LCD TV Association

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“LCD TV Matters”

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"A Great TV in Every Room"

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Chairman's Corner: 3D…

by Bruce Berkoff

One of the most highly publicized display trends from CES 2010 was the explosion of 3D TV models exhibited by many major TV set manufacturers. While it is clear that 3D content and technology are converging this year (and will be a commercial success and driving force in movie "theater" chains in the USA) and that this content and some form of hardware will be widely available to consumers in 2010 and beyond, it is still far from certain how quickly mass adoption in the home will happen since consumers have to change their viewing behavior (for today that means wearing special glasses) and pay extra money for the experience ("3D" ready TVs will be ready for you to buy an expensive kit with glasses and special transmitter for you to actually ever see the 3D part).

Already, this new 3D trend is more than just "hype" in commercial movie theaters. 3D movies have been around for almost 100 years, with a surge in 3D movie releases happening in the 1950s, only to subside again for five decades. But recently 3D movie releases, such as Avatar (see figure 1), combine better 3D technology with content that is enhanced by the 3D rather than subservient to it. We can expect lots of 3D movies to follow Avatar's lead and also expect 3D movie revenue to surge from this point forward (but it may be a long time for another film as successful as Avatar to come along – great technology with a great story and reality-based science "thought experiments" wrapped up with talented writing, acting, and directing will remain a rarity). We can also imagine other public viewing experiences becoming another content source for 3D movie theaters to generate additional revenue, such as sports events, concerts (like U2's earlier 3D splash), and even theater (a Broadway play that is truly "off Broadway") that might be more widely viewed as 3D movies or simulcasts in the growing number of venues across the US and the world that are now set up to project and show 3D to the ever-larger number of people willing to pay more for this new "theater" experience (and how many people get to see famous artists in concerts or plays in their home town at their convenience)?.

Figure 1: Avatar is on target for 3D audiences

But back to the home and our TVs; already TV makers are launching "3D ready" sets, which function as a normal high-end 2D TVs and can be upgraded to 3D with the purchase of a kit (glasses and transmitter). However, the price of upgrading may be several hundred dollars or more depending on the number of glasses purchased. This high cost, together with the inconvenience of having to keep track of glasses, and the isolation from others during group viewing (or the dizziness I feel if I tilt my head or try and recline!) may slow the adoption of 3D TV viewing in the home. In the near-term it might be only high-end early adopters and gamers that bring 3D TVs to their homes and actually use them that way (with glasses). However, larger numbers of consumers can certainly enjoy the high-quality 2D viewing experience with 240Hz refresh rate that "3D ready" trend will bring us.

A few years back, some large screen rear projection TVs tried to be a 3D platform (see Figure 2) but RPTV became a shrinking category as LCD TVs grew bigger in size and market acceptance. Now, 240 Hz LCD TVs (see Figure 3) make a great platform for any home viewing experience including the "3D ready" set which may be in our future. Of course, to really make it an easy choice for mainstream consumers, you would want a 2D/3D switchable TV that looked great in either mode and required no extra glasses (thus a type of autostereoscopic display which has not yet been perfected, but which many of the major players like LG Display are certainly working on). Will this type of display happen and be affordable in the next few (or many) years? I am not sure, but I do believe some great content will be there if the sets can come along.

One final question to ponder as we think about the future of LCD TVs is of course how OLEDs may play out, and in this case how an OLED 3D TV might look, but since Sony showed off a demo of one at CES (see Figure 4) at

least we have one data point to consider. The bigger question if whether the whole supply chain around OLEDs will grow to support the larger size screens, or will it remain a niche technology to be used on small cell phone type displays? Certainly the current advances in LED lighting solutions for LCD TVs take away much of the potential promise of OLED TVs of tomorrow with the great 240 Hz LED lit TFT LCD TV of today! (and as noted last month, when added with a wireless cabling box, these make great solutions to hang on your wall right now, as my wife recently found out…when will you)?

Figure 2 (on the left) is the Mitsubishi 82-inch WD-82737 rear projection system that supports 120Hz frame rates to enable shutter-glass-based 3D TV. Figure 3 (center) is Samsung's recently introduced "UN40C7000 40-inch 1080p 3D-ready LED LCD HDTV" (otherwise known as "the TV with lots of acronyms"). Figure 4, on the right is Sony's 24.5-inch 3D OLED TV prototype.

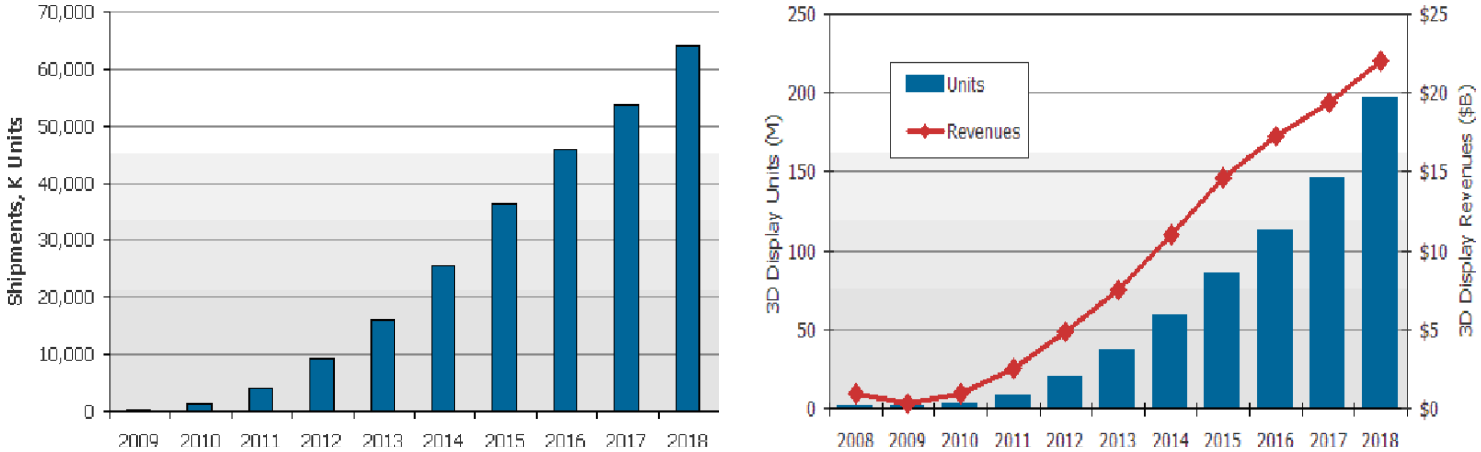
Mr. Berkoff is the chairman of the LCD TV Association, a global not-for-profit marketing trade association dedicated to "informing, promoting, improving and connecting" the entire LCD TV supply chain and their related companies, to help promote "a great LCD TV in every room in the house!" For over six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

DisplaySearch forecasts boom in 3D displays

In their "Quarterly TV Design and Features Report", DisplaySearch research indicates that LED backlighting and 240Hz LCDs will serve as enabling technologies for new feature developments in TVs in 2010, specifically for 3D TVs. DisplaySearch forecasts 3D-ready TVs will grow from 0.2 million units in 2009 to 64 million units in 2018. 3D-ready TV will be the largest application in terms of revenue in 2018 with $17 billion. Additional findings from the DisplaySearch 3D Display Technology and Market Forecast Report: 3D-ready monitors will grow from 40K units (0.02% penetration) in 2009 to 10 million (3.6% penetration) in 2018; 3D notebook PCs are forecast to grow from 66K units (0.04% penetration) in 2009 to 17.7 million (3.2% penetration) in 2018; mobile phones will be the largest 3D display application on a unit shipment basis in 2018, with 71 million units with 3D capability. The largest screen size category for 3D display shipments will be 1-4.x inch, due to demand from mobile phone and digital camera/camcorder applications. The second largest size range will be 40-49 inch, due to TV, public display and 40+ monitor applications. LCD will be the primary display technology used for 3D displays, as a result of its wide range of display applications ranging from small mobile phones to large public displays and TVs. Eyewear will be necessary for most 3D applications for many years to come, due to the limitations of auto-stereoscopic (no glasses) technologies. DisplaySearch forecasts there will be more than 7,000 new 3D cinema screens installed in 2010 and an additional 9,000 in 2011.



The figure on the left shows DisplaySearch's unit forecast for 3D TVs; the figure on the right shows unit and revenue expectations for 3D display across all applications.

In its recently released 3D Display Technology and Market Forecast Report, DisplaySearch forecasts that the total stereoscopic 3D display market will grow from 0.7 million units and $902 million in revenues in 2008 to 196 million units and $22 billion in revenues in 2018, a compound annual growth rate (CAGR) of 38% for revenues and 75% for units. The market for 3D displays, which is encouraged by the recent success of 3D cinema, is forecast to take off in 2010, providing a welcome boost to the electronics industry. http://www.displaysearch.com

THX supports Sensio 3D format with THX Media Director

THX Ltd. and Sensio Technologies have partnered to integrate Sensio 3D video processing flags with THX Media Director, a technology designed to simplify the home entertainment experience. THX Media Director will provide TVs featuring both Sensio 3D video processing and THX Media Director with the ability to select appropriate 2D and 3D playback settings automatically, resulting in a seamless, high quality 3DTV experience for consumers. THX Media Director enables Sensio and its consumer electronics partners to showcase signature 3D playback features and settings, while simplifying the user experience. THX Media Director technology uses metadata to describe the creative and technical characteristics of 2D and 3D content to TVs, AV receivers and other home theater playback devices. Acting on the metadata, THX Media Director-enabled TVs can trigger the appropriate playback settings for Sensio 3D video processing, or resume 2D playback, without requiring user intervention. http://www.thx.com

Japan's Sky Perfect JSAT to offer 3D programming this summer

With the advance of 3D movies from Hollywood, and TV makers announcing launches of 3D TV in the coming months, Sky Perfect JSAT say they will start offering 3D content from 2010 summer. After researching and reviewing different content and possibility for the past year, Sky Perfect JSAT will first concentrate on live events especially on sports events. Sky Perfect JSAT current "SUKAPA!HD" offers 58 HD channels. They are planning to offer 85 channels by the end of December 2010, and 100 channels by 2012. In the beginning, there will only be two to three 3D programs available monthly. http://www.sptvjsat.com

Sensio given new patent application from the USPTO relating to quincunx format decoding

Sensio Technologies announced that it has received a notice of allowance for one of its pending patent applications by the United States Patent and Trademark Office (USPTO). The patent application allowed covers a fundamental method for high-quality decoding of quincunx (checkerboard) compressed stereoscopic formats. The decoding method covered can be integrated into various products; namely chips, DVDs and Blu-rays, which are specifically described in the patent application and represent part of Sensio's core business. The patent application protects the checkerboard decoding technique in multiple markets and applications, from D-cinema to mobile phones. "Our first issued patent covers the whole method of compression, decompression, formatting and display of stereoscopic content in both 2D and 3D while this patent application is specifically targeted to quincunx decoding and its application for 3D. The quincunx format is widely recognized to provide the best quality of all spatial compression formats", states Étienne Fortin, CTO at Sensio. "The general method described in the patent application covers a wide family of efficient decoding algorithms." http://www.sensio.tv.com

Quixel Research says 50% of consumers want 3D home theater

According to a recent survey from Quixel Research, 50% of consumers want 3D home theaters and about 80% have already watched something in 3D. Quixel's second annual 3D study, "3D Displays and Content 2009", surveyed 1,000 HDTV owners to get their opinions on 3D technology. The data also shows consumers are willing to pay for 3D glasses; want to receive 3D programming from their service provider; and prefer to watch 3D content from their cable or satellite provider vs. buying Blu-ray/DVD. The study also found the following: 78% of respondents have had a 3D experience; half of those surveyed are interested in watching 3D at home, with those who have seen a 3D movie recently more interested in purchasing; more than one third of those surveyed expect 3D TV within 12 months; a significant majority would be interested in changing their content provider in order to receive 3D content; nearly two-thirds say 3D is a group experience; consumers are willing to pay for 3D glasses but don't expect to pay twice as much for two pairs. http://www.quixelresearch.com

Sensio and Vizio sign agreement for integration of Sensio 3D format decoder into Vizio 3D HDTVs

Sensio Technologies announced that they have been selected by Vizio to incorporate Sensio's decoder, the S3D Core, into its new line of Full HD3D TVs. Vizio plans to deliver a significant number of Full HD3D TVs into the market beginning in the second half of 2010. http://www.sensio.tv.com

Samsung begins mass-producing 3D TV screens

Samsung Electronics announced it had started mass production of screens for 3D LCD TVs. "Recently, 3D displays have captured the industry spotlight. Samsung Electronics aims to lead the global 3D TV panel market in pioneering mass production for 3D LED and LCD TVs," the company said in a statement. The company already began producing 3D-compatible LED and LCD screens for 40-inch, 46-inch and 55-inch full-HD 3D TVs in January. Several companies announced 3D-ready TVs at the International Consumer Electronics Show in Las Vegas earlier in the month, making it one of the most talked about product categories at the show. The LED TVs with 3D capability from Samsung include its LED7000 series and above, and 750 Series LCD TVs. The 3D LED TVs have LED backlights, which provide greater color saturation and energy savings than older CCFL technology. Samsung has reduced the response time of its LCD and LED panels by 20% to less than four milliseconds, eliminating any interference between left and right eye images. With this improved response time, Samsung is able to achieve natural 3D images and also deliver 2D pictures capturing rapid movement with exceptional clarity. Samsung's new 3D Active Glasses technology first blocks the left and then right lens, causing a momentary lag when images are shown to each eye to achieve more lifelike 3D images. The term "3D Active Glasses" was selected as an official term by the Glasses Standardization Working Group of the Consumer Electronics Association (CEA) earlier this year. http://www.samsung.com

XpanD brings out X103 3D active-shutter glasses for LCDs

The X103 glasses from XpanD are designed to work seamlessly with 3D-ready LCDs, DLP and plasma displays. The XpanD X103 glasses are designed to work with 3D-ready LCD laptop and desktop monitors, LCD, DLP and plasma televisions. Virtually anything capable of playing 3D-encoded content at 120fps will be compatible with the X103 glasses, making it possible for users to enjoy completely immersive 3D environments for video games, movies, TV, and presentations. XpanD active-shutter glasses utilize a specialized fast-switching liquid crystal cell, called the "pi-cell," as a shutter to alternately block each eye. Through fast switching, optimal extinction ratios, and a wide viewing field, the XpanD active-shutter glasses offer the clearest, flicker-free 3D experience in the world, the company says. The X103 glasses are available in a variety of different colors, allowing users to choose a style that meets their specific preference, as they would a pair of sunglasses or prescription eyeglasses. XpanD currently possesses a 95% global market share of 3D active-shutter glasses and is the only company in the world to provide 3D active-shutter glasses for all of the following markets: cinema, home entertainment (including DLP-Link projector technology), broadcast, education, corporate and PC gaming. http://www.xpandcinema.com

AUO to produce 65-inch 3D LCD panels

AU Optronics has come up with a 65-inch full HD 3D LCD panel which the company aims to enter volume production sometime in the second half of next year. AUO indicated that the flat panel industry's future development of technology will focus on high resolution and 3D displays, and fast response time will be a key factor for the development. http://auo.com

Silicon Image introduces 4K and 3D H.264 digital video decoder IP core

Silicon Image announced the newest member of its IP core family, the cineramIC 4K and 3D H.264 digital video decoder. The cineramIC IP core can be integrated into System-on-Chips (SoCs) for next-generation digital TV (DTV), set-top-box (STB) and camcorder applications, as well as professional video editing, broadcast, medical and surveillance FPGA applications. The cineramIC IP core comes with the following features:

- Performance of up to 4K x 2K at 30 frames per second or high-definition 1080p 3D at 60 frames per second utilizing a single video pipeline implementation.
- Support for H.264, MPEG-1/2 and VC-1 decoding.
- Fully automatic multi-stream decoding for up to 16 streams, error detection and concealment, with very low software processing requirements.
- H.264 Multiview Video Coding (MVC) extension support for multi-camera 3D, surveillance and sports viewing applications.
- JPEG decoding of images up to 16K x 8K size with a decoding rate of 9 pictures per second for 32-megapixel pictures.

Silicon Image's family of IP cores also includes a broad range of HDMI technology solutions, including transmitters and receivers incorporating HDMI Specification Version 1.4 features, Silicon Image's Mobile High-Definition Link (MHL) technology, Serial ATA storage (SATA) and camera image signal processors for mobile phone and netbook applications. http://www.siliconimage.com

NXP introduces advanced 3DTV processor

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

LG begins mass-producing 3D 1080p displays

LG has begun mass-producing 3D 1080p LCD 23-inch panels. The panel will use the maker's proprietary "high-performance 3D exclusive controller" engineered to enhance resolution and other visual elements, according to LG. The company also said the units will provide more than twice as much image "information" as current 3D LCD models. LG Display reportedly has made a "major breakthrough in the display industry race to deliver the depth and dynamic nature of 3D images." The company has announced that it plans **to** sell 3.8 million HDTVs within the next couple of years. LG's chief technical officer told the *Korean Times* the company intends to raise its global market share by 50 percent next year by selling 400,000 3DTV sets, and by selling 3.4 million 3DTVs in 2011. Baek Woo-hyun said the company expects 3DTV sets up comprise 10 percent of its overall TV sales. LG plans to roll out 3DTVs ranging in size from 42- to 72-inches in 2010. LG will focus on North America and Europe next year, and launch 3DTVs in South and Central American and Asia in 2011. http://www.lge.com

LG has showcased a 47-inch 3D LCD TV and a 23-inch 3D LCD monitor that work as both 2D and 3D displays and come with real-time 2D-to-3D playback conversion technology

LG also just announced a partnership with Korea's direct broadcast satellite operator, SkyLife. The two signed a memo of understanding for a strategic partnership to develop the 3DTV industry in that nation. LG rolled out Korea's first 3D-capapable, LCD TV set in August. After a trial in October, SkyLife will be running a second 3D content trial in January. SkyLife chief Mong-ryong Lee said the company intends to invest US$25 million in creating 3D content in collaboration with LG. The FIS Snowboard World Cup will be the inaugural event. Additionally, the Korea Communications Commission (KCC), the nation's top broadcasting regulator, recently announced a plan to start a trial service for full HD 3D terrestrial broadcasting in the second half of 2010.

LG and SkyLife (Korea Digital Satellite Broadcasting) will work together to set 3D broadcasting standards for content, devices, and technologies. The two will also develop technologies that "don't cause eye strain or dizziness".

Sony demos 280-inch 3D TV wall

Sony recently displayed a 280-inch screen at Japan's annual International Broadcast Equipment Exhibition, describing the screen as a "3D LED wall". The wall is actually comprised of 70 LED-backlit LCD screens, each measuring roughly 28 inches. The demonstration was for a complete 3D video production system for business use. Sony showcased a business-use camera, processor to compensate and adjust 3D images, switcher and recorder for editing. They introduced the SRX-R320 digital cinema projector that can project 4K2K 3D video and was released Nov 9, 2009. Additionally, the HDC-P1 – a multi-purpose camera for taking 3D images – and a "rig" will be launched in February 2010. The rig is a mount for the camera, and it enables to combine two units of the HDC-P1 and a half mirror to shoot 3D video. The 3D LED Wall measures 6.4-meters in width and 3.4-meters in height and can switch between 2D and 3D video. http://www.sony.net

Sony introduces 3D activities related to the 2010 FIFA World Cup

Sony announced its plans to embark on a series of strategic initiatives focused on its 3D programs in connection to its sponsorship of the "2010 FIFA World Cup." Sony and FIFA announced an agreement for selected media rights of the 2010 FIFA World Cup in 3D. FIFA is to produce the world's first FIFA World Cup in 3D. Up to 25 of the 2010 FIFA World Cup South Africa matches will be produced using Sony's 3D professional cameras, which will provide coverage of the action to viewers around the world. "The transition to 3D is underway, and, we, at Sony, intend to be leaders in every aspect. Our sponsorship of the FIFA World Cup allows us to leverage our cutting-edge 3D technology and premier products with dazzling content to produce a unique and totally compelling viewing experience. 3D viewers will feel as though they are inside the stadiums in South Africa, watching the games in person," said Sir Howard Stringer, CEO at Sony. http://www.sony.net/united/football/

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

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

Sony and PGA partnering to bring golf entertainment in 3D

Sony and the PGA Tour announced a partnership to explore new entertainment experiences for golf in 3D. Together, Sony and the PGA Tour will work to develop a plan to make the 2011 Sony Open in Hawaii the first PGA TOUR event shot in 3D and available for distribution in 3D to select audiences, in addition to its regular 2D presentation. Development work will begin at the 2010 Sony Open, at which Sony will shoot portions of the event in 3D as a first step in the joint study, and continue through the 2010 PGA TOUR season. The organizations will also explore development of 3D golf for other potential applications. The Sony Open in Hawaii, now in its 12th year, is one of the leading charity sporting events in the state of Hawaii and reaches over 450 million homes in over 200 countries via multiple national and international broadcast networks. All net proceeds from the event benefit Friends of Hawaii Charities, an organization dedicated to providing funds to qualifying not-for-profit endeavors in support of women, children and elderly in need. http://www.pgatour.com: http://www.sony.net

Sony PlayStation 3 firmware update to enable 3D games

Sony says all consoles will benefit from stereoscopic depth-of-field technology after downloadable patch. At the 2009 Consumer Electronics Show, Sony showed off Polyphony Digital and Evolution's MotorStorm with full depth of field using the emerging 3D display technology. Sony representatives also said in September at IFA that Sony would begin manufacturing a PlayStation 3-compatible 3D Bravia HDTV by the end of 2010. What's more, Sony reps said that it also plans to integrate the stereoscopic 3D technology directly into the PS3 beginning in 2011 or 2012. Now, Sony has thrown its full corporate weight behind its intent to integrate stereoscopic 3D into the PS3 as part of a presentation given to media and investors today. Sony said all PS3 units would eventually be given a 3D display mode as part of a future firmware update. The company also said that it will release a line of 3D games that make use of the technology. CEO Kaz Hirai confirmed that the PlayStation group will begin enacting its 3D strategy in 2010. Aside from new games, Sony has previously indicated that the 3D technology could also work with existing software. http://www.sony.net

Sony set up the prototype unit with a PS3 showing off existing games, like WipeOut HD, being played in 3D. Company reps said the technology on display was built into the HDTV itself, meaning it would work with pre-existing PS3 games and consoles.

Softkinetic-Optrima and Texas Instruments collaborate to develop and market 3D solutions

Softkinetic-Optrima announced a collaboration with Texas Instruments to design, develop and market joint 3D imaging solutions for the television, personal computers, digital signage, health & fitness, industrial, robotics, automotive, security and many others markets. As part of the collaboration with TI, Softkinetic-Optrima will port its 3D gesture recognition middleware called iisu directly onto TI's intelligent digital signal processors and will provide direct support for OptriCam, Softkinetic-Optrima's 3D imagers product, to TI-based development boards. Softkinetic-Optrima's iisu middleware insulates application developers from the low-level technicalities of the 3D depth sensing cameras, dramatically reduces their development cycles by offering a rich set of interfaces and predefined gesture-based patterns, and allows them to focus their effort on the game play itself. The OptriCam driver for the OMAP 3 processors-based BeagleBoard is available today for evaluation, and iisu-based solution will be available in the first half of 2010. http://www.softkinetic-optrima.com

Softkinetic's industry-leading 3D gesture recognition software, along with Optrima's patented 3D camera and sensor hardware, make full-body gesture recognition interfaces possible with a variety of digital mediums and consumer electronic devices.

VIZIO shows off XVT Pro line-up and "Beyond TV"

VIZIO announced its forthcoming XVT Pro series of HDTVs – representing one of the highest range of high-end, differentiated products on the market. VIZIO is normally known for mass market televisions that mainly appeal to customers' pocketbooks, but with the XVT Pro line of products, VIZIO has clearly stepped into the arena of leading-edge technologies as well. The new and future products feature everything from 3D capability, up to 480 zones of smart-dimming LED backlighting, wireless HDMI, 21:0 aspect ratios, Quad HD, and 480Hz refresh rates for smooth motion. The XVT Pro series also add in Wi-Fi, Bluetooth, and integrated Internet-savvy applications for connecting to home networks. http://www.vizio.com Features of the XVT Pro line-up include:

- The XVT Pro series will be available in 47-, 55-, and 72-inch sizes.
- All the sets feature 480 Hz refresh rates, five HDMI inputs, integrated Wi-Fi and Bluetooth, LED backlighting (though the number of dimming zones varies: the 47-incher will have 160, the 55-incher will have 120, and the 72-incher will have 480).
- The sets also incorporate Sensio 3D technology to handle delivery of 3D content – although, of course, users will still need 3D glasses, in this case Bluetooth-enabled XpanD active-shutter glasses that dynamically switch the shutters between opaque and transparent in synch with the television.
- The XVT Pros will also feature a Wireless HDMI receiver so users can put their Blu-ray players and other high-definition technology out of sight somewhere without having to run a heap of cables through a wall or across a room. The Wireless HDMI solution runs at 60 GHz and handles up to 4 HDMI sources.
- The XVTPros also feature Vizio Internet Apps: the televisions connect to an existing home broadband connection using 802.11/n Wi-Fi and can connect to on-demand and streaming video, music, and media services without a separate set-top box.
- VIZIO isn't planning on shipping the XVT Pros until August 2010. However, the prices look interesting: VIZIO says the MSRP for the 47-inch model should be around $1,999, with the 55-inch unit going for $2,499 and the 72-inch set going for $3,499.

In addition, VIZIO showcased several next-generation "Beyond TV" technologies during the Consumer Electronics Show. New technologies included:

- A Whole-home portable TV using VIZIO's Multi-Room Wireless Full HDTV system based on Celeno's WiFi chipset. Celeno's 802.11 + OptimizAIR system works in the 5 GHz band and operates over 20 channels with unique redundancy to provide up to 10 times the throughput and range of standard WiFi systems. The system delivers flicker-free Full HD reception throughout the home and is able to connect up to 120 feet from the base station, even through multiple walls.
- A 65-inch 120Hz 3D HDTV with full 1080p resolution. This technology allows these sets to display 3D content from DVD and Blu-ray players, cable, satellite and broadcasts, as well as provide a 3D gaming experience.
- A Quad Full HD 4K x 2K HDTV. With 8 megapixels, fully four times the pixels of 1080p displays, this 56-inch LCD concept piece boasts a resolution of 3840x2160. Exhibiting the same resolution as Digital Cinema projectors used in commercial digital theaters, this presentation will reveal the benefits of higher resolution displays for the home
- VIZIO's Cinema Display, which has a 21x9 aspect ratio, to show "Scope" films on the entire screen area. The demonstration was on a 58.0-inch display at 2560x1080 pixels.
- A new HDTV Powerline Networking system for the home that uses the AC power line to connect devices in the home.
- Ultra-thin Blade TVs, which feature incredibly thin profiles as shallow as ¼-inch. A 42-inch Blade model is a 120 Hz LED with Edge illumination, Smart Dimming and a 1,000,000:1 contrast ratio. The 26-inch model also has a ¼-inch display and edge illumination. Both sets are 1080p Full HD.

NEC Electronics introduces Super-resolution ASSP with LVDS interface for digital TVs and PC monitors

NEC Electronics announced its new super-resolution application-specific standard product (ASSP), the µPD9281GC. The ASSP addresses the dramatic divergence between yesterday's image resolution and the high resolution of today's audio-visual (AV) display systems, and supports the low-voltage differential signaling (LVDS) interface, a technology extensively adopted in broad ranges of flat panel displays, projectors for digital TVs (DTVs) and PC monitors. The rapid development of today's high-performance digital audio/visual (AV) devices has left consumers with the challenge of how to view low-resolution images on their new high-definition (HD) electronic products. For example, 1920x1080-pixel HD televisions have six times the resolution compared to the 720 x 480-pixel standard-definition (SD) image data, which results in blurred images. Although many image-enhancement technologies have been developed to process low-resolution image data into full HD images, designers, using traditional solutions, require large-capacity external memory devices and high-performance computational engines, as well as facing other challenges, to achieve real-time processing for vivid moving images. To solve these problems, NEC Electronics and NEC Central Research Laboratories jointly developed a new technology that enables very high-resolution processing with just one frame of image data. The company has named its super-resolution ASSP lineup the "NeoClearResolution (Bikaizo)" and now offers the new µPD9281GC NeoClearResolution ASSP with LVDS interface. http://www.am.necel.com/superresolution

- With an integrated LVDS-interface circuit that connects the flat panel display and the image-data processing circuits, NEC Electronics' new ASSP reduces the number of external components and saves space on system boards.
- The new ASSP integrates a noise-reduction feature to reduce mosquito noise unique to compressed video images of MPEG2, widely used for digital media such as DVDs and Blu-ray™ Discs, and H.264 used for viewing digital satellite broadcasting. The new ASSP also reduces mosquito noise for JPEG compressed images, used especially for digital still cameras. Reducing the mosquito noise enables processing of images that are more natural.
- Designers can select up to four specific sections of an image and apply NEC Electronics' super-resolution technology to enhance image quality of those sections. This feature enables the application of the super-resolution technology, such as applying the technology onto a specific area of the picture–in–picture display, which is useful for picture-enhancement demonstrations at consumer electronics stores.

"Super resolution" is a technology that is used to sharpen out-of-focus images or smooth rough edges in images that have been enlarged using a general up-scaling process (such as a bilinear or bi-cubic process), thereby delivering an image with high-quality resolution.

Sharp debuts RGBY QuadPixel technology; claims 1 trillion colors

Sharp added a sub-pixel to much of their 2010 LCD TV line-up, featuring the theme of "Yellow". Sharp's red, green, blue, and yellow primary colors technology, called QuadPixel, can produce a trillion colors, making for "more sparkling golds, Caribbean blues, and sunflower yellows," says Sharp. The company plans to release three new series of LED edge-lit LCD TVs featuring the RGBY arrangement. The debut of QuadPixel technology is one of a series of worldwide company innovations that Sharp Japan president and COO Mikio Katayama said would impact display, energy consumption, and room environment technologies now and in the future.

RGBY is not a new solution – and Sharp may have introduced it for that very reason – as the IP is reported to be openly available. RGBW, which in many ways is a simpler technology solution, suffers the burden of some possible IP entanglements.

Datacolor and Portrait Displays demonstrate TV calibration system – Spyder3HDMI

Datacolor and Portrait Displays announced their new Spyder3HDMI calibration system. Spyder3HDMI automatically calibrates any digital TV using an HDMI connection, eliminating the need for a computer or cumbersome third party solution that requires OSD adjustments. The software, including all dialogs and color targets, is embedded directly into the TV for easy calibration. With Spyder3HDMI, professional color adjustments are no longer proprietary to only sophisticated users or installation technicians but available to everyone. The built-in process calibrates the color of each TV to its environment. http://www.datacolor.com http://www.portrait.com

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. Equipment forecasts include internet connected equipment such as Blu-ray players, game consoles, media extenders, proprietary equipment, retail DTT+IP STBs, and connected TV sets. While the previous forecast revealed opportunities in this emerging market, the new study incorporates the latest 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

IMS Research launches new quarterly report on LED Market

IMS Research released the first market research report characterizing the supply side of white and RGB LED production used for high brightness (HB) LEDs. HB LEDs, including GaN and InGaN, have been experiencing record breaking growth from early 2009 as a result of the rapid shift to LEDs in notebook displays. While this growth continues to accelerate, other markets are also increasingly migrating to LEDs such as signaling, very large outdoor displays, digital billboards, personal lighting, automotive and industrial. In addition, LEDs are enabling the solid state lighting to penetrate the general lighting market. Furthermore, the LCD TV market is now rapidly shifting to LEDs due to their improved performance, superior form factor and lower power. As a result, TVs should become the #1 market for HB LEDs in 2010 creating a supply shortage. The report forecasts the extraordinary growth in large area display backlights by application and shows the capacity, yielded production and in-spec (binned) LED dies on a quarterly basis by LED supplier. By the end of 2009, there were 1,413 reactors at 75 manufacturers with a capacity of188 billion die/year. http://www.imsresearch.com

2009 Top 5 LED Manufacturers		
LED Supplier	**In-Spec Die (m)**	**Share**
Nichia	5582	16.5%
Epistar	4088	12.1%
Samsung LED Company	2974	8.8%
Cree	2821	8.3%
Showa Denko	2031	6.0%
Others	16346	48.3%
Total	**33843**	**100.0%**

In-Stat predicts that Ultra HDTVs will penetrate 40% of homes by 2025

The so-called ultra HD formats are expected to provide four to 16 times the resolution of existing high-definition displays. A recent study by In-Stat predicts that the mass adoption of these sets will be a lengthy process stretching into the 2020s, but that about 40% of North American homes will have ultra HD sets by 2025. By then, about 20 million ultra HD sets will be shipped in North America. In-Stat is also predicting that the penetration of ultra HD sets in Europe will approach 5% by 2021 and increase to about 28.2% by 2025 and that the Japanese market will be an early adopter of the technology in Asia. Michelle Abraham, principal analyst at In-Stat and the author of the new study, *The Market Opportunity for Ultra-High Definition Video*, expects it will take five to 10 years before the displays reach even 5% of all homes and that the broadcasters won't begin offering some ultra-HD content until the 2017 to 2022 period. A number of consumer-electronics manufacturers are already exploring the higher formats, and theatrical film makers are already producing 4K content for digital cinemas.

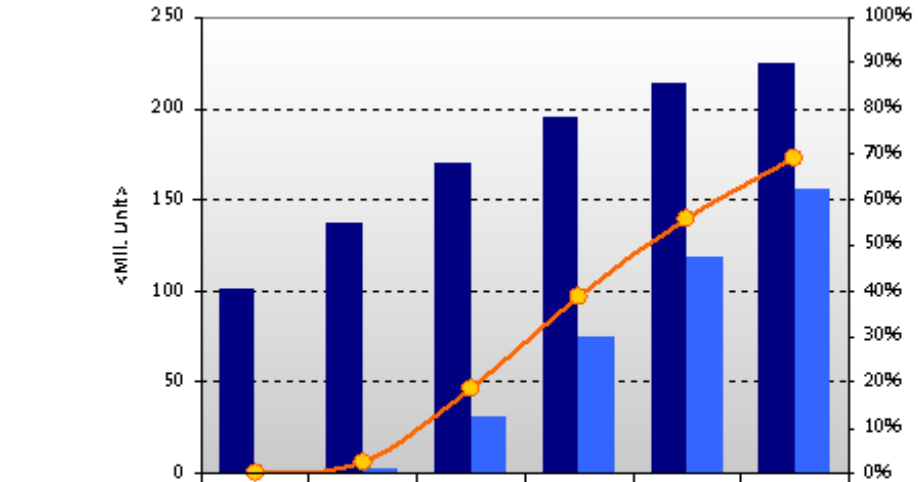
Ultra-high definition refers to the 4K resolution of 3840 by 2160 pixels, which offers four times the resolution of the current 1080p high-def displays, and 8K resolution, which has 7680 by 4320 pixels, or about 16 times the resolution of today's HD sets. While the adoption process is likely to be lengthy and require most of the existing television production and distribution infrastructure to be almost entirely rebuilt, several factors are likely to push consumer adoption in the coming decades. For starters, digital cinemas are already exposing consumers to higher resolution 4K content and creating an infrastructure for 4K and 8K content, according to Abraham. Early ultra HD sets will likely to be marketed to those who want to replicate the digital cinema experience in the home. At the same time, consumer electronics manufacturers continue to look for new features that allow them to maintain better margins on their sets. http://www.in-stat.com

Vizio gains lead in US LCD TV market reports iSuppli

Samsung Electronics, the world's largest TV maker, was overtaken by Vizio in the U.S. LCD TV market in 2009 according to a new report from iSuppli. Vizio accounted for 18.7 percent of the U.S. LCD TV market in 2009, surpassing the previous year's No. 1 manufacturer Samsung Electronics, which shipped 5.6 million units and claimed 17.7 percent of the market. Vizio's shipment of LCD TVs surged 92.1 percent in 2009 from a year ago to 5.92 million units. Japan's Sony took the No. 3 ranking in the market last year with a 15.2 percent share, the data showed. However, Samsung maintained its lead in the US market for flat-panel TVs overall, which are comprised of LCD TVs and plasma sets. Samsung Electronics shipped 6.57 million flat-panel TVs to the US market last year, claiming an 18.4 percent market share. Vizio came in second with 5.98 million units, claiming a 16.8 percent market share. Japan's largest TV maker Sony and South Korea's LG Electronics, the world's second-largest TV maker, were the third and fourth largest seller of flat-panel TVs in the US. Sony shipped 3.68 million units, while LG sold 2.99 million in 2009, the data showed. http://www.isuppli.com

LED LCD TV market expected to grow to 32 million units in 2010 according to Displaybank

In 2009, 3.6 million LED LCD TVs were sold and Samsung Electronics led the market by comprising 68.3% of the LED LCD TV market. In 2010, the LED LCD TV market size is expected to grow to 32 million units, representing 19% of all LCD TVs. Based on major the sales plans for the major brands, Samsung plans to sell over 10 million LED LCD TVs representing 29% of the company's lineup. LG Electronics plans to sell 5-7 million LED LCD TVs and Sony also plans to sell 5-7 million LED LCD TVs. Sharp plans to sell 6 million LED LCD TVs. As sharp growth in LED LCD TV production is expected, LED TVs will be considered mainstream TVs – and not just "premium" performance devices. Factors such as eco-friendliness, savings in power consumption and ultra slim features accelerate the transformation into LED LCD TVs. In 2013, Displaybank thinks that the LED LCD TV market will comprise 156 million units, representing 69.1% of the entire LCD TV market. http://www.displaybank.com

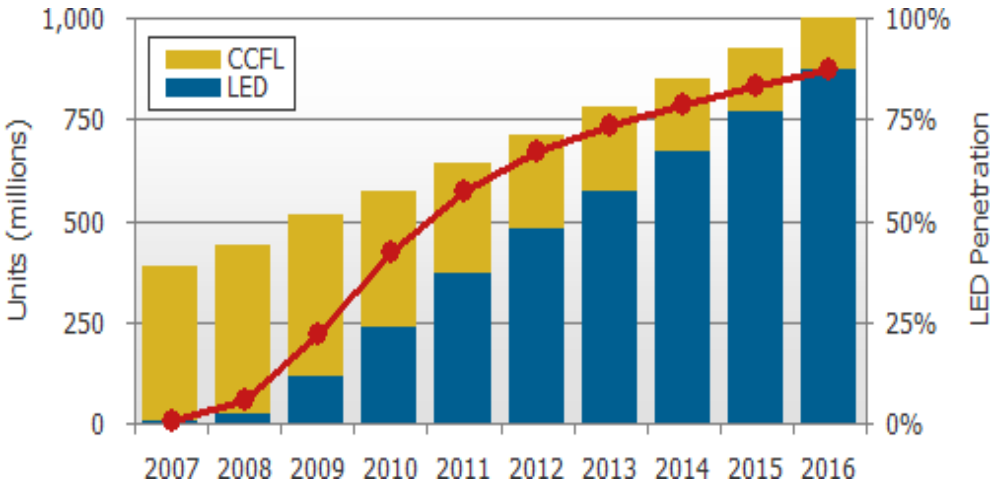


	2008	2009	2010	2011	2012	2013
LCD TV	101.5	138.3	170.0	195.4	213.6	224.9
LED LCD TV	0.2	3.6	32.0	76.0	119.0	155.5
LED LCD TV (%)	0.2%	2.6%	18.8%	38.9%	55.7%	69.1%

Global LED LCD TV Market Forecast
(Source: LED LCD TV Maker's Roadmap and Market Forecast, December 2009, Displaybank)

DisplaySearch reports that LED will surpass CCFL in large-area TFT LCD backlights in 2011

The LED backlight unit market has rapidly emerged in the TFT LCD industry, and momentum for this segment is expected to continue over the next five years. In the latest DisplaySearch *Quarterly LED Backlight Report*, the company reports that LED backlight units will surpass CCFL/EEFL backlights in large-area TFT LCD panels in 2011, and achieve 74% penetration in 2013. Large-area LED backlight demand for all applications will grow from 114 million units in 2009 to 770 million units in 2015.

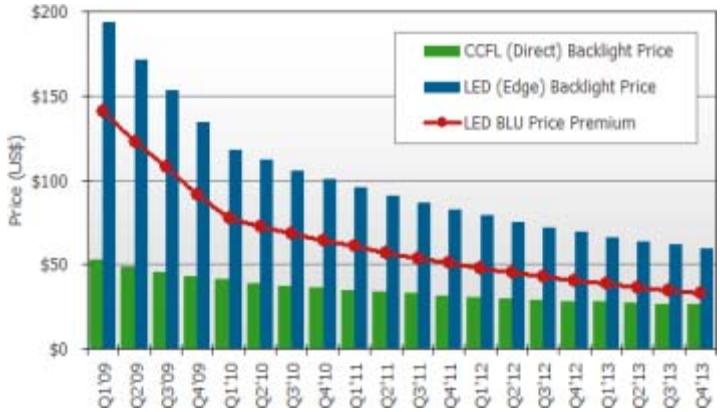


LED backlight unit penetration including notebook PCs, LCD monitors and LCD TV applications.

DisplaySearch forecasts the shipment of LED backlight units for LCD TVs to grow from 36.5 million units (a 20% penetration rate) in 2010 to 184.9 million units (a 72% penetration rate) in 2015. Cost and performance remain bottlenecks for panel manufacturers for LED backlight units for monitor panels. Despite this, the Energy Star 5.0 specification will drive growth for this segment. In particular, LCD manufacturers are mass-producing 18.5"W-24-inch LCD monitor panels with LED backlight units. DisplaySearch predicts that <26-inch LCD TVs with LED backlights, mainly using monitor panels, will grow rapidly also, as the cost premium is acceptable. The notebook PC segment has the highest LED backlight unit penetration rate, as the power-saving benefit justifies the cost premium compared to CCFL BLU. Meanwhile, the prices for side-view, high-intensity (1,900-2,200 mcd) white LEDs continues to fall. As a result, LED backlights will have an 84% share of notebook PC shipments in 2010 and will be close to 95% in 2011. http://www.displaysearch.com

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.



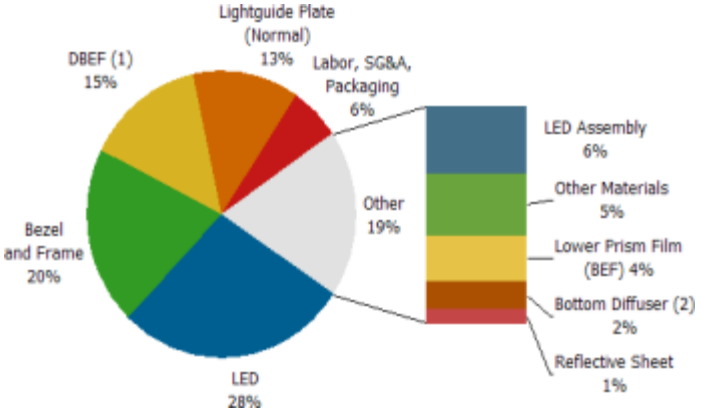


Figure 1 (on the left): Backlight cost comparison for 40-inch full HD LCD TV panel; Figure 2 (on the right): Cost breakdown for 40-inch FHD Edge-LED backlight unit (Q1'10)

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

Quixel Research reports that 32-inch LCD TVs fuel 2009 volume increases

Supported by huge 32-inch volume, unit sales for the USA LCD TV category increased 40% from 2008 to 2009. Quixel Research's recently published *LCDTV Market Review* revealed that the 32-inch LCD TV screen size segment nearly topped 10 million units 2009. All screen size segments grew in both units and revenues in Q4 2009, but the 32-inch segment was one of the only segments to gain unit and value share in 2009 overall. The 32-inch screen size segment accounted for 32% of the volume and 22% of the value in 2009. For the first time, the increase in overall LCDTV volume did not compensate for price erosion and annual revenues declined for the LCDTV category, with revenues of $21.3B in 2009 or a 6% decline from 2008 revenues of $22.7B. However, strong Q4 2009 sales of large sized LCD and LED models, as well as strong unit sales overall, did support significant Q3 2009 to Q4 2009 revenue growth, as the category topped $6.2B or up 34% over the prior quarter. Larger size and higher resolution models have become commonplace and the market has begun to embrace 240Hz and LED backlight solutions, with the later doubling revenues in 2009. Quixel Research's projections for the USA LCDTV market in units show the category increasing out to 2013. http://www.quixelresearch.com

NXP announces support for 21:9 cinema-like display

NXP Semiconductors announced that its TV550 platform now offers direct support for 21:9 panels running at 60Hz. The 21:9 format enables full screen "true size" movies. In addition, the format enables interactive Internet applications such as widgets, newsfeeds, weather and Video on Demand, which can run in the remaining screen space, alongside a high-definition 16:9 image. The NXP TV550 is a global DTV platform featuring NXP's proprietary Motion Accurate Picture Processing (MAPP2) technology on a single chip. The TV550 brings HD TV and Internet content with unparalleled picture quality on mid-range TVs. Using an extremely efficient 45-nm SoC, the NXP TV550 supports key features such as DVB-T, MPEG4/H.264 decoding, HDMI reception, decoding of digital SD and HD content, CI+ security, and Internet connectivity on TV. NXP already offers a TV550 reference design that will speed manufacturers' development and dramatically reduce bill-of-materials for widescreen TVs. http://www.nxp.com/applications/tv/digital_tv/tv550/index.html

ORC study identifies that two-thirds of US consumers own HDTVs

A new study from ORC examining US consumer awareness of and usage habits with technologies including high definition television (HDTV) and 3DTV revealed that nearly two-thirds (62%) now have an HDTV in their home, and another 12 percent are looking to purchase one within the next two years. Sony was identified far and away as the HDTV brand most synonymous with high quality (43% cited this brand on an unaided basis); trailed by Samsung (11%); Panasonic (5%); Vizio (4%); Phillips and LG (3%); Toshiba, RCA, and Sharp (2%); and Magnavox, Mitsubishi, JVC and Zenith (1%). Despite high awareness levels, however, only five percent currently have plans to buy a 3DTV within the next two years. http://www.opinionresearch.com

Quartics and Acer introduce "Beyond HD" video experience

Quartics and Acer announced a partnership that delivers a new, higher standard of video experience for consumers: "Beyond HD." Defined as a viewing experience that surpasses HD quality for movies, games, and streaming media, Beyond HD is considered to be the next level in viewing quality and one that meets consumers' increasing levels of expectations for an improved experience with electronics devices. The two companies will work in partnership to deliver a Beyond HD experience in a wide range of consumer electronics products offered by Acer that are enabled with the new Qvu Solution, which also was introduced by Quartics. The QV1721 is a dedicated chip based inside the netbook or laptop that handles all the complexities associated with multiple HD codec standards, digital rights management, post processing, etc. It allows the PC to offload all video processing from the CPU and GPU, resulting in substantial power savings – the CPU and GPU do not have to work as hard on video content they were not designed to handle efficiently. The QV1721 does not even require a powerful CPU, meaning that computers with less powerful (and inexpensive) CPUs can be turned into HD video powerhouses. This makes the QV1721 ideal for new PC products such as Netbooks and mobile Internet devices. http://www.quartics.com

Alereon announces laptop to HDTV wireless HDMI solution

Alereon announced the availability of its NoWire Laptop to HDTV Extender Kit reference design. Alereon's NoWire technology allows OEMs to provide a unique product that allows consumers to quickly and easily enjoy their laptops wirelessly connected to their HDTVs. Alereon's NoWire technology allows customers to set-up the Alereon Laptop to HDTV Extender without the installation of wireless drivers or user applications. The Extender Kit, which consists of a small 2-inch USB dongle, and a small HDMI adapter for the HDTV, supports Windows 7, MAC OS-X, Windows XP and Vista. The Alereon NoWire extender wirelessly displays a notebook screen onto a HDTV, monitor, or any other type of HDMI enabled display device. Streaming the wireless video link between a PC and a HDTV at speeds up to 220Mbps via ultra wideband wireless technology leaves the WiFi radio in the PC free to connect to the Internet at full speed to stream video files from web sites such as Hulu, Netflix and YouTube, supporting resolutions up to 1680x1050 graphics or viewing 720p audio and video streams up to 30 feet away. In addition, Alereon's AL5000 UWB chipsets offers the only true worldwide solution by supporting Band Groups 1, 3 and 6, which enables end users around the world to use multiple channels in the legal frequency ranges in their particular country. http://www.alereon.com

WirelessHD next generation standard supports 3DTV and HDCP 2.0, data applications

The WirelessHD Consortium, the first and largest 60GHz initiative worldwide and the only wireless standard that provides wireless lossless A/V support, announced a major enhancement to the WirelessHD 1.0 specification. The next generation of the WirelessHD specification will enable 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 standards group also announced its new authorized self test house (ASTH), extending the WirelessHD Compliance Test Program capabilities.

The next generation spec increases the data rate to 10-28 Gbps, 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. 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 the resolution of 1080p. This feature allows the WirelessHD interface to transmit content at the same resolution as many digital theaters. Connected devices that include this feature supports sync'n go file transfers at 1Gbps for portable and fixed devices. This new specification also provides for IP connectivity for Internet access and networking of WirelessHD devices. The scalability of WirelessHD technology has been extended to support lossless video streaming plus 1Gbps data connectivity in low-power portable devices such as portable media players, netbooks and smart phones. 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

SiBEAM launches products and partnerships to fuel WirelessHD expansion

SiBEAM, the innovator of 60GHz wireless solutions and developer of high-speed wireless communication platforms, announced key milestones and partnerships signaling the expansion of the WirelessHD ecosystem. SiBEAM announced formal entry into mass production of its second generation chipsets as well as the launch of the company's IP licensing program designed to address increased demand for embedded 60GHz solutions in new market segments within the CE and PC industries. SiBEAM also announced a strategic partnership with Best Buy. SiBEAM's second generation chipsets consists of low cost, low power transmitter and receiver chipsets, each including an RF IC and network processor. The SB9220 Network Processor and the SB9210 RF Transmitter may be designed into devices such as A/V receivers, home theater-in-a-box systems, Blu-ray players, set-top boxes and media center PCs. The SB9221 Network Processor and the SB9211 RF Receiver chipset may be used in digital televisions, monitors and front projectors. SiBEAM's second generation chipsets include all of the features of the first generation plus the following advanced features: lowest total power consumption for multi-gigabit wireless ideal for CE systems via the elimination of the need for active cooling; smaller form factor suitable for inclusion in super slim DTV panels and smaller profile devices, such as Blu-ray players and notebook PCs; 3D video support; integrated HDMI and LVDS; support for both HDCP 2.0 and DTCP; worldwide regulatory approvals; and back-channel (LR)-audio for enhanced surround sound capability.

SiBEAM also launched an IP licensing program to kick-start the development of embedded designs with WirelessHD technology. Through this program, SiBEAM will partner with industry leaders and provide incentives for the development of both fixed and portable WirelessHD A/V applications. SiBEAM will provide program participants with access to its full SB9220 chipset IP core that includes the MAC, PHY and embedded beam steering algorithms, WirelessHD SB9220 technical training, the SB921x WirelessHD RF Transceiver interface, verification environment and IP documentation. http://www.sibeam.com

SiTune unveils ultra low power mobile analog CMOS TV tuner

SiTune Corporation announced its latest generation of state-of-the-art Global Analog CMOS TV tuners based upon its P^2TUNE architecture. STN-55T2000 is a highly integrated LOW-IF Tuner that delivers best performance for PAL/SECAM/NTSC for terrestrial and mobile applications with best in class power consumption. 2010 will mark SiTune's entrance into the silicon tuner market. In addition to the STN-25T2000/STN-T2000 and STN-10D3000 announced in September/October 2009, STN-55T2000 evaluation kits are available now with production devices available in Q2 2010. http://www.situne-ic.com

Virgin Media wins TV software patents 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. Patent '49 was filed in 1991 and describes:

> "Screen (10) for a user interface of a television schedule system and process consists of an array (24) of irregular cells (26), which vary in length, corresponding to different program lengths of one half to one-and-one half hours or more. Because of the widely varying length of the cells (26), if a conventional cursor used to select a cell location were to simply step from one cell to another, the result would be abrupt changed in the screen (10). By restricting cursor movements to the regular cells, abrupt screen changes will be avoided. A conventional offset shadow (34), which is a black bar underlines the entire cell and wraps around the right edge of the cell. To tag the underlying position which defines where the cursor (32) is and thus, where it will move next portions (36) of the black bar outside the current underlying position are segmented, while the current position is painted solid."

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.

Simplay Labs launches new HDMI certification

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 the only tool 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.

Simplay's Universal Test System is multi-technology and human behavior scoring test tool solution and enables all HDMI features performance and consumer experience testing. The complexity of new HD features across multiple technologies requires new product quality testing techniques and approaches. Product quality metrics are evolving from simple single standards support to more complex "use case" support. The new tool features a modular design and integrated human-perception modeling technologies, which allow testing and service organizations to customize the solution for their specific requirements as well as add test functions. http://www.simplaylabscom

Westinghouse spotlights power-saving greenvue LCD HDTVs in national TV campaign

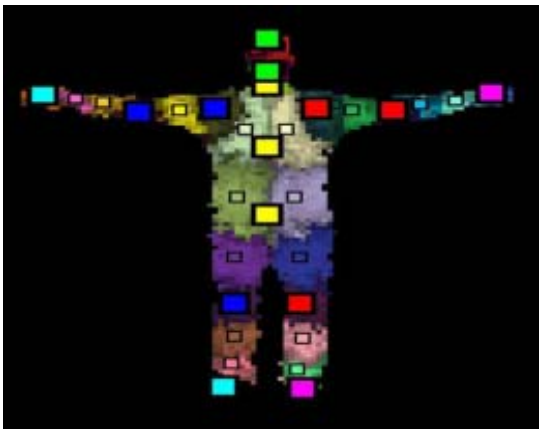
Westinghouse Digital Electronics recently ran an extensive TV branding campaign which was slated to reach 55 million consumers on CBS Television stations across the United States, Westinghouse stressed its "Energy Savings" features being offered in its family of greenvue LCD HDTVs. Westinghouse's greenvue LCD HDTVs deliver up to a 20% power savings over the Environmental Protection Agency's requirements and Departments of Energy Star 3.0 specification standards for power consumption. The full greenvue TV line is currently available and includes: the 26-inch SK-26H640G ($349), 32-inch SK-32H640G ($429.99) and 42-inch TX-42F810G ($699.99). http://www.westinghousedigital.com

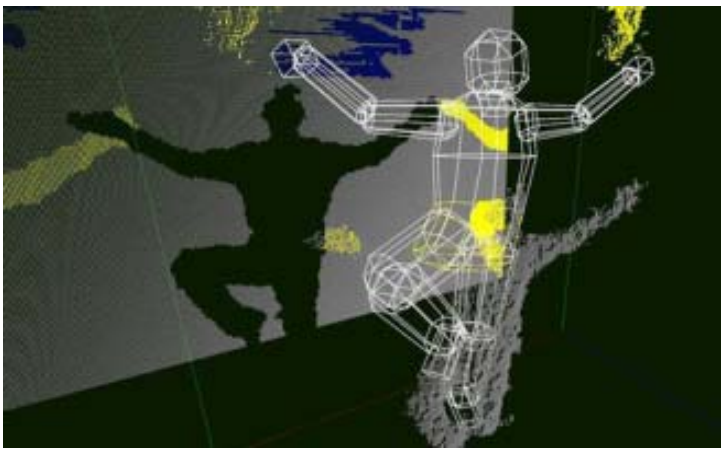
The Refinishing Touch launches TV recycling program

The Refinishing Touch, a specialist in environmentally safe and sustainable on-site furniture refinishing, upholstery and armoire modifications, has launched a government-approved television recycling program that will reduce the amount of electronic waste created by its customer organizations during furniture remodeling projects. The Refinishing Touch has experience gained from working with some of the largest organizations in the country, from hotel chains such as Hilton, Hyatt, IHG, Marriott, Wyndham and Starwood to government organizations such as The White House, US Congress, Department of Defense, US Military, and the US Coastguard. In recent years, several hotel chains have commissioned The Refinishing Touch for large-scale modification of armoires in order to accommodate modern flat screen televisions, the inspiration for this new initiative. The Refinishing Touch's new program will recycle older television sets that are replaced during such renovation projects. A 2007 study by the Environmental Protection Agency (EPA) found that over three million tons of electronic waste are generated in the US each year, with 86.4% ending up in landfills and only 13.6% being recycled. TVs and computers are especially difficult to recycle, because they contain toxic materials such as brominated flame retardants. Across the United States, electronic waste is a serious and growing problem. To help combat this problem, The Refinishing Touch will ensure that TVs are recycled in compliance with OSHA and EPA industry standards as well as all applicable local, state and federal laws and regulations. http://www.therefinishingtouch.com

Popular Science features pictorial about Microsoft's Project Natal

Popular Science has an interesting pictorial summary of Project Natal. The captions explain that Project Natal lets users control a game just with body movements – no buttons or Wii-like wands – by watching movements with a 3D video camera and then mapping body positions via a massive computational effort called "the brain". Microsoft relies on an advancing field of artificial intelligence called machine learning. The premise is this: Feed the computer enough data – in this case, millions of images of people – and it can learn for itself how to understand it. That saves programmers the near-impossible task of coding rules that describe all the "zillions" of possible movements a body can make. As the user stands in front of the camera, it judges the distance to different points on your body. Then the "brain" guesses which parts of your body are which. Once Natal has determined it has enough certainty about enough body parts to pick the most probable skeletal structure, it outputs that shape to a simplified 3D avatar. Then it does this all over again—30 times a second! As you move, the brain generates all possible skeletal structures at each frame, eventually deciding on, and outputting, the one that is most probable. This thought process takes just a few milliseconds, so there's plenty of time for the Xbox to take the info and use it to control the game. http://www.popsci.com/gadgets/gallery/2010-01/natal-gallery





Images representing some of the computational process of the Project Natal "brain"

Philips Research presents "Generative Art"

Philips Research has been examining how to support artists in producing new expressions of art that combine traditional techniques with advanced technologies to create something very different. Known as Generative Art, these series of images never stop evolving, within the framework defined by the artist, yet never repeat themselves. Multimedia art is not in itself particularly new. However, much of it is developed for special occasions like shows or exhibitions. Italian artists Federico Bonelli and Maurizio Martinucci set out to create something that was more permanent - yet at the same time transient. Their unique form of generative art is known as "protoquadro". Protoquadro art starts out conventionally enough with a series of photos and images with very specific properties along the artist's chosen theme. A software algorithm designed according to the laws of chaos is then applied to select and combine different aspects of the photographs to create unique and constantly evolving works of art that can be displayed on flat screens or projected onto suitable surfaces in places ranging from homes, offices and hotels to shops, museums and other public buildings.

Philips Research first became involved in the generative art movement out of sheer fascination with the technique. It was immediately clear, however, that the scope of art could be expanded by applying technology developed within Philips to reach a much wider audience. Philips initially supported the artists in successfully scaling up their protoquadros to wall-sized and multiple screens. Philips has also, for example, applied its motion sensor technology to develop an interactive version of protoquadro that accelerates the speed at which the image evolves when someone approaches. The sensors even detect which angle passers-by are approaching from. This variation of generative art could be of huge potential interest to the retail sector. Interactive shop windows could come to life as people pass, attracting great attention even when the shop is closed. A demonstration version of this can already be seen at the Philips Research ExperienceLab in Eindhoven, the Netherlands.

LCD TV Association

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Recession… What Recession?

by Paul Gagnon

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

The outlook for 2009 TV sales worldwide was radically scaled back at the end of 2008 after the global economy suffered a massive setback and it appeared that consumers would react by cutting back on discretionary purchases. TVs seemed like a prime example of a non-necessary purchase, but this would truly be the first time that notion was put to the test. The expected downturn in consumer demand seemed likely to make 2009 a bleak year for TV shipments, with our outlook being downgraded from 4% growth (216M units) to a 1% decline (205M units) worldwide in our Q4'08 forecast update. Predicting the future looked to be a significant challenge in those dark times as Christmas 2008 sales were weak and the supply chain began shutting decreasing capacity to prepare for the worst.

However, now that we have reached the conclusion of 2009, shipments have far exceeded those initial expectations as consumers purchased TVs at a strong rate, spurred on by a very high rate of price erosion. Global TV shipments grew 2% overall to 211 million units while flat panel TV technologies, like LCD, enjoyed better growth in 2009 on a unit basis than during 2008, rising 37% vs. 34% respectively. The final quarter of 2009 showed even stronger year-over-year (Y/Y) overall unit shipment growth, rising 17% Y/Y, with LCD TVs climbing 50% Y/Y, the strongest growth in LCD TV units since Q4 of 2007, although Q4'08 was very weak, easing the comparison period. In fact, the total TV shipment growth in Q4'09 was the single strongest quarter of growth seen since we began tracking the total TV market in 2004, well before the flat panel boom took off.

Strong flat panel TV shipment growth in emerging markets like China (>100% Y/Y) led the flat panel share of total annual TV shipments to pass 75% for the first time in 2009, and flat panels accounted for over 90% of all TV revenues. All of the major mature TV markets, like Japan, Western Europe and North America are at nearly 100% flat panel share of shipments (even if household saturation isn't yet) and many emerging markets are accelerating their growth. China's flat panel shipment share surged in 2009, emulating the share growth rates seen in North America a few years earlier, and helped by government stimulus programs, climbing from 36% in 2008 to 72% in 2009, the vast majority of which was LCD.

One of the key drivers of growth was the acceleration of average selling price erosion, mostly driven by cost reductions at the component level, especially panel prices early in the year, but also by decreasing margins at the brand and retail level. Coupled with greater consumer price sensitivity that resulted in much slower average screen size growth, the global volume weighted average selling price declined more than 8% worldwide and fell as much as 24% Y/Y for LCD TVs, the largest decline since DisplaySearch began tracking the TV marketplace. Once prices began falling early in the year as brands and retailers passed along falling panel prices in an attempt to clear inventory, consumers became accustomed to the discounts and expected such deals throughout the year. This became a challenge in Q2 and Q3 of 2009 when panel prices started rising as the industry was caught by surprise when demand proved more robust, but retailers and brands made sure to keep prices moving down, not sideways or up, and consumers responded.

The better than expected 2009 results clearly demonstrate that consumers still have a strong desire to purchase flat panel TVs, but at the same time are willing to shift their buying behavior to match their budget in a recession plagued year. We saw a lot more compromise on size and features in 2009, with a greater number of consumers

perhaps opting to upgrade smaller secondary sets and postpone getting a larger living room set than we would have seen in a normal economy.

For LCD TVs, this means that growth in sub-40" sets outpaced growth of big screens in mature developed markets like North America during 2009, despite the introduction of advanced new TV technologies to larger screen sizes, like LED backlit LCD TVs and Internet connected sets. Key screen sizes like 32" broke through the $500 TV pricing milestone in 2009, causing demand to surge. At the same time, 32" is an ideal size in many markets worldwide, and the pricing made it even easier for new adopters to make the upgrade. So attractive was the pricing for smaller sets, and so price sensitive were consumers that the average LCD TV screen size actually *declined* in North America from 2008 to 2009 after years of strong growth.

Table 1: 2009 Worldwide TV Shipments by Technology (000s)

Technology	2009 Units	2009 Unit Share	Y/Y Growth
LCD TV	145,680	69.0%	37%
PDP TV	14,175	6.7%	-2%
OLED TV	1.9	0.0%	-50%
CRT TV	51,176	24.2%	-41%
RPTV	184	0.1%	-58%
Total	**211,218**	**100%**	**17%**

Source: DisplaySearch's *Advanced Global TV Shipment and Forecast Report*

LED Backlights Account for 4% of LCD TV Units Shipped in Q4'09, But More Than 11% of Revenues

DisplaySearch is also now tracking LCD TV shipments by backlight type, including a breakout of edge-lit and full array types by screen size, resolution and frame rate, as well as by brand for historical periods. LED backlights are not new in LCD TVs, but they have become significantly more affordable and offer many valuable attributes like lower power consumption, thinner and lighter cabinet designs and better picture quality. However, the premiums for LED backlit LCD TVs had been prohibitively high until 2009, and are expected to narrow much further in 2010 with explosive growth expected. LED backlit LCD TVs only accounted for 4% of global units in Q4'09, but above 40" they accounted for 11%, while above 50" they claimed 24% of shipments. Western Europe had the highest LED backlight share (7%) with North America second highest at 5%. The vast majority of LED backlight LCD TVs shipped in Q4'09 were edge-lit models, and most were 40" or larger, although there were some smaller sets launched by brands based on LED monitor panels, like Vizio. For the most part though, penetration was better as screen size increased, since the percentage premium for LED was considerably smaller. This will be an important consideration in 2010 as huge LED shipment goals can only be achieved through share growth at key screen sizes, like 32", and the "LED premium" cannot be too large.

Samsung Leads Global Brands with Record Share in Q4'09

Samsung achieved their highest revenue share ever, reaching a record 23.6% of global TV revenues in Q4'09 (Table 2). This high revenue share is the result of being the global leader in units as well as having a strong mix of larger screen sizes as well as leading positions in advanced technologies like LED backlit and high frame rate LCD TVs, all of which support higher average selling prices. Samsung has been #1 in both TV units and revenues worldwide every quarter for more than three years now, achieving a 22.6% share of 2009 full year TV revenues.

LGE was the #2 brand worldwide in TV shipment revenues and demonstrated the strongest annual growth among the top 5 brands, an indicator of the aggressive market share growth campaign the brand undertook in 2009. The result is that LGE improved their total 2009 TV revenue share by a full 2 percentage points to 13.2%, a larger increase than any other brand in 2009.

Table 2: Q4'09 Worldwide TV Brand Rankings by Revenue Share

Rank	Brand	Q3'09 Share	Q4'09 Share	Q/Q Growth	Y/Y Growth
1	Samsung	21.9%	23.6%	33%	13%
2	LGE	12.9%	13.0%	24%	20%
3	Sony	9.9%	11.5%	43%	-18%
4	Panasonic	9.2%	8.0%	8%	-3%
5	Sharp	5.7%	5.4%	15%	-23%
	Other	40.4%	38.6	18%	13%
	Total	100.0%	100.0%	23%	5%

Source: DisplaySearch's Advanced Global TV Shipment and Forecast Report

LGE's Q4'09 revenue share rose slightly, to 13.0%. Sony rounded out the top 3 brands in global TV revenues during Q4'09 at 11.5%, up sharply from 9.9% in Q3'09, as sales for Sony surged during the holidays, a typically strong quarter for the company. Sony had the largest Q/Q shipment growth among the top 5 in Q4'09. However, Sony's full year 2009 total TV revenue share was down almost 2 percentage points from 2008, to 11.5%, and is at the lowest level since 2005 when it last led the overall TV market. Much of Sony's share loss went to the two surging Korean brands that aggressively targeted growth in 2009.

Overall, it's clear that consumers are still very enthusiastic about owning flat panel TVs, and are willing to make tradeoffs to buy one. There can be no doubt that attractive discounting helped to drive some of the strong sales growth in 2009, but much can be said of the argument that TVs have simply become a more vital part of consumers electronic-centric lifestyles. Hopefully, demand generated in 2009 will carry on through the following years, although price erosion is not expected to match the feverish pace set in 2009. We do however expect the pace of large screen size growth to improve as fully featured sets with new technology like 3D, LED, and enhanced connectivity entice current flat panel owners to upgrade their primary sets, especially as the economy continues to improve. Apparently, TV demand is recession-proof.

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Global TV Market Analysis and Forecast

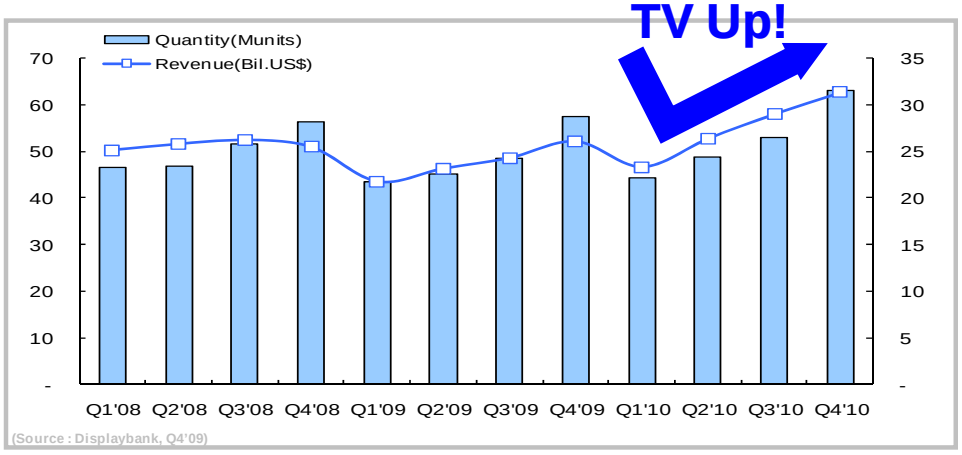
by Jed Yune

Jed Yune is in charge of the FPD TV industry research at Displaybank. Jed served as Product Manager of FPD TV for LG Electronics from 2006-2008 and Technology Development Manager from 2004-2006. Jed received his Bachelor's degree in Chemistry and Business administration from Sung-Kyun-Kwan University in 2002.

In this column, we will predict the market after 2010 from aspects of device, inch, region, and price and conclude the series.

Market Variations: There are numerous factors that influence the overall TV market's growth and shrink. For instance, the market either grows or shrinks as a result of organic connections of numerous factors including the new device, new product category, new function, time period of replacement demand creation, price, TV market saturation level, raw material, and component demand & supply along with external environmental changes such as the economic status, national policy, DTV conversion, sports event, and exchange rate.

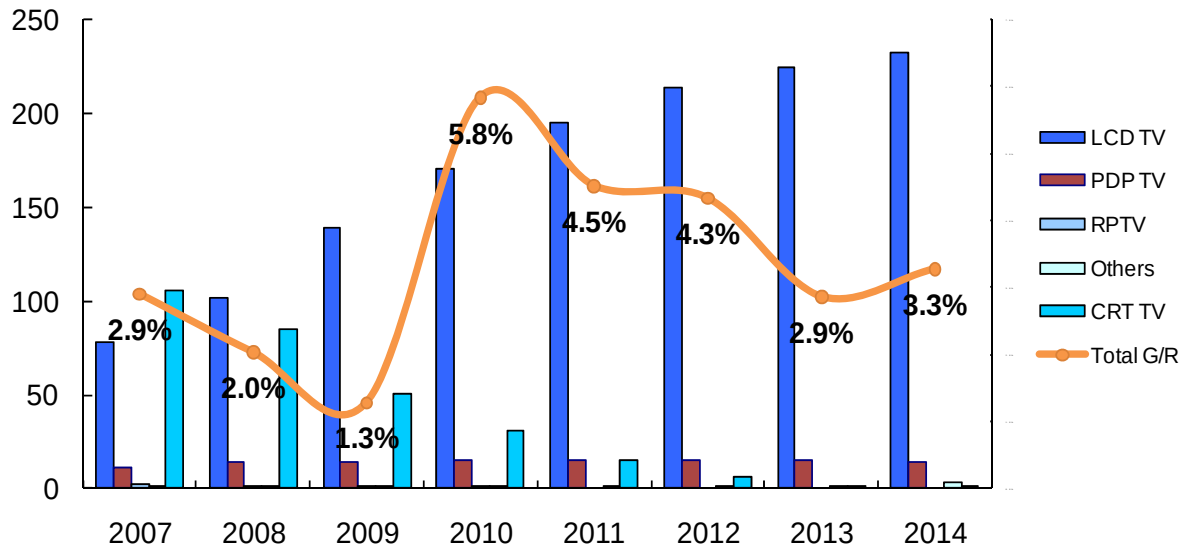
Growth Factor vs. Shrink Factor: Then, will the market have more growth factors or shrink factors after 2011? Based on the TV market trend thus far, it is highly likely to have more and stronger growth factors. First, the currently stagnated economy appears to enter a recovery phase even though there are some risks presented and DTV conversion regions also gradually expand. China's LCD TV sales increase is stimulated and the number of regions showing increases in replacement demand expands. In addition, 3D TV, LED, and IPTV activates the market and World Cup is to be held in 1H'10.



What are market's shrink factors? The economy appears to be entering a recovery phase, but some worries that it may turn back to a recession. Such turn back seems unlikely now when many hints of recovery phase are spotted in the market, but it still is too early to be at ease. In particular, it is too early to say Eastern Europe's economy will recover. If a select nation in EU or Asia Pacific encounters a risk, it inevitably damages the global economy which is in a symbiotic relationship. This may also trigger the main economy, which was extremely fearful until the very recent, to shrink yet again. Due to the recent rumor about the financial crisis in Europe, the exit strategy may require some time to spread to other regions. The exit strategy is expected to proceed especially slowly in North America and Europe which have the largest consumer market.

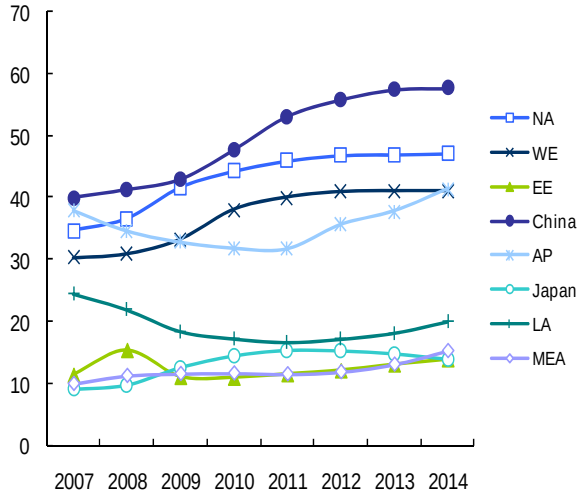
However, it is difficult to deny the overall market recovery trend. The GDP growth rate in advanced markets began to increase and is predicted to continuously increase. In addition the exit strategy operated first in Australia, but the consumption did not decrease and embraces its aftereffect. Hence, the center of gravity ought to be transferred to other nations based on the need of applicable nations. Such trend is mostly based on the market confidence and is analyzed to be due to the center of gravity on growth factors rather than shrink factors.

TV Market by Device: As shown in the graph (top of next page), the overall 2010 TV market is expected to reach 215.8 million units which are increased by 5.8% from the previous year's prediction of 203.9 million units. Of this, the LCD TV shipment quantity is expected to be 170 million units which are increased by 22.3% from the previous year's prediction of 139.1 million units. Likewise, the TV market is predicted to be led by the LCD TV and the decreasing trend of CRT is to be expedited.



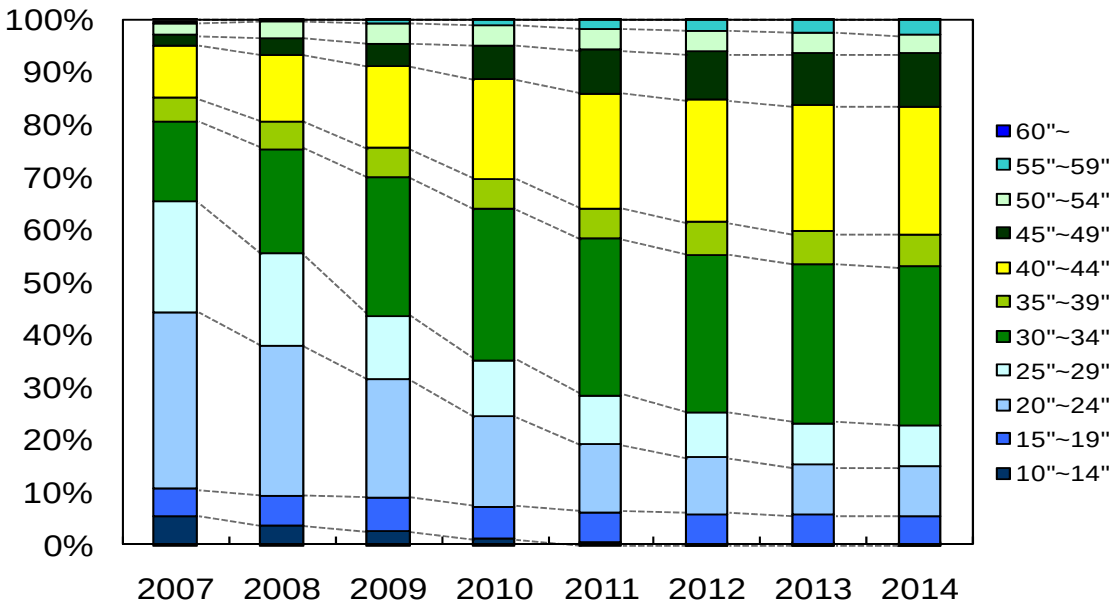
TV Market Forecast by Device: millions of units								
Technology	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
LCD TV	78.3	101.5	139.1	170.0	195.4	213.6	224.9	232.3
PDP TV	11.0	13.9	14.1	14.9	15.3	15.1	14.8	14.1
RPTV	2.0	0.4	0.1	0.0	0.0	0.0	0.0	0.0
Others	0.0	0.0	0.0	0.0	0.0	0.2	1.1	3.2
CRT TV	106.0	85.4	50.6	30.8	14.8	6.3	1.2	0.3
Total	**197.3**	**201.3**	**203.9**	**215.8**	**225.5**	**235.3**	**242.0**	**249.9**
Total G/R	2.9%	2.0%	1.3%	5.8%	4.5%	4.3%	2.9%	3.3%

TV Market by Region: In 2010, China's TV demand is expected to reach 48 million units and the nation is to strengthen its stature as the world's largest market based on quantity. In addition, the demand in emerging markets is predicted to contribute to the growth of the overall market as it turns to a recovery in 2010. Asia Pacific is expected to maintain the growth and precede Western Europe in 2014.



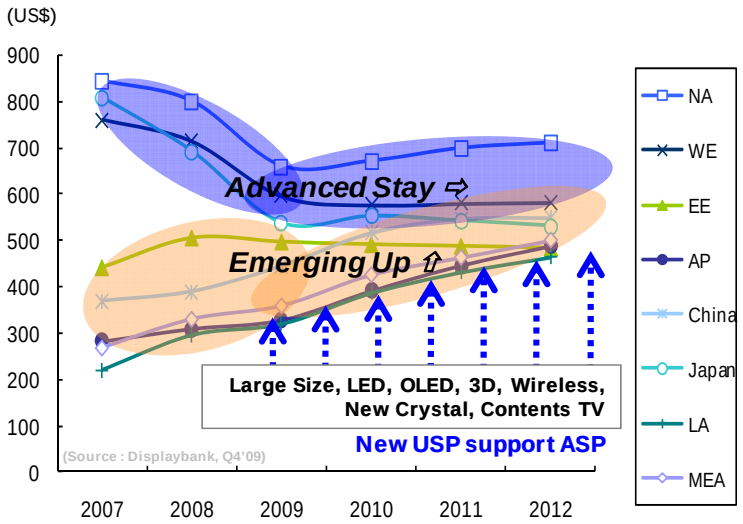
Total TV Shipment Quantity Forecast by Region: millions of units								
Region	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
NA	34.7	37	42	44	46	47	47	47
WE	30.2	31	33	38	40	41	41	41
EE	11.3	15	11	11	11	12	13	14
China	39.9	41	43	48	53	56	57	58
AP	37.8	35	33	32	32	36	38	41
Japan	9.0	10	12	14	15	15	15	14
LA	24.5	22	18	17	17	17	18	20
MEA	9.9	11	12	12	11	12	13	15
Total	**197.3**	**201**	**204**	**216**	**226**	**235**	**242**	**250**

TV Market by Inch: In 2010, 40-inch and larger TV is expected to grow to 30% of the quantity market. Such growth trend is predicted to continue until 2013 when it reaches 40% and find its balance eventually. In terms of region, China closely chases North America and Western Europe which are the most advanced in the large-size TVs. China is also expected to show the fastest growth rate in the large-size TVs.



TV Shipment Quantity Forecast by Inch								
Size	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
~39"	85%	81%	75%	70%	64%	61%	60%	59%
40"~	15%	19%	25%	30%	36%	39%	40%	41%
	100%	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

TV ASP Forecast by Region: In terms of ASP changes by region, advanced markets are expected to show steady TV ASP after a radical decrease. On the other hand, emerging markets are predicted to record a continuous increase joined with FPD TV growth and large-size trend. Elements such as LED premium, 3D display, wireless, and IPTV are to support the ASP decrease hereafter.



Implications: The 3D TV summarizes the difference between 2009 TV market and 2010 TV market. The 2009 market created by the LED LCD TV existed within the LCD TV, whereas the 3D TV of 2010 is to be created from the LCD and PDP that its effect is predicted to be much greater than the LED in 2009. In reality, most TV makers consider 3D TV product line-ups and even 3D OLED is expected to appear in mobile phones.

Then, will the key competitiveness in 2010 TV market be a realistic and low-cost production of 3D TV? The product competitiveness in cost and technology had been especially important traditionally and makers still endeavor to enhance the competitiveness, but it may not be enough. The conventional competitiveness was sufficient in the conventional products, but makers need to further ponder on what they want the viewers to see through TVs and do with TVs in newly emerging markets. The 3D TV market grows faster than expected. Makers that offer various pleasures with TVs through a strong content supply capacity and online app stores may lead the market. This requires significant changes from the conventional structure that TV makers are greatly challenged. Though, the market control will be passed on to new entrants if conventional makers fail to correspond to such market changes. People wonder which products and services will be commercialized and draw attentions in the rapidly changing market.

Interview with Ahmed Masood from Supertex

Ahmed Masood joined Supertex in 2004. He has over 20 years industry experience in design, marketing, and business unit management. He has held senior management positions at On Semiconductor, Temic/Siliconix, and National Semiconductor. Ahmed holds a Bachelor of Science in Electrical Engineering from Columbia University and an MBA from the UCLA, Anderson Graduate School of Management.

Please give us some background about Supertex and how you came to be involved in the LCD TV market. Supertex saw a trend emerging in 2004, where LEDs were beginning to be used for back-lighting LCD TVs. Supertex began to work with the leading TV manufacturers and currently we are developing our fifth generation LED driver for the 2011 year models. Supertex currently is the market leader for LED drivers for LCD TVs.

What exactly do LED drivers do? Our LED driver takes voltage from the main TV power supply circuit and delivers constant current to single or multiple LED string(s) used for backlighting the LCD TV screen.

Is there a significant difference between LED driving technology and CCFL-based technology? Is there a significant price difference? LED backlighting offers tremendous advantage over CCFL backlighting. Just to name a few: Power saving of up to 50%, better contrast ratio. Better color gamut, eliminates motion blur. Because these LED Backlighting Units (BLUs) are a lot thinner than their CCFL counterparts they allow TV manufacturer the ability to offer extremely thin and light LCD screens. The latest LED-backlit TVs are under 0.5" thick.

Tell us about some of the unique things that your LED drivers enable in the LCD TV market. Our LED drivers employ our proprietary high voltage CMOS (HVCMOS) process. The HVCMOS used for building LED drivers can operate directly from the main AC supply line (up to 450V), without using a separate power conversion stage.

Please give us a brief tutorial describing terms like "buck, boost, buck-boost, and SEPIC topologies". Our LED drives can be configured to run in any of these modes, depending on the system requirement (i.e. input voltage versus the output load voltage).

- Buck configuration is used when the input voltage a greater that the output load voltage. Example 120V or 240V input voltage driving an LED load of 80V.
- Boost configuration is used when the input voltage is lower than the output load voltage. Example 24V input driving a 50V output load.
- Buck-Boost (or (Cuk) configuration is used when the input and output voltages are roughly equivalent. Example input and output are roughly 120V. This configuration requires sensing the output voltage reference from the high-side voltage line.
- SEPIC is similar the Buck-Boost but requires the sensing from the low-side of the voltage line.

Are your LED drivers agnostic when it comes to the LEDs being incorporated, or do you need to design customized drivers for each LED solution? Supertex divers are very versatile and can operate from a very wide input voltage range from 8V to 450V. Depending on the input and output loads a user can configure any of the topologies listed above.

Most LED backlighting today uses edge-mounted white LEDs. Please give us your opinions about a shift to behind-the-screen LED placements. Edge backlighting of course is much cheaper than direct backlighting, since it requires a lot fewer LEDs. Direct backlighting gives a user the option of "local dimming", allowing for much better contrast ratio and overall better picture quality. Due to the much higher cost of direct backlighting, we feel a majority of the TVs will employ edge backlighting. Our drivers are capable of operating in both edge and direct backlighting configuration.

Will LED backlighting shift to RGB solutions or do you think white LEDs will remain dominant for the foreseeable future? Does Supertex have any preferences? Our drivers can drive both the white, as well as,

the RGB LEDs. As white LED based system is much cheaper to build, we feel that a majority of the TVs will continue to use white-LEDs.

What sorts of things does Supertex do to stay differentiated in the field of LED backlighting? We continue to work with leading TV manufactures to develop new drivers using our proprietary HVCMOS process and help customer keep the overall system cost lower that other competing solutions.

Tell us about your pulse-width modulated dimming capabilities. All of our drivers use PWM dimming, with some drivers allowing a dimming ratio of up to 5000:1, this gives our customer a fairly wide dimming range and options.

Can you give us some clues about next-generation solutions and the sorts of differentiators we might see in the future? Details about our next generation drivers are very closely guarded as leading TV manufactures want to use these drivers and features to stay ahead of their competition.

Tell us about LED binning and the problems you encounter in this regard. The biggest problem our customers tell us in LED backlighting design is heat dissipation. Because LEDs are heat sources, unless proper precautions for heat-sinking are considered, the LEDs are prone to overheating and failure. Another important factor is to minimize unnecessary power losses, requiring the use of well-matched (or binned LEDS). Unlike our competition, the Supertex solution requires binning by current only – whereas most of our competitors require binning by not just current but by Vf (forward voltage) also, which is more cumbersome and potentially more costly.

Using edge-lighting across a very large surface must create all sorts of problems, particularly with regard to both overall brightness and then brightness uniformity across the surface of the display. Is Supertex able to help in these areas? LEDs are becoming more efficient every year. As an example, a 100-200 mA LED can deliver much higher light output (in lumens per watt) than equivalent LEDs from 1-2 years ago. Additionally, light guides that are used to disperse light from the edges to the back panel are also becoming more efficient. TV manufactures can therefore build 60+ inch TVs using edge lit LEDs today, which they may not have been able to without using very costly, high current, ultra high brightness LEDs in the past.

Is your support for the LCD TV industry limited to LED drivers, or are you also supplying other solutions to the LCD TV market. Our primary focus f or the LCD TV is the LED drivers used for backlighting.

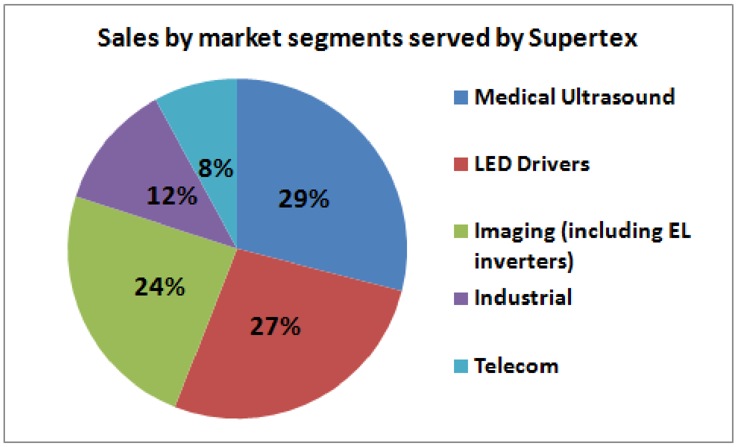
Do you think the driving force behind LED backlighting is due to superior front-of-screen performance, or do you think "green" factors are more significant? LED backlit TVs not only offer a "green" alternative but even the edge-lit LED BLUs offer a much better picture quality over their CCFL counterparts.

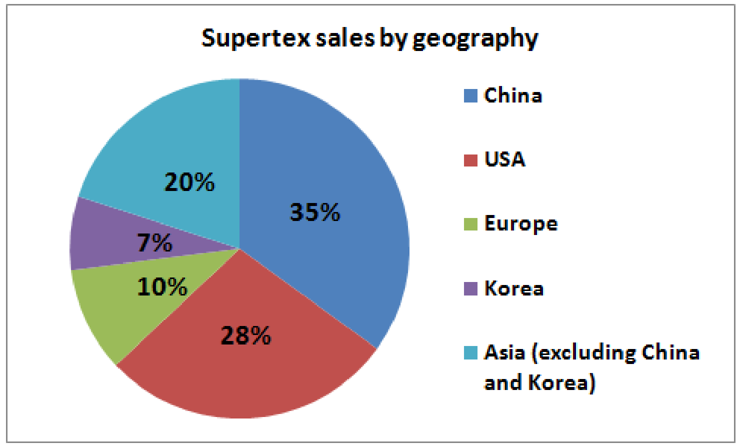
Please tell us more about your "green" initiatives. Supertex today is recognized as one of the leading LED driver supplier offering the most power efficient (hence green) solution in the market today. We are continuing to strengthen our patent portfolio in this area and we want to use our proprietary process and design to maintain that standing.

Tell us briefly about some of the other markets that Supertex supports. Are there any breakthrough technologies outside of the world of LED backlighting that are particularly exciting to you? Supertex is also the leading supplier of medical ultrasound transmit pulsers and switches. We also have the leading position in the EL inverter market supplying to cell phone market.

It seems that most US-based companies involved in the semiconductor industry are "fabless". Supertex has a 6-inch wafer fab in California. Do you think this gives Supertex some advantages or do you think that your foundry approach sometimes limits your options? We still have a cost advantage over most of our competitors, since we use a high voltage analog process, which does not require the smallest geometric node (as you know analog design do not shrink that much). Our California fab is almost fully amortized, which gives us a fairly reasonable front end wafer cost. Our IC assembly and test is done offshore in Asia, just like the rest of our competitors.

Tell us about your sales mix, both geographically and by end market.





How is Supertex positioned in terms of market share in the area of LED drivers for the LCD TV market? The exact market share data changes very rapidly, but right now (and for the last several years) we are (have been) the leading supplier in this market.

Tell us about one of your favorite "customer success" stories. Our customers' problems are fairly common. The funny thing is that no matter whenever I visit a new customer they always want the same thing -- the highest power efficiency at a cost considerably lower than their competition. Once we go through the analysis of their system requirement and propose a solution they get awed and say something like, "I wish we had this discussion with you last year, we would not have gone with …."

>>>>>>>>>>>>>>>>>>>><<<<<<<<<<<<<<<<<<<<

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The HD Revolution:
The Swelling Demand for Content and Bandwidth

courtesy of Corning Incorporated

The widespread popularity of high-definition television (HDTV) is due in part to continual technology improvements that have led to better image quality for viewers. But many consumers who have purchased the latest in HDTV display technology aren't experiencing all that their sets are capable of offering. That's because in many cases, the pipeline that brings the signal to their sets doesn't have the necessary bandwidth to deliver on the full promise of the TV. In other words, the high-definition televisions of today are capable of displaying much better picture quality than many delivery systems currently allow.

Since the inception of cable television, copper cables have been the standard for content delivery. Now, however, due to improvements in the type and size of content available, as well as the increasing size and number of televisions and other display devices being used around the world, the bandwidth available from copper cables is strained. As we look to the bandwidth-hungry applications of the future, the constraints will only be magnified. Industry-watchers are concerned that the capability of our display devices has outpaced the delivery systems that support them.

In addition to being a leader in the display industry, Corning has also been a pioneer in the development and continued improvement of fiber optic cables. This distinctive understanding of the display and telecommunications industries allows Corning to provide customers with an informed view on the bandwidth needs of today and tomorrow.

Bob O'Brien, director, end market intelligence, Corning Display Technologies, notes that the amount of information now coming into homes is increasing dramatically, and suggests the situation is akin to a train moving full speed ahead but quickly running out of track. "The train is the performance and features of today's HD devices, while the track is the infrastructure that supports them. If we want to meet consumer expectations, we have to keep laying down track at the rate that keeps pace with the 'full-steam-ahead' progress of advancements in display technologies."

"It's a cycle," says Bob Quinn, manager, business analysis and reporting, Corning Display Technologies. "Corning's introduction of low-loss fiber in the 1970s provided the bandwidth that drove the growth of the Internet. As flat panel displays were adopted for TV applications, they became larger in size and higher in resolution, which in turn required more broadband capacity. And as the broadband infrastructure improves, that will open the door for even more advanced displays."

A logical solution to the growing need for additional capability is fiber. Japan led the application of fiber-to-the-home (FTTH) in the late 1990s, and the year 2004 marked the first mass deployment of FTTH in the United States. Relying on fiber optic cable instead of copper, FTTH has the ability to provide many times the bandwidth of its predecessor.

Fiber's advantage is based on how it delivers information. Fiber cables transmit content using light, whereas copper cables transmit using electricity. This difference gives fiber several advantages – the chief one being its ability to provide significant bandwidth. Other benefits include the elimination of electromagnetic interference and noise that sometimes plagues copper cable, and the ability to deliver a stronger signal over a longer path.

"Fiber optic cable has virtually unlimited bandwidth," said Dr. Bernhard Deutsch, director, marketing and market development, public networks and OEM, Corning Cable Systems. "And with the availability of high-quality video content increasing significantly in recent years and consumers increasingly expecting a high-quality viewing experience, copper cable is at its limit. In terms of capability to transmit full HD content without compromising the image quality through compression, copper is no comparison to fiber."

Just as consumers' expectations increased with the move from standard TV to HDTV, new technologies such as 3-D and Quad HD will require even more bandwidth to support a great picture, and copper cable will not be sufficient.

"Quad HD will quadruple the need for bandwidth because of the increase in pixels," said Dr. Bob Boudreau, technology development manager, Corning Display Futures. "Because a Quad HD picture is two times the pixels in each direction of the picture than current HDTV, it will need four times the bandwidth to operate. And 3-D will need eight times the bandwidth."

David Kozischek, manager of global strategic growth, Corning Cable Systems, agrees. "The more technologically advanced the display, the bigger the thirst for bandwidth. HDTV is not the end. From Quad, Super and Ultra HD to 3D televisions, viewing technologies are going to improve, placing a large amount of strain on the networks as they exist today."

Bandwidth needs will also increase as consumers incorporate additional TVs and HDTVs in their homes, and as the popularity of Internet TV and gaming on-demand continue to grow. All of these factors add to the urgency of improving content delivery solutions. "We believe that fiber-to-the-home is the ultimate broadband solution for supporting the needs of today and the near future," said Deutsch. "We're also proud that Corning innovations have made this solution more economically competitive versus other technologies."

Collaborating to Find Solutions: As the inventor of both optical fiber and the AMLCD glass substrate, Corning is uniquely positioned to address the content and delivery challenges from both sides.

As TVs improve, the need for optimal surface quality increases, and Corning's fusion-formed glass meets customers' needs for a pristine surface. Corning has also been a pioneer in the development and continued improvement of fiber optic cables and connectivity; for instance, the company's sealed connector, OptiTap was the key to reducing the deployment cost of FTTH networks. This distinctive understanding of both technologies allows Corning to provide customers with in-depth solutions for improved display and telecom performance.

In fact, Corning recently harnessed this power in a research project that brings together experts from its display and telecommunications businesses. Their goal is to work collaboratively to find solutions to meet the challenges brought about by today's bandwidth needs as well as to develop measures to anticipate the needs of tomorrow. Specifically, the project is working to quantify the HD viewing experience by investigating network demands of current products, benchmarking HD content delivery over different types of networks, and gathering data on the impact of compression on picture quality. The team is also considering the effect of factors such as display glass attributes, display size, and bit rate.

Dr. Boh Ruffin, research associate, Corning Science and Technology, describes some of the work being done: "We have upgraded our optical test bed to emulate the digital video transport capabilities of fiber-to-the-home, cable television, and digital subscriber line networks. We've also integrated several video-quality metrics to characterize HD video signals that were transmitted through our test bed link or directly from an actual network. The study is generating valuable information that will help the display and telecom industries understand how an all-optical fiber network can help deliver sufficient bandwidth to large displays in the home."

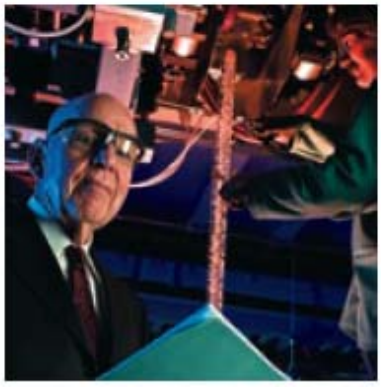
Corning expects the research project to provide valuable data for service providers to act upon; however, doing so will require teamwork. "The display and telecommunications industries need to work together to help deliver the full benefit of HD to consumers. Our research will help that effort, and Corning will also continue to supply the products and the innovations to create a better picture for consumers," said Peter Volanakis, president and chief operating officer, Corning Incorporated.

"We can only begin to imagine what TV will be like 10 or 20 years from now," said John Geniviva, director, marketing, Corning Display Technologies. "One thing is certain, though – the rate of innovation will be much more rapid than in the past. The research that Corning is carrying out today will help us be better equipped to support our display and telecommunications customers in the future."

More behind the glass

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

History



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Busting the "Super Bowl Sells HDTV" Myth

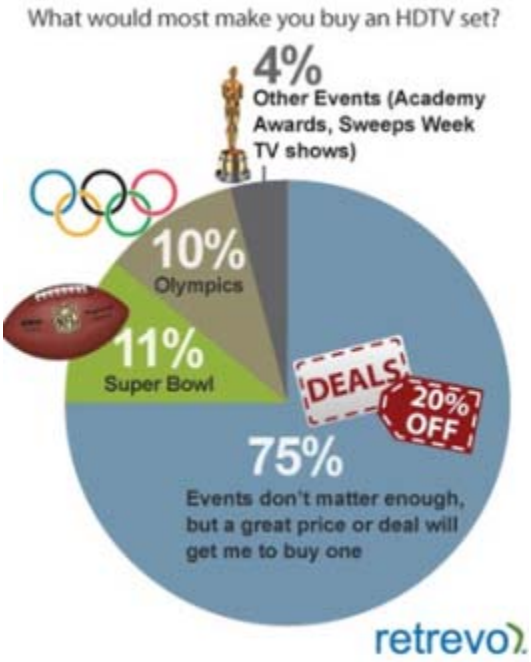
by Andrew Eisner

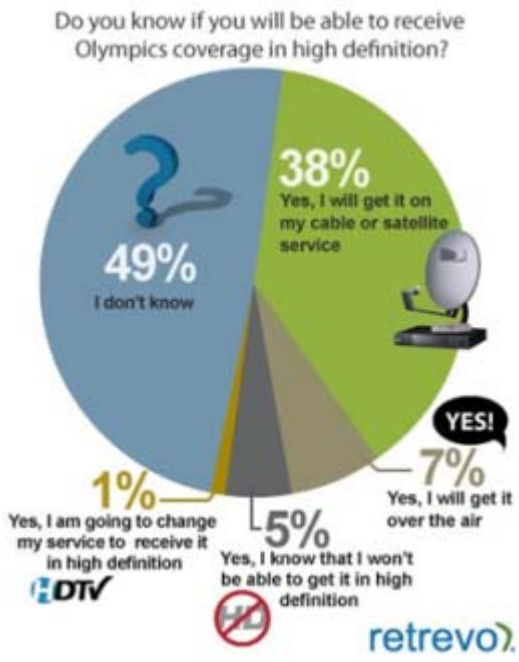
Andrew Eisner is a former test manager for Ziff Davis Labs and is currently director of content for Retrevo.com a website specializing in consumer electronics. Retrevo has reviews, manuals, and buying information for all popular gear and gadgets.

Conventional wisdom has big media events like the Super Bowl dramatically increasing demand for HDTV sets. With the record audience watching the New Orleans Saints beat the Indianapolis Colts and the Winter Olympics also seeing big ratings, Retrevo turned their Pulse study to look at how events like these influence consumers decisions to buy HDTV sets and services. We asked which events would be more likely to get someone to purchase a high definition TV or HD service. We were surprised to find that neither the Olympics, Academy Awards, or even the Super Bowl provided the biggest motivation to buy an HDTV set.

Although the Olympics is a good reason to buy an HDTV set, a much larger number of respondents in the study said major events like the Super Bowl don't matter as much as a great price or deal does. The Retrevo Pulse has also seen close correlation between price and demand for HDTVs in its demand index. http://www.retrevo.com/pulse/ce-demand-index

The Super Bowl was a more popular reason to buy an HDTV set than the Olympics, but not by much. Both the Super Bowl and the Olympics beat out the Academy Awards but price and deals prevailed by a wide margin.





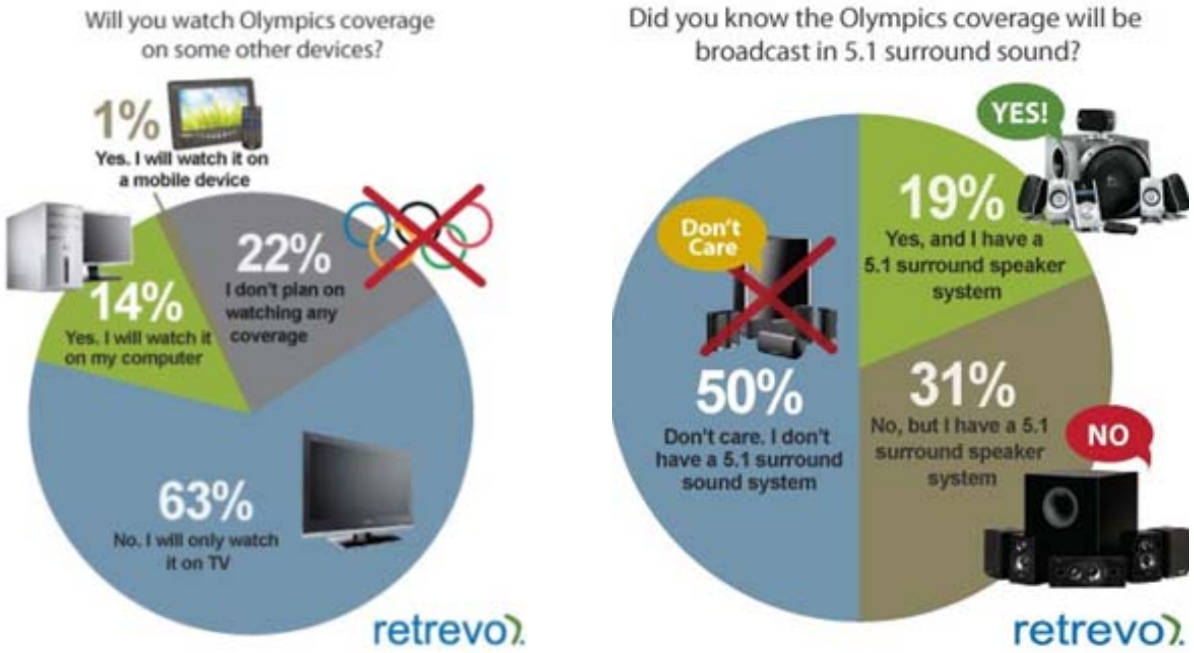
The graphic on the left shows that price beats programming as a purchase motivator; the graphic on the right indicates that the networks still need to raise awareness

When we asked about their ability to receive the Olympics in high definition, almost 50% of respondents answered, "I don't know." Many of them did say they will be able to receive it however, many more said they didn't know. We're not sure whether they meant they didn't know if the Olympics were going to be broadcast in HD, whether or not they receive the right channel, or whether or not their TV was able to receive it. In any case, it

appears that consumers like these need some educations about HD programming, what it means and what's available on their sets. Whether it's NBC, Comcast, the Olympics organization, or TV resellers, it sounds like someone needs to do a better job of educating consumers about HDTV.

We were impressed by the number of respondents saying they planned on watching the Olympics online with almost 14% indicating they will watch the Olympics on their computer.

On the other hand, if we believed all the hype about TV viewing on mobile devices we'd think regular TVs were going to become obsolete soon. Not that we don't believe mobile device owners won't be watching more and more TV on these devices in the future but as this study shows, at least as far as the Olympics are concerned, it doesn't look like mobile is going to be the viewing method of choice for most viewers.



The image on the left suggest that viewing on on-line and mobile viewers is still relatively small; the image on the right shows that Surround Sound is still a relatively small feature.

NBC went to great lengths to provide high quality, immersive, 5.1 channel surround sound for the Olympics. This year TV owners with surround sound speakers should have been able to feel more of the drama at the starting gate, in the ice rink, or at any other venue. However, according to the study, not only do most HDTV owners not have surround sound speakers but they aren't even aware of the lengths NBC went to in order to provide a great audio experience.

Conclusion: We're sure Best Buy and other TV sellers saw bursts of sales before the Super Bowl and the Olympics and we're not saying they should give the HDTV department the week off before the Academy Awards, but if Best Buy and others really want to bring buyers into the store they should add on some killer HDTV deals.

LCD TV Association

Inform • Promote • Improve • Connect

Value Based Features for a Recovery

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.

TV sets, providing the value that they do, set unit sales have held up and even grown during the global recession, even in hard hit locations. Beyond that the industry has introduced a number of new features during the recession that have sold well at premium and super premium price levels. Given recent history, it would be expected that the proportion of premium sets would continue to grow with a recovery. However, I suspect that this move to premium features may be temporary and due largely to differing demographics of the 2009 TV shopper rather than any mass move to upscale TV features.

While the recession has weighed heavily across virtually all demographic groups, something that should be self-evident, it weighs more heavily on younger, working age people. The threat of job loss is much more pressing on working age and middle class people than those that are either wealthy enough to weather the storm or who are already retired. Consequently, the average TV shopper in 2009 was probably older than usual and has some characteristics that come with being older. With a recovery and a return of a more usual TV purchasing demographic, I expect sets with value based features to grow disproportionately as increasingly younger demographic returns in force.

Upscale Features: With increasing age frequently comes decreasing eyesight. Consequently older shoppers are more likely to rely on published specs and advertising, rather than their own visual assessment of the sets on display. Further, these older shoppers will be less willing to re-arrange their living space to accommodate a new TV and may even have existing furniture that they would like the TV to fit in. Their TV purchase is invariably a replacement for a still working TV set. As such, their reason for buying is to upgrade capabilities rather than a purchase of basic functionality

All of these motivations feed into the current array of upscale features on flat screen TV sets that are quantifiable and easily promotable but not essential to basic TV viewing. Among these are elevated contrast ratios, refresh rates, LED backlights, and thinness. While these features will continue to be important to the consumer and to the retailer in promoting TV sales, I expect the market will shift.

Value Features: One thing that is somewhat surprising given the drastic drop in TV set pricing has been a slower move to larger set sizes than would be expected. Again, an older purchaser is more likely to be replacing a working set and less likely to want to rearrange their living space to accommodate a larger set. As a larger proportion of younger purchasers come back into the market I expect the demand for larger sizes to grow disproportionately. Another feature that will be of great value to younger consumers is a gaming mode, essentially the ability to turn off the electronic visual enhancements in an LCD TV set. The visual enhancements require considerable processing power and time and most LCD TVs have a sound delay to compensate for the delay that results from the visual processing. For a serious gamer, the delay is more than enough to impede their performance so while gaming mode is currently a premium feature, it is costless and will become a value feature as we move forward.

A further premium feature that will rapidly become a value item is easy internet connectivity. While internet connectivity is attractive for younger consumers, the move from being a premium feature to a value will not be

driven by demand to surf the net. As retailers increasingly seek to attach services to their TV set sales a base of connected sets provides a market to push video content. More importantly, as the retailers also seek to attach service contracts with set sales, the internet becomes essential. It takes an average of two truck rolls to service a malfunctioning TV; one to diagnose and one to make the actual repair. Truck rolls are expensive and if they can be replaced by remote diagnostics over the internet, the connectivity becomes significant to profitability for the service contracts.

A final premium feature that will move into value sets will be home delivery of the TV purchase. Although in the previous section, I address the expense of truck rolls, retailers have other expenses and challenges that can be reduced by home delivery, among them inventory. For the big box retailers with multiple locations in the same geographic area, the cost of maintaining separate inventories for each store can be considerable. Centralized inventories can yield considerable cost reduction. Further, absent the implementation of digital signage in their stores that inform the consumer of out-of –stocks, consumers commonly spend hours in the store picking out a set (the reason why they went to a brick and mortar retailer to begin with) only to find that the specific model they wanted is out of stock at that store. The store will commonly offer home delivery at a later date to keep the sale.

With larger sizes, that no longer fit into smaller cars, at cheaper prices, home delivery for sub $1K sets will be essential. Home delivery will also allow the store to do away with individual packaging for each TV set. Beyond the Green benefit of doing away with the box, damaged boxes are a common reason for aged inventory sitting around the store. No one wants the TV with the gouge in the box even though the sets are well protected. Manufacturers can ship to the retailers in multi-packs and the retailer can deliver from racks in their trucks much like replacement windshields are delivered for on-site windshield replacement. The combination of the greenness of doing away with the box along with home delivery also gives the brick and mortar retailers a leg up on internet sellers.

Summary: While advanced technological features will continue to grow sales and support profitability in the TV set supply chain, the larger portion of growth in the set market will be more driven by mundane developments. The ability to turn off some of that technology as in the gaming mode, internet connectivity for remote diagnostics, included home delivery to compete with internet sales will propel sales from the TV industry's traditional retail outlets. Younger consumers will take advantage of the bigger set for the money offered by current pricing. As with other products, a chastened population will increasingly turn to value offerings at the relative expense of luxury features.

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Approximately Right

Seasonal Patterns Persist

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.

"The new normal" is an oft-used phrase nowadays. The phrase reminds us that favorable business conditions we took for granted last decade may not return this decade. While useful, this truth is not universal. Some factors have not changed, they remain the old normal. Profitable business decisions depend on our ability to recognize how changing conditions interact with unchanging factors. I therefore offer the following observations in the belief that it is better to be approximately right than precisely wrong.

Several analysts have claimed that seasonal patterns have changed as a result of Asian demand for flat-panel products. Their premise seems plausible: as LCD TV demand in regions celebrating lunar-calendar holidays becomes a greater portion of global demand, the seasonal pattern of consumer purchases will change. Their concern seems important: a shift in seasonal patterns could smooth corporate earnings or swing earnings more than we have seen in the past. Their thesis appears weak, however: public disclosures by leading LCD producers and the US Census Bureau show established seasonal patterns persisted through 2009. Readers interested in a detailed study of these numbers in spreadsheet and written formats can visit the Comments section of http://www.bizwitz.com for downloads. Here, I will summarize the findings.

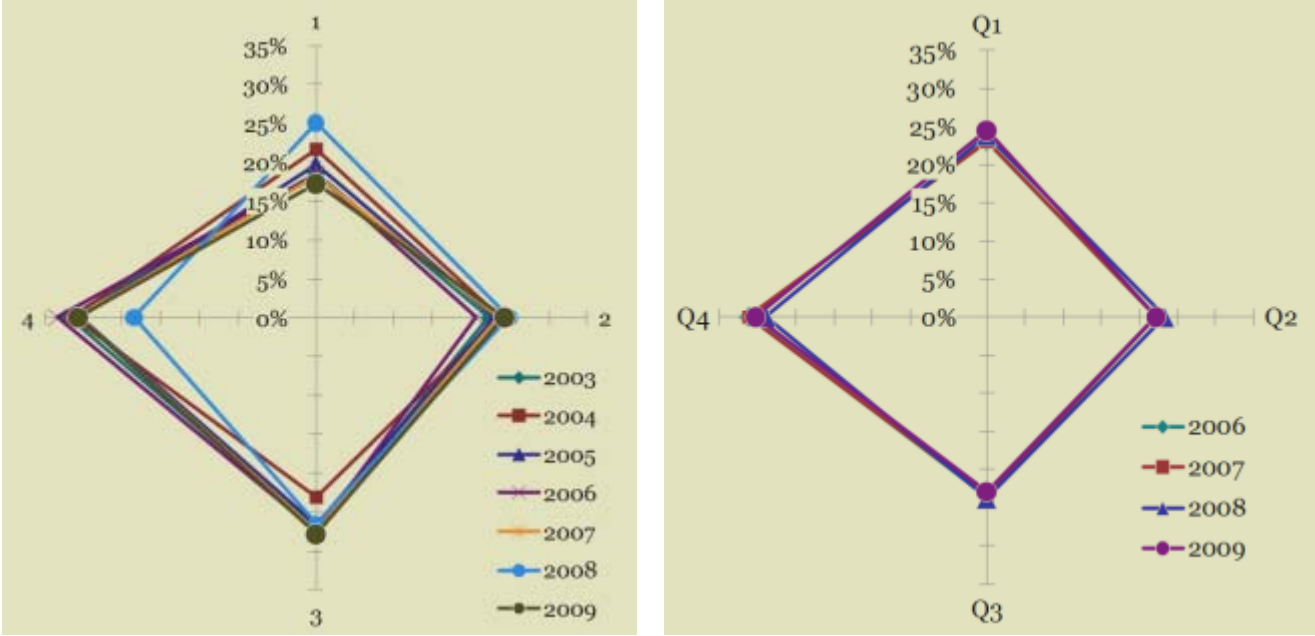
Seasonal Pattern of LCD: Both AU Optronics (AUO) and LG Display (LGD) report the amount of display area they deliver each quarter. In addition, they report these amounts on a consolidated (global) basis. Since the two companies account for more than one-third of global AMLCD production, their quarterly presentations indicate market conditions for panel makers as a whole. Their shares of AMLCD capacity averaged 17% and 20% respectively over the past seven years. Similar shares allows us to differences between their product mix or corporate policy do not distort the findings. Combining the number of square meters shipped each quarter by both companies allows us to plot the seasonal patterns since 2003. The following chart plots the percentage of annual area shipped each quarter by year.

It is easy to see how different 2008 was from other years. The global financial crisis curtailed display demand in 2H'08 for macroeconomic reasons. Before and after that, 2004 is the only other standout. That was the year several AMLCD producers issued convertible bonds or new shares to fund capacity for LCD TV applications. Those companies primed the pump with 1H'04 shipments then faced rapid price declines in 2H'04 for microeconomic reasons. Looking at 2009, we see nothing unusual.

Seasonal Pattern of Retail: The US Census Bureau publishes monthly measures of retail sales and details retail activity for electronics and appliance stores (NAICS 443). If we summarize sales by calendar quarter for the past four years, we see that the seasonal pattern remains consistent. There is no evidence that consumers in the USA have changed their spending patterns in such stores.

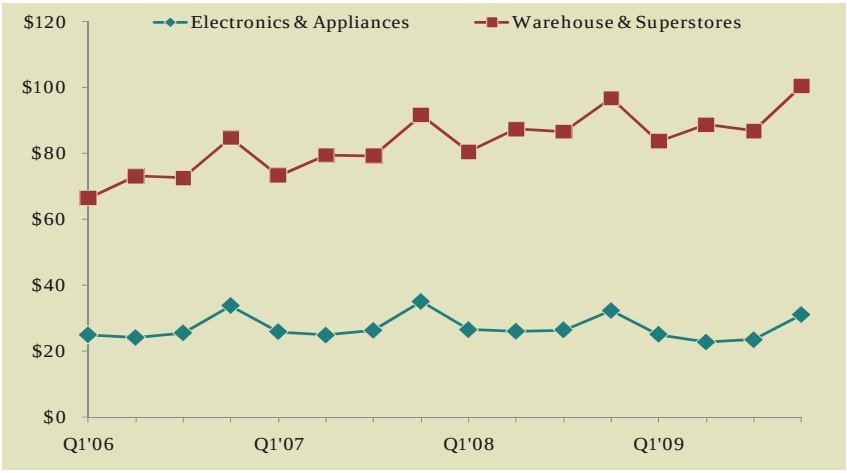
We can see a change in spending patterns if we compare absolute sales for electronics and appliance stores compared to sales for warehouse and superstores, however. US consumers have been spending more in

warehouse and superstores (NAICS 45291) as the number of such outlets increased and macroeconomic conditions worsened.



The image on the left is the quarterly portion of annual AMLCD area, 2003–2009; the image on the right shows the quarterly portion of electronics and appliance store sales, 2006-2009. Sources: company disclosures and US Census Bureau, Food & Retail Sales, NAICS 443, respectively

Retail spending has been flat to declining in electronics and appliance stores. Spending in warehouse and superstores has increased about 8% a year. We cannot compare these directly in terms of LCD TV demand because warehouse outlets run by Wal-Mart Stores or Costco sell a wider variety of items than stores run by Best Buy, Conn's or hhgregg do. Still, we can assume that consumers are buying more LCD TV at warehouse or other discount outlets than they did in years gone by.



Retail Sales, 2006–2009 (billions USD)
Source: US Census Bureau, Food & Retail Sales, NAICS 443 and NAICS 42591

The Old Normal: As a result, we see a change in commercial preference but not a change in seasonal preference. A greater portion of consumers are seeking bargains today but they are seeking products on the same schedule. Companies in the LCD TV supply chain may remain as dependent on third quarter orders and fourth quarter sales as they have been in past years. They may also depend as much on seasonal promotions.

As noted in a recent press release from DisplaySearch, the ASP of LCD TV sets declined more than 20% Y/Y in Q4'09. That is in-line with historical declines on an area basis, so it appears that the old normal pattern of rapid price reduction persists. The areal price of LCD panels declines at a similar rate, of course. As these prices move down together, profit margins decline slowly. This makes LCD TV products more attractive to superstores and less attractive to specialty stores. Retailer profits depend on the ability to promote the right products at the right time so that total receipts rise above a store's breakeven level. It is too early to predict what promotional strategies brands and retailers will use in Q4'10 but it seems likely that the seasonal pattern of pricing and promoting will continue.

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

Paying for it…

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 diversity of TV broadcasting and some of the dilemmas associated with paying for the diverse content.**

The Shifting Sands of Video Content: It used to be so easy: three networks, one simple TV listing in the newspaper; race home from school to watch the Mouseketeers; get ready for bed early on Sunday night if you're going to get to watch Ed Sullivan. Now it has become so much more complicated. Sure, it is this very expansion of choice that has launched a million flat screen TVs. (Okay, tens of millions of them).

With more choices, more people will find something that they want to watch. And as the price of the TVs fall, these same people will find more reasons to buy more TVs so that they can have "a great TV in every room". But this fragmentation of the viewing audience into tiny segments has other important implications. Clearly, we can't afford to provide individualized content for every viewer, 24/7. There's some break-even point below which the content producers will simply stop creating video programs and movies, and will start growing cabbages or find some other way to make a living. Recently, I've been giving some thought to the whole question of who will pay for video content production and distribution in this brave new world of an infinite number of "channels".

The Power of Internet TV: You wouldn't have found this in your TV guide. It barely got mentioned on the national news. You may not know it, but the US challenger, BMW Oracle Racing, won the America's Cup back from the Swiss defender recently by winning the second race in a best-best-of-three competition. Oh, this is about sailing, by the way.

So why am I mentioning it here? I'm a fan of sailing, and there's not a lot of coverage of sailing events on broadcast television, even on cable or satellite stations. In this case, each day of racing took four or five hours of coverage. The event was held in Valencia, Spain, on the Mediterranean, so the start times were around 6:00 a.m. Eastern and 3:00 a.m. Pacific time. This is hardly the prime time where a network would want to launch expensive coverage. The problem was made worse by the fact that on the first two days scheduled for racing… nothing happened. No race. (There was too little wind on one day and too much on the second day). How would a major network deal with an event like this that doesn't even do anything the first two days? Who's going to come back on the third day, and how do you fill the missing time? And will you be able to clear the schedule for additional coverage on subsequent days? Keep in mind that the whole thing could have been over on the second day, but in fact it hadn't even started then.

Thanks to ESPN360, however, there was professional coverage start to finish of the whole event. They had expert commentators, cameras on the water and in two helicopters, and some very slick computer graphics with instantaneous speed and leader advantage data (much like you get now for car racing coverage). Under normal circumstances, it's hard to see which boat is actually in the lead at times. With this coverage, you could see which boat was faster second by second. It added to the excitement of the event.

And I could watch it for free online, whenever I wanted. I started watching the second race while the race was still going on, but I was able to quickly rewind to the beginning and watch without knowing the final outcome. And watching it in full screen on my HDTV greatly enhanced the experience.

Now, no broadcast network would give up the time for an event like this, yet ESPN was able to make it available on the Internet. Even though the target audience was tiny compared with other sporting events, they were able to assign the resources to provide the coverage. The Internet makes it possible to reach a group of viewers with a narrow interest like this, which in turn provides advertisers with laser-focused access to their market. I'm convinced that this sort of "narrowcasting" is an important part of the future of video on the Internet.

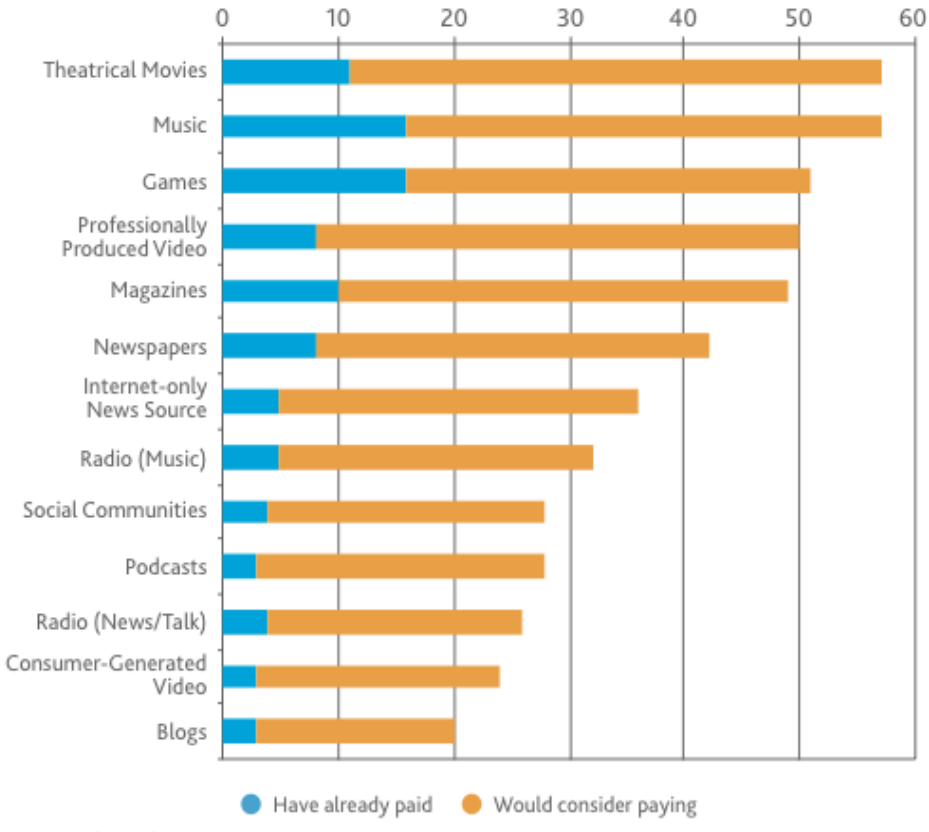
TV Rights for Next Olympics: $2 Billion: As for blockbuster sporting events, there's always the Olympics. According to a recent report in *Television Broadcast*, the International Olympic Committee (IOC) expects to get more than $2 billion for the US television broadcast rights for the 2014 Winter Olympics in Sochi, Russia, and the 2016 Summer Olympics in Rio de Janeiro, Brazil. NBC paid nearly $0.9 billion for the 2009 Summer Olympics in Beijing, China, and according to the network's annual report, lost $150 million in the deal. (NBC continues to broadcast programming from those events on their Universal Sports channel, however, so the books aren't entirely closed yet on the earnings for that content).

If $2 billion sounds like a lot of money, you're right, even if it is spread over two sporting events with worldwide scope. It's still surpassed by the contracts for the broadcast of NFL football games. According to *Sports Business Daily*, the average annual licensing fees for the NFL telecasts total more than $3.7 billion annually.

Now, keep in mind that this is just the fee to set up shop. It does not include the equipment, sets, production and support staff, on-air talent, marketing, and a myriad of other expensive details. And these billions of dollars have to be made back in advertising revenues and subscriber fees. And we can reasonably expect to see at least some of the 2016 Games in 3D. Keep that in mind when you dream about new models for content distribution that are free to the consumer without advertising. Someone's got to pay these billions of dollars a year if we want to see football or the Olympics on our high-definition screens.

Will People Pay for Online Content? The World Wide Web has changed everything, and it appears that it hasn't finished changing yet. One of the topics that I keep coming back to is the question of who will pay for production and distribution of video and movie programming over the Internet. One problem is that people tend to like "free" better than something that costs them money. While iTunes has proven that people are willing to pay small amounts for things like music tracks, does that transfer to more expensive endeavors, such as a blockbuster movie? Can you really fund an effort like *Avatar* through billions of small payments?

A new report from Nielsen points to some promising results. In a worldwide survey, the company confirmed the obvious, with 85% of the respondents expressing a preference for free content. But when asked about specific types of content, many indicated that they would be willing to consider making a payment, especially in areas where they have already spent money online.



Percent of consumers who have already pad or would consider paying for various on-line service

At least half of the respondents indicated that they would consider paying for movies, music, games, and "professionally produced video" (which I take to mean network programming). And also impressive was that fact that about 10% of them had already paid for this sort of content. Another interesting result was an apparent link to subscriptions in other formats; 78% of the respondents believed that if they subscribe to a newspaper, magazine, or television service, they should be able to access the online content at no additional charge. And nearly two-thirds of them thought that if they purchase online content, then they should be able to copy it or share it any way they want. And about the same number felt that if they pay for online content, that content should be free of advertisements.

I take this survey as a hopeful sign. Add this to the fact that about two thirds of Netflix subscribers with broadband service have taken advantage of the company's streaming movie and video service, and it appears that there could be some momentum building for user-supported video content on the Internet. This also could be an encouraging sign for the cable subscription services which want to offer a "TV anywhere" service to their subscribers.

We still don't know the answers to the big questions about streaming video on the Internet, but I believe that we will solve the problem of how to pay for it**.**

Rather Switch than Pay? Another piece of the TV payment puzzle are the subscription-based services such as cable, satellite, or telco. While brand loyalty may remain an important part of many consumer markets in the US, a report by Strategy Analytics indicates that subscription television service is not one of them. A recent survey found that more than 2 out of 3 cable subscribers would change providers if they were offered a 20% discount. For the smaller number of people who subscribe to television from a phone company, such as Verizon or AT&T, that number is cut in half to just 1 in 3.

Perhaps more telling is the fact that fewer than 22% of the subscribers overall felt that they were getting "value for the money". With "100 channels and nothing on", consumers are starting to question the return they get for their monthly subscription. The rapid growth of services such as Hulu and Netflix streaming movies is another indication of consumer dissatisfaction with the current choices.

From where I sit, one of the primary problems facing cable companies – and to a lesser degree, satellite services – is that they were established under a different set of rules and market conditions. In return for investing in running cable throughout a community, a cable company was given the right to provide the service to those homes. Now consumers are faced with a number of alternative choices, while cable costs keep rising year after year. One easy way to lower cable bills would be to offer a la carte pricing, but that will no doubt result in a huge drop in revenues because subscribers would opt out of all but a handful of favorite channels. But if cable and satellite services don't do something soon **to** address the consumers' concerns, they will find their customers voting with their dollars and looking elsewhere for their video programming.

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Display Industry Calendar of Events – 2010

A detailed calendar with active URLs is maintained by Veritas et Visus. Please notify mark@veritasetvisus.com to have your future events included in the listing. http://www.veritasetvisus.com/industry_calendar_2010.htm.

January 2010			
January 5-6	Storage Visions Conference	Las Vegas, Nevada	
January 6-9	Digital Hollywood CES	Las Vegas, Nevada	
January 7-10	2010 International CES	Las Vegas, Nevada	
January 11-13	Display Metrology Short Course	Longmont, Colorado	
January 17-21	Electronic Imaging 2010	San Jose, California	
January 18-20	Stereoscopic Displays and Applications	San Jose, California	
January 20-22	NEPCON World Japan	Tokyo, Japan	
January 23-28	Photonics West 2010	San Francisco, California	
January 25-27	Tangible, Embedded, and embodied Interaction	Boston, Massachusetts	
January 26	Power Saving in Displays	Oxford, England	
January 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
April 2010			
April 7-10	International Sign Expo	Orlando, Florida	ISA
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	The Digital Signage Show
April 14-16	FineTech Japan & Display 2010	Tokyo Japan	FINETECH JAPAN
April 14-16	Touch Panel Japan	Tokyo, Japan	TOUCH PANEL 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 27	Photovoltaic Technology Electronics	Stuttgart, Germany	
April 28-30	Organic Photovoltaics	Philadelphia, Pennsylvania	
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 Futures	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	3DTV World Forum	London, England	
May 18-20	SGIA Membrane Switch & Printed Electronics Symposium	Phoenix, Arizona	
May 19-21	SEMICON Singapore	Singapore	
May 19-21	Three Dimensional Systems and Applications	Tokyo, Japan	
May 20-21	DisplaySearch China FPD TV and HDTV Conference	Shenzhen, China	
May 23-26	China Optoelectronics & Display Expo	Shenzhen, China	
May 23-28	SID International Symposium	Seattle, Washington	
May 24	SID Business Conference	Seattle, Washington	
May 24-26	CeBIT Australia	Sydney, Australia	
May 25-29	Advanced Visual Interfaces	Rome, Italy	
May 31 - June 2	LOPE-C -- Large Area, Organic and Printed Electronics Convention	Frankfurt, Germany	
May 31 - June 2	Graphics Interface 2010	Ottawa, Ontario	

June 2010			
June 1-3	Dimension3 Expo	Seine-Saint-Denis, France	
June 1-5	Computex 2010	Taipei, Taiwan	
June 3-6	SIIM 2010	Minneapolis, Minnesota	
June 5-11	InfoComm '10	Las Vegas, Nevada	
June 7-8	Projection Summit	Las Vegas, Nevada	
June 7-9	3DTV-CON 2010	Tampere, Finland	
June 9-10	EuroLED 2010	West Midlands, England	
June 9-11	3DCOMM	Las Vegas, Nevada	
June 9-11	Photonics Festival: OPTO Taiwan , SOLAR, LED Lighting, Optics	Taipei, Taiwan	
June 14-16	SEMICON Russia 2010	Moscow, Russia	
June 15-17	E3 Media and Business Summit	Los Angeles, California	
June 15-17	Digital Signage Expo 2010	Essen, Germany	
June 15-17	CEDIA Expo Europe	London, England	
June 21-24	Solid State and Organic Lighting	Karlsruhe, Germany	
June 21-24	Cinema Expo	Amsterdam, Netherlands	
June 21-25	Nanotech Conference & Expo	Anaheim, California	
June 22-25	OLED Expo 2010	Seoul, Korea	
June 22-25	LED & Solid State Lighting Expo	Seoul, Korea	
June 22-25	International Conference on Organic Electronics	Paris, France	
June 29 - July 1	Plastic Electronics Asia	Osaka, Japan	
July 2010			
July 7-9	China International Flat Panel Display Exhibition	Shanghai, China	
July 7-9	China International Touch Screen Exhibition & Seminar	Shanghai, China	
July 7-9	International Symposium on Flexible Organic Electronics	Halkidiki, Greece	
July 8-11	SINOCES	Qingdao, China	

July 11-16	International Liquid Crystal Conference	Krakow, Poland	
July 12-14	Nanosciences & Nanotechnologies	Halkidiki, Greece	
July 13-14	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 29-30	RFID Europe	Cambridge, England	
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 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 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 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 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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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.

"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

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