080p streaming, and suppliers could build battery-operated portables that stream uncompressed 1080p when not plugged into AC, depending on how they want to prioritize power consumption, the consortium previously said. Both the 1.0 and 1.1 specs support DTCP copy protection and HDCP 2.0 protection, enabling streaming not just for display but also for copying. http://www.wirelesshd.org

Samsung, DreamWorks Animation and Technicolor form a global strategic alliance for 3D

Samsung Electronics America, DreamWorks Animation, and Technicolor announced that they have formed a global strategic alliance for the delivery of a complete 3D home entertainment solution in 2010. The three companies have joined forces to accelerate the worldwide deployment of in-home 3D to mainstream consumers. The solution includes a broad line-up of 3D-capable HDTVs from Samsung, its new 3D Blu-ray disc player, and an exclusive promotion that includes a first-time feature-length, 3D Blu-ray version of DreamWorks Animation's 2009 release, "Monsters vs. Aliens". The disc will be created and produced by Technicolor. Samsung will provide customers several 3D selections, including a short entitled "Bob's Big Break" as well as trailers for 2010 DreamWorks Animation feature film releases "How to Train your Dragon" and "Shrek Forever After" on Samsung HDTVs with its Internet@TV feature. http://www.samsung.com http://www.technicolor.com

Philips selects XpanD active 3D technology

Underscoring the innovation leadership of XpanD's active 3D technology platform for cinematic, television and gaming applications, XpanD announced a partnership with Philips to provide consumers with co-branded iterations of its patented pi-cell active 3D glasses with Philips' 3D television sets. XpanD has an estimated 90-percent 3D market share in Asian cinemas and a share of more than 50-percent in Europe with 75-percent share of the 3D sector in France, Europe's largest cinema market. http://www.xpandcinema.com

XpanD's introduces universal active 3D glasses

The XpanD X103 glasses are designed to work seamlessly within XpanD cinema and with almost all the new 3D-ready TVs of all brands, allowing XpanD X103 to use their personal glasses with their friends 3DTVs, 3D computer monitors and XpanD cinema. The new XpanD X103 active 3D glasses are available in 12 different colors, allowing users unprecedented freedom of expression. XpanD is exhibiting the world's first universally compatible active 3D glasses for 3D-ready televisions. The XpanD X103 glasses are compatible with virtually any monitor capable of playing 3D-ready content, making 3D an affordable social experience. As with all XpanD models, the X103 active 3D glasses utilize a fast-switching, liquid crystal cell, known as "pi-cell" – the fastest 3D glasses in the world. Owners of XpanD universal glasses are starting to come to the cinema with their personalized glasses. As a result, the cinema owners and the studios do not need to pay for 3D glasses anymore, making 3D cinema distribution and exhibition less expensive. The cinemas are becoming a point of sale for universal 3D glasses, and can profit from these sales. http://www.xpandcinema.com

Technicolor develops advanced 3D compression; broadcast via conventional HD channel

Technicolor announced several innovations to support the consumer electronic industry's migration to 3D, including new technologies for Blu-ray 3D, broadcast 3D, 3D subtitling, and auto-stereoscopic 3D delivery to mobile handsets. Technicolor demonstrated the following at CES: Blu-ray 3D: Technicolor has developed the first advanced compression and authoring solution to bring the recently released Blu-ray 3D specifications to production reality. Technicolor has expanded its capacity in anticipation of increased demand for Blu-ray 3D authoring. Broadcast 3D: Technicolor has built the first independent 3D broadcast facility located at its London broadcast location at Chiswick Park. The 3D channel is capable of transmitting both live and pre-recorded 3D content using a conventional HD channel. The solution is currently delivering content to a Technicolor HD set-top-box. The company is now ready to offer this service to its network service provider and broadcast clients. Automated 3D Subtitling Creation: Subtitles in 3D introduce unique challenges due to the number of various depths at which objects appear on the screen, thus creating limitations on where subtitles can be placed. Technicolor has developed a production tool that automatically recommends the best placement of subtitles to minimize disruption to the creative intent of the content. http://www.technicolor.com

ESPN 3D to launch on June 11 with FIFA World Cup soccer

The world's first 3D network – ESPN 3D – will debut at 9:30 a.m. (ET) on Friday, June 11. The historic first program will be the 2010 FIFA World Cup match between host nation South Africa vs. Mexico at Soccer City in Johannesburg. It will be the first of 25 matches broadcast in 3D throughout the month-long event; culminating with the FIFA World Cup Final Sunday, July 11 at 2 p.m. Sony was named the first official sponsor of the network in January 2010. DirecTV and Comcast will distribute ESPN 3D. Previously, ESPN 3D announced the new network would show the 2011 BCS National Championship game in Glendale, Ariz., as well as NBA, X Games 16, Winter X Games 15, college football and basketball. ESPN has produced several 3D telecasts, including the Masters in April 2010, a Harlem Globetrotters game in February 2010. http://sports.espn.go.com

CBS proclaims basketball 3D a success

CBS made broadcast history by producing the NCAA Men's Basketball Championship game in stereoscopic 3D and transmitting it to 55 theaters nationwide through Cinedigm's satellite-based digital cinema delivery system. CBS's 3D production, which was underwritten by TV set-maker LG Electronics, was the second collegiate national championship game to be broadcast in 3D, following Fox's 3D broadcast of the BCS college football championship in January 2009. While CBS's broadcast footprint was smaller than originally expected due to high demand for 3D-capable screens from competing 3D theatrical releases "Clash of the Titans" and "How to Train Your Dragon", the network was pleased with how its first live 3D production turned out and is anticipating more 3D coverage this summer, perhaps of tennis and golf. CBS used Fusion 3D camera rigs from Vince Pace, who developed the camera systems used in the 3D blockbuster movie "Avatar" and worked with ESPN and NEP this week to produce 3D coverage of The Masters tournament at Augusta. CBS used six 3D cameras in all, including overhead cameras mounted above both baskets, and also pulled video from a 2D SkyCam aerial camera that was up-converted to 3D using a Sony production switcher. CBS also converted all the LG commercials and CBS promos during the broadcast, as well as a halftime documentary piece, using the same technique. http://www.lge.com

GUNNAR Optiks announces 3D lens technology for gaming and movies

GUNNAR Optiks announced today that they will be offering a collection of 3D glasses enabled with components of their i-AMP lens technology. Versions will be available for the most widely used 3D platforms in gaming and video. For the first time, premium consumers will have a chance to view 3D technology with ergonomically correct and distortion free optics. GUNNAR is relying on components of its i-AMP technology to provide the optics. "While typical 3D eyewear is stamped from a flat sheet of plastic, GUNNAR lenses are shaped, formed and cut to provide distortion free optics," said Joe Croft, co-founder of GUNNAR and EVP of research design & development. "For the amount of technology and effort that goes into the creation and delivery of the content, it is a shame that the weakest link in any 3D system today is the eyewear used to view the final product." GUNNAR eyewear with i-AMP 3D will initially be available in Q2 of 2010 in configurations that are compatible with iZ3D gaming systems and Real D video. Ready to wear versions will be priced from $89.00 to $149.00. Prescription eyewear in both configurations will be available in Q3. http://www.gunnars.com

Newsight Japan 70-inch TV offers 3D without glasses

Newsight Japan debuted a 70-inch 3D TV that does not require glasses, thanks to a new, but still evolving, technology. Newsight is using a method called parallax barrier technology. The 70-inch set claims to be the largest 3D TV set in the world. Although the set does project 3D without glasses, other details – including price and release date haven't been announced. A parallax barrier is a device that goes in front of an LCD screen. The device has a series of precisely placed slits that allow each eye to see a different set of pixels. This creates a sense of depth and allows the user to view 3D images without glasses. The drawback to this type of technology is that the viewer must be positioned in a relatively specific spot. Sharp recently announced a mobile 3D touch screen that uses the same parallax barrier technology, but it had no immediate plans for a larger model. Other manufacturers are working on the same idea through different technology. Sunny Ocean is working on a screen that would use the same lens technology as the glasses, but the screen itself would render the images in 3D. This technology is promising, but it will only work with images that are broadcast in 3D, and users would need to remove the screen for standard 2D. The most common of the current autostereoscopic sets seems to be lenticular lens technology, favored by Chinese maker TCL, Samsung, NEC and Philips, all of which had displays at this year's CES. Lenticular lens technology uses multiple magnified lenses that create the illusion of depth. In television sets, projectors display images through eight or more lenses, although you only see a few at a time. The multiple lenses allow the viewer to see the image in 3D from multiple angles. Although still new, TCL has a working model on the market now, for $20,000.

Sharp to join 3D TV battle with advanced display

Japan's Sharp Corp said it would begin selling 3D-capable LCD TVs in Japan this summer, the latest consumer electronics maker to enter the market. The maker of Aquos brand flat TVs plans to launch 3DTVs in China, Europe and the United States by December, joining larger rivals such as Samsung Electronics and Sony Corp. Sharp's new products will be the world's first 3D TVs using four-primary-color technology, which utilizes yellow on top of the three conventional primary colors of red, green and blue, enabling the TV sets to offer brighter, more vivid images. Panasonic Corp and Samsung have already released 3D models, while Sony plans to start offering 3DTVs in June. Demand for 3D TVs will likely grow more than 10-fold to 27 million units in 2013 from an estimated 2.5 million units this year, according to research firm DisplaySearch. Sharp expects 3DTVs to account for 5-10% of its total LCD TV sales in the business year ending March 2011. http://www.sharp.com

UC Berkeley and Bangor University researchers flag health concerns related to 3D

Stereo 3D movies and TV could generate as many as seven different perceptual problems, said Martin Banks, a professor of optometry and vision science at the University of California at Berkeley. He gave a talk in February to a broad group of consumer and Hollywood technologists about some of his biggest concerns. "I think there are real things to be concerned about with the use of stereo displays becoming very widespread, especially if younger children are exposed to them routinely," added Simon Watt, a lecturer in the school of psychology at Bangor University in Wales who, like Banks, has been conducting studies on eye movements and stereo 3D displays. One of the main issues the researchers are studying is the so-called convergence-accommodation conflict. People watching stereo 3D content have to adjust what they see at one point on a flat screen to information in the content that tells them that object is at another point in 3D space. Such adjustments are not needed in the real world, so the human brain is not wired to handle them smoothly. Recent 3D movies such as *Avatar* did a good job of minimize the effect, Banks said. But "as you decrease the distance [to the display] the problems created by this conflict accelerate and it's non-linear so they accelerate quickly. "Things you could get away with in movies, you can't in a video game where a kid is close to the screen, so I am more troubled about stereo 3D TVs than movies," he added. Both Banks and Watt are working on one possible solution. In separate efforts they are developing so-called multi-focal-plane displays that could reduce eye strain.

Bit Cauldron demonstrates 3D glasses for home theater and gaming

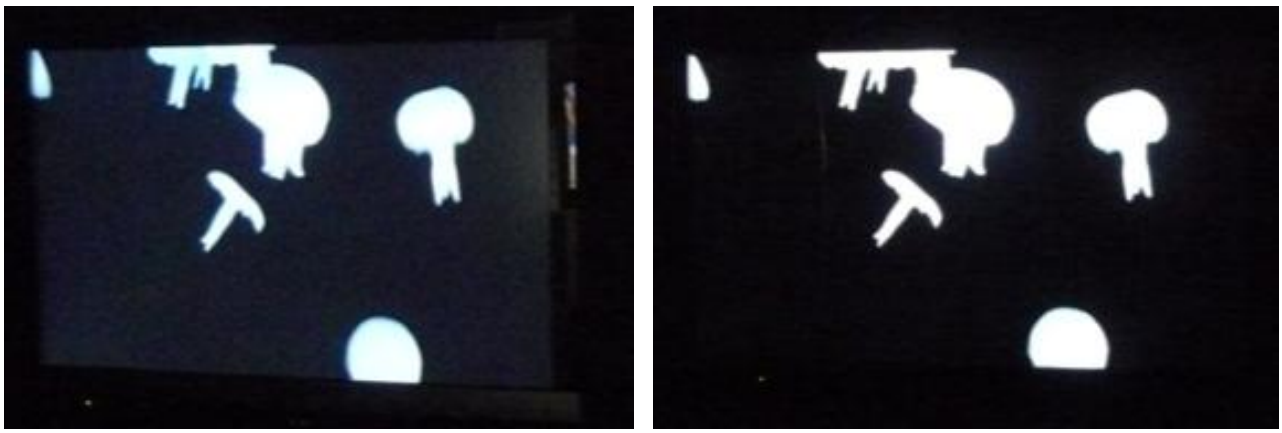
Bit Cauldron demonstrated its stereoscopic 3D shutter glasses showcasing how consumers will soon get to enjoy high-fidelity 3D movies and games at home with their own televisions or computer. Bit Cauldron glasses incorporate fast, neutral density lenses for a clearer, brighter picture than ever while preserving HDTV color and resolution. The glasses work together with AMD GPUs. They use advanced IEEE 802.15.4 radios for a reliable connection from display to glasses. Bit Cauldron glasses will be available from major household brand names in the second half of 2010. http://www.bitcauldron.com

Sony details backlight units in its upcoming 3D LCD TVs

Sony recently gave some insights into the backlighting systems utilized in their upcoming HX900, HX800, and LX900 3D LCD TVs:

- **HX900 series:** The backlight unit of the HX900 series consists of groups of white LEDs, and those groups of LEDs (as units) are attached to the back of the panel like tiles. The light-emitting part of the white LED is parallel to the panel, and it lights the back of the panel by using optical elements such as a light guide plate. This structure enables a slimmer LCD panel than the structure of a normal direct-type LED backlight with LEDs whose light-emitting part is vertical to the panel. Furthermore, by controlling the light emission of each unit of LEDs, it is possible to improve the contrast.
- **HX800 series:** The HX800 series is equipped with Sony's edge-lit white LED backlight that has a local dimming function. White LEDs are arranged in lines at the upper and lower edges of the panel. And the light emissions of groups of white LEDs are separately controlled. Controllable areas are arranged in two lines in the vertical direction. Sony did not disclose the number in the horizontal direction but said that it is 10 or less and that the areas cannot be controlled as minutely as those of a direct-type LED backlight.
- **LX900 series:** The LX900 series comes with a normal edge-lit LED backlight that does not have a local dimming function. The HX900 and LX900 series have a structure where the LCD panel unit and the glass plate on the surface are integrated by filling the gap between them with newly-developed resin. The structure is called “Opti Contrast Panel.” Because of the integration, the reflection of backlight and the light from outside can be reduced compared with panels made by filling the gap between the LCD panel and glass plate with air. The surface of the glass plate is coated with an AR film.

The "HX900" series (right), which has a direct-type LED backlight, and the "XR1" series (left), which features RGB-color LED backlight



The "HX800" series (right), which has an edge-lit backlight with a local dimming function, and an LCD TV with a normal edge-lit LED backlight (left).

3D@Home Consortium provides expert advice for 3D content and equipment developers

Well-known creators of existing 3D content have collaborated on a new "From the Experts" set of guidelines available from the 3D@Home Consortium website. The experts' advice and topical "White Papers" are valuable additions to the consortium's online repository of information for the stereoscopic 3D community, which includes producers and directors, through rig operators and 3D systems engineers. Located on the consortium's website at http://www.3DatHome.org, these sections augment information on 3D products, live 3D events, an industry glossary and more. Visitors to the "From the Experts" section of www.3DatHome.org will obtain both quantitative and qualitative recommendations on creating 3D content from highly regarded stereographers of films such as "Avatar", "U2 3D", and "Beowulf", as well as links to high-quality 3D information being published by others in the 3D community. Jon Shapiro, chair of Steering Team 1 on 3D content creation and co-founder of high-end 3D gear maker, 3ality Digital, notes, "Not all 3D is created equal. Continued growth of a robust home market requires that consistently high quality 3D content is available. We believe that "From the Experts" will help to educate the next generation of 3D stereographers, directors, producers, and technicians, as well as amateurs, and thus improve the consistency of 3D video overall." Other experts have prepared white papers on 3D technology signal processing and market overviews. These papers reveal valuable information to the engineering community currently trying to create technology and processes for successful integration of 3D into broadcast, hardware and software platforms. A steady stream of papers will be posted in the coming weeks on other topics, including: rendering in 3D, the evolution of 3DTV formats, 3DTV compression rates, real-time holography, and 3D photography.

Cablevision licenses Real D format for 3D content in the home

Real D and Cablevision Systems announced that Cablevision has licensed the stereoscopic Real D format for the delivery of high definition 3D content to the home. Through this licensing agreement, Cablevision's content providers will be able use Real D tools to format their 3D content and deliver it to millions of homes in crisp, clear high definition 3D. The delivery of Real D Format content is compatible with Cablevision's current HD broadcast and on-demand systems and works with existing HD set-top boxes. The Real D format was first utilized for the March 24th telecast of the Rangers vs. Islanders hockey game from Madison Square Garden, the first network hockey telecast ever produced in 3D and the first time a live 3D sports telecast was available to homes in the US. The Real D format builds on the company's patented side-by-side 3D formatting technology and is capable of delivering high-definition 3D to the home utilizing all channels of the existing HD broadcast infrastructure. Cablevision has chosen to use the side-by-side method as its primary method of delivering 3D content due to its ability to deliver high-quality progressive and interlaced video over existing infrastructure including existing HD set-top boxes and DVRs. http://www.reald.com

Oberon Media announces casual games catalog for 3DTV

Oberon Media, the provider of multi-platform casual games, has announced its 3D games catalog for 3DTV, a new addition to the robust line of content and services Oberon offers for living room devices. These 3D games will provide players with fun and visually engaging game experiences based on Oberon's commercially proven casual games catalog, including the extremely successful Dream Day Wedding franchise. In addition, this new content will help promote and highlight the capabilities of the latest advancements in 3DTV screens. Oberon's stereoscopic 3D games are designed and optimized for 3DTV experience and take into account screen size, processing power, memory and input devices. The games will be accessible either through Oberon's distribution solutions, serving over 150 game services and interactive TV channels worldwide, or pre-loaded and embedded in 3DTVs purchased at retail. http://www.oberon-media.com

HDNet to produce programs in 3D

Mark Cuban's HDNet is to produce original 3D programs to begin distributing later this year. At the Cable Show in Los Angeles, an HDNet exhibit was prominently demonstrating 3D programming. Cuban later told 3DHollywood.net/HollywoodInHiDef.com: "We are starting to produce now, with the goal of having our travel shows in full duel 3D/2D production in December. We will make it available on VOD and to our distribution partners who create linear 3D channels." http://www.hd.net

NVIDIA introduces 3DTV Play

NVIDIA launched a companion app for home theater PCs. 3DTV Play gives any PC with a modern, 3D Vision-capable GeForce card the ability to output a true 3D image to any TV with both 3D and HDMI 1.4 inputs, including new Panasonic VIERA plasmas as well as LCDs from Samsung, Sony and others. The system works with any set's existing active shutter glasses and doesn't need a format change for games or movies. The graphics chip maker is joining Panasonic on a 3D TV tour starting today in New York City but only plans to ship 3DTV Play for $40 to those jumping directly to a TV for the added depth. Those who already bought into the GeForce 3D Vision kit for desktop viewing can get the software for free. http://www.nvidia.com/object/3D_TV_play.html

Eldim develops measurements for 3D displays with active glasses

Time sequential stereoscopic 3D displays are likely to be one of the more popular solutions for 3D TV in the near future. Optical characterization is mandatory for quality control and comparison between the different technologies. Eldim recently presented a full working solution to fully characterize these displays. OPTIScope-SA allows full characterization and analysis of the temporal behavior of such displays. UMaster with dedicated software allows full quality control. ELDIM's OPTIScope-SA measures precisely the response times and luminance levels for each grey level transitions of 3D-ready LCD displays. Shutter glasses transmittance and temporal behavior is also obtained. Thanks to dedicated grey to grey transition analysis software, luminance levels seen by left and right eye observer across shutter glasses can be computed. Grey level variations due to response time and temporal synchronization can be deduced. ELDIM's UMaster videocolorimeter thanks to its telecentric objective, Peltier cooled CCD sensor and new generation of color filters allows precise imaging measurements even in low luminance conditions. Used with automatic software and dedicated grey level patterns it is the tool of choice for quality control of time sequential stereoscopic 3D displays. Grey level stability and temporal synchronization are quantified simultaneously. http://www.eldim.fr

HDMI Licensing releases version 1.4A, enabling 3D enhancements

HDMI Licensing announced the release of HDMI Specification Version 1.4a featuring key enhancements for 3D applications including the addition of mandatory 3D formats for broadcast content as well as the addition of the 3D format referred to as Top-and-Bottom. The complete HDMI Specification Version 1.4a, along with the 1.4a version of the Compliance Test Specification (CTS), is available to Adopters on the HDMI Adopter Extranet. An extraction of the 3D portion of Specification Version 1.4a is available for public download on the HDMI Web site at http://www.hdmi.org. The purpose of the extraction document is to provide public access to the 3D portion of the HDMI Specification for those companies and organizations that are not HDMI Adopters but require access to this portion of the Specification. The HDMI Specification Version 1.4a provides a level of interoperability for devices designed to deliver 3D content over the HDMI connection. The mandatory 3D formats are:

- For movie content:
  - Frame Packing
    - 1080p @ 23.98/24Hz
- For game content:
  - Frame Packing
    - 720p @ 50 or 59.94/60Hz
- For broadcast content:
  - Side-by-Side Horizontal
    - 1080i @ 50 or 59.94/60Hz
  - Top-and-Bottom
    - 720p @ 50 or 59.94/60Hz
    - 1080p @ 23.97/24Hz

Implementing the mandatory formats of the HDMI Specification facilitates interoperability among devices, allowing devices to speak a common 3D language when transmitting and receiving 3D content. The mandatory requirements for devices implementing 3D formats are Displays – must support all mandatory formats; Sources – must support at least one mandatory format and Repeaters - must be able to pass through all mandatory formats.

HDMI Licensing makes 3D portion of HDMI specification version 1.4 available for public download

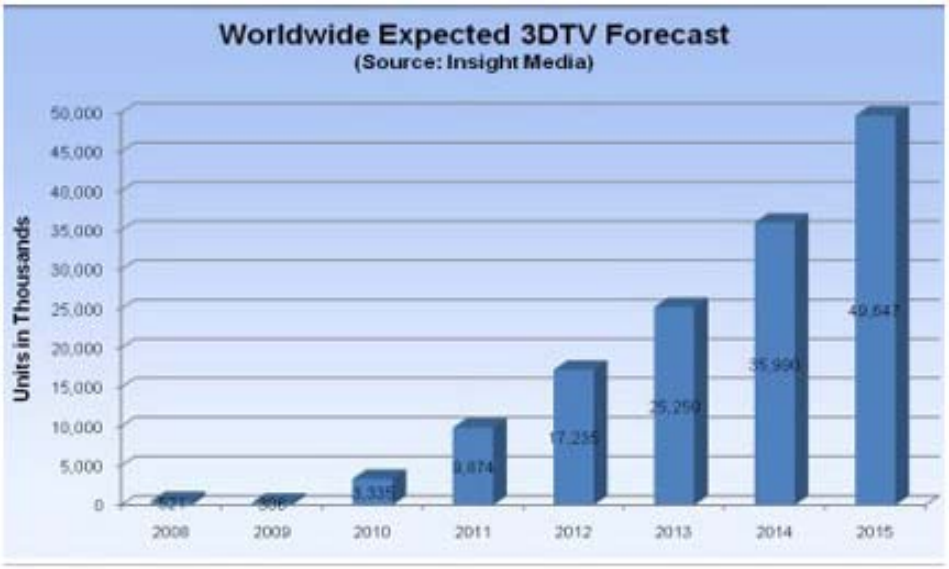
HDMI Licensing announced that it has made the 3D portion of the HDMI Specification Version 1.4 available for public download on the HDMI website at http://www.hdmi.org. The purpose of this document is to provide public access to the 3D portion of version 1.4 of the HDMI Specification for those companies and organizations that require access to this portion of the specification but have not executed an HDMI Adopter Agreement. The document available for download is extracted from version 1.4 of the HDMI Specification. The HDMI Consortium intends to release a 1.4a version of the HDMI Specification shortly which will include updates to the 3D portion of the Specification. As soon as the 1.4a version of the specification is published to adopters, an update to the 3D portion of the document, available for public download, will also be published. http://www.hdmi.org

CableLabs develops 3D test support and opens laboratory for 3D TV technology

CableLabs has expanded support for development of 3D television technology. CableLabs is providing testing capabilities for 3D TV implementation scenarios over cable. These capabilities cover a full range of technologies including various frame compatible, spatial multiplexing solutions for transmission. Based upon an RFI issued by CableLabs in March 2009, CableLabs opened its test facilities for development and support to vendors and TV designers to explore interoperability with 3D cable delivery systems. As a result of these investigations, CableLabs has determined that many of the digital set-top boxes deployed by cable operators are capable of processing 3D TV signals in frame-compatible formats. Today's new generation of 3D TV receivers is expected to support these formats using an HDMI video connection. It was through this testing that CableLabs played an influential role in the recently announced changes to the HDMI 3D specifications to add support for the "Top/Bottom" format and enable legacy STBs to signal 3D carriage. A "frame-compatible" 3D format is one that carries separate left and right video signals within the video frame used to convey a conventional (2D) high-definition signal by squeezing them to fit within the space of one picture. The advantage of such a format is that it can be delivered through existing plant and equipment as if it were a 2D HDTV signal. While the frame-compatible formats will enable support for stereoscopic 3D signaling almost immediately, work continues on an effort to define a long-term solution that will enable support for 3D content that can be delivered at resolutions and frame rates as high as 1080p60 for both eyes. http://www.cablelabs.com

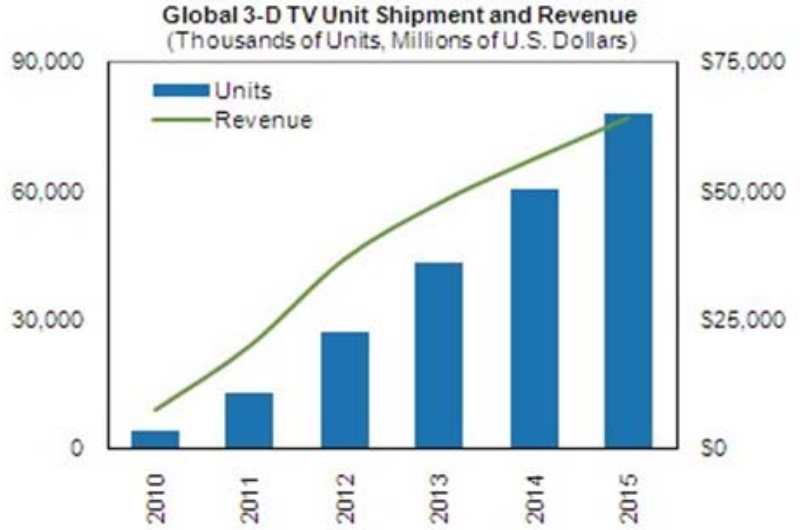
Insight Media issues 3DTV forecast

Insight Media issued a new report: *2010 3DTV Forecast Report: A Comprehensive Worldwide Forecast of 3D Television Unit Sales by Region and Technology*. The report finds that nearly 50 million 3DTVs are expected to be sold in 2015, rising from 3.3 million 3DTVs in 2010. The forecast features Insight Media's unique and proprietary convergence method that includes Tops-Down and Bottoms-Up approaches that are converged, reconciled, adjusted and validated to produce the final forecasts. Expected, optimistic and conservative forecasts are offered in the report. The report provides 3DTV forecasts by region, with a technology breakdown for each region. The Tops-Down analysis includes a determination of the Total Available Market (TAM), adjustment for TVs over 30", evaluation and selection of penetration rates to model 3DTV acceptance, and the development of intermediate, optimistic, and conservative forecasts. The Bottoms-Up approach includes a Consumer Expectations Analysis (technology dependent and technology independent), a Price-Performance-Competitiveness analysis and a Market Development analysis. The report is available in pdf format as a company site license for $2,000 http://www.insightmedia.info/reports/20103dtvdetails.php



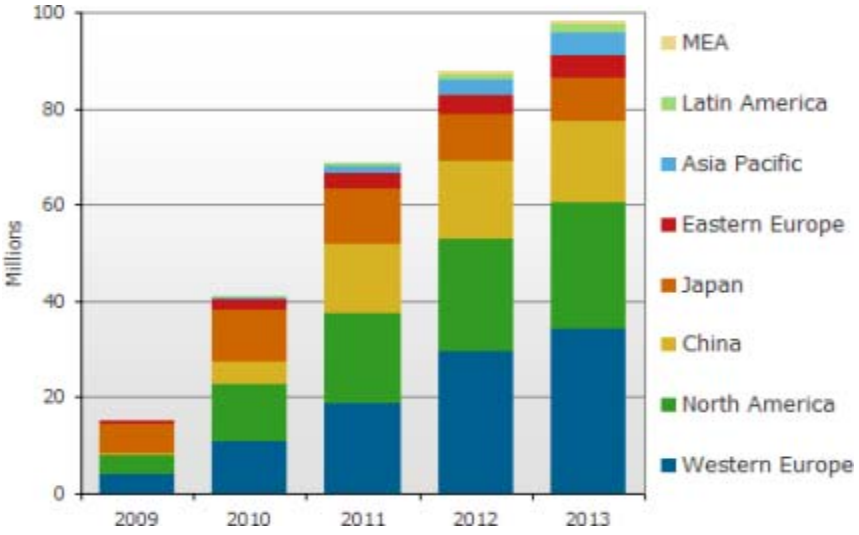
iSuppli estimates that 3D TVs will command a $600-700 price premium in 2010

According to iSuppli, the typical 3D TV will sell for about $1768 in 2010. The researchers calculate that $600-700 premium over regular LED-backlit LCD TVs will keep 3D out of the mainstream for the next few years. The limited availability of 3D content to watch, and uncertainties over the price and the compatibility of the 3D glasses needed to view the material, will act as barriers to growth. iSuppli's near-term forecast is more bullish than the one made by rival market watcher DisplaySearch earlier this year. DisplaySearch predicted that only 1.2 million 3D TVs will ship this year, rising to 15.6 million in 2013 and then to 64 million in 2018. iSuppli, on the other hand, estimates shipments will reach 78 million by 2015 after passing the 45 million mark in 2013. That's a compound annual growth rate of 80 per cent. The growth driver will be a sharp fall in average selling prices, according to iSuppli. From that average figure of $1768 today, the price will pass below the $1000 in 2014 and reach $825 in 2015. http://www.isuppli.com



DisplaySearch say TV manufacturers continue to breathe new life into TV market

A deluge of new product announcements so far this year shows that TV set makers are far from running out of ideas, according to the latest DisplaySearch Quarterly TV Design and Features Report. “While 3D TVs are all the rage, there has been a surge in the development of other TV enhancements,” noted Paul Gray, DisplaySearch Director of TV Electronics Research. “Incorporating USB connectors in TVs is fast becoming as important as HDMI, and is enabling all kinds of new functionality. Skype is moving into the living room with video calling and a surge of new connected sets are soon to reach the market in China. Also, Wal-Mart’s purchase of VUDU could transform TV features if the retailer decides that any set they sell has to be capable of accessing it.” DisplaySearch forecasts that almost 100 million connected TVs will be shipped in 2013, up 546% from nearly 15 million in 2009.

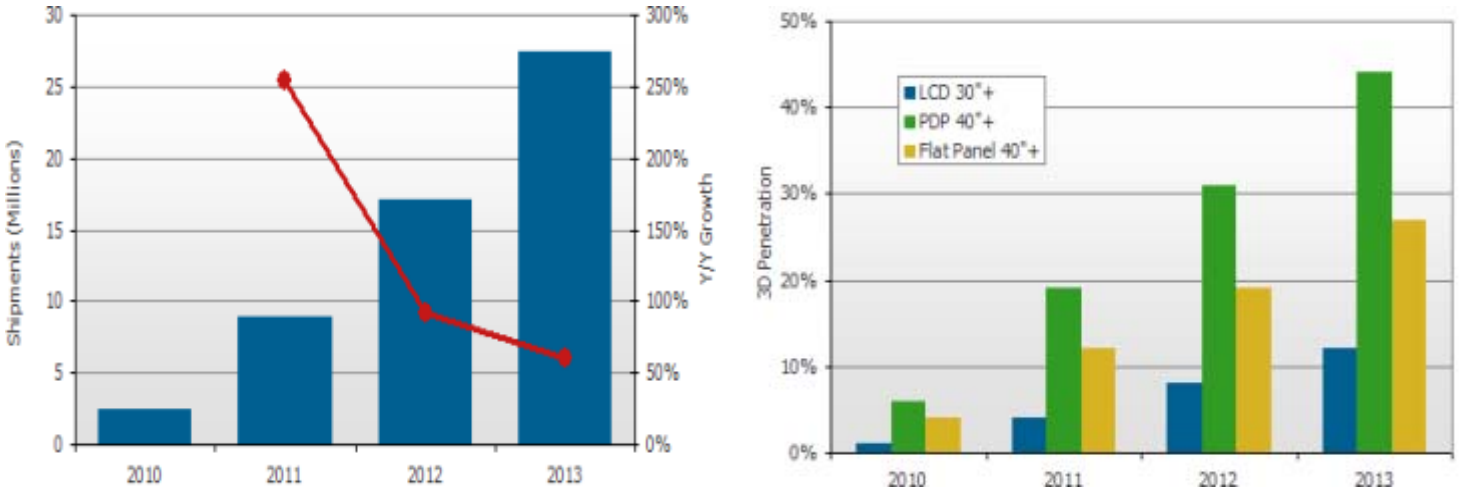


DisplaySearch connected TV forecast

Digital broadcasting is also reaching a new phase, with government policy driving rapid adoption in Brazil and China, while 2010 is the year of terrestrial HD for Europe. Despite this, the Internet is revolutionizing video delivery and TV set makers are preparing to ride that wave. DisplaySearch research also indicates that LED backlighting and 240Hz LCDs will serve as enabling technologies for new feature developments in TV in 2010, specifically 3D, an area of intense interest to broadcasters, movie studios and set makers. DisplaySearch forecasts that 2.5 million 3D-capable TVs will be shipped in 2010, with growth to 27 million sets in 2013. The DisplaySearch Quarterly TV Design and Features Report is a quarterly update of the issues and fast-moving feature developments in TV sets. The 200+ page report examines and forecasts video processor and signal processing IC market development, including 120/100 and 200/240 Hz frame rates and market shares for major IC vendors. In addition, the report also features forecasting for MPEG-4 decoding and the digital broadcast environment around the world; TV connectivity, such as wired and wireless networked TVs; LED backlighting; 3D capability and implementation; remote controls and chassis design; and power consumption. http://www.displaysearch.com

DisplaySearch upgrades 3D-capable TV shipment forecast to 2.5M units in 2010

With the first round of 3D-capable TVs now reaching retail floors and plans for the top TV manufacturers to bring more products to market soon, DisplaySearch has increased its 2010 forecast for 3D-capable TV shipments. According to the latest Quarterly TV Design and Features Report, the market is forecast to grow from 2.5 million 3D-capable TVs shipped in 2010 to 27 million sets in 2013. The video processing and extra display performance required for 3D remain relatively costly compared to entry-level models. As a result, 3D is constrained by the penetration of double or quadruple frame rate sets in the market. While 3D is forecast to show rapid growth, DisplaySearch research indicates that only 27% of 40 inch or larger sets shipped in 2013 will be 3D-capable. Furthermore, Blu-ray Disc and HD broadcast have low penetration in Western Europe, and as a result there remains a content gap that needs to be filled before 3D can flourish. http://www.displaysearch.com



3D-capable TV forecast; 3D penetration by technology

IMS Research Launches 3D Tracker

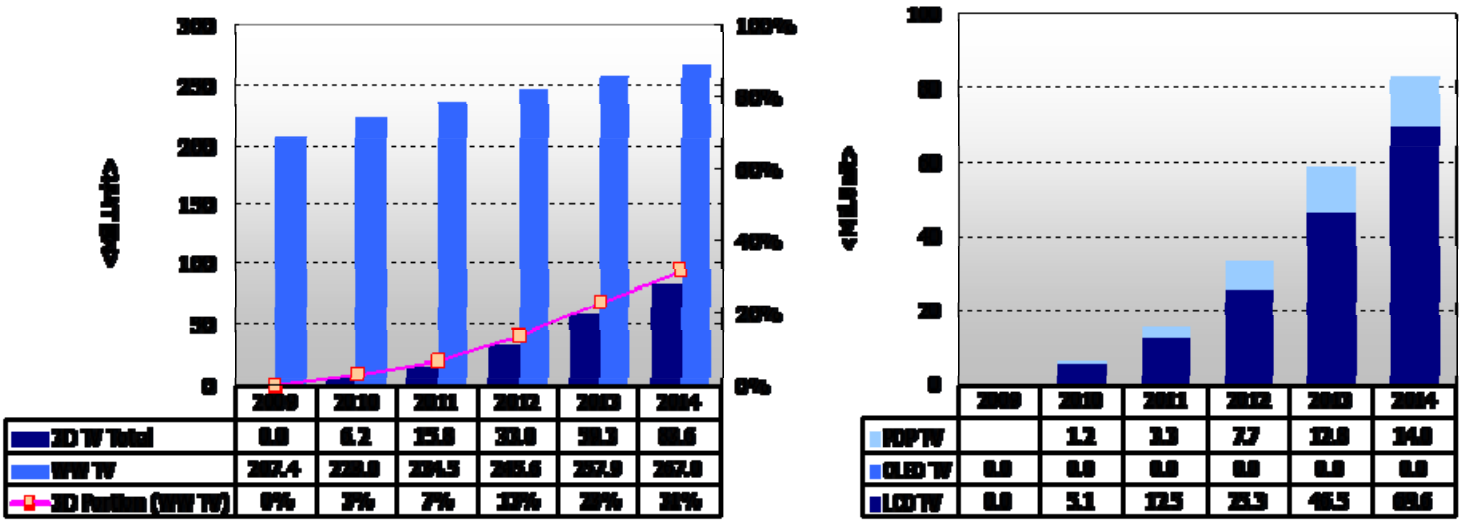
IMS Research has begun work on a 3D tracker, providing desired monthly and quarterly shipments along with a rolling 4-quarter forecast to track the progress of the rapidly growing 3D market. Initial products covered include:

- 3D TVs
- 3D LCD TV Panels
- 3D Blu-ray Players
- 3D active shutter glasses

IMS also anticipates adding more products to the tracker in 2011 including 3D channels, 3D game consoles, and 3D projectors. STBs are not going to be included initially as a firmware upgrade will allow existing HD STBs to have dual decode capability necessary for 3D. If a 3D broadcast standard is adopted and 3D specific STBs are introduced, they will be added to the tracker. Regional coverage will include US, Asia Pacific, Europe and Middle East and Africa. Monthly deliverables include monthly shipment results on an aggregate basis in an Excel pivot table with no brand data revealed. Analysis will also be provided in PowerPoint. Quarterly deliverables include shipments by brand and region along with a rolling 4-quarter forecast with both an Excel pivot table and PowerPoint slides provided. http://www.imsresearch.com

Displaybank predicts 6.2 Million 3D TVs to be sold globally in 2010

Displaybank announced that 3D TV market is expected to represent 3% of all TVs sold with 6.2M units in 2010 and among these; 5M units are expected to be 3D LCD TV and 1.2M units for PDP TV. Displaybank forecasts 6.2M 3D TVs will be sold in 2010 growing to 33M units in 2012 and 83M units by 2014 to represent 31% of all TV market. These and other findings are disclosed in Displaybank's newly published *3D TV Industry Trend and Market Forecast Report*. In terms of device type, 3D LCD TV market is expected to reach 5.1M units in 2010 to represent 81% of total 3D TV market and is expected to be mainly applied to premium products utilizing Full HD and 240Hz in large-sized TVs over 40-inch in size. By 2014, 3D LCD TV market size would reach about 70M units to represent 28% of all LCD TV market. In 2010, 3D PDP TV is expected to penetrate 8% of all PDP TV market but by 2014, most of PDP TV makers are expected to apply 3D as one of TV's function that 3D PDP TV is expected to represent 99% of all PDP TVs. http://www.displaybank.com

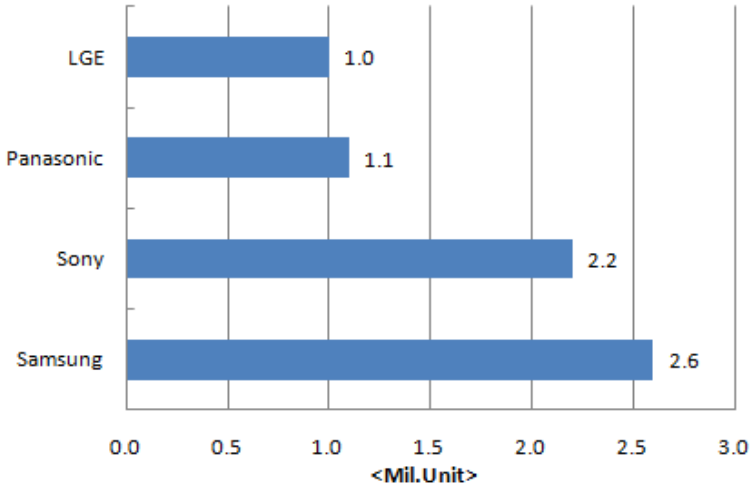


On the left: Total 3D TV Market Forecast (Unit Based); on the right: 3D TV Market Forecast by Device

(Source: Displaybank, *3D TV Industry Trend and Market Forecast Report,* May 2010)

Displaybank says 3DTV market growth will be led by TV makers in 2010

The TV market is not consumer-led but a manufacturer-led market, according to Displaybank. In the past, FPD, FHD, LED and 120Hz have all seen growth through makers' marketing and sales strategy. With makers' aggressive strategies, 3D is also expected to see sharp growth in the future. In that sense, 2010 will become the advent year of 3DTV. In 2010, major global TV makers including Samsung, LG, Sony and Panasonic are expected to show aggressive 3DTV sales strategy in order to maintain each company's competing edge in the 3DTV market. The number of 3DTV models that have either been launched or planned to be launched in 2010 by these four makers reach 42 models and their combined sales target is 6.9M units. At the second-half of 2010 when 240Hz panels will be actively supplied to the market, the number of models and sales quantities will sharply jump as other makers begin participating in the 3DTV market. At the moment, 3DTV is mainly applied in high-priced premium models utilizing LEDs and 240Hz and it will take some time before 3DTV to enter into the mainstream. http://www.displaybank.com



3DTV sales target by maker in 2010 (in the case of Japanese makers, calendar-based yearly target is applied)

Nielsen says TV and Internet use together is growing

Americans are spending more time watching television and surfing the Internet simultaneously, and nearly 60% of TV viewers use the Web at the same time at least once a month, according to a Nielsen report. The Nielsen Three Screen Report said the findings in its study belied early concerns that the growing popularity of the Web would kill off traditional TV. The report for 2009's fourth quarter, which tracked viewing across TV, the Internet and mobile phones, found a 35% rise in the amount of time Americans used the TV and Internet simultaneously compared with the same quarter in 2008. It found Americans now spend 3.5 hours per month watching TV while on the Internet. Active mobile video users grew by 57% over the year to 17.6 million from 11.2 million people, with much of the increase attributed to the growth of smart phones. The report found that Americans now watch about 35 hours of TV per week and two hours of time-shifted TV via video recorders (DVR), with 25 to 34-year-olds making more use of time-shifting than any other age group. DVRs are now found in 35% of American households, the report said. http://uk.nielsen.com

In-Stat says consumers want both pay TV and over-the-top video

Consumers want their Internet TV, according to market research firm In-Stat. Already, based on In-Stat's new multi-client research, 26% of US consumer respondents report viewing Internet TV more than once per week. However, rather than a substitute for traditional pay TV services, consumers want Over-the-Top (OTT) Internet video to compliment traditional TV offerings. The recent research also found: while PCs remain primary devices used for viewing Internet TV, consumers are increasingly using multiple devices; consumers use a several devices to get Internet video to their TVs, including PC-based and dedicated media adapters, gaming consoles, Blu-ray players and Internet-enabled TVs; at year end 2009, 24 million web-enabled devices were in operation in the US – this is expected to grow to 102 million by 2013. http://www.in-stat.com

Quixel Research reports LED and large screen LCD TV sales were a bright spot in a challenging Q1 2010

After an exceedingly strong Q4 and overall 2009, US LCD TV sales fell flat in Q1 2010, with LED and large screen model results providing a silver lining for the quarter. Quixel Research's recently published LCD TV Market Review revealed that volume and value were down sharply for both Q1'09 to Q1'10 and Q4'09 to Q1'10. LCD TV value for the category fell 34% Q2Q to $4.1B in Q1'10 compared to $6.2B in Q4'09 and was down 21% Y2Y. Unit sales dropped 40% Q2Q and 10% Y2Y. For the first time, the LCDTV category has seen wider availability and affordability in the 60-inch+ screen size segment, with more than seven models launched in Q1 2010. Unit sales almost doubled from Q4'09 to Q1'10 for the 60-inch+ segment driving sales growth up 700% from Q1'09 to Q1'10. The Q1 2010 decline in the overall LCDTV market has not altered Quixel Research's outlook for 2010 and beyond. Quixel's projections for the US LCD TV market in units show the category growing out to 2013 with large screen models taking an increasing share in the category. http://www.quixelresearch.com

DisplaySearch says that Q1'10 Shipments Show Global TV Market Continues to Recover

TV shipments continued to show a strong rebound in growth rates from the very weak levels of early 2009 as improving global economic conditions led to greater demand for TVs. According to the latest TV shipment data from the DisplaySearch *Quarterly Advanced Global TV Shipment and Forecast Report*, total TV shipments increased 25% Y/Y in Q1'10 to 55M units, while LCD TV shipments showed a 50% Y/Y improvement to more than 40M units, very close to expected levels. Other TV technologies showed strong results as well, with plasma TV shipments surging 21% Y/Y to 3.4M units. CRT TVs, which had been averaging 40% Y/Y shipment declines during most of 2009, had a only a 21% decline in unit shipments, with emerging market demand for TVs ahead of the 2010 World Cup soccer tournament injecting life into the fading technology. Even mature flat panel TV markets had strong results in Q1'10. Japan, which completed the transition from CRT to flat panel TVs several years ago, enjoyed a 93% Y/Y increase in LCD TV shipments and a 38% increase in plasma TV shipments as a government sponsored stimulus program, the green Eco-Points initiative, is nearing its expiration, spurring

Technology	Q1'10 Units	Q1'10 Unit Share	Q/Q Growth	Y/Y Growth
LCD TV	40,595	74.1%	-20%	50%
PDP TV	3,390	6.2%	-28%	21%
OLED TV	0.1	0.0%	-73%	-84%
CRT TV	10,750	19.6%	-12%	-22%
RPTV	41	0.1%	-20%	-38%
Total	54,777	100%	-19%	25%

Table 1: Q1'10 Worldwide TV Shipments by Technology (000s)

consumers to upgrade. In Europe, the upcoming World Cup and digital TV transition in several countries drove a 33% Y/Y increase in TV shipments during Q1'10 as brands and retailers prepared for the increased level of demand.

LED Backlights Account for 8% of LCD TV Units Shipped in Q1'10 and More Than 17% of Revenues: As TV brands aggressively transition their lineups away from CCFL backlights to LED backlights in an effort to increase average prices and profits, most are facing an immature LED supply chain struggling to keep up. As a result, supply shortages are keeping key component prices high, along with the market premium of LED-backlit sets over CCFL-backlit counterparts. Even so, the share of LCD TV shipments with LED backlights nearly doubled from 4% in Q4'09 to nearly 8% in Q1'10, the vast majority of which were edge-lit models. Penetration of LED backlights in LCD TV shipments was highest at larger screen sizes, with LED share at more than 35% of 50"+ in Q1'10, compared to less than 4% below 40".

Samsung Leads Global Brands with Top Unit and Revenue Share in Q1'10: Samsung's global TV market share pulled back from record levels reached in Q4'09, but still led all other brands by a healthy margin, at 21.9% of global TV revenues in Q1'10 (Table 2). Samsung continues to be aggressive in taking leadership positions for new technologies, such as LED in 2009 and 3D in 2010. Such actions have led to strong unit growth and high average selling prices. Samsung was the #1 brand in LCD TV and #2 in plasma TV. LGE was the #2 brand worldwide in TV shipment revenues, increasing their share to 14.8%, a record result for the brand. LGE also had the best Y/Y revenue growth among the top five brands with strong share expansion in nearly every region, aside from Eastern Europe and Japan, where the brand doesn't participate. Sony rounded out the top three brands in global TV revenues during Q1'10, declining in share to just under 10% after a strong surge in growth during Q4'09. Sony's 34% Q/Q decline in revenues also led the top five brands and was the only brand among the top five with a Y/Y decline in TV revenues. http://www.displaysearch.com

Rank	Brand	Q4'09 Share	Q1'10 Share	Q/Q Growth	Y/Y Growth
1	Samsung	23.7%	21.9%	-26%	18%
2	LGE	13.0%	14.8%	-9%	29%
3	Sony	11.5%	9.6%	-34%	-15%
4	Panasonic	7.9%	6.7%	-32%	28%
5	Sharp	5.4%	6.3%	-7%	1%
	Other	41.7%	41.4	-18%	17%
	Total	100.0%	100.0%	-20%	15%

Table 2: Q1'10 Worldwide TV Brand Rankings by Revenue Share

CE Department upgrades at WalMart and Target

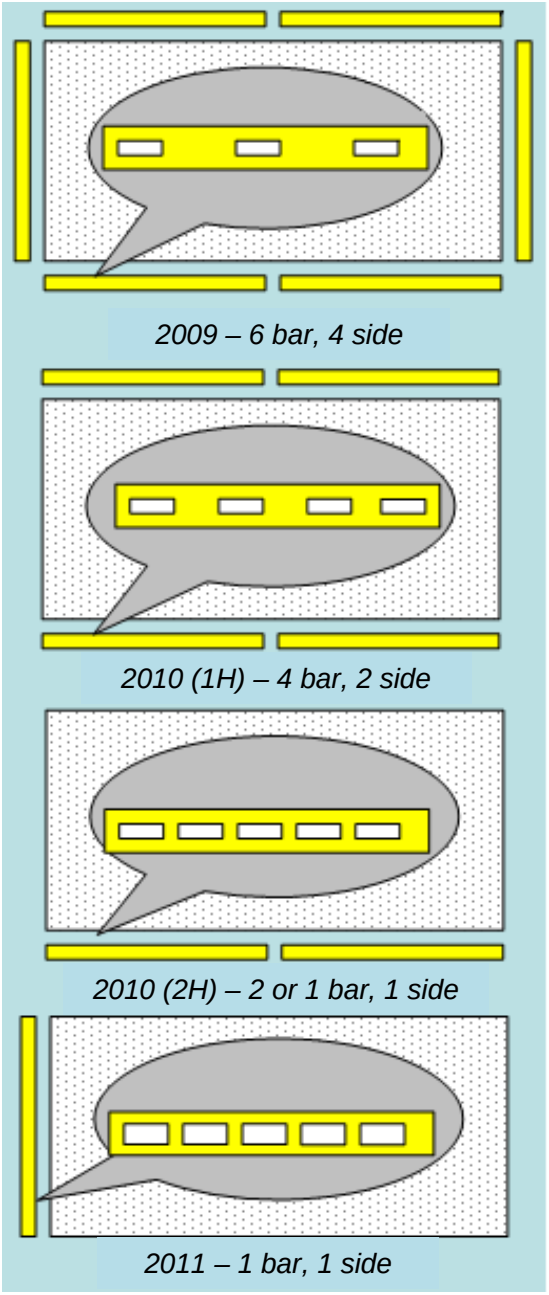
Both WalMart and Target recently issued press releases announcing plans to upgrade their consumer electronics departments with expansions in the TV area of each. Both upgrades are underway this month. Included in the TV related part of the WalMart reset are back- and edge-lit LED IPTV, streaming Blu-ray Disc players amounting to a 50% increase of Internet streaming Blu-ray players from LG, Samsung, Sony Vizio TVs hosting content from Vudu, Netflix and Pandora. 1200 WalMart stores will configure a "New Technology" HDTV Center featuring LG, Samsung and Vizio, among others along with a "Wireless at Home" networking display. Target will update their TV wall with an eye toward improved picture quality across comparable models and incorporate an in-home ambiance in the department. The chain will expand the selection of screen sizes and add edge-lit LED and IPTV models into the mix.

Westinghouse announces LED-backlit TV line

Westinghouse announced a new lineup of LED-backlit LCD TV models The new edge-lit lineup consists of eight models ranging from 24- to 55-inch screen sizes with a new industrial design. The models are about 1-inch thick at the TVs' visible edges and feature a high-gloss black frame, with red accents in a modern styling. The new sets are considered "statement" technology from Westinghouse, and all feature an edge-lit LED system. All eight models meet or exceed Energy Star 4.0 ratings going into effect in the Q2'10 and six out of the eight new models exceed Energy Star 5.0 ratings, which are slated to go into effect in 2012. According to Westinghouse, the 24-inch LD-245 series uses 15% less energy than a 40-watt light bulb, and the 26-inch LD-265 series and LD-268 series use less energy than a 45-watt light bulb. The 32-inch LED models use 10% less energy than a 60-watt light bulb. The 42-inch LD-425 series LED set uses 20% less energy than a 100-watt bulb.

Displaybank reports TV-use edge-type LED BLU technology advancement and cost saving accelerates

Displaybank announced that the edge-type LED BLU technology used in LED LCD TV shows rapid advancement. Edge-type technology that places LEDs as "bar" type to four sides of the TFT-LCD panel is seeing accelerated evolution in terms of method that lowers number of LED bars used and also of cost saving. The edge-type LED LCD TV products launched in 2009 had 6 LED bars in four sides of the panel but in 2010, products that have LED bars in only two sides are being launched and in some small-sized application, products with one-side 2 LED bars are being launched. Displaybank forecasts that the average price of LED BLU in 2009, which was $226.10, would decline to $129.00 in 2010, reflecting a 43% price decrease based on the 40-inch sized product. Andy Yu, senior vice president in the display research group at Displaybank noted: "The technological advancement can be considered as the industry's efforts to respond to the LED shortages by lowering number of LEDs applied with the cost saving factor. The explosive demand increases for LED LCD TVs lead to endless concerns on shortages for LEDs as well as other related components but major TV makers are continuously updating their new product lineup with not only LED LCD TV but "3D" LED LCD TVs." Displaybank forecasts the market size of LED LCD TV in 2010 to be 32M units, 9 times Y/Y growth, and this correspond to 19% of the total LCD TV market size. http://www.displaybank.com



Efforts to lower LED bars applied in edge-type LED LCD TVs.
Source: Displaybank, Large-size BLU/LED BLU Industry Trend and Analysis, April 2010

Sony showcases its first HD Freeview TV

Sony showed off its latest range of Bravia TVs, the first includes a DVB-T2 tuner, capable of receiving high definition Freeview channels. In terms of design, the new Monolithic design presents a solid black slab, which is designed to recline at six degrees off vertical, which according to Sony offers a better viewing experience when you're on the couch. Furthermore the aluminum stand can include an optional speaker as well. The company has revamped the remote to better suit the Monolith concept and has included a power toggle button on the back. Many of the new Bravia's and several of its upcoming Blu-ray players are network enabled and incorporate Sony's cross-media bar interface, which is currently found in the Playstation Portable, PS3 and some Sony Ericsson phones. The exact services will vary from device to device, but from this interface users will be able to access content from the network and the Internet, including social networks and a range of IPTV and video streaming services like YouTube and soon Demand Five, Lovefilm and iPlayer amongst others. Certain models will also include support for widgets, giving access to real time updates about weather, news, etc. Due to the lack of an inbuilt browser, most of these new features are accessed through bespoke interfaces better suited to navigating with a remote. This is currently delivered on a proprietary system, but Sony is working with the Hybrid Broadcast Broadband TV (HBBTV) consortium to create an open standard for harmonizing the broadcast and broadband delivery of entertainment to the end consumer through connected TVs and set-top boxes. The new design and interface will be available in some of the new Blu-ray players and a range of LCD, LED and LED backlit Bravia TVs with screen sizes ranging from 32 to 60 inches. http://www.sony.com

Sharp announces new line-up of AQUOS LCD TVs using RGBY pixel structure

Sharp announced its new AQUOS LCD TVs – a six model series in different equipment categories and screen sizes up to 60 inches. Sharp's "RGBY technology" is included in the AQUOS LE900E series as well as within the model series LE820E, LE822E, LE810E and LE812E. The LE320E model range is available in two attractive colours, white and black, and makes the ideal second or third television for the home. With 25 new LCD TVs, Sharp has announced its AQUOS team for spring 2010. The full line-up consists of the AQUOS LE900E series and the model series LE820/822E, LE810/812E and LE320E. One particular highlight of the new line-up is Sharp's own RGBY technology. The addition of yellow as the fourth pixel colour in the new Sharp panels gives TV viewers an even more brilliant picture and therefore an incomparable experience when watching high definition TV, according to Sharp. The company claimes that

> "Picture quality is the most important criterion when deciding which new television to buy. Here, Sharp has been able to make yet another advance with the RGBY pixel technology of its new LCD TVs. The expanded colour space of this system, together with its more refined rendition of subtle hues, are particularly evident in the reproduction of golds, yellows, greens, blues and browns. These colours now appear even more radiant and natural".

At the same time, the new AQUOS LCD TVs have persuasively outstanding environmental properties. Here, the LE820/822E and LE810/812E lines are particularly remarkable. These models have even managed to break the power saving record achieved last year by the award-winning AQUOS LE705/700 and LE600 model series – only Sharp is so far capable of providing power consumption of less than 100 watts for a 52-inch (132-centimetre) LCD TV. At least, AQUOS series LE812E and 822E integrate a triple-tuner for DVB-T /-C and -S2.

On the left is a clever promotional image from Sharp; the image on the right magnifies the RGBY structure as compared to the more typical RGB structure. The technology utilizes a fourth color pixel, yellow, in addition to the standard RGB color pixels, which increases the range of displayable colors, and which may mimic more closely the way the brain processes color information, according to Sharp's messaging.

TAOS debuts integrated digital ambient light sensing and proximity detection

Texas Advanced Optoelectronic Solutions announced the first members of its next generation digital ambient light sensor (ALS) and proximity detection family that is designed to provide consumer electronics manufacturers with greater freedom to produce sleeker, more appealing and innovative product designs. These latest TAOS devices eliminate the need to use clear glass/plastic in front of the sensor or drill holes/slots into the display, bezel or frame in order for light to reach the sensor. Specifically designed to operate behind darkened glass or other translucent materials, the TSL2771 device family provides both ambient light sensing and proximity detection in a single device that consumes far less power than currently available comparable solutions. Proximity detection is ideally suited for touch screen smart phones to automatically turn off the display or control other user functions and can also be used in laptops, desktop computers and monitors to conserve energy or maintain information privacy when the user is not present. Other emerging applications for proximity sensing technology include touchless display

controls activation and management as well as human gesture detection. The TSL2771 ambient light sensor and proximity detection device family incorporates an IR LED current-limited driver, analog-to-digital conversion (ADC), interrupt capability, multiple I2C interface voltage options and flexible programming allowing it to be configured into many different applications. As darkened glass or translucent materials can be transparent to IR wavelengths while attenuating visible light by 100 times or more, the device utilizes TAOS' patented dual-photodiode architecture that allows the sensor system to compensate for the increased IR component. When combined with the ability to adjust the analog gain settings up to 128x, the device excels in challenging low-light level applications. http://www.taosinc.com

NTT Electronics achieves super-low latency with low bit rate, Full HD H.264 encoder/decoder

NTT Electronics Corporation has upgraded the AVC/H.264 HDTV/SDTV encoder/decoder HVE9100/HVD9100, which was released in January 2008, to support a new "super-low latency mode." With the upgrade, NTT Electronics has achieved the low latency of 100ms, a world-class result for low bit rate AVC/H.264 encoding. Due to the shift from analog to digital broadcasting, the global broadcasting industry frequently uses picture encoding. However, as restrictions on data rate necessitate the use of video encoding, video transmission latency has become an issue in live broadcasting, interactive video communication, and when controlling the camera. Broadcasting stations in particular require real-time video transmission with the lowest latency possible in order to attract viewers through live coverage of events. For this reason, in networks with data rate restrictions for HDTV video, achieving low latency is a crucial issue. The new mode also supports audio compression, substantially reducing the delay perceivable in interactive video communication during live broadcasts and remote operation of fixed cameras. The HV9100 series supports HDTV (1080i, 720p) and SDTV (480i, 576i). As an option, the series also supports up to 16ch PCM audio input and output, as well as an IP interface. This series has various audio compression modes, enabling ancillary transmission as well. http://www.ntt-electronics.com

Testronic Labs joins Open IPTV Forum

Testronic Labs, independent global Quality Assurance experts, has been accepted to join the Open IPTV Forum (OIPF). TL is lending its support to this standards-setting initiative which exists to provide a "plug and play" experience to the end-consumer of IPTV. As one of the world's leading test houses for hardware quality assurance and certification of multimedia equipment and interfaces, TL will contribute to the OIPF on matters of certification and testing. http://www.testroniclabs.com http://www.openiptvforum.org

Zixi and PeerTV form strategic alliance to solve video delivery over the Internet for content distributors

Zixi and PeerTV announced that they have formed a strategic alliance to provide a turnkey end-to-end solution for narrowcasters seeking to deliver live TV channels and VOD services to target consumers over the open Internet. By combining Zixi and PeerTV's platforms, content distributors now have the ability to deliver HD quality live video over the Internet that starts instantly and has no latency, packet loss, jitter or frame freeze. Zixi's platform provides a highly scalable live and VOD video global delivery system with Dynamic Adaptive Bitrate supporting up to full HD (1080p) resolution. PeerTV's complete Internet based middleware contains a content and subscriber management system, an easily configurable UI, EPG and other essential features for streaming video over the Internet. The combined Zixi and PeerTV solution supports PC (Windows/Mac), a unique advanced Internet based HDTV set top box that enables the live TV over the Internet channel viewing, VOD in HD format, and reception of DVB-T channels to the home TV. The combined solution will be offered as a web based service solution allowing OTT content providers to start paid subscription services with minimal startup costs and allowing for the delivery of fully-personalized TV. http://www.zixi.com

Mvix introduces HDMI splitter for digital signage and residential applications

MvixUSA launched Mvix Splitter, a stand-alone HDMI video distribution system for splitting the high-definition video signal. Mvix Splitter splits the 1080p high-definition video signal from one HDMI source device (Blu-Ray, digital signage, media system) to four display LCDs simultaneously. Mvix splitter offers a high quality, high performance HDMI 1.3b platform for AV signal distribution. Equipped with one input and four outputs on gold plated connectors, it supports high bandwith, full-HD (1080p) video and high-resolution digital DTS-HD and Dolby True HD 7.1 channel audio. A built-in, powered, equalizer ensures reliable connections for longer cable runs. Mvix Splitter provides a data rate of up to 2.25Gbps, and allows for a comprehensive deep color HD splitting. Mvix Splitter is priced at $130. http://www.MvixUSA.com

Portrait Displays demonstrates new color space control software in collaboration with Intel

Portrait Displays announced Chroma Tune, a software application uses Intel Corporation's newest i3 and i5 CPU/GPU platform to provide accurate color-space control. LCD-panel color technology has improved significantly. Manufacturers and consumers want the greatest number of bright and vibrant colors. Wide-color gamuts on the display can give the most appealing images. However, the color gamut of the display needs to be controlled to match the color standards of the content being viewed – DVD, DSLR photos, Blu-ray, Flickr, and web-shopping sites all have different gamut standards. To get the most accurate image on a computer display, the display needs to be set to the same color gamut as the content being viewed. A Chroma Tune-enabled display can automatically assign the proper color space to any application without any user intervention. Chroma Tune is the result of technical collaboration between Intel and Portrait Displays. Chroma Tune reprograms the Intel GPU to change the color gamut of the display. The Chroma Tune Windows application allows the end user to change the color gamut instantly by selecting a gamut from a pull-down menu – sRGB, Rec709, and Adobe RGB are examples of standard color gamuts that can be selected with Chroma Tune. http://www.portrait.com

Hillcrest Labs launches new Web browser for TVs

Hillcrest Labs announced that it has launched a new Web browser for viewing Internet videos on TVs. The Kylo Web browser works with PCs or Macs that are physically connected to consumers' TVs to let them visit Web sites of their choosing. Unlike traditional Internet browsers, Hillcrest said Kylo was developed to let help viewers watch Internet content on their TVs from a distance in living rooms or family rooms. Since viewers can access all types of over-the-top services that are available on the Internet, the Kylo is more of an open approach than "walled gardens" that keep customers in designated areas of the Internet. "No matter how hard they try, no single set-top-box manufacturer, specialized TV widget developer, or content aggregator can match the volume of online viewing choices available on a computer," said Dan Simpkins, founder and CEO of Hillcrest Labs. "For this reason, many consumers are simply using their new HDTVs as an alternative display for their PCs or Macs. So, we've developed Kylo as a free and simple TV browser that enables them to visit any site on the Web, and makes the entire experience more enjoyable." While Hillcrest is offering the Kylo for free, the company is hoping it will drive sales of its Loop in-air mouse, which can be used as a remote control that retails for $99, although Kylo works with a standard mouse. http://hillcrestlabs.com

Coincident TV and Ascent Media provide enhanced interactive video services

Coincident TV (CTV), creators of the CTV hyper-video software suite that combines online video, social media, weblinks and commerce in one immersive experience, announced a technology collaboration with Ascent Media Group's Blink Digital, one of the leading digital media production studios. CTV's unique cue point language (CPL) driven software and technology offers a foundation for Blink Digital to incorporate advanced design, development and delivery service capabilities when creating multifaceted online video experiences, such as virtual DVDs and superfan web destinations. CTV and Blink Digital's initial projects and proofs of concept are currently being developed and will be released later this spring. http://www.coincident.tv http://www.blinkdigital.com

Elgato intros TV tuner for DTV antennas

Elgato released its EyeTV One TV tuner. The receiver lets Mac or PC users watch and record North American over-the-air TV programs for free. The device has an extended USB connection on one side that connects to a computer's USB port and a full-size coaxial plug on the other that can be connected to an indoor or outdoor antenna. The product ships with Elgato's EyeTV 3 software for the Mac platform that lets users watch, pause, and rewind live TV, record shows, subscribe to a favorite TV series and create smart playlists. The software also has an editor feature that can remove unwanted content and can be set to send recordings directly to iTunes and sync with an iPhone, iPod, or Apple TV. These recordings can be shared over a local network with other Macs as well. Other apps can be downloaded that will let iPhone users view their recordings while away from home. The EyeTV One is now available at Apple stores on online at Elgato, priced at $120. Users get one year of TV Guide data, which they can renew later for $20 per year. http://www.elgato.com

Industry leaders announce open platform to bring web to TV

Leading industry players announced the development of Google TV — an open platform that adds the power of the web to the television viewing experience, ushering in a new category of devices for the living room. Intel, Sony, and Logitech, together with Best Buy, DISH Network and Adobe, joined to announce their support for Google TV. With Google TV, consumers will now be able to search and watch an expanded universe of content available from a variety of sources including TV providers, the web, their personal content libraries, and mobile applications.

Google TV is based on the Android platform and runs the Google Chrome web browser. Users can access all of their usual TV channels as well as a world of Internet and cloud-based information and applications, including rich Adobe® Flash based content – all from the comfort of their own living room and with the same simplicity as browsing the web. When coupled with the Intel® Atom processor CE4100, Intel's latest system-on-a-chip designed specifically for consumer electronics, the new platform will offer home theatre quality A/V performance. Sony and Logitech said they would be delivering products based on the new Intel Atom processor and running Google TV later this year. While Google TV is designed to work with any TV operator, at launch the user experience will be fully optimized when paired with DISH Network. Google TV expands video choice from the hundreds of channels available today through a pay TV provider to the vast storehouse of video content available through the web and streaming videos. The Google TV experience is complemented by the ability to watch streaming video from leading content platforms, including Netflix, Amazon Video On Demand, and YouTube. Google TV will also have the capability to run apps from the Android Market. To navigate the array of content that will now be available through a single device and on a single screen, Google TV introduces an integrated search experience to help viewers easily find relevant content across over-the-air and pay-TV channel listings, DVR, and the Internet, as well as a picture-in-picture layout to access multiple windows simultaneously. Google TV also features an innovative home screen to help viewers quickly organize their favorite content and personalize their TV viewing experience. Some of these features are only available with advanced integration from DISH Network.

Google also announced that they would soon release a set of TV specific APIs for web applications, encouraging web developers to begin building unique web applications for use on television sets. Later this year Google will also release an updated Android SDK, which will support applications built for Google TV. Google plans to open source the Google TV platform to help spur innovation and so that other developers can benefit from the project. The long term goal is to collaborate with the entire developer community to help drive entertainment in the living room forward and to introduce the next generation of TV-watching experience. http://www.google.com/tv

World's first Android TV launched by People of Lava

A Swedish company will be the first to sell an Internet-connected, Android-based TV set. The TV, from the People of Lava, will also be the first television made in Sweden for a long time. The TV is set to enter beta-testing in early summer, and other than size and price, tech-specs are still to be finalized. The first model will have a 42-inch high-definition LED screen and cost between $2,000 and $2,500. This will be followed by 47 and 55-inch models. The People of Lava TV will come with a browser, Google Maps, and more apps (Twitter and Facebook head the list). But these will require a keyboard. http://www.peopleoflava.com

Samsung's new line of DTVs first to feature enhanced InstaPort technology

Silicon Image announced that Samsung's new flagship line of 3D LED/LCD TVs is featuring Silicon Image's enhanced InstaPort S single-second switching technology. InstaPort S-enabled HDTVs will work with any HDMI-connected source device to enhance consumers' HD experience by significantly reducing the four to seven-second delay that typically occurs when switching between HDMI-enabled devices connected to the DTV. http://www.siliconimage.com

New tougher HDTV Energy Star standard takes effect

On May 1, the new Energy Star 4.0 standard for televisions, published last September, became effective. The maximum amount of power an Energy Star TV can consume will drop by about 40%. No televisions manufactured on or after May 1 will be able to carry an Energy Star logo unless they are 4.0 compliant. If a particular model is only 3.0-compliant, a unit built on April 30 could have the logo, but not one built the next day. In addition, such models will disappear from the EPA's online list of compliant televisions as of that date. Meanwhile, the EPA's list will continue to be updated with 2010 models that are compliant. The outgoing 3.0 specifications were not particularly strident. A 50-inch set could consume a full 318 watts when turned on and still get to display the logo. By comparison, Energy Star 4.0 means a 50-inch HDTV will not be able to carry an Energy Star logo if it burns more than 153 watts, just shy of half 3.0's maximum. The new specifications also require that a set use less than a single watt when in sleep or standby mode. Already, the 2010 models for Panasonic, Samsung, Sharp, Sony, and Vizio are Energy Star 4.0 compliant. Television manufacturers don't have to comply with Energy Star rules to sell their wares in the United States, but they'll have to come close to that in California. Last year the California Energy Commission introduced regulations, going into effect at the beginning of 2011 that come very close to Energy Star requirements. Effectively speaking, only Energy Star sets will be sellable in the Golden State. Even more strident rules are on the horizon. Energy Star 5.0 becomes effective on May 1, 2012. When that happens, a qualifying 50-inch set will have to burn no more than 108 watts when on. So will a 60-inch set, since the EPA has decided that, for 5.0, the maximum consumption for 50 inches will be the maximum, period. By comparison, according to the Energy Star 3.0 specs, a 32-inch set can burn more than that. http://www.energystar.gov

CPC's e-Captioning technology sets a new standard for closed captioning

CPC's e-Captioning software-based encoding and tape or tapeless delivery of closed captions is establishing itself as the new industry standard, the company says. Closed captioning is required by the FCC for virtually all TV broadcasts in the United States, and by the CRTC for most TV broadcasts in Canada. e-Captioning delivers dramatically faster and cheaper workflows for closed captioning, by streamlining the video delivery process. Traditionally, closed captioning required a video production facility to mail master tapes to a caption service company, which would run the video tape through legacy tape-to-tape encoding hardware, incurring generation loss in the video. This legacy hardware is pretty expensive (a closed caption hardware encoder can cost from $2,000 to $10,000, not including the costs of the software, tape decks, time code reader equipment, etc.). This made captioning costs high, and it was not feasible for most facilities to own and operate their own closed captioning hardware. Today, utilizing e-Captioning, editors and post houses do not need to buy expensive closed caption hardware encoders. Instead, they can simply exchange closed caption and subtitle documents over the Internet, and apply them to their video (including HD and SD tape, DVD/Blu-ray, and all kinds of digital files) using any non-linear video editing software. e-Captioning technology makes small caption files that are easily transmitted over the Internet, even if the deliverable is uncompressed HD. http://www.cpcweb.com/e-captioning

Sigma Designs showcases NeoVue wireless display-to-display technology

Sigma Designs announced the availability of the NeoVue transmitter/receiver platform designed to wirelessly transport audio/video (AV) and texts from notebooks or netbooks and display them in rich 1080p on a HDTV. In addition, NeoVue supports the VGA projector standard to allow wireless display collaboration in meetings. With the increase of multimedia being stored locally on computers, along with the increase of online content such as YouTube, Hulu and Netflix, the need for a clear solution to wirelessly stream high definition content to a HDTV or projection display is growing. Consumers would rather share their photos, video and Internet contents with other family members on a high quality HDTV than on a small display of a notebook or netbook. The NeoVue platform aims to solve this problem with its easy plug-and-play and affordable transmitter and receiver. The NeoVue platform includes both a transmitter with a USB dongle, based on Sigma's Coair wireless chipset, and a receiver that connects to a HDTV via a HDMI connector or to a projector via VGA connector. The transmitter captures the display and audio of the multimedia being displayed, encodes the media and sends it to the NeoVue receiver wirelessly to display in full 1080p on a HDTV or projection display. NeoVue uses standards based encoding (H.264/MPEG2) over standards based wireless link (ECMA-368 and ECMA-369 ISO recognized standard) with IP-based communication. http://www.sigmadesigns.com

WirelessHD Consortium next generation standard now available

The WirelessHD Consortium, the first and largest 60GHz initiative worldwide and the only wireless standard that provides wireless lossless A/V support, announced immediate availability of the WirelessHD 1.1 specification announced this January at the Consumer Electronics Show. This next generation WirelessHD specification enables HDTVs, Blu-ray disc players, PCs and portable devices to transmit, share and display content in "billions of colors" with unprecedented vividness and accuracy as well as instantaneously transfer large multi-gigabyte media files among a variety of devices. The WirelessHD specification, the de facto standard wireless digital interface for high definition consumer electronics, is currently supported by over 45 global technology industry leaders. Products implementing WirelessHD 1.1 technology will be backward compatible to those products using WirelessHD 1.0 technology. The WirelessHD 1.1 specification includes the following updates. Optimized architecture handles multi-gigabit data rates for A/V streaming and file transfer (Wireless Personal Area Networking or WPAN) at the lowest link power. Highest data rates: the next generation specification increases the data rate to 10-28Gbps, an unprecedented level of wireless bandwidth. This will support the demands of future high definition display devices, such as higher resolutions, deep color and high frame rates, as well as high-speed data applications. 3D over WirelessHD: the new specification will define common 3D formats and resolutions for WirelessHD-enabled devices. 4K resolution support enables devices to support HD resolution four times beyond that of 1080p. This feature allows the WirelessHD interface to transmit content at the same resolution as many digital theaters. WPAN data support: connected devices that include this feature support sync'n go file transfers for portable and fixed devices. This new specification also provides for IP connectivity for Internet access and networking of WirelessHD devices. Portable device support: the scalability of WirelessHD technology has been extended to support lossless video streaming in low-power portable devices such as portable media players, netbooks and smart phones. HDCP 2.0 content protection over WirelessHD: in addition to DTCP, both the current and future versions of WirelessHD will include support for HDCP 2.0 content protection. WirelessHD is the only standard to support both streaming and copying of multimedia content. http://www.wirelesshd.org

Atlona Technologies bridges the gap between your computer and HDTV with HDViEW

Atlona Technologies has come out with a simple solution for integrating a computer into a home theater. The HDViEW connects to the standard VGA monitor port on any computer, and outputs 1080p video through HDMI, the new standard for HD video. Since the HDViEW is powered through USB, there is no need for an additional bulky power supply. The HDViEW also takes audio from a computer's speaker or headphone jack, and embeds it with the video over HDMI, so there is only one cable going to the TV. http://www.atlona.com

Zhaga standardization group created to define LED light engine

An international group of companies from the lighting industry – including Acuity Brands Lighting, Cooper Lighting, OSRAM, Panasonic, Philips, Schréder, Toshiba, TRILUX and Zumtobel Group (Thorn's parent company) – is to initiate the formation of Zhaga, an industry-wide cooperation aimed at the development of standard specifications for the interfaces of LED light engines. As rapid advances in LED technology continue, Zhaga will enable interchangeability between products made by diverse manufacturers. Interchangeability is achieved by defining interfaces for a variety of application-specific light engines. Zhaga standards will cover the physical dimensions, as well as the photometric, electrical and thermal behavior of LED light engines. Zhaga is being formed for the benefit of the consumers in the expectation that standardization will prevent market fragmentation into incompatible light engines. Zhaga standards will give consumers the confidence to specify and purchase LED products that will be easily replaceable and commercially available, while continuously enjoying the performance upgrades that LED technology enables. http://www.zhagastandard.org

LG, Panasonic, and Samsung embed Skype into high-end TVs

LG, Panasonic, and Samsung have announced plans to embed Skype into its high-end TVs, putting video calling firmly into living rooms. LG and Panasonic announced plans for Skype-enabled TVs in January, and Samsung followed in February with two models to feature Skype functionality. Available now in Korea, Samsung plans to roll out the sets worldwide in "the first half of 2010", getting the jump on LG and Panasonic's plans for the middle of the year. http://www.samsung.com

HDBaseT Alliance formed to promote Ethernet-based home networking

LG Electronics, Samsung Electronics, Sony Pictures Entertainment, and Valens Semiconductor are allying to promote Valens' HDBaseT technology for whole-home distribution of uncompressed HD multimedia. The four companies formed the HDBaseT Alliance, and are working to develop a standard for home networking. HDBaseT, based on Ethernet, would join such standards as HDMI 1.4, G.hn (The HomeGrid Forum), WHDI, and WiGig as a possible solution to incorporating home electronics into a network capable of swapping uncompressed HD video. The HDBaseT Alliance is banking on the comprehensive product portfolios of its members, who say their standardization activities "will cover the entire value chain of the digital media ecosystem and the various market segments: TV sets, projectors, professional AV equipment, home theater, content providers, IT companies and more." http://hdbaset.org

WiGig Alliance announces completion of multi-gigabit wireless specification

The Wireless Gigabit Alliance (WiGig) announced the completion of its unified wireless specification. The WiGig specification enables high performance wireless display and audio and provides data transfer rates more than 10 times faster than today's wireless LANs, extending Wi-Fi technology while supporting backward compatibility with existing Wi-Fi devices. The completed specification is ready for member review and is anticipated to be made available to WiGig adopter members in Q1 2010. The WiGig version 1.0 specification includes the following key elements:

- Supports data transmission rates up to 7 Gbps – more than ten times faster than the highest 802.11n rate
- Supplements and extends the 802.11 Medium Access Control (MAC) layer and is backward compatible with the IEEE 802.11 standard
- Physical layer enables both the low power and the high performance WiGig devices, guaranteeing interoperability and communication at gigabit rates
- Protocol adaptation layers are being developed to support specific system interfaces including data buses for PC peripherals and display interfaces for HDTVs, monitors and projectors
- Support for beamforming, enabling robust communication at distances beyond 10 meters
- Widely used advanced security and power management for WiGig devices

The completed specification will be made available to WiGig members in Q1 2010. http://www.wigig.org

DVB initiates 3D TV standards group

Over the past year DVB has been closely studying the various aspects of (potential) 3D-TV solutions. A Technical Module Study Mission report was recently finalized, leading to the formal creation of the TM-3DTV group. As the DVB process is business and market driven, a 3D-TV Commercial Module has now also been created to go back to the first step: what kind of 3D-TV solution does the market want and need, and how can DVB play an active part in the creation of that solution? http://www.dvb.org

Simplay Labs launches new HDMI certification and two new test tools

Simplay Labs announced a number of new initiatives in HDMI Specification Version 1.4 certification, test tools, and testing facilities. As manufacturers quickly develop and release HDMI Version 1.4-enabled products, Simplay has launched HDMI Authorized Test Center (ATC) support for the latest specification. Products recently certified will release in the consumer marketplace in early 2010. In addition to standard ATC testing services manufacturers can also leverage the technical support of Simplay Labs consulting resources, which provide system-level application engineering and design integration services. The Simplay CEC Explorer SL 309 Development Tool has been officially recommended as a compliance test tool in the HDMI CTS Version 1.4. The tool helps design engineers develop, simulate and debug all aspects of CEC (consumer electronics control)/CDC (capability, discovery and control) functionality in real time, and includes a powerful GUI (graphical user interface) that allows engineers to interface with their own product prototype by exercising and monitoring CEC/CDC performance. The Explorer is officially recommended for CDC and the only tool that tests for both CEC and CDC. It also enables the testing for HDMI Ethernet Channel and Audio Return Channel through its CDC and CEC capabilities. http://www.simplaylabscom

Virgin Media wins TV software patent judgment against Rovi

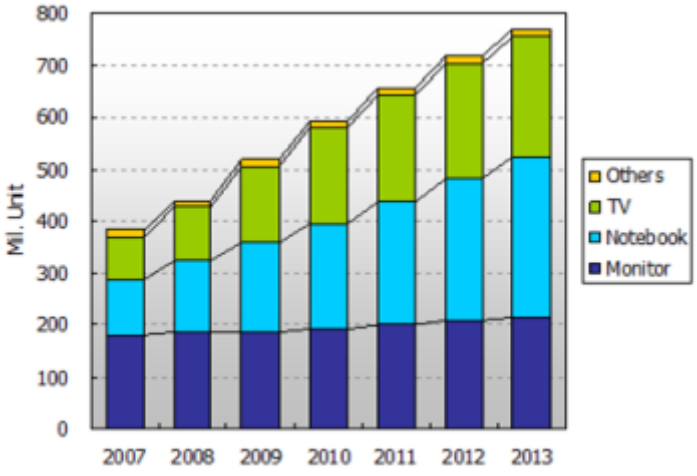
A US High Court has reaffirmed the difficulty of defending software programs by finding for Virgin Media. Virgin Media was sued by Gemstar, now owned by Rovi, for breaching user interface intellectual property it had successfully licensed to other TV operators. A court has now declared the patents invalid. One in particular, EP (UK) 1377049, was a computer program and could not be protected, the judge ruled. Patent EP0969662 describes a TV listing in grid form, which the judge said was not a technical effect, while EP1613066 describes an option for recording shows from the EPG. According to Justice Mann: "The patent describes a computer taking some information, getting some input from the user, and then giving the user the information he wants… No more than that." Rovi says it will appeal the decision.

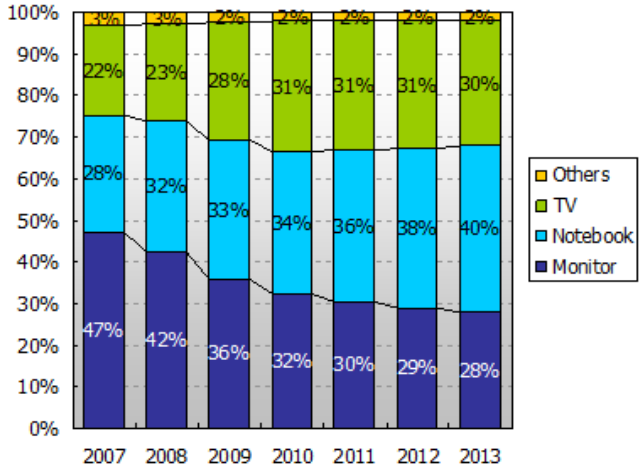
Netgear Push2TV sends notebook content to any TV wirelessly

Netgear launched NETGEAR Push2TV (PTV1000), a small device that enables consumers to wirelessly display their notebook computer screens on their big-screen HDTVs. Compatible with select laptops featuring Intel Wireless Display and leveraging the new 2010 Intel Core Processor Family, Push2TV transforms the living room HDTV into a huge, remote monitor without the need for any cables. Slightly larger than a deck of cards, Push2TV enables consumers to wirelessly send stored media, content from other parts of the home network, and videos streamed from the most popular websites. The NETGEAR Push2TV adapter, combined with Intel Wireless Display, extends the browsing and viewing experience on the PC, with setup as simple as "point and click", according to the companies. The solution consists of NETGEAR Push2TV connected to the TV via HDMI and Intel Wireless Display preloaded on new-generation notebooks powered by the 2010 Intel Core Processor Family. According to the company, Intel Wireless Display captures fully rendered display frames in real-time and sends the compressed video and audio directly to Push2TV via Intel My WiFi technology – what it claims is the industry's first commercially available Wi-Fi Personal Area Network (PAN) or Wi-Fi Direct solution: the protected short-hop high-bandwidth wireless connection between the laptop and Push2TV, saving bandwidth overhead by up to 50%, Netgear said. http://www.netgear.co.uk

Displaybank reports on the take-off of the LED backlight market

The eco-friendly LED industry is currently under the spotlight. It appears indisputable that the LED has capitalized as an added-value enabler for the display backlighting market. The CCFL was a relatively closed market, whereas the LED market is more positive to new entrants as it offers more opportunities. The LED demand is expected to firmly lead the growth and, accordingly, the BLU is on a road for growth as well. The large area BLU market recorded about 518 million units in demand in 2009. It is expected to reach 593 million units which is 14.5% growth in 2010. The market is predicted to grow to 770 million units in 2013. This signifies a high growth of CAGR 12.4% for 6 years from 2007. http://www.displaybank.com

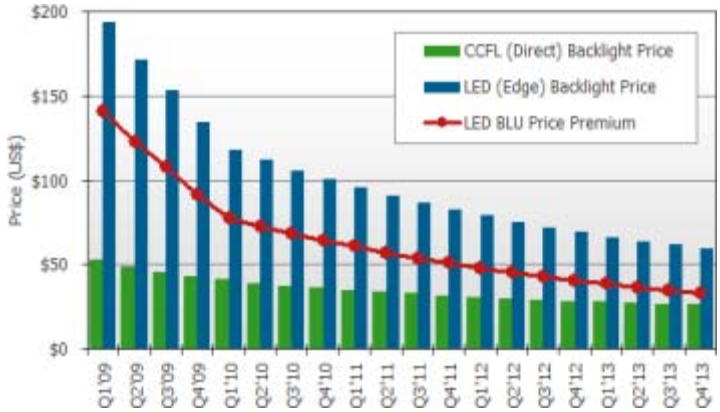




Large-Size BLU Market Forecast Application (Unit); Large-size BLU Market Forecast by Appl. (% Unit)

LED backlight costs falling faster than conventional LCD backlights according to DisplaySearch

Most LCD panel and set makers are focusing on development of LED backlight units for improved visual performance, thinner form factor, and lower power consumption. The key issue has been reducing cost, in absolute terms and relative to the conventional CCFL backlights. The newly-released DisplaySearch *Quarterly LED & CCFL Backlight Cost Report,* which analyzes and forecast the cost structure of CCFL and LED backlight costs, disclosed that the average cost of 40-inch edge LED backlight unit in Q1'10 is $118, and will fall to $100 by Q4'10 (see Figure 1). Cost reduction is driven by increasing production volumes, which affects LED and material costs, and by improvement in LED luminous intensity, which enables the use of fewer LED chips. The core components in a TV with an LED backlight unit – LED chips, LGP (light guide plate), and DBEF (dual brightness enhancement film)—are not used in conventional CCFL backlight units for LCD TVs. In the 40" LED backlight cost, the light source including the LED assembly accounts for 34% of the BOM, the LGP is 13%, and the DBEF is 15% (see Figure 2), so it is clear that LED design, output, and chip cost will be key for LED backlight cost reduction.



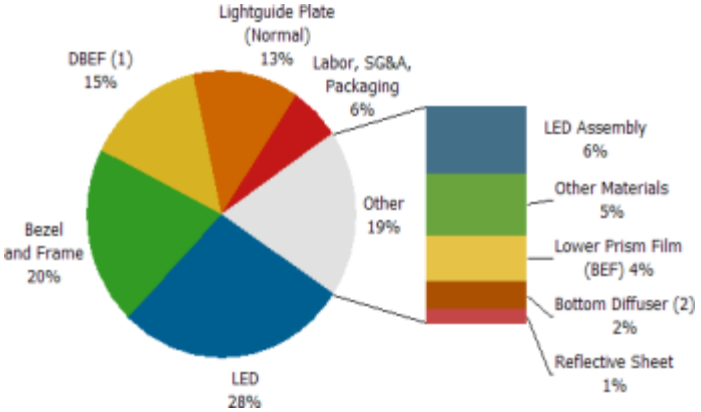


Figure 1 (on the left): Backlight cost comparison for 40-inch full HD LCD TV panel; Figure 2 (on the right): Cost breakdown for 40-inch FHD Edge-LED backlight unit (Q1'10)

The DisplaySearch *Quarterly LED & CCFL Backlight Cost Report* covers backlight unit cost structures and trends, with detailed cost breakdowns for 17 different configurations of notebook backlight units from 10.1- to 17.3-inch, 21 configurations of monitor backlight units from 15.6- to 27.0-inch, and 27 configurations of LCD TV backlight units from 26.0- to 60.0-inch. http://www.displaysearch.com

iSuppli identifies growth of TV connectivity to the Internet

More than one-quarter of all TVs purchased by American consumers in January were linked to the Internet, affirming consumer desire to distribute their media across multiple devices in the home. According to a survey conducted by iSuppli Corp., 27.5 percent of US consumers who bought a TV in January indicated their sets were connected to the Internet, either through the internal capabilities of their TVs or via external devices, such as digital video boxes or game consoles. This is up from 24.3 percent in December 2009. iSuppli's survey revealed that 41.9 percent of Internet-connected televisions in the United States in January were IETVs. The next most popular means of connection, at 20.3 percent, was through video game consoles. iSuppli defines an IETV as a set that has the capability to connect to the Internet, either with a wired link or wirelessly, and provides sufficient system resources to support thin-client applications such as Yahoo Connected TV widgets or the Adobe Flash Platform for the Digital Home. http://www.isuppli.com

DVD Association changes name to IDMA

The International Digital Media Alliance (IDMA) announced a name change from DVDA (DVD Association) to IDMA. While the DVDA has been a proud fixture on the digital media scene since its name was first adopted in 2000, the IDMA name better reflects the alliance's efforts in expanding its mission to promote best practices and excellence in the entire digital media market, rather than limiting the organization to just the DVD market. Furthering the goal to educate both the industry it serves as well as its consumers, IDMA has also begun work on the IDMA MediaPedia; an online encyclopedia about digital media. http://www.TheIDMA.org

IMS Research reveals opportunities for Internet video

IMS Research's newest report Market Opportunities for Internet Video to the TV reveals that demand for connected CE devices are being driven by increased bandwidth, the evolution of content delivery methods and the convergence of media and communications industries. These market drivers are resulting in new delivery methods, new content and evident changes in consumer behavior. The IMS Research study *IPTV: A Global Market Analysis* reveals that nearly 13% of global IP set-top box (STB) shipments in 2008 were operator-deployed hybrid boxes with the ability to receive content via IP or digital terrestrial broadcasts. Of these 1.6 million hybrid STBs deployed, 87% were shipped to Western European TV households.

IMS further reveals that global revenues of connected TVs will reach $29.3 billion in 2011, accounting for 58% of global revenues for Internet TV equipment in 2011.Since Blu-ray manufacturers have been quick to incorporate content libraries into their offerings, IMS believes that TV manufacturers will follow suit and address content partnerships this year. Before 3D viewing becomes a necessity, IMS Research anticipates that consumers will demand access to other avenues of content. This report builds onto IMS Research's first Internet Video household and device study that was released in December 2008. While the previous forecast revealed opportunities in this emerging market, the new study incorporates shipment data and industry trends along with splits of pay versus ad-supported content delivery. This update also extends the forecast period through 2015, at which time households with the ability to view Internet video on the TV are expected to exceed 463 million. http://www.imsresearch.com

AUO develops 37-inch full-HD LCD panel with oxide TFTs

AU Optronics Corp (AUO) has prototyped a full-HD (1,920x1,080 pixels) 37-inch LCD panel by using TFTs based on a transparent amorphous oxide semiconductor (TAOS-TFTs). Thus far, the sizes of LCD panels using TAOS-TFTs have been smaller than 20 inches. AUO exhibited the prototype at SID 2010 in Seattle. The TAOS-TFT used for the prototype is a coplanar type made with amorphous IGZO (In-Ga-Zn-O). So, its source and drain electrodes are formed on the lateral sides of a channel. With elements whose gate width and length are 22 and 5μm, respectively, its carrier mobility is 10 to 13cm^2/Vs, and its on/off ratio is higher than 10^8, AUO said. As for the instability of element characteristics, which tends to be a problem of TAOS-TFTs, AUO reduced it by applying a N_2O plasma process after forming an IGZO layer and by improving a passivation method. http://www.auo.com

Mitsumi Electric develops chip to sharpen images on inexpensive TVs

Mitsumi Electric Co Ltd has developed the MRFX-0001, an IC chip that can adjust the image quality of an LCD TV. Attached to the image processor or the scaler chip in the posterior part, it can be used to adjust the color, white balance and sharpness of an image. Normally, Japanese manufacturers develop such an image quality adjustment function by themselves for the high-grade models of their LCD TVs. Therefore, the MRFX-0001 is targeted at middle- and lower-priced LCD TVs manufactured by Chinese and Taiwanese TV makers. Image compensation can be dynamically done. For example, when many people are shown on the screen, the IC chip emphasizes flesh colors. And it emphasizes green colors in the scene of a forest. Though the release date of the chip has not been decided yet, Mitsumi plans to commercialize it within 2010. The MRFX-0001 supports 1,920x1,080 resolution and 60fps frame rate. It is mounted in a 144-contact TQFP package (22x22mm). http://www.mitsumi.co.jp/english/

An original image (left) and a processed image (right). The flesh colors have been emphasized.

MotionDSP announces free and premium versions of vReveal 2.0 with high-definition video enhancement

MotionDSP Inc. has released vReveal 2.0, the latest version of its consumer video enhancement software, which now provides support for HD videos. Plus, for the first time, vReveal software for Windows is available in a free version and a premium version. In both versions of vReveal, video enhancement processing runs up to 5x faster on CUDA-enabled Nvidia graphics processors (GPUs) than on CPUs, enabling real-time HD enhancement capability. Consumers expect the HD videos they capture to have pristine quality, but without a tripod, video from any handheld camera will shake. And regardless of camera quality, video captured under less-than-perfect lighting

conditions can produce dark, grainy footage. vReveal 2.0 makes it easy for to fix these and other common video problems for consumers in the exploding HD video segment, which IDC expects to account for 60% of video camera units sold in 2010, up from 45% in 2009. New features for vReveal and vReveal Premium include additional video fixes like Auto White Balance, an all-new set of fun special effects, and faster video-processing performance on both CPUs and Nvidia graphics processors. As with previous versions, vReveal 2.0 can optionally leverage a CUDA-enabled NVIDIA graphics processor (GPU) to process video enhancements up to 5x faster than with a CPU. With vReveal, users can fix shaky, dark, and blurry videos, for free. Output resolution for vReveal is limited to SD (480p), and a temporary watermark is applied to the lower-right corner of all exported videos. With vReveal Premium, users can save enhanced videos to HD resolutions, remove grainy video noise and pixilation with the "Clean" feature, and use super-resolution technology to add detail to videos for a better viewing experience on big-screen HDTVs and monitors. vReveal Premium also includes a new "Vintage" effect to give videos what the company describes as an "old home movie" look. http://www.motiondsp.com

DarbeeVision develops digital imaging technology

A team at DarbeeVision has discovered that pictures can be made even better than what the most perfect camera and display systems can produce. Going beyond the limitations of optics and electronics and taking into account what the human visual system does when images are viewed is the key to achieving the best images possible. By using computers to process an image in the same way a human brain does and then adding these results back into the original image, pictures take on new properties that are both unexpected and visually gratifying. Today, all digital media can be processed to improve contrast and color depth, add sharpening and filter noise. However, these solutions are limited by an inability to transcend fidelity constraints, and they often add unnatural artifacts, worsen noise or process parts of the image inappropriately. The Darbee approach solves an extremely tough challenge for monoscopic digital images – adding depth cues while avoiding artifacts. Darbee uses parallax disparity as the basis for local luminance modulation within an image, using a patented defocus-and-subtract method, which is selectively applied based upon a fast and accurate saliency map called the Perceptor. Darbee processing happens in real-time, with performance surpassing HD 1080p/60. The image processing is done intra-frame so no large buffer memory or time delays are required. Processing is resolution independent, scaling linearly with the number of pixels in a frame. The processing is local, modifying the image luminance on a per-pixel basis. With 3D television already in the stores, Darbee Visual Presence added to the left and right images of each stereo frame in a movie produces stunning results, the company says. They call it 3.5D. DarbeeVision's technology will next be deployed in three distinct ways: as an IP block, as a graphics processing unit (GPU) workstation and as a field-programmable gate array (FPGA). It has market applications spanning legacy, emerging and long term markets, including television sets, video game consoles, mobile devices, digital picture frames, and aftermarket TV accessory boxes. http://www.DarbeeVision.com

MONKEYmedia launches SeamlessTV Partner Program

MONKEYmedia announced the launch of its SeamlessTV Partner Program for the licensing of its portfolio of Seamless Expansion and Seamless Contraction patents, which includes claims directed towards telescopic video-on-demand (VOD) and other enhanced viewing experiences, and are essential to the practice of various industry-governed standards such as DVD-Video, Blu-ray and tru2way (e.g. Enhanced TV & SCTE-130). The SeamlessTV Partner Program is now open to all parties interested in practicing MONKEYmedia's patented technology and methods in connection with DVD players, Blu-ray players, set-top boxes, DVRs, smart TVs, PC video players, mobile devices, discs implementing telescopic video features, and telescopic advertising. Seamless Expansion is a form of interactive media in which a link from a video enables playback of optional content, such as another video, pictures, text or interactive media. When the viewer is done watching the expansion content, the main video resumes where it left off. On DVD and Blu-ray today, the technique is often used for behind-the-scenes footage, and is commonly referred to as seamless branching. The broadcast TV industry refers to it as long-form VOD or telescopic advertising. Internet video advertising community uses the terms in-video ads and contextual video overlay ads. Used in conjunction with addressable advertising technologies, advertisers now have powerful new means to attract audiences and overcome ad-skipping trends. Seamless Contraction is the inverse of Seamless Expansion; enabling long videos to be shortened by skipping over undesired or non-salient segments based on user preference. http://seamless.TV

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"A Great TV in Every Room"

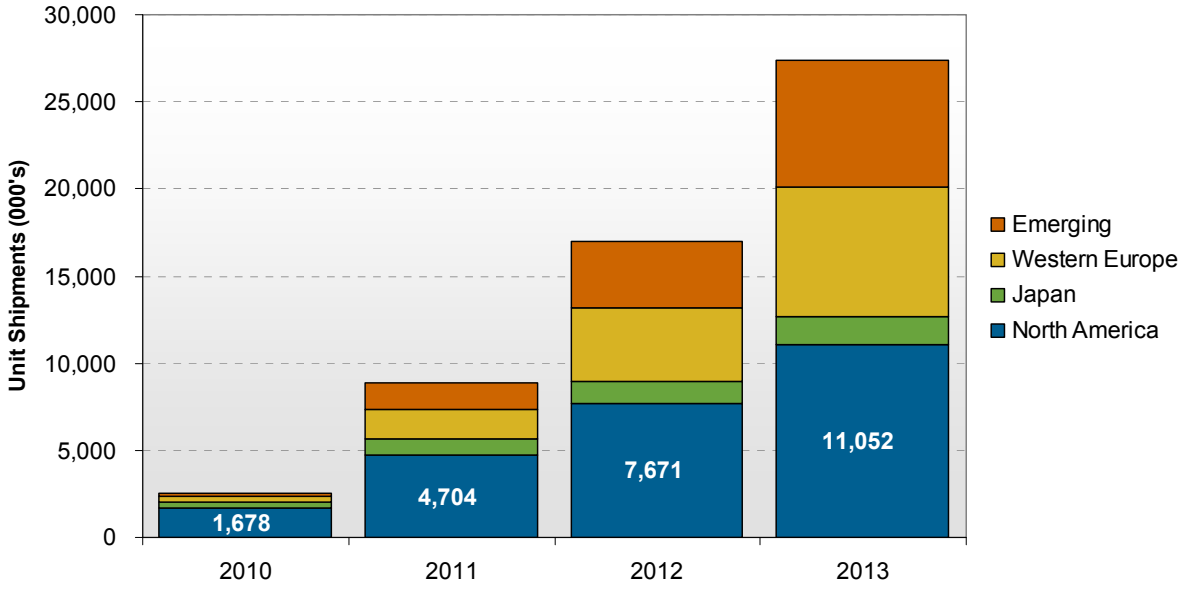
Where Will the 3D TV Profits Go?

by Paul Semenza

Paul Semenza is responsible for managing the worldwide analyst teams at DisplaySearch. Previously Paul served as Vice President of Display Research for iSuppli Corporation from 2000-2008 and for Stanford Resources, Inc. from 1997-2000. Prior to Stanford Resources, Paul was a Program Officer at the Computer Science and Telecommunications Board of the National Research Council, where he directed studies on IT policy, and was an Analyst for the US Congress Office of Technology Assessment (OTA), covering emerging technologies such as flat panel displays. Paul received his Bachelor's degree in Electrical Engineering and Master's degree in Electro-optics from Tufts University. In 1994, he received a Master's degree in Public Policy from the John F. Kennedy School of Government at Harvard University.

There is a tremendous amount of interest in whether or not the current 3D cycle is able to successfully transition from the cinemas to the TV set. Underlying all of the promotion regarding 3D as the next "killer app" is, predictably, economics. The hope seems to be that 3D will shorten the replacement cycle, drive consumers to purchase larger sets, and, most importantly, enable set makers to realize some profits. DisplaySearch currently forecasts a market of 27 million within the next 3 years, driven initially by North America (Figure 1). But regardless of how big you believe the 3D TV market will be, are these assumptions valid?

Figure 1: 3D TV Unit Forecast by Region



Source: DisplaySearch Q1'10 *Quarterly TV Design and Feature Report*

There are many ways to produce a 3D display, including stereoscopic, autostereoscopic, head-mounted, and volumetric. Currently, 3D flat panel TVs are made using some form of stereoscopic approach, requiring the use of special glasses to view the content. There are pros and cons to the different approaches (Table 1), but the initial TVs are primarily frame-sequential, which use panels operating at high frame rates (at least 120 Hz) in conjunction with active shutter glasses, to present different images to the left and right eyes. This approach is appealing to TV makers as it requires very little additional manufacturing cost for the set, though it does require consumers to purchase (multiple) shutter glasses, which are expensive. Some companies, including LG, have been developing displays with a polarizing film that can be viewed with cheaper, lighter, passive polarizing glasses. However, this approach increases the cost of the display, and can result in tradeoffs in image quality and resolution. But it is an interesting approach as there has been some concern about the cost and weight of the active shutter glasses. Meanwhile, the shutter glasses have the potential for significant profit margins.

Table 1: Stereoscopic 3D Technology Comparison Table

3D Technology Detail	Passive glasses with 1 TFT panel, (Micro-pol, XPol)	Passive glasses with 2 TFT panels	Active glasses frame sequential
Display device type	LCD	2 LCDs	120 Hz or higher, RPTV, PDP, LCD, OLED
Applications and availability	3D monitors; 3D notebook PC since 2009	3D monitor	3D monitors; 3D TVs since 2007. NB PC since 2009
3D input format	Row-interleaved	2 images or dual channel	Frame sequential
Frame rate	60 Hz or 120 Hz, or others	60 Hz or 120 Hz, or others	≥120 Hz
Size	15" up to >60"	17" to 30"	15" to >60"
3D resolution	Half of 2D resolution	Same as 2D resolution	Same as 2D resolution
Cost adder	Micro polarizer film, passive glasses	1 more LCD, passive glasses	Active shutter glasses, emitter, TCON
Display module price	10-30% more than 2D	80-200% more than 2D	2D plus the active shutter glasses, emitter
Advantage	Cheaper, uses inexpensive passive glasses	3D has full native resolution; inexpensive passive glasses	3D has full native resolution
Challenges	3D has half native resolution	Use 2 panels, so cost is high	Needs active shutter glasses (with battery)

Source: DisplaySearch, *3D Display Technology and Market Forecast Report*

At present, there is certainly profit in selling 3D-capable sets using high frame-rate panels, as prices are significantly higher yet there is little cost associated with implementing the 3D: most are using 240 Hz panels, which are slightly more expensive, though 3D plasma can use standard panels, and there is additional cost for a second video channel and the transmitter for synchronizing the goggles. However, there is nothing proprietary in these approaches, as the panels and electronics are standard parts. The alternative approach, using polarizing film and passive glasses, may involve some proprietary films, but it is likely that those would eventually be available from optical film suppliers. As multiple set makers adopt one or both of these approaches, the margins for 3D will likely be compressed significantly. For 3D to be a standard feature on most or all TVs most likely requires autostereoscopic (glasses-free) operation, which is still several years away from the TV market. Is it possible that this would involve some proprietary approach that could be profitable for set makers? Not likely.

It is more likely that the profits in 3D will go to those who own, distribute, or somehow control the content itself. One of the reasons Hollywood is so excited about 3D (beyond the immediate impact on box-office revenues) is the fact that 3D is very difficult to pirate, for now, allowing studios to charge a premium. It is likely that they will want a premium for Blu-ray discs and other forms of distribution, and that broadcasters and cable/satellite companies will want to create premium services around 3D and share in the additional revenues. It is even possible that aggregator-distributors such as Netflix, Vudu, CinemaNow, etc. could also share in this new revenue stream. But how will set makers profit? Most likely from partnering with those who can develop attractive ways to package and access content. Thus, for all its vertical integration of movie studios, games, and devices, Sony saw opportunity in getting on board the Google TV platform.

So it is quite possible that 3D could have all of the positive impacts on market growth that the set makers are hoping for, but after the initial revenue bump, competition would drive down any 3D premium for the TV itself. Set makers who consider this possibility are more likely to think about both their hardware (3D, connectivity) and software/content strategies.

What Ambient Light Sensing can do for HDTVs

How ALS can save energy and improve image quality

Contributed by TAOS, Inc.

TAOS, Inc. (Texas Advanced Optoelectronic Solutions) has more than a decade of analog mixed-signal technology innovation and market leadership, TAOS designs and manufacturers digital and analog light-sensing solutions that deliver increased system integration, design flexibility and functionality to a wide range of products in the consumer, computer, industrial, medical and automotive markets. Integrated ambient light sensing and proximity detection solutions enable "Green" displays by reducing system power consumption. An expanding portfolio of programmable analog and digital RGB color sensors provides accurate color discrimination, determination and measurement.

The television world is turning flat…and green. With retail prices dropping 20% a year over recent years, manufacturers are working hard to find the right combination of features and costs that will attract consumers and make their products winners. The biggest challenge, however, is how quickly the market moves. A feature such as 120 Hz refresh rate for LCD TVs was a competitive advantage a year ago, but now is viewed as almost a standard feature for all but the least expensive models.

One of the key consumer concerns has been that of energy consumption. An energy efficient flat panel television has a competitive advantage for the moment because it will cost less to operate over its lifetime. This may not seem like much, but people tend to keep their televisions for 10 years or longer. Saving $30 a year in energy costs could add up to half the purchase price of a 42-inch LCD HDTV.

And soon that competitive advantage will turn into a feature that consumers will expect as a standard. The Energy Star program – http://www.energystar.gov/ -- sets optional standards that flat panel TVs must meet in order to qualify for the logo. According to the Energy Star program, televisions account for 4 percent of the residential electricity consumption in the United States, or about 50 TWh a year.[1] More stringent version 4.0 qualifications are set to go into effect in May 2010, with even tighter requirements for version 5.0 starting in May 2012. And California has set mandatory limits that television sets will have to meet in order to be sold in that state.

Manufacturers of both plasma and LCD models have made enormous strides to make their products more energy efficient. For example, Vizio recently released some LCD models that exceed the existing Energy Star requirements by 65%.[2]

The question is how to design flat panel televisions so that they are as energy efficient as possible. And the trick is to not detract from the image quality in the process.

Designing HDTVs to Save Energy: Fortunately, there are plenty of tools available to help designers reduce the amount of electricity required by large flat panel displays. One of the most effective approaches is to control the light output of the display using an ambient light sensing (ALS) system.

The energy consumption of a plasma display is affected by the content of the image that is shown on the screen, but the bottom line is that a brighter image requires more energy. For most LCD displays, the power use is independent of the image, as the backlight stays on at a steady level. Whether the flat panel is plasma or LCD, a darker room will permit the use of lower backlight output. This also can improve black levels which in turn can improve image contrast. As a result, a lower brightness setting can save energy and produce a better quality image for the consumer at the same time.

ALS Component Considerations: In designing an ALS system for a television, a number of factors need to be considered in order to best match the component capabilities to the application requirements. Digital ALS devices – pioneered by TAOS – have a number of advantages over analog alternatives. They have digital interconnects, which increase reliability and lower manufacturing costs. Multiple devices can share a common data bus. They are much more versatile, providing flexibility with features such as wide dynamic lux range, covering dark to bright

sunlight, low power consumption, programmability, 50/60-Hz flicker rejection, and reduced output noise susceptibility compared with analog alternatives.

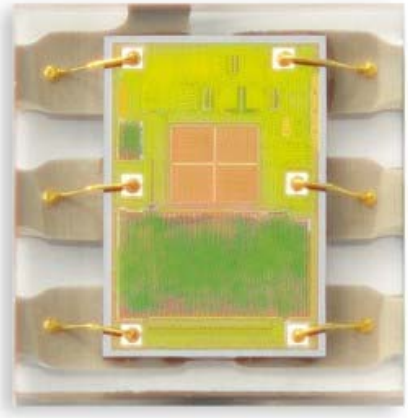
- **Interrupt Architecture:** An early TAOS customer for a digital ALS system was one of the leading computer manufacturers, which was developing a new notebook computer. In order to save energy and extend battery life, the company's engineers wanted to dim the LCD backlight in response to lower ambient light levels. If they used an analog part, however, they would have to poll it continuously at preset intervals. TAOS designed its digital part to include an interrupt feature so that it was able to signal the controller when light levels dropped below predetermined levels. This interrupt feature has both an upper and lower limit that allows notification if the light level either increases above the upper limit or decreases below the lower limit. This greatly lowers the processing power required. This can have the benefit of either allowing the processing power to be available for other applications or to allow the processor to go into a low power mode thereby conserving power and extending battery life.
- **Persistence:** In a related manner, the intelligence in a digital ALS device can be used to avoid rapid changing of the display light levels. It can be programmed so that an interrupt is only triggered after the ambient light readings have been below or above a pre-defined threshold level for a defined amount of time. With sampling intervals of 100 ms to 500 ms, this makes it possible to eliminate the false signal caused by someone walking in front of the sensor, or some other temporary event.
- **IR Blocking:** One of the problems with the silicon photodiodes is that they are sensitive to light energy across a broad range of the spectrum. While this includes the visible light portion of the spectrum, a major portion of the response curve is in the invisible infrared (IR) range, which the human eye does not see. As a result, an ALS system using a silicon photodiode would need to filter out this unwanted light energy. Without taking into account the IR energy, the silicon-based reading would show the ambient light is much higher than the person would actually perceive it to be. The end result would be that the display would not be adjusted properly. TAOS has developed a patented dual-diode solution that addresses this problem. By adding a second diode that is responsive primarily to IR light, its light energy can be subtracted from that of the primary diode (which is responsive to both visible and IR light energy). This dual-diode approach also provides the flexibility of having a simple subtraction as opposed to a more complex series of equations.
- **Sensitivity Requirements:** It's not enough to read room lighting conditions accurately, however. Flat panel television designers typically want to create a bezel that is as uniform and aesthetically pleasing to the end customer as possible; drilling a hole in the bezel for a light sensor is not an acceptable solution in most cases. However, it is possible to hide the sensor behind a translucent plastic or glass bezel, even if it appears to be solid black. This is because some light will be transmitted through the bezel, and even though it's a small fraction of the ambient light in the room, its levels remain proportional with the room light levels. One complication is that the certain bezel materials can be transparent to IR wavelengths while visible light can be attenuated by 100 times or more, so the ability to compensate for the IR component is essential. As a result, this requires a digital ALS that is far more sensitive at very low-light levels than might be needed for other applications. The TAOS digital ALS product family supports analog gain setting options up to 120X that are ideal for challenging low-light level applications such as when the light sensor is operating behind darkened glass. Additionally, TAOS digital ALS devices can be further fine-tuned to match the specific transmissivity of the bezel glass or plastic in order to achieve the optimum system performance. Programmable gain, when combined with programmable integration times, supports up to a 1,000,000:1 dynamic range which enables them to operate effectively in very low-light conditions (tenths of lux) as well as in high light conditions.
- **50/60-Hz Lighting Flicker:** Alternating current (AC) powered light sources such as incandescent or fluorescent lighting have variations in light output. This variation – or flicker – can cause an ALS to trigger when it's not supposed to, resulting in unwanted variations in light measurements. The integrated analog to digital converter (ADC) in TAOS digital ALS devices serve to filter out optical noise, such as 50/60-Hz lighting flicker, through high-resolution sampling.

Color Temperature: A digital ALS system can also include color sensors with color filters that will read the red, green, and blue components of the visible light spectrum. A system with this ability can be used to measure the color temperature of the light source – fluorescent or incandescent – to further optimize the picture display quality. This feature can help improve image quality by maintaining a correct white color balance under changing lighting conditions, automatically and without any intervention from the user. For HDTVs using RGB LEDs for backlighting, LED aging can cause the white point for the entire backlight to shift over time. Color sensors provide an automatic feedback mechanism that can maintain the white point at the original factory settings for the life of the set. To accelerate time-to-market and simplify design-in effort, support for device drivers and/or C-reference code is available from TAOS.

Proximity Detection: Another device that can be incorporated into flat panel HDTV designs – and work in concert with an ALS system – is a proximity detector. Proximity detectors rely on an IR light source and an IR optical sensor. Since the TAOS digital ALS system already provides the IR sensor, all that is needed is the IR source.

One of the most unique features of the TAOS implementation is the use of a state machine to control the ALS, proximity, and wait timing. This allows the device to provide both ALS and proximity sensing at the same time without having to change the operational mode of the device. In addition, the ability to insert wait states allows for very low power operation.

Proximity detection in the TAOS system is designed to be highly flexible. The high gain allows the device to operate from sensing very short distances to several feet by changing the programmed values with no resistor or component changes. To simplify the interface to an external IR LED, a constant current source driver is implemented to eliminate the need for an external current limiting resistor. In addition, the current can be programmed from 12mA to 100mA. If higher power is needed, an external transistor can be implemented to increase the sensing distance. Similar to the ALS interrupt functionality, the proximity sensor also has both a programmable level detection and a persistence function. This again reduces the amount of interrupt overhead.



TAOS makes a single-chip package that includes an ALS device and a proximity detector.

The TAOS single-chip ALS and proximity solution is available in a small 2mm by 2mm package. This approach simplifies system design, reduces part count, increases system reliability, and lowers assembly costs.

Application Examples: A digital ALS system can be an important component in a consumer electronics product design, including flat panel HDTVs. In some cases, integration of a proximity detection feature can yield additional benefits. Here are some examples that such features can help various products.

- **Notebook computers:** In creating a notebook computer, designers are constantly struggling with the trade-off between weight and battery life. Make the battery smaller and the total unit weighs less, but the battery won't last as long. The only way to reduce weight without cutting battery life is to cut power consumption. If a notebook can use an ALS system to automatically dim the backlight by 50% when ambient lighting is lower, this can result in a significant power savings. As a bonus, the screen image will be easier on the eyes for the user under dimmer lighting conditions.
- **Mobile phones:** The main display on a mobile phone consumes the major portion of the device's energy budget. Today's smart phones require a proximity detection system to turn off the display panel and the touch screen features when the user brings the phone close to his or her ear. This eliminates the inadvertent pressing of controls during a conversation, and saves power by shutting down the display.
- **Flat panel HDTVs:** The LCD TV Association recognizes that the backlight of an LCD HDTV is responsible for the largest part of the device's energy consumption. As a result, the group established

ALS-controlled dimming of the backlight in response to ambient lighting conditions as the sole requirement for its "Green TV" logo program.

According to the LCD TV Association, automatic brightness control can cut the backlight power consumption by as much as 30% over normal usage patterns.[3] In addition, of all the flat panel televisions that meet the stringent qualifications of the Energy Star Version 3.0 requirements, 40% of the LCD models and 40% of the plasma models have some form of automatic brightness control.[4]

Adding proximity detection to an HDTV design makes additional features and benefits possible such as touchless human interface sensing. For example, Vizio's VM190XVT and VM230XVT LCD HDTVs have a novel front panel with touch controls. The lighted icons for these controls only turn on as the user's hand approaches the bezel. This design makes it possible to have a clean, unblemished bezel design, while supporting a user interface that is intuitive and interactive. The Sony Bravia WE5 uses a proximity sensor that can tell when the viewer leaves the room, at which point the set will turn the picture off but leave the sound playing. When the person returns to the room, the set will turn the screen back on. This can save a significant portion of the energy consumed by the set.

The Vizio 19-inch and 23-inch Razor LED LCD HDTV models use proximity sensing to activate the front panel touch controls.

The Digital ALS Advantage: A digital ALS system can deliver a number of important benefits to both the manufacturer and end user of flat panel HDTVs. They can simplify system design while adding more sophisticated functions and automatic controls. Fewer components and interconnects make for easier assembly, lower costs, and greater reliability. And they can save power multiple ways.

Consumers will appreciate the "green" qualities of lower power consumption, but they'll also value the improved image quality that comes with automatic brightness control. And when proximity detection is added to the design, new features are possible that can enhance the user interface and provide additional power savings.

>>>

[1] Energy Star Web site; http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=TV

[2] Vizio Web site: http://www.vizio.com/flat-panel-hdtvs/vm230xvt.html

[3] LCD-TV Association White Paper #2: TV Power Consumption: Is There a Problem? (and Can LCD TVs Help?), 2008; http://www.lcdtvassociation.org/images/TV_Power_Consumption_White_Paper_LCD_TV_Association.pdf

[4] Energy Star Television Product List, as of October 2, 2009; http://downloads.energystar.gov/bi/qplist/tv_prod_list.pdf

Inform • Promote • Improve • Connect

Interview with Ian Watson from Quinn Pacific

Ian Watson worked as European Sales Manager of Kaypro (in the days before MS-DOS let alone Windows). Ian then became U.K. Managing Director of the French computer maker Goupil and brought to market the first portable computer with an internal CD-ROM. He established Quinn Pacific in 1989 to work with major electronics companies on creating value from under-utilized technology assets and has completed transactions with a Who's Who of the electronics and display industries.

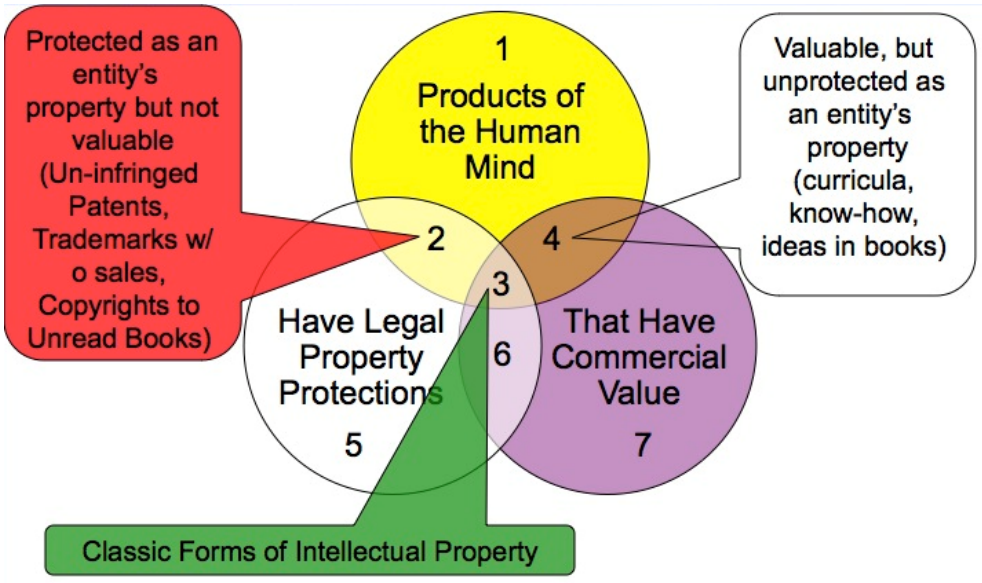
Please give us some background information about Quinn Pacific. Quinn Pacific specializes in two business segments related to displays and mobile devices:

- Brokering IP -- patents and technology -- relating to TVs, displays , user interfaces and mobile devices
- Technology re-purposing of custom hardware, typically related to displays or components

We are based in Los Angeles and have been working in the display area since 1989.

How did you come to be involved in the LCD TV Association? We have been involved in display related technology and tradeshows like SID, for years, and met and heard Bruce Berkoff speak a number of times over the years. When he became involved with the LTA and fine companies like Corning and Merck and LG Display and Vizio became involved we thought it would be a good organization to support and a great way to stay connected to the leading players in this space. We have not been disappointed and Quinn Pacific has made many mutually rewarding contacts via this association.

What is Intellectual Property and how does Quinn Pacific create value from it? IP is (1) any product of the human mind that (2) has commercial value, and (3) a form of legal protection. In the Figure, IP is the stuff that falls into region 3. Intellectual property is extremely volatile. For example, a company may have a patent that is in region 3, and then a technology shift happens in the industry served, and then because of the technology shift, the patent may lose its commercial value for the company. The patent that started in region 3, would then fall into region 2 where it is not valuable to the company it is assigned to, but it might be valuable to some other company. What Quinn Pacific does best, is to find patents held by companies in region 2 of the Figure, and then sell them to companies that can really apply the patents to capture value in region 3.



What are some "hot" areas in terms of intellectual property that you see in the TV market? 3D is the hottest. We've never seen interest in patents like the attention we are getting from our 3D patent offerings and particularly auto-stereoscopic 3D. The industry has a love-hate relationship with 3D. On the one hand the industry loves being able to sell new equipment. On the other hand, the industry knows that with-glasses, 3D technology is not optimal. We are putting our efforts into maximizing the visibility of key 3D auto-stereoscopic IP.

We really enjoy working with leading edge technologists and helping them monetize their inventions. For example, we are currently offering the Actuality/Optics for Hire IP portfolio covering glasses free 3D. Many of us in

the industry remember Gregg Favalora, the founder of Actuality, and the Perspecta volumetric auto-stereoscopic 3D display as covered in the May/June 2010 issue of Information Display magazine. Gregg is one of the pioneers of multiple kinds of auto-stereoscopic displays and image computing pipeline technologies.

Do you believe that most companies have a good handle on their intellectual property and are able to monetize their IP assets appropriately? No. But that is changing. With the financial downturn and with major NPEs (Non-Practicing Entities) shaking up the patent world with infringement suits, major companies are starting to look closely at the cost-benefit of holding onto all of their patents and are starting to shed non-core assets.

In terms of a good business plan relating to IP, do you see a big difference between large and small companies? Very small companies typically only focus on patents if they know they will be acquired (rolled up) into a larger company once they prove the concept with their product or if they can get a broad simple patent on an architectural control point for a dominant design for an industry. Small companies can typically get away with avoiding IP questions until they get to about $10,000,000 in annual sales. After that it becomes a question of when an operating company will show up and demand royalties or a cross license with balancing payments or when an NPE will show up just demanding payment. At $100 million revenue most companies experience their first major patent loss i.e. they are forced to start paying significant royalties to a patent owner. The biggest companies basically use IP as an oligopoly entry/exit barrier and occasionally as a strategic weapon if major markets are threatened.

Does your business cater mostly to people who already have good IP, but are looking to solidify their overall position, or are your clients looking mostly to grab IP that is in the bargain shop. In other words, do you try mostly to help distressed companies gain some value for their IP, or do you mostly try to bring specific needs together? We look for motivation on both the sell and buy side. So, yes, we do a lot of work for bankrupt or hibernating companies, but not exclusively so. As I said in the answer related to the Figure, we look for patents that have slipped into region 2 for the company owning them, and then try to find as many motivated buyers as we can. So we can build a market from nothing, a market where the patents are going to move the needle for their new owners as region 3 assets.

Are your clients usually the selling party or the buying party? We are usually retained by the selling party, although we have had significant buy-side engagements. Sell side engagements for us have ranged from single patents to over 1700 assets in one portfolio. Buy side engagements have been very specific and very strategic. For example, company A needs to buy a certain type of IP in a certain market for defensive purposes against a certain competitor or group of competitors.

What is the key benefit you bring your clients? We bring value and get deals done. Quickly. Quinn Pacific has over 20 years of face-to-face credibility with senior management of electronics companies. So we have access to decision makers and influencers inside major companies. There is just no substitute for trust, connections and technical knowledge in a specific field to facilitate win-win transactions.

What is the main motivator for buyers? Love and fear. Some buyers buy because they love a technology. But fear is also a key motivator. Fear of a competitor getting the technology or IP creates urgency in the decision making process.

Do you typically arrange for royalty-based licensing agreements, outright sales of IP, or some combination of the two? We aim for outright sales, with an occasional revenue share if it makes sense. We have not licensed IP because, although there might be a large upside, it is a long and risky process and our clients typically want cash with as little downside risk, cost, and opportunity cost as possible. Many of the portfolios we sell are Emerging Technology Portfolios. That is, there is no current use in the market and the technology may only come to market years in the future.

Does Quinn Pacific buy patents itself in order to realize later royalties? No. We are 100% focused on selling the highest quality IP on the market.

Can you share a favorite "success story"? In 2007 we were hired to sell the entire patent portfolio of SIEMENS MOBILE/BenQ Mobile out of insolvency. This portfolio comprised of just over 1700 patents related to every aspect of mobile phones. Putting it mildly it was an intense process in terms of understanding the patents, developing the markets and navigating the German insolvency and patent system with its many intricacies. Bottom line was the entire portfolio was sold within 4 months and is, as far as we know, the biggest patent sale ever out of a European insolvency.

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IMS Research Launches TV Forecast Model

Covering 64 Different Countries

by Ross Young

Ross Young is SVP, Displays and PV at IMS Research USA. Prior to joining IMS Research in November 2009, Young co-founded Young Market Research (YMR) with Barry Young in May of 2009 which IMS Research acquired in November. Prior to forming YMR, Young was VP of New Market Creation at Samsung Electronics' LCD Business, reporting to the LCD CEO, where he tracked, analyzed and assessed the solar market and supported their market intelligence efforts in notebooks and TVs. Prior to Samsung, Young was the founder and CEO of DisplaySearch, the leading flat panel display market research, consulting and events firm. Young ran DisplaySearch from 1996 to 2007 and launched most of their product areas and many of their most popular reports on such topics as production equipment, supply/demand, large-area displays, notebooks, monitors and TVs. He sold DisplaySearch to The NPD Group in Sept. 2005. Young was educated at UCSD, Australia's University of New South Wales, UCSD's Graduate School of International Relations and Pacific Studies and Japan's Tohoku University.

IMS Research has launched a one-of-a-kind TV forecast model and online database covering 64 individual countries as well as a global view. For each of the 64 countries, it provides extensive country-by-country data on a large number of parameters including:

- TV households
- # of TVs per household
- TV installed base
- % of TV sets replaced each year
- Average days of retailer inventory
- TV shipments by tech – CRT, LCD, PDP, Projection, OLED
- TV shipments with and without tuners
- Cable, satellite and terrestrial households
- Analog, digital and IPTV households
- Cable, satellite and IPTV share by operator

Based on extensive primary and secondary research, IMS Research's TV forecast model is ideal for TV brands, cable operators, set top box manufacturers and other companies in the TV supply chain interested in understanding how changes in TVs per household and replacement rates will affect the evolution of the TV market and content delivery. The model covers the period from 2005 to 2014 and is available online with 24 x 7 access to changes.

For 2010, 7% unit growth is predicted to 226M units. Key drivers include the World Cup, increased competition and lower prices for LED TVs, launch of 3D TVs and 3D broadcast and packaged media content. Threats to 2010 growth include a significant emphasis on more advanced features and higher price points, limited supply growth, slower price reductions and weakness in Europe and the Euro. Slower economic growth expected in Europe along with the depreciation of the Euro which will increase the cost of imports into Europe is a major concern. LCD TVs are projected to rise 21% to 176M TVs. Plasma is projected to grow 9% to 17M units with 3D a helpful stimulus to plasma sales.

Unlike 2009 when the TV replacement rate declined and the market was driven by more TVs per household, in 2010, the TV replacement rate is expected to rebound reaching 5.9% as a growing number of consumers in the developing world switch to flat panels while those in the developed world upgrade their flat panel TVs taking advantage of LED, 3D, internet connectivity and other advances. That doesn't mean the average # of TVs per household will stay still. We see this ratio rising from 1.71 in 2009 to 1.74 in 2010.

We see the US market rising 7% to 40.5M units with the replacement rate rising from 8.6% to 8.9% and the average # of TVs per household rising from 2.84 to 2.90 The total # of HHs is expected to rise to 117M with The IMS Research TV Forecasting Model is an excellent tool for tracking and predicting TV shipments and the pay TV operator market on a country by country basis. I wish I had a tool like this in prior positions. I would encourage all companies in the TV, pay TV and set top box supply chains to take a look at this offering. For a sample view of the online database, please contact sales@imsresearch-usa.com for demo log-in details. Note that the model will be extended to 68 countries in June.

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Should You Buy a 3DTV Now?

by Andrew Eisner

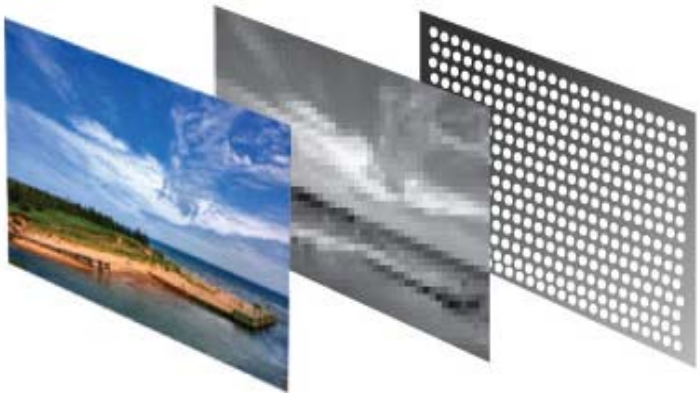
Andrew Eisner is a former test manager for Ziff Davis Labs and is currently director of content for Retrevo.com a website specializing in consumer electronics. Retrevo has reviews, manuals, and buying information for all popular gear and gadgets.

In this post-Avatar era, gadgeteers have been bathed in the promising glow of the latest 3DTVs. You may well ask, is 3DTV for real, is it a fad, should you pay the premium for a 3DTV or are you better off buying a standard HDTV? Although we've been impressed by the 3DTVs we've seen, we're not convinced you shouldn't just go with standard HDTV or even "3D Ready," TVs until prices come down and more programming becomes available.

Here are some reasons we think you could feel good about holding off on a 3DTV for now and buying a standard HDTV instead.

1. **Very Little 3D Content and Sets Are Expensive**

   3DTV may be over-hyped. Yes, we are all caught up in the post-Avatar, 3D craze right now, but, with only a few worthwhile 3D movies to speak of, very little TV programming and no major video games scheduled for immediate release, we wonder if now is the time to invest in 3DTV? 3DTV is pretty cool for sure, but it lacks content, and is more expensive than an equivalent HDTV. Keep in mind that the premium you pay for being an early adopter of a 3DTV might very well pay for another HDTV set for your home although, we suspect 3DTV prices will fall over time.



2. **LED Backlit LCD TVs at Affordable Prices**

   LED backlit LCDs are becoming the standard in HDTVs. Using LEDs as backlighting, instead of fluorescents (CCFL), new LCD HDTVs produce a great picture while saving both energy and space. Yes, most new 3DTVs will use LED backlighting too, but the influx of new stock might motivate shops to move current LED backlit LCD TVs off the shelves at attractive prices.

3. **Future-Proof With High Refresh Rate and Internet Connectivity**

   Until 3DTVs become a better buy, we think you can future-proof your HDTV with features like high refresh rate and Internet connectivity. Internet connectivity will revolutionize your entertainment routine, and can be found on many non-3D TVs. Thanks to services like Hulu, Netflix, Pandora, YouTube and Boxee, the internet is becoming the go-to source for all sorts of media. It is accessible on-demand, across multiple platforms, and, often, completely free. Manufacturers, now, are including broadband, wired and wireless, on many TVs so you can stream your favorite TV shows, YouTube channels, music, and movies, right into your living room.

4. **3D Glasses Could Be a Problem**

At around $150 a pair, 3D glasses are not cheap. The latest 3D glasses are not the simple disposable lenses of old. These new specs are high-tech wireless devices that work in tandem with your 3DTV to physically block light as it travels toward your eye. Expect to shell out as much as $600 a set for a family of 4. Too make matters worse, every parent knows that this equation: Kids + Delicate x Expensive = Trouble.

5. **Other Purchases May Be Required With Your 3DTV**

Speaking of costly peripherals like 3D glasses, if you buy a 3DTV and want to watch Full HD (1080p) 3D content you won't be able to use your current DVD or Blu-Ray player. You'll need a special 3D-Ready, Blu Ray device in order to watch Full HD 3D content. Admittedly, you'll be able to watch "Half HD" 3D on many "transport" mediums like standard cable or satellite and standard DVD players and you might not even notice the difference but if you want the best quality 3DTV you'll be looking at a new Blu-ray player and a new AVR (receiver).

Bottom Line on 3DTV Now: We believe sound bargains can be found in standard HDTVs. Sure, you can't invite a bunch of friends over to re-watch Avatar in 3D, but then again, could you *afford* to anyway? We say, if you don't want to pay the premium to have the first 3DTV on your block then go for the HDTV that offers the best picture quality in your price range and make sure it has features like high refresh rate and Internet connectivity. On the other hand, with programming like new 3D sports available in June from ESPN and the promise of 3D Blu-ray movies on the way, a 3DTV starts to look more attractive.

3D "Ready" HDTV Might Be Best Bet: If you want to hedge your bet you could always look for an HDTV set that can be made to display 3D content when you're ready. A 3D "ready" HDTV will have a high refresh rate (120Hz or higher), HDMI 1.4 to hook up to a 3D Ready Blu-ray player or receiver, a USB hookup for a 3D glasses interface box, and the TV will have the necessary processing power or 3D "engine" to decode and display 3D content. The problem right now is we're not sure how you can identify a true 3D Ready HDTV and what level of 3D (Full or Half HD) it's actually "ready" for. All we can say is stay tuned for more information and be careful about believing the marketing hype or sales pitch. And, of course, you'll still need to buy enough glasses to outfit all the "viewers" in your household.

Retrevo Can Help With All Your Gadget Needs: Retrevo has lots of reviews on the latest HDTVs to help you make the best choice. You can also check out our collection of electronics manuals, and reviews of digital cameras, laptops and other gear and gadgets.

LCD TV Association

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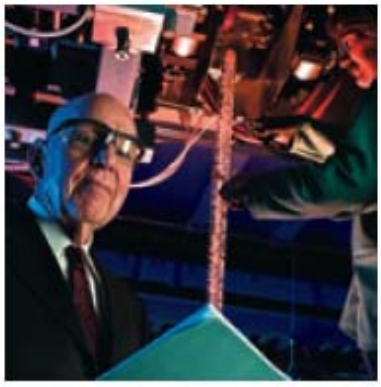

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Happy Talk

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.

"I see trees of green, red roses too
I see them bloom for me and you
And I think to myself, what a wonderful world"

-- Louis Armstrong's "Wonderful World"

In the early part of the recession, when the industry was in the midst of a "Beer can surge", a senior financial officer at one of the display industry's leading suppliers proclaimed the TV set industry recession proof. This was right before the surge petered out and set sales plunged… but briefly. He was accused of "Happy Talk" by members of the financial press.

More recently, having gone through the deepest part of the recession with TV set sales actually growing, I have seen industry pundits once again proclaiming the TV set industry to be recession proof. Without a deeper comprehension of what happened, the reader will not appreciate what it takes to sell TV sets and how the future is going to be different, instead relying on a presumed inflexible demand to move volume.

Much of what happened was detailed in advance in my previous article, "The Other Side of the Recession" ("*LCD TV Matters*", vol 2, issue 3, pp 38-44 www.veritasetvisus.com/LCDTVA/LCDTVA-7,%20Winter%202009.pdf. With the HDTV transition, the move to wide aspect ratio content, the introduction of the Blu Ray video format, and the newly widespread availability of flat panel TVs at affordable prices, the industry could not have picked a better time to take the hit from a recession. This sentiment was echoed in Bruce Berkoff's "Blue Skies" article in the same publication. **Don't count on being so lucky next time.** Believing that TV sets sell themselves ignores the challenges ahead and the platform positioning decisions that will have long lasting impact on TV set and display industry profitability.

Below I detail some additional favorable features of the "Great Recession" TV market and the impact, going forward as these favorable conditions dissipate even as the economy improves.

Accommodating the Market: One of the great things that was done by the industry, for the industry, has been the accommodation programs for the store personnel. TV sets were made available to purchase by the leading manufacturers at irresistible prices. One of the most common questions the shopping public has of store personnel is "What do you have at home?" With the accommodation programs, the store personnel could honestly and enthusiastically talk about their home sets. In large part, Samsung's accommodation program contributed greatly to the growth of their brand.

Set sales were also directly helped by the sale of TV attachments. Retailers were willing to devote significant floor and advertising space for TVs while living on slim margins in large part because the hardware attachment sales were so profitable. The net margin from HDMI cables, wall mounts, sound systems, even screen cleaning fluid, can easily exceed the margin on the TV those products are sold with and the ROS of these products is fantastic. Though the opportunity to sell service attachments will remain indefinitely, as consumers accumulate cables and mounts, etc, the opportunity to sell supporting hardware will diminish. Additionally, even the service attachment opportunity will fall somewhat as the opportunity to sell wall mounting services declines with an accumulating stock of homes with existing mounts and home theatre setups.

There was also the “geographic” expansion of the market as flat TVs made it possible to have TVs in rooms with no space for a CRT. The additional TVs being purchased by consumers also pushed the consumers’ existing TVs into new rooms in their homes where there was not previously a TV present…. “A great TV in Every room” has been virtually achieved. Future mass influxes of new TVs will not have the same opportunity as there will be fewer rooms in anyone’s home that do not already have a TV.

The industry has introduced pricing schemes by refresh rate, by contrast ratio, and for thinner sets. Such tiered pricing can persist for a long time; however, the escalation in each of these categories can invalidate the perceived value of the feature as a performance metric. When a 30 Million to one contrast set is introduced and it gets placed alongside a 50K to one and the difference needs to be obvious or it attack the credibility of contrast ratios as a valid measure of performance. The industry must be careful not to overdo it with these types of metrics.

Although manufacturers may continue their accommodation programs with new product, both the hardware attach opportunity and the room-by-room expansion of the TV market will decline. TV manufacturers will have to come up with new ways to maintain the profitability of their retailers to keep the interest and justify the floor space and advertising. Further, without an HDTV transition or an opportunity to place sets in new rooms, the industry has to me up with a compelling reason for consumers to replace working sets. Larger sets at cheaper prices might not be such a driver if an old and working large size former living room set has already found its way into the bedroom. This is not to say that doom and gloom are on the horizon. The recession did have its effect and there is a large pool of pent up demand that will materialize with the return of consumer confidence. However, the industry has to figure out how the entire channel is to make money on the TV sets themselves, not just the HDMI cables and such. Declining margin dollars from declining hardware attachment sales could challenge the interest of the channel in promoting TV sales. Without the enthusiastic support of the channel a recession is a recession. If the channel finds another platform to drive high sales ROS (display related or not) or one not tied to the existing industry structure, or one tied to a new type of display (say a flexible one), woe be the current display industry.

Summary: Although there are common features about TV sales from recession to recession, next time will be different. The things that drove sales during this recession will have gone away. Thinking TV set sales are “Recession Proof” is a fool’s paradise... “Happy Talk”.

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Google TV

by Jin Kim

Jin Kim is the founder and president at DisplayBlog, bringing together news, information and analysis from the high-tech display industry to help, educate and entertain. By combining the experiences and knowledge gained serving as senior marketing manager at LG Display and as director of TFT LCD Market Research at DisplaySearch, Kim brings a fresh look at the display industry and products such as LCD TVs, LCD monitors and notebook PCs. Kim received a BA at UC Berkeley and an MBA at from Claremont Graduate University.

I'm sitting in our old room. My brother and I shared this room when we were young. Next to me is a myLGtv box (yes all that stuff you see is dust). The Internet connection in this house has a bandwidth of 100mbps, which is quite common in Korea. For that fat of a pipe in the US it would cost a serious amount, probably more than $100 per month, if it is available at all. In Korea, thanks to intense competition, the monthly bill is just around $20.

(Yes, the blacks are quite deep on the 19-inch curved CRT TV.) The little black myLGtv box has a lot of interesting services. One of them is called myPC and it accesses shared videos, images and music off of a PC. You can also insert a USB stick on the back of the myLGtv box to do the same thing. You can play games such as Go, sing songs (karaoke), learn English, purchase movies via VOD, etc. Terrestrial channels, including a lot of HD versions, total about 100.

The only feature lacking is Internet-based video integration; US-based examples would be YouTube and Hulu. Oh, there is one more feature missing: DVR. So here in Korea there is already something similar to Google TV with the exception of Internet-based video integration. But an Internet-integrated TV-watching experience is what Google TV is all about, right?

I might be naive in thinking this, but don't we already have a perfect device that does a lot of these things already? By using a full-blown computer with a TV tuner attached to it we can watch pretty much anything we want: Netflix, Hulu, YouTube, all the channels the TV tuner brings in, DVD, Blu-ray, etc. With a proper NAS there is access to not only the movie archives but also the hundreds of thousands of photographs as well as terabytes of music. Even the enormous hard drives inside the computer will make it simple to store hundreds of shows via DVR.

Why are we in such a hurry to find other solutions when we already have one? *Engadget* got all the folks together for their opinions on Google TV and is worth a read. http://www.engadget.com/2010/05/21/engadget-on-google-tv/

TV Ecosystem Conference

Managing the Innovation Cycle

August 18, 2010, San Jose, California

2009 was a notable year for the TV industry as unit growth proved quite successful given the state of the global economy, but not all results were good. Average prices fell year-over-year for the first time on a total basis and LCD TV prices fell more than twice as much as they did in 2008. All of this led to the first global decline in revenues since DisplaySearch started tracking TVs as consumers clearly loved buying TVs but were attracted to ever more commoditized sizes and styles. What can be done?

TV innovation has always been present, but each subsequent innovation gets reduced in price and margin more quickly. As a result, we've seen the pace of major innovation increase from every 2-3 years to a year or less. In 2010, three major TV innovations are set to take off; 3D TVs, LED backlights in LCD TVs and Internet connected TVs. All three offer a strong opportunity to offset the pace of price erosion while at the same time enhancing the value proposition of the TV itself. All members of the TV Ecosystem from component makers, to OEMs, to brands and even retailers need to be aware of the issues surrounding these innovations, as well as other potential new technologies, in order to get the most out of them and avoid yet another round of rapid devaluation.

Agenda-at-a-Glance

Session I:	Setting the Stage: TV Market Overview and New Technology Highlights
Session II:	3D TVs
Session III:	New TV Display Technologies
Session IV:	The Connected TV

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Approximately Right

The Case of the Disappearing Premium

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.

Sometimes, I imagine myself as Sherlock Holmes, digging through the data, deducting the truth. Alas, real life is seldom as simple as a detective story. Analysts seldom find all the data they need, at least not consistent data that provides a complete picture. Most of the time, we must theorize as best we can. That's why I titled this article "The Case of the Disappearing Premium." I found enough evidence to develop theories but I hesitate to say who done it. Nevertheless, I thank DisplaySearch for providing some useful data and I think we can draw some useful ideas from it. As for predicting how LCD TV price premiums for 3D features will hold up over time, it may be too early to say for sure.

Price Trends: Both AU Optronics (AUO) and LG Display (LGD) report the amount of display area they deliver each quarter. In addition, they report these amounts on a consolidated (global) basis. Since the two companies account for more than one-third of global AMLCD production, their quarterly presentations indicate market conditions for panel makers as a whole. Combining their disclosures, we find their average price per square-foot of display area has been falling 21% a year (shown in green below). As expected, this trend corresponds to the long-term rate of AMLCD module price decline since the mid 1990s.

Using data from the DisplaySearch Global TV Shipment and Forecast Report, we can calculate the average LCD TV set price per square-foot, also (in red below). It should come as no surprise that this trend falls 21% a year; LCD modules comprise the major portion of LCD TV costs. TV brands and retailers reduce their prices as their supply costs decline.

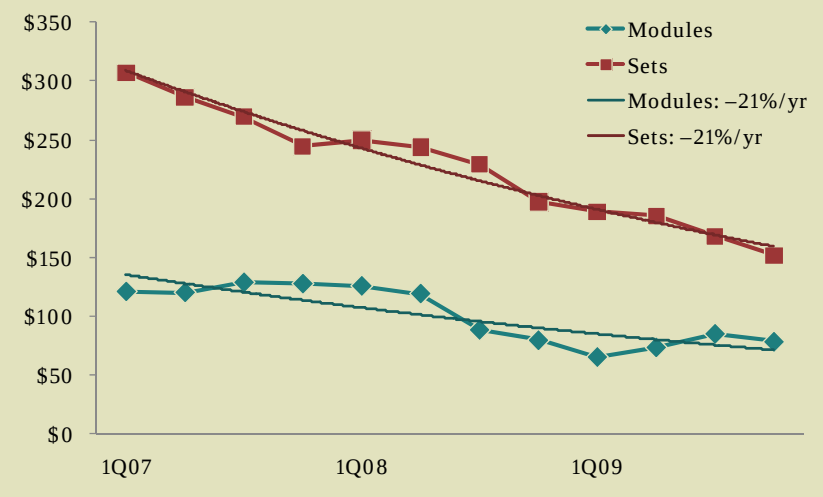

Figure 1: Average Price per Square Foot of LCD Modules and LCD TV Sets

Source: AU Optronics and LG Display disclosures; DisplaySearch Global TV data, BizWitz analysis

Some people might question the comparison because most AMLCD panels are not made for TV sets. The answer is that the portion of panel area sold into PC and mobile phone markets keeps declining as the LCD TV market grows. From Q1'07 through Q4'09, total LCD TV set area grew 49% a year. By Q4'09, total LCD TV display area sold exceeded 177 million square feet. Considering only sets with 32" or larger diagonals, the pace of area growth has been nearly 53% a year. Focusing more tightly on sets larger than 42", we see annual growth greater than 87%. A 60" TV screen uses about 36 times more panel area than a netbook screen does, so unit counts can be misleading.

Feature Premiums: The area prices of AMLCD or LCD TV sets vary significantly according to their features, of course. The global average may fall smoothly but price premiums for any given feature (attribute or specification) may fluctuate more depending on how fast it becomes popular (enters the mainstream commodity channel).

In the early years of LCD TV, wide-format screens were novel. Most LCD TV sets used conventional PC display formats such as 640x480 pixels (VGA) because these matched conventional 480-line CRT formats. In addition, panel makers mass produced such aspect ratios already and their costs allowed an LCD TV market to develop. Conventional LCD TV formats were still selling well as late as 2006 because most wide-format sets were larger and more expensive. As shown in the following figure, the area price of wide-screen sets was still 40% above the price of conventional sets in Q1'06. The premium for wide formats (including 854x480 pixels) declined to zero by 2008, however. Wide LCD TV sets accounted for more than 98% of global sales and the supply of smaller sets became erratic. In mid-2009, we saw the price of conventional sets rise as they became niche products. This sort of price behavior has signaled the end of life for various panel features in the past.

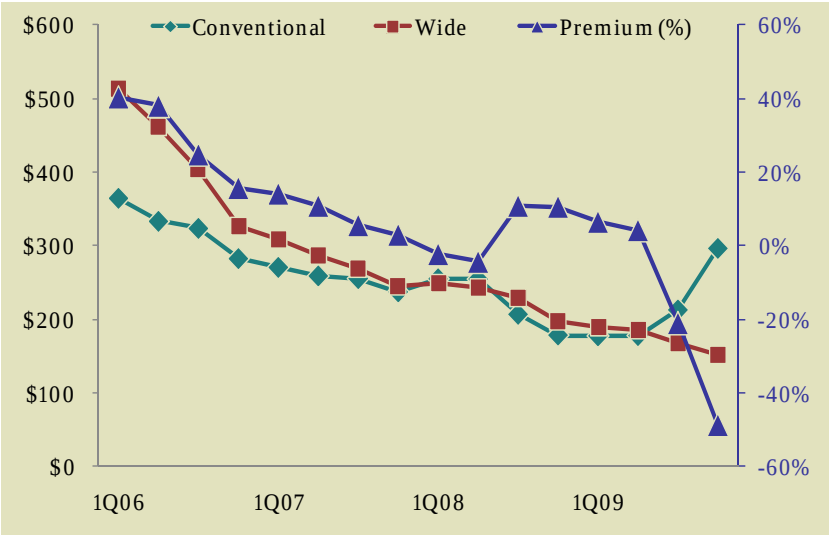

Figure 2: Price/ft² for Conventional and Wide-screen LCD TV Sets

Source: DisplaySearch Global TV data, BizWitz analysis

If we choose 2005 as the start of the mainstream LCD TV market, then we see wide-format sets losing their price premium over a three year period. The typical AMLCD business cycle is about three years long, also, so there is some rationale for assuming feature premiums last only three years or so.

The assumption does not seem valid for features of display resolution (pixel count, actually) however. Looking at the data, we see two periods of rising premiums for full-HD (1080p format) sets in the 32-inch and larger product category. More significantly, we note that consumers paid about 20% more for six quarters after the premium fell to that level in Q2'08. Evidently, consumers see the value of having more pixels, especially in larger TV sets. If this value proposition sustains itself, there is reason to assume that future pixel-count increases (e.g. quad-HD) could lead to long-term premiums also.

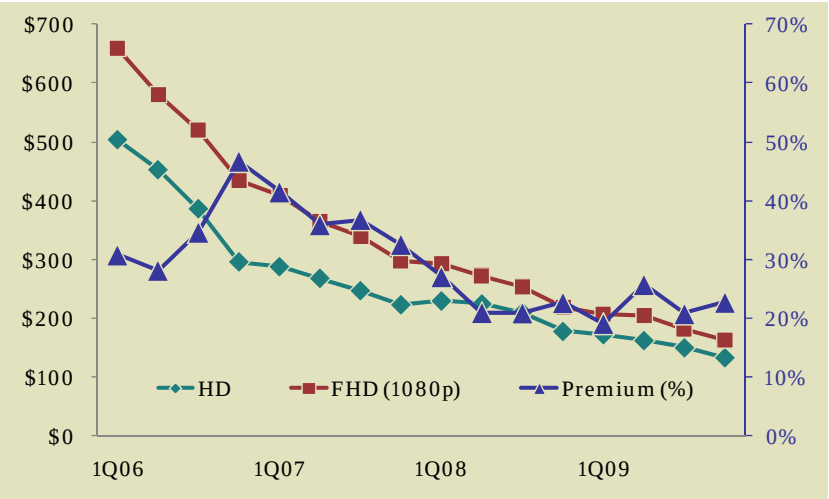

Figure 3: Premiums for Full HD (1080p) LCD TV Sets (32-inch and larger)

Source: DisplaySearch Global TV data, BizWitz analysis

One other factor to consider here is cost. It would be interesting to study the relative cost of producing a full-HD the last time I saw such data, the bill of materials cost for a 32" 1080p set was 15% more than the cost of a HD set. As panel size increased, the cost difference decreased to about half that for a 42" set. The additional cost of drivers and other electronics was a greater portion of the smaller panels' price. Given the popularity of 32" sets remains high, accounting for about one-third of all LCD TV display area even today, much of the sustained price premiums for full-HD sets may be explained by costs.

If not all features lose their price power over three years, then which do not? That seems to be an important question for brands and retailers. Looking at pricing data for LCD TV sets with single, double and quadruple frame rates (e.g. 60 Hz, 120 Hz and 240 Hz) since 2008, we see some convergence. Could this be a case where premiums erode over a period of three years?

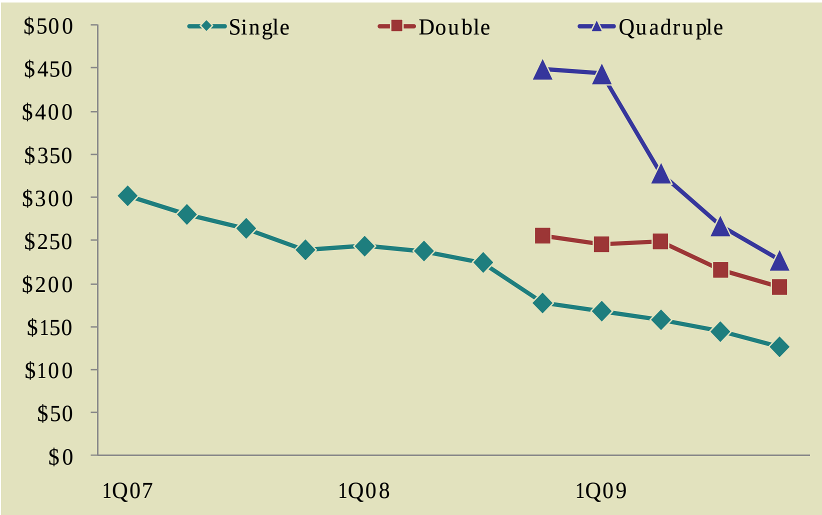

Figure 4: Premiums for Double and Quadruple Frame Rates (32-inch and larger)

Source: DisplaySearch Global TV data, BizWitz analysis

So far, the data is inconclusive. At the end of 2009, double frame-rate sets carried a price per square-foot 49% higher than the area price of 50/60 Hz sets. The price premium for quadruple-rate sets was only 15% compared to double-rate sets, however. Apparently, consumers became less impressed with this feature last year.

Conditions may change if quadruple frame-rates become linked in consumers' minds with 3D capability, however. The quadruple-rate premium may be sustained by consumer interest in buying 3D-ready sets this year and next. As for 3D TV itself, will the high premiums people pay today last through 2012? I suspect not, if 3D really enters the mainstream as many market watchers expect.

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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

Vivid & Clear Motion Picture

- Fast and stable response time provides you motion picture without image distortion
- Cooper lines helps the panel to handle movie data at high speed and volume without any data loss
- Scanning Backlight technology is applied to realize superior moving image quality of 240Hz or above level

Touch Screen Interactive Functions

- Horizontal aligned Liquid Crystal does not have image retention in video streaming condition when it is touched
- It has 10 times faster recovery rate after the array is scattered by touching the panel
- Representative sample of an interactive function is to be used in Public display, IPTV, Home Network and Game area

Low Power Consumption

- High aperture ratio and simple BLU structure with EEFL bring users low power consumption
- Optimal Power Control algorithm which controls BLU dimming by analyzing the display data reduces cumulative power cosumption
- Environment friendly sources which dose not contain Pb.

No Color Wash

- The colors are the same regardless of the view at any angle with lowest Color shift and Gamma Shift of IPS
- The colors are not distorted because it does not cause image blurring which brings color wash
- There is no distinctive color distortions in the shifts between color levels

Full HD LCD TV.
IPS technology brings the best quality screen to
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The right choice of true brightness on your TV.

IPS technology works everywhere, watching high speed movie or trying it by touch, it delivers the ultimate brightness that you're looking for!
Experience the clear difference, now.

LG Display

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

From the professor…

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 four recent entries about the TV industry, providing some insights into just how diverse and continuously interesting the market has become; still not without some substantial problems.**

SID 2010: HDTV take-aways

As always, it has been a packed week at the Society for Information Display (SID) annual conference. There were no earth-shaking developments for the HDTV market revealed here, but I want to recap the overall themes based on what I saw and heard:

- First, 3DTV is real and it's here to stay. I didn't see anything that changed my view that active glasses will be the only commercial solution for the living room for the foreseeable future. Passive glasses add too much cost to the TV set, and auto-stereoscopic just can't work for multiple viewers in a living room setting. Auto-stereoscopic displays are great for single user situations – 3M's clever portable 3D screen proves that – but until you have many more images than just the two used in stereoscopic 3DTV, the limited "sweet spots" are just too restrictive. (Now, when you get to the 200-camera system that has been demonstrated in Japan, that's a different story). http://www.blogtechnical.com/724/3d-telecasts-as-part-of-japan-2022-fifa-world-cup-bid.html
- Next, the debate over "native 3D" versus "synthesized" content developed from 2D originals won't end soon. Yes, the best content is made in 3D from the start when it is initially captured. (Note that some of the worst content is also native 3D, as content producers are still struggling to learn the basics about stereoscopic imagery.) And yes, you can get a good result (though some would not call it more than "acceptable") if you carefully convert 2D to 3D using human graphic artists to make painstaking decisions about the details in each frame. This gets expensive, however, because it is similar to hand-drawn animation in terms of effort. And yes, the real-time conversion of 2D source content into 3D in a $2,000 home television set is not going to be as good as the best examples of the native or hand-converted content. The key question is whether it's "good enough". I think it is for most viewers, and if I were buying a 3DTV today (which I'm not, by the way) I would definitely get one that could do the real time conversion. I'd rather have the feature and decide to not use it than not have the feature and wish I did.
- Finally, LED backlights will take over from fluorescent backlights for LCD HDTVs. They are friendlier to the environment in terms of manufacturing, energy consumption while in use, and ultimate disposal as waste or recycling material. They have better color. And they make it possible to create the thinner displays that consumers appear to prefer. The increasing demand for LEDs for all sorts of applications, including HDTVs, is resulting in rapid growth of production capacity, which in turn should drive down costs. Between that and the fierce competition among manufacturers, I expect to see the price differential between LED and fluorescent models to continue to shrink.

So I don't think we're going to be buying holographic 3D HDTVs or quad-1080p super high definition sets next year. The story is that we can expect steady improvement in the technology (and perhaps a sprinkling of both useful and wacky features as manufacturers struggle to differentiate their products) along with some continued price erosion so by the holiday season, a big flat panel HDTV will be more affordable than ever. And that's enough good news to satisfy me.

HDTV manufacturer fraud?

One thing I've learned in almost 30 years in the technology products business is that it's inevitable that as competition gets more intense, the manufacturers play faster and looser with the whole idea of "specifications". I

saw it in the processor speeds of IBM PC AT compatibles, and in the dots-per-inch claims for personal computer printers, and in the resolution claims of picture tube (CRT) computer monitors. And it's been a part of the HDTV market nearly from the start. (One plasma company claimed that 1024x1024 pixels were enough to be called "HDTV" even though it couldn't show all the 1280x720 pixels in the 720p image; amazingly, a federal judge agreed with the company).

Now my friend, colleague, and mentor in display technology has taken on the manufacturers and their misleading or misconstrued features and specifications. In an article on the Maximum PC site, Ray Soneira of DisplayMate doesn't pull any punches. http://www.maximumpc.com/article/features/display_myths_shattered I've weighed in on many of these same topics in the past: LED TVs are actually LCD TVs with LED backlights, contrast ratio specifications are useless at predicting what you'll see, and LCD "viewing angle" specifications are measured in a way that renders the results pointless. Ray digs into these and more, including Sharp's new 4-color LCD technology and 120 Hz refresh rates. And he finds good reason to criticize them all.

Now, Ray is not some crackpot or a technology lightweight who is just shooting off his mouth. He created the DisplayMate software that we used for every monitor and projector test for years at PC Magazine Labs. He taught me a lot about testing displays, which I then applied when I developed all those test protocols for PC Magazine Labs. And this recent article of his is based on hard results that he got from an extensive shoot-out project that he ran in his New Hampshire lab. http://www.displaymate.com/shootout.html

So before you buy another HDTV, be sure to check out what Ray has to say about the specifications and other manufacturers' claims, just so you'll know what you're looking at when you see the emperor's newest clothes.

Who has the most HDTV?

Ah, the HDTV channel wars are heating up again. Earlier this year, Dish Network announced that it was going to add eight more HD channels, bringing its "total" to 200 HD channels. Then DirecTV revealed plans to add 30 more HD channels this year, bringing its "total" to 160 HD channels. Now, I've put "total" in quotes because not everyone might agree with the count. For example, Dish Network includes 72 pay-per-view HD movie slots in the total. Is a 90-minute program equivalent to a channel that has 24 hours of content a day? DirecTV can also claim some bragging rights from the fact that it also will have four 3DTV channels, including the new ESPN 3D channel and one 3D movie on-demand service. Granted, only a handful of households will be able to make use of these, but it is an important first step in providing stereoscopic content for its subscribers.

All this bragging over the number of channels seems to lose its punch when you've just surfed through the whole range for the second time, trying in vain to find something that you want to watch. As with most things, there comes a point where quality trumps quantity. If none of these extra channels add content that enough subscribers want to watch, it doesn't matter who has the most.

More LED backlight price drops forecast

Two months ago, I reported on DisplaySearch's forecast (http://hdtvprofessor.com/HDTVAlmanac/?p=1153) that prices for LED backlight units for a 40-inch LCD HDTV would fall about 15% this year, though LCD HDTVs with LED backlights would continue to cost significantly more than equivalent models with traditional CCFL (cold-cathode fluorescent lamp) backlights.

Now another display market tracking firm has weighed in on the subject. Displaybank has stated that they expect prices for LED backlights for 40-inch LCD HDTVs to fall by 43% this year, which is a striking amount. This would represent about $100 off the bill of materials price for an HDTV. http://www.displaybank.com

How can this be? Currently, many LED edge-lit models use LED strips along all four sides of the LCD panel, in order to provide enough light with good brightness uniformity. Improved LED technology and more advanced light diffusers mean that manufacturers now are using LEDs just along the top and the bottom of the panel, requiring about 20% fewer LED devices. Later this year, manufacturers are expected to start using LEDs just along the bottom of the panel, reducing the number of LEDs required by another 10%. Eventually, a single bar of LEDs along one side edge will be sufficient to light the entire panel, which will reduce the number of LEDs required by more than a third.

These shifts have some important implications. LEDs are in great demand from a wide range of industries, including automotive and home lighting. In spite of increased production capacity, some analysts are concerned that supplies may fall short. As HDTVs can get by with fewer and fewer LEDs for a backlight, it reduces the risk of supply shortages. Edge lighting also means that manufacturers may have to give up the localized dimming that some have demonstrated with a full-matrix LED backlight that can increase contrast. Dimming can also reduce energy consumption, but there is real risk of visible artifacts from the process. By giving up the dimming, manufacturers can focus on making the sets as thin as possible, which seems to be the feature that consumers prefer in any case.

The bottom line here is that the prices for LCD HDTVs with LED backlights are likely to continue to decline this year, and you can expect to pay hundreds less for a 40-inch set next holiday season than you would for an equivalent set today. It's hard to see how the industry will be able to sustain these substantial price cuts year after year, but it looks like we can enjoy the downhill ride for at least one more year.

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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.

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.

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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 26-28	ATEI 2010	London, England	
January 27	Touch Panels and Overlays for Displays	Oxford, England	
January 26-28	International Gaming Expo	London, England	
January 27-28	DisplaySearch Japan Forum	Tokyo, Japan	
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 16-18	Broadcast Video Expo	London, England	
February 16-19	Hollywood Post Alliance 2010 Tech Retreat	Rancho Mirage, California	
February 17-18	Createasphere/EXPLORE	Universal City, California	
February 19-21	Symposium on Interactive 3D Graphics and Games	Washington, DC	
February 23-25	Digital Signage Expo	Las Vegas, Nevada	
February 25	Winning display technologies for the new decade	Cambridge, England	
February 26-28	Sound & Vision 2010	Bristol, England	
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 4	Functional Polymer Systems	Sedgefield, England	
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	Flexible, Printed Electronics Workshop	Tempe, Arizona	
March 9-10	National Electronics Week	Johannesburg, South Africa	
March 9-11	Air Traffic Control	Amsterdam, Netherlands	
March 9-13	Game Developers Conference	San Francisco, California	
March 14-17	Lighting Quality and Energy Efficiency Conference	Vienna, Austria	
March 15-18	Showest 2010	Las Vegas, Nevada	
March 16-18	FPD China	Shanghai, China	

March 16-18	Laser World of Photonics China	Shanghai, China	
March 18-19	Personal Projection and Information Displays	Dresden, Germany	SID
March 20-21	Symposium on 3D User Interfaces	Waltham, Massachusetts	IEEE
March 20-24	Virtual Reality 2010	Waltham, Massachusetts	IEEE
March 22-26	2010 Measurement Science Conference	Pasadena, California	
March 23-25	Phosphors Summit	San Diego, California	INTERTECH pira
March 23-25	Image Sensors Europe	London, England	INTERTECH pira
March 24	Korea FPD Conference	Seoul, Korea	DISPLAYSEARCH
March 24	Transistors on Plastic	London, England	
March 24-27	EHX Spring	Orlando, Florida	EHX
March 25-26	Symposium on Haptic Interfaces and Virtual Environments	Waltham, Massachusetts	Haptics Symposium
March 31	3D: Behind the Hype	Santa Clara, California	3D : Behind the Hype 2
April 2010			
April 7-10	International Sign Expo	Orlando, Florida	
April 8-9	2010 Taiwan FPD Conference	Taipei, Taiwan	DISPLAYSEARCH
April 8-10	Global FPD Partners Conference	Tokyo, Japan	semi
April 9-11	China International 3D World Forum & Exhibition	Shenzhen, China	C3D
April 10-15	NAB 2010	Las Vegas, Nevada	NAB
April 10-15	CHI 2010	Atlanta, Georgia	CHI 2010
April 11-14	International Symposium on Flexible Electronics	Palma de Mallorca, Spain	Engineering Conferences International
April 12-14	Digital Holography and Three Dimensional Imaging	Miami, Florida	OSA
April 12-16	MIPTV	Cannes, France	miptv
April 13-14	Printed Electronics Europe	Dresden, Germany	IDTechEx
April 13-14	Photovoltaics Europe	Dresden, Germany	IDTechEx
April 13-15	Sign UK/Digital Signage Showcase	Birmingham, England	sign&digital UK
April 14-15	Digital Signage Show 2010	Las Vegas, Nevada	DIGITAL SIGNAGE
April 14-16	FineTech Japan & Display 2010	Tokyo Japan	FINETECH 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 21-22	3D Gaming Summit	Universal City, California	
April 21-22	Solid-State Lighting Manufacturing R&D Workshop	San Jose, California	
April 27	LEDs & Solid State Lighting – Metrology, Metrics and Standards	Birmingham, England	
April 27	Photovoltaic Technology Electronics	Stuttgart, Germany	
April 28-29	Flat Panel Displays Training Workshop	Pforzheim, Germany	
April 28-30	Organic Photovoltaics	Philadelphia, Pennsylvania	
April 29-30	Displays: An Executive Overview	Nottingham, England	
May 2010			
May 3-6	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 10-11	Printed Electronics Summit	San Jose, California	
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 18-19	Printed Electronics 101	Clemson, South Carolina	
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 24-26	CeBIT Australia	Sydney, Australia	
May 25-26	3DTV World Forum	London, England	
May 25-29	Advanced Visual Interfaces	Rome, Italy	
May 26	The Future of Lighting and Backlighting	Seattle, Washington	
May 26-27	TV 3.0: The Future of TVs	Seattle, Washington	
May 27	The Future of Touch and Interactivity	Seattle, Washington	
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	Flexible, Printed Electronics Workshop	Raleigh, North Carolina	
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	3DNext	Hollywood, California	
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 23-25	Electronic Materials Conference	Notre Dame, Indiana	
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 13-14	International Conference on Stereoscopic 3D for Media and Entertainment	New York, New York	
July 13-14	TV 3.0 Summit and Expo	Los Angeles, California	
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 8-10	Semicon Taiwan	Taipei, Taiwan	
September 9-10	China FPD	Shanghai, China	
September 9-14	IBC 2010	Amsterdam, Netherlands	
September 13-16	PLASA '10	London, England	
September 15-16	3D Entertainment Summit	Universal City, California	
September 19-23	International Conference on Digital Printing Technologies	Austin, Texas	
September 19-23	Digital Fabrication 2010	Austin, Texas	
September 20-21	Organic Electronics UK	London, England	
September 22-23	Createasphere/EXPLORE	New York, New York	
September 22-26	CEDIA Expo	Atlanta, Georgia	
September 24-26	The 3D Experience	New York, New York	
September 27-29	OLEDs World Summit 2010	San Francisco, California	
September 29-30	RFID Europe	Cambridge, England	
September 27 - October 1	International Workshop on Inorganic and Organic Electroluminescence & International Conference on the Science and Technology of Emissive Displays and Lighting & Advanced Display Technologies International Symposium	St. Petersburg, Russia	
October 2010			
October 3-6	Symposium on User Interface Software and Technology	New York, New York	
October 5-9	CEATAC Japan 2010	Tokyo, Japan	
October 6-10	CeBIT Bilisim EurAsia	Istanbul, Turkey	
October 11-14	Showeast	Orlando, Florida	

October 11-14	Taipei Int'l Electronics Autumn Show	Taipei, Taiwan	
October 11-15	IMID/IDMC/Asia Display	Seoul, Korea	
October 12-14	Solar Power International	Los Angeles, California	
October 13-16	ElectronicAsia 2009	Hong Kong, China	
October 17-20	AIMCAL Fall Technical Conference	Myrtle Beach, South Carolina	
October 18-21	Digital Hollywood Fall	Santa Monica, California	
October 18-24	3DDD Film Festival and Stereoscopic World Congress	Barcelona, Spain	
October 19-21	Semicon Europa 2010	Dresden, Germany	
October 19-21	Plastic Electronics 2010	Dresden, Germany	
October 19-21	SATIS 2010	Paris, France	
October 21-23	Viscom	Milan, Italy	
October 24-28	Frontiers in Optics	Rochester, New York	
October 25-26	Workshop on the Impact of Pen-based Technology on Education	Blacksburg, Virginia	
October 25-29	International Conference on Multimedia	Florence, Italy	
October 26-28	SMPTE 2010	Hollywood, California	
November 2010			
November 2-3	DisplayForum	London, England	
November 3-4	Createasphere/EXPLORE	Burbank, California	
November 3-4	International Workshop on 3D Geo-Information	Berlin, Germany	
November 7-11	Annual Meeting of the IEEE Photonics Society	Denver, Colorado	
November 8-10	Tabletops and Interactive Surfaces	Saarbrucken, Germany	
November 9-12	electronica	Munich, Germany	
November 8-12	Color Imaging Conference 2010	San Antonio, Texas	
November 10-11	Digital Signage Show 2010	New York, New York	
November 10-12	FPD International	Tokyo, Japan	
November 13	Taiwan TV Supply Chain Conference	Taipei, Taiwan	
November 17-19	InfoComm Asia	Hong Kong, China	

November 21-24	International Conference on Electronic Materials and Nanotechnology for Green Environment	Cheju Island, Korea
November 25-27	China International Touch Screen Exhibition & Seminar	Shanghai, China
November 29 - December 1	International Symposium on Visual Computing	Las Vegas, Nevada
December 2010		
December 1-2	Printed Electronics US	Santa Clara, California
December 1-3	SEMICON Japan	Tokyo, Japan
December 6-8	Virtual Reality Software & Technology	Hong Kong, China
December 7-9	CineAsia	Hong Kong, China
December 8-10	3D Stereo Film & Technology Festival	Liege, Belgium
December 15-18	SIGGRAPH Asia	Seoul, Korea

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INFORM · PROMOTE · IMPROVE · CONNECT

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.

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.

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 Every Room"

LCD TV Association

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

Sustaining Members

CORNING, APPLIED MATERIALS, LG Display, NOVA Chemicals, MERCK, AmTRAN, UNIPIXEL, retrevo, DISPLAYSEARCH, FlexTech Alliance, Ventas et Visus, Fusion optix, mSilica, QUINN PACIFIC, rallypoint, Supertex inc., DOLBY, LG Electronics, Westinghouse, VIZIO, LG Innotek, TAOS

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