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# **“LCD TV Matters”**

**Volume 2, Issue 1**



***"A Great TV in Every Room"***

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# Chairman's Corner: Timescale is everything...

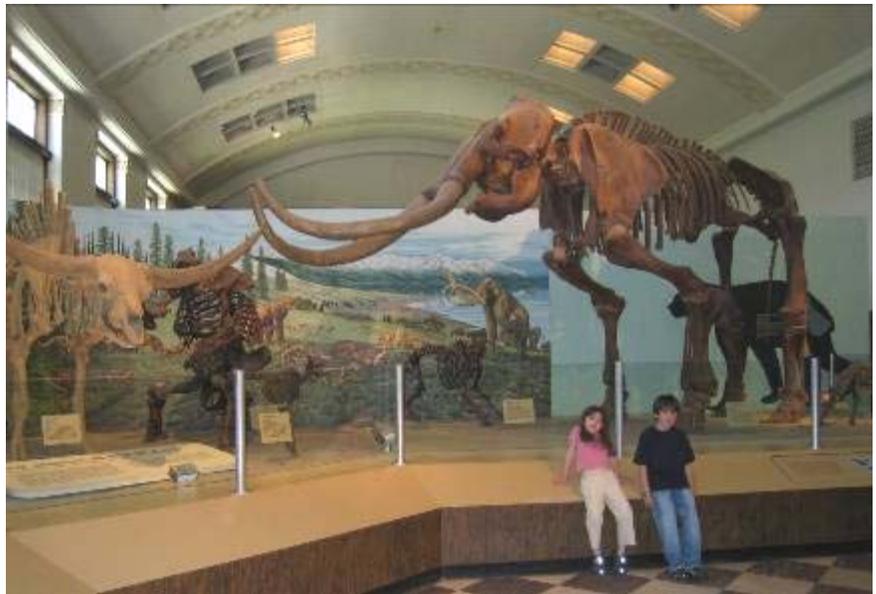
by Bruce Berkoff

"The times they are a-changin'"... yet timescale is everything... and memory should count for something. This is small solace to those who feel we are entering a recession at the same time that the TFT LCD cyclical industry is remembering it is cyclical, and the "shortage" that was so clearly here last fall may be a distant memory by the time you read this. June/July is usually a weak IT time, and TV folks ramp to get ready for the "big" season, but with Beijing Olympics on the one hand and US potential recession on the other, and a global debt crisis of "constipation" in between, all bets are off for a bit, thus my attempt today to point out some perspective in the longer term picture....

Of note is the picture shown below of a pretty lake left behind by a melting ice field in Glacier National Park, Montana, illustrating big changes over many many years, but still only a short perspective in "geological time". This clearly exemplifies a divergence of expectations. (The image is beautiful either way and this example is not meant to diminish the impact of any climate change, just put a marker down in time versus events).

Many people have asked me, "Will Beijing disappoint the way the World Cup did a couple years back?", to which I can only answer, the premise is wrong, and "no", not to me for either! In fact, if one went back to one year prior to the World Cup, and looked at everyone's LCD TV forecasts, the reality was better than what had been forecasted, but as analysts are likely to do, they raised forecasts every month for the next year so "disappointment" was predetermined. Beijing may be the same in that it is likely to be a big success, both as an Olympics and as an incentive for LCD TV sales in China, by any "reasonable" metric. Of course, no one can count on analysts to be reasonable, so I am also sure some folks will be disappointed - but not me! Year-over-year growth will continue to do well, and average size globally and especially in China will go up nicely (just not as fast as it did last fall when panel makers would only supply their largest sizes despite the ever-present demand for 32-inch LCD TVs, etc.).

A shortage may seem to some like the woolly mammoth (shown below), a memory from the distant past – but in the world of LCD TVs, we will not need DNA and *Jurassic Park* to recover that dream, just some time and natural growth in our cyclical industry. The many end-markets and faster reaction time in investment and production behavior that we have today, versus the "ancient past" of earlier this century, uh, well – decade, means we are always closer to "balance" than it may seem. But change still comes fast and hard for those in the thick of things...



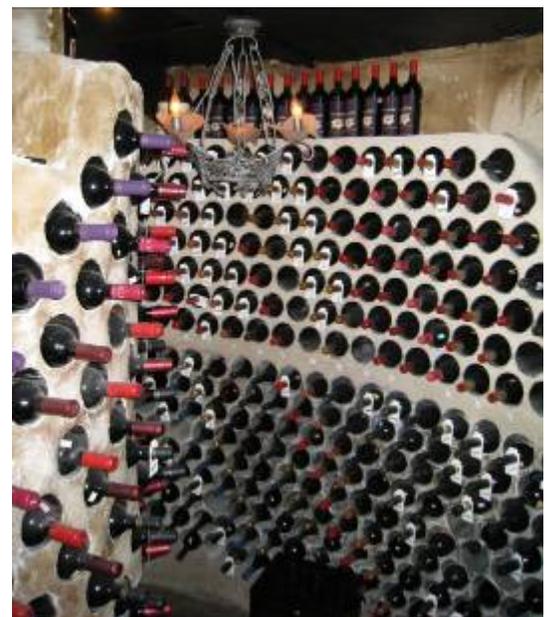
*As with glacial melt and the extinction of the woolly mammoth, changes in the world of LCD TVs sometimes need to be considered with the perspective of a longer timescale. The photo of the lake is from within Glacier National Park in Montana; the image of the mammoth is at a museum in Utah.*

Much discussion happens about all the changes in our world of large LCD TVs - much of it good, like image quality improvements for electronics (frame rate doubling to 120 Hz, advanced liquid crystals like IPS, motion blur reduction, etc.) and from new technology like LED back or edge-lighting (more from Luminus Devices in this issue) which enable better color gamut, better fast motion picture response times, lower power, better contrast (the last two especially with regional dimming or HDR), larger and more affordable sizes like 47 and 55-inch for the mass market homes by this holiday season, etc. But, many others jump ahead of reality and ask about the next “big” thing, whether it be carbon nanotube display announcements (again!) or OLED TVs (not again!) or FEDs (again?)... All of these ignore the basic principals of Berkoff’s Law, which our readers know well (“science loses to engineering, engineering loses to economics, and all lose to politics”). Despite this, a corollary many forget is that “time and money are needed to anneal a supply chain”. Lots of time makes continental drift and evolution not only obvious but inevitable – though humans can barely fathom the timescales involved in these processes. (If you do not believe in either of these, we can discuss that later in front of your CRT, or candlelit room, as well as point out that neither go against anyone’s “bible” which, by the way, was never written in English, but like an analyst before the Olympics, I digress)...

The point is, though someone like Sony could make a great FED happen, even they could not afford to make the supply chain happen to supply millions a month of them by themselves... Lots of time and money would be needed to anneal that supply chain into shape, the way it happened for LCDs via the notebook market in the early 1990s. This may happen for some OLED cell phone displays over the next few years, but TVs will take much longer, if ever, as the “driving forces” are still in doubt, and thus the need and outcome is as well.

Some folks still wax nostalgic about CRTs; others ask me about 3D holographic displays. I await my half-inch thick edge-lit LED TFT LCD TV that comes in a one-inch thick box (resulting in huge cost savings in logistics and packaging, and which is a truly green TV. (Ask me for details if you really want to know how to make this happen, since it is very doable, and beneficial, but not so likely given human behavior and our “laws” as mentioned above).

Some folks remember that glaciers melt, and species die out (not always a “cause and effect”) and even companies “too big to fail” may still go away - or change in ways we barely can imagine (like Anheuser-Busch being bought by InBev! An American icon, going “overseas”, almost unthinkable, and a product of globalization for the old and new: like this photo from the heartland (below), which I took in Canada!



*The image on the left was taken in Alberta, Canada, depicting an enormous billboard of the iconic American beer, which may be acquired by a Belgian company. Globalization is taking place all the time, such that some of our specialty memories of the display market and its many participants may best be kept like the fine wines depicted in the image on the right, taken at the Wine Cellar from La Caille in Sandy, Utah.*



### Samsung debuts slim bezel "Touch of Color" LCD HDTV

Samsung Electronics introduced two new LCD HDTVs. The Series 8 850 and 860 LCD HDTVs feature a next-generation implementation of Samsung's "Touch of Color" (ToC) design – a new slim and narrow frame with a depth of 1.9 inches at its widest. In addition to rose (850), Samsung offers its ToC design in deep blue (860). The Series 8 delivers a crisp full HD 1080p picture with up to a 50,000:1 dynamic contrast ratio, and features Samsung's latest Auto Motion Plus 120Hz and Ultra Clear Panel technologies for continual rich details and lifelike color. Since color is infused and not painted on, no volatile organic compounds (VOC) are emitted during the production process reducing CO2 emissions. For vibrant onscreen portrayal of nature-perfected colors, Samsung's Wide Color Enhancer 2 technology maximizes the expanded color range used in HDTV broadcasting. By strengthening the reds, greens, and blues, depth and intensity are added to images that may appear weak on other displays without over-saturation. Moreover, the new Series is designed to minimize the motion judder and image blurring that can occur in fast-paced action scenes or sports broadcasts, Samsung's Auto Motion Plus 120Hz technology estimates and inserts an extra frame between frames to create a smoother viewing experience. The extra frame renders images that flow more naturally, allowing even the quickest action scenes to be presented with lifelike precision and clarity. Samsung's Series 8 LCDs also feature a unique "Energy Saving Mode" making the HDTV compliant with the latest EPA EnergyStar rating system. By selecting a low, medium, high, or auto setting, the HDTV's backlight brightness is adjusted and power consumption is substantially decreased compared to similar 2007 models. For added convenience, the Samsung Wireless LinkStick allows consumers to access the InfoLink feature on the Series 8 LCD HDTV wirelessly. While a connection to the Internet via an appropriate modem and wireless router is still required, consumers will no longer need to run an Ethernet cable directly to their HDTV. The Wireless LinkStick is available at an estimated selling price of \$34.99. The Series 8 850 LCD HDTVs will be available in September in the 46-inch class and 52-inch sizes <http://www.samsung.com>



### Samsung's MediaLive: brings digital content from the PC to the big screen

Samsung Electronics America launched the MediaLive adaptor which delivers digital content (including HD content) in real-time from Windows Media Center on a PC to the big screen of a Samsung HDTV via a wireless or wired home network. MediaLive allows PCs running Windows Vista or Windows Vista Home Premium to stream a personal movie, photo, music, and video collection to any 2008-model Samsung HDTV in the home with an HDMI-CEC connection. Users can transfer PC content in real-time and share it on a 50-inch HDTV. One PC can stream content to up-to five Samsung MediaLive boxes connected to a TV through a home network. Beyond streaming personal entertainment, Samsung's MediaLive gives consumers access to a wide range of entertainment options including online services such as Vongo, MovieLink, Showtime TV, XM Radio, and FOX Sports, as well as the ability to browse through top news stories from Reuters and NPR. The Samsung MediaLive will be available in August 2008 for an estimated selling price of \$200. <http://www.samsung.com>

### Syntax-Brilliant files voluntary petition for Chapter 11 bankruptcy reorganization

In early July, Syntax-Brilliant announced that it entered into an asset purchase agreement to sell certain of its assets to a newly-created company, Olevia International Group, LLC, which is under common ownership with TCV Group. TCV Group is one of Syntax-Brilliant's original partners for industrial and mechanical design and it provides the plastic injection molded parts for the Olevia branded HDTV LCD TVs. Under the terms of the transaction, in exchange for the purchased assets, Olevia International Group has agreed to assume \$60.0 million of Syntax-Brilliant's secured debt. Concurrent with this announcement, Syntax-Brilliant filed a voluntary petition for relief under Chapter 11 of the United States Bankruptcy Code in the US Bankruptcy Court. <http://www.syntaxbrilliant.com>

### VIZIO introduces high performance XVT HDTVs

VIZIO is now offering two new LCD TV models offering the latest technology that significantly enhances video and audio performance, with 120Hz refresh rate, Smooth Motion Video Processing, 5ms response rate and 5.1 virtual Surround Sound using SRS TruSurround XT, upgradeable to Wireless 5.1. The new line of products is called the XVT Series, the SV470XVT (47-inch) and SV420VXT (42-inch) both provides side access HD Game Ports with two HDMI v1.3 inputs for fast connections of game consoles, camcorders and other portable sources, in addition to two HDMI ports on the rear panel. Available through traditional consumer electronics retailers such as Circuit City and Sears and Club retailers like Costco and Sam's Club, the new VIZIO SV420XVT and VIZIO SV470XVT began shipping in July at estimated selling prices of \$1499.99 and \$1899.99 respectively. <http://www.vizio.com>



### Westinghouse unveils wireless LCD TVs

Westinghouse Digital Electronics introduced two wireless HDMI HDTVs. Targeted to the B2B digital signage sector, the new 42- and 47-inch units can wirelessly receive real-time high quality audio and video content from a gamut of entertainment sources. The Westinghouse 42-inch P4210FW and 47-inch P4710FW feature fully integrated CWave UWB Wireless HDMI technology for real-time wireless streaming of high quality audio and video content from entertainment source devices such as a DVR, Blu-ray DVD player, live cable or a satellite feed. Video data is encoded using the JPEG2000 video codec, the same codec used by movie theaters for "Digital Cinema," providing a secure high quality HD experience. The P4210FW and the P4710FW feature a 1920x1080 resolution, along with a full suite of connectors includes HDMI, DVI, YPbPr, VGA, Composite/ S-Video. The sets offer Westinghouse Digital's proprietary SpineDesign construction for easy cable management and convenient media box access, and Autosource technology, which automatically turns the TV on and adjusts it when an external source is detected. For safety proposes, the displays feature anti-tip over/theft deterrent rings, and front panel and remote locks for security in public environments. <http://www.westinghousedigital.com>

### Sony's new XBR LCD TVs deliver exceptional color reproduction and black levels

Sony recently introduced seven new BRAVIA XBR flat-panel LCD high-definition televisions including models with Triluminos LED backlight and local dimming for outstanding black-level reproduction and high levels of contrast. The XBR models represent Sony's premium line, delivering the latest features and the pinnacle of picture quality. Leading the line is a full HD 1080p 70-inch model. Sony's TRILUMINOS LED backlight technology dramatically expands the TV's color range by aligning individual clusters of red, green and blue LEDs, significantly elevating color purity compared to traditional single white LED backlights. Additionally, the sets offer the new Advanced Contrast Enhancer PRO (ACE PRO) technology.



ACE PRO, which features Sony's own algorithm for local dimming, improves contrast and dynamic range by controlling the LED backlight level by area so that detail is maintained in the dark areas, while other areas are driven near peak brightness. The technology reduces unnecessary light emission resulting in true, deep blacks and reduced power consumption compared to conventional LED backlit models. The models also feature BRAVIA Engine 2 PRO, which is Sony's latest picture processing technology and the company's Motionflow 120Hz high frame rate technology. Rounding out the picture enhancement suite is x.v.Color compatibility. This technology expands the potential color data range of video by about 1.8 times, resulting in the display of more natural and vivid colors similar to what the human eye can actually see. This complements Sony's HD camcorder models and Blu-ray Disc players, which capture color beyond what broadcasters currently deliver. <http://news.sel.sony.com>

### JVC debuts ultra slim eco-friendly LCD TV

JVC debuted a new LCD TV model in the Precision Series that supports 1080p resolution with ultra slim and energy saving aspects. The company said that the product uses less than 200W of electricity. The thin case of the product is 1.5 inch and 3 inches from the central TV panel part. JVC explained that the ultra thin design was possible through a slim panel BLU and power supply circuit. The new BLU shows 40% less size than the existing one. With 26 pounds using only 145W electricity, the product has low numbers across the board compared to the 200W typical LCD TV electricity use. Also the BLU of the product is optimized by an extended substrate and additional reflected film such that light penetrates to the corner and side of the screen without an additional CCFL tube. <http://www.jvc.com>

### Sharp brand campaign targets TV and solar power

Sharp launched July 14 a large national marketing campaign that highlights an expanded brand focus, highlighting its core strengths in LCDs and solar electricity. The ad campaign, which was developed in conjunction with Lowe Worldwide of the Interpublic Group, is designed to send a message that Sharp's products and innovations "can help change consumers' lives in different ways - from providing clean energy sources to improving the experience of watching a Major League Baseball game at home". "LCD TV continues to be one of the premier technologies for Sharp and is the cornerstone that Sharp built its brand around," stated Doug Koshima, Sharp Electronics chairman and CEO. "This new marketing initiative reinforces this message but also shows that as the company evolves, we are increasing our commitment to the solar industry and becoming a company that provides energy-saving and energy-creating products for consumers and businesses." The campaign will target print, broadcast and online vehicles, with the first phase focusing on Sharp's Aquos LCD TVs. This will involve an MLB-themed commercial, showing Aquos as "the ultimate ticket for a baseball fan, providing the viewer with the best seat in the house for the game", the company said. <http://www.sharpusa.com>

### SunBriteTV showcases weatherproof LCD TVs

SunBriteTV showcased its latest weatherproof outdoor LCDs during 2008 CEDIA Expo. The 4610HD (46-inch), 3220HD (32-inch) and 2310HD (23-inch) weatherproof LCDs all feature corrosion-resistant, powder-coated aluminum exteriors. The TVs will function in temperatures from -24 to 124 degrees Fahrenheit. The 46 and 32-inch models include two HDMI connections, component, VGA, S-video, composite, RF, RS-232 and IR control. Each TV features water-resistant detachable speakers. The LCD screens are protected from rain, dirt, and debris by an anti-reflective, impact and scratch-resistant window built into the exterior. The 4610HD (pictured) is a full HD 1080p display (1920x1080 pixels) and 2000:1 contrast ratio, while the 3220HD features 1366x768 pixels and a 1500:1 contrast ratio. The 2310HD has a 1366x768 resolution, 700:1 contrast ratio and one HDMI connection. <http://www.sunbritev.com>



### Tatung establishes joint venture in North America with GE equity

Taiwan's Tatung announced 6/24 its plan to establish a joint venture with GE Equity for home electronic sales in North America. Tatung has invested \$16.32M to acquire 51% share in General Displays and Technologies LLC and GE Equity will have 49% shares. Tatung will produce home appliances like LCD TVs and sell through a joint venture under the GE brand. <http://www.tatung.com>

### Sony offers all-in-one Blu-ray/PC/HDTV

Electronics chain Best Buy has begun selling a new "all-in-one" Vaio-brand desktop PC/HDTV from Sony that includes a Blu-ray drive. The combo unit comes with a 22-inch LCD wide screen and is packed with an Intel Core 2 Duo T8100, 3GB DDR2 RAM, 640GB hard drive. It holds a slot loading drive that reads (and writes) Blu-ray discs. The new Vaio unit includes an nVidia GeForce 8400 GT GPU, and 802.11n technology. Sony has also routinely included Blu-ray drives in its PlayStation 3 game consoles that some analysts believe helped it win the next-gen format war against the HD-DVD format last winter. <http://news.sel.sony.com>

### **Panasonic wireless home theater system with integrated Blu-ray disc player is now shipping**

Panasonic Consumer Electronics Company announced that its first home theater in a box (HTiB) system with an integrated Blu-ray Disc player will be available for purchase in late Spring, with a suggested retail price of \$999.95. The new model, SC-BT100, is the perfect complement to a high definition, flat panel large screen TV. It is made for iPod and features an advanced integrated dock which not only recharges an iPod but plays music or video through the home theater system, displays audio tracks and menus on the TV screen and operates with the supplied remote control. Its SD Memory Card slot offers simple playback of digital images or original video footage



in either standard or High Definition AVCHD format. The optical input offers simple digital 5.1 channel audio connection for a set-top box, digital video recorder and game system. The SC-BT100 can be upgraded to wireless full 7.1 channel sound with the optional purchase of two side speakers and a transceiver. It is equipped with Viera Link HDAVI control, HDMI digital A/V connectivity for one-touch operation of all the components including a Panasonic High Definition TV. <http://www.panasonic.com>

### **Dolby shows latest HDR display prototype developed in collaboration with SIM2**

Dolby Laboratories and SIM2 Multimedia showcased a new prototype high-dynamic-range (HDR)-enabled LCD flat-screen display using Dolby's new LED local dimming technology. Dolby's HDR technologies utilize the capabilities of LED-based backlight units (BLUs) to provide outstanding contrast combined with crisp brightness to deliver picture quality that matches real-world visual perception of depth, detail, and color. As part of the collaboration effort, SIM2 designed and developed the BLU, which drives the electronics of the LCD display, plus the BLU and BLU thermal management system. In addition to the prototype development, SIM2 will provide Dolby with manufacturing reference designs. The prototype is a 46-inch LCD. It has 1,838 LEDs, a resolution of 1920x1080, fitting a native 16:9 aspect ratio, brightness: greater than 4000cd/m<sup>2</sup>. Incorporated into the design is a Xilinx Virtex field programmable gate arrays (FPGAs) chipset, recently approved by Dolby for HDR innovations. The Xilinx FPGA chipset enables the implementation of Dolby's complex high-dynamic-range algorithms in the SIM2 display. <http://www.sim2.com>

### **HP brings out industry's first integration of HDTVs and Media Center Extender**

HP announced it is the first company to release Microsoft's Media Center Extender capability to an Internet-connected TV. With the capability, people using HP MediaSmart TVs not only get access to rich content from the Internet but they also can enjoy their own digital treasures from their home PCs on a big screen high-definition TV (HDTV). Extender for Windows Media Center enables MediaSmart TV owners using PCs with Windows Vista Home Premium or Ultimate to go beyond simply watching TV to enjoy pictures, music, videos as well as a world of online services and on-demand TV. The capability will be included on all new HP MediaSmart TVs and provided automatically to owners of second-generation MediaSmart TVs. Extender for Windows Media Center also will be included in HP's upcoming digital media receiver - the MediaSmart Connect - which is planned to be released later this year and will make any HDTV "MediaSmart". <http://www.hp.com/go/mediasmart>

### **HP unveils new digital receiver for HDTVs**

HP announced the availability of its "MediaSmart Connect" digital receiver, a device that provides digital media from around the home or the Internet to any high-definition television. HP officials say the MediaSmart Connect can retrieve digital videos, music and photos stored on a notebook across the room or a desktop in a home office, and can display all of them in a single list on any HDTV. The technology's users can use digital media receiver to get connected to a large amount of online content from wherever they watch TV, according to HP. They can rent or purchase thousands of day-and-date release movies from CinemaNow, share and purchase photos from Snapfish, and discover new Internet radio stations from Live365. <http://www.hp.com>

### CMO develops 19.8mm width 42-inch 120Hz TV LCD panel

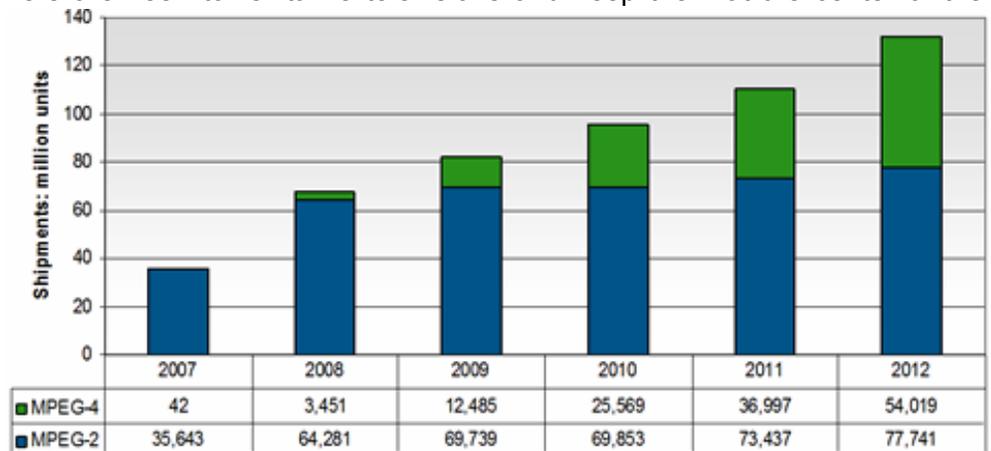
CMO exhibited a 1.98cm 42-inch 120Hz TV LCD panel during Display Taiwan 2008 in Taipei. In order to enable a thinner form, CMO has renovated the panel layout such that light guide plate and expanded film have been optimized. From this, light penetrating rate and brightness characteristics have been transformed, and the number of BLU CCFLs used has been increased from 20 to 24. The resolution for the product is Full HD (1920x1080 pixel), 500 nit brightness, 4000:1 contrast ratio, response time of 4ms, color gamut with 92% NTSC ratio (10bit colors) with 160 degree viewing angle. <http://www.cmo.com.tw>

### Corning continues to see strength in LCD TV sales

Corning Incorporated said that strong US LCD TV sales reported through the first five months of the year reinforces the company's belief that the 2008 global LCD glass market will grow at the upper end of its original 25% to 30% year-over-year estimate. "So far this year, we are not seeing evidence of the economic downturn impacting our forecasted growth," said James B. Flaws, vice chairman and chief financial officer. "In fact, the evidence we have shows that May LCD TV sales in the US increased nearly 50% over a year ago. This view is consistent with outside, third-party sources such as The NPD, an independent consumer market research firm. We cannot guarantee that retail sales will remain resistant to economic pressures. However, the strength of TV sales to date is consistent with consumers' behavior during the last three recessions. We have seen LCD TV sales grow significantly year over year every month this year. The strength of reported LCD TV sales through the first five months of this year leads us to believe that the worldwide market will reach the 105 million units that we originally forecasted," Flaws said. Remarking on supply chain concerns, Flaws said, "Our conversations with our customers, the panel manufacturers, indicate that their inventories are at very reasonable levels as the supply chain prepares for seasonally robust second-half demand." <http://www.corning.com>

### Worldwide TV IC market expected to be \$1.33 billion in 2008 according to DisplaySearch

The worldwide market for flat panel TV ICs is expected to be \$1.33 billion in 2008, and is forecast to grow to \$1.35 billion in 2011. This is one of the findings in DisplaySearch's latest Quarterly TV Electronics Report. The share of MPEG-integrated video processors is expected to surge from 22% to 37% of flat panel TV ICs this year, due to design wins from Mediatek and Zoran reaching production in Samsung and Taiwanese ODMs. See *Figure 1* for a forecast of shipments of TV decoding capabilities by compression type. The forecast also represents an upward revision of 12% of TV IC revenues in 2011. Previous forecasts had anticipated a decline; however, new features are gaining acceptance and increased penetration of digital reception means that revenues are expected to remain broadly flat. "The industry has managed to find new ways to add value, through MPEG-4 decoding and 100 or 120 Hz refresh rates," said Paul Gray, director of European TV research at DisplaySearch. "Broadcasters moving to MPEG-4 are triggering a fresh round of innovation in TV set-making. The potential for refreshing the role of the TV is significant. The decode capability makes networked TV a mainstream opportunity. However, a continuation of recent hyper-competition would see the market pushed back into declining revenues in spite of its shipment growth." He added, "Set-makers are keen to revitalize televisions and keep them at the center of the home. Chipmakers are rising to this challenge, but a round of consolidation will be inevitable, if only because the development costs for these sophisticated devices can only be recouped over large shipments." The report includes an analysis of the different applications of MPEG-4 and H.264 decoding by region. 120 Hz frame rate conversion systems are covered in the report and also analyzed in greater detail including LCD panels and TV sets in the 120 Hz Value Chain and Forecast Report. <http://www.displaysearch.com>



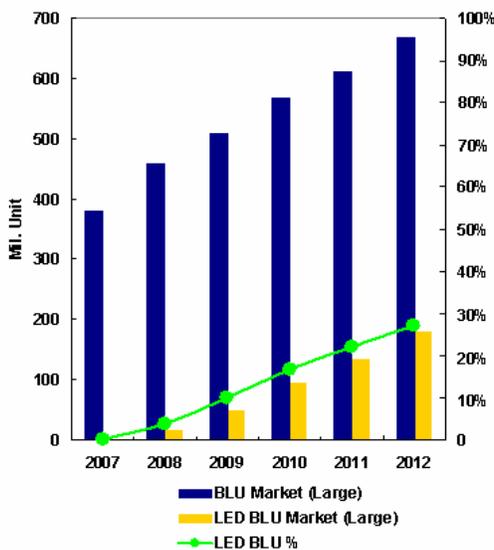
2007 to 2012 Forecast of TV Digital Decoding Capabilities  
by Compression Type

**UniPixel releases latest TMOS display panel performance results**

UniPixel recently announced the results from its testing and evaluation conducted on its Time Multiplexed Optical Shutter (TMOS) prototypes. Results from UniPixel’s lab tests found that the TFT-TMOS display operational voltage has been reduced to less than 12 volt operation – allowing TFT panel manufacturers to use existing TFT processes to design TFT-TMOS backplanes. TMOS display pixel actuation (shutter speed of an on-to-off pixel) was measured to be less than two microseconds. Leveraging this tremendous speed, TMOS systems have been measured running in excess of 150 frames per second of video output. <http://www.unipixel.com>.

**Displaybank forecasts large-sized LED BLU market**

In early July, Displaybank updated a report entitled “LED BLU Industry Trend”, looking at the large-sized LED BLU market combining LCD TV, LCD monitor, and laptop shipments. The reports suggests that 18 million units will ship in 2008 which is forecasted to take up to 3.8% of the entire BLU market; by 2012, the number is expected to grow to 182 million units which is forecasted to be 27% of the entire BLU market. From the year 2004 when TV-use LED BLUs were first introduced, many technical developments have been made and white LED-applied products are expected to be mass produced, and possibly lead the industry from the second half of 2008. Because of the issues with material costs, majority products are expected to be white LED applied until the first half of 2008, yet RGB LED will lead the market after such period. The LED comprises up to 44% of the overall costs. From the applications for white LEDs, the heat emitting solution price has been significantly decreased, but the price of the circuit for local dimming has been added. The LED chip, operational circuit, heat emission system are analyzed to take up to 68% of the overall costs. Narrowing the price gap between CCFL BLU based on the current price does not necessarily portray the prerequisite for the LED BLU market expansion. This is because price declines for CCFL BLU are almost as rapidly as the rate of decline for LED BLUs.



Manufacturer	2005	2006	2007	2008
SONY		82"	70"	70"
Samsung	32"/46"	32"/40"/46"/82"	52" 70"	46"/52"/55" 82"
LG Display		32" 47"	47"	47"
Sharp	57"			52"
Philips				52"
AUO	46"			42" 46"
CMO		32"		42"
Delta			32"/40"/42"	
Tama Fine Opto	32"		26"	

Legend: RGB LED (Blue), Hybrid (Cyan), White LED (Green), FLAT LED (Orange)

The chart on the left is Displaybank’s large-area LED BLU market forecast. The table on the right shows LED BLU development status by year for the TV segment.

By 2012, the LED BLU market is projected to surpass 27% of the overall BLU market. The Displaybank forecast includes:

- A detailed forecast of LED BLU market covering from 2007 to 2012
- LED BLU material cost analysis of the representing size products by applications
- Enhanced LED and LED BLU manufacturing process and technical aspects such as White LED
- The current product lineup by applications including TVs, Monitors, Laptops TV as well as product analysis, trend by manufacturers and roadmaps
- Panel with LED BLU application development forecast

Displaybank suggests that the current period is a time to focus more on the marketing aspect in order to emphasize the merits of LED BLU. <http://www.displaybank.com>

**120Hz LCD TV market demand growing at breakneck speed, DisplaySearch reports**

As 120Hz technology begins to deliver LCD TVs with enhanced motion performance rivaling PDPs and CRTs, this feature is expected to maintain value in the face of continuing price pressure on LCD TVs. The DisplaySearch Topical Report: "120 Hz Value Chain Analysis and Forecast" examines the growth potential of the 120Hz LCD TV sales, penetration rates by region and manufacturing costs and techniques for this enhanced technology. Report highlights include comprehensive forecast of 120Hz LCD TV shipments by region, size and resolution; in-depth analysis of 120Hz technology, including developmental trends and key manufacturer roadmaps; extensive manufacturer cost analysis; future developments in the LCD TV market. <http://www.displaysearch.com>

**DisplayBank says 120Hz LCD TV market likely to mark explosive growth to 71 million units in 2012**

In its latest "120Hz Technology Trends and Market Forecasts (2007~2012)" report, Displaybank, predicts that the market for 120Hz LCD TVs designed to improve the image quality of LCD TV will grow sharply from 4.5 million units in 2008 to 26.7 million units in 2010. The 120Hz TV boasts an innovative upgrade in motion blue phenomenon, one of the weak points of the traditional 60Hz LCD TV, by increasing the conventional transfer image frame number from 60 per second to 120. For TV vendors, the 120Hz TV can notably appeal to consumers on the strength of image quality as a premium level TV, allowing a high sales price point of \$600 in 40-inch TV set equivalents, jumping from \$300 for the existing 60Hz Full HD products. At the same time, this corresponds to a \$30 to \$35 higher price in terms of LCD panels. <http://www.displaybank.com>

**Insight Media forecasts steep LED backlight price drop**

A new cost model tool developed by Insight Media and validated by industry experts, finds that the price decline for LED backlights will be steep, allowing a rapid changeover to begin around 2011. Insight Media's cost/throughput model for LCD BLUs is a tool that can be used to determine the component and subsystem cost for dozens of different types of backlight configurations. Pricing is forecasted to 2012, allowing easy comparison between alternative solutions. The tool can also be used for design tradeoff analysis. The figure below shows the input parameters, calculated results and the pricing forecasts for the component bill of materials for a specific configuration. Using this tool, Insight Media has found that the cost of a CCFL backlight unit for a 46-inch LCD TV costs about \$212. By 2012, the cost will be reduced by nearly 50% to \$122. Significant savings will come for advancements in the BLU inverter/driver electronics, diffusion board, DBEF sheet and prism sheet. Using this tool for a direct-view type LED backlight (assume white LED without red/green enhancement phosphors), the cost picture is much different. The grand total for the BLU in 2008 is \$388, an 83% premium over the CCFL BLU. By 2012, this premium falls to only 13%, as the cost of the BLU is about \$138. History has shown that adoption of a new technology begins in earnest at about a 30% premium level and accelerates as this premium drops. According to the model, this will occur near the end of 2010 or early 2011. <http://www.insightmedia.info>

**New study by ABI Research predicts big uptake of home theater PC systems**

According to ABI Research there will be some 25 million home theater PC systems installed worldwide by 2013, with adoption boosted by the media applications in Microsoft's Vista software, a new study revealed. The study says that HTPCs, or media centers, will retain a key role in the connected living room of the future despite the multitude of non-PC devices now available for at-home entertainment. It says that PCs will play an ever-increasing role in the management, distribution and playback of multimedia content in the home, with both network-connected PC media servers and in-living room PCs growing in adoption over time. An HTPC is a convergence device that is connected to a television or a television-sized computer display for use as a music, video player, personal computer, TV receiver and digital video recorder. Microsoft's bundling of the Media Center application with Vista will help solidify the role of the PC in future living rooms, and clients running over home networks and extender technologies will be the early adopters, the study says. However, these efforts will take time, and there will be some bumps in the road, as shown by the fate of Intel's Viiv program. Additionally, while new broadband-based services may bypass the home PC initially, the PC model will become more inclusive in the future. There will still be a small market of home theater PC enthusiasts who buy custom-designed home theater PC systems resembling consumer audiovisual equipment, the study says. While all-in-one systems are a bit bulky today, in the future, we will see more optimized designs for converging the PC and TV. <http://www.abiresearch.com>

### US IPTV revenues to hit \$13.7 billion in 2012 according to Strategy Analytics

IPTV service revenues will approach \$14 billion in 2012, growing from \$694 million in 2007, according to “US IPTV Forecast and Outlook,” a report just released by Strategy Analytics. Although there are numerous IPTV providers of all shapes and sizes in the US, the landscape is largely dominated by the two incumbents: AT&T and Verizon, each of which has a different approach in terms of technology and investment. “2007 was a watershed year for IPTV in the US market,” said Ben Piper, Director of the Strategy Analytics Broadband Network Strategies service. “The two major US players reached critical mass in terms of subscriptions. The onus is now on service providers to quantify and articulate the benefits of IPTV against ‘traditional’ Pay TV media, such as cable and satellite.” ARPU is expected to remain relatively stable throughout the forecast period, and service growth will come largely from an increased number of IPTV-passed homes, and higher take-up rates. “Our models suggest that IPTV will make impressive headway in the next several years, both in terms of overall homes passed and service revenues,” said David Mercer, Vice-President of the Strategy Analytics Digital Consumer Practice. In addition to providing an outlook of the current United States IPTV market, this report forecasts homes passed, homes connected and service revenues in the market through 2012. In addition, it identifies key imperatives for service providers to compete effectively in a highly penetrated Pay-TV environment. <http://www.strategyanalytics.com>

### Civil rights groups criticize US DTV transition

A coalition of civil rights groups has called the nation’s scheduled move from analog to digital full power television a “transition in trouble” and is urging the government to provide more guidance and money to address the challenge. “There is an absence of clear federal leadership and a comprehensive transition plan to address the needs of those most vulnerable to the transition,” Mark Lloyd of the Leadership Conference on Civil Rights (LCCR) said. “And there seems to be no rapid response capability to deal with what we are certain will be problems on or after February 17th, 2009.” LCCR cites media and government surveys suggesting that the transition will face “very serious problems”. These include a May 2008 Nielsen report from which the group has concluded that “23 million households will wake up on February 18th either completely or partially unready to receive digital broadcast television services”, and a June 10th Government and Accountability Office (GAO) survey suggesting that about half of them “are still unprepared for the switch”. Prominent among these households are non-English speakers, the elderly, people with disabilities (particularly people with hearing problems), and rural households. <http://www.dtv.gov> LCCR’s report – “Transition in Trouble” – also offers an array of recommendations that address key areas where the transition could go bad after February 17th. Here are three:



- *Organize rapid response teams to help people after February 17th.* These teams should be ready to move starting on January 1, 2009, LCCR says, with the Federal Communications Commission and NTIA providing consumer assistance lines, “fully staffed” with people able to help non-English speakers and TV watchers with disabilities. “Community-based organizations should be empowered and funded to mobilize teams that will assist their members who are unsuccessful in making the transition.” LCCR recommends: “The NTIA and FCC should be prepared to conduct significant and rapid outreach to media outlets that may reach those who have lost television service, such as community and ethnic newspapers and radio.”
- *Make the converter boxes more accessible and affordable.* LCCR suggests that the NTIA eliminate the expiration dates for the converter box coupons “or at the very least extend the expiration date to March 2009”. Tens of thousands of already ordered coupons have expired, forcing consumers who have been confused about the process to re-order them. People with hearing disabilities have had a particularly difficult time identifying which converter boxes are most user-friendly. In addition, LCCR notes that households are eligible for two \$40 coupons only, a restriction that may limit the benefits of the program to smaller families.
- *Put more money and presence into the project.* So far Congress has allocated \$5 million for the DTV transition educational project. LCCR calls that sum “not nearly enough”, and notes that the government just collected \$19.5 billion in the recent 700MHz auction. “A small portion of that money should be devoted to public education about the transition,” the coalition suggests. President Bush should produce a public service announcement on the transition, LCCR says, and every government agency should display a DTV transition link on its website.

### **NBC to use Olympics as research lab for new media viewership**

How we watch this summer's Olympic Games could significantly shape the future of online and on-demand video. NBC plans to track viewership of the Games on broadcast and cable TV as in past years, but this time will also closely track online and mobile users. The network is referring to the Olympics as a "billion-dollar research lab" and hopes that the data it compiles will help give it - and advertisers - a better idea of how we consume its content. In addition to the 3,600 hours of programming on network and cable TV, NBC also plans to put 2,200 hours of streaming video on its website at NBCOlympics.com. NBC plans to post "Olympic data" (probably game scores and times), blogging of live events, and even games to the website. Quantcast will help NBC determine the statistics of who is using the site, what are people doing there, and for how long.



### **Study suggests 2008 the year for HDTV in Asia**

MEASAT Satellite Systems Sdn. Bhd. and Euroconsult jointly announced the results of a study into the development of HDTV in the Asia-Pacific region. The study, which was conducted during May by Euroconsult, polled the rationale, benefits, challenges and expectations of HDTV amongst the region's leading PayTV operators. 25 operators in 15 markets, collectively serving more than 24 million subscribers, were interviewed. The study found that 75% of PayTV operators surveyed have, or were planning, to launch a HDTV offering during 2008. It showed operators as generally bullish on the outlook for HDTV, with a majority expecting it to increase ARPU or profits on its own. HDTV, which most saw as here to stay and destined to become a must-have offering, had been identified as a key strategic priority for their business. The study indicated that the rollout of HDTV is being spearheaded by newer PayTV platforms looking to differentiate their offerings from existing platforms. More established platforms were taking a slower approach to implementing HDTV. <http://www.measat.com>  
<http://www.euroconsult-ec.com>

### **Insight Media publishes in-depth report on 3DTV**

Insight Media has just published a 3DTV report. Its objective was to provide a solid technical and market analysis of the 3DTV options; forecast the penetration of this technology into the worldwide television market; and evaluate the many 3D file formats at multiple levels in the creation, distribution and display chain. It is 253 pages with 146 figures and 24 tables. Authors include Matthew Brennesholtz, Art Berman, Chris Chinnock, Michael Kalmanash, Dale Maunu and Bernard Mendiburu. The methodology used was interviews, meetings, e-mail discussions with 50 companies over a six month period together with the review and analysis of hundreds of related documents and validation of key sections by outside experts. The approach used by Insight Media was to understand the creation of 3D content and the scope of development (one component of the chicken-and-egg problem); evaluate and rate multiple display technologies for 3DTVs; explain and evaluate the multiple levels of content distribution from camera to TV; forecast 3D-ready and 3DTVs by technology with conservative, expected and optimistic forecasts. The questions addressed were:

- Which display technologies are most suited for consumer 3D?
- What is the cost to create 3D-ready and 3DTVs (with embedded codec, transcoder and converter)?
- What are the performance levels and hurdles?
- What is the timing for 3D display introductions?
- How can 3D content be compatible with the 2D content creation and distribution infrastructure?
- How will the chicken-and-egg log-jam be broken?
- Will 3DTV be a fad or will it be a long-term part of the television market?
- Will there be sufficient content to sustain 3DTV sales?

The report covers: human factors of 3D stereo perception, existing content for 3DTV, new 3D content creation, 2DTV display technologies, 3DTV display technologies, 3DTV projection systems (front and rear projection), 3D AMLCD television, 3D plasma television, 3D OLED television, 3DTV content delivery, forecast and prospects for 3DTV, glossary of 3D terms and acronyms. <http://www.insightmedia.info>

### Hyundai introduces 3D TV

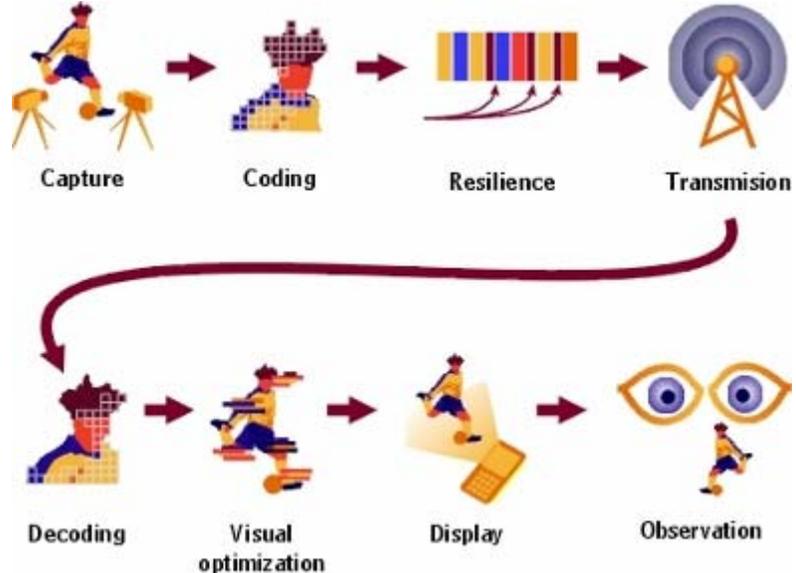
Korean company Hyundai's E465 3D TV, which requires special glasses to see the effect, went on sale for \$4,980 in Tokyo. This will allow audiences to watch the 3D content that Nippon BS Broadcasting (BS 11), a digital satcaster subsidiary of the NTV net, has been airing since December. The station airs an hour of 3D programming daily, including sports events, travel shows and animal documentaries. It plans to air live 3D sports in summer or fall. Hyundai will launch a 32-inch 3D model in August for \$2,000. Also in the works are 50-inch and larger models that will not require glasses to see the 3D images.

### Mobile 3DTV program established as European FP7 project

Mobile3DTV is a small-scale focused collaborative research project funded by the Europe's Seventh Framework Program for research and technology development (FP7). The project's ultimate goal is to develop and demonstrate the viability of the new technology of mobile 3DTV. It will comprise the following features: suitable stereo-video content-creation techniques; efficient, scalable and flexible stereo-video encoders with error resilience and error-concealment capabilities, tailored for robust transmission over DVB-H; and also the corresponding stereo-video decoders and players working on a portable terminal device equipped with a stereoscopic display. The project is planning:

**MOBILE3DTV**

- In 2010, the first mobile 3DTV users in Germany watched the FIFA World Cup final broadcast live from South Africa where Germany scored 3-0 against their competitors.
- In 2011, a Finnish family traveled to their summer cottage near a lake. Before falling asleep, the four-year-old Tarja watched her favorite cartoon "Moomin family" on her daddy's mobile 3DTV portable computer. After she fell asleep, her father continued watching the F1 Grand Prix broadcast from Indianapolis, USA and cheered the victory of the Finish veteran Kimi Räikkönen.
- In 2012, a couple of million mobile 3DTV users around the world turned their portable devices on, while in cars, commuter trains or cafeterias, to watch the live broadcast of the landing of the ESA's spacecraft to Mars.

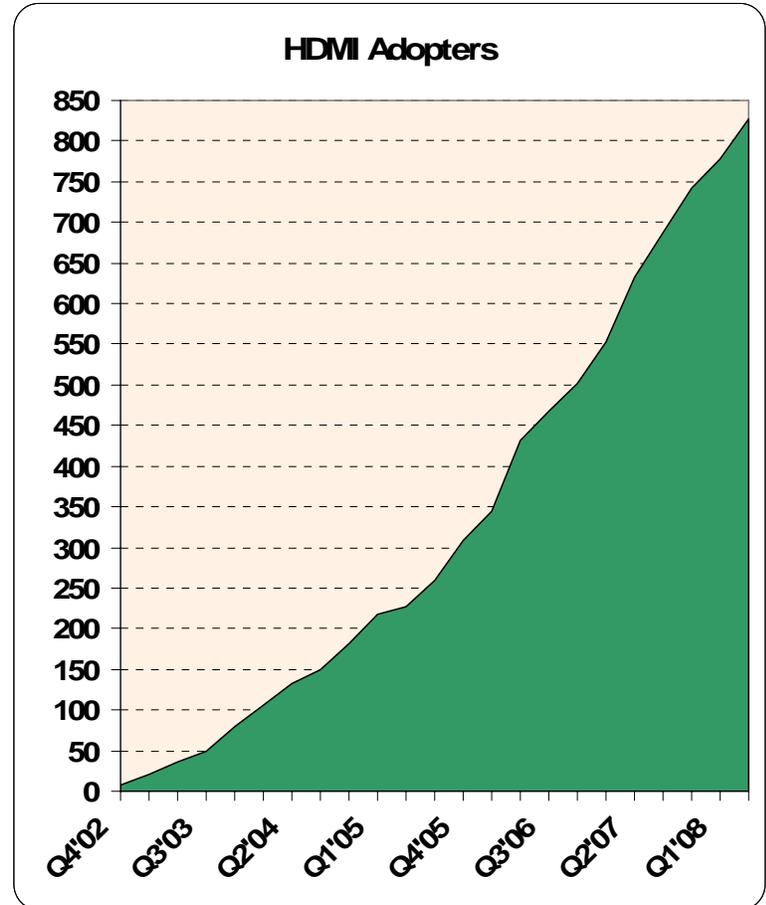


The mobile TV market is forecasted to be a rapidly evolving one. Mobile TV broadcast subscribers are expected to leap to 100 million by 2010 and mobile TV is to generate more revenues than mobile video starting in 2011. But the stories above are not about a trivial mobile TV. To achieve the project ultimate goal, the project leaders intend to develop optimal formats for stereo video content creation for mobile 3DTV in terms of compressibility, efficient rendering and user satisfaction; develop optimal appropriate codecs for mobile 3DTV in terms of supported spatial and temporal resolution, compression efficiency and decoder complexity; develop optimal tools for error resilient transmission of mobile 3DTV content over DVB-H; gather new knowledge about user experience in terms of acceptance of and satisfaction with mobile 3DTV content, relevant to the artifacts specific to mobile stereo-video compression and transmission and to the purpose for which the user will view such media. [www.mobile3dtv.eu](http://www.mobile3dtv.eu)

### HDMI adoption continues to soar

Although it would seem natural for the number of HDMI adopters to slow down as the market becomes increasingly saturated, the group continues to grow at a torrid pace – now counting more than 825 adopters – more than doubling in the past two years. HDMI continues to find popularity in the consumer electronics space, essentially a standard requirement on all HDTVs and increasingly common on digital video cameras, digital still cameras, and a variety of other CE devices, and increasingly popular as a port on personal PCs as well. HDMI adoption is bolstered by several legislative mandates. In the US, the FCC requires that beginning July 1, 2005, all HDTVs 36-inches and larger labeled “Digital Cable Ready” must include either a DVI/HDCP or HDMI/HDCP interface. In addition, either a DVI/HDCP or HDMI/HDCP interface is required for models with screen sizes 25 to 35-inches imported after July 1, 2006, and for models with screen sizes 13 to 24 inches imported after July 1, 2007. PCs with integrated TV tuners are a case in question, but most include an HDMI port anyway. As of July 1, 2005, all cable operators must “include both a DVI or HDMI interface and an IEEE 1394 interface on all high definition set-top boxes acquired by a cable operator for distribution to customers.” In Europe, the European Information & Communications Technology Industry Association (EICTA) in 2005 mandated that all HDTVs displaying the “HD Ready” logo must include HDMI or DVI inputs and support for HDCP. In August 2005, the Cable and Satellite Broadcast Association of Asia (CASBAA) recommended that HDMI (or DVI) and HDCP “be included on every set-top box capable of outputting uncompressed high definition content.”

<http://www.hdmi.org>



### DIVA Consortium unveils a new interface standard for interactive digital TV and CE networking

At the China Digital Living Forum & Showcase 2008 in late May, the formation of the DIVA Consortium was formally unveiled to the Chinese consumer electronics industry. The China Video Industry Association (CVIA) announced its support of the DIVA Consortium's efforts to create a new interface for next-generation interactive digital television and consumer electronics (CE) networking. DIVA's interface technology promises to combine uncompressed high-definition video, multi-channel audio, and high-bandwidth, bi-directional data transfer over a single cable. Once connected with DIVA, CE devices will be networked locally so they can be easily set up and controlled from any TV on the DIVA network-passing video, audio and bulk data between devices. DIVA technology combines a high-speed, bi-directional data channel with an uncompressed video and audio channel to allow users to connect, configure and control various home CE devices from their digital TVs. DIVA technology enables an 8B/10B encoded forward channel for transporting uncompressed video up to 13.5 Gbps, which is capable of handling video transmissions well beyond 1080p resolution with deep color and high refresh rates. In addition, DIVA enables a high-speed, bi-directional hybrid data channel that can operate at up to 2.25 Gbps, and can be divided into sub-channels that transport audio, command and bulk data. The protocol for the hybrid channel can be bridged to other wired and wireless interfaces, allowing DIVA interface products to easily connect to a home network that is comprised of a variety of devices. The DIVA Consortium's charter members (called the Promoters Group) include major CE and home appliance manufacturers such as TCL Corporation; Chang Hong Electric Co.; Skyworth Group; Hisense Electric Co.; Konka Group; Haier Co.; SVA Information Industry Co.; Panda Electronics Co. and Synerchip Co., Ltd. <http://www.diva-interface.org>

### **Analogix unveils industry's lowest power HDMI transmitter technology**

Analogix Semiconductor, Inc., a world leader in high performance analog and mixed-signal semiconductors and IP solutions, unveiled details of the industry's lowest power HDMI transmitter. The "Cool HD" technology consumes less than 50mw while supporting resolutions up to 720p and 1080i, and utilizes zero power at 480p resolution. Once released, the new CoolHD power-optimized HDMI transmitter technology will be offered in sub 0.18µm CMOS process and available in either BGA or TQFP packages. The Cool HD ultra low and zero power HDMI transmitters are designed specifically to deliver high performance to the growing small form factor ultra mobile personal computing (UMPC) market and high performance portable media player (PMP's) as well as devices as camcorders, digital cameras, and mobile phones. The Cool HD transmitter will support HDMI specification v1.2 and also feature a high-bandwidth digital content protection (HDCP) engine and keys that enable the secure distribution of content between HDMI-enabled devices. <http://www.analogix.com>.

### **Two new distribution solutions from Gefen deliver 1080p for HDMI v1.3**

Gefen's newest solutions engineered to support the expanded HDMI v1.3 format include a 1:5 Splitter for HDMI v1.3, and a 1:10 HDMI v1.3 distribution amplifier. The Gefen 1:5 Splitter for HDMI v1.3 accepts one audio/video input, such as a DVD player or set top box, and transmits the same signal to five displays. The 1:10 HDMI v1.3 distribution amplifier transmits one HDMI source to ten displays. Both units can accommodate larger distributions when "daisy chained" with another splitter. For optimal and consistent results, the source and destination displays' resolutions should match. All high definition resolutions are supported from 480p up to 1080p. Both solutions enable a clean, simultaneous distribution of one high definition audio/video signal to multiple HDMI displays. The instant delivery of HDCP-compliant video to several displays is desired in entertainment venues, public spaces, clubs, restaurants and event facilities offering a cutting-edge delivery of HDTV. The expanded HDMI v1.3 format allows for optional color and audio refinements along with an increased bandwidth that ensures the highest signal quality possible from high definition video delivered using HDMI. <http://www.gefen.com/dealers/worldmap.jsp>

### **ASUS upgrades VGA to HDMI output**

ASUS brought out the ASUS Splendid HD1 Video Enhance card. The card is able to upgrade generic VGA to true HDMI output. The card appears to use a PCI Express x1 slot and has dual DVI outputs, one of which could be changed to HDMI with an adapter. The card is capable of outputting full 1080p resolution movies and has onboard sound and full HDCP compliance. The card has several display modes to optimize the visual appearance for different uses. A photo mode tailored for viewing photos or for normal daily computing. This mode increases the color performance and dynamic contrast according to ASUS. The second mode is a video mode optimized for watching movies. This mode helps to reduce blurring caused by LCD monitors and increases color depth and contrast. The final mode for the card is a game mode. This mode allows gamers using ASUS branded video cards to run a demo mode that allows comparison of processing provided by the card in several ways.



### **Onkyo increase HDMI feature set on TX-SR606 receiver**

Onkyo has upgraded the features set of its most popular HDMI-1.3a-capable home theater receiver by adding 1080i video upscaling, two additional HDMI inputs to handle a total of four HDMI sources, Audyssey's new Dynamic EQ loudness compensation technology, and Onkyo's new Music Optimizer circuit. The new Onkyo TX-SR606 replaces the company's TX-SR605. The Onkyo TX-SR606 provides HDMI 1.3a inputs for up to four high-definition 1080p video sources, plus high definition surround sound processing all over a single HDMI connection. This version of HDMI has greater bandwidth for higher resolution, higher frame rates, and 36-Bit Deep Color. Onkyo's HDMI video upscaling technology converts standard definition signals to 1080i, and Faroudja DCDi Edge (directional correlational deinterlacing) technology effectively eliminates video artifacts. This receiver also has a powerful 90 watt-per-channel amplifier section, Remote interactive control over HDMI (RIHD), Audyssey 2EQ automatic room correction, is Sirius Satellite Radio ready, and offers a full range of advance surround sound codecs, including Dolby TrueHD and DTS-HD Master Audio to provide lossless bit-by-bit audio identical to the master recordings. <http://www.onkyousa.com>

### **TranSwitch announces first HDMI 1.3 PHY IP core operating at 10.5 Gbps**

TranSwitch Corporation announced the first HDMI 1.3 intellectual property (IP) cores operating at up to 10.5 Gbps (3.5Gbps per channel). The HD-PXL-1.3 transmitter IP core extends TranSwitch's existing offerings in high-performance video interconnect applications and is available in 90nm CMOS technology. The HD-PXL-1.3 transmitter IP core is available in two versions. The first version meets all the current HD standards up to 2.25Gbps. The second version supports serial communications at a speed of up to 3.5Gbps per channel for extended HD resolutions, with backward compatibility to the first version of 2.25Gbps. The transmitter IP core and the DSP-based receiver IP core can run at aggregated speeds of up to 10.5Gbps and support color depth of up to 16 bits, while providing exceptionally low power consumption and small die size. <http://www.transwitch.com>.

### **Gefen extends HDTV over CAT-5 cable**

Connectivity solutions provider Gefen announced the arrival of two new distribution solutions for digital high definition sources and displays using the HDMI format. Available in distributions to four and eight displays, both rack mountable units also enable the extension of HDMI audio and video beyond its specified limits over industry-standard CAT-5 cable. The 1:4 and 1:8 HDMI CAT-5 distribution amplifiers include a sender unit that performs a seamless split of one HDMI input with delivery to multiple displays. Users have the option of ordering small, individual receivers for remote displays that must be placed a distance from the source. Signals can travel up to 300 feet (100m) at resolutions to 1080i, and up to 150 feet (50m) at resolutions to 1080p. Multi-channel audio is delivered alongside the video using two CAT-5 cables that connect the HDMI source (sender) to the display (receiver). Both sender and receiver units are powered to ensure a high quality HDTV signal complete with HDCP compliance at both short and long range distances. If users opt to connect their HDMI displays directly to the sender, no additional power is needed. [http://www.gefen.com/kvm/product.jsp?prod\\_id=4719](http://www.gefen.com/kvm/product.jsp?prod_id=4719)

### **Gefen adapter gives HD access through USB port**

A new USB to DVI graphics adapter from Gefen offers a handy way to connect additional displays to all Windows XP and Vista operating systems available today, and now for Mac OS X as well. This tiny adapter allows a plug and play connection of a DVI or VGA display to any USB 2.0 port so you can add digital video displays or projectors to a laptop and personal computer for simultaneous video delivery without needing a DVI port. Output video is delivered in the DVI-I format, allowing for either VGA or DVI display compatibility. The Gefen USB to DVI Graphics Adapter (MSRP \$129) enables users to tweak their video performance, offering a variety of screen resolutions up to 1600x1200. These built-in features ensure video performance is of a similar quality as the main display connected through the DVI port. Users also have the option of having the USB connected display mirror the main display or extend the desktop to provide increased visibility and the ability to view several applications at the same time in a multiple display situation. Testing has shown that up to six USB to DVI adapters can be connected to any one personal computer with a reliable delivery of video to all six displays. <http://www.gefen.com>

### **US commerce secretary Gutierrez announces ten millionth coupon request for TV converter box**

Commerce secretary Carlos M. Gutierrez announced over 10 million coupons have been requested since the launch of the TV Converter Box Program on January 1, 2008. The February 17, 2009 transition will offer consumers a clearer picture, more programming choices and free up the airwaves for better communications among emergency first responders. The Commerce Department's National Telecommunications and Information Administration (NTIA) is administering the TV Converter Box Coupon Program.

### **ATSC commemorates 25 years**

Paving the way for mobile/handheld broadcast digital television (DTV) and other next-generation DTV standards, the Advanced Television Systems Committee (ATSC) is celebrating its 25th anniversary this spring. The first ATSC meeting was held on May 13, 1983, at the National Association of Broadcasters (NAB) headquarters in Washington, DC.

The ATSC was formed by the Joint Committee of Intersociety Coordination (JCIC). The JCIC was composed of the NAB, the National Cable and Telecommunications Association (NCTA), the Consumer Electronics Association (CEA), the Institute of Electrical and Electronic Engineers (IEEE), and the Society of Motion Picture & Television Engineers (SMPTE). Today, the ATSC is made up of approximately 165 member organizations from all segments of the television industry. <http://www.atsc.org>



### FCC fines Funai \$8 million over non-compliant TVs



Continuing its crackdown on manufacturers and distributors of non-compliant televisions, the Federal Communications Commission (FCC) has proposed a monetary forfeiture of nearly \$8 million against a distributor for interstate shipments of digital television receivers without the requisite program blocking features. The company, Funai Corporation, allegedly shipped in interstate commerce “large numbers” of digital television receivers that did not comply with the Commission’s V-Chip technology requirements. Although Funai has requested confidentiality regarding the number of televisions shipped by the company, an FCC Notice of Apparent Liability for Forfeiture says that the shipments took place for more than 16 months after the March 1, 2006 compliance deadline, and that “these unlawful shipments were substantial both in terms of the number of non-compliant models and the total number of non-compliant units”. <http://www.fcc.gov>

### Head of FCC seeks fines for DTV violations

FCC chairman Kevin Martin has indicated that the commission is working on an order that would propose 24 fines aimed at nearly all the largest American consumer electronics retailers and manufacturers for alleged DTV violations. On March 20, when Martin mentioned the pending order, he said by the FCC’s next meeting on April 10 (with no formal agenda posted yet online) he hoped to have the three votes necessary to issue the order that would cite Circuit City, Best Buy, Sears, CompUSA, Target, Toys R Us and the largest retailer of them all – Wal-Mart – for alleged failure to properly label analog-only devices to adequately warn consumers of the digital switch pending in February 2009. Manufacturers also facing fines in Martin’s pending order (for alleged V-Chip violations) would include: LG, Audiovox, Sanyo, Westinghouse, Panasonic, Philips and Polaroid. No fine amounts have yet been disclosed. <http://www.fcc.gov>



### CEA launches campaign to “convert your mom” to digital television

With the biggest change in over-the-air television since the 1930s coming in February 2009, some seniors may need to take steps to continue watching their favorite programs once the digital television transition is complete. To encourage baby boomers to help their elderly parents, relatives, and neighbors get ready, the Consumer Electronics Association (CEA) enlisted actress Florence Henderson, best known for her role as Carol Brady on TV’s “The Brady Bunch”, to launch the Convert Your Mom public awareness campaign. Beginning with a satellite media tour hosted by Ms. Henderson in early May, the Convert Your Mom campaign will feature a special downloadable guide and tips for getting ready for the digital TV transition, among other elements. <http://www.digitaltips.org>



### Version 3.0 ENERGY STAR TV products specification finalized

The Version 3.0 ENERGY STAR TV products specification has been finalized and will take effect on November 1, 2008. Stakeholder feedback, all draft versions of the specification, and related proposals can be viewed on the Revisions to Existing Product Specifications in Development at <http://www.energystar.gov/productdevelopment>. On Mode requirements for large-screen TVs now take effect for those units with a screen area of  $\geq 1045$  square inches, (vs  $\geq 1068$  proposed in the Draft Final) to ensure that all TVs sold with an advertised viewable diagonal screen size of 50 inches must meet the same set of requirements. Although EPA received several comments on the Draft Final document, nearly all of the input had previously been provided and carefully considered and, thus, did not result in a change to the specification text. These comments and an explanation of EPA’s rationale for not including them in the specification are included in the Comment Response Document. In the coming months, EPA will provide all stakeholders with separate instructions that explain how to continue as an ENERGY STAR partner for TVs under the new Version 3.0 specification. The instructions that will be provided at that time will include an updated Commitment Form and an outline of the data that manufacturers will need to report in the future for individual product qualification. Once this specification is in effect on November 1, 2008, a manufacturer must do two things to promote any products as ENERGY STAR qualified. First, the manufacturer must re-commit as a partner under the Version 3.0 specification by submitting a new Commitment Form. Second, the manufacturer must qualify products under Version 3.0 by submitting qualifying product data for EPA review via the Online Product Submittal (OPS) tool at <http://www.energystar.gov/ops>. Manufacturers who fail to submit an updated Commitment Form by October 31, 2008, will be removed from the ENERGY STAR Partner List.



### EPA announces new Energy Star specifications for boxes that deliver television and video content

EPA announced a new specification for boxes that deliver television and video content, also called set-top boxes. Effective Jan. 1, 2009, new cable, satellite, and telecom set-top boxes that carry the Energy Star will be at least 30% more efficient than conventional models. The new specification is expected to prevent greenhouse gas emissions while allowing consumers to continue to enjoy high-quality content. After this new specification goes into effect, if all set-top boxes sold in the United States meet the Energy Star requirements, the savings in energy costs will grow to about \$2 billion each year and greenhouse gas emissions will be reduced by the equivalent of greenhouse gas emissions from about 2.5 million vehicles annually. For the first time, EPA will also partner with the cable, satellite and telecommunications companies that deliver content to consumers. As Energy Star partners, these companies agree to improve the energy efficiency of a significant number of set-top boxes by offering newly qualified boxes to subscribers or by upgrading boxes already in homes to help subscribers reduce their carbon footprint and save money. <http://www.energystar.gov>

### HomeGrid Forum to develop technology for enjoying multimedia anywhere in the home

**HomeGrid™ Forum** Infineon Technologies, Intel Corporation, Panasonic and Texas Instruments announced the creation of HomeGrid Forum, which aims to promote and influence a single, next-generation worldwide standard for networking digital content, such as movies, music and pictures, over home wiring. The forum will be a companion to ITU-T G.hn working group, supporting the interests of service providers, consumer electronics manufacturers, PC OEMs and other networking companies to create a single MAC and PHY protocol for transporting multimedia across a home's existing wiring to include coaxial cable, power lines and phone lines. HomeGrid Forum is contributing next-generation technology requirements to ITU-T G.hn, quickly developing consensus around one worldwide standard. ITU-T is the standardization sector providing global telecommunication standards in the International Telecommunication Union. HomeGrid Forum has 11 founding members. Infineon, Intel, Panasonic and Texas Instruments will serve on the board of directors. Aware Inc., DS2, Gige Semiconductor and Pulse~LINK will serve as promoters; and Ikanos Communications, Inc., Sigma Designs and Westell will serve as contributors. <http://www.HomeGridForum.org>

### Report reveals lessons for UK switchover

A report on the UK's first digital television switchover highlights lessons to be applied across the rest of the country as analogue signals are turned off over the next four years. The report from Digital UK, the independent body established to co-ordinate switchover, is based on research into the experiences of 25,000 households in Copeland, Cumbria, including the town of Whitehaven. In a two-stage switchover during October and November 2007, four analog television channels were replaced with approximately 20 Freeview channels. The timing of Copeland's switchover was brought forward to test plans for the nationwide program to upgrade the UK's terrestrial television network to digital. The next switchover will be for viewers served by the Selkirk transmitter group in the Border TV region, which will go fully digital from November 6 this year. It will be followed by 14 switchovers affecting 4.6 million households during 2009, with the rest of the UK switching to digital TV by the end of 2012. The report includes the following findings: viewers were well prepared. Everyone was aware of the switch, and 95% understood what to do in order to be ready. Virtually all households had converted their television by the completion of switchover on November 14. Most found it straightforward. 81% had no problems with their digital television equipment and 50% found installing equipment easier than they thought. Some needed extra help. Approximately 10% of households took up the Switchover Help Scheme. Digital UK estimates 5% rang its help line or visited one of its locally run help centers. A further 5% of households sought help or advice from retail outlets. <http://www.digitaluk.co.uk>

**digitaluk**

### Bluewin TV Mobile adds HD service from Swisscom

DVB-H services are due to be available in Switzerland from mid-May 2008. The Swisscom website indicates that 20 of the 30 services that are currently available streamed over the Vodafone Live! service will be broadcast in higher quality using DVB-H. They are branding this service as the "HD" offering within the Bluewin TV Mobile service. <http://www.swisscom.ch>



Coverage map as of April 2008.  
Source:  
[swisscom.ch](http://www.swisscom.ch)

### DivX now playing on high definition digital televisions

DivX announced that the company has made significant progress extending the DivX Certification program to digital televisions from a variety of manufacturers that will enable consumers to easily enjoy high-quality video they create on their PC or discover on the Internet from the comfort of the home theater. DivX is a high-quality digital video technology that allows consumers to create and watch content on the PC, living room and on the go. Over 100 million DivX Certified devices have already shipped worldwide from major manufacturers, including DVD players, mobile phones and gaming consoles. The company has extended its ecosystem into digital televisions with over 80 models certified from major brands such as LG and HP that allow consumers to easily play back their content via USB storage devices that plug directly into the televisions. Various models also enable content to be streamed directly from Internet services. DivX is also working with leading chip providers such as AMD, Chips and Media, Broadcom, and Trident to extend support for DivX on digital television platforms. <http://www.divx.com>

### Industry facilitates supply chain communication on declarable substance content in electronic equipment



The Consumer Electronics Association (CEA), European Information & Communications Technology Industry Association (EICTA) and the Japanese Green Procurement Survey Standardization Initiative (JGPSSI) announced a partnership to conduct an extensive revision of the Joint Industry Guide for Material Composition Declaration for Electronics Products (JIG) version 101A. JIG version 101A - an industry materials declaration standard, will be revised to address future substance declaration requirements due to new developments, such as the European Union's Registration, Evaluation, Authorization and Restriction of Chemical Substances ("REACH") Regulation. Common industry-wide approaches, such as the new JIG, which helps to manage REACH and other materials restrictions, can improve the protection of human health and the environment through the better and consistent identification and reporting of chemical substances contained in electronic products. The original JIG 101, published in 2005 by the Electronics Industries Alliance (EIA) and JGPSSI, and supported by the Electronic Components Association (ECA) and the leading developer of standards for the solid-state industry, JEDEC - provides a standardized list of substances for supply chain disclosure that may be present in parts or components supplied to electronic manufacturers and that are relevant for disclosure due to regulatory or other purposes. JIG version 101A was released by EIA and JGPSSI in 2007 in order to reflect recent regulatory changes since the JIG was initially published and is now available at <http://www.jedec.org> and <http://www.eia.org>.

### Testronic Labs launches Digital TV testing service

London-based Testronic Laboratories announced a new digital testing service to broadcasters, IRD and set top box manufacturers and related digital television software and service providers. The new testing service, designed to ensure the highest possible quality of user experience in digital television has been developed to identify compatibility and functionality issues which are often only manifest on the end user's TV set. Common – but serious problems – have included picture problems due to unsupported resolutions on the TV, parental control that still permits children to view adult material, loss of image or sound, wrong tiering of Pay TV services and channel tuning set-up failures. Testronic Labs has developed a global solution to quality assurance issues facing the digital TV industry. Skilled operatives provide testing from labs in Belgium, Poland, UK and USA or at the client's facility measuring not only the technical aspects of the equipment and services but also the user experience and functions. Testronic Labs offers both testing for known quality assurance issues and tailored testing solutions for the client in order to ensure that new problems are detected. Digital TV services include the IRD (Integrated Receiver Decoders) BluePrint Suite which provides an elaborate library of pre-designed and pre-implemented test cases and the expertise to deliver specific test cases to meet the requirements of broadcasters, satellite operators, cable operators, IRD manufacturers and subscriber management service providers. <http://www.testroniclabs.com>

"Our initial research into digital television presented us with some surprises," explains Johan Craeybeckx, CTO of Testronic Labs, "Contrary to expectations, we found that consumers have no guarantee of the optimal viewing experience. Happily we found that our knowledge of how consumers interact with DVDs and computer games has enabled us to detect user problems with the set top box, the remote control and the functions within digital TV and as a result, we have been able to develop a truly tailored service to meet the needs of the digital TV industry."

### CITEL guide includes DVB

The DVB Project announced that the Inter-American Telecommunication Commission (CITEL), a body of the Organization of American States (OAS), has decided to include the standards for digital terrestrial television DVB-T (fixed reception) and DVB-H (mobile TV) as official standards within the CITEL implementation guidelines. The CITEL "Digital Terrestrial Broadcasting Implementation Guide" is intended to aid OAS member states planning to implement digital terrestrial television (DTT). The incorporation of the DVB-T and DVB-H standards in the CITEL guide has been accelerated as a result of the adoption of the standards by Uruguay, a member of the OAS. Uruguay adopted the DVB-T and DVB-H standards in August 2007 and has already launched some DVB-T services, while DVB-H trials are under way. The selection of a DTT system is now at a critical stage for a number of countries in the region, including Argentina, Colombia, Peru, Venezuela and Chile. During recent months, significant efforts have been made by the DVB community to propose DVB-T and DVB-H as the best options for the transition to DTT in Latin America. The inclusion of DVB standards in the Guide is seen as an important endorsement that supports these activities. Many other countries in the region, including the Bahamas, Barbados, Bolivia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Jamaica, Nicaragua, Panama, and Paraguay are also addressing their requirements and making plans for the introduction of DTT services. <http://www.dvb.org>



### The Open IPTV Forum publishes its end-to-end architecture specification

The Open IPTV Forum is working towards an end-to-end specification to allow any consumer end-device, compliant to the Open IPTV Forum specifications, to access enriched and personalized IPTV services. The first version of the Service and Platform Requirements document, for both Managed and Open Internet models was released in the autumn of 2007. This document was followed recently by the first Architecture specification. The agreed Architecture specification is publicly available via the Open IPTV Forum home page and the Service and Platform requirements via the publications area (<http://www.openiptvforum.org/downloads.html>). These are considered important steps towards the Open IPTV Forum goals and the Forum encourages the industry to take a look at them. The Open IPTV Forum also announced that it has accepted the following new members: Accenture, ANT Software Ltd, Funai Electric Co., Ltd., Quative - Kudelski Group, SES-Astra, Sharp Corporation, Sun Microsystems and Toshiba Corporation. This now brings the Forum's membership to 26.



### Mobile DTV Alliance applauds ICO for mobile services satellite launch

The Mobile DTV Alliance announced that member company ICO Global Communications (Holdings) Limited has advanced mobile digital TV in North America to the next level with the launch in April of its ICO G1 satellite, designed specifically to deliver mobile applications. The satellite launch, supported in part with contributions from three other MDTVA members, makes ICO North America's first operational Mobile Satellite Services (MSS) provider in the S-band. Market trials for the ICO Mobile Interactive Media (ICO mim) service will be conducted in Las Vegas and Raleigh-Durham, N.C., starting later this summer. NBC Universal will provide content for the trials. MDTVA member companies Alcatel-Lucent, Harris Corporation and DiBcom, are part of the ecosystem of suppliers and vendors ICO assembled for ICO G1. <http://www.mdtvalliance.org>



### OMVC reports positive progress on mobile DTV

The Open Mobile Video Coalition (OMVC) announced today that the broadcasting industry is on track to develop standards and launch services for mobile digital television (mobile DTV) in 2009. The group stated that recent Independent Demonstration of Viability (IDOV) trials showed that DTV-based mobile video technologies are feasible. The OMVC is an association of commercial and public television broadcasters representing over 800 television stations, which came together in 2007 to accelerate the development of mobile digital television. A recent marketplace study projected a potential \$2 billion annually in mobile digital television advertising revenue – if broadcasters move quickly. They must agree on a single standard by early 2009 and begin rolling out mobile DTV services by the end of 2009. <http://www.omvc.org>



**MPEG-2 patent owners sue Target Corporation for MPEG-2 patent infringement**

MPEG LA announced that several MPEG-2 patent owners have filed an enforcement action in the Federal District Court of the Southern District of New York against Target Corporation and Doe Corporations 1-10, fictitious names for corporations currently unknown to the plaintiffs, for infringing patents essential to the MPEG-2 digital video compression standard used worldwide in digital television broadcasting and DVD. According to the complaint, Target offers in its retail stores a variety of products under its Trutech house brand name, such as digital televisions and DVD players, that use patent protected MPEG-2 methods without having entered into licenses with the individual patent holders or a portfolio license that includes these patents offered by MPEG LA. The complaint also alleges that at Target's request the Doe Corporations manufacture and produce the unlicensed products for sale by Target under Target's Trutech brand name, but these Doe Corporations are not believed to be licensed or paying royalties on Target's behalf. <http://www.mpegla.com>

**Newport Media demonstrates world's first mobile TV system-on-chip for MediaFLO**

Newport Media, a fabless semiconductor company supplying products to the mobile broadcast media market, announced sample availability of the world's first complete single-chip solution for the MediaFLO mobile broadcast platform. The NMI700 FLO mobile digital TV receiver integrates a RF tuner, demodulator, MAC and all required memory into a single monolithic CMOS device that will enable designers of cellular handsets, and non-connected portable devices to deliver the smallest, power-efficient and cost effective products available. Mohy Abdelgany, president and chief executive officer for Newport Media advised: "Newport Media clearly stands alone in its ability to offer best in class SOC solutions for all major commercial mobile TV standards. The addition of a pin-for-pin compatible MediaFLO SOC to our portfolio of DVB-T/H and ISDB-T SOCs will significantly enhance our ability to be the supplier of choice for mobile TV system silicon solutions." Key features of the NMI700 solution include up to 120dB of variable gain and greater than 50dB of adjacent channel selectivity. The device consumes only 20mW of power, yet still combines an extremely low 3.0dB noise figure with a very high +5dBm IP3. The monolithic chip includes a dual-band VHF and UHF radio, a FLO demodulator, MAC, plus all necessary memory in a very small footprint. No other external memory, baluns or loop filters are required to create a complete solution with a very low bill of materials. <http://www.newportmediainc.com>

**Discretix, VisualOn and Axel Technologies offer joint mobile TV solution**

Three prominent names in the mobile handset software space – embedded security solutions leader Discretix, multimedia application provider VisualOn, and mobile TV middleware developer Axel Technologies – have partnered to provide a pre-integrated mobile TV solution for handset OEMs. The DVB-H-based solution, which supports both the OMA BCAST Smartcard and DRM Security Profiles, delivers an ultra-reliable, out of the box strategy for the "next big thing" in cell phones: digital television. The partnership gives handset OEMs and service providers a new and practical alternative for rolling out mobile TV. The solution combines VisualOn's Mobile TV Player, Axel Technologies' Salmonstream Mobile DVB-H middleware stack and Discretix' Multi-Scheme Mobile TV security client. The OMA BCAST Smartcard Profile protects Mobile TV services via the use of a Subscriber Identity Module (SIM) card. Both the Smartcard and DRM Profiles ensure that commercial broadcast content can be protected and tracked when transmitted over wireless networks. In addition to supporting DVB-H, VisualOn's Mobile TV multimedia player allows T-DMB, DVB-T and ISDB-T with PVR services. <http://www.visualon.com> <http://www.axel.fi> <http://www.discretix.com>

**New Iomega drive brings HD content directly to home theater systems without PC**

Iomega recently announced the ScreenPlay HD Multimedia Drive, a portable external hard drive that delivers multimedia content to high-definition televisions and home theater systems without an intermediary computer. The new device is a 500GB drive with the storage capacity to hold up to 2 million photos, 9,250 hours of music, or 750 hours of video. The drive is a 500GB 3.5-inch 7200 RPM hard drive formatted with the NTFS file system. Video connection options include HDMI, component and composite video, and SCART (RGB). Audio connection options include composite RCA and coaxial S/PDIF outputs. PC transfers use the USB 2.0 interface. USB, composite video, and component video cables are included. It is now available in the Americas for \$209.95 and is expected to be available in international markets in late May for euro 179.99. <http://www.iomega.com>

### **Mirics develops global solution for TV based on a PC utilizing software demodulation**

Mirics Semiconductor announced the Mirics FlexiTV broadcast receiver, a complete RF, host interface and software demodulation solution for the PC platform. Mirics FlexiTV enables reception of all global analog and digital broadcast standards (e.g. FM, DVB-T, ATSC, DTMB), to become a standard feature on all notebook PCs. Mirics FlexiTV also enables a sub-\$5 bill of materials (BOM) for a complete PCTV MiniCard, allowing manufacturers to develop a single broadcast receiver for global deployment, thereby benefiting from simplified manufacturing logistics and substantial economies of scale. Mirics has combined its multi-standard RF tuner capability with its algorithmic expertise to develop the world's first universal antenna-to-LCD broadcast receiver solution. By implementing software demodulation running on a host processor, Mirics FlexiTV leverages the power and abundant system memory of today's PC platforms. This allows nomadic reception of global analog and digital broadcasts without requiring multiple silicon-based demodulators or additional system memory. In addition to reducing system cost and silicon real estate, the Mirics FlexiTV solution provides an easy standards upgrade path via software re-configurability, enabling future-proofing against emerging or variant broadcast standards. Mirics FlexiTV solutions comprise a host-based software demodulator paired with a "SmartTuner" which performs the multi-band RF tuning and digital interfacing to the host. The MSi3101 is the first in a series of SmartTuner products, and combines Mirics' proven MSi001 poly-band tuner and the MSi2500 USB interface chip. The MSi001 features Mirics' unique FlexiRF tuner architecture enabling low-power multi-band reception from 150KHz (LW) to 1.9 GHz (L-band). The MSi2500 integrates analog to digital conversion, MSi001-optimised digital signal processing, a control host and standard High Speed USB2.0 connectivity. <http://www.mirics.com>

### **Samsung's single-chip mobile TV channel decoder RF SoC supports global TV standards for cell phones**

Samsung Electronics unveiled the S3C4F60, a 65nm single-chip mobile TV system-on-chip (SoC) which combines a channel decoder with an RF chip. Samsung's new S3C4F60 supports all worldwide TV standards with respect to frequency range and channel bandwidth, giving consumers the ability to enjoy real-time news, sports, weather forecasts, and live entertainment anywhere. Samsung's new receiver chip supports six different mobile TV standards and complies with all related specifications of DVB-H/T (ETSI EN 300 744, EN 302 304, EN 301 192 and MBRAI); ISDB-T (ARIB-B29/ B31 1/ 3-Seg); T-DMB [Korean T-DMB, DAB (Eureka-147)]; and DAB/ DAB-IP standards. The integrated built-in multi-band RF tuner supports VHF III (174-240 MHz), UHF (470-862 MHz), and L-bands (1350-1750 MHz). Samsung's S3C4F60 also offers a significant boost in mobile performance. By achieving 180Hz Doppler frequency performance at DVB-H 16 QAM, 8 K, 2/3 CR, and 1/4 GI, mobile TV products using the S3C4F60 can achieve perfect reception of digital TV signals, even inside high-speed trains like the TGV, ICE, or Shinkansen traveling at speeds of up to 300km/h. Fabricated in Samsung's advanced 65nm process and housed in a tiny 5x5mm wafer level chip scale package to minimize the footprint, Samsung's new S3C4F60 integrates into a single chip a low noise amplifier (LNA), embedded SRAM, analog-to-digital converter (ADC), PLL, CPU (ARM 7) and a low drop-out, reducing the number of components needed. <http://www.samsung.com>

### **PacketVideo mobile broadcast receiver delivers new TV services to existing handsets**

Eliminating a major obstacle to launching mobile broadcast services, PacketVideo (PV) demonstrated its patented new pocketable mobile broadcast receiver that turns WiFi-enabled phones and personal media players into mobile TVs. PV's mobile receiver device decodes a digital TV signal and repurposes it for use on the phone, sending it via a wireless signal, such as WiFi, to a playback device. The receiver uses specific, patented protocols to ensure optimum rendering of the TV signal on the playback device, and provides secure access to premium channels. This allows mobile subscribers to upgrade to advanced mobile TV services without changing their current handset. The mobile broadcast receiver will be available in versions for all major mobile broadcast standards, including TDTV, DVB-H and MediaFLO as well as for WiMAX. The device can also be customized with the operator's badge or branding for the retail market. The mobile broadcast receiver is compatible with many industry-leading phones including the Nokia N-series, Apple iPhone and HTC Smartphone devices.

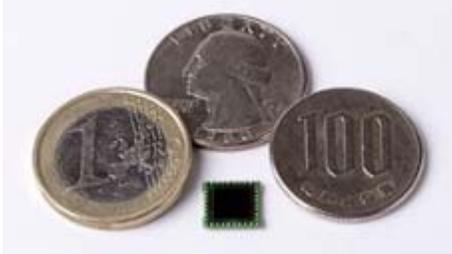
<http://www.pv.com>



*PacketVideo introduced its new pocketable mobile broadcast receiver at Mobile World Congress. The matchbox-sized device allows mobile subscribers to upgrade to advanced mobile TV services without changing their current handset.*

### Imagination Technologies and Sharp demonstrate multi-standard mobile TV module

Imagination Technologies, a leader in system-on-chip intellectual property demonstrated Sharp Corporation's new advanced multi-standard, mobile TV module that incorporates Imagination's mobile TV IP. Sharp has developed the VA3B5EZ915, the world's first dual-mode tuner module supporting both DVB-H and T-DMB terrestrial mobile digital broadcast reception. The receiver is highly integrated, featuring a high performance RF tuner LSI from Sharp, combined with baseband SoC also from Sharp that incorporates Imagination's ENSIGMA UCC multi-standard demodulator technology and META MTX embedded 32-bit processor. The receiver module containing both the baseband receiver and RF tuner has extremely low power consumption of around 43mW for DVB-H reception. Its impressive compact and low-profile package is just 8.0x8.0x1.25mm. <http://www.sharp-world.com>



### AOptix Technologies demonstrates a technology first for HD sports television production

AOptix Technologies, a developer of ultra-high bandwidth laser communication solutions, and television microwave services provider Total RF, announced recent successful Free Space Optical (FSO) lasercom link transmission tests for a national sports television network in New York and San Jose. Recent demonstrations showcased the benefit of eliminating a long fiber run to an HD camera feed above the New York skyline. The AOptix broadcast lasercom terminals were located atop the GM Building on 5th Avenue and near the production truck, 1km away in Central Park. The 2.5Gbps bi-directional link consisted of an uncompressed 1080i camera and gigabit Ethernet feeds through a single, line of site, single-mode-fiber connection. In San Jose, two additional long-distance demonstrations showcased the portability and ease of set-up for the AOptix system. TV network engineering executives were impressed when observing error-free performance at distances of 0.6km and 3.2km. Continuous un-compressed HD-SDI and SD-SDI video feeds along with gigabit Ethernet, audio, and production line comms were transmitted over DWDM lasercom. Terminals were placed on the rooftops and inside a mobile van on a parking garage roof. "The new broadcast lasercom system from AOptix, offers a complete wireless solution for multiple HD feeds - from the remote cameras, audio and controls to the mobile studio for post production," said Bruce Carpenter, director of sales, Commercial Communication Systems at AOptix. "At the center of the AOptix system is the LCT-5 lasercom terminal providing the 10 Gbps FSO wireless transmission. The backend I/O hardware completes the solution with a generic interface for standard broadcast equipment, supporting multiple configurations of uncompressed 1080i & 720p video, AES Audio, RTS Intercom and GIG-E." To achieve stability and link quality over the air, the LCT-5 uses AOptix Technologies proprietary adaptive optics technology to compensate for atmospheric distortions in real time. This approach to FSO minimizes the effects of atmospheric scintillation, dramatically enhancing link availability. <http://www.aoptix.com>

### A-VSB Initiative demonstrates the first end-to-end ATSC-compatible mobile broadcast TV platform

The A-VSB Initiative, whose members include Samsung Electronics, MobiTV, Nokia Siemens Networks, Rohde & Schwarz and SES AMERICOM's IP-PRIME, announced a live demonstration of an end-to-end broadcast mobile TV platform at NAB. The platform has been proposed to the Advanced Television Systems Committee (ATSC) as an open ATSC Mobile/Handheld (ATSC-M/H) standard. It includes the A-VSB physical layer and global standard OMA BCAST service layer for mobile broadcasting, showing live local and national content as well as interactivity. The live demonstration at NAB 2008 used existing Las Vegas transmission infrastructure owned by the Sinclair Broadcasting Group (station KVMY) and Telemundo (station KBLR). In addition, interactivity and electronic service guide functionality were demonstrated for the first time in an ATSC-compatible mobile system. <http://www.ses-americom.com> <http://www.samsung.com> <http://www.mobitv.com> <http://www.nokiasiemensnetworks.com>

### LCD TV/LCD monitor system patent granted to O2Micro

O2Micro International was issued 20 claims under United States patent number 7,345,431 for its DC/AC converter circuit architecture: a continuation of the invention issued March 2007 under patent number 7,190,123. The patented DC/AC converter circuit architecture drives a plurality of cold cathode fluorescent lamps (CCFLs), providing uniform brightness to large LCD panel applications, such as LCD TVs and monitors. "This patent continuation provides the system designer with a cost effective method to control CCFL brightness uniformity, thereby reducing system costs," said Dr. Yung Lin, executive vice president, O2Micro. <http://www.o2micro.com>

# Hey Mister, Need a Shine?

by David Barnes

**David Barnes is Vice President of Strategic Analysis at DisplaySearch. He has 30 years of experience managing and advising electronics manufacturers on new investments and restructures. He leads DisplaySearch's Large-Area TFT LCD team responsible for glass substrate, large panel shipment, product cost and worldwide forecast reports. Before joining DisplaySearch, Barnes worked at LG.Philips LCD where he advised managing directors, board members and shareholders on industry structure, opportunity and risk. Prior to that, Barnes worked as a product manager at Photon Dynamics where he created the ArrayChecker and ArraySaver products. Barnes past successes also include managing the business units that validated the 386, 486 and Pentium microprocessors. He attended the University of California at Santa Cruz and is the author of more than \$10B of funded capital plans.**



There is an old story about Joe Kennedy, the father of President John Kennedy, avoiding loss during the Great Depression because of a stock tip he got from a shoe shine boy in 1929. He figured that if a shoe shine boy was playing in the stock market, it was time to get out. There are so many versions of that story that one wonders if it is factual. It seems true nonetheless: when most people agree that the market will go up forever or down forever, the market is probably ready to change direction.

It seems almost everyone thinks the economy is in bad shape. We read about new lows in confidence or new highs in prices every week. Is this a sign that we are nearing a turning point?

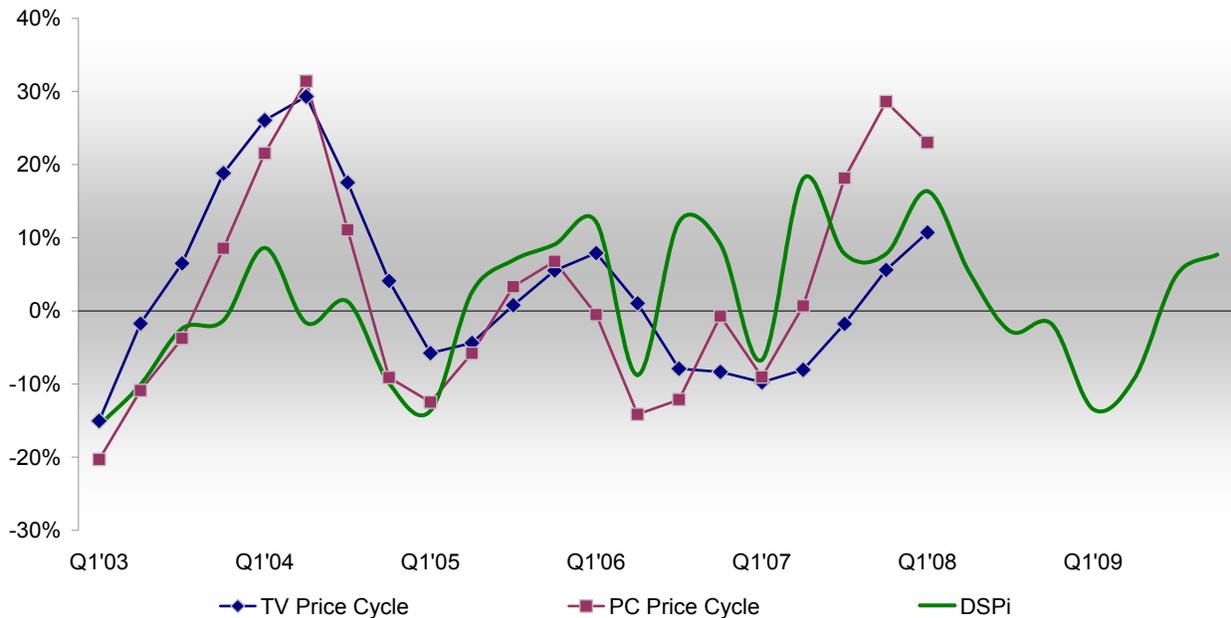
Yes and no. It depends on what cycle we consider. Some cycles, like the oil drilling-refining cycle may take several years to complete. That cycle, in particular, cannot be synchronous around the globe because different nations operate under different conditions regarding subsidies, incomes and inflation targets. Other cycles, like the domestic housing cycle, are well underway and should recover in the near term. The Crystal Cycle (TFT LCD business cycle) is of that class. Looking back on what DisplaySearch presented at the annual US FPD Conference earlier this year, the cycle appears to be right on schedule and ready for a turn-around in early 2009.

The basic driver of the Crystal Cycle is capacity acceleration. When panel makers ramp-up a number of new TFT fabs about the same time, they step-up supply. The step increase in panel supply increases buyer power. Consumer brand owners can obtain better prices than they can when capacity grows slower. We have seen rapid panel price declines on a square-inch basis after every surge of capacity growth over the past two decades. This time is no exception.

The emotional response to this Crystal Cycle is heightened by problems in the broader economy. The key thing to keep in mind is that the Crystal Cycle results from investment decisions made one or more years ago. Investment decisions made this year will drive the next Crystal Cycle, not this one. For example, plans for Gen-10 or larger substrate fabs publicized by AU Optronics, Samsung Electronics and other manufacturers recently will not affect supply this year. Such investments will create a surge of supply in 2011–2012. As these and other plans firm up, the DisplaySearch Price Indicator (DSPi) will predict the next turning point. Until then, the DSPi signals stronger panel pricing and improving profit margins from early 2009 through 2010.

This Crystal Cycle seems to be more shocking to some people for a second reason. The TFT LCD market is worth more than \$100 billion a year. It is larger than the DRAM market. It has attracted many more investors and speculators than it had in the past. Some of these public or private equity companies have not been through a Crystal Cycle before. It is a bit like riding a roller coaster. The ride is always a thrill but it is less shocking for those who have ridden it before. This is partly because people who get sick the first time seldom ride again.

### Areal Price Fluctuations for TV and PC Monitor Panels with the DSPi



Source: DisplaySearch's Q2'08 Worldwide Flat Panel Forecast Report

The wave of prices rising and falling on the long-term trend line sends ripples up and down the supply chain. Brands are often happy to get better prices, until they realize the implications. When panel prices fall quickly, the inventory values of finished goods fall also. If retail conditions or strategies do not permit rapid reduction of inventories, then order rates may slow. If panel makers do not anticipate this, they may overproduce and increase their inventories. When they recognize this condition, they may cut capacity utilization and attempt inventory reduction. This sends a shock wave back up the chain to their suppliers. There may be a sudden decrease in orders for glass optical films or other materials. Eventually, most companies in the supply chain make adjustments. Panel prices decline further in order to absorb capacity. Orders for material pick up and product prices fall to clearance sale levels.

In prior cycles, the average area price for PC monitor modules led the market and this cycle seems no exception. There are more makers of panels for monitor applications than for other large-panel applications so competition is more intense. In addition, demand for new desktop PC systems grows less quickly than in the past now that notebook PC offer comparable computing power with wireless connectivity. In the most recent major cycle, the average display area price for monitor panels fell 45% from peak to bottom in three quarters. There is no reason to assume such dramatic price reduction will repeat. In Q2'08, which appears to be the first of three quarters of correction, the average area price fell relative to the trend line but things were not as bad as some people perceived them to be. Indeed, DisplaySearch expects demand for some panels will be tight in Q4'08. Demand for notebook PC panels continues globally and one-third to one-half of all TV panels were shipped in the fourth calendar quarter from 1999 through 2007.

Data released by the US Census Bureau supports this view. There has been no collapse in consumer demand for electronic products. On the contrary, retail sales of electronics and appliances increased 3.4% in 1H'08 compared with 1H'07. In retrospect, 2007 was a down year and 2008 appears to be a year of recovery. Retail sales at electronics and appliance outlets decreased 2.7% in the first half of 2007 compared to the first half of 2006. Last year was not great, so be happy that this year is better. Recent results from Wal-Mart underscore this finding. This leading retailer reported same-store sales over the 22 weeks ending July 04 increased 3.2% over the same 22 week period in 2007. The Wal-Mart results and the Census Bureau measurements tell us that things are not as bad as we may think after watching the nightly news. Sure, car lots are full of unsold Hummers but car dealers can't keep Honda Civics in stock. It is a matter of having the right product in the right place at the right time.



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***"A Great TV in Every Room"***

# Retail price survey of LCD TVs in Q2'08

by WitsView

WitsView is a neutral market research firm dedicated to the TFT-LCD industry, providing a full coverage of information resources and analytical research to over 1,800 companies worldwide. WitsView's service consists of all-round quantitative research, bottom-up industry analysis and insightful market viewpoints that enable clients to make prompt and convinced decisions. <http://www.witsview.com>

Based on WitsView's Q2'08 survey, the price of some LCD sizes for the TV market increased over the previous quarter for the first time. The middle-sized segment (32- to 42-inch) maintained a small increase, while the larger-sized 46-inch and above experienced a price drop of more than 5%.

**Price of the >32-inch segment rose in Q2'08:** The average price of the 20-inch segment was \$446, up from last \$442 last quarter. Japan, Taiwan, Korea and China all experienced a quarterly price increase. One exception was the UK, where prices dropped by 5% to \$465. When compared to Q4'07, prices in the UK have slipped by more than a hundred dollars in a mere six months. Separately, the average price for the 19-inch and 22-inch segments in the UK was respectively \$382 and \$417, both lower than the 20-inch average.

The 26-inch segment retailed at \$643, roughly the same as last quarter's \$641. Prices in Japan, Korea and Taiwan were up, due partly to the appreciation of their respective currencies.

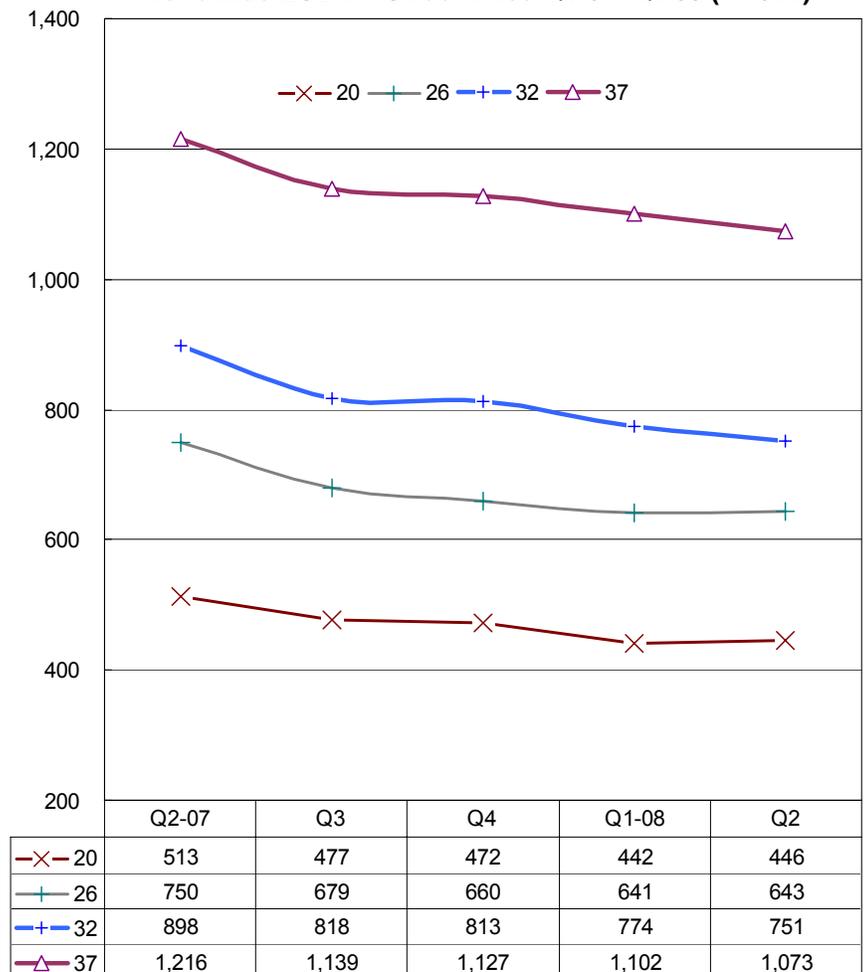
## Fewer promotions render medium-sized TVs to slightly drop in Q2

Traditionally, there are little sales promotions in the second quarter (in Q4 there is the Christmas holiday shopping season in the western world, while in Asia there is the Chinese Lunar New Year promotions in Q1). One key event during this period is China's Labor holidays, where people get more than a week off from work. Yet, for this year, with the holidays reduced to only three days, smaller retail price changes were seen. For the 32~42-inch, which are often used for the living room TV, prices only fell by 3%. The only exception was in the 40-inch category. Given the sharp price cuts by Sony and Samsung on their 2008 models, 40-inch panels fell by more than 8.5%.

The 32-inch segment was sold at an average of \$751, down by 3% from last quarter's \$774. As the TVs in Japan were equipped with more high-end features, such as FHD resolution from Sharp, Toshiba, and Panasonic and the ultra slim design from Hitachi, prices fell by a mere \$5 in the region. Meanwhile, in China, prices stood flat at \$662, while in the US, it fell 1.5% Q/Q to \$669.

Average pricing in the 37-inch segment reached \$1,073, down by 2.6% Q/Q; narrowing the price gap with 32-inch panels

Worldwide LCD TV Street Price Q1-07~Q1'08 (< 40in.)



to \$299 from last quarter's \$318. Given the increase of FHD models in 2008, it has slowed the price drop of the 37-inch. In the North America market, the FHD penetration rate in Q1'08 reached 17.5%. In Q2'08, this ratio jumped to 31.3%, resulting in the region's Q2'08 average price (\$867) to be \$15 more expensive than in Q1'08. Meanwhile, in Japan, the FHD penetration rate reached 92%, up from Q1's 81.8%. The average price stood at \$1,323, up \$33 Q/Q.

In the 40-inch segment, due to the launch of new models by Sony and Samsung, its average price fell sharply by 8.5% Q/Q to \$1,319. Among the surveyed sizes, the fall was only second to that of 52-inch panels. The 40-inch segment is a key highlight of Sony's V, S, and W series and Samsung's Series 3~Series 7. In Japan, the above 40-inch FHD penetration rate has already reached 100%.

For the 42-inch, the average price reached \$1,327, down by a mere 2.3%. Once again the price has fallen below its 40-inch counterpart. In most of the global markets, the 40-inch segment was slightly more expensive than the 42-inch, except for Japan (\$1,549 vs. \$1,774), where 42-inch panels were \$225 higher than 40-inch panels.

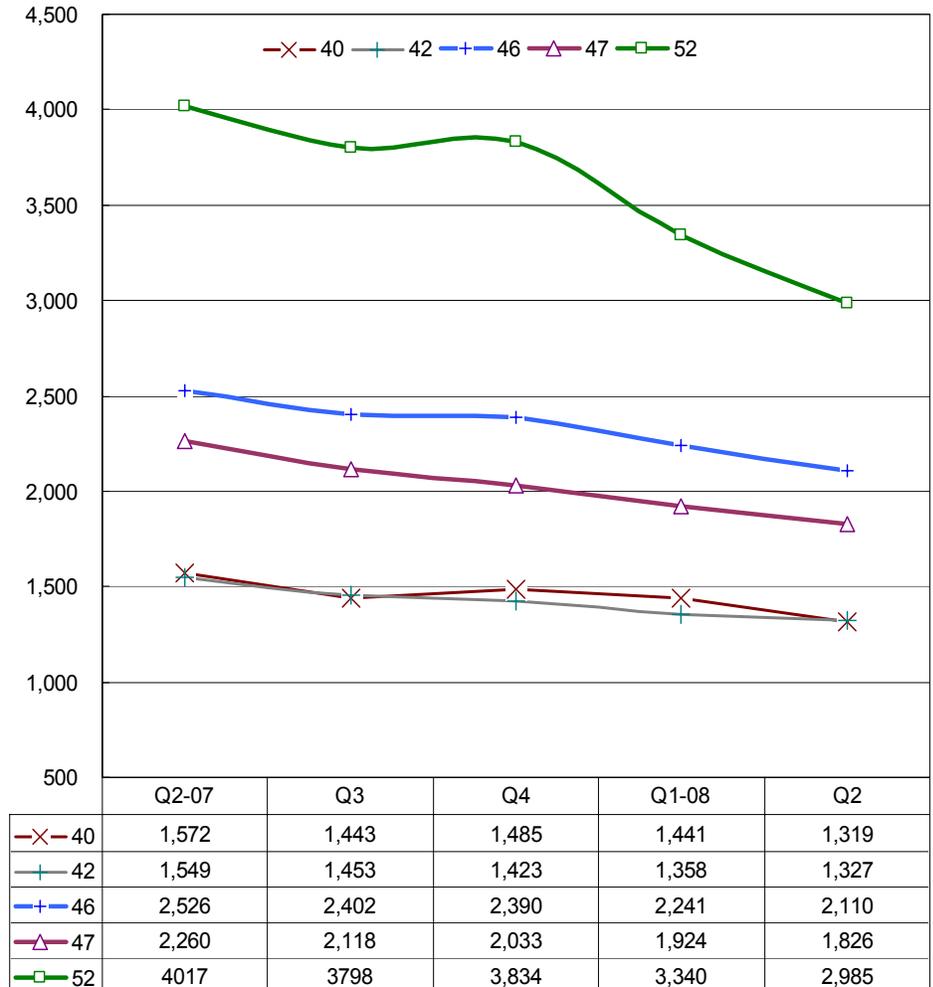
A year ago, the 42-inch segment was retailed at \$1,724 in Japan, lower than current levels. This shows that the current price tag has become relatively acceptable to consumers, rendering further price cuts unnecessary. Thus, the competition between brand vendors has shifted from "price" to "design", such as Internet capabilities, slimness, energy efficiency and adding of a built-in hard drive. In addition, Sharp and Toshiba have both unveiled TVs that can process 12 bit or more color production (Sharp's 12 bit, Toshiba's 14 bit)

**Large-sized LCD TVs retains more than 5% price drop**

For the 46-inch category, it was retailed at \$2,110, down by 5.8% Q/Q. In the North America market, prices fell by 8.5% to \$1,584, roughly equivalent to the 40-inch sold in Japan. Korea was a more expensive region compared to others, despite Samsung sharply cutting its prices in expanding its global market share. However, since 2008, prices of the 46-inch dropped sharply in Korea, where the decline exceeded \$100 for each month. For Q2'08, prices stood at \$2,178, down by 14.6% Q/Q.

The 47-inch slipped by 5.1% to \$1,826, slightly narrowing the price gap from last year's \$284 to \$266. In the US, it fell \$133 to \$1,391, while in Japan it rose by \$129 to \$2,466. The price difference between the two exceeds by a whopping \$1,000. After Toshiba exited the 47-inch market since 2008, JVC is the remaining player that still offers the size in Japan. In Korea, the price fall of the 47-inch has been consistent with the 46-inch, falling monthly by \$100. Thus, it can be seen that LG and Samsung are both initiating price cuts in the large-sized LCD TV market. However, the 46-inch is currently \$581 more expensive than the

**Worldwide LCD TV Street Price Q1'07~Q1'08 (=/>40in.)**



47-inch in Korea, which marks a big difference with the mere \$51 gap (47-inch more expensive) that occurred a year ago.

For the first time, the 52-inch fell past the \$3,000 level, declining by 10.6% Q/Q to \$2,985. This was the biggest decline among the surveyed sizes. The price gap with the 46-inch fell to \$875, a big drop from last year's \$1,491. In the US, the average price of the 52-inch was \$2,043, very close to the \$2,000 level. The 52-inch is still mainly offered by the Tier 1 players in the North America market. Local brand vendors only accounted for 12%. By contrast, local brand vendors accounted for roughly 36% in the China market.

WitsView believes except for the 40-inch and 52-inch price drops that occurred globally, varying price developments were seen for the different regions in Q2'08. In the US, 46-inch and larger panels experienced bigger price falls. In the UK, all the TV display sizes trended downwards. In Japan, prices for the 47-inch and smaller panels appear to have stabilized. In China, the low-priced TV promotions were concentrated on the 47-inch and larger panels. In Taiwan, the 37-inch and smaller panels experienced a price increase. Finally, in Korea, the 32-inch and larger panels fell by double digits.

**Quarterly Price Change by Region Q2'08**

	US	UK	Japan	China	Taiwan	Korea
20-inch	-4.7%	-5.3%	3.5%	8.6%	2.2%	1.3%
26-inch	-4.2%	-0.8%	1.3%	-2.0%	3.9%	2.9%
32-inch	-1.5%	-8.4%	-0.5%	-0.2%	1.6%	-8.4%
37-inch	1.7%	-7.0%	2.6%	0.7%	1.0%	-10.4%
40-inch	-7.4%	-8.2%	-4.4%	1.8%	-9.5%	-18.0%
42-inch	-2.7%	-5.6%	8.9%	-3.0%	-1.5%	-12.2%
46-inch	-8.3%	-8.6%	-4.0%	-4.8%	3.8%	-14.6%
47-inch	-8.8%	-5.1%	5.5%	-9.6%	-3.5%	-13.4%
52-inch	-7.2%	-5.8%	-3.6%	-11.6%	-7.4%	-25.8%



### 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 "specsmanishp" 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>.

## Interview with Roman Maisch from Merck KGaA

Dr. Roman Maisch graduated in organometallic chemistry from the Julius-Maximilians University, Würzburg, Germany in 1984. In 1985, he joined Merck as Applications Technology Consultant in Pigments. After several assignments in Pigments, among those Regional Manager for Asia/Oceania, stationed in Tokyo, Japan, Dr. Maisch joined the Liquid Crystals Division in 2004 and today serves as the company's Senior Vice President globally responsible for Marketing and Sales.



**Merck has a long history associated with the development and production of liquid crystals. Can you give us a short overview?** Merck was involved from the very beginning in the research of liquid crystals. Shortly after Friedrich Reinitzer discovered the phenomenon of the liquid crystal state in 1888, Merck offered already in 1904 liquid crystals in its sales program. Then 40 years ago in 1968 Merck started research on nematic liquid crystals. In 1980 the "viewing independent panel" (VIP display) the basis of all active matrix flat panel LCDs was developed. In the same year we established an application laboratory for liquid crystals in Atsugi, Japan. Similar laboratories were established in 1989 in Korea and 1996 in Taiwan. Today, Merck produces in all these sites its liquid crystal mixtures close to its customers. In 1995 Merck and Hitachi Ltd. cooperated in the development of In Plane Switching (IPS), a new technology for LCD monitors based on a patent filed in 1990 by the Fraunhofer Institute for Applied Solid State Physics in Freiburg, Germany. This patent was acquired by Merck in 1994. Together with Fujitsu Ltd. Merck developed an LCD video monitor based on Vertical Alignment (VA) technology. Both technologies – IPS and VA – are now the most widely used technologies for LCD TV. In 2004 Merck inaugurated the worldwide most modern production plant for liquid crystals in Darmstadt, Germany. This investment totaled in approximately €250 million.

**Do you think that the development of a new LC formulation is mostly science – with very predictable and calculable results – or is there an element of art – similar perhaps to the abilities of a master chef?** I think the development of a new LC formulation is most of all science, where results are all in all predictable and calculable. On the other hand synthesis of new chemical compounds involves a lot of experience and you have to be ready to deal with surprises, either positive or negative. Of course also hard work and good luck always helps. By the way Merck just published a book, which tells the story of the last 40 years of Liquid Crystal research at Merck. It is called "Coincidence and Courage, 1968 – 2008, 40 Years of Liquid Crystal Research at Merck".



*Liquid crystals: The botanist Friedrich Reinitzer was the first to observe a peculiar behavior of cholesteryl benzoate while investigating its melting point; the physicist Otto Lehmann explained it by assuming a new, yet unknown state of aggregation and introduced the term "liquid crystals". Since 1904, suitable substances with liquid crystalline properties have their place not only in this box of collections from the laboratory but also in Merck's catalog of chemicals.*

**Please give us a short tutorial on what all is involved in the production of a liquid crystal solution.** To produce liquid crystals involves many – sometimes up to 10 steps of complicated chemical synthesis. But just to go over so many steps to the final molecule is not enough. Sophisticated purification methods and quality control are required, to get to the ultra pure liquid crystal compounds, which are used in a final mixture to be used for LCDs. Finally to get to the mixture the optimal combination of about 10 to 20 single liquid crystal compounds have to be developed and tested at the customer for final qualification at the LCD-line.

**Approximately how many different formulations of LC do you currently have on the market?** At the moment I would say at least several hundreds different liquid crystal mixtures.

**What are the differences in the LC used in a large-area LCD TV compared to the LC used in a mobile phone?** The main differences are polarity and nematic phase range of a liquid crystal mixture. The polarity of a mixture for mobile phones needs to be higher in order to achieve lower operating voltages. Also LCs for mobile phones have a broader LC-phase range in order to ensure operation over a larger temperature range. Besides these there are many other parameters, which can be adjusted to the application specific requirements.

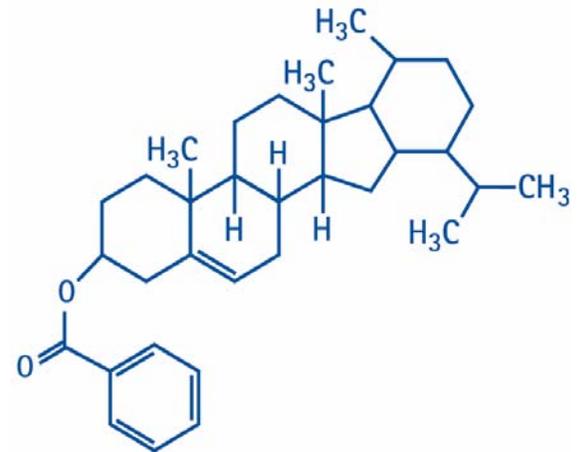
**Do the various LCD manufacturers use fundamentally different LC solutions used in the production of large-area LCD TVs, or are all of the solutions pretty much the same?** Almost each liquid crystal mixture is customized for the application and the customer. The individual liquid crystal compounds may in many cases be of similar type, but the combination of these different compounds makes the difference and this combination is different from application to application and from customer to customer.

**Aside from displays, what are the major products for which Merck is developing liquid crystal solutions?** Displays for what ever application be it TV, monitors, notebooks, mobile phones, digital still camera, car navigation, games, public information displays, picture frames etc. are basically the only products liquid crystals are used in at the moment.

**For LCDs, you also manufacture such materials as optical films. Tell us a bit about this business.** Besides liquid crystal mixtures (licristal®) we develop and sell materials, so called Reactive Mesogens (licrivue™), for optical films. These are used to optimize for example viewing angles of TV's. In addition we develop organic semiconductors (lisicon™), which can be used for examples in flexible backplanes. Both businesses are still in the development stage. In addition we offer structuring solutions (isishape™) for patterning of functional layers for displays and photovoltaic applications.

**What is the approximate value (in dollars) for the liquid crystal used in the production of a 40-inch LCD TV?** It is quite small, actually less than 3% of the production cost of a 40-inch LCD TV.

**Is the price of liquid crystal impacted by various performance features? In other words is the LC used in a 1080p system more expensive than the LC used in a same-size 720p system?** As I mentioned above all mixtures are developed specifically for a certain application, which has specific performance requirements. So it is often not a "one to one" relationship. One has to take the full picture into account. Of course to achieve certain performance parameters specific liquid crystal compounds are needed to achieve such a performance. As the requirements increase also the complexity of the synthesis and purity of such materials increases, which normally results in higher costs, at least in the beginning. One should understand that such improved performance parameters should give the panel manufacturer also the possibility to charge a better price for his product.



*Cholesteryl benzoate: the structural formula of the "original liquid crystal"*

**What will you do if competitors offer the same performance in their mixtures than you do?** The mixtures might in some cases be exchangeable, the service offered is not. Our localized support and mixture development and production, our quality labs, our broad diagnostic support which is based on a long-year experience and expertise, all these services are strong differentiators. We are known for our speed of response in new mixture development and our high degree of professionalism and discretion in treating our customers. Furthermore we continuously invest significantly in the appropriate production capacities, ensuring the satisfaction of the market demands. (You may compare the figures of money invested over the last couple of years by us with the investments made by competitors.) This is value to customer. Merck has been the technology leader in the past and will be driving product improvements and technological innovations in future. We strive for superior performance that supports the customers and justifies a premium rather than price competition.

**Concerns have been raised about the disposal of LCDs, suggesting that if released into groundwater liquid crystal can be carcinogenic. Please comment.** Merck has a very clear and strict policy concerning safety of liquid crystal materials: Merck has never and will also not in the future introduce acutely toxic or mutagenic substances into the market. Merck performs toxicological and eco-toxicological studies with liquid crystal materials already in the development stage as precautionary measures according to the principles of "Responsible Care" and "Product Stewardship". All toxicological tests were performed according to the recent international guidelines (OECD, EU) and followed the national regulations for animal welfare as well as the worldwide acknowledged principles of "good laboratory practice". In addition Merck has just recently committed itself to fully comply with the "chlorine free" policy requested by the industry.

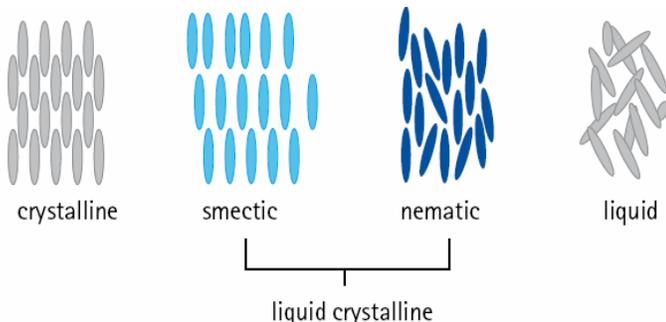
**What things is Merck doing to help meet the increasing demands for "green" and recyclable materials?** Besides the comments made above, Merck has developed two eco-efficient recovery processes. In incinerators and metallurgy processes LCDs substitute used raw materials with recovery rates of almost 100%. This supports the new legislations in Europe ("WEEE" directive, waste of electrical and electronic equipment) and in Japan (Recycle Law).

**In addition to liquid crystal, Merck is also developing OLED materials. Is this being done to hedge against possible encroachment by OLEDs into LCD market share, or do you expect that OLED and LCD will be complementary?** First of all we believe LCDs will remain the dominant display technology for all applications in the foreseeable future. Among the R&D activities for new display technologies, OLED materials represent an opportunity for future display and lighting applications. Merck is pro-actively accompanying the R&D efforts of the FPD industry aiming at a leading position for OLED-FPD applications, similar to the current LCD position. OLED materials are already commercialized in small displays, e.g. mobile phones. For TVs, some hurdles still need to be overcome. Besides display applications, we think that OLED lighting technology opens up a new application field.



*Liquid crystals exhibit characteristics between those of perfect crystalline order and the unstructured chaos of liquids. Macroscopically, the liquid crystalline phase behaves as a liquid. Microscopically, however, it resembles the solid phase since its physical characteristics are like those of a solid having anisotropic (i.e. directional) behavior. This is also reflected in the arrangements of the individual molecules.*

**What sorts of improvements in LC do you expect we'll see over the next couple of years?** In LCDs we expect to see higher contrast ratio and improved MPRT (moving picture response time) as well as higher transmission, which should result in lower energy consumption. All these are of course closely linked to the development of new liquid crystal materials.



*There are different ways in which liquid crystal molecules can be arranged in a liquid crystal; smectic, nematic or cholesteric. The smectic phase is formed when the molecules align parallel to each other in layers. In the nematic phase the molecules are also aligned parallel but do not form layers. The cholesteric phase occurs when the molecules align in layers which twist relative to one another, like the steps of a spiral staircase that twist against each other. Nematic liquid crystals by far are of the greatest technical importance.*

## Interview with John Langevin from Luminus

John Langevin is Vice President of sales and marketing at Luminus Devices. Mr. Langevin joined Luminus in January 2005, with a strong track record in sales, marketing and business development for high growth companies in components and hardware technology. Prior to Luminus, Mr. Langevin was Vice President of marketing at TeraConnect, Vice President of business development at Extreme Packet Devices (sold to PMC-Sierra), and Director of business development at Cimaron Communications, (sold to AMCC). Mr. Langevin holds an MBA from Boston University and a BSEE from Lehigh University.

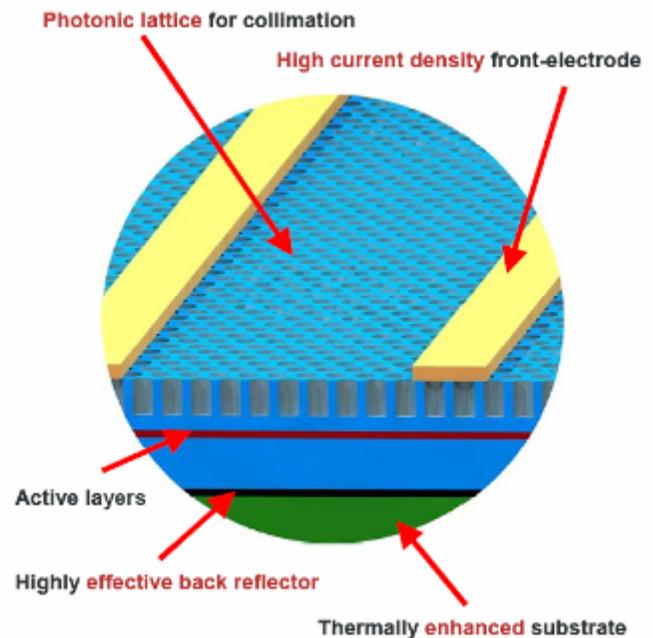


**Please give us some background about Luminus Devices and how you came to be involved in the LCD TV market.** Luminus was launched in 2002 by our founder and CTO Alexei Erchak. At MIT, Alexei's research focused on using photonic lattices to extract light from LEDs more efficiently. This core technology has become the foundation of our PhlatLight platform at Luminus. Today we have about 150 employees. Our headquarters, engineering and packaging is located in Billerica, Massachusetts and our semiconductor fab is about 10 miles away in Woburn, Massachusetts. Our initial product focus was manufacturing red, green and blue PhlatLight LEDs for microdisplay projection systems, namely projection TV and projectors. LCD TV backlighting has always been on our roadmap as a logical extension of our PTV business, with a very similar channel.

**“PhlatLight” is not a word most people are familiar with; how did you choose this name to describe your core technology?** The name PhlatLight is derived from our underlying Photonic Lattice technology. Our PhlatLight products are based on innovations at both the chip and the package level.

**Please give us an overview about how PhlatLight technology works.** The photonic lattice is an intricate, sub-wavelength microstructure embedded in the LED. The lattice influences the photons to emit vertically from the surface, rather than laterally from the edges of the chip. The emission is very efficient and uniform. And because the light emits from the surface, not the edges, the technology is scalable to large sizes and various shapes. The PhlatLight platform also includes a high performance package with low thermal resistance, allowing operation at very high current levels. The result is a device that is an order of magnitude brighter than any other LED.

**What are the primary benefits of LED backlighting in an LCD TV implementation over a CCFL solution?** LEDs are more rugged and more energy efficient than CCFL lamps. And they don't contain mercury. But the most interesting benefit stems from the fact that they can be switched on and off very quickly, allowing TVs to reach full brightness instantly, and enabling features like black bar scanning to eliminate motion blur, and local dimming to improve contrast and reduce power. Our PhlatLight BLU uses RGB LEDs instead of white LEDs. RGB provides deeper color saturation and wider color gamut than CCFL lamps or white LEDs. The RGB color is noticeably spectacular, and allows TVs to stand out amongst all of the other TVs on the wall at the retail stores.



*PhlatLight large format LED design*

**LED backlighting has become a popular performance feature for many LCD devices. When do you think it will also become a price-based feature?** LEDs are already lower price for handhelds and smaller displays. For TVs, LED based BLUs today are slightly higher than CCFL, but the gap is closing quickly. LEDs are rapidly getting

more efficient and cheaper. As LED efficiency improves, fewer devices are required, which leads to lower costs for drivers and thermal management. I expect LED based BLUs to be at parity with CCFL in a couple of years max. Our PhlatLight BLU uses RGB LEDs, not white, providing all of the benefits of LED backlighting plus the better color. The 46-inch model only uses eight RGB modules, which has substantially lower LED and driver costs than approaches that use hundreds of traditional LEDs.

**Do you foresee a day when RGB LEDs will be used to eliminate color filter technology in transmissive LCD devices?** Absolutely. The cost benefit and power savings make it inevitable. But it's hard to predict exactly when. It feels like we're still about four or five years from having liquid crystals with fast enough response time to make color sequential, or color filterless technology feasible for LCD TVs, but the time for early design-work is now.

**Tell us about your edge-lighting solutions for LCD TVs.** Our PhlatLight BLU has been created through a collaboration with Global Lighting Technologies, or GLT. PhlatLight LEDs have the brightness and collimation light properties that are perfect for coupling into large optical waveguides. GLT has extensive manufacturing experience, and their MicroLens technology is designed for color mixing and uniformly spreading light across large optical waveguides. Our approach involves a single RGB module coupled to the edge of one of these waveguides, which we call a blade. Eight of these blades are stacked to implement a backlight for a 46-inch TV. This approach is easily scaleable to smaller and larger screen sizes, 65-inch and higher, by varying the length and the number of blades used in the backlight.

**Using edge-lighting across a very large surface must create all sorts of problems, particularly with regard to both overall brightness and then brightness uniformity across the surface of the display. How do you do it?** The MicroLens technology provides excellent uniformity: more than 90% across each blade, and more than 85% across the entire BLU. And each blade is equipped with a color sensor that allows us to monitor, adjust and maintain brightness uniformity and color consistency for the life of the TV.

**Tell us about your local dimming solutions.** The main benefit of our edge-lit approach is its low cost, and its thinness. Local dimming can be implemented from blade to blade. While this doesn't have the granularity of 2D local dimming, it can provide most of the power savings benefit, depending on the content.

**LED backlighting has been heralded as a "green" technology. While certainly true in terms of the use of hazardous substances, is it also true in terms of power consumption?** LEDs are already equal to and in many cases more efficient than CCFL lamps, depending on the application. With EnergyStar incentives LEDs will continue to improve efficiency at a much faster rate than CCFL will. And of course LEDs don't contain mercury.



**Please tell us more about your "green" initiatives.** The green benefits of PhlatLight technology are a core part of our messaging. We promote these benefits on our website, in promotional videos, and speaking appearances. To more closely identify PhlatLight technology as a green technology, we've created a green colored version of our PhlatLight logo with a small leaf added, which manufacturers can use to help identify their product as using our green LED technology.



*The PhlatLight LED back light unit won the 2008 Display Component of the Year Gold Award from the Society of Information Display (SID). The PhlatLight 46-inch BLU is illuminated with eight light modules, each containing a single red, green and blue PhlatLight LED. The LEDs illuminate the BLU from the edges, not the back, enabling thinner designs.*

**Tell us about LED binning and the problems posed in this regard.** Binning is less of an issue for PhlatLight LEDs than it is for conventional LEDs because there are so many fewer LEDs to match. Our PhlatLight BLU has only eight RGB chipsets, while a comparably sized BLU with conventional RGB LEDs has hundreds. With our color management system, the need for binning is virtually eliminated.

**Luminus has recently made some breakthroughs related to PhlatLight technology used on projection TV. Tell us how this works.** Luminus continues to invest a significant amount of money in R&D to improve the brightness and efficiency of our PhlatLight products. As a result, Samsung has been able to launch new DLP-TV models every year with larger screen sizes and smaller chipsets. The 67-inch model on the market this year uses a PhlatLight chipset that is half the size of the chipset in their 2006 56-inch model, and is brighter.

**The rear-projection TV market has dipped significantly in terms of unit volumes over the past couple of years, with many market analysts forecasting the quick demise of the technology in the TV market. What are your thoughts?** The overall market for projection TV has certainly dropped since 2006. But the category has established a foothold for large screen models, 60 inches and larger. With Samsung converting an increasing number of models to LED, we're still experiencing growth in this segment. Our projector business is benefiting from the improvements we've made in brightness and efficiency, and economies of scale in manufacturing. We have a number of customers, including Samsung and LG Electronics, selling or preparing to launch PhlatLight-based projectors this year. We're also working with a number of companies on home cinema projectors and data projectors. As the PTV category diminishes our LCD TV backlight business is cranking up. The transition from PTV to LCD TV happened faster than we expected, but the capacity is there and we're ready to ramp.

**In terms of market opportunity, is Luminus equally focused on both backlighting solutions and general lighting solutions, or do you expect that one of these will eventually dominate your development efforts?** Both markets benefit equally from the investments we make in our PhlatLight technology. Brightness and efficiency are essential in backlighting as well as in lighting. For the next couple of years our display business (TV and projector) will be larger. But by 2011 I see an even balance between our display and lighting businesses.

**Tell us about one of your favorite "customer success" stories.** The Samsung PTV business is a great customer success story. We started sampling our first PhlatLight chipsets in mid-2004, and by 2006 we were mass producing and selling PhlatLight chipsets to the leading TV company in the world. The quality and reliability of the chipsets has been extraordinary, which has given us instant credibility with new customers in both our display business and new lighting business.

**Considering the TVs in your home, tell us what illumination solutions are used.** I have two PhlatLight based Samsung DLP-TVs, a 56-inch and a 61-inch, and a Sharp Aquos LCD. I've got a spot reserved in my family room for the first PhlatLight based LCD-TV which I expect to fill in 2009.

**Please give us your estimate as to the percentage of the LCD TV market that uses LED backlighting in 2009. How about in 2012?** LED penetration is starting slowly, maybe 5% in 2009. But as economies of scale are achieved and the price gap closes, I can see more than 50% LED by 2012. Once price parity is achieved, why would anyone use CCFL?



*"It feels like we're still about four or five years from having liquid crystals with fast enough response time to make color sequential, or color filterless technology feasible for LCD TVs."*

# HDTV 2008 Conference

**DISPLAYSEARCH**  
AN NPD GROUP COMPANY

## Confronting the New Reality

September 15-17, 2008  
Renaissance Hollywood Hotel and Spa Hollywood, CA

### Reasons to Attend

#### Reclaim Your Competitive Advantage

This year's HDTV Conference focuses on delivering the insight and knowledge you need to break the cycle of reduced margins and increasing commoditization. Learn where to find new sources of added value, competitive advantage and increased profitability. Find out if you are optimizing sales in your target markets and uncover untapped markets to boost your bottom line.

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Experience instant ROI with actionable analysis and insight that will help you discover opportunities to regain your competitive advantage in an increasingly commoditized marketplace. In addition, you'll get thousands of dollars worth of information to size up the marketplace and identify new business opportunities.

#### Key Issues Addressed

- How can excitement and margin be realized when HDTVs have progressed from novelty to commodity?
- How should TV set makers and retailers respond to proliferation of digital video beyond the traditional broadcast model?
- How can the TV set makers deliver greater value and differentiation beyond the box?
- In an age of infinite choices, how can TV stakeholders maintain an effective and engaging entertainment experience?
- What will it take to deliver on the promise of the full HD entertainment experience?
- How can cable/telecommunications, content-related and set and player manufacturing companies work together implementing various design requirements to deliver a full HD experience to customers?
- Which technologies are driving customer preferences and what developing consumer trends will influence design considerations?

#### Who Should Attend?

Brands	Component Suppliers
Panel Suppliers	Retailers
Equipment Manufacturers	Media
Design Manufacturers	Financial Analysts
Equipment Suppliers	

#### Sponsorship Opportunities

To find out more about sponsorship and exhibit opportunities, contact **Heather Boudreau** at 516.625.6133 or [heather\\_boudreau@displaysearch.com](mailto:heather_boudreau@displaysearch.com)

### Agenda

#### Tuesday, September 16

8:00 AM - 10:45 AM

State of the Union

11:00 AM - 12:30 PM

Discs vs. Digital: The Last Format War

1:45 PM - 3:45 PM

The Connected Television: Content from Across the Living Room, the House and the World

4:00 PM - 5:40 PM

Red, Blue and Green: Television in an Age of Environmental Consciousness

5:40 PM - 6:10 PM

DisplaySearch Analyst Panel

#### Wednesday, September 17

9:00 AM - 10:45 AM

**Development Track**

Leveraging User Experience Into Competitive Advantage

9:00 AM - 10:45 AM

**Marketing Track**

Last Call for Analog: Courting the Late Adopter

11:00 AM - 12:30 PM

**Development Track**

Tru2Way: Is Cable Finally Tuning Into Openness?

11:00 AM - 12:30 PM

**Marketing Track**

Reinvigorating the Audio Experience: Integrated, Speaker Bars and Home Theater

1:45 PM - 3:45 PM

Retailer Roundtable

Register at [www.displaysearch.com/hdtv](http://www.displaysearch.com/hdtv)



# Active Format Description

by Michael Dolan

Michael A. Dolan is founder and president of Television Broadcast Technology, providing specialized professional encoders, test tools, and technical consulting in the field of digital television. He holds a BSEE degree from Virginia Tech '79 and has worked for and founded various leading edge computer graphics and real time systems companies since then, including early foundational work in W3C technology and analog data broadcasting. Mr. Dolan has been involved in digital television engineering for the past 10 years, including data broadcast system architecture and digital receiver design and compliance. He also currently chairs the ATSC Data Broadcasting Specialist Group (TSG/S13), chairs the SMPTE Television Applications Committee, and is active in various other television standards activities in CEA and ATIS. Mr. Dolan is an SMPTE Fellow, authors the SMPTE Journal Almanac column, and holds several patents in computer web technology.



Active Format Description (AFD) is a new kind of video metadata that solves an annoying viewer problem as we transition from conventional 4:3 display devices to widescreen 16:9 displays. It provides information to ultimately assist a decoder or display to properly present video material that was encoded or transformed during production and distribution from an aspect ratio that is not the same as the display device. The aspect ratios of 4:3, 16:9 and 14:9 are addressed. The problem is not directly related to SD versus HD video formats, but more to the aspect ratios supported by the various equipment.

**What's the problem?** Video material comes from all kinds of sources, including feature film, traditional (SD 4:3) video cameras and now the newer digital (HD 16:9) cameras. During production and distribution, the original material is usually modified to conform to 4:3, so it is viewable on traditional (4:3) television displays. This transformation is done using various techniques that include linear scaling, anamorphic scaling, pillar-boxing and letterboxing. You are probably familiar with the leader disclaimer, "This presentation has been modified from its original form...to fit on your television screen". The transform details are not the subject of this paper, but their end results and affects on the viewer are. The transforms in the distribution often involve multiple steps at different times for different applications of the material. A worst case scenario can result in many or all of the above transforms before the program arrives at the consumer display.

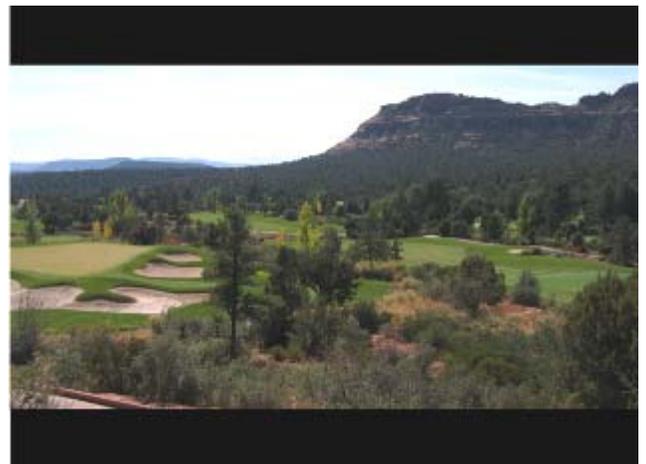
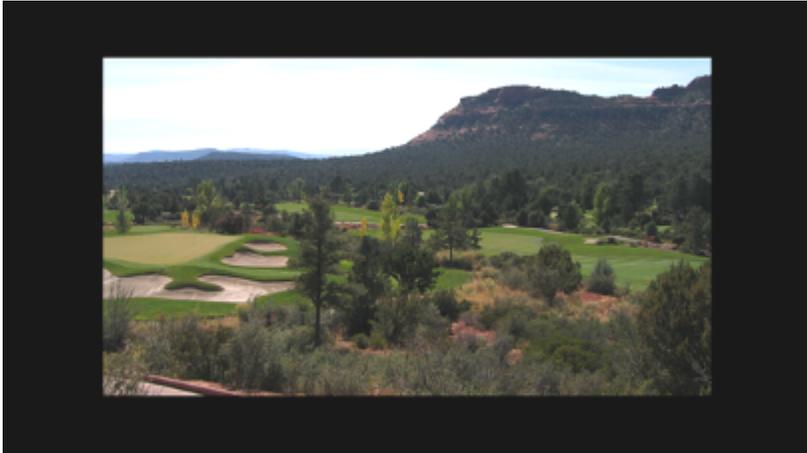


Figure 1, on the left, shows original material (View from the 4th tee box at Seven Canyons), while Figure 2, on the right, shows the image letterboxed and formatted for a 4:3 display

An example of a fairly typical set of transforms over a digital broadcast is shown in Figures 1 through 3. The

original encoded material is shown in *Figure 1*; its letterbox transform to 4:3 is shown in *Figure 2*; and the additional pillar-box transform to 16:9 is shown in *Figure 3*.

There are several transforms of *Figure 1* possible for viewing on a 4:3 display. The letterboxing shown in *Figure 2* is one common option especially for material with panoramic scenes. What the viewer wants to see, of course, is the image of *Figure 1* on their expensive 16:9 display, and not the “postage stamp” of *Figure 3*.



*Figure 3: Pillar-boxed and formatted again for a 16:9 display*

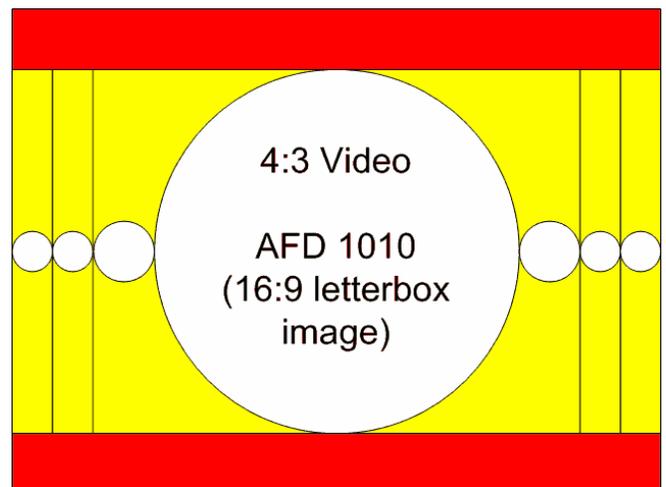
**How does AFD work to fix this?** AFD is metadata attached to the video that specifies the “active area” to be displayed. It doesn’t signal the transforms (or cumulative transforms), but rather what to do about the final resulting picture. For example, when the image of *Figure 2* is transmitted, it is accompanied by an AFD value that signals that the picture actually contains a 16:9 image and it is letterboxed. The AFD descriptive test signal picture (used for display AFD reaction verification and based on CEA CEB16) is shown in *Figure 4*, which provides visual guidance on what the display should actually display (i.e. not the red fields of the picture) when testing a 16:9 display with a specific AFD value, in this case “1010”.

AFD also provides the additional benefit that allows the display device to process the incoming signal to make the highest-resolution and most accurate picture possible. Furthermore, the display can take advantage of the knowledge that certain areas of video are currently unused and can implement algorithms that reduce the potential effects of uneven screen aging that occurs with prevalent letterboxing and pillar-boxing on some display technologies.

It’s also worth noting that there is related metadata, known as “bar data”. While this initially had a broader intent, today it forms a companion with AFD to support non-standard aspect ratios and unusual transforms. It allows the encoder to specify specific, video-format-dependent video samples to discard from the top, bottom, left and right edges of the encoded picture before display.

**How and where is AFD specified?** AFD, and its carriage through the distribution, is specified in a wide collection of standards in almost as many standards organizations. Work on the problem initiated in Europe within the ETSI as part of TR 101 154 V1.4.1, “Digital Video Broadcasting (DVB): Implementation Guidelines for the use of MPEG-2 Systems, Video and Audio in Satellite, Cable and Terrestrial Broadcasting Applications, Annex B”, published in summer 2000. Along with that work is the UK application defined in “DTG Implementation and User Group Digital Receiver Implementation Guidelines and Recommended Receiver Reaction to Aspect Ratio Signaling in Digital Video Broadcasting”.

AFD comes to America with a collection of standards. CEA CEB16, “Active Format Description (AFD) & Bar Data Recommended Practice” published summer, 2006 extends the ETSI and DTG work and defines a series of new AFD values. ATSC defined the carriage of AFD in terrestrial broadcast



*Figure 4. Example AFD Test Pattern*  
(Used with permission of CEA and TBT, Inc)



# Sony yells “timber!”

## The connected TV landscape just changed

by Henry Choy

Henry Choy is Vice President of TV and video research at Jon Peddie Research. He is an industry veteran of 19 years with senior level positions in sales and marketing in the graphics, video, and multimedia markets since 1989. He delivered the first PC-based 3D texture mapping graphics card to Id Software in 1995. He has held various positions in engineering, ISV evangelism, business development, marketing, and sales with a number of leading companies. <http://www.jonpeddie.com>

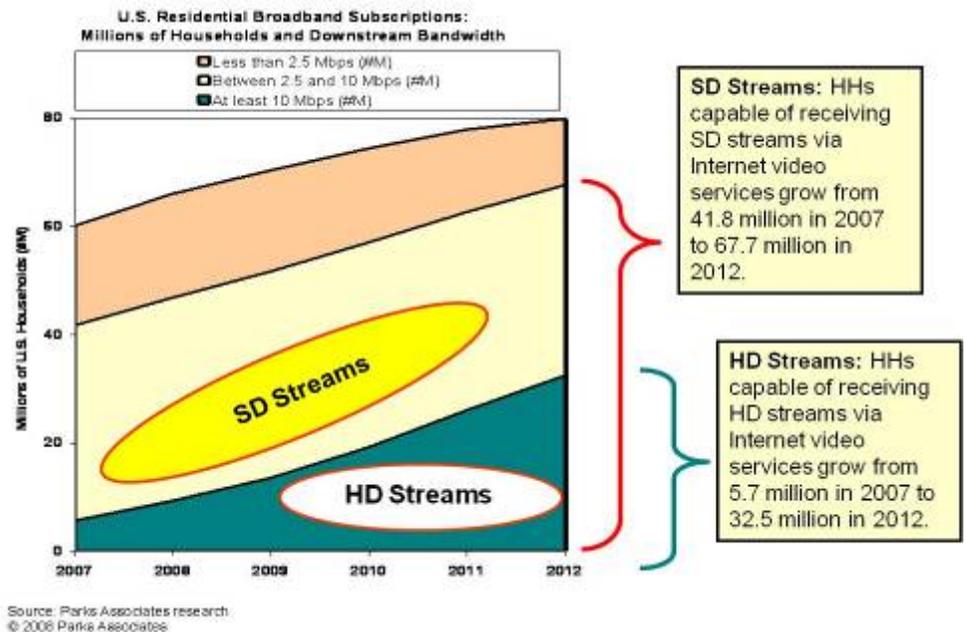


There was a tree that fell in the forest while Park Associate's Connections Conference was being held. Did you hear it on June 26? Sony chopped the tree down and if you're involved with TVs, then you need to hear the tree crashing to the ground. Howard Stringer, Sony's chief executive, said that 90% of the Sony TVs will have Internet connections by 2011. Howard Stringer also announced that their new movie “Hancock” will be available for download before video on demand, cable or satellite. CES was the first showing where most of the tier one TV companies showed connected TVs. They all had walled gardens with simple widgets and only Panasonic showed a YouTube demonstration at CES 2008. This has some wide implications and how appropriate that it was announced while Connections was being held 5700 miles away.

Most TV companies are looking at providing a connected TV for 2009. Sony's announcement puts even more pressure on the TV companies that don't have engineering and marketing resources to develop the TV software, infrastructure or content partnerships. It's no wonder why there are a number of software companies trying to offer solutions to TV companies. These companies include large corporations like Macrovision to start ups like AnySource Media.

It's not about just providing simple widgets but offering video content as well. It's about getting access to short form, long form, movie downloads, and premium content. Gen Y'ers (11 to 28 year olds) are accustomed to accessing media when they want it and not when the broadcasters want to show it. The consumer experience should be close to the current TV experience without adding too much clutter. It also cannot disrupt current advertising and branding models of the broadcasters. It must be additive for the content providers to support.

One of the issues with connected TV is bandwidth for the US market. The US ranks 15 in average broadband ranking with 4.9Mbps by Information Technology and Innovation Fountain. According to Parks Associates, slightly over 40M households (HH) today have available bandwidth for standard definition. Parks forecasts 67.7M HH will be able to download SD streams by 2012. The growth of HH will be from 5.7M HHs in 2007 to 32.5M in 2012. The figure to the right indicates that 30% of all HH will be able to view HD downloads and 60% will be able to download SD content by 2012.



US residential broadband subscriptions – Source: Parks Associates

The release window of “Hancock” for download before DVD or video on demand could send shock waves in the industry. Studios have experimented with different release windows for DVD, VOD and movie downloads. Many studios release their movie for VOD 30 to 45 days after the DVD release. Some deals, such as Microsoft and Disney, have VOD and DVD release dates that coincide. The windows have been getting closer together and some believe the release window will eventually all coincide. If Sony releases all their movies to for their TVs and PS3s, then this could create a higher demand for Sony products. Sony’s move will be closely watched by the other studios and TV manufacturers. This may help companies like CinemaNow, MovieLink, Netflix and other movie download companies. It’s not too hard to envision downloads directly to the TV.

People have commented on how the TV will change more in the next five years than the last 50 years. There are some many technologies that are aligning to make this a reality. Increasing broadband speeds, availability of Internet content, and new release windows are just some of the changes ahead. You can certainly see more lumberjacks chopping down trees. Can you hear them?

## Are CNTs important for LCD backlights?

by Chris Chinnock

**Chris Chinnock is the founder and senior analyst at Insight Media. He serves as managing director for Insight Media’s operations in newsletters, reports, consulting and conferences as well as new business development. H combines a broad background in display-related consulting with 15+ years in a variety of engineering, management, and business development positions at MIT Lincoln Labs, Honeywell Electro-Optics, GE AstroSpace and Barnes Engineering. Chinnock has a Bachelor of Science degree in Electrical Engineering from the University of Colorado.**



Most of the current activity in LCD backlight units (BLUs) is focused on LED architectures. This is appropriate as the benefits of LEDs are real. Notebook manufacturers are rapidly adopting the technology, with TVs and monitor manufacturers to follow. In our LCD BLU Report, we forecast a 39% penetration of LEDs into the notebook market by 2010, representing over 64M units. For LCD TVs, we forecast a modest 2.8% penetration by 2010, representing 3.8M units.

Why will LEDs be so successful in notebooks and lag in TVs? The short answer is cost. According to our cost models, a 46-inch LCD TV with a DBEF, prism sheet and lower diffuser film stack, and a 20-tube CCFL BLU will have a current module (LCD panel and BLU) cost of \$200. If you substitute 757 white LEDs for the CCFL tubes today, the cost rises to \$354.

We forecast this will decrease rapidly. By 2010, the CCFL approach shrinks to \$148, while the white LED approach gets much more competitive at \$208. And, if you want to consider using very high power RGB LEDs in an edge-lit configuration, our cost model says this will be available for about \$182 in 2010. These much smaller price gaps with CCFL means that by 2011, we should start to see a much more rapid changeover to LED BLUs in TV-sized displays.

But there has also been some talk recently about carbon nanotubes being a good approach for creating an LCD backlight. In fact, Samsung SDI has said they have developed a 40-inch LCD prototype with a CNT BLU and are now considering commercialization of the technology.

To look into the prospects for CNT and other alternatives for LCD backlights, we started by evaluating a number of factors that describe the features of each backlight approach. These factors are:

- Cost
- Start Cycle Limit
- Peak Luminance
- Operating Voltage

- Color Gamut
- Dimming Range
- Response Time
- 2-D Dimming
- Lumen Maintenance
- Cold Temp Start
- Hg Free
- Color Feedback Required
- Driver Complexity
- Depth
- Efficiency
- Optical Complexity (film count/type)
- Supply Chain Maturity and Stability

This rating of the features of each technology (we looked at nine different approaches) resulted in a high rating for CNT – nearly as high as white LEDs.

As a second step in understanding the value of each approach, we then constructed an “importance matrix” for notebooks, monitors and TV applications. For example, peak luminance is a more important factor with TVs than for notebooks or monitors, so the peak luminance weighting is higher for the TV application. In this way, each of the above factors is weighted for the three applications.

When the performance ratings are multiplied by the weighting factors, a more detailed assessment can be made as to the viability of an approach for each application. Doing this for the TV application shows that CNTs score 180 points, ranking number two behind white LEDs with 189 points. For reference, CCFLs scored 153 points for a fifth place ranking.

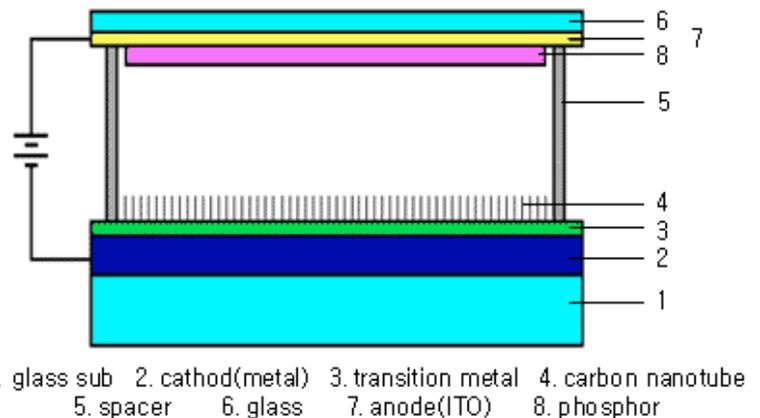
So what’s so great about CNTs? Factors that rated the highest included peak luminance, 2D dimming, cold temp start, Hg free, start cycle limit, depth and optical complexity. That means you can make a very thin, monolithic backlight that is environmentally friendly with operation over wide thermal environments. And, according to Nano-Proprietary (<http://www.nano-proprietary.com/>) CEO Zvi Yaniv, CNT BLUs can be printed, potentially making them a very low cost solution.

But with any new technology struggling to be commercialized, issues remain. What ranked lowest in our review of CNTs were efficiency and supply chain maturity. According to Yaniv, CNT efficiency is about 40 lm/W today, not great, but possibly good enough for some BLU applications. He thinks 60 to 80 lm/W is much more attractive for commercialization. In addition, packaging remains an issue, in particular, maintaining the BLU’s vacuum.

Nano-Proprietary has developed IP around how to specify and use CNTs in BLUs and is working through Mitsui to find partners to commercialize the approach. “But progress is slow,” said Yaniv. He says there are a number of companies that have been evaluating the technology and the approach, but none have developed what he calls prototypes – BLUs aimed at specific products. This is a precursor to setting up a pilot line to commercialize the technology.

Samsung SDI, ITRI, HonHai and several Japanese companies are known to be looking at the CNT BLU technology. The approach under investigation by Ijjin Nanotech (<http://www.ijjinnanotech.co.kr>) is shown in the associated figure. Samsung SDI remains a bit of a mystery. The company, known to be working on a pixilated CNT display, has recently been talking about a non-pixellated LCD BLU product. And they are not saying much about their plans.

We see the prospects for CNT BLUs as promising, but murky. Other backlight technologies, like Xe-FFL, looked very promising a year ago but have all but been abandoned as major supporters like Samsung Corning stopped its development plans. NEC was also a big supporter of CNT BLUs, having at one point considered investing \$750M in a CNT pilot line, but has now quietly exited the CNT business.



*CNT Technology from Ijjin Nanotech*

Yaniv sees the best use of the technology in large screen (80 to 120-inch) applications because of the monolithic printing capability and relatively high brightness the technology can offer. Maybe he's right, but someone needs to commit some real money to make these backlights before this can become a reality. Time will tell.



Covering The Business of 3D

# Biz-Ex



U.S. Display Consortium

September 29-October 1, 2008  
Sheraton Universal Hotel, Universal City, CA

## Conference

The conference is focused on highlighting key trends and opportunities in the 3D industry so decision makers can develop products and service to suit the growing markets. Speakers from all over the world are being invited, representing a variety of inputs and applications, to discuss the changing dynamics of *the business of 3D*. Insight Media analysts with numbers and data, the conference will cover the forecasts for many professional applications.

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The location is spectacular for showcasing the latest in 3D theatres and movies. Stay tuned for some exciting news on events and activities to add another level of networking with your colleagues old and new!

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BARCO	MOXTEK
Bayer Material Science	MTBS 3D
BVC Productions	NanKai University
Coloredge	Newsight
ColorLink	Oerlikon Optics
Consultant	Pacific Title and Art Studio
Cowen & Company	Paramount Pictures
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Dell	Polymedia
DEP3D	Prodisc
Digislide Americas	Progeny 3D
Dimension Technologies	Provision Interactive
Display Solutions	PureDepth
Dolby	Real D
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GGT Consulting	Sony
Heriot-Watt University	Sumitomo Chemical
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Laser Light Engines	Waring Vision
Light Blue Optics	Zebra Imaging
Lightspace Technologies	Zecotek Medical Systems

# Can VIZIO's success in the US be replicated in Europe?

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. He is a frequent speaker at display company events and conferences.**



Watching the TV set-making industry over the last several years has been a very interesting occupation as LCD has come in to clear away the CRT-based industry. If we look back at the TV industry of the past, it was heavily vertically integrated – that is to say that TV makers typically owned the CRT making factories (Sony, Samsung, Panasonic, Toshiba, Hitachi, Philips, LG, Thomson et al), they made the sets and sold them under their own brands. In Europe, the sets from smaller brands and some parts of the ranges of the high-end vendors were made in Turkey, which has special duty arrangements with the EU.

With the arrival of LCD and PDP, there was a feeling that the TV industry might change to a more “horizontal” structure, more like the PC industry. Dell, after all, doesn't make CPUs or memory or operating systems, it buys them from other suppliers and assembles them into finished products. Would the TV business go that way, too? Many thought it would. While the old CRT/analog world depended on a lot of experience and engineering, there was the idea that with the shift to digital and chip-based TVs, you could take a chip from a company such as Genesis or Mediatek and add a panel from AUO or CMO to make a set and be in the TV business.

However, the reality has been that the LCD has not been truly disruptive of the industry structure. The major TV brands remain vertically integrated, with access to their own LCD plants (Samsung, LG, Sharp, Panasonic) or with investments in them (Sony). Only Philips really continued to work on the idea of horizontal integration, disposing of its chip and LCD interests and working with Funai and AOC as assemblers. This is part of a longterm move by Philips to get out of consumer electronics to focus on more profitable businesses such as medical and lighting.

One company that has really made the new paradigm a success has been Vizio, which very quickly grew from nothing to becoming one of the top selling brands in the US TV market. As specialists in the European market, we often get questions from clients asking if such a success is possible in the local market. Our view, so far, is that it is not possible. There are some key reasons for this.

First, we need to look at what has made Vizio successful in the US (and here, my analysis is based on much that I have learned about the US market from our partners, DisplaySearch, which has a deep knowledge of the US TV market). My view is that there were three critical components to VIZIO's success in the US.

- Vizio was able to enter a new channel for TV, the warehouse club channel, that allowed a relatively unknown brand to be accepted by consumers. TV is an established industry and buyers are not the “innovators” and “early adopters” of innovative markets any more. They are the “early majority” and “late majority” buyers. These buyers hate risk with a passion and will not experiment, especially with a new and unknown brand, as Vizio was several years ago. However, American friends have told me that Costco, the first retailer that really got behind Vizio, has a reputation of only selling a small number of products in a category, but of selling high quality products. Furthermore, Costco had (although I understand this has changed now) a one year “no questions asked” return policy. The combination of

the reputation of CostCo and the elimination of much of the risk because of the firm's warranty policy meant that consumers could buy the new brand with very little perceived risk.

- Because CostCo has national US scale, Vizio was able to ramp up to good volumes quickly. That allowed the firm to quickly take a significant market share and in turn meant that it could enter other channels such as the traditional electronic stores. The timing also coincided with WalMart's decision to take the TV market seriously and that again allowed high volume very quickly. So the second major factor was the ability of the channels to deliver high volume quickly, which meant that the cost base of the new company could be kept very tight. At the DisplaySearch HDTV conference in August of 2006, Vizio said that its selling, general and administrative expenses (SG & A) were "less than 2% - including advertising".
- Finally, Vizio had good support in its supply chain back to Asia, with the backing of long time monitor maker AmTRAN. The supply chain, with, originally, just one customer, a simple model range and uncomplicated supplier base meant that the firm could be flexible, responsive and exploit low manufacturing costs in Asia.

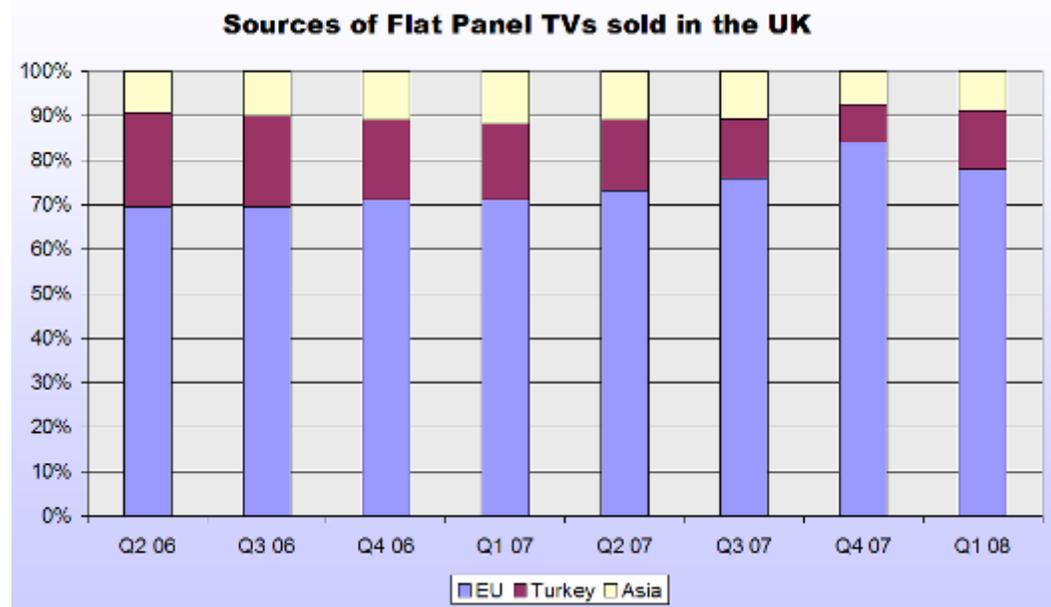
So, in summary, the key factors in the success were:

- A channel that gave consumers the confidence to buy an unknown brand.
- Scaling to high volume quickly
- A low cost supply chain from Asia.

Of course, Vizio also had to execute its model, which it did very well.

Turning to Europe, the issue is always one of complication and fragmentation. Looking first at channels, there is no single retailer that can deliver sales over anywhere near the whole continent. Retailing models are quite different from country to country and although some, such as the UK's DSGi have tried to roll out their models across Europe, nobody has made that work. Nor does any retailer with a multi-national approach have the credibility to enhance an unknown brand. The recent announcement that Best Buy will combine with Carphone Warehouse to try to attack the European CE retail market is a very interesting one, but the challenges in Europe are very real. WalMart, the giant of US retailing, had to pull out of Germany after spending a number of years trying to establish itself.

While some markets in Europe are genuinely "single markets", the TV industry is not one of them. There are different technical requirements on a country-by-country basis and this, combined with different channel models and requirements makes low cost operation impossible. When companies have tried to come in with low overhead and fast volume we have seen them hit with huge warranty and returns problem costs. Taking things slowly means building up sales and marketing expertise for each country that is addressed and there is no way to do that quickly or cheaply. (A vendor from outside the TV business that is just establishing a stable business model for small size TV told us recently that it has taken the brand four very expensive years to learn the lessons needed!).





**2008 Summer Olympics in 5.1 channel audio:** Adding to the high-def experience, NBC has selected five Calrec (<http://www.calrec.com>) Omega with Bluefin consoles as part of its coverage of the 2008 Olympic Games in Beijing. "This is the first time the games will be produced totally in high definition with 5.1 discrete channels of audio," said Bob Dixon, NBC's Director of Sound Design and Communication. Dixon added, "Our new Calrecs will give us the ability to address all six channels at once, or divide them up quickly and easily so we can address the delay on the surround channels separately, or the EQ on the center channel only. This is exactly the kind of quick flexibility an operator mixing a live event in Surround needs."

**Special HD Olympic programming:** In addition to the thousands of hours of programming that NBC will be generating, other channels like MOJO HD (<http://www.mojohd.com>) will offer a 10-Part series of high-def profiles exploring the mindsets and motivations of US Olympic athletes, beginning July 28. Experts in each sport will be featured, detailing the psychological and body strength needed to compete including how to overcome injuries and setbacks and how these new competitors compare with previous champions.

**How to buy an HDTV set for watching the Olympics:** It looks like it's going to be a 1080i experience for the HDTV Summer Olympics and there are many good values in 720p/1080i sets. Although 1080p offers the best future-proof product the process of deciding what to buy can be complicated. Retrevo.com has a unique approach to helping consumers navigate the often difficult path of selecting high tech gear and gadgets.

Retrevo crawls the web for expert and user reviews, applies some sophisticated artificial intelligence including clustering, classification, and machine learning along with statistical analysis of large feature sets to come up with a graphical representation of price vs. features they call a Value Map. Each dot on the Value Map represents a product that has been positioned according to "bang for the buck." Users can roll over a dot to identify the product and price range and the click on the dot for detailed information including manuals, reviews, and manufacturer's information.



Based on the analysis, Retrevo generates a "thumbs up" or "thumbs down" representation indicating whether Retrevo's analysis engine thinks the product is a good value or not and also indicates the aggregated summation of expert and user reviews.

**More Ways to Save Gas:** For more ideas on how to save gas this summer and beyond check out additional tips from Retrevo (<http://www.retrevo.com/content/special-reports/2008/05/eight-ways-save-lots-gas-summer>).

# Train wrecks, lab rats, and transitions...

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 current events in the HDTV industry.



## Digital TV transition: triumph or train wreck?

In the Sunday, June 22, 2008 edition of the local Wilmington, NC newspaper, *The Star-News*, the following statement appeared in print:

“The Wilmington television market will transition on September 8, and anyone relying on an outdoor antenna or rabbit ears will be unable to get reception. The switch will not affect houses that have cable or satellite service.”

It's not hard to imagine that some of the public may still be confused about the upcoming transition to digital terrestrial broadcasts. But when the media is still getting the facts so dreadfully wrong at this late date, it's not unreasonable to be concerned about how this will turn out. *(Just in case you don't see the error in the quote above, it says that anyone using an antenna won't be able to get reception after the transition. That's simply not true; the fact is that only those using an antenna without a digital tuner won't be able to receive most of the local broadcasts).*

The transition from analog to digital terrestrial broadcast of television signals is intended to free up bandwidth in the radio spectrum for other uses, because digital transmissions are more efficient. But will we be ready for the transition when they throw the switch?

Nielsen released a report in May indicating that 22% of US TV households were either totally or partially unprepared for the digital TV transition next February (or Labor Day, if you're in Wilmington, NC). Some of the markets with the highest percentage of unprepared households included Milwaukee, Salt Lake City, Portland (Oregon), and Houston. The report also indicated that a disproportionate share of the unprepared households were Hispanic. Nielsen estimated that there were about 10 million totally unprepared households. This was only an improvement of about three million households since Nielsen released a similar report last February. And while 86% of households have cable or satellite TV service – when means that those televisions won't be affected by the transition – many of those homes have “secondary” TV sets that are not hooked up to cable or satellite. This results in the large number of “partially” unprepared.

The report did not indicate one way or the other, but there's plenty of circumstantial evidence that households with lower income are more likely to be in the unprepared category. I also expect that senior households are over-represented in the unprepared category. I expect that these groups are going to have a more difficult time than others in getting their sets ready for the transition. And given the slow change in the numbers since February 2008, we can look forward to millions of these people losing their TV service when analog broadcasts cease in February 2009.

Additional problems relate to the government's \$40 rebate coupon program. If you don't live in a household at your address, but instead are a resident in a nursing home or other similar group facility, you're not eligible for a coupon. And if you do get a coupon, they expire in 90 days. And you cannot get a replacement. So far, more than \$3 million of coupons have expired without being used to buy a converter.

## Wilmington, NC: lab rat?

If we want to get an idea of what we'll see across the country next year, we need look no further than Wilmington, North Carolina. Known as the high school home of basketball legend Michael Jordan as well as the backdrop for

the TV shows *Dawson's Creek* and *One Tree Hill*, Wilmington is about to make history again. Television viewers there will get to set their clocks ahead this fall... by about five months.

Last March, the FCC decided that maybe we should test this transition to digital television broadcasting, just so that we can make sure all the kinks have been worked out before we go ahead and ask the whole country (well, most of it) to cease analog television broadcasts on February 17, 2009. So on September 8, 2008, the full-power TV stations in Wilmington will turn off their analog transmissions. Well, most of them will.

Wilmington faces a number of issues that could foreshadow problems with the national transition. There are low-power television stations in the Wilmington market that will not be required to switch to digital when the full-power stations have to switch. WILM-LP is a low-power station that is a CBS network affiliate, but apparently it and a local translator station for a religious network will switch to digital broadcasts by the September date. The remaining low-power station has also chosen not to convert to digital, since it is not required to do so. But the local PBS station will not make the change, even though it is a full-power station. It is part of a statewide network and part of an official emergency broadcast system (which might be useful to have during hurricane season).

Given that studies show only 75% of US television viewers are aware that there's something happening with their television signals, I'm betting that this cut-off will be a big shock to Wilmington residents who don't have cable or satellite service. As the government and broadcasters step up their advertising campaigns to increase awareness of the February 17, 2009 date, will they reach the Wilmington market to effectively educate them about their earlier change date?

I think that this trial run is a great idea. I think that waiting until there is less than four months to prepare for it is a terrible idea. This trial market should have been identified and isolated from the start. As it is, I expect that there are going to be a lot of confused and unhappy football fans in the Wilmington market on September 14th.

### **Cable transition to digital**

One of the key points about the digital broadcast transition is that if you have cable or satellite service, you will not be affected by the digital changeover when it happens next February (or this coming Labor Day, if you happen to live in Wilmington, NC). I'm very careful how I state this; you will not be affected by the changeover, but that does not mean that you won't be affected by some other change.

I've received some angry e-mails from readers who say that they are cable subscribers and they already have been affected by the switch from analog to digital. Last June, *USA TODAY* ran an excellent story about the problem many cable subscribers are experiencing as their local cable provider tries to push them to switch from analog to digital service.

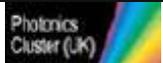
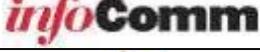
Cable companies want to move to digital because it lets them transmit HDTV content. It also lets them transmit more content over the same infrastructure than they can with analog signals, just like the terrestrial broadcasters. And digital makes all sorts of interactive features possible, such as video recording and programming guides.

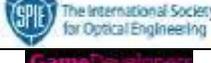
The problem is that traditional analog sets cannot work with these digital signals. You can get a set-top box (STB) that will connect your analog TV to digital service, but many homes have second or third TV sets that are connected directly to the cable without an STB. Some providers have been cutting back the number of "free" channels included with their basic analog service as a means of encouraging subscribers to switch to digital, but this has been a source of irritation for many customers. The solution may be a digital to analog converter box – something less than a full-blown STB – that will take the basic digital cable service signal and convert it for use on an analog TV. And this is an added complication that some subscribers will resist.

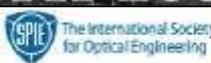
The bottom line is that just because you're a cable subscriber does not mean that you won't experience hassles with the conversion from analog to digital service. The difference between this and the terrestrial broadcast change, however, is that it is not mandated by the federal government, but is a business decision made by the cable companies.

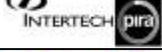
# Display Industry Calendar of Events

A detailed calendar with active URLs is maintained by Veritas et Visus. Please notify [mark@veritasetvisus.com](mailto:mark@veritasetvisus.com) to have your future events included in the listing. [http://www.veritasetvisus.com/industry\\_calendar\\_2008.htm](http://www.veritasetvisus.com/industry_calendar_2008.htm).

<i>January 2008</i>			
January 6-9	Game Power and Mobile Entertainment	Las Vegas, Nevada	
January 7-10	2008 International CES	Las Vegas, Nevada	
January 9-13	International Conference on Consumer Electronics	Las Vegas, Nevada	
January 11	LEDs in Displays	Costa Mesa, California	
January 14-18	MacWorld Expo	San Francisco, California	
January 15-16	Metalization and Dielectrics	Stratford-upon-Avon, England	
January 17	Practical Light & Color Measurement	Birmingham, England	
January 19-24	Photonics West 2008	San Jose, California	
January 21-24	Flexible Microelectronics and Displays Conference	Phoenix, Arizona	
January 22-24	ATEI 2008	London, England	
January 24	Korea FPD Conference	Seoul, Korea	
January 27-31	Electronic Imaging 2008	San Jose, California	
January 28-30	Stereoscopic Displays and Applications	San Jose, California	
January 29-31	Integrated Systems Europe 08	Amsterdam, Netherlands	
January 30-31	Japan Forum	Tokyo, Japan	
January 30-31	Grand Challenges for Emerging Technologies in Displays	Cambridge, England	
January 30 - February 1	Video Forum Europe	London, England	
January 30 - February 1	Semicon Korea	Seoul, Korea	
<i>February 2008</i>			
February 5-6	Screen Expo Europe	London, England	
February 7	AC Electroluminescence	Swansea, Wales	
February 7-9	CEA 2008 Winter Retreat	Park City, Utah	

February 11-13	Strategies in Light Conference	Santa Clara, California	
February 12-15	Display Metrology Short Course	Boulder, Colorado	
February 13-14	Image Processing and Optical Technology	Birmingham, England	
February 15-17	Symposium on Interactive 3D Graphics and Games	Redwood City, California	
February 16-21	Medical Imaging	San Diego, California	
February 18-22	Game Developers Conference	San Francisco, California	
February 20-21	RFID Smart Labels	Boston, Massachusetts	
February 22-24	Sound & Vision 2008	Bristol, England	
February 24-27	Focus on Imaging	Birmingham, England	
February 26	Transistors on Plastic	Maccelsfield, England	
February 27-28	Electronic Displays 2008	Nuremberg, Germany	
<b>March 2008</b>			
March 3-4	Business Goes Green	San Jose, California	
March 3-5	Global Phosphor Summit	San Diego, California	
March 3-6	O'Reilly Emerging Technology Conference	San Diego, California	
March 4-9	CeBIT 2008	Hanover, Germany	
March 5-6	LED China 2008	Guangzhou, China	
March 6	HD Expo	Beverly Hills, California	
March 6	Displaybank New York Conference	New York, New York	
March 8-9	Symposium on 3D User Interfaces	Reno, Nevada	
March 8-12	Virtual Reality 2008	Reno, Nevada	
March 10-13	Showwest 2008	Las Vegas, Nevada	
March 10-14	2008 Measurement Science Conference	Anaheim, California	
March 11-12	Investigating 3D Technologies and Projection Displays	Leicester, England	
March 11-13	FPD China	Shanghai, China	
March 11-13	Air Traffic Control	Amsterdam, Netherlands	

March 11-13	US FPD Conference	San Diego, California	
March 11-15	EHX	Orlando, Florida	
March 12-13	Media Summit	New York, New York	
March 12-14	DVB World 2008	Budapest, Hungary	
March 13-14	Microdisplays, Applications, and Optics	Jena, Germany	
March 13-14	Symposium on Haptic Interfaces and Virtual Environments	Reno, Nevada	
March 17-19	Digital Holography and Three-Dimensional Imaging	St. Petersburg, Florida	
March 18-19	Digital Living Room	San Francisco, California	
March 18-20	Semicon China	Shanghai, China	
March 18-20	electronica & ProductronicaChina 2008	Shanghai, China	
March 20	Display Material & Device Business Forum	Taipei, Taiwan	
March 24-25	Future of Television	Los Angeles, California	
March 26-28	Eye Tracking Research & Applications	Savannah, Georgia	
March 26-29	International Sign Expo	Orlando, Florida	
March 28-30	Sign Today	New Delhi, India	
March 31 - April 2	IPTV 2008	Berlin, Germany	
March 31 - April 3	Digital Signage 2008	San Francisco, California	
<b>April 2008</b>			
April 1	Lighting for Mood, Health, and Well-being	London, England	
April 1-3	Display 2008	Paris, France	
April 1-3	Foundation in Displays	Nottingham, England	
April 5-10	CHI 2008	Florence, Italy	
April 7-11	Photonics Europe	Strasbourg, France	
April 7-11	MIPTV	Cannes, France	
April 8-9	Printed Electronics Europe	Dresden, Germany	
April 9-10	AMOLED and Flexible Displays	Seoul, Korea	

April 9-12	Global FPD Partners	Miyazaki, Japan	
April 10-11	RTT 3D Realtime Visualization Conference	Vienna, Austria	
April 11-17	NAB 2008	Las Vegas, Nevada	
April 12-13	Digital Cinema Summit	Las Vegas, Nevada	
April 13-18	CEA 861/HDCP PlugFest	Milpitas, California	
April 14-15	International Integrated Manufacturing by Printing Colloquia	Gregynog, Wales	
April 14-15	Inkjet Academy: Theory of Inkjet Technology / Manufacturing Process Symposium	Denver, Colorado	
April 14-17	Hong Kong Electronics Fair Spring	Hong Kong, China	
April 14-18	EuroGraphics	Crete, Greece	
April 15	Mobile TV & Video Summit	Las Vegas, Nevada	
April 15-16	2nd Annual International Film Festival Summit Europe	London, England	
April 15-17	iSuppli European Briefing	Lisbon, Portugal	
April 15-17	LED Packaging 2008	Penang, Malaysia	
April 16	Broadband TV World	Las Vegas, Nevada	
April 16-17	Mobile & Interactive Displays Display Drivers and Interfacing Techniques	Stevenage, England	
April 16-17	KioskCom Self ServExpo	Las Vegas, Nevada	
April 16-18	FineTech Japan & Display 2008	Tokyo, Japan	
April 16-18	Inkjet Technology Supplier's Showcase	Denver, Colorado	
April 17-18	2008 Taiwan FPD Conference	Taipei, Taiwan	
April 21-23	Organic Photovoltaics	Philadelphia, Pennsylvania	
April 22-24	Sign UK/Digital Signage Showcase	Birmingham, England	
April 25	Business Goes Green	New York, New York	
April 28-30	Innovative Lighting & Design	Dearborn, Michigan	
April 29 - May 1	Worship Facilities Conference & Expo	Indianapolis, Indiana	
April 30 - May 2	CEDIA Electronic Lifestyles Forum	Dallas, Texas	

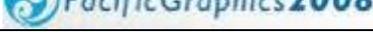
### May 2008

May 4-7	UV and EB Curing for Electronics	Chicago, Illinois	
May 5-7	SEMICON Singapore	Singapore	
May 5-7	Smart Fabrics 2008	Charleston, South Carolina	
May 5-8	International Conference on Animation, Effects, Games, and Digital Media	Stuttgart, Germany	
May 5-8	Digital Hollywood Spring	Los Angeles, California	
May 6-7	Introduction to Printing for Micro Manufacture	Swansea, Wales	
May 8-9	Plastic Electronics Workshop	Cardiff, Wales	
May 13-16	Symposium on Virtual and Augmented Reality	João Pessoa, Brazil	
May 14	Integrated Digital TV Conference	Taipei, Taiwan	
May 14	Digital Book 2008	New York, New York	
May 15-16	BLU & LED Seminar	Seoul, Korea	
May 15-18	SIIM 2008	Seattle, Washington	
May 18-23	SID International Symposium	Los Angeles, California	
May 19-21	International Symposium on Electronics and the Environment	San Francisco, California	
May 19-23	2008 Technology & Standards Forum	Nashville, Tennessee	
May 20-21	DisplaySearch China HDTV Conference	Guangzhou, China	
May 20-22	CeBIT Australia	Sydney, Australia	
May 20-23	Orbit-iEX	Zurich, Switzerland	
May 21-23	Asia Flat Panel Display Industry Expo	Guangzhou, China	
May 23	Shenzhen FPD Conference '08	Shenzhen, China	
May 25-27	International CES/Hometech	Dubai, UAE	
May 26-28	EuroVis 2008	Eindhoven, Netherlands	
May 26-30	Lightfair	Las Vegas, Nevada	
May 28	Digital Signage Conference	Chicago, Illinois	
May 28-30	Graphics Interface 2008	Windsor, Ontario	

May 28-30	3DTV Conference	Istanbul, Turkey	
May 27 - June 2	International OLED Summer School	Krutyn, Poland	Frontiers in Molecular Optoelectro
<b>June 2008</b>			
June 1-5	Nanotech 2008	Boston, Massachusetts	
June 2-3	Ambience 08	Boras, Sweden	
June 3-5	Dimension 3 Expo	Chalon sur Saône, France	
June 3-7	Computex 2008	Taipei, Taiwan	
June 4-5	EuroLED 2008	Birmingham, England	
June 5	High Def Expo	Chicago, Illinois	
June 6	Business Goes Green	San Jose, California	
June 9-13	European Conference on Color in Graphics, Imaging, and Vision	Terassa, Spain	
June 11-12	ITO & Touchscreen Panels	Seoul, Korea	
June 11-13	Display Taiwan 2008	Taipei, Taiwan	
June 11-13	Photonics Festival: OPTO Taiwan , SOLAR, LED Lighting, Optics	Taipei, Taiwan	
June 12-14	Digital Downtown	New York, New York	
June 14-20	InfoComm '08	Las Vegas, Nevada	
June 16-17	Projection Summit	Las Vegas, Nevada	
June 16-18	International Conference on Organic Electronics	Eindhoven, Netherlands	
June 17-18	Photovoltaics US	Denver, Colorado	
June 18-20	Photovoltaics Summit	San Diego, California	
June 19	Communications Goes Green	Las Vegas, Nevada	
June 23-26	Cinema Expo	Rotterdam, Netherlands	
June 24-26	CEDIA Expo UK	London, England	
June 24-26	Plastic Electronics Asia	Seoul, Korea	
June 24-27	FPD Expo/LED Expo	Seoul, Korea	
June 25	Bistable Displays and Applications	Bristol, England	

June 25-27	Industrial Virtual Reality Expo & Conference	Tokyo, Japan	
June 25-27	Electronic Materials Conference	Santa Barbara, California	
July 26-29	Taitronics Bangkok 2008	Bangkok, Thailand	
June 27-29	Flat Panel Display Technology and Equipment Exposition	Beijing, China	
June 27-29	International LED Exposition	Beijing, China	
June 29 - July 4	International Liquid Crystal Conference	Cheju Island, Korea	
<b>July 2008</b>			
July 2-4	International Workshop on Active Matrix FPD & Devices	Tokyo, Japan	
July 3-4	Korea Display Conference 2008	Ilsan, Korea	
July 3-6	Imaging Expo China	Shanghai, China	
July 7-9	Eurographics/SIGGRAPH Symposium on Computer Animation	Dublin, Ireland	
July 8-11	Information Visualization	London, England	
July 9-14	National Stereoscopic Association 2008 Convention	Grand Rapids, Michigan	
July 10-11	Symposium on Flexible Organic Electronics	Halkidiki, Greece	
July 10-13	SINOCES	Qingdao, China	
July 15-17	Semicon West 2008	San Francisco, California	
July 15-17	E3 Media and Business Summit	Los Angeles, California	
July 16-17	It's not easy being Green Symposium	Boston, Massachusetts	
July 30-31	DisplaySearch Japan Forum	Tokyo Japan	
July 30 - August 1	CEDIA Expo Asia Pacific	Sydney, Australia	
July 31 - August 1	Printed Electronics Course	Carrabassett Valley, Maine	
<b>August 2008</b>			
August 9-10	Web3D 2008 Symposium	Los Angeles, California	
August 9-10	Emerging Display Technologies - Emerging Projection Technologies	Los Angeles, California	
August 9-10	Symposium on Applied Perception in Graphics and Visualization	Los Angeles, California	
August 10-14	Optics & Photonics	San Diego, California	

August 11-16	SIGGRAPH 2008	Los Angeles, California	
August 19	3D Home Display Formats	Los Angeles, California	
August 19-22	Display Metrology Short Course	Boulder, Colorado	
August 20	Flexible Electronics Workshop	St. Louis, Missouri	
August 24-26	Australasian Gaming Expo	Sydney, Australia	
August 25-27	NVISION '08	San Jose, California	
August 29 - September 3	IFA 2008	Berlin, Germany	
<b>September 2008</b>			
September 2-5	electronicIndia	Bangalore, India	
September 2-6	International Conference on Electroluminescence of Molecular Materials and Related Phenomena	Dresden, Germany	
September 3-4	PDP Tutorial	Seoul, Korea	
September 3-7	CEDIA Expo 2008	Denver, Colorado	
September 4-5	DisplaySearch China FPD Conference	Shanghai, China	
September 5-6	International Workshop on Image Media Quality and its Applications	Kyoto, Japan	
September 7-10	PLASA '08	London, England	
September 9	DisplayBank San Jose Conference	San Jose, California	
September 9-11	Semicon Taiwan, 2008	Taipei, Taiwan	
September 9-12	Foundation in Displays	Dundee, Scotland	
September 9-12	International Workshop on Inorganic and Organic Electroluminescence & International Conference on the Science and Technology of Emissive Displays and Lighting	Rome, Italy	
September 10	Display Measurement	Teddington, England	
September 10-12	InterOpto '08	Tokyo, Japan	
September 11-13	Taitronics India 2008	Chennai, India	
September 11-16	IBC 2008	Amsterdam, Netherlands	
September 14-16	Inter-Society Color Council Annual Meeting	Baltimore, Maryland	

September 15-17	HDTV Conference	Los Angeles, California	
September 16-17	Organic Electronics for Displays	London, England	
September 17	Future Lighting Debate	London, England	
September 18	Network Rail Passenger Display Strategy Workshop	London, England	
September 23-24	Mobile Displays 2008	San Diego, California	
September 23-28	Photokina	Köln, Germany	
January 11	3D Gaming in HDTV	Irvine, California	
September 25	Gas and Moisture Permeation Measurement for High Barrier Films	London, England	
September 29 - October 1	Organic Semiconductor Conference 2008	Frankfurt, Germany	
September 29 - October 1	3D Biz-Ex	Universal City, California	
September 29 - October 1	LEDs 2008	San Diego, California	
September 29 - October 2	EOS 2008	Paris, France	
September 29 - October 2	Liquid Crystal Displays	Oxford, England	
September 30 - October 4	CEATAC Japan 2008	Tokyo, Japan	
<b>October 2008</b>			
October 1-2	KioskCom Europe	London, England	
October 1-3	Display 2008	Moscow, Russia	
October 2-3	Tabletops and Interactive Surfaces 2008	Amsterdam, Netherlands	
October 2-3	LED Measurement and Standards	San Diego, California	
October 7-8	Taiwan FPD Conference '08	Taipei, Taiwan	
October 7-9	SEMICON Europa 2008	Stuttgart, Germany	
October 7-9	Printed Electronics Asia	Tokyo, Japan	
October 7-11	Taipei Int'l Electronics Autumn Show	Taipei, Taiwan	
October 7-12	CeBIT Bilisim EurAsia	Istanbul, Turkey	
October 8	Touchscreen & Interactive Display Technology	Cambridge, England	
October 8-10	Pacific Graphics 2008	Tokyo, Japan	

October 9-10	2008 FPD Market Analysis & 2009 Market Outlook	Seoul, Korea	
October 13-16	ElectronicAsia 2008	Hong Kong, China	
October 13-16	Hong Kong Electronics Fair Autumn	Hong Kong, China	
October 13-16	Showeast	Orlando, Florida	
October 14-17	Korea Electronics Show	Seoul, Korea	
October 15	Medical Displays	London, England	
October 15-16	Photonex 2008	Stoneleigh Park, England	
October 15-16	KioskCom Self ServisExpo	New York, New York	
October 15-19	CEA Industry Forum	Las Vegas, Nevada	
October 16-17	SID Vehicles and Photons	Dearborn, Michigan	
October 15-18	SMAU 2008	Milan, Italy	
October 19-22	AIMCAL Fall Technical Conference	Myrtle Beach, South Carolina	
October 19-22	Symposium on User Interface Software and Technology	Monterrey, California	
October 19-23	Frontiers in Optics	Rochester, New York	
October 19-23	GITEX 2008	Dubai, UAE	
October 20-23	Display Measurement: Physical and Human Factors	Dundee, Scotland	
October 20-23	SATIS 2008	Paris, France	
October 20-24	Technology & Standards Fall Forum	Las Vegas, Nevada	
October 23-25	Mac Live Expo	London, England	
October 27-29	Plastic Electronics	Berlin, Germany	
October 27-30	CeBIT Asia	Shanghai, China	
October 27-30	Digital Hollywood Fall	Los Angeles, California	
October 28-29	International Conference on Organic Materials Technology	Tokyo, Japan	
October 28-30	SMPTE Technical Conference & Exhibition	Los Angeles, California	
October 29-30	High Def Expo	Burbank, California	
October 29-31	FPD International	Yokohama, Japan	

October 30 - November 1	Viscom Germany	Frankfurt, Germany	
October 30 - November 1	Integrated Systems Russia	Moscow, Russia	
<b>November 2008</b>			
November 3-6	IDRC	Orlando, Florida	
November 4	Future Generation Solar Cells: Research and Exploitation	Daresbury, England	
November 4-5	DisplayForum	Dusseldorf, Germany	
November 4-6	Digital Video Expo East	Los Angeles, California	
November 4-7	EHX Fall 2008	Long Beach, California	
November 5-6	OLED Seminar	Seoul, Korea	
November 8	Future Generation Solar Cells	Daresbury, England	
November 10-11	OLEDs World Summit	La Jolla, California	
November 10-15	Color Imaging Conference 2008	Portland, Oregon	
November 11-13	Crystal Valley Conference	Cheonan, Korea	
November 11-14	electronica	Munich, Germany	
November 11-16	SIMO 2008	Madrid, Spain	
November 12	Thin Film Transistors	La Jolla, California	
November 12-13	Nano 2008	Boston, Massachusetts	
November 13	Taiwan TV Supply Chain Conference	Taipei, Taiwan	
November 13-14	Workshop on Virtual Reality Interaction and Physical Simulation	Grenoble, France	
November 13-14	International Workshop on 3D Geo-Information	Seoul, Korea	
November 13-14	Flexible Displays & Electronics	La Jolla, California	
November 13-14	International Symposium for Flexible Electronics and Display	Hsinchu, Taiwan	
November 13-15	Viscom	Milan, Italy	
November 17-19	LatinDisplay	Campinas, Brazil	
November 18-19	Future of Television	New York, New York	
November 18-20	Global Gaming Expo	Las Vegas, Nevada	

November 18-21	Display Metrology Short Course	Boulder, Colorado	
November 19-21	International Conference on Enactive Interfaces	Pisa, Italy	
November 19-21	InfoComm Asia	Hong Kong, China	
November 19-23	3DX: 3D Film and Entertainment Festival	Singapore	
November 30 - December 5	RSNA 2008	Chicago, Illinois	
<b>December 2008</b>			
December 2-3	Forum 'be-flexible'	Munich, Germany	
December 3-4	Display Industry Equipment Forum	Seoul, Korea	
December 3-4	Printed Electronics US	San Jose, California	
December 3-5	International Display Workshops	Niigata, Japan	
December 3-5	SEMICON Japan	Tokyo, Japan	
December 9-10	Hollywood Goes Green	Los Angeles, California	
December 9-11	CineAsia	Macau, China	
December 10-13	SIGGRAPH Asia	Singapore	
December 15-16	Displays 2009	Munich, Germany	
December 15-18	Optics for Displays	Cambridge, England	

<b>January 2009</b>			
January 3-5	Integrated Systems Europe 09	Amsterdam, Netherlands	
January 5-9	MacWorld Expo	San Francisco, California	
January 7-10	Digital Hollywood at CES	Las Vegas, Nevada	
January 8-12	2009 International CES	Las Vegas, Nevada	
January 13-14	Metalization	Stansted, England	
January 18-22	Electronic Imaging 2009	San Jose, California	
January 19-21	Stereoscopic Displays and Applications	San Jose, California	
January 24-29	Photonics West 2009	San Jose, California	
January 27-29	ATEI 2009	London, England	

### February 2009

February 2-5	Flexible Electronics and Displays Conference	Phoenix, Arizona	
February 14-19	Medical Imaging	San Diego, California	
February 17-20	Displays for Industrial, Household, and Auto Applications	Pforzheim, Germany	
February 20-22	Sound & Vision 2009	Bristol, England	
February 22-25	Focus on Imaging	Birmingham, England	
February 24-25	Transistors on Plastics	Cambridge, England	
February 25-27	PV Expo 2009	Tokyo, Japan	
February 27 - March 1	Symposium on Interactive 3D Graphics and Games	Boston, Massachusetts	
February 28 - March 3	LED China 2009	Guangzhou, China	

### March 2009

March 3-8	CeBIT 2009	Hanover, Germany	
March 4-5	HD Expo	Beverly Hills, California	
March 9-12	O'Reilly Emerging Technology Conference	San Diego, California	
March 14-15	Symposium on 3D User Interfaces	Lafayette, Louisiana	
March 14-19	Virtual Reality 2009	Lafayette, Louisiana	
March 17-19	Air Traffic Control	Amsterdam, Netherlands	
March 17-19	Semicon China	Shanghai, China	
March 17-19	electronica & ProductronicaChina 2009	Shanghai, China	
March 17-21	Emissive and Organic Emissive Displays	Nottingham, England	
March 18-20	Symposium on Haptic Interfaces and Virtual Environments	Salt Lake City, Utah	
March 23-27	2009 Measurement Science Conference	Anaheim, California	
March 25-26	Future of Television	Los Angeles, California	
March 30 - April 2	Showest 2009	Las Vegas, Nevada	
March 31 - April 3	Active Matrix Displays	Dundee, Scotland	

# “A Great TV in Every Room”



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## Sustaining Members



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