

Digital to Analog Converters: Preparing for the Future of Television

On February 19, 2009, United States analog television transmission is scheduled to come to a long-anticipated end. While analog transmissions may end, millions of consumer analog television receivers will still be in homes.

When broadcasters cease analog transmission, the approximately 45 million television sets¹ which rely exclusively on local, over-the-air stations will need to receive digital signals in order to continue to receive programming. Although consumers are rapidly buying new digital televisions with integrated ATSC receiving capability, it is essential that consumers have the ability to adapt their existing analog televisions for DTV. Because of the number of these existing analog-only sets, what else will be required? Digital-to analog converter boxes, and lots of 'em.

Digital-to-analog converter boxes will make DTV signals viewable on analog TV sets. These converter boxes are expected to be available in retail stores during the transition. Digital-to-analog converters, sometimes referred to as "set-top boxes", are devices that receive and decode digital television (DTV) broadcasts, so that such broadcasts can be displayed on analog televisions. In the most straightforward configuration, a consumer can simply connect an RF antenna cable to the input of the set-top box and an output RF cable into the analog television set. The set-top box then receives the digital signal being broadcast and converts it to analog so that it is usable with older televisions.



While digital-to-analog converters will not provide viewers with high definition quality images, they will provide down converted versions of HDTV programs so the viewer can still enjoy over-the-air programming. In addition, viewers will have access to new programming services brought about by multicasting. Consumers will also enjoy the high quality images and sound brought about by digital broadcasting which eliminates the noise and ghosting artifacts typical of analog transmission.

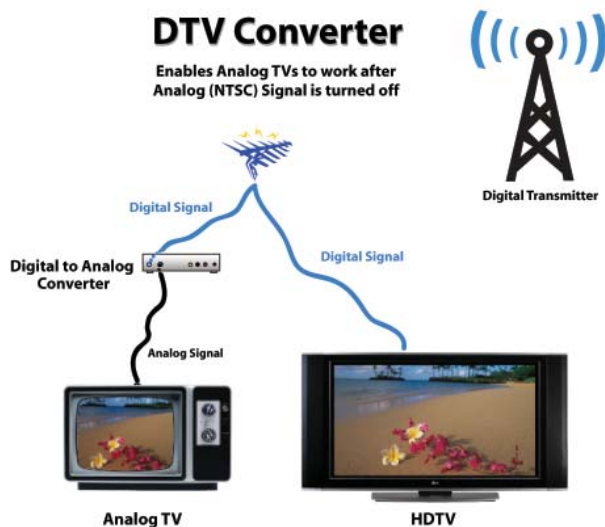
The National Association of Broadcasters (NAB) and the Association of Maximum Service Television (MSTV) have been particularly concerned with proving the high quality, low cost digital-to-analog converter boxes – ensuring high performance without sacrificing cost-effectiveness. To respond to the need for practical digital converters, and to avoid viewer disenfranchisement as a result of the analog cessation, in June 2005 MSTV and NAB sought proposals from electronics manufacturers to develop a prototype set-top box that would be easy to use and low cost while achieving high quality. NAB and MSTV awarded contracts to LG Electronics/Zenith and Thomson/RCA. These companies completed digital converter boxes underwent laboratory and real-world testing during 2006.

On February 8, 2006, the DTV Television Transition and Public Safety Act of 2005 (part of the Deficit Reduction Act) was signed into

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law by the President of the United States. This act sets the hard deadline for cessation of analog broadcasts for February 17, 2009. The act also authorizes the National Telecommunications and Information Administration (NTIA) to administer a program for households to obtain coupons that can be applied towards the purchase of digital-to-analog converter boxes.



On September 25, 2006, MSTV, NAB, and the Consumer Electronics Association (CEA) submitted comments to the NTIA in support of a government-sponsored coupon program to assist citizens in the purchase of digital to analog boxes. MSTV, NAB and CEA believe that implementation of NTIA's converter box program should be guided by the following five principles: continued consumer access to broadcast television; availability of high-quality, easy-to-use, low-cost digital converter boxes; simplicity and clarity; fairness and prevention of waste and abuse; and industry cooperation to serve the consumer. The three organizations submitted technical specifications based upon ATSC's A/74 Recommended Practice on Receiver Performance Guidelines.

"The core principles presented by manufacturers and broadcasters provide the framework for government as we enter the final stretch of the analog-to-digital transition," said CEA President and CEO Gary Shapiro. MSTV President David Donovan stated: "Our goal was

PHIL LIVINGSTON REMEMBERED

An ATSC friend and colleague, Phil Livingston, passed away November 8, 2006. Phil served on the ATSC Executive Committee and Board of Directors, which he chaired for three years.



Phil began his four-decade broadcast engineering career in local radio, and moved to television with the construction of WOKR-TV in Rochester, N.Y. He worked in Instructional Television for the Rochester City School District and also served for ten years at the State University of New York College at New Paltz as Associate Director for Instructional Resources. Phil was with Panasonic Broadcast for more than 25 years. He joined the system engineering and integration company Azcar, but in 2001 re-joined Panasonic. He chaired the SMPTE Committee on Television Production Technology (P-18) for 2 years, represented Panasonic on the Board of WHD-TV, the Digital Model Station, and served as the Panasonic representative and board member of the Advanced Television Technology Center (ATTC).

In addition to his technical contributions to our industry, we remember Phil for his kind and gentle approach to dealing with even the most difficult matters. He will be missed. ■

to assure that all Americans would continue to enjoy the full benefits of over-the-air television. The steps outlined in this joint filing will help ensure that the transition can move forward without disenfranchising tens of millions of Americans that rely exclusively on free, local, over-the-air television broadcasting. "As we usher in this exciting new era of digital TV, NAB looks forward to working with our colleagues and NTIA in establishing final rules that reflect the appreciation Americans place on having access to free, local television," said David K. Rehr, President and CEO of the National Association of Broadcasters.

¹ NAB's 2005 comments before the Federal Communications Commission: *Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming*. ■

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ACAP Interactive TV Summit

January 30, 2007 - Palm Springs, CA

This winter, ATSC will sponsor a half-day seminar on the Advanced Common Application Platform (ACAP) for interactive television. The "ACAP Interactive TV Summit," set for January 30, 2007, will be held in conjunction with the 13th Annual Hollywood Post Alliance (HPA) Technology Retreat in Palm Springs.

The ACAP specification was developed as the result of a harmonization effort between the ATSC DTV Application Software Environment (DASE) and CableLabs' Open Cable Application Platform (OCAP) specifications. ACAP provides consumers with advanced interactive services while providing content providers, broadcasters, cable and satellite operators, and consumer electronics manufacturers with the technical details necessary to develop interoperable services and products.

The ACAP Interactive TV Summit will outline the basic elements of ACAP and focus on the demonstration and field trial of the ACAP standard currently being coordinated by the ATSC Planning Committee. Led by Dan Berkowitz of NBC Universal, the project is designed to illustrate how ACAP can be used to enhance the viewing experience. The seminar will feature presentations by many of the organizations participating in the ACAP field trial, including major content producers, including:

"An Introduction to ACAP" by David Cutts, Strategy and Technology; "ACAP and Data Broadcasting" by Mike Dolan, TBT; "Deploying ACAP Services" by Jeff Bonin, Alticast; "ACAP Field Trial Project" by Dan Berkowitz, NBC Universal; "ACAP/OCAP Interoperability" by Darren Forster, Softel-USA; "Creating Content" by Ed Skolarus, Fox; "PBS Content" by Lewis Zager, PBS; and "Enhancing The User Experience" by Graham Jones, NAB.

In addition to the seminar, a demonstration is planned for the HPA Technology Retreat showing practical ACAP applications. The demonstration will include interactive television applications



developed for some well-known U.S. network programs, shown running on both ACAP (over-the-air DTV) and OCAP (cable) platforms.

About the Demonstration and Field Trial Project

The overall goals of the ACAP field trial being organized by the ATSC Planning Committee are:

- To raise awareness for broadcasters of content and business opportunities afforded by interactive television.
- Raise awareness for local stations of content and business unhinged opportunities.
- Demonstrate the interoperability of ACAP and OCAP. The Planning Committee ACAP field trial project is divided into two primary elements; specifically:

Phase 1 - prove interoperability of ACAP and OCAP for interactive television in the U.S.

Phase 2 - field trial in select market(s) of ACAP applications broadcast over the air to and run on ACAP and OCAP receivers.

Some of the key organizations participating in the project include Aircode, Alticast, Ethercast, LG, Samsung, Softel, Sun, SysMedia, Triveni Digital, Unisoft, Vidiom, Zenith, ABC, FOX, NBC, and PBS.

The ACAP seminar comes at an important time in the move toward interactive television. With the ACAP demonstration and field trial project gaining momentum, content producers are looking for ways to improve the viewing experience for a variety of programs—from games shows to scripted dramas to news.

Thanks to the ongoing transition of television from analog to digital, it is now possible to efficiently combine video, audio, and data within the same signal. This combination leads to powerful new applications.

The backdrop for ITV growth comes from both the market strength of the Internet and the technical foundation that supports it. With the rapid adoption of digital video technology in the cable, satellite, and terrestrial broadcast industries, the stage is set for the creation of an ITV segment that introduces to a mass consumer market a whole new range of possibilities.

Technologies are readily available that support interactive features for game shows, sports and other programs, interactive advertising, e-mail, and Internet access. Rather than concentrating solely

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ACAP Summit (continued from Page 3)

on Web services, the goal is to deliver a better television experience.

Registration

The ACAP Interactive TV Summit will be held at the Westin Mission Hills Resort and Spa, 71333 Dinah Shore Drive, Rancho Mirage, CA 92270. Additional information and registration details can be found on the HPA web site; <http://www.hpaonline.com/>.

The Hollywood Post Alliance is the trade association representing the Southern California-based professional community of businesses and individuals who provide expertise, support, tools, and the infrastructure for the creation and finishing of motion pictures, television, commercials, digital media, and other dynamic media content.

Additional information on the ACAP standard can be found on the ACAP Web site: <http://www.acap.tv> ■

Board of Directors

Members of the Advanced Television Systems Committee (ATSC) have elected Glenn Reitmeier, VP, Technology Policy, Standards and Strategy, NBC Universal; as the 2007 Chairman of the Board of Directors. Glenn has been an active participant in ATSC since its inception, contributing to its technology and standards group, the planning committee and the board's strategic planning and membership subcommittees.

"This is an exciting time for the ATSC as we define the next stage of the digital revolution in television broadcasting," said Reitmeier. "I look forward to working with all of our members to develop the standards that will create new capabilities for delivering content to consumers through innovative DTV products and services."

Reitmeier was a key member of the Digital HDTV Grand Alliance from 1993 to 1996, which laid the framework for the original ATSC DTV Standard. He is the recipient of the Society of Motion Picture and Television Engineers' (SMPTE) Progress Medal and the Leitch Gold Medal, and is an inaugural member of the Consumer Electronics Association's Academy of Digital Television Pioneers. Reitmeier holds over 50 patents in digital video technology and is recognized in the New Jersey Inventors Hall of Fame.

ATSC members also elected three new members to the board including Jay Adrick, Vice President Broadcast Technology Architecture, Broadcast Communications Division, Harris; John Godfrey, Vice President of Government and Public Affairs, Samsung; and Craig Todd, Senior Vice President and CTO, Dolby Laboratories.



Joseph Flaherty, Senior Vice President, Technology, CBS; was reelected to the Board.

Returning board members for 2007 are Lynn Claudy, NAB; Brian Markwalter, CEA; Gavin Schutz, SMPTE; Sterling Davis, Cox Broadcasting; Joseph Flaherty, CBS; Victor Tawil, MSTV; Ed Barrett, Sony; and Wayne Luplow, Zenith. IEEE has appointed Yiyang Wu, CRC to serve on the ATSC Board. ■

Profile: Lynn Claudy

ATSC would like to congratulate the following members for their prestigious industry awards:

2006 IEEE BTS Awards

2006 Matti S. Siukola Memorial Award

Best paper - IEEE 55th Annual Broadcast Symposium:
Andy Bater
Tribune Broadcasting

2006 Scott Helt Memorial Award

Best paper - 2005 IEEE Transactions on Broadcasting:
Matthew Rabinowitz Rosum Corporation/
Stanford University
James Spilker, Jr. Rosum Corporation/
Stanford University

"Among other activities, the National Association of Broadcasters (NAB) is in the business of bringing people and ideas together on behalf of the broadcast industry," Lynn Claudy, NAB Senior Vice President of Science & Technology says. "The word 'facilitate' repeatedly comes to mind, as does 'education.' Not really all that different than ATSC, which must balance a number of diverse views within the television technical industry and is constantly educating the industry as well."

Lynn was originally a music major in college before transferring to an engineering school - he has a bachelor of arts degree from Oberlin College and a bachelor of science degree in electrical engineering from Washington University in St Louis. Afterwards, he earned a master of science in electrical engineering from the Illinois Institute of Technology while working in Chicago.

His career path has always been associated with facets of the audio and/or display technology business. After college, Lynn's first job was as a phonograph cartridge development engineer at Shure Brothers in the Chicago area. "Dragging rocks through plastic grooves" is how Lynn describes the state-of-the-art in-home sound reproduction in those days. When CDs first began to be demonstrated in the early 80's, it became clear that the phonograph industry's days were numbered- Lynn went into the custom systems integration business for large scale display and sound systems. By the latter part of the 80's, Lynn was designing and installing first generation high resolution video projectors for large screen displays and video compression systems for video teleconference applications. Around this same time, the FCC started its initial inquiry into advanced television services and when an opening came up at NAB in 1988, it was a natural fit for Lynn's background. He started at NAB as a staff engineer, and was promoted to Director of Advanced Engineering in 1990, Vice President in 1993 and Senior Vice President in 1995.

Outside of the office, Lynn enjoys tinkering with home theater electronics, and running, "albeit slowly." Lynn reports that his wife Jeannie does a good job making sure most of his free time is occupied. "Additionally, my teenage daughter

Caitlin and college-age son Carl provide me with a good deal of perspective on the media consumption desires and habits of the young."

Lynn has been involved in ATSC committees and specialist groups since the late 80's when he chaired the Specialist Group on Macro Systems Approach, which eventually helped ATSC recommend which portions of the developing DTV standard should be in government regulations and what should remain voluntary. He was also the first chair of S9 in 1994-1995, which was responsible for documenting the transmission section of the original A/53 DTV standard and A/54 recommended practice on the standard.

Lynn is currently the Vice Chairman of the Board of Directors, Chairman of the Budget and Finance Committee and serves on the Board Nominations Committee, among other activities. "NAB has always had a strong institutional commitment to the work of the ATSC and staff members from NAB Science and Technology are quite active in participatory or leadership roles in most of the ATSC groups."

Lynn was also a part of the leadership team that worked on the recently released ATSC Strategic Plan and says he is particularly proud to have been involved in that first time effort. "I'd encourage every ATSC member to read the Strategic Plan front to back, and get involved in making the future work proposed in it a reality," Lynn says. "NAB's leadership strongly believes that proactive planning for the technological future of television broadcasting is critical to maintaining a competitive digital television broadcast service. ATSC has made a key contribution with its first Strategic Plan." ■



Lynn Claudy, NAB.

the standard



1750 K Street NW, Suite 1200, Washington DC 20006

The ATSC is an international, non-profit organization developing voluntary standards for digital television. The ATSC has member organizations representing the broadcast, broadcast equipment, motion picture, consumer electronics, computer, cable, satellite, and semiconductor industries.

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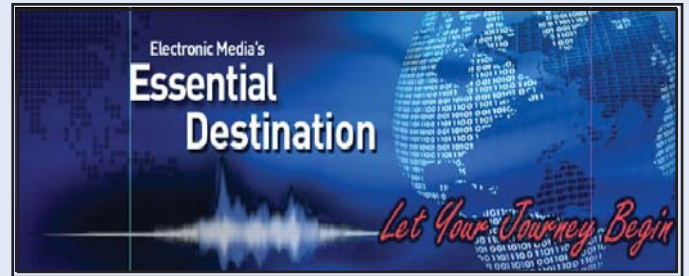
Welcome Wagon

ATSC would like to welcome it's newest members:

**Flextronics
Strategy and Technology, Inc.**

These companies have recently become members. We eagerly anticipate their contributions to the DTV standards currently being developed in the ATSC, and we know their participation will have an immeasurable effect on the future of digital television.

ATSC thanks
the sponsors of
this issue...



2007 NAB DTV Hot Spot April 14-19, 2007

It's that time again - ATSC has entered initial planning stages for the NAB 2007: The World's Largest Electronic Media Show, to be held in Las Vegas April 14-19.

<http://www.nabshow.com/>

ATSC will once again sponsor the DTV Hot Spot in a lobby area of the Las Vegas Convention Center. Setup will be similar to last year, although there will be a few changes and adjustments. Sponsorship prices will most likely remain the same as last year.

We are excited for this event, and hope you plan on participating once again!

For more information, please contact Lindsay Shelton-Gross at lsheltongross@atsc.org.