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New HD Programs Fall into Place

NBC builds infrastructure for 'Today'



by Robin Berger

NEW YORK

NBC's launch of its signature "Today" show this month marks the second stage in a three-pronged plan to transition the peacock network's programming to high definition.

"The Today show is 'step two'" in NBC's multiyear HD transition," said Larry Thaler, vice president, production and on-air technology for NBC Universal—part of a process that began with last year's HD upgrade for "Saturday Night

Live" and "Late Night with Conan O'Brien." No dates were given for step three's rollout of hi-def news.

A new set was built to enhance the look, provide additional production space, and ensure that camera angles work in the 16:9 HD format. And a much expanded control center automatically mixes formats, enables multizone live updates during a broadcast, and greatly improves the show's audio mix, according to the network.

The number one challenge was mixing variously formatted feeds and archival footage.

TODAY, PAGE 8

HD syndication debuts with hi-def 'Wheel,' 'Jeopardy'

by Robin Berger

LOS ANGELES

Sony Pictures Television spent about \$4 million to upgrade "Jeopardy" and "Wheel of Fortune" for this month's 1080i high-definition debut. But the complexities of involving multiple players and high-def syndication created

unique hurdles.

"The biggest challenge may be the whole distribution side, which we're not so involved in, as is CBS and King World," said Phil Squyres, senior vice president of technical operations for Sony Pictures Television, who oversaw the studio upgrade. "A syndicated show like this [is] not just distributed out to one

JEOPARDY,
PAGE 10



In Demand VOD buying spree erupts

by Mark R. Smith

BALTIMORE

It's been a busy summer in the network equipment business, with Cisco buying Arroyo, Harmonic purchasing Entone and Motorola icing a deal for Broadbus.

The purchase of the smaller concerns by the large network players points to the burgeoning importance of distributing video-on-demand (VOD) as consumer awareness has dovetailed with technical enhancement to make long-discussed viewing conveniences become reality, notably via

DEMAND, PAGE 12

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SONY XDCAM HD

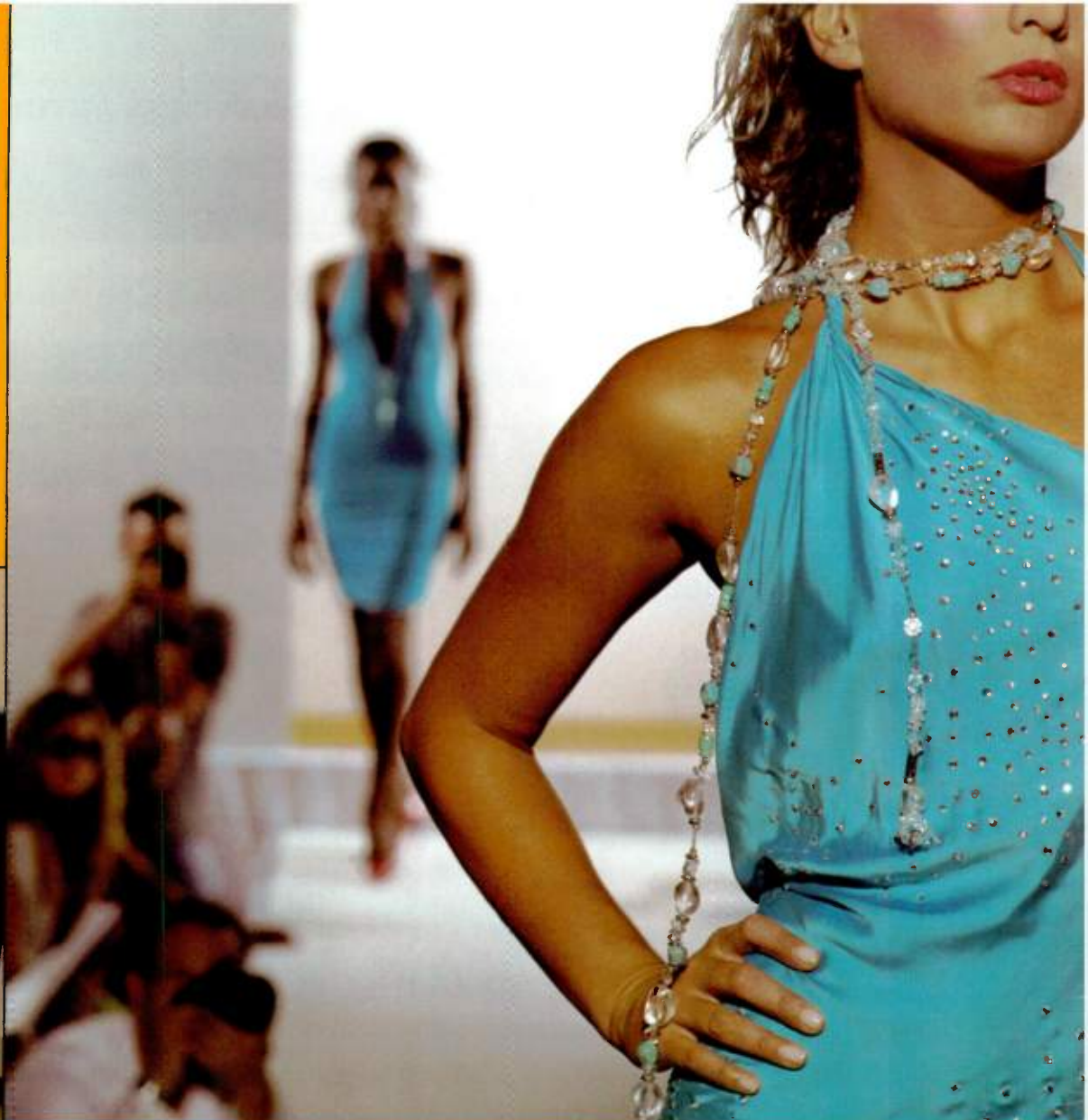


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Panasonic ideas for life

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Tuning In
Gary Arlen



When Time Warner Cable launched "Shop by Remote" on its Hawaiian system last month, momentum picked up for the next wave of interactive TV. Using standard remote control devices, viewers can click on a "buy" icon in the upper right hand corner... p. 26

Focus on Editing
Jay Ankeney



We've all wanted to go tapeless ever since the CMX-600 dangled that tantalizing possibility before our eyes in 1971. An oddity then, disk-based editing has become so commonplace that Editware's release of a new linear, tape-based edit controller at NAB2006... p. 30

Digital TV
Charles S. Rhodes



The ATSC document A/74: ATSC Recommended Practice: Receiver Performance Guidelines could be the basis for the National Telecommunications and Information Administration performance standards for the 10 million digital to analog converters... p. 34

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FROM THE EDITOR

Standard Issue



Have you tried buying a digital-to-analog converter box lately? Not easy, huh? It's not like they've been flying off retail shelves.

No, there's not much demand for the devices right now, but as the popular saying goes, "watch this space."

NAB and MSTV this month are unveiling the prototypes that they hope will fulfill the NTIA's campaign to distribute low-cost converter boxes to qualified TV households in time for the analog shutoff in early 2009. The specific technical details of these boxes from LG Electronics and Thomson are a closely guarded secret.

What about box standards? What features should such a box have? What will

the typical user want in such a box and how long do they intend to use it? Will the box be so expensive that consumers—even those eligible for a voucher—decide to, for a hundred dollars or more difference, purchase a new set with a DTV tuner anyway?

Two of our illustrious columnists—Mario Orazio and Charles W. Rhodes—weigh in on the subject in this issue. The Masked One (p. 37) is characteristically skeptical about the eligibility requirements for vouchers as well as the box standards; Charlie (p. 34) thinks that the NTIA's proposal to use the ATSC's recommended practices for receiver performance guidelines as the performance standards for the boxes could spell trouble.

As usual, they make some valid points. We hope the NTIA is listening.

Tom Butts
Editor
tbutts@imaspub.com

ERRATUM

In the story "Driving Towards HD," in the Aug. 23 issue of **TV Technology**, Tom Jennings, director of broadcast sales at Wolf Coach, is erroneously identified as an employee of Frontline. In addition, the Frontline product "Vortex" is "Vertex" and the dish size is 1.8, not 1.6 meters.

LETTERS

Send to Editor, TV Technology at e-mail tvtech@imaspub.com

Hats Off to NBC

Dear Editor:

I'm responding to "Winter Games Frustration," (Letters, June 14). The reader indicated in his letter that he was disappointed with his local NBC station's handling of NBC's Torino Winter Olympic coverage.

I understood his letter to imply that the HD off-air product would have been of better quality if the affiliate had delegated more of its 19.39 Mbps TS to the HD feed.

I am not familiar with that station's equipment or operating procedures. However, I too witnessed many of the same compression artifacts and quantizing errors with many parts of the NBC HD feed. I have a slightly different take on the matter though.

I watched much of it from the HD sat receiver that provides our station with the raw feed, and these same errors and artifacts were present there! We broadcast an HD channel, a weather channel (not Weather Plus), and an SD multicast feed as well.

I won't get too technical here, but when provided a flawless stream to transmit, we can provide that same quality to our viewers. I saw many different levels of quality with the NBC HD feed coming in to our facility during the Torino Olympics. The studio HD content was awesome, as was most of the pre-produced material.

However, the "field" feeds were pretty much hit and miss, with regard to HD "enjoyability." I found myself wondering, how much content was being upconverted? How much was it being compressed to be delivered across the countryside? How was it being delivered: Fiber, microwave, copper?

Overall, I did enjoy the coverage immensely. Obviously, NBC's coverage of the Olympics was an enormous undertaking. My hat goes off to NBC. Just as NBC has done in decades past, with the Torino Olympics they keep pushing the limits of emerging technology. Only with such commitment and purpose will technology continue to improve.

Joey Gill
Paducah Ky.

Get With the Program!

Dear Jerry Whitaker:

I read with interest your article on the use of AFD to correct aspect ratio discrepancies ("Using AFD to Resolve Aspect Ratio Discrepancy," ATSC Update, July 12). I have had a "beef" for a long time regarding this issue.

I have a 16:9 aspect ratio display at home and am an avid viewer of DVDs in the widescreen mode. I'm also an "Image Purist" in that I want to see everything the director wanted me to see, so am quite happy with 2.35:1 images letterboxed on my 1.78:1 display.

However, I also eagerly watch the special features and "making of" featurettes on the disc. Considering that most of these items were shot very recently, in keeping with the release of the DVD, it's frustrating to me that on a widescreen-labeled release, the interviews, etc. are still shot in 1.33:1 (4:3) mode and when they reference scenes within the movie, those scenes are inserted into the production in a "double letterboxed" format. Although the special features are shot on video, almost all video cameras in the professional marketplace are now capable of shooting in 1.78:1. Why is it that the production companies producing these special features continue to cling doggedly to the old TV aspect ratio?

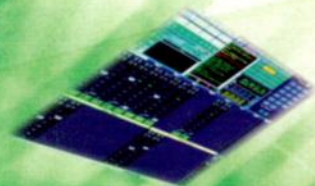
I recently watched some DVD versions of "Foyles War," a U.K.-originated mini-series, and was very happy to see the special feature interviews shot in 1.78:1. Then again, the U.K. has been using widescreen SD for quite a few years now. Come on Hollywood—let's catch up!

Keith Graham
San Jose, Calif.

Jerry responds:

The issue noted by Mr. Graham is one of the many challenges in managing aspect ratio—for content producers, broadcasters, and receiver manufacturers. As noted in the article, Active Format Description solves a very important part of the equation. Clearly, implementation of AFD is in everyone's best interests.

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Subchannels Made Easy With Software

'Station in a box' approaches have familiar PC look

by John Merli

CEDAR RAPIDS, IOWA

Channel Builder from Decisionmark, a system with a lot more software than rack-hungry hardware, is taking its official bow this month with the promise of providing the simplest and most cost-conscious solution to a local broadcaster's subchannel needs. If it catches on, the firm's IT software will allow stations to quickly repurpose their primary station's local content to compete for ad dollars with NBC Weather Plus and other emerging subchannel fare.

find it "an interesting term.")

The introduction of Channel Builder 1.0 this fall follows a month-long beta test in August at ABC affiliate KCRG-TV in Cedar Rapids, Iowa, which is also the home of Decisionmark. The station is airing its subchannel (dubbed "Local 9.2 KCRG") on Channel 9.2 (and Channel 109 for about 80,000 Mediacom cable subscribers).

CONTENT CONTROL

KCRG Program Director Dan Austin said the advantages of the new service quickly became obvious.

"Unlike other subchannel products," mostly highlighting weather, he

ous video, text, graphics and other elements on-screen, similar to an online scenario.)

"At launch, we were devoting approximately 4 MB of bandwidth to video with the quality, while somewhat dependent on the display device, appearing to be quite good," Austin said. "We'll continue to experiment with bandwidth allocation to further define boundaries of what viewers will find acceptable quality for this subchannel, and potential future sub-

major market) this month when iTX Version 1.0 ramps up.

Basically a compact software package with a small footprint, iTX—intelligent transmission—builds on IT-based technology for a station's master control and other operations, such as automation, from ingest to play-out. Like Channel Builder, it does not rely much on standalone hardware. At NAB2006, OmniBus said it demo-ed up to a dozen subchannels using less than one full rack.

"We're calling it a revolutionary product because it replaces all the typical elements in master control and other chains with a box or two," said Dave Polyard, senior vice president for sales and marketing for OmniBus Systems. "We think it gives broadcasters a big advantage... without having to add a ton of new hardware, and where all systems are from one vendor and are contained basically in one box."

What little hardware is contained in iTX systems comes from PC maker Hewlett-Packard, with chips from AMD. Similar to Channel Builder, iTX creates time-line-based presentations with drag-and-drop capabilities for a wide

array of typical elements such as voice-over, animated graphics, and other MC options.

"We created synergy between what a local station wants to do, and then iTX anticipates it," Polyard said.

He said iTX enables mixing different types of content on the same time-line, such as MPEG 2, Windows Media 9, PAL, HD, SD, without system discrimination.

"Architecturally, you have central storage and a central server that runs core services. Once you have this 'brain,' you can add more channels by simply adding off-the-shelf servers for each channel. Each one takes up only about eight rack units—not eight racks, eight units!" Polyard said.

As with Channel Builder, iTX provides no content of any kind. ■

"Users with a basic understanding of Windows and knowledge of how television works can put together a 'scene' in a few hours and then put it on-air in a matter of minutes."

—Dan Austin, KCRG program director

The Channel Builder approach, which can look very much like an online Web site on steroids, was created to provide broadcasters with relatively simple capabilities to create their own fully customizable subchannel (or channels) using virtually any type of content—audio/video feeds, EPG, text headlines, weather maps, commercials—displayed in an eye-catching menu (in effect, a TV "home page") that viewers could also use as a television "screensaver," similar to a computer monitor. (However, for the moment, viewers cannot interact with the screen, similar to online links.)

"It builds on a station's strengths without using tremendous amounts of money and resources," said Decisionmark President and CEO Jack Perry. "TV stations are outstanding at collecting local news, weather and sports. This [software] takes a minimum amount of time to 'build' a channel or update its content, maybe five minutes, and it's pretty simple. Essentially it's a sandbox for the PD or ND to imprint his or her subchannel with, at any given time."

Although Channel Builder has been dubbed as "station in a box" by some, it is not being marketed as such by its creator. (Not yet, anyway. Perry does

said, "Channel Builder puts us in total control of the content, the revenue opportunities, and how it all is displayed.")

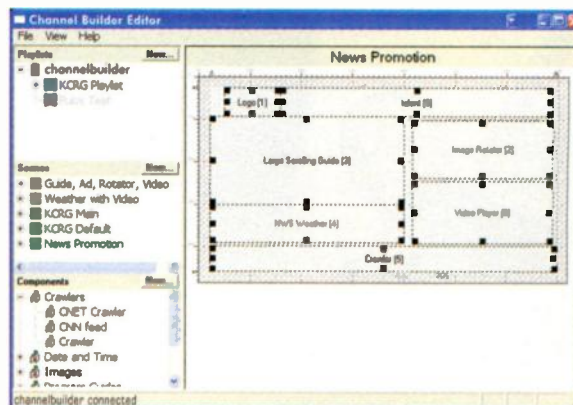
Austin said updating particular elements or adjusting the channel's entire focus (i.e., from a news item to a sports theme) is done on the station's timetable, which means it's often dealt with immediately. He also sees the subchannel as an effective platform for brand extension and promotion of KCRG's primary channel.

And because the audience is still quite small, Austin said Local 9.2 KCRG will allow the station to experiment with things that might not be possible to do on the primary channel. But, he said, "Right now, offering local content to our viewers and attracting advertisers are our key objectives."

Austin said the technology behind the screen has been well thought out.

"You don't have to be a computer programmer to accomplish what you want to do. Users with a basic understanding of Windows and knowledge of how television works can put together a 'scene' in a few hours and then put it on-air in a matter of minutes, he said.

(A "scene" is the placement of vari-



The Decisionmark Channel Builder software takes minimal time to build a channel or update its content.



iTX from OmniBus Systems creates time-line based presentations with drag-and-drop capabilities for a wide array of typical elements such as voice-over, animated graphics, and other MC options.

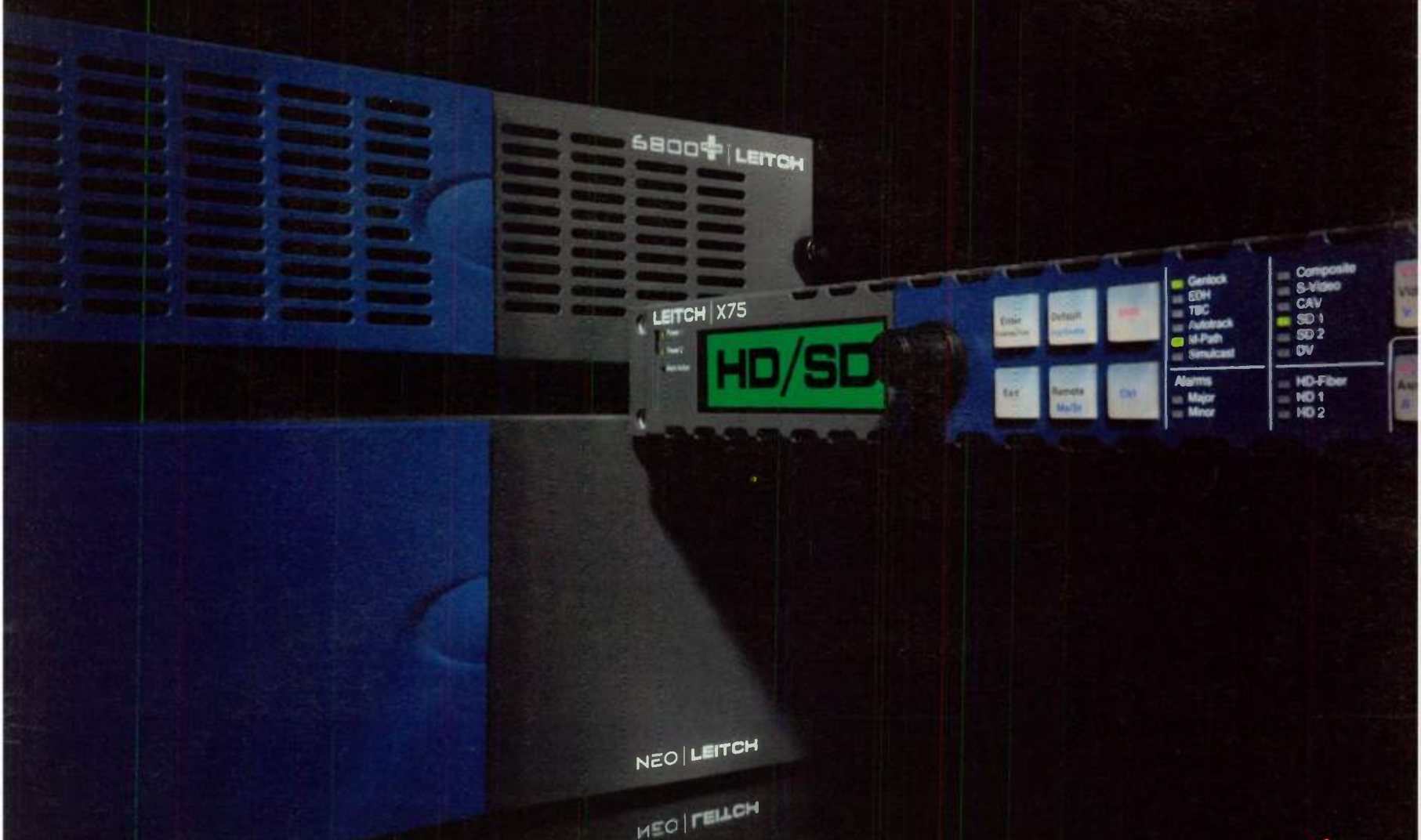
channels. Our priority is to maintain the highest quality level possible for our primary HD signal."

Austin said within hours of the subchannel's terrestrial DTV launch Aug. 1, online postings began appearing from DTV enthusiasts in the local Cedar Rapids thread of the AVS Home Theater Forum (www.avsforum.com). "Viewers seem to 'get' the channel's local focus and the amount of information now available to them."

ITX TECHNOLOGY

Another option open to local broadcasters in the "TV in a box" mode comes from OmniBus Systems, which currently is testing its proprietary iTX technology internally and plans to sign up its first still-unnamed local broadcaster (a CBS affiliate in a

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World Radio History

Today

CONTINUED FROM PAGE 1

"We decided that we were going to build HD-only facilities and let our core plant do the translation and aspect ratio conversion," Thaler said. "Working with a number of vendors, we have invented technologies to enable us to identify, at the source, the aspect ratio of the material, and our systems downstream handle [conversion] seamlessly."

Miranda's XVP811i cross-converter was first installed on a smaller scale for Saturday Night Live last September, said Thaler, who noted that, "we've expanded that greatly to support the 'Today Show.'"

Notable among its expanded capacities is the inclusion of an Active Format Description-based functionality. AFD identifies video format via a

"We decided that we were going to build HD-only facilities and let our core plant do the translation and aspect ratio conversion."

**—Larry Thaler,
NBC Universal**

flag in the VANC (vertical ancillary) timecode so that "converter cards, like XVP, can do the proper conversions automatically," said Claude Krelie, product development manager for interface products with Miranda.

According to Krelie, Miranda brought the AFD specifications to SMPTE two years ago and, as proposed standard 2016-1, it will hopefully get final approval by year-end.

Miranda has also been a key voice on SMPTE's Audio Metadata Embedded Committee (No. 829), along with Evertz, Harris/Leitch and Dolby. The manufacturers aim to standardize the embedding of audio specifications for 5.1 and other formats into the VANC.

DO NOT DISTURB

Last January, "Today" left its 3,700-square-foot control room at 10 Rockefeller Center for a morning time

slot at the "Nightly News" hub across the street while its new 6,700-square-foot control complex was under construction. And in June, it vacated its 12-year home in studio 1A for a temporary set up outside 30 Rockefeller Center.

Production space was slated to expand from 3,000 to 4,500 square

solution.

"We're using rear projection monitors by Barco instead of the dedicated CRTs prevalent in most control rooms, coupled with a display driver that actually puts the video on those rear projectors," he said. "It gives us a lot of versatility—we can configure the control room for other users and it

show for the other time zones as the clock ticks down," Thaler said. "We're using a number of different systems for that, including automation put together by NBC and electronic servers from EVS [XT2] and Grass Valley [PDR-2000]."

IN-HOUSE DESIGNS

Other equipment in the new installation include Sony's MVS-8000 production switcher, Calrec's Alpha digital audio console, and Avid's NewsCutter and ISIS. Ascent Media provided systems engineering, wiring, testing and project management services.

Live updates for other time zones will originate from a port facility designed in-house and constructed at

NBC Universal built a new production control desk to monitor and coordinate HD feeds for "Today" and the NFL in its digital production systems facility. It is located across the street from the studio, on the fifth floor of 30 Rock, where all editing facilities have been consolidated.



feet, spread over two floors, said David Lazecko, director, Studio System Engineering, NBC Universal.

"David and his team—in addition to building a new control room—had to completely rebuild the infrastructure to support the control room," Thaler said. "Air conditioning and power needed to be supplemented because an HD control room requires drastically more resources in these areas."

Lazecko lauded the show's new monitor wall configuration, created by Barco's mDR50-DL, a 1900x1050, xSVGA Monitor Wall display, and Evertz's MVP multisignal monitoring

allows us to put video anywhere we want on the monitor wall, [in] any size we want."

A new Sony camera system lets operators use HDC1500 HDCAMs in a studio docking station.

"Since the 'Today Show' does so much work inside and outside, this will quickly allow a camera operator to use the same camera in both locations," Thaler said.

And the show can now incorporate live anchor updates to other time zones while broadcasting East Coast programming.

"We edit, repackage and update the

a studio across the street. Lazecko credits the new capability to "HD technology, fiber optics and interconnectivity between the two plants utilizing switching technology and communications systems that we own."

"It was a systems design approach," Lazecko said. "Nobody had a magic box that we saw at last year's NAB that was an 'aha' device for us to do this—just good design work."

Lazecko's team also built a separate

music mix facility within the control room, which will supplant the supplemental outboard mixers used previously for, among other things, the show's large concert series.

"We designed a state of the art mixing room around ProTools' ICON mixing system," Lazecko said. Digidesign's ICON audio control service interfaces with its ProTools HD workstations, keeping the process "all in the family."

NBC and General Electric's corporate research and development arm also created automation systems to integrate programming and commercials, Thaler said. ■

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Beating Video Pirates at Their Game

Digital Rapids, Thomson offer forensic watermarks to protect content

by Craig Johnston

MARKHAM, ONTARIO

Television today has no shortage of fictional programs like the CSI trio, where the case relies on forensic evidence to solve crimes. In the real world, however, the video and electronic cinema industry have come up with a way to embed forensic evidence right in their product, through forensic watermarking, to help solve the number one video crime: piracy.

There's generally little trouble establishing that a copy is pirated when it beats the official DVD release to the street. But as in the cop shows, the question to be solved is "whodunit?"

Forensic watermarking can be defined as the marking of video content, in a manner that is imperceptible to the human eye, for the purpose tracking down those who pirate such content.

"Digital watermarking is another level of content protection for the content owners against piracy of the content," said Mike Nann, marketing manager for Digital Rapids Corp., an encoding equipment builder that employs Philips watermarking technology in Version 2.3 software for its StreamZ CP family of professional content encoding solutions.



Digital Rapids StreamZ encoder uses Philips' watermarking technology.

someone from duplicating the content, but by making it trackable back to its source, it acts as a deterrent."

Toward that deterrent end, those employing digital watermarking want potential video pirates to know watermarking is out there, but are reticent to have details of their use of watermarking made public. Nann said Digital Rapids studio customers themselves don't want to be identified.

Pascal Marie, vice president of content security for Thomson Content Security, which offers its own forensic watermarking system, said post-production houses are starting to offer such watermarking as a value-add.

"A studio, when they do the international versioning and distribute the video master copies to different broadcasters throughout Europe, ask the corresponding post-production houses in charge of the duplication of the master videotapes to embed a different watermarking in each of these master videotapes before shipping," Marie said.

READING A WATERMARK

The watermark information itself is encrypted, so that, while ordinary test equipment can detect the watermark, Marie said a key token is required to actually read information from a watermark. The post-production house maintains a database cross referencing watermark information with those who were sent master copies of the tapes.

"One of the keys to the technology is it being robust enough to survive most of the transformations that happen to the video throughout the broadcast and

WATERMARK, PAGE 14

Jeopardy

CONTINUED FROM PAGE 1

network's owned and operated or affiliated stations—they have some technical challenges."

At press time, more than 50 of the 207 client stations showed interest in taking the shows in HD, said Bob Seidel, vice president of engineering and advanced technology for CBS.

SATELLITE DISTRIBUTION

Initially, the HD version will be distributed via real-time linear satellite transmission using the 1920x1080i/59.94 format at a data rate of 45 Mbps, according to Seidel. (CBS/King World expects to eventually transition from satellite transmission to Pathfire's store and forward system, which is used to distribute the SD version of the shows.)

Stations will need "to install traditional high-definition tape machines or HD servers for play out," Seidel said, and use an HD-capable satellite receiver.

"The high-definition signal contains both EIA 608 and EIA 708 captions, audio metadata, and broadcast flag on Line 9 of the VANC data space," Seidel said. "The Harris Net Plus 300 HD satellite receiver is capable of carrying VANC data signals [and] has a built-in cross converter."

However, due to incompatibility about how stations implement 5.1 audio, Sony Pictures decided to forgo surround sound for the time being.

"Unfortunately, right now every

network handles surround sound in a different way—we negated it early on," Squyres said. The shows' HD debut will broadcast in stereo.

Squyres, with head technician Charlie Gertner and Sony's technical advisers "spec'd the entire facility" to upgrade production for both shows, which have adjoining stages and share a control room and equipment.

About two years ago, they bought Sony HDW-950s with Canon Super25HD lenses, but used them in SD mode. Last October, they hooked up the cameras to Sony HDW-M2000/20 recorders for HD review.

"We quickly realized there weren't really going to be a lot of necessary changes," Squyres said.

The lighting stayed the same and color was taken care of in the cameras and in post production.

"Color is slightly different, but it very well documented, and the equipment that is used to convert back and forth—it's a straight-forward process."

16:9 ANOTHER MATTER

The new 16:9 aspect ratio was another matter.

"It basically amounted to making alterations in the set," Squyres said. "The director chose to spread the 'Jeopardy' contestants a bit further away from each other so that he could get clean singles—when the frame's wider, it has a tendency to catch a bit of the person next to the [single]."

Relocating contestants on "Wheel" would have required making a larger Wheel, so the idea was dropped. But

the once distinctly separate audience and stage areas are now melded, as requested by the art director.

"The end of the stage now joins with the audience area—it's more of a 360 degree face," Squyres said.

His crew deftly converted its Sony DVS9000 SD switcher into an HD compatible MVS8000.

"The panel stayed the same, but the electronics package behind it got swapped out," Squyres said. But things weren't as easy in upgrading the shows' special effects or graphics.

"We literally had to do a wholesale change out of all of our graphics elements—the main titles, transitional material," Squyres said.

The game shows also rely heavily on transitional video effects and other image manipulation, which requires a 12-channel switcher.

"Up until our order, Sony was only delivering four channels built into the switcher," Squyres said. "At our request, they built an extra eight," the Sony MVE-9000.

Over the last few years, the show's post-production unit had also gotten used to the efficiencies of the tapeless, optical disc-based format that its Sony XDCAM offered. Unfortunately, when the HD upgrade began, there was no HD version of XDCAM.

"We went back to a tape-based format for recording—XDCAM-HD decks," the PDW-F70s, "at least for the primary production recording," Squyres said. Instead of locating material quickly, "you actually have to rewind the tape to the exact part

that you need."

Sony later introduced an HD version of XDCAM, which the studio uses for interstitial playback of short pieces. But the decks are still used for the main record.

"We were not able to use [the HD XDCAM] for the actual main record for a number of reasons," Squyres said.

INTEGRATING FORMATS

One reason was the integration of legacy material—like video clues for "Jeopardy" and vendor videos of prizes for "Wheel" contestants—which can arrive in digiBeta, Beta SP or any number of other 4:3 formats.

"About half of the HDWM2000 decks that we purchased are multi-format machines," Squyres said. "They will actually accept a digiBeta tape or a Beta SP tape and automatically upconvert as it plays back."

Evertz provided HD timecode, distribution, conversion, fiber interconnect and multiviewers. Editing is on an Avid Symphony Nitris, plus Adrenaline hardware with Unity storage; graphics are handled by Chyron's Hyper X graphics system with Lyric Pro Software and Clip Player; audio mixing is done on a Yamaha 48-channel M7CL digital mixing console; two Leitch upconverters, one for the stage and one for the edit bay convert footage, and monitoring is done on Sony 24-inch HD CRT evaluation monitors for critical viewing, plus 17- and 24-inch LCD HD monitors for source and continuity monitoring. ■

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Demand

CONTINUED FROM PAGE 1

broadband and mobile receivers.

"Increasingly, VOD is becoming more important," said Gary Schultz, president of MRG Inc. in Sunnyvale, Calif., "and it takes a better integrated software system to put the right clips in the right place so it's instantly available to a lot of people."

He added that more news could be on the horizon, noting Bitband and Kasenna as two more VOD software developers he thinks "will be purchased or in a merger in the foreseeable future."

ANYTIME, ANYWHERE

The VOD market has expanded in the past year or two, said Bruce Leichtman, president and principal with Leichtman Research Group in Durham, N.H.

"Close to 85 percent of all digital households have some kind of access and it has become nearly ubiquitous with the major MSOs, like Time Warner, Cablevision, Cox and Comcast."

That sentiment was echoed at Comcast, which has had more than 2 billion VOD views since 2004, 95 percent of which were available at no additional cost, according to Jenni Moyer, spokesperson for the nation's largest cable operator.

Moyer said on average, the MSO has more than 7,500 VOD programs available monthly. The top categories include free movies, children's programming, music videos, and sports and fitness.

Leichtman said about 60 percent of all digital subscribers are starting to use VOD, up from 25 percent two years ago.



"The Broadbus system brings on-demand capabilities that let us offer consumers access to their digital entertainment seamlessly."

—Paul Alfieri, Motorola

Ron Piovesan, spokesperson for Cisco, said, "We bought Arroyo simply because we believe that content on demand is the future—and, in our case, that means any sort of content from any sort of device. That could mean watching a movie or accessing a Web page from your TV, or accessing any music from your PC."

One thing of particular note about the

Arroyo software is that "it can run on off-the-shelf hardware," Piovesan said. "So we will integrate the software into our routers and switches."

That's key, because Cisco just plunked down \$92 million for Arroyo for a few reasons. "It is important to Cisco's service provider customers because they

want to roll out new services to their end users," he said, adding that it "gives Cisco the added opportunity to sell its home networking gear," like the Linksys system, and, of course,

"consumers want it."

Piovesan offered the example of watching the start of a show on a big screen TV at home, "then flying to another city and picking it up right where you left off, on your PC in your hotel room," he said.

"Arroyo software pushes content to where you want it and does not care what type it is or what screen it will appear on."

Nimrod Ben-Natan, vice president of solutions and strategies for Harmonic, said not only is the usage of VOD in the cable market on the upswing, but "IPTV is becoming more prevalent."

"Now VOD is becoming used more often for content aside from classic movies," but also includes new technical features, such as Time Warner's Start Over feature, Comcast's Digital Video Recorder or Cablevision's content storing service, he said.

Such equipment and software upgrades are also leading Hollywood and other content providers to understand how they can push more content into cable systems. "They have a new platform, so they can monetize their assets," Ben-Natan said.

Harmonic made the \$45 million deal to acquire Entone based on such products as the StreamLiner Network Video Server, an open, scalable software architecture that turns off-the-shelf servers into video delivery platforms, or what has been termed a "video pump," and the Armada Intelligent Asset Manager, which automates the distribution of assets between a large network of video servers, based on actual consumption patterns and operator-defined rules, in real-time.

This mechanism solves the problem of deciding which assets to place on which servers, where and when. It also optimizes the storage capacity deployed in the network, thus reducing the CAPEX cost of the video server infrastructure.

Newer services on the Web, including youtube.com, video.google.com and iTunes are also driving demand, as well as "putting pressure on the cable companies to provide a good experience for the customers," he said, "and the cable

companies are experiencing a new dimension of competition.

"I think there is life beyond cable," Ben-Natan said, calling Entone "strongest in IPTV and Arroyo and Broadbus stronger in cable."

TWO NETWORKS IN ONE

Paul Alfieri, spokesperson for Motorola said the corporation bought Broadbus "because their hardware and software has content management capabilities—and when you combine their technology with Motorola's video delivery platform we can enable consumers to access their content on demand on any device," be it in the home "or on a MotoRazr."

The Broadbus platform offers dynamic random-access memory that requires less space and power than traditional hard-disk based technology.

"While we already had a video delivery platform for live content, the Broadbus system brings on-demand capabilities that let us offer consumers access to their digital entertainment seamlessly from a variety of devices and features," such as time-shifted TV, network-based digital video recording, on-demand ad insertion and switched digital video for a set-top in the living room or a mobile handset.

"That's our whole point," Alfieri said. "It's not just about the living room, but to anywhere the user is."

The other point to consider, he said, is fixed mobile convergence is becoming a reality. "The ability for a cable or telco service provider to offer services that span their wired and their wireless networks is becoming more of a reality everyday."

Alfieri said Motorola can now combine the Broadbus platform with the corporation's strength in broadband wireless technologies, such as WiMax, or ultra-broadband wired solutions like channel bonding or fiber to the home, "to create a truly seamless mobility experience."

Leichtman also pointed to other players in the VOD space such as SeaChange, Concurrent Computer Corp. and C-COR.

"The startups like Broadbus and Arroyo did not have anything near the bases that a SeaChange or Concurrent have," he said, "but offer more software-centric applications with slightly different technologies and delivery techniques."

"One of the corporations trying to buy a more established company like SeaChange might have been more difficult, since it and Concurrent are more established and publicly traded," Leichtman said. "In each of these cases, the big companies are looking at equipment that can serve a lot of content to a lot of people simultaneously. And," he said, "startups like Arroyo and Broadbus are in this to get bought in the first place."

And those small players opted for that choice because they recognized what was brewing in the VOD sector, as Piovesan pointed out. "There is only one trend that matters," he said, "and that is consumer demand. Cable, telco and mobile service providers are all looking for better ways to supply VOD to end users." ■

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AES Sounds Off for 121st Confab

Engineering, analog issues get increased focus at annual audio gathering

by Susan Ashworth

SAN FRANCISCO

A revamped and re-energized electrical engineering program will greet attendees at this year's Audio Engineering Society convention, held at San Francisco's Moscone Convention Center, Oct. 5-8.

More than 20,000 are expected at this year's convention—a mix of scientists, educators, systems designers, manufacturers, and Grammy and Academy Award-winning recording engineers—who will find the 2006 convention will offer insight on audio coding, digital radio, surround mixing and more. The 2006 convention also boosted some of its efforts on exploring ongoing electrical engineering issues, said AES Executive Director Roger Furness.

SESSIONS & TUTORIALS

The boost in EE-focused programming signals an effort to reach out to electrical engineers, which organizers believe will be well served with the convention's mix of papers, workshops and master classes.

"AES has been the ideal place for electrical engineers and computer scientists to learn about audio," said John Strawn, convention chair for the 121st convention.

"The original papers on CD technology and MP3 technology were presented here at our show," Strawn said. "Now, we want to reach out to those electrical engineers and computer science professionals

in Silicon Valley to let them know what audio has to offer today."

AES has not forsaken other segments of the industry, however, and will offer an in-depth slate of sessions and tutorials to address ongoing audio engineering problems and issues.



(L to R): AES 121st convention committee workshop co-chair, David Harris; live sound events chair, Larry the O; convention chair, John Strawn; volunteers chair, Joe Alexander; special events chair, Veronique Larcher; facilities chair, Bob Megantz; master class and tutorials co-chair, Valerie Tyler; technical tours chair, Jim McTigue; workshop co-chair, Bob Lee; Chris Plunkett, director of convention management and historical events chair, Bill Wray.

"Over the past 58 years, AES members have created a vast library of research papers documenting every aspect of the field, from digital filtering to speaker design and acoustic treatment," said Bob Moses, co-chair of convention tutorials and master classes. "The AES has also pioneered the acceptance of many important standards for digital audio connectivity ...and many others have been

AES-tested, examined, debated and ultimately passed into the day-to-day vocabulary of audio professionals."

One session track will be dedicated solely to broadcasters, with sessions such as "Considerations for Facility Design."

"AES continues to see broadcast to be a very important community," Strawn said.

During the opening ceremony, concert sound and recording engineer Robert Scovill will give the convention's keynote address, "Live Sound, the Heart and Soul of Professional Audio," addressing issues impacting today's live sound community.

Given the theme of the convention, "Where Audio Comes Alive," AES hopes to tap the expertise of an individual who could address the intricacies of live sound. Scovill seems a wise choice, having

made live tours with bands like Tom Petty and the Heartbreakers, Prince, Rush and Def Leppard.

"[This] list of credits ...sends a clear signal that live sound remains a cornerstone of the AES constituency," Strawn said.

Other sessions include "Surround Sound-Now & In the Future," which will look at ways to bring the benefits of

surround sound to a larger group of music consumers and "Audio for HDTV," which will explore the ongoing lip sync problems found in high-definition broadcast environments. Workshops will cover surround mixing techniques, and a hands-on demonstration known as "Audio Data Compression," will allow participants to evaluate the different aspects of the coding process.

ANALOG AFFAIR

A master class—which Strawn expects to be a standing-room only affair—is the session "What's all this Analog Stuff, Anyhow?" Led by Robert Pease with National Semiconductor, the master class will explore the ongoing importance of analog components in audio devices.

"After all, audio begins and ends with analog components like microphones and loudspeakers," Strawn said.

AES will also usher in its well-orchestrated mix of special events and technical tours. This year's schedule includes a concert at Davies Symphony Hall with the San Francisco Symphony, followed by a smaller concert—only one instrument and one musician—at San Francisco's Trinity Episcopal Church, in which attendees will get to hear audio in full organ form from the renowned E.M. Skinner Opus 477 pipe organ.

Special AES tours include a behind-the-scenes look at the new home of George Lucas' Industrial Light and Magic studio in San Francisco's Presidio neighborhood. ■

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Watermark

CONTINUED FROM PAGE 10

distribution chain," Nann said.

Through many levels of video compression, scaling to half resolution, conversion and so forth, the watermarks remain decipherable. At some point, Nann said the video content can be degraded enough in quality to render the watermark useless.

The Philips watermarking system allows up to five separate watermarks to be applied to an individual piece of video, either all at the same time or each at a different time. The Thomson system allows three.

Marie offered a digital cinema scenario where the video is not only watermarked when original master versions are made and when copies are encrypted for delivery to theaters, but that a distinct watermark is applied each time the movie is decrypted for projection at the theater, adding theater identification,

time and date into this final watermark.

Both the Thomson and Philips watermarks are so robust that they can be found and decoded from a recording made by a camcorder in the theater. Reading the watermark off a pirated copy made from such a recording, Marie said "they can double-check according to a standard schedule of projection to the public, or in the middle of the night or very early in the morning, which would tell that there's some connection within the theater."

Another source of content piracy has been from awards voters and critics from advance DVD copies. In these cases, each copy is given an individually identifiable watermark so the disc's recipient can be identified.

"We're not trying to stop the individual who wants to make a copy so his daughter can watch it another day," he said. "We're trying to stop people from massively reproducing or distributing it." ■



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— Sean Richardson, Manager
Audio Post Production
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Road Warriors for HD

Truck companies respond to increasing demands for hi-def sports

by Claudia Kienzle

HAMILTON, N.J.

For the major networks that broadcast live HDTV sports, there are a handful of truck companies equipped to provide the state-of-the-art mobile HD production units that meet their needs.

In recent years, as quickly as these companies have added new HD trucks to their fleets, the networks—such as ESPN, CBS, NBC, and Fox Sports—have booked them for high-profile events as well as for a package of events. When the package is considerable, truck vendors have built HD units just to serve that particular network's schedule exclusively.

For example Game Creek Video, in Hudson, N.H., built a new HD truck for Fox Sports, which has already booked it with Fox Sports NFL A-level games, followed by NASCAR events. Since the package that Fox Sports offered promised to book the truck for 40 weeks of the year for possibly several years, it was worthwhile for Game Creek Video to invest several million

dollars in its design and construction.

"If the package I'm offering to a truck vendor is only for 15 or 17 weeks of football, then it probably doesn't pay for him to build a truck

us a lot of input into the design and technical specs because our production people will be living in that truck between racing and football for about 40 weeks a year."



HD11, NMT's newest HD mobile unit, will be doing Friday night NCAA Football for ESPN HD this fall, as well as NBA telecasts for ESPN when the season begins in November.

unless he can find another customer with a package that fills in most of the remaining time," said Jerry Steinberg, vice president of field operations for Fox Sports in Los Angeles.

When Game Creek was building the HD truck, Steinberg adds, "They gave

While the truck's crew is comprised of freelancers, some technicians and engineers have been hired by Game Creek Video, and some production people were hired by Fox Sports.

Fox Sports live HDTV sports telecasts are produced in 720/60p HD

with Dolby E audio and backhauled via fiber or satellite to the Fox Network Operations Center on the Fox lot in Los Angeles. Fox Sports is currently using the Game Creek truck to do six games a weekend for football, all in HD; as well as the All Star Game, post-season baseball; all of NASCAR; and the BCS Series College Football championship series, all being done in HD.

"If we count all of the HD events televised by Fox Sports, as well as all the local programming done in HD by our 23 regional Fox Sports Net sports networks, we're doing more HD than anybody in the country. And that speaks to the quality of our productions," Steinberg said. "It takes many HD trucks from many vendors to cover our HD production needs, and next year, our entire sports schedule will be entirely in HD."

For its football schedule, Fox Sports also hires two trucks from Florida-based FNF Productions; one from New Century Productions; one from Chicago-based Trio Productions; one from NEP for football B-games; and one from New York-based All Mobile Video for the football pre-game shows.

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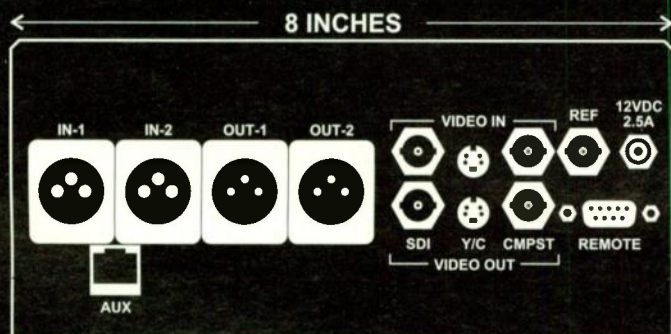
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Game Creek Video has five HD units and plans to add more, depending on demand, according to Pat Sullivan, president of the company.

"We are still trying to meet demand; however, we are approaching the point where supply will meet demand," Sullivan said.

Sullivan acknowledges the considerable influence that major sports networks have over the equipment and design of new HD trucks.

"Meeting the customer's need for more space and more equipment in a confined space is the biggest challenge in the sports production truck business

in a production truck that no one can use, no matter how good it may be."

NCP has four large HD trucks and is under contract to build another shortly. NCP trucks are also booked to cover ABC College Football, the AFC Championship pregame show and Super Bowl pregame show for CBS.

"The biggest challenge at NCP revolves around keeping our guys in the field sane. It's not anything new for the industry; however, it seems to have become more acute lately," Werteen said. "So much is expected of these individuals. They have to know the nuances of every piece of gear on the

truck and keep their wits about them during high-energy shows, all while working on a few hours sleep. The talented individuals are the ones who can handle it and we are lucky to have quite a few working for us."

Based in Denver, HDNet is a national television network dedicated to carrying all its programming—sports, news, movies, and entertainment specials—in 1080i HD.

HDNet's sports lineup includes NASCAR Grand National Division auto racing; National Hockey League, National Soccer League play-off games, college basketball, WEC Cage Fighting, and boxing.

Since HDNet owns all of its own trucks and has garnered well-established venue relationships, the biggest challenge the network has is finding good crews, according to Phil Garvin, general manager and co-founder of HDNet.

HDNet owns and operates two mobile units: the 40-foot HD-1, and HD-SX, a 44-foot expando. Both mobile units are paired with tractors that incorporate HD Ku-band uplinks with 2.4 meter dishes.

Signals are back-hauled to the HD broadcast center in Denver, which is equipped with editing rooms and an MPEG-2 digital switching infrastructure. And HD programming is maintained entirely in 1080i HD with nothing less than 5.1 channel surround sound.

HD-2X is equipped with a Grass Valley Kalypso 4M/E production switcher, while HD-1 has a Grass Valley Kayak 2.5M/E production switcher. HD-2X also carries two Sony HDC-900 1080/60i HDTV studio cameras, three HDC-50 HDTV handheld cameras, with a full complement of Canon HDTV studio lenses. The monitor wall includes one Panasonic 52-

ROAD, PAGE 18



Jerry Steinberg, vice president of field operations for Fox Sports with the new Game Creek HD production truck outside Giants Stadium at the Meadowlands in New Jersey.

today," he said. "Customers want space, flexibility, quick setup, and quality output. We will not purchase a major product without our customers' input."

Sullivan said that network customers want the latest generation multiformat cameras and lenses, which is why they chose the Sony 1500 cameras and Canon lenses. Another customer favorite is the Calrec Alpha 100 digital audio console—allowing operators to store their setups—which is installed on Game Creek's Patriot and Yankee Clipper HD trucks.

Besides the Fox Sports package of NFL A games, Game Creek HD trucks are also booked for ESPN Thursday prime football; ESPN Saturday prime football; and ESPN/ABC Saturday prime football.

DRIVEN BY TALENT

In Philadelphia, New Century Productions, provides multiple HD trucks for Fox Sports so that the network can cover NFL games, the Major League Baseball league championship series, and the World Series during this busy fall sports season.

NCP builds trucks robust enough to handle the demands of any network, according to Mike Werteen, vice president of production and marketing for NCP.

"Major sports networks have significant input as to what we purchase and install on our trucks," he said. "There's no sense putting a piece of equipment

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Road

CONTINUED FROM PAGE 17

inch HDTV DLP display and four 22-inch HDTV monitors. HDNet trucks are also equipped with EVS HD replay capabilities.

When it comes to serving up HD sports, EVS gear is among the prominent in the industry.

"There isn't a single major sporting event in the world that does not use EVS XT servers," said Gregory Macchia, general manager of operations for EVS USA, in Fairfield, N.J. Considered the de facto standard for mobile trucks, the EVS HD XT[2] server was used at the 2006 FIFA World Cup, at the HBS Broadcast Center, in Germany; at NBC's IBC at the 2006 Torino Olympics; as well as most Super Bowl, NBA Finals, NHL Finals, and major golf and tennis events.

"We also provide a real, high-bandwidth reliable HD production network allowing live access across multiple services, and archive this valuable content on XFile," Macchia said. "To facilitate better communications between the remote production units and studios, EVS introduced XFile removable drives, which can store up to 10 hours of HD content on a single IDE hard drive; as well as advanced logging features to enable studios to supplement the metadata from remote units.

BUILDING MORE

Another EVS customer is Pittsburgh's NEP Supershooters, which has a fleet of 14 HD units, with plans to add a few more next year. NEP's largest HD unit, SS24, which is actually two 53-foot double expando trailers, carries server-based EVS HD live Slo Motion disk recorders, as well as a Sony MVS-8000 production switcher with internal DVE and HD DVEous, and Sony HDC-900/950 1080i HD cameras and Canon lenses from 100:1 to wide-angle, and a Calrec Alpha 5.1 digital audio console.

"Our customers specify in detail

exactly what they want equipmentwise. Function takes precedence over form generally," said George Hoover, senior vice president of engineering for NEP Broadcasting, LLC.

"The challenge is blending the requirements of the various clients who might use a particular mobile unit in order to get maximum utilization of

there are seasonal shortages, which is why you see our industry building more HD units."

Frank Coll, senior vice president of operations for National Mobile Television in Los Angeles, agreed that the major networks have a very big influence on the equipment installed on today's HD mobile units.

"Truck rentals are won and lost based on the equipment complements of production units," Coll said.

NMT currently has nine HD production units and is rolling out a 10th unit this December, with plans to expand the HD fleet through upgrades and new builds at a rate of one to two annually based on demand.

"Although several mobile vendors have introduced a

number of large-scale HD production units over the past few years, there are approximately 50 HD mobile units in the U.S. and Canada currently, and there still seems to be a lack of availability on weekends, particularly in the fall during football season," Coll said.

NMT's newest HD mobile unit, HD11, will be doing Friday night NCAA Football for ESPN HD this fall, as well as NBA telecasts for ESPN when the season begins in November. NMT's HD1 is doing an HD NFL package for CBS this fall, while HD3 will be at Madison Square Garden in New York for Rangers and Knicks events on MSG Network.

And an updated HD6 will be handling Boston Bruins home events for NESN as well as Celtics home games for FSN New England, both in HDTV. And HD10 will be doing San Jose Sharks and Golden State Warriors telecasts in HD for FSN Bay Area; and HD12 will roll out for CBS Sports' cov-

erage of the PGA Tour in January 2007.

One of the biggest challenges that all truck companies face is the need to maximize very limited space and adhere to strict vehicle weight restrictions. Video monitoring throughout the truck is one critical area where efficiency is needed. Montreal-based Miranda addresses this concern with its new Kaleido-X multiroom, multi-image display processor and router, which was designed with production trucks in mind.

Introduced at IBC2006, Kaleido-X is designed to be an extremely flexible, multiroom, multi-image processor/router. Each of its 96 video inputs can be displayed any number of times, in any size across eight displays of any resolution and orientation without blocking or grouping restrictions.

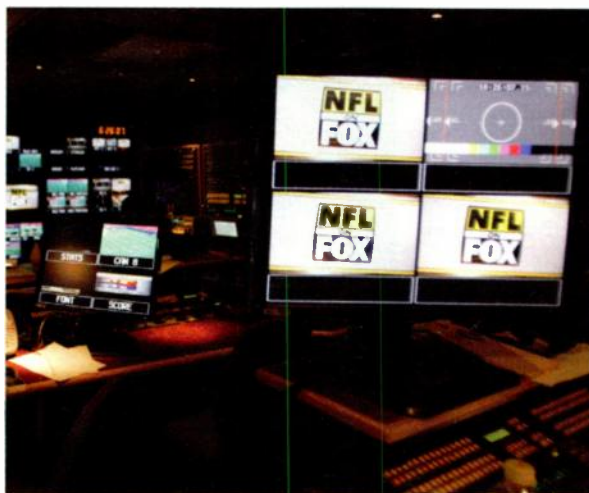
Kaleido-X offers up to 48 unprocessed, baseband HD/SD router outputs from any of the 96 HD/SD inputs to the processor. It features auto-sensing HD/SD/analog inputs which allow multiple source formats to be combined effortlessly.

DYNAMIC SUPPORT

The processor also offers dynamic text support and a tally interface with Grass Valley Kalypso and Zodiac switchers, as well as switchers from Ross Video.

"With respect to space and cost-savings, we realized that we could achieve a higher level of efficiency if we combined multi-image and routing functions in one processor. This would eliminate the need to use a separate, dedicated router for feeding monitors, test equipment, and the production switcher," said Louis Caron, Miranda's product development manager for multi-image technologies.

"Kaleido X is targeted at customers using multiple video formats," Caron said. "We're finding that nearly all new trucks are being constructed for HD operation, with primary content now being captured in HD, especially for events such as sports and entertainment." ■



The interior of the Fox Sports HD production truck

that asset and therefore lower the clients' cost," Hoover said. "Also, high-profile events demand the newest and best technology. With the short lifespan of equipment, it is a challenge to generate a return on our investment without charging the client an arm and a leg for it. Any PC or microprocessor-based technology is obsolete the day you take delivery."

Finding and recruiting qualified engineers is also a challenge, so NEP works to identify universities to partner with to develop new engineering talent.

NEP Supershooters is providing HD trucks for NBC's "Sunday Night Football" throughout the season. NEP HD trucks are also being used by Fox and CBS for NFL; ABC College Football; and NASCAR on NBC/TNT.

"There simply aren't enough HD trucks available to meet the needs of major networks," Hoover said. "More and more events are moving to HD and



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“Sony was the only supplier to step up to the plate.”

— Jason Taubman and Paul Bonar, Game Creek Video

HDemanding

Jason Taubman, VP of design for mobile production company Game Creek Video, faced contradictory demands. He tells us, “Some clients required the highest quality in 1080i and others demanded the same in 720p. Some venues only had fiber and some strictly triax. Sony was the only supplier to meet all these requirements in a single camera.”

“We committed to the HDC-1500, Sony’s 1080/60p camera before it was even a model number,” says Paul Bonar, VP of engineering. “And Sony committed to us. Their engineers heard our input on the large lens ‘sled,’ which works like a charm. We gave them distressed cable to help design the triax adaptor, which is brilliant. And in service and support, Sony has risen to every challenge and met every need. We’re now on our fifth consecutive truck with the HDC-1500, the best HD camera we’ve ever seen.”

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Switching: Familiarity Breeds Success

Sports networks dictate truck, stadium equipment

by Claudia Kienzie

HAMILTON, N.J.

On HD sports production trucks, the equipment complement is largely determined by the major networks that commission those trucks. As a result, many of the top HD mobile units on the market are similarly equipped in what amounts to an industry-standard configuration.

When it comes to production switchers, if the same switcher brand and model can be found on every truck a network books, its operators can always sit down to a familiar control panel. And they can load their preferred settings into the switcher, which saves considerable set-up time and maintains a consistent look from one show to the next.

INDUSTRY STANDARD

The ability of the Grass Valley Kalypso HD switcher to handle native 720p in a live environment plays a

large part in the product's success in the production truck market, according to company officials.

"When ABC, ESPN, and Fox Sports began booking trucks for their live events in 720p HD, we were one of the few manufacturers ready to offer native 720p production switchers and cameras, and so we won the business for trucks being built by companies such as NEP, NMT, and NCP," said Mark Narveson, director of product marketing for live production solutions for Grass Valley in Nevada City, Calif.

Today, Kalypso HD supports every major 1.485 Gbps format, including 1080i/60i and 50i, 720/60p and 50p, and 1080/24p, the latter of which is preferred for many live concerts. Narveson said that in large trucks, the emphasis is on production value, control panel size, and power consumption. Used on every major sporting event, the Kalypso HD offers up to 4 M/Es, four keyers per M/E, up to 90 inputs, and features like FlexiKey, which enables four different



NEP uses the Grass Valley Kalypso in its sports production trucks.

feeds out of the program preset of the switcher.

"This keying capability allows customers that have multiple clients to push different shows out of the same switcher, each with its own channel branding and graphics," Narveson said. "For example, it's fairly common for the same switcher to be used to produce both a clean feed and international feed and customize each program in terms of the graphics they contain."

Other features include a package called Spektra for lighting, glow and

throughout Europe and Asia.

Ross Video is also a leading provider of switchers to the sports stadium market, including Dolphins Stadium, in Miami Gardens, Fla. As one of the first stadiums to offer a HD in-stadium show on large Daktronics HD monitors, Dolphins Stadium installed the Ross Video Synergy 3 MDX 3-MLE, 96-input switcher last spring, and has used it to enhance the stadium experience at all Florida Marlins' home games.

"Like sports mobile units, stadiums are doing replays and using lot of

"With switchers, the user interface is paramount. The operation of the switcher must use a minimum of keystrokes, which is essential for live operation."

—Andrew Alexander, FOR-A

defocus effects; an internal HD stillstore that can record live video as well as FTP still or animated graphics for playback; picture-in-picture; and 2D with perspective. For internal DVE, there are up to six video and keyframe-based DVEs that provide most of the 2D, 3D and curvilinear effects needed, such as page turns and ripples.

SPORTS STADIUMS

While U.S. truck vendors are installing Kalypso in response to sports network demands, Ross Video's Synergy production switchers have been installed on many trucks

graphics and effects in their productions. And stadium control rooms are often as space-challenged as large mobile units," said David Ross, CEO of Ross Video, in Ottawa, Canada.

Ross Video's top-of-the-line model Synergy 4 MD-X is a 4-MLE architecture, with each MLE equipped with four channels of Squeeze & Tease 3D DVE; one floating UltraChrome Chroma Keyer; 96 serial digital inputs and 48 serial digital outputs; four channels of MLE Store (stillstore) with Media Cache moving image playback, and more for SD and HD production.

SWITCHING, PAGE 22

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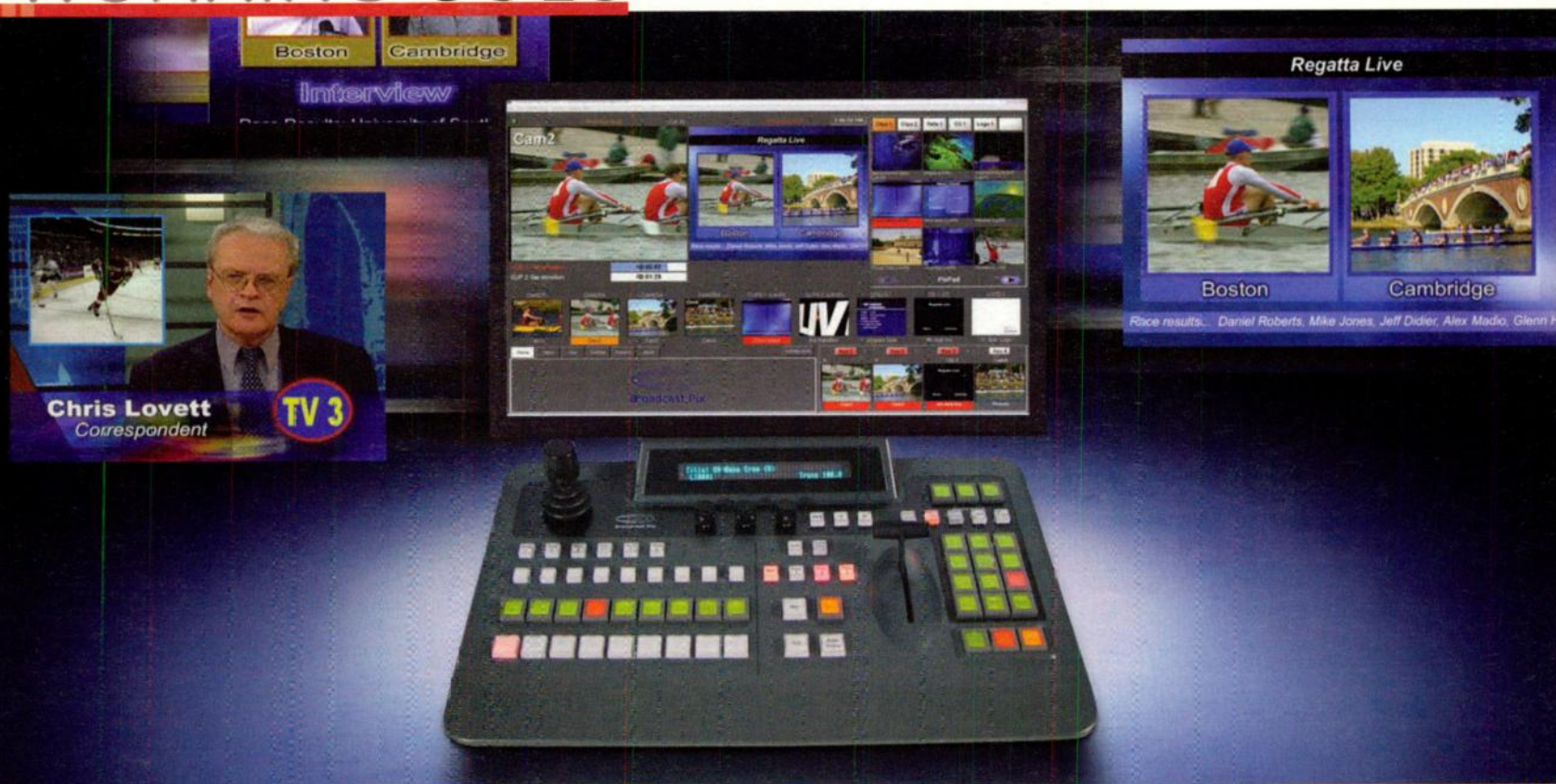
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World Radio History

Ross Video also offers an Overdrive Production Control System that provides touchscreen user interface control over servers, robotic cameras, audio mixers, and other external devices.

"Our feature sets are better than what Thomson has built into Kalypso," Ross said. "Unfortunately the reality is that on the big mobile units, sports networks have 'built their shows' around Kalypso because they want to standardize on that switcher. Then they can just bring in all their disks with the show's configurations onto any truck using that switcher. Because of this, truck vendors are locked into installing Kalypso or they risk losing that business."

DRIVING TOWARD HD

Interface Communications, a full-service television production company in New York, is converting its Hermes 33-foot mobile unit to HD based on the Ross Synergy 3. As the larger of the two trucks in Interface's operation, Hermes is a hybrid production-satellite uplink truck catering to productions of seven to eight cameras.

Hermes currently is equipped with

the Ross Synergy 3 3-MLE digital video production switcher, used for SD-only. However, with minor modi-



Interface Communications uses the Ross Synergy switchers in its Hermes HD production truck.

fications, the switcher will be converted to HD in December, along with every piece of gear on the truck.

"We plan to upgrade this truck to HD contingent upon winning a pending contract requiring HD production," said Dimitrios Lagos, manager

of remote operations for Interface Communications. "We can't justify shelling out \$2 million dollars to upgrade the truck if the business isn't there."

"We felt that the Ross Synergy digital switcher was the simplest to operate, with the best price performance," Lagos said. "With features like the built-in DVE, we can produce a product with quality comparable to what is produced by the far more expensive 'mega' switchers on the market for one-third the cost."

Interface serves a

diverse clientele that includes ESPN and NBA TV. For ESPN2, Hermes is regularly booked for live remote productions of "Cold Pizza," a morning sports talk show that broadcasts from various sports venues. And for NBA TV, the NBA's own channel, the truck is used to cover NBA games as well as promotional events featuring NBA players.

HUMAN INTERFACE

Most switcher manufacturers cite reliability, redundancy, and ergonomic design as critical attributes for production switchers on sports trucks. However, Andrew Alexander, vice president for For-A Corp. of Canada, in Toronto, added the need for an intuitive user interface.

"With switchers, the user interface is paramount. The operation of the switcher must use a minimum of keystrokes, which is essential for live operation," Alexander said.

The For-A switcher product line includes the HVS-3800HS Hanabi HD/SD 2 M/E digital video switcher, as well as the HVS-1000HS HD/SD 1 M/E switcher, both of which offer a powerful, compact design.

"For-A's niche in the switcher market is with smaller 1 or 2 M/E switchers. In the larger trucks, our switchers would be used as a submix switcher," Alexander said. "We also offer one of the only 'true 3D' DVEs in HD. Our 3D DVE can be used to create flying pizza-box effects that are very popular in sports coverage for scores and updates. And, switcher features like system memory and simple control of other devices, such as the stillstore or clipstore, are also very popular."

At Snell & Wilcox, the Kahuna HD/SD production switcher was designed to maximize space and power consumption on mobile units. It also addresses the growing need to

have dual SD/HD capabilities within the same mainframe, with the same control panel.

"In basketball, for example, the main cameras are now HD, but the net-cams hanging above the nets are lower-cost SD cameras in case they are damaged," said John Carter, production switcher product manager for Snell & Wilcox, in Hampshire, England, with offices in Burbank, Calif. "Both SD and HD signals need to be pulled into the final content stream, so a switcher than can handle both simultaneously, and from the same control surface, is more and more a necessity."

At the 2006 FIFA World Cup soccer tournament, the BBC used Kahuna systems at its studios and facilities in Munich and Berlin, Germany, mixing HD and SD sources in the same mainframe, and supplying transmission feeds in both formats simultaneously.

The Kahuna, which can be HD-only, SD-only, or multiformat HD/SD, offers four twin-channels of DVE effects and up to 80 SDI inputs.

FLEXIBLE FUNCTIONALITY

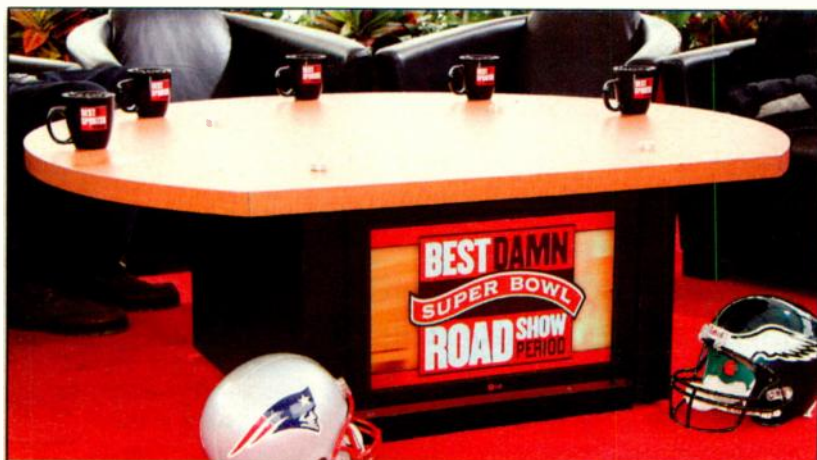
With more than 1,000 units shipped worldwide, the Sony MVS-8000A production switcher offers users a higher level of production flexibility and a broader range of signal management capabilities.

Version 5.3 of the MVS-8000A's software includes Multi Program 2 to enable true split mix-effect bank functionality, allowing the 2 M/E processor to be used like a 4 M/E switcher. And keys can be assigned to either the main or sub sections of the switcher, or to both simultaneously.

According to Lee Blanco, director of mobile operations for All Mobile Video in New York, "We have been involved with the Sony MVS switchers since version one of the software. Sony has continually met all software promises with working, stable features."

The MVS-8000A was also installed on ND3HD, a new HD truck from NEP Supershooters. First commissioned in May, the truck has been used primarily for covering golf and primetime football. The truck also features a range of Sony multiformat HD technology, including Sony HDC-1500 multiformat cameras.

"The design of the MVS-8000A has evolved since its inception," said Rob Wilcox, director of marketing for content creation at Sony Electronics, in Park Ridge, N.J. "The latest enhancements incorporate customer input, resulting in a system that professionals can put to immediate use in their jobs. The switcher is the core of any video production application, and it has to be flexible enough to meet the needs of a variety of users." ■



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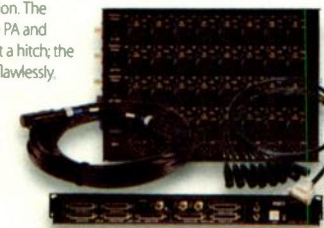
February 2005 & 2006: For six days leading up to the Super Bowl, live broadcast of the *Best Damn Sports Show Period* streamed live audio to Fox SportsNet, then went live to Fox Television before the game on Super Bowl Sunday. Audio Specialties of Burbank, CA deployed the portable fiber optic LightViper system to handle the audio feeds.

"I was extremely pleased with how well the LightViper performed in this high-profile network TV live broadcast situation. The main fiber run to the F&F Productions High-Def broadcast remote truck was approximately 1,000 feet away from the venue's live stage and we also needed to provide a separate monitor split from the LightViper system for the audience. The audio quality was excellent; we used all 32 mic inputs on the head end of the snake system."

"The LightViper digital snake elegantly solved one of our larger planning headaches for this show which was the long run to the broadcast truck's distant location. The terminations into both Yamaha digital consoles for live PA and audio master control in the remote truck went without a hitch; the new optical audio path was 'invisible' and performed flawlessly. I can't imagine doing a critical job like this now with a conventional copper snake."

"LightViper also saved us a lot of time and we all know what that translates into."

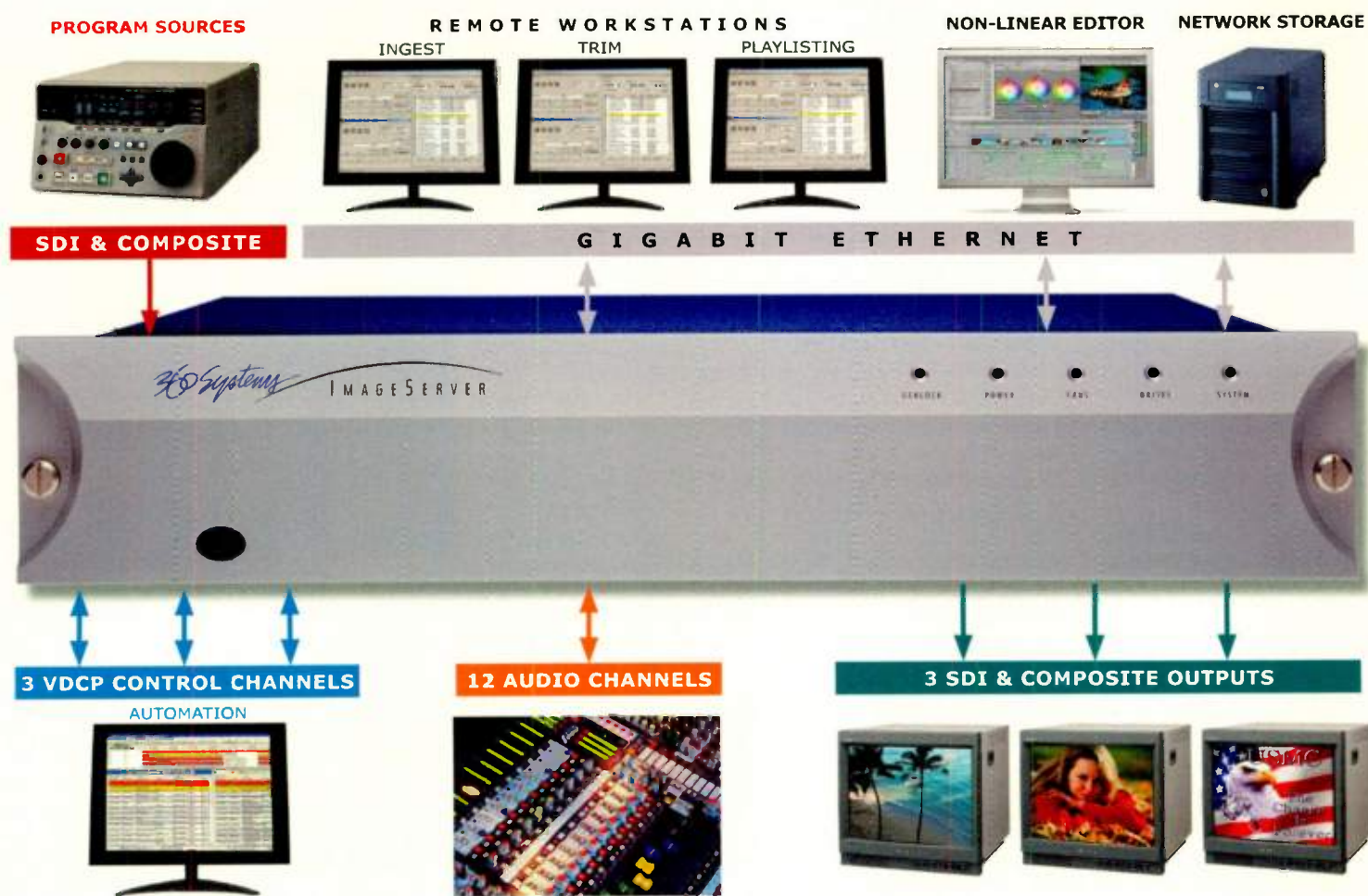
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360 Systems
BROADCAST

Maintaining a Consistent Audio Path

How Belo deals with 5.1 surround and stereo audio for DTV

by Mary C. Gruszka

DALLAS

Audio for the DTV transmission path has proved challenging for many stations. One issue is how to handle switching between 5.1 surround and stereo audio.

For many of the 19 stations in the Belo television group, it used to be the traffic department's responsibility to keep track of which programs and commercials were in 5.1 and which were in stereo.

"We used to put in a secondary event in the automation system to trigger a GPI to switch the Dolby encoder between the different modes," said Reed Wilson, technology manager for broadcast media at the Belo Television Group.

But switching audio this way led to viewer complaints that the center channel would jump to the side speakers.

To address this, stations and groups are tending to provide a constant surround sound signal for the DTV main channel, upmixing stereo to surround where necessary, and setting the Audio Coding Mode (acmod) on the Dolby Digital encoder to a fixed or 3/2L.

Belo decided to follow this concept with 11 of its stations installing the Neural Audio MultiMerge. Wilson said that most of the stations use the Harris FlexiCoder ATSC MPEG-2 encoder with the MasterPlus HD master control processor module which has two HD inputs and one SD input with upconverted and logo capabilities.

Since the MasterPlus switches video

with embedded audio, the output is run through an external audio de-embedder to extract the AES audio. AES is then fed through a TFT 940A for EAS, and then into the MultiMerge.

"The MultiMerge auto senses whether the input is stereo or 5.1 and always creates a 5.1 mix," Wilson said. "No longer do we need to GPI anything to switch between 2/0 or 3/2 mode."

FORMAT DETECTIVE

According to Dave Casey, product line manager for Neural Audio, "MultiMerge uses a patent-pending process of detection to determine if content is 2.0 or 5.1. When MultiMerge detects a stereo input, it automatically upconverts the audio to 5.1. There really is a .1 to the 5.1 as MultiMerge creates an LFE channel. MultiMerge uses the Neural Surround algorithm for up conversion and blends to UpMix mode instead of abruptly cutting over. Neural Surround is 100 percent backwards-compatible to L/R matrix encoded content. The upmix results in a stable and natural-sounding image without the traditional upmix issues broadcasters are familiar with such as dialog leakage or unstable surrounds."

The output from MultiMerge then feeds a Dolby DP569 AC-3 encoder, with acmod set to 3/2. This in turn feeds the FlexiCoder which provides SMPTE310 to the STL. (The FlexiCoder does not contain an internal AC-3 encoder.)

The FlexiCoder also takes in the main channel HD video as well as SD subchannels. The SD subchannels, like NBC's WeatherPlus or stations' local

weather channels, typically have stereo audio which is encoded in a separate Dolby DP569.

Another Belo station, NBC affiliate KGW in Portland, Ore., chose the Linear Acoustic OCTiMAX 5.1 audio processor as its upmixer.

"We didn't have the correct facilities to deal with the upconverted signal," said Tim Kerr, technical systems manager at KGW. "So we generated a station capital project to do it before the corporate level Neural Audio project."

The impetus for getting something on the air sooner was the 2006 Torino Winter Olympics. The station was also in the process of adding an HD master control switcher, the Grass Valley M-2100, and the new Grass Valley K2 shared storage servers for commercial play-out, all under automation control by a Sundance Titan. The project was completed about two weeks before the Olympics began.

Inputs to the HD M-2100 include an IRD with the NBC HD feed with 5.1 audio, a second IRD with the NBC HD feed but with stereo audio, the station's upconverted SD feed with stereo audio, and the outputs from the K2 servers. While the K2 servers provide 16 channels of embedded audio, they provide two AES outputs, Kerr said. The audio inputs to the M-2100 are AES.

The audio output of the M-2100 is a set of three AES pairs which feed distribution and patching, and for the first two pairs, a backup switcher. The first pair also feeds a TFT 940A for EAS.

PULLING THE TRIGGER

These three AES feeds are input to the Linear Acoustic OCTiMAX 5.1. The first AES feed is also copied into a fourth AES input on the OCTiMAX. (When a stereo source is switched on the M-2100 its output appears on the first AES pair.)

When the M-2100 makes a switch to a stereo source, the tally output acts like a GPI to trigger the OCTiMAX to switch to the fourth AES input (stereo) and then upmix the audio to 5.1. Whether the input to the OCTiMAX is stereo or 5.1, the output is always 5.1, and this is what feeds the Dolby DP569 encoder.

"The upmixer in OCTiMAX 5.1 is called upMAX, a proprietary algorithm developed by Linear Acoustic," said Tim Carroll, founder and president of Linear Acoustic. "We generate a true 5.1-channel



Jerry Paonessa, engineering supervisor at KENS, with the MultiMerge installation

nel output. The LFE channel is created by default, but can be shut off if desired, and some customers choose to do this for music mixing. upMAX provides realistic surround sound and is completely downmix and matrix decoder compatible, meaning that stereo and Pro Logic or PLII listeners also get the best audio possible."

As for metadata, Kerr said that the metadata from the NBC IRD is connected to the OCTiMAX input. The Dolby DP569 then receives metadata from the OCTiMAX, which passes through NBC metadata, but changes the acmod value to 3/2L when it upmixes.

OCTiMAX also provides audio level processing. "Level processing is automatically applied to both the 5.1 and the 2-channel programming to match network, local, and commercial programming," Carroll said. "The loudness control follows suit in the background and does not normally require additional operator intervention, although GPI control can be used to make processing changes if desired."

KGW installed a Wohler multichannel level meter panel in the master control room to confirm that the feed on the network HD 5.1 IRD really provides six audio channels. If by chance stereo is sent instead, the master control operator can take the HD with stereo IRD feed to be upconverted.

"We want to turn on the surround light on all the receivers," Kerr said.

The audio processing through the OCTiMAX and Dolby Digital encoder produces audio delays. "We adjust for lip-sync at the FlexiCoder by setting the video delay," Kerr said.

The audio for the upconverted SD feed must be de-embedded and then put through an AES delay before feeding the HD master control switcher M-2100.

"End users like it," Wilson said. "It allows simulated 5.1 and the dialog is always in the center channel." ■


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TUNING IN

Gary Arlen

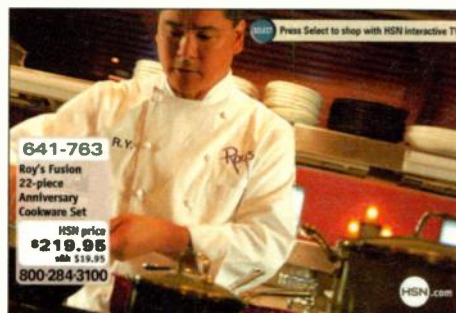
HSN's Remote Shopping Sparks New Interactivity

When Time Warner Cable launched "Shop by Remote" on its Hawaiian system last month, momentum picked up for the next wave of interactive TV. Using standard remote control devices, viewers can click on a "buy" icon in the upper right corner of the screen when they are tuned to Home Shopping Network—triggering a purchase of the product being offered. HSN expects to roll out remote-control ordering to many more cable systems in the coming year.

Although the spontaneous ordering concept has been bruited about for nearly 20 years, HSN's new push into T-commerce (interactive TV commerce) could be an important milestone. HSN's parent company, Barry Diller's InterActive Corp. www.iac.com, has spearheaded many e-commerce initiatives, and this venture signals an aggressive uptick in on-demand TV beyond ordering movies.

It's also a participatory gauge of whether the booming e-commerce world

(now generating nearly \$90 billion in annual sales) can transfer to TV. InterActive Corp. has a proven e-commerce track record; its current ventures include Ticketmaster, LendingTree, Match.com



HSN's "Shop By Remote" service features an interactive TV overlay prompting viewers to order the product on display.

and the search engine Ask.com. A year ago, IAC spun off its iconic travel businesses (including Expedia and Hotel.com). The company certainly knows how to handle electronic transactions.

Moreover, the Shop by Remote project may help HSN build its core business. HSN pioneered the TV shopping category, but currently runs a distant second to QVC, with about half the annual revenues (\$3 billion for HSN compared to QVC's \$6 billion).

Shop by Remote uses Tandberg Television technology at the set-top box and at the cable headend to process each order. The Tandberg Interactive TV platform includes software that delivers the application to the set-top box and displays and manages the application throughout the ordering process.

The Tandberg technology also communicates the orders from the cable headend to HSN's central order processing system and then confirms the buy back to the viewer.

Viewers can use their current remote control and set-top box for the process. The Tandberg technology is based on

interactive TV software it acquired when it bought GoldPocket Interactive last year. The solution requires a software download into the set-top, a Time Warner Cable spokesman said.

Although the Hawaii deployment runs on Scientific-Atlanta set-tops, a Tandberg Television marketing official said that it will roll the service out "to all set-tops for which HSN has the appropriate distribution deals, including all capable cable and all satellite boxes."

An HSN official confirmed that the telemerchant plans "on making it available to all systems, regardless of their set-top box." Cable operators do not pay any extra fee for using the interactive ordering system—and are presumably motivated to put the software into their headend and set-top equipment for the value of increased sales commissions from HSN.

SIGN-UP REQUIRED

Viewers must register to use the HSN remote service by phoning HSN or setting up an online account with credit card information and shipping address. The actual ordering process may take up to 20 clicks on the remote control—a potential user-surly hurdle, but one that seems necessarily to assure legitimate transactions (and prevent kids from abusing the easy-order process).

The remote process takes about 30 seconds, according to Scott Sanborn,

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HSN's senior vice president for marketing. That's far faster than the typical two-minute phone-in ordering time. Shoppers can customize their orders, specifying quantity, color, size and other factors—

"Our original intent... is to provide a service to our customers," he said. "Attracting new customers and sparking additional sales would be a bonus." In a low-key pilot project of the same

ule for that expansion is not yet clear.

In many ways, HSN's venture with Tandberg Television may become a key demarcation point in the long and bumpy road toward interactive TV. At a

the interactive TV infrastructure is more robust. Last year, QVC United Kingdom, handled more than 1 million orders using the BSkyB remote control button.

But QVC is not publicly speculating about its U.S. interactive agenda—admitting only that it is looking into such services, and acknowledging that its corporate culture rarely assumes the "first-mover" role.

Another factor in the interactive TV migration is the need for standards, which cable TV and broadcast organizations have been debating for decades. Big cable operators see click-to-order as part of an objective to beat satellite and telcoTV ventures.

A Time Warner Cable official acknowledged his company is "committed to industry standards as the best solution" for interactive ventures. He said that TWC "will only do limited market deployments with programming partners... until industry standards are implemented and supported across the board."

HSN's new initiative could mean that standards expectation is not so remote after all. ■

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Source: U.S. Department of Commerce Census Bureau, 2006

just as they do via HSN's phone-in and online systems. Order confirmations appear on the screen after each purchase.

HSN anticipates growing comfort levels with e-commerce will generate usage of on-screen ordering—especially among the growing coterie of tech-savvy women, who are HSN's core customers. Company spokesman Brad Bohnert said that it's "too early to say" what percentage of total sales will come in via Shop by Remote.

remote technology that began in spring at Cablevision Systems in Long Island, N.Y., HSN logged "thousands" of orders, Sanborn said vaguely in published reports. Other sources indicated that HSN generated several hundred-thousand dollars during the Long Island trial, even though there was no promotion for the remote ordering feature.

All HSN items will be available through the remote service as it moves into other markets, although the sched-

time when there is so much talk about "participatory" video and media's movement toward Web-based video, the relatively simple addition of an on-screen ordering system seems archaic—almost insignificant. Yet, the timing may be ideal—as digital consumers transfer their ordering fingerwork from a computer keyboard to a TV remote control.

QVC offers similar on-screen interactive shopping capabilities through its operations in Britain and Japan, where

Another factor in the interactive TV migration is the need for standards, which cable TV and broadcast organizations have been debating for decades.



AUDIO BY DESIGN

Mary C. Gruszka

5.1 Monitoring: Bass Management

When mixing in 5.1, if you're only monitoring the low-frequency effects channel on the subwoofer, you could be missing out on what the listener at home hears.

The LFE or .1 channel of the 5.1 mix is mainly used to add some low-frequency sound, generally in the 20 to 120 Hz (some say 80 Hz) range, often loud, to hopefully enhance the overall mix. Explosive booms, earthquake rumbles, thunder claps or the roar of a crowded stadium are a just a few examples of how this channel can be used.

Unlike the main channels, which in a professional monitoring environment generally use full-range loudspeakers, the LFE channel is reproduced with at least one subwoofer—a loudspeaker unit designed specifically to handle high-power, low-frequency energy.

However, in the consumer environment, the quality and frequency response of the loudspeakers in a home theater package can vary widely. Some offer full-range mains and a subwoofer. Others offer what are called "satellite loudspeakers" with a frequency response that starts around the top of the subwoofer

response (120 Hz or a little higher).

In the second case especially, most of the low-frequency energy in the main five channels would be lost simply because the loudspeakers weren't designed to reproduce them. If the LFE channel was reproduced in the subwoofer all by itself, it wouldn't make much aesthetic sense without the rest of the low-frequency content.

Makers of consumer surround sound processors recognized this dilemma, and many offer a function called "bass management" that provides a means of reproducing the original low-frequency content without using the main loudspeakers. Some systems are more flexible than others concerning implementation and how much control they allow the consumer.

FIVE TO TWO

In general, here is how bass management works. Each of the five main signals is split into two paths. On one path, each channel is sent to a high-pass filter (that strips the bass frequencies) and is passed along to its appropriate loudspeaker (left, center, right, left surround

or right surround).

On the second path, each of the full-range main channels are summed together, then put through a low-pass filter to extract the bass, and then finally summed with the LFE channel. This whole concoction then becomes the signal to the subwoofer. A far cry from what the audio mixer heard in the original 5.1 mix.

Not only that, bass management can allow the listeners at home to hear more in their subwoofers than the audio mixers in their control rooms. And not all of it is good.

Problems like external subway or traffic noise and rumble, HVAC rattles, plus hums, buzzes, microphone boom noise, and equipment scraping the floor as it's being moved can all be magnified when all the low-frequency energy from all the 5.1 channels are directed to the subwoofer.

These kinds of problems, especially in the very low end of the frequency scale, are often inaudible in the main loudspeakers, even those with good bass response.

What this means for audio mixers is

that in addition to all the other gotchas they have to watch for—downmix compatibility, levels, strong center channel dialog or announce, sound localization—while creating a well-balanced and aesthetic sound mix, they need to monitor bass management.

And that means putting the 5.1 monitor channels (not the mains) through an outboard bass management processor (assuming that some enlightened audio console manufacturer hasn't included it in the console itself), that can be selected or de-selected.

This is important to do even if the main monitor loudspeakers have excellent low-frequency response. By listening with bass management on, at some point in the rehearsal or program, an audio mixer will get a good idea of what the end listener will likely hear, including noise and out-of-polarity problems.

Another issue regarding bass applies to those listeners who don't receive discrete surround sound (like AC-3), but rather decode a left/right matrixed downmix. It's important for the audio mixer to remember that this downmix does not include the LFE channel.

The only bass that the listener will hear is that provided by just the main channels. So it's wise to create full audio bandwidth main channels, and not try to redirect the low end of these channels solely to the LFE channel. ■

Mary C. Gruszka is a systems design engineer, project manager, consultant and writer based in the New York metro area.



INSIDE BROADBAND

Will Workman

I Tube, YouTube, We All Tube

Who is Geriatric1927? His name is Peter, and he's a formerly obscure 79-year-old British pensioner whose video journals are watched by tens of thousands of adoring fans each day.

This widower has lived a life hardly extraordinary by today's hypercelebrity standards. Yet he has become Exhibit A in the YouTube phenomenon, and featured on the BBC, the Guardian, Reuters and other major news outlets that are hunting him down for a live interview.

With his geriatric handle—(but don't tell my mom, who was born the same year)—Peter airs his daily five to 10 minute Webcast from his home computer. Clues such as his accent indicate he may live somewhere in Northern England, but his identity has not been made public.

Tune into Peter's videos and they seem rankly amateurish. He sits in a dimly lit

room, with a black-and-white photo of his motorcycle the only backdrop amidst nondescript wallpaper. In a low, soothing intonation he recounts episodes from

back as if a vessel filling with memories.

Hypnotic, yes, but not soporific.

Whether drawn by the memories or the delivery, young "YouTubers," as he

Launched by Silicon Valley entrepreneurs in February 2005, YouTube has catapulted over similar ventures by Google, Yahoo and AOL to account for 60 percent of all videos watched online (100 million daily).

his life, from surviving the Blitz as a teenager to opening his own motorcycle shop to the death of his wife, frequently closing his eyes and rocking

calls them, are flocking to his daily dispatches, making him one of the most-subscribed video posters on the site. They leave adoring comments, both written and video.

"Thanks for sharing... It's really quite an inspiration to hear someone of your age talk to people our age about things that happened in the past, plus it's your personal life experience," said one girl, perhaps Chinese, in a video reply. "As I watch your videos, I gain wisdom, I guess, from what you say."

MASS CONSUMPTION

Launched by Silicon Valley entrepreneurs in February 2005, YouTube has catapulted over similar ventures by Google, Yahoo and AOL to account for 60 percent of all videos watched online (100 million daily).

Peter's posts represent only one genre of programming available on the site, which can range from pirated Daily Show clips to a video of Peeps battling in a microwave. The most popular homemade clip, "The Evolution of Dance," has drawn 31 million viewers.

YouTube is rapidly displacing MySpace as punditry's next endlessly dissected broadband Internet development. It's also drawn similar interest from investors and media conglomerates, with Wall Street valuing the privately held site at up to \$1 billion. (By comparison, Rupert Murdoch's News Corp. last year bought MySpace for \$580 million).

As a platform for video posting, YouTube is already challenging the dominant broadcast video paradigms. NBC, for example, recently threatened YouTube to pull pirated "Saturday Night Live" clips. That is, until someone smart at NBC realized those same clips were actually driving viewers to the live show.

Now NBC and other networks are jumping on YouTube as a cross-promotional platform. Not missing a beat, record labels are also seeking exposure for music videos, and YouTube executives vow to make "every music video ever created" available free on the site.

But this trend heralds a crisis of identity for the burgeoning platform, a crisis also at the core of broadband video's future. What will prove more popular, or drive more profitable ad revenue or cross-promotional deals: media produced for the masses or by them?

VIRAL VIDEO STAR

Peter's trials, in a microcosm, reveal this tension. In one recent post he says he had to stay up until 2 a.m. sorting through the 2,000 or so messages in his mailbox, separating fans' responses from media requests.

Though the latter beseech him for an interview, he said, "I do not want to have anything to do with them," adding that such interviews "would not only be pointless, but dangerous."

"The only people that I want to talk to are you," he said to his fans. "You people have taken me into your hearts and encouraged me to continue, and warmed my heart with your comments. I do read them all."

The irony is profound, bordering on tragic. Here's a man who only wants to tell his story to those with whom he feels he has made a connection, in the form of community, being hunted down by mass media outlets seeking to cash in on his cachet.

It's that very cachet—a tangible authenticity that echoes through his Webcasts and resonates with his audience—that Peter is trying to preserve. Despite his naivete about technology, he understands his deeper appeal.

"Basically, what you get is what you see," he said. "As friends, I can talk with you in an uninhibited way and tell you all my secrets, and that's the way I like it to be; I have nothing to say to the world in general."

Through its very unreal depicted "reality," and its spawning of celebrity cultism, media produced for the masses is increasingly attempting to co-opt this authenticity. But Peter's subscribers seem to see through the media mirage that has penetrated so deeply into our popular culture.

"You actually cared, and in this day and age it seems like no one cares," one fan stated. "These days people are so self-centered, and so superficial and so fake, and it's so refreshing to hear someone like you tell your story about what your life was like."

Refreshing, yes. And possibly revolutionary. ■

Will Workman is a former editor of telco industry publications Cable World and MediaView. He is now working on his PhD in mass communications. He can be reached care of TV Technology.

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FOCUS ON EDITING

Jay Ankeney

Tapeless: From the Field To the Edit Suite

We've all wanted to go tapeless ever since the CMX-600 dangled that tantalizing possibility before our editing eyes in 1971. An oddity then, disk-based editing has become so commonplace that Editware's release of a new linear, tape-based edit controller at NAB2006 was noteworthy mostly for its singularity.

Now that tapeless acquisition is starting to gain acceptance, we'll look at tapeless workflow from a post-production perspective.

Currently, there are several options for abandoning tape in the field, from recording to hard disk to using solid-state memory cards. But one of the first to benefit from real-world practicality has been the Sony XDCAM professional optical-disc system, unleashed only two years ago. Now that we've seen the advent of Blu-ray XDCAM HD discs, several stations have decided the system is ready for primetime.

With this year's release of Version 2.5 software for its Media Composer and NewsCutter NLEs, Avid has demonstrated that importing XDCAM HD into its systems is as smooth as tape. That is in part thanks to XDCAM recording incorporating the Media eXchange Format, or MXF.

"XDCAM uses a long-GOP MPEG-2 recording codec but wraps it in the MXF format which our systems read natively," said Matt Allard, senior product manager at Avid. "That means you just have to discover the footage with our Media Tool feature and import it directly to the editing disks without any need for a file translation."

Not wanting to leave Apple Final Cut Pro out of the competition, Sony released new transfer software for use with Apple's latest OS X Version 10.4, or "Tiger."

Free at www.sony.com/xdcamhd, this new software provides native interoperability between Sony XDCAM HD discs and Apple Final Cut Pro editing software.

"The industry is in the midst of a dramatic transition to both high-definition and tapeless production," said Rob Schoeben, Apple's vice president of applications product marketing, as the announcement was made. "Working

He recently traveled with a local high school choir that performed in Salzburg, Austria, as part of the international Mozart Festival, and shot the whole production with a Sony PDW-F350 in XDCAM HD.

The HD "Trip of a Lifetime" produc-

"Material... from the field shot on PDW-F350

cameras and ingested into our Avid Unity

shared storage

system... will be the

seminal production

for 'The News Hour'

in high definition."

—Ed Kennedy,

WETA



in close collaboration, Sony and Apple have paved the way by defining the world's first complete XDCAM HD workflow, from acquisition to post."

One of the first groups to commit to XDCAM HD for field production was News 12 Networks, a division of Cablevision Systems Corp., which will be adopting XDCAM HD for ENG and news production. Operating seven 24-hour local cable news channels in the Northeast as well as HDN News distributed in HD on EchoStar satellite, News 12 Networks decided to purchase 90 XDCAM HD camcorders over the next two years.

Brian Endres, photographer and editor for the News 12 station in Long Island, N.Y., has edited XDCAM footage in standard definition on a Leitch Velocity Q nonlinear editor and in high definition on an Adobe Premiere 2.0 system.

tion was edited in Adobe Premiere.

"We simply hooked up a Sony PDW-F70 XDCAM deck player to the Adobe system and transferred the material," Endres said. "Once you get the footage into the Adobe system, everything worked just as it would with any other HD source. But the ability to see thumbnails of each take on the XDCAM disks lets me pre-select scenes. This saved a lot of time during post because we did not have to watch the clock tick off minutes while we were rolling through tape."

Another shooter/cutter with News 12, Michael DelGiudice, has been using XDCAM HD for ENG work. But with no NLE available, he dumps his disc acquisition to DVCPRO tape in SD and cuts it using a Panasonic linear controller.

Although DelGiudice also appreciates the efficiency of viewing thumbnails of

each take on the XDCAM camcorder's LCD screen before editing, he admits that it can bring with it an unexpected cost in time.

"Since each reporter is fascinated by this new technology, they all want to review their stand-ups in the field," he laughed. "Unlike when using tape, I can no longer deflect their requests with concerns about accidentally stepping on a take. The discs won't inadvertently record over a shot, so I don't have that excuse any more."

Another early adopter of XDCAM HD is WETA, the PBS affiliate in Washington, D. C., and the production home of the highly acclaimed series "The NewsHour with Jim Lehrer" which WETA hopes will be the first daily national news show in high definition.

"We will be editing segments with our Avid NewsCutter and Symphony systems and will upgrade them for HD work, including DNA acceleration," said Ed Kennedy, senior director of engineering and technology at WETA. "Since we want all of our work to be at the HD level, we'll also install a Solid State Logic C132 audio board and a Sony DME-8000A high-definition switcher."

Kennedy feels the transition to HD editing will be fairly transparent.

"Material will come in from the field shot on PDW-F350 cameras and ingested into our Avid Unity shared storage system," he said, "and this will be the seminal production for 'The News Hour' in high definition. We'll keep everything in 16:9 and provide a center cut for standard definition. As we get experience with HD production and post here, it will spread out to our other bureaus."

OTHER OPTIONS

Several other tapeless options are available for production and post, and XDCAM HD is not the only one involving disc. But editors should also be aware of the growing buzz around a new alternative called AVCHD being developed jointly by Sony and Panasonic.

Using MPEG-4 H.264/AVC compression, AVCHD promises to be twice as efficient as HDV. Sony has announced AVCHD cameras for October and Panasonic should follow by the end of the year. The glory is that unlike tape-based HDV, this new format can be recorded to flash RAM, mini Blu-ray optical discs or fixed or removable hard disks.

Sure, some wags declare AVCHD is just a prosumer format. But that's what they said about DV 25 when it first came out. AVCHD is definitely tapeless, and with Panasonic not having an HDV camcorder to defend we can expect them to put a lot of marketing muscle behind 50 Mbps AVCHD. Rest assured that as the last part of the production chain, editors will be cutting it. ■

Jay Ankeney is a freelance editor and post-production consultant based in Los Angeles. Write him at 220 39th St. (upper), Manhattan Beach, Calif. 90266 or at JayAnkeney@aol.com.

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PRODUCTION MANAGER **Craig Johnston**

A Bit of Daydreaming Can Be Productive

What if your boss ordered you to devote only 70 percent of your time to doing your specific job duties at the company, 20 percent to things related to the company's business, and 10 percent of your time on far-out ideas?

Crazy, huh? Regular readers of this column know that I like to read about and share things about successful companies. One very well-known, successful company, Google, has just such a policy.

According to a recent Time Magazine article on Google, "Every employee is meant to divide his or her time into three parts: 70 percent devoted to Google's core businesses, search and advertising; 20 percent to pursuits related to the core; and 10 percent on far-out ideas."

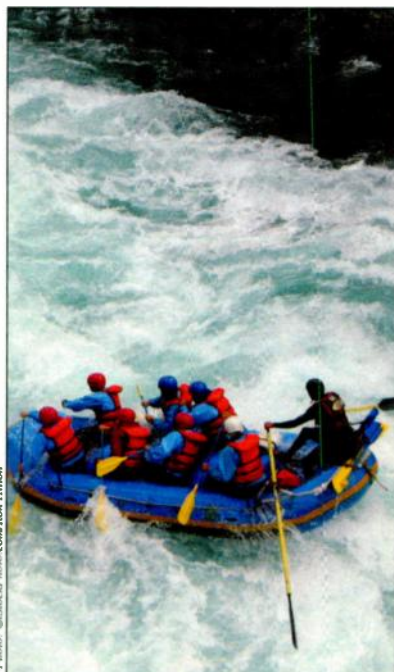
The article went on to describe several breakthrough products or services the company had launched as a result of one employee or another's far-out time.

Obviously, there are some differences between Google and the company you work for.

For one thing, Google is a relatively new company. I don't know when they put this policy into effect, but you can bet that they have gone out of their way since then to hire people who will work their tail off during the 70 percent part, and will make good use of the other 30 percent of their time.

Depending on how new you are in

your manager position, you may have had little or no hand in hiring most of the people who work for you, and up to this point you've not been hiring with that 70-30 stuff in mind.



That's still no reason to kiss such an idea off without seeing how it, or something like it, could work in your shop.

I think first off all it comes down to what kind of activities would constitute the 20 percent "pursuits related to the core," and the even harder to define 10 percent "far-out ideas." What an

employee might think qualifies, and what you (and your boss) think would qualify, may be quite different.

So you may not be able to plunk down a policy that breaks down time,

You may not be able to plunk down a policy that breaks down time, 70-20-10, and say, "go for it," but there may be a way to wade into the water and test it.

70-20-10, and say, "go for it," but there may be a way to wade into the water and test it.

Let's look at 10 percent of an employee's time. That's one day every two weeks, or 48 minutes in an eight-hour workday. You don't even have to commit to that total amount of time in

the beginning, and you don't have to try it with everybody at the beginning.

What if you gave employees, on a voluntary but paid basis, the chance to shadow people working in other parts of the company? For instance, work it out with the news director to send them out on a story in the morning, and follow the video through the logging, script writing and editing process.

Or send them up to the transmitter site with the engineers for a day of maintenance.

Or out with a commercial production crew.

It could be ticklish because those they are shadowing might feel like they're in the way, there might be a union situation that mandated they could be on site, but not touch anything; who knows?

But what could come back from that is an appreciation, for instance, for why news scripts and edited pieces frequently come in at the last moment. It's not exactly dealing with Google's far-out ideas, but it might be a start.

One of the reasons you're probably reading **TV Technology**, other than to try to choke down another one of my columns, is to keep up to date on gear. What if you assigned one or several of your people to look at how to redesign your facility as, let's say, a central server-based facility. Make that 10 percent of their job.

GREAT EXPECTATIONS

Here, in addition to somehow managing their time, you've also got to manage their expectations. Just because they design it doesn't mean it's going to be built.

But this just might qualify as resulting in a far-out idea. People from your part of the station may look at the facility entirely differently than the folks who normally design such facilities, and down the road the information they've gathered and the report they write might have a very positive effect on the upgrade when it does happen.

What if you had an employee or two spend 10 percent of their time working with you on your operating budget for the next year, and helping you come up with your quarterly projections?

They not only might come out of the process with a greater appreciation for controlling the costs of what they do, they might also have some suggestions that would make this budgeting work easier for you.

I think Google is really on to something here, and I think they get a double win out of it because they may not only get some good operating and product ideas out of it, but they probably develop better employees along the way. If you just got that second part accomplished, it would be well worth it. ■

Craig Johnston is a Seattle-based Internet and multimedia producer with an extensive background in broadcast. He can be reached at craig@craigjohnston.com.

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DIGITAL TV

Charles W. Rhodes

NTIA Proposes Minimum Performance Standards

The ATSC document A/74: ATSC Recommended Practice: Receiver Performance Guidelines could be the basis for National Telecommunications and Information Administration performance standards for the 10 million federally subsidized digital-to-analog converters.

That document was never intended for such purposes. It appears to be a compendium of the performances of commercially available DTV receivers in the 2003-04 era, which has little bearing on what it takes to reliably receive DTV signals as envisioned by the FCC in its planning factors for DTV, (see OET Bulletin No. 69, revised).

Specifically, A/74 states the dynamic range of DTV signals is -83 to -8 dBm. However, the FCC used as planning factors a signal-to-noise ratio of 7 dB at UHF and 10 dB for both VHF bands. Based on the 7 dB receiver noise figure, the minimum usable received DTV power is -84 dBm, not -83 dBm. By inference, the ATSC document indicates that DTV receivers may not achieve the 7 dB noise figure.

Where DTV reception is noise-limited, a low noise pre-amplifier mounted on the rooftop directional antenna could more than make up for the weak signal in UHF and high VHF, but probably not in low VHF, where manmade noise picked up by the antenna dominates receiver-generated noise.

Alas, the cost of such a low-noise receiver exceeds the subsidy, so its benefits do not extend to folks in weak signal areas, unless these DTV converters are tested under weak signal conditions not anticipated by A/74. That document lists three desired signal powers: -68, -53 and -28 dBm, all of which are well within the dynamic range of terrestrial broadcast DTV signals and over which digital-to-analog converters should work.

The weak signal power, -68 dBm is 16 dB above the low end of the range. A DTV converter with an effective noise figure of 20 dB would work at -68 dBm, but not much below it, no where near -84 dBm.

DYNAMIC RANGE

A simple test to find the lower end of a receiver's dynamic range is to feed a DTV signal at 0 dBm into a calibrated attenuator set to -85 dB and then to the receiving device under test. Unless the device under test has a noise figure below 6 dB, it will not decode the data. Decrease the attenuation in 0.5 dB steps until it does decode. You have found the lower limit of its dynamic range.

The other end of the dynamic range of DTV signal power is limited by receiver overload. This is much more important. A/74, in Appendix D, Table D.1, gives the computed received power at an urban site in Southern Florida for

all stations in that area. It is based on the FCC planning factors for DTV.

While the text of A/74 suggests the maximum received power is -8 dBm, Table D.1 gives higher values for several DTV signals, up to -5 dBm. This is average power. The text notes that mul-

Alas, the cost of such a low-noise receiver exceeds the subsidy, so its benefits do not extend to folks in weak signal areas...

multiple strong undesired signals may be present, which Table D.1 clearly illustrates. However, A/74 does not suggest how to calculate the combined effect of such multiple DTV signals.

DTV-to-DTV interference results from nonlinearity in the signal path. The distortion that results is related to the peak voltage seen by the nonlinear devices. When two or more DTV signals are present, it is their combined

peak envelope power, not average power, that counts.

Convert power to RMS voltage squared across 75 ohms. Convert this to peak volts squared and take the square root (peak voltage per signal). Add these peak voltages, square the sum and divide by 75 ohms to get peak envelope power.

One strong DTV signal can overload a receiver. When overloaded, third-order intermodulation (IM₃) products are generated. It is well known that some of these fall in the first adjacent channels. The rest of the IM₃ is within the DTV channel masked by the DTV signal. These IM₃ raise the noise floor under the desired signal. If the noise floor is 15.2 dB below the desired signal, reception fails.

Dr. Oded Bendov has shown the desired signal is subject to cross-modulation that results from the same third-order nonlinearity that produces IM₃. Where there is IM₃, there will also be cross-modulation.

The upper end of the dynamic range of DTV signals that a given receiver can handle is set by the combined IM₃ and cross-modulation in the channel. Dr. Bendov provided such data in "Transactions on Broadcasting," Vol. 51, March 2005. He will also be presenting a DTV interference paper at the IEEE Broadcast Symposium Sept. 28-30 in Washington, D.C. His paper will be published in the December issue of "Transactions."

A simple test also will determine the upper limit of a receiver's dynamic range. A DTV signal at 0 dBm is fed through a calibrated wideband attenuator to the receiving device under test. With 0 dB of attenuation, the receiver sees 0 dBm and will probably not be able to decode the DTV data stream.

Increase the attenuation in 0.5 dB steps until the receiver is able to decode the DTV data stream, and the upper limit is established. Table D.1 indicates the strongest DTV received signal power is -5 dBm. DTV receiving devices should be able to handle a signal up to -5 dBm. I believe the dynamic range of DTV receiving devices, including DTV converters, should be -84 dBm to at least -5 dBm. Over this entire range, such devices should work unless the TV service is interference-limited within the noise-limited coverage area of the station.

CHANNEL INTERFERENCE

While we usually think of co-channel interference only near the edge of a station's noise-limited coverage area, there are two exceptions.

In the first, co-channel interference may result within a station's coverage area if it employs multiple transmitters operating synchronously, as in distributed transmission. If the adaptive channel equalizer of the receiving device cannot treat the weaker signals as ghosts, they act as a noise source within the channel. By varying the delay between

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NTIA

CONTINUED FROM PAGE 34

the stronger and weaker versions of the same DTV signal, one can quickly find the range over which its dynamic channel equalizer works.

The second situation is where a strong DTV signal overloads the receiver, generating enough distortion products

within the channel that the data cannot be decoded.

It is now well accepted that adjacent channel DTV interference is due to receiver nonlinearity. Under moderate to strong received signal power, the receiver tuner is overloaded.

This was first published by Gary Sgrignoli in 2003 and elaborated upon by Dr. Bendov and myself in our recent papers published in IEEE Transactions

on Broadcasting.

Sgrignoli, Bendov and I reported that the total sideband splatter radiated into each first adjacent channel by a legal DTV transmitter is 44.5 dB below the ERP radiated within its channel. This received sideband splatter is attenuated by about 2 dB in the receiver so it is 46.5 dB below the undesired signal being received.

This is noise within the desired chan-

nel. As Sgrignoli reported, DTV reception fails when the desired-to-undesired ratio is -31.3 dB, because the received splatter increases the in-channel noise, lowering the signal-to-noise ratio to 15.2 dB.

The FCC established a desired-to-undesired ratio for DTV-to-DTV adjacent channel interference to -27:±1 dB in 1998. There isn't a lot of headroom between -31.3 dB and -27 dB for any additional noise within the desired channel. In fact, where undesired, or U = -5 dBm, the desired (D) signal must exceed -36 dBm for a perfectly linear receiving device. At D = -36 dBm, the receiving device would have to have a third-order intercept power (IP₃) above 24 dBm which I don't think is feasible. Fortunately at D = -30 dBm, IP₃ of 15.7 dBm suffices, and this is a value that can and should be provided.

The amount of additional in-channel noise that can be tolerated depends on the strength of the received desired signal and the undesired DTV signal power on one or both adjacent channels. While the FCC has one D/U ratio for lower and one for upper adjacent channel interference, it still does not recognize that there is a maximum U for each D level.

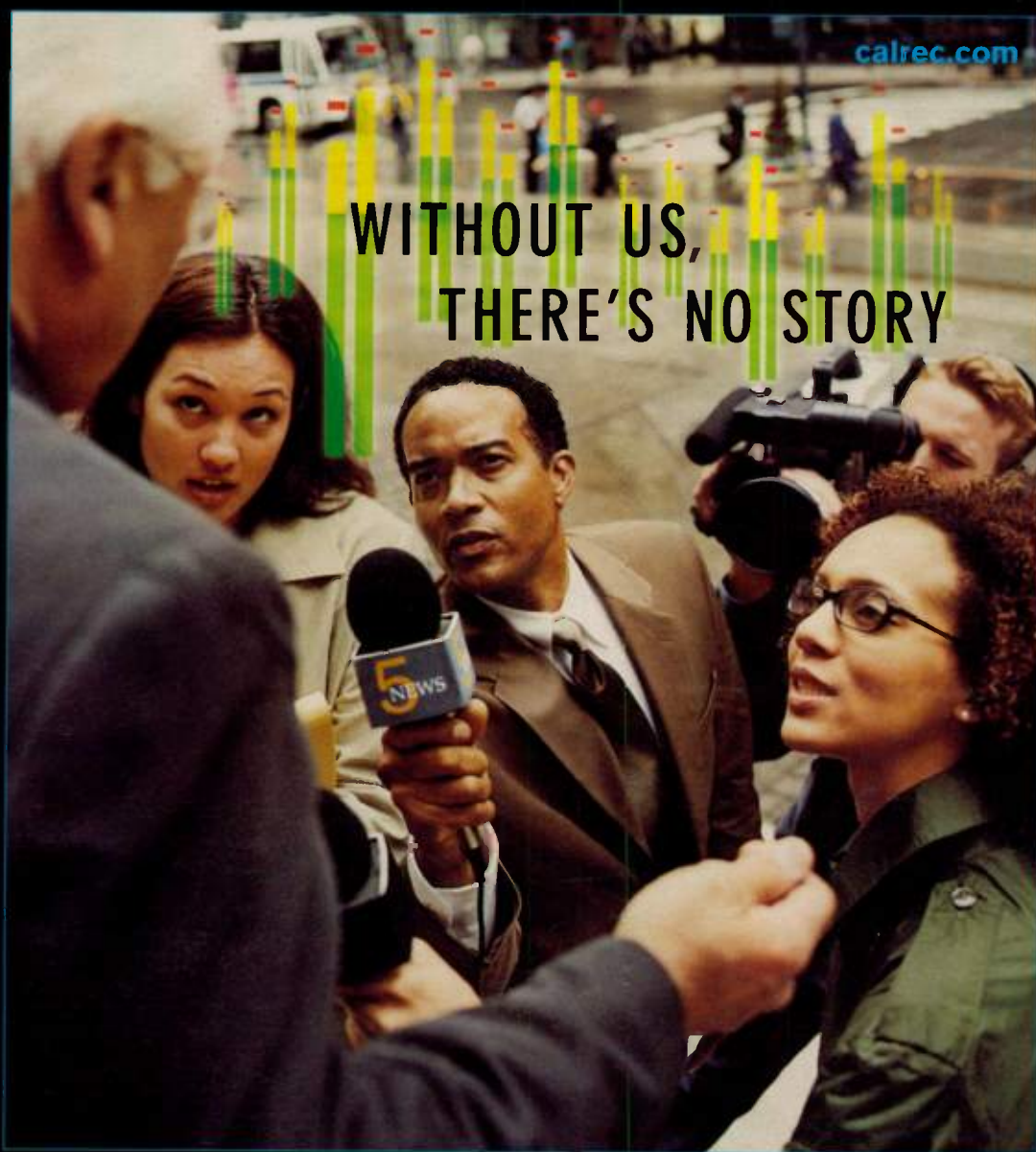
A/74 gives two values for D/U for ACI between DTV signals for D=-68, -53 and -28 dBm. These are the D levels at which the ATSC directed testing to be carried out in 1995. Those tests were designed to choose between competing modulation schemes. As each modulation scheme was tested with its own proprietary demodulator, we tested at signal levels well above where those differences in tuners such as noise figure and voltage standing wave ratio could mask the results.

Testing at -68 dBm cannot indicate performance between -84 and -69 dBm, as below -70 dBm, the effect of receiver-generated noise comes into play. Testing at -28 dBm will not provide useful information about receiving device performance between -27 dBm and -5 dBm.

Manufacturers would welcome such restricted testing, but this is not in the public interest. It is in the interest of broadcasters that the market is not flooded with DTV receiving devices that do not operate over the wide dynamic range unique to terrestrial DTV broadcasting. It is time for the broadcasters to speak up.

The NTIA deadline for filing comments on its notice is Sept. 22. There is much yet to be said about testing DTV converters using A/74. Next month, that will be my topic and I hope the NTIA will extend its deadline for comments so this critical issue can be treated as it deserves. ■

Charlie Rhodes is a consultant in the field of television broadcast technologies and planning. He can be reached via e-mail at cwr@bootit.com.



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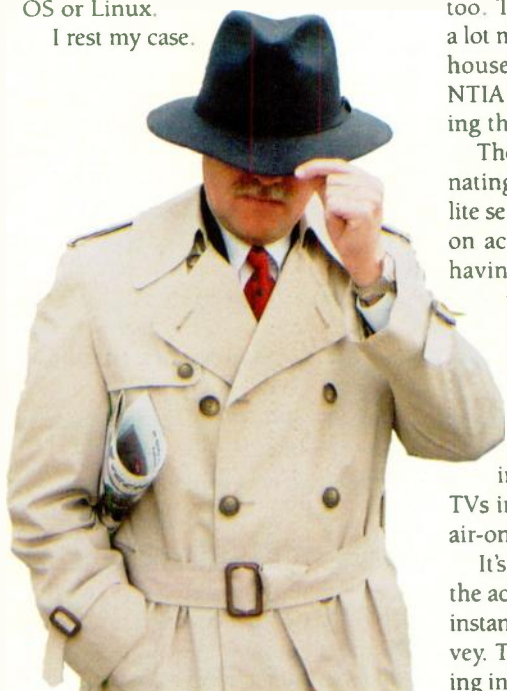
Mario Orazio

NTIA's DTV Dilemmas: Box, Stock and Barrel

You might not have noticed that a good chunk of Americans don't believe in evolution—a lot more than in 31 European countries or Japan. Only in Turkey, according to results reported in Science magazine in August, do more people reject the idea that humans evolved.

Don't worry; I ain't here to rant about creationism or "intelligent design" this lunar cycle. I'd just like to point out that, iPods notwithstanding, residents of the U.S. of A. ain't necessarily the brightest bulbs on the technological scoreboard. Forget Darwin; try Windows versus Mac OS or Linux.

I rest my case.



No, this month I'm here to pity the poor National Telecommunications and Information Administration, and I do mean poor. Our all-wise Congress has provided NTIA with "not more than \$5 million for consumer education concerning the digital transition and the availability of the digital-to-analog converter box program." As TV Technology Managing Editor Deborah McAdams has pointed out, that covers first-class postage to fewer than 13 million households.

If they skip the mailing and can condense their message into 30 seconds, they could buy commercial spots on the next two Super Bowls and still have \$200,000 left to produce the ads.

Yes, they're poor.

Broke or not, they've been given the task of turning another \$890 million

(after administrative expenses) into \$40 coupons to be applied towards the cost of buying a digital-to-analog TV converter, better known as a set-top box (although how you get an STB to sit on top of an LCD or plasma TV, I ain't yet figured out). My lightning-fast calculator says \$40 into \$890 million goes 22.25 million times (and Congress says they could, if necessary, go as high as \$1.34 billion, after expenses, or 33.5 million coupons).

THE COUPON CLATCH

Now that's a lot of coupons, and this time there's enough postage for them, too. There's just one hitch. There are a lot more than 22.25 (or 33.5) million households in the United States. So NTIA has asked for some help in picking the lucky winners.

They figured they'd start by eliminating anyone with cable TV or satellite service. The NAB says that's uncool on account of some folks with cable having some TV sets that ain't connected, and also on account of there being more TVs in off-air-only homes than the maximum number of coupons. For both, they use a Government Accountability Office report saying there "are" 73 million off-air TVs in use, 45 million of them in off-air-only households.

It's maybe worth having a glance at the actual report (GAO-05-258T). For instance, NTIA didn't conduct any survey. They bought data collected starting in February 2004. Just in case you ain't noticed, it's now September 2006, and the coupons ain't getting distributed until 2008.

Now then, the percentage of TV households connected to cable or satellite has, according to Our Beloved Commish (the FCC), been increasing annually. The data GAO purchased showed about 19 percent of households had not cable or satellite in February 2004, with a margin of error of plus-or-minus six percentage points. Our Beloved Commish found about 14 percent off-air-only households as of June 2005, which could have been on account of satellite-subscriber growth. Anyhow, it's within GAO's margin of error.

Using the larger, GAO number, that's around 21 million coupons, which is less than 22.25 million. That ought to

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thinking inside the box

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Dilemmas

CONTINUED FROM PAGE 37

mean that every off-air-only household can get one. But there's a hitch.

According to Our Beloved Com-mish, the percent of homes that have cable has been dropping each year. Satellite more than makes up the difference, but, depending on your pro-

gramming package, you might not get local channels that way. You could be a satellite customer and still rely exclusively on off-air reception for local TV. The GAO commissioned a mini study of this and found almost a quarter of satellite subscribers getting local channels off air—back then anyhow.

Congress offered another hitch. Households can ask for two coupons each, in which case there ain't enough

after all. So NTIA's trying to figure out who can get coupons. That's the "box" problem. The "stock" problem is where those boxes come from. Welcome to another hitch.

Congress said the box is "a stand-alone device that does not contain features or functions except those necessary to enable a consumer to convert any channel broadcast in the digital television service into a format that

the consumer can display on television receivers designed to receive and display signals only in the analog television service, but may also include a remote control device."

So, if the box offers a program guide, you can't use a coupon to buy it. If it's



Will there be pix on TVs when the Great American Viewer switches from analog to digital?

got a recording-output spigot, it's likewise taboo. Methinks even baseband audio and video outputs would put it off limits. So what manufacturer is going to want to make boxes that most customers won't want to buy? It's a head scratcher, all right.

That brings us to the "barrel." You know what a barrel is. In consumer RF, it's an F-81, a double-female coaxial antenna connector.

Way back at the beginning of this month's folderol, I mentioned that the American public ain't exactly a bunch of Mr. Wizards. Those who are watching off-air TV are maybe using the rabbit ears that came with the set or else an old TV antenna attached to a chimney and pointing somewhere or other.

If so, the analog pix they're getting probably ain't much to write home about, but so what? They're there.

(FYI, Professor Nitpick, aka Mark Schubert, even claims to get very good off-air reception via rabbit ears in his Manhattan-canyon apartment. So he claims.)

Will there be pix on TVs when the Great American Viewer switches from analog to digital? With a rooftop antenna pointed the right way, the answer's probably yes. But that might take a barrel, and even an F-81 is probably beyond the ken of the GAOV. So NTIA is considering tech specs for boxes, too.

They've asked for ideas. Best of luck! ■

Mario Orazio is the pseudonym of a well-known television engineer who wishes to remain anonymous. E-mail him at Mario_Orazio@imaspub.com.



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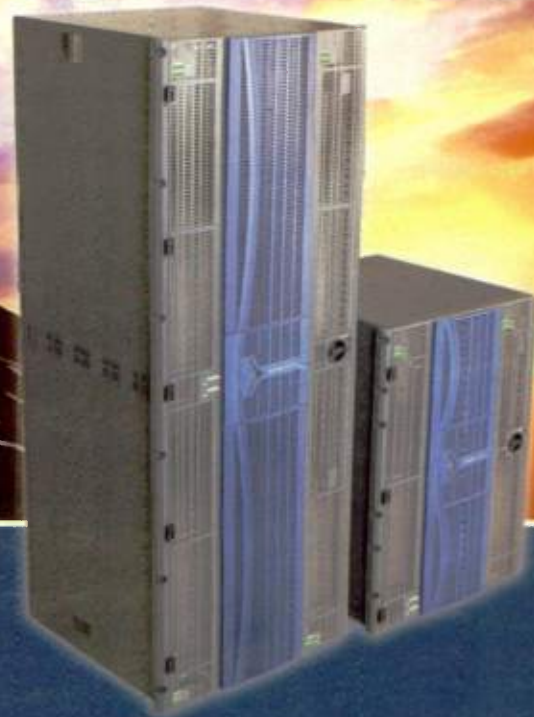
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THE BIG PICTURE

Frank Beacham

Crossing the Line to On-screen Confusion

The maxim "every picture tells a story" usually comes under challenge whenever an amateur videographer works without understanding the basic language of the moving picture medium.

Just as an understanding of grammar is an ingredient in good writing, there are conventions that audiences have come to expect when watching video or film.

Rules, of course, are made to be broken by artists. Most of today's camcorder users, however, are not artists. Those who ignore the tried-and-true conventions of the motion picture process without understanding why are usually doomed to failure.

DRAWING THE LINE

Every video—whether an industrial, educational, commercial, documentary, or dramatic production—is designed to tell a story. How the videographer selects the individual images and pieces them together in an edited sequence determines whether the story is effectively told or leaves the audience confused.

A key consideration in creating a sequence of shots is to maintain clear screen direction for the viewer. That is, to keep everything—people and objects—facing the same direction as the camera switches shots.

Though this may sound simple and obvious, it is a common problem that

can cause the audience to become disoriented when the camera position is changed.

All of us have seen reverse cuts when a person moving one way across the screen suddenly reverses direction; or when two people, facing each other, are having a conversation and suddenly one

As long as the camera stays on one side of the line, it can move freely from shot to shot, and screen direction will be maintained.

Though in theory this sounds like a simple rule to follow, in the real world of production, there are times when crossing the line is necessary. There are

All of us have seen reverse cuts when a person moving one way across the screen suddenly reverses direction; or when two people, facing each other, are having a conversation and suddenly one appears to be talking from behind the other.

appears to be talking from behind the other. In both cases, the camera operator has "crossed the line."

The so-called "line" represents an imaginary linear reference point drawn through a scene over which the camera may not cross without shaking the audience's sense of screen geography. The line can be referenced to movement, eye contact between subjects or any other area of interest in the scene.

several ways to do so without confusing the audience. These techniques are essential to the videomaker's craft.

One way to cross the line is to let the audience see the subject change direction on screen. For example, a motorcycle that moves toward the right of the screen, then turns and moves toward the viewer and then turns away and moves to the left clearly alerts the audience to the changes in screen direction.

In this case, the camera never moved and the line simply changed with the on-screen action.

Another way to shoot this same scene would be to have the camera move on a track across the line as it follows the movements of the motorcycle. Again, the audience sees the motorcycle reverse direction and keeps its geographic footing on the screen.

TRANSITIONAL SHOTS

A frequently used method for crossing the line is to place the camera exactly on-the-line for a transition shot. Examples of this can be found in one of the greatest chase scenes ever filmed. The chase in "The French Connection" not only demonstrates how to cross the line by intercutting an on-the-line transition shot, but how the use of artful composition and rapidly sequenced camera angles can build suspense.

In constructing this scene, director William Friedkin used knowledge that artists have known about picture composition for centuries: Objects placed in the right side of a rectangle communicate an exaggerated sense of power, while objects placed on the left create uneasiness and tension.

Friedkin also knew that scientists have discovered that when we view a surface—like a television or movie screen—our eyes constantly move in a pattern around the screen. Our brain resolves that movement into a steady image. The director used this natural eye movement and left side discomfort along with some fancy cross-the-line footwork to create tension in this classic chase sequence.

Gene Hackman, as Popeye Doyle, pursues a villain on a train. The scene begins with emphasis on the right side of the screen. Then the action moves to the left. Then a neutral shot—a shot made directly on-the-line—is introduced. It is Hackman behind the wheel of his car.

This shot allows a reverse of screen direction. Then the scene gradually gets more tense, the action moving sharply to the left and the camera angle frequently crossing back and forth across the line. The human eye and the objects on the screen collide, inducing stress in the viewer.

But as screen direction flip-flops back and forth, the audience is never confused or disoriented. The sense of time and place are always secure. This scene is a study in how crossing the line can transcend into an art form.

BACKGROUND SUBJECT

Another variation of the screen direction rule is often used to the benefit of camera operators shooting single-camera interviews for news and documentary programming. Let's assume the best background on a location has been chosen for the interview subject and the background behind the interviewer, who

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- Michael Drazin, Engineering Consultant



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SBE UPDATE

Vinny Lopez

Planning Ahead: Upcoming Events

The approaching fall season marks the busy time for SBE regional conferences and conventions. Typically, each year brings us at least a half a dozen events throughout the country. For the fall of 2006, there are four regional conventions scheduled, with two taking the year off to return in 2007.

In today's world, one cannot underestimate the value that each of these shows provides to SBE members and other industry professionals. Face it, not everyone gets to go to the big dance in April in Las Vegas.

DISCOVERING NEW GEAR

These SBE regional shows can provide a valuable alternative and opportunities for educational experiences through a workshop or session, and most feature an exhibit floor overflowing with the latest technologies. Many times their smaller more relaxed pace may lead to an equipment discovery that you did not know existed.

I encourage you to check and see if a regional convention is near, and make the effort to attend. Who knows, you may learn something and have a good time in the process.

First, I'll look at the two regionals that are not occurring this year, but plan on being back in 2007.

SBE Chapter 67 in Dallas/Ft. Worth



Typical SBE regional conventions like the Bos-Con convention in Marlborough, Mass. outside of Boston sponsored by SBE Chapter 11, bring affordable and accessible broadcast equipment trade shows to engineers close to home.

has hosted the Broadcast Equipment Expo, or BEE, since 2003. This convention was also the site of the 2005 SBE National Meeting.

Due to the location and timing of the NAB Radio Show in Dallas this fall, Chapter 67 has decided not to hold a BEE for 2006; however, the chapter is working with the NAB to provide an SBE Day that includes a technical session on the morning of Sept. 20 at the NAB Radio Show.

In addition, an SBE certification exam session will be offered that afternoon. The chapter promises that it will be

back in full force with a brand new expo for 2007.

SBE Chapter 16 in Seattle has long hosted Sea-Con every fall, and it was the scene of the 1998 SBE National Meeting. Chapter 16 has decided to take a year to re-tool and focus its show, and is also planning to return for 2007.

Now, let's look at the four other regional conventions occurring this fall.

Earlier this month Bos-Con, held Sept. 12-13 in Marlborough, Mass., featured an Ennes Workshop as well as a full day of exhibits with more than 140 booths and 100 exhibitors. Bos-Con

was the site of the 2004 SBE National Meeting.

On Sept. 26 and 27, the 2006 Broadcast & Technology Expo, presented by SBE Chapter 22 of Central New York takes place. It will also be the site of the 2006 SBE National Meeting, which was previously held there in 2001 and 1997.

The Broadcast & Technology Expo is one of the elder statesmen on the SBE regional convention circuit, having begun in 1972 at the Treadway Inn in Owego, N.Y., as the brainchild of then Chapter 1 member Larry Taylor.

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Crossing

CONTINUED FROM PAGE 40

faces the subject, is less than desirable. The rule can be used to create a new background for the interviewer.

First, record the interview with the camera on the subject. Then rotate the subject and interviewer until a desirable background is found for the interviewer. In doing this, remember as long as the camera doesn't cross the line, it can be placed anywhere. And since the interviewer is still facing the same direction as before, the line has not been crossed and the two shots will cut with the same screen direction.

Often, interview subjects are in a hurry and will not sit for "reversals" of the interviewer's questions. So television crews frequently have to record the questions without the interview subject being present.

Sometimes those questions are even recorded at a different time and place from the original interview. As long as screen direction is maintained, the pictures will cut.

MULTIPLE LINES

Scenes with more than two people can become highly complex when it comes to line crossing problems. There can be multiple lines of interest in a scene and deciding how or when to cross the line can become difficult. Such scenes should be mapped out in advance and a shooting strategy planned.

In documentary situations, where advance planning is impossible, it is best to cover yourself with plenty of wide establishing shots to show screen geography and as many cut-aways of individuals and objects as possible. These can save the day in the editing session.

The basic rules of crossing the line should be mastered by every video camera operator. Failure to do so highlights one's amateur status. ■

Frank Beacham is a New York-based writer, director and producer.

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Events

CONTINUED FROM PAGE 42

It has substantially grown through the years, moving several times to larger facilities. For 2006, it will be held at the Events Center at Turning Stone Casino Resort in Verona, N.Y. One of the larger SBE regionals, the B&TE boasts more than 150 booths, over 100 exhibitors,

years ago.

Held at the Madison Marriott West Hotel, the clinic features three days of technical sessions and an exhibit floor. The Broadcasters Clinic was the site of the 1999 and 2002 SBE National Meeting. Admission to the exhibits is free, but there is a charge to attend the sessions depending on the number of days you wish to attend. Visit www.wi-broadcasters.org for more information on the

Broadcasters Clinic.

The many SBE chapters mentioned here take great pride in being able to present these opportunities for education, window-shopping and networking with friends and colleagues to SBE members and potential members throughout the country. Each of these conventions is unique and most are within easy travel distance of many major metropolitan areas.

The SBE Regional Convention Strategies Committee is working with other chapters, notably in the southwest and southeast regions, about starting their own regional conventions to help make these educational events more accessible to engineers in those areas. ■

Vinny Lopez, CEV/CBNT, is chairman of SBE Regional Convention Strategies Committee.

I encourage you to check and see if a regional convention is near, and make the effort to attend. Who knows, you may learn something and have a good time in the process.

two days of technical sessions and almost 1,000 attendees.

Admission to sessions and exhibits is free. New this year are sessions presented by Adobe and a 2GHz relocation session. More information on the 2006 B&TE, along with free registration can be found at www.sbe22expo.org.

On Oct. 12, we move to western Pennsylvania for the Pittsburgh Regional Broadcast Expo presented by SBE Chapter 20. This show is another member of the old guard on the SBE circuit, having been around since the early 1970s. Pittsburgh was the site of the 2000 SBE National Meeting.

The 2006 Expo will be held at the ExpoMart in Monroeville, Pa., just outside of Pittsburgh. It will feature a day of technical sessions and an exhibit floor. Admission to the Expo is also free.

Get more information at www.broadcast.net/~sbe20.

Our trek across this great country brings us to our final stop on the fall SBE convention tour, the dairy state. On Oct. 24-26, the Wisconsin Broadcasters Association and SBE Chapter 24 will host the annual Broadcasters Clinic in Madison, Wis. This event began many years ago as a program of the University of Wisconsin Extension, and picked up its current management about 11

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BUYERS GUIDE

Audio Equipment

USER REPORT

Trio Video Mixes 5.1 Surround With Calrec

by **Carl Roszczybiuk**
Director of Engineering
Trio Video

CHICAGO

My company, Trio Video, is the leading mobile television company in the Midwest, with four trucks, two of which—Tango and Phoenix—are fully equipped for high definition production, including 5.1 surround sound. We cover a lot of Chicago-related entertainment events and national sports.

My job is to make sure our events go off without a hitch. I oversee all the main operations of the trucks, help integrate new technologies into the vehicles and train new staff members. It's not always easy, but I find that with careful planning, reliable equipment, and the ability to think on one's feet, we deliver the best possible experience for our customers and viewers.

5.1 IS VERY IMPORTANT

In the broadcast industry, video tends to get the attention. However, with the introduction of 5.1 surround sound, consumers are becoming aware of audio's contribution to an entertainment experience.

So for me, it's absolutely crucial that 5.1 audio forms a major component of our trucks.

When we started planning the Tango and Phoenix trucks, one of the first things was choosing the best audio consoles that could handle 5.1. In addition, I sought desks that would make mixing 5.1 as simple as possible.



One of the Trio Video Calrec-equipped trucks is ready for another outside event.

Another requirement was the ability to handle a large number of signals simultaneously. On a typical Trio event, we deal with numerous analog and digital signals, and approximately 40 internal truck sources. Because of the repetitive nature of shows and the need

for multiple audio operators, we looked for consoles with setup recalls to allow quick show changeover and setup times. Finding audio consoles that met these requirements was one of the main purchasing decisions. We found it in Calrec Audio.

We installed Calrec's Alpha in Tango and its Sigma console in Phoenix. The

Trio Alpha features a 48-fader board, with 24 mono equivalent channels and 64 stereo channels, while the Sigma has 56 faders with 30 mono equivalent channels and 32 stereo channels. Stereo channels allow operators to handle truck stereo sources and easily mix them into the 5.1 surround field.

The ability of the Calrec consoles to route digital and audio signals

with no outside conversion allows great flexibility in handling feeds, without any concerns over quality loss or external conversion patching.

The consoles have excellent 5.1 mixing and routing capabilities. They provide the full EQ and dynamics resources

to all channels without risk of maxing out the system. And they store different board setups according to an operator's preference.

Reliability is another reason Trio decided to go with Calrec consoles. They feature full redundancy across all system-critical points, so everything that has the smallest chance of taking you off-air is backed up.

In case of a power failure, the full control system can be reset in less than 15 seconds with little loss of audio and the last settings being fully restored. This is especially handy for live-to-air events. The Alpha and Sigma operate independently of the PC, so the PC can be switched off and the consoles will still process audio and provide full control.

Calrec's support staff made the installations as painless as possible. If there are any problems, there's always a staff member to help. That's the kind of reassurance we need in the field. ■

Carl Roszczybiuk is director of engineering for Chicago-based Trio Video. He has been with the company since 1988 and may be contacted carlr@triovideo.com.

For additional information, contact Calrec at 212-586-7376 or visit www.calrec.com.

USER REPORT

KTLA Relies on Linear Acoustic OCTiMAX

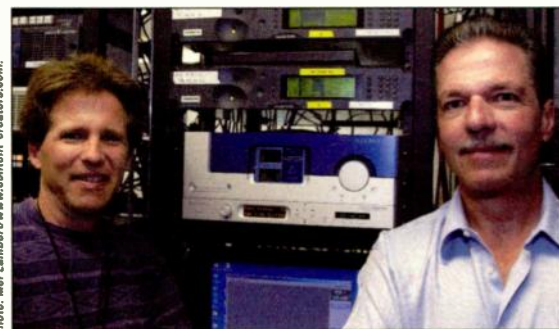
by **Chris Neuman**
Director of Broadcast
Operations and Engineering, KTLA-HD
and
Larry Price
Broadcast Project Engineer, KTLA-HD

HOLLYWOOD, CALIF.

We installed our Linear Acoustic OCTiMAX 5.1 Digital Television Audio Processor here at Tribune Broadcasting's flagship high-definition station slightly more than two years ago. The original decision came from Ira Goldstone, vice president and chief technology officer for Tribune Broadcasting, while the

station was planning an HD infrastructure and 5.1-channel surround-sound signal path.

OCTiMAX combines multichannel, multiband dynamic range processing with audio metadata functionality and local audio insertion capability, and offers analog and digital I/Os. A separate upMAX upmixer section selectively creates a 5.1 channel version of stereo/two-channel programming, while AutoVoiceover allows control-free insertion of voiceovers by simply applying local audio to the unit. (OCTiMAX 5.1 also generates a separate left-right compatible stereo downmix of the main multichannel program output that can be used to feed legacy NTSC systems.)



Larry Price, KTLA broadcast project engineer and Chris Neuman, KTLA director of broadcast operations and engineering, with the Linear Acoustic OCTiMAX.

The unit not only supports eight mono sources and a 5.1 plus two-channel program, but almost any format

signal path combines a two-band AGC with four bands of compression, look-ahead and peak limiting.

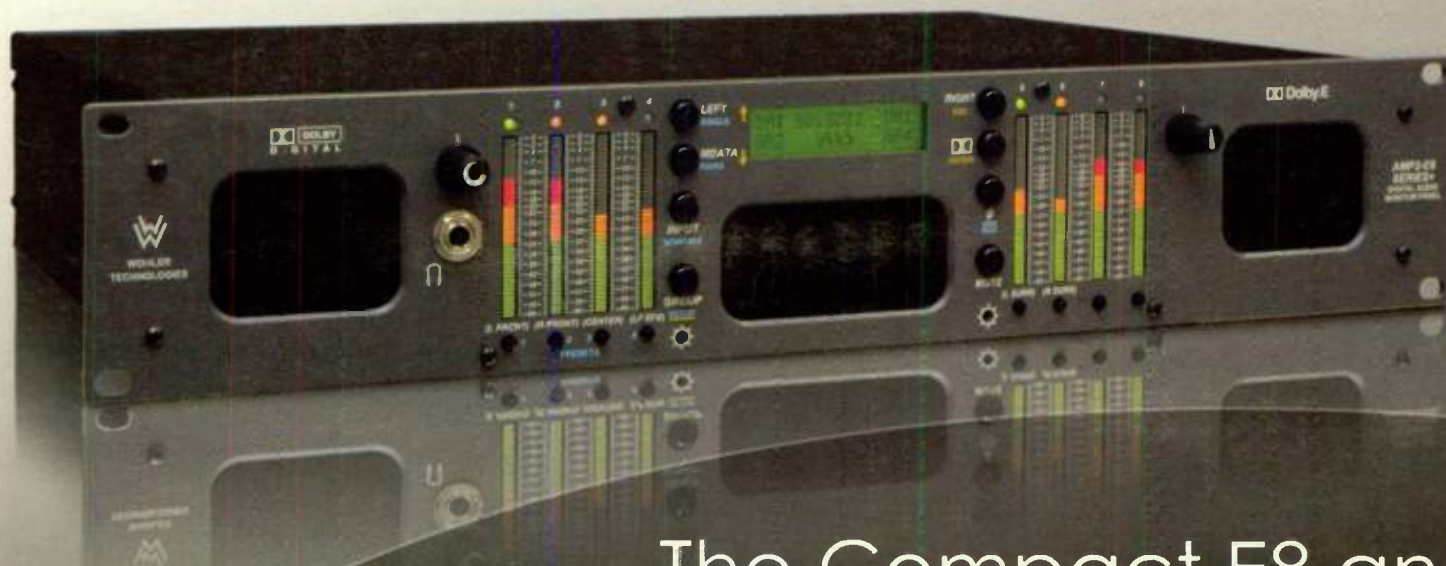
in between. The two-channel signal path combines two-band AGC with five bands of compression, look-ahead, and peak limiting. Multiband source noise reduction is also selectable to improve legacy film soundtracks and audio tracks from older programs. The 5.1-channel

LINEAR, PAGE 54

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USER REPORT

Producer Counts on Lectrosonics

by Senator Mike Michaels
Studio M Productions

LOS ANGELES

I've been a freelance audio mixer for more than 20 years, and I get called upon by a variety of clients, including network and syndicated news magazines and tabloid TV programs. I also get calls from news and sports departments to assist with event coverage. I've covered lots of big stories over the years, including both O.J. trials, and I know I can't risk letting my clients down, or I won't have them again.

Whether the task is for talent-to-mixer or mixer-to-camera hops, when I have to provide network quality wireless audio, I know I can depend on my Digital Hybrid Lectros!

The wireless spectrum has become clogged with interference from new digital TV signals, wireless phones and computers. Whenever I show up at a location, I scan the band for interference and locate the best frequencies available. At events with a lot of interest and media coverage, I've found it best to get there as early as possible and shop early for frequencies. I can then turn on my trans-



Senator Mike Michaels prepares for audio coverage at Aloha Stadium.

mitters and camp out on them, so that late arrivals will find them busy.

When using frequency agile wireless gear, finding usable frequencies is not the hassle it used to be. The Lectrosonics units are favorites because the portable receivers have an easy to use scanner feature to help find the clear channels right here, right now.

After staking our spot, the arrival-on-site scan is always the next order of business, as sometimes frequencies that worked well the day before may be subject to interference.

Rugged construction of the wireless microphone system components is vital in professional applications, and the diversity circuits in the receivers are important, too.

Something else I like about Lectrosonics is that the receivers don't draw much power. In order to be certain my receiver is on whenever my

shooter's camera is hot, I power the wireless units from the camera batteries whenever possible.

With this arrangement, the camera operator can go as soon as he's ready, without anyone having to remember to power up the receiver or check batteries. The Lectrosonics receiver current draw is so small that there's really not much difference in battery life. This could make the difference in getting a once in a lifetime shot or not.

Another application where my Lectrosonics gear shines is in doing radio

show remotes. This is a little different from television where the big concerns may be hiding microphones and making sure nothing shows. The radio show host will frequently bring along his or her favorite mic and we have to connect it to the Lectrosonics plug-on transmitter.

A mix-minus IFB from the station, possibly thousands of miles away, is essential, too, and we can provide that wirelessly in the blink of an eye. Another big plus for radio is reliable range. Radio people aren't normally concerned with getting out of camera range, and any little edge in this respect is always useful. Lectrosonics delivers.

Whether the job is covering the Oscars, Emmys, Golden Globes, Grammys, or political conventions and NFL games, I'm always ready to go with a little help from my friends at Lectrosonics. ■

Senator Mike Michaels (his real name!) lived and worked many years in Hawaii before moving to Los Angeles. Michaels does audio for film, television and radio. He may be contacted at Senator@Sound4Film-TV.com.

For additional information, contact Lectrosonics at 800-821-1121 or visit www.lectrosonics.com.

USER REPORT

HDNet Adopts Dolby

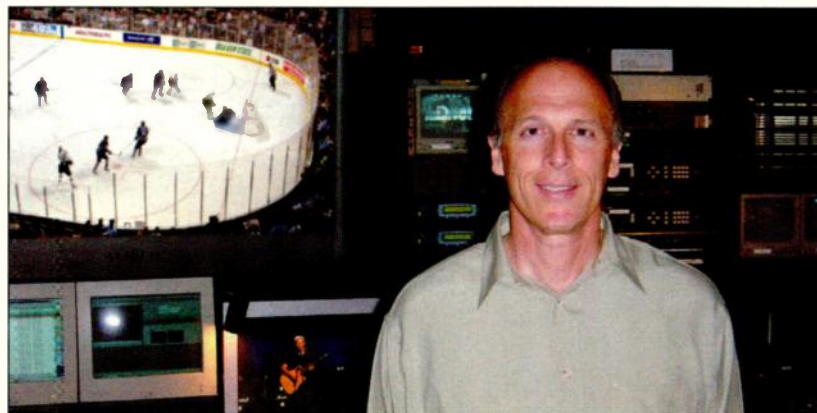
by Philip Garvin
General Manager, Chief Operating Officer and President
Colorado Studios

DENVER

I've long been an advocate for high-definition programming and joined Mark Cuban to create HDNet more than five years ago. I'm

currently leading the team of producers, directors, engineers and editors at HDNet's broadcasting facility in Denver where I manage daily operations.

HDNet is the first national television network with all programming in 1080i, the highest quality format in HD television. We produce and televise more hours of HDTV sports, news and entertainment programming each week than



HDNet's Philip Garvin in the HDNet master control room

any other network.

When HDNet launched in September 2001, we were looking for the right sound to complement the crystal clear video in our programs. Our choices were to either deliver a simple PCM/MPEG stereo stream or attempt to implement multichannel Dolby Digital 5.1. After reviewing each option in depth, we concluded that Dolby Digital 5.1 was a cost-effective way to deliver high quality, multichannel surround sound.

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Dolby

CONTINUED FROM PAGE 46

Digital 5.1, is used in our on-air broadcast operations, entertainment production edit suites, remote production trucks and quality control monitoring positions.

We were an early implementer of Dolby Digital 5.1 and appreciate the tremendous support Dolby has provided to make sure all HDNet programs sound as good as they look. Dolby has been efficient and effective about how to best manage audio in the design of all its equipment. Also, there are provisions throughout the Dolby product line that support all the things we need to do with our Dolby Digital 5.1 content.

We use Dolby Digital encoders and monitoring decoders in our production facilities. Other Dolby products here include LM100 loudness meters and the DP564 decoder for monitoring.

We use Dolby E to place 5.1-channel audio onto HDCAM master tapes, before they're sent to the library. Dolby E gives us a convenient method for storing contribution-quality multichannel audio on just two channels of the HDCAM. When these programs are ready for air, they are played back and Dolby E audio is decoded, monitored in the LM100 loudness meter and then sent to Dolby Dig-

ital encoders, where metadata with program type and dialnorm value are set. Both this stream, and MPEG-2 video are stored on a SAN for play-out.

For live events, our production trucks are equipped with a pair of Dolby Digital encoders, a Dolby Digital decoder and an LM100 meter. The audio engineer will mix a Dolby Digital 5.1 show while watching for proper dialogue level. The DVB-ASI from the truck is MPEG-2 video

along with the Dolby Digital signal.

This signal is sent via satellite back to our MPEG-based MC where we splice in commercials and send the non-decoded MPEG stream onto our viewers. This allows them to see and hear HD content that has only been encoded once.

We're excited to deliver a premium viewing experience to our customers and believe we made the right choice when we selected Dolby technologies. ■

Philip Garvin is co-founder, general manager and COO of HDMet and HDNet Movies. He started his career as a photographer and moved to TV in the 1970s. He may be contacted at pgarvin@hd.net.

Also contributing to this report was Glenn Valenta, director of engineering for HDNet. He may be contacted at gvalenta@hd.net.

For additional information, contact Dolby Laboratories at 415-558-0200 or visit www.dolby.com.

BUYERS BRIEFS

The BTC from **AMS Neve Ltd.** is an analog broadcast audio console for television, radio, broadcast production and OB applications. The console comes in standard frame sizes from 24 to 68 channels and is modular. It is available with a mix-minus matrix option and offers four-band EQ on every channel. The BTC provides a switched on-air output for warning signs and has channel pre-selectors that can be automated.

For additional information, contact **AMS Neve Ltd.** at 44-128-245-7011 or visit www.ams-neve.com.

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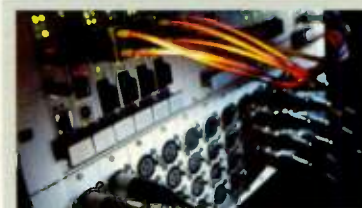
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SOUND | VISION

USER REPORT

WXXI Renovates With Wheatstone

by **Kent S. Hatfield**
Vice President of Technology and
Operations
WXXI-TV

ROCHESTER, N.Y.

In early 2004, WXXI began a major renovation of its radio and audio production studios. Requirements for audio mixing and routing were quite strict. The new facility would be totally digital and had to fully interface into the television production world. The design had to fully support live as well as post production requirements. Also, the technology needed to be new and innovative, simple to operate and easy to install and support.

WXXI chose the Wheatstone Bridge router for all the audio switching, and a complement of 10 fully compatible radio and television production and live consoles. Two Wheatstone D9s were chosen to support television production.

One console was placed in the audio area supporting television production control, and the second console was placed in the newly redesigned audio production suite. Two G5s were utilized as radio control room consoles supporting WXXI-AM and WXXI-FM.

Four Wheatstone D3 consoles provide control in audio production areas, with one of them being installed on a rollout system near the television technical director. This console allows the technical director to access any audio

source for cueing, as every input to any console is an output from the router.

The console also supports smaller productions when the full complemented D9 console isn't required. When this G5 console is not needed, it is sim-



Kent Hatfield, WXXI-TV vice president of technology and operations, with one of the station's Wheatstone audio consoles

ply tucked away in a cabinet. This flexibility is possible because of the limited number of cables required to support any of the Wheatstone Bridge interfaced consoles. Only two network RJ45 connectors and power cables are required.

The Wheatstone bridge system allowed simplified cutover from the analog system with reduced cabling. The Bridge router design segments the system into several physical sections.

The primary tier was placed in the technical operations area and a second smaller tier went in the radio technical area. Each tier frame contains digital signal processing to support the consoles that use that specific frame.

Additional satellite frames were placed

where digital and analog audio conversions were required. The satellite frames provide digital I/Os, analog microphone preamp inputs and line level I/Os. There are also logic controls for on-air lights, cough switching, talkback switching and commands for auxiliary equipment.

Much of the multiconductor cabling that interfaces high- and low-level analog to the rack frames was custom made by Wheatstone. Other digital audio I/O connections were made using punchdown terminal blocks. Category 5E cables connect the satellite frames and provide interconnection between tiers. Multiple distributed control processors provide redundancy and automatic failover.

During the final design phase, Wheatstone provided an interactive spreadsheet for I/O naming. This spreadsheet

was later used in the factory to generate the initial base configuration. Wheatstone's X-point software provides the configuration tools to complete and manage the installation.

The Wheatstone Bridge router and consoles have provided WXXI a solid audio platform for television and radio. I've found the versatility of the Bridge router to be unsurpassed, providing high quality audio, ease of configuration and smooth day-to-day operation for the users at WXXI. ■

Kent S. Hatfield began his career in 1967 and has been with WXXI for seven years. He may be contacted at khatfield@wxxi.org.

For additional information, contact Wheatstone at 252-628-7000 or visit www.wheatstone.com.

USER REPORT

Sound Devices 442 Mixer Performs

by **Ken Dabek**
Independent Sound Engineer
West End Recording

HOFFMAN ESTATES, ILL.

Gear is my life. Day to day, my job requirements are constantly changing. I might be working

with five cameras, or just one. I may need four or more sound sources, or just one lav—and any number of destinations for the audio. Last year, I was on the road about 160 days.



Ken Dabek (L) is shown on location with the Sound Devices 442 Field Mixer.

When I buy gear, it's an investment in my business, and I get more work when I invest wisely. The Sound Devices 442 field production mixer is one of the smartest investments I've ever made. It's a compact, full-featured production tool that's always in my bag. I think of it as my portable audio command center.

FLEXIBILITY

Flexibility is what really sets the 442 apart. It has input routing, direct channel outputs and dual monitor inputs. There are three distinct mix outputs, with full isolation. It has a locking TA3, 10-pin Hirose for direct camera connection, and of course XLRs. This mixer can handle whatever I run up against.

For instance, I just did a commercial

SOUND, PAGE 49

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ENCO

Sound

CONTINUED FROM PAGE 48

shoot, not huge, but a run-and-gun thing. I ran three wireless lavs for the talent, plus a boom mic. I used the mix outputs to send to the camera, but also sent the four direct outputs to a digital recorder with timecode—the Sound Devices 744T. That way, the client gets isolated tracks to use in post production. I typically use this setup on all my HD shoots as well.

FLEXIBILITY COUNTS

I recently did a reality show with five mics. However, the mixer has only four inputs. But there's a mix bus connector, and since I own a smaller Sound Devices 302 mixer, all I did was plug into the bus, and I had seven inputs.

Another great thing about the 442 is the ergonomic design. The pan, gain and hi-pass filter controls are all pop-up knobs. You set them and forget them. The fader knobs move so smoothly that you can literally mix with one finger per channel—almost like a linear fader. It

has a dense, full-featured front panel; however, nothing's in your way.

Another nice thing with the 442 is metering. When working with digital cameras, it's nice to know what the average level is, and it's essential to know peak levels so you don't overdrive a digital input. I use the peak-and-VU ballistics.

The bottom line is sound quality. I appreciate a portable mixer with a gain-and-fader approach. It really makes a huge

difference. You set your gain properly and don't have to worry about overdriving inputs. And the 442 has the quietest pre-amps I've ever found on a portable mixer.

The 442 is really well built—just unbelievably robust. It's not the lightest portable mixer, but I would say that every ounce is well spent. In summary, whether it's wired or wireless, accepting extra inputs or sending extra outputs, the 442 gives you anything you need. ■

Ken Dabek built his first recording studio in 1984. His suburban Chicago company, West End Recording, handles field capture, studio, and post-production audio for a wide variety of national network and advertising agency clients. He may be contacted at westendrecording@comcast.net.

For additional information, contact Sound Devices at 608-524-0625 or visit www.sounddevices.com.

BUYERS BRIEFS

The FMX-32 from **Azden Corp.** is a three-channel field mixer. The unit provides three balanced mic inputs with XLR connectors and is powered by six AA batteries or external 12 VDC source. The FMX-32 has a built-in LED battery indicator and is designed to mount directly to the user's camera with hook-and-loop tape. The mixer features switchable phantom microphone power and a switchable input limiter. The FMX-32 offers a five-step LED array for level indication and provides output via a stereo minijack.

For additional information, contact Azden Corp. at 516-328-7500 or visit www.azdencorp.com.

The StudioHub from **Euphonix Inc.** is a 12 x 12 TDM digital signal routing system accommodates up to a 768 x 768 time slot configuration. It can support 56 channels at 48 KHz on each MADI port, or 28 channels per port at a 96 KHz sampling rate. It is available in three different packages. One provides integral routing for System 5 and Max Air console products. The system can also be supplied to interface with Grass Valley, Nvision, Pesa, Pro-Bel, Sony or Utah Scientific ES-Switch protocol routers. It is also can function as a standalone MADI router.

For additional information, contact Euphonix at 650-855-0400 or visit www.euphonix.com.

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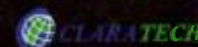
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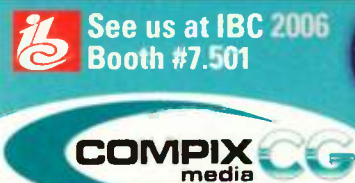
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USER REPORT

Food Network Finds SSL Satisfying

by Tom Killoy

Vice President of Operations
Scripps Productions

NEW YORK

When we decided to purchase a Solid State Logic C100 digital broadcast console in 2004, Food Network was enjoying skyrocketing popularity and also moving into a new space to consolidate our growing broadcast facilities and corporate offices under one roof.

In the midst of that expansion, we wanted to identify and install an audio console that would allow Food Network to seamlessly upgrade programming to high-definition and 5.1 Dolby Digital surround-sound broadcasts.

PERFECT FOR SHOWS

The C100 has been perfect for all of our shows, especially "Iron Chef America." We really put the console to the test for this show, as we have over 32 tracks of audio to record onto Sony IMX tape

machines with their eight digital audio tracks. Before installing the C100, we had to shoot "Iron Chef America" with the audio tracks recorded on a separate track



Tom Killoy, vice president of operations for Scripps Productions, is shown at the Solid State Logic C100 digital broadcast console at Food Network in New York.

recorder. The router in the console has made it easier to designate tracks to the appropriate deck and has eliminated patching. This aids editing in post without having to constantly go back to a track machine.

In addition to the chefs, "Iron Chef America" involves other talent requiring

many microphones. The sous chefs have mics, as do the judges. Other talent includes Alton Brown, the moderator, and "The Chairman," who chairs the battles on the program.

The console also addresses all of our production needs, including creation and storage of recallable setups. This allows us to quickly recall individual EQ settings and dynamic processing. We've just purchased another module for the board and expanded the router so we can route additional signals instead of patching.

We had 24 faders and now we have 32. This allows us to accommodate just about everything connected with the show, including 14 wireless mics and 10 audience mics. On layers underneath, we can store tape machine playback and other additional isolated effects and slugs.

One of the most attractive features is the console's center screen which provides instant information on everything leaving the board. When working on a bigger show like "Emeril Live," many mics are used at the same time, along with other audio sources that are not nec-

essarily in the main mix. This information is directly in front of the engineer, making the task of managing a complex setup easier than in the past.

Another critical factor is ease of use. Many engineers work in our studios, so it's necessary that operation is simple.

We launched "Food HD" on June 30, 2006, and are transmitting it in 5.1 Dolby Digital. With the C100, we're ready and will soon start recording in 5.1. The C100 is already set for multichannel audio. We'll be performing tests to decide the best way to do this.

The SSL C100 Digital Broadcast Console has been a key component of Food Network's new facility. As HD migrates from sports and movies to general programming, it's crucial that we have the technology to facilitate the transition. ■

Tom Killoy is vice president of operations for Scripps Productions. He may be contacted at TKilloy@foodnetwork.com.

For additional information, contact SSL at 212-315-1111 or visit www.solid-state-logic.com.

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USER REPORT

360 Instant Replay Scores Big Points

by Dieter Ruehle

Music Director
Staples Center

LOS ANGELES

Staples Center is a large sports and event complex in downtown Los Angeles that's home to numerous L.A. sports teams such as the Lakers, Kings, Sparks and Avengers. My job is to play the organ and recorded music during games and events such as boxing and tennis matches.

I also manage a 1,500 piece CD library, digitally edit music and work with record companies to acquire new music.

I've been using the 360 Systems Instant Replay audio player practically since it came on the market. Our first Instant Replay, purchased for The Forum, was the seventh or eighth model ever built. And now I'm using two Instant Replay units purchased

when Staples Center opened in 1999. I was cueing up CDs or cassette tapes before I started using Instant Replay. The device gives me the freedom to make spontaneous, creative decisions.

I really like the ability to call up music cuts and play them back instantly—and I mean instantly. I've



Dieter Ruehle, Staples Center music director, is ready for action with the 360 Systems Instant Replay.

used a computer music software program before, and it's not nearly as quick. Instant Replay gives truly instant access.

The unit's editing software allows me to trim music cuts on the front and back end—very helpful as otherwise

REPLAY, PAGE 53

Replay

CONTINUED FROM PAGE 52

I would have to re-record the whole cut. Game music uses lots of cuts. For example, during an Avengers arena football game I'll use 150 to 200 cuts of music.

This is walk-in music, warm up music and music for scripted and nonscripted time-outs. The average cut length of in-game music is about 60 seconds, but I usually play about 20 seconds of each cut. I have to work very fast and stay focused, as games can last from four to four-and-a-half hours—the time from when doors open until the last fans leave.

I prep for a game by writing down some rough ideas and combine that with cuts assigned to hot keys. Sometimes there are script changes during the game and I have to be able to access cuts quickly. At all events, both 360 machines are in use. I use the "find" button and

save hot keys for specific cues, like hand clapping effects, vocal effects and contest music—cuts that are used more than once during a game.

I'm very happy with Instant Replay because it's so user friendly. The keys are spread out, so you never miss hitting one of the hot keys.

MAKING THE SCENE

I love this machine—it's extremely

helpful in getting my job done. And the tech support has been great. At first, I needed help learning how to defrag the hard drive. That's when I found that 360 Systems was great to work with. Upgrades have gone smoothly as well.

We've gone from a 16 to a 24-hour capacity on both units. I see this unit just about everywhere I go. I've seen them in New York in use at David Letterman's Late Show and also at Yankee

Stadium and Madison Square Garden. ■

Dieter Ruehle is music director for Staples Center and has been working in the industry for more than 20 years. The opinions expressed above are the author's alone. He may be reached at druehle@staplescenter.com.

For more information, contact 360 Systems at 818-991-0360 or visit www.360systems.com.

BUYERS BRIEFS

The ATH-A55 closed-back dynamic headphones from **Audio-Technica** provide extended frequency response and natural spatial acoustic performance. The headphones have soft leather ear pads and a self-adjusting wing support that automatically adjusts to head size. Drivers are constructed with neodymium magnets and copper-clad aluminum wire voice coils. Frequency response extends from 5 Hz to 28,000 Hz and the headphones have a maximum power rating of 1,400 MW. A standard 3-meter cable terminated in a gold-plated mini stereo plug is supplied with the headphones, along with a standard 1/4-inch adapter.

For additional information, contact Audio-Technica at 330-686-2600 or visit www.audio-technica.com.

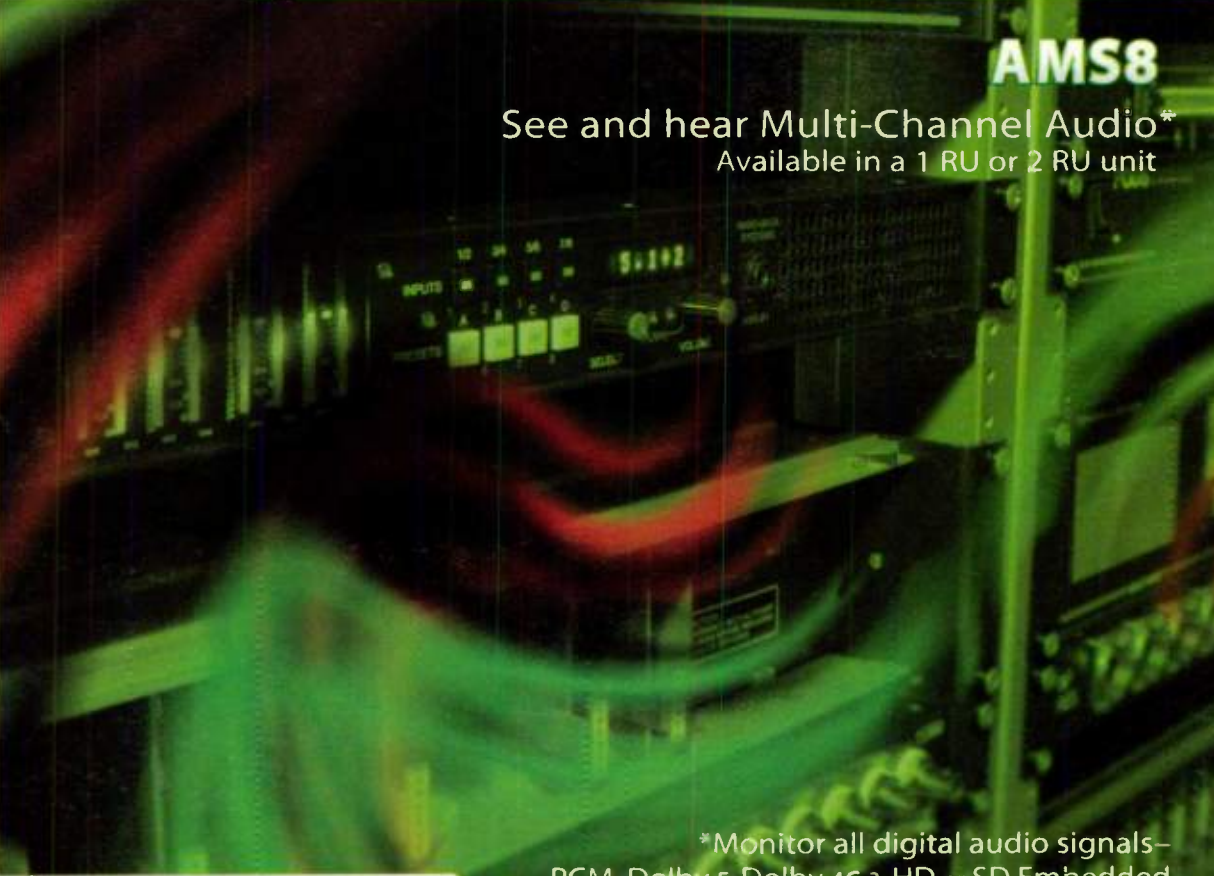
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CONTINUED FROM PAGE 44

The 3 RU unit provides us with a color TFT display of audio metering and processing activity. There's a large control knob and four companion control keys for quick navigation through the GUI; this lets you work with the unit without the user manual. OCTiMAX is

intuitive to operate, and provides many adjustment parameters. (Along the way, we found that Linear Acoustic has really competent telephone support.)

The OCTiMAX 5.1 has been totally reliable. We spent a lot of time adjusting the system parameters until we were happy with the overall station sound and we've established an excellent reputation for our clean, powerful air signal in this market.

The multichannel output sounds as good as anything we've heard—we love the way we sound! Our engineering department believes that less is more. Anything unnecessary has been removed so we maintain a clean, open on-air sound.

Right now, as KTLA is predominantly a news operation, we only produce stereo mixes from our studios. Because of this, we use the UpMax stereo-to-5.1 function for creating realistic surround

sound. The OCTiMAX feeds our Dolby DP569 unit, which generates the AC-3 bitstream. Incoming 5.1-channel network feeds are bit-spliced in the digital domain using a companion Linear Acoustic StreamStacker LA-5124 unit.

KTLA now broadcasts the New Year's Day Pasadena Rose Parade in HD. We decided to simplify things by concentrating on a good, wide-perspective stereo mix of the event and use a separate OCTiMAX for 5.1 upmixing. It's a cost-effective solution—we don't need to rent a surround-capable truck with a mixing engineer. We think our surround sound is equal to or better than a dedicated 5.1-channel mix.

The results are outstanding. I challenge anyone to tell the difference between our mixes and those prepared discretely. After the broadcast, it was nice to know that our opinions were borne out by correspondence on the AVS Forum—there were a large number of positive comments about the surround sound that went with our HD broadcast. ■

Chris Neuman is director of broadcast operations and engineering for KTLA. He may be contacted at cneuman@tribune.com. Larry Price is a broadcast project engineer at KTLA. He may be contacted at lprice@tribune.com.

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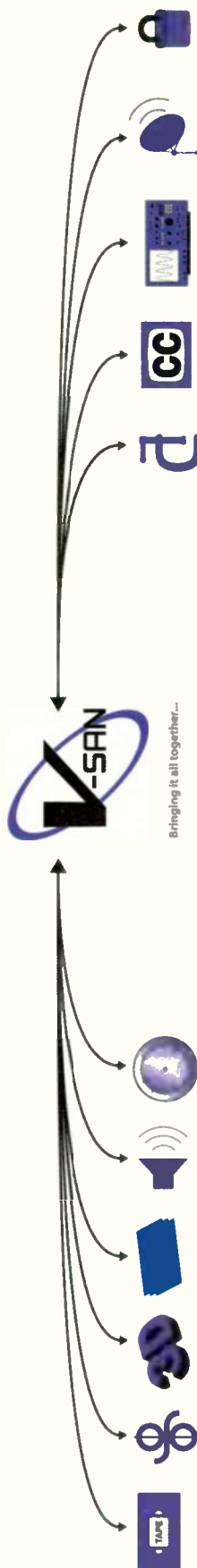
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For additional information, contact Sennheiser Electronic Corp. at 860-434-9190 or visit www.sennheiser.com.

The MLA8 from Yamaha Commercial Audio Systems Inc. is an eight-channel microphone preamplifier in 1 RU rack-mounted package. The preamplifier provides up to 44 dB of gain, an 80 Hz high pass filter and phantom power for each channel. Inputs are provided via XLR connectors and outputs are available via "D" and Euroblock connectors. The MLA8 operates on 120 VAC and consumes 25 W.

For additional information, contact Yamaha Commercial Audio Systems Inc. at 714-522-9011 or visit www.yamaha.com.

USER REPORT

A Titan-Sized Studer for All Mobile Video

by Eric Duke

President

All Mobile Video and
Chelsea Television Studios

NEW YORK

All Mobile Video is a premier provider of end-to-end video and audio solutions for entertainment, sports, and news programming and events. We offer the full spectrum of services—from large Manhattan-based sound stages with full post-production capabilities, to mobile production and editing trucks and extensive uplink solutions that travel worldwide.

As one of the very first companies to begin working with HD video, as well as building both mobile linear and non-linear editing solutions, AMV is continually looking for newer and better technologies.

When it recently came time to equip our new flagship HD mobile production unit (a 53-foot truck dubbed 'Titan'), we felt it was imperative to not only make it the most technologically advanced unit on the road, but also the



All Mobile Video's Eric Duke (R) is shown with his father, Anton, at the Studer Vista 8 audio desk inside the Titan production vehicle.

most ergonomic, intuitive and versatile.

Extending this philosophy to the audio suite at the rear of the truck, we installed a Studer Vista 8 digital live production console, which, at nearly 10 feet wide, is one of the largest built.

The first thing engineers usually notice about the Vista 8 is the user interface, which uses "Vistonics," a patented technology that embeds rotary controls and switches within flat-screen monitors.

Instead of turning a knob in a central shared control section of the console

and then having to look elsewhere to see out how the parameter is being affected, the operator can see the change right next to the knob and on that applicable channel.

It's an extremely user-friendly concept that allows engineers to maximize their operational

efficiency and speed—both critical in the hectic world of nationally syndicated live television production.

MUCH TO RECOMMEND

There are no second chances in a live broadcast. Therefore, it was a paramount concern to us that Titan's console be reliable. We've certainly had no issues with the Vista 8's stability. This is now our third one. The first went into our Celebrity truck early last year; the second went into Studio A of our Chelsea Television Studios for Martha Stewart's

ongoing daytime show, "Martha."

The console has many other merits as well, including an extremely robust redundancy system for peace of mind, pristine sound quality, and the ability to handle 5.1 and even 7.1 surround formats.

But two other things still stand out as key reasons for once again choosing the Vista 8. One of these is the fact that the freelance broadcast engineering community using this console has truly embraced it. The other is that the service and support we've received from Studer has been second to none.

When we first debuted our Titan production unit in the Sony booth at NAB2006, there was no denying that its sheer size and comprehensive facilities impressed show attendees. And part of that "wow factor" could be attributed to the Studer Vista 8. It is a remarkable desk. ■

Eric Duke is the president of both All Mobile Video and Chelsea Television Studios. He may be reached at eduke@amvchelsea.com.

For additional information, contact Studer at 818-920-3285 or visit www.studer.ch.

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USER REPORT

Holophone Brings CFL Action Home

by Michael Nunan
Post Sound Supervisor
CTV Television

TORONTO

Unpredictability is what makes watching a Canadian Football League game exciting. A crucial play can change the outlook of the whole game. Just as players cannot

stop the game, rewind and fix a botched play, television crews can't stop and adjust equipment to ensure they are sending the best signals.

That's where I come in. As post sound supervisor for CTV, Canada's largest private broadcaster, and TSN, Canada's first 24-hour, all-sports network, I'm often asked for advice on the selection of proper tools for capturing great surround sound at live events.

HD REQUIRES 5.1

A fairly large portion of CFL coverage are the production elements, music, graphics and videotape components—all of which need to transition seamlessly with live elements.

In our search for the best way to bring the excitement and energy of a CFL game to our audience in high definition and 5.1 surround, we found the Holophone H2-PRO microphone, and are using it to provide viewers with sound quality that compliments HD pictures.

Depending on the physical layout of the stadium, our H2-PRO is typically positioned at field level on the 55-yard line to capture both the sound of the "near-side" crowds as well as field sound.

The H2-PRO multicapsule design enables TSN to obtain a sonic perspective matching the visual perspective of the game—the near crowd is at the back, the far crowd is across the field, and the game action is spread in front on the field.

Since the CFL field is so large—10 yards longer and 12 yards wider than a NFL field—two stereo pair are positioned on the far side of the stadium and another pair is placed at the top of the stadium to augment the crowd sounds.

In an environment where time is precious, set-up time is critical. Previously, we used an array of microphones to cover live events, but it took a long time to run cables, rig mics, and then to build the soundstage panners on the audio console.



Michael Nunan is post sound supervisor at CTV in Toronto.

That might be okay for special events, but for the tight deadlines of a football game, we would have been unable to get a proper configuration without extending set-up time and expanding our audio crew.

That's not necessary with the H2-PRO; it takes almost no time to set it up—you plug it in, put up the faders and almost instantly it's delivering a fantastic, clean and stable surround image. ■

Michael Nunan is post sound supervisor for Toronto-based CTV Television, whose properties include TSN and Discovery Channel Canada. The opinions expressed are his alone. He can be contacted at mnunan@ctv.ca.

For additional information, contact Holophone at 416-362-7790 or visit www.holophone.com.

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The AMS8-1 from Ward-Beck is a compact monitor designed for multi-channel audio signals. It features eight PPM/VU LED bar graph indicators and has a multiple speaker system for operator monitoring of audio. The AMS8-1 is equipped with four digital audio inputs and is may be ordered with a Dolby decoder card and/or a multistandard SD/HD demux card. The addition of the Dolby decoder allows the device to be used with PCM, Dolby E or AC-3 signals, or any combination. The AMS8-1 has four digital audio inputs, with 3-pin terminals for 110 Ohm signals and BNCs for 75 Ohm inputs.

For additional information, contact Ward-Beck at 800-772-2556 or visit www.ward-beck.com.

The SRS MW-02 Megawide from SRS Labs Inc. is an audio processor high quality stereo. The unit restores spatial information that may be masked by traditional recording and playback techniques and combines several patented SRS audio enhancements to deliver professional sound. It provides complete control of clarity, stereo width, bass and other parameters, as well as stereo synthesis. Frequency response is 20 Hz to 20,000 Hz and the S/N ratio is greater than 100 dB. The device has two active balanced inputs and has an LED-type output meter. There's a failsafe mode, with relays to ensure signal continuity.

For additional information, contact SRS Labs Inc. at 949-442-1070 or visit www.srslabs.com.

USER REPORT

Studio Technologies Shines in Sports

by Michael Drazin
Engineering Consultant

GREENWICH, CONN.

Studio Technologies announce consoles give today's field audio engineer the best of both worlds—operating in their existing analog environment, while giving them the option of moving into the digital realm when they're ready.

One of the biggest issues I run into in setting up for major college and professional sporting events is that the announce booth is located anywhere from several hundred feet to several thousand feet from the audio console in the remote truck. However, this is a non-issue with Studio Technologies 200 series consoles and their built-in microphone preamp and transformer coupled outputs.

I have been the core A2 for a premier college football show for a major Network for several seasons. As soon as Studio Technologies had a working prototype, we test drove it and then put it on the air.

During the first show, my A1, Bill Bye, couldn't stop raving about how much better the announcers sounded from the booth. After the success of the prototype, we were able to get a set of hardware purchased for our show.

We had four of the model 230s in our booth. Three of them were set up to handle play-by-play and color, with one reserved as a spare. The other unit was configured for our statistician (he listens to the play-by-play interrupt, and talks on the stats intercom channel).

HEADSET COMPATIBLE

I set the Model 230 up so that he would hear interrupt in the left ear, intercom channels in his right ear and also the intercom. With this arrangement, he was able to move to one piece of hardware and wear just an announce headset. The announcers transitioned to the new hardware without a problem. They commented that they liked the big buttons and their responsiveness.

This system takes just minutes to set up and calibrate.



Studio Technologies equipment ready for use at a sports venue

At the end of last season, I designed a digital announce package which debuted at the Dr. Pepper Big 12 Championship. This package transported all the audio to and from the booth digitally over redundant fibers. For the first time, we were able to bring digital audio from the announce console to the audio console in the remote truck. To the best of my knowledge, this was one of the first events to feature a fully digital path between the announce console and the audio console.

The Studio Technologies hard-

ware was at the core of the system, featuring the model 212, the model 44, the model 41 and the model 742. This package provided the cleanest

and best sounding audio that I had ever worked with. The announcers, who were unaware of the new system, asked why both they and the producer sounded so clear.

For many of you who use the Studio Technologies hardware, I know I am preaching to the choir. For those of you who haven't used this hardware, I highly recommend giving it a test drive.

The units are a requirement for the shows I am involved with, because Studio's innovative products drastically improve the audio portion of any production environment in both ease of set-up and crystal clear output. ■

Michael Drazin is a freelance engineering consultant. He may be contacted at michael@mdrazin.com.

For additional information, contact Studio Technologies at 847-676-9177 or visit www.studio-tech.com.

USER REPORT

Wohler DAC Provides A/V Functionality

by Jim Sutherland
President / Owner / Senior Engineer
SPTV

SAN FRANCISCO

We've been using Wohler equipment for years. Their audio and video products are compact and convenient and they are a no nonsense broadcast products engineering company who listen to our problems and requests for solutions.

Most of the Wohler equipment we use provides built-in video and audio DACs, so when I heard a rumor that they were going to offer a cost-effective stand-alone video and audio DAC under their Panorama video division brand, I became interested.

I placed an order for this new product, the Panorama HD 12D, and found it to be a great way to convert HD and SD SDI to component or composite video, as well as to de-embed audio. The converter is low in cost and very compact, allowing it to easily fit into the most space critical environments. And on top of that, it's versatile enough to meet all of our needs.

The HD 12D is a dual rate SD/HD true 12-

bit D/A converter with two times oversampling for HD and 16 times oversampling for SD signals. Video is automatically selected and there's an external dipswitch configuration for setting other options.

The compact size of the unit (4-by-3.4-by-1-



The Wohler Panorama HD 12D digital-to-analog converter

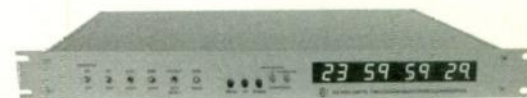
inch, plus the external 12 V power supply) allows it to fit onto equipment with ease. I was a little concerned about the power supply, as it doesn't have a locking connector. However, we have not had any problems in this area so far.

One of the best features of the HD 12D is

WOHLER, PAGE 60

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USER REPORT

Zaxcom Delivers Great Location Audio

by Don Zenz
Production Sound Mixer

MANHATTAN BEACH, CALIF.

I started out in freelance audio mixing more than 15 years ago, making the move from concert and theater sound to film and television production. The backbreaking labor of moving giant speakers around thankfully no longer applied to my new role, but one truth remained constant. If you couldn't do the job well, you didn't keep the job.

This fact has kept me searching for products with flexibility and superior sound quality, but I've found the perfect combination with Zaxcom technologies. For the past two years I've been using the Deva multitrack audio recorder along with some Zaxcom wireless transmission components on the set of "The OC." I couldn't be happier with their performance.

The Deva records audio directly to a hard disk, with backup to DVD, and its biggest benefit is multitrack recording.



Don Zenz is an independent audio mixer who relies on Zaxcom wireless products on such productions as "The OC."

Ad libbing is common on the set of "The OC," and the Deva helps us remain flexible and responsive to unexpected script changes.

As I follow a script, I switch between mics to create my mix, making sure we don't get audio degradation when mics get too close together. I can't always anticipate unexpected dialogue, but with each mic having its own channel, post production can balance the mix.

The multitrack recording also comes

in handy when I have to select a dominant mic in overlapping dialogue situations. Having each mic record to its own channel keeps options open for the post team if they want to emphasize a different actor than the one I'd chosen.

Zaxcom's wireless transmission capabilities have proven themselves equally useful on "The OC" set. I often set up the system so that my boom pole mic transmits to Zaxcom's wireless receiver. Without cables, the boom operator is able to move much more quickly, which further helps us to respond to ad lib or to more smoothly execute walk-and-talk shots.

WORKING OUTSIDE

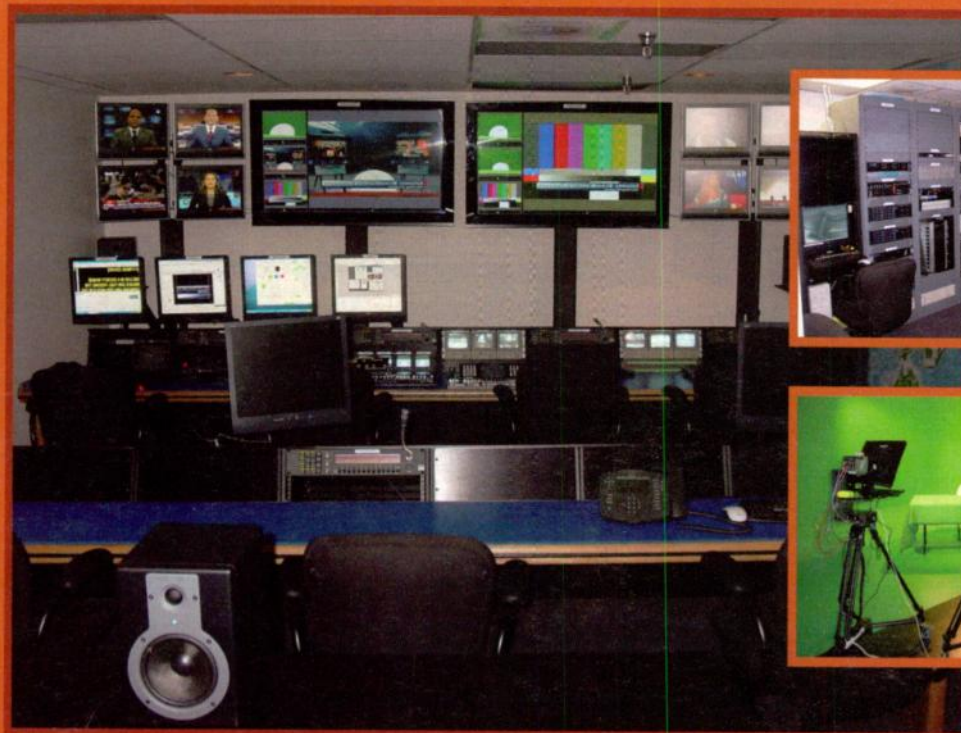
We often work on the beach, and Zaxcom technology is a key resource. I often set up a mic for the purpose of recording wave noise onto a separate channel. This allows the post team to keep the waves at a consistent level, rather than having to pick up background audio from various actor mics.

The sound captured by Zaxcom's products is truly phenomenal. I don't know any mixers who wouldn't prefer to use hard-wired mics, but I would honestly be hard-pressed to distinguish between audio transmitted with the Zaxcom units and that of a hardwired mic. The dynamic range is fantastic, and if I have to crank up the gain, we still experience very little noise.

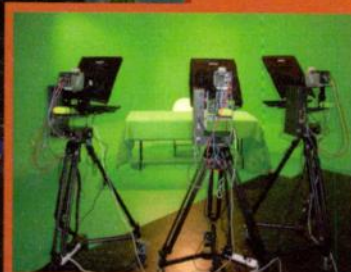
Best of all, the service from Zaxcom is outstanding. They design with the real-life conditions of TV production in mind, and the products are durable and versatile. The company has been quick to act whenever I've needed support, so I know my equipment will be up and running when I need it. In the freelance business, where I prove myself every day, Zaxcom's quality and responsiveness counts. ■

Don Zenz has been a production sound for more than 15 years. He may be contacted at donzenz@msn.com.

For additional information, contact Zaxcom Inc. at 973-835-5000 or visit www.zaxcom.com.



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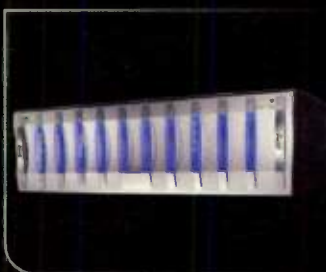


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Wohler

CONTINUED FROM PAGE 57

that it de-embeds audio. In addition to the wide range of video formats accommodated by the unit. Two channels of audio can be de-embedded from the SDI input stream and converted to analog with high quality 24-bit DACs. The analog audio output is supplied via two unbalanced RCA connectors. This makes it easy to do audio monitoring of any of the eight

stereo audio pairs from any group selected for output. It's really great to have video and audio conversion in the same unit and this feature does away with the need to have to carry around yet another box dedicated to audio.

WOHLER LISTENS

My engineers really love the small size of this converter, as well as its many other features. There's provision for SD pedestal, a horizontal blanking enable/disable function, both 4:3 and

16:9 safe area masks, as well as a title graticule generator.

We needed a test pattern generator at one of our testing stations and I asked Wohler engineering if they could provide it as an added feature. And they did! This is why we like buying Wohler and Panorama gear—great people and great products. The only downside to Wohler is that they are an engineering-centric company and that means their marketing isn't very good, so you have to dig around a lot and ask questions. The upside, of

course, is the high quality of their products, including this DAC. I highly recommend both the company and the HD 12D. ■

Jim Sutherlin is owner of SPTV, a San Francisco-based television production company and facility design house. He also serves as its president and senior engineer. He may be contacted at jsutherlin@gmail.com.

For additional information, contact Wohler at 888-596-4537 or visit www.wohler.com.

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Sony UVW-1800 BetacamSP, \$3995; Sony PVW-2800 BetacamSP, \$4495; Sony PVW-2650 Betacam SP, \$1950; Sony PVW-2600 Betacam SP, \$1950; Sony BVW-70, \$4750; Panasonic AJ-SD93 DVCPRO 50, 1w hrs, \$5495; Sony DSR-2000, \$7995; Sony VO 9850 w/timecode, \$1200; Sony VO 9800, \$1000. 818-246-7100 or 212-564-9933 or www.tvprogear.com.

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EMPLOYMENT

HELP WANTED

Production Technical Supervisor: Univision Network the leading Spanish Television Network in the US, is seeking qualified applicants for the position of Production Technical Supervisor. The successful candidate will be in charge of our standard definition expando mobile unit based in Miami, Florida. Responsibilities include the operation, maintenance, and equipment upgrades of the unit. Requirements include Engineering Degree or equivalent; a minimum of 2 years as EIC; and full familiarity with all aspects of location television production. Please send resumes via e-mail to ecaro@univision.net or fax to 305-471-4286. No phone calls will be accepted. Univision is an Equal Opportunity Employer.

TV Technical Specialist: Raycom Media has an immediate opening for a TV Technical Specialist. Candidate must possess a minimum of ten years broadcast television experience with an emphasis on RF maintenance as well as TV technical project management. Position requires varied levels of travel in support of Raycom 33 station group. Relocation to Montgomery, AL is preferable. Send your resume to: bthurber@raycommmedia.com. EOE-M/F/D/V.

SNG Operator/Maintenance Engineer, Engineering Department (IBEW Union Full-time Position) Duties: Operate and Maintain SNG/DSNG vehicles. Troubleshoot and repair broadcast electronic equipment. Operate various broadcast equipment at the studio, transmitter and remote locations, including ENG/SNG/DSNG and IS based equipment. There is a possibility of covering the Engineering Operations Divisions, such as media manager and production assistant. Requirements: Work hours will vary. Previous broadcast SNG maintenance experience required. Electronics Engineering Degree or equivalent preferred. IT/IS experience also required. Light bookkeeping and account reconciliation required. Contact: Brian Vctor, Chief Engineer, WRTV, 1330 N. Meridian St., Indianapolis, IN 46202-2303. (317) 269-1493 or brian_vctor@wrtv.com. Applications: Applicants must apply online at: <http://www.mcgraw-hill.com/cgi-bin/careers/recruitsoft.pl?url=uscan&lang=en>

CHIEF ENGINEER: KMEX-TV Channel 34, LA's leading Spanish language television station, seeks a highly motivated professional to oversee the broadcast engineering operations, including the design, installation and maintenance, both hardware and software, of all broadcast equipment and RF systems. Individual will also establish and maintain technical quality standards, forecast, prepare and maintain departmental operational and capital budgets. Must be a strong team player with excellent interpersonal skills. Familiarity with an all digital facility and experience with high power UHF transmitters and antenna systems are essential. Bilingual English/Spanish is desired. Requires a BSEE or equivalent technical training/work experience, FCC General Class License and Senior SBE Certification. 10 years of TV Broadcast Engineering experience to include supervisory roles in a union environment. Please send resumes to 5999 Center Drive, Los Angeles, CA 90045 or via fax (310) 348-3414 attention: Human Resources. EOE.

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(including cameras, robotics, VTRs, routing equipment and production switchers). Knowledge of broadcast automation systems and thorough understanding of PC hardware and software operations. Ideal candidate should possess strong troubleshooting skills and have the ability to work independently and quickly in high-pressure situations. Must be flexible - may include evenings, nights and weekends. Apply online at <http://careers.bloomberg.com>, choose "Job Search" then "News" Select "Broadcast Operations - Broadcast Engineer".



www.tvtechnology.com

ACTION-GRAM

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TV Technology's Equipment Exchange provides a FREE listing service for TV stations and studios only.

All other end users will be charged. Simply send your listings to us and please indicate in which category you would like your listing to appear. Mail your listings to the address below. Thank you.

Please print and include all information:

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Are you currently a subscriber to TV Technology?

☐ Yes ☐ No

Signature _____ Date _____

Please check only one entry for each category:

I. Type of Firm

- | | | |
|---|---|--|
| <input type="checkbox"/> A. VHF-TV station | <input type="checkbox"/> R. Broadcast consultant | <input type="checkbox"/> N. Gov. TV facility |
| <input type="checkbox"/> B. UHF-TV station | <input type="checkbox"/> S. Mfg. dist. or dealer | <input type="checkbox"/> P. Edu. TV facility |
| <input type="checkbox"/> D. Prod/post-prod studio | <input type="checkbox"/> L. Corporate TV facility | <input type="checkbox"/> Q. Record studio |
| <input type="checkbox"/> E. Cable TV | <input type="checkbox"/> M. Medical TV facility | <input type="checkbox"/> K. Other (specify) |
| <input type="checkbox"/> G. Network/group owner | | |

Purchasing Authority (check one only) ☐ 1. Recommend ☐ 2. Specify ☐ 3. Approve

II. Job Function

- | | |
|--|---|
| <input type="checkbox"/> A. Corporate mgt | <input type="checkbox"/> E. News mgt or staff |
| <input type="checkbox"/> B. Engineering mgt | <input type="checkbox"/> G. Training |
| <input type="checkbox"/> C. Engineering staff | <input type="checkbox"/> F. Other (specify) |
| <input type="checkbox"/> D. Prod/oper mgt or staff | |

WTS ☐ WTB ☐ Category: _____

Make: _____ Model: _____

Brief Description: _____

Price: _____

WTS ☐ WTB ☐ Category: _____

Make: _____ Model: _____

Brief Description: _____

Price: _____

WTS ☐ WTB ☐ Category: _____

Make: _____ Model: _____

Brief Description: _____

Price: _____

*Listings close every other Friday for the following month's issue. All listings are run for one issue only.

Broadcast Equipment Exchange

PO BOX 1214, Falls Church, VA 22041 • Tel: 800-336-3045 x. 153

• Fax: 703-998-2966

REFERENCE GUIDE

The Reference Guide is a selected sampling of current products. Specifications and prices are supplied by the manufacturer and are subject to change without notice.

MANUFACTURER	MODEL	TYPE	CAMERA INTERFACE	INTERNET INTERFACE	EXPANDABILITY	FEATURES
Clear-Com 510-496-6600 www.clearcom.com	Eclipse Matrix	Analog	Connects to 2- and 4-wire interfaces	VoIP interface	Audio trunk lines, digital trunk lines, fiber networking and IP networking	36 ports in 1 RU to 512 in 6 RU
HME 858-535-6060 www.hme.com	Pro850	Analog	N/A	N/A	Multiple stations can be daisy-chained for several beltacks	Frequency agile/exceptional operating range, wide frequency response with low distortion, simultaneous dual-channel operation
Riedel Communications 818-563-4100 www.riedel.net	Artist Matrix	Digital	Connects to 4-wire cameras without an external interface	TCP/IP routing through Ethernet interface	Non-block expansion from 8 x 8 to 1,024 x 1,024	Networking frames via fiber, broadcast-quality audio, programmable VOX, remote control, panels can be used for on-air announce
	C-2 Digital Artist Beltack	Digital	Connects to cameras via Artist Matrix	N/A	Daisy-chaining of beltacks	Fully digital, noise- and hum-free, broadcast-quality audio, daisy-chaining, seamless integration with matrix
Telex Communications 877-863-4169 www.rtsintercoms.com	RTS Digital Matrix (wired intercoms)	Digital	Direct connect to 4 wire	Native IP connection	Provides up to 1024 ports	Intelligent linking of frames, VOX, full ISDN and POTS interface, plug-in VoIP interface
	Radiocom (wireless intercoms)	UHF, FHV, VOIP	Direct connect to 4 wire	Ext. connection	2-64 system	Full duplex, relay, intelligent connection to 2- and 4-wire intercom systems
Trilogy Communications 800-372-3198 www.trilogycomms.com	Mercury	IP Digital	Direct connect to 4 wire	Native IP connection with standard RJ45	Infinitely scalable port	Full-featured intercom on LAN, WAN, Internet or over satellite
	Commander	Digital	Direct connect to 4 wire	Compatible with Mercury	576 ports	Full-featured digital matrix

ADVERTISERS INDEX

While every care is taken to ensure that these listings are accurate and complete TV Technology does not accept responsibility for omissions or errors.

PAGE	ADVERTISER	WEB SITE	PAGE	ADVERTISER	WEB SITE
23	360 Systems	www.360systems.com	32	Marshall Electronics	www.lcd racks.com
38	360 Systems	www.360systems.com	24	Network Electronics ASA	www.network-electronics.com
50	AJA Video	www.aja.com	2	Panasonic Broadcast & TV Systems	www.panasonic.com/broadcast
52	Analog Way	www.analogway.com	66	PBS	www.pbstechconference.org
14	Autumn Wave LLC	www.autumnwave.com	31	PESA Switching Systems, Inc.	www.pesa.com
33	B&H Pro Audio	www.bhproaudio.com	60	Petrol Bags	www.petrolbags.com
59	B&H Pro Audio	www.bhproaudio.com	54	ProMax Systems, Inc.	www.promax.com
34	Bittree, Inc.	www.bittree.com	67	RF Central LLC	www.rfcentral.com
42	Boland Communications	www.boland.com	50	RF Central LLC	www.rfcentral.com
21	Broadcast Pix	www.broadcastpix.com	51	RF Central LLC	www.rfcentral.com
58	Broadcast Store	www.broadcaststore.com	18	Riedel Communications	www.riedel.net
16	BUF Technology	www.buftek.com	49	Ross Video LTD.	www.rossvideo.com
20	Burk Technology	www.burk.com	35	Sachtler Corp. Of America	www.sachtlerusa.com
36	Calrec Audio Ltd.	www.calrec.com	51	Schneider Optics	www.schneideroptics.com
43	Canare Corp of America	www.canare.com	47	Solid State Logic	www.solid-state-logic.com
41	CEA	www.cesweb.org	9	Sony Broadcast & Professional Group	www.sony.com
51	Cobalt Digital	www.cobaltdigital.com	1	Sony Broadcast & Professional Group	www.sony.com
50	Compix Media Inc	www.compixmedia.com	19	Sony Broadcast & Professional Group	www.sony.com
46	Computer Modules - DVE0 Division	www.dveo.com	37	Sound Devices, LLC	www.sounddevices.com
50	Compuvideo Co., Ltd.	www.compuvideo.com	13	SRS Labs Inc	www.srslabs.com
12	Digital Rapids	www.digital-rapids.com	30	StreamBox	www.streambox.com
15	Dolby Labs Inc	www.dolby.com/tvaudio	40	Studio Technologies	www.studio-tech.com
51	DTV Exchange	www.dtvexchange.com	17	Telecast Fiber Systems, Inc.	www.telecast-fiber.com
55	Electronics Research, Inc.	www.eriinc.com	5	Thomson/Grass Valley	www.thomsongrassvalley.com
48	Enco Systems, Inc.	www.enco.com	51	Torpey Time	www.torpeytime.com
25	Ensemble Designs	www.ensembledesigns.com	11	TV ONE	www.tvone.com
57	ESE	www.esa-web.com	60	Videoquip Research Ltd	www.videoquip.com
22	Fiber Plex	www.lightviper.com	51	V-Soft Communications	www.v-soft.com
26	For-A Corporation	www.for-a.com	53	Ward-Beck Systems	www.ward-beck.com
28	Gefen	www.gefen.com	68	Wheatstone Corporation	www.wheatstone.com
50	JK Audio	www.jkaudio.com	45	Wohler Technologies	www.wohler.com
39	Leitch Inc.	www.leitch.com	60	Xintekvideo, Inc.	www.xintekvideo.com
29	Leitch Inc.	www.leitch.com	56	Zaxcom, Inc.	www.zaxcom.com
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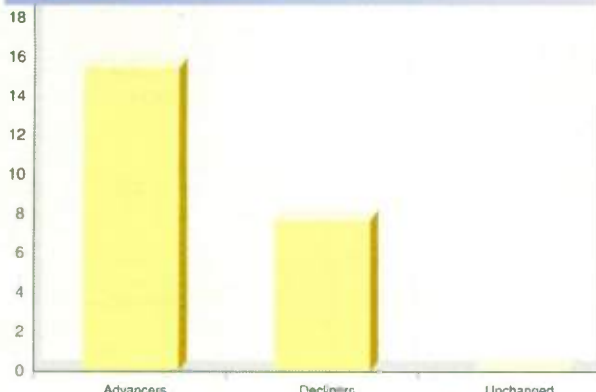
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TV TECH BUSINESS

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TOP ADVANCERS BROADCAST STOCKS (AUGUST 18 - SEPTEMBER 1)

Young +15.06%
Lin TV +10.02%

TOP DECLINERS BROADCAST STOCKS (AUGUST 18 - SEPTEMBER 1)

Ion Media -3.23%
Sinclair -1.89%

TOP ADVANCERS TV STOCKS (AUGUST 18 - SEPTEMBER 1)

SeaChange +20.03%
Belden +14.02%

TOP DECLINERS TV STOCKS (AUGUST 18 - SEPTEMBER 1)

Harris -4.51%
Tektronix -1.26%

TV Tech STOCKS as of September 1

Company Name	52-Week Range	August 18	September 1	% Change
Avid	32.05 - 59.10	38.80	39.96	2.99%
Belden	18.65 - 36.85	31.88	36.35	14.02%
Ciprico	4.00 - 6.84	4.33	4.54	4.85%
Harmonic	3.79 - 6.95	5.66	6.41	13.25%
Harris	36.72 - 49.78	45.45	43.40	-4.51%
LSI Logic	7.41 - 11.81	8.05	8.01	-0.50%
Scopus	3.05 - 8.35	3.15	3.34	6.03%
SeaChange	5.07 - 9.89	7.14	8.57	20.03%
Tektronix	22.64 - 36.89	28.66	28.30	-1.26%

Broadcast STOCKS as of September 1

Company Name	52-Week Range	August 18	September 1	% Change
Acme	3.50 - 5.74	5.19	5.28	1.73%
Belo	15.11 - 24.68	16.42	16.33	-0.55%
Entravision	6.59 - 9.18	6.95	7.49	7.77%
Fisher	38.89 - 49.89	39.72	43.09	8.48%
Gray	5.15 - 12.50	6.10	6.40	4.92%
Hearst Argyle	19.97 - 26.27	22.03	23.20	5.31%
Nexstar	3.80 - 6.20	4.51	4.50	-0.22%
Lin TV	6.12 - 15.44	6.59	7.25	10.02%
Ion Media	0.37 - 1.15	0.93	0.90	-3.23%
Sinclair	7.18 - 10.07	7.95	7.80	-1.89%
Univision	23.52 - 36.67	33.49	34.82	3.97%
Young	1.70 - 4.40	2.39	2.75	15.06%
Tribune	27.09 - 39.06	31.62	31.25	-1.17%
Meredith	45.04 - 56.83	47.15	47.96	1.72%
EW Scripps	40.86 - 50.98	43.75	47.01	7.45%

VCI Acquires Digital Transaction Group

SPRINGFIELD, MASS.

Video Communications Inc., a developer of traffic and billing solutions, has acquired Digital Transaction Group, an automation software maker in Austin, Texas. Financial details were not released. DTG will now operate as VCI Automation.

"DTG is proud to be a part of the VCI team and the vision they have for the future," said James Brown, general manager of VCI Automation.

DTG's automation system resides on an extensive multilayered platform, Xe. The companies said Xe's architecture is one of the most influential factors of the acquisition. The deal will lead the merged companies in a new global direction and expand their product portfolio.

"We are excited about the acquisition and the opportunities it will afford our two companies going forward. Together with our business system, Orion and the revolutionary technology of Xe, we will be able to provide the industry with a single solution for a total content delivery platform," said Lowell Putnam CEO of VCI.

Belden Appoints Gray Benoist CFO

ST. LOUIS

Belden has named Gray G. Benoist vice president of finance and chief financial officer.

Benoist was previously with Motorola, most recently as senior vice president and director of finance of the networks segment.

President and CEO of Belden John Stroup said, "I am delighted to wel-

come Gray Benoist to the senior leadership team of Belden. Gray has significant experience providing financial leadership in a dynamic, high-performance environment. His focus on results with a strong process orientation will fit our culture extremely well."

Benoist succeeds Richard K. Reece who left the company in 2005. Belden's Treasurer Stephen Johnson has served as interim CFO.

Radyne Names New Chief Exec

PHOENIX

The Radyne Corp. board of directors has elected Carl Myron Wagner president and CEO. Wagner succeeds Robert C. Fitting who retired Aug. 31.

Wagner comes to Radyne from General Dynamics, where he served as vice president and director of engineering for the Space and National Systems Division. Prior to General Dynamics, Wagner held several business and engineering management positions at Motorola Inc.

"Myron Wagner has already demonstrated his ability to grasp the essence of Radyne's operations and strategic strengths," Radyne Chairman C.J. Waylan said. "His broad business and technical background, including the development of large, complex hardware and software products will be key to achieving Radyne's growth goals and earning returns for our shareholders into the future. He is an excellent choice to succeed Bob and to build on his accomplishments."



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MGM Grand Hotel, Las Vegas

CALL FOR BROADCAST TECHNOLOGY PAPERS

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Once again the PBS Technology Conference will join the SBE Ennes Workshop helping to kick off the NAB Broadcast Engineering Conference!

We are seeking informative, objective and dynamic presentations on a variety of topics, including a focus on new media technologies and applications.

Please visit www.pbstechconference.org for details on topics of interest and how to submit a paper for presentation at the 2007 PBS Technology Conference.

The dead-line for submissions is **November 15, 2006.**

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- scalable – up to 64 input faders
- routable mixes
- event storage and recall
- eight stereo subgroup mixes
- eight stereo sends
- eight mix-minus outputs (can be expanded)
- four DCM faders (digitally controlled groups)
- Bus-Minus (w/TB & solo) on every input (direct out)
- pan/bal, blend, mode, EQ/dynamics on every input
- delay inputs or outputs (frames or milliseconds)
- fullscale digital peak and VU metering
- two studios, CR and HDPN/Studio 3 monitors
- talkback communication (programmable)
- mix follows talent / logic follows source
- 12 user-programmable switches (comm, salvos, triggers, etc.)
- automatic failsafe DSP card option
- automatic failsafe CPU card option
- redundant power supply option
- switched meters with system wide access (including all console inputs and outputs)
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- motorized faders
- pageable fader option
- dedicated LCD display per function (EQ, Pan, Dynamics)
- multiple surfaces can share I/O

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