



Inform • Promote • Improve • Connect

“LCD TV Matters”

Volume 4, Issue 3



"A Great TV in Every Room"

Contents

Chairman's Corner: TV Darwinism... by <i>Bruce Berkoff</i>	3
LCD TV News compiled by <i>Veritas et Visus</i>	6
NEC Display Solutions introduces next-generation video wall display	6
ATEME launches program to pave the way for ultra-high definition television	6
Elemental showcases multi-screen video delivery	6
IHS says cable industry zeroing in on multi-screen device market	7
MPEG prepares H.265 HEVC for release in 2013	7
Hulu refreshes its website with a 55% larger video player	7
Centris Research reports Blu-ray player household penetration reaches 26%	8
Gefen introduces fiber optics-based extenders to deliver high resolution graphics	8
Philips launches new smart TV experience	8
Samsung launches its 2012 line-up of smart TVs	8
Sony backs 4K in Rio shoot	9
Sony introduces 4k2k Blu-ray Disc player	9
Atmel introduces LED driver that enhances LCD TV picture quality, eliminates 3D ghosting	10
DisplaySearch reports LCD TV shipment growth to improve in 2012	10
Marseille introduces its first 4K up-converter chips	11
Haier shows off completely wireless 55-inch 3DTV	12
MPEG LA offers patent license for 3D video	12
Shipments of 3D LCD TV panels reach 21M in 2011 reports DisplaySearch	13
Blockbuster streaming due on Samsung TVs in 2012	13
Comcast launches new streaming video service	13
TE Connectivity introduces new video distribution system	13
Ooyala report highlights strong growth trends in smart phone, tablet and smart TV viewing	14
Microsoft and Netflix form group to promote new streaming media standard	14
WalMart to boost UltraViolet	15
Hon Hai buying 10 percent stake in Sharp	15
UK government creates tax credit for TV drama	15
Warpia launches wireless streaming kit	15
Next generation TV standard from ATSC on track to be completed this year	16
Akoo International awarded patent in Japan for enabling smart-phone control of TV and VOD	16
Plus news from IHS, My Voucher Codes, Displaybank, IHS iSuppli, Park Associates, Xilinx, Dolby LG Display, and International 3D Society	
Connected TV: Becoming Mainstream! by <i>Paul Gray</i>	21
European broadcast market by <i>Bob Raikes</i>	24
LED-backlit LCD TV shipments doubled during 2011 by <i>Veronica Gonzalez-Thayer</i>	27
Can feature-rich sets save the flat-panel TV market? by <i>Lisa Hatamiya</i>	29
Approximately Right: Panel Makers Drive the Market by <i>David Barnes</i>	32
Breaking Barriers and Broken Windows by <i>Marty Shindler</i>	35
Hugo and Tintin... by <i>Mark Fihn</i>	37
When will 4K make your HDTV obsolete? by <i>Andrew Eisner</i>	39
Digital Signage Expo and Television by <i>Norman Hairston</i>	42
2012 HDTV Buying Guide coming soon	44
From the professor... by <i>Alfred Poor</i>	46
Display Industry Calendar of Events	49

Chairman's Corner: TV Darwinism...

by Bruce Berkoff

We have often heard about Darwinian evolution being about the survival of the fittest. This often brings to mind less subtle battles between species, or even technologies. Certainly, in the display field, we saw LCDs overtake and now almost completely dismiss what was the dominant and entrenched technology for many decades, the CRT. What was apparent to some of us, admittedly biased observers, early on, was that the bloody battle for CRT successor would not only go to the quickly growing and fiercely competing LCD "monster", as some have called it, but that some very valid and valuable opponents would be vanquished in the LCD wake, much like this shark is doing to this boy (see figure 1), and that is what appears to now become more obvious to some others, as they look at the shrinking forecasts of PDP/Plasma TVs going forward. LCD TVs have just become so much better (due to everything from LED backlighting to internet connectivity) as well as so much less expensive over time (a 42-inch good brand LED LCD TV can now be had online for ~\$500, about half the price of just 2-3 years ago), that even great new PDP sets just cannot compete in the overall landscape of the CE (consumer electronics) TV world of today. Many other new technology battles are being fought around the edges of the ecosystems, like the one with lightweight 3D passive glasses (see figure 2) vs. the heavier shutter glasses, but in general, these remain "niche" issues in the marketplace as opposed to the truly big "wars" over technological direction of the species.



Figure 1



Figure 2

As for these bigger battles, or even wars, as some call them, I have been an interested student and participant of display technology "history" for over two decades now, and believe I will see another 2 decades of interesting developments in the future, with some just as painful for some of the players going forward as they have been in the past. In figure 3, we see the remnants of the 747 crash scene from the recent remake of war of the worlds, and I know of some display manufacturers who have felt like this in the past decade, but what will the next decade bring?



Figure 3

Well, for starters, for 15 years the OLED folks have been saying they will take over from LCDs in the “next few years”, and while that has not even come close to happening yet, the money and efforts and results of at least one of the two big Korean display “superpowers” has seen to it that the topic is certainly relevant once again, at least for small panels today (and of course the rumors and even demonstrations are piling up for the TVs of “tomorrow”). This is shaping up for a multi-front and multi-part battle for sure. Besides the obvious camps like, OLED vs. LCD, or Samsung vs. LG (see figures 4 & 5, and note that both of these varied fight scenes were in the same place- at the same time, but in different but nearby rooms, of the LA convention center, as they had the Tae Kwon Do nationals the same day as an ANIME convention last year, proving that the real world is almost as strange as the display world), we have much more real details to consider, that will play a big role in determining the outcome of any “war”. A major one of course is the various technologies involved INSIDE the displays, from the frontplane to the backplane, and for how they both might be made. Thus I mean big things like from LTPS to metal oxide, for both LCD or OLED, and for just a possible OLED display, might it be RGB or white OLED, and how will the front plane be made, via deposition or printing (and each again has many possible approaches as well). I have heard some long time display experts get very confused by all these issues recently, and say both some insightful and at times even some very silly things.



Figure 4



Figure 5

The truth is, the future will have many twists and turns along all these roads before it is clear which way the battles on every front will be won. It is sometimes hard to see the forest from the trees.



Figure 6

In figures 7&8 we see two pictures taken from about the same spot and the same time, with just a rotation in camera orientation. In the first picture it seems to be a violent stormy day in the middle of winter. A closer look might reveal that those small dots in the foreground are people skiing, on a glacier on top of Mt Hood, on a pretty July day, with just a cloud sweeping by the mountaintop. The next shot shows more clearly the nice summer weather and the view toward the south of Mt. Jefferson. It should remind us all, that sometimes it is hard to keep all the data we have at our fingertips in context, and to note what are passing phases (like the weather) and what are true fixtures of nature (like the mountains). I can say one thing for sure, the next 5 years in the world of LCD TVs will be even more exciting than the last, and no matter who might become a loser in this “war” of the CE world, the consumer will surely win!

LCD TV News

compiled by Veritas et Visus

NEC Display Solutions introduces next-generation video wall display

NEC Display Solutions of America announced its next-generation ultra-narrow display, the X463UN, to its X Series of displays. This professional-grade large-screen model is designed for the 24/7 operation required in a variety of digital signage, corporate and broadcast video wall applications. The X463UN is a direct LED-backlit LCD display, which allows for improved brightness uniformity, reduced power consumption and mercury-free components. The X463UN has a 5.7mm distance between active screen areas of two neighboring displays. The model supports Intel's Open Pluggable Specification (OPS), which is the first industry-wide standardization in option slots to simplify digital signage. The OPS option slot allows for easier installation, use and maintenance of digital signage. The X463UN includes the following features: direct LED backlighting source, which allows even distribution of light across the panel, resulting in improved uniformity from bezel-to-bezel; professional-grade LCD panel with advanced thermal protection and sealed panel design for the most formidable digital signage industry requirements; full 1080p high-definition resolution; brightness of 500cd/m² (typical); contrast ratio of 3500:1 (typical); power consumption of 120W (typical); full digital connectivity with DisplayPort In/Out, DVI-D In/Out and HDMI; network control and communication through RS232C or LAN; TileMatrix technology for video walls up to 100 displays; built-in expansion slot, which allows for seamless integration of NEC-branded or Intel OPS-certified cards; optional color calibration solution, which ensures color and brightness uniformity across multiple screens, creating a perfectly matched image in tiled environments; and carbon footprint meter, which calculates and tracks carbon savings. <http://necdisplay.com>



requirements; full 1080p high-definition resolution; brightness of 500cd/m² (typical); contrast ratio of 3500:1 (typical); power consumption of 120W (typical); full digital connectivity with DisplayPort In/Out, DVI-D In/Out and HDMI; network control and communication through RS232C or LAN; TileMatrix technology for video walls up to 100 displays; built-in expansion slot, which allows for seamless integration of NEC-branded or Intel OPS-certified cards; optional color calibration solution, which ensures color and brightness uniformity across multiple screens, creating a perfectly matched image in tiled environments; and carbon footprint meter, which calculates and tracks carbon savings. <http://necdisplay.com>

ATEME launches program to pave the way for ultra-high definition television

ATEME, a global provider of compression solutions for broadcast and broadband, announced the launch of an ambitious research program to reduce the bandwidth required for the delivery of ultra high definition television using High Efficiency Video Coding. HEVC is the latest compression standard developed jointly by ISO/MPEG (Motion Picture Experts Group) and ITU-T/ VCEG (Video Coding Experts Group). Currently a draft, it is expected to be submitted for final standardization approval in January 2013 as MPEG-H Part 2. The primary goal of the 4EVER program is to pave the way for the delivery of an enhanced high-definition television experience to viewers regardless of the viewing context (in the home, on the go, in public places, cinemas, etc.) in a practical and inexpensive way. Initially a large part of the research effort will be invested in the evaluation of the television experience enhancement that can be offered from not just higher resolutions, but also higher frame rates, increased color depth, surround sound, and more. ATEME's objective beyond this program is the development of an industrial, efficient, affordable, and deployable implementation of HEVC. 4EVER program members include Orange Labs, ATEME, France télévisions, GlobeCast, TeamCast, Technicolor and Doremi, as well as the Télécom ParisTech and INSA-IETR University labs. The consortium expects to demonstrate a first complete Ultra HD production and transmission chain within one year, and several field trials are planned throughout the 4EVER project for sports events, music concerts and other live shows. <http://www.ateme.com>

Elemental showcases multi-screen video delivery

Elemental Technologies showcased in more than ten partner booths at the National Association of Broadcasters (NAB) annual conference and exhibition in Las Vegas, April 16-19. Partners highlighting Elemental on the show floor included Adobe, Akamai, ATTO, AuthenTec, Dell, Dolby Laboratories Incorporated, DTS, EMC Isilon, NVIDIA, SRS Labs, Supermicro, Toshiba and Verimatrix. Akamai streamed MPEG-DASH content created by Elemental over its content delivery network. DASH is a new delivery protocol designed to address the dramatic growth of Internet video by defining a universal delivery format. Dell demonstrated Elemental Live as a part of its content delivery solution. The solution combines server expertise from Dell with software from Elemental and

Edgecast to create a content delivery platform that helps carriers manage on-demand delivery of any video to any screen with reduced hardware and power consumption. DTS showcased Elemental Server for transcoding content to DECE's Ultraviolet CFF format for secure and ubiquitous content delivery. In the demonstration, Elemental Server performed DTS-HD encoding, including the high-efficiency DTS Express profile, and CFF multiplexing. Nvidia demonstrated a high-performance solution for live event production featuring the new Elemental Live 150 Series running on dual Nvidia Tesla GPUs. The Elemental Live 150 Series packs high-performance video processing and throughput in either a rack mount or desktop form factor, allowing live event producers to output streams for multi-camera angle viewing. SRS Labs demonstrated its HELM solution (Head-End Loudness Management), integrated into Elemental Live. The combination of SRS' HELM with Elemental's head-end products allows broadcast operators and MVPDs to not only check for CALM Act and EBU R-128 compliance, but allows for broadcasters to automatically correct any problems found with loudness inconsistencies across all of the operators' feeds. This ensures a problem-free consumer viewing experience, whether it be program-to-commercial, program-to-program or channel surfing. Supermicro showcased Elemental Live on its 1U SuperServer (6016GT-TF) with dual Nvidia GPUs. The combined power of Supermicro's server solution with Elemental Live provides a low-cost-per-stream solution delivering real-time HD video streams live over the Internet. In addition, this solution encodes the highest-quality video at unprecedented speeds, allowing for faster throughput and increased capacities for any Internet-based video site. <http://www.elementaltechnologies.com>

IHS says cable industry zeroing in on multi-screen device market

A new research paper suggests that cable operators are moving away from services based around set-top box (STB) hardware and toward software and services. The IHS Screen Digest Insight Report, "Cisco, NDS, Google and Motorola Play Musical Chairs", says this conclusion comes from the number of recent acquisitions and divestments in the US cable market, notably Cisco's \$5 billion purchase of NDS. The trend is to pay-TV multi-screen devices including smart phones, media tablets, portable media devices, video game consoles, personal computers and Internet-enabled televisions (IETVs). IHS calculates that the number of multi-screen devices active on global pay-TV networks will likely rise to 303.7 million units by 2015, up by a factor of more than 10 from 29.5 million in 2010. Such growth is contrasted with the relatively flat performance of the STB market, where the installed base of set-top boxes should grow at a compound annual rate (CAGR) of only 9% as opposed to the expected 59% CAGR of active multi-screen devices. <http://www.ihs.com>

MPEG prepares H.265 HEVC for release in 2013

High Efficiency Video Coding (HEVC), also called H.265, is the next step for MPEG video coding. It currently exists in the form of a preliminary draft standard finished in February and is expected to be completed, approved, and published in 2013. Like MPEG-2 and -4, H.265 builds on its predecessors. Some improvements include larger block structures with flexible mechanisms of sub-partitioning. In the draft specification, the traditional MPEG macroblock structure is replaced with variable-block-sized coding units, (CUs) which define the sub-partitioning of a picture into rectangular regions. Each CU in turn contains one or more variable-block-sized prediction units (PUs) and transform units (TUs). Each TU is processed by performing a spatial block transform, and quantizing the resulting transform coefficients. Within the prediction loop, an adaptive loop filter (ALF) is applied, then the frame is copied into a reference decoded picture buffer, a process that improves both objective and subjective picture quality. As in H.264, context-adaptive entropy coding schemes are used. So MPEG-2, MPEG-4 AVC, and the work-in-progress HEVC represent a new and improved video coding standard about every decade. While MPEG-4 was pretty much all about increased coding efficiency, HEVC promises increased efficiency plus adaptation to all the present and future video applications that may be currently envisioned, from mobile phones to UHDTV. <http://hevc.info>

Hulu refreshes its website with a 55% larger video player

Hulu rolled out an update to its website user interface, increasing the size of its video player by 55%. Hulu's number one draw is current season TV shows from major broadcast networks like ABC, NBC, Fox, and the CW. In addition to the larger size player, the site also implemented a number of design changes to emphasize the content. All the details – like the name of the show, episode title, running time, etc. – have been moved underneath the video player. Hulu has removed some viewing features with its refreshed UI design. Users can no longer "dim the lights", which basically made everything on the screen darken except for the player. <http://www.hulu.com>

Centris Research reports Blu-ray player household penetration reaches 26%

About one in four homes had a Blu-ray Disc player or capable consumer electronic device in the fourth quarter of 2011, up 47% from the same period in 2010, according to new research. Centris Research disclosed the finding in a quarterly report outlining communication and technology penetration in the home. The Blu-ray data mirrors weekly *Home Media Magazine* research figures, including that 26% of total disc sales (\$42.1 million) revenue came from the high-definition format for the week ended March 10. It is the Blu-ray market that continues to drive packaged media sales and generate higher margins for studios than standard DVD, disc rentals, transactional video-on-demand and electronic sell-through. The format also is a foundation in Hollywood's effort to launch the cloud-based digital locker UltraViolet. Surprisingly, the number of households with a DVD player increased 4% to 91% in the period, compared with 87% in the previous year. The data underscores the notion that average consumer demand for optical disc entertainment remains strong. In addition, the report — based on 2,000 Internet survey respondents monthly — found that household penetration of time delayed TV programming via digital video recorders (DVR) also increased by 4% to 38% from 36% in 2010. The report also found that HDTV penetration increased by 6% to 63%, while high-definition TV service from multichannel video program distributors increased by 11% to 42% of households. <http://www.centris.com>

Gefen introduces fiber optics-based extenders to deliver high resolution graphics over long distances

Gefen delivered five new extenders for digital signage applications in which displays must be extended away from the source. These new extenders work through compact sender and receiver units that link local and remote locations with fiber optic cabling, ideal for installations in which electromagnetic interference is an issue or when multiple extenders are used in tight spaces. The DVI RS-232 Fiber Extender sends DVI (1920x1200) and RS-232 up to 1000 feet (300m) over a single strand of multi-mode fiber optic cable terminated in SC connectors. RS-232 signals are carried on the same cable, providing convenient control of the display. Locking power supplies stabilize performance. The DVI FM-15 delivers DVI (1920x1200) using a single multi-mode fiber optic cable terminated in SC connectors up to 1640 feet (500m). Two small transceivers are connected at the local and remote locations, linked by a single strand of fiber optic cable. Virtual EDID programming ensures a constant synching of the video source to the monitor used in the system. The DVI FM-2500 delivers high resolution (3840x2400) dual link DVI using two fiber optic cables terminated with SC connectors, reaching distances up to 1640 feet (500m). The use of two fiber optic cables ensures the integrity of a longer distance signal delivery without quality loss. The DVI Fiber Optic Extender offers a unique cable design exclusive to Gefen; this extender uses tiny sender and receiver modules to extend DVI (1920x1200) up to 1000 feet (300m) from the source. It uses one multimode fiber optic cable terminated in SC connectors. TMDS and EDID data are delivered over the same cable for a rock-solid performance. The HDMI Fiber Optic Extender works with all video sources and displays equipped with HDMI, delivering 1080p full HD video with audio up to 1000 feet (300m) over a single multi-mode fiber optic cable terminated in SC connectors. Immunity to EMI, HDCP compliance and a small form factor make this extender ideal for demanding installations. <http://www.gefen.com>

Philips launches new smart TV experience

Philips has updated its smart TV infrastructure and introduced a new user interface. Using a cloud-based solution, the new screen is automatically seen by all owners of a Philips connected TV set. The new screen displays the current time and weather at the location of the viewer, while a picture-in-picture shows the live feed of the channel being viewed. The new home screen also gives personalized TV tips from all channels as well as of the VOD and catch-up TV content. In the lower half of the screen, viewers can put and organize their favorite apps. Philips is also introducing its Wi-Fi Smart Screen for the 8000 series of TV sets enabling streaming digital TV via the Philips Smart TV to an iPad. According to Philips, there are now some 500 apps available including catch-up services from RTL, NPO, ARD, ZDF, NRJ, France Television, Euronews, Antena 3, France 24, a streaming service from CNBC and VOD services from a variety of national and international parties including Viewster, Videoland, Video Futur and many others. The manufacturer hopes to increase the number of apps even further and has launched a special partner portal, with a number of tools including an SDK, information, and support. <http://www.philips.com>

Samsung launches its 2012 line-up of smart TVs

Samsung Electronics America announced that its 2012 TVs began shipping in the US, beginning with the LED 6-series and higher, as well as the plasma 6-series and higher. The new models represent Samsung's fifth

generation of smart TV. While features vary by model, highlights of the products include: improved picture quality with Micro Dimming Ultimate and Real Black Pro; dual-core CPU for quick app launching and task-switching; integrated camera and noise-canceling microphone; “Smart Evolution” to help the TV stay up-to-date with new features; voice and gesture control, as well as face recognition; AllShare Play with seamless connectivity to other devices and to cloud storage; new smart touch remote and smart wireless keyboard; new roster of exclusive signature services; and new browser based on the powerful Webkit engine.

Voice control and gesture control are available in the LED ES7500, LED ES8000 and Plasma E8000. For example - just say “web browser” to get online, use voice recognition to start a search, and wave a hand to control the mouse cursor and select links. Face Recognition lets each member of the family log in to their Samsung account and automatically sign into Facebook, Twitter and more. Also new in 2012, the Smart Touch Remote – included with the LED ES7500, LED ES8000 and Plasma E8000 – makes navigating content and channels effortless. The built-in touchpad makes web-surfing easy, while channel and volume buttons are on the edge for easy access. The Smart Touch Remote Control also has a built-in microphone for Smart Interaction commands when the viewer is too far from the TV’s built-in microphone. Samsung’s new Smart Wireless Keyboard (sold separately) features a standard-sized keyboard along with touch pad. The keyboard utilizes Bluetooth to connect to the TV and also has an IR emitter to support TV functions. The Smart Wireless Keyboard can also be used with the Galaxy Tab or other mobile devices. Samsung’s Micro Dimming contrast enhancement will be extended to significantly more LED models this year, beginning with the LED ES6600. Micro Dimming Pro adds color and detail enhancements to the LED ES7500 for superior color and sharp detail. Micro Dimming Ultimate, available on the LED ES8000, analyzes the picture in hundreds of pieces to optimize the LED backlight and video signal for each piece in real time. This leads to a noticeable increase in brightness, richer colors and higher contrast ratio. All Samsung plasma TVs will have Samsung’s proprietary Real Black Filter, previously only available in premium models, to deliver improved black levels and color contrast. In the higher-end E6500, E7000 and E8000 models, Samsung will incorporate the new Real Black Pro to deliver even better black levels. The technology has an unprecedented ability to absorb external light reflections through an increased wedge depth, which leads to “blacker” blacks, more-realistic pictures and higher color contrast. With the wealth of user-generated content on video streaming apps like YouTube and Vimeo, Samsung Smart TVs also offer De-Blocking and De-Mosquito picture filters that significantly improve the viewing experience for low resolution video. New in 2012, the EH line of LED TVs is ideal for consumers who value the picture performance and energy efficiency of LED technology, in Samsung’s most affordable LED TV offering yet. This line delivers richer colors and sharper images than a traditional LCD, even in fast moving scenes, yet consumes half the power. Samsung EH LED TVs also sport Samsung’s signature narrow bezel design so consumers can have a larger screen without increasing the overall size of the TV. In 2012, Samsung will extend 3D capability to even more LED and plasma TV models. All Samsung 3DTVs will ship with at least two pairs of active 3D glasses – higher-end TVs will ship with four pairs. <http://www.samsung.com>

Sony backs 4K in Rio shoot

Sony helped produce some “stunning” 4000-line test footage, along with Brazilian broadcaster TV Globo, of the famous Rio de Janeiro carnival. The tests are another example that Ultra HDTV technologies are real, the company says. Raymundo Barros, Rede Globo Engineering Director, pointed out that these 4K images show that the TV evolution does not stop at today’s HDTV. Barros said that the UHDTV technology will reach free-to-air television “in a couple of years”. The producers used a pair of Sony’s F-65 high-end cameras, already being used by filmmakers in place of celluloid-based cameras.

Sony introduces 4k2k Blu-ray Disc player

Sony developed a Blu-ray Disc (BD) player that supports 4k2k video and exhibited it at the 2012 International CES. The player can up-convert BD contents, etc to 4k2k video and display it by using a projector or TV supporting 4k2k video. Though its price has not been determined yet, it is scheduled to be released in the second quarter of 2012. The BD player and a display device are connected via an HDMI cable. It seemed that Sony used the 1.4 version of HDMI because it supports the transmission of 4k2k video. The player can be connected to the Internet by using its built-in wireless LAN function. Also, smart phones and tablet computers including the iPhone, iPad and Android-based machines can be used as remotes for the player. <http://www.sony.com>

Atmel introduces LED driver that enhances LCD TV picture quality, eliminates 3D ghosting

Atmel announced a new high-performance family of 16-string LED drivers with integrated timing algorithms that improve picture quality of LCD TVs by eliminating 3D ghosting and flickering effects. With these capabilities, the Atmel MSL2164 and Atmel MSL2166 devices are ideal for delivering the most compelling viewing and video gaming experience via new 3D and 2D scrolling backlight TVs.

Featuring highest efficiency power management and backlight control along with multiple dimming modes for 3D, scanning and zone dimming edge-lit LCD TVs, the MSL2164 and MSL2166 devices drive up to 16 parallel strings of LEDs and offer comprehensive system and fault management to support high-performance backlight design. With this new driver family, high-end TV OEMs can deliver high screen resolution and greatly enhance picture quality using internal lighting timing algorithms that improve the backlight timing accuracy, with higher resolution vs. other solutions on the market today. At the same time, since OEMs will be able to choose from smaller form factor MCUs, such as tinyAVR devices, they can lower their system overhead. Historically, TV OEMs have had to calculate the appropriate parameters to effectively illuminate a desired area in the backlight of a display. LED drivers would generate algorithms to set the appropriate string phase to optimize synchronization of the backlight to the LCD panel. Often, OEMs had to perform additional calculations to adjust the string phase to ensure that the backlight was properly synchronized within the frame refresh. The MSL2164 and the MSL2166, with multiple pulse width modulation (PWM) modes—including forward, inverse, trailing and center—reduce design complexity because the timing algorithms are integrated into the devices. This ensures that the backlight is illuminated at the most optimal moment, when all of the LCD pixels have settled. <http://www.atmel.com>

DisplaySearch reports LCD TV shipment growth to improve in 2012 driven by 40-inch and larger sizes

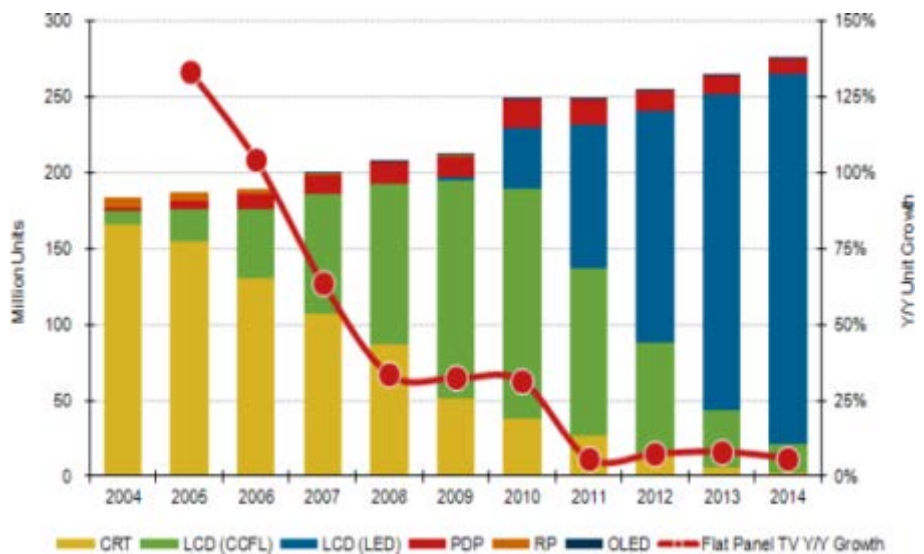
Consumer demand for TVs has been softer than expected in 2011, but showing signs of improvement late in the year. However, inventory pressure plagued the industry through much of early 2011 and led to a sharp reduction in shipments to retailers. The result is that global TV unit shipments are expected to rise only 0.1% in 2011. According to the latest forecast released in the NPD DisplaySearch Advanced Quarterly Global TV Shipment and Forecast Report, growth is expected to improve in 2012, rising 2% to 254 million units. Flat panel TV continues to grow, but at a more gradual pace of 2-4% per year as the rapid transition from CRT to LCD and plasma nears an end. LCD TV continues to be the dominant technology on a unit and revenue basis, and in fact seems likely capture even more market share due to a weaker outlook for plasma TV going forward. As LCD narrows the pricing gap with plasma at many sizes, the demand for plasma has fallen; NPD DisplaySearch expects this to continue and has reduced its forecast for plasma TV.

Large TV sizes also continue to show strong growth, with shipments of 40-inch+ and larger sets expected to grow 12% in 2012 while <40-inch sizes decline 3%. A strong contributing factor to the growth of larger sizes, including an 18% increase in shipments of 50-inch+ sets, is pricing. Sizes up to 50-inch will have average prices below \$1000 in 2012 and even 60-inch+ sizes will fall below \$2000 for the first time. During Black Friday holiday sales in the US, many 40-47-inch sets were below \$500, and even 60-inch sets fell below \$1000, prompting robust unit sales as consumers were attracted to the new price points. Many consumers seem to be willing to give up features in favor of larger sizes for a given TV buying budget. Even in China, shipment share of 50-inch+ and larger sizes is growing strongly and may become the only region outside of North America to reach 10% 50-inch+ mix of unit shipments by 2015. LCD TV shipments will rise from 206 million units in 2011 to 225M units in 2012, an increase of 9%. LCD will account for more than 82% of all global TV shipments in 2011, rising to more than 88% in 2012, as demand for plasma falls and OLED TVs arrive late in the year in small quantities and at high prices. LCD is now a strong competitive technology at all sizes and should climb to more than 95% share by 2014 as CRT fades and OLED is slow to grow.

Premium features continue to grow, like LED backlights and 3D, and are keeping LCD TV average prices very stable, falling just 6% Y/Y on a volume weighted basis in 2011, the slowest year of LCD TV price erosion yet. Price erosion will be about the same in 2012 before picking up to 7-8% per year through 2015, but much less than the 24% decline seen in 2009. However, with the slower ASP erosion, total LCD TV revenue growth should remain positive through 2013 at 1-3% per year. The share of LED backlights in LCD TV shipments is expected to be about 46% in 2011, rising to nearly 68% in 2012. 3D will account for around 3% of LCD TV units this year.

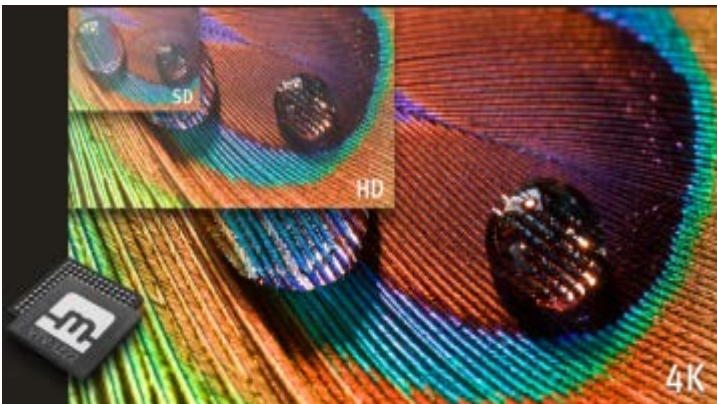
Plasma TV units grew 30% in 2010 due to a favorable pricing advantage over LCD, but as that advantage has narrowed in 2011, shipments are expected to fall 11%, to 16.3 million units. The decline in unit growth and weak profits have led manufacturers to focus on more profitable segments, even at the expense of unit growth. As a result, plasma TV shipments are projected to fall to less than 10 million units by 2015. The first OLED TV shipments are expected in the second half of 2012, but due to prices that are expected to be well above \$4000 initially and remain significantly higher than mainstream high-end LCD TVs, will only grow to about 2.5% of the 40-inch+ segment by 2015. The worldwide forecast for 3DTVs was slightly increased to more than 23M units in 2011 through better than expected growth in emerging markets and Europe. By contrast, demand in North America has been surprisingly soft for 3D, and may only reach 3.6 million units in 2011 as US consumers remain very price sensitive. Eventually though, North America will see a rise in 3D adoption due to stronger preference for 40-inch+ sizes where the 3D feature is common and expected to be less costly. Globally, 3DTV is expected rise to more than 100M units shipped by 2015. Emerging regions, which includes China, Asia Pacific, Latin America, Eastern Europe, and Middle East/Africa, will account for the majority of flat panel TV growth over the next four years, averaging 11% growth each year, while developed regions decline an average of 1% each year. In fact, China has become the largest market for flat panel TVs and will continue to be throughout the forecast period. The Asia Pacific region is positioned for strongest growth as the late-adopting India market begins to boom. <http://www.displaysearch.com>

Worldwide TV forecast by technology



Marseille introduces its first 4K up-converter chips

Marseille introduced its first 4K up-converter chips, demonstrating a full suite of products. Enabling faster, more affordable adoption of 4K resolution technology for home theater, personal computer and mobile devices, these chips will ship in 2012. Poised to drive the video transition from HD to 4K, Marseille's proprietary virtualization technology will change how many other applications and consumer products are also designed in the future. To set a new standard in video performance, Marseille took just six months to design its latest 4K chip, but spent over five years developing its virtualization platform to enable faster, more affordable and differentiated chip and electronic system design. Marseille showcased both this platform and its 4K video processor chip reference design in current Blu-ray player and A/V receiver architectures, the best 4K video scaling for 3D, jaggy reduction, sharpness enhancement and on screen display graphics, mobile devices rendering full-resolution 8M pixels on 4K televisions, and the company's 4K TV platform. <http://www.marseilleinc.com>



Haier shows off completely wireless 55-inch 3DTV

Haier Inc exhibited a large-screen 3DTV that features a wireless power transmission technology and does not have a power plug. In 2010, Haier showed a prototype of a 32-inch TV capable of being wirelessly powered. This time, it prototyped the TV by using a 55-inch LCD panel. The company is not planning to commercialize the TV at this point. Haier calls the latest prototype "completely wireless TV" because not only electricity but video signals are wirelessly transmitted to the TV. The video signals are transmitted by using the WHDI (Wireless Home Digital Interface), the high-speed wireless transmission standard for high-definition video. As a wireless power transmission technology, Haier used the magnetic resonance method. Toshiba has also exhibited a tablet computer based on this method. A power-receiving coil was located near the bottom of the TV while a power-transmitting device was stored in the box on which the TV was placed. The distance between the bottom side of the TV and the power-transmitting device was about eight inches (about 20cm). <http://www.haier.com>



No cable is seen on the back side; A side view. The TV and the power-transmitting device are separated.

MPEG LA offers patent license for 3D video

MPEG LA, an organization that licenses digital video technology patents on behalf of their owners, has announced terms for using a 3D video encoding technology called MVC. MVC (Multiview Video Coding) is used in Blu-ray disc players, personal computers, video cameras, software, and other situations calling for 3D video. It is a codec, a specification for encoding and decoding video so it can be stored more compactly or streamed more efficiently across networks. MPEG LA debuted the MVC license agreement terms at the Asia-Pacific 3D Standards & IP (Intellectual Property) Forum in Seoul, South Korea. For companies that want to use something like MVC, licensing a patent pool is more convenient than hammering out agreements from a host of individual patent holders. But MPEG LA also licenses a patent pool for the widely used H.264 video codec. Google is trying to promote a royalty-free video codec called VP8 that competes with H.264, but MPEG LA is investigating whether to offer a patent pool for VP8 and says so far it's found 12 organizations with patents that bear on VP8. Building the MVC technology for 3D video into a Blu-ray player will cost 10 cents per device, and selling discs costs a penny each, according to newly released licensing terms. For MVC, there are a variety of ways to pay for the patent license, each method limited to a maximum of \$6.5 million annually: a payment of 10 cents per unit for products that include MVC; a payment of 1 cent per Blu-ray disc or 1 percent of the price, whichever is lower, though titles shorter than 12 minutes are free; various payments for subscription services to with an unlimited number of titles using MVC, ranging from free for services with less than 100,000 annual subscribers to \$300,000 for services with more than 25 million annual subscribers. A sizeable list of organizations hold patents essential to using MVC, MPEG LA said: Dolby Laboratories; Fraunhofer; Fujitsu; Hewlett-Packard; Hitachi; Koninklijke; LG Electronics; Mitsubishi Electric Corporation; Nippon Telegraph and Telephone Corporation (NTT); NTT Docomo; Panasonic; Sharp; Sony; Columbia; and Thomson Licensing. http://news.cnet.com/8301-30685_3-57385106-264/mpeg-la-offers-patent-license-for-3d-video/#ixzz1ngvqbSqV

Shipments of 3D LCD TV panels reach 21M in 2011 reaching 10% penetration reports DisplaySearch

Shipments of 3D LCD TV panels spiked to 7.8 million in Q4'11, up 26% Q/Q. As a result, total 3DTV panel shipments in 2011 reached 21.2 million, accounting for 10% of all LCD TV panels shipped. According to the NPD DisplaySearch Quarterly Large-Area TFT LCD Shipment Report – Advanced LED + 3D, panel makers are targeting very strong growth of 138% for 2012, which would lead to 3D LCD TV panel shipments of 50 million units, for a penetration rate of 21.6% of all LCD TV panel shipments. According to the report, shutter glass technology use is still larger than patterned retarder technology, with 6.2% penetration in total LCD TV panel shipments in 2011, with patterned retarder accounting for 3.9%. According to the NPD DisplaySearch estimates of panel makers' shipment targets, 2012 penetration rates will increase to 11.6% for shutter glass type and 10.0% for pattern retarder type. In addition to TV, panel makers are aggressively promoting 3D monitor panels, especially for consumer entertainment and gaming PCs. In 3D LCD monitor panels, pattern retarder manufacturers are more aggressive than shutter glass makers. Panel makers are targeting shipments of more than 1.5 million per quarter from Q2'12 onward. This is up from 235K in Q4'11. <http://www.displaysearch.com>

Application	Q2'11 Actual	Q3'11 Actual	Q4'11 Actual	Q1'12 Forecast	Q2'12 Forecast	Q3'12 Forecast	Q4'12 Forecast
2D	90.7%	88.2%	85.9%	84.8%	79.0%	76.5%	74.3%
3D Pattern Retarder	3.6%	4.8%	5.9%	6.2%	10.2%	11.1%	12.1%
3D Shutter Glass	5.8%	7.1%	8.3%	9.0%	10.8%	12.4%	13.6%

LCD TV panel shipment shares by type

Blockbuster streaming due on Samsung TVs in 2012

Blockbuster stated that Samsung had scored a key deal to get Blockbuster On Demand across virtually all its devices. The pact outlined to Smarthouse would see Blockbuster arrive both on TVs and Blu-ray players as well as on mobile devices like smart phones, tablets, and ultrabook. Unofficially, the US, UK, and mainland Europe would get access in the first half of 2012, with Australia not expected before September. Concerns had existed that Blockbuster's presence was shrinking following a decision by TiVo to shed support. A Samsung move would dramatically improve Blockbuster's reach given Samsung's front position in TVs. Typically, only companies like Netflix have had a similar level of ubiquity. There have been reports that Samsung was working on a universal payment system that could tie together disparate services to pay for it regardless of where it comes from. A typical challenge of Internet TVs has been having to juggle multiple accounts to get access to both pay-per-show and subscription services. <http://www.blockbuster.com>

Comcast launches new streaming video service

Comcast announced the launch of Xfinity Streampix, a new subscription video service that enables Xfinity video customers to instantly view favorite movies and TV shows in and out of the home, including numerous past seasons of current hit shows and full series, to multiple screens and devices including TVs (as a subscription On Demand folder), online platforms and mobile devices. This new service complements the 75,000 TV shows and movies currently available on Xfinity On Demand, XfinityTV.com and through the Xfinity TV app. To launch Streampix, Comcast has entered into licensing agreements with leading movie studios and programming providers including Disney-ABC Television Group, NBCUniversal, Sony Pictures, Warner Bros. Digital Distribution, and Cookie Jar Entertainment and built a line-up of content. In the coming year, the Streampix service will be available on additional devices such as Xbox 360 and Android-powered devices. With Streampix, the Xfinity TV service is a comprehensive video solution that lets users watch TV episodes of current seasons and complete past seasons of broadcast and cable hits. Xfinity TV also offers a suite of tools to personalize and manage viewing across screens for no additional charge through XfinityTV.com and the Xfinity TV app. <http://www.comcast.com>

TE Connectivity introduces new video distribution system


TE Connectivity has introduced a new video distribution system (VDS) that enables network managers to deliver true high-definition RF and IP video over an existing data cabling infrastructure without the need for coaxial cabling or any RF tuning. VDS enables the delivery of video signals such as cable television, satellite, in-house video, digital signage, electronic bulletin boards or any other service normally delivered over coaxial systems – over a Category 6 or higher twisted-pair infrastructure. The VDS eliminates the need for a separate coaxial infrastructure

or the need for an RF technician to install it. Delivering rich content in the form of high-definition video has often been a challenge for network managers as it typically means overlaying their twisted-pair infrastructure with an additional, coaxial infrastructure. Now, with TE's new system, they have effectively eliminated the time and expense associated with this additional layer of infrastructure. VDS allows anyone to access these services, including high-definition or IP video, wherever they have a network outlet. The TE Connectivity VDS solution is TIA-568/ISO 11801 compliant and delivers broadband RF signals over an existing structured cabling infrastructure. It supports full-spectrum video (862MHz) for up to 295 feet or 550MHz for up to 328 feet. VDS is a true "plug and play" system for greater ease of installation and maintenance and features automatic gain control. Using self-adjusting baluns to provide amplification and equalization, output and input levels are adjusted to provide perfect HD video at the TV set. The system automatically adjusts the head-end signal for proper system operation and thereby eliminates the need for manual tuning by solving equalization and balancing issues traditionally associated with coaxial systems. <http://www.te.com>

Ooyala report highlights strong growth trends in smart phone, tablet and smart TV viewing

Ooyala, a provider of digital video technology, analytics and services, published its Q4 2011 Video Index report revealing insights into video viewing behavior and engagement across the web, smart phones, tablets, social networks and connected TVs. Each quarter Ooyala provides key insights and trends based on the viewing habits of its more than 100 million viewers every month, to help publishers better understand audiences, increase viewership and earn more revenue with online video. The Video Index report is available in English, French, Japanese, Portuguese and Spanish to support Ooyala's broad customer base. Key highlights from the report include: video plays on tablets, mobile devices and connected TVs nearly doubled in Q4 2011 over Q3 2011; both iPhone – boosted by the iPhone 4S release in October – and Android grew rapidly quarter-over-quarter in terms of videos played and hours watched; Facebook users on average share ten times more video than Twitter users; video plays on Google TV grew 91% in Q4 2011 over Q3 2011; tablet viewers continue to be far more engaged than desktop viewers – they were 45% more likely to complete at least 75% of videos played, a reliable measure of engagement. Ooyala hosts one of the world's largest video analytics data stores, receiving over 1 billion daily analytics "pings," or data queries across more than 110 countries each month. Nearly one in three US online video viewers use an Ooyala player. Over a hundred million people worldwide tune into Ooyala-powered video to watch movies, news, live product launches, fashion shows, events such as The Grammys, The Australian Open and English Premier League football and much more. Ooyala technology measures many aspects of viewer engagement in real time so publishers can act quickly on trending information to maximize revenue via advertising, pay-per-view transactions, subscriptions, and in the case of brand marketers, increased product sales. "While people are still watching much more traditional TV than streaming video, our data shows we're on a clear and irreversible course toward an IP-delivered future," an executive said. "For example, looking at non-desktop video views, Q4 was the second straight quarter of nearly one hundred percent growth. The Video Index also shows people are far more engaged on tablets, which are closer to TVs than they are to smart phones when it comes to viewing behavior." <http://www.ooyala.com>

Microsoft and Netflix form group to promote new streaming media standard

The nascent MPEG DASH streaming media standard got a boost with the creation of the DASH Promoters Group. The standard, which stands for  dynamic adaptive streaming over HTTP, was ratified in November and it enables media streamed over the Internet to dynamically adapt to changing network conditions. Its goal is to optimize the video streaming experience for end users. According to a release issued by the DASH Promoters Group, the new standard "incorporates all of the best elements of proprietary adaptive streaming solutions designed to solve the classic issues users see when they stream video: intermittent stalls, poor video quality under changing network conditions, and significant video start-up lag." Participating in the promoter's group are founding members Microsoft, Netflix, and Qualcomm. Other participants include Adobe, AEG Digital Media, Akamai, BuyDRM, Digital Rapids, Digital TV Labs, Dolby, EBU-UER, Elemental, Envivio, Ericsson, Harmonic, Intertrust, NDS, Packet Ship, Path1, RGB Networks, Samsung, Thomson, University of Klagenfurt, and Zixi. One of the first activities of the new group was a live MPEG-DASH interoperability demo at the Metro World Congress event in Barcelona. In addition to promoting broad adoption of DASH, the Promoters Group also said it will focus on aligning ongoing DASH standards development, promoting the use of common profiles across industry organizations, and facilitating further interoperability tests. The group is

also working toward recommended deployment configurations for DASH, informally called DASH-264. The goal is to enable DASH requirements for the industry and help enable further commercialization of mobile devices that support it. The new MPEG-DASH standard should be of interest to service providers considering service offerings based on Internet video. <http://dashpg.com/>

WalMart to boost UltraViolet

US retail giant WalMart Stores is in discussions with companies behind the UltraViolet (UV) common file format and digital rights authentication ecosystem to provide an in-store service that will assist customers in registering DVDs they already own, reports The Wall Street Journal. UV has some 800,000 household accounts in the US since the first UV-enabled DVD and Blu-ray Discs were sold in October 2011 according to the IHS Screen Digest US Video Market Intelligence Service from information and analysis provider IHS. UltraViolet is run by the Digital Entertainment Content Ecosystem (DECE), which includes five of the six major film studios: Time Warner Inc.'s Warner Brothers Entertainment, Sony Corp.'s Sony Pictures, News Corp.'s Twentieth Century Fox, Comcast Corp's Universal Pictures and Viacom Inc.'s Paramount Pictures. While UltraViolet accounts are free to set up, the initial process has been criticized as cumbersome, leading to reports of Wal-Mart's involvement. It is understood that employees of Wal-Mart will help customers create UltraViolet accounts, and will also check DVDs that shoppers already own, adding titles that are part of UltraViolet system to their accounts for a small fee. WalMart is a member of the UltraViolet consortium. WalMart acquired online movie service Vudu in 2011 for a reported \$100 million, with the service becoming the third most popular in its sector, according to IHS Screen Digest. Reports also suggest the consortium is in discussions with Best Buy, a fellow member of the DECE consortium, about introducing a similar service at the electronics retailer's stores. Any such deal with retail outlets would mirror the initiative announced February 28th by UK electronics retail group Dixons, which has launched the KnowHow Movies online service utilizing the "360 degree" product knowledge and customer care "KnowHow" staff training initiative and branding. Dixons executives have confirmed that the service will offer UV-enabled titles later in 2012.



Hon Hai buying 10 percent stake in Sharp

Taiwan electronics manufacturer Hon Hai Precision Industry is taking a 10 percent stake in struggling Japanese electronics company Sharp Corp. Hon Hai, owner of the Foxconn factories in China. Sharp and Hon Hai will form an alliance in liquid crystal displays and other electronics sectors to cut costs. Sharp makes flat-screen TVs and LCD displays for TVs, game consoles, tablet computers and smartphones, appliances and other products. Hon Hai will buy up to 50 percent of the LCD displays made at Sharp's Sakai plant in Japan. Sharp will sell a 46.5 percent stake in that plant to Hon Hai chief Terry Gou and other investors. Japanese rival Sony Corp. will keep its 7 percent stake. Sharp's share of the plant will drop to 46.5 percent from 93 percent.

UK government creates tax credit for TV drama

Chancellor George Osborne has announced a tax credit scheme for TV production and animation firms is to be introduced, in a bid to keep creative talent in Britain. Osborne said it was the government's "determined policy" to keep *Wallace and Gromit* animators Aardman in Britain. Last month, Aardman bosses admitted they had been considering moving abroad where it was cheaper. "Not only will this help stop premium British TV programs like *Birdsong* being made abroad, it will also attract top international investors like Disney and HBO to make more of their premium shows in the UK," the Chancellor told MPs. Recent shows, such as *The Tudors*, *Camelot*, and the Julian Fellowes' drama *Titanic*, were all made abroad to take advantage of tax incentives in other countries.

Warpia launches wireless streaming kit

Warpia announced the Warpia StreamEZ wireless HDMI streaming kit. This new product can connect a PC, set-top box, Blu-ray player or pretty much any other AV device to a HDTV, all without additional wire clutter. All that is needed is an HDTV output on both of the devices being hooked up. The package comes with a transmitter and a receiver, and promises streaming up to 1080p with 5.1 surround sound. Once hooked up, you can easily stream Netflix, Amazon Instant Video, YouTube, Hulu or anything else on the web, without having to hook the HDTV to the web. It also allows users to place equipment with ease, meaning that cable box or Blu-ray player doesn't need to be close to the HDTV to enjoy the benefits. According to Warpia, the StreamEZ solution can deliver content up to 30 feet away and is compatible with PCs and Mac products. (Mac laptops, however, need a Mini Display Port to HDMI connector, which is not included.) <http://www.warpia.com>

Next generation TV standard from ATSC on track to be completed this year

The next-generation technical standard for broadcast television will be done by the end of the year if not sooner, according to Jerry Whitaker, vice president of standards development for the Advanced Television Systems Committee. He said it could be completed by “maybe mid-2012; certainly by the end of the year.” Known as “ATSC 2.0,” the standard is often described as a marriage of broadcast TV with the Internet. ATSC 2.0 reflects the direction TV consumption is already taking in the market. Projections are for explosive growth of TVs with Internet connectivity, expected to reach 98 million by 2014. ATSC 2.0 will provide a variety of interactive capabilities to broadcasters not now available. For example, WRAL now pushes news alerts over wireless networks to smart phones. With 2.0, it could push those alerts to TVs, powered up or otherwise. There is also a scenario where a viewer could watch two channels simultaneously on a single screen. <http://www.atsc.org>

Akoo International awarded patent in Japan for enabling smart-phone control of TV and VOD

Akoo International Inc., a media and technology innovator, announced that it has been awarded patent number 4892481 by the Japan Patent Office. The patent was granted for the company’s interactive technology, which enables smart phone and tablet users to search and select on-demand television and video content via a mobile app or text messaging. To date, Akoo has been awarded patents for its technology in eight major global markets, including the world’s three largest advertising markets, the US, China, and Japan. Akoo TV provides entertainment programming across 166 premier shopping malls in 60 top U.S. markets. The network’s programming is featured throughout the most highly trafficked seating areas in each mall – branded the “Akoo Pavilions” – which attract more than 64 million shoppers each month. Akoo TV uniquely enables viewers to make on-demand content requests with their mobile devices, via free mobile apps or text messaging. Viewers in Akoo Pavilions can also connect with friends via Facebook and Twitter, download mobile coupons, and participate in exclusive promotions. An on-demand transaction occurs on the network every four seconds. <http://www.akoo.com>

UltraViolet hits 800,000 US households according to IHS

UltraViolet, the so-called “digital rights locker” technology that allows users to port their content to multiple devices, now has 800,000 US household accounts, according to market research from IHS. IHS notes that the UltraViolet initiative “has made rapid progress” since it was launched last October with the introduction of UV-enabled DVD and Blu-ray discs. The initiative represented the content industry’s answer to preventing piracy while allowing file-sharing within a household. UltraViolet stores and manages the digital rights of content purchased by a user, who can register up to 12 devices for playback. It handles the rights for both physical and electronic media from participating content creators, which now include Warner Home Entertainment, Flixster; Sony, Universal and Paramount Pictures. UltraViolet’s US user-base has grown by 50,000 since the Consumer Electronics Show in January, IHS said. For each account, users have redeemed the rights to 1.25 titles, meaning their collective content library exceeds 1 million. IHS has projected that only 19 million digital film files were sold during the entire year of 2011 by electronic sell-through vendors like iTunes, Xbox Live and Vudu. This suggests that if UV can continue to gain momentum this year, it could encourage consumers to buy more movies. Movie purchasing represents an important priority for movie studios, which have seen their film sales dwindle in the face of growing physical and digital rentals and streaming services like Netflix. People rent more content than they buy, according to IHS numbers dating back to 2006. Digital rentals outpaced digital purchases last year by 300%. Rentals cost less and make more money for retailers and distributors. Studios make more when people buy content, digital or otherwise –IHS says as much as 80% reaches the studios’ top-line revenue. Recent UltraViolet developments include the coming availability of Flixster on Panasonic smart Viera TVs and Blu-ray players; a compatible Blu-ray Disc player in development from Samsung that will unlock older non-Ultraviolet discs “for a nominal fee”; and a deal between Amazon and an unnamed studio to offer electronic sell-through of UltraViolet enabled titles later this year. Additionally, Neustar, which manages the UltraViolet database, has debuted Catalyst, an UltraViolet “storefront” for retailers. <http://www.ihs.com>

36% of UK audiences don’t watch TV live, reports My Voucher Codes

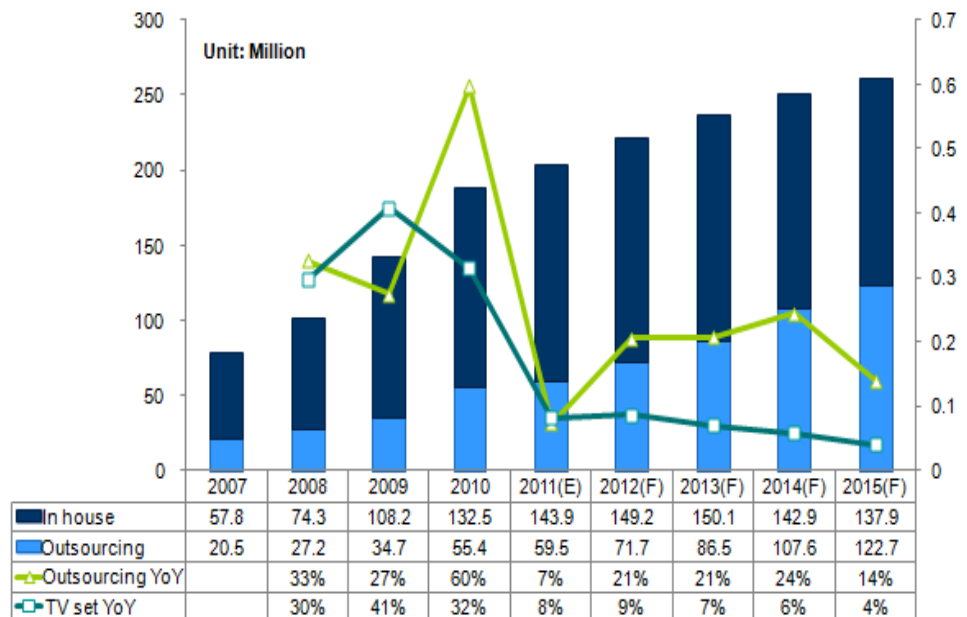
Thirty-six per cent of British viewers claim they no longer watch live TV, preferring to either access content on catch-up sites or PVRs. Nearly two thousand people, aged 18 and over, were polled by discounts site My Voucher Codes to find out how prevalent time-shifted and on-demand viewing was throughout the UK. Respondents were initially asked “Do you have a television?” to which 98% said “yes”. Of the two per cent that didn’t, when asked why

not, the majority said that there was “no point” because they could watch everything that they wanted to on their computer. Those polled were then asked “Do you tend to watch programs when they first air on the television?” to which 36% replied “no”. Those who said they did not watch live television were asked to explain why not, to which 52% said that they “didn’t have time”. Of those that said they didn’t have time to watch live TV, the majority 74% said they caught up with the programs they wanted to watch at the weekend. They were then asked to specify how they “caught up”. A quarter said that they watched the programs that they wanted to by using “watch on demand sites” such as the BBC iPlayer, ITV player and Channel 4 On Demand. Three per cent said that they preferred to watch DVD box sets once they were released and 42% said they had access to a service such as Sky+ and TiVo. <http://www.myvouchercode.co.uk>

Displaybank reports worldwide LCD TV outsourcing volume is increasing year by year

Worldwide LCD TV outsourcing is gradually becoming a market trend, based on the cost down issue. The total outsourcing volume reached 55.4 million units, and Y/Y increased by 60% in 2010, says Displaybank. This high growth rate has encouraged the LCD TV OEM industry to flourish. However, the LCD TV market demand was impacted by the sluggish global economic of 2011. Therefore, LCD TV outsourcing volume growth only reached 7% Y/Y in 2011. According to the OEM strategy of Japan-based LCD TV brand vendors (Sony, Panasonic, Sharp, etc.), Displaybank optimistically estimates that the worldwide LCD TV outsourcing will register double-digit growth ratio from 2012 to 2015. In terms of the detailed LCD TV outsourcing ratio number, it already reached 29.2% in 2011. The outsourcing ratio of 2011 slightly decreased by 0.3% compared to year 2010 since Korean TV brand vendors (ex. Samsung, LGE) reduced the OEM quantities in order to satisfy their in-house capacities first. In terms of the forecast of year 2012, Displaybank predicts that the worldwide LCD TV outsourcing ratio will reach 32.5%. Furthermore, in 2014, the outsourcing ratio will exceed 40% and reach 42.9% in 2015. <http://www.displaybank.com>

Worldwide LCD TV outsourcing and in-house volume from 2007 to 2015



Online film viewing in US to top discs in 2012, IHS iSuppli says

Online movie viewing in the US will exceed digital video disc and Blu-ray use for the first time this year, according to researcher IHS Screen Digest. Legal online viewings of films will more than double to 3.4 billion this year from 1.4 billion in 2011, IHS said today in a statement. Physical viewings of DVDs and Blu-ray discs will shrink to 2.4 billion from 2.6 billion, according to the forecast. Unlimited-streaming subscription plans, including those offered by Netflix and online retailer Amazon’s Prime service, accounted for 94 percent of all paid online movie consumption in the U.S. last year, Englewood, Colorado-based IHS said. Streamed movies have been replacing video discs, much as streamed music is overtaking compact audio discs. “We are looking at the beginning of the end of the age of movies on physical media like DVD and Blu-ray,” Dan Cryan, IHS senior principal analyst, said in the statement. “But the transition is likely to take time: almost nine years after the launch of the iTunes Store, CDs are still a vital part of the music business.” The report highlights the price disparity between online purchases and movies sold in retail shops. Consumers paid an average of 51 cents for every movie consumed online, compared with \$4.72 for physically purchased videos, IHS found. Five major studios announced on March 13 an exclusive agreement with Wal-Mart Stores Inc. (WMT) that may re-ignite home- video purchases by giving consumers the option to store digital copies in the cloud. The program, called disc-to-digital, lets consumers pay a fee to convert physical libraries to digital, and could become a new source of revenue. <http://www.isuppli.com>

Park Associates study says one-third of US households watch TV video via Internet

Almost one-third of US broadband households use the Internet to watch video on their TV sets, according to research firm Park Associates. That number is growing, with 4% of US households buying a video media receiver – including Apple TV and Roku – over the 2011 holiday season, showing a strong consumer appetite for over-the-top video, said the research firm. According to Kurt Scherf, vice president and principal analyst, for Parks Associates, buyers are not just young adopters. “Nearly 20% of these holiday-season buyers are over 45 years of age, so these devices have achieved relatively broad appeal among multiple consumer segments,” he said. “While this trend does not yet frequently equate to canceling pay-TV services,” he said, “it can mean shaving some premium channels for a set of households,” Scherf said. “That is a risk that pay-TV providers must address and a trend that both manufacturers and content providers are following with eagle eyes and plans for defensive actions.” <http://www.parksassociates.com>

Xilinx display platform accelerates development of Super High Resolution 4K2K displays

Xilinx announced availability of the Display Targeted Design Platform (TDP) based on the ACDC (acquisition, contribution, distribution and consumption) 1.0 hardware platform from Premier Xilinx Alliance Program member Tokyo Electron Device Ltd. (TED). The Display TDP accelerates development of 4K2K monitors and high resolution projection systems by stitching together existing 1080i or 1080p video sources into virtually seamless 4K displays. It's the latest addition to Xilinx's growing library of TDPs that allow broadcast equipment designers and manufacturers to quickly implement solutions targeting the acquisition, contribution, distribution and consumption (ACDC) areas of the video production value chain. The Display TDP is built around Xilinx's Kintex(TM)-7 family of field programmable gate array (FPGA) devices built on industry leading 28nm technology. Broadcast equipment designers who base new equipment designs on the Kintex-7 FPGA-based Display TDP will be able to reduce power consumption, increase their system performance to 4K2K resolution and accelerate their design productivity to rapidly implement a working display or projector system. The inherent programmability of FPGAs enables flexible adaptation throughout design and into production to meet ever evolving industry content delivery and display standards. By using the Display TDP, designers can focus on features that will differentiate their products and get to market ahead of competitors. <http://www.xilinx.com/display>

Dolby Professional Reference Monitor increases high-frame-rate support

Dolby Laboratories announced that the Dolby Professional Reference Monitor has added support for content shot at a rate of 48 frames per second (fps). It already supports 60 fps, and expanded support for 48 fps is part of a set of new features that enhance the content-creation process and reduce the cost of ownership involved in postproduction. The software update with new features is planned to be available beginning next week.

Directors Peter Jackson and James Cameron have both advocated 48 fps capture and display for digital cinema. Dolby and ARRI® have produced a short film in 48 fps and high dynamic range that both companies will showcase at their booths (SU1212 and C6737, respectively) to highlight the detailed capabilities of the capture and display components of filmmaking. Shot using an ARRI Alexa digital camera, the film will be played on the Dolby Professional Reference Monitor.

Dolby is also now providing postproduction facilities with Display Calibration Services, an inexpensive and convenient way to ensure that facilities maintain the most precise color accuracy and true black levels. Dolby is the only display manufacturer that currently offers an optimized calibration service. Its worldwide team is equipped to deliver the service when and where needed, with minimal downtime on the set or in the postproduction facility. Dolby Display Calibration Services will significantly reduce the cost of ownership by removing the need for facilities to buy expensive calibration equipment. <http://www.dolby.com>

LG Display begins mass production at new LCD module plant in Mexico

LG Display [NYSE: LPL, KRX: 034220], a leading manufacturer of thin-film transistor liquid crystal display, announced today that it has recently begun mass production at its new LCD module plant in Reynosa, Mexico. The plant will serve as a strategic base to expand the company's presence in North America, the world's second largest TV market. In 2012, the plant is expected to produce 700,000 LCD modules for FPR (Film Patterned Retarder) 3D TVs, which comprises about 10 percent of the total TV product output of strategic partner LG Electronics' local plant in Reynosa. Future increases in production will be determined depending on the market

situation. The production line is able to manufacture both individual components such as back light units and LCD modules, as well as complete TV sets. The integrated process will dramatically reduce total production costs as LG Display in conjunction with its strategic partner oversee both component and complete products, making it easier to manage total output and supply issues. The partnership also allows for the ability to more efficiently respond to consumer needs and market demand in North America. The plant in Mexico is LG Display's fifth global module plant, with additional factories located in Nanjing, Guangzhou, and Yentai, China, as well as Wroclaw, Poland. <http://www.lgdisplay.com>

LG Cinema 3D Smart TV earns International 3D Society technology award

The International 3D Society honored LG Electronics with a 2012 3D Technology Award for the company's innovative, consumer-friendly approach to 3D TV called CINEMA 3D. "The Awards Committee considered 3D technologies with an eye on those that are genuine advances to the state of the art. We want to shine a spotlight on worthy products like LG CINEMA 3D TV that make a contribution to professional and consumer applications," said Ray Zone, 3D expert and member of the Society's Awards Committee. At its awards gala Thursday in Hollywood, the International 3D Society presented the 3D Technology Award to LG, stating: "The fabulous LG CINEMA 3DTV delivers a great viewing experience with a bright picture, wide viewing angles and lightweight 3D eyewear. Powered by FPR technology, LG CINEMA 3D TV is a fast growing player in the dynamic 3D business." LG CINEMA 3D TVs use similar 3D technology as movie theaters. LG's FPR screen technology gives viewers a great 3D effect without the flicker of active-shutter glasses. Plus, the inexpensive glasses make CINEMA 3D the ideal choice for families and friends who want to watch together. <http://www.International3DSociety.com>



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>.

20 Years of Selling Technology Assets

**Specialists in creating value
from Technology and IP**

QUINN PACIFIC

If you have IP to sell related to:

- Mobile Devices**
- Displays**
- Touch**
- Search & User Interfaces**

Please contact us!

Ian Watson
ian@quinnpacific.com
+1 310 476 5287
Los Angeles, CA 90077



Inform • Promote • Improve • Connect

Sustaining Members:
Thank you for your support!



"A Great TV in Every Room"

Connected TV: Becoming Mainstream!

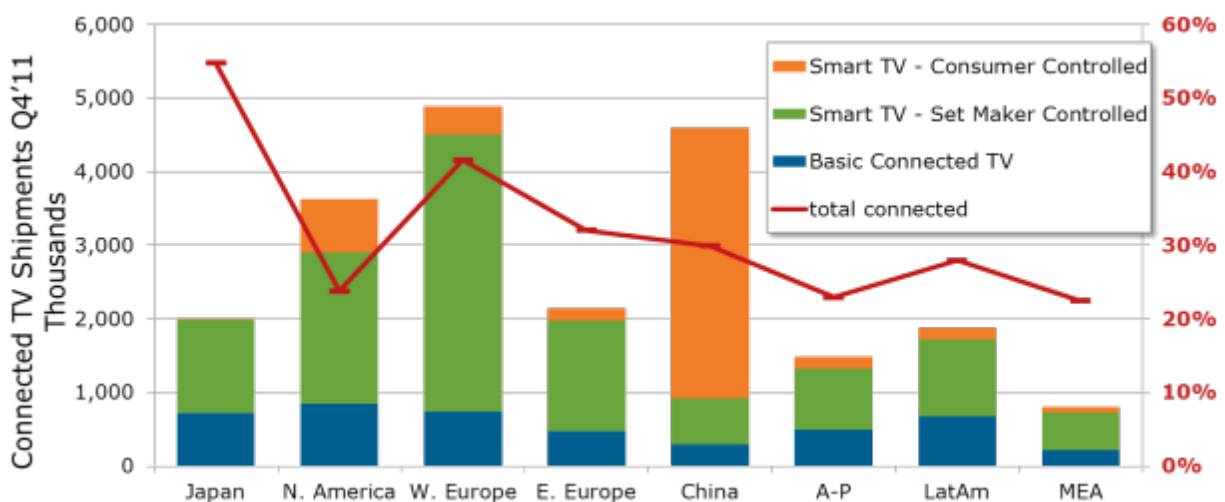
by Paul Gray

Paul Gray is Director of European TV Research for DisplaySearch. He also covers digital broadcast, signal processing and semiconductor technology. He is heavily involved in analysis and forecasting of connected TV and 3D. Paul has worked his entire career in the TV supply chain, and has more than 15 years of experience in market intelligence, marketing and product management. His work includes forecasting, product strategy and investment and R&D decisions. Before joining DisplaySearch, Paul worked at NXP Semiconductors as a market intelligence manager and also as product manager for TV semiconductors. Before NXP, he held positions of increasing responsibility at Philips Display Components (later LG.Philips Displays), including Director and International Account Manager in both Asia and Europe. Paul started his career as a production shift leader in a CRT factory. Paul has a bachelor's degree in electrical engineering and a management diploma in industrial studies.



We have completed a first survey of TV set makers' shipments for Q4'11. It reveals the extent that connected TV has broken out of the high-end and is starting to become a mainstream feature in all regions. What is remarkable is that this reflects the new realities of the TV business – it is global and emerging markets are seeing features introduced at the same pace as developed ones. All regions now see connected TV penetration above 20%. We segment connected TVs according to their service type – featuring evolves and the whole point of such sets is extra content to watch.

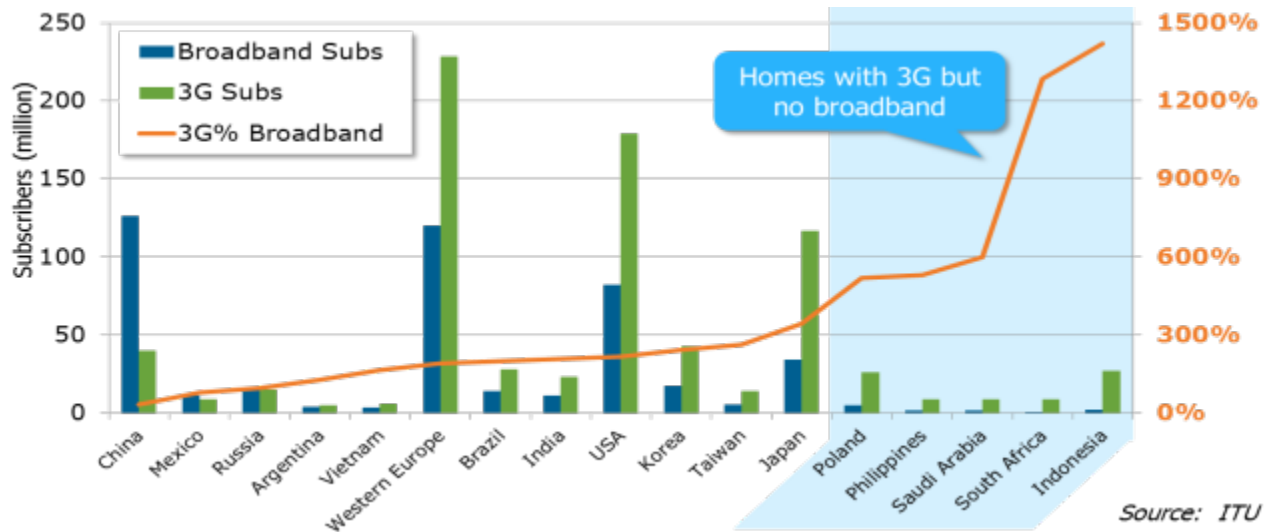
- Basic connected TVs can access structured services from broadcasters such as Hbb.TV in Europe, MHEG-RP, Hulu in the USA and AcTVila in Japan. Netflix and YouTube also such services. These platforms are common and identical across brands. They have high production values and are simple to use – very much like tele-text services or channel zapping.
- Set Maker Controlled sets can usually access broadcaster platforms, but in addition have unique services from a portal. No two brands are alike, and the services may be configurable as Apps. However, as a consumer you are dependent on the brand – if they cease to support a specific app then the functionality is lost. Some brands are operating their portals as cloud-based services. iTunes is such a service, along with Sony's and Philips Net TV.



- Consumer Controlled sets are able to escape the constraints of a portal and allow the consumer to access the whole internet. These sets typically have a browser inside, although a navigation and recommendation service would be equally effective. Samsung and LGE have such sets. The added complexity of unrestricted internet access demands a significantly more complex remote control or

human interface. The diversity of web pages and video codecs means that some sites will display incorrectly or not at all.

What is perhaps surprising is that connected TV penetration outstrips the adoption of broadband internet in some regions – which begs the question of what consumers will do with a connected TV without broadband. The answer is that some will lie unused, some have limited value as future-proofing, and thirdly that such TV customers are a self-selecting group who DO have broadband. Consumers with lower incomes (and no broadband) buy TVs far less often and so are under-represented in the TV market.

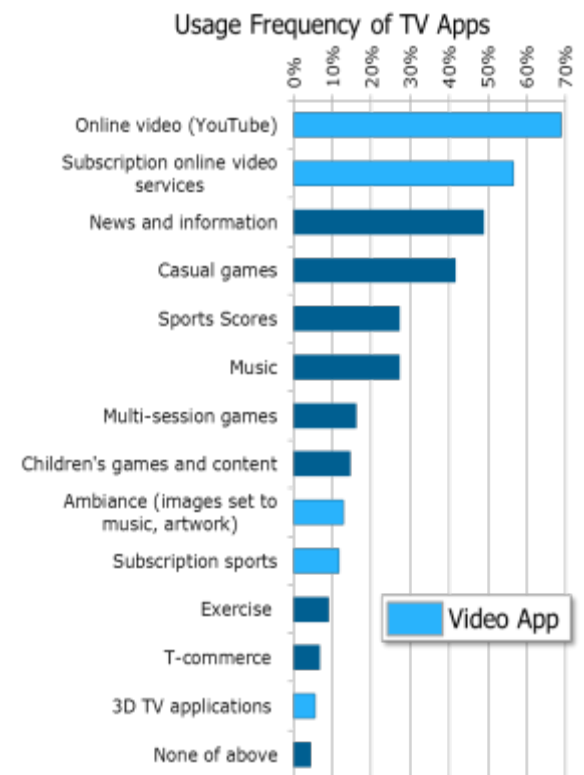


There is also a diverse group of countries where an alternative development path is being taken. Indonesia, Poland and Saudi Arabia (amongst others) have far higher adoption of mobile broadband than fixed. These countries appear to be moving directly to mobile internet and may never adopt fixed lines, in the same way that African countries have moved mainly to all-mobile voice communications. Such markets will use connected TVs differently – for example Wi-Fi Direct streaming between a TV and mobile, rather than using a home network and gateway.

Our research shows that the most-valued functions for TVs are video related – in other words lean back entertainment very much like TV viewing. Apps for TV need to be different from mobile devices and focus on viewing not location-based services. The most popular apps are either directly accessing extra things to watch or complementing viewing by providing context or extra depth to TV content.

It is hard to interact with a screen on the other side of the room that you cannot touch. While an arms race is beginning to develop solutions to the interface problem, it might still be better solved by ensuring seamless interoperability with a tablet or smartphone. Tasks would therefore become split, with the handheld screen being used for selection and navigation and the TV performing playback.

The next steps in connected TV are going to be very different from the recent past. Many of the basic technical hurdles have been solved. Development will need to focus increasingly upon consumer behavior: what types of app do consumers value? How do people want to interact with TV? Is TV still a passive experience? What is the willingness to pay for services? The answers to these questions will doubtless differ by region and culture.



2012中国智能电视高峰论坛

2012 China Smart TV and Smart Display Conference



2012年5月24至25日 May 24-25, 2012

中英同声传译 English-Chinese Simultaneous Interpretation

深圳马哥孛罗好日子酒店
MARCO POLO SHENZHEN

2012 China Smart TV and Smart Display Conference

Time: May 24-25, 2012

Organizer: DISPLAYSEARCH

Venue: Marco Polo Shenzhen Hotel

Website: www.displaysearch.com

Event Website: <http://www.displaysearch.com/cps/rde/xchg/displaysearch/hs.xsl/events.asp>

Make Your TV Smart, Display Smarter!

Flat panel TV penetration in Q4'11 has reached almost 100% in developed countries and 89% in emerging countries, Industry players are not only looking for new features and applications, but also trying hard to lower costs to stimulate the replacement cycle, especially for developing countries. On the other hand, the availability to intelligently connect is a more recent advancement—one that could significantly change how TVs are used.

The 2012 DisplaySearch China Smart TV and Smart Display Conference on May 24-25 at the Marco Polo Shenzhen will highlight the latest and most important market trends and forecast the future of the smart TV and display industry. Topics will cover global TV outlook, smart and connected TV, user interface, winning TV features, and display technology trends like naked 3D and OLED.

Why it is invaluable to participate?

- The most influential flat panel TV event in China
- Attendees can get the most recent update for the whole TV supply chain in two days
- International platform for networking with others in industry
- Wide variety of topic coverage
- Complimentary one-on-one time with DisplaySearch analysts
- Excellent breadth and depth of topics

Session 1: Keynote Speech - Global FPD & TV Outlook

Session 2: Winning TV Features

Session 3: Interactivity and User Interface

Session 4: Keynote: Connected TV and Content

Session 5: OLED and Smart Display

Session 6: DisplaySearch Special

CONTACTS

Display Search Shanghai Office

Yolanda Xie

Tel: 86-21-6275-2555

Fax: 86-21-3209-7567

Email: yolanda.xie@displaysearch.com

European broadcast market

by Bob Raikes

Bob Raikes is an experienced sales and marketing specialist in distribution and in the PC displays business in particular. Pursuing a keen interest in micro-computers, he joined the PC industry in 1982 at Data Efficiency. Following a spell to establish the distribution company DDL, he helped to set-up Taxan UK as the UK sales manager. From there he spent seven years with Japanese monitor and graphic board maker Eizo, initially as sales director and later as managing director of the company's UK subsidiary. He established Meko Ltd in 1994. As well as being managing editor of Display Monitor, Bob was for several years the displays editor for The Peddie Report and a regular contributor to Computer Shopper and other titles. Bob long ago decided that if Moore can have a law, he can have one too.



- Bob's First Law, first developed in the mid-1980s, states: "Everyone that buys a computer, always buys another".
- Bob's Second Law states: "Anything that increases the visual bandwidth wins in the end". This observation dates from slightly later, after years of hearing the questions: "Who needs graphics?", "Who needs color?", "Why does anyone need more than 256 colors/a 15-inch screen/VGA resolution?"... The law predicts that there will be a continuous development of electronic displays until they match the capabilities of human visual perception

Last time I wrote for the LCD TV Association, I talked about the difficulties in the European TV market from the problems in the Eurozone. As I sat down to write this article, my radio is telling me of the problems in Greece with the Euro and there is lots of talk about the problems in Spain, Italy and France. So, there's little change in the economic climate.

So, I thought I'd write about something else – the broadcast market in Europe, which is very different from any other region, I believe. The market for TV services and broadcast services in Europe is very, very fragmented and disparate. One of the challenges to understand the market is that it is fundamentally a series of national markets. Although organizations such as the EBU do their best to coordinate the activities of national broadcasters, even that organization really only has an advisory role. Several countries and regions in Europe have strong traditions in broadcasting, whether we're talking about the Bavarian broadcasters in Munich, RAI in Italy or the BBC in the UK, there are long traditions of engineering and innovation.

Much of the broadcasting that is watched by viewers in Europe is provided by national broadcasters running broadly under the supervision of the national governments and at little or no charge at the point of consumption. Most countries have mandatory TV licenses and public service broadcasters are funded by license fees, taxation, advertising or a combination of these. In most countries, there is a belief that most TV should be free or close to free – a few euros per month (63% of Germans pay something for TV, but mostly just a few Euros – only 6.1% pay for 'premium' TV).

(A report released just as we were writing this article highlighted that early in a recession, pay TV does quite well as it is a cheaper form of entertainment than going out to a restaurant or to the cinema, but later in a recession, it falls back. In Q1 2012, pay TV revenues fell sharply in Italy, Spain and Greece, although they rose in Germany.) The situation in Europe contrasts with the US, for example, where most consumers are used to the idea that TV is usually paid for and costs real money, whether that money goes to a cable or satellite provider. In Europe, the culture of free TV is a real barrier to innovation. Let's take the example of the development and introduction of HDTV.

In the US, the commercial broadcaster, satellite broadcaster, DirecTV introduced HDTV and started to attract viewers. More importantly, it attracted the higher spending consumers that advertisers wanted to connect with. As a result, other broadcasters that wanted to retain their advertising revenues needed to offer HD – we all found quickly that once you get used to HD, it's hard to go back.

In most of Europe, this didn't happen. HD takes up more bandwidth than SD, so needed more resources. To transmit HD, you may also have to invest in new compression systems and possibly new broadcast standards such as DVB-T2. It's difficult for a public service broadcaster to justify a lot of investment on what is always, initially, a very small audience, usually of the wealthier part of the population that can afford the latest set technology.

An exception is the UK market, where BSkyB, part of the News Corp media empire, is a major commercial satellite broadcaster. This company has aggressively invested and marketed its HD services and as a result has around 60 channels of HD. That has forced its terrestrial and cable competitors to also offer HD in order to compete. It is only in the last year or so that HD really has started to take off outside the UK.

The same arguments will make it even harder for S3D to take off in Europe. Although the EBU is keen to develop standards and technologies for S3D, it will be a long time before there is more than a token number of 3D channels in Europe.

Technical standards also differ around Europe. The EU countries and Western Europe are pretty well now digital in terms of terrestrial broadcasting, but some countries use MPEG-2, while others use MPEG-4. Most use DVB-T for terrestrial broadcasting, but some use DVB-T2.

Satellite is digital as well, but large parts of the cable industry in Germany still broadcasts in analogue.

Interactivity is supported in some countries using MHEG middleware, while others use MHP and more have had no interactive TV at all. For pay TV, there are different encryption methods. For a number of years, all digital TVs were obliged to include a slot known as the CI slot that could support a standardized decoder (although not every country took great care that sets were actually supplied with the slots). Unfortunately, the CI slot was developed before the development of content protection systems for HD content, so it has had to be superseded by a CI+ specification.

My favorite example of the problem for set makers associated with this diversity was a classic one in Italy. Soccer rivals religion in importance in Italy and the soccer clubs negotiate their own broadcast rights individually. At one time, the major soccer clubs did deals with different broadcasters that sold Pay Per View subscriptions. They both broadcast on the terrestrial system, but had different encryption systems, so although all sets had CI slots, different decryption modules were needed to watch the two broadcasters' content. So set makers that were successful in Italy were shipping special CAM modules that would accept SIMs for both services so that consumers didn't have to keep changing the decryption chip in their sets.

Now that everybody is moving to hybrid/OTT TV, there has been some agreement, especially between French and German broadcasters, on Hybrid Broadband TV (HbbTV) as a standard that will be used by public service broadcasters in those countries and a number of others. However, the UK regarded HbbTV as a potentially backward step as its interactive system was better developed already. Having said that, the UK has been so slow to develop its own OTT technology that HbbTV might catch up!

So, the broadcast market in Europe remains very fragmented and although Moore's Law means that TV chips can get more sophisticated rapidly to reduce the number of different chassis and product variations needed, it is still a complex and fractured landscape for TV set makers to address.



Vivid & Clear Motion Picture

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

Touch Screen Interactive Functions

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



Low Power Consumption

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

No Color Wash

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

Full HD LCD TV.
 IPS technology brings the best quality screen to
TruMotion 240Hz
 The right choice of true brightness on your TV.

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

LED-backlit LCD TV shipments doubled during 2011

by Veronica Gonzalez-Thayer

Veronica Gonzalez-Thayer is an Industry Analyst for the Consumer Electronics Group at IMS Research, (recently acquired by IHS). Her expertise is in the World Television market, with focus on TV sets and pay-TV. She manages IMS Research's "TV Set Shipments and Forecast Database". Before joining IMS Research, Veronica was a Solutions Engineer for Telefónica (Movistar Venezuela) and spent over two years working in Consumer and Market Knowledge for Procter & Gamble. Veronica holds a B.S. degree in Electronics Engineering from Simon Bolivar University (Venezuela) and is based in IMS Research's Austin, TX office.



IMS Research (recently acquired by IHS Inc. estimates that worldwide liquid crystal display (LCD) TV unit shipments increased six percent during 2011 when compared to 2010. LCD TVs are currently dominating the market, with more than 80 percent of the total TV set unit shipments during 2011, and their share will keep increasing as cathode ray tube (CRT) TVs vanish from the market and plasma TVs continue to lose relevance. However, total worldwide TV set unit shipments are forecast to experience minimal continuous growth between 2013 and 2016, resulting in growth for LCD TVs to slow down during the next five years.

One of the regional trends impacting LCD TV growth is the weakening TV market in developed regions. For example, looking at Japan after the Eco-points program ended, TV sales in the country started to rapidly decline and they are expected to return to the lower pre-2010 figures in the next two years, which is almost half of the TVs sold in the country during 2011.

Another recent trend is the demand for light-emitting diode (LED) backlit LCD televisions, which has continued to sharply increase worldwide. By the end of 2011, LED-LCD TV shipments had doubled year-on-year. IMS Research expects that the price gap between cold cathode fluorescent lamp (CCFL) backlight and LED-backlight televisions will close in the next five years, and that during 2016 more than 90 percent of the LCD TVs shipped will be LED-backlit.

Additional features such as 3D and Internet-connectivity also started gaining more presence during 2011, with the latter showing more significant uptake among consumers. IMS Research forecasts that during 2016, approximately 40 percent of the TV sets shipped worldwide will have 3D capabilities and close to 70 percent will connect to the Internet.

Internet connectivity is becoming a standard on high-end TV sets, and it's increasingly being added to mid-end televisions. TV set manufacturers' product launch plans are expected to drive the majority of the growth for connected TV sets during the next few years. Connected TVs will help boost sales of LCD TVs as the awareness and the demand for Smart TV features increases. However, the impact that internet-connectivity will have on flat panel TV growth will be diminished by the availability of other internet-connected devices that offer over-the-top applications and video services, such as Apple TV, Roku, Blu-ray players and game consoles.



CORNING
Gorilla® Glass

Tough, yet sophisticated.

Corning® Gorilla® Glass is changing the face of television. Remarkably thin and lightweight, Corning Gorilla Glass enables streamlined designs that dissolve the boundary between you and the action. Its amazing optical clarity brings TV images to life. And it features exceptional durability to handle those moments when viewing unintentionally becomes a contact sport.

Learn more at CorningGorillaGlass.com



© 2011 Corning Incorporated. All rights reserved.

Look for Corning® Gorilla® Glass on Sony BRAVIA HDTVs at leading electronic retailers.

Can feature-rich sets save the flat-panel TV market?

Sophisticated products drive rare rebound in US pricing

by Lisa Hatamiya

Lisa Hatamiya is the researcher for television and retail services at IHS iSuppli. Her responsibilities include tracking and analyzing market prices, specifications, and consumer preference. She also monitors market trends as well as monitoring supply and demand. Previously, Hatamiya participated in Morgan Stanley Smith Barney's Financial Training Program and interned at Farmers Insurance Group. Hatamiya graduated from the University of California Davis with a Bachelor of Arts in Economics and a minor in Communications.



A rare, sustained increase in average selling prices in the U.S. flat panel television market in early 2012 may indicate that the future of the global TV business lies in offering sets with more sophisticated features, rather than continuing to battle over pricing, according to information and analysis analytics provider IHS.

High-end television features like Internet connectivity and light-emitting diode (LED) backlight technology allowed U.S. flat-panel TV prices to climb 11.4 percent during the period from December 2011 through April 2012. In April, average pricing for U.S. flat-panel televisions including liquid crystal display (LCD) and plasma sets reached \$1,248, up from \$1,119 in December, as presented in the figure below.

Feature-rich TV models are responsible for the ongoing surge in prices, especially Internet connectivity and LED-backlighting. TV manufacturers and retailers are charging a premium for these features, boosting their pricing and protecting their revenue. This represents a shift in strategy among brands and retailers to hold the line on pricing and to encourage consumers to buy more expensive sets.

After riding high during the flat-panel replacement wave of the 2000s, the growth of television unit shipments has slowed, impacting market revenue. Having frequently risen by double-digit percentages in the mid to late 2000s, global television unit shipment growth has slowed to low single-digit percentages.

Going forward, TV sellers are expected to put a greater emphasis on advanced features. Combined with Apple's capability to manage the supply chain to obtain optimal pricing, the company should be product the set at a competitive cost.

The Apple television would also likely integrate the electronics from Apple TV set-top box into the television chassis. A critical feature of the Apple television will be the user interface. Press reports indicate Apple plans to use the Siri voice recognition software first employed in the iPhone 4S smartphone. This will bring revolutionary ease of use to the set, allowing users to eschew complex, easy-to-lose remote controls and instead employ voice commands using natural language.

A farewell to price wars: The current conditions in the U.S. flat-panel market represent a major departure from 2011 and previous years, which were marked by aggressive pricing competition.

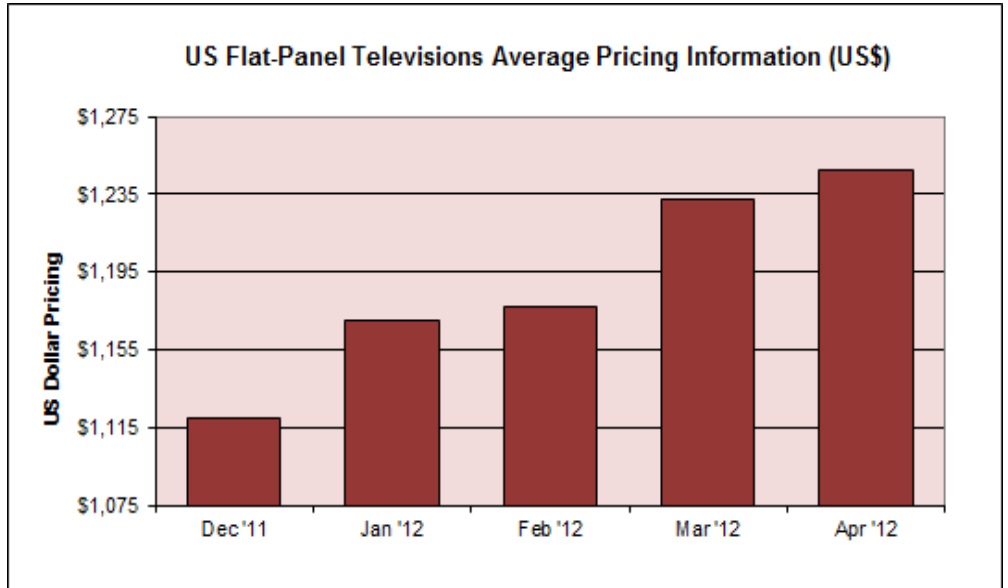
Brands and sellers in 2012 are working together to keep money flowing into the industry. The industry is able to accomplish this by making consumers pay for features that they want, and by excluding features that buyers are not willing to pay for.

Such an approach has meant implementation of different pricing strategies from brands and retailers as well controlled inventory into distribution channels—a strategy that has also successfully preventing prices from sliding this year, IHS iSuppli believes.

In comparison to TVs that gained in pricing, models that featured lower refresh rates or had no Internet connectivity saw their prices decline. For instance, pricing slipped 6 percent in April for 40- and 42-inch sets made by premium brands that used the older LCD technology of cold cathode fluorescent lamp (CCFL), had lower 60-hertz refresh rates and that lacked Internet capabilities.

For TVs that offered the desired advanced functionalities, pricing during the same period ticked up -- by 1 percent for the 30- to 39-inch segment, and by 2 percent for both the 40- to 49-inch as well as for the 50-inch-and-larger categories.

The upsell strategy: Sellers have also been working to “upsell” customers – i.e., to persuade consumers to purchase more expensive television sets. Retailers are working to convince buyers to move up to either a larger-sized TVs or to one using LED-backlit panels – but the price to upgrade carried different costs.



For instance, the extra cost to upgrade a premium-model 32-inch TV without LED backlighting to another 32-inch model with an LED panel is 14 percent. However, the cost to upgrade to the next-bigger size of 40 or 42 inches – but one without LED backlighting – is 21 percent. The larger price premium for upgrading to a bigger TV size indicates the market was aware that buyers were willing to shell out more money to obtain larger-sized sets over a similar-sized TV model with LED backlighting. Just the same, the forced choice between one or the other option is proving increasingly untenable for consumers, so sellers in the future are expected to close the price gap between the two features. This means that buyers in the future would pay the same price premium – say, 10 percent – to either upgrade to an LED panel or to a bigger size. No longer will upgrading to one option cost more than the other, as is the case today.

Among 3D LCD TVs, average prices in April rose 3 percent sequentially to \$2,492. Prices also rose 3 percent to \$1,638 on average for TV sets featuring the LCD rival technology of plasma, which continues to focus on 3D and larger-than-50-inch sizes.



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

LCDTV Association

A great TV in every room!



INFORM · PROMOTE · IMPROVE · CONNECT

LCD-TV Association White Papers

TV Power Consumption: Is There a Problem? (and Can LCD TVs Help?)

http://www.lcdtvassociation.org/images/TV_Power_Consumption_White_Paper_LCD_TV_Association.pdf

Best Way to Save Gas; Stay Home and Watch HDTV

<http://www.lcdtvassociation.org/whitepaperslinks/featuredarticle.html>

LCD-TV: The Pleasures of Selling a Commodity Product (Plus)

http://www.lcdtvassociation.org/images/LCDTVA_SellingPLUS.pdf

Plus numerous Member White Papers and TV Resources

<http://www.lcdtvassociation.org/whitepaperslinks.html>



Approximately Right

Panel Makers Drive the Market

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.

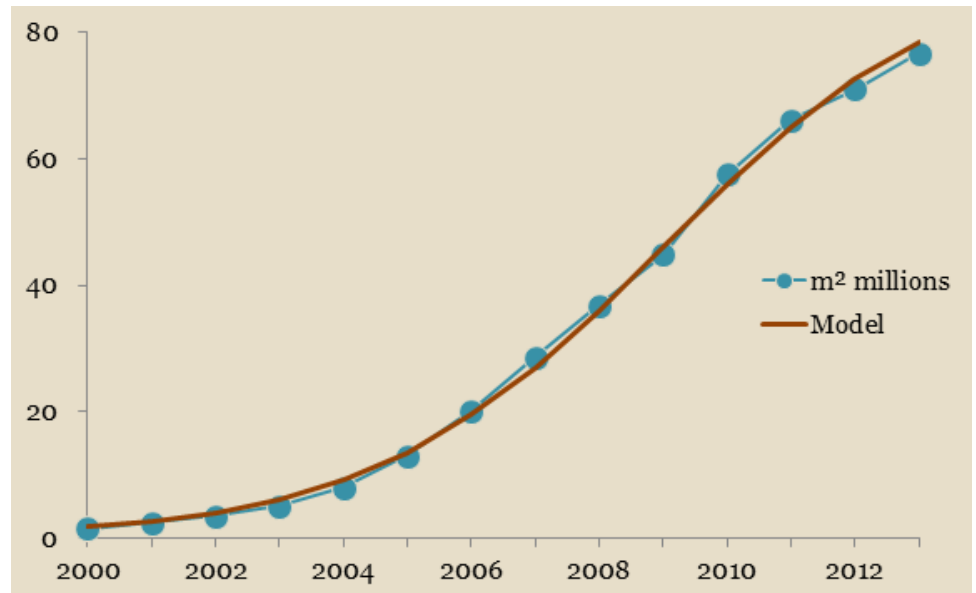


Ken Werner, a friend of mine and a frequent contributor to *Display Daily*, commented recently on ChiMei Innolux's success creating new TV sizes such as 39". From a historical perspective, such actions seem normal; indeed it is business as usual. In preparation for DisplayWeek 2012, I looked back on prior prognostications and updated by capacity-acceleration price indicator (CAPI) for 2012–2013. These have a lot to say on the subject of TV panels: what sorts we may see and at what prices.

AMLCD Capacity Trends: The substrate process area capacity of AMLCD producers appears to follow an S-curve. Updating my model with DisplaySearch Q1'12 data and recent estimates, the inflection point appears in 2009. Since then, we have started the second half of the AMLCD ball game: capacity growth will decelerate. I hesitate to call an upper bound to capacity. The CEC Panda – TCL Gen-10 plan is an example of how BRICs may continue to pile into the industry. Nevertheless, I can find a very good and simple Pearl-Reed model for historic growth through 2013.

Figure 1: Slide Presented at
SID DisplayWeek 2010

Source: BizWitz analysis of
DisplaySearch data, Q1'12



Despite our current deceleration, this model says capacity could increase by one-third from 2011 to 2016. It used to grow more than that in a year but that was on a much smaller base. The TV market is the biggest place to put all that glass, so I assume most of it will go there. Demand for Tablets and other mobile gadgets has been terrific, but it takes sixteen tablets to use the capacity absorbed by one 42" TV.

Price Effects: As I explained at US FPD 2011, it doesn't really matter where panel makers ship the panels. Parts is parts and their fabrication assets are fungible. They can and do fabricate displays for Tables, Notebooks, Monitors and TVs on the same process line. One result of such fungibility is a continuous rate of price decline for panel area since the 1990's. I checked PriceWise data available (free!) from DisplaySearch to see how prices of 32-inch and 42-inch TV panels developed in recent years.

Looking back at the dawn of large LCD TV, we see that panel prices fell rapidly the first year or two after introduction. From that, we should anticipate that today's 70-inch or larger TV prices will decrease rapidly into the 2014 Holiday season. Since Q1'05, when the market started to mature, see 32-inch panel prices falling 20% a year. That is near the AMLCD industry average for all panels over decades. No surprise there. The price of 42" panels fell a bit faster, at 24% a year. That seems normal, given that smaller panels bear a greater portion of fundamental, intractable costs than larger panels do. In any case, typical square-foot prices indicated by the latest PriceWise spreadsheet are \$41 for 32-inch panels and \$39 for 42-inch ones.

Figure 2: Price per Square-foot for 32" and 42-inch TV Panels

Source: BizWitz analysis of DisplaySearch data, May'12

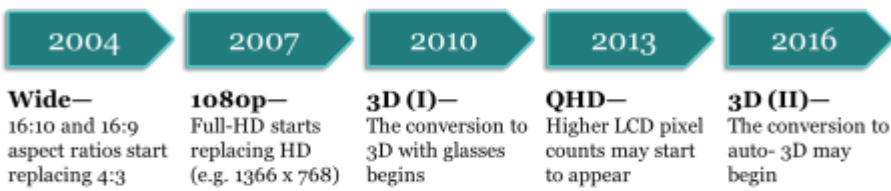


CAPI: Even a casual look at PriceWise data will show prices fluctuate. Indeed, TV panel prices have inched up in recent weeks as global demand began to soak up excess capacity. Fortunately, there is a way to anticipate such rises and falls over the business cycle. As explained in *The Handbook of Visual Display Technology* (edited by Mark Fihn, et al), the Crystal Cycle can be predicted by the acceleration of capacity. The faster new capacity comes on-line, the faster panel makers have to decrease prices to clear that capacity through the market.

CAPI predicted the downturns in Q4'02, Q2'04, Q2'06, Q4'08 and Q4'11. It also predicted up rises such as the one we are in today. The present up-cycle should last into 2013 before a minor cycle bust in Q2'13.

New Value Propositions: It makes sense for panel makers to introduce new products as panel prices strengthen over the next few quarters. After all, introducing larger panels or higher resolution ones has been one of the few ways panel makers can resist price erosion. There are few constraints on display size, after all. There is some limit to the panel width people can hold in their hand (though Samsung is testing that limit). There is some limit to the monitor width people can see without moving their head (about 24-inches, depending on viewing distance). Other than that, demand seems more sensitive to areal price than to diagonal size. If ChiMei Innolux can offer better (and more profitable) prices by cutting 39" panels out of the glass instead of 40-inch or 42-inch ones, there is no reason it should not do so. The apparent difference when sitting five or ten feet from the TV is unremarkable.

The three-year cycle suggests future features: more pixels and 3D without glasses



- We have seen major feature sets introduced every three holiday seasons.
- Product leaders enjoy price premiums; followers enjoy far less. New features become commodities over three years.
- Premiums for 1080p persist for sets smaller than 42" but full-HD is standard for larger LCD TV sets.
- LCD producers have driven new formats before and quad-HD seems attractive.
- Internet TV could support more pixels and more pixels would enable auto-stereoscopic TV sets.

to the panel width people can hold in their hand (though Samsung is testing that limit). There is some limit to the monitor width people can see without moving their head (about 24-inches, depending on viewing distance). Other than that, demand seems more sensitive to areal price than to diagonal size. If ChiMei Innolux can offer better (and more profitable) prices by cutting 39" panels out of the glass instead of 40-inch or 42-inch ones, there is no reason it should not do so. The apparent difference when sitting five or ten feet from the TV is unremarkable.

Figure 3: Slide Presented at SID DisplayWeek 2010

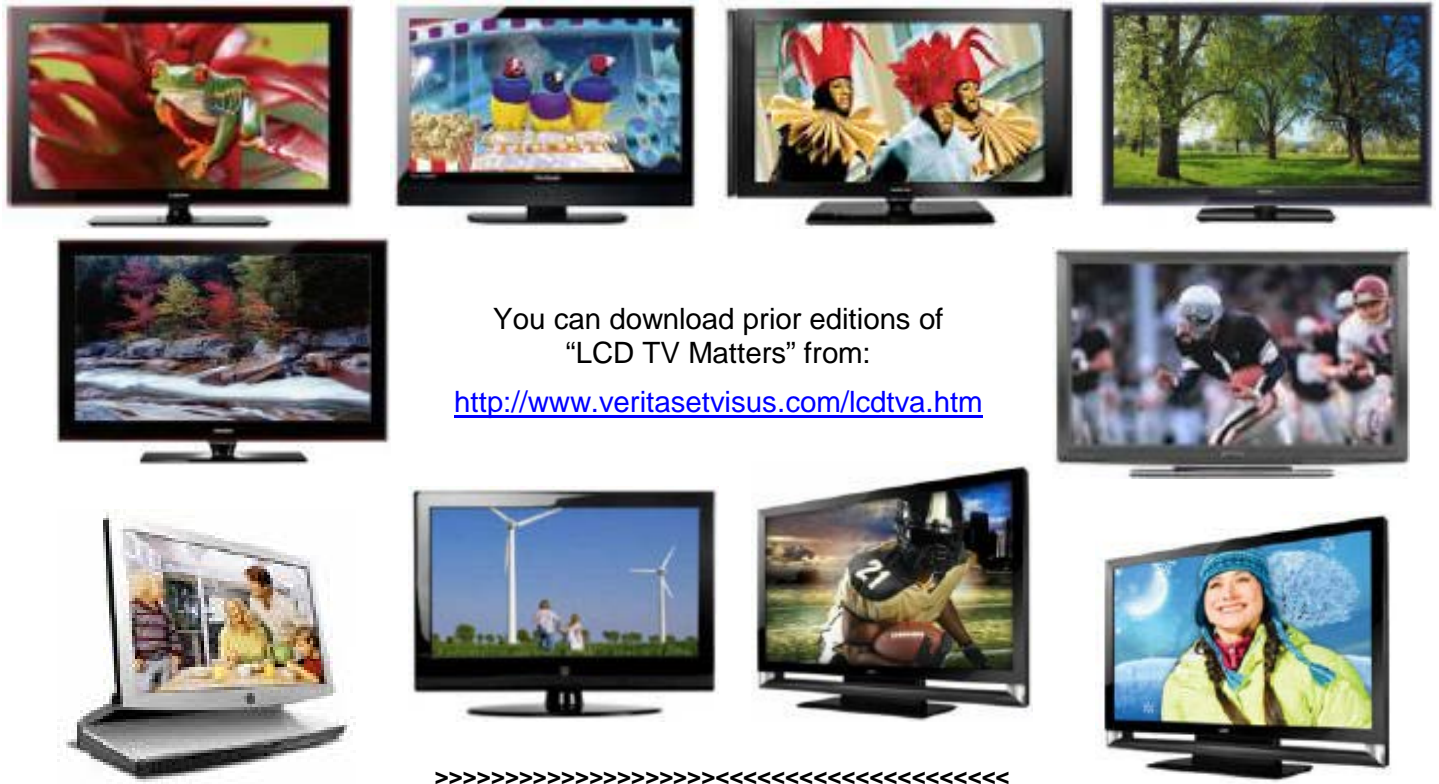
Source: BizWitz presentation at TV 3.0—The Future of TV at Display Week, 2010

Similarly, there is no reason panel makers should keep to a certain pixel count. After all, a 60-inch 1080p panel has less resolution than a typical Notebook panel. As consumers learn to display photographs, experimental videos and other content on their TV sets, there is no reason to constrain displays to HD formats. Besides, panel makers have found more pixels easy to sell. Think about consumer response to 8 megapixel then to 12 megapixel cameras. Pixel counts are an easy point of product comparison (even if those are not always the best point of comparison).

Looking back on my presentation at DisplayWeek 2010, I was not far wrong in predicting a wave of higher resolution TV panels in 2013. Sharp has started shipping IGZO-TFT panels, which should enable more pixels per panel, and other producers are talking about quad-HD TVs.

So I say, innovate! Bring on those new panels. Just be careful how much new capacity you bring on-line.

Past Editions of “LCD TV Matters”



INFORM the public on the many benefits of LCD technology (vs. CRT and projection, PDP and the coming set of laser RPTV players). The LCD TV Association will debate the claims of competing technologies, as well as sponsor, post and distribute white papers on industry research and relevant topics - as determined by LCD TV Association Advisory Board.

Breaking Barriers and Broken Windows

by Marty Shindler

Marty Shindler is CEO of The Shindler Perspective, Inc. a husband and wife consulting practice with a pedigree that includes a Big 4 firm and a top 5 business school, with additional experience at 20th Century Fox, MGM, Lucasfilm/Industrial Light & Magic and Kodak's Cinesite. At NAB 2012, Shindler moderated the Super Session Predictions from the Street: The Power Players behind the Great Content Shift. Visit <http://www.iShindler.com> for more information.



Since the dawn of the filmed entertainment industry, there have been periodic changes to the ways that content has been distributed. At various junctures in the modern industry, barriers were broken, the concept of release windows changed and new business models evolved. More often than not, the changes were incremental and relatively subtle.

Today, barriers are still being broken as traditional and often revered release windows are breaking once more. We are seeing a more dramatic shift than ever before. A new world order of the content creation and distribution hierarchy is in the offing.

In the beginning, the studios developed a large volume of movies, shown mostly in the theaters that bore their name. The consent decree in the 40s required that they divest themselves of the theaters and soon new owners controlled exhibition.

In the 50s, TV came on the scene in a big way and the number of people attending the cinema declined. Concurrently, the baby boomer generation came along and families stayed at home watching whatever was on the tube. It was a whole new world. Once the studios got over their fear of the new medium, they, too, began to develop programming, which in many ways was more sophisticated than what had been broadcast to that point. The barrier had been broken and the studios became a force in TV that persists to this day.

The three networks began movies and sports programming in addition to the sitcoms and variety shows.

Ted Turner broke another barrier when he overcame hurdles and successfully put his Atlanta based Channel 17 on a satellite for pick up by the growing cable business. Early content was primarily older movies and sports. Before too long Turner introduced some original programming and in time, additional cable channels from Turner and from others were developed. In almost every case, they all started with acquired, previously released programming, with the exception of sports and the news that Turner brought 24 hours a day, a novel concept at the time, that has become the standard today.

Through the years, the TV eco-system grew to be a dominant force in our entertainment. Traditional broadcast, cable and satellite enabled people "everywhere" to watch TV, to a point that there were more households with a TV than with a telephone.

Different business models evolved, beginning with subscription to cable, and later satellite, for access to shows that still included advertising as their base business model.

Soon subscription services for premium channels such as HBO and Showtime emerged, offering Hollywood movies free of advertising for a fee. As those and other services evolved, they, too, began to develop original programming to supplement acquired product.

In the late 70s, home video arrived. The recording capability broke barriers resulting in a paradigm shift as consumers gained more say in what they watched and when. Suppliers of beta and VHS tapes gave rise to the video store. Different business models were used, from rental to sell through. A six month window from theatrical release was established, then replaced by shorter and shorter windows, with day and date, a barrier that eventually will break, for a price.

Movies dominated content availability. It was not until the DVD was introduced in 1997 that TV on DVD started to become a viable business, although it took many years to reach a tipping point.

We are now at the dawn of another era. The shifts that are taking place are going to be seismic. There is already an installed base of hardware that is being used for viewing content. Homes with PCs and broadband have become almost ubiquitous. Flat screen TVs are present in nearly 70% of US TV households now, with over 35% of households having more than one HDTV. The growth and the replacement cycle will continue to increase penetration as the technology improves and prices decline.

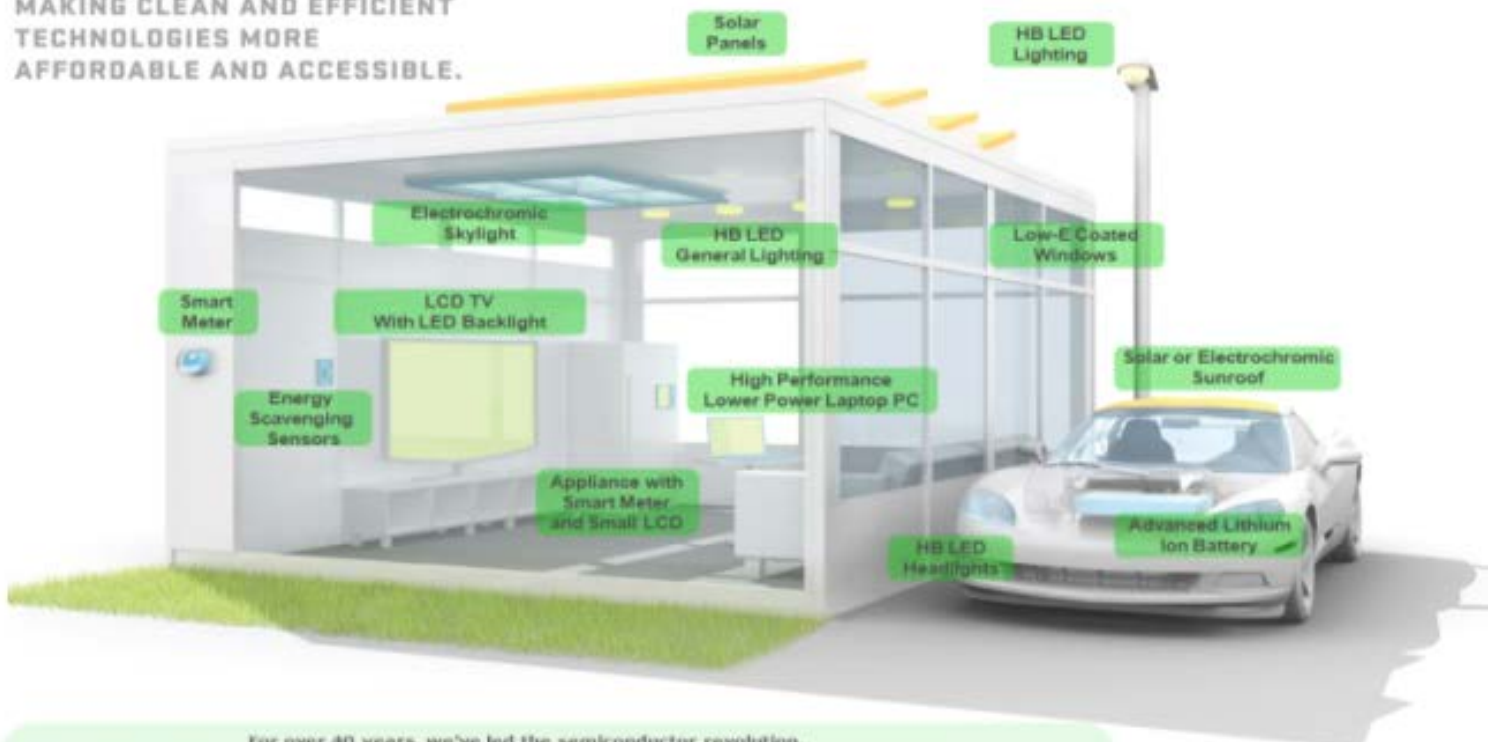
In recent years, new players have come to the market, such as Netflix and HULU, starting with acquired content and moving to original programming. Each has become a formidable force in the eco-system with a variety of business models and delivery methods. YouTube, with arguably one of the most robust and sophisticated digital delivery platforms, is also delving into original programming, some of which will likely be sold on a subscription basis, while other content will take the traditional advertising route.

As we look at the ways that content will be produced in the coming years and how it will be distributed across a wide variety of platforms, it is safe to say that yet again another series of barriers will be broken and the lines are forever blurred between who is a producer and who is a distributor/exhibitor.

It is just a matter of time before some show from one of the new power players emerges as a bona fide hit, generating the kind of viewership that others dream about and creating a new world order in its wake. And it will not matter if the show is in 2D or 3D, watched on a 37, 42 or 60 inch flat screen or a 4.3 inch smart phone or larger tablet.

The barriers will have been broken and release windows changed once again, only to have the process repeat itself in a year, 3 years or 5 years. What remains to be seen is who the new power players will be, how they will reign and the extent to which they disrupt the eco-system.

THE WORLD LEADER IN
NANOMANUFACTURING,
MAKING CLEAN AND EFFICIENT
TECHNOLOGIES MORE
AFFORDABLE AND ACCESSIBLE.



For over 40 years, we've led the semiconductor revolution, helping our customers create smaller and more powerful electronic devices, while also making them more affordable and accessible. Our technology helps produce flat panel displays that are brighter and crisper, solar panels that are the world's largest and most powerful, and energy-efficient architectural glass that lowers heating and cooling costs. Join us creating cleaner future with these and yet more amazing technologies to come.

Hugo and Tintin...

by Mark Fihn

Mark Fihn currently heads a publishing company called Veritas et Visus, where he supports the flat panel display industry based on his expertise related to notebook PCs, Tablet PCs, touch technologies, the LCD TV market, and display related human factors, including high resolution and wide aspect ratios. Prior to Veritas et Visus, Mark worked for 3 years at the market research firm DisplaySearch. He additionally participated for 15 years in computer system and LCD-related procurement at Texas Instruments and Dell while living in the United States and Taiwan. <http://www.veritasetvisus.com>



It's still common to read articles in the popular press about how 3DTV is a bomb – for a variety of reasons – but largest among them because there's a lack of enough content. Although I admit that I only find time once or twice a week to watch my 3D TV, (a fabulous 55-inch device from LG using their extremely impressive FPR technology), I have no trouble whatsoever finding considerable content – and some really good stuff at that.

The latest two movies that I added to my Blu-ray 3D collection are *Hugo* and *Tintin* – both utterly impressive shows, but also incredible examples of the 3D medium.

Hugo is simply one of the best movies I've seen in years. If you can only enjoy shoot-em-ups, then this might not be for you, but it's hard for me to imagine anyone not enjoying this movie. I saw the movie in the theater, and thoroughly enjoyed it. I've read some mostly negative commentary about the 3D cinema implementation, and I must admit that I was so entranced by the story, that the 3D was scarcely noticeable. But now that I have the Blu-ray 3D version for home use, I can say without hesitation, that the 3D is superb – adding substantially to the effects. Numerous friends have now enjoyed the 3D version with me – and every one of them has the same response about the 3D – “amazing”, “superb”, “stunning”, or some similar superlative.

Tintin, at least for me, was nowhere near as good a story. The animation in *Tintin* was phenomenal – oftentimes difficult to distinguish the animation from live action. Again, in the theatre, I really enjoyed *Tintin*, but it wasn't until I brought it home that I really appreciated the 3D implementation. At the theater, I didn't enjoy very good seating – so was sometimes a bit disappointed with the 3D, but at home, the combination of spectacular animation and top-notch stereography, and I am extremely impressed.



Hugo and Tintin have cemented my perceptions that 3D capability on the TV will quickly become a required feature – and not the sort of question-mark that so many pundits seem to be predicting...

I'm now really looking forward to *Titanic 3D* – wondering if I will prefer it at the theater or at home. This in itself is a remarkable statement, as not too long ago, I was a doubter when it came to 3D TV. I was certainly convinced, even entranced, by 3D cinema, but I thought that TV was too much of a shared activity to enjoy in the home. While I've now enjoyed many 3D titles at home, it truly was *Hugo* and *Tintin* that have convinced me that the 3DTV medium is a winner and is here to stay.

LED
PHOSPHORS

ORGANIC
TFTS

LIQUID
CRYSTALS

PATTERNED
RETARDERS

TOUCH
SCREENS

OPTICAL THIN FILM
COATINGS

MATERIALS FOR
OLEDs



www.merck4displays.com

The Perfect Pixel powered by Merck

You can't see Merck, but you see the difference

Besides market-leading liquid crystals, Merck's product range for displays comprises reactive mesogens for 3D displays as well as materials for OLEDs and organic electronics. Our anti-fingerprint coatings and phosphors for LEDs bring out the best picture quality on your display.

State-of-the-art display materials, a long history of expertise in their interaction and much-needed closeness to our partners in the display industry are the best conditions for perfect display performance.

Natural presentation of moving pictures, very high contrast and lower energy consumption are still today's biggest challenges in the display industry.

With our innovative new display materials we can push the limits even further and open the doors to unprecedented display performance.

The Perfect Pixel powered by Merck makes the difference – you can count on that. www.merck4displays.com



When will 4K make your HDTV obsolete?

by Andrew Eisner

Andrew Eisner is Retrevo's resident gadget enthusiast and former Executive Producer at *PC World Magazine*. Andrew is well versed in technology products, having helped establish Ziff Davis' premiere test lab, where he led a team testing the latest high tech gear. When he's not pouring over gadget specs, he can be spotted riding his motorcycle around Bay Area back roads or hiking in the hills while listening to NPR podcasts on his iPod.



There's an old saying that "in theory, there is no difference between theory and practice but, in practice, there is." The reason we bring this up is the fact that in theory even if affordable 4K HDTV sets magically appear on the market tomorrow, you might not even be able to tell the difference between it and your current HDTV set. However, we're here to tell you that based on what we saw with our own eyes at this year's CES, 4K sets will definitely be the future of high definition TV. The only question in our minds is how far into the future are we talking about?

Believe Us or Believe What We Saw: The reason they are calling the future generation of high definition TVs, 4K (Quad or Ultra HD) is because the resolution will increase from the current 1920 x 1080 to 3840 x 2160 which is roughly 4k by 2k. Now there are some experts like CNET contributor Geoffrey Morrison who recently made a case that 4K TVs were "stupid." Morrison presented some compelling arguments why, in theory, the average viewer won't be able to see any difference between 2K (current 1080p sets) and 4K sets. That notwithstanding, when I was standing in front of a Toshiba 4K TV at this year's CES the Toshiba rep at the booth told me he loved discovering all the little things in the 4K demos. He pointed to the video of a Tokyo apartment building at night where you could actually make out some activity going on through the windows of the building. I have to say the level of detail was impressive and reminded me of one of the first times I watched HDTV and could make out the fans sitting in the stands at a basketball game. It was the next best thing to being there. With 4K you should be able to see what the fans are holding in their hands.



Hollywood is Going Quad HD: When the distribution and display technologies get sorted out the studios should have plenty of 4k content to show. More and more films are using 4k either in post-production or in the camera itself. We've heard that some recent films that used 4k include *Tinker Tailor Soldier Spy*, *Moneyball* and *Girl with the Dragon Tattoo*. High-end 4K cameras are not cheap; Sony's F65 CineAlta costs around \$65,000) and Red's EPIC camera costs around \$58,000.



An Affordable 4K Camcorder: If \$60,000 for a professional 4K camera is a little over your budget you might want to consider the recently announced JVC GY-HMQ10, which is available now for around \$4,995. The JVC 4K camcorder records 3840x2160 video at 24, 50, or 60 fps. Although the initial market for this camera will most likely be medical, security or some cinematography, it foretells the affordable 4K video gear to come.



Getting 4K Video to Your TV Set: A logical question you might ask is won't 4K content require a lot of bandwidth to deliver it to your 4K TV set? Without using any new coding technology a three-hour 4K movie could represent



over 3TB of data. At the current Blu-ray capacity we'd be talking over 200 Blu-ray discs. One solution being proposed in a new encoding technology called HEVC (High-Efficiency Video Coding) which is being promoted by the ITU and the Motion Picture Experts Group (MPEG) as a successor to H.264/MPEG 4 AVC (Advanced Video Coding). With a new codec like this it might be possible to deliver 4K content at current 1080p bit rates of 5-6 Mbps. Optical disc technology also has some room to grow. Current Blu-ray technology is capable of supporting up to eight layers and 200GBs of data. Downloading a 4K movie using current encoding with networking techniques won't work either. A 2-3TB movie would take days rather than

hours to download however with new codecs and higher speed networks it may become practical sooner than later. One consolation is that the current HDMI 1.4a spec is designed to handle 4K video so at least you might not have to buy expensive new cables.

Upscaling Will Be the Short Term Solution: Merely doubling the current 1920x1080 (FullHD) picture to 3840 x 2160 will upscale an HD video to 4K. This means that if 4K displays appear sooner than the 4K content and distribution method but viewers should still see noticeable improvements in picture quality. You can already buy A/V gear like the Onkyo TX-NR515 receiver that will upscale to 4K.

Here Come the 4K TV Sets: At CES this year we saw many 4K sets but none of them had a price tag or availability date. We expect that to change over the next year or two. Toshiba is one of the first out of the gate with a 4K TV. The 55X3 should be available soon for around \$6,000. Although LG hasn't officially announced the availability of a 4K TV at CES we saw an amazing 85-inch LCD 4K running passive 3D that looked very close to what you might see looking out a window. Passive 3DTVs may get a huge boost with 4K resolution since it eliminates any signs of a "raster" that we've noticed on current passive 3DTVs.

Hints of 4K Starting to Emerge: Although Japan's TV network, NHK puts the time frame at 2020 for the first 4K (Ultra HDTV) broadcasts. We've read reports that DirecTV is already developing some 4K transmission capability. Satellite could have an advantage in the early stages of 4K broadcasting over copper-based cable networks. We also read of plans to broadcast some of this summer's London Olympics in 4K to special locations.

Should You Wait for 4K? Should you put off buying that new HDTV set because of 4K? The answer to that is, probably not. Although the production tools are available and 4K content is being produced the distribution formats are a long ways from being settled. In the meantime, it's worth keeping your eye on 4K technology and if you want to be an early adopter, the ability to upscale may be a rational to buy an expensive 4K set. You might also be able to feed a 4K TV content from a PC or game console long before you can get 4K programming on a disc or cable service.

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



Knowledge



People



Technology



Ecology



CORNING

Digital Signage Expo and Television

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.

At the recent Digital Signage Expo (DSE) in Las Vegas, one of the speakers had been the technical consultant on "Minority Report". If you have not seen the movie, it takes place in a future where digital public information displays are everywhere. They are constantly updated with new material, which included wanted posters of Tom Cruise, the star of the movie. Given the heavy amount of digital signage in the movie, it was obvious that that was a world where the square inches of digital signage outstripped that devoted to home TV. This is actually a common theme to many movies about the future.

The basic presumptions of digital signage is that everywhere there is a printed poster, particularly one that is routinely changed, there is an opportunity to cost-effectively replace a printed poster with a digital display. At DSE, I ran into one of the display industry luminaries and asked him if this was possible, if public digital display could ever outstrip TV in annual square inches sold.

Are You Smiling Yet? Even without eclipsing TV in sales, it seems that commercial applications for LCD will have a substantial impact on the television market. Due to the fact that public displays are usually tied to a revenue stream, much more can be afforded in a public/commercial display than for a consumer bill of materials. Indeed, much more is required for commercial displays:

- Heating, cooling, ingress protection for outdoor displays,
- Improved backlight,
- 24/7 operation and/or portrait orientation,
- Longer warranty, finally
- Increased interactivity.

It was the increased interactivity that was largely on display at DSE. It seems that the iPhone and other mobile devices have trained the US population to expect that every display that they can touch is a touch panel. This requires that the display, or the network that it is connected to have a menu of optional content for the demands of the person using the signage to obtain information. In more advanced applications, the display recognizes the consumer generically and produces push content for that particular type of consumer: male or female, age, etc. As important for the digital signage owner, the display measures its own impact, not only who is using it but their reaction to it.

For consumer TV, such interactivity can be translated into TVs that recognize who in the household is watching and suggest or block content appropriately. It can also mean that TV's turn off the display and turn up the sound if there is no one in the room, scout local businesses for sale prices, and such domestic functions. Indeed, the only limitation seems to be the imagination of the TV makers and what consumers will tolerate in terms of the intrusion of the TV watching them. Here again, the digital signage market will help. As consumers get used to the idea of public displays recognizing who they are, they will be more comfortable with the home TV set seemingly knowing more about them. As other interactive technology becomes prevalent in cell phones and in public displays, thing such as remote touch and voice response, these too will be incorporated in the home TV interface.

Larger Sizes/Thinner Bezels: Many of the displays at DSE were grouped together in video walls. This is because many digital signage owners would prefer a much larger display but are driven to tiled displays because of economics. In the Las Vegas airport, Samsung had placed a 100 unit (10 by 10) video wall prior to DSE 2011 showing that tiling taken to an extreme. In terms of impact, bigger is frequently better. The move toward more

tiled display has prompted the development of thinner and thinner bezels which, presumably makes the tiling less obtrusive.

The thinner bezel designs are significantly more expensive but can be expected to find their way into consumer TV as it gives a cleaner appearance. In my opinion, it actually does more for consumer TV than for tiled displays. Some years ago, Samsung actually showed a large size LCD that was effectively spliced together; the ultimate in bezel-less, at least along one axis. The splice was barely noticeable, but once you did notice it, it became plain; not as much was gained as you would expect. Further, as you would anticipate in the field but not necessarily at a display show, many of the video walls at DSE were composed of displays tuned to different color temperature, giving a mottled appearance.

If demand for larger commercial displays continues to grow, the display industry might find a way to provide larger sizes economically, perhaps even moving toward domestic manufacture or at least more of the value added being placed domestically. If this does happen, while it may be driven by commercial applications, certainly there is always a market for larger and larger consumer flat panels.

New Applications: Much of the growth in digital signage is in outdoor applications. This is because the signage owners' desire to bring consumers inside. Many outdoor signage applications, particularly larger ones where dpi does not matter, are done with LEDs. However, for smaller ones where LCD class dpi's are demanded, many issues, particularly moisture protection and isolation, had to be solved. The widespread availability of moisture-proof LCDs may be the jump-start that is needed to drive consumer adoption of bathroom TVs.... "A Great LCD TV in Every Room".

The ongoing impact of the 2008 collapse and the tepid recovery that has followed has been a reduction in the number of households and possibly even a reduction in the number of TVs per household. Certainly the number of households without a TV has risen. This collapse in the base market was partly offset by the HDTV conversion, effectively driving many consumers to purchase replacement TVs ahead of schedule. Some bounce back in 2010 was also felt as some of the pent up demand from 2008-9 was relieved. However, what could be a significant market expansion for consumer TV would be to finally normalize TV placement in the one room in the household where TVs are not normally found, the bathroom.

3D: There was a fantastic 3D demo by LG at the show. It was a video wall that was originally designed to show automobiles in full size. The concept was for a dealer to be able to show the consumer the full range of product (models, colors, options, etc.) without having to carry the inventory. The economics of such a display are obvious. Further, the economic model is transferable to clothing and to other consumer goods. I said that the display was fantastic which, today at least, inherently means that it must be viewed with glasses.

There were other 3D displays at the show including one autostereoscopic display that can only be described as nauseating. I am a believer that 3D is an eventuality in consumer TV in spite of the so far disappointing sales. I am also of the opinion that autostereoscopic 3D is a technology in need of a fundamental invention. If that invention is made, the first widespread application might be signage ahead of TV, especially if that invention is expensive. There was much interest in 3D expressed within the community at DSE however; it is difficult to envision 3D general signage using glasses.

Conclusion: The digital signage, or public video displays, market has been around since the CRT. The limitations had been difficulty in placing the display and content delivery. With the change to flat panel technology and wireless content delivery, these limitations have gone away and the market is blossoming in spite of the economy. Indeed, it may be the only large size display market that is currently undergoing rapid growth.

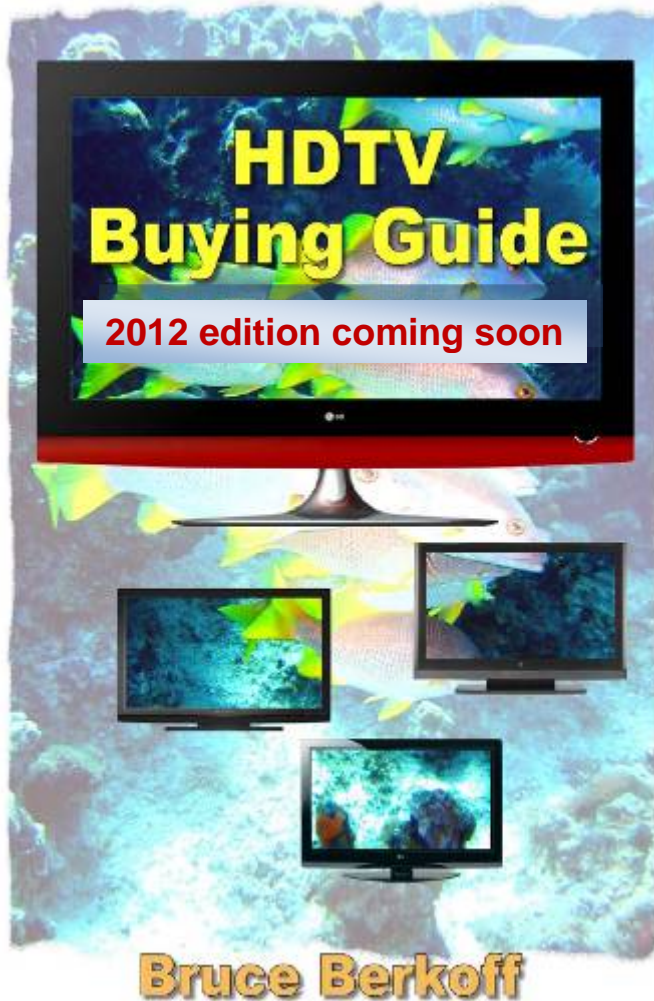
With that growth and with a bill of materials that is more tolerant of the expense of innovation, digital signage may be becoming the pioneer for new consumer TV technology. Properties such as increased interactivity, larger sizes, smaller bezels, and better adapted for wet environments will grow both the performance of consumer TV as well as the base market. It may even, eventually, contribute to structural changes in the display manufacturing environment. As to whether digital signage/commercial applications could ever eclipse TV in importance to the display industry, the expert that I asked didn't answer.

2012 HDTV Buying Guide coming soon

Authored by Bruce Berkoff and edited by Alfred Poor, the 2008 edition of the HDTV Buying Guide is currently 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



The Future of Touch & Interactivity
Conference
June 7, 2012
Boston, MA



IMS Research is proud to announce the 3rd annual, The Future of Touch & Interactivity Conference at Display Week 2012 in Boston on June 7th. The event will be part of the IMS Research Market Focus Conference Series and is the premier user interface event for the display industry.

For more information, contact Bob Perez at: bob.perez@imsresearch.com or +1.512.302.1977.

Gold Sponsor:



Media Sponsor:



Silver Sponsors:



Presenting Sponsors:



-and-



2012 SID Business Conference
June 4, 2012
Boston, MA



IMS Research is hosting the Business Conference at Display Week 2012 which will take place on Monday, June 4th at the Boston Convention & Exposition Center. The event will feature some of the leading minds from both Wall Street & the display industry and address the opportunities & challenges we are facing in this highly volatile economic environment. The Business Conference will feature keynotes & presentations from industry leaders, lively panel sessions and plenty of time for networking.

For more information, contact Bob Perez at: bob.perez@imsresearch.com or +1.512.302.1977.

Presenting Sponsor:



Media Sponsor:



From the professor...

by Alfred Poor

Alfred Poor is the editor and publisher of "HDTV Almanac", a free daily service of news and commentary on the HDTV, digital television, and home entertainment electronics markets: <http://hdtvprofessor.com/HDTVAlmanac>. This article comprises three recent entries about the TV industry, providing some insights into just how diverse and continuously interesting the market has become; still not without some substantial problems.



Panasonic Dozen-Foot Diagonal Display

Once again, Panasonic has moved the goalposts in the "Mine Is Bigger than Yours" contest. The latest is a 145-inch diagonal plasma television; that's more than 12 feet from corner to corner. According to a news report by Tech-On, the behemoth was a joint effort with NHK (Japan Broadcasting System) and was produced in one of Panasonic's idle plasma panel fabrication lines. It's not a big surprise that NHK is involved, because they have been at the forefront of higher-than-1080p resolutions for a long time.

There are several points of interest about this demonstration. First and foremost is the resolution; the panel has 7,680 by 4,320 pixels. I've done the math for you already, and that is the equivalent of sixteen 1080p resolution panels tiled together. The tiled panels would be only about 36-inches diagonal apiece, which is on the small size for current plasma products. As a result, the display has a pixel pitch of 60 ppi, which is smaller than a typical 42-inch plasma. This means that each sub-pixel is smaller and has less surface area for phosphors, which would mean that the panel can emit less light per pixel. This is one of the limitations of plasma technology.

One detail that is a surprise is that Panasonic engineers have come up with a way to divide up the scanning signals for these panels. Apparently they scan multiple horizontal lines at the same time, in order to refresh the 4,320 lines without flickering.

Finally, the article quotes Yoshio Ito, director of Display Devices Business Group and senior vice president at AVC Network Co, Panasonic: "It is possible to experience video with realistic sensations from a distance of 1.6 meters, which is the optimal viewing distance." That's just over five feet, folks. (That's just about the distance that I'd recommend for a 36-inch 1080p screen, which would have the same pixel size.) So I don't want to hear any more complaints when I recommend a bigger screen for your viewing distance; here's the SVP from Panasonic saying that five feet from a 12-foot diagonal screen is "optimal."

IKEA Television: What Gives?

Have you seen the new IKEA Uppleva television? It apparently is designed to make it easy for consumers to choose a new HDTV that fits in with their Scandinavian decor. The set hasn't been released in this country yet, so we don't know what the price will be. Without this detail, it's hard to assess the value of this new product, but it clearly marks some interesting changes in the market.

First, if you don't think that the LCD TV has reached the commodity stage, this should convince you. Here's a television branded not by any consumer electronics giant, but a furniture maker. This also conveys a message that this set will be as easy to install and use as the IKEA furniture (or with any luck, even easier). It bundles everything for you, including a Blu-ray player.

It is also interesting that a furniture maker should decide to market its own TV. I remember when Magnavox made a big deal about the furniture surrounding its massive cathode ray tube console sets, but I can't remember another case where that was turned around. And you don't have to worry about being overwhelmed by a lot of choices. The Uppleva comes in three sizes; that's it. You don't have to deal with a lot of the specifications that you might encounter in an electronics store, such as LCD vs. plasma TV, or whether the screen is 120 Hz or not, if it supports 3D TV, or how the contrast ratio compares. Just pick the television that fits your space and you're good to go.

Is this the start of a trend? Will you be able to buy a television branded by Sterns and Foster that is designed just for your bedroom? Maybe the major supermarket chains will offer their own television brands; buy one at Thanksgiving and get a free turkey. The price of a flat screen TV has fallen to the point where they could be sold by retailers other than the traditional consumer electronics, shopping club, and discount chains. IKEA could be the bellwether for a whole new approach to selling televisions.

You can be sure that the Uppleva experiment will be watched closely to see if it is a strategy worth emulating. Of course, the company may have to endure a little rib-poking before the new HDTV can be deemed a success, as has been done by late night TV host Conan O'Brien: <http://www.youtube.com/embed/89taazMC6FE?rel=0>

Bed-Sized 3D LCD TV in China

How much is too much? If it's possible to go too far with a television set's specifications, this could be it. China Star Optoelectronics Technology Co Ltd is a subsidiary of the electronics giant, TCL Corporation, and earlier this month, the company announced a monster of a 3DTV.

This behemoth measures 110-inch diagonal. It also has 4K by 2K resolution, or 4,096 by 2,160 pixels. That's the same as if you had glued four 55-inch 1080p screens together. And it is an active 3DTV display, using shutter glasses for the stereoscopic view. And if that's not enough, it also has multi-touch touchscreen input.

The company's press release is silent on plans to make this a commercial product, but does indicate that two units were donated to the Great Hall of the People in Beijing for public display. This points to what is likely the true motivation for the technology demonstration. It shows that China is able to hold its own in terms of innovation in the display industry.



TCL quotes an expert from Fudan University; "China will replace Japan and South Korea as the world leader in TV display screens in terms of manufacturing and R&D in three to five years, and will provide a higher level of quality and more cost-effective products to the global community."

Clearly, this is a very large stake to drive in the ground, but China is marking its territory. Given the current state of the flat panel industry, however, China could end up like the dog who chases a cat, and then has to figure out what it wants to do with it once it catches it. There could be a lot of corporate blood and fur strewn about before this is all over.



PROMOTE the industry and technology via speeches, debates, interviews, PR and publically available white papers on topics that promote these goals. The founder's history with the industry ensures many lively and engaging interviews on the industry's strategies and will put a human face on this huge and influential industry. The press is constantly seeking validation from neutral, yet knowledgeable industry experts such as those at the LCD TV Association.

Introducing a Whole New World of Color



XT
EXTREME TECHNOLOGY


VIZIO
www.VIZIO.com

Display Industry Calendar of Events

Please notify mark@veritasetvisus.com to have your future events included in the listing.

<i>January 2012</i>			
January 8-9	Storage Visions Conference	Las Vegas, Nevada	
January 9-11	Digital Hollywood CES	Las Vegas, Nevada	
January 10-13	2012 International CES	Las Vegas, Nevada	
January 18-20	NEPCON World Japan	Tokyo, Japan	
January 18-20	LED/OLED Lighting Technology Expo	Tokyo, Japan	
January 21-26	Photonics West 2012	San Francisco, California	
January 22-26	Electronic Imaging 2012	San Francisco, California	
January 23-25	Stereoscopic Displays and Applications	San Francisco, California	
January 24-26	ICE Totally Gaming	London, England	
January 25-26	DisplaySearch Japan Forum	Tokyo, Japan	
January 26-28	MacWorld Expo	San Francisco, California	
January 30-31	International Thin-Film Transistor Conference 2012	Lisbon, Portugal	
January 30 - February 4	Advances in Computer-Human Interactions	Valencia, Spain	
January 31 - February 2	Integrated Systems Europe	Amsterdam, Netherlands	
<i>February 2012</i>			
February 3	Emerging Display Technologies	Costa Mesa, California	
February 4-9	Medical Imaging	San Diego, California	
March 5-9	Game Developers Conference	San Francisco, California	
February 6-9	Flexible Electronics and Displays Conference	Phoenix, Arizona	
February 7-9	Imagina	Monaco	
February 7-9	Semicon Korea	Seoul, Korea	
February 14-17	Intelligent User Interfaces	Lisbon, Portugal	
February 14-16	Broadcast Video Expo	London, England	

February 14-17	Hollywood Post Alliance 2012 Tech Retreat	Indian Wells, California	
February 19-22	Tangible, Embedded, and embodied Interaction	Kingston, Ontario	
February 20-23	LED China 2012	Guangzhou, China	
February 20-23	Sign China 2011	Guangzhou, China	
February 22-23	3D Display Technology, Perception and Application	Washington, DC	
February 22 -23	Createasphere/Digital Asset Management Conference	Los Angeles, California	
February 24-26	Sound & Vision 2012	Bristol, England	
February 24-26	International Conference on Imaging Theory and Applications	Rome, Italy	
February 28-29	US FPD Conference	San Diego, California	
February 28 - March 1	APEX Expo	San Diego, California	
February 29 - March 1	Electronic Displays Conference 2012	Nuremburg, Germany	
February 29 - March 2	PV Expo 2012	Tokyo, Japan	
<i>March 2012</i>			
March 4-5	Symposium on 3D User Interfaces	Costa Mesa, California	
March 4-7	Focus on Imaging	Birmingham, England	
March 4-7	Haptics Symposium	Vancouver, British Columbia	
March 4-8	Virtual Reality 2012	Costa Mesa, California	
March 6-8	Air Traffic Control	Amsterdam, Holland	
March 6-9	Digital Signage Expo	Las Vegas, Nevada	
March 6-10	CeBIT 2012	Hannover, Germany	
March 8-9	Augmented Human Conference	Megeve, France	
March 9-11	Symposium on Interactive 3D Graphics and Games	Costa Mesa, California	
March 12-14	DVB World	Rome, Italy	
March 14	Silicon Chip Industry Training Seminar	London, England	
March 15-17	EHX Spring	Orlando, Florida	
March 19-23	2012 Measurement Science Conference	Anaheim, California	
March 20-21	Digital Signage Show Australia 2012	Sydney, Australia	

March 20-21	Over-the-Top TV Conference	Santa Clara, California	
March 20-22	FPD China	Shanghai, China	
March 20-22	Laser World of Photonics China	Shanghai, China	
March 20-22	Phosphors Summit	Scottsdale, Arizona	
March 20-22	Image Sensors Europe	London, England	
March 21	Korea FPD Conference	Seoul, Korea	
March 22-24	International Sign Expo	Orlando, Florida	
March 23-27	Symposium on Liquid Crystal Photonics	Guilin, China	
March 27-29	Sign UK/Digital Signage Showcase	Birmingham, England	
March 28-30	Eye Tracking Research and Applications	Santa Barbara, California	
March 28-30	LAVAL Virtual	Laval, France	
<i>April 2012</i>			
April 1-4	MIPTV	Cannes, France	
April 2-3	Smart Lighting Partnering Summit	Santa Clara, California	
April 3-4	Printed Electronics and Photovoltaics Europe	Berlin, Germany	
April 10-11	The Road to Flexible, Wearable Electronics for Biometrics and Medicine	San Jose, California	
April 10-12	China International 3D World Forum and Exhibition	Shenzhen, China	
April 11-13	Highly Functional Film Technology Expo	Tokyo, Japan	
April 11-13	FineTech Japan & Display 2012	Tokyo, Japan	
April 11-13	Touch Panel Japan	Tokyo, Japan	
April 11-13	Printed Electronics & Electronic Materials Show	Seoul, Korea	
April 12-14	Photovoltaic Technology Show	Berlin, Germany	
April 14-15	2012 Taiwan FPD Conference	Taipei, Taiwan	
April 14-17	Global FPD Partners Conference	Himeji, Japan	
April 14-19	NAB 2012	Las Vegas, Nevada	
April 16-18	Photovoltaics Summit	San Diego, California	
April 17-18	Taiwan Display Conference	Taichung, Taiwan	

April 17-19	Smart Fabrics 2012	Miami, Florida	 
April 19-20	DisplaySearch Taiwan	Taipei, Taiwan	
April 23-26	Cinemacon	Las Vegas, Nevada	
April 23-27	SPIE Defense, Security, and Sensing	Baltimore, Maryland	 The International Society for Optical Engineering
April 24-26	SEMICON Singapore	Singapore	
April 25-27	Digital Signage World ASIA	Singapore	
April 26-27	Laser Display Conference	Yokohama, Japan	
April 29 - May 2	Digital Holography and Three Dimensional Imaging	Miami, Florida	
April 30 - May 2	UV/EB Technology Expo and Conference	Chicago, Illinois	
<i>May 2012</i>			
May 5-10	CHI 2012	Austin, Texas	
May 7-8	SID ME Spring Meeting	Stockholm, Sweden	
May 8-11	International Conference on Animation, Effects, Games, and Digital Media	Dusseldorf, Germany	
May 9-11	CEDIA Expo Asia Pacific	Brisbane, Australia	
May 10-11	Mastering Printed Electronics Principles Workshop	Kalamazoo, Michigan	
May 13-15	SMPTE Forum on Emerging Media Technologies	Geneva, Switzerland	
May 13-18	EuroVis 2012 / Eurographics	Cagliari, Italy	
May 14-15	Advances in 3D	Toronto, Ontario	
May 15-16	CEDIA Expo New Zealand Expo	Auckland, New Zealand	
May 16-17	Screen Media Expo Europe	London, England	
May 21-25	Advanced Visual Interfaces	Naples, Italy	
May 22-24	CeBIT Australia	Sydney, Australia	
May 24-25	China Smart TV and Smart Display Conference	Shenzhen, China	
May 28-30	Graphics Interface 2012	Toronto, Ontario	
<i>June 2012</i>			
June 3-8	SID International Symposium	Boston, Massachusetts	

June 4	SID Business Conference	Boston, Massachusetts	
June 5	SID Investors Conference	Boston, Massachusetts	
June 5-7	E3 Media and Business Summit	Los Angeles, California	
June 5-9	Computex 2012	Taipei, Taiwan	
June 6	The Lighting Evolution: From Sapphire to Lumens	Boston, Massachusetts	
June 7	Touch and Interactivity	Boston, Massachusetts	
June 7-10	SIIM 2012	Orlando, Florida	
June 9-15	InfoComm '12	Las Vegas, Nevada	
June 11	Silicon Chip Industry Training Seminar	London, England	
June 11-14	Fusion ¹² Developer's Summit	Bellevue, Washington	
June 11-12	Projection Summit	Las Vegas, Nevada	
June 12	Infocomm DisplaySearch Digital Signage Conference	Las Vegas, Nevada	
June 12-13	Digital Signage Expo 2012	Berlin, Germany	
June 12-13	TV of Tomorrow Show	San Francisco, California	
June 12-15	Interaction Design and Children	Bremen, Germany	
June 13-15	Dimension3 Expo	Plaine St. Denis, France	
June 15-16	SEMICON Russia 2012	Moscow, Russia	
June 18-21	CineEurope	Barcelona, Spain	
June 18-21	Nanotech Conference & Expo	Santa Clara, California	
June 19-21	LOPE-C -- Large Area, Organic and Printed Electronics Convention	Munich, Germany	
June 19-21	Photonics Festival: OPTO Taiwan , SOLAR, LED Lighting, Optics	Taipei, Taiwan	
June 20-22	3D & Virtual Reality Expo	Tokyo, Japan	
June 25-29	3D Research 2012	Seoul, Korea	
June 25-29	International Symposium on Display Holography	Cambridge, Massachusetts	
June 26-29	OLED Expo 2012	Seoul, Korea	
June 26-29	LED Expo 2012	Seoul, Korea	
June 30 - July 7	Nanosciences & Nanotechnologies	Thessaloniki, Greece	

June 30 - July 7	International Symposium on Flexible Organic Electronics	Thessaloniki, Greece	
<i>July 2012</i>			
July 4-6	EuroITV 2012	Berlin, Germany	
July 5-8	SINOCEs	Qingdao, China	
July 9-12	Intersolar North America	San Francisco, California	
July 10-12	Semicon West 2012	San Francisco, California	
July 13	Hot Topics in 3D	Melbourne, Australia	
June 18-20	International Symposium on Wearable Computers	Newcastle, England	
July 25-30	National Stereoscopic Association Convention	Costa Mesa, California	
July 18-20	China International Touch Screen Exhibition & Seminar	Shanghai, China	
July 25-26	Japan Forum	Tokyo, Japan	
July 31 - August 1	The LED Show	Las Vegas, Nevada	
<i>August 2012</i>			
August 4-5	Web3D	Los Angeles, California	
August 5-9	SIGGRAPH 2012	Los Angeles, California	
August 13-14	Emerging Technologies Conference	Santa Clara, California	
August 12-16	SPIE Optics+Photonics	San Diego, California	
August 19-24	International Liquid Crystal Conference	Mainz, Germany	
August 21-23	Australasian Gaming Expo	Sydney, Australia	
August 28-31	IMID	Daegu, Korea	
August 28-31	European Conference on Cognitive Ergonomics	Edinburgh, Scotland	
August 31 - September 5	IFA 2012	Berlin, Germany	
<i>September 2012</i>			
September 3	IFA DisplaySearch Business Conference	Berlin, Germany	
September 3	Silicon Chip Industry Training Seminar	London, England	
September 5-7	Semicon Taiwan	Taipei, Taiwan	

September 5-8	CEDIA Expo	Indianapolis, Indiana	
September 6-7	China FPD	Shanghai, China	
September 6-11	IBC 2012	Amsterdam, Netherlands	
September 9-12	PLASA '11	London, England	
September 9-13	International Conference on Digital Printing Technologies	Quebec City, Quebec	
September 9-13	Digital Fabrication 2012	Quebec City, Quebec	
September 12-13	Touch Gesture Motion Europe	London, England	
September 17-18	Organic Electronics UK	London, England	
September 19-20	3D Entertainment Summit	Hollywood, California	
September 19-20	3D Gaming Summit	Hollywood, California	
September 19-20	MultiScreen Summit	Hollywood, California	MultiScreen Summit
September 21-24	Mobile HCI 2012	San Francisco, California	MobileHCI2012
September 26-28	OLEDs World Summit	San Francisco, California	
September 27-28	Createasphere/Entertainment Technology Exposition	New York, New York	
<i>October 2012</i>			
October 2-3	Printed Electronics Asia	Tokyo, Japan	
October 2-6	CEATEC Japan 2012	Tokyo, Japan	
October 4-6	Viscom	Milan, Italy	
October 9-11	Semicon Europa 2012	Dresden, Germany	
October 9-11	Plastic Electronics 2012	Dresden, Germany	
October 9-12	Korea Electronics Show	Seoul, Korea	
October 9-12	Taipei Int'l Electronics Autumn Show	Taipei, Taiwan	
October 10-13	Solar Power International	Orlando, Florida	
October 13-15	3DimPVT	Zurich, Switzerland	3DimPVT
October 13-16	ElectronicAsia 2012	Hong Kong, China	
October 14-18	Frontiers in Optics	Rochester, New York	
October 18-19	Printed Electronics and Membrane Switch Symposium	Las Vegas, Nevada	

October 22-25	SMPTE 2012	Hollywood, California	
October 22-26	AIMCAL Fall Technical Conference	Myrtle Beach, South Carolina	
October 25-27	Viscom	Frankfurt, Germany	
October 29 - November 2	ACM Multimedia 2012	Nara, Japan	
October 30	International Symposium on Emerging and Industrial DLP Applications	Frankfurt, Germany	
October 31 - November 2	FPD International	Yokohama, Japan	
<i>November 2012</i>			
November 5-8	CEDIA China Expo	Shanghai, China	
November 5-8	Showeast	Miami, Florida	
November 7-8	UK Plastic Electronics Show	Birmingham, England	
November 7-8	Createasphere/Entertainment Technology Exposition	Burbank, California	
November 11-15	Solid State and Organic Lighting	Eindhoven, Netherlands	
November 12-13	WCPC Annual Technical Conference	Swansea, Wales	
November 12-16	Color Imaging Conference 2012	Los Angeles, California	
November 13-15	SATIS 2012	Paris, France	
November 15-16	Digital Hollywood Fall	New York, New York	
November 19	Silicon Chip Industry Training Seminar	London, England	
November 25-27	China International Touch Screen Exhibition & Seminar	Shenzhen, China	
November 28 - December 1	SIGGRAPH Asia	Hong Kong, China	
November 29 - December 2	CeBIT Bilisim EurAsia	Istanbul, Turkey	
<i>December 2012</i>			
December 4-7	IDW/AD	Kyoto, Japan	
December 5-6	Printed Electronics US	Santa Clara, California	
December 5-7	SEMICON Japan	Tokyo, Japan	
December 9-11	Workshop on Liquid Crystals for Photonics	Hong Kong, China	
December 11-13	CineAsia	Hong Kong, China	

“A Great TV in Every Room”



Inform • Promote • Improve • Connect

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

Sustaining Members



16055 SW Walker Road, Suite #264, Beaverton, OR 97006 U.S.A. Phone +.215.206.6506 membership@lcdtvassociation.org
© 2012 LCD TV Association, All Rights Reserved Worldwide. All registered trademarks are the property of their respective owners.