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WHAT'S INSIDE

Content Is King at CES

Distribution deals overshadow new gear

by Gary Arlen

LAS VEGAS

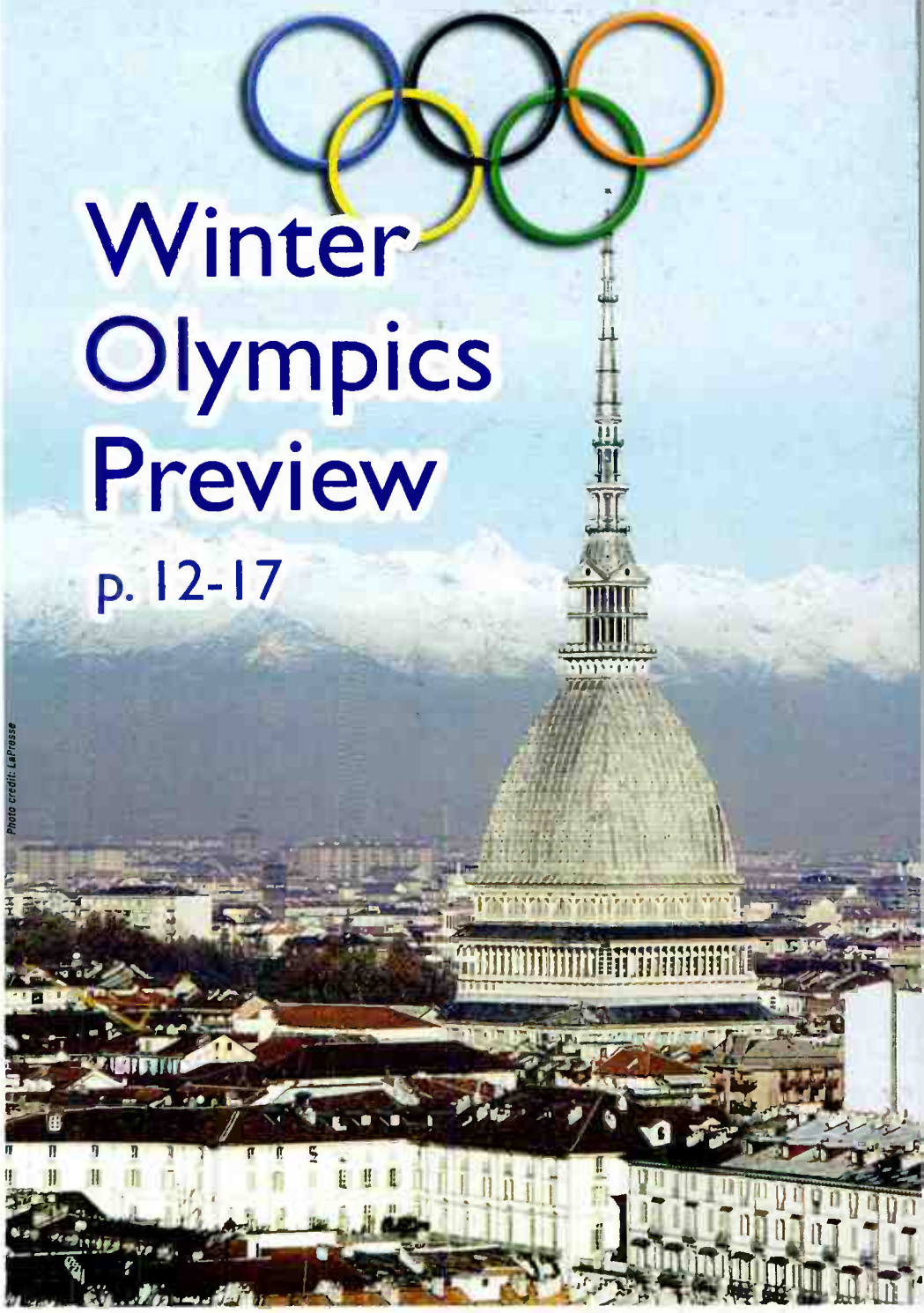
The annual Circus of Extraordinary Superlatives (CES) delivered greater-than-ever Chaos, Ebullience and Surprises (CES) this year. Even with more emphasis on Convergence, Entertainment and Services (CES), this year's International CES (Consumer Electronics Show) was still focused on control, efficiency and size (CES)—both big (up to 103-inch plasma TV prototypes) and small (TV reception delivered via mobile phones).

At times, CES is simply surreal. Its "big tent" draws executives and exhibitors from an array of affiliated industries, and this year the emphasis was on content and applications delivered via the hardware that is the event's original focus. For example, top executives of the largest cable TV companies used CES to unveil their latest Open Cable Applications Platforms agenda, which could create a retail digital set-top box market; their plan, not surprisingly, keeps cable operators in control of the end-to-end system.

HOLLYWOOD'S MESSAGE

Meanwhile, Hollywood engaged in guerrilla lobbying in its perpetual copyright battle. Taking advantage of the Consumer Electronics Association's success in attracting dozens of Washington policy-makers to Las Vegas, the Motion Picture Association of America invited the Congressional and FCC

CES, PAGE 10



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IN THIS ISSUE

P.6
Special Report: Making TV family-friend'y

P.40
Learning new software for fun and profit

P.42
Test equipment

NEWS

FEATURES

BUYERS GUIDE

EQUIPMENT

Photo credit: LaPresse/Gian Mattia D'Alberto

Olympics Preview

CONTRIBUTING WRITERS

Doug Lung

RF Technology

When designing a new DTV transmission facility or planning DTV conversion of an existing analog facility, in addition to selecting a transmitter with sufficient power and an antenna that has the correct tradeoff between gain and elevation pattern, Power handling... p. 28

Karl Paulsen

Media Server Technology

The past decade has seen the broadcast and professional side of content storage technologies focused on systems that define operational workflow requirements while addressing physical scaling in order to meet the objective of migrating from tape to disks... p. 32

Dave Moulton

Inside Audio

It's a new year, a clean slate, all that jazz. So it occurred to me that a brief reconsideration of digital audio might not be a bad thing, especially given the amount of mythology, mystery and mayhem that continues to surround the very thought of it... p. 38

FROM THE EDITOR

Let the High-Def Games Begin

Since the last Olympic flame was extinguished in Athens approximately 18 months ago, the number of HDTV sets in U.S. homes has more than doubled. Despite recent concerns expressed in this column (and elsewhere) about viewers' lack of HDTV knowledge, few events compare to the Olympics when it comes to spectacle; if the amount of high definition coverage of the Games offered up by NBC this time around doesn't get viewers onto the HDTV bandwagon, I don't know what will.

However, NBC has its work cut out for it. The majority of American viewers watching the Winter Olympics either don't actually participate in winter sports or aren't that enthusiastic about the events. But getting viewers excited about winter sports is a challenge that the experienced NBC team handles well.

David Mazza leads a team of broadcast engineers and technicians at NBC that have put in long days of hard work to provide a record total 416 hours of coverage of the two-week event. And unlike in 2004, when some of the high-definition coverage was delayed by more than 24 hours, viewers watching NBC's high-def coverage this time around will be treated to a simulcast of the analog broadcast: same time, same broadcasters and same graphics.

As expected, you will find the best coverage of how broadcasters are using the latest technology to cover the Games in the pages of **TV Technology**. In this issue, our preview starts on p. 12. Watch for TV Technology Europe Editor Mark Hallinger's wrap-up in the April 24 issue. Mark will shadow the NBC engineering crew for the two weeks of the Games, providing our readers with the most comprehensive Olympics coverage from any broadcast technology publication.

* * *

TV Technology welcomes a new member to the editorial team. Melissa Sullivan is the new Associate Editor. Melissa brings a wealth of journalism experience from Capitol Hill as well as several daily and weekly newspapers. We look forward to having her as part of the **TV Technology** team!

Tom Butts
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tbutts@imaspub.com

LETTERS

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

Enough Already

Dear Craig Johnston:

Your article "More Isn't Always Better With Sports Graphics," (Nov. 23) is dead on. Thank you for the terse and cogent analysis of graphics production.

As a former graphics AP for networks, I see the rampant abuse of graphics. It all comes down to that particular game producer, and thanks to a predominantly freelance army of producers, the inherent tendency is to separate themselves from the pack, and they do this by putting something new on the screen. Whether it looks good (correct framing and readability) or makes sense, is secondary. Even some of your storied producers just lob crap on the screen just to put something on the air.

Also, thanks for the compliments on the NASCAR pointers.

Jonathan Corl
Coordinating Producer
Sportvision
Chicago, Ill.

Dear Craig Johnston:

I enjoyed your very relevant article in the Nov. 23 issue of **TV Technology** re: overuse of broadcast sports graphics. I couldn't agree with you more and here's hoping the networks take notice… and action!

John Dannenbaum
Autodesk
New York, N.Y.

Dear Craig Johnston:

Just read your article on sports graphics and I just wanted to say thank you!

I agree with every word you wrote, especially the "red arrow" graphics. That NFL graphic is annoying. Not only is it redundant, it takes my eye off of the prime image. We know which way the team needs to go; I am insulted. It's worse than the glowing-trailed puck in hockey as far as a true fan is concerned. Not only is it left up after the play has started, it is also effected out during the play. So my eye obviously gets confused with so much going on.

I even see the NASCAR-type flags being used to point out football players, telestrator-style, during sport show analysts' time. Works really well.

My one big complaint is "ABC Monday Night Football." All that equipment and talent, yet player statistics hardly ever make it to air, other than end of quarter full-screen stats. MNF is more about stories than game info.

And yes, I also have a fantasy football team, so in my book, CBS STATracker wins hands down for the fantasy group. Clean, out of the way, yet still noticable when it effects in. I still wonder what MNF is doing with all that graphics power? Hopefully, NBC will have read your article and with ESPN taking over, that issue will be void.

So Fox has too many ties to choose from, ABC needs a few more and CBS has just the right amount.

Thanks again for the article—perfect! I am going to clean out my tie rack now.

Scott Sandstrom
BCSN
Toledo, Ohio

Craig responds:

In the future, there's the possibility that Scott and I can get the level of graphics we want, and some producers can still cover up the entire screen as they seem to want. In the same way, I can add or remove details and graphics from my GPS screen so I see just what's important to me, I see a day when a next generation of DTV allows us to pick the level of graphics we see on-screen.

And I think they should let Scott and me name those three levels. I'll name the first two "minimal" and "sensible," and let Scott come up with a name for the third level.

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SPECIAL REPORT

Catching Those Indecent Proposals

Current delay solutions offer new features to keep indecent conduct off the air

by Susan Ashworth

WASHINGTON

What havoc was wreaked by a little wardrobe malfunction. But one thing is for sure. That little thing that happened with Janet Jackson's top at Super Bowl XXXVIII two years ago has had a profound impact on how broadcasters prepare for live television broadcasts. Few want to be levied with a half-million dollar fine, as CBS and its affiliates were in 2004, after more than 540,000 viewers complained to the FCC.

The outcry has helped spur a revival of a fairly standard piece of technology—an audio/video delay device—that had been used primarily for timezone adjustments.

Today's devices, however, offer a bit more functionality and precision, and unlike previous offerings, provide broadcasters with a choice, be it a standalone or integrated solution, or a standard- or high-definition model.

EVERTZ

"After the Super Bowl there was a mad scramble to get some kind of protection into future broadcasts to avoid any such problem again," said Orest Holyk, director of sales for Evertz. "Broadcasters want to make sure this never happens again."

After the Super Bowl goof, the time delay buzz became incessant, with CBS using a tape delay for the 2004 Grammy Awards and ABC imposing a video and audio delay on its 2004 Academy Awards. Tape delays had been used in previous years, but the previous standard—which was often five seconds or so—typically only enabled network censors to delete offensive audio. Images such as nudity or an indecent hand gesture were left untouched. After the 2004 Super Bowl, however, other networks began trying seven-second delays on some of their programming, some of which were eventually lifted after the excitement died down.

But that hasn't slowed current demand, say manufacturers. Broadcasters now see this as a key piece of their broadcast pipeline.

One of the newer solutions is the Evertz HD/SD 9545 DLY-PRO, a protection device—"labeled as the JJ Box," Holyk said—that was released in 2004. This standalone 2RU box enables an operator to insert desired time delay up to a maximum of 40 seconds for HDTV streams. A standard-definition delay of 240 seconds is possible via a secondary model known as the DLY-PRO HD40, which the operator programs via a front-panel control.

"As soon as you detect something, you're able to switch over your audio and video to a clean feed," Holyk said.

The solution offers broadcasters two simultaneous program paths, both of which are on the same delay cycle. The first program feed is typically focused on the main action. Should an unscheduled or offensive event occur, the operator hits a button to cause the original audio and video program stream to be clean-switched to the alternative back-up channel.

"You also want to make sure you don't have clicks and pops when switching," Holyk said.

When the event passes, the output can be returned to the main program stream, without the audience noticing that an edit has occurred.

The HD/SD 9545 DLY-PRO includes dual power supplies as well as a built-in HD/SD Quattro card that allows an operator to see all four pictures on a single screen, including the main program, the delayed main program, the safe input and the delayed safe input. Features include embedded audio and discreet audio support, relay bypass protection for audio and video, contact closure inputs for bypass triggering, programmable pre-trigger reaction time and dual power supplies.

The Evertz HD/SD 9545 DLY-PRO

DOREMI

Integrated systems, such as the standard-definition V1-MP2 video disk recorder and high-definition V1-HD recorder from Doremi Labs feature a delay mode that can be set for a few seconds or for several hours.

Delay devices have usually been separate, standalone boxes, "but with this kind of configuration, the box offers additional functionality as a disk recorder or one-channel server to replace a video tape deck, for example," said Ramzi Shakra, marketing manager for Doremi Labs.

Delay operations are given additional functionality with a software solution known as LiveEditPro. "Users have increased functionality [with the software] and are now able to delay and insert different clips or beep out voices as needed," Shakra said.

The software operates with the Doremi MCS server. Users control the software via a PC interface that allows broadcasters to create pre-set clips or commercials that can be loaded at the ready for replacement in a program stream. Delays can be set for several seconds up to several hours.

The company also offers the TSS-100 delay device, allowing stations to delay a DVB/ASI stream as it comes from the network.

PRIME IMAGE

Focusing on audio sync issues as well as indecency issues, Prime Image offers the HD/SD Pipeline, a 2 RU SDI variable audio/video delay standalone box that provides delay, sync adjustment and signal alignment.

Pipeline can provide up to 39 seconds of SD delay and six seconds of HD delay, allowing users to delay the output frame by frame if needed. Users can cut away audio and video simultaneously or independent of one another during output.

Features include programmable video delay through frames or seconds, 10-bit video processing with a primary video that is complemented by an auxiliary/alternate video input, four channels of AES/EBU digital or analog audio, 24-bit audio processing with four in and out channels, and four auxiliary/alternate audio channels.

The HD/SD Pipeline's signal adjustment capability aligns incoming and outgoing signals so they remain in synchronization. ■

Cable, DBS Explore Family Tier Potential

Safe content packages may be too restrictive to succeed

by John Merli

WASHINGTON

Major cable companies, pushed into hastily offering family-friendly tier packages to divert renewed interest on Capitol Hill and at the FCC in à la carte programming, now hope they've fed the Washington beast just enough to keep it satisfied, and quiet, for the moment.

FCC Chairman Kevin Martin's remarks in late November that seemed to put à la carte back on the table—and which characterized as flawed an earlier FCC study that concluded à la carte would be prohibitively costly to MSOs—led Comcast and Time Warner to unveil their respective family packages seemingly in near-record time for the industry. Time Warner announced first in mid-December, followed a week later by Comcast. Cox Cable announced its tier plan in early January, followed shortly thereafter by EchoStar and DirecTV.

MORE CONTROL

At the CES confab in early January, asked if à la carte was an FCC option if consumers did not take a fancy to family packages, the chairman responded by saying he believed consumers will demand more control over content. "I believe you can provide that in a variety of ways," Martin said, and that a migration away from cable and broadcast to broadband and IP video would be one indication that consumers are taking more control over content.

Comcast said the timing of its family tier announcement in December was not affected by Martin's remarks a few weeks earlier, saying its family plan had already been under consideration.

"We've actually been looking at it for awhile, so it's something that's been in the works. It's part of an ongoing commitment to family-friendly programming," said Comcast spokeswoman Jenni Moyer.

The planned tiers of all three MSOs are quite similar, offering between 32-40 channels for an average of $32 monthly, plus the seven broadcast networks, religious and public access channels like C-SPAN, and Hispanic outlets. Channels tapped as family-friendly, among others, include: Disney, PBS Kids Sprout, The Weather Channel, The Food Channel, HGTV and CNN Headline News. All three plans

TIER, PAGE 8

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Tier

CONTINUED FROM PAGE 6

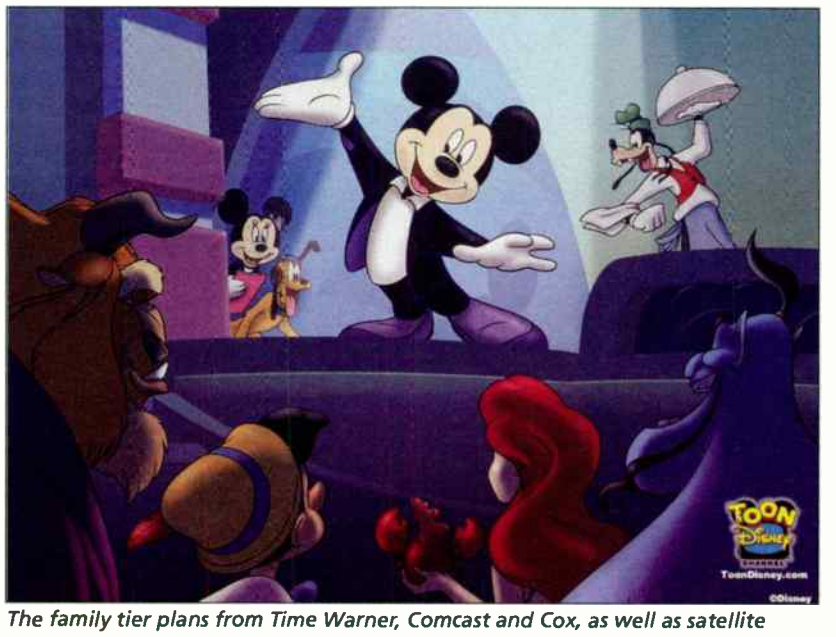
include Toon Disney, but no MSO tapped the popular Cartoon Network. Time Warner said no to Nickelodeon. All three have axed The History Channel from their tiers.

And there are no sports channels like ESPN in the Time Warner, Comcast or Cox menus. Moyer said Comcast's decision to not include sports (a big pet peeve with critics) was based on how much live programming a channel may offer. Sports coverage, she pointed out, is nearly always live.

"The Janet Jackson incident occurred during a sports event," she said, "as did that NBA brawl in the stands last year." (However, both incidents occurred on broadcast networks, which the MSOs are compelled to include in their tiers.) "But we still have other parental control features to deal with content like that," Moyer said.

Time Warner and Cox also cite parental controls as an effective tool for handling objectionable content, and all three cable giants seem to suggest that family tiers are not the ready solution for all families.

"Our family tier is designed to be used by a limited segment of our customers who want as much control as possible over a limited number of stations and what their kids watch," said Mark Harrad, Time Warner senior vice president of corporate communications.



The family tier plans from Time Warner, Comcast and Cox, as well as satellite provider EchoStar include family-friendly Toon Disney.

"Our consistent message is that cable is not under-serving its customers. It's really over-serving millions of homes."

—CEO Steve Lindsley, USDTV

Asked what parents can do who want live sports, cable news and entertainment coverage after the kids have gone to bed, Harrad suggested subscribers purchase expanded basic cable packages and simply use existing set-top box parental controls to filter content accordingly.

All this family talk may have a ring of déjà vu for the DBS industry, which announced similar family friendly packages last month.

Both plans were similar to the offerings from cable operators, however glaringly omitteed from EchoStar's 'DishFAMILY' package were any channels from Disney. Both packages offer approximately 40 channels; DishFAMILY is now available for $24.99 (including local channels), while DirecTV's TOTAL CHOICE plan will cost $34.99 per month (also including local channels), when it launches in mid-April. DirecTV is hoping it will receive better public reception for this plan after the satellite provider offered a family friendly package five years ago that was discontinued.

"As I recall, the package didn't do very well, so we folded the channels into some of our basic packages," said spokesman Robert Mercer.

TIER, PAGE 23

CES Marks Network-'Net Marriage

Networks clamor to push content to new devices

by Claudia Kienzle

LAS VEGAS

At the 2006 Consumer Electronics Show (CES) in Las Vegas, there was a flurry of announcements that many major video content providers and Internet companies have formed partnerships to expand the ways that primetime TV shows and movies can be accessed by users of video cell phones, video iPODs, laptop computers, and other portable media devices.

While it's too early to assess how much revenue can be generated by Internet-driven video on demand to mobile media devices, media companies are seeding the field in the event that this new technology wave mushrooms into something that reshapes the media landscape.

(L to R): CBS President and CEO Les Moonves and Google co-founder Larry Page announce a deal at CES to distribute CBS programming on Google's Web site.

EVOLUTION UNDERWAY

While these ventures are ushering in innovative content distribution models, they call into question what impact they will have on traditional media outlets, such as affiliate TV stations that have always carried primetime TV shows to viewers.

"These new forms of media distribution should be watched carefully because obviously there is an evolution taking place," said Bruce Leichtman, president and principal analyst for Leichtman Research Group, Inc., in Durham, N.H.

Although the market for using portable devices like video iPODs and video cellphones is still relatively small, Leichtman cautions that it could steadily grow in the same way that satellite radio grew from zero to nine million subscribers in just a few years.

On the other hand, Leichtman added, "It remains to be seen if the public will willingly pay fees to download individual TV shows onto portable media devices. "Very quickly, they'll realize, 'Duh. I could just record these shows and watch them for free.'"

Leichtman's advice to affiliate stations is, "Don't panic. But pay attention to what's happening. Change doesn't happen overnight but things are clearly evolving. The fact that media companies are busy entering into partnerships is their way of testing the waters and hedging their bets in the event something does happen to dramatically change traditional business models."

GOOGLE TV

One of the biggest announcements at CES was the planned opening of the "Google Video Store," the first open video marketplace enabling consumers to buy and rent a wide range of video content, such as music videos from Sony BMG; feature length independent films from

'NET, PAGE 26

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CES

CONTINUED FROM PAGE 1

staffers to a private suite at the Bellagio Hotel. There, MPAA showed them how digital devices (many of which were on display elsewhere around town) are being used to scuttle copyright barriers.

The Hollywood message came with an endorsement of "The Digital Transition Content Security Act" (HR.4569), which House Judiciary Committee Chairman James Sensenbrenner (R-Wisc.) introduced in Congress just prior to the December recess.

And as a further reminder of the transient state of the industries, News Corp. President Peter Chernin promised that his company's 20th Century Fox studio subsidiary is planning to shake up the traditional home video release pattern this year. Movies in HD format will be released within 60 days after their theatrical debuts, and some films will come out on DVD and VOD simultaneously, Chernin revealed in his remarks at CEA's invitation-only "Leaders in Technology" banquet.

"The content industry is ceding control to consumers and coming to terms with technology and today's landscape," Chernin said.

The Fox announcement was the first commitment by a major studio to launch "day-and-date" distribution patterns, although Disney and Mark Cuban's production and exhibition conglomerate are planning similar approaches.

While digital rights management and copy protection oozed from many presentations—including Sony Chairman Howard's Stringer's blunt acknowledgement that downloading is a core element in the digital home—a number of other legacy issues persisted on the CES agenda.

Rep. Fred Upton (R-Mich.), chairman of the House Telecommunications Subcommittee, said that he did not expect Congress to take up any additional digital TV transition legislation this year now that the fundamental issue—a Feb. 17, 2009, date certain—has been set for turning off analog broadcasting.

Speaking at two consecutive CES policy sessions, Upton suggested that he might call "an oversight hearing by summertime on what is the industry doing... to see if there are some lagging players." But he insisted that no new bills about unresolved transition factors will get through Congress in 2006.

That stance generated an anguished response from fellow panelist Martin Franks, CBS Corp.'s senior vice president and chief Washington lobbyist.

"It's discouraging... that, despite your best efforts, we cannot get enough going in Congress to finish off... some of the details," Franks said, referring to the broadcast flag and other copy protection issues along with cable must-carry.

"If we're not going to take [them] on until February 2007, we're going to burn up the margin for error in getting things done," Franks added, alluding to the countdown toward February 2009.

On the same "End of Analog" panel, FCC Commissioner Jonathan Adelstein pointed to the progress in crafting consumer education programs. He said that the FCC and industry collaboration will assure that Americans will be prepared for the cutoff of analog TV broadcasting in the weeks after the 2009 Super Bowl telecast.

Microsoft Corp. Chairman and Chief Software Architect Bill Gates forecasts the digital future at CES2006.

PRODUCTS TO PONDER

Alongside all this politicking and positioning, CES's primary mission—to introduce new gizmos and gadgets—persisted. Perpetual sensory overload and competitive confusion reigned. For example, in the high-definition home video category, the emerging marketplace battle between the incompatible Blu-ray and HD-DVD formats escalated as both camps introduced products and new studio allies. With vastly varied pricing—$499 for a Toshiba HD-DVD player versus $1,800 for Pioneer's Blu-ray device—potential customers face a complex evaluation process before making any buying decisions.

The even more undefined market for home networking saw the arrival of several new standards consortia, including the High Definition Audio Video Network Alliance, the Z-Wave Alliance (wireless home control systems to transmit broadband video and other signals) and VSBNet (a LG Electronics proposal using existing coaxial home wiring). These groups join the alphabet soup of networking hopefuls such as DLNA (Digital Living Network Alliance), MOCA (Multimedia over Coax Alliance) and the various wireless, power line and Ethernet initiatives.

Elsewhere in the sprawling Las Vegas venues, proponents of plasma, liquid crystal display and digital light processor monitors lauded the falling prices of their respective monitors. At the same time, Toshiba and Canon showcased prototypes of their surface-conduction electron-emitter display equipment—promising to bring the eye-popping screens to market this year at competitive (but unspecified) prices. The prototype Toshiba and Canon SED flat-panel monitors were both in the approximately 37-inch 16:9 format, but Toshiba said its production models will be up to 55 inches wide. Both companies' demonstrations fulfilled SED's promise of CRT-level brightness and contrast, but with power demands about one-third less than plasma.

Organic light emitting diode technology, another promising display option in recent years, was relatively hard to find this year. Sanyo used an OLED display in a small way—as a viewfinder on a portable high-definition camera. Eastman Kodak, which has productized its "NuVue" OLED technology in recent years, was invisible to most attendees since the company did not have a floor exhibit this year.

Nonetheless, Kodak Chairman and CEO Antonio M. Perez joined the "convergence chorus" in his keynote speech, asserting that the digital content era will rely on identification, organization and access to all content instantly.

Portability and mobility were buzzwords throughout CES, featured in Yahoo! CEO Terry Semel's introduction of "Yahoo! Go," a line of transportable services. QualComm, the mobile chipmaker, offered more details about MediaFlo, which will use TV spectrum to stream video programs to dedicated mobile devices later this year. Verizon signed up to carry the MediaFlo service, but no pricing was attached. Crown Castle, a competitor to the MediaFlo network, provided details of its wireless video service, dubbed "Modeo."

This year's CES could be gauged in small increments. Most of the product improvements were derivative; nhancing existing products such as portable media players and digital video recorders.

To the ongoing bemusement of video aficionados, the glory of the biggest plasma screens on the show floor came down to one inch. While the gargantuan prototype screens attracted attention, neither Samsung or LG (with their 102-inch displays) nor Panasonic (showing a 103-inch model) used their bragging rights to announce definitive near-term commercialization of the giant displays.

31 FLAVORS OF IPTV

First there was Akimbo and Roku. Two years ago, those companies debuted at CES with visions of set-top boxes that draw streaming content and other material from the Internet to display on digital monitors. Although those pioneers have struggled in the IPTV arena—but are surviving with next-generation products—a slew of companies have followed in their steps.

DAVE-TV (Distributed Audio Video Entertainment) showed up last year, and came on stronger this year with a "cross-platform ecosystem" featuring on-demand DVD and HDTV quality content. Interactive Television Networks offers a similar line-up, for $29.95 per month, of old TV shows, kids' programs, documentaries and other Internet video content—including some HD programming, through its proprietary set-top box.

Media center computers took on a new online life at CES—thanks in part to Intel's new VIIV chip. A prototype VIIV computer, often compared to the absent Apple's Mac-Mini, was called the "future of the home network." Intel CEO Paul Otellini's celebrity guests during his presentation included Morgan Freeman, who heads ClickStar, a new studio, backed in part by Intel, to create movies that will premiere online.

Such convergence alliances seeped into many of the relationships unveiled during CES. For example, Comcast revealed set-top box deals with Panasonic and Samsung, each for about 250,000 digital devices. On one level, the contracts mark Comcast's slap at the duopoly, which has long dominated cable set-top equipment: Motorola and Scientific-Atlanta (which is being acquired by Cisco Systems). Beyond that, the Panasonic alliance in particular gives Comcast the potential to control a number of home devices through the set-top box—including DVD and music devices.

Comcast calls the new device "RNG"—which can stand for other "Real Next Generation" (implementing the Next Generation Network Architecture that Comcast has been backing through CableLabs) or "Residential Network Gateway," according to Comcast's top technology strategist, Mark Coblitz.

The presence of cable operatives like Coblitz and his boss, Comcast head Brian Roberts, not to mention Verizon Chairman Ivan Seidenberg (who talked up that telephone company's broadband wireless and wired video ventures) added to the intrigue in Las Vegas. This was a show of convoluted, enterprising solutions (CES) and the combative entrepreneurial sorties (CES), as technology and marketing confronted the challenge of political reality. ■

Ikegami's HD-Tapeless Editcam:

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Ikegami, the leader in broadcast camera technology, introduces the HDN-X10 Editcam HD (1000TV lines). This breakthrough tapeless camera features nonlinear random access in shooting, viewing, and editing, along with CMOS imaging technology for smaller size, decreased power consumption and multi-native format (1080/60i & 50i, 1080/24p, 720/60p & 50p) capabilities. Images are recorded in full resolution (no pre-filtering) on FieldPak2 removable media using the Avid DNxHD codec in MXF file format.

The high 145Mbps data rate yields negligable compression artifacts and accurate editing, yet offers an impressive 90 minutes recording time on a single 120G FieldPak. Popular Editcam features such as RetroLoop, Time-Lapse, and Intelligent Recording (you can start recording anytime without fast-forwarding to where your current recording ends), and future migration to solid state recording, make the Editcam HD a camera beyond compare, an ideal HD production camcorder system.

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NBC: Olympics Means More of Everything

by Robin Berger

TORINO, ITALY

The International Broadcast Center at the XX Winter Games will, from Feb. 10 through 26, become "the largest operating HD facility in the world," according to David Mazza, senior vice president of engineering for NBC Olympics, which will use part of the real estate to cover the games for American viewers.

Mazza estimated that more than 60 percent will be shot in native HD by the host broadcaster, the other 40 percent in 16:9 SD. Adding in HD graphics, roll-ins, profiles and studio segments provided by NBC, native HDTV could comprise 70 to 75 percent of all airtime, he said. NBC expects to air 416 hours of Olympic coverage (the most of any Winter games in history) over its broadcast network and cable channels USA, MSNBC, CNBC, NBC HD and Universal HD, as well as its Web site, *NBCOlympics.com*.

NBC staffers definitely have their work cut out for them. In addition to the traditional constraints such as last minute construction delays, transportation issues, weather, red tape, etc., there's the new challenge of balancing three video formats simultaneously: 1080i HD, 16:9 SD, and 4:3 SD.

Mazza noted that the NBC Engineering team, Sony partners and systems integrator Ascent Media spent about 15 months planning the conversion of the IBC and venue facilities to accommodate HDTV. An extensive SD infrastructure precluded starting from scratch, so HD was overlaid on top. All HD signal paths and associated routing are based on newly installed HD equipment.

Upconversion will result in HD images for all events except curling (which airs exclusively on cable channels in 4:3 SD). The official IBC standard for HD is 1080i/50, which must be converted to 1080i/60 before transmission to New York. Standard-definition feeds, derived from a 4:3 center cut of the HD feed, will be transmitted with the HD signal as a dual stream using independent converters, encoders and paths. AT&T will provide transmission services.

"In Salt Lake City, we sent an aggregate bandwidth of about 155 Mbps home to New York," Mazza said. "In Torino, we're sending over 1,000 Mbps."

New York will insert SD and HD commercials separately in different control rooms.

Mazza said the 4:3 material—which will include archived and specialty cam footage—will be pillar-boxed with side panels which may be filled with a graphic.

OB TRUCKS

At the 2004 Olympics in Athens, NBC had seven trucks, one flypack, seven C-worlds (smaller NBC flypacks), eight on-site announcers and 18 OT venues (announcers in voiceover booths), Mazza said. In Torino, NBC will have eight trucks, three flypacks, two C-worlds, one on-site announcer and one OT venue. This time, seven venues will have all-HD trucks and flypacks. All SD venues will be shot 16:9 and upconverted at the IBC (except for the


1


2


3

1. Carolina Kostner competes in the European Figureskating Championships. Photo credit: LaPresse/Gian Mattia D'alberto; 2. Hermann Maier wins the Gold Medal in the Giant Slalom at the Winter Olympics in Nagano, Japan, 1998. Photo credit: LaPresse/Claudio Papi; 3. Jani Soininen of Finland won the 90-meter ski jump Gold Medal in Nagano, 1998; Photo credit: UPI/Corbis/Marten Hangen, Pandis Media

curling footage).

NBC contracted trucks and rental equipment from Vision Outside Broadcast, PrimeVision, Cine Video, Outside Broadcast, Presteigne and Bexel.

EDITING & GRAPHICS

In Athens, six venues had on-site editing; in Torino, there will be eight. The new equipment lineup includes Avid Media Composer Adrenaline HD workstations, an Avid Unity ISIS shared storage system, Avid (Pinnacle) Deko3000 HD CGs and stillstores. Several new HD graphics, compositing, storage and play-out devices—all Mac-based—share files among themselves and with the Avid equipment via Apple's Xsan and a Blue Arc server.

There's also an extensive deployment of networked SD and HD EVS equipment, specifically the HDXT server (the EVS workhorse since 2002) and its HDXT[2] upgrade. According to EVS manager of operations, Greg Macchia, the XT[2] can be configured to six channels (versus four), has an SDTI network bandwidth of 1.5 Gbps, and supports M-JPEG.

HD IMPACT

Despite the muscle, Mazza doesn't expect the experience to be a piece of cake.

"HD runs at roughly six times the data rate of SD, it only goes one-third as far on copper cable, and it requires three to four times the storage space and processing power to edit," he said.

As such, the editing system will have to run faster to keep up and could run out of space sooner. The power constraints of doing HD will also impact layout and design.

"The equipment needed to be grouped much closer together so that we didn't have any long cable runs," said Jim Kraenzel, project manager for Ascent Media's integration group in Torino. "We lose signal beyond 340 feet. In some cases we had to put in repeating distribution amplifiers to reclock the signal."

Miranda's iControl, Kaleido and Allegro technologies will be used for command and control. There will also be Tandberg transmission HD and SD encoders and decoders, Shibasoku HD motion compensated standard converters, discrete 5.1 sound acquisition equipment and custom Dolby PL II decoding software.

ASSET MANAGEMENT

The MXF Proxy Encoder from MOG Solutions, a Portuguese developer of MXF solutions, will be part of NBC's Blue Order digital asset management system for low-resolution proxies, which will enable editors at the Olympics to make shot selections and clip lists as footage is being recorded.

"MOG Solutions is making the actual low-res proxies;" the technology generates an MXF proxy from any SD or HD source, said Matt Adams, director of technology for NBC Olympics.

NBC also will encode on-the-fly static and dynamic metadata as part of the MXF proxy file.

The on-site Telex ADAM intercom makes extensive use of RVON voice-over-IP. Many of the telephones at the venues are also VoIP.

"We had no choice but to employ a *lot* of new equipment at this time," Mazza said. "There are more Avids, more EVS, more IP-based products, more IT infrastructure, more audio, more aspect ratio issues, more Macs, more lip-sync issues, more transmission circuits and bandwidth, more ASI... What there isn't more of is *time*."

CAMERAS & COMMS

NBC will use a variety of Sony cameras to capture the action, including the HDC 1000/1500 (1080/60p), HDW730S camcorder and HVRZ1U HDV Pro camcorder. Sony is also supplying the SRW 5500/5000 HD VTR, MVS 8000 switcher, BVM-D HD mastering monitors and LUMA LCD monitors.

A Sony PCSG50 video communication system will facilitate interviews in the Athlete's Village, according to Bob Dixon, NBC's project manager for Sound Design at the Olympics. The on-site setup will include a remote camera, plus automatic lavalier microphones (ATT899), signal-to-earpiece equipment and MX351 mixers from Audio-Technica.

The PCSG50 has an H.263 network IP connection of up to 4 Mbps and can record audio and video directly to a Memory Stick in MPEG-4 (QuickTime Media Player enables playback on any PC), according to product manager, John Garmendi.

LENSES

All of NBC's Olympics

OLYMPICS, PAGE 14

4. Curler throws a rock during a 2002 curling competition; Photo credit: LaPresse;
5. The women's biathlon, 2002 Winter Olympics in Salt Lake City; Photo credit: LaPresse, Gian Mattia D'alberto;
6. The Oval Ingot will serve as the venue for speed skating in Torino. Photo credit: LaPresse, Gian Mattia D'alberto.

Olympics

CONTINUED FROM PAGE 13

coverage will be acquired through Canon lenses, according to Mazza. The list includes the XJ100x9.3 IE-D DIGI SUPER100xs, long field lens, which he describes as an "incredible 100x HD lens with image stabilization."

Other lenses meriting special attention are the HJ11ex4.7B IRSE, which is Canon's widest angle of view portable HDTV production lenses, as well as the HJ40X10B IASD-V, which captures images over considerable distances.

AUDIO

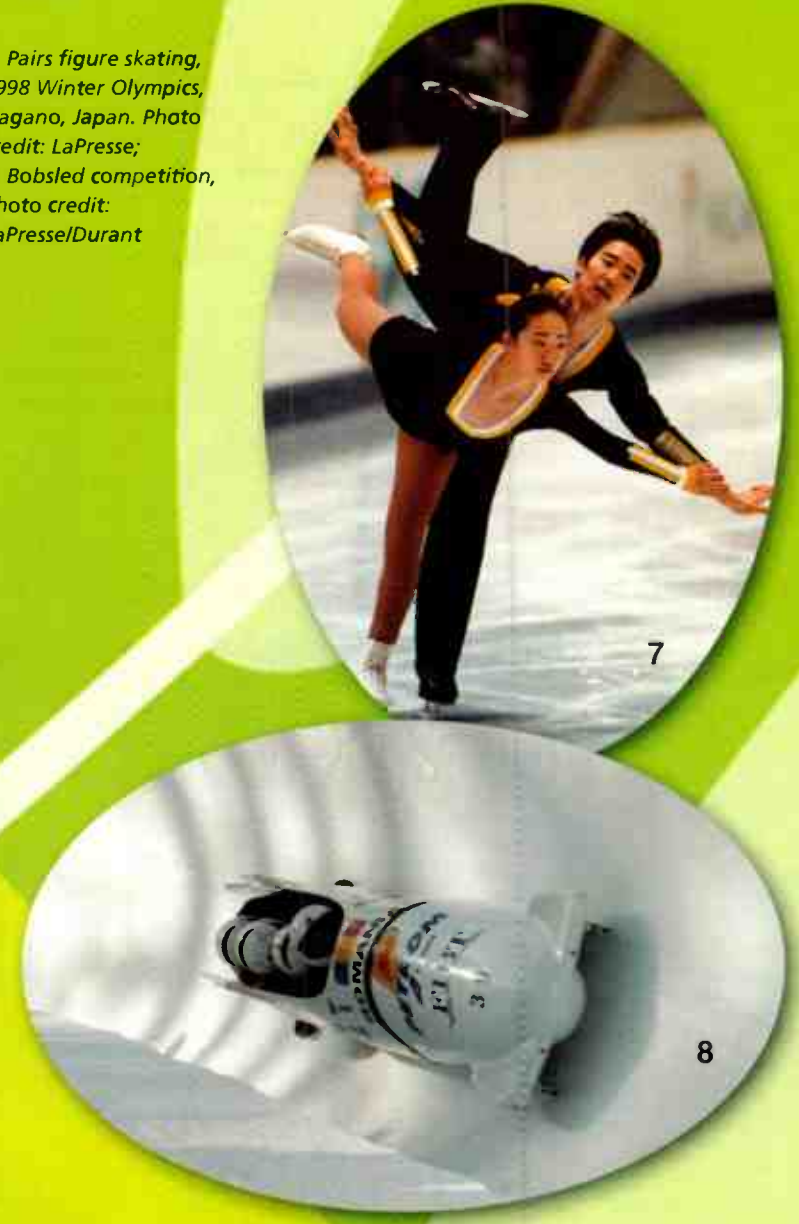
The biggest audio challenge is providing a pleasant experience for everyone, whether they have a 5.1 surround sound system or stereo, Dixon said. Separate acquisition and processing technologies will run simultaneously, as well as transmission provided in a 2-channel format tailored to client specs.

"A lot of the recording machines that take signals in can only record four audio channels—even some of the high-def machines can't do that," Dixon said. "We start out with 5.1 channels of audio [and] have to get down to two—to do that, we've got the Dolby ProLogic II encoder DP563."

Audio-Technica AT4050 multi-pattern condenser mics, housed in special Rycote shields, will record ambience, and the company's 815ST stereo shotgun will be on every handheld camera, Dixon said. Sennheiser will provide RF technology, including EK3041 receivers and SK5012 transmitters.

Calrec Alpha 100s will be used in the IBC's two main control rooms, Dixon said. Calrec Sigma and Q-2 consoles will be in the venues' mobile units along with consoles from Studer and Neve. Yamaha BM2000s will be at three smaller sites.

There will also be 5.1 surround sound monitoring systems using NHT Pro M20 loudspeakers and B20 subwoofers in every control and edit room at the IBC. ■



7. Pairs figure skating, 1998 Winter Olympics, Nagano, Japan. Photo credit: LaPresse;
8. Bobsled competition, Photo credit: LaPresse/Durant

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Host Broadcaster Helms HD Coverage

TOBO provides everything from SD 4:3 to 1080i HD

by Robin Berger

TORINO, ITALY

As the host broadcaster at the XX Olympic Winter Games, the Torino Olympic Broadcasting Organization (aka TOBO), will shoot high-definition footage of the events in 1080i, "the primary format for Europe" and "format of choice among the majority of HD participants," according to TOBO's executive director for engineering and operations, Frank Grillo. This will be in addition to the standard feed.

"The high-definition standard here is another level of service to the broadcasters," Grillo said. "The standard television format for Torino is SD 4:3—that's the standard that the host broadcaster is required to provide to the rights holding broadcasters."

Five participating broadcasters will receive HD feeds with 5.1 audio: NBC, CBC, Torino Olympics Japan Consortium (comprised of 10 Japanese broadcasters), the Korea Pool (three Korean broadcasters) and Channel 7 Australia.

Included in TOBO's HD lineup are seven venues—the opening and closing ceremonies, two hockey venues, figure skating and short track, speed skating, freestyle skiing, and ski jump.

The biggest challenge will be dealing with three formats simultaneously, according to Grillo.

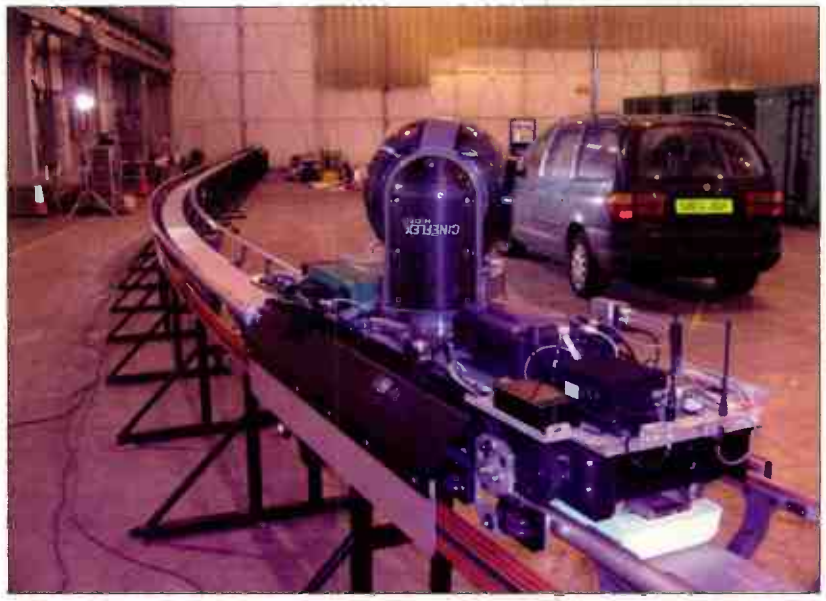
"Since the official IOC broadcast standard for the Torino Olympics is SD 4:3, all signals, regardless of how they are produced at the venue—HD or SD 16:9—must be converted to SD 4:3 for delivery to the rights-holding broadcasters, and also for official archiving," Grillo said. "This, of course, adds additional equipment for standards conversion and aspect ratio changing, as well as additional personnel to manage these changes and the increased levels of complexity."

AlfaCam, the largest provider of HD-capable mobile units in Europe, will supply the OB (outside broadcast) vans. A number of integrators will also be on board, including Aerial Camera Systems for tracking and aerial cameras; Camera Corps Ltd., for specialty cameras and beauty shots; Movie Engineering Srl for specialty camera mounts and apparatus; Audio-Technica for audio planning, equipment and installation; and Broadcast RF Ltd. for radio links and related radio frequency services.

CAMERAS AND SIGNALS

Surrey, England-based Aerial Camera Systems is providing a high-speed linear rail with HD Cineflex mount and HD video link for the speed-skating events, and a CAMCAT cable system with HD Cineflex mount and HD video link for mogul skiing.

The TOBO-commissioned system for speed skating, based around a linear motor, is a J curve-shaped track of more than 260 meters and capable of speeds up to 20 meters per second. A Cineflex stabilized camera mount fitted with a Sony HDC T950 with Fuji HD X22 lens and an HD video transmission system is attached to a camera buggy, which is built over the motor.



The Aerial Camera Systems camera tracking system, used to cover speed skating, was put through a test run at the Dunsfold Aerodrome in Southeast England.

There will be two HD links on the camera buggy, both available to the director to cut live on air, said ACS Sales and Marketing Manager Matt Coyde. ACS is supplying an HD link manufactured by Link Research (provided by Charter Broadcast UK) and NHK, host broadcaster to the speed skating venue, is supplying "an HD link specially designed by their team," he said.

"This is the first time that such a configuration has been used in live sports broadcasting," said Coyde. The system transmits pictures to receivers inside the venue.

AEC is also supplying an ACS-tethered blimp with an HD Cineflex mount to capture the opening and closing ceremonies as well as the biathlon, bobsled and alpine skiing events, a CAMCAT HD for the open-

Panasonic, an Olympic Partner with TOBO will supply 25 Astrovision giant outdoor video screens.

ing and closing ceremonies, and several systems built for SD.

Broadcast RF Sales Manager Chris Brandrick said TOBO is using a combination of Gigawave clip-on and MTV-D digital transmitters, plus MVL-D receivers and various antennas manufactured by U.K.-based Broadcast RF.

AlfaCam OB vans will use Grass Valley LDK 6000 cameras and LDK 6200 super slo-mos. EVS disk storage will be on board, too.

At the International Broadcast Center, Vistek Electronics and Panasonic products will play a key role in manipulating TOBO's HD signals, the first in regard to signal amplification and frame synchronization, the latter for monitoring and display.

TOBO will use Vistek Electronics V6153 (eight output) and V6154 (16 output) HD-SDI distribution amplifiers and V6402 HD synchronizer with V6302 advanced audio processor, said Pro-Bel spokesperson Katharine Guy, whose company was recently acquired by Vistek.

Guy also noted that the Vistek VALID test signal, introduced at NAB2005, would be used to correct any lip-sync errors before footage is supplied to the rights holders. She said no specific customizations were made to any Vistek equipment used for TOBO's Olympics coverage.

TOBO will transmit its HD signals from the venues to the IBC using Evertz and Network Electronics fiber encoders and decoders. Both, according to the TOBO crew, are equipped with the latest laser technology for maximum distance performance.

As an official Olympic Partner with TOBO, Panasonic will provide its P2 solid state gear as well as DVCPRO HD and DVCPRO50 recording equipment. In addition, 25 Astrovision giant outdoor video screens will be placed in various Olympic venues as well as 8,800 color TVs and monitors, including 200 plasma TVs.

AUDIO CONSIDERATIONS

According to Grillo, the host broadcaster will monitor discrete 5.1 surround sound, Dolby Pro Logic II Surround Sound, stereo, and even a mono mix to ensure quality and fidelity. He said the Dolby Pro Logic II Surround Sound efforts are a joint project with NBC.

Grillo, with the assistance of Isidoro Moreno, director of IBC engineering, and Dennis Baxter, TOBO's audio consultant, noted that most of the OB vans have a digital mixing desk designed to accommodate large-scale signal and routing flows.

The TOBO team said that the Olympics opening and closing ceremonies pose "an unusual challenge" due to "large loud crowds, pyrotechnics and large PA systems." This combination, they said, requires the use of a microphone "with wide dynamic range, very high fidelity because of the digital mixing consoles, and pattern control because of the PA."

As such, they chose to use the Audio-Technica AT4050. Although the AT4050 is best known for its use in recording studios, host broadcasters have used this microphone at the opening and closing ceremonies ever since the 2000 Olympic games in Sydney.

TOBO will also use TC Electronics System 6000 processor at the opening and closing ceremonies to expand the mix into the surround sound channels. ■

DIGITAL JOURNAL

Bill Hayes

DTV Moves Audio Monitoring to the Fore

Cheaper and better surround sound gear exposes flaws

JOHNSTON, IOWA

It is funny that after more than 60 years of television broadcasting, we are still struggling with how to deal with audio. Consistent levels between program content and commercial content is probably the most familiar problem, but the digital transition has moved audio/video synchronization up high on the list as well. Add to that the plethora of different channels available, the different delivery sources and the quality and capability of the hardware that is available and audio inconsistencies sudden leap out at the consumer and can quite frankly cause the viewer to leap out of their chair.

OUTMODED VALUES?

But it is more than that. I think we as an industry have made audio such a secondary consideration that we have begun to make decisions regarding the handling and processing of audio that are based on outmoded values rather than on the factual conditions.

I was recently on a PBS Engineering Technical Advisory Committee conference call and we were discussing the next generation interconnect system (NGIS) project. Part of the vision of NGIS is transferring the PBS content delivery from a real-time baseband content delivery system to a file-based, non-real time delivery system. The system includes an edge server at each station that will store the delivered files.

The overall concept is very visionary and no doubt is the future, but we were debating how to store the audio files. To minimize bandwidth required for transmission and maximize the storage efficiency, compression is a given. In discussion about using Dolby AC-3, Dolby-E, PCM and the like, someone made the observation that it seems wrong or inefficient to transmit or save audio at rates and file sizes that approach 50 percent of their associated video file. No one on the call, myself included, questioned the validity of this observation; I think we just accept it as fact.

There is this ingrained mindset that video is so much more complex than audio that the storage and transmission should reflect that level of complexity as well. In the analog world I would agree with that assumption but when we move analog material in and out of the digital domain to move and manipulate it, we have to abandon our analog perspective. Is it possible that audio's simplicity when compared to video's is the very thing that makes it so much more difficult to compress in the digital domain, especially when lossy compression is used? Could it also be that the same simplicity is what makes the end user so sensitive to deficiencies? If so, can there be any correlation between the compression used on associated video and audio files?

The Dolby LM100 Loudness Meter

With the increased dynamic range of high quality surround sound available at reasonable prices, the efforts to manage audio levels need to be redoubled.

ALL OVER THE PLACE

And what about audio levels? This one has been bothering me since I purchased my HD set just prior to the 2004 Olympics. I have been watching DTV off air now for several years and whereas the pictures always look great, audio is all over the place. During the NFL playoffs I borrowed our Dolby LM100 Loudness Meter and set it up to monitor whichever DTV station I was watching.

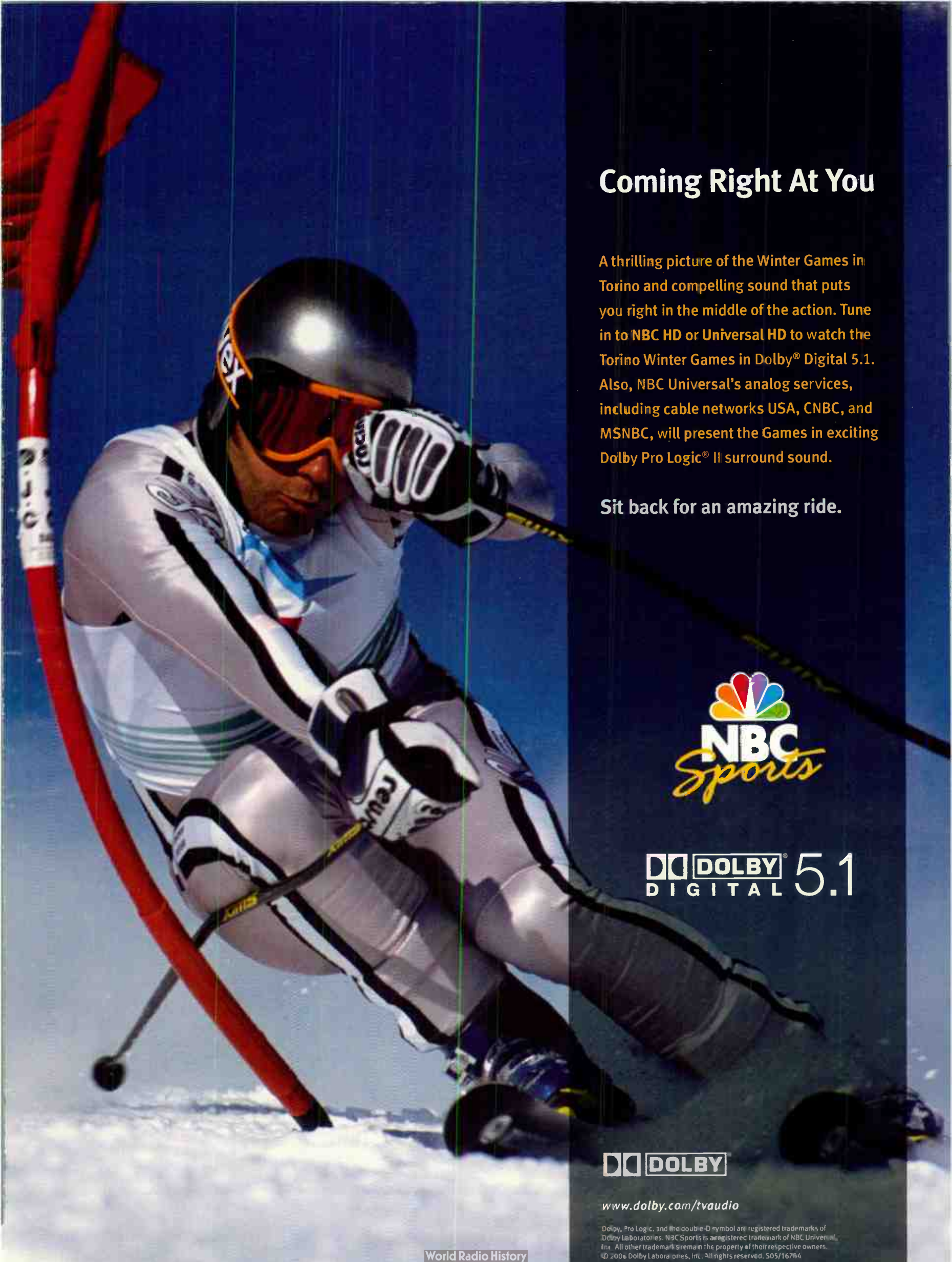
Now this is by no means meant to be a scientific measurement, I just wanted to see if some relative measurements between network and local content and between local stations is as dramatic as it appeared to my ears. The first issue I wanted to look at was the audio levels of the IPTV DTV feed. I have been told by others and noted on my own set that we have typically had the softest sound. Over the last few weeks, I have noted it less and less on the majority of the stations, however I was still hearing pronounced audio differences between IPTV and a few of the other stations. Since I was not using a professional receiver, but the digital output of my LG LST-3510A—which is a PCM feed—I couldn't lock to dial-norm but I was pleased to see that the majority of the over-the-air station levels were in the -27 dBFS area that is the recommended level.

While watching the Jaguars play the Bears on KDSM (the local Fox affiliate), I was pleased to note that in switching between them and KDIN (IPTV), there was no need to adjust volume. I was also pleased to note that the local inserted spots stayed in the same relative range. What was somewhat surprising in the Fox feed was that there was about a 4 or 5 dB difference between the audio coming from the game and the audio coming from their studio commentators which made the throws back to the studio annoying.

Watching the Steelers play the Colts on KCCI (the local CBS affiliate), the results were not as good. When switching between channels, KCCI was almost 10 dB hotter than KDIN or any of the other local stations. Depending on content, this can be somewhat annoying to downright scary if you happen to make the channel change on a strong peak. There was no discernible difference between the network audio and the local audio so it appears that the 10 dB increase is a local station choice. I should add that while watching the late news, the newscast itself was only about 6 dB hotter than the reference, but local spots were 3 to 4 dB higher than the newscast.

All of my measurements were done from the off-the-air signals and clearly the stations in this market and in many other markets need to get together and agree to adhere the standards for audio levels. Just maintaining consistent levels within the plant has always been a challenge. Now with the increased dynamic range of high quality surround sound available at reasonable prices, the efforts to manage audio levels need to be redoubled since the inconsistencies that were somewhat annoying to the viewers can now generate outright anger. Local cable systems also need to part of the discussion as well to ensure that the home viewer receives all of the benefits of DTV. ■

Bill Hayes is the director of engineering for Iowa Public Television. He can be reached via TV Technology.



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Camera Makers Cope With Diverse Market

Despite surge in HD content, worldwide demand for SD studio cameras continues to climb

by Craig Johnston

SEATTLE

The first television cameras were such tube-based behemoths they were relegated to the studio and scheduled remote broadcasts.

Though modern solid-state electronics allow the highest quality cameras to be made shoebox size, studio and outside broadcast (OB) applications still call for large form factor studio cameras capable of supporting box lenses and rear-mounted operator controls.

Although few stations are actually doing high-definition production from their studios today, the life expectancy of studio cameras has stations thinking in terms of HD future-proofing.

PANASONIC

"The typical ROI on studio camera systems is about 10 years," said Jeff Merritt, product line business manager for high-definition products at Panasonic.

Merritt said this led Panasonic to bring out its AK-HC930 1080i and AK-HC931 720p cameras, which can be delivered in either SD (ready for an easy HD upgrade), or HD-ready out of the box. Both cameras are in the portable form factor, with buildup kit accessories to allow them to support operator monitors, large lenses and rear controls.

"[Broadcasters] want to make sure that what they buy today, even though they're going to use it in standard def, can easily be made into HD in the future." he said. Panasonic now makes no standalone SD cameras for the broadcast market.

SONY

At NAB2005, Sony introduced its HDC-1000 multiformat studio camera, which images natively at 1080 at 60p, and can switch its output between 1080i, 720p and other formats.

"It's being used on the top-rated network shows today, including 'American Idol,'" said Rob Willox, national marketing manager for content creation systems at Sony. Willox pointed to the very different needs of the OB vans versus the fixed studio broadcasters.

"OB van operators need the flexibility to change formats from event to event, but stations determine their format and buy their studio cameras accordingly."

Sony has addressed the OB van dilemma of interfacing HD cameras requiring fiber-optic cabling with the existing triax installed in the venues where the pickup is taking place: the HDC-1550 triax interface portable HD camera, available with an HDLA-1500 large lens adapter.

"[The HDC-1550] allows an HD cable run of 1,500 meters on triax, and up to 2,000 meters with a triax/fiber hybrid cable run," Willox said. Sony's HDTX-100 fiber-to-triax converter allows the fiber and triax connection.

IKEGAMI

Where it might be intuitively obvious that studio cameras might dominate studio purchases, suppliers are finding a good deal of mixing and matching going on.

Launched at NAB2005, the Sony HDC-1000 handles both 1080i and 720p.

"For studio applications, we're selling a little bit of everything: box and POV HD cameras, portable HD cameras with portable lenses, portable cameras with studio lenses utilizing studio build-up kits, and then hard cameras themselves," said Alan Keil, vice president and director of engineering for Ikegami.

"They match well, control systems are the same, sensors and processing are identical or nearly identical, given the features of small or large lenses," he said. Ikegami's HD studio cameras are the HDK-725, which images natively in 720p, and the HDK-790E, which images natively in 1080i.

Keil said to look for Ikegami to make some future camera offerings featuring CMOS (complementary metal oxide semiconductor) imagers. "I think we're leading in the area of CMOS sensor technology, which we certainly see as a new technology and a bit revolutionary."

GRASS VALLEY

With the exception of Japan and the U.S., the rest of the world is lagging in actually delivering HD to the viewer. But Europe seems to have settled on a 720p standard, and OB vans have found the international market for sports coverage includes distribution to HD terrestrial, cable and satellite broadcasters, so the pickup has to be high definition.

Grass Valley found this driving new international interest in its LDK 6000 Mk II WorldCam HD cameras, capable of switching output between 1080i and 720p.

"Especially in the last year, we had substantial interest from Europe, and also Asia and South America, so it's basically interest from around the world," said Jan Eveleens, general manager for cameras at Grass Valley. "We focused on the U.S. before that, and before that was where we did most of our sales. In 2005 there was a shift to the rest of the world."

"In today's world, conversion from one format to another is easily done, it's cost effective, and the technology is very mature," said Panasonic's Merritt. "So standards conversion is almost a no-brainer."

HITACHI DENSHI

Introduced at NAB2005, the Hitachi SK-3010P HD portable camera can be configured as a studio camera with the SA-3100 studio adapter, and can be delivered with native 1080i or 720p imagers.

Hitachi touts the new entry as the lowest-cost HD camera in its lineup.

"The SK-3010P will have wide appeal for users coming to terms with the inevitable need to broadcast SD and HD format DTV signals" said Emilio Aleman, product manager, broadcast and professional products for Hitachi Denshi America. Though studio camera makers report broadcasters in the U.S. are buying HD or HD-ready studio cameras, there is still a brisk business being done in SD worldwide and in the industrial-corporate-education market in the states.

"The cost of high-def is a little prohibitive for the mid-range market, like the college and university studios, corporate studios," said Jack Breitenbucher, vice president of the Broadcast and Professional Division of Hitachi Denshi America.

JVC

"There's this transition between standard definition and high definition in the U.S. market; we're finding that standard definition is very viable in the overseas market," said Craig Yanagi, national marketing manager for creation products at JVC Professional Products Co.

JVC's GY-DV550U is selling into studio applications for corporate, education, church and cable access, giving them a CCU controllable camera that can also operate as a standalone camcorder.

Yanagi said JVC hopes to have an HD studio camera product announcement in the future, as well as an effort to bring more CMOS imager cameras to market.

"Our engineering team feels ultimately that CMOS would be the logical transition for image capture going forward," he said. Yanagi cited the flexibility of CMOS to handle both analog and digital, progressive or interlace.

"Another key factor is that the CMOS technology has lower energy consumption with its higher density, which allows it to run cooler, and overall better performance than a CCD."

The Panasonic AK-HC931 can be used as a portable or studio camera.

HD VERSUS SD

Ikegami has found enough SD business to introduce the HK-399W studio camera, featuring Ikegami's Advanced Interline Transfer CCDs and 14-bit A-to-D processing.

"What 14-bit processing allows us to do is to go a little bit more digital," said Ikegami's Keil. "We don't need to limit the signal prior to the A-to-D process, which was done with the analog pre-knee circuit. Then we can deal with the entire dynamic range of the sensor in the digital domain with the 14-bit."

Hitachi's Breitenbucher said his company has also upgraded all of its studio cameras to 14-bit A-to-D processing. "There's also going to be digital triax available by NAB, we'll be showing that." ■

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HDV Looks for its Broadcast Niche

As manufacturers roll out new cameras, broadcasters mull their options

by Craig Johnston

SEATTLE

In the same way that digital transmission made for a big payday for transmitter, antenna and tower suppliers, moving news acquisition to high definition seemed to promise a big payday to suppliers of cameras and the other equipment necessary to shoot the news and get it on the air.

And while many networks and major market stations have plans to buy big-ticket HD equipment for news, a lower tier of equipment may find its way into many newsrooms.

When it was introduced in 2003 as a specification for recording and playback of high-definition video on DV cassette tape, HDV was originally envisioned as a consumer format. That's what they said about DV nearly 10 years ago, when it was introduced as a replacement for VHS. It went on to become an international standard, and found its way into many a newsroom.

If you're wondering if history can repeat itself, there are 55 companies that are hedging their bets by being listed on the HDV Format Web site (*www.hdv-info.org/*), as HDV supporters.

And there are stations and networks that are experimenting with HDV, though none we contacted wanted to talk about it on the record at this point. But HDV professional level camcorder makers are not so shy.

The JVC GY-HD100 ProHD camcorder acquires high-def video in 720p.

SPACE AND MOBILITY

"We're seeing our HDV camcorders increasingly used for specific aspects of newsgathering and broadcast television production, in applications where space is at a premium or extreme mobility is required, but high quality is also a must," says Theresa Alesso, general manager of professional video and audio products at Sony.

She also noted that news videographers encounter "rugged, challenging and, at times, dangerous, situations," where they might choose to risk a $5,000 HDV camcorder rather than a much more expensive top-of-the-line model.

"In fact, what's happening with our HDV camcorders is very similar to how we saw our DVCAM camcorders used in the field," she said, "going places where larger cameras couldn't, or shouldn't have been used."

While news may be the ultimate users of HDV, Michael Jackson, JVC district sales manager, digital video division, said the first HDV camcorders may not enter the station directly though the newsroom.

"[Stations or groups] don't just buy a camera and say 'let's see how this works, or how it edits,' unless it's in the promotions or commercial production department," he said. Stations shooting promo or commercial material in HDV are finding benefits in their SD end products.

"If you shoot in high-def HDV, and if your editing system will support editing in high def, you can improve your resolution and colorimitry," said Jackson. "The picture in general looks much, much better, even if you cut it down to standard def when you output it from the nonlinear edit system."

There's also the benefit of having high definition archive material so that a high definition version of the promo or commercial can be cut when HD comes to the station throughout.

Of importance to a newsroom application, the Sony, JVC and newly introduced Canon professional level HDV camcorders use 1/3-inch CCD sensors, have XLR inputs, and can record onto 1/4-inch miniDV tape in both HDV and DV. (Sony's camcorder can also record in DVCAM.)

The first difference among the camcorders is format: Sony's HVR-Z1U and the Canon XL H1 acquire video in 1080i, JVC's GY-HD100 acquires video in 720p. The second difference is that all three camcorders have different form factors. Sony's is slightly smaller and has a fixed lens, a 12X optical zoom Carl Zeiss Vario-Sonnar T Lens.

Canon's is nearly identical to its popular standard definition XL models, and is delivered with a 38.9-778mm 20X lens coupled with Canon's Super Range Optical Image Stabilization (OIS) system. Lenses on the H1 can be interchanged.

JVC's model is slightly larger and uses bayonet-mounted interchangeable lenses. It is delivered with a 16X Fujinon ProHD lens.

COME TOGETHER

Jackson addressed one hurdle stations wanting to use HDV have to cross.

"The biggest obstacle at this point is just making [HDV] integrate with [the stations'] editing systems. A lot of stations are standardized, they've got six to 10, or maybe more edit bays, and some are machine-to-machine cuts-only."

In the nonlinear realm, the integration is easier to handle. Janet Matey, marketing communications director for Matrox, said the company's Axio editing platforms can mix any supported format in HD and/or SD on the timeline.

"A timeline will playback in real time if the frame rates and resolutions match," she said, "so, for example, you can mix 1080i HDV with 1080i DVCPRO HD in real time."

Matrox's Axio does not support 720p HDV currently.

Avid's edit systems can also mix supported HDV with other video material.

"We can set a target resolution for all new material, so for example, if you are editing HDV mixed with DVCPRO 100 and want to do a dissolve, we can render up to DNxHD [an Avid proprietary codec]," said David Schleifer, vice president of Avid Broadcast and Workgroups.

While Schliefer said there are some "small caveats," Avid-supported formats can be mixed together in the timeline "regardless of codec, number of lines or bit rate." Avid's editors support both 1080i and 720p HDV.

So whether its founders envisioned it or not, HDV may be coming soon to a newsroom near you. As Jackson said, "There's a freight train coming over the horizon of new technology, and this camera is the first car." ■

Tier

CONTINUED FROM PAGE 8

'A VERY BAD JOKE'

The conservative nonprofit Parents Television Council was quick to label the upcoming family cable packages "a very bad joke" and accused MSOs of making the tiers as unattractive as possible. "This is an idea deliberately designed to fail," said Dan Isett, the council's director of corporate and government affairs. "Family tiers are a step in the right direction, but they do nothing to solve the fundamental problem of giving parents the ability to choose what they want to allow into their homes. The cable industry appears willing to do anything to keep families from having a choice," Isett said.

Whether any lack of enthusiasm by parents over family tiers would prompt another debate over à la carte is anyone's guess, but the American Cable Association, representing small operators, believes (like its bigger cable brethren), that true à la carte would be enormously costly to pull off. The ACA, for example, estimates industry costs would approach $300,000 per headend.

Perhaps the closest scenario to à la carte today is USDTV. Formed in 2003 as a terrestrial digital subscription service, the local broadcaster-backed, spectrum-pooling enterprise offers only about 30 stations for a relatively low $20 monthly fee in a handful of early markets. As an alternative to cable's traditional all-inclusive services, USDTV says its customers are not paying for a lot of stations they would never watch anyway. USDTV serves Dallas/Fort Worth, Salt Lake City, Albuquerque and Las Vegas, and will add Norfolk, Va., this spring.

"We believe what cable has proposed is not a family tier but really a 'kids tier,' and most kids have parents," said USDTV CEO Steve Lindsley. "We believe cable missed the mark. They should have created not just another tier, but something consumers will demand. We think they really created more of a 'political tier.' Our consistent message is that cable is not under-serving its customers. It's really over-serving millions of homes." ■

Deborah D. McAdams contributed to this article.

Indecency Discussions Continue on Hill

WASHINGTON

At the second of two media content indecency hearings held by the Senate Commerce Committee, the handful of lawmakers who attended last month were split on passing legislation, given the First Amendment issues involved.

"As I've said, whatever we mandate is going to go to court," said Chairman Ted Stevens (R-Alaska). "Whatever we reach by consensus is going to happen now."

Stevens launched a call for voluntary action from the TV industry last November after four bills related to content indecency got stuck in his committee for lack of support. These included H.R.310, which increases fines from $32,500 to $500,000 for each violation up to $3 million a day and mandates license revocation hearings and performer fines. Stevens called the bill "extreme," and instead favors S.193, which merely increases fines. The third bill, S.616 would give the FCC 60 days to determine if children are protected by current content technology such as the V-chip. If not, the commission would be directed to step up content regulation. The fourth bill, S.946, requires more "kid friendly" programming, something multichannel video distributors are trying to self-address with the recent introduction of family tiers.

Sen. John Rockefeller (D-W.V.), who introduced S.616 last March, said, "I'm not sure voluntary action alone will address the issue. It's time for this committee to take action... We need to address the extraordinary level of indecent and violent content commercial television is presenting to us."

Sen. Daniel Inouye of Hawaii, the ranking Democrat on the committee and a co-sponsor of S.616, said it was "essential" for the committee to address violence on television, yet he wondered how news and documentaries would be handled.

Sen. George Allen (R-Va.) said he thought voluntary approaches were helpful, although he hinted that he might support increased indecency fines by asking non-broadcast witnesses if the current structure was adequate.

Another industry initiative unveiled at the second hearing involved a parental-control education campaign valued at $250 million to $300 million. Under an arrangement brokered by former movie lobby chief Jack Valenti, the Ad Council will create public service announcements instructing people on using the V-chip and other set-top blocking technology. Distributors have agreed to air the messages for 18 months. Retailers will also pass out written materials, which will also be shared with churches. Additionally, content ratings will be shown out of every commercial instead of just the opening of a program.

Deborah D. McAdams

Tech Retreat 2006: Display's the Thing

HPA's annual confab addresses exploding market for new displays all sizes and shapes

by Robin Berger

RANCHO MIRAGE, CALIF.

Content producers are reluctantly acknowledging that their output can now be seen on a wide array of displays. TV guru Mark Schubin easily names a half dozen: DLP-projected digital cinema, broadcasts on an LCD, plasma, or CRT screen—or programs delivered by a DLP projector or soon-to-be released SED (surface-conduction, electron-emitter display). And then there are the mini-screens.

The Hollywood Post Alliance plans to get attendees thinking about the implications of this trend from Day One of its 2006 Technology Retreat here in Rancho Mirage, Calif. Feb. 22-24.

"There are things that the display manufacturers do to accommodate the differences in their displays," Schubin said. "But there are also things that production and post production people need to be aware of."

DAY ONE

Color is the most obvious consideration, specifically, how do to translate the intended colors to these various displays. Ron Williams, founder and CEO of The Landmark Group, which specializes in image quality control, will discuss "Color Translations" on Wednesday, Feb. 22.

Also on Wednesday, Jed Deame, co-founder and GM of Teranex (a DTV specialty unit of Silicon Optix), will discuss non-color issues: namely, scaling, motion, and interlace characteristics that appear to be problematic.

Although Deame acknowledges that "great strides" have been made in brightness, convergence and uniformity, he concludes that signal processing in the current crop of digital TV displays' "leaves much to be desired."

"Fixed pixel displays are only capable of displaying progressive images that are sized to the native resolution of the display device," Deame said. "In the case of interlaced input, the signal must be de-interlaced prior to scaling," a process he concludes "is wholly inadequate in most modern fixed pixel displays."

Hiroshi Shimamoto will introduce the "Super High Vision Camera."

Deame will demonstrate the Teranex Mini display processor, which addresses many of these issues, during an HPA Demo night.

Smaller screen displays will be discussed Wednesday afternoon. Brad Medford of SBC Labs will present "Telco TV," and Tom McDonough of Azcar Technologies will discuss "TV for Mobile Devices." Azcar is installing a mobile TV system for Crown Castle Mobile Media.

DAY TWO

Sessions on Thursday will highlight cutting edge cameras and digital processing equipment here and abroad.

Stanford University visiting scholar Hiroshi Shimamoto will start the Thursday sessions with a recap of the latest camera research at NHK. He plans to focus on an 8k x 4k Ultra High Definition color video camera that uses 1.25-inch, 8M-pixel CMOS digital imagers and diagonal pixel shifting. It has a limiting resolution of more than 3,200 TV lines.

> "These people have come up with stuff that we've only been dreaming of."
> —Mark Schubin

During Thursday's lunch, Schubin and Larry Thorpe, national marketing exec for Canon USA Broadcast and Communications division, will co-host a "Small Format HD Acquisition Seminar," discussing what the new 1/3-inch format cameras really can and cannot do.

Wrapping up Thursday, Tom DeFanti will present "International Developments in Digital Cinema." Dr. DeFanti splits his time directing the Electronic Visualization Laboratory at the University of Illinois, Chicago and conducting research at the University of California's Calit2 institute.

"These people have come up with stuff that we've only been dreaming of," Schubin said.

DeFanti and his colleague, Laurin Herr of Pacific Interface Inc., have been working for more than a dozen years with NTT Labs, Tokyo University and Keio University to develop 4K digital network services and technologies. The 4K images have roughly 4,000 horizontal pixels, about four times the resolution of HDTV.

He has installed one of the first Sony SRX-R110 4K projectors at Calit2, and his colleagues at Keio are testing Olympus SH-880TM 4K prototype video cameras. The group's international network—CineGrid—successfully transmitted 4K digital video over Gigabit IP optical-fiber networks between San Diego and Tokyo last September.

"We have confidence and proof that [4K] works," DeFanti said. "You can—with a sufficient amount of money—buy it."

Of course, a 4K projector ballparks at about $150,000, including warranties and set up costs. But, he said, there could be offsets to the initial outlay.

"The biggest gamble for filmmaking is how many release prints to make," he said. "Once you get away from the physical and [replicate] electronically, it's easy."

Fully realizing that this ease may also strike fear of piracy in the heart Hollywood, Deane is quick to note that CineGrid is a proving ground for security solutions as well as high-end storage, networks, projector and camera technology.

DAY THREE

The retreat agenda will also pay heed to ongoing issues, like lip sync, putting 4:3 formatted content onto a 16:9 screen (and vice versa), and compression standards.

Saving the best for last, Schubin says that on Friday, the last day of the retreat, there will be a "major revelation."

"Bill Miller is going to give a presentation called 'canceling the postage stamp—how to code stuff so that TV sets automatically [display content] at the appropriate aspect ratio," he said.

On Friday morning, Bill Hogan of Clarity Image, which makes a variable speed control for Panasonic's Varicam, will recap the latest developments regarding lip sync. Right after lunch, SMPTE Fellow Peter Symes will moderate a Compression Update panel, which will include a peek at the upcoming H.265 standard. ■

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'Net

CONTINUED FROM PAGE 8

Greencine.com; news and documentary footage from ITN, as well as current NBA basketball season games and highlights from previous season games provided by the NBA.

"Google video will let you watch lots of high-quality video on the Web for the first time. You can search and browse, and we make it fast and easy for you to watch," said Larry Page, Google's co-founder and president. "From the Google Video homepage at *http://video.google.com*, people will be able to browse listings of video by category from the store or search Google's entire collection of videos by simply entering keywords into the search box."

Among Google's content partners is CBS, which is offering a collection of commercial-free, primetime and classic TV shows, including "CSI: Crime Scene Investigation," "Survivor," and "The Amazing Race," as well as library classics like "MacGyver," "Have Gun Will Travel," "I Love Lucy," and "The Brady Bunch."

"This is yet another exciting platform in which CBS can leverage its market-leading content to a whole new audience," said Leslie Moonves, president and CEO of CBS Corp.. "Making our programming accessible to the Google Video Store guarantees our shows significant new exposure to millions of users who are likely to access this Web service and who may not be traditional TV viewers. As the industry's most prolific generator of popular TV content, it's only natural that CBS would partner with Google on this service, which is destined to become one of the Web's most popular destinations."

Just prior to CES, CBS sent out several announcements showing that it is pursuing multifaceted, broadband initiatives, joining forces with many entities to ensure maximum exposure to their library whenever, wherever, and using whatever devices the audience may choose.

Through one such deal, CBS properties, such as "Late Night With David Letterman" and "Entertainment Tonight," are now accessible via the Verizon Wireless VCAST multimedia service, which enables over 140 million Verizon Wireless customers to view video content on cell phones.

CBS also announced that full episodes of its primetime shows, such as "Two and a Half Men" and "How I Met Your Mother," are now available for video streaming via Yahoo! TV (*http://tv.yahoo.com*) commercial-free.

"We're always looking for ways to provide current and potential new viewers every possible opportunity to sample our series," said Nancy Tellem, president of CBS Paramount Network Television Entertainment Group.

CBS and sister network UPN also have entered into an agreement to offer their TV fare to broadband wireless devices by Los Angeles-based Amp'd Mobile, a mobile entertainment company created to bring broadband wireless services to the youth market. Its members will have access to entertainment branded channels on their cellphones to download video, wallpapers, ringtones and voicetones, all accessible through the Amp'd Live program guide.

SEEING STARZ

Another major player staking out opportunities in the growing portable video device market is Starz Entertainment Group LLC (SEG), in Englewood, Colorado. At CES, Robert B. Clasen, SEG president and CEO, announced "Vongo," a new video download application and service that delivers movies and other select video content over the Internet for playback on laptops and portable media devices that use Microsoft's PMC (Portable Media Center) OS.

"By combining the wide array of programming choices on Vongo with a host of new [PMC OS-enabled] portable media devices, consumers will be able to seize control of their video and watch whatever, wherever, and whenever they want," Clasen said. Among the brand devices currently supporting the PMC OS are LG Electronics, Tatung, and Toshiba. A new version of PMC will incorporate DRM (Digital Rights Management) capabilities critical to offering Vongo.

For a monthly fee of $9.99 and a special Vongo application from SEG, subscribers can download from almost 1,000 SEG movie offerings and transfer the files between any three devices they choose to use. Through its long-standing relationships with Disney and Sony studios, the movies will be available during SEG's exclusive rights window (beginning about 6-8 months after theatrical release, and lasting about 18 months) and after that the user will no longer be able to play them.

"Vongo represents the launch of a completely new environment in which business and leisure travelers, and other users of portable video players, can watch movies on the go," said Eric Becker, SEG's executive director of corporate communications. "For example, families would be able to download movies onto a laptop that the kids can watch on the road." This value and convenience may erode the brick and mortar video rental business potentially," said Becker. "But with the proliferation of portable media devices, we view the marketplace as an ever-expanding pie with enough opportunity for all types of media service providers." ■

"Making our programming accessible to the Google Video Store guarantees our shows significant new exposure to millions of users."

—Les Moonves, CBS

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Doug Lung

Is Your Transmission Line Digital TV Ready?

When designing a new DTV transmission facility or planning DTV conversion of an existing analog facility, in addition to selecting a transmitter with sufficient power and an antenna that has the correct tradeoff between gain and elevation pattern, be sure to consider the transmission line.

Power handling capability and loss have to be considered for any design, but don't forget to look at VSWR (voltage standing wave ratio) and group-delay performance.

When reusing an existing transmission line run for a DTV operation, make sure it can handle the maximum DTV transmitter power. Systems designed for analog TV will often show the rated power for the line as peak visual power with 10 percent (sometimes 20 percent) aural power.

DTV power is specified as average, not peak power, and as a result, the maximum average DTV power the line can handle will be significantly less than the maximum peak visual power. For example, at Channel 39, using the Dielectric DASP program (available at *www.dielectric.com/broadcast*), we see a 1,000-foot run of 3 1/8-inch 50 ohm "digitLine" rigid transmission line can handle 29.9 kW peak visual power but only 21 kW average DTV power.

Both of these ratings are before considering any derating factor. Dielectric's DASP program adds a 0.9 derating factor for DTV, which reduces the maximum average DTV power to 18.9 kW.

It isn't sufficient to stop at the catalog specifications for transmission line power ratings. Look at the fine print! Dielectric's DASP program notes that maximum power ratings are based on a VSWR of 10:1, no line pressurization, an ambient temperature of 40 degrees Celsius (104 degrees Fahrenheit) and a maximum inner conductor temperature of 120 degrees Celsius (248 F).

While the temperature ratings are valid for most tower sites, if the transmission line runs in an enclosed space in a building with other lines, the ambient temperature could be much higher.

Solar radiation has an impact. Myat (*www.myat.com*) recommends using a derating factor of 0.83 for middle latitudes and 0.66 for tropical latitudes to cover the temperature increase from solar radiation.

I have yet to see an antenna with a VSWR of 1.0:1 across the channel, and an antenna VSWR of 1.08:1 is not unusual. Higher VSWRs will reduce power handling capability. It makes sense to pressurize transmission lines, if only to keep out moisture. It is also an easy way to increase the power handling capability of transmission lines, but if pressurization should fail and input power is not reduced to the rating without pressurization, the line could be damaged.

	Total Length In Feet						
TYPE:	200	400	600	800	1000	1500	2000
WR1800	14	14	14	14	14	18	22
WR1500	14	15	19	22	25	31	36
WR1150	41	41	41	44	47	54	60
DTW1500	27	27	27	27	30	36	42
DTW1350	28	29	33	37	40	47	52
GLW1750	14	15	19	24	25	31	36
GLW1700	20	20	21				
GLW1500	39	39	39	39	39	44	50
GLW1350	56	56	56	56	57	56	60

Table 1: Lowest usable channels with theoretical group delay less than 20 nanoseconds in various waveguide transmission line systems. Note: Data was obtained from spreadsheets and calculations provided by Henry Fries. Group delay was calculated across the 6 MHz DTV channel. Noticeable degradation of an 8-VSB signal will not occur with less than 20 nanoseconds of delay. Other components in the transmission line system may affect group delay.

In such cases, it is essential to monitor transmission line pressure, and if the site is not monitored 24/7, there should be some provision to automatically reduce power to a safe level if pressurization fails.

WHAT ABOUT VSWR?

VSWR is an indication of mismatches in the transmission line system that cause some power to be reflected to the generator and thus create standing waves on a transmission line. A mismatch at the antenna can cause power at certain points on the transmission line to exceed the manufacturer's ratings.

For NTSC systems, our main concern was VSWR at visual, aural and chroma subcarrier frequencies, in that order, where power was concentrated. The DTV signal is broadband and noise-like, so it isn't sufficient to optimize VSWR at one or two frequencies.

Dan Barton, an RF engineer at Alive Telecommunications (*www.alivetele.com*) who has worked on many broadcast antenna systems, told me he finds broadcasters tout the VSWR performance of the antenna, but often ignore the transmission line, which can have a significant impact on system VSWR. The number of elbows in the transmission line and the length of line sections will affect system VSWR. At UHF, tuning elbows can reduce their impact on system performance. Manufacturers can tune elbow complexes for best VSWR performance at a given channel.

TRANSMISSION, PAGE 30

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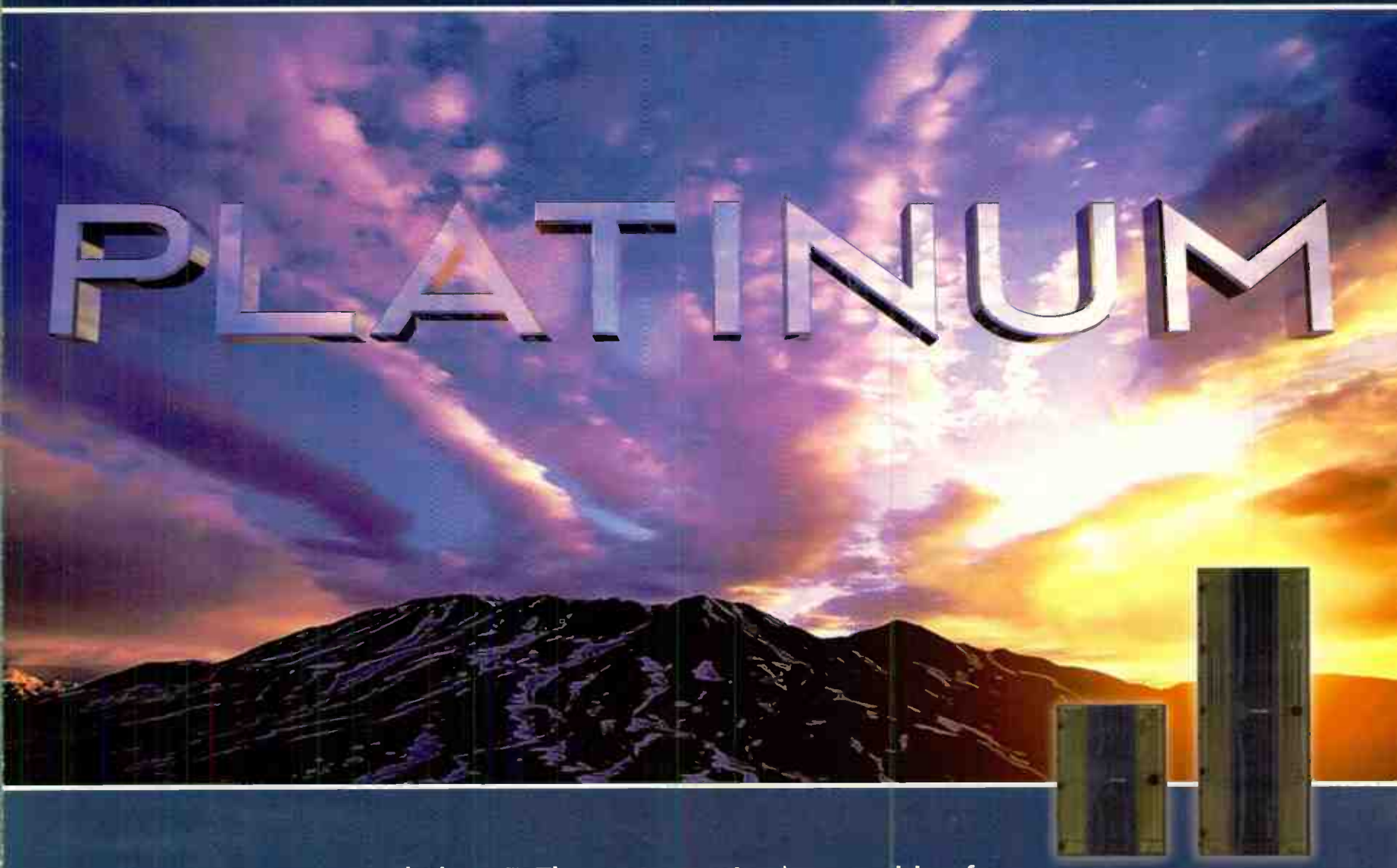

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Transmission

CONTINUED FROM PAGE 28

If you are planning to use an existing rigid transmission line run on a different channel, be sure to check the length of the line sections. While manufacturers have made improvements in inner conductor connections and the Teflon insulators at the end of rigid transmission line sections, they won't exactly match the characteristic impedance of the transmission line. As sections are combined, these variations in impedance at the rigid line flanges will add and create high VSWR at certain frequencies. See the Myat University technical page at *www.myat.com* for information on how to calculate these critical frequencies, and for a table showing the appropriate channels for 20-foot line sections, 19 3/4-foot line sections and 19 1/2-foot line sections and a listing of critical frequencies for other line sections.

I like waveguides. No inner conductor to burn up. Plenty of power handling capability and low loss. I've installed many waveguide systems, and the only problems I've had with them, except for one undersized coupler, have been at transitions between rectangular and circular waveguides and, more common, the transition between rectangular waveguides and coax.

If you are planning to use a waveguide for DTV, especially on a lower UHF channels, there could be a problem—group delay.

Six years ago, Henry Fries at Thales (which was then called Thomcast) sent me a table he created showing group delay for different lengths and types of waveguide transmission lines.

Coaxial lines and one rectanglar waveguide in the mast on top of the World Trade Center, taken by the author Oct. 7, 1999.

There is general agreement that group delay less than 20 nanoseconds will not cause noticeable degradation of an 8-VSB signal. Using that as the criteria, a WR1500 rectangular waveguide should work fine above Channel 35 for line lengths less than 2,000 feet. For 1,000-foot lengths, performance should be fine above Channel 24.

He found that a DTW1500 doubly truncated waveguide is okay above Channel 41 for a line length of 2,000 feet or less. With a line length of 1,000 feet or less, group delay is less than 20 nanoseconds above Channel 29. Using a GLW1500 circular waveguide, lengths of 2,000 feet or less are fine above Channel 49; and 1,000 feet or less for Channel 39 up. See Table 1 for

TRANSMISSION, PAGE 32

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MEDIA SERVER TECHNOLOGY

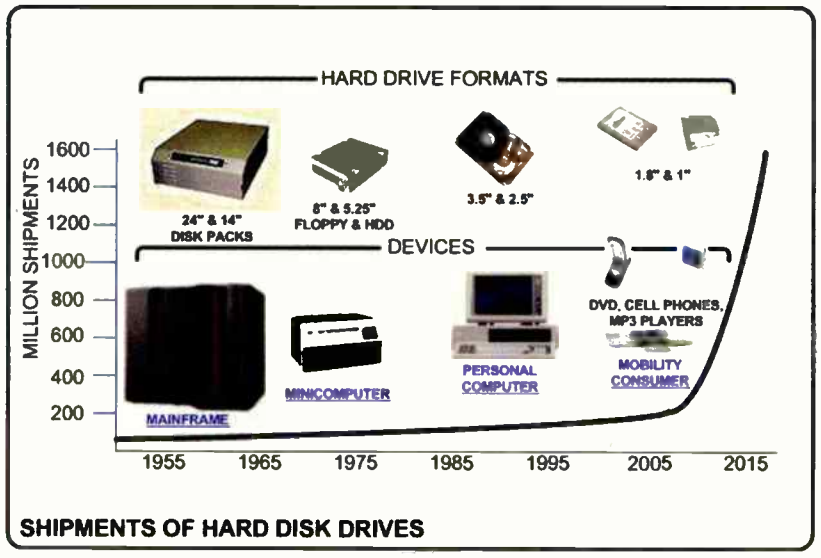
Karl Paulsen

Data Storage Moves Into The Realm of Exabytes

The past decade has seen the broadcast and professional side of content storage technologies focused on systems that define operational workflow requirements while addressing physical scaling in order to meet the objective of migrating from tape to disks.

New products and services incorporating digital content storage continue to grow in all directions, becoming more diverse and surfacing in many more end-user applications. The means and methods of managing content development, distribution and in turn deployment of content continue to challenge the marketplace from all perspectives, not just the broadcast and professional space.

For example, when addressing storage methodologies, there are myriad products that capture, manipulate, catalog and display moving images. In consumer and professional implementations, i.e., mobile, fixed and semi-transportable storage systems; a mandate demands the co-existence of solid-state memory, embedded disk drives and (replaceable) hard disk drives that must fit into a diverse set of architectures. Requirements, quantities and adaptations for storage systems are growing at record pace.



SHIPMENTS OF HARD DISK DRIVES

According to reports from the 2006 Consumer Electronics Show, the storage of data for digital content will be a major factor in the growth of digital storage devices. By 2008, estimates indicate that nearly 185 million hard disk drives or 34 percent of the total hard disks shipped will be used in consumer electronics alone.

Predictions further indicate that by 2007, the average wired home will nominally employ 500 GB of storage for conventional uses, and those with home entertainment networks or media centers will exceed 1 TB.

In perspective, 2004 storage requirements for content creation, editing, archiving, and distribution were a meager 1.7 billion GB (1.7 exabytes, or EB). An exabyte is equivalent to 10^{18} bytes or nine orders of magnitude greater than a gigabyte. By 2008, the expected growth will be nine times greater, reaching an estimated 15.4 EB.

Storage and content management systems need to continually endure rapid changes in technology to meet the demands of both users and creators. In addition, these subsystems will need to provide for content protection while remaining flexible. Storage requirements for these applications must also achieve acceptable performance and reliability, with sufficient protection from data loss, without overwhelming costs.

MOBILITY STORAGE

PCs and home media networks are already capable of achieving a portion of these goals. By simple mirroring of internal hard drives, adding incremental external storage or by the employment of readily available RAID systems (hardware or software); end users can enjoy the reliability and performance found in many professional systems. By contrast, the rapidly developing mobile media space faces a different set of problems related to storage, reliability and protection.

Mobility storage is typically integrated into mobile devices such as iPods, cell phones, MP3 players, etc. This storage need not necessarily be spinning media; yet, its integration vir-

STORAGE, PAGE 34

Transmission

CONTINUED FROM PAGE 30

more examples. You will notice that the group delay for a given channel increases as the line shape transitions from rectangular to circular.

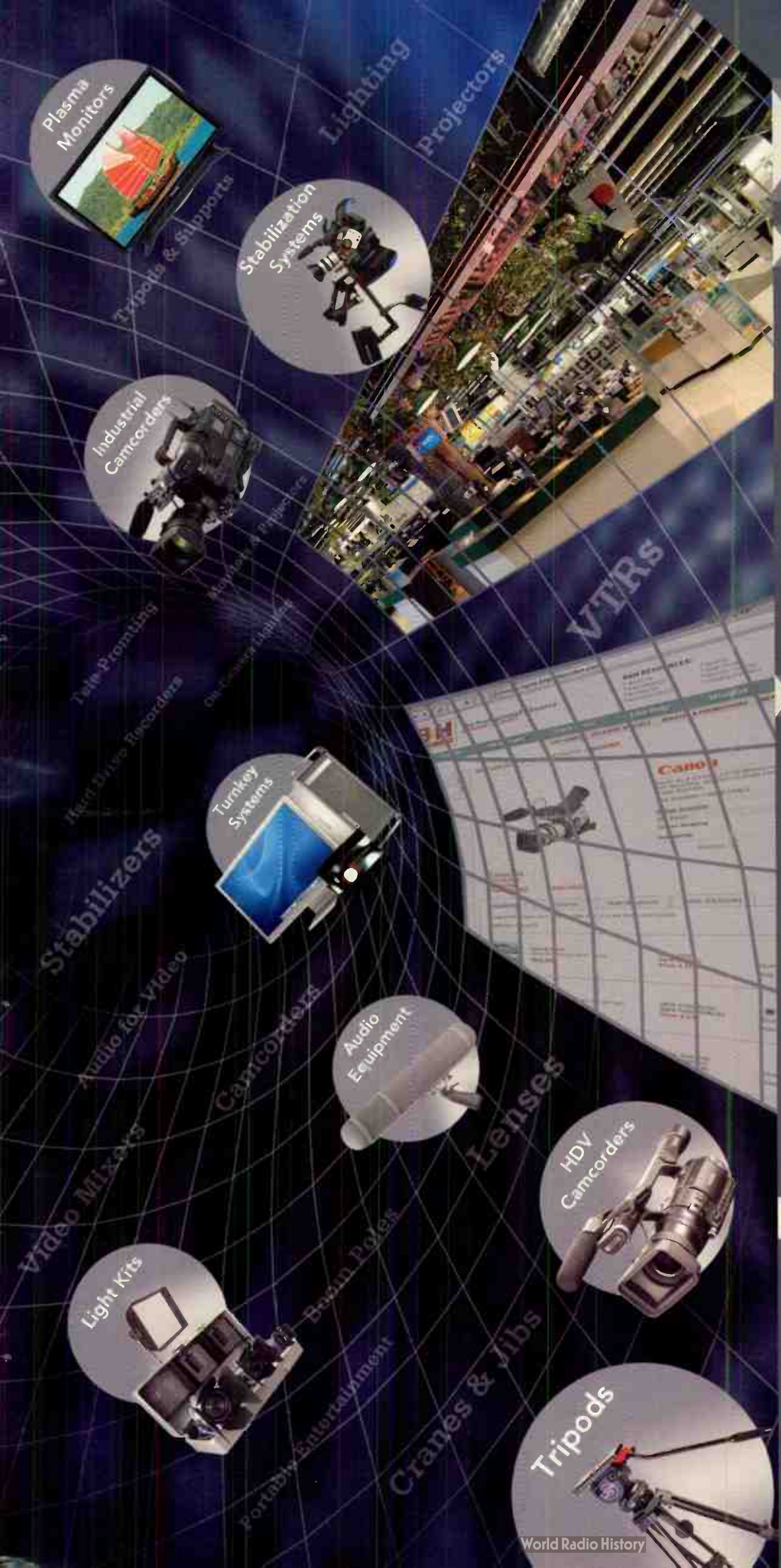
If you are now looking out the window at a 2,000-foot run of 15-inch circular waveguide you planned to use for DTV on a Channel 45, and worrying it won't work, relax. First, for GLW1500, the group delay exceeds the recommended maximum by less than 5 nanoseconds. Second, there is a way to correct for it in the transmitter!

At the 2002 NAB Broadcast Engineer Conference, four engineers from Harris Corp. (A.S. Mattsson, D. Danielsons, C. Abascal and J. Seccia) presented a paper titled "New Adaptive Techniques for Correcting VSWR Distortion in DTV Transmitters." The paper focused primarily on correcting for distortion due to VSWR, but group delay is also discussed.

The Harris Apex DTV exciter can dial in group delay precorrection based on the channel, type of transmission line, and length. I'm not aware of any other manufacturer offering this capability, but it would seem easy to add, even if the group delay correction had to be manually calculated. After all, it shouldn't change!

For more information on the impact of group delay on DTV transmission, see my January 2002 RF Technology column, "IEEE Broadcast Symposium Part 2," available at *www.tvtechnology.com*.

I welcome your questions and comments. Send them to me at dlung@transmitter.com.



INTO THE SOURCE

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Storage

CONTINUED FROM PAGE 32

tually eliminates any means for the end user to extend directly attached storage on a do-it-yourself basis. Thus, integral storage must be sufficient to meet the needs of the user, or the device becomes valueless.

Semi-fixed devices, such as a PVR provided by cable and satellite systems, face similar storage limitations. Users want and need to store more content, hence, the concept of home networking systems and home media servers is beginning to catch on with professionals and consumers. Major software vendors, such as Microsoft, are dancing in this arena at both the PC and the dedicated platform level. Several household consumer electronics companies are also providing products. Most new media devices already provide the means for external connectivity via USB, iLink, FireWire, etc., lending extensibility to products while the demands and the standards for home and media networking continue to expand.

The expectation of a never-ending storage requirement opens the realities of how we develop efficient systems and protocols that can support the needs of content distribution, tracking and billing, and digital rights management. A number of organizations continue to work on existing and future standards aimed at providing solutions for a wide set of these requirements.

The development of a multimedia framework in MPEG-21, which unlike its MPEG-2 and MPEG-4 compression predecessors, is an under-development ISO/IEC standard that defines the description of content and also the processes for accessing, searching, storing and protecting the copyrights of content.

MPEG-21 subsections include a Rights Expression Language (REL) that specifies the rights to content, its fees or other consideration required to secure those rights, the types of users qualified to obtain those rights, and the other associated information necessary to enable e-commerce transactions in content rights.

By 2008, estimates indicate that nearly 185 million hard disk drives or 34 percent of the total hard disks shipped will be used in consumer electronics alone.

MPEG-21 defines how to declare, identify and describe content (referred to as DID and DII&D), describe user context (DIA), express and enforce the rights to the content (MPEG REL, indecs2 RDD, IPMP), and more. The Content Reference Forum (CRF at *www.crforum.org*) is another liaison group that aims to leverage existing and developing standards and specifications as appropriate, and to interact with those groups that govern them.

These growing issues of storage, digital rights management, content distribution and creation are all matters that stand squarely in the face of future media server technologies. Facility owners and their technologists need to be aware of how each of these segments affects one another. As evidenced, the future of this industry goes much deeper than just spinning disks and encoding schemes.

Karl Paulsen is vice president and chief technology officer for AZCAR. He is a Fellow in the SMPTE and a SBE Life Certified Professional Broadcast Engineer. Contact him at karl.paulsen@azcar.com.

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Corplex's mobile unit Platinum uses NVISION to route HD broadcasts of the Masters and PGA Championship golf tournaments for CBS Sports.

Photo: Steve Jordan

NET SOUP

Frank Beacham

True Convergence Is Changing Everything

Not since the mid 1970s have I witnessed so much excitement among people who create video. There's a sense that real change is in the air—that the convergence of television and the Internet is finally going to shake the television business to its very foundations.

Of course, this phenomenon has been building for a long time. Last year it jumped into the collective consciousness when it was demonstrated repeatedly that the Internet could serve as a robust platform for television. Then, after Apple introduced the video iPod last Oct. 12, we witnessed the beginning of a shake-up in television distribution. Major program producers rapidly began offering their shows for sale to anyone on an episode-by-episode basis.

We are now moving toward the reality of a long-held dream—personalized media that can be accessed on-demand, anytime, from anywhere, on any display device. Better yet, we are heading toward the day that we will pay for only for the programs that we want to watch.

The traditional gatekeepers of television are finally losing their grip. For the creators of programming, this means the new ability to sell shows directly to viewers. No more middlemen to throw up roadblocks to distribution. It will no longer matter what members of Congress, broadcasting lobbyists, and FCC members think—television will soon become a private transaction between consenting adults. The censors can do little more than foam at the mouth.

For viewers, the deal will be equally sweet. Those who don't choose expensive program "tiers" from the pay TV company will finally have a choice: true *à la carte*. After years of resistance, the video iPod finally let that very big cat out of the bag. And it's not going back.

We are now moving toward the reality of a long-held dream—personalized media that can be accessed on-demand, anytime, from anywhere, on any display device.

It will still be a few more years before the technology fully catches up with the dream. More Internet bandwidth, better compression and maturity of IP video systems is still needed.

But the handwriting is on the wall. The vision is so compelling there will be no turning back.

In the meantime, non-broadcaster Web sites are rapidly migrating from static text and images to full-motion video. Progressive thinkers already are beginning to view the modern Web site as a mini television station. The technology is here today, though the communications skills to fully exploit new media are still evolving.

STORYTELLING

Let's cut to the chase—all media is a form of storytelling. From the most basic text to the most sophisticated multimedia production, the goal is the same. Unfortunately, in too many cases, recent technology has outpaced the skills to effectively use it.

For many of us who are facing this brave new world, it's time to learn new skills. Last year, acutely aware that communicating through the written word is no longer enough, I embarked on journey to enhance my personal multimedia storytelling skills.

In the process, I shifted to digital from 35mm film photography. I took several professional-level classes, having little idea how many new issues I would confront. I learned that the word "workflow" often requires one to learn new disciplines previously left to others.

To fully understand how to produce "podcasts" and streaming audio, I've polished my audio production skills. Not just technical skills, mind you, but storytelling skills. Next up is graphics and digital video. It is clear that the competitive and effective multimedia storyteller must embrace all these technologies to take advantage of the rich opportunities before us as television embraces the Internet.

During the previous holiday, when this topic was discussed among my circle of friends, a question often arose: "How do I learn how to do all this?" For young people, the answer is not so hard—study it in college. Some of the best and brightest multimedia students are in the Interactive Telecommunications Program at New York University's Tisch School of the Arts.

If you're older—or worst yet—stuck in the daily grind of old media production, the going is harder. It becomes a mission of self-education, learning the new skills you need on a piecemeal basis.

It used to be that younger people could find a mentor who helped them learn the necessary media skills. Today, those of us who are older often need to find a kid who can be our mentor!

If you think I'm joking, then try to address the issue of story pacing across generations. I can guarantee if you're over 40, that media-savvy kids can open your eyes to a thing or two.

Not to be forgotten is marketing. Not only must independent programming be of exceptional quality to find a wide audience, but it must be vigorously sold to viewers. Video producers selling directly to audiences must learn to cut through the noise and become effective marketers of their own works.

It can be done. To find great examples of independent media marketing, look no further than the music business. Artists like Ani DiFranco and her Righteous Babe record label helped define Internet marketing.

As we enter 2006, it couldn't be a more exciting time. The artificially constructed walls that have previously prevented entry into the television business are falling fast. New talent—those who have something of value to say to a wide audience—have enormous opportunities never before available. Journeys into a chaotic future are never easy, but we're entering one of those very exciting periods where everything is once again up for grabs. It's time to take a personal measurement of whether each of us is up to the opportunity ahead.

Frank Beacham is an independent writer and producer who lives in New York City.

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INSIDE AUDIO | Dave Moulton

Further Thoughts About Doing Digital Audio

It's a new year, a clean slate, all that jazz. So it occurred to me that a brief reconsideration of digital audio might not be a bad thing, especially given the amount of mythology, mystery and mayhem that continues to surround the very thought of it.

You would think, now that we're a quarter of a century into digital audio, that we'd have a pretty clear handle on it. But my experience with clients, colleagues, vendors and end users has led me to conclude that there are still some rather remarkable digital confusions rattling our audio cage.

Let's get to it.

SUBSET OF ANALOG

Much of the persistent murk obscuring our understanding of digital audio arises from a sort of polarized world view that regards digital and analog modalities as separate and distinct entities. As you all must have noticed, we often get into quite heated debates about which is better. Is it analog (warmer, purer, richer, more human and soulful) or digital (more precise, analytical, sterile and cold)? Does this sound familiar?

The problem is, analog and digital audio are *not* alternative modalities. Virtually all audio starts and ends as an analog signal. We do not yet have any acoustic-to-digital or digital-to-acoustic transducers and none are on the horizon.

If we would like to work in the digital realm (and there are some very good reasons for wanting to do so), we must take a plain old analog signal and convert it to a plain old digital signal. That process of conversion is well known and reasonably well-understood. It also, inevitably, introduces errors into the signal as a function of the conversion. This is exacerbated by the related inevitable fact that we will subsequently need to convert the digital signal we've created back into analog for playback. That process, too, inevitably introduces yet more errors into the signal.

Now, we take some serious pains to minimize such errors and keep them inaudible. And while the debate continues to rage in certain single-malt fueled circles, we've gotten those errors down to a pretty insignificant level.

But the fact remains. In this purest and simplest set of conditions, the digital signal *can never be better* than its analog source. It can only be worse, and sometimes it is considered to be audibly worse. Holy Wowzers, Penny!

THE PROBLEM?

With that scientific verity in mind, the question must occur to everybody—why do we bother?

Analog may not be perfect (in fact, it's way less than perfect—just as errors accumulate when converting from analog to digital and back, errors accumulate when we convert from acoustical to analog and back—and those errors are, relatively speaking, huge!), but it is, by definition, better than its digital clone.

The problem is that life is neither pure nor simple. If we step back a little bit, we can ask the same question about analog—why bother? It introduces huge errors into the acoustic signal, it's expensive and complicated, and it plain and simple isn't very good, especially when compared to its acoustical progenitor. Once again, why bother?

The answer is, of course, that there are things we can do with an audio signal that cannot be done with an acoustical signal. Among those things are storage, duplication, and transmission. These things turn out to be immensely desirable for us humans. And, that's the business we are in.

When we attempt to store, duplicate and/or transmit an analog signal, we introduce errors into that signal, just as we did with conversion to digital. Unfortunately, in the analog ream, the errors that we introduce during storage (and recovery from storage) usually exceed the errors introduced during conversion to digital. Uh-oh!

And this is where digital is able to gain some ground back. Digital storage, at its best, does not introduce additional errors into the signal—the storage itself is transparent. Holy Mackerel!

So just as pure analog has fewer errors than analog/digital/analog, we can similarly state that analog/storage/analog has *more* errors than analog/digital/storage/digital/analog.

And that, kids, is the rest of the story.

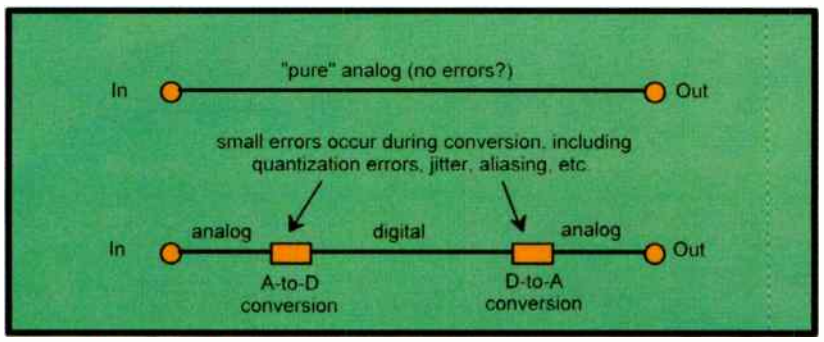

Fig. 1

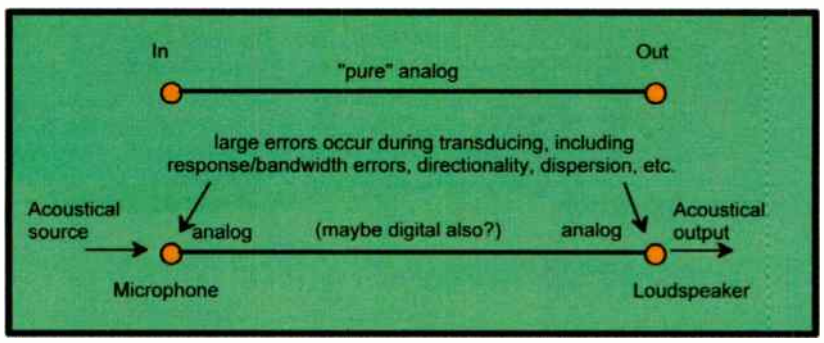

Fig. 2

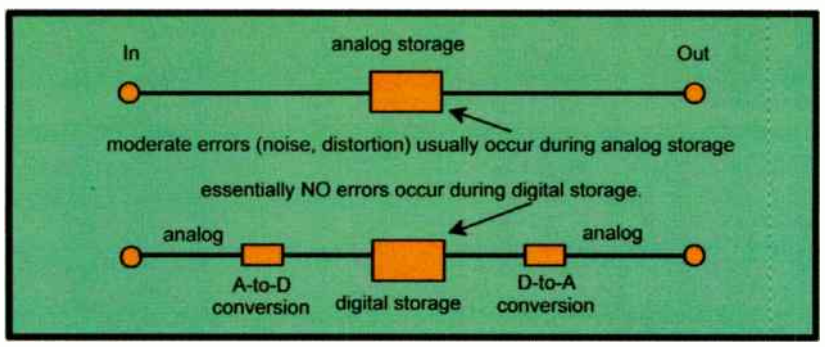

Fig. 3

RETAIN YOUR SANITY

We use the digital modality because it is fast, cheap, flexible and surprisingly adaptable as well as because, at the end of the production day, we find we've generally accumulated fewer errors than we would have had we stayed in the analog realm. Nothing wrong with that!

More to the point, however, is a second important value that gets lost in all of this. We don't do audio simply for the pleasures of error-free reproduction. We do audio for a kind of personal and emotional communication that has nothing to do with errors or modalities.

When we ask which modality allows us to generate a more effective and emotionally powerful outcome, the answer becomes a little more fuzzy and idiosyncratic. Some of us (me included) find we get greater artistic traction working in the digital realm. Others of us really prefer to work in the analog realm. Most of us work most of the time in a hybrid realm where we use elements of both analog and digital for a variety of reasons and outcomes.

In a practical sense, my advice is that you should work to your greatest comfort and effectiveness. Don't obsess about errors; obsess instead about emotional and production quality. Use whatever tools seem to give you the greatest production bang for the buck at any given moment.

And when some dude/dudette begins to pontificate on the relative strengths of analog or digital, just sit back, sip your single malt or whatever and smile. You've got your craft working, and the rest doesn't really matter. Ahhhh!

Happy New Year, and thanks for listening.

Dave Moulton is wondering how a 5.1 malt would taste. You can complain to him about anything at his Web site, www.moultonlabs.com.

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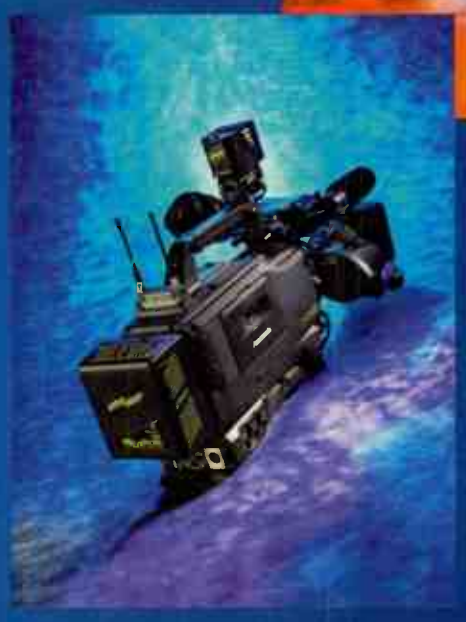

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INSIDE PRODUCTION Walter Schoenknecht

Learn How to Learn or Get Out of the Way

Over the period of time I've been privileged to fill this space, I've noticed that some of the columns I've written could easily be classified into one of several categories. The most distasteful of these is the "Old Guy Whining" motif.

Some such topics are fairly straightforward: "I remember the good ol' days, when men were men, and videotape was *two inches wide*." Others simply make no sense: "These kids today don't even know how to register and balance a Plumbicon-tube camera!" as if that's a skill that ever added meaning to life.

The clear implication is, most often, that the old ways are better, and new stuff—ideas, technology, whatever—is somehow illegitimate.

GUILTY OF GRIPING

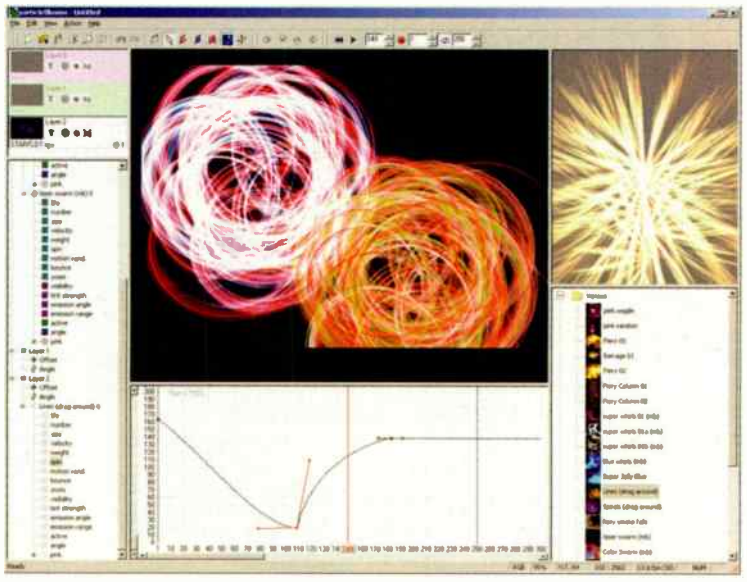
I've noticed that these "Old Guy Whining" pieces are invariably crowd pleasers. For me, there's no better way to generate reader mail than to take a stroll down memory lane, especially if I can say something inflammatory along the way.

Apparently, it gets readers' blood flowing to see these gripes and complaints dragged out into the cold light of day; and once you reach a certain point in your career, there are precious few things that get the blood flowing at all, hence these stories' popularity among "senior staffers."

So here I stand before you all, acknowledging this nasty little habit, and speculating as to its surprising appeal: It's tough to learn something new.

Wouldn't life be so much simpler if we could freeze our skillsets in time and space, and just keep doing what we've always done? Probably, but we'd be doing it alone, since nothing in all existence remains the same for long. Skin cells grow and wear away, hour by hour; the Wednesday winds in Chicago spent the weekend in the Yukon. Change remains the lone constant, and if you're going to continue to live, you'd better learn how to learn.

Here a quick question: When was the last time you attended a workshop or course on a technology you previously knew nothing about? When did you last sit down, turn off the phone, and complete a CD-, DVD- or Web-based product tutorial? What feathers have been added to your cap, or notches cut into your belt? There's nothing to fear here—life usually gets better when you learn new things.



Wondertouch Particle Illusion effects rendering software includes well-designed instructions.

I recently had an opportunity to re-evaluate my learning skills as I tackled a new piece of software, and the experience was a rewarding one. When I first received a copy of Particle Illusion from Wondertouch some months ago, I followed the usual new software strategy—blunt-force learning. In the past, that's never been a particularly effective method for me; more often the passage of time (wasted time, that is) deserves most of the credit for imparting the "gestalt" of how an application runs, if not the nuts-and-bolts details.

With Particle Illusion, I may have picked an easy target. Alan Lorence and the Wondertouch team have done an excellent job of creating a novice-friendly user interface and workflow for their powerful flagship app. If you're unfamiliar with Particle Illusion, it's a clever, highly controllable program for adding effects and creating textures using, well... particles. Particle rendering is used for some of the most difficult tasks in computer-generated imaging, such as water, fire and fog, but until recently, has been available only in more complex and costly animation packages.

Wondertouch has democratized this technology, making Particle Illusion available at a modest cost to artists, animators and editors at all levels.

IMMEDIATE GRATIFICATION

Right out of the box, the new user can make things happen. Particle Illusion lets you preview the program's stunning "emitters," a feature that helps demystify magical effects like columns of fire, sparkling pyrotechnics and hydrant-sized streams of water. These aren't purely canned presets, either; every parameter can be modified and keyframed, permitting a daunting intricacy of control. And it's here where the learning curve steepens.

In fact, the potential for intricate adjustments is one of the attributes which has prevented Particle Illusion from being quickly and easily ported to an After Effects-compatible plug-in. Lorence still has plans such a plug-in, but cautions that it won't—and can't—replicate all the features of the standalone OS X and Windows versions. So if you want the whole enchilada, you need to learn more than blunt force can deliver, especially the tricks for handing off to and from After Effects.

Enter Aharon Rabinowitz, an accomplished animator and After Effects compositor. Partnering with the online community Creative Cow, Rabinowitz created a QuickTime-delivered video tutorial series packaged on a single DVD-ROM. His entertaining style drives the task-specific tutorials, and in no time at all, I'd seen and heard what I needed to make things work; turns out that it was actually fairly straightforward once you'd seen it done. As with all learning, however, there's seldom a single "right way" to teach, and although I'd read Wondertouch's documentation and even seen their online tutorials, it didn't click until Aharon taught it.

Did it work for me? Well, so far, I've created columns of fire for a "Wizard of Oz" takeoff, and shot pink steam out of people's ears. I've choreographed a skyscraper fire, including small explosions and big eruptions, and ultimately put it out with a big stream of water. I've thrown away that old stock reel with video footage of fireworks. Now, if I need them, I'll make my own, thank you very much. And they'll be spectacular.

I know that this was a small lesson, easily learned thanks to clever software and effective training materials. I'm facing a bigger training task as I migrate between editing platforms in the months ahead, and it's bound to be much harder. But this experience renewed my faith in my own ability to learn, and without that faith, I'd be condemned to blunt-force learning forever.

Walter Schoenknecht is a partner at Midnight Media Group Inc., a New York-area digital production facility. You can reach him via e-mail at walter@mmgi.tv.

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USER REPORT

WDRB Monitors MPEG with Thales

by Gary Schroder
Chief Engineer
WDRB/WFTE-TV

LOUISVILLE, KY.

Last year, we purchased a new DTV transmitter system from Thales Broadcast and Multimedia. As part of the package, Thales provided us with a full DTV monitoring system that included the Granite Sentinel TNM-2422 MPEG-2 transport stream monitor. This unit monitors quality of service in an easily understood manner.

Before we purchased our new transmitter, we toured several installations. The one thing I noticed lacking at most sites was testing and monitoring equipment. When I asked the engineering staffs what they would use to diagnose a problem if they went off the air, most pointed to a consumer tuner feeding composite video to a 4:3 monitor. In other words, there are a lot of stations out there on the air, but if a problem were to develop, they wouldn't have the equipment to diagnose it.

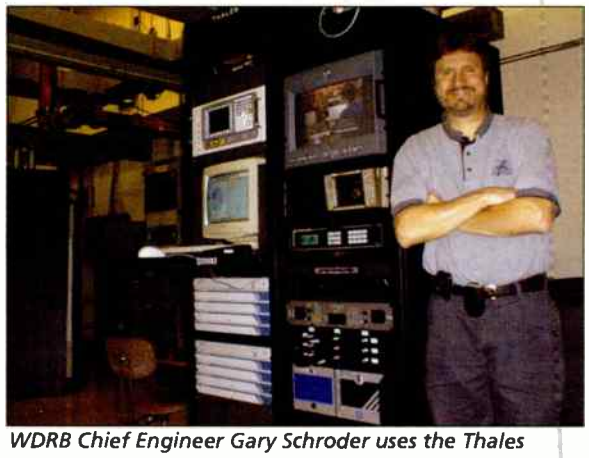
HDTV looks great most of the time, but what do you do when it's not perfect? I wanted a tool to help diagnose PSIP or TSID problems, as well as intermittents that might arise at 3 a.m. That's exactly where the Granite Sentinel came into play.

MONITORS ENTIRE SIGNAL

The Sentinel lets us monitor our entire DTV signal. It offers two monitoring layers. The first is an intuitive level with user-friendly icons and views for non-MPEG experts. This level quickly highlights error conditions. The Sentinel GUI provides a quick view of all video content. It also has audio level indicators, and provides a quick view of our electronic program guide. This first level is perfect for a quick-check confidence monitoring.

The second layer is a monitoring level that provides in-depth real-time analysis, error reporting and diagnostics for MPEG experts. This second level checks the transport stream for errors including syntax and does bitrate and PCR analysis. It uses the DVB-ASI TR 101 290 parameters for in-depth transport stream trouble shooting and diagnostics. TR 101 290 is a standard that specifies three levels or priorities for monitoring a transport stream.

The first is a basic set of parameters necessary to ensure the signal can be decoded. The second is the set of recommended parameters for continuous monitoring, and the third is a set of optional application-dependent parameters. The Granite Sentinel shows all three. The unit even provides transport stream capture for offline analysis.



WDRB Chief Engineer Gary Schroder uses the Thales Granite Sentinel for transport stream monitoring.

Our Granite is configured for a three-input operation: SMPTE-310M, ASI and 8-VSB. We can use these to probe our transmitter facility at multiple points, allowing us to characterize the signal both before and after the transmitter. The 8-VSB input even provides DTV signal RF performance metrics. Aside from having capabilities for analyzing any portion of any digital stream, the unit can set upper and lower limits on each and every parameter and write that information as a log for later viewing.

Limits can be tailored to fit transmitter idiosyncrasies. Then, if a problem *does* develop at 3 a.m., you can rest assured the Sentinel is logging the information so it can be analyzed later. In this digital age where a new piece of test equipment is needed at every turn, it's important to have many capabilities in one box. This makes it more cost effective to diagnose problems. The Granite Sentinel provides us with the easiest means to diagnose potential transport stream issues and resolve them before they become problems.

Gary Schroder is the chief engineer for WDRB in Louisville, Ky. and WFTE-TV in Salem, Ind. He may be contacted at gschroder@fox41.com. *The opinions expressed above are the author's alone.*

For additional information, contact Thales Broadcast & Multimedia at 800-288-8364 or visit www.thales-bm.com.

USER REPORT

KAET-TV Chooses Pixelmetrix

by Terry Harvey
Chief Engineer
KAET-TV

TEMPE, ARIZ.

Clear and concise MPEG-2 transport management and measurement have become prime concerns for Arizona PBS member station KAET. We began digital broadcasts in 2001 and strive to optimize our transmissions by efficient monitoring.

KAET's studio infrastructure for DTV is comprised of numerous DVB-ASI compressed transport paths as well as HD and SD baseband routing. Adequate and reliable monitoring of the digital television transport stream has been a major challenge.

At KAET, we needed a transport stream monitoring system that could readily monitor and easily perform basic measurements—at the station and from remote locations via the Internet. After thoroughly reviewing these requirements, we recently selected the Pixelmetrix DVStation Remote transport stream monitor. A single DVStation Remote is configured to handle our 8-VSB DTV signal off-air monitoring with simultaneous studio transport stream analysis. In this way, we are able to make fast yet comprehensive measurements of all transport streams in the station.

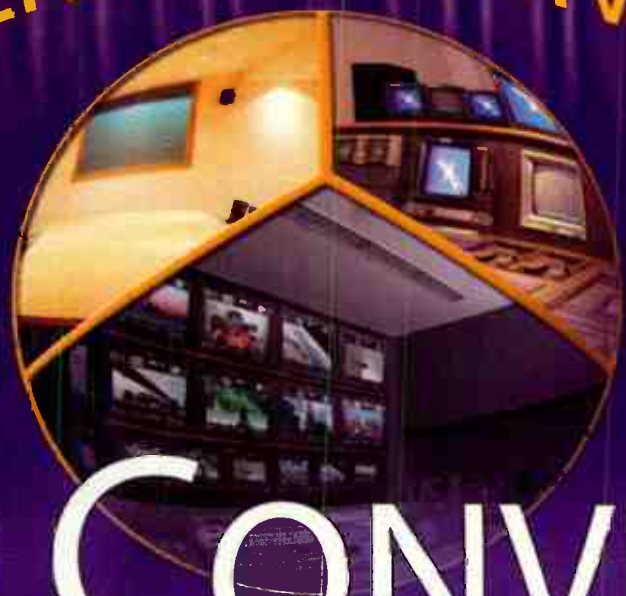
KAET-TV Chief Engineer Terry Harvey installed Pixelmetrix DVStation.

AT HOME AND AWAY

The flexible setup of the DVStation Remote allows us to separately perform basic dedicated monitoring of our off-air 8-VSB modulation and transport-stream content, as well as fully selectable monitoring of all transport streams via an external DVB-ASI router. Pixelmetrix DVStation runs on a Linux platform, which is not only rugged, but allows multiple simultaneous operator sessions. Multiple users may access the DVStation at the same time via the local

PIXELMETRIX, PAGE 46

POWERFUL & UNIVERSAL

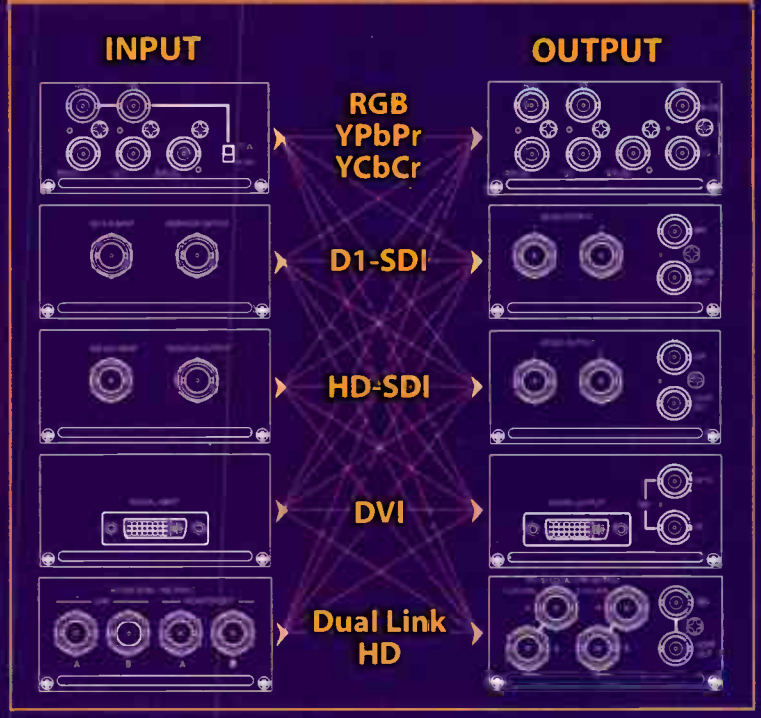


SCAN CONVERTER

SC-2055A

The SC-2055A supports HD Dual Link, HD-SDI, SD/D1-SDI, DVI and Analog (RGB/YPbPr/YcbCr) video signals, depending on the modules the user has connected to the unit. For these interface options, the user is provided with 2 input slots and two output slots. With Astrodesign's I/P conversion technology, "SNaP" (Super Natural Motion Picture), jaggy diagonal lines usually resulting from interlaced video signals can be significantly improved without the omission of frames. The SC-2055 performs an exceptionally smooth conversion of the frame rates and resolution of the video signal as well as producing excellent scaling results. This unit also functions as a line doubler, converting interlaced signals into progressive signals. With its 3:2 and 2:2 pull down functions for film/CG imagery, the SC-2055 presents a very realistic feel / look to image conversion even when not in its original form, which is essential for large venue display systems. We have also included the amazing original animation search feature as well as image compensation. Additionally, it carries functions such as noise reduction and edge enhancement. This unit also supports outside reference synchronization through all the output modules.

Interchangeable Module Options



Astro Systems will be show casing the SC-2055A along with other great products at this year's **NAB Show** (April 14-27). Come by and see our extensive line of HD/SD Waveform Monitor, Display Monitors, Scan Converters, Video & Sync Generators and more. We will be located in the **Central Hall, Booth # C3246**. We look forward to seeing you there.

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USER REPORT

Ascent Media Analyzes with JDSU

By Bob Timpone & Stavros Hilaris
Senior Technologist & Senior Technology Vice President
Ascent Media Systems

CHANTILLY, VA.

Ascent Media Systems & Technology Services recently launched a broadcast/IT integration test laboratory in connection with the acquisition of TGS, a Washington D.C.-based systems integrator. With the support of JDSU's industry-leading digital test platform and MPEG analyzers—the DTS-200 and the DTS-330—we constructed this new lab to serve as an innovative broadcast/IT integration hub. The goal is ensuring reliable and efficient deployment of digital video and other broadcast services for all of Ascent Media's systems integration clients.

Bob Timpone and Stavros Hilaris rely on JDSU's DTS-330 for MPEG analysis.

The broadcast/IT integration lab provides a way for our engineers to solve complex integration issues associated with today's emerging broadcast technologies, long before implementation at customers' sites. It also allows us to qualify new equipment and systems.

We selected the JDSU DTS-330 for MPEG analysis. The DTS was selected for its ease of use, open architecture and ability to perform transport stream creation, capture and analysis. These are invaluable tools in helping provide the highest quality service to end users.

We knew the DTS would be an important element, as all new broadcast facilities require at least some level of MPEG-2 compression. Its open architecture allows use with existing screen-capture utilities and its built-in logging makes the system a good long-term test tool.

Recently, we used the DTS-330 to get baseline measurements of test streams. These were then recorded on a video server and played back through the analyzer. The output was logged and recorded to find anomalies from the demux and remux processes in the server. Along with doing stream analysis, we were able to use the DTS-330 as a transport stream player for feeding multiple equipment components to establish baselines before inserting a system under test.

MULTIPLE INTERFACES

The DTS-330 also allows incoming streams to be tested with DVB SDI, QAM, GbE, COFDM, 8-VSB, SMPTE-310M, DHEI, and QPSK interfaces. It also generates streams over the same complement of interfaces. We appreciate having a flexible analyzer in the lab, as our clients can put forward any number of requests for testing or integration.

The DTS-330 adapts to a client's requirements very quickly. In many situations we are able to use just this single device instead of multiple analyzers. Within the first week of testing in our lab, there were several occurrences where a device under test exhibited incompatibility with test streams. The DTS-330 allowed us to see the stream in real time and to analyze potential problems, thus saving hours of troubleshooting. We couldn't imagine taking on some of the integration challenges we've had without the DTS-330. Its single-instrument functionality provides thorough testing and also helps ensure a high standard in service delivery.

Bob Timpone is senior technologist for Ascent Media & Technology Services and may be contacted at btimpone@ascentmedia.com. *Stavros Hilaris is senior technology vice president for Ascent Media Systems & Technology Services. He may be contacted at* shilaris@ascentmedia.com.

For more information, contact JDSU at 408-546-5000 or visit www.jdsu.com.

BUYERS BRIEFS

The WVR7100 rasterizer from **Tektronix Inc.** supports high definition television signal monitoring and provides the user with the option to add SD and/or composite analog monitoring. Other options for the WVR7100 include analog, AES and embedded audio and Dolby digital AC-3 and/or Dolby-E monitoring. It detects and decodes closed captioning data and V-chip information. A special display provides signal timing information and a positive indication that correct timing relationships have been established. An alarm status screen is provided for displaying current information on any of the parameters being monitored. The rasterizer provides digital cursors for precise signal amplitude and timing measurements.

For more information, contact Tektronix, Inc. at 800-833-9200 or visit www.tek.com.

The ATS-1 is a dual domain audio analyzer from **Audio Precision** designed for measuring both analog and digital signals. Digital parameters measured include jitter, data integrity, sample rate, amplitude and delay. It performs wow and flutter measurements, and indicates input-to-output phase shift. With both digital and analog signals, the unit performs level, noise, THD, crosstalk and other measurements. It also measures AC line voltage and frequency and provides users with both on-screen and printed measurement results. It has inputs and outputs for both balanced and unbalanced audio.

For more information, contact Audio Precision Inc. at 505-627-0832 or visit www.audioprecision.com.

The CSA-1 is a 2 MHz FFT spectrum analyzer from **Belar Electronics Laboratory** for TV and audio applications. It has inputs for 2 MHz IF and RF signals, 150 kHz composite signals and both balanced and unbalanced 24 kHz analog left and right audio signals. The unit also accepts digital audio via both XLR and RCA connectors. A split-screen mode allows simultaneous display of two channels. The device has a user-selectable FFT window function and has peak hold and peak averaging capabilities. Windows-based software and an RS-232 data output are provided for remote display, printing and data storage.

For more information, contact Belar Electronics Laboratory at 610-687-5550 or visit www.belar.com.

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Pixelmetrix

CONTINUED FROM PAGE 42

console or the Web and perform independent or shared monitoring.

The difficulty in remotely analyzing the many DVB-ASI streams in our facility was overcome by using a DVB-ASI router feeding a single DVStation input. This arrangement allows our engineering staff to conveniently monitor and analyze all incoming and outgoing transport streams, locally and remotely. We needed Internet access to the stream analyzer by the staff when on call. The DVStation's GUI Web interface provides full remote access and is able to remotely control our DVB-ASI router, enabling quick diagnoses of problems off-site.

To those familiar with transport stream analyzers, the DVStation has all of the standard stream diagnosis tools—table analysis, PID repetition rate and PCR jitter measurements. The little things that make life easier are what distinguish the DVStation.

There are a number of user-configurable alarm conditions that provide us with visible alarms, GPI switch closures or SNMP MIB items. I particularly like the TR101-290 display. It is a DVB standard, but it provides a higher level alarm to readily and quickly identify major transport stream problems. Pixelmetrix promises to provide a more specific ATSC equivalent soon.

Perhaps one of the most useful tools is the triggerable transport stream clip recorder. Multiple self-triggered or operator initiated 80 MB transport stream clips can be stored for local analysis.

Problems experienced at the elementary stream level have required outside assistance. The DVStation facilitates easy delivery of our clips worldwide via FTP for more detailed analysis.

We have been very happy with our selection of the DVStation Remote. It has provided answers for all of our requirements. Indeed, without the DVStation, we would have found it impossible to integrate much of the DTV infrastructure in our studio.

Terry Harvey is chief engineer at PBS member station KAET-TV/KAET-DT in Tempe, Ariz. He may be reached at tjharvey@asu.edu.

For additional information, contact Pixelmetrix at 866-749-3587 or visit www.pixelmetrix.com.

BUYERS BRIEFS

The PSA-5 from **Sencore Inc.** is a hand-held digital satellite spectral meter for aligning, testing and troubleshooting both digital and analog satellite signals, including DVB and DSS systems. It tunes from 930 MHz to 2.25 GHz and features a 2.5-inch display. The PSA-5 performs signal level, LNB frequency conversion error, noise margin and pre- and post-BER measurements. It operates from internal ni-cad batteries and can provide power to any type of LNB, including double feed systems. The instrument stores information on up to 100 analog or digital satellites and features a frequency resolution of 0.1 MHz. The PSA-5 weighs 3.5 pounds.

For more information, contact Sencore Inc. at 800-736-2673 or visit www.sencore.com.

The 812-OP/F from **Link Electronics Inc.** is a digital video test signal generator card designed to be used in the company's SPG-812 card tray. It provides 16 individual SDI video test signals including color bars, modulated and un-modulated stairstep, ramp, field square wave, multiburst, pathological pattern, gray, black and red field. Three outputs are provided with the 812-OP/F. The device operates in both 525 and 625 line systems and has indicators for determining line standard and genlock condition. Test signals may be selected either via a front panel switch or from a remote control panel.

For more information, contact Link Electronics, Inc. at 800-776-4411 or visit www.linkelectronics.com.

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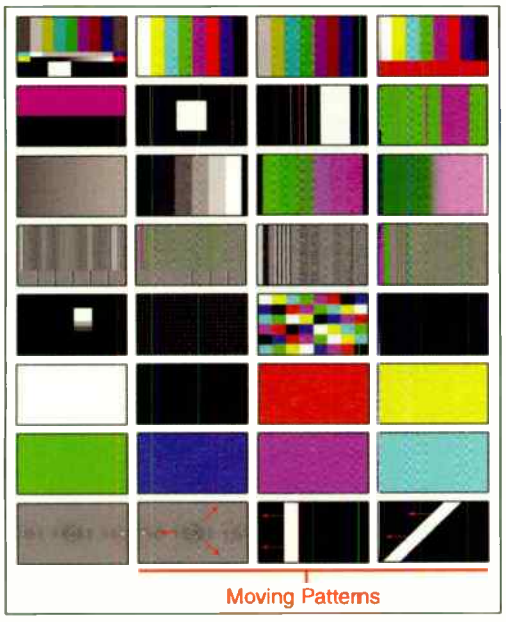

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USER REPORT

Z Technology Provides Assist for OPB

by Everett Helm
Director of Engineering for RF Systems
Oregon Public Broadcasting

PORTLAND, ORE.

Oregon Public Broadcasting operates five full-service television stations, each with NTSC and DTV transmitters, along with 40 additional NTSC translators across the state.

DTV signals from Portland, Corvallis, Eugene, Bend, La Grande and associated digital translators will eventually serve most of the state.

While originating sites are continuously monitored from the studio and visited regularly by maintenance personnel, translator site performance tends to be supported more by local viewer reports. As we upgrade our network to DTV, we face the task of installing and maintaining a large number of transmitters within a reasonable budget. Ideally, we would like to be able to monitor the 40 translators from a central location.

We evaluated the Z Technology model DM1010 for this application. This DTV measurement demodulator can be installed anywhere an Internet connection is available, such as at a translator site, or at a receive location in the translator community. The DM1010 can provide a comprehensive set of measurement capabilities from any of our monitored transmitting locations. With the DM1010, we found that we could remotely monitor and alarm any site, anticipate any performance issues and even view signal parameters while on the phone with a viewer on the other side of the state.

Everett Helm optimizes one of OPB's transmitters using the Z Technology DM1010.

EXTREMELY SATISFYING

We also evaluated the DM1010 at our KOPB transmitter, operating the measurement receiver both locally and over our local area network from our Portland studio, located on the Willamette River, with a direct signal shielded by Portland's West Hills. Being able to monitor transmitter performance from an RF transmission line directional coupler while back at the studio was an extremely satisfying experience. It was interesting to confirm transmitted constellation, spectrum, eye diagram and transmission system echo profile, while documenting a full set of numeric parameters for long-term performance trends.

We evaluated our off-air signal with an outdoor antenna at a six-mile, line-of-site distance from our transmitter, using a second Internet-connected DM1010 measurement receiver. This simulated network monitoring of a remote transmitter site from a local community where no Internet connection was available at the transmitter. We found that all measurements, including the NIST-calibrated power measurement, and instrument displays provided reliable and useful information. Operated apart from the transmitter, the DM1010 measures not only the selected DTV signal, but also the local effects of other interfering signals, multipath, and environmental noise.

FULL RF PARAMETERS REPORTED

A full set of RF and DTV measurement parameters are reported, and full control of the DM1010 is available from the instrument front panel. In addition, all measurements and graphic measurement displays are available, whether connected locally by RS-232 or remotely by TCP-IP over the Internet or LAN, by using the supplied WinDM-Pro application software.

Alarms are configured at the WinDM-Pro operating position, allowing a selective and critical watch of parameters, without having to return to the remote site to reset alarm sensitivity for routine operations.

We especially appreciate full operation using the direct network connection, as we don't have to depend on a PC running unattended at the transmitter. Data transfer between the measurement demodulator and the remote PC is very efficient. It is quite interesting to see a full performance spectrum or I/Q constellation display over a dial-up modem connection.

We concluded that use of the DM1010 would be very beneficial to Oregon Public Broadcasting or to any organization responsible for the performance and maintenance of unattended DTV transmitters. The instrument's measurement receiver can be used for routine setup and maintenance, and it is economical enough to be installed at or near almost every transmitter site for continued monitoring from a remote operating center.

Everett Helm has been director of engineering, RF Systems, for Oregon Public Broadcasting through most of its transition to DTV. He may be reached at ehelm@opb.org.

For additional information, contact Z Technology at 888-613-9832 or visit www.ztechnology.com.

USER REPORT

The Leader LV 5750: A Video Village

by Dean Krueger
Owner
Dean Kruger Films

OCEANSIDE, CALIF.

Among the modern toys of today's movie sets is a not-so-modern invention—the tent. Inside today's tent you'll see engineers with a blue glow on their face coming from array of HD monitors and test equipment. These tents have earned the nickname "video village," and you'll see them on the sets of HD features, music videos and commercials. But what about productions with smaller budgets?

As an owner-operator of a Sony F900 CineAlta package, I have been in a variety of productions with crews of various sizes, including just me. I've found a monitoring solution which works great on any size set. It's the LV 5750, a portable multi-SDI monitor from Leader Instruments. Every test instrument that engineers in the video village tent would use is in this portable unit. In addition to being a great picture monitor, the LV 5750 functions as a waveform monitor and vectorscope. The unit offers a number

LEADER, PAGE 49

Leader

CONTINUED FROM PAGE 48

of ways to view the information, and it weighs only 6 pounds and is just 6 inches deep. If you're on a dolly track, you could mount it on your camera. If you're chasing sunsets in the desert by yourself, you could sling the unit from your neck. The LV 5750 is a video village in a box.

Recently I was on a commercial set in San Diego. An advertising agency rented my CineAlta package to produce the spot and hired a DP and gaffer from Los Angeles for the two-day shoot. I had recommended that the producer rent an HD monitor, but it wasn't approved, so we just watched the downconverted signal on a 9-inch standard-definition monitor. On the set that day, the producer leaned into the monitor and asked if the video signal was hot. The DP looked at me for an answer. I checked the zebra levels on the black-and-white viewfinder, then walked over to the monitor and told him that to the best of my knowledge, the levels were good, but that the only way to be absolutely sure was to use a waveform monitor. He then asked me why we didn't have one, and I reminded him that someone didn't approve it in the budget. He looked at me as if to say, "Oh, yeah. That was my idea." Then he told me to get the monitor for the following day.

Dean Kruger on the set with the Leader LV 5750.

After we wrapped the next day's shoot, we gathered around the LV 5750 to review the footage. The artists and the engineers loved what they saw. And we all learned a valuable lesson—with HD, trusting the zebra levels for proper exposure isn't good enough. You needed a video village in a tent or in a box.

Dean Krueger is the owner of Dean Kruger Films and may be contacted at dean@montevistapictures.com.

For more information, contact Leader Instruments Corp. at 800-645-5104 or visit www.leaderusa.com.

BUYERS BRIEFS

The SVR-1700 HDSD from **Compuvideo** is a combination digital and analog video waveform monitor and vectorscope. The unit features a 6-inch CRT and provides waveform displays for SD and HD SDI signals and accommodates numerous signals. It has analog inputs for NTSC, PAL and SECAM signals, and analog component video. Two active SDI outputs are available for distribution of digital signal input video. An input is provided for external reference. The SVR-1700 HDSD is designed for use anywhere in the world, as its power supply accepts input voltages between100 and 240 at either 50 or 60 Hz. It is available in both portable and rack mount configurations.

For more information, contact Compuvideo Co., Ltd. at 561-733-4780 or visit www.compuvideo.com.

The TS12-CARD test generator from **Multidyne** provides users with a total of 16 NTSC video test signals. These include a 5 MHz line sweep, multiburst, NTC-7 composite and multipulse. The TS12-CARD is designed to be used in a Grass Valley 8500/8800 series card tray or a Multidyne UTIL-200 tray. It also provides vertical interval test signals which are compatible with the Tektronix VM-700 video analyzer. The device has a programmable character generator capable of creating a 32-character message. In addition to the video test signals, it provides five dedicated black burst outputs, an audio tone and a lip-sync audio/video synchronizing signal. The device conforms to RS-170A specifications.

For more information, contact Multidyne at 800-388-8378 or visit www.multidyne.com.

USER REPORT

Henninger Selects Videotek for QC

by Samuel Crawford
Director of Engineering
Henninger Media Services

ARLINGTON, VA.

Henninger Media Services is the leading film and video production/post-production company in the Mid-Atlantic region. Our customers include broadcasters, corporations and associations—anyone who has a need for film, video and audio services.

Every day is different at Henninger, with projects ranging from a client producing a single show to another producing a full 13-part series for broadcast. We are service-oriented and like to start at step one with our clients, and then consult with them throughout the entire process. This allows us to identify and handle any problems before they become costly.

In an effort to continuously enhance our production value, Henninger has been a pioneer in the area of high definition. This has enabled us to increase our competitiveness in the market, but has also brought challenges, such as the increased need for quality control (QC) in a high-definition environment. Our existing equipment was suitable for SD QC, but did not address HD.

HD QC DEVICE NEEDED

When we began shopping around for a multiformat QC solution, we were prepared to carefully compare specifications to find the right product for the job. However, the decision turned out to be quite simple, as there was only one product on the market that delivered all the features we wanted in a single box: the Videotek TVM-950HD. This is a multiformat HD/SD SDI monitor with a high-resolution color LCD display. It provides an accurate and stable user-customizable display of waveform, vector, gamut, audio, picture and timing functions in quadrant or full-screen views, for up to four inputs.

We use the TVM-950HD in our QC environment for measuring a show's technical specifications to ensure they fall within the guidelines mandated by the broadcaster receiving the product. With its multiple capabilities, the TVM-950HD takes the place of more than 10 different pieces of equipment.

Kevin Barker, a quality control engineer at Henninger Media Services, uses the Videotek TVM-950HD monitor to ensure high quality.

The TVM's exceptional flexibility made its installation simple and actually improved the QC room workflow. As we received one of the very first units, there were a few bugs that had not yet been taken care of in the factory. However, whenever we've had problems, the support has been impeccable. The company has been great about getting us software revisions too.

The equipment has performed very well. In fact, it does even more than I expected. One of the key benefits of the TVM is that it features multiple presets, which, once stored, make setup and change simple and fast. This also makes our QC work much easier and improves the thoroughness of the process.

SAVES TIME AND MONEY

Because this box can measure a signal in so many different ways at one time, it has also made our QC process more efficient. As a result, the TVM-950HD has saved money for our clients and for us. Perhaps most significant, the TVM-950HD allows us to spot any technical issues with a client's show that might keep it from making it to the air.

As the first company in the Washington, D.C. metro area to use this equipment, Henninger is now able to offer services not available at other post houses. Clients depend on us as a full-service production/post-production one-stop-shop, and the TVM-950HD enables us to deliver the quality necessary to provide this service.

Samuel Crawford is director of engineering at Henninger Media Services. He may be contacted at scrawford@ henninger.com.

For additional information contact Videotek at 800-800-5719 or visit www.videotek.com.

BUYERS BRIEFS

The PT5300 from **DK-Technologies** is a multi-format digital video signal generator which supports 21 HD formats, as well as NTSC, PAL and SDI video. It includes dual AES/EBU audio functionality with word clock output and can provide up to eight tri-level sync outputs. It is backwardly compatible with PT5230 and PT5210 option modules and offers analog outputs along with its SDI outputs. The PT5300 features a moving element in SDI test patterns which is synchronized to an embedded audio "click" for checking and correcting audio/video synchronizing problems. A time and date option is available for the PT5300.

For more information, contact DK-Technologies at 800-421-0888 or visit www.dk-technologies.com.

The POD22 from **Ward-Beck Systems Ltd.** is a stereo loudness meter with bar graph indicators displaying both VU and peak levels simultaneously. It accepts analog stereo or AES/EBU digital audio signals. The device also includes A/D and D/A converters with rear-panel connections for the convenience of users. Screw terminals are provided for balanced audio input and output connections. BNC connectors are used for 75 ohm digital signals. Two of the units may be mounted side-by-side in a standard equipment rack. LED indicators are provided for display of sample rate, lock to signal and errors.

For more information, contact Ward-Beck Systems Ltd. at 800-771-2556 or visit www.ward-beck.com.

USER REPORT

Hamlet's Flexiscope Convinces Skeptic

by Michael Brennan
Independent Cinematographer

LONDON

I had my doubts about the Flexiscope. I thought the handheld form factor wasn't ideal for location use; that it was designed for engineers lurking around a broadcast facility; that its battery life would probably be minuscule and that the screen was very small.

But it was significantly cheaper than other battery-powered waveforms and, for this reason, I thought it would be worthwhile to give it a try.

Well, the longer I used the Flexiscope the more I liked it!

The Hamlet Flexiscope in flight

Although it would be more versatile if it could be mounted on top of the camera for the series of shoots I recently did, I wouldn't have bolted it to the camera anyway.

DOES WHAT THE BOX SAYS

As one would expect from Hamlet, the Flexiscope does what is says on the box. It is a waveform and vectorscope with modular plug-in options. I use the multistandard/frame rate HD option. Added features include an embedded audio monitor and picture monitor. The audio monitor displays four channels in bar graph form and a minijack enables stereo monitoring.

For field use, the Flexiscope is quite versatile. It can even be passed to a director to monitor sound or used as a framing monitor. Internal nicad batteries power the unit for around four hours—long enough for a day's shooting if you are using it for checking exposure and occasional monitoring.

Hamlet did provide a cannon 4-pin adapter so I could power the unit from a camera battery, but with careful use, the internal batteries lasted all day. A minor irritation was that the positive lead is connected to the outside of the plug; this could cause smoke when short-circuited to vehicle or aircraft bodies, which have negative grounding.

The waveform/vector display is bright and easily viewable in sunlight. A programmable audible alarm function is included for illegal luminance values, among other things. The video display can be selected to show bowtie and has horizontal time base ranges of H, 2H and parade. There's also a horizontal magnifier position. Eight sets of

HAMLET, PAGE 54

PRODUCTS & SERVICES SHOWCASE

PRODUCTS & SERVICES SHOWCASE

Hamlet

CONTINUED FROM PAGE 51

display settings can be memorized and recalled with front panel buttons. The unit comes with an installation CD for PCs. Error logs can be downloaded to a computer and software upgrades can also be uploaded.

A useful feature of the Flexiscope is "Hands Free Timing," which automatically switches between internal and external syncs to easily identify timing errors.

The unit survived the rigors of extreme degree heat in the Israeli desert. I can also testify that it works at an altitude of 500 feet below sea level! The Flexiscope is a very handy device to have in a freelancer's digital rucksack.

A leather case or means of attaching a neck strap is essential, and I hope Hamlet is working on this, but since I was using Serial Number One, I'll let them off this time.

I am very impressed that the unit survived the knocks and abuse of airline travel and location shooting. It is one of the few pieces of my HD kit that has worked straight out of the box, and the handheld form factor became less of an issue the more I used it.

Although waveforms are being introduced into some LCD monitors, nothing beats this full specification dedicated device.

Michael Brennan is an independent cinematographer and an exponent of high-definition and digital cinema. He may be contacted through his Web site, www.hd24.com.

For additional information, contact Hamlet at 949-597-1053 or visit www.hamlet.co.uk.

BUYERS BRIEFS

The Analyst RS-422/RS-232 Tester from **DNF Controls** is a device designed for troubleshooting data communications problems. The Analyst allows users to identify and isolate data linkage problems with VTRs, file servers, routing switchers, still stores, editors and other broadcast plant or production house equipment. The handheld device features a 4 line x 40 character internal display and an eight-button keyboard. It can identify swapped transmit and receive lines, reversed transmitter output polarity and reversed receiver input polarity. The tester checks system parity settings and baud rate. When used for VTR testing, the Analyst emulates Sony protocol machine play and stop commands. No specialized training is required for use of the device. The Analyst has connectors for both RS-232 and RS-422 input and outputs.

For more information, contact DNF Controls at 818-898-3380 or visit www.dnfcontrols.com.

The 7750TG from **Evertz** is an SDI test signal generator card designed for use in the company's 7700 series of card trays. It can provide test signals in both 525 and 625 line standards and has four SDI outputs. Up to four audio tones can be embedded in the video signals provided by the 7750TG, with audio levels fixed at –20dB full scale. The card has an external reference input for genlocking and allows users to select test signals via a card edge toggle switch. Front panel LEDs are provided for indication of genlock presence and module status. Error detection and error handling codes are embedded in all output signals.

For more information, contact Evertz at 877-995-3700 or visit www.evertz.com.

USER REPORT

Modulation Sciences Wins KGTV Praise

by Ron Eden
Chief Engineer
KGTV

SAN DIEGO

I've been with KGTV for 32 years and have had a very active part in the DTV transition here. We were early adopters, going on-air with our first digital signal on Sept. 13, 1999. I knew all 10 of our original HD viewers on a first name basis. DTV and 8-VSB monitoring have come a long way since then. We now have more than 100,000 off-air viewers, plus those watching us on cable.

I've had the opportunity to work with several pieces of 8-VSB monitoring equipment, from the high end to the low end. I tested the Modulation Sciences' MSI-4400 a couple of months ago and was quite pleased. The package includes a hardware box and software for the client and server computers. Written for a Windows platform, software installation and navigation were familiar and simple.

The 4400 worked "out of the box." Setup and configuration were "plug and play" and required no troubleshooting. However, the MSI-4400 does require a parallel port, which is now less frequently found on laptops. We were able to purchase a laptop with a parallel port and once the laptop and 4400 were connected and software installed, we were up and running and taking measurements.

The home screen is very informative. It displays most of the critical parameters necessary for station monitoring. The eye pattern, constellation, signal quality meter and strip chart for displaying MER/EVM/SNR are all available right there. I can configure each display according to my needs via the drop-down menus. For the price, I was surprised at the number of critical parameters the 4400 measures and the flexibility when working within each of those parameters.

Further review of the software brought me to the tap weight page. Not only is this a display, but it is also highly interactive and includes a feature I'd not seen in other products costing twice as much. It has the capability of zeroing or freezing the pre- and post reflection taps to measure transmitter or path performance and capture data to memory for graphic comparison of live readings. We used the tap weight feature to measure the transmitter SNR without equalization.

Part of the initial setup includes the ability to set my own parameters on the built-in alarming feature. Once the parameters were established, I set up the e-mail alarm feature with two e-mail notification lists in case of alarm or failure. However, the lack of a real failure has prevented a full operational test. Based on the alarm parameters I set, an alarm and trend log are stored on the laptop. The data retention period is a rolling year for both logs. Both are easy to read and provide information on everything that is happening with my signal. They are also exportable to any type of spreadsheet

MOD SCI, PAGE 56

Mod Sci

CONTINUED FROM PAGE 55

program for further analysis and evaluation.

A most useful feature of the box is the remote accessibility. I set it up at the transmitter and the client software allows me to access and control the unit no matter where I am.

I found the unit to be an extraordinary value, priced under $10,000, with many necessary and desirable features for 8-VSB monitoring.

Ron Eden has been with KGTV since 1974 and may be reached at reden@kgtv.com.

For additional information, contact Modulation Sciences Inc. at 800-826-2603 or visit www.modsci.com.

The Modulation Sciences MSI-4400 8-VSB analyzer

BUYERS BRIEF

The AG2 test signal generator from **Hotronic Inc.** provides simultaneous SDI, analog composite and analog component outputs; AES/EBU and analog audio signals are also available. The device uses 10-bit digital processing for generation of test signals and provides four configurable sync outputs in addition to test signal outputs. The AG2 is genlockable and has a user-programmable station identification feature. Test signals available include color bars, multiburst, ramp and bounce. The test generator is available for either NTSC or PAL applications.

For more information, contact Hotronic, Inc. at 408-378-3883 or visit www.hotronics.com.

USER REPORT

Wohler Penpal-HD Ideal for Demos

by Walter Bridges
President
Southern Digital Products, Inc.

HUNTSVILLE, ALA.

Southern Digital Products, Inc. is systems integrator and reseller for the broadcast and professional AV markets. Our customer base ranges from broadcast networks and television stations to government entities, corporations and churches. We represent manufacturers who provide the highest quality products and services to our customers.

We provide demonstrations on HDTV products from most of the manufacturers to customers across the southeast U.S., including NASA. To aid in their evaluation of products, many customers want to display or record test signals. Most are just considering HDTV and thus do not have any equipment to support a demo. We have to bring everything needed. The less that I have to carry, the quicker I can perform the demo and the tests. For these demos, I needed a signal source that was small, but still a precision instrument. Wohler's Penpal-HD test generator makes this possible without carrying a big test generator.

The Penpal-HD is a very compact and portable test signal generator.

It's less than seven inches long, weighs seven ounces and produces 32 video test patterns in 18 HD standards. Each of these signals can be combined with three different embedded audio tone settings. The Penpal was a win-win situation—it decreased the amount of equipment carried around and made testing easier.

I hooked up the Penpal-HD to NASA's Synthesis MVA3000 multistandard analyzer to check the output quality. It came up clean and stable, and met all our specs.

A POWERFUL TOOL

For such a small HD generator the Penpal-HD proved to be a powerful tool. The quality and precision of the Penpal-HD matched the quality level of the other entries in this marketplace.

The generator operates from battery or an AC power. The test patterns are organized into eight groups and it is very easy to operate.

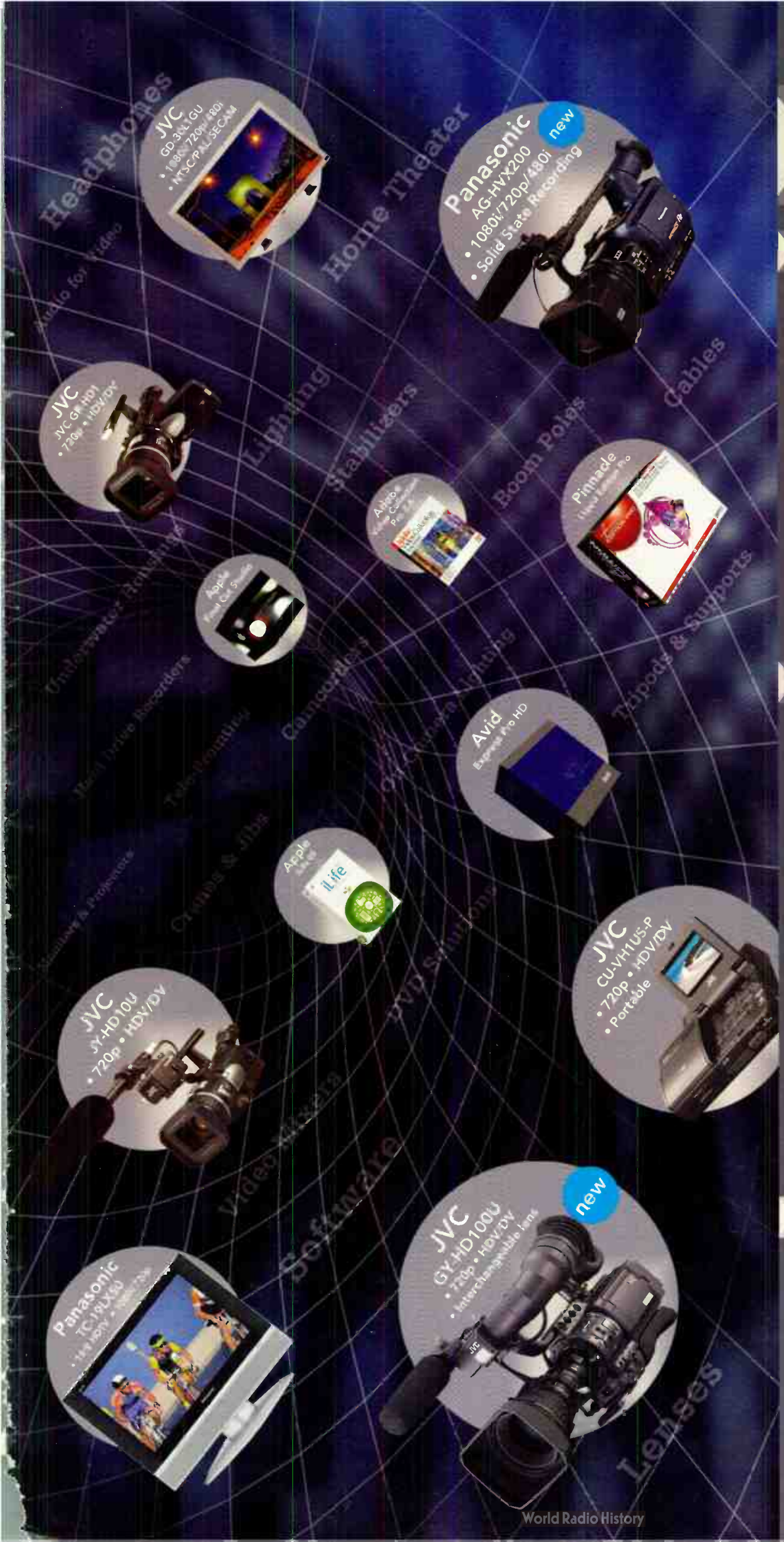
WOHLER, PAGE 60

REFERENCE GUIDE

The Reference Guide is a selected sampling of current products. Specifications and prices are supplied by the manufacturer and are sub ect to change without notice.

WAVEFORM MONITORS & VECTORSCOPES

MANUFACTURER	MODEL	FORMATS	INPUTS	DISPLAY MODES	STANDARDS	SIZE/WEIGHT	SPECIAL FEATURES	PRICE
Broadcast Video Systems 905-305-0565 *www.bvs.ca*	VITS-2	NTSC/PAL balanced audio	4 video 4 bal. audio ref.	Freeze / 2 sec. updated video; realtime peak program audio	525/625	1 RU; 12 lbs.	Dial-up remote operation; video S/N; alarms; single line; audio PPM bar graphs	$3,100
Hamlet 866-442-6538 *www.hamlet.us.com*	MS601AX	SDI/NTSC/PAL	2 SDI 2 composite 2 AES; 4 balanced audio; ref.	Waveform; vector; parade; picture; audio level & phase	525/625	3 RU; 6.5 lbs.	Color display; GPI connector; multiple audio scales	$5,995
CompuVideo 561-733-4780 *www.compuvideo.com*	SVR-1100-SDI	SDI/NTSC/PAL/ analog component	1 SDI 2 composite 1 analog component; ref	Waveform; vector; parade	525/625	3 RU; 6.5 lbs.	Digital encoder (SDI-composite); SDI d.a. (1 in, 2 out)	$3,995
Leader Instruments Corp 800-645-5104 *www.leaderusa.com*	LV 5100D	SDI/NTSC/PAL	2 SDI 3 composite/ component analog ref.	Waveform; vector; picture	525/625	3 RU; 11 lbs.	SDI signal level displayed as coax length; 3 wire analog picture output	$6,505
Magni Systems 800-237-5964 *www.magnisystems.com*	SDM-560M	SDI/NTSC/PAL/ S-Video	2 SDI 1 composite 1 S-Video; 2 AES 4 bal. analog; ref	Waveform; vector; picture; audio level & phase	525/625	2 RU; 12 lbs.	Alarms; reporting; headphone jacks for audio monitoring	$7,995
Tektronix 800-833-9200 *www.tek.com*	WFM601A	SDI	2 SDI ref	Waveform; vector; diamond; lightning; arrowhead	525/625	3 RU; 8.5 lbs.	Video error detection; alarm; on-screen diagnostics; analog monitor outputs	$7,240
Videotek/Leitch 800-800-5719 *www.videotek.com*	TVM-850	SDI/NTSC/PAL	2 SDI 2 composite ref.	Waveform; vector; gamut; timing; picture	525/625	3 RU; 11 lbs.	Frame capture; Ethernet port; USB port; DVI-I output	$7,995



IN-DEPTH WITH HDV

What is HDV?

HDV is a new video recording format that enables **High Definition** video to be recorded onto MiniDV tapes. This revolutionary technology provides almost **6 times the picture information** of standard definition, while keeping the cameras **small & affordable**. Just like standard DV, the HDV signal can be transferred to your computer editing system via Firewire. This keeps the HDV edit workflow easy, familiar and manageable.

B&H: Your HDV Source

B&H offers every solution for your HDV video production: Cameras, Decks and Editing Systems. Our knowledgeable sales staff is on hand to help you make the best possible choice. For **Broadcast, Corporate, Event Videography** and **Digital Filmmaking**, B&H has the products needed to take you through editing, mastering and delivery.

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COMPANY PROFILE

Rohde & Schwarz: Pride in Excellence

by James E. O'Neal

COLUMBIA, MD.

Rohde & Schwarz can trace its beginnings to an unassuming two-man R&D laboratory in Munich, Germany in the early 1930s. There, the Drs. Lothar Rohde and Herman Schwarz, school friends with fresh degrees in physics and a common interest in RF measurements, collaborated to build a precision frequency meter.

From this beginning, Rohde & Schwarz has grown through the years to become a major player in broadcasting, test and measurement and other areas where precision, quality and innovation are at the forefront.

Rohde & Schwarz can rightfully boast of being first in a many areas. For example, the company developed the world's first device for measuring RF properties of ceramics (1933), the first European VHF FM transmitter (1949), the first-ever system for television signal quality monitoring (1975), the first European stereo television transmission system (1980) and the world's first tap-proof GSM mobile phone (2001).

Rohde & Schwarz still remains a family-owned company, and the grandson of one of the founders is COO of the Executive Board. However, it has grown a bit beyond its original two-person staff. Rohde & Schwarz is now an independent group of companies, with almost 7,000 employees and a presence in more than 70 countries.

The company prides itself as being the only manufacturer of a complete line of transmission, monitoring and measurement equipment for radio and TV broadcasting. This includes analog and digital transmitters as well as digital test and measurement equipment.

According to Eddy Vanderkerken, director of sales and marketing for the Rohde & Schwarz broadcast division in North America, one of the strengths of the company is that it is privately held.

"There have been a lot of groups in this business over the years who have made good products; however the number who have both made good products and lasted for nearly 75 years is quite small," Vanderkerken said. Being privately held is our strong point—no one wants to change that. We have never been forced to make good quarters or good years. We've never had to drop a project to try and turn up a good quarter. We've never had to rush a product to market for that reason. Our primary goal is to make good and innovative products over a long period of time. We prefer steady, sustained growth as opposed to a series of peaks and valleys."

The ascendancy of digital technology in broadcasting has had a rather dramatic impact on many manufacturers. Vanderkerken says that due to the nature of the company's operations, this really wasn't the case with Rohde & Schwarz.

"We've done analog broadcasting for quite a long time and we've always been occupied with the creation of test and measurement devices," he said. "The digital era in broadcasting has really only increased the number of products that we carry. We have always been active in digital standards throughout the world and have expanded our equipment range accordingly. We cover all areas of the world's digital standards, and today the digital division is the major part of our business. According to the last survey, we have sold worldwide more digital transmitters than anyone else in the world."

The Rohde & Schwarz Innovation Center for research and development

Vanderkerken is especially proud of his company's complete line of television transmitters.

"We've taken a new approach to transmitter design and construction. In any transmitter we sell, most all of the individual 'building blocks' are exactly the same. That goes for analog and digital, ASTC and DVB-T. There's really little difference, except for the exciter. We can provide power outputs up to 30 kilowatts. We manufacture virtually everything in our own factory. We're not a gatherer of parts. We do the metalworking, the machining, build the cooling systems, design and construct the electronic units, the couplers—all of it. We know exactly how everything was designed, constructed and fitted together. This ensures very high reliability."

Despite the company's long-standing reputation in other parts of the world, Rohde & Schwarz is a relatively unfamiliar name to most American broadcasters. Although the company has sold to the American market for over 25 years, until two years ago most products were marketed in the United States via a third party. That has changed with the establishment of a new service center in Columbia, Md.

"The new U.S. center is set up not only to provide spare parts, but also to fully support our customers. We have a complete facility for repairs, for calibration of test and measurement equipment as well as routine maintenance and checkups. We also provide customer on-site support for our broadcast products from this center. We see the U.S. as a very important part of our market and want to be fully involved in this area of the world." ■

ROHDE & SCHWARZ
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Columbia, Md. 21046

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Fax: 410-910-7801

www.rohde-schwarz.com

Wohler

CONTINUED FROM PAGE 57

Each video signal may be accompanied by audio test signals on one or more of the AES audio channels. The video test patterns cover just about any alignment or checkout situation.

The Penpal has only two buttons and four LED indicators. The top button turns the unit on and off, and selects the desired pattern. The other selects the format and audio test-tone. It's very useful to have the audio combined with the video, as it saves me from carrying additional test gear.

My entire team is impressed with the quality and ease-of-use of the generated signals. It features a total of 40 A/V test signals, and is powerful, compact and convenient.

If you work in high definition, you need to put a Wohler Penpal HD in your tool kit. Not only do we use this wonderful tool ourselves, we recommend it to our customers as well.

Walter Bridges is president of Southern Digital Products Inc. with headquarters located in Huntsville, Ala. He may be contacted at the wbridges@sdpi.net.

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

BUYERSBRIEFS

The model 7405 high definition test signal generator from **Ensemble Designs** supports all common HD formats. The 7405 is designed to mount in Ensemble Avenue equipment trays and provides test signals and reference black output simultaneously. Test signals include color bars, pulse and window, crosshatch, ramp, five step and others. Signals are selectable from a front panel control, Avenue control panels or an external computer. The generator works in both 50 and 60 field television environments.

For more information, contact Ensemble Designs at 530-478-1830 or visit www.ensembledesigns.com.

The SDM-560M serial digital and analog composite monitoring and measurement device from **Magni Systems Inc.** provides monitoring capability for 525/625 SDI, analog composite and S-Video, as well as for digital, analog or SDI-embedded audio. Headphone jacks are provided for audio monitoring. The unit provides picture displays, waveforms, vector presentations, as well as digital signal status parameters including jitter and EDH errors.

For more information, contact Magni Systems Inc. at 800-237-5964 or visit www.magnisystems.com.

The 820 color bar generator from **Kramer Electronics Ltd.** provides SDI color bar signals to troubleshoot, test, and align DV equipment. The 820 provides SDI bar signals for both 525 and 625 and has four outputs and requires 12 volts DC for operation, making it suitable for both fixed and portable applications. The compact 820 weighs slightly over a third of a pound. Brackets for mounting is standard and a 19-inch rack is available as an option.

For more information, contact Kramer Electronics Ltd. at 888-275-6311 or visit www.kramer-us.com.

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AUDIO PRODUCTION

Want to Sell

Bittree & ADC Audio and Video Patch Panels from $300; Stantron 45RU racks from $450; Mackie 1604 VLZ Pro, new, too low to quote; Mackie 1604 VLZ, used, $625; Mackie CR1604, used, $350; Tascam M-2600 MK II 16-Channel Mixer, $1,750; Sony MXP-390 Mixer, $1,000; Digidesign 888, $650; Sony PCM7040 DAT, $3,990; Crown D75 and D150 amps, low $$; DPS Stereo Audio Sync, $1,000; Panasonic SV-3700 DAT, $200; Panasonic SV-3800 DAT, $300; Alesis M1 Active Speakers, $295/pair; Wohler Amp 1-A, $325; Wohler AMP-1A-VTR, $550; Wohler AMP-1AP, $325; Wohler Amp-1APF, $325; Wohler AMP-1APS, $325; Wohler MSH-8AL Audio Level Meter, $700; Wohler VMQ-4, $500; Audio Monitor Neumann U87 Ai Studio Microphone, $1495; AKG C 414 B ULS Microphone, $950. 818-788-4700 or 212-564-9933 or www.tvprogear.com.

CAMERAS

Want to Sell

Sony DXC-D30 w/PVV-3 docking camcorder, $9500; (4) Panasonic AW-E750 2/3" 3-CCD convertible camera w/lens, $5950/ea; Sony DXC930 color video camera, $2995. 818-788-4700 or 212-564-9933 or www.tvprogear.com.

Sony UVWB Betacam SP camera, hard case, 3 batts, chrgr & AC adapter, $2000. Glen, 208-735-1970 or 208-420-9779.

CAMERA ACCESSORIES

Want to Sell

Cartoni Beta Head & Single Stage Sticks, $1750; Sachtler Vario-Ped 2-75, $12500. 818-788-4700 or 212-564-9933 or www.tvprogear.com.

EDITING EQUIPMENT

Want to Sell

Avid Adrenaline, new, $21500; Avid Symphony Version 3.5 on IBM Intellistation, $15500; Avid Adrenaline on Mac G5, call. 818-788-4700 or 212-564-9933 or www.tvprogear.com.

MICROWAVE/STL

Want to Sell

M/A-COM 7 GHz, 13 GHz and 23 GHz, broadcast-quality radios in-stock. Excellent for STLs. Refurbished, repaired, retuned, tested and warranted. Save thousands of dollars over new radios. Antennas and waveguide also available. 100% Customer satisfaction. Massachusetts Microwave (978) 635-1556. www.massmicrowave.com.

MONITORS

Want to Sell

Sony PVM-1954Q, $1250; Sony PVM-20M4U, $1750; Sony PVM-20M2U, $1600; Sony PVM-1944, $1000; Sony PVM-1354Q, $600; Sony PVM-1351, $450; Sony PVM-14M4U, $1095; Sony PVM14L2, $1295; Sony PVM9L3, $900; Sony PVM8044Q, $500; Sony PVM8045Q, $700. 818-788-4700 or 212-564-9933 or www.tvprogear.com.

SIGNAL PROCESSING

Want to Sell

Leitch FR-684 Dual PS 2RU Frame, $295; Leitch FR-884 Dual PS 2RU Frame, $295; Leitch Mix-7001 Multi-function digital frame, $400; Leitch 6804 Mounting Frame w/Pwr sply, $250; Leitch SPG-2602N Pulse Gen, $1,250; Grass Valley Series 8900 Frames w/redundant pwr sply, $600; GVG 8501 Video DA's, $125; GVG 8551 Audio DA's, $100; Sony BVX-D10/BVR-11, $3,990; Leitch DPS-290 Component TBC, $1,200. 818-788-4700 or 212-564-9933 or www.tvprogear.com.

SWITCHERS

Want to Sell

Videotek Prodigy Component audio follow video switcher, $2995; Videotek RS-12DVA SDI Routing Switcher, $600; Miranda Digipath 16x16 SDI Router (w/remote panel), $3,500; Leitch 4x4 MB Routers, $175; GVG Ten X, $600; Kramer 5X4 A/V Switchers, new, $475. 818-788-4700 or 212-564-9933 or www.tvprogear.com.

TELEPROMPTERS

TEST EQUIPMENT

Want to Sell

Tektronix WFM601M SDI Waveform, $5,500; Tektronix WFM601i SDI Waveform, $5000; Tektronix WFM601 SDI Waveform, $3,990: Tektronix 1750 wfm/vec, $2250; Tektronix 1755A wfm/vec, $2550; Tektronix 1760 NTSC/PAL wfm/vec, $2950; Tektronix 1765 NTSC/Pal wfm/vec, $3450; Tektronix 1730D SDI vector, $2000; Tektronix 764 Digital Audio Monitor, $1500; Tektronix 760a Audio Monitor, $1000. 818-788-4700 or 212-564-9933or www.tvprogear.com.

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Sony UVW-1800 BetacamSP, $4950; Sony PVW-2800 BetacamSP, $5000; Sony BVW-70, $5000; DSR-1500A, new, $5150; Sony DSR-45, new, $3895; Sony VO 9850 w/timecode, $1200; Sony VO 9800 w/timecode, $1000. 818-788-4700 or 212-564-9933 or www.tvprogear.com.

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We are currently seeking candidates with a background in the design, repair & installation of multi-media communications systems, and knowledge of equipment and current industry trends & technical developments. These positions are responsible for the design & functional checkout of advance audio, video & software systems. Contract positions are currently available. Qualified Engineers interested in possible future full-time openings are welcome to submit their resume.

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Network Control Supervisor

Georgia Public Broadcasting has an opening for a Network Control Supervisor. Candidate needs associate's degree or equivalent in Broadcasting, Electronics, Communications, or related field. Five yrs exp. TV broadcast operations; background in network control and digital electronics. On-air master control and library management systems experience. Knowledge of broadcast network control functions, equipment and software, nature of network control functions in the digital world, and effective delivery of content via broadcast and satellite. Familiarity with FCC rules and regulations and the ability to ensure they are followed. Solid communication, interpersonal, organizational, and team leadership skills is a must. Candidate will train, schedule, evaluate, counsel, and otherwise supervise network control staff, oversee day-to-day activities, develop, update, communicate and ensure standard operating procedures are followed. Monitor discrepancy reports and determine preventive measures. Works closely with key staff in maintenance, programming and traffic operations to ensure equipment and operating systems are adequate and in optimal working and to optimize operational procedures related to broadcast logs, play lists, record schedules and tape library maintenance.

Excellent Benefits. Salary Is Commensurate With Experience and Leadership Ability. Send resume, letter of interest, and three work related references by January 31, 2006. Email Resume to jobs@gpb.org. GPB H.R. Office, 260 14th Street, NW, Atl., Ga. 30318.GPB is an Equal Opportunity Employer.

Chief Engineer

ABC affiliate KQTV, St. Joseph, MO seeks a Chief Engineer. Candidate should have experience with VHF transmitters, microwave equipment, all studio related and ENG equipment. Position requires an individual with management skills as well as strong hands on capability. Major responsibilities will include managing and involvement in the daily repair and maintenance of studio/transmitter, maintaining operating budgets, capital project implementation and maintenance of in house computer network. Salary is commensurate with experience. Send cover letter and resume' to Rick Stolpe, Nexstar Broadcasting, Inc., 62 South Franklin St., Wilkes-Barre, PA 18702. EOE.

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PAGE	ADVERTISER	WEB SITE	PAGE	ADVERTISER	WEB SITE
31	360 Systems	www.360systems.com	58	Hotronic, Inc.	www.hotronics.com
50	AheadTek	www.aheadtek.com	11	Ikegami	www.ikegami.com
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66	Altronic Research	www.altronic.com	41	Leader Instruments	www.LeaderUSA.com
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5	Avid Technology	www.avid.com	1	Leitch Inc.	www.leitch.com
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16	Belden Wire & Cable Company	www.belden.com	35	NVision	www.nvision.tv
53	Broadcast Software Solutions	www.broadcastsoftware.tv	15	PESA Switching Systems, Inc.	www.pesa.com
53	Bron Kobold USA	www.bron-kobold-usa.com	28	Pixelmetrix Corporation	www.pixelmetrix.com
22	Burk Technology	www.burk.com	46	Radyne	www.radn.com
30	Calrec Audio Ltd.	www.calrec.com	53	RF Central LLC	www.rfcentral.com
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53	Cobalt Digital	www.cobaltdigital.com	49	Rohde & Schwarz	www.rohde-schwarz.com
52	Compuvideo Co., Ltd.	www.compuvideo.com	54	Ste-Man Inc.	www.ste-man.com
19	Dolby Labs Inc	www.dolby.com/tvaudio	36	StreamBox	www.streambox.com
23	Doremi Labs, Inc	www.doremilabs.com	7	Tektronix, Inc.	www.tektronix.com
53	DSC Laboratories	www.dsclabs.com	17	Telecast Fiber Systems, Inc.	www.telecast-fiber.com
48	Electronics Research, Inc.	www.eriinc.com	18	Telemetrics Inc.	www.telemetricsinc.com
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67	Evertz Microsystems Ltd.	www.evertz.com	52	Videoframe, Inc.	www.videoframesystems.com
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34	Focus Enhancements	www.focusinfo.com	37	Videotek	www.videotek.com
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24	Hi Tech Systems Ltd	www.hitechsys.co.uk	47	Wohler Technologies	www.wohler.com
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TV TECH BUSINESS

Vizrt Acquires Ardendo for $23M

BERGEN, NORWAY & STOCKHOLM, SWEDEN

Vizrt, the Norwegian-based provider of professional graphics systems for television, has signed a letter of intent to acquire Ardendo, a developer of media asset management software based in Stockholm, for $23 million. The deal is expected to close by the end of April 2006.

Ardendo's range of media asset management address digital archiving, ingest, transcoding, browsing and system integration media management for broadcasters moving to IT-based production and archiving and is expected to greatly enhance and expand the capability of Vizrt's product range and allow it to address new markets including mobile video. In September 2005, Ardendo purchased a 19 percent interest in Adactus, a Norwegian company specializing in using the MPEG-21 standard to deliver video content to mobile phones.

"By marrying ingest, archiving, editing, transcoding, playout and newsroom components from Ardendo with real-time graphics components, mobile distribution and mobile visualization tools from Vizrt, we're establishing a company that can provide the world's first complete multi-platform production solution," said Bjarne Berg, CEO of Vizrt.

Ardendo recently was hired to develop a digital asset management system for BBC's new Broadcast Centre in London and has partnerships with IBM, SGI and Scheduall, among others.

CBS O&Os Adopt XDCAM HD

NEW YORK

CBS says that its 17 owned and operated stations have adopted the Sony XDCAM HD format for their newsgathering operations.

The CBS O&Os in Boston (WBZ) and Chicago (WBBM) will be the first to take delivery of the new cameras in March, followed by the other 15 stations over the next two years. The XDCAM Professional Disc system is based on the Blu-ray standard.

The deployment follows CBS announcement in 2004 that the news operations at its O&Os would adopt the XDCAM system in a deal that was valued at $20 million. CBS News began acquiring and accepting XDCAM content in October 2005.

The announcement provides further evidence of broadcasters' move to providing news in high-definition, at a time when broadcasters are also transitioning to digital ENG, according to the network.

"HD News is a hot topic on the minds of many in our industry, and it's critical to have the right technology in place when it's time to make the switch," said Bob Ross, senior vice president, East Coast operations, CBS Television.

Grass Valley, SGL in Marketing Partnership

NEVADA CITY, CALIF. & SOUTHAMPTON, U.K.

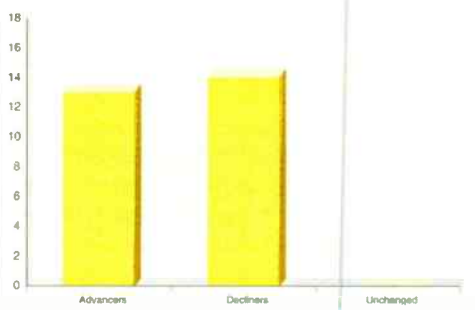
Grass Valley has agreed to market SGL's FlashNet software in connection with Grass Valley archiving and newsroom systems.

When incorporated into the GVG Profile archiving system package, SGL's software allows users to extend storage capacity to tens of thousands of hours. Customers with NewsBrowse systems will be able to archive material for decades.

"The agreement with Grass Valley formalizes the excellent working relationship we have had with them," said Steve Atkinson, SGL vice president of American operations.

The agreement covers both sales and service of the system to North America customers.

WIN-LOSE RATIO



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(Jan. 6 - Jan. 20)

Nexstar	+13.15%
Paxson	+4.40%

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(Jan. 6 - Jan. 20)

Emmis	-13.92%
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Harmonic	-10.09%
Avid	-7.88%

To have your company listed, send an e-mail to msullivan@imaspub.com.

TV Tech STOCKS as of January 20

Company Name	52-Week Range	January 6	January 20	% Change
Avid	35.78 - 68.35	57.36	52.84	-7.88%
Belden	17.65 - 26.00	25.05	25.42	1.48%
Ciprico	3.70 - 5.98	5.56	5.64	1.44%
Harmonic	4.08 - 12.40	5.35	4.81	-10.09%
Harris	26.94 - 47.87	46.58	45.50	-2.32%
LSI Logic	5.01 - 10.75	9.06	8.62	-4.86%
S-A	26.73 - 43.90	42.98	42.99	0.02%
Scopus	5.80 - 7.51	6.63	6.18	-6.79%
SeaChange	5.07 - 17.00	8.03	8.04	0.12%
Tektronix	20.97 - 30.78	28.35	29.87	5.36%

Broadcast STOCKS as of January 20

Company Name	52-Week Range	January 6	January 20	% Change
Acme	3.30 - 6.24	3.74	3.51	-6.15%
Belo	20.74 - 24.96	22.05	22.37	1.45%
Emmis	15.29 - 24.49	20.47	17.62	-13.92%
Entravision	6.90 - 9.50	7.02	7.20	2.56%
Fisher	41.43 - 52.60	41.71	42.39	1.63%
Gray	8.65 - 15.74	9.20	9.12	-0.87%
Hearst Argyle	23.15 - 26.34	24.10	23.75	-1.45%
Nexstar	4.09 - 9.27	4.26	4.82	13.15%
Lin TV	10.10 - 19.03	11.09	10.17	-8.30%
Paxson	0.37 - 1.84	0.91	0.95	4.40%
Sinclair	7.25 - 10.07	9.19	8.78	-4.46%
Liberty	34.32 - 48.05	46.87	47.19	0.68%
Univision	23.52 - 32.50	31.04	31.42	1.22%
Young	1.70 - 10.74	3.78	3.51	-7.14%
Tribune	30.05 - 42.17	30.89	30.05	-2.72%
Meredith	44.51 - 54.37	53.04	53.95	1.72%
EW Scripps	44.85 - 52.91	49.58	49.40	-0.36%