



Inform ◦ Promote ◦ Improve ◦ Connect

# **“LCD TV Matters”**

**Volume 1, Issue 1**



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

# Contents



*Mobile TV broadcast standards vie for supremacy, p7*

<b>Chairman's Corner: "LCD TV Matters"</b> by <i>Bruce Berkoff</i>	<b>3</b>
<b>LCD-TV News: Standards &amp; Electronics</b>	<b>5</b>
<b>Digital Television Transition Coalition</b> established	5
<b>Digital UK</b> countdown to first digital switch begins	5
<b>Sky Network</b> slams UK HDTV plans	5
<b>Best Buy</b> exits analog TV business	5
<b>CEA</b> publishes digital accessory standards	6
<b>CEA</b> considers specification for 1080p analog video	6
<b>HDMI</b> adoption continues to soar	6
<b>MPEG LA</b> issues <b>ATSC</b> patent portfolio license	6
European showdown for mobile TV broadcast standard	7
<b>EU Commission</b> favors DVB-H over MediaFLO standard	8
<b>Open Mobile Video Coalition</b> encourages participation in developing ATSC standard	8
<b>Open Mobile Alliance</b> releases globally interoperable mobile TV standard	8
<b>ATSC</b> to develop broadcasting standard	9
Industry consortium sets up <b>Open IPTV Forum</b>	9
<b>Pace</b> demonstrates standards-based home digital TV using <b>DLNA</b>	9
<b>Euro1080</b> makes move to <b>MPEG-4</b>	9
<b>Chrontel</b> premieres video interface chips that links PCs to HDTVs via <b>HDMI</b>	10
<b>MainConcept</b> wins codec award	10
<b>Entone</b> offers HD <b>MPEG-4</b> delivery solution	10
<b>Fujitsu</b> transcoder compresses Full HD <b>MPEG-2</b> to <b>H.264</b>	10
<b>Zoran</b> demonstrates <b>ATSC</b> set-top converter box	10
<b>Micronas</b> processors support Full HD on one chip	10
<b>Pixelworks</b> announces PixelAmp+ universal color processor IC	11
<b>Amimon</b> and <b>Pixelworks</b> create WHDI reference platform	11
<b>OWLlink</b> single-fiber technology demos on <b>Mitsubishi</b> HDTV	11
<b>AMD</b> brings out HDTV viewing for PCs	11
<b>Algolith</b> introduces Acclaim HD video processor-scaler	12
<b>3DLABS</b> brings out 1080p scaling technology	12
<b>Sharp</b> files lawsuit against <b>Samsung</b> related to LCDs	12
<b>HDNet</b> makes 4K plans	12
<b>Genum</b> showcases first commercial solution to drive 4Kx2K display	12
<b>LCD TV Shipments Surge in Q4'06:</b> by <i>Ross Young</i>	<b>13</b>
DisplaySearch's summary about the strong end to a strong year for LCD TVs	
<b>An analysis of the current mainstream LCD TV retail pricing</b> by <i>WitsView</i>	<b>15</b>
Review of mainstream LCD pricing at retail	
<b>Interview with Sam Miller from Syntax/Brilliant</b>	<b>17</b>
Syntax/Brilliant shares insights about their plans in the LCD TV market	
<b>Commentary: Who Needs 1080p?</b> by <i>Alfred Poor</i>	<b>21</b>
<i>Alfred Poor tells us why 1080p is booming, even though it may not be really needed</i>	
<b>2007 Display Industry Calendar of Events</b>	<b>22</b>

# Chairman's Corner: "LCD TV Matters"

by Bruce Berkoff

Welcome to the first LCD TV Association newsletter. We are a new not-for-profit trade organization whose goal is to Inform, Promote, Improve, and Connect the entire supply chain, retail channel and even end consumers of LCD TVs, to help all related vendors who are members to make better products and better values for consumers and to get these to market sooner for the benefit of the whole industry. We use via various communication tools, which include research and white papers, speeches around the world, PR, interviews with the press and background education and help with reviews, test and benchmarks too, as well as meetings and standards, in addition to this new newsletter to help accomplish these basic marketing goals of the LCD TV Association. We speak at the many industry shows globally and help promote the community as well as members interests and get them to engage in more mutually beneficial discussions for faster time to market of beneficial features and more efficient supply chain logistics.

The LCD TV Association does not compete with any existing organization, but wants to work with them (like the CEA and DisplaySearch, etc.) and be very complimentary to the existing organizations of today. We fill a new and needed niche in this rapidly growing market, in order to help make better and more affordable products, which are easier to use and provide ever more consumer value over time.

In general, we want to utilize this new newsletter format to help provide additional viewpoints and news summaries which are also not commonly available via other sources, and we start this process today, with our inaugural "Summer 2007" issue of "LCD TV Matters". Each quarter or so, we will bring you some new topics, comments and interviews from industry personalities, some recent market and pricing data as well as our view of current trends, and a great industry calendar of events (probably the most complete offered anywhere in the world).. We also hope to add various contributed articles on both markets and or a technology of relevance to our audience (and indeed, we have a unique perspective at the intersection of investment, technology and business in this seemingly "newly minted" \$100 Billion industry from both our background and our various members).

We believe that our industry is at an inflection point for all HDTVs, and LCD TVs in particular, in terms of growth, quality, new technology and market penetration. What a spectacular couple years it has been for LCD TVs! The growth has been amazing (over 40 million sets worldwide last year and probably over 70 million this year), and yet there have remained nay-sayers eager to complain about some missed forecast, future cataclysmic event, or even the economic trouble that have faced most panel makers until the recent (cyclical and easily forecasted) recovery. Now of course, we have to look past the global credit issues and home mortgage/CDO debacle to the hugely impactful and positively wonderful Beijing Olympics, and to the ever increasing global forecasts, sure to surpass reality by someone at some point soon.

About a decade ago when I was telling people LCDs would take the majority of the PC monitor space in about 5 years I was called "overly optimistic", but this was quite complimentary to the terms that were used when I said the same would happen for the TV business just a few years later (I think the first company to publicly declare that LCDs would hit 100 million a year was Samsung at the 2005 SID, but I commented to Ross Young of DisplaySearch that same day that this might indeed happen by 2008 (if all the announced fabs got built and filled as usual). As 2004 just ended with less than 10 million sold, this seemed a stretch to many who were not used to the manufacturing driven nature of this industry. Now, this seems like an easy "lay-up" to be achieved by 2008



*Bruce Berkoff and family at the 3 Camel Lodge in Outer Mongolia, one of the few places on earth that has not yet been penetrated by an LCD TV...*

Today, you see at least some LCD TVs in almost every country and venue on earth (except for perhaps this beautiful place in Outer Mongolia shown here, the "3 Camel Lodge", where we were fortunate to visit and find real dinosaur bones, but someday soon I bet you will find an LCD TV in a Ger near you!)

In fact, with LCD TVs getting better and less expensive every year, in a relentless march toward 200 million by 2012 (out of an expanded TV TAM of 400 million by then, we believe, but more about this later) even my parents will be buying one (or two) in the not so distant future, and probably your friends and their parents too!).

This is not just the result of "Monday morning quarterbacking" today, nor a trivialization of the ~million man-years invested in this technology so far, but also an outgrowth of the ~\$100 Billion in CAPEX spent on TFT LCD factories and equipment to date. That is what got us to this 30 year old "overnight success", with of course, the heroic efforts of many thousands of engineers to keep making things better (and cheaper). In fact, many years ago I said LCDs would win due to their high WAF ("wife acceptance factor", a term I was the first to use in English at a 1999 SID speech, but I borrowed it from my Dutch coworkers at Philips) even though at the time LCD TVs often looked better "off then on", I knew their interior designs statements were so positive that EVERY home would want a "flat TV" someday soon! Of course, these days many companies have spent years making LCD TVs look great on too!

Even when turned "off", many years ago, it was clear LCD TVs were a great new "turn on" for interior designers, and this type of design element has only grown in importance over time, and will continue to do so as the many shades of "wireless" continue their relentless growth as well (wireless is also a high "WAF" idea, in that cables have very LOW WAF! This will begin to change by the holidays in 2008, but more on this later too).

There are a great deal of LCD TV players today, many of them old and famous (like Philips, LG, Sony, etc.), and a few new upstarts as well (like Syntax's Olevia brand) and some with old names and a new product/company (like Westinghouse Digital), but the landscape moves very fast. In our next newsletter I will tell you about a recent major conference in Japan where one of the biggest and best players in Plasma admitted, "we need to make more and larger LCD TVs, as that clearly is a big growth area for the industry", and this company has great technology for EVERY type of TV.

For now, let me welcome you to our new LCD TV Association newsletter and ask for your feedback directly.

Bruce Berkoff, Chairman, [bruce@lcdtvassociation.org](mailto:bruce@lcdtvassociation.org)  
LCD TV Association: "A Great TV in Every Room"

*Note that this first issue of "LCD TV Matters" is a couple months behind where we thought it would be due to typical "start-up" issues in process & people and ramping how we will gather and distribute content, thus some of the more "timely" pieces from folks like DisplaySearch and WitsView may seem a little behind the curve, but we will have a second issue done in record time, in just a few days, with many new inputs "fresh off the presses", thus getting us close to the point of being where we want to be going into the New Year, the start of our first full year in existence.*

**Mr. Berkoff is the founding Chairman of the LCD TV Association, a global not-for-profit trade association dedicated to "informing, promoting, improving and connecting" the entire LCD TV supply chain and their related companies, to help promote "a great LCD TV in every room in the house!" For over 6 years, residing in Seoul Korea, Mr. Berkoff was also the Executive Vice President of Marketing and Chief Marketing Officer (CMO) for LG Philips, LCD. He has also been the CEO of a fabless semi start-up in the video processing space and general manager of Philips Flat Display systems software and electronics business. Prior executive positions also include UMAX Computer Corporation, Radius and SuperMac Technologies. Mr. Berkoff is a speaker and author in the display and electronics industry. He has display related patents both granted and pending in the U.S. and China. He holds an undergraduate degree in physics from Princeton and a graduate degree in biophysics from the University of California- Berkeley. Mr. Berkoff currently sits on the boards of four publicly traded companies: InFocus Corporation (INFS), Syntax-Brilliant Corporation (BRLC), Tvia, Inc. (TVIA) and Uni-Pixel, Inc. (UNXL), and is known for his many visionary talks at display and technology related conferences around the globe.**



# LCD TV News: Standards & Electronics

compiled by Veritas et Visus

In this edition of the "LCD TV Matters" newsletter, we feature news about LCD TV-related standards and developments related to component-level LCD TV electronics. Volume two of the newsletter will be released soon and will feature news about high performance LCD TVs and the emergence of 3DTV.

## Digital Television Transition Coalition established

In late February, a diverse coalition including representatives from private industry, trade associations, civil rights organizations and community groups plus the National Telecommunications and Information Administration (NTIA) announced that they will work together on a comprehensive consumer education campaign to increase awareness of the transition from analog to digital television, which will be completed in the US on February 17, 2009. In a recent survey of over-the-air viewers conducted by the National Association of Broadcasters (NAB), 56 percent of



respondents reported that they have "seen, read, or heard nothing" about the transition to digital television, and only 10 percent were able to guess that the transition would occur in 2009. Nearly 20 million households that rely solely on over-the-air television signals will be affected by the end of analog broadcasting on February 17, 2009. Millions more

households that receive over-the-air signals on secondary TV sets will also be affected. About 96 million consumers subscribe to a cable or satellite service and should continue to receive the broadcast signals through their subscription service. The mission of the DTV Transition Coalition is to ensure no consumer is left without broadcast television due to a lack of information about the transition. The Coalition's founding members include: Association for Maximum Service Television (MSTV), Association of Public Television Stations (APTS), Consumer Electronics Association (CEA), Consumer Electronics Retailers Coalition (CERC), Leadership Conference on Civil Rights (LCCR), LG Electronics, National Association of Broadcasters (NAB), and the National Cable & Telecommunications Association (NCTA), <http://www.dtvtransition.org>

## Digital UK countdown to first digital switch begins

The date on which the UK's switch to digital TV will begin was announced by Digital UK, the body leading the process. Whitehaven and the surrounding Copeland area of Cumbria had its first analog signal (BBC2) turned off and replaced by digital services on October 17 this year. The remaining three analog channels were switched off on November 14. The two-stage process will then be repeated across the UK, until switchover completes in 2012. <http://www.digitaluk.co.uk>

**digitaluk**

## Sky Network slams UK HDTV plans

*The Register* website recently reported that the British "HD for All" campaign, designed to promote HDTV, has drawn a withering blast from Sky. BSkyB public affairs head Martin Le Jeune described it as a "shabby alliance between a group of public service broadcasters who should know better and vendors who sell expensive product". At the core of the delay is the issue of spectrum. The established public service broadcasters say there isn't enough. For Sky, the answer is to open up the market. This would end the UK state's "cozy relationship" with its terrestrial broadcasting partners. But supporters of public service broadcasting balk at the prospect. With the BBC and ITV's limited resources, they fear Sky would grab the lot - or at least the best bits - as it has done frequently in the past in the TV area. [http://www.theregister.co.uk/2007/07/05/uk\\_hdtv\\_debate/](http://www.theregister.co.uk/2007/07/05/uk_hdtv_debate/)

## Best Buy exits analog TV business

Best Buy, a large consumer electronics retailer, announced that they have pulled all remaining analog television products from store shelves and will only sell digital video tuners in the future. The company also announced that they will participate in the NTIA DTV Converter Box Coupon Program to help people purchase digital converter boxes for their analog televisions. Coupon-eligible converter boxes will be available in Best Buy stores beginning in early 2008. Best Buy is the first CE retailer to publicly announce an exit from the analog television business. Stores were instructed to stop selling these products on October 1, 2007.

**CEA publishes digital accessory standards**

The Consumer Electronics Association (CEA)'s Digital Television (DTV) Interface Subcommittee published CEA-761-B, *DTV Remodulator Specification with Enhanced OSD Capability*, and CEA-CEB5-B, *Recommended Practice for DTV Receiver "Monitor" Mode Capability*. Together these standards will enable consumers to easily set-up and control a digital television accessory, like a set-top box or digital video recorder (DVR), using their TV screen. <http://www.CE.org/standards>



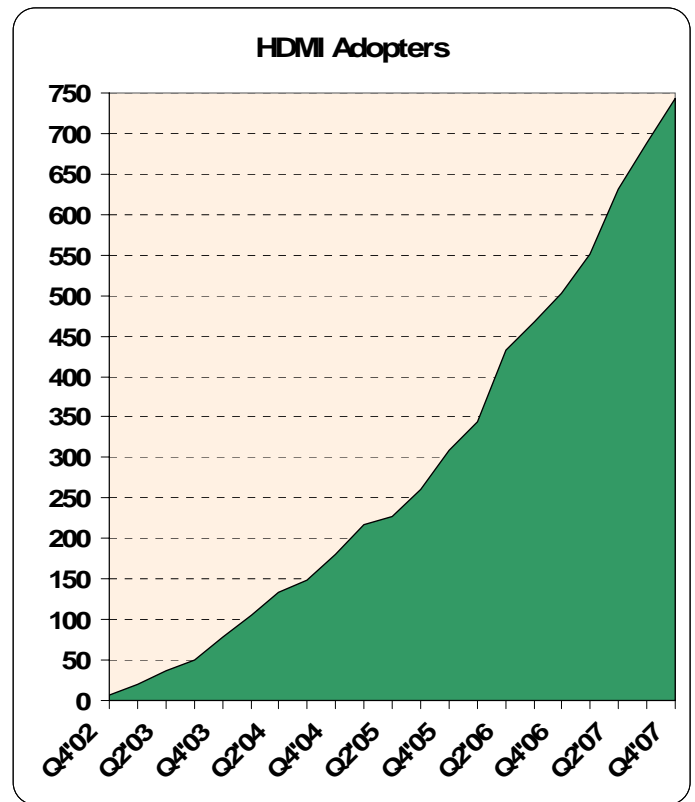
**CEA considers specification for 1080p analog video**

The CEA is considering a specification for 1080p over analog, which does not currently exist. The CEA says that customers frequently ask for eight displays throughout their home, a front projection home theater with a next-gen optical disc player, two gaming consoles, an HD cable DVR, and a network media player for playing MP3s, all of which can be shared on all the other displays in the home - all 1080p using HDMI. High definition analog component video is defined by the CEA specification, CEA-770.3-rev C. The spec was last revised five years ago, and defines 720p and 1080i, but not 1080p. Even in the absence of a standard, 1080p component video has made its way into a surprising amount of consumer devices. Several display manufacturers support 1080p over component video, either across the line such as Samsung, or as an undocumented feature on certain models such as Syntax/Brilliant. Many networked media players, such as those from PixelMagic Systems and Ziova, will output 1080p, as will Media Center PCs. The most significant source devices are the major gaming consoles, with both the Playstation 3 and the Xbox 360 supporting 1080p analog. <http://www.ce.org>

**HDMI adoption continues to soar**



The number of companies that have formally adopted the HDMI digital video interface standard continues to soar, totally 632 companies as of mid-June, up by more than 50% from a year earlier. By mid-November, membership had continued to surge, with the HDMI website showing almost 750 adopters. If anything, the growth curve seems to be getting steeper, rather than showing signs of a slowdown. More than a year ago, the HDMI founders dropped their annual fee from \$15,000 to \$10,000, with some concerns that it would negatively impact their revenues, but the continued growth has already offset the fee reduction. Support for HDMI is coming from all regions, with growth in cost-conscious China being particularly strong, which is particularly unusual considering China's reputation for preferring standards developed in-country. Support for HDMI is also expanding outside of the TV arena, gaining a solid foothold in the gaming world and recently in both the projection and PC markets. Numerous LCD monitors now come with one or more HDMI ports, and more and more, PC makers are adding HDMI output to their systems for easy connectivity to TVs, monitors, and projectors. <http://www.hdmi.org>



**MPEG LA issues ATSC patent portfolio license**



MPEG LA announced the availability of the ATSC Patent Portfolio License. The joint license includes patents that are essential to the digital television standard (including high definition and standard definition) developed by the Advanced Television Systems Committee (ATSC) and used in digital televisions sold in the United States, South Korea, Mexico, Canada and other countries. Essential patent holders include Zenith, Scientific-Atlanta, Samsung Electronics, Mitsubishi, Panasonic, LG Electronics, and Philips. <http://www.mpegla.com>

## European showdown for mobile TV broadcast standard



In late May, the European Commission actively encouraged the adoption of the DVB-H (digital video broadcasting-handheld) standard, which has been developed using almost €40m of EU research funds. European telecoms commissioner Viviane Reding said earlier this year that if the mobile industry could not agree on a standard she would choose it for them. The DVB-H format is already in use in 17 EU countries, and as such is being touted as the pan-European mobile TV standard. DVB-H is approved by the European Telecommunications Standards Institute (ETSI) and mobile giants Nokia and Samsung recently announced their plans to work together to deliver the DVB-H standard. However, the mobile industry has a deadline of this summer for all to agree on a chosen format. Several groups are being considered as alternatives to the DVB-H implementation:

- The T-DMB format is widely used by the Korean mobile industry. Debitel, Germany's third-largest mobile telecoms operator, has adopted the South Korea led format of T-DMB and in the UK the DAB-IP format is used widely. The South Korean mobile TV market is one of the oldest and better developed worldwide and as such the T-DMB format cannot be overlooked by the European Commission.
- The ISDB-T system finds backing in Japan. In Japan, serious discussions are ongoing between industry and the government on how to handle spectrum issues for mobile TV and a decision on mobile video is likely later this year. ISDB-T has also been adopted in Brazil.
- China supports the China Multimedia Mobile Broadcasting (CMMB) format, which is based on the satellite and terrestrial interactive multi-service infrastructure (STiMi), also developed in China.
- A second Chinese mobile TV standard is trying to rally support by building up a design and manufacturing base in Tianjin. Backers of the standard, known as China Digital Multimedia Broadcasting (CDMB), claim they will eventually invest \$1 billion in the base, but that assumes that CDMB is chosen as a national standard, which is hardly assured. The hope is to attract players from several quarters, including chip design companies, handset makers, multimedia content suppliers, a testing center and IP developers. Some potential candidates, based on those who have joined the CDMB alliance, include Taiwan's Via Technologies, Shanghai-based ZL Telecom and Beijing-based CEC Wireless. The CDMB workgroup said its standard will be tested this month in the metro system of Guangzhou, a city in southern Guangdong province. CDMB is a combination of China's 3G standard, TD-SCDMA, as well as DAB and the local codec AVS. It was jointly developed by five local universities and companies. The workgroup said around 30 cell phone makers, design houses, and chip makers have joined as members, including Lenovo Mobile, Amoi, Haier, Bird and TCL.
- A mobile version of the ATSC standard for DTV is said to be nearing final approval, and Harris Broadcast recently hinted at the unveiling of ATSC-compatible mobile-video technology. Crown Castle is already offering to deliver mobile video via its version of DVB-H, called Modeo.
- MediaFLO, a Qualcomm technology, has gained support in North America following recent announcements by major US-based wireless-telephone companies AT&T and Verizon Wireless of their plans to deliver mobile video via the platform. In Europe, Qualcomm recently completed a high-profile trial in Europe, in partnership with British Sky Broadcasting (BSkyB). One of MediaFLO's key advantages is that it does not have to be backward compatible with terrestrial broadcast systems, allowing it to be better optimized for mobile delivery, but it requires new frequency while DVB-H can often piggyback on existing broadcast frequencies.

"The odds are that it will be a multi-standard world for delivering TV to mobile phones," says FLO Forum president Kamil Grajski, who is also vice-president for engineering at Qualcomm. While maintaining forum members' confidence in the technology, Grajski believes that many other factors come into play when choosing equipment vendors. It remains to be seen, for example, if governments will have a big impact on decisions like the adoption of home-grown technology for the good of local business, says the forum chief.

Sharp recently announced its development of the world's first "dual mode" tuner, which will receive mobile TV in both DVB-H and MediaFLO formats. This tuner has been developed to fit into most mobiles devices, especially mobile phones, which could serve to create something of a compromise solution. Most recently, at a telecom convention in Barcelona, Spain, Qualcomm announced steps to unify mobile video announcing a universal-broadcast modem chip that could receive MediaFLO, DVB-H or ISDB-T, assuring that it will be delivered to handset vendors at essentially no additional cost, unlike one-technology chips.

### EU Commission favors DVB-H over MediaFLO standard

In calling for a single broadcasting technology standard across Europe, the European Commission recently chose the DVB-H standard and will add it to its list of standards within August. The news is a blow to Qualcomm's competing MediaFLO technology, which the firm was hoping to get licensed in Europe. The decision added to a particularly hard month for Qualcomm, who also lost court decisions to Broadcom related to patent issues related to MPEG-4/AVC-H (see article on page 69). The FLO Forum, which was formed to promote MediaFLO technology, stated that it believes the commission's intention of favoring one particular mobile TV technology for Europe could stall the advancement of the mobile TV ecosystem. <http://www.floforum.org> *Implementation of DVB-H was considered a forgone conclusion by most analysts, since much of Europe has already adopted the standard and it is supported by numerous European heavyweight telecommunication players. Analysts in fact have suggested that the European decision is likely to boost support for DVB-H in the United States as well.*

### Open Mobile Video Coalition encourages participation in developing ATSC standard

The Open Mobile Video Coalition (<http://www.openmobilevideo.com>) issued the following open letter to companies in the technology industry in an effort to drive the development of mobile broadcast television.



"The OMVC is issuing this open letter to urge companies in the technology industry interested in introducing new mobile video capabilities for digital television broadcasting to actively participate in the inter-industry standardization process for mobile video launched by the ATSC. The OMVC was formed by Belo Corp., FOX Television Stations, Gannett Broadcasting, Gray Television, ION Media Networks, the NBC & Telemundo Television Stations, Sinclair Broadcast Group, and Tribune Broadcasting Company, which together own and operate over 280 television stations covering 95 million homes, and has come together specifically to facilitate and accelerate the development of mobile video in the United States. The Coalition believes that adherence by the technology industry to the process set forward by the ATSC will result in most timely deployment and adoption of mobile video.

The Coalition and its members fully support and will participate in the process announced by the ATSC on April 9, 2007 for the development of an ATSC-M/H standard, a backward compatible mobile and handheld standard for television broadcasters, including the Request for Proposal (RFP) that was issued on May 21, 2007. Specifically, the Coalition views as critical the ATSC's RFP requirements that i) candidate technologies be incorporated into an open standard, with underlying intellectual property made available for licensing under reasonable and non-discriminatory terms; and ii) candidate technologies be submitted according to the schedule of the RFP, so that they can be evaluated under an expeditious, consistent and fair process.

The Coalition believes that one of the major threats to the successful and timely introduction and adoption of new mobile video products and services is a marketplace "format war" among incompatible approaches. In broadcasting, the AM Stereo debacle resulted in failure for all interested parties; fragmented approaches in other products—such as for videocassettes (i.e. VHS vs. Betamax), rewritable DVDs (i.e. DVD-R vs. DVD+R), and high-definition DVDs (i.e. Blu-Ray vs. HD-DVD) — may have significantly delayed or diminished consumer adoption. As such, the Coalition urges all interested technology companies to participate in the ATSC process – we believe that reaching a single open standard that fosters healthy competition and encourages consumer confidence and rapid adoption is ultimately in everyone's best interests".

### Open Mobile Alliance releases globally interoperable mobile TV standard

The Open Mobile Alliance (OMA), an international specifications setting body, announced the public availability of its Mobile Broadcast (BCAST) Version 1.0 Candidate Enabler Release. The specification is an open global standard for interactive mobile TV as well as on-demand video services, and is adaptable to any IP-based mobile content delivery technology. Currently, OMA's BCAST 1.0



can be adapted to broadcast systems like DVB-H as well as cellular systems like 3GPP MBMS, 3GPP2 BCMCS and mobile unicast streaming systems. Over 35 companies have actively contributed to OMA's new specification, setting the global market requirements of the end result. <http://www.openmobilealliance.org>



### ATSC to develop broadcasting standard

The Advanced Television Systems Committee (ATSC) has launched the process to develop a standard that will enable broadcasters to deliver television content and data to mobile and handheld devices via their DTV broadcast signal. "The ATSC-M/H Standard will facilitate broadcasters' use of their DTV broadcast channels to provide new services directly to small hand-held receivers, laptop computers and vehicles moving at a high rate of speed," said ATSC President Mark Richer. "ATSC-M/H will be backwards compatible, allowing operation of existing ATSC services in the same RF channel without an adverse impact on existing receiving equipment." Broadcasters will be able to allocate a portion of their 19.39 Mbps/8-VSB signal to mobile and handheld while continuing to transmit services such as HDTV. ATSC-M/H will be developed to support a variety of services including free (advertiser-supported) television and interactive services delivered in real-time, subscription-based TV, and non-real-time content download for playback at a later time. It may also be used for transmission of new data broadcasting services such as real-time navigation data for in-vehicle use. <http://www.atsc.org>



### Industry consortium sets up Open IPTV Forum



AT&T Inc., Ericsson, France Telecom, Panasonic, Philips, Samsung, Siemens Networks, Sony, and Telecom Italia announced the founding of the Open IPTV Forum, an industry consortium that will work to define an interoperable end-to-end specification for delivery of IPTV services. The forum, which is fully open to participation across the communications and entertainment industries, will focus on development of open standards that could help to streamline and accelerate deployments of IPTV technologies, and help to maximize the benefits of IPTV for consumers, network operators, content providers, service providers, consumer electronics manufacturers and infrastructure providers. While standardization bodies are already addressing specific elements of IPTV, the pan-industry Open IPTV Forum will work to aggregate today's diverse standards into a complete delivery solution, with the goal of accelerating the full standardization of IPTV-related technologies. The Open IPTV Forum plans to establish requirements and architecture specifications as well as protocol specifications later in 2007. The Open IPTV Forum will work on the basis of suitable open-standards technologies, and will also address key technology elements such as content protection, necessary interfaces that allow IPTV services to be delivered over both managed network environment and the public Internet, and adequate measures to ensure interoperability between such services and retail consumer devices. Candidates include, but are not limited to: IP Multimedia Subsystem (IMS) and Digital Living Network Alliance (DLNA). Initially the Forum will consist of the founding member companies, but will be open to other companies at a later date. <http://www.openiptvforum.org>

### Pace demonstrates standards-based home digital TV using DLNA

Pace Micro Technology has added Digital Living Network Alliance (DLNA) capabilities to a server set-top box. It integrates Macrovision media server software with existing Pace software, to show operators how they can offer a "multiroom solution" that distributes content securely to off-the-shelf DLNA-compliant products such as digital media adapters, mobile phones or PCs. The DLNA-capable Pace server offers high definition and personal video recording capabilities, the company says, as well as storage for audio and photo files, which can then be accessed from any of the connected DLNA-compliant products in the home. <http://www.pacemicro.com>

### Euro1080 makes move to MPEG-4



All channels of Euro1080 now broadcast in MPEG-4, the new compression standard. HD1 will temporarily remain available in MPEG-2 on Astra 23.5°E. In order to facilitate the switch to MPEG-4 Euro1080 offers a special MPEG-4 compatible set top box promotion to its existing customers. Euro1080 was the first channel in the world to broadcast HDTV in MPEG-4 in August 2005. The quality at that time was not yet perfect enough and receivers were not available. Steadily, Euro1080 improved the quality of HDTV MPEG-4 DVBS2 and the company is convinced that the quality is yet better than traditional HD MPEG-2 broadcasting. Euro1080 decided to switch as from 2nd January 2007 all Euro1080's HDTV channels (HD1, HD2, HD5 and EXQI Culture Channels) to MPEG4 compression standard on Astra 23.5°E, Sirius 5°E, and Eutelsat W3A satellites. <http://www.euro1080.tv>

**Chrontel premieres video interface chips that links PCs to HDTVs via HDMI**

Chrontel recently announced a new HDMI transmitter IC, the CH7315A, which links PCs to high-definition TVs. The CH7315A HDMI transmitter is a mixed-signal IC that transmits uncompressed, copy-protected video and audio data over a secure link from PCs to external televisions, HDTVs, DVD recorders and A/V receivers. The device receives video data via SDVO bus and audio data via an HD Audio bus, combines audio and video data, converting it into a single HDMI-compliant bit stream for transmission to external CE devices. It accepts SDVO serial input speeds of 1G to 2Gbps, and transmits video output at 25M to 165M pixels per second - pixel rates that support all HDTV display modes from 480i to 1080i/1080p. The CH7315A also incorporates HDCP cryptographic functions and HDCP keys. The CH7315A features dual output ports so that two external CE devices can be connected simultaneously. This eliminates the need to manually switch connectors as consumers swap the active receiving device from one connection to another. This feature allows easy implementation of a second HDMI output via the docking station of a notebook PC. <http://www.chrontel.com>

**MainConcept wins codec award**

MainConcept won the "Third Annual MSU MPEG-4 AVC/H.264 Video Codecs Comparison" of the MSU Video Group. The goal of the comparison is a comparative evaluation of the quality of new H.264 codecs using objective metrics. The complete test consisted of three types of application, which strongly differ by resolution, bitrates and encoding speed requirements: videoconferences, movies and HDTV. The codecs were scored in the following order: MainConcept; x264; VSS; DivX (MPEG-4 ASP); and Intel H.264. <http://www.mainconcept.com>

**Entone offers HD MPEG-4 delivery solution**

Entone announced the launch of HD NOW, a solution that enables IPTV service operators to rapidly deploy high-definition (HD) services alongside their existing MPEG-2, IPTV infrastructure. HD NOW is a fully-integrated HD MPEG-4 solution that complements existing MPEG-2 IPTV headend infrastructures, without the high costs of building out an MPEG-4 headend. In addition to Entone's Hydra IP Video Gateway, HD NOW utilizes SES AMERICOM's HD-4 technology and includes options content security systems. <http://www.entone.com>

**Fujitsu transcoder compresses Full HD MPEG-2 to H.264**

Fujitsu Microelectronics has a new transcoder chip that can compress full HD (1920x1080) MPEG-2 video data to H.264 data. The new chip, MB86H52, is capable of compressing MPEG-2 video to less than half the data size while, it is claimed, maintaining the same video quality. The new chip is expected to be used in applications including hard drive PVRs where recording time could be increased by more than 250%. It also allows transmission of full HD video over narrower bandwidth channels. The new part uses a proprietary algorithm developed by Fujitsu Laboratories that automatically applies less compression to areas in the image where compression artifacts are most noticeable to human vision, such as human faces or slow-moving objects, and greater compression to other areas. <http://www.fujitsu.com>

**Zoran demonstrates ATSC set-top converter box**

Zoran Corporation announced that its advanced ATSC-compliant set-top converter box reference design, demonstrated at the International Broadcast Congress (IBC) in Amsterdam, is available to qualified Zoran customers. Powered by Zoran's SupraHD 741 processor, with an integrated ATSC-compliant demodulator, the energy-efficient set-top reference platform includes Zoran software, tuner, memory, and all associated circuitry needed to bring new set-top converter box products quickly to market. The platform was designed to meet ENERGY STAR requirements and includes other features such as a smart antenna, programmable remote controls, and S-video output. <http://www.zoran.com>

**Micronas processors support Full HD on one chip**

Micronas' VCT-Premium is the third generation of the company's VCT family of single-chip flat panel TV video processors. The new part supports full HD (1920x1080p) at 24fps and integrates audio, video, Teletext, OSD and controller-related functions including memory and program ROM. It has a dual input HDMI receiver and supports xvYCC and H.264. The VCT-Premium has noise reduction algorithms for mosquito and blocking noise that is associated with digital TV signals. Adding the company's FRC 94xyM module allows for frame rate conversion of 24fps input signals to up to 120fps. There are two variants of the processor - one with integrated DRAM and one packaged without. <http://www.micronas.com>

### Pixelworks announces PixelAmp+ universal color processor IC

Pixelworks announced the PixelAmp+ Universal Color Processor IC that uses a proprietary video processing algorithm to increase color performance for more brilliant images on advanced TVs. The PixelAmp+ IC is a post-processing chip which can supplement advanced television systems using image processing platforms from any IC supplier. The PixelAmp+ family of ICs, which include the PW9702 and PW9705 parts, uses proprietary video processing techniques to increase color performance and enhance edges for a more brilliant, crisper image — even on high-definition content. For lower resolution images, PixelAmp+ technology recovers clarity which improves consumer experiences when viewing legacy content on advanced TVs. <http://www.pixelworks.com>

### Amimon and Pixelworks create WHDI reference platform

Pixelworks and Amimon announced at CES that they are cooperating to provide joint reference designs that combine Pixelworks' video and image processing hardware and software and Amimon's Wireless High-definition Interface ( WHDI) wireless uncompressed HDTV solution on a single integrated platform. The joint reference designs will facilitate the design of a new class of wireless projectors and wireless flat-panel TVs that offer a wireless uncompressed HDTV link that is compatible with the most common wired HDTV interfaces: HDMI and component video. The joint reference design includes advanced digital processing circuitry and features Pixelworks' DNX (Digital Natural Expression) video processing technology and advanced 3D noise reduction. The platform includes a WHDI link, which delivers wirelessly uncompressed HDTV video streams with equivalent video rates of up to 1.5 Gbps (including support for uncompressed 720p and 1080i) with video quality that the company's claim is equivalent to that achieved with an HDMI cable. With latency of less than one millisecond, synchronization between audio and video is assured. The wireless link occupies 20 MHz bandwidth in the 5GHz unlicensed band, conforming to worldwide 5GHz spectrum regulation, and it covers a range of more than 100 feet through walls. Future versions of the joint reference design will also support uncompressed 1080p (with an equivalent rate of 3 Gbps) by using 40 MHz of spectrum, conforming to FCC 5GHz regulations. <http://www.amimon.com>



### OWLink single-fiber technology demos on Mitsubishi HDTV

OWLink Technology announced an exploratory relationship with Mitsubishi Digital Electronics America in which OWLink will demonstrate the compatibility of their fiber optic technology with the Mitsubishi NetCommand home theater control system. OWLink's technology enables the transmission of uncompressed high-definition digital signals over a single transparent fiber link at distances up to 400 meters. The same fiber link supports the transmission of voice/audio data as well as bi-directional control signals. Because it is approximately the thickness of high-test fishing line, the fiber link is virtually invisible to the naked eye after installation. NetCommand, a feature on select Mitsubishi HDTVs, enables single remote control of an entire home theatre system. NetCommand blends control of HDMI and IEEE 1394 digitally-connected products and conventional IR analog connected components into a single icon-based on-screen control system. <http://www.owlink.com>

### AMD brings out HDTV viewing for PCs

AMD introduced two new solutions that offer high-definition television (HDTV) viewing and digital video recording (DVR) capabilities on desktop and notebook PCs. With the external plug-and-play ATI TV Wonder 600 USB, a desktop or notebook PC becomes a feature-rich DVR for HDTVs. The TV Wonder 650 Combo PCIe is a combo tuner that can capture both locally-available over-the-air and cable programming, including HDTV where available. The PCIe add-in card offers ClearQAM technology that captures unscrambled digital channels that may have previously been unavailable. The ATI TV Wonder 600 USB package includes a slim credit-card-sized IR remote control, A/V input adapter for video capture from a camcorder or VCR, and Catalyst Media Center Software. Catalyst Media Center offers a simplified user interface optimized for TVs, an advanced electronic programming guide, DVD authoring and playback, video conversion and AMD LIVE! On Demand powered by Orb! for accessing the DVR from any computer with a broadband connectivity. The ATI TV Wonder 600 USB and ATI TV Wonder 650 Combo PCIe are scheduled to be widely available throughout North America by September 2007. <http://www.amd.com>



### **Algolith introduces Acclaim HD video processor-scaler**

Algolith, a developer of video image enhancement solutions introduced the Acclaim HD Video Processor-Scaler in mid-June. Designed for the professional market, the Acclaim boasts AnyPlace flexible projector placement, which gives integrators the freedom to place video projectors virtually anywhere in a room. This unusual flexibility is especially valuable in asymmetric venues like houses of worship, town halls, and restaurants which often contain unintended structural obstacles. The Acclaim features the Realta HQV video engine by Silicon Optix. The Acclaim up-scales, down-scales, de-interlaces and cadence-corrects all video signals from 480i to 1080p. The Acclaim includes front-panel controls and a bright active-matrix LCD screen for detailed settings menus. It also comes with a remote control. <http://www.algolith.com>

### **3DLABS brings out 1080p scaling technology**

3DLABS showcased its DMS-02 processor's ability to decode and display high-resolution video and photos on high definition 1080p TVs in early June. The new DMScaler technology extends the capabilities of the current DMS-02 media processing libraries to enable consumers to view their standard D1 resolution video on the growing number of high definition TVs at their native 1080p resolution. The DMScaler enhancements use the power of the DMS-02's software programmable media processing array to apply complex, high-quality filters to remove the visual artifacts normally seen when upscaling or downscaling video and images. It can display and manipulate photos larger than 10-megapixels and output at 1080p resolution; view standard definition video content, upscale and output to 1080p TV screens; play back high definition H.264 video at 720p at 24 fps; downscale and play back HD and standard definition video on small screens without transcoding; and includes high-end 3D navigation with accelerated OpenGL ES map render. <http://www.3dlabs.com>

### **Sharp files lawsuit against Samsung related to LCDs**

A US lawsuit filed by Japan's Sharp is the latest of a string of unexpected shocks for Samsung Electronics. On August 6, in a lawsuit filed in the United States District Court for the Eastern District of Texas, Sharp accused the South Korean electronics giant of infringing upon five of its patents related to liquid-crystal display technologies. Sharp is seeking compensation and a sales ban on Samsung products that allegedly infringe upon the patents. Last month, Samsung turned in its worst quarterly results in four years. But the cyclical LCD panel industry is finally moving into an upswing.

### **HDNet makes 4K plans**

Mark Cuban, founder of HDNet says the hi-def network will eventually go all 4K with a mix of 3D, adding that 4K cameras from Red Digital Cinema have been ordered, and plans for field tests are under way. Production in 4K was established by Peter Jackson, director of "Lord of the Rings". Jackson and crew shot and edited the short World War I film "Crossing the Line", in 4K in less than two-and-a-half weeks. HDNet currently originates its own material in 1080i and upconverts the rest. Cuban said there are also plans in the works to do the type of live HD streaming to theaters that the Metropolitan Opera launched earlier this year. <http://www.hd.net>

### **Genum showcases first commercial solution to drive 4Kx2K display**

Genum Corporation showcased an advanced processing for large screen displays at InfoCom 07. Leveraging its VXP technology, Genum showed an image processing solution to drive 4096x2160 pixel (4Kx2K) displays, highlighting the commercial opportunity for displays that provide a more detailed image than can be realized on current high definition televisions (HDTVs), plasmas, computer screens or digital projection systems. While previous industry demonstrations of 4Kx2K have used custom processing solutions, often utilizing multiple field programmable gate arrays (FPGAs) to manage the complexity, Genum's 4Kx2K reference design, incorporating two of Genum's popular GF9450 image processors provides full motion-adaptive deinterlacing, professional quality scaling up to 4Kx2K, frame rate conversion and various image enhancement technologies such as 3D noise reduction, compression artifact reduction and detail enhancement. The low power of the GF9450, under 3.5 watts, is also key to emerging 4Kx2K displays as it will eliminate the need for a fan to cool the device. Genum also disclosed its roadmap for a single chip solution that delivers the performance necessary for 4K displays. The integrated, single-chip processor will start shipping in Q4'07. <http://www.gennum.com>

# LCD TV Shipments Surge in Q4'06

*Publisher's note: This article is obviously dated, but provides a good perspective about last year's Holiday selling season. An update will be published in Volume 2 of "LCD TV Matters", which will be out in a few days.*

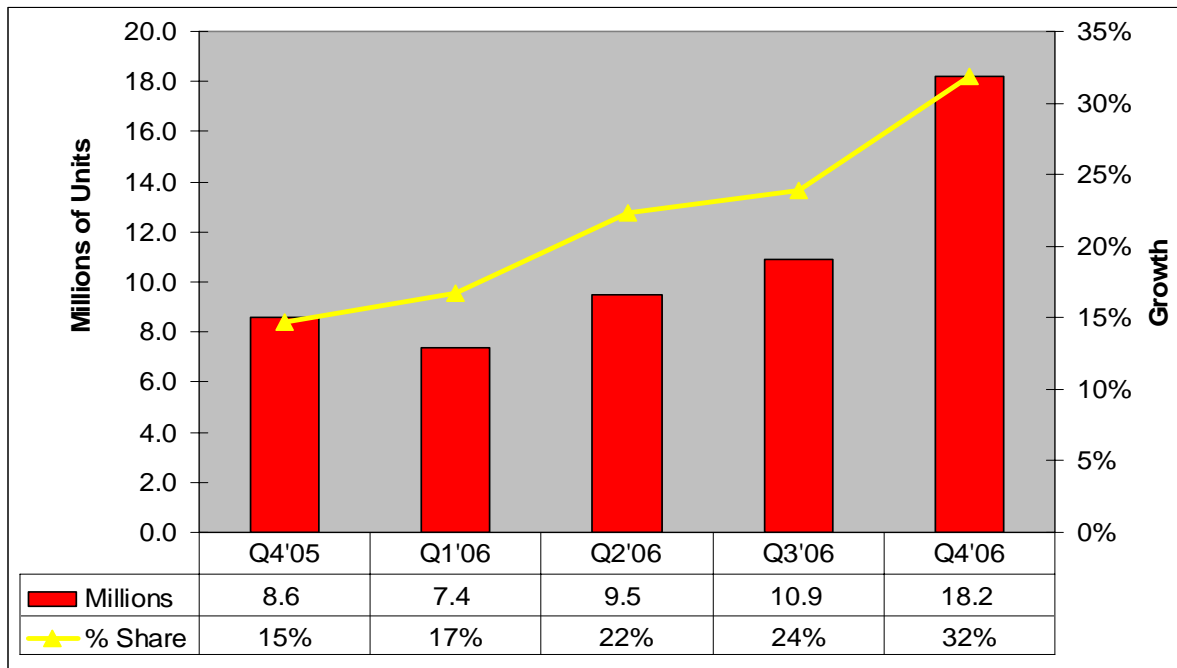
by Ross Young

**Ross Young is the founder and President of DisplaySearch. Prior to founding DisplaySearch in 1996, he served in senior marketing positions at OWL Displays, Brooks Automation, Fusion Semiconductor and GCA in the driver IC, flat panel automation, etch and strip and lithography markets respectively. Ross attended the University of California at San Diego (UCSD), Australia's University of New South Wales, UCSD's Graduate School of International Relations and Pacific Studies and Japan's Tohoku University.**



LCD TV shipments enjoyed a record quarter in Q4'06. Units rose 67% Q/Q and 113% Y/Y to a new high of 18.2M TVs which amounted to 32% of the Q4'06 TV market as shown in Figure 1. Driving the growth was a healthy decline in average selling prices (ASPs) which dropped 15% Q/Q and 21% Y/Y to \$933. In addition to their attractive form factor and excellent picture quality, LCD TV shipments also benefited from pent up demand for 1080p resolution at affordable prices. 1080p LCD TV shipments rose 195% Q/Q and over 1000% Y/Y to 7% of Q4'06 LCD TV shipments and more than a third of 40"+ LCD TVs.

**Figure 1: Worldwide LCD TV Shipments and Unit Share of the Global TV Market**



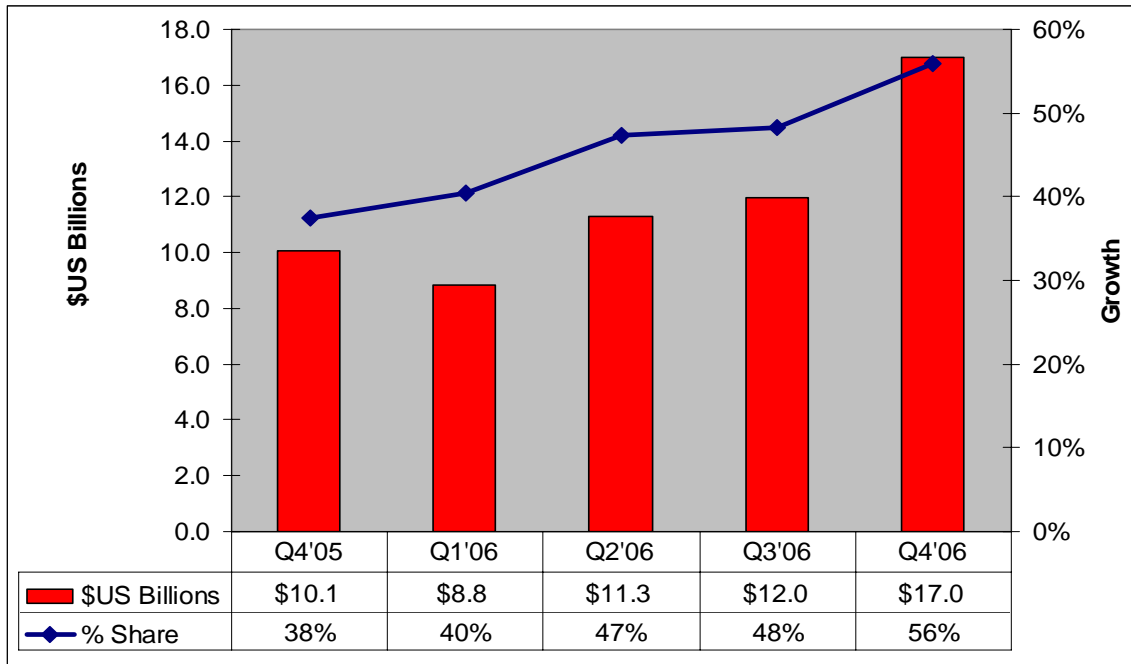
Source: DisplaySearch's Quarterly Global TV Shipment and Forecast Report

Because they are available at nearly all size ranges and carry a premium due to their form factor, LCD TVs are already the largest TV category on a revenue basis. As shown in Figure 2, LCD TV revenues rose 42% Q/Q and 69% Y/Y in Q4'06 to \$17B, earning a 56% share of the Q4'06 TV market on a revenue basis. LCD TVs enjoyed more than a 50% share of TV revenues in Europe, Japan and North America and earned more than 50% unit share in Europe and Japan.

Q4'06 was also the first quarter in which LCD TVs overtook PDP TVs at 40"-44" on a unit basis as shown in Figure 3. The LCD share surged from 17% in Q4'05 to 52% in Q4'06 in this key size category due to increased cost

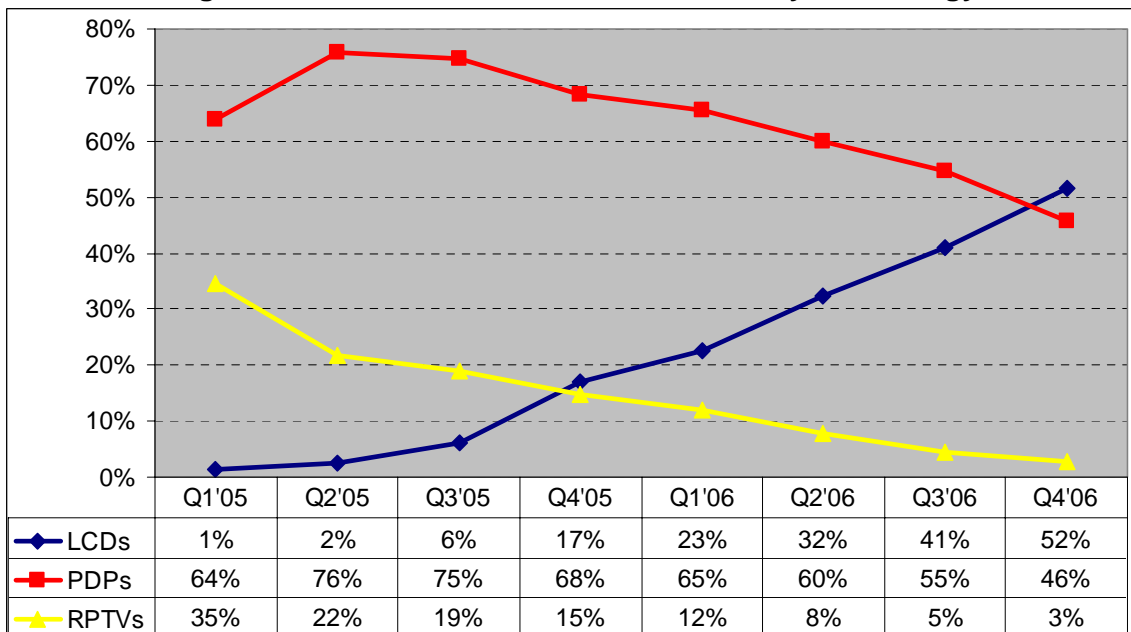
competitiveness from rising capacity at 7<sup>th</sup> generation and larger TFT LCD fabs. A growing number of TV brands shifted their focus at 40"-44" from plasma to LCD due to rising LCD capacity, increased LCD cost competitiveness, 1080p supply and the existence of merchant rather than competitive suppliers. While PDPs enjoyed 43% growth in this category from 2005 to 2006, 40"-42" LCD TV volume surged 726%. By Q4'06, 40"-42" LCD TVs led PDPs in China, Europe, Japan and North America. The only region where PDPs still led LCDs was the price sensitive rest of world market. In general, larger LCD TV sizes took share through the year with 30"+ LCD TV shipments rising to a 60% share, up from 43% in Q4'05 with 40"+ rising from 6% in Q4'05 to 17% in Q4'06.

**Figure 2: Worldwide LCD TV Revenues and Revenue Share of the Global TV Market**



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

**Figure 3: Q1'05 – Q4'06 40"-44" Unit Share by Technology**



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

# An analysis of the current mainstream LCD TV retail pricing

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 1800 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 decision. <http://www.witsview.com>

According to WitsView's survey, the average LCD TV retail price continued to drop in Q1'07. A decline ranging from 7.0%~17.7% was seen among the 32-, 37-, 40-, 42- and 46-inch sizes. For the first time, the 32-inch model slipped below the US\$1,000 level. This marks a significant change, as they were US\$2,475 just two years ago.

Among the 32- to 46-inch LCD TV category, the decline in the 32-inch in the past two years has surprisingly not been the steepest (59.9%). The 37-, 40-, 42- and 46-inch models each respectively saw a 67.5%, 64.7%, 73.7% and a 65.5% drop.

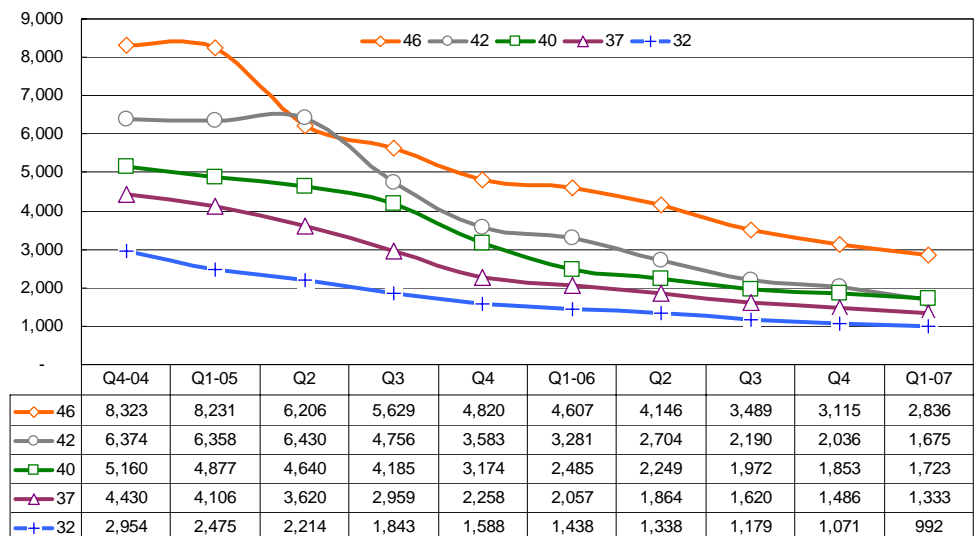
The 32-inch is still at the moment the most popular LCD TV size. Although its average cost remains at the US\$992 level; models that are priced merely at US\$499 have begun to appear in the market beginning from the end of 2006. Not only are Tier 2 manufacturers rolling out such products, Tier 1 players, who have distinguished themselves as manufacturers of high-end models, have also entered this particular market segment. For example, consumers can find a Samsung brand TV for only US\$848 at Wal-Mart.

Although the 32-inch is the most common living room TV size, they may slowly start to migrate to the bedroom, as panel makers continue to produce even larger TV panels targeted for the home living room. If the living room TV shifts to the 40- to 50-inch category, consumers are highly unlikely to pick a small-sized 20-inch TV for their bedroom. At the CES 2007 exhibition, numerous LCD TVs were seen in being equipped with a built-in DVD playing function, such as the Toshiba REGZA LCD DVD series, which comes in the 26- and 32-inch sizes. Through the delivery of more diverse contents, manufacturers strongly hope this will serve as a big incentive in enticing consumers to purchase even larger-sized LCD TVs.

The 37-inch LCD TV currently stands at US\$1,333, down 67.5%, in contrast to Q1'05. The decline is second only to that of the 42-inch, but still higher than the 32/40-inch, which poses a threat to the 37-inch model sandwiched in between. As the 37-inch is not the most economical size cut for the Gen 7 line of Samsung and S-LCD, Sony and Samsung have literally no products in this particular size group. Without the support of the world's two biggest brands, it has significantly inhibited the growth of the 37-inch LCD TV.

However, in light of the existing size difference between the 32- and 40-inch category, Samsung has responded by purchasing panels made by Taiwan in launching 37-inch TV products in selected markets. Sony is also considering whether or not to launch such products in the Japanese market. However, after already concentrating on the 40-inch class, devoting more resources now in the 37-inch class may be a bit too late, as the market focus in 2007 will be on the 40-inch and above category.

Worldwide LCD TV Average Street Price Q1'05-Q1'07



The average price for the 40-inch LCD TV is now roughly US\$1,723, a Q/Q decline of 7%. By comparison, the 42-inch has slipped 17.7% from the US\$2,036 level in Q4'06. This is the first time the 42-inch price is lower than its 40-inch counterpart.

The 40- and 42-inch models basically belong to the same market segment. Underpinned by the aggressive marketing campaign by Sony and Samsung, the demand in the 40-inch class surpassed that of the 42-inch class in 2006. The main reason was attributed to the fact that such products were considered high-end a year ago. Thus, consumers were more attracted to the brand name than choosing between the 40-inch and 42-inch models. However, the trend now appears to be changing.

With the 40- and 42-inch LCD TV prices now evidently lower, Tier 2 TV products are becoming more acceptable to consumers. Taking into account the panel source, many of the Tier 2 manufacturers focus on the production of 42-inch TVs (42-inch panels are produced by LPL, AUO and CMO. By contrast, 40-inch panels are mainly manufactured by Samsung and S-LCD, where Sony and Samsung are given priority in the supply) Manufacturers that simultaneously roll out both sizes have begun to scale back on their operations. For instance, Olevia and Polaroid are both placing more emphasis on the 42-inch product.

As for Tier 1 manufacturers, Sharp stopped producing 45-inch LCD TVs beginning from Q3'06, and redirected their attention on the 42- and 46-inch category in diversifying their panel sources. (Sharp hopes to reach a 10 million LCD TV sales target for 2007. Thus, it will need to acquire panels from outside sources. However, the 45-inch is produced only by Sharp. By switching to the production of 42- and 46-inch LCD TVs, Taiwan will help fill the 42-inch panel insufficiency, while its own Gen 8 line will be responsible for the 46-inch class). JVC, on the other hand, are introducing new 42- and 47-inch models, instead of the previous 40- and 46-inch TVs. These developments are helping to push the 42-inch shipments past its 40-inch counterpart.

The 46-inch LCD TV is currently priced approximately at US\$2,836, a Q/Q decline of 9%. Although the 46-inch is an economical size cut in the Gen 7 line (The mother glass from the Gen 7 line can make 8 cuts for the 40-inch class, or 6 cuts for the 46-inch class), demand is not too strong. Like the 40- to 42-inch models a year earlier, the 46-inch LCD TV is still considered a high-end product, where a US\$1,000 price gap exists with the 40- to 42-inch models. Coupled by competition from the 50-inch PDP TV, more demand should begin to appear when the 46-inch price drops further. The 4-inch gap with the 46-inch LCD TV allows the 50-inch PDP TV, which is priced at US\$2,890, to be more attractive, as they are priced roughly the same.

Due to its higher price, only the Tier 1 makers -- Samsung, Sony and Sharp and so forth, are offering 46-inch LCD TVs on the global markets. Among these various markets, a larger assortment of brands can be seen in China. Changhong, Xococo and TCL are just a few that have also introduced 46-inch products. As for the other market segments, the market share is mostly divided among the Tier 1 makers.

**Conclusion:** After the Christmas season brought forth steep price drops in retail stores during Q4'06, LCD TV prices continued to slide in Q1'07. This is due to the fact that the Jan/Feb period is still a hot selling season in some countries, such as the Chinese New Year holidays in mainland China and Taiwan. Although not as significant as the Christmas holiday season, sales promotions are also seen during the US Super Bowl event. All in all, in terms of the mainstream living room LCD TV size, Tier 2 makers have already respectively lowered the 32- and 37-inch below the US\$500 and US\$1,000 mark. It is worthy to see whether or not Tier 1 makers will also begin to substantially cut the price of their US\$1,300 high-end 32-inch products. For the 40- to 42-inch category, with the average price of the 42-inch below the 40-inch, it will further boost the shipment growth in the 42-inch category. The high price tag of the 46-inch LCD TV should be further driven down by the mass production of Sharp's Gen 8 line. However, more concrete demand will be witnessed when S-LCD's Gen 8 line also becomes operational.



## Interview with Sam Miller from Syntax-Brilliant

Sam Miller is Chief Product Officer of Syntax-Brilliant Corporation. He is responsible for defining and executing the company's global product strategy and development including engineering requirements, product definition and IDs, components procurement, product planning and market requirements. With a consumer-centric focus, Mr. Miller has created an infrastructure for developing high performance, yet cost-effective Olevia LCD TVs that provide top quality features and front of screen viewing experience. He also heads Syntax-Brilliant's state-of-the-art video development lab for Olevia LCD HDTVs. Mr. Miller joined Syntax-Brilliant from ViewSonic, where during his 10-year career there, he transitioned the company's CRT monitor business to LCDs, and later directed its technical marketing and engineering programs for plasma and LCD TVs. He holds a Bachelor of Science degree in Electrical Engineering from the University of Cincinnati, and a Masters in Applied Physics from the Case Institute of Technology.



**Give us some background about Syntax-Brilliant (Olevia) and your road to the LCD TV market.** Syntax-Brilliant Corporation (<http://www.syntaxbrilliant.com>) is a leading designer, developer, and distributor of LCD HDTVs, digital cameras, and microdisplay entertainment products. The company's lead products include its Olevia brand (<http://www.Olevia.com>) high definition widescreen LCD televisions — one of the fastest growing global TV brands — and Vivitar brand (<http://www.vivitar.com>) digital still and video cameras. Syntax-Brilliant has built an Asian supply chain coupled with an international manufacturing and distribution network to support worldwide retail sales channels and position the company as a market leader in consumer digital entertainment products.

**Syntax-Brilliant/Olevia is one of the fastest growing LCD TV companies in the world. To what do attribute your fast growth, especially against the major brands who command such strong brand-name recognition?** We believe our focus on “best in class image quality” has been readily understood by consumers, press and the channel as an excellent value proposition, and our “brand awareness” campaigns have helped accelerate that knowledge and acceptance.

**Who are your primary LCD suppliers?** We buy panels from various high quality suppliers, depending on our needs and their abilities to help us provide the best in class image quality and affordable prices which our customers have come to expect and depend upon. That said, we believe in long term win-win relationships with our suppliers, including CMO, LG.Philips LCD and Sharp. These mutually beneficial relationships have supported our volume ramps over time, and helped us create great “best in class” image quality products.

**Considering that some Tier 1 players in the LCD TV industry have invested into LCD manufacturing facilities, are there any thoughts about Syntax-Brilliant investing in LCD production capacity?** We believe in focusing our assets in the technology that adds the most value to our end consumers. We also believe the panel suppliers already do an excellent job in a very capital intensive segment of our industry, and that we are better served by utilizing their expertise and not replicating it!

**The major brand players all insist that huge investments made over many years or decades are required to establish a major consumer electronics brand presence. Given your experience with the Olevia brand, is this a fair claim?** It is certainly true that you must invest in your brand, in terms of quality, product development, service and support, and marketing communications programs to spur awareness of “best in class image quality” and great value across the globe. That said, we believe that some other companies may over or under invest in these efforts and not always deliver on their goals. It is a question of a constant balance, and ROI, consistency and longevity to do things right. We will be looking closely at what is best for us each quarter, and will have multiple paths and strategies to build our brand and Olevia brand awareness.

**In as much as the Brilliant side of Syntax-Brilliant has been focused on LCoS technologies for some time, when you consider the ever-increasing size of LCDs, do you foresee a time when LCDs will displace rear projection TVs?** LCD TVs have clearly become the flat TV of choice for almost all size categories, especially 47-

inch and below, and we see that trend continuing to grow, thus LCD TVs are becoming the major TV type overall. It is also interesting to see how 47-inch and 52-inch LCD TVs have created a “sandwich” surrounding 50-inch plasma TVs. RPTV penetration has completely shrunk, although above 80-inch they may remain quite affordable. Considering that LCD growth and average size are very impressive, we have decided to refocus our efforts as a company on LCD TVs. We know that we have great technology in the LCOS space, but have chosen to divest ourselves of that to other partners so that we can focus on our strengths and core market of LCD TVs.

**What are your thoughts about panel size standardization in the LCD TV industry?** Clearly the average size has grown for TVs from 20-inches into the high 30-inch range. As 37-inch and 42-inch become ever more popular, some sizes like 32-inch and 37-inch have been accepted as standards while others like 40-inch and 42-inch seem to want to co-exist, or “fight it out” depending on your point of view. For instance, when the price of a 42-inch TV comes down, it puts pressure on the 40-inch. We believe that choice is good for consumers but actual standards help lower costs for everyone, which is also good. We shall see what happens at the larger sizes, where the 52-inch and 65-inch may become the new “standard” sizes following the 32-inch and 37-inch trends.

**Will a 1080 Full HD (FHD) or a 720 High Definition (HD) panel dominate the LCD TV space?** We believe there is a role for many types of native panel resolutions. Most importantly is to ensure that the TV’s electronics supports scaling from the various source formats to the native panel format. Any HD or FHD panels will provide a great looking display. The broadcast standards of 720p or 1080i will look great on all LCD TVs 23-inches and larger which have HD or FHD. At 47-inches and above, all seem to be FHD or 1920x1080. Today, only at the 37- and 42-inch range do we see both HD and FHD co-existing (1366x768 and 1920x1080 respectively). For smaller sizes, HD is sufficient today. Even the small size TVs must support all input sources: broadcasting at 720p or 1080i; or HD-DVD and BluRay -- so 1080p will certainly be handled by better electronics from the better vendors, like our Olevia LCD TVs.

**For a 40-inch LCD-TV, and with all other factors being equal, approximately what are the cost differences between a display at 1080p vs. one at 1080i vs. one at 720p?** As I noted before, in most sizes you will not have or need both formats, but in the 40/42-inch class, both do exist for now. There is a slight premium in cost and thus price for the 1920x1080 panels but that slight 10-15% panel price premium can be reflected in much higher end TVs with better audio and video and higher prices to balance the difference. Over time any price delta will be minimized and in fact they will tend to not co-exist at the same size.

**Is 1080p the end-game in the TV market, or do you envision even higher resolutions becoming available in the not so distant future?** Well, yes and no. Clearly for broadcast and cable and satellite TV, 1080i and 720p will be the standard for a while, and for source material via optical drives, 1080p will be standard. For public signage and other new and bigger display niche markets, people have already spoken about higher resolutions like Quad FHD (3840x2160) or 3D screens which need more pixels than a 2D. You never know what is possible.



*The Olevia 2 Series HDTV, model 242T, is a 42-inch LCD at a native pixel format of 1366x768, links via HDMI or VGA ports.*

**Do you think the uncertainty caused by the current battle between the competing Blu-ray and HD-DVD formats has negatively impacted sales of HDTVs? What strategies is Syntax-Brilliant/Olevia employing to cope with the format stand-off?** Yes, uncertainty hurts the industry, but not really for LCD TVs. Any time you have more than one standard, you really have no standard, and this hurts end user adoption which also hurts the whole industry. Unless you get quick adoption you risk never having a positive ROI, and thus the whole optical disk industry is at risk due to lack of one standard. But flat TVs and LCD TVs still have great appeal either way because they are compatible with both Blu-ray and HD-DVD.

**Tell us about the TV assembly facility you've put together in southern California. Is this primarily just a distribution hub or you doing a significant level of integration at the facility?** Well in fact we do many things in southern CA as part of our global OEM strategy. We have design resources globally, and various regional assembly resources, often with partners in the supply chain. Our Ontario, CA production facility is a full assembly operation with many of the TV components sourced locally.

**"Green electronics" is certainly gaining traction in consumer electronics. What sort of things is Syntax-Brilliant (Olevia) doing to assure environmentally-friendly products and lifetime product management?** We first and foremost are focused on providing products that are high quality and that last, and thus have real value for end consumers. That said, we must always improve, and that means working with high quality suppliers that focus on good "Green" guidelines. Our Olevia LCD TVs employ energy-efficient designs and are RoHS and Energy Star-compliant. We also participate in an increasing number of recycling programs in States where these programs are available. For instance, we recently measured a very famous competitor's LCD TV and found that it uses over 5 watts of power in "stand by mode" compared to most of our TVs which are below 1 watt. Olevia LCD TVs save lots of energy for our customers – this is both better for their energy bills but also for the global energy "footprint". We will continue to lead the way in various "Green" areas. We are also looking at things like packaging efficiencies to save in shipping and recycling costs as well which also helps lower the global energy footprint of our logistics and products.

**What sorts of things is Syntax-Brilliant/Olevia, doing to help reduce power consumption of your LCD TVs?** As mentioned before, we are focused on reducing energy consumed in the various modes of usage, with up to 5x lower stand-by power consumption when compared to some famous Asian competitor brands. We are also looking at ways to lower the power used. For example the "GreenTV" architecture being promoted by the LCD TV Association would enable us to add a very inexpensive ambient light sensor and save over 30% of energy used when the TV is in a dark room. Brightness can automatically be lowered without any reduction in perceived image quality, and it can actually lower eye strain as well. We also plan to participate in the new Energy Star guidelines that are currently in development.

**You recently extended your marketing with ESPN. Tell us more about how this relationship has helped you.** We clearly have led the way of brand awareness in creating a new flat TV brand, Olevia, via our partnership branding campaigns with ESPN HD. These programs have given us good exposure to the "early-adopter" sports fans who have lead the way in purchasing some of the first and perhaps largest flat HDTVs. This has been a true win/win relationship, where even the end user has learned about best-in-class image quality!



*Syntax-Brilliant recently introduced new 1080p HDTVs. Pictured on the left is the Olevia 252TFHD, a 52-inch model priced at a suggested \$2499; and on the right is a 65-inch model, the Olevia 265TFHD, with an MRSP of \$7,999. Both use a Silicon Optix Realta Hollywood Quality Video (HQV) video processor and lets users view full HD unencrypted digital cable from a standard cable service. The new models offer standard inputs, including two HDMI and two component hook ups, as well as enable 1920x1080 computer monitor or presentation display support.*

**Most market analysts have under-forecasted the long-term growth of the LCD TV market, (particularly with regard to larger panel sizes). What's your view of the size of the market in 2008?** Most people forget how much the market has grown already and how much more it can still grow – especially as HD broadcasting continues to roll out globally over the next several years. In addition, we believe the coming growth in the “BRIC” (Brazil, Russia, India, China) markets will give many years of healthy year-over-year growth in the LCD TV markets. Some analysts such as DisplaySearch forecast over 100 million LCD TVs next year globally, growing to over 200-300 million perhaps by 2012 or so, and with more than half of these being 37-inch and larger by the end of 2008 or so.

**And what's your expectation about the Syntax-Brilliant's “Olevia” LCD TV market share in 2008?** We can't really comment about our individual Olevia and Vivitar brand market share growth other than to state that we have been happy with our customer acceptance and growth over the last few years as a new CE company. We will continue to grow by providing even better value and image quality to our customers and the market.

**In addition to large-area TVs, mobile television seems to be getting increasingly popular. Particularly, in consideration of your acquisition of Vivitar, are there any plans to add mobile DTV products to your lineup?** We do believe there are indeed many areas of synergy for displaying all sorts of digital images on a variety of display devices, from digital TVs to digital cameras and in between with things like digital photo-frames. We can't really comment about future products other than to state that we are confident our customers will be impressed by the ever increasing image quality and value we will provide across our product lines in many sizes. Stay tuned for upcoming announcements!

**Technology-wise, what is the area that needs the most attention to further improve the viewing experience, and what is Syntax-Brilliant/Olevia doing in this area?** LCD TVs have gotten better in almost all aspects – from viewing angle, to brightness, thinness, weight, power, and of course higher resolutions (HD and FHD) and the related improvements in electronics. In almost every respect, the image quality of LCD TVs is getting better and has really passed the “good enough for most folks not to notice anymore” threshold in all aspects except perhaps for motion issues where much work is being done. From motion blur reduction, to motion estimation and motion compensation and film de-judder, there are many improvements in progress. The TVs and even the panels are moving to faster response times (below 8ms) and faster refresh rates like the new 120Hz panels from LPL and others. Tuning it all together into even better performing TVs gives us much work to do over time. We will work with companies like AMD, Micronas and others to do that even more-so in the future. Additionally, as LED backlights become more cost effective and thus more commonplace, we think that the ability to “strobe” the backlight on and off will end all discussions of any weakness of LCDs with respect to “response time” or speed questions, (as well as add more color gamut and dark contrast ability). However, the cost will gate their adoption, which should grow in earnest in 2009 and beyond.



*The Olevia 242TFHC is a 42.0-inch LCD TV at 1920x1080 pixels and features 2 HDMI ports, a 1600:1 contrast ratio, a 6.5ms response time, and 4 stereo speakers.*

**Please tell us a little about the most exciting area that Syntax-Brilliant/Olevia is working on for the next generation of LCD TVs.** Well, if I told you now, I'd have to kill you! But come by our booth at CES 2008 and see what great new things we have in store! We will also be growing the countries we sell in globally, and how we sell globally via our Olevia and VIVITAR brands.

# Commentary: Who Needs 1080p?

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 consumer electronics markets, at <http://hdtvprofessor.com/HDTVAlmanac>.*

Even King Canute would recognize that it would be futile to try to stem the tide as LCD HDTVs move to 1080p resolution. But that doesn't mean that we shouldn't stop and consider the question of whether or not anybody actually needs that much resolution to watch a movie or a sport competition.

Some might say that consumers want the extra resolution so that they can see finer detail in the images on their television screens. That could be a compelling argument if it were not for the fact that numerous studies have shown that the half of people with HDTVs — or more — do not get a high definition signal. And a large portion of those people *think* that they are watching high definition. So the viewing experience alone does not explain why people are buying 1080p sets.

Even if consumers were getting a signal that showed them more detail, the television sets are too small for the distances from which they are viewed. At a distance of 15 feet from a 42" wide screen, the average person cannot see the difference between a wide format standard definition image (which some call "enhanced definition") and a 720p image, let alone the difference between 720p and 1080p. At this point, few Americans are buying sets big enough for their rooms.

**So what explains the move to 1080p?** There's a marketing aphorism that "good enough beats better". If that alone was the case, then 720p would be pushing 1080p off the charts. The saying is made more accurate by adding "unless the prices are close." And that's what's happening with 1080p. Initially, there was a large premium charged for the extra resolution, but now many low-cost models boast 1080p. The fact is that if the price is not that different, the typical American buyer will get the product that has "more". It doesn't matter whether it's horsepower in a car engine, or square feet in a home, or dots on the screen, the American consumer will choose more if the cost increment is small.

And LCD HDTV manufacturers recognize this. It's not all that hard to make a given panel size with 1080p resolution instead of 720p. The extra pixels provide a marketing advantage over other technologies, especially plasma. It's difficult to increase the horizontal resolution of plasma panels — especially in smaller sizes — which is why many "720p" plasma panels are only 1,024 pixels wide instead of the standard 1,280 pixels. That count has to almost double in order to get the 1,920 pixels required by 1080p, which means making all those tiny physical structures half the size. On the other hand, the microdisplay makers already have tipped to the advantages of touting 1080p for their sets, and rear projection models with this resolution account for the lion's share of unit sales.













The fact is that 1080p can also offer some viewing quality advantages, beyond just the extra detail. The bulk of the broadcast and cable HD content is distributed in 1080i format. If processed correctly, this should show on a 1080p display in full detail with no scaling. "Shrinking" the image to fit a 720p display could result in visible scaling artifacts.









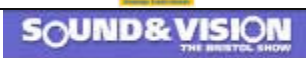
















So while there may not be a compelling argument that 1080p is noticeably better than 720p, the fact remains that consumers are going to prefer it. And LCD TV manufacturers are going to continue to move their product lines to 1080p because that's what consumers want to buy. In spite of what the Stones might have said, you may not always get what you need, but you can get what you want.



# 2007 Display Industry Calendar of Events


























A detailed calendar is maintained by Veritas et Visus: [http://www.veritasetvisus.com/industry\\_calendar\\_2007.htm](http://www.veritasetvisus.com/industry_calendar_2007.htm). Please notify [mark@veritasetvisus.com](mailto:mark@veritasetvisus.com) to have your future events included in the listing. The 2008 Calendar of events will be published in Volume 2 of "LCD TV Matters".












<i>January 2007</i>			
January 7-10	Game Power Showcase and Forum	Las Vegas, Nevada	
January 8-11	2007 International CES	Las Vegas, Nevada	
January 8-12	MacWorld Expo	San Francisco, California	
January 23-24	Japan Forum	Tokyo, Japan	
January 19	LEDs in Displays	Costa Mesa, California	
January 20-25	Photonics West 2007	San Jose, California	
January 23-25	ATEI 2007	London, England	
January 25-26	International Thin Film Transistors Conference	Rome, Italy	
January 29-31	Stereoscopic Displays and Applications	San Jose, California	
January 29 - February 1	Electronic Imaging 2007	San Jose, California	
January 30-31	Polymers in Electronics	Munich, Germany	
January 30 - February 1	Integrated Systems Europe 07	Amsterdam, Netherlands	
January 30 - February 2	International Conference on Display LEDs	Seoul, Korea	
January 31	Automated Testing for Organic Discrete LEDs	Cambridge, England	
January 31 - February 1	Screen Expo Europe	London, England	
January 31 - February 2	Semicon Korea	Seoul, Korea	
<i>February 2007</i>			
February 5-8	Flexible Microelectronics and Displays Conference	Phoenix, Arizona	
February 6-8	electronicIndia	New Delhi, India	
February 6-8	Video Forum Europe	London, England	
February 7-8	Media Summit	New York, New York	
February 13-14	Electronic Displays 2007	Nurnberg, Germany	


February 13-15	Air Traffic Control	Maastricht, Belgium	
February 14	iHollywood Europe	Barcelona, Spain	
February 14-15	Machine Vision & Displays Technology (formerly EID)	Birmingham, England	
February 17-22	Medical Imaging	San Diego, California	
February 12-14	Strategies in Light Conference	San Jose, California	
February 20	Metalization 2007 -- Update and Review	Bletchley Park, England	
February 20-23	Display Metrology Short Course	Boulder, Colorado	
February 22	Let there be Light	Uxbridge, England	
February 23-25	Sound & Vision 2007	Bristol, England	
February 25-28	Focus on Imaging	Birmingham, England	
February 26-28	CEA 2007 Winter Retreat	Vail, Colorado	
February 26 - March 2	2007 Technology & Standards Winter Forum	San Antonio, Texas	
February 28	Display Materials Outlook	New York, New York	
<b>March 2007</b>			
March 1	USDC Display Investment Conference	New York, New York	
March 5-7	Global Phosphor Summit	Seoul, Korea	
March 6-8	US FPD Conference	La Jolla, California	
March 6-8	Displays 2007	Paris, France	
March 6-10	EHX	Orlando, Florida	
March 7-9	DVB World 2007	Dublin, Ireland	
March 8	HD Expo	Los Angeles	
March 8-9	Digital Media Summit	Los Angeles, California	
March 10-14	Virtual Reality 2007	Charlotte, North Carolina	
March 12-15	Showest 2007	Las Vegas, Nevada	
March 12-16	Asia Display 2007	Shanghai, China	
March 13-15	FPD China	Shanghai, China	

March 15-16	Introduction to Print for Flexible Displays and Electronics	Cardiff, Wales	
March 15-21	CeBIT 2007	Hanover, Germany	
March 19-21	LED China 2007	Guangzhou, China	
March 19-23	Emissive Displays	Nottingham, England	
March 21-23	electronica & ProductronicaChina 2007	Shanghai, China	
March 22-23	Big Displays 2007	London, England	
March 26-28	LED Packaging 2007	Shanghai, China	
March 26-28	Printed Electronics Symposium	San Francisco, California	
March 26-28	Digital Signage 2007	Los Angeles, California	
March 29	Reading Displays in High Ambient Lighting Conditions - Development of a Usability Metric	Bletchley Park, England	
March 29-30	FlexiDis Training Workshop	Cambridge, England	
<b>April 2007</b>			
April 2-5	Active Matrix Displays	Dundee, Scotland	
April 9-13	Microdisplays	Edinburgh, Scotland	
April 11-13	FineTech Japan & Display 2007	Tokyo, Japan	
April 11-14	International Sign Expo	Las Vegas, Nevada	
April 11-14	Global FPD Partners	Nagasaki, Japan	
April 12	Practical Strategies for Implementing Solid State Lighting	Bletchley Park, England	
April 14-17	Hong Kong Electronics Fair Spring	Hong Kong, China	
April 14-19	NAB 2007	Las Vegas, Nevada	
April 14-19	Digital Cinema Summit	Las Vegas, Nevada	
April 15-18	Web3D 2007 Symposium	Umbria, Italy	
April 16-19	Photonics Europe	Prague, Czech Republic	
April 16-20	MIPTV	Cannes, France	
April 17-18	Printed Electronics Europe	Cambridge, England	
April 19	Liquid Crystal Material for Displays & Optical Devices	York, England	



























April 21-24	Taipei Int'l Digital Electronics Show	Taipei, Taiwan	
April 23-24	Industry Forum on Printed Electronics	Chicago, Illinois	
April 23-25	OLEDs Asia 2007	Taipei, Taiwan	
April 23-25	International Colloquium on Integrated Manufacture by Printing	Swansea, Wales	
April 24	Display Summit China	Beijing, China	
April 24-25	Ohio Nanotechnology Summit	Akron, Ohio	
April 25-27	Integrated Systems China 07	Beijing, China	
April 26	FID Europe	Budapest, Hungary	
April 27	Optical Film Technology Trend for BLU & Competitiveness Analysis	Seoul, Korea	
April 29 - May 1	Inter-Society Color Council Annual Meeting	Kansas City, Missouri	
<b>May 2007</b>			
May 1	Lighting Workshop -- Barriers to Solid State Lighting	Bletchley Park, England	
May 1-2	Organic Photovoltaics	Baltimore, Maryland	
May 1-3	Sign UK/Computer Trade Show	Birmingham, England	
May 1-3	Connections 2007: Digital Home Conference & Show	Santa Clara, California	
May 1-3	CeBIT Australia	Sydney, Australia	
May 7-9	3DTV Conference	Kos Island, Greece	
May 7-9	Smart Fabrics 2007	Washington, DC	
May 7-10	International Symposium on Electronics and the Environment	Orlando, Florida	
May 8-10	SEMICON Singapore	Singapore	
May 8-10	Lightfair	New York, New York	
May 9	Digital Book 2007	New York, New York	
May 10-11	2007 Taiwan FPD International Conference	Taipei, Taiwan	
May 10-11	RTT 3D Realtime Visualization Conference	Berlin, Germany	
May 11-13	Home Entertainment Show	New York, New York	
May 16	Accommodating Disabilities for Displays and Lighting	Bletchley Park, England	



























May 16-18	e <sup>3</sup> Expo 2007	Los Angeles, California	
May 17-18	Organic and Nano Electronics Workshop	Montreal, Quebec	
May 20-24	Nanotech 2007	Santa Clara, California	
May 20-25	SID International Symposium	Long Beach, California	
May 22-25	Orbit-iEX	Zurich, Switzerland	
May 23-25	EuroVis 2007	Norrköping, Sweden	
May 28 - Jun 1	Symposium on Virtual and Augmented Reality	Petropolis, Brazil	
May 29 - Jun 1	FPD Expo/LED Expo	Seoul, Korea	
<b>June 2007</b>			
June 4-7	International Conference on Organic Electronics	Eindhoven, Netherlands	
June 4-7	Photonics North 2007	Ottawa, Ontario	
June 5-6	Printed RFID	Frankfurt, Germany	
June 5-7	EuroLED 2007	Birmingham, England	
June 5-7	Dimension 3 Expo	Paris, France	
June 5-9	International Symposium on Digital Earth	San Francisco, California	
June 5-9	Computex 2007	Taipei, Taiwan	
June 6	Laser Patterning Processes for Advanced Displays, Flexible Electronics, Energy & Lighting Applications	Oxford, England	
June 7	High Def Expo	Chicago, Illinois	
June 7-8	2007 China HDTV Conference	Shenzhen, China	
June 7-10	SIIM 2007	Providence, Rhode Island	
June 11-14	Digital Hollywood Spring	Santa Monica, California	
June 12	Inkjet Printing of Conductive Materials	Cambridge, England	
June 13-15	Display Taiwan Business & Technology Forum	Taipei, Taiwan	
June 13-16	Photonics Festival: FPD Taiwan, OPTO Taiwan, SOLAR, LED Lighting	Taipei, Taiwan	
June 14-15	TV Supply Chain Conference	San Diego, California	




















June 15-21	InfoComm '07	Anaheim, California	
June 17-18	Projection Summit	Anaheim, California	
June 17-19	Trends in Optoelectronics	Munich, Germany	
June 18-20	Digital Holography and Three-Dimensional Imaging	Vancouver, British Columbia	
June 19-21	Flexible Displays & Electronics	Oakland, California	
June 19-21	Broadcast Live	London, England	
June 20-22	Electronic Materials Conference	Notre Dame, Indiana	
June 20-23	Consumer Electronics CEO Summit	Santa Barbara, California	
June 21-23	Mac Live Expo	Cologne, Germany	
June 25-26	HD Masters	London, England	
June 25-28	CEDIA Expo UK	London, England	
June 25-28	Cinema Expo	Rotterdam, Holland	
June 26-28	Korea Display Conference 2007	Seoul, Korea	
June 27-29	Industrial Virtual Reality Expo & Conference	Tokyo, Japan	
<b>July 2007</b>			
July 2-6	Economics of Choice and Emerging Technologies	Nottingham, England	
July 2-6	European Conference on Liquid Crystals	Lisbon, Portugal	
July 4-6	Information Visualization	Zurich, Switzerland	
July 4-6	FPD Expo/IDMC	Taipei, Taiwan	
July 6-9	SINOCES	Qingdao, China	
July 10-17	National Stereoscopic Association 2007 Convention	Boise, Idaho	
July 11	Display Measurement & Assessment	Teddington, England	
July 11-13	InterOpto '07	Tokyo, Japan	
July 11-13	International Workshop on Active Matrix FPD & Devices	Hyogo, Japan	
July 13-16	Imaging Expo China/Interphoto Shanghai	Shanghai, China	
July 15-18	Immersive Projection Technology Workshop	Weimar, Germany	

July 16-20	Semicon West 2007	San Francisco, California	
July 17-20	SMPTE Australia Conference	Sydney, Australia	
July 18-20	International Conference on Organic Materials Technology	Tokyo, Japan	
July 19-20	US FPD Conference '07	San Jose, California	
July 20-22	Sign Today	Bangalore, India	
July 20-22	Digital Video Expo East	New York, New York	
July 23-24	DisplaySearch Japan Forum	Tokyo, Japan	
July 24	Displays Lighting on the Move	Formula 1, England	
July 26-29	Taitronics Bangkok 2007	Bangkok, Thailand	
<b>August 2007</b>			
August 2-3	ASID '07	Singapore	
August 5-9	SIGGRAPH 2007	San Diego, California	
August 8-10	International LED Exposition	Beijing, China	
August 8-10	Flat Panel Display Technology and Equipment Exposition	Beijing, China	
August 19-21	Australasian Gaming Expo	Sydney, Australia	
August 21-23	3D Digital Imaging and Modeling	Montreal, Quebec	
August 26-30	Optics & Photonics	San Diego, California	
August 27	2007 IMID Business Forum	Daegu, Korea	
August 27-31	IMID 2007	Daegu, Korea	<b>IMID EXHIBITION 2007</b>
August 28-31	Display Metrology Short Course	Boulder, Colorado	
August 31 - September 5	IFA 2007	Berlin, Germany	
<b>September 2007</b>			
September 3-7	Eurographics	Prague, Czech Republic	
September 3-8	Ferroelectric Liquid Crystals	Sapporo, Japan	
September 4-6	2007 FPD Education Forum	Seoul, Korea	
September 5-9	CEDIA Expo 2007	Denver, Colorado	

September 6-7	Flexible and Stretchable Electronics Workshop	Leuven, Belgium	
September 6-7	2007 China International FPD Conference	Shanghai, China	
September 6-11	IBC 2007	Amsterdam, Netherlands	
September 8-12	GITEX 2007	Dubai, UAE	
September 9-12	PLASA '07	London, England	
September 10-11	Europe Workshop on Manufacturing LEDs for Lighting and Displays	Berlin, Germany	
September 10-11	Printed Electronics Asia	Tokyo, Japan	
September 11	Workshop on Dynamic 3D Imaging	Heidelberg, Germany	
September 12-14	Semicon Taiwan, 2007	Taipei, Taiwan	
September 13	Printing Manufacturing for Reel-to-Reel Processes	Kettering, England	
September 14-16	Taitronics India 2007	Chennai, India	
September 16-20	Organic Materials and Devices for Displays and Energy Conversion	San Francisco, California	
September 17-20	EuroDisplay	Moscow, Russia	
September 18-19	3D Workshop	San Francisco, California	
September 18-19	Global Biometrics Summit	Brussels, Belgium	
September 18-19	RFID Europe	Cambridge, England	
September 21	FPD Components & Materials Seminar	Tokyo, Japan	
September 24-26	Organic Electronics Conference	Frankfurt, Germany	
<b>October 2007</b>			
October 1-4	European Conference on Organic Electronics & Related Phenomena	Varenna, Italy	
October 1-5	International Topical Meeting on Optics of Liquid Crystals	Puebla, Mexico	
October 2-3	3D Insiders' Summit	Boulder, Colorado	
October 2-3	Mobile Displays 2007	San Diego, California	
October 2-6	CEATAC Japan 2007	Tokyo, Japan	
October 2-7	CeBIT Bilisim EurAsia	Istanbul, Turkey	

October 3-4	Displays Technology South	Reading, England	
October 7-10	AIMCAL Fall Technical Conference	Scottsdale, Arizona	
October 8-9	Printed RFID US	Chicago, Illinois	
October 9-11	SEMICON Europa 2007	Stuttgart, Germany	
October 9-13	Taipei Int'l Electronics Autumn Show	Taipei, Taiwan	
October 9-13	Korea Electronics Show	Seoul, Korea	
October 10	Novel Light Sources	Bletchley Park, England	
October 10-11	International Symposium on Environmental Standards for Electronic Products	Ottawa, Ontario	
October 10-11	HDTV Conference 2007	Los Angeles, California	
October 10-12	IEEE Tabletop Workshop	Newport, Rhode Island	
October 10-13	CeBIT Asia	Shanghai, China	
October 11-12	Vehicles and Photons 2007	Dearborn, Michigan	
October 13-16	Hong Kong Electronics Fair Autumn	Hong Kong, China	
October 13-16	ElectronicAsia 2007	Hong Kong, China	
October 15-18	Showeast	Orlando, Florida	
October 15-19	CEA Technology & Standards Forum	San Diego, California	
October 16	Enabling Technologies with Atomic Layer Deposition	Daresbury, England	
October 17-18	Photonex 2007	Stoneleigh Park, England	
October 17-19	Printable Electronics & Displays Conference & Exhibition	San Francisco, California	
October 17-20	SMAU 2007	Milan, Italy	
October 18	Displaybank FPD Conference Taiwan	Taipei, Taiwan	
October 22-25	CTIA Wireless IT & Entertainment	San Francisco, California	
October 23	Stereoscopic Production	Brooklyn, New York	
October 23-25	SATIS 2007	Paris, France	
October 23-25	Display Applications Conference	San Francisco, California	
October 24-26	Workshop Facilities Conference & Expo	Atlanta, Georgia	

October 24-26	LEDs 2007	San Diego, California	
October 24-26	FPD International	Yokohama, Japan	
October 24-27	SMPTE Technical Conference & Exhibition	Brooklyn, New York	
October 25-27	Mac Live Expo	London, England	
October 29-30	Plastic Electronics	Frankfurt, Germany	
October 29 - November 1	Digital Hollywood Fall	Los Angeles, California	
<b>November 2007</b>			
November 1-2	Digital Living Room	San Francisco, California	
November 5-7	OLEDs World Summit	La Jolla, California	
November 5-6	Challenges in Organic Electronics	Manchester, England	
November 5-9	Color Imaging Conference 2007	Albuquerque, New Mexico	
November 6-8	Crystal Valley Conference	Cheonan, Korea	
November 6-9	EHX Fall 2007	Long Beach, California	
November 6-11	SIMO 2007	Madrid, Spain	
November 7-8	High Def Expo	Burbank, California	
November 7-8	KioskCom Europe	London, England	
November 8	Taiwan TV Supply Chain Conference	Taipei, Taiwan	
November 8-10	Viscom	Milan, Italy	
November 8-11	Color Expo 2007	Seoul, Korea	
November 9	2007 FPD Market Analysis & 2008 Market Outlook	Seoul, Korea	
November 11-15	Photonics Asia 2007	Beijing, China	
November 12-14	LatinDisplay 2007	Campinas-SP, Brazil	
November 12-15	Printed Electronics USA	San Francisco, California	
November 13-15	Global Gaming Expo	Las Vegas, Nevada	
November 14-15	Nano 2007	Boston, Massachusetts	
November 14-15	DisplayForum	Prague, Czech Republic	
November 14-16	Quantum Dot Optoelectronic Symposium	Limassol, Cyprus	

November 15-16	Future of Television	New York, New York	
November 19-20	International Conference on Enactive Interfaces	Grenoble, France	
November 25-30	RSNA 2007	Chicago, Illinois	
November 27	Symposium on Emerging and Industrial DLP Applications	Wetzlar, Germany	
November 27-29	Stereo-3D	Munich, Germany	
November 27-30	Display Metrology Short Course	Boulder, Colorado	
November 29	Displaybank Japan Conference	Tokyo, Japan	
<b>December 2007</b>			
December 3-4	Quantum Dots	Ft. Lauderdale, Florida	
December 4-5	FID 2007	Las Vegas, Nevada	
December 4-6	Connections Europe: Strategies for Digital Living	Berlin, Germany	
December 4-6	Digital Video Expo West	Los Angeles, California	
December 4-6	CineAsia	Macau, China	
December 5	Displays for Harsh Lighting Environments	Newmarket, England	
December 5	Displaybank Shanghai Conference	Shanghai, China	
December 5-6	Thin Semiconductor Devices	Munich, Germany	
December 5-6	Smart Fabrics	Prague, Czech Republic	
December 5-6	Active RFID & RTLS	Dallas, Texas	
December 5-7	SEMICON Japan	Tokyo, Japan	
December 5-7	International Display Workshops	Sapporo, Japan	
December 11-12	Hollywood Goes Green	Los Angeles, California	
December 12-13	Displays	Munich, Germany	
December 12-14	International Workshop on 3D Geo-Information	Delft, Netherlands	
December 17-18	International Symposium for Flexible Electronics and Display	Hsinchu, Taiwan	



“A Great TV in Every Room”



**LCDTV**  
Association

Inform ◦ Promote ◦ Improve ◦ Connect

For more information on the LCD TV Association, membership, or to join, please visit us on the web at [www.LCDTVAssociation.org](http://www.LCDTVAssociation.org) or email [membership@LCDTVAssociation.org](mailto:membership@LCDTVAssociation.org)

---

Sustaining Members



16055 SW Walker Road, Suite #264, Beaverton, OR 97006 U.S.A. Phone +.215.206.6506 [membership@lcdtvassociation.org](mailto:membership@lcdtvassociation.org)  
© 2007 LCT TV Association, All Rights Reserved Worldwide