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WHAT'S INSIDE

Senate Bill Slog Starts

Broadcast white spaces hang in the balance

by Deborah D. McAdams

WASHINGTON

At presstime, several schisms remained as the Senate telecom bill was being prepared for a floor vote, but no objections have emerged for opening unoccupied broadcast channels to unlicensed transmitters.

The portion of the bill dealing with unlicensed devices, the Wireless Innovation Networks Act, makes Channels 2-51 available in markets where they're not directly licensed to TV stations. Such channels have come to be referred to as "white spaces."

The legislation has bi-partisan support. At the first markup session on the bill, Sen. George Allen (R-Va.) said the WIN Act represented "a fantastic opportunity for people

SENATE, PAGE 17

Photo: Steve Snoddy

Verizon Launches New HD Service

New East Coast pipe could be boon for high-end video production

by Wes Simpson

NEW YORK

Verizon Communications has just released a new uncompressed HD digital video transport service in their Maine to Virginia service territory, available to customers via specified wire centers in a number of major cities. The "Hi-Definition Digital Video Transport Service" (Hi-Def DVTS for short), became available June 15.

"This is a compelling service offering for broadcasters, particularly since the pricing appears to be reasonable when compared to existing SDI/270 services," said Brad Gilmer, president of Gilmer and Associates, an Atlanta-based broadcast industry consulting firm. "Radio has gone to the model of collaborative production, where talent doesn't need to be all in the same place. With these new types of services being offered, I foresee that video production will be able to use the same operational model."

Local Loop transport has long been one of the slowest evolving and more expensive parts of a telecom network. Inside modern production facilities, 270 Mbps and 1.5 Gbps connections are relatively inexpensive and widely used. A surprising number of carriers compete to transport video services from one city to another by providing links that terminate in carrier "hotels" or "PoPs" (points of presence) located in many major metropolitan centers in the

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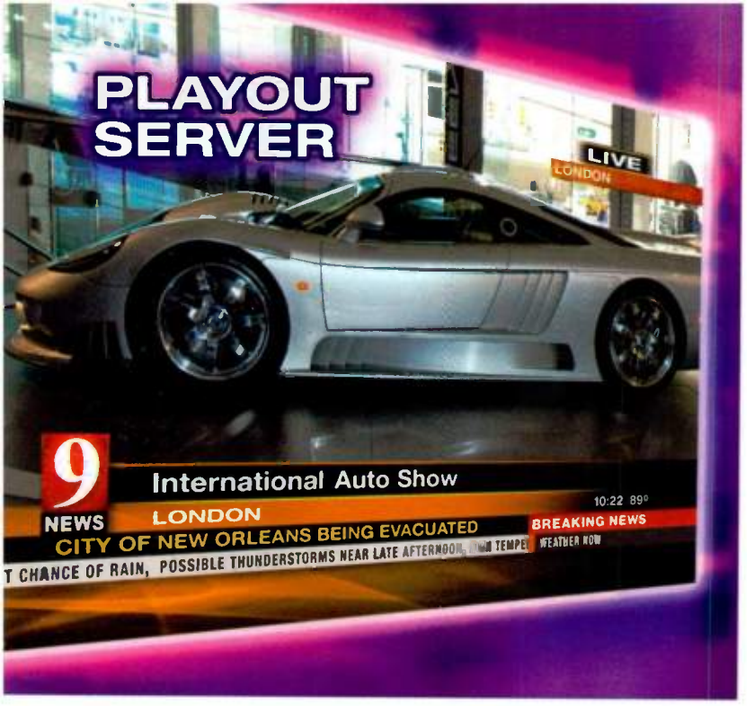

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Active Format Description solves a troublesome problem in the transition from conventional 4:3 display devices to widescreen 16:9 displays, and also addresses the variety of aspect ratios that have been used over the years by the motion picture... p. 40

Randy Hoffner

Technology Corner

The cathode ray tube that until recent years served as the principal television and video display device generates its own light. The CRT's electron beam bombards electroluminescent phosphors, which absorb the energy in the electron beam... p. 46

Wes Simpson

Video Networking

Internet Protocol Television is all the rage today, but it is really the latest of a series of technologies that has been evolving for more than 40 years. In this column, we'll be discussing technologies for sending a variety of video signals over many different kinds of networks... p. 48

FROM THE EDITOR

The Road To 2 GHz

Broadcasters concerned about the DTV deadline have another important deadline to mark on their calendar: Sept. 7, 2007. This is the deadline that the FCC has mandated to mark the end of the 31.5-month period the commission gave for Sprint Nextel to complete its transition with broadcasters to move their ENG spectrum to the 2 GHz band.

By now, you should know the reasons behind this project: Sprint Nextel wants to move some of its wireless services to the spectrum currently occupied by broadcasters, who use the band to transmit ENG signals. The company developed a plan in coordination with the federal government to reimburse broadcasters for the equipment they will need to move to the digital ENG band.

TV Technology believes this is a vitally important issue for broadcasters, and we are working with Sprint Nextel, via quarterly special reports, to provide our readers with the latest updates and issues concerning the transition. But, we're also aware that there is frustration on both sides with the process, which is progressing slowly. Michael Degitz, vice president, global development and spectrum management for Sprint Nextel, has spent his last several columns explaining the procedure for completing quote packages, and he says in his latest column on p. 18 that, although progress has been made, "a greater number of quote packages and signed frequency relocation agreements (FRA) need to start coming in." Disagreements over what equipment is eligible to be replaced, as well as tax liability concerns, have been cited as some of the issues hampering progress.

The 2 GHz relocation transition presents broadcasters with a great opportunity to move to a more efficient process for electronic newsgathering, without the excessive costs that have hampered the DTV transition. It's critical that we move forward and work together with Sprint Nextel and work out any differences that remain so we can meet the deadline.

* * *

The **TV Technology** family is growing! Starting with this issue, Wes Simpson, a well-respected consultant in the area of video transport, is penning the "Video Networking" column. (I'll let Wes provide you with his experience and background, p. 48.) Welcome aboard, Wes!

Tom Butts
Editor
tbutts@imaspub.com

LETTERS

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

Horrific Symbols

Dear Charlie Rhodes:

Your DTV articles in **TV Technology** have been a great education, but I think there is an error in the May 31 issue, ("Television Reception History Repeats Itself").

At the bottom of the third column on page 22, you wrote, "There are eight symbol levels in 8-VSB, four are below the average power and four above it. It will be the highest power symbols (+7) that get crushed."

As I understand it, the 8 symbol levels are labeled –7, –5, –3, –1, +1, +3, +5, and +7. The negative symbols have the same power as the positive symbols of the same number but the carrier is reversed in phase.

Bob Gross
WPIX-TV
New York, N.Y.

Charlie responds:

We are both right. You are correct as to the values of the data symbols, but I am right about the radiated signal.

The disparity is that the radiated signal includes the Pilot Carrier whose value is 1.25, so your max symbol +7 is radiated as 8.25, while your –7 symbol is radiated at 5.75.

So I was writing about those horrific +8.25 symbols with pilot added. I call them "horrific" because the voltage value squared determined their instantaneous peak power, which is 68.0625 compared to the average symbol power, which is 22.0625, or is 4.9 dB above the average signal power.

Thanks for taking the time to write. Stay tuned.

To Each His Own

Dear Editor:

Obviously, Ed Fraticelli disagrees with my assessment of television programming today ("Better Than You Think," Letters, May 31). Of course, that is his unqualified right. However, his reply concerning my comments ("It's Still Junk," Letters, April 24) leads me to believe he is not as selective as I am regarding the types of programs he watches.

For example, I gave up watching "Survivor" more than 5 years ago because it reminded me of an ongoing soap opera (another type of programming I detest). Furthermore, I have never seen the programs Mr. Fraticelli watches including but not limited to "Lost," "24" or "The Sopranos," since those programs do not interest me. Most other network and syndicated programs I deem insipid, contrived stories and are essentially somewhat far-fetched in their content. However, I do prefer "Jeopardy," for its often historical and educational content.

I also prefer commercial-free programs such as those found on PBS and TCM (Turner Classic Movies). It is very irritating to have a network movie interrupted every 7 minutes or so to feed us 4 minutes of insipid, redundant commercial junk I see a dozen times a day. I do watch the History Channel, National Geographic and a few other programs simply because their content appeals to me. Even so, I am still faced with having to wade through 4 minutes of commercials at every break. Because of this, my remote mute button is nearly worn out so at least I do not have to listen to commercials until the program returns.

I spent 40 active years in television but now that I am retired, I have become far more selective in what I watch and I do not feel it is worth buying an HDTV receiver to see sharper junk.

Arthur Schneider
Port Hueneme, Calif.

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Switching to IPS

Vendors tout competitive advantages with single operator systems

by Claudia Kienzle

HAMILTON, N.J.

Now that broadcasters have tackled automating their master control rooms, they're turning their sights upstream to their studio control rooms. They want to replace their conventional set-up with an Integrated Production System (IPS) that would enable switching, keying, transitions, graphics, titling, cameras, feeds, and other live production tasks to be controlled from a central user interface.

This means they can reduce the manpower in the studio control room from a team of people down to a single operator. They can also streamline workflow, ease into HDTV, and manage more without compromising the on-air product.

For newscasts, today's new IPS can leverage MOS protocol to promote a seamless, unified workflow that ties the station's graphics automation, newsroom computer, and news editing systems to the studio control room. And this integrated workflow will also make it easier to take video produced for air and distribute it to multiple outlets, like the Internet and mobile TV.

MARKET DRIVERS

According to Alex Holtz, director of IPS for Grass Valley, in Jacksonville, Fla., there are intense market pressures compelling broadcasters to adopt IPS.

Holtz said Grass Valley's Ignite IPS offers an economical approach to producing live content for DTV multicast channels, such as 24-hour local news channels, sports, local shopping, and educational channels that leverage the broadcasters' digital bandwidth.

The Grass Valley Ignite HD IPS meets these goals while promising to pay for itself within one year at top tier stations, and within three years at mid-market stations. It integrates a Grass Valley Kayak HD compact video production switcher frame with popular third-party CGs, Grass Valley K2 Media Server, and robotic camera technology. Using MOS, Ignite integrates with AP's ENPS, Avid iNEWS, and Grass Valley Digital News Production equipment, including the NewsEdit nonlinear editing system.

Since Los Angeles-based KABC installed a Grass Valley Ignite HD IPS earlier this year, a single operator has been efficiently running KABC's daily morning and weekend newscasts. Based on this initial success, KABC will transition its afternoon and evening newscasts to Ignite HD as well.

"Until now, the control room has been the 'Holy Grail' that you don't touch because it directly affects the on-air quality," said Scott Matics, robotic camera product manager for the Grass Valley IPS product line. "But now large market stations like KABC are looking for a better cost structure; and smaller market stations want to cost-effectively produce an on-air product that has a higher market look. New Ignite SDC/HDC robotic camera systems, which work seamlessly with the Ignite IPS, enable small to mid-market stations to produce live content with on-air moves like the higher market stations."

The KSNW Ignite training suite

TAKING IT SLOW

KSNW-TV3 (NBC) in Wichita, Kan. installed an Ignite system in last Spring, and the system officially went live to air for the noon newscast in June. The system's on-air debut was preceded by four weeks of technical rehearsals without talent followed by practice run-throughs with talent.

"Due to the complexities of this changeover, we took it slowly. But the inaugural broadcast went very well with no technical failures," said Warren Kunkle, chief engineer of KSNW-TV3, which is owned by Montecito Broadcasting Group.

KSNW does have an HDTV channel, however the station's newscasts are produced in SD and upconverted. The station does plan to produce its newscasts in HD in the future, and plan to upgrade Ignite to HD.

KSNW integrated its Grass Valley Kayak switcher-based Ignite system with a Chyron Duet, Aprisa SSX still store, Leitch Nexio server, and using MOS, the AP ENPS newsroom computer system. According to Kunkle, the station's Vinten robotic camera system needed to be upgraded so that Ignite could automate the camera controls to the station's four Sony studio cameras.

Ignite has also been installed at two other Montecito stations—KOIN-TV, Portland and KHON-TV Hon-olulu—and personnel there are being trained in anticipation of taking the systems live to air at the end of the summer.

Over the past several months, Broadcast Pix, a Burlington, Mass.-based developer of broadcast production technology, has rolled out the Slate 100 and Slate 1000. These "studio-in-a-box solutions" integrate live switching, Inscriber CG, graphics, a single VGA panel displaying program and preview sources; robotic camera control; and uncompressed clip storage for about $13,000. The future roadmap for the Slate systems includes HD and integration with newsroom computer systems.

The Slate 1000 has a hard panel with a familiar Grass Valley switcher layout; whereas the Slate 100 only has a touch screen panel and mouse. However, both systems can be boiled down to a custom-designed "Slate" card set residing in the workstation's PCI slots. These card sets are powerful enough to support six SDI and analog cameras plus all the integrated functionality needed for the live show.

"Until now, the control room has been the 'Holy Grail' that you don't touch because it directly affects the on-air quality."

—Scott Matics, Grass Valley

Slate systems have been purchased by ABC, CBS, Fox, and PBS TV stations, corporations including Microsoft, Cisco, Morgan-Stanley, and General Motors, as well as churches and schools. Broadcast Pix President Ken Swanton estimates that 30 percent of Slate customers use the system for Internet broadcasting.

"A decade ago, many of the dedicated proprietary black boxes in the production control room gave way to PC workstations," said Swanton. "Now all of that broadcast-quality functionality has been reduced to a single, low-cost workstation and that evolution is going to contribute to the democratization of live TV production."

While the industry has been focused on HDTV, Echolab, after conducting market research, determined that 60 percent of the market had yet to transition from analog to serial digital video. Among these were small broadcast stations, cable TV operations, churches, corporations, and small production companies.

"For this middle tier market segment, making the jump from analog to HD is very difficult and expensive, and they don't have either the budgets or the technical needs of top tier users," said Battista Remati, Studio Ensemble project leader for Echolab in Billerica, Mass.

To address the needs of this "gap" market, Echolab initiated Studio Ensemble, a new, pre-integrated compact studio solution that combines best of breed components from four partnering companies in a way that eases the transition from analog to serial digital, holds down costs while maintaining broadcast quality, and streamlines production of live news, sports, and special events.

The central component is the Echolab Opera 3408 dual-format (digital and analog), 10-bit NTSC/PAL production switcher, which through Echolab's "System on Chip" architecture is software-driven for easy upgrade. Echolab also developed integration protocol that allows the switcher to centrally control the other Studio Ensemble components. These include the Compix CG Media Aria2000 CG, the 360 Systems Broadcast Image Server 2000 3-channel media server, and the Avitech MCC80004dE Multi-Viewer which enables multiple video displays on a single LCD screen. Also through Echolab, Crystal Vision interface gear can provide SD widescreen aspect ratio conversion and SD to HD upconversion.

"Since we include the integration software worth $10,000 for free, the [under $45,000] Studio Ensemble represents savings by a factor of seven compared to high-end installations," said Remati.

Remati says future editions of Studio Ensemble will include MOS-enabled integration with news automation software and robotic camera control. Studio Ensemble's hardware and software can be traded-up to support native HD when the customer is ready. In addition, a new product, the Remote Ensemble, will take all the Studio Ensemble components and packages them into a pre-wired, turnkey flight-pack for ENG, among other applications, Remati says

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IPS, PAGE 8

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DOLBY

Priming the Flow

System integrators, manufacturers fill in the gaps

by Robin Berger

LOS ANGELES

The annual NAB show gives systems integrators a good opportunity to assess the state of the industry and review the latest technologies garnering broadcasters' attention. This year was no different.

As expected, customers confirmed they were looking to save money by using file-based production to improve workflow efficiencies and lower start-up and upgrade costs.

"Television is files these days—file systems allow you to know who's working with your material," said Ed Hobson, vice president of National TeleConsultants in Glendale, Calif. "Everyone we're working with is moving to file-based production and large servers."

"Automated production also enables centralization of everything from master control to graphics, traffic and weather systems," said Glenn Thomason, director of engineering for Tampa, Fla.-based Professional Communications Systems.

And broadcasters were "keen to get the most out of recent developments in common, open architectures—particularly in centralized storage solutions," said Chris Summey, senior vice president/general manager, Ascent Media Network Services.

"I was impressed with the extent of interest shown in Captive Audience Networks and related distribution opportunities," Summey said. "There was also significant activity by a number of content distributors looking at disaster recovery scenarios."

CURRENT PROJECTS

While the companies spent the bulk of their time at the show consulting with existing customers and garnering new ones, their compatriots back home were busy working on existing projects.

National TeleConsultants, for example is following up its recent work upgrading ABC News' New York facility to HD by converting ABC's Washington News Bureau to high definition. NT is also continuing its HD conversion work at Warner Bros. in Burbank and with DirecTV nationwide, while designing HD production studios for KQED-TV San Francisco, according to Hobson.

PCS is working with two station groups looking to add centralized master control and automated production control, as well as continuing to implement centralized facilities in its own station group, Media General, Thomson said (Media General bought PCS in 1996).

Ascent is designing, installing and commissioning new facilities for CBS' KYW/WPSG duopoly in Philadelphia, the network's WBBM-TV Chicago, and its KCBS/KCAL duopoly in Los Angeles, Summey said.

AZCAR is working with Fox Network Engineering and Operations to design and integrate IT at the new Fox Network Center-Houston, which will replace Fox's Houston Technical Operations Center.

"It's an entirely new system built from the ground up," said Spike Jones, director of business development for AZCAR in Canonsburg, Pa. "It will incorporate 28 master control rooms and will be the origination point for Fox's cable networks."

White Plains, NY-based Venue Services Group is "in discussions with at least four mobile unit projects," said company president Dave Shaw, "a direct result from the showcase of HD11" at NAB2006. HD11 is VSG's 53-foot "expando unit," which includes a unique "LCD monitor wall, personal control positions at every production location, and built-in tape storage.

"News acquisition equipment finally emerged in the digital environment," said AZCAR's Jones. "There's now a nonlinear acquisition format to compliment the nonlinear-based newsrooms and edit infrastructure that's existed for the last five or six years."

His list was topped by Sony's XDCAM system (camcorders plus optical disc decks—both compact and mobile); Panasonic's DVCPRO P2 series (AG-HVX200 camcorder, P2 card); and Grass Valley's Infinity series of recording and storage devices. These will effectively replace tape, which has limited the benefits of the already-installed IT technology to post acquisition throughput. The new ingest process creates "a real nonlinear workflow from the field through to playout," said Jones.

PCS' Thomason is sold on Grass Valley's Ignite integrated production system, which, he felt, was the only really proven product of its kind on the market.

"When Grass Valley bought ParkerVision [2004], they took it from being a bunch of pieces of equipment made by some company in Florida and replaced it with Grass Valley and Thomson components, so now you've got a pretty robust functioning system—with the Grass Valley reliability and service," he said. "It requires basically two people to run it, compared with your traditional control room."

"Everyone we're working with is moving to file-based production and large servers."

—Ed Hobson, National TeleConsultants

National TeleConsultants recently converted ABC News' facility in New York to HD.

His experience installing the product proved to be an elegant as well as cost-saving proposition, with all of the equipment fitting into two racks. In one case, his crew was able to connect the racks before shipment to a station with a bulkhead panel. The station then connected the equipment to its local sources and "were done in no time," Thomason said.

Moreover, Ignite enabled KOG-TV in Mobile, Ala. to air round-the-clock updates on Katrina last summer, accommodating both time and manpower constraints, he said.

EXISTING GAPS

"Everyone is still looking for lower cost," said NT's Hobson. "The thing that impressed me was the rapidly dropping cost of HD equipment and the improvement in HD equipment—like enhancements to editing systems and large storage capability."

But he did concede the need for still more speed and capability—and "systems that [would] allow more people to form more and bigger collaborative groups."

Shaw says broadcasters' top concerns include interoperability between products; archive storage solutions; standardized formats and obsolescence.

PCS' Thomason also noted concerns about transfer/conversion bottlenecks attributed to incompatible technologies. He said files sent by a digital media distributor—or swapped out by edit machines—were often not recognized by the servers designated to receive them.

To date, said Thomason, "the only way around (this) is to have more systems, more server ports available and more of these 'FlipFactories' so that they can keep importing the stuff—there's obviously a cost in all that." ■

IPS

CONTINUED FROM PAGE 6

and playout, Harris offers the Nexio NewsNet product line which works seamlessly with its Nexio server to form an end-to-end, MOS-enabled news production solution.

The newest addition to the Nexio NewsNet product family is a low-cost field editor called Velocity XNG, nonlinear editing software that runs on a laptop. Material acquired in the field can either be edited on XNG or transferred to the station's Nexio server, which acts as a centralized, shared database as well as a multi-channel playout device. Using Media ID technology, Nexio NewsNet systems and the Nexio server can intelligently manage storage resources by only storing one copy of each element. Rather than always moving video from place to place, the assets remain on the server and are accessed and composed using pointers and EDLs.

"Velocity XNG also connects to the newsroom computer system, and if the journalist has written a VO [voice-over] script, that copy and any video clips they may want to use, can be pulled directly into the timeline of the NewsNet editing system," said Kyle Cowan, product manager for news solutions for Harris Broadcast Communications Division in Burbank, Calif.

At $3,000 per seat software, Cowan said that there is strong demand for this editing solution, especially among smaller market stations that have been priced out of digital news editing until now. Velocity XNG will ship after IBC in September. ■

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CONTINUED FROM PAGE 1

U.S. and around the world. However, the links that connect between the carrier facilities and the production studios are the domain of the local carriers, where cost can be high and the availability of services can vary from one block to another in the same city.

NATIVE BASEBAND

Rich Wolf, vice president for telco and distribution services at ABC Network, called the new service a "milestone" for hi-end video production.

"We have always believed that the best way for us to provide video connectivity between our locations is in the native baseband form of those signals," he commented. "We currently use baseband analog and 270 Mbps SDI circuits from carriers that serve a number of our facilities. Our goal has always been to transport HD video in its native 1.5 Gbps baseband format. Verizon is the first carrier that I know of to provide our industry with this service on a widespread basis; this is really a big milestone in local loop video transport."

There are a number of potential uses for this new service. One of the most basic applications is to connect between a broadcaster and a remote production studio. These links can also be used to connect to post-production houses or other frequent users of HD video signals. Because these links offer uncompressed transport, there is no compression step required, and these links can actually offer video quality that exceeds that of even the most popular HD tape formats.

These circuits can also be used to connect to long haul service providers, particularly those who use compression to transport HD signals over their system (as is the case with all satellite and almost all current long-haul fiber providers.) By using this service, the problems associated with concatenated compression between the long-haul link and the local loop (possibly on two ends of a circuit) can be avoided. One intriguing use of these circuits could be to deliver uncompressed HD final programming to a direct-broadcast satellite, CATV, or IPTV provider, thereby avoiding the need for those providers to decompress off-air broadcasts and recompress it into the format used for distribution to consumers.

Hi-Def DVTS offers one-way transmission of 19.39 Mbps compressed digital video defined in ANSI/SMPTE Standard 310M, or uncompressed 1.485 Gbps SMPTE 292M format signals. The signals are supplied to Verizon using standard 75-ohm video coax and connectors, so it is completely compatible with existing standards-based equipment. The service is Intra-LATA, which means that the start and end point of each circuit must be located inside the same Local Access Transport Area, as defined by the FCC; however connections can be made to other carrier circuits that cross the LATA boundaries.

"This is a compelling service offering for broadcasters."

—Brad Gilmer, Gilmer & Associates

It's also a tariffed service, which means that it is available to all qualifying customers within the service area at the same rate. The service has three main price components: a monthly recurring charge per circuit termination, a monthly fixed charge for each circuit, and a monthly charge that varies with the length of the circuit in miles. The service is available with contracts of varying terms, including month-to-month, 1 year, 3 year and 5 year, with the monthly charges decreasing for longer-term contracts. The minimum contract length is 3 months; temporary (short-term) service is not available.

A unique feature of this service is that the transport network automatically detects when customers input either 19.39 Mbps or 1.485 Gbps and chooses the correct means of transport.

"This is part of an emerging trend in video transport equipment where devices and networks automatically adapt to different signal inputs," said Brian Wilson, senior offer manager for Verizon, "thereby removing the need to pre-configure equipment and helping to prevent operator errors from interfering with critical production environments." ■

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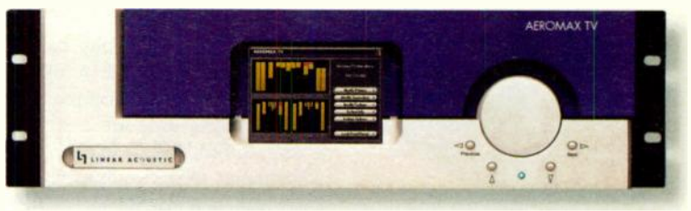
AEROMAX-TV™



AEROMAX-TV™ Television Audio Processor is a dynamics unit for two-channel main plus SAP audio, with front-panel display and controls plus Ethernet remote control. The four-channel unit can be configured as 2+2 or 2+1+1 (stereo plus two mono channels). CrowdControl™ Dialog Protection Processing is provided for the main program audio.

"Can we use AC-3 and maintain audio quality?" - We know how!"

AC-3 bitstreams are being used successfully to distribute audio programming by four major US terrestrial television networks, and by countless cable and satellite channels, dramatically streamlining such challenges as metadata and lip sync. The Model LA-5448 AC-3 Frame Synchronizer and Rate Shaper makes handling such AC-3 compressed bitstreams a simple task. Commercials and local audio insertions plus seamless switching of bitstreams can be accomplished easily and in many cases with existing routing switchers, all without the need to decode and re-encode: perfect audio quality preserved.

LA-5448 Synchronizer

The Model LA-5448 AC-3 Frame Synchronizer and Rate Shaper can accept up to four independent AC-3 programs, re-synchronize them to a local reference, protect against bad frames by repeating or inserting known good silent frames, and selectably rate shape outputs up to a fixed rate of 384 or 448 kbps regardless of input data rate.

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Avoiding the 'Color Police'

Using specialized displays to monitor colorimetry

by Mary C. Gruszka

NEW YORK

Measuring HD-SDI signals is similar in many ways to SD—both use component waveform monitors and vectorscopes. Eye pattern displays and jitter measurements check the health of the physical layer, with HD being more critical.

Any errors in the Cyclic Redundancy Check (CRC) indicate how close a signal path is to the digital cliff. In HD, CRC is present in each video line with a separate value for chroma and luma components.

Readouts of ancillary data (there's lots more with HD) check if things like closed captioning and embedded audio are where and what they should be.

But there are differences between HD and SD, besides the obvious—number of lines, pixels per line, and frame rates.

A big one is colorimetry. The percentages of red, green and blue that make up the luminance signal are different for HD compared to SD.

For HD:

Y = .2126R + .7152G + .0722B

While for SD (and NTSC):

Y = .299R + .587G + .114B

So it follows that the color difference signals B-Y (Cb) and R-Y (Cr) will also be different. HD color bars, when viewed on a waveform monitor will indeed look different than the SD color bars waveform most are used to. That is as it should be. Don't try to make adjustments to HD equipment to make color bars look like SD.

Also, some colors that are available in HD don't have an equivalent in SD or analog. While these colors may be legal in HD, they won't be valid when down-converted to SD or NTSC. Or colors generated in RGB space may produce out of range colors in color difference space. This is especially easy in areas like graphics and camera control where RGB levels are readily manipulated.

Invalid colors can manifest themselves as washed out areas, color changes, striping, loss of color detail in an area of the picture, and loss of brilliance. In addition, analog transmitters will clip any signal levels that are too high, like those caused by invalid colors.

Illegal colors are those that fall outside of specified voltage levels in a particular format, and when this happens, a gamut violation occurs. Those colors that are out of range are said to be "out of gamut."

To avoid a run in with the "color police," it's a really good idea to monitor color signals on specialized displays that indicate when illegal and invalid colors occur. There are several tools to help with that task.

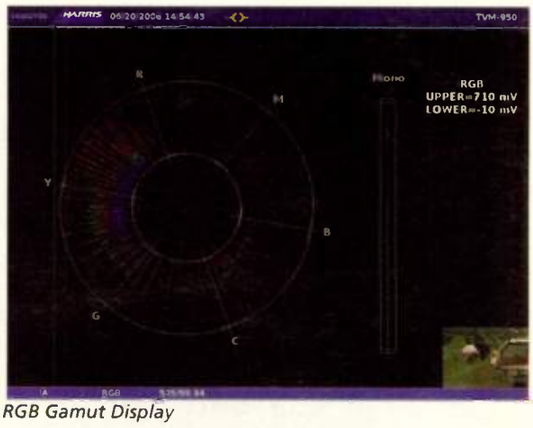
The Leader LV5700A rack-mount, LV5750 portable (both with internal displays), and LV7700 and LV7720 (rasterizers) all provide as standard the 5-Bar display for red, green, and blue color signals, plus Y and Y+C (luminance plus chrominance) signals. These bars resemble audio level meters, but here video levels are monitored. If levels are too high this is indicated by a change in color (red) on the bar display.

According to George Gonos, director, sales & marketing, for Leader Instruments, the scope includes modes where the 5-Bars display is seen side-by-side with a waveform display of Y, Cb, Cr as they are encoded from the stream. Three of the bars show the RGB equivalent levels. The Y bar represents the RGB levels converted to luminance using the SD formula. The Y+C bar is used to tell if any HD colors will be invalid in the composite area.

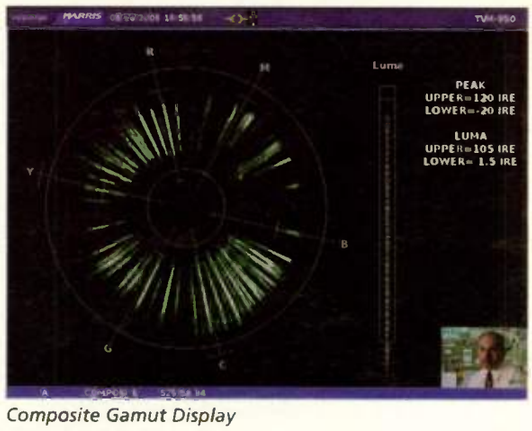
A helpful tool in camera setup is the DSC Labs ChromaDuMonde series of charts. Properly lit, the DSC color chips are at mid-saturation and produce levels of 560 and 280 mV digital (80 and 40 IRE analog).

The HD vectorscope used for camera setup with this type of chart should be taken out of the "CAL" or calibrated position and its gain should be set to 1.875. The camera controls are then adjusted so the color vectors terminate in their boxes on the display.

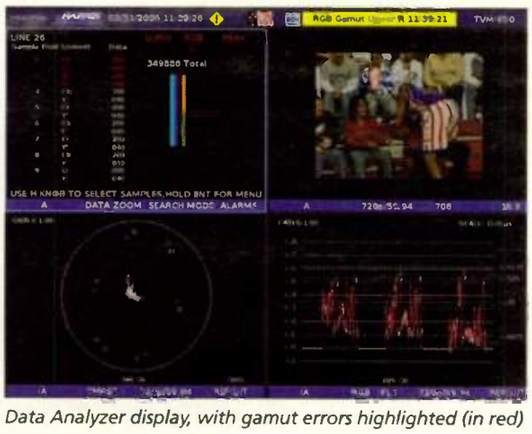
Once that's done, a DP or director can creatively deviate from the standard setting to create a warmer or cooler look by adjusting the color controls. Gonos said that many DPs, directors, and camera operators use the 5-bar display to help them get the exposure and look they want right in the camera, instead of trying to change things later in post, and also to keep them out of color trouble.



RGB Gamut Display



Composite Gamut Display



Data Analyzer display, with gamut errors highlighted (in red)

COLOR DISPLAYS

As Gonos point sout, an expert has a lot of control over the camera's performance. The more basic adjustments include lens flair (setting true black), color balancing the camera, and setting the toe and knee points. The more advanced settings involve the camera's color matrix and a read-through of the service manual, but allow DPs and directors greater control of color saturation and the "look" of the camera, Gonos said.

Tektronix developed color-related

HD TIPS, PAGE 14

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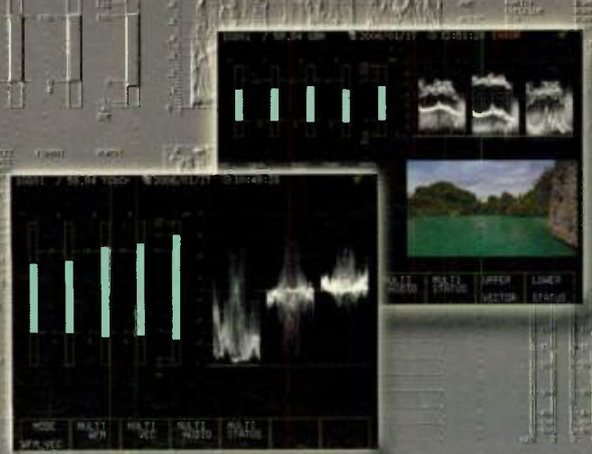

Professional film shooters use light meters to determine their best exposure. Professional HD shooters use Leader HD Test Monitors to maximize the working dynamic range of the camera, set exposure and ensure the recorded material meets client specifications. All with easy to read displays, quick preset controls and with excellent quality, reputation and field experience. See our web site at www.LeaderUSA.com for a quick commentary/explanation on Leader's new 5-BAR display; designed specifically for production and Q/A applications.

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SIGGRAPH Heads to Beantown

Annual CG/animation confab to combine ethics, cutting-edge tech

by Ken Freed

BOSTON

A fusion of art and technology along with ethical and legal issues in digital imaging will highlight the 33rd annual SIGGRAPH conference and exhibition, at the Boston Convention & Exhibition Center, July 30-August 3.

Attracting about 25,000 computer graphics and interactive media professionals from six continents along with 250 exhibitors, SIGGRAPH 2006 will feature technical and creative programs on video games, animation, video special effects, film, software, digital tools, research, computer science, and interactive technologies.

"This year we've put together a five-day experience that will be fully immersive," said John Finnegan, full conference chair for SIGGRAPH 2006 and associate professor of computer graphics technology at Purdue University in New Albany, Ind.

WORLD'S LARGEST

The digital art gallery, for instance, will host an extensive retrospective exhibition featuring the works of computer graphics and animation pioneer Charles A. Csuri, presented in tandem with the 2006 SIGGRAPH Computer Animation Festival, which will debut of the world's largest Etch-A-Sketch. The popular SIGGRAPH Sketches program, meanwhile, will offer 20-minute presentations on digital imaging innovations. The digital animation festival and Sketches program attracted record-breaking submissions this year.

"Bubble cosmos" by Masahiro Nakamura of the University of Tsukuba Kazuhito Shiratori in Japan, will be among the emerging technologies demonstrated at SIGGRAPH 2006.

Joe Rohde, executive designer and creative vice president for Walt Disney Imagineering will keynote the event on July 31. His speech, "From Myth to Mountain: Insights Into Virtual Placemaking," will explore Rohde's work as the lead designer of Disney's Animal Kingdom. He was the main creative force behind Expedition Everest, the virtual reality attraction that debuted this year.

Tackling what Finnegan called "the rough subjects" will be six panel discussions "that will not shy away from hard questions," he said.

Atop the list is a session on digital rights management (DRM), called "Digital Rights; Digital Restrictions." The Digital Millennium Copyright Act (DMCA) supports lawsuits against content piracy, but now companies are trying a more active approach. "Where is the line drawn?" asked Finnegan, "and who gets to draw it?"

"DRM technology raises serious concerns about user's rights and privacy," asserted panelist Karen Sandler, counsel at the Software Freedom Law Center in New York City, "Restricting purchasers from legitimate and legal use of media runs counter to creative expression. Additionally, DRM technologies attached to the digital graphics broadcasters use could prevent them from the 'fair use' of images, a right regularly exercised in the news and entertainment media today."

A related panel, "So You Want to Create Content," examines the latest copyright licensing schemes.

Those in the television industry will be especially interested in the technical sessions on such topics as video MPEG advances for on-air logo graphics and Web broadcasting. "SIGGRAPH is focused on the academic research and science behind the new products featured at the NAB show," Finnegan observed. "This is where you can find out how to make digital technology faster and smaller."

For more information on SIGGRAPH 2006, visit *www.siggraph.org*. ■

HD Tips

CONTINUED FROM PAGE 12

displays of its own. The Tektronix WFM7100, for example, provides Diamond, Split Diamond, Arrowhead, and Lightning, according to Mike Waidson, video test applications engineer at Tektronix.

The Diamond display is used to monitor the effects of creative adjustments, track gamut violations, and help users make color correction, gray scale tracking and black balance adjustments. The upper diamond displays the green and blue components, and the lower diamond the green and red. When a signal is out of gamut, the trace on the display is outside the boundaries of one or both of the diamonds.

The Split Diamond display just separates the two diamonds so that it's easier to see the black region, where, on the Diamond display, the two diamonds join.

The Arrowhead display is used to determine if a component signal is within gamut after it's been encoded to composite PAL or NTSC signal. This is done without actually encoding the component signal. This display plots luma on the vertical axis and the magnitude of the chroma subcarrier at each luma level on the horizontal axis.

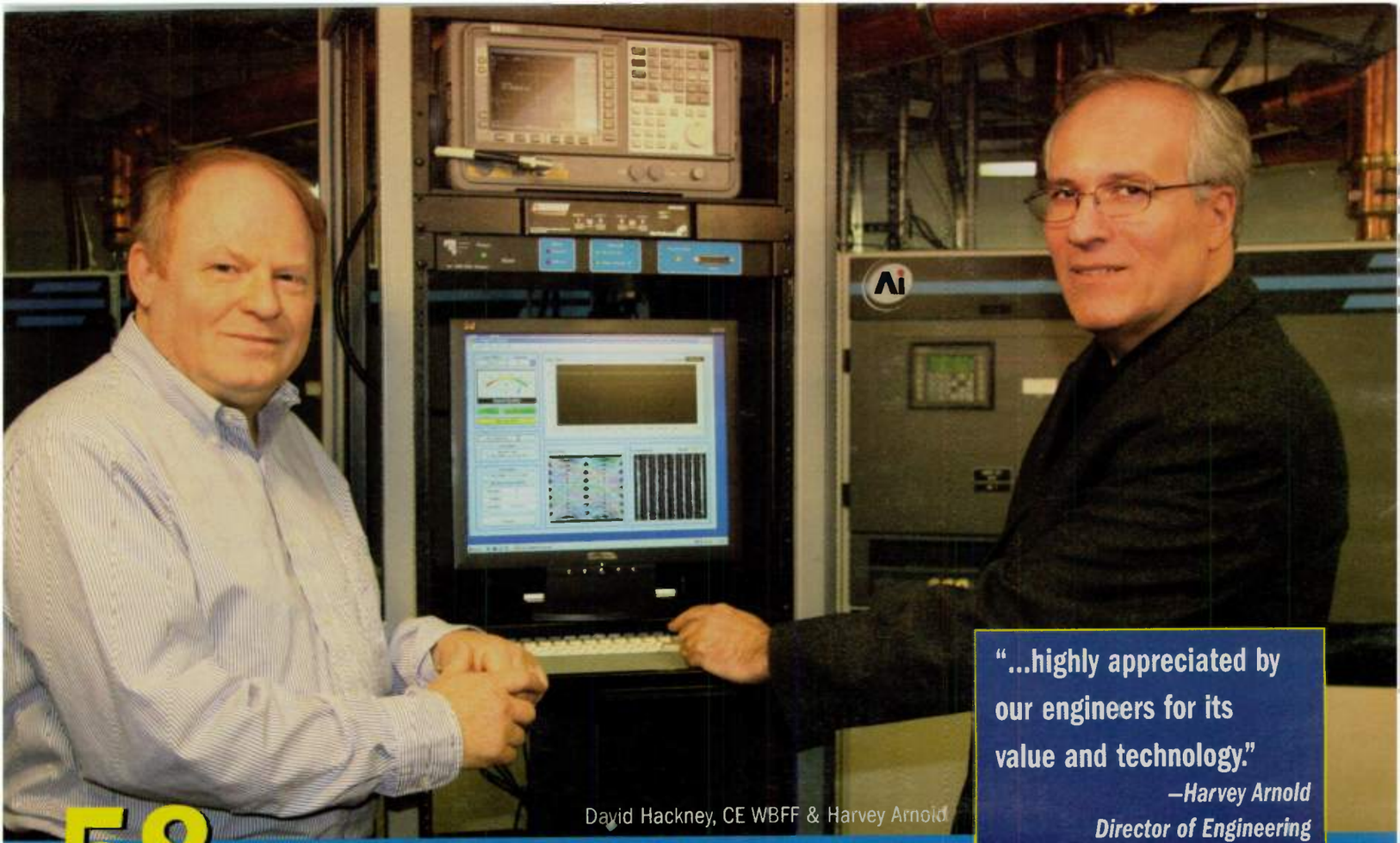
The Lightning display, which shows the luma and color difference components, is used to properly time the component signals together and to correctly set amplitudes.

The Videotek TVM-950 provides the company's Digital Gamut Display to check for out-of-gamut conditions. According to Mike Richardson, director of product technologies for Videotek at Harris, this display is a vector type of plot that maps color space information (based on luminance and chrominance sample values) into a circular diagram. In the composite gamut display, active video samples are converted to a representative composite value before being plotted (see screen captures on p. 12).

In the RGB Gamut display, the vector plot consists of three points, Y, Cb, and Cr sample values that are decoded into RGB values.

The graticule scales are two concentric circles that form a ring. These represent the upper and lower limits of acceptable levels. Inside the ring are legal values, outside the ring are not.

These various color-related displays can greatly help in understanding the intricacies of color space, and as an added bonus, aid in creating better pictures. ■



David Hackney, CE WBFF & Harvey Arnold

"...highly appreciated by our engineers for its value and technology."
–Harvey Arnold
Director of Engineering
Sinclair Broadcast Group

58 Sinclair Stations* Chose Our 8vsb Analyzer

After reviewing all the products that analyze **8vsb**, Sinclair chooses Modulation Sciences for ALL of its DTV Stations. The **msi-4400** is a full-featured, professional **8vsb** analysis tool at a very affordable price.

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–Joe Woody, Chief Engineer, WDKY, Lexington, KY

"The **msi-4400** allows me to monitor my DTV signal from any place on our Intranet. It's a great device."
–Bob Hardie, Chief Engineer, WTTA, Tampa, FL

"It was literally an 'eye-opening' experience to see our digital signal with the **msi-4400**."
–David Ostmo, Regional Engineering Director, SBG
Director of Engineering, KABB/KRRT
San Antonio, TX

"I enjoyed installing and learning all the functions. The **msi-4400** is a tool with many features and I'm glad to have them!"*–Steve Scott, KVWB/KFBT, Las Vegas, NV*

"The **msi-4400** provides us with all the measurements on one screen to fully confirm the correct operation of our DTV transmitters."
–Dan Carpenter, Regional Engineering Director, SBG
Director of Engineering, WSYX/WTTE
Columbus, OH

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IndyCar Fans Direct Traffic Online

WhiteBlox powers customizable interactive viewer

by Sanjay Talwani

INDIANAPOLIS

When Sam Hornish, Jr., passed Marco Andretti on the last lap of the Indianapolis 500, his victory—by just .0635 seconds, Indy's second-tightest ever—the finish was exciting even to folks who think racing is just driving in circles. But for serious fans, IndyCar's multi-camera Internet version of the race cranked it up a gear, offering views from Andretti's car, or one of five others, with a fleet of other features from polls to blogs to expanded stats.

The race on the Internet was fueled by technology from WhiteBlox, part of the privately held Continental Vista Broadcasting Group, based just north of Houston. The technology lets clients set up a multimedia interface—a player—customized with up to 40 pre-programmed interactive features called ToolBlox. These include chat rooms, VOD offerings, credit-card purchases, ticketing, software detection, and so on, enabling clients to build their own high-octane, branded, interactive universe.

"What we have been looking for is a way to take our content and make it available to interested parties in various ways," said Fred Nation, vice president of communications for the Indianapolis Motor Speedway. "WhiteBlox gave us the opportunity to take it to a level we had not achieved before."

"It's the bridge," said WhiteBlox CEO Greg Demetriades, referring to the long-sought TV-Internet fusion WhiteBlox creates.

SELF-AWARE MACHINES

Live sporting events already use multiple cameras, but generally only show one at a time. Why not give viewers access to that additional live content, the thinking goes, and why not let them pick their camera? And as broadcasters struggle to recapture some of the revenue and attention lost to new platforms, the technology promises new revenues from the most valuable viewers—those who will engage further with the programming, open up a second screen, pay more attention to ads, and use new features.

Using the WhiteBlox-enabled media player, Indy 500 fans could view racing action from six different driver's perspectives.

The ToolBlox are "self-aware smart blocks," said WhiteBlox CTO Serge Stein. The client only has to drag-and-drop the desired ToolBlox and the media player, PlayBlox, essentially builds itself. The client can put its own branding and style on the player so it looks like its own player, not WhiteBlox's.

"We make the broadcaster look like they're the ones doing all the hard work," said Stein.

And it doesn't even have to be a broadcaster; anyone with some media, or with a camera and a business plan, can rig the player to provide any number of products.

At the Indy 500 and other IndyCar races, the six in-car cams transmit their images to a helicopter above the speedway, which sends them back down to the production truck. From there the feeds go to HP servers with ViewCast capture cards and AMD encoding processors. A seventh video feed was delivered directly from the press center and appeared along side the six other video streams in the WhiteBlox Player.

The encoders can produce up to 16 streams apiece at a variety of bitrates and encoding schemes from two different live video sources and an unlimited number of pre-recorded sources. For the seven-screen Indy 500 production, the bitrate for each was held to 400 Kbps.

Indy used four of the encoders (plus a hot standby for backup) to produce the seven streams. Three of the two-processor encoders were each connected to a pair of the in-car cams, and the fourth was at the press center for that feed.

The full IndyCar player includes a schedule function, scrolling horizontally; a ticker; seven pictures linking to the seven cameras; a "tab paradigm" along the left, with tabs to features such as WhiteBlox's chat and poll functions; and, of course, there are interactive ads.

Users access the player from the IndyCar Web site. The start of programs is free, with a small payment required to continue. The WhiteBlox system includes accounting functions and flexible payment schemes, as well as digital rights management and geographic controls.

For the Indy 500, tens of thousands of people in all 50 states and 88 countries clicked in. To prevent an identical picture from running on television and the Internet—to avoid redundancy or to comply with a carriage agreement or regional blackout—the Web version of a camera view can switch to something else, such as an interactive ad, whenever that cam is the one on television.

TECHNOLOGY INNOVATOR

The player itself, PlayBlox, is built around Macromedia Flash and encapsulates whatever player the broadcaster chooses—Windows Media Player, RealPlayer or QuickTime, for example.

"Flash has become fairly sophisticated over the last two or three years," said Stein. "They've made significant advancements in the programming language behind the scenes, called ActionScript—it's a fully object-oriented environment now and it does a very good job of providing a highly dynamic and configurable user interface environment. So we take advantage of that by using that environment to dynamically construct players on the fly, based on the choices and selections that the broadcaster has made."

For Indy, the WhiteBlox experiment is just the latest in the speedway's long history of adapting to technology. The races began 90 years ago, and the Indy says its 500 is the world's best-attended single-day sporting event.

According to Nation, the race was first broadcast, on local television, in 1949. In the early 1960s, Indy experimented with live broadcasts to paying audiences in movie theaters, but the race wasn't broadcast on national television again until it began its long relationship with ABC in 1965 (the second oldest such relationship in sports, second only to CBS and The Masters). Even then, the broadcast was delayed, typically with highlights appearing on shows such as "ABC's Wide World of Sports." Live broadcasts of the race didn't start until 1986. A few years ago, Indy ran one season on the short-lived Yahoo! Platinum video Web service.

Nation said the 2006 project is more a technical test-run than a major revenue raiser. The small viewing fee, he said, is more to control traffic than to make money. Indy will take the lessons from 2006 and apply them in 2007 in a fast-moving technological, legal and financial landscape.

"Years ago, you made a TV rights agreement for three or five or six years and didn't think about it," Nation said. "Now, you think about it every day." ■

Senate

CONTINUED FROM PAGE 1

in small towns and big cities to have access to broadband."

Allen was joined by fellow Republicans John McCain of Arizona and John Sununu of New Hampshire; and Democrats Byron Dorgan of North Dakota, California's Barbara Boxer and John Kerry of Massachusetts in developing the WIN Act.

"Their bill... will allow innovators like Intel and Microsoft to use the spectrum from vacant TV channels to offer broadband throughout the country," said Ted Stevens (R-Alaska), Commerce Committee chairman. "They worked closely with NAB and others to address concerns raised about harmful interference. The committee report will include extensive report language to ensure that the FCC has proper guidance to prevent harmful interference."

The NAB was not completely ducky with the final language in the bill however. In a letter to Stevens and Co-Chairman Daniel Inouye (D-Hawaii), NAB Chief David Rehr cautioned senators about moving too fast.

"While the Senate legislation rightly seeks to mitigate interference through an FCC certification process, there remain many uncertainties with unlicensed device operation that could have very negative effects on consumers," Rehr said.

EVIDENCE OF INTERFERENCE

Evidence is mounting that unlicensed devices operating in television white spaces will interfere with DTV reception. According to tests done by Charles Rhodes, former chief scientist at the Advanced Television Test Center, energy from unlicensed transmitters bleeds into nearby TV channels. Rhodes, a columnist for **TV Technology**, wrote about some of his results in the June 28 issue. ("Can Broadcasting Survive Unlicensed Devices?")

The NAB reached similar conclusions in tests conducted on wireless FM modulators used to transmit MP3s, iPods or satellite radio through an in-dash car radio. Of 17 devices tested, 13 exceeded the FCC's allowable field strength; six by 2,000 percent and one by 20,000 percent. Several also exceeded the 200 kHz bandwidth allotment and had inadequate labeling.

"This study shows an existing problem with unlicensed devices in the radio spectrum and may foretell the state of things to come if we proceed too quickly on white space proposals," Rehr told the senators.

Rehr also notified FCC Chairman Kevin Martin of the FM modulator test results, but with an indirect reference to white spaces.

"It is particularly troublesome with regard to current deployment of new digital signals that consumers are just beginning to experience," he wrote.

Martin stands apart from the majority of regulators and lawmakers who want to cut unlicensed devices loose yesterday. He recognizes that broadcasters are still in the process of moving to their final digital channel assignments, many of which currently carry analog transmissions. Until those channels become available Feb. 17, 2009, the very location of white spaces is a moving target.

Martin's aides have said he would prefer to deal with unlicensed devices after the DTV transition is complete.

The bill in the Senate opens white spaces 270 days after the president signs it. David Donovan, head of the Association for Maximum Service Television said the bill should do more to protect DTV from interference.

"Significant research by the FCC and the TV industry took place before the FCC established rules for cellular radio, low power FM, MVDDS, and many other services," Donovan wrote in his own missive to Stevens and Inouye. "There is no reason to sidestep this deliberate, scientific approach. However, the legislation does just that—authorizing unlicensed devices to enter the band in 270 days, and then relying upon the FCC's certification process in the hope of avoiding interference."

Donovan also brought up the issue of FM demodulator interference.

"Millions of these devices are already in the hands of consumers, and it is impossible to reclaim or to turn them off," he said.

BILL BOONDOGGLES

If anything threatened to stall the telecom bill, it had to be network neutrality. Network neutrality legislation would prevent broadband providers like Verizon or Comcast from packet prioritizing, which could ultimately affect how fast a Web site loads. Google and Amazon have crusaded for network neutrality legislation, fearing hefty packet fees from the cable and telco companies.

Network neutrality opponents, chiefly Republicans, say let the multibillion dollar conglomerates duke it out. Proponents say such a battle will change the Internet as consumers know it by allowing cable and telco companies to manipulate what consumers can ultimately access.

The Republicans hadn't budged from their opposition when markup began. Sen. George Allen (R-Va.) called his side of the table "the freedom corner" because they view net neutrality as Internet regulation.

Sen. Olympia Snowe (R-Maine) split with the freedom corner, however, and joined Dorgan to press for stronger network neutrality language in the telecom package.

In all, 213 amendments were filed on the bill. About a dozen or so were dispensed within the first two-hour markup session. ■

BAS Update

Preparing Your Quote Package

More advice on dotting the i's and crossing the t's

by Michael Degitz
Vice-President, Sprint Nextel, Global Development and Spectrum Management

The Sprint Nextel 2 GHz Relocation Team

RESTON, VA

At NAB2006 in April, we were pleased to see broadcasters and vendors engaged in 2 GHz relocation activities. Indeed, high participation in initial planning activities indicates as much. We've had good attendance at our relocation kickoff meetings across the country and have only a few left to go.

As of mid-June, 743 inventories have been submitted and 446 inventories have been verified. However, despite this progress, a greater number of quote packages and signed frequency relocation agreements (FRA) need to start coming in to Sprint Nextel. It bears reminding that all parties must comply with the FCC's requirement to complete the 2 GHz relocation by next year and Sprint Nextel needs the collaboration of Broadcast Auxiliary Services (BAS) licensees to move the project forward.

In April, I shared a few tips on preventing common errors in quote packages. In this column, I'd like to share a few more thoughts on that topic.

TIPS ON QUOTE PACKAGES

For broadcasters with MRC Broadcast quotes, MRC quotes must be final, meaning not marked "PRELIMINARY," in order to be included with the complete quote package. This is not Sprint Nextel being picky (as one broadcaster told me at NAB), but rather an MRC requirement in order to ensure accuracy of quotes.

Quotes must be for a valid timeframe. Most equipment manufacturers and some service providers are already setting a longer duration than normal on quotes (or setting the quote valid for the duration of the 2 GHz project). You must ensure all quotes, but especially your service integration quotes, are valid for at least 120 days. If a quote has expired, the station (or Sprint Nextel) will need to get either a requote from the vendor or an e-mail from the vendor indicating that they will still honor the quote.

When creating internal labor estimates, a code can be used in place of an employee name to hide sensitive human resource information (name and/or salary). For example, a broadcaster can choose to replace all employee names on the estimate with a unique 5-digit code for each employee. This 5-digit code must be retained at the broadcaster location for the duration of the project and available in the event of an audit (Sprint Nextel suggests through December 2008). See the Broadcaster Information Guide ("BIG"), Section III, under Internal Labor, for more information.

Anticipated external legal expenses require quotes with the same level of detail as system integration and engineering quotes. For example, license modification (submission or review) FRA review, tax advice, negotiations with Sprint Nextel and related travel expenses all need to be itemized with employee or position, tasks, billing rate and hours anticipated or itemized estimated travel expense.

QUOTE, PAGE 23

As of mid-June, 743 inventories have been submitted and 446 inventories have been verified. However, despite this progress, a greater number of quote packages and signed frequency relocation agreements need to start coming in to Sprint Nextel.

2GHz Relocation Packages

Troll Systems has your BAS solution all wrapped up.

> Ground Control & Communications
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TouchStar™ Master Controller- with SpecTroll Viewer- an 800 MHz real-time Spectrum Monitor

Relocating to a new frequency doesn't need to be stressful. At Troll Systems, getting you to your destination on-time and intact is our highest priority.

A worldwide leader in airborne and ground microwave control and communication systems, Troll is committed to helping your station make a smooth transition. Within an evolving 2GHz and digital HD landscape, Troll configures your current remote sites to take advantage of new and existing devices while simplifying the implementation of pending FCC regulations and/or future technologies.

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With Troll, your new 2GHz location will be HD ready, infinitely expandable and highly intuitive to operate. For almost 20 years, Troll has delivered continuous broadcast innovation. Our ground systems feature unique options like real-time spectrum monitoring at 800MHz, pre IF filtering and AGC. Our award winning TrollCam HD™ features a fully-sealed enclosure to protect expensive components from environmental hazards. In the air, our proprietary AZ + EL steerable antenna increases RF range and accuracy while minimizing the effects of multi-path.

So, if you're planning to upgrade your system or make the BAS move, call the relocation experts at Troll Systems. We'll get you where you're going with remarkable ease.

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TROLL SYSTEMS

BAS Update

The Clock is Ticking...

Discussing BAS relocation progress with Sprint Nextel

L to R: Pat Hughes, R.J. Russell, Cindy Hutter Cavell, Tim O'Regan

by Craig Johnston

RESTON, VA.

The FCC's mandated 2 GHz relocation of Broadcast Auxiliary Spectrum is relentlessly counting down to the Sept. 7, 2007 conversion date. As of mid-June, one market, Yuma, Ariz., has all qualifying stations, and one large group, ABC stations, signed on the dotted line with Sprint Nextel.

For a status report, TV Technology's Craig Johnston caught up with Sprint Nextel officials Cindy Hutter-Cavell, director of broadcast engineering for the relocation project; Pat Hughes, senior spectrum resource manager for the Northeast region; R.J. Russell, the West region broadcast engineer; and Tim O'Regan, Sprint Nextel spokesman.

TV TECHNOLOGY: Sprint Nextel has done kickoff meetings for all the really large markets. What kind of reception are you getting from broadcasters?

PAT HUGHES: We started kicking off markets back in April of 05, and the response at that point was a lot of curiosity, a lot of interest in understanding how this project was to be accomplished because there was not a great level of understanding or industry sense of what the steps of the processes were.

So we met with the licensees in the greater New York DMA, and the enthusiasm was good. I would say that everyone was trying to understand how this was going to meld into their other processes and priorities and such. [As we met with other markets over the next six months,] people became pretty knowledgeable in the industry. Questions that we were getting in the early stages seemed to be not as present in the markets we were launching later, because people were talking and sharing information and the information was becoming pretty well known.

Enthusiasm was higher in the smaller markets because originally they weren't going to get included in the MSS decision that the FCC had, so anything below market 30 there was question as to whether they were going to get accommodated or not. Under this project they certainly would be accommodated, so they were pretty thrilled about that.

TV TECHNOLOGY: What about the other questions you're still getting? Are there questions they still need answered?

PAT HUGHES: From a business side I think information is pretty well distributed and in place. I think they understand the eligibility issues and the qualification issues, so at this stage with launches, I think that the knowns are pretty well distributed out there as far as the business aspects of the project.

RJ RUSSELL: And from the technical standpoint I would say it's pretty much the same. We were getting a lot of questions the first few months, but as we've done more and more of this, the sister stations and the corporate groups are sharing a lot of information among the stations, and the questions have kind of died down. The only one that I still see on a fairly routine basis—and a lot of it is because I cover the West Region, where we have a lot of wide-open terrain, where we have some really long fixed-lengths—[is] the question about moving out of band. They want to make sure that that's a viable option. A lot of stations that have these super-long fixed links are looking at this as an opportunity for getting out of the two-gig band with their fixed links, especially as this is getting more and more congested for news operations.

CINDY HUTTER CAVELL: They provide us with quotations as if they were going to replace their two-gig stuff with two-gig stuff, and that provides the basis for their budget. And they can go out and buy other bands, whether it's seven or 13, or even if they want to migrate to fiber, they can do that. And we will reimburse them up to the level of what we would have spent on them, had we been replacing their two-gig gear with two-gig gear.

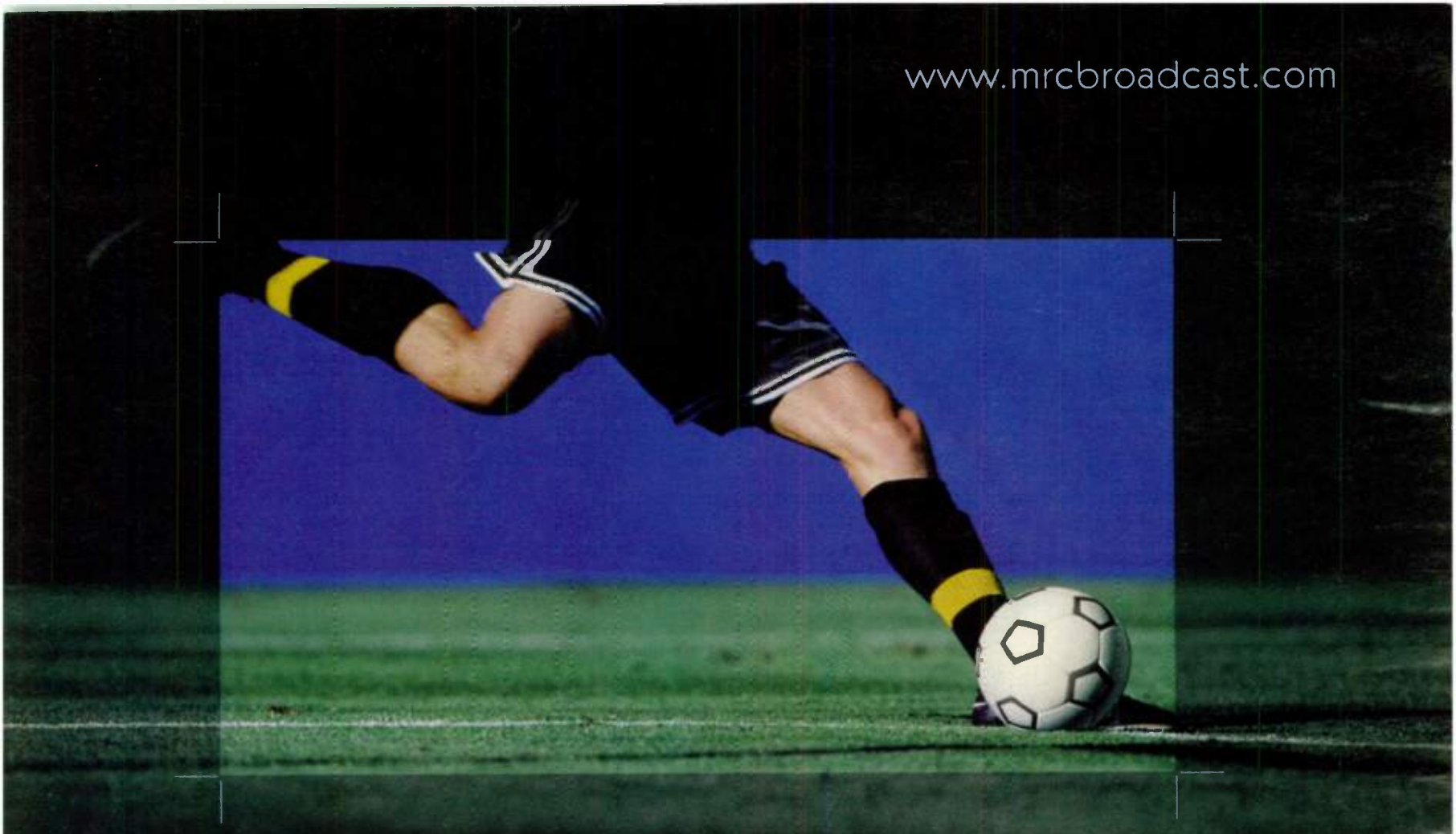
The upside for the stations, if they replace it with two-gig gear, they don't have to shell out the money and get reimbursed. If they want to buy seven-gig gear or 13-gig gear or fiber equipment, they have to shoulder the cost up front and then we'll pay them back.

TV TECHNOLOGY: What are the one or two recurring questions that keep coming up. We talked about out-of-band, are there any others?

PAT HUGHES: Well from my standpoint, the business aspects, making sure that they understand those portions of the costs and expenses that Sprint Nextel is directly paying for, versus, again as Cindy mentioned, that they will pay for and then we'll reimburse them, which tend to be more third-party service costs or integration work, in some cases ancillary hardware, and certainly their own internal labor costs. And the area that probably is the most unusual process for them is coming up with what's called a 'soft cost budget;' what their costs are likely to be through the duration of the project.

CLOCK, PAGE 22

www.mrcbroadcast.com



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MICROWAVE RADIO COMMUNICATIONS

2 GHz BAS Relocation

Clock

CONTINUED FROM PAGE 20

TV TECHNOLOGY: Now that you've got a pretty good sampling of equipment inventories, are they what you thought they'd be? Are they more? Are they less?

RJ RUSSELL: From a technical standpoint, and from having worked in the industry, I think they were. I've worked everywhere from market 2 to market 174, and I've seen a pretty wide array of stations and makeup of stations, and I think the equipment inventories were pretty much what we expected.

CINDY HUTTER CAVELL: We're doing some reconciliation now on some preliminary numbers that we based the project dollar figures on, versus what we're seeing as actuals coming in. And since I did original estimates, there isn't anybody more surprised than I am that they're actually working out. (laughs) The estimates were incredibly close, closer than I could have imagined.

TV TECHNOLOGY: Is it that some of them are higher and some are lower, but somehow the tune that comes out at the end is fine?

CINDY HUTTER CAVELL: Most of them are pretty well quite on. We underestimated a few markets, we overestimated a few markets, but most of the markets, even the very large ones we hit pretty close on.

TV TECHNOLOGY: Around NAB time, Sprint Nextel announced an agreement with ABC for all their stations. Has this provided any momentum for the other groups?

PAT HUGHES: Well, the other groups are probably better off to answer that question themselves. We're seeing the activity pick up, there's certainly a high awareness in the industry of ABC's confirmation. My sense is that it's only helped bring into focus the importance of the project, and get other groups to expedite their activities as well.

TIM O'REGAN: Absolutely, that's one of the reasons we made the announcement: We wanted to show the progress in the group agreements, that these can get done and can get done successfully. As of mid-June, we have not signed additional group agreements. We have been negotiating with a number of groups and we're making progress, and we're anticipating in the near-term to announce more.

> **As of mid-June, we have not signed additional group agreements. We have been negotiating with a number of groups and we're making progress.**
>
> **—Tim O'Regan, Sprint Nextel**

TV TECHNOLOGY: From the time you get a quote package in, how long does it take to get the verification and so forth?

CINDY HUTTER CAVELL: Between the time the station hands one of the deal managers absolutely all of their quotes, including their internal costs, gets approved by everybody it's got to be approved by, goes back to the TV station, TV station signs it, comes back to us for final signature, is somewhere in the 60-day neighborhood.

TV TECHNOLOGY: But there's no downside to doing the inventory and submitting it, even if you don't have a group deal done?

CINDY HUTTER CAVELL: There's no downside to doing anything, up to and including getting the quote package in, if the group deal's not finished. Because once the group deal is finished, you're pre-loaded and ready to rock and roll. And that's what we prefer.

TV TECHNOLOGY: In closing, is there any message you want to send to the broadcasters that we haven't covered so far?

CINDY HUTTER CAVELL: Get those quote packages done…

PAT HUGHES: And turn them in, because many stations have them ready, but they haven't been given the green light by their company yet to submit them. ■

Quote

CONTINUED FROM PAGE 18

FOLLOWING UP

When completing your internal labor estimates, remember to add in the hours for activities beyond installation, including:

Michael Degitz

Training: We estimate that each engineer will require six hours for the SignaSys-provided market-level training and each operator will require two hours for in-station training.

Relocation Weekend: Depending on your station size there could be a considerable amount of work to complete. Please use our "Relocation Weekend: Sprint Nextel's Perspectives" presentation given at NAB as a starting point for anticipated tasks in order to estimate the workload during relocation weekend. This presentation can be found at *www.2ghzrelocation.com/plugin/template/broadcast1/538* (third item on the list).

Post-Relocation Weekend Activities: In addition to shipping back the retired radios and power amplifiers to the Sprint Nextel warehouse, keep in mind your relocation activities may include removal of old equipment from central receive sites and filter installation.

Follow a general rule of thumb for all quotes: If it doesn't look reasonable to you, don't accept the quote. I was told by another broadcaster at NAB, "I received a quote and it was outrageous. It was double the amount for the exact same work I did last year with this same company." In the end, broadcasters are responsible for providing reasonable quotes to Sprint Nextel and we rely on you to help determine what are reasonable quotes.

Finally, broadcasters will be responsible for verifying the hours invoiced by the service providers. Whether legal work, tower climbing, equipment installation or integration, you must be able to document the actual number of hours worked for any particular activity.

Remember that your prime resource for more information on these issues and others is the Broadcaster Information Guide ("BIG") which your Sprint Nextel Regional team member has provided to you. If you do not have a copy, please visit *www.2GHzRelocation.com*. ■

Follow a general rule of thumb for all quotes: If it doesn't look reasonable to you, don't accept the quote.

Choices Abound for Spectrum Monitoring

Vendors' options range from built-in monitoring to third-party features

by Craig Johnston

SEATTLE

It was not immediately clear whether spectrum monitors were in Sprint Nextel's original plans to replace broadcasters' 2 GHz analog microwave equipment with digital gear in return for some of the Broadcast Auxiliary Spectrum (BAS) used by stations for ENG and other purposes.

But the realities of D-ENG require spectrum monitors for receive sites, and Sprint Nextel clarified there was a $3,500 spectrum monitoring allowance per receive site. (See "Spectrum Monitoring Takes Many Forms," p. 25)

Microwave radio manufacturers, remote control system vendors and test equipment makers have offered a bevy of spectrum monitor options. The differences among them are principally where in the signal path the monitoring is done, and whether monitoring is built into the receiver itself, into the remote control system, or is done by a third-party piece of test equipment.

Spectrum can be monitored between the antenna and the receiver at 2 GHz by installing a directional coupler. At this point the signal is unprocessed, giving a clear view of it, but the signal fed to test equipment out of the directional coupler can be low, and the testing device must then be manually centered on the channel being tuned by the receiver.

Sampling the downconverted signal from within the receiver, at one of the intermediate frequencies (IF), gives the user the advantage of having a monitor that is already looking at the frequency tuned by the receiver. The first IF is usually in the 800 MHz neighborhood, the second around 70 MHz.

"Until recently, the one place you could easily sample the RF spectrum was the second IF," said David Otey, engineering manager for SignaHelp, the training arm of system integrator SignaSys that has been hired to do operator training for qualified BAS transition stations.

"But there's some disadvantages to looking at the spectrum that far down in the processing of the receiver. It turns out that there are some operational advantages to looking at the first IF."

David Otey, engineering manager for SignaHelp

> "Until recently, the one place you could easily sample the RF spectrum was the second IF."
> —David Otey, SignaHelp

Regardless of the point in the signal path the spectrum is sampled or which device does the sampling, it must be done at the receive site, which is usually located some distance from the receive operator's console. This requires that the spectrum monitor be located at the receive site, its

MONITORING, PAGE 26

BAS Update

Spectrum Monitoring Takes Many Forms

TV Technology talked with six microwave radio makers, two remote control system manufacturers and three test equipment vendors about their strategies for spectrum monitoring:

MICROWAVE RADIOS

Broadcast Microwave Services

The BMS' DeCoder II receiver does not offer a spectrum monitor as an option. It offers outputs at the first and second IFs. The first IF output is ahead of the automatic gain control circuit.

BMS DeCoder II

Global Microwave Systems

Global's Messenger Smart Receiver has taps that allow external spectrum monitors to sample at IF frequencies, and the company markets its own Messenger Spectral Monitor which can be used for that purpose.

Global's Messenger Smart Receiver

Microwave Radio Communications

MRC's CodeRunner receiver products do not have built-in spectrum monitors but offer a tap to the first IF. The company has partnered with Troll Systems for a spectrum monitor solution. External spectrum monitors can also use that tap.

Moseley HD220RS

Moseley Broadcast

Moseley offers a built-in spectrum monitor in its HD 2200RS receiver that monitors at 2 GHz. It also has an IF output at 140MHz that can be monitored by a third-party spectrum monitor.

Nucomm ChannelMaster

Nucomm

Nucomm offers a spectrum monitor, which samples at the first IF, as an option for its CR6D rack mounted receiver, for its portable ChannelMaster RX1 receiver and its Newscoder RX3 demodulator, sampling the 1st IF around 800MHz. On the CR6D it offers a 70 MHz output for a third party spectrum monitor.

RF Central RFX-RMR

RF Central

RF Central offers a spectrum monitor for its RFX-RMR central receiver, sampling at 2 GHz. It can interface via IP over the Internet or other network, via USB, and via a com port, either RS232 or RS45, and is working to interface with the NSI remote control system. For external spectrum monitors it offers a 70 MHz output and can supply one for its first IF as well, between 600 and 700 MHz.

REMOTE CONTROL SYSTEMS

N Systems

NSI's MC5 PC-based remote control system is designed to take an RS232 data feed from external spectrum monitors that are either built-in to microwave receivers or stand-alone. It currently interfaces with LP and AVCOM of VA, and is working with other such equipment suppliers. The spectrum monitor display appears as a window on N Systems' control screen.

Troll Systems

Troll has three options for spectrum monitoring. It offers its own built-in spectrum monitor which samples at the first IF and displays on Troll's control screen. Troll and Nucomm have arranged to have Troll's spectrum monitor built-into the Nucomm receiver, to be displayed on Troll's control screen. And it can take the RS232 feed from other spectrum monitors, transport it back to the studio, and display it either on Troll's control screen or on a separate monitor.

SPECTRUM MONITORS

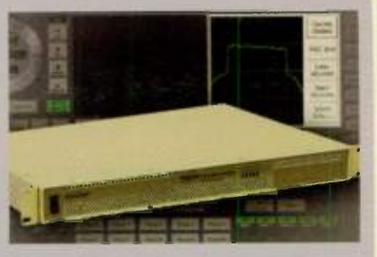
AVCOM of Virginia

AVCOM's RSA-1100AS remote spectrum monitor can sample at the first and second IFs as well as at 2 GHz by offering a range from one to 1,100MHz. It is designed to interface with the N Systems remote control unit for both remote operation and display at the studio.

LP Technologies LPT-3000

LP Technologies

LP's LPT-3000R 3.0 GHz Remote Spectrum Analyzer can sample at the first and second IFs as well as at 2 GHz by offering a range from 9 kHz to 3 GHz. It interfaces with the N Systems remote control system, allowing control of the monitor and display of its output at the studio.



Morrow Technologies VC70/800B

Morrow Technologies

Morrow's VC70/800B ENG spectrum monitoring system samples at either the first or second IF, and can be controlled and displayed at the studio via IP, as a 4800 baud or faster modem, RS232 or FireWire.

Monitoring

CONTINUED FROM PAGE 24

data transported back to the operator's console and displayed there.

If the test equipment is located within the remote control system, its data is multiplexed with the control signals and displayed on the remote control monitor.

Remote control system manufacturers have also made accommodations to bring spectrum monitor data from other devices back via serial data ports on both ends of the remote control equipment, and even to display the spectrum monitor trace on the remote control system's operator screen.

Certain radio makers and test equipment companies have also built networking and modem devices into their equipment to transport spectrum monitor data back to the studio.

Among the problems an operator can determine from a spectrum monitor display are a weak signal caused by antenna misalignment or low transmit power, excessive sideband regrowth or signal frequency offset.

Receiver makers **TV Technology** spoke with about spectrum monitoring pointed out that the device is best used in conjunction with link quality reading displayed by the receiver itself. Each manufacturer has its own proprietary method of determining link quality, which display as a number, others as a bar chart.

The central receive operator can determine from the spectrum monitor, for example, that another signal has begun being transmitted on an an adjacent channel, but the spectrum monitor does not indicate whether it is interfering. A quick check of the link quality tells a more complete story: If the link quality has dropped, the operator may want to add filtering or take other measures to reduce the interference.

Likewise, an operator finding that the link quality reading is dropping may have no idea what the problem causing it is. By checking the spectrum monitor, he may find a new signal has begun being transmitted on an adjacent channel.

In digital-ENG, the advantage of being able to evaluate the link quality and spectrum monitor readings is that problems can be solved before there is any degradation of the video or audio itself. And it's critical that action be taken when these metrics degrade to a considerable extent, because the disadvantage of digital-ENG is that when the audio or video fails, it fails completely. ■

What Are You Eligible For?

Sprint Nextel considers spectrum monitoring solutions a requirement for comparable facilities and thus eligible for inclusion in the Broadcaster's relocation compensation. Generally, Sprint Nextel has set a not-to-exceed cap on spectrum monitoring solutions of $3,500 per receive site, but there are permutations to this guideline. Examples cited on the 2 GHz relocation Web site (*www.2Ghzrelocation.com*) include:

Scenario 1: A station has one receiver at a receive site and one link to backhaul it to the station. Station receives $3,500 for the spectrum monitor for that receiver and a $1,000 software/monitor allowance for the whole system (assuming that this is not the only receive site).

Scenario 2: A station has two receivers at a receive site and one link to backhaul them to the station. Currently, they use a video switcher to switch between the outputs of the two receivers. Station receives: $3,500 for a spectrum monitor, a $1,000 allowance to switch the IF outputs from the receiver into the spectrum monitor, and a $1000 software/monitor allowance for the whole system. The $1,000 allowance for the switch can't be applied to anything else, and it's to be applied to any switching arrangement desired whether it's an in-house built station solution or a commercial product.

Scenario 3: A station has two receivers at a receive site and two links to get them both back to the station. Station receives: 2 x $3500 for two spectrum viewers—one for each backhaul since the station is used to looking at both receivers simultaneously, and a $1000 software monitor allowance for the whole system.

Any other scenarios are combinations of the three scenarios. For example, a station that had three receivers and 2 backhauls at a receive site would combine Scenario 1 and Scenario 2 above.

(Reprinted from Sprint Nextel's 2 GHz Relocation Broadcasters Instruction Guide)

Technology Takes Center Stage at C4-Sports

For the sports broadcast and production community, the explosion in new distribution mediums brings with it new opportunities as well as new challenges. Sports programming on the big and little screen has never been more popular, but how can broadcasters take advantage of this ever-expanding market? Organizers of the new C4-Sports Technology Conference and Exposition, taking place at the Las Vegas Convention Center, July 17-19 hope to provide some of the answers.

"Sports today relies on technology not only to improve the performance of the athlete, team or orgnization, but also to greatly enhance the experience of fans, whereever and however they're watching a sporting event," said Gene Sanders, C4-Sports general manager and event concept developer. "In the age of 'new media,' teams, sports organizations, leagues and broadcast rights holders are using a large variety of platforms to distribute sports content.

"Fans want their sports information in the stadium and car, on the phone and computer, and advertisers want to reach this fan base with their product messages. We've created C4-Sports to be the first event dedicated to the technology used to create, manage and deliver these assets via traditional broadcast, at large venues, through fiber, cable and wireless networks. Until now, this audience would have to go to a variety of shows to get information on their content options, and were often competing with masses of people for education and technology demonstrations. We have flipped the show format to make the sports community our hub, and the ways they use content our spokes." ■

Slam Dunk

NBA Entertainment tells all at C4-Sports

Ken Adelson, NBA Entertainment's senior vice president of production operations and planning

Q&A

by Robin Berger

LAS VEGAS

On Tuesday, July 18, Ken Adelson will demonstrate the National Basketball Association's multimedia production, distribution and archive strategy in his C4-Sports keynote speech, "The Challenges of Capturing, Editing, Distribution and Storage of Sports Media." Ken's presentation will outline the end-to-end process of managing, storing, sharing, and delivering sports media to multiple distribution outlets—all on the digital platform.

Adelson, NBA Entertainment's senior vice president of production operations and planning, was instrumental in building this new digital platform. The platform features Silicon Graphics' InfiniteStorage solution, an expandable system with an initial capacity of 36 terabytes, that is integrated with NBAE's digital editing, network and logging system to provide and easily access a powerful data warehouse. SGI's solution architect, Bill Buhro, will also be at the conference to supply how-to details. TV Technology caught up with Ken recently to discuss his upcoming keynote.

TV TECHNOLOGY: How did you get chosen as a keynote speaker?

ADELSON: I've known Ben Kozuch for many years. His training facility trained our editors in nonlinear editing—at least 10 years ago—when we first went to nonlinear.

He contacted us when they were formulating the concept for C4, told us about what they were attempting to put together. It sounded incredibly right on—for the industry, for the timing—to bring the whole sports-business-technology-content

SLAM DUNK, PAGE 29

Slam Dunk

CONTINUED FROM PAGE 27

world together.

There are better and less expensive ways to create content [and] more ways to reach people. You want to preserve your assets—to have a source where you store [and retrieve] them.

TV TECHNOLOGY: How does NBA Entertainment's platform do this?

ADELSON: SGI is building us a system for capturing footage and data; storing it; [enabling it to be used] for internal viewing, both in low resolution for rough cutting and viewing purposes and in high resolution for actual broadcast production; and storing the [finished] material. They're our partner to develop the end-to-end system. We're using other vendors with their own specialties also—no one company has all the pieces.

TV TECHNOLOGY: What's the timeline for the platform?

ADELSON: We started almost two years ago and we are using the system online to produce our footage, to log, to encode. Right now we're [also] finishing the piece to actually store it in a digital format, to put the material onto an LTO-3 tape.

StorageTek SL8500 is the name of the robotic system that we've partnered with, using SGI's input. There'll be a huge robot with the capability to hold hundreds and hundreds of thousands of hours of material on computer data tape that can handle high resolution and high definition video.

These [LTO-3] tapes can actually hold approximately 16-20 hours of footage [versus about 90-120 minutes for digiBeta tapes]. DigiBeta tapes have a shelf life of approximately 15 years; the estimation for (LTO-3) tapes [by their manufacturers] is 40 to 50 years—and [archives] are in a digital form.

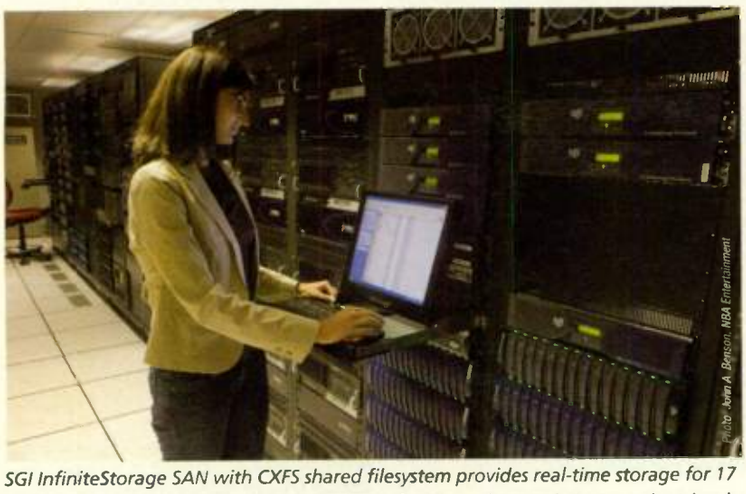
TV TECHNOLOGY: What are the other pieces in the puzzle?

ADELSON: Other main vendors are Snell & Wilcox [Asteroid SD/HD MPEG-2 MXF encoders], Pinnacle [Liquid Blue 6.1 nonlinear editing system] and Virage [retrieval]—it's a Virage system but we've done some customization [to the NBA database categories]. The logging system we built ourselves.

The encoding is SGI—SGI is the one pulling all the pieces together, with our engineers, to make them all talk to each other, make the footage flow from one point to another. You've got a system [that lets you] look at all the material virtually on a real—time basis. Hours after a game is logged we can locate it online, repurpose it for *www.nba.com*, and edit post-production material.

Right now it can hold hundreds of thousands of hours of tape, data and photos—all media—but it's expandable as we grow.

Ultimately we're the archivists—the Library of Congress—for the NBA: Our primary mission is to preserve the assets.



SGI InfiniteStorage SAN with CXFS shared filesystem provides real-time storage for 17 online Pinnacle Liquid Blue NLEs and storage for Virage low-res browse and retrieval.

On the set of "NBA Insider"

TV TECHNOLOGY: Could you describe the system NBAE created?

ADELSON: We developed an entire, very defined, category-based retrieval system. Everything is logged live [using] the NBA's statistical system—categories such as shots, free throws, fouls, coach reactions, hero shots, cutaways—every facet of a game that you could think about. We'll be showing this out there [at C4-Sports]: how the system is broken down in the logging process. The retrieval process then mirrors that: You go into the database and (can request) Dwayne Wade in a home uniform making a slam—dunk against Dallas. It will respond with those clips and descriptions.

TV TECHNOLOGY: What do you want attendees of C4-Sports to get from your speech?

ADELSON: A lot of the people out there—including the some of the bigger players—are still formulating their own plans. For people to hear how we've begun to handle a huge amount of content—to keep it in pristine condition through the years and be able to access it—might spur ideas for others, as far as how they're going to handle their own situation.

I'm not focusing on any one vendor or one piece of the puzzle—it's how does this chain work and also how are we distributing: I'm going to talk about our Web site, iPod and wireless distribution.

When you build the core engine, you can maximize these different methods of distribution. But you've got to have the material in a position where you can use these new tools. We're trying to use it for production, for the Internet, for distribution.

But ultimately we're the archivists—the Library of Congress—for the NBA: Our primary mission is to preserve the assets. Everything else works from that as far as getting the materials out to the world.

TV TECHNOLOGY: And what do you hope to get out of C4-Sports?

ADELSON: I want to see what others are doing and how they're dealing with the same scenarios. ■

Special software, called "SGI Mass Storage Engine," added to the SAN, allows producers to retrieve specified clips from entire games.

615 Music Booth #2401
615 Music is a world leader in production music, especially in sports. Its music libraries feature 300 CDs and are available for digital download. Its custom division has composed original themes for ABC Sports, Chicago Bulls, L. A. Lakers, Boston Red Sox, and other professional sports teams.
Randy Wachtler, President
E-mail: *info@615music.com*
Web site: *www.615music.com*

Anton/Bauer Inc. Booth #1817
Anton/Bauer products include Gold Mount batteries, featuring exclusive InterActive RealTime on-board fuel gauge with remaining operating time display, and super-lightweight compact shoulder support for mini-DV cameras.
Joe Teodosio, Manager, Customer Support Group
E-mail: *websales@antonbauer.com*
Web site: *www.antonbauer.com*

ATA Audio Inc. Booth #1624
ATA Audio manufactures IP, POTS, ISDN, GSM, INMARSAT audio codecs. Codecs include the Portanet, a four-input audio codec designed for IP applications.
Alvin Sookoo, President
E-mail: *sales@ataaudio.com*
Web site: *www.ataaudio.com*

Autoscript Booth #1816
Autoscript is a maker of innovative teleprompting systems. Every Autoscript prompter is designed by users, serviced and supported by prompting experts.
Michael Accardi, President
E-mail: *m.accardi@autoscript.tv*
Web site: *www.autoscript.tv*

Avid Technology Inc. Booth #1603
Avid On-Air Graphics solutions are designed for mission-critical live to air environments including small to large venue remote sports events. Avid Deko real-time graphics system is engineered for SD and HD broadcasts that depend on speed to air and ease-of-use.
Danielle Antonacci, Broadcast Field Marketing Manager
E-mail: *Danielle_Antonacci@Avid.com*
Web site: *www.avid.com/broadcast*

Azden Corp. Booth #1423
Azden Corp. manufactures a complete line of wireless microphone systems, wireless powered speakers, shotgun microphones and portable mixers for all types of audio applications.
Wayne Alonso, Vice President of Sales
E-mail: *walonso@azdencorp.com*
Web site: *www.azdencorp.com*

B&H Photo Video Pro Audio Booth #1401
B&H is a leading supplier with over 250,000 different professional imaging products in its available inventory, including cameras from the "point and shoot" level, to the broadcast level and beyond.
Jim MacFadden
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Web site: *www.bhphotovideo.com*

BigFoot Mobile Carts Booth #1428
BigFoot Mobile Carts, originally designed for the NFL, can prove to be your personal production station. The company can customize the style and interior features of BigFoot to fit any application.
Doug Solis
E-mail: *doug@vtrspecialists.com*
Web site: *www.vtrspecialists.com*

Boeckeler Instruments Inc. Booth #2002
Boeckeler Instruments is a leading manufacturer of video annotation products. Boeckeler's Pointmaker Video Markers give presenters the power to draw on video images to emphasize key points or details.
Sean Smiley, National Sales Manager
E-mail: *sean@boeckeler.com*
Web site: *www.boeckeler.com*

Brightline Booth #2602
Brightline fluorescent lighting systems bring energy-efficient, color-correct illumination to sports broadcast-studio and videoconference applications. Past projects include World Cup and Olympic facilities as well as studios and press conference rooms.
Jon Katz, Marketing Director
E-mail: *information@brightlines.com*
Web site: *www.brightlines.com*

BUF Technology Booth #1222
BUF's trademarks are robust, reliable designs and customer service. From control systems to "Sport," BUF's new replay system, its designs provide solutions to real world needs.
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Web site: *www.buftek.com*

Capstone Entertainment Booth #1224
Capstone Entertainment is a sports, entertainment, and live event production company offering production for video boards, broadcast, and live events; 2D and 3D animation and FX; and more.
Robert Becker, General Manager
E-mail: *bob@capstoneentertainment.com*
Web site: *www.capstoneentertainment.com*

Christie Digital Booth #2400
Christie is a leading manufacturer of DLP and LCD projection display solutions used in A/V systems integration. Christie's projectors are ideal for use in sports arenas, stadiums and facilities.
Tony Barton, Director of Sales
E-mail: *tony.barton@christiedigital.com*
Web site: *www.christiedigital.com*

Comrex Corp. Booth #2001
Chris Crump, Director of Sales and Marketing
E-mail: *ccrump@comrex.com*
Web site: *www.comrex.com*

Comtel Pro Media Booth #1420
Comtel Pro Media is the largest Sony Professional Media Dealer in the U.S., and authorized master distributor for Sony, Panasonic, FujiFilm, Maxell, TDK, Verbatim, HHB and Quantegy.
David Freeman, Senior Sales Executive
E-mail: *david@comptelpm.com*
Web site: *www.comtelpromedia.com*

CRT Custom Products Inc. Booth #1220
One stop shop for manufacturing, printing, CD and DVD replication, folding cartons, packaging, die cutting, gluing, UV coating, package design, corrugated items, fulfillment, warehousing and more.
Wayne Maniscalco, Vice President, Sales & Marketing
E-mail: *waynem@crtcustomproducts.com*
Web site: *www.crtcustomproducts.com*

Darim Vision Co. Ltd.
Darim Vision has been producing products for the digital video market since 1993. Darim Vision develops breakthrough technologies for MPEG encoding and streaming, and broadcast-quality 3D virtual set systems and digital video management systems.
Norman C. Krebill, Sales Manager
E-mail: *nkrebill@darim.com*
Web site: *www.darim.com*

daVinci Bridge Booth #2420
Jeffrey P. Milligan, President
E-mail: *jeff@davincibridge.com*
Web site: *www.davincibridge.com*

Devlin Design Group Booth #2600
For two decades, DDG has pushed the limits of scenic design around the world. Services include construction, facility integration, newsroom design, lighting equipment and direction.
Dan Devlin, Creative Director
E-mail: *contacts@ddgtv.com*
Web site: *www.ddgtv.com*

Disc Makers
Disc Makers' services include CD or DVD replication, short-run duplication, complete printing and packaging options, or affordable blank CDs and blank DVDs.
Steve Love, Marketing Project Manager
E-mail: *slove@discmakers.com*
Web site: *www.discmakers.com*

DNF Controls Booth #1623
DNF Controls is a leading provider of hardware and software-based control solutions for equipment used in television and sports broadcast markets.
Robert Goldsobel, Manager, Inside Sales
E-mail: *rgoldsobel@dnfcontrols.com*
Web site: *www.dnfcontrols.com*

DRM Networks/SAVVIS Booth #2014
DRM Networks offers a turnkey solution for the "fast-to-market" distribution, protection and sale of digital media. SAVVIS provides global IT infrastructure and managed services tailored to the media industry's requirements for fast and secure management.
Laurie Biviano, Director of Education and Marketing
E-mail: *mktg@drmnetworks.com*

Echolab Booth #1422
Studio Ensemble is a consortium of several manufacturers jointly bundling key components of a studio system. The consortium includes Echolab, 360 Systems, Compix Media and Avitech.
Battista Renati, Director Marketing
E-mail: *bat@echolab.com*
Web site: *www.echolab.com*

Endzone Video Systems Booth #1429
Endzone Video Systems redefined the way athletic programs video their practices and games. The company provides a simple and safe way to shoot video from heights of 25 and 35 feet above the action.
Chad Walling, Vice President
E-mail: *chadwalling@msn.com*
Web site: *www.endzonevideo.com*

Event DV Magazine Booth #1622
Event DV is read by professional event videographers as well as those doing corporate, church, sports, stage, legal, and other independent and in-house videography work.
Dan Huggins, Publisher
E-mail: *dhuggins@infotoday.com*
Web site: *www.eventdv.net*

Evertz Microsystems Booth #2221
Headquartered in Burlington, Canada, Evertz is a globally recognized television, satellite, cable and IPTV broadcast equipment designer and manufacturer. Evertz offers end-to-end HDTV solutions and high-performance systems for the broadcast market.
Nancy Parrish, Marketing Coordinator
E-mail: *nancy@evertz.com*
Web site: *www.evertz.com*

EVS Broadcast Equipment Booth #2407
EVS builds products that constitute the foundation of a rapidly evolving world of digital broadcast television and motion pictures. It has redefined live broadcasting with tapeless solutions based on advanced production and playout servers, and its software applications.
Greg Lawler, Sales Manager
E-mail: *g.lawler@evs.tv*
Web site: *www.evs.tv*

Fast Forward Video Booth #1425
FFV has a wide range of digital video recorder options that offer many solutions to your video recording needs, including motion key fill, bumpers, still frames, and slow motion and instant replay.
Douglas Salmon, Managing Principal
E-mail: *dsalmon@oldhorses.com*
Web site: *www.ffv.com*

Front Porch Digital Booth #2411
Front Porch Digital, the Broadcast and Media Division of Incentra Solutions Inc., provides total digital archive management and transcoding solutions.
Mike Knaisch, President
E-mail: *mknaisch@fpdigital.com*
Web site: *www.fpdigital.com*

Future Media Concepts Inc. Booth # 2012
Future Media Concepts the nation's premier digital media training center, provides a complete range of manufacturer-authorized training in all areas of digital media including film and video editing, sound design, web development, DVD authoring and animation.
Ben Kozuch, President, Co-Founder
E-mail: *ben@fmctraining.com*
Web site: *www.fmctraining.com*

Grey House Publishing Booth #1424
Sports Market Place Directory, 2006, details over 13,000 sports organizations and teams, college sports, media, corporate sponsors, sponsorship and marketing event agencies, professional services, manufacturers, facilities and more.
Jessica Moody, Vice President, Marketing
E-mail: *jmoody@greyhouse.com*
Web site: *www.greyhouse.com*

Harris Corp. Booth #1821
Rich Hajdu, Vice President, Graphics
E-mail: *rich.hajdu@harris.com*
Web site: *www.harris.com*

IDX Booth #1617
IDX is a worldwide manufacturer and supplier of batteries, chargers, power supplies, and accessories for a wide range of applications. From the design of its compact power supplies, to its Lithium Ion battery; all IDX system technology products are designed to recognize international EMC specifications.
Michele King, Sales and Marketing Coordinator
E-mail: *idx.usa@idx.tv*

ISIS Group Inc. Booth #1616
ISIS Group manufactures video, audio, and signal management solutions for the television, post-production and multimedia industries.
Tess Pender, Director of Marketing
E-mail: *info@isis-group.com*
Web sites: *www.isis-group.com/www.gpsys.com*

ITS Enclosures Booth #1801
ITS Enclosures has been manufacturing thermally managed enclosures for more than 20 years. Its VIEWSTATION product line allows LCD and plasma displays to be completely enclosed and protected from vandals, elements and theft.
Karl Jackson
E-mail: *kjackson@itsenclosures.com*
Web site: *www.itsenclosures.com*

JocTrac Booth #1229
Wellspring Software has developed a patent-pending sports statistics program called JocTrac. Its first adaptation of the data input system is a basketball program.
Stuart Neale, Vice President
E-mail: *stu@wellspringsoftware.com*
Web site: *www.wellspringsoftware.com*

Joseph Electronics Booth #2202
The company is built on a 60-year reputation of supplying broadcasters with unique service. It distributes complete custom fiber solutions, assemblies, design and consultation, DT12 repairs and test equipment.
Gideon Uys, Director, Fiber and System Solutions
E-mail: *info@josephelectronics.com*
Web site: *www.josephelectronics.com*

LRS Sports Booth #1600
From complete video network installations to entry-level video software, LRS Sports is changing the way you look at the game. Its GamerEZ software provides state-of-the-art video editing functions to schools with limited budgets and unlimited goals.
Daniel Burgess, Sales Supervisor
E-mail: *daniel.burgess@lrs.com*
Web site: *www.lrs.com*

Masstech Group Inc. Booth #1608
Masstech Group is a developer of software and embedded hardware centered on a powerful core database to enable management, conversion, distribution, and sharing of digital content across IT storage and networking infrastructures.
Tara Whitman, Marketing Coordinator
E-mail: *tara.whitman@masstechgroup.com*
Web site: *www.masstechgroup.com*

Me Inc. (The SCO Group) Booth #1814
Me Inc. is an innovative suite of personal mobility services that enable improved communications, collaboration and control for groups of any size and type.
Greg Hartle, Marketing Manager
E-mail: *ghartle@sco.com*
Web site: *www.edgeclickpark.com/meinc/app*

Media Solutions Booth #1226
Media Solutions is your one-stop supplier for professional audio/video equipment, media and accessories. It specializes in cameras, VTR's, monitors, NLE systems, software upgrades and lighting kits.
Josh Hatfield
E-mail: *sales@media-solutions.us*
Web site: *www.media-solutions.us*

Microboards Technology Booth #2215
Microboards Technology has been leading the world in CD and DVD recording technologies since 1988.

Based in Chanhassen, Minn., it has grown with the acceptance of CD and DVD as the medium of choice in both consumer and industrial markets.
Aaron Pratt, Marketing Manager
E-mail: *sales@microboards.com*
Web site: *www.microboards.com*

Microwave Radio Communications Booth #1807
MRC is a leading manufacturer of video microwave systems for television broadcast operations worldwide. MRC designs and manufactures microwave systems for applications that support terrestrial, satellite and video downlink systems.
Michael C. Payne, Vice President of Marketing & Business Development
E-mail: *sales@mrcbroadcast.com*
Web site: *www.mrcbroadcast.com*

Miller Camera Support Booth #2223
Miller Camera Support Equipment has been designing and delivering professional fluid heads and tripods for film and television since 1954. It holds the first patent for fluid head design for film cameras in 1946.
Gus Harilaou, Sales Manager
E-mail: *gus@millertripods.us*
Web site: *www.millertripods.com*

Miranda Technologies Inc. Booth #1625
Miranda Technologies is a world leader in designing, manufacturing and marketing video infrastructure products and solutions. Its digital video and audio equipment is used in all stages of production.
Martine Généreux, Events Manager
E-mail: *show@miranda.com*
Web site: *www.miranda.com*

Mitsubishi Electric Power Products Booth #1612
Mark Foster, General Manager
Phone: *Mark.foster@meppi.com*
Web site: *www.diamond-vision.com*

Moseley Associates Inc. Booth #2415
Event HD-2200 and HD-6500 products are designed for ENG mobile microwave links providing data rates of 26 Mbps to 76 Mbps. DTV Link provides broadcasters a fixed link network with industry standard interfaces SMPTE-310, DVB-ASI, Ethernet and T1.
Steve DeFala, Video Broadcast Sales Engineer
E-mail: *sdefala@moseleysb.com*
Web site: *www.moseleysb.com*

Mundoentrenador Booth #1416
Mundoentrenador is a company focused to improve the sport performance through new technologies applications. Its integrated solutions gives sports professionals the tools to manage their work areas, improve analytical skills and achieve success.
Lluís Casas i Francas, Founder
E-mail: *llcasas@mundoentrenador.com*
Web site: *www.mundoentrenador.com*

NEP Broadcasting
NEP is an international provider of outsourced teleproduction services critical to the delivery of live sports and entertainment events. NEP provides facilities, engineering expertise and customer service, in support of telecasts of events worldwide.
Dan Wilhelm, Executive Vice President
E-mail: *dan.wilhelm@nepinc.com*
Web site: *www.nepinc.com*

Nevada Film Office Booth #2201
The Nevada Film Office assists over 650 film, television, commercial, reality, and other multimedia productions free of charge. It provides a 24/7 interactive Web site and digital locations photo packages, tours, research, problem solving and permitting assistance.
Charlie Geocaris, Director
E-mail: *lvnfo@bizopp.state.nv.us*
Web site: *www.nevadafilm.com*

NHK Enterprises America Inc. Booth #2200
NHK Enterprises America has been a leader in the creation of HD programs since 1988. As the American subsidiary of NHK Japan Broadcasting Corp., Japan's public broadcaster, it is based in New York City and Los Angeles producing programs extensively throughout North and South America.
Naga Endo, Producer, Co-Productions
E-mail: *endo@nepamerica.com*
Web site; *www.nepamerica.com*

Nine Systems
Nine Systems is the smart choice for rich media publishing and delivery, powering the online media experience for more than 300 of today's most valuable brands including CinemaNow and CBS SportsLine.
Lauren Becker, Marketing Coordinator
E-mail: *lauren.becker@ninesystems.com*
Web site: *www.ninesystems.com*

Nucomm Inc. Booth #1221
Nucomm provides digital and analog microwave systems for the television broadcast, government and sports microwave industries. Nucomm will feature in its booth the Campac2, the next-gen digital wireless camera transmitters; and the Newscaster DR, a digital COFDM diversity HD and SD receiver.
Bill Dumm, Area Sales Manager
E-mail: *sales@nucomm.com*
Web site: *www.nucomm.com*

Nvision Booth #1621
Nvision is dedicated to the development of high performance routing switchers and signal distribution equipment. Since its founding in 1989, Nvision has pioneered many technological advances including AES routing and large-scale HD-SDI routing.
Doug Buterbaugh, Director of Sales
E-mail: *dougbuterbaugh@nvision.tv*
Web site: *www.nvision.tv*

Olympic Case Co. Booth #1604
Olympic Case Co. is a manufacturer of custom ATA reusable shipping cases and containers. Olympic makes cases for any industry by also providing plastic Pelican cases, N-series professional cases and the lightweight designed Q-CASE.
Josh D. Schneidmiller, Sales Manager
E-mail: *info@olycase.com*
Web site: *www.olycase.com*

Peak Media Inc. Booth #1228
Peak Media is your one stop shop for professional audio/video equipment, media and accessories.
Shannon Shearer, President
E-mail: *sales@peakmediainc.com*
Web site: *www.peakmediainc.com*

Pioneer Electronics Inc. Booth #1628
Pioneer's industrial plasma displays are the ultimate HD plasmas for commercial applications using Pure Drive technology.
Shana Hurley, Marketing Coordinator
E-mail: *Shana.hurley@pioneer-usa.com*
Web site: *www.pioneer-usa.com*

Professional Sound Services Booth #1421
Professional Sound Services provides sales, service, and rental to help its customers achieve their goals and meet their needs in the audio field; be it studio recording, ENG/EFP, location sound recording, or communications.
Rich Topham, President
E-mail: *Rich@pro-sound.com*
Web site: *www.pro-sound.com*

RF Central LLC Booth #1800
RF Central manufactures and supplies RF equipment to TV broadcasters throughout the U.S. The company supports live news, sports, and other events including NFL games, the Reno Air Show, and both Summer and Winter Olympic Games.
Tim Blosser, Marketing Manager
E-mail: *tim.blosser@rfcentral.com*
Web site: *www.rfcentral.com*

Riedel Communications Inc. Booth #1223
Riedel designs, manufactures and distributes intercom and radio technology for customers worldwide in the broadcast, pro-audio, event, sports and theater industries. The Riedel group also includes a European based rental operation that provides radio, intercom services and ticketing systems.
Vinnie Macri
E-mail: *vinnie.macri@riedel.net*
Web site: *www.riedel.net*

RK Enterprises Booth #2204
RK Enterprises is a manufacture and master distributor of LCD monitors. The company offers multiformat units including composite/RGB/HD/SDI, and full HD.
Randy King
E-mail: *rking@rkenterprises.tv*
Web site: *www.rkenterprises.tv*

Rushworks Booth #1613
Rushworks provides low-cost, high-performance television automation systems for broadcast, cable, education, and digital signage/cinema. RE:PLAY, a sports slow-motion and archiving system, supports up to four "live" input sources and playback channels.
Rush Beesley, President
E-mail: *solutions@RushWorksMedia.com*
Web site: *www.rushworksmedia.com*

Sachtler and Vinten Booth #1813
Sachtler and Vinten provide industry-leading camera support for corporate, film and television broadcast applications. Sachtler subsidiary Petrol bags offer well designed and high-quality cases and bags for broadcast and DV audio and video equipment.
Bob Carr, Vice President, Sales
E-mail: *sales@vitecgroup.com*
Web sites: *www.sachtler.com/www.vinten.com*

SES Americom Booth #1614
SES Americom is a leading provider of satellite services to broadcast television networks and cable programmers. As an SES Global family member, Americom can provide end-to-end telecommunications solutions to any region in the world.
Patrick Rourke, Customer Service Center Rep
E-mail: *patrick.rourke@ses-americom.com*
Web sites: *www.ses-americom.com/*
www.ses-global.com

Silicon Graphics Inc. Booth #1851
SGI is a leader in high-performance computing. SGI helps customers solve their computing challenges, whether it's sharing images to aid in brain surgery, studying the global climate, or enabling the transition from analog to digital broadcasting.
E-mail: *info@sgi.com* ■ Web site: *www.sgi.com*

Snell & Wilcox Booth #1804
Snell & Wilcox designs and builds systems for live production switching, video playout, mastering and infrastructure. The company serves a worldwide base of customers in the broadcast, postproduction, cable, satellite and IPTV markets.
John Shike, Vice President, Marketing & Channel Management
E-mail: *john.shike@snellwilcox.com*
Web site: *www.snellwilcox.com*

Sound and Video Creations Inc. Booth #1225
Fran Kowalski, President
E-mail: *fkowalski@clickeffects.com*
Web site: *www.clickeffects.com*

Stats LLC Booth #2003
Stats is a leading sports information provider with more than 20 years of experience in sports data collection, processing and distribution. Stats is owned by the Associated Press and News Corp.
Nick Stamm, Senior Manager, Communications
E-mail: *stamm@stats.com*
Web site: *http://biz.stats.com*

Stratos International Inc. Booth #1620
Stratos International designs and manufactures optoelectronic, fiber optic, RF and microwave components for the broadcast, telecommunications, enterprise and military markets. It provides a range of digital video aggregation and transport solutions.
E-mail: *Info@stratoslightwave.com*
Web site: *www.stratoslightwave.com/index.asp*

TEAC America Booth #2205
TEAC America offers a complete line of disc publishing products. TEAC will exhibit its revolutionary P55 thermal dye-sublimation printer, the highest resolution thermal printer in the market today.
Todd Brown
E-mail: *TBrown@teac.com*
Web site: *www.teac.com*

Telecast Fiber Systems Booth #2005
Telecast Fiber Systems is a leader in portable and fixed fiber optic systems for television broadcast production. Its video, audio, and communications systems are used worldwide and accommodates all television production signals.
Carolyn Borrelli, Sales
E-mail: *cborrelli@telecast-fiber.com*
Web site: *www.telecast-fiber.com*

Thales Angenieux Booth #1627
Thales Angenieux specializes in high-end optical solutions for broadcast and film. It offers a full complement of high precision lenses for a range of broadcast and video production applications, including HD and SD lenses for ENG/EFP.
Kevin Tomczyk, Sales Manager, Video Products
E-mail: *angenieux@tccus.com*
Web site: *www.angenieux.com*

Tieline Technology Booth #1812
Tieline Technology provides high-quality remote broadcast digital audio codecs, offering live, broadcast quality, reliable audio over the Internet, broadband cellular, 802.11 wireless, GSM, POTS, ISDN and X.21/V.35 based connections with its Commander G3 and i-Mix G3 platforms.
Kevin Webb, General Manager
E-mail: *kevin@tieline.com*
Web site: *www.tieline.com*

Total Production Services
T.P.S. provides mobile video production solutions for sports, news, entertainment, and corporate events throughout the U.S.
Steve Paino, President
E-mail: *stevepaino@tpsweb.com*
Web site: *www.tps.tv*

Tower Solutions Booth #2000
Tower Solutions creates automatic self-erecting towers for lighting, telecommunications and/or lifting applications. The towers rise to 80 feet in four minutes at the "push of a button," and carries a payload of 2,000-plus pounds.
Allen Karson, President and CEO
E-mail: *akarson@towersolutionsinc.com*
Web site: *www.towersolutionsinc.com*

VDO Booth #2403
VDO, a broadcast design and animation studio, has created worldwide on-air graphics for networks, cable channels, and stations for 18 years. From bold, brand-driven opens, through your in-show look, the VDO team delivers memorable graphics that set you apart.
Dianne Streyer, Vice President/General Manager
E-mail: *dstreyer@vdo.tv*
Web site: *www.vdo.tv*

Video Design Software Inc. Booth #1822
VDS provides graphics automation and content design tools for the broadcast, cable television and post-production markets.
Steve Papdakis, Director of Sales
E-mail: *stevep@videodesignsoftware.com*
Web site: *www.videodesignsoftware.com*

VideoBank Booth #1601
VideoBank Digital Asset Management Solutions provide all the components for the storage, manipulation and distribution of digital assets.
E-mail: *info@videobankdigital.com*
Web site: *www.videobankdigital.com*

WhiteBlox Booth #2209
WhiteBlox, a leading broadband network solutions company, delivers technology that allows companies to become their own IPTV broadcasters.
Laura Haworth, Manager, Marketing & Communications
E-mail: *info@videobankdigital.com*
Web site: *www.videobankdigital.com*

Wohler Technologies Inc. Booth #1826
Wohler Technologies is a leader in in-rack audio and video monitoring solutions. Its systems allow broadcasters to monitor important and complex signals in every phase of broadcast.
Chris Shaw, Director of Sales
E-mail: *sales@wohler.com*
Web site: *www.wohler.com*

Zaxwerks Inc. Booth #2203
Awarded Best Animation Program of 2005 by Videomaker magazine, Zaxwerks ProAnimator software delivers 3D title and logo animation into the hands of video editors and computer animators.
Laureen Dow, Sales Director
E-mail: *sales@zaxwerks.com*
Web site: *www.zaxwerks.com*

C4-SPORTS

July 17-19, 2006 Schedule Las Vegas

Keynotes and General Sessions | Paid Full Conference

Monday, July 17, 2006

			Location
8:45am - 9:00am	Opening Remarks	Gene Sanders, General Manager, C4-Events	S-219
9:00am - 10:00am	KEYNOTE:Leadership Through Teamwork and Victory	Mike Krzyzewski, Head Basketball Coach, Duke University Blue Devils	S-219
10:00am - 4:00pm	Exhibit Floor Open		LVCC - South Hall Upper Level
10:00am - 11:00am	Budget HD Production for Sports Events- Women's Club Volleyball Exhibition	Nigel Spratling, President, Mavens Inc.; Dale Matthews, Director and Founder Inter-School Television, Oregon State University	On Floor Court
11:00am - 12:00pm	Digital Signage - a New Medium for Sport Venues	Jeff Milligan, President, daVinci Bridge	On Floor Theater
11:30am - 12:00pm	Final Cut Pro Speed Tips		Digital Media Theater Booth #2013
12:00pm	"Brick Basketball Shot Contest - Half Court		On Floor Court
12:30pm - 1:00pm	Avid Speed Tips		Digital Media Theater Booth #2013
1:00pm - 2:30pm	Marketing to the Millenials	Uri Geva, CEO, Infinity Pro Sports; Elizabeth Estes-Cooper, Executive Vice President, Strategic Planning, Jayne Hancock Group Inc.; Jim Bloom, Vice President Business Development, TxtStation	On Floor Theater
1:00pm - 2:30pm	Sports Book Summit - Invitation Only		S-230
2:00pm - 3:00pm	Budget HD Production for Sports Events- Women's Club Volleyball Exhibition	Nigel Spratling, President, Mavens Inc.; Dale Matthews, Director and Founder Inter-School Television, Oregon State University	On Floor Court
2:00pm - 3:00pm*	Final Cut Pro Speed Tips/Avid Speed Tips		Digital Media Theater Booth #2013
3:00pm - 3:30pm	The Future of Sports Technology	Steve Schklair, Founder and CEO, Cobalt Entertainment	On Floor Theater
3:30pm	"Brick" Basketball Shot Contest - Three Point Competition		On Floor Court
4:00pm - 5:00pm	Creating the Ultimate Sports Experience	Matt Rose, President and CEO, Ultimate Sports Resort	S-219
5:00pm - 7:00pm	Networking Happy Hour	All Invited	South Hall Upper Lobby

Tuesday, July 18, 2006

8:45am - 9:00am	Opening Remarks	Gene Sanders, General Manager, C4-Events	S-219
9:00am - 10:00am	The Impact of Converging Technologies on Sports	Brian Bedol, President and CEO, CSTV	S-219
9:00am - 10:15am	Post-Production and Live Delivery of HD On Air	Gary Adcock, Digital Artist and Technology Trainer; Tom Meegan, Owner and Editor, Woven Pixels	S-224
	Automating Broadcast Graphics with Adobe Photoshop	Richard Harrington, President, RHED Pixel	S-225
	HD on Disc - Demystifying Next Genration DVDs	Bruce Nazarian, President, Gnome Digital Media	S-226
10:00am - 4:00pm	Exhibit Floor Open		LVCC - South Hall Upper Level
10:00am - 11:00am	Budget HD Production for Sports Events- Women's Club Volleyball Exhibition	Nigel Spratling, President, Mavens Inc.; Dale Matthews, Director and Founder Inter-School Television, Oregon State University	On Floor Court
10:45am - 11:45am	Keynote: The Future of Sports Media Storage Management and Distribution	Ken Adelson, Senior Vice President Production Operations and Planning, NBA Entertainment	S-224
11:00am - 12:00pm	Using Sports Information to Leverage Technology to Activate Your Brand	Walter Lis, Vice President Marketing, Stats Inc.	On Floor Theater
11:00am - 12:00pm*	Final Cut Pro Speed Tips		Digital Media Theater Booth #2013
12:00pm	"Brick" Basketball Shot Contest - Three Point Competition		On Floor Court
12:30pm - 1:30pm*	Avid Speed Tips		Digital Media Theater Booth #2013
1:00pm - 2:00pm	Introduction to Content & Delivery Fundamentals - An Overview of the HD Landscape	Moderator: John Abel, Senior Vice President, USTelecom; Panelists from Belden CDT, Harris Digital Signs, Miranda, EMC Corp., and Sony Broadcast and Production Systems Division	On Floor Theater
1:45pm - 3:00pm	With the Whole World Watching: Live HD Editing Production for Fox's World Series Broadcast	Tom Meegan, Owner and Editor, Woven Pixels	S-224
	Shooting and Posting HD Sports Video	Gary Adcock, Digital Artist and Technology Trainer	S-225
	Advanced Podcast Production Techniques	Scott Sheppard, CEO, Inside Media Networks	S-226
2:00pm - 2:45pm	Budget HD Production for Sports Events- Women's Club Volleyball Exhibition	Nigel Spratling, President, Mavens Inc.; Dale Matthews, Director and Founder Inter-School Television, Oregon State University	On Floor Court
2:00pm - 3:00pm*	Photoshop for Video Tips/After Effects Titling Tips		Digital Media Theater Booth #2013
3:15pm - 4:30pm	Choosing an HD Camera Package for Sports Photography	TBA	S-224
	HD Post Production Primer	Gary Adcock, Digital Artist and Technology Trainer	S-225
	Get the Most from Flash Video	Marcus Geduld, Certified Instructor and Author, Future Media Concepts	S-226
2:45pm	"Brick" Basketball Shot Contest - Three Point Competition		On Floor Court
3:00pm - 4:00pm	Rights Management Discussion	Andy Bernstein, Vice President, Kangaroo.TV Inc. and Ed Desser, President, Desser Sports Media	On Floor Theater
4:00pm - 5:00pm	Bringing Fans Closer to the Games They Love: Sports as Mobile Ent.	Steve Gaffney, Director National Sports Marketing, Sprint Nextel Corp.	S-219
4:45pm - 6:00pm	Bringing the Sounds of the Game Into the Living Room	Jim Hilson, Senior Broadcast Audio Specialist, Dolby Laboratories	S-224
	Larger than Life: Producing for the Arena 'Big Screen'	Stig Daniels, President, Java Time Productions and Editorial	S-225
	Encoding Sports for Mobile Devices	Ben Waggoner, Program Manager Video Encoding, Microsoft Professional Content Group	S-226

Wednesday, July 19, 2006

8:45am - 9:00am	Opening Remarks	Gene Sanders, General Manager, C4-Events	S-219
9:00am - 10:15am	Crossing the Streams -Mixing HD Formats and Cameras	Gary Adcock, Digital Artist and Technology Trainer	S-224
	Motion Control 3D -Create Dynamic Footage from Photos	Richard Harrington, President, RHED Pixel	S-225
	On the Go: Delivering Sports to Mobile Devices	TBA	S-226
10:00am - 4:00pm	Exhibit Floor Open		LVCC - South Hall Upper Level
10:00pm - 11:00pm	Budget HD Production for Sports Events	Nigel Spratling, President, Mavens Inc.; Dale Matthews, Director and Founder Inter-School Television, Oregon State University	On Floor Theater
10:30am - 11:45pm	Keynote: Technology and Design: A Vital Harmony	Doug Towey, Creative Director, CBS Sports; Micha Riss, Founder and Creative Director, Flying Machine	S-224
11:00am - 12:30am	Winning at Extreme Sports	Andy Munitz, Product Training Manager, and Leigh Herman, Marketing Manager, Professional Audio and Video Products, both with Sony Broadcast and Production Systems Division	On Floor Theater
11:30am - 12:30pm*	Photoshop for Video Tips/After Effects Titling Tips		Digital Media Theater Booth #2013
12:30pm	"Brick" Basketball Shot Contest - Three Point Competition		On Floor Court
1:00pm - 2:00pm*	Final Cut Pro Speed Tips		Digital Media Theater Booth #2013
1:00pm - 2:00pm	Introduction to Content & Delivery Fundamentals - Profiting Through Technology	Moderator: John Abel, Senior Vice President, USTelecom; Panelists from SI Digital, Me Inc., Collegiate Images, ScorePAD, and SXRD Systems, Sony Broadcast and Production Systems Division	On Floor Theater
1:45pm - 3:00pm	Remote Sports Video: Using Robotic Cameras for the Spectacular Shot	Gary Adcock, Digital Artist and Technology Trainer; Jim Huritz, Product Manager, Telecast Fiber Systems	S-224
	Revolution or Evolution? Sports Channel Re-Brand	Micha Riss, Founder and Creative Director, Flying Machine	S-225
	Using Podcasts to Extend a Brand: A Case Study of Varsity.com	Scott Sheppard, CEO, Inside Media Networks	S-226
2:30pm - 3:30pm*	Avid Speed Tips		Digital Media Theater Booth #2013
3:15pm - 4:30pm	Sports Workflow Management for Truck, Stadium or Studio	Caren Anhder, Director of Product Management, Avid Broadcast On-Air Graphics	S-224
	Creating Custom Backgrounds for HD and SD	Richard Harrington, President, RHED Pixel	S-225
	Advanced Compression Techniques for Sports Content	Ben Waggoner, Program Manager Video Encoding, Microsoft Professional Content Group	S-226
4:45pm - 6:00pm	Sports Workflow Management for Truck, Stadium or Studio	Caren Anhder, Director of Product Management, Avid Broadcast On-Air Graphics	S-224
	All-Star Broadcast: Multi-Purposing Live Event Multi-Media	Ken Adelson, Sr. Vice President Production Operations and Planning, NBA Entertainment; Robert Carney, Manager of DMO, NBA Entertainment	S-225
	Leveraging Existing Sports Media Assets in New Media for Incremental Revenue	Nada Usina, President, XOS Network	S-226

* 30 minute sessions

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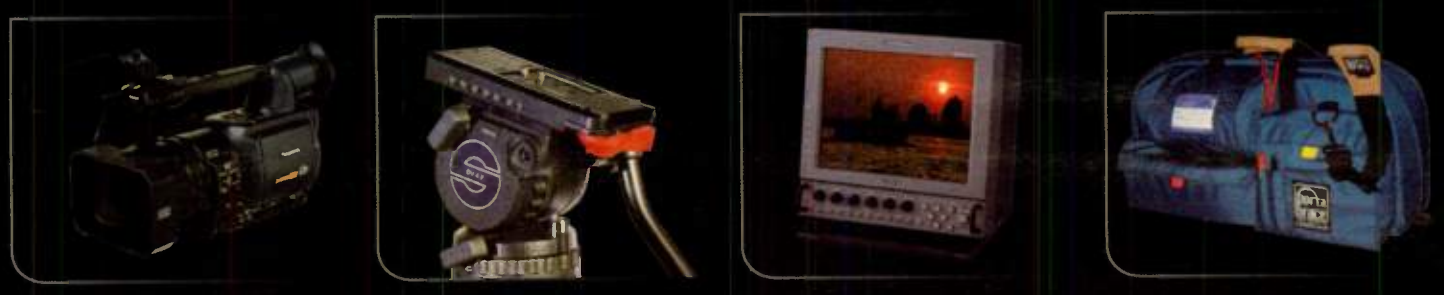

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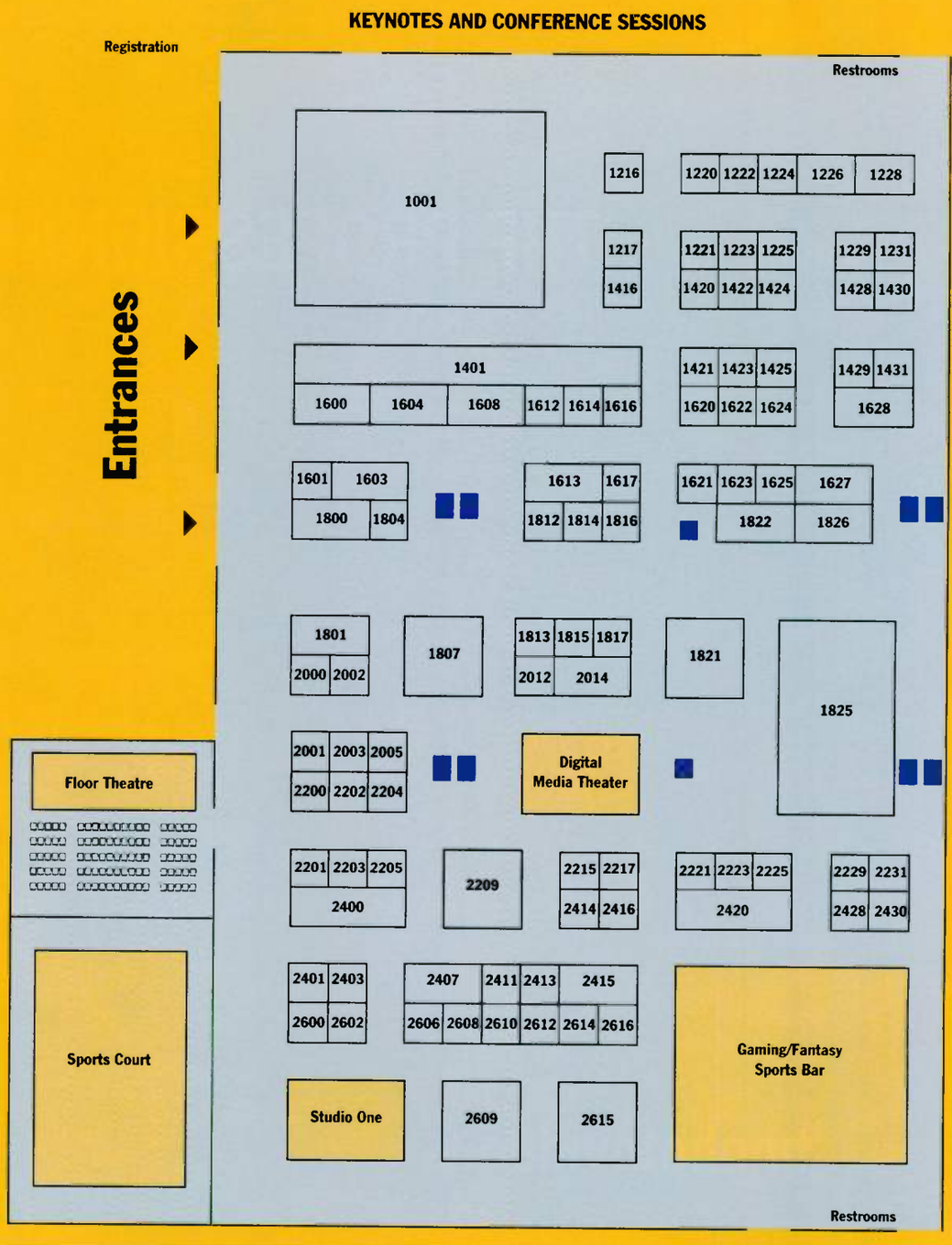

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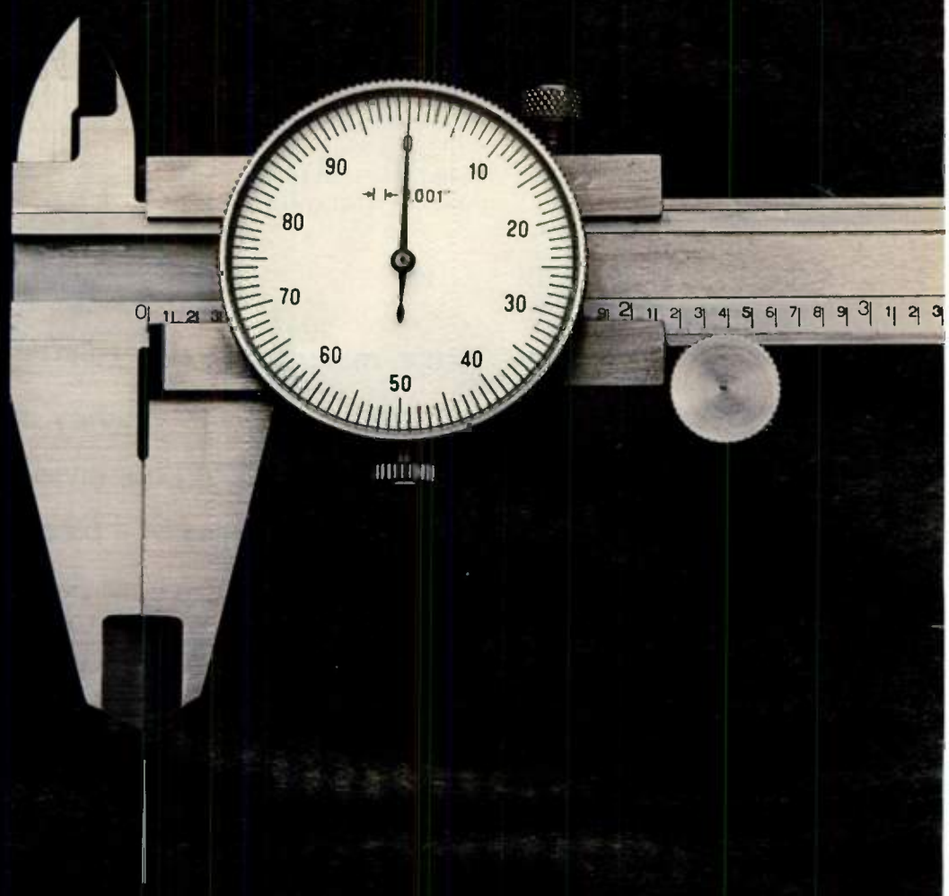

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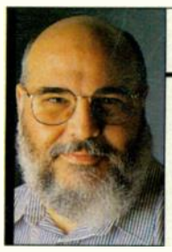


LET THERE BE LIGHTING — Andy Ciddor

You Can Always Read the Manual

Call me perverted or even deranged if you like, but I actually like to read manuals. Ever since I started playing with electronics as a kid, I have been fascinated by the capabilities of the equipment that was around me.

In my early teens, I used to hang out in the basements of military surplus stores, reading the manuals for all of the ex-World War II and ex-Korean radios, radars and field telephones, trying to figure what I could do with them, if only my folks would let me spend my pocket money on such devices.

MANUAL MANIA

In high school, I borrowed the manuals for everything, from the new electronic lab scales, to the 16mm projectors in the school auditorium.

Then I started playing around with lighting, and began to borrow manuals from the local lighting companies for such advanced equipment as the first SCR dimmers and solid state multipreset consoles, which the school could not be convinced to purchase or even hire.

When I stared working in theater lighting, the first thing I would do in a new venue was gather up all of the manuals from the control room and the lighting workshop and read them from cover to cover to make sure I knew how to tweak, drive and maintain the equipment.

Theaters being even more impoverished than most television installations, I frequently read what amounted to historical documents that chronicled the development of lighting equipment. Hence, my knowledge of technologies, such as the magnetic amplifier, that were introduced well before I was born.

As memory consoles trickled on to the market, I would borrow (and copy) the operator's manuals from the manufacturers' representatives and study them to the point where I could operate a show on the console, if I was ever lucky enough to work in venue that could afford one.

In the mid-'70s, the station where I worked decided to update the main production studio with thyristor dimmers and a sophisticated memory lighting console.

Because I had read all of the manuals for just about every console in existence at that time (a few dozen at most), I was able to help with the selection and configuration of the system. Sadly, I had already moved to the other side of the country to be head of lighting at another station by the time that system was delivered.

Around this time, I bumped into my first caption generator, one of Chyron's earliest, based on an S-100 bus microcomputer, with the data stored on those big *really* floppy eight-inch disks.

When the news department wasn't using it, I sat down in an empty control room with the manual and learned how to drive it, discovering fonts, ligatures and kerning in the process.

Several years later, I realized that I had also inadvertently learned the CP/M computer operating system.

In the early '80s, when I belatedly started playing with computers for lighting, I had a ball working my way through the eight-foot shelf of manuals for the VAX minicomputer, regardless of my understanding less than 25 percent of what I was trying to read.

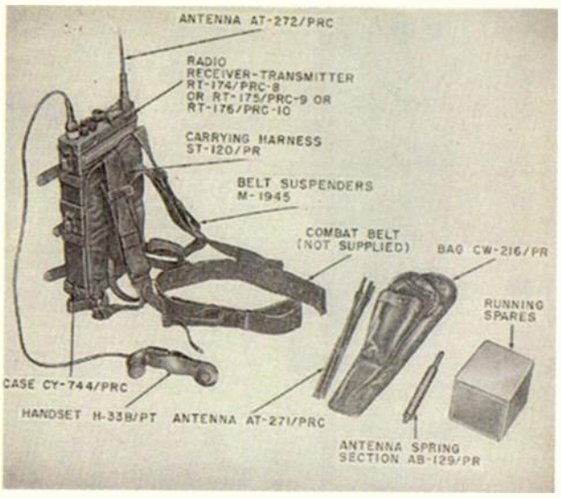
Despite the fact that I haven't written a real piece of software for nearly a decade, I still enjoy picking up programming language manuals—just to see what labor saving tricks are currently available and to consider how I could use them.

To me, manuals are the travel guides that take us on a journey of discovery, opening our minds to the possibilities of a piece of equipment, a software package, or a process. To achieve this requires a manual that is not just a careful explanation of the operation of the product, but is set in the context of how the equipment is actually used.

SOLVING PROBLEMS

Conversely, one of the most exciting aspects of what we do—solving

To me, manuals are the travel guides that take us on a journey of discovery, opening our minds to the possibilities of a piece of equipment, a software package, or a process.



The AN/PRC 10, a vintage Korean war "Army/Navy Portable Radio communicator Model 10," once coveted by the author.

artistic problems with technical means—is the totally unpredictable and off-the-wall ways that we can find to use the equipment and materials we have at our disposal.

Several trends at work right now, are having an impact on the way manuals are produced and presented. The sum total of their impact may well be zero, but there are some matters of serious concern.

The introduction of computers and software into the general community has resulted in a culture of "if I need to read the manual then it's too hard to use."

The result of this is a dumbing-down of many consumer-oriented products, so that only the most basic functions or adjustments are available.

While this may reduce or eliminate the need to read (or even write) the manual, the resulting product has very little flexibility to employ in creative or unexpected ways to solve problems.

There is also a risk that this trend may carry over into removing some of the more complex functions from our own equipment, just to save users from reading the manual.

UNNECESSARY COST

This may add weight to the long-held view among equipment manufacturers that manuals are an unnecessary cost in developing and manufacturing products.

They just want to build and sell their widgets, not give away books on how to drive the widgets. Some manuals are growing dangerously thin, having been reduced to lists of features and menu headings, and starved of sufficient explanations to allow a product's capabilities to be fully exploited.

There is a story around (probably an urban myth), that 80 percent of the new feature requests for Microsoft Office Suite are for items already in the software, but not found by the users.

Such an assertion could hardly be made about an industry that has online discussion forums where the users share knowledge of features that even the marketing people don't know are in their company's products.

Then, there's the two-edged sword that is Adobe Acrobat Portable Document Format.

While it is just about impossible to overestimate the benefits of being able to download a copy of the manual for almost any piece of modern equipment or software, electronic documents have severe limitations.

Aside from a tendency to pile dozens of pages of irrelevant material into the electronic manual, (because it looks like someone may care, and besides, there's plenty of vacant space on the CD-ROM), an electronic document is pretty useless away from your desk, unless you need a drink coaster.

It's very hard to sit at a lighting console, balancing a notebook computer on your lap, while you look up how to save the show in Light Palette 90 format. It's even harder to read that notebook crawling under the stage in dimmerland, while you're trying to interpret the error code on the bottom dimmer in the rack.

Getting a hold of a hard copy manual for most equipment, when and where you actually require it, has become more difficult than ever.

The manuals are often so large that we don't want to obliterate the last rainforest in Brazil just in case we may need to read page 315, but most of us don't carry the equipment with us to print pages on demand.

The manuals are often so large that we don't want to obliterate the last rainforest in Brazil just in case we may need to read page 315, but most of us don't carry the equipment with us to print pages on demand.

DIGESTING THE MATERIAL

Perhaps most importantly, my relationship with a manual usually consists of sitting down, away from the desk and the bustle of a production, and slowly working my way through the concepts and the possibilities of the device.

More than ever, as the gear we use becomes both more sophisticated and more complex, there is a place for well written and well presented manuals that allow the art to emerge from the technology that we use. ■

Andy Ciddor has been involved in lighting for more than three decades as a practitioner, teacher and writer. You can reach him via e-mail c/o TV Technology.

Photo: Steve Jordan

NET SOUP Frank Beacham

An Indecent Silence

On a recent visit to Los Angeles, a friend screened some hilarious video comedy sketches on a 10-foot screen in his media room. Like any enjoyable viewing experience, the technology was out of sight, out of mind.

When I finally asked where he'd gotten the clips we watched, I was surprised to learn the source was Apple's iTunes. Whoa! That was a concept I hadn't considered: clips from iTunes projected on a big screen.

For me, it was an "ah-hah" moment. I had considered those downloads mainly for viewing on a small display, such as an iPod or computer screen. But, the Quicktime movies I viewed looked good enough that the story had triumphed the technology—just as it should be.

As an intermittent TV viewer, I reconsidered the perceptions I've had about what constitutes home theater. For the first time, I was conscious of how Internet television had successfully moved beyond computing devices to the big entertainment screen.

My friend had a dedicated Mac Mini computer hooked to his ceiling-mounted Panasonic HD projector. Also routed to the display was a cable box with HDTV service and a standard-definition DVD player.

As he switched between the video sources, we watched a bit of the recent remake of "King Kong." The images were stunning and I just assumed it was HD. But it was actually a standard DVD. When we compared it an HD signal off the cable box, I found the difference so minimal that it was totally irrelevant.

The digital sound—through his Denon home theater system—was what I really noticed. Suddenly, it became clearer why Apple added digital audio I/Os to the latest version of the Mac Mini. All in all, however, it was that low definition—not made for bigscreen projection—collection of hilariously funny Internet downloads that made the evening.

Christopher Walken as Colonel Angus on "Saturday Night Live"

One very funny clip we watched—"Colonel Angus" from the 2003 season of NBC's "Saturday Night Live"—had everyone in stitches. Because its ribald humor is based on double entendre, I wondered if, in this age of stiff fines and FCC censorship, this kind of comedy, (even thought it airs late at night), would ever again appear on terrestrial TV.

One very funny clip we watched—"Colonel Angus"... had everyone in stitches. Because its ribald humor is based on double entendre, I wondered if, in this age of stiff fines and FCC censorship, this kind of comedy... will ever appear on terrestrial TV again.

As quick as I had that thought, I realized that it doesn't really matter anymore—except, of course, to the terrestrial broadcasters. If the FCC guts the humor of "Saturday Night Live," NBC now has the option to simply to move it to another distribution platform.

With the invisible blending of video distribution technologies now available, the FCC can't really censor anything. It can only destroy the business of terrestrial broadcasters by driving their viewers elsewhere. Why would it want to do that? Who would it have left to regulate?

Then, I remembered all those panels at media conferences on which Bob Wright, the chief executive at

NBC Universal, predicted that premium programming would eventually shift away from "free TV" to pay platforms. In fact, he welcomed the additional revenue streams to help defray increasing production costs.

Could it be that secretly the broadcast networks actually welcome the new FCC fines targeted at their affiliate stations? Before you answer, think about it for a moment.

The threat of stiff fines certainly give the networks a perfect excuse to shift their more provocative programs to pay platforms, a place where they generate far greater revenue.

COINCIDENTALLY

The fines also could give the networks an incentive to accelerate the demise the network-affiliate system—an ancient arrangement many television industry executives have long thought is obsolete in the era of multichannel digital distribution.

Hmmm, I wondered. Is there a secret agenda here?

Then I made a connection with another interesting hot button issue: network neutrality. Though the concept is cloaked in a lot of high-falutin' language, it's end result is easy to understand.

The big telcos now building high-speed fiber networks that are designed to distribute pay television programming and other rich media to homes. Since these new high-bandwidth networks will eventually merge into the IP-based conduits of the public Internet, the telcos are expected to want to charge content distributors additional fees for enhanced performance.

If the telcos are allowed to discriminate among the types of bits being transmitted along their networks, the public Internet we know today will be assume class differences.

Those with the big bucks will pay to get superior delivery services over the smaller (and poorer) content providers.

It's a bit like auto transportation, when we compare the difference between superior "toll roads" versus free, but slower, inferior back roads. Then, add high-occupancy lanes on the toll-road that allow drivers that can afford it to have even quicker movement.

PREFERRED TREATMENT

Critics of current legislation in Congress say without network neutrality protections, the freewheeling soul of the Internet will be lost. And, of course, they are right.

A premium-tiered Internet means the usual suspects will get preferred treatment for their big budget shows, while the small players—those who bring real diversity to the 'Net—will become second class citizens.

The last thing large media companies want is for small upstarts to have equal access to the high-speed networks. The stakes for both sides are very high.

I find it ironic that these two incredibly important media issues have converged at the same time. Only a cynic like myself would wonder if there's not a hidden agenda here by the FCC and the current leadership in Congress.

In the old days, journalists like myself were taught to "follow the money" in order to get to the truth in any story of business or government policy. If you do that in this case, it becomes inescapable that the end result of indecency policies and a lack of network neutrality protections add up to helping create an entirely new media delivery system run by the same gatekeepers who control old media.

One wonders where the TV stations owners are as their ability to compete with pay competitors is crushed by government regulators. Why are they not fighting for their survival? It just doesn't add up.

I can't help but think there might be some hidden agendas in this 'Net Soup. ■

Frank Beacham is a New York City-based writer and media producer.

ATSC UPDATE

Jerry Whitaker

Using AFD to Resolve Aspect Ratio Discrepancy

Active Format Description solves a troublesome problem in the transition from conventional 4:3 display devices to widescreen 16:9 displays, and also addresses the variety of aspect ratios that have been used over the years by the motion picture industry to produce feature films.

AFD is described in ATSC document A/53, the Digital Television Standard, Annex A. While the AFD specification has been on the books for some time, the need for certain updates has been identified.

The ATSC is currently working through revisions designed to bring the AFD spec into alignment with work undertaken concurrently by the Society of Motion Picture and Television Engineers and the Consumer Electronics Association.

The changes, while relatively minor, are important to ensure that AFD data moves properly through the DTV system and effects the desired result on consumer displays. AFD and the related "bar data" are two functions that—by necessity—span the entire DTV spectrum from production through transmission and ultimately to the consumer's television set. As such, coordination with other industries is critical.

ABOUT THE NEED

There are, of course, many different types of video displays in common use—ranging from 4:3 CRTs to widescreen projection devices and flat-panel displays of various design.

Each of these devices may have varying abilities to process incoming video. In terms of input interfaces, these displays may likewise support a range of input signal formats—from composite analog video to IEEE 1394 to HDMI.

Possible video source devices include cable, satellite, or terrestrial broadcast set-top (or integrated receiver-decoder) boxes, media players (such as DVDs), analog or digital tape players, and personal video recorders.

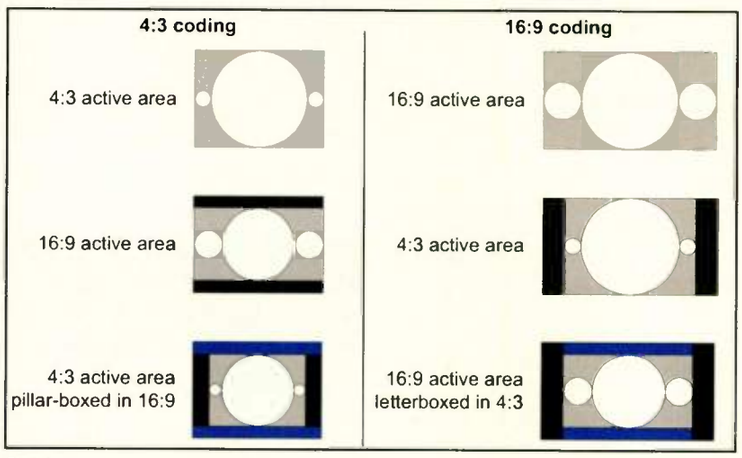


Fig. 1

The only sure way to know active area is for the service provider to include this data at the time of video compression and to embed it into the video stream.

Although choice is good, this wide range of consumer options presents two problems to be solved:

First, how does a program supplier communicate to the display device the "active area" of the video signal? It would be useful, for example, to signal that the 4:3 program being transmitted contains within it a letterboxed 16:9 image.

Second, how does a program supplier communicate to the display device, for all interface types, that a given image is intended for a 16:9 display? AFD answers these questions and, in the process, provides the following additional benefits.

Active area signaling allows the display device to process the incoming signal to make the highest resolution and most accurate picture possible. Furthermore, the display can take advantage of the knowledge that certain areas of video are currently unused and can implement algorithms that reduce the potential effects of uneven screen aging.

Aspect ratio signaling allows the display device to produce the best image possible. In some scenarios, lack of a signaling method translates to restrictions in the ability of the source device to deliver certain otherwise desirable output formats.

ACTIVE AREA SIGNALING

A consumer device such as a cable or satellite set-top box cannot reliably determine the active area of video on its own.

Even though certain lines at the top and bottom of the screen may be black for periods of time, the situation could change without warning. The only sure way to know active area is for the service provider to include this data at the time of video compression and to embed it into the video stream.

Fig. 1 shows 4:3- and 16:9-coded images with various possible active areas. The group on the left is either coded explicitly in the MPEG-2 video syntax as 4:3, or the uncompressed signal provided in NTSC timing and aspect ratio information (if present) indicates 4:3. The group on the right is coded explicitly in the MPEG-2 video syntax as 16:9, provided with NTSC timing and an aspect ratio signal indicating 16:9, or provided uncompressed with 16:9 timing across the interface.

As can be seen in Fig. 1, a pillar-boxed display results when a 4:3 active area is displayed within a 16:9 area, and a letterboxed display results when a 16:9 active area is displayed within a 4:3 area.

It is also apparent that double-boxing can also occur, for example when 4:3 material is delivered within a 16:9 letterbox to a 4:3 display; or, when 16:9 material is delivered within a 4:3 pillarbox to a 16:9 display.

For the straight letterbox or pillarbox cases, if the display is aware of the active area it may take steps to mitigate the effects of uneven screen aging.

Such steps could involve using gray

DISCREPANCY, PAGE 49

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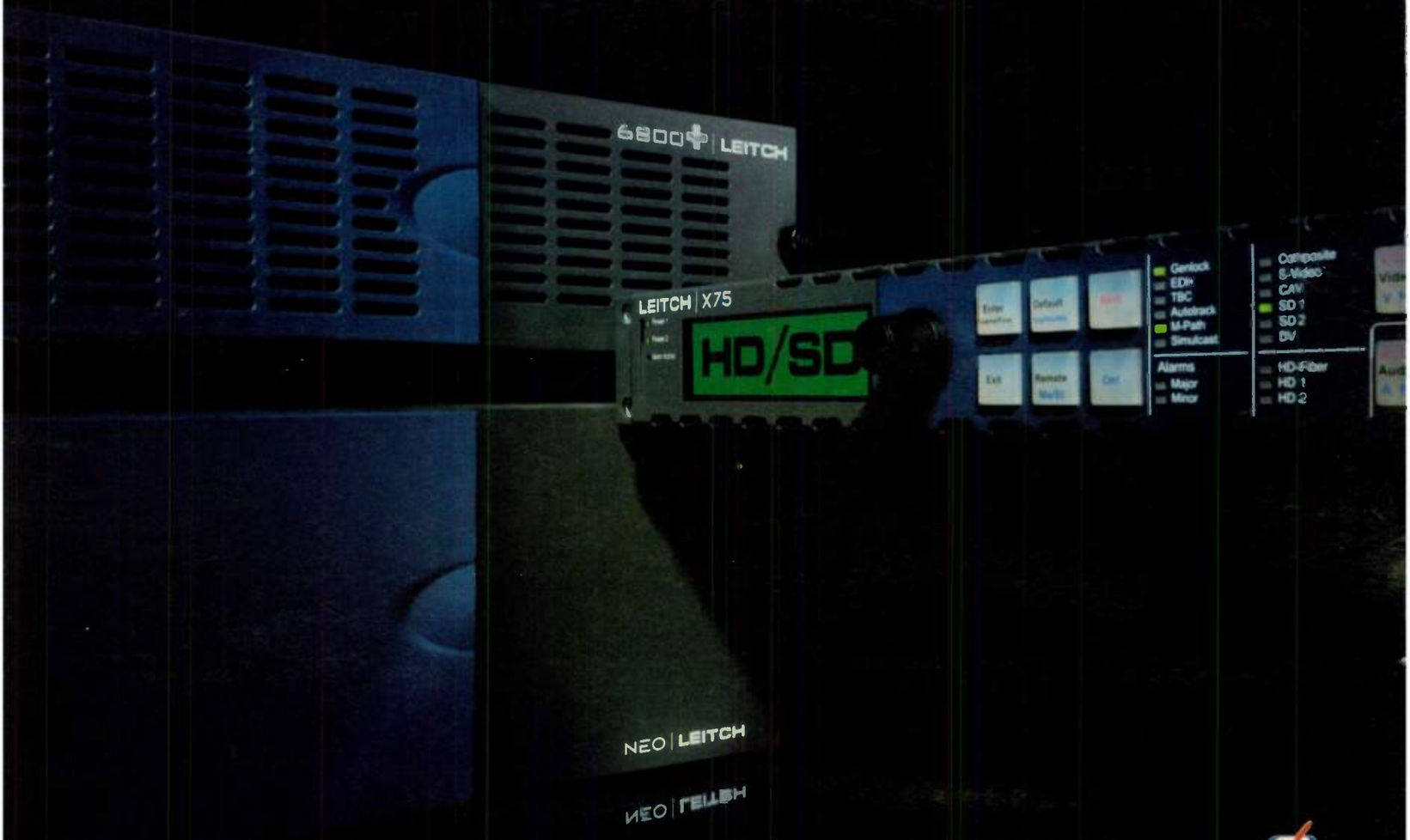

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MEDIA SERVER TECHNOLOGY

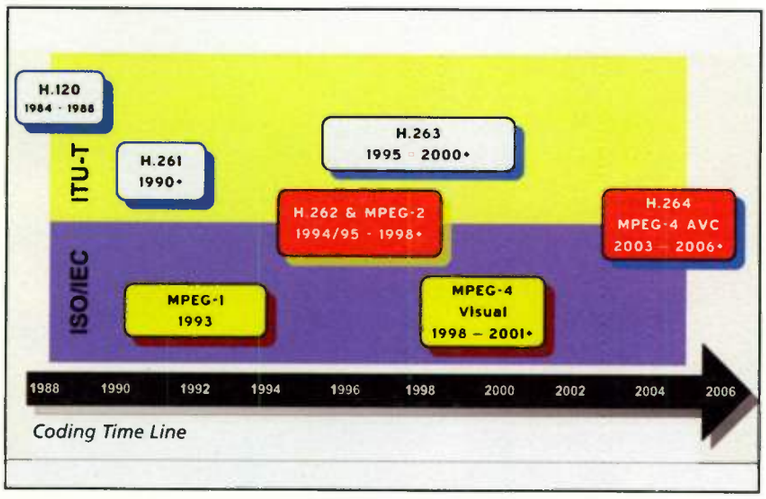
Karl Paulsen

Dealing With Multiple File Formats

The repurposing of content into other forms of digital media and for other means of transmission is gaining momentum for all sectors of the broadcast industry.

The translation of standard-definition content through upconversion to fit into the high-definition footprint is a routine process for those broadcasting in HD. Other content delivery channels, such as satellite, cable and IPTV are all looking for content to be shaped for their needs.

With this transition comes a realignment of file formats to fit specific parameters for the production, transmission and emission chains. Serious work is well underway to come up with answers to these requirements.



ONE SIZE FITS ALL

In a blue sky sort of sense, users find the most desirable means would be an automatic translation for content in any form (or format) to any other format—and a structure that easily addresses the "any content-any device-any place-any time" model.

That is asking for a lot, given the number of new formats and delivery schemes under development or in some cases already deployed today.

We need to start somewhere, and understanding what "format-" and/or "file conversion" means, and how or if it can be accomplished while retaining the intent of the original content creator, is the challenge we now face.

With many flavors to choose from, figuring out which ones fit as the most cost effective and future-proof solutions requires considerable thought and study on the part of the content distributor.

With the prognostication that the networks may be dropping their standard-definition signals in favor of only HD delivery by this fall; the migration of well-known services headed toward MPEG-4 (AVC or H.264); and the pressure to translate distribution operations from real-time only to a mixture of real time and non-real time transport—such as

In a blue sky sort of sense, users find the most desirable means would be an automatic translation for content in any form (or format) to any other format.

MPEG-encapsulated into IP-over-satellite on DVB-S2—the industry is again facing a quantum shift in how it will next do business.

Hardware that facilities have been accustomed to using for years will be replaced by common platforms that will adapt to needs more through software than hardware. This yields a real positive in the financial goal to keep depreciation in check.

BASEBAND TO FILES

Transitioning from a baseband mode to a file-based infrastructure is an ongoing battle, one that's been in full pace development for the past 15-plus years. Compressing video into a format suitable for the transport medium it is carried on has resulted in fitting moving images into far less data space than its frame-based, full-motion, full-bandwidth original material.

Understanding what "format" and/or "file conversion" means, and how or if it can be accomplished while retaining the intent of the original content creator, is the challenge we now face.

And the two forces, video conferencing and personal computers, that helped start that movement; coupled with the ongoing development of both file formats and compression schemes, is allowing this happen.

End users are now more than ever afforded a means to share imaging between hosts of other entities.

PLETHORA OF CHOICES

However, this plethora of choices is commanding a new perspective on how to deal with the multitude of file types, compression schemes, interfaces and translations.

Historically, compression technologies have moved video from a barely recognizable image to very high quality high-definition video—and in a relatively short period of time.

Comparatively, this development of commercially available compressed video has happened at a faster rate than the transition from early black-and-white to full color over-the-air reception.

To outline from where we came, one of the earliest standardized formats, the CIF (Common Intermediate Format), an NTSC and PAL video coding format based on YUV coding, was first employed for videoconferencing systems.

CIF came from the first widespread practical digital video coding standard, H.261, developed by the ITU (International Telecom Union) in the 1988-1990 timeframe.

H.261 requires support for CIFs, and was designed for multiples of 64 kbps data rates called out in p x 64 kbps, where p is in the range of one to 30 over a range of from 64 to 2,049 kbps.

This fit nicely into the footprints for carrying data over telephone lines and other systems.

Previously, H.210, originally developed as the first digital video coding standard in 1984. In 1988, the second version of H.210 added motion compensation and employed differential pulse code modulation.

FORMATS, PAGE 51

INSIDE PRODUCTION **Walter Schoenknecht**

Object Lessons in Breakout Karma

I've never been one to chalk up much to fate. Usually, hard work and talent are rewarded, and sloppiness and mediocrity ignored. Still, the notion of karma as a force in our professional lives is an alluring one, a reassurance that some day, if the planets all align properly, our talents might just get noticed.

Karmawise, an odd set of intersecting stories about editing and editors has been unraveling for me lately. I'm not sure that the catharsis at the end of the tunnel will hold any practical value... a lesson learned, a new life direction. I'm not even sure there will be anything approaching catharsis. But then again, that's the thing about karma—one never knows where these coincidences will lead.

Start in the here-and-now. Our little company is in hiring discussions with a freelance editor who's ready to try a more stable lifestyle. And while we've known him for years, something about talking at this level—more seriously, about life and philosophy and craft—has brought out stories we've never heard from him before.

He once created an entry for an H.P. Lovecraft film festival on a whim, in less than two weeks; he's also working on video adaptations of graphic novels and comic books. He's been breaking out, working on projects which reflect his passions, and he hasn't just been editing... he's been shooting and writing and dreaming. He's been *creating*.

KEYNOTE KARMA

Flashback to the NAB2006 convention in April. I'm attending on my own behalf — shopping, looking, learning — but have agreed to help out with some of this magazine's many writing assignments as well. One assignment holds promise: coverage of the Post|Production World Conference keynote address delivered by Hughes Winborne, Academy-Award winning editor of 2005's "Crash."

The magical part of the story is that Hughes Winborne had won the brass ring simply by being an editor... one of us.

Then again, I've heard film editors talk before. They ramble on about intangible aesthetics: about finding the "pulse" of the piece; the near-supernatural "visions" they develop for the film; and the holistic appeal of the 19-frame dissolve, which they claim excites a resonance in some prehensile region of the human brain stem. I'm not looking forward to this.

Hughes Winborne is introduced in the usual manner, and takes the stage. Surprisingly, though, the character who reveals himself to us is very far outside the Hollywood editor caricature. For starters, it's not just all about *him*—he's brought along his assistant, and insists that he share the stage, telling stories, fielding questions. Unusual.

Winborne talks about his early experience... as a house painter. He talks about accidentally discovering NYU's film school, and accidentally discovering that he loved to edit. Everyone else wanted to direct, but Winborne was thrilled to stay late into the night, when all the prima donna directors had retired to the clubs and cafes of the East Village.

He knew he was born to edit. He loved working with indie writer/directors, whose raw passion for their projects left them snowblind in the edit room. Winborne took whatever gigs he could to pay the rent and the light bill—editing gigs, of course. He cut some of the earliest *cinema verite*-style stories for CBS "48 Hours." He spent three years cutting industrials at AT&T's in-house facility, right down the road from us. My friend Jim Masi recalls working with him there.

Winborne describes real editing, the kind I know. He talks about using leftover, orphan footage to create the film's stunning main title by accident. Mostly, he talks about following instincts formed over 25 years—no formulas, no visitations from the muse. His karma arrived in the form of a friend-of-a-friend recommendation to Paul Haggis, the writer/director behind "Crash."

In short, the magical part of the story is that Hughes Winborne had won the brass ring simply by being an editor... one of us. And instead of channeling his own creativity and passion into writing or directing, he was able to simply and intuitively do what he does so well, and the Academy noticed.

Karma doesn't always take that route, though. Sometimes you need to branch out in order to break out.

SEARCHING FOR FRIENDS

Here's a guilty little admission: From time to time, I Google some old classmates and friends to see what they're up to. A kid from my neighborhood is now one of the world's foremost hip-hop mastering engineers; a high school buddy left 20 years of social work to become a noted anesthesiologist.

One set of results had particular significance for me. Joe D'Augustine is a high school friend and classmate who'd become a film editor, at first conforming spots overnight in New York, and later moving to Los Angeles. Over the years, he's done some really interesting work: he restored "The Good, The Bad And The Ugly" as well as the John Wayne classic "Hondo," worked with Michael Cimino on "The Sunchaser," and cut the "Kill Bill" movies for Quentin Tarentino.

Flash forward again, to a few weeks ago: Google says that Joe has apparently found his creative voice. IMDB reports that Joe has written and directed an indie film called "One Night With You," and that it's nearing completion. The trailer is intriguing—a *film noir* set in seedy L.A, featuring a cast of quirky, veteran character actors. This is no vanity piece, no student film; this is what happens when a real editor, hooked-in to the Hollywood crowd, decides to stretch his legs.

Check it out for yourself at *www.kitehillpictures.com*; like Hughes Winborne's story, Joe's story is every editor's dream-come-true—taking a chance and letting that innate creativity come screaming out, inviting the world to judge it.

I haven't talked to Joe in over 30 years, but I think I'll send him an e-mail when I finish writing this. Maybe some of his breakout karma will get something fired up in me, too. ■

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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TECHNOLOGY CORNER **Randy Hoffner**

Developments in LCD Backlights

The cathode ray tube that until recent years served as the principal television and video display device generates its own light.

The CRT's electron beam bombards electroluminescent phosphors, which absorb the energy in the electron beam, exciting the electrons in their atoms to a higher energy level. When an energized electron returns to its previous lower energy level, it emits its excess energy as a photon of light. The materials comprising the phosphors are chosen to emit photons of the desired light colors.

In 2006, the CRT's days appear numbered as consumers choose among various advanced displays. One of today's most prevalent advanced displays, the direct-view liquid crystal display, does not emit its own light, but rather must be illuminated from behind. One possible source of illumination for such a display is a xenon lamp, as is frequently used in projection displays.

While xenon lamps furnish a lot of light with good spectral content, they are not ideal for direct-view LCD panels because in addition to generating a considerable amount of heat, they are close to being point sources, making it difficult to spread their light evenly over an entire display screen.

A fluorescent tube is more optimally shaped for direct-view LCD backlighting. It may be made in a length that spans the entire display horizontally or vertically, and it may have a diameter sufficiently small to fit within the LCD's thin depth.

This roiling stew of electrons and positive ions is called a "plasma."

Fluorescent lights bear a similarity to CRTs in that their light is also generated by phosphor coatings, but the mechanism used to energize the electrons in fluorescent phosphors is different. The atoms in a fluorescent tube's gases are excited to the point where they cause some of their outer electrons to separate, and a state is reached where some electrons absorbing quanta of energy are jumping out of atomic orbit, while some previously freed electrons rejoin their atoms, with the release of quanta of energy in the form of photons. This roiling stew of electrons and positive ions is called a "plasma."

The photons released from the plasma are in the ultraviolet region of the electromagnetic spectrum. They bombard the tube's phosphor coating, raising some of the phosphors' electrons to higher energy levels. When these electrons return to their lower energy states, they release photons in the visible light region.

The fluorescent tubes used to light offices use "hot cathodes,"—coils of wire coated with materials that enhance thermionic emission, or the "boiling off" of electrons, to generate their plasmas. There is such a cathode at each end of the tube, and the light is started by connecting the two cathodes in series, and passing an alternating electric current through them.

The thermionic filament-cathodes

become sufficiently hot to boil off electrons in the same way a vacuum tube cathode does. When this point is reached, the series connection between the two filament-cathodes is opened, and this causes an inductive voltage surge from the lamp's ballast to strike an arc through the now conductive plasma in the tube, igniting it.

COLD CATHODES

The fluorescent tubes used as LCD backlights are cold cathode fluorescent lights. In a CCFL tube, electrons are not boiled off a heated filament-cathode by thermionic emission.

Instead, electrons are released from two parallel cathodes within the CCFL tube by ion and electron bombardment. As ions and electrons bombard the cathode material, secondary electrons are knocked loose and emitted from it. CCFL lamps are also driven with alternating current, so their cathodes also serve as anodes.

The cathode material is typically a metal such as iron. Although this is a called a "cold cathode" device, heat is of course generated in the bombardment process and the excitation of the plasma within the tube, so heat is emitted by the CCFL lamp, albeit less heat than a hot cathode lamp emits.

One disadvantage of the CCFL is that the constant bombardment of the cathodes causes them to deteriorate over time. A relatively recent development that addresses this problem is the external electrode fluorescent lamp.

This EEFL does not contain internal electrodes. Rather, the electrodes are external to the lamp itself, and the electron energy they generate is capacitively coupled to the gases within the tube.

ADVANTAGES OF EEFL

Claimed advantages of the EEFL include high efficiency and brightness, less heat and less deterioration of the phosphors that heat causes, as well as the elimination of the electrode deterioration caused by ion bombardment.

Further, capacitive coupling imparts the ability to operate a number of EEFL lamps in parallel from a single set of electronics, as opposed to the CCFL, where each lamp or pair of lamps requires its own set of electronics.

Because there are no electrodes within the lamp, no wires pass through the glass tube, eliminating the need for a glass-to-metal seal, which is claimed to reduce gas leakage problems.

EEFL is a relatively new development in fluorescent lamp technology, and as such is not prevalent in current display products. We may expect to see it in an increasing number of future products, however.

Another significant new fluorescent backlight development is the flat fluorescent lamp. The FFL is a thin, flat, rectangular lighting source that has the appearance of being an adaptation of the EEFL.

The FFL is sufficiently thin and large to cover the entire display area. Electrodes are arranged on the back surface of the FFL fixture, phosphors coat the front, while the gas plasma occupies the space between. This permits the backlight source to be spread across the entire display area, rather than being located along its edges with distribution by reflectors, as is the case with round fluorescent tubes.

One recent survey of backlighting techniques indicates that today, in 2006, backlighting for direct-view LCDs consists almost entirely of CCFL sources. Four years from now, CCFL is projected to be the second-largest source of backlighting. The No. 1 light source is projected to be LED lighting, as has previously been mentioned in this column.

The No. 3 and 4 backlighting sources are projected to be EEFL and FFL fixtures respectively. New technologies are being applied not only to advanced displays themselves, but also to methods of backlighting them. ■

Randy Hoffner is a veteran TV engineer who recently relocated to sunny California from New York. He can be reached through TV Technology.

VIDEO NETWORKING

Wes Simpson

Drilling Down Into Video Pathways

Internet Protocol Television is all the rage today, but it is really the latest of a series of technologies that has been evolving for more than 40 years. In this column, we'll be discussing technologies for sending a variety of video signals over many different kinds of networks, including IP, wireless, point-to-point, and telco networks.

We'll take a look at how these technologies work and their implications for broadcasters, program creators, and viewers, but before going into too much detail, it might be appropriate to tell you a little bit about who I am.

THE NEW GUY

I am an engineer by education and training, although I haven't been doing any detailed design work for the past 20 years. Instead, I focused on products and markets, first at Lightwave Communications Inc. where we developed a system to send video signals from high-performance workstations to displays hundreds of feet away.

When I joined ADC in 1994, it was to work on the DV6000 product line, which sent multiple baseband television signals over fiber for telcos, broadcasters and cable TV providers. After spending most of 2000 as chief operating officer of VBrick, I decided to strike out on my own as an independent consultant, which has kept me quite busy ever since.

Video networking equipment will need to be flexible enough to handle new video formats and frame rates, more audio signals, and a wide variety of network technologies within and between different countries.

I have worked with a number of companies that have used a variety of technologies to transport video signals over local and long-haul networks.

In my "spare" time in 1997, I became one of the founding members of the Video Services forum, an industry association dedicated to the business and practice of video transport services. I'm also the author of a book titled "Video Over IP—A Practical Guide to Technology and Applications," published by Focal Press earlier this year.

NOW ABOUT NETWORKING

The HD Masters conference in London in May was a real eye-opener. Until now in Europe, companies and viewers have not yet embraced HD television. But this situation is changing rapidly, for several reasons.

First, many consumers are buying HD-capable television sets, even though there aren't yet many sources for programming. Second, HD DVD players and discs are starting to come to market in Europe and elsewhere.

Third, the FIFA World Cup soccer matches, held in Germany this summer, exposed a large number of viewers throughout Europe to HD images, particularly in public spaces (such as local pubs) and consumer electronics stores.

By waiting until now to get started on HD, the Europeans have a number of advantages. Most technology for HD transport and processing is in its second or third generation, so many of the early bugs and high initial costs have been wrung out.

Also, the viewer base is getting ready—many (if not most) of the new television sets on sale in Europe are flat-panel HD-ready televisions. Additionally, there's a large pool of HD content available, as a result of U.S. and other content buyers demanding HD material from content producers around the world.

Of course, the transition to HD won't be completed without some pain. The format wars will need to be fought. In Britain, BSkyB started delivering 1080i HD services in June, while experts at the European Broadcasting Union are recommending 720p (with an eventual migration to 1080p).

To complicate matters further, more viewers get their television signals off-air in Europe than in the United States, with the transition to digital broadcasting being scheduled at different times in different countries.

And because of the smaller potential market for each broadcaster (due to wide variations in languages and tastes among the various countries) the investments to transition to HD will be spread over a smaller number of viewers.

The change to HD will have a big impact on all aspects of video networking. Compression technology for HD is more processor intensive and more expensive than SD.

Uncompressed HD signals occupy roughly six times as much bandwidth as uncompressed SD signals. Viewers who are replacing 27-inch CRT's with 50-inch flat panel displays will more easily notice poor video quality.

Producers who are looking to the future will also want high-quality archives for all of their valuable new footage.

Overall, video networking equipment will need to be flexible enough to handle new video formats and frame rates, more audio signals, and a wide variety of network technologies within and between different countries.

This column is written with users in mind. Users who need to understand how their valuable video signals are going to get processed, manipulated, distorted, and otherwise banged-about in moving from one location to another.

Users who need to choose the right combination of technology, price, and circuit availability to meet their needs. Users who need to know what things to look for, and to look out for, when choosing a video service provider.

News items (like the above segment on HD in Europe) will be included from time to time. In the coming months, I hope to cover many different aspects of video networking technology and practice.

Thanks for reading. I hope you liked my first column. ■

Wes Simpson, author and president of Telecom Product Consulting, loves to talk about video networking any chance he gets. If you have news, comments, questions, or want to suggest a topic for a future column, please feel free to write to wes.simpson@gmail.com

Discrepancy

CONTINUED FROM PAGE 40

instead of black bars. Some amount of linear or nonlinear stretching and/or zooming may be done as well, using the knowledge that video outside the active area can be safely discarded.

The two double-boxed cases can occur as a result of poor or uninformed production choices made by the service provider, in some cases in concert with the content provider.

Whenever 4:3 material is coded as 16:9, double-boxing occurs when the 4:3 display places the 16:9-coded frame on screen. Whenever 16:9 material is coded as 4:3, double-boxing occurs when the 16:9 display pillar-boxes the 4:3 coded frame.

Regardless of the cause, two aspects of this problem are of prime importance to broadcasters. The display device should not be expected to process the double-boxed image to fill the screen to make up for incorrectly coded content; content and service providers should be expected to deliver properly coded content.

Native 4:3 content must be delivered coded as 4:3. Native 16:9 content must be delivered coded as 16:9. Letterboxed widescreen video in NTSC should not be coded as 4:3, but should be coded into a 16:9 coded frame.

Recognizing these issues, the ATSC undertook a study of available options and decided to endorse the basic signaling structure developed by the DVB consortium. The benefits of common AFD signaling across many different markets are easily understood.

COMMON FORMATS

Some common active video formats represented by the 4-bit AFD field include:

The aspect ratio of the active video area is 16:9; when associated with a 4:3-coded frame, the active video is top-justified.

- Active video area is 16:9; when associated with a 4:3 coded frame, the active video is centered vertically.
- Active video area is 4:3; when associated with a 16:9 coded frame, the active video is centered horizontally.
- Active video area exceeds 16:9 aspect ratio; active video is centered vertically (in whatever coded frame is used).
- Active video area is 14:9; when associated with a 4:3-coded frame, the active video is centered vertically; when associated with a 16:9 coded frame, it is centered horizontally.

In addition to AFD, ATSC defined another data structure—bar data—also for use in the video elementary stream. While the AFD gives a general view of the relationship between the coded frame and the geometry of the active video within it, bar data is able to indicate precisely the number of lines of black video at the top and bottom of a letterboxed image, or the number of black pixels at the left and right side of a pillar-boxed image.

For the ATSC system, AFD and/or bar data are included in video user data whenever the rectangular picture area containing useful information does not extend to the full height or width of the coded frame. Such data may optionally also be included in user data when the rectangular picture area containing useful information extends to the full height and width of the coded frame.

For more information on AFD and bar data, consult the following references:

ATSC Standard A/53E with Amendment No. 1, "ATSC Digital Television Standard," Dec. 27 2005, *www.atsc.org/standards/a_53e-with-Amend-1.pdf*. ATSC Recommended Practice A/54A, "Guide to the Use of the Digital Television Standard," Dec. 4, 2003, *www.atsc.org/standards/a_54a.pdf*.

All ATSC Standards and Recommended Practices can be downloaded at no charge from the ATSC Web site (*www.atsc.org*). ■

Jerry Whitaker is vice president of standards development for the ATSC. You can reach him via TV Technology.

NEWS TECHNOLOGY | Harlan Neugenboren

The Road to Producing More Content

Everyday, we all read articles about news stations expanding their presence in broadband, wireless and podcasting in response to changing viewer demands. Some are repackaging existing content while others are producing exclusive content for these outlets.

At the same time, increased competition for ad dollars and shrinking audiences have started to put a dent into the profits of many stations.

Therefore, stations are looking to cut costs, but still add content. It's a bit tricky, but it is possible. It requires a little work and a willingness to change or modify what you are doing now.

Fortunately, a number of vendors, including Avid, Omnibus, Proximity and Apple, have brought new products to market that are making it easier for people to manage their content.

ANALYZE WORKFLOW

The first step in this process is to analyze your current workflow and get a good idea of what you're producing and how you're producing it.

A good place to start is at the assignment desk. Who is shooting what? What are they shooting it on? Where is it going when it comes back to the station? Meeting with the assignment manager, news director, executive producer and operations manager would be very helpful.

Take a step back and look at the bigger picture. For example, if you are shooting a daily press conference, could the crew get there a bit earlier and shoot the whole press conference? You then could cut up that press conference into segments and put it up on your Web site.

Another area to explore is how you are using the assignment grid in your newsroom system. ENPS has a way to export much of the data that your assignment staff is filling in the grid and that can be used as metadata to search content.

METADATA TAGS

Things like names, phone numbers and Web sites can be extracted and output in XML format to your Web site.

Knowing what media you have, where it's located, and what format it's in is very important if you are trying to repurpose content.

Avid's Interplay System, the Omnibus OPUS System and Proximity Artbox provide the ability to catalogue, convert, view and log the content you have.

If you don't have the storage to keep all your media in high resolution, consider making a low bit-rate Windows Media or Quicktime version. It takes up a lot less space, is easy to encode and can be edited using Windows Media or Quicktime Pro.

The ideal is to have what you display online in high resolution. Apple's XServ is a very cost-effective storage option. Also, at NAB2006, Sun introduced a low-cost asset management system comprised of the Video Ingest Management System and Video Asset Management System.

There are several other solutions that can be found with a little bit of research. It pays to read those NAB press releases.

One of the biggest challenges to media management is getting the media into a system to manage it without having to ingest a ton of content.

Knowing what media you have, where it's located, and what format it's in is very important if you are trying to repurpose content.

While there are a number of disk-based recording solutions (Sony XDCAM, Panasonic P2, Thomson/Grass Valley Infinity), many stations are not ready to invest in new technology. Focus Enhancements FireStore drive plugs into most cameras via FireWire and offers two to six hours of storage, depending on your recording format (DV25, 50, HD).

DIRECT-TO-EDIT

By using the FireStore drives, you also can take advantage of their direct-to-edit technology that allows you to record in the format for your nonlinear edit system. Therefore, you can attach the drive to your nonlinear editor and just edit without any transferring.

Workflow systems are another area to explore. Avid Interplay, Omnibus OPUS, Anystream Agility and Telestream FlipFactory and Ardendo Ardenc all offer the ability to automate the process of ingesting and transcoding media.

If you couple this with NAS or SAN storage (Apple XSan/Serve, NetApps Nearstore, Sun and Isilon) you can quickly have a large amount of content available for repurposing.

There are many applications and hardware solutions that are not from the traditional broadcast vendors. Apple's XServe/XSan is very cost-effective and scaleable storage.

Also, Apple is working with Vicom Systems to deliver a fully mirrored SAN solution.

Coupled with Final Cut Pro, the combination makes a very powerful and cost-effective system. Apple's ILife Suite, standard on most Macs, has Garage Band, which allows you to produce audio and video podcasts; and iMovie, a very simple nonlinear editor.

GOOD ENOUGH

Microsoft offers Movie Maker, which is based on Windows Media. These applications are good enough to produce content for the Web or mobile applications.

For HD field acquisition, you should consider HDV. Both Sony and JVC offer a number of cameras that record in HDV.

Some may argue that it is not "broadcast quality" but people didn't think DV was either and look at how many shows are shot on DV.

Final Cut Pro can edit HDV natively. Since it's only 25 Mbps, it can work across a 100Base-T network (provided that you have the right storage configuration to support the bandwidth requirements).

My point is, it's good enough, and it fits the application. You can produce some pretty good HD content with this.

While many may argue that this is more complicated than it sounds, sometimes we make simple tasks into complex ones. Also, our previous experience clouds our judgment sometimes.

If you approach each task from the "what am I trying to do and what's the best way to do it" you will produce workable solutions that probably include using much of the infrastructure you already have.

Harlan Neugeboren is CEO of The Workflow & Technology Group. He can be reached at Harlan@wftgroup.com.

Formats

CONTINUED FROM PAGE 43

Analog-to-digital conversion was accomplished by sampling the analog and then taking the difference between the actual sample value and its predicted value, then quantizing and encoding to form a digital value.

The technique is a predicted compression scheme, generally applied to lossy compression, and had few units made. H.210 is essentially no longer used today.

Yet, with this many technical acronyms, confusion in naming and functionality is not unusual, hence it is not uncommon to find CIF also defined as the Common Interchange Format or vice versa.

With this many technical acronyms, confusion in naming and functionality is not unusual.

The basis of the structure in the first, then CCITT Rec. H.261, embodied 16x16 macroblock motion compensation, 8x8 DCT (discrete cosine transform), scalar quantization, zig-zag scan and run-length, variable length encoding.

H.261, while still use today, is retained mostly as a backward-compatibility feature, and was overtaken by H.263 adopted in 1995.

CIF, with a frame rate of 30 fps for NTSC and 25 fps for PAL; has 288 lines and 352 pixels per line per frame for NTSC, and is sometimes referred to as full CIF to distinguish it from QCIF.

One of the CIF-resolution sublevels called "Quarter Common Intermediate Format" is one-quarter the resolution of CIF. Each QCIF NTSC frame contains 144 lines with 176 pixels per line. PAL further defines a ub-quarter CIF (SQCIF) refers less than QCIF (i.e., 128x96).

Common Intermediate Format, should not be confused with CIFS, the Common Internet File System that Microsoft developed for remote file sharing protocol.

Nor should CIF be thought of as Common Image Format, which is the standard frame size for digital video and defines 720x480 and 720x576 as the two standard SDTV (i.e., SDI in ITU-R BT.601) frames in digital video.

From lessons learned during the beginning of intraframe encoding, starting with DCT (in the early 1970s), rounding off or quantizing to scaled integer values (in the 1950s and 1960s), and Huffman variable length encoding VLC (circa the 1950s); H.261 and its predecessor, H.263, essentially became the foundation for what we consider modern digital video encoding.

Since those early developments have come hundreds of man years of related development over the course of the 1980s, 1990s and now into the 21st century.

With the increases in general server computing power, the specialty 'video server' as we know it will be taking on new dimensions of functionality.

In the next months this column will explore such new devices—both in hardware and software—that can handle the routine issues of quality assurance, correction and general monitoring at a file level and as a background task.

Look to next month, when we fast forward to current practices and take a look at where file management, video correction and transcoding concepts are taking us. ■

FORMAT	NTSC	PAL Mbps/sec at 30 fps	BIT RATE
SQCIF	128 × 96	4 4	
QCIF	176 × 120	176 × 144	9.1
QCIF+	176 × 220	176 × 220	
CIF (FCIF)	352 × 240	352 × 288	36.5
4CIF	704 × 480	704 × 576	146
9CIF	1056 × 720	1056 × 864	
16CIF	1408 × 960	1408 × 1152	583.9
D1 (Std Def)	720 × 480	720 × 576	~ 270

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PRODUCTS & SERVICES SHOWCASE

PRODUCTS & SERVICES SHOWCASE

ELECTRONIC SIGNAGE

Harris InfoCaster

by Tor Rolf Johansen

InfoCaster is a powerful signage solution for broadcasting and cable. It's akin to a revved-up videotext appliance. Intuitive and easy to use, InfoCaster integrates crawls, rolls, animations, clocks, live video, clips, graphics and text for professional, multi-zone presentations of news, weather and community information. InfoCaster comes equipped with content creation tools and a multi-zone scheduler for straightforward production design and maintenance. Public display of electronic signage (PDES) is a trend that is going nowhere but up. Information Channels, PEG (Public, Education, and Government) cable channels, closed circuit cable, lobby kiosks and transportation hubs can all benefit from this technology.

FEATURES

If you've everprepared a full screen graphic for television, or composed a Web page with "tables," you're already primed for taking full advantage of this tool. Highlights of the new release include the use of a live video editor to stream video from the Web directly to an InfoCaster region for displaying up-to-the-minute information. Standard streaming and ASX file streaming will be supported. In addition, new transitions such as ripple, page curl, flip, cube, mosaic and zoom offer new creative design possibilities. Further enhancements include increased flexibility to transition each screen item independently, application of transitions between complete page changes and application of transitions between clips and live video events.

Electronic signage display produced by the Harris Infocaster

InfoCaster can be installed for use within SDI, composite or S-Video environments. Inca InfoCaster Workstation can generate both SDI video key and fill signals for use by a switcher with external key inputs. This type of installation is ideally suited to the user who wants to maintain the highest quality SDI video or needs to work in a TV studio or professional television presentation environment where genlocking and video signal quality are important.

A larger sequencer window greatly enhances the information available about each item in a sequence such as playback and scheduling information, start/stop times, days of the week, expiring events, transition type, etc. There are enhanced sequencer functions like "loop or play once" as well as options to play non-timed sequences which are triggered by other regions. There are controls to play specific events between a given set of dates and for specific times. This can be a real lifesaver in making sure that nothing outdated hits the screen. There's even notification of a blank or empty event, with an option to fill the gap where no content exists between two other items in a sequence.

I was pleased to find an enhanced table quick editor which makes an easier alternative to TitleMotion for creating of tables. Choose the number of columns, rows, table headers, assign different colors to content versus headers, choose a font, type content of tables or link to an external database query. When you need to make a lot of updates, and you're on a tight schedule, it's nice to be able to share the load, even with your less graphically inclined counterparts.

IN USE

For this review, I opted for the "full monty" with all the bells and whistles. Inca InfoCaster Workstation has the following advantages: genlocking, SDI video, internal (downstream) keying, external (upstream) keying and full motion video background. The basic InfoCaster Workstation system contains both the InfoCaster software and the video output card required to display one channel of composite output. This single system allows you to create, edit and output your content. You can even make content changes on the fly while it's playing. Whether you are adding new content to a display zone, such as scheduling new video to play, or just changing some

INFOCASTER, PAGE 55

FAST FACTS

Application
Electronic signage

Key Features
Multiple zone and multiple device control capabilities

Price
$2,750 for creation system; software for each player, $1,100

Contact
Harris Broadcast Division
800-231-9673
www.infocaster.tv

MOTION GRAPHICS FOR EDITING

Adobe After Effects 7.0

by Michael Hanish

Arguably the industry standard for motion graphics and likely the most widely used application for desktop compositing and special effects, Adobe After Effects has just moved to version 7.0 in both Standard and Professional versions for Mac OS X and Windows. This upgrade is more on the evolutionary, rather than revolutionary, side of things, but still has more than enough new and improved features and capabilities to justify the price. After Effects 7.0 is also available as part of the Adobe Production Studio (available for Windows only) which includes Premiere Pro 2, Photoshop CS 2, Illustrator 2, Encore DVD 2 and Audition 2. For additional details, system requirements and upgrade pricing, visit the company's Web site.

FEATURES

The first thing that you notice about After Effects version 7.0 update is the redesigned user interface. This now consists of docked panels, which can be separated at will. As you can see in the accompanying illustration, the color scheme is easy on the eyes, with a mix of 2D and 3D elements. A number of preset, task-based workspaces are provided, such as Animation, 2 Monitor, Motion tracking, Effects and Paint. These can be modified and saved, making it easy to move between different configurations as the project progresses.

A major new feature of the redesigned interface is the Graph Editor, which is visible in the lower right corner of the illustration. It allows users much easier control over animation properties. Also, the new interface allows you to see and compare properties for any layer or group of layers, gives you the ability to synchronize and scale groups of key frames, and also to add and move individual key frames with only a simple mouse click.

In the area of animation, the program includes another new feature—Adobe Bridge—a browser-type application which is useful for more than just looking at and managing digital assets of all types. You can also run batch processes, work with metadata, and preview and apply animation and behavior presets (many are supplied, and an unlimited number can be created, stored and used across multiple projects). The number of file formats supported by After Effects has been expanded now to include HDV (720p and 1080i), Camera Raw, AAF,

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FAST FACTS

Application
Creating motion graphics and visual effects

Key Features
Graph Editor, Adobe Bridge, Timewarp and PixelMotion

Price
Standard, $699 MSRP; Professional, $999 MSRP

Contact
Adobe Systems Inc.
888-724-4508
www.adobe.com/products

InfoCaster

CONTINUED FROM PAGE 54

descriptive text, it's just a few clicks away.

For large scale digital signage networks requiring collaborative administration, InfoCaster Network Manager Clients offer remote control and monitoring of groups of InfoCaster Players on the InfoCaster network. Hundreds of InfoCaster displays can be controlled from one centralized location, using just one operator, saving you valuable time and resources. Powerful tracking capabilities allow you to track and log playback, which is perfect for accurately monitoring and billing advertisers. You can remotely provide fresh information to all or selected displays, and keep your audience constantly informed and up-to-date. Server maintenance is simplified, so you can remotely update every InfoCaster player in your network as new software versions are released.

With InfoCaster Player, content on individual displays can be customized, which is perfect for announcing regional schedule changes, transit delays, breaking news, or advertising for specific retail markets. There is no limit on the number of zones that can be created. Zones can be set up to display either stills, rolls, crawls, animations, clocks or video. Each zone is an independent item, and can be customized with different attributes. The user interface allows creation of zones in 4:3 and 16:9 and provides output support. While you can use a wide variety of graphical creation programs such as Photoshop or Painter, Inscriber includes a cg utility—TitleMotion—for advanced text creation.

SUMMARY

Communicating with your audience has never been easier, thanks to this broadcast video appliance. InfoCaster is a powerful communications tool for digital signage and broadcasting and provides a cost effective, out-of-the-box solution for achieving your presentation needs. It has scaleable options to suit any budget.

InfoCaster is extremely easy to use and is designed to quickly create attractive multi-zone layouts for immediate digital display. It allows you integrate crawls, rolls, animations, clocks, video and audio clips for dynamic presentations. Even if you have to manage a display group that spans a vast area or market, InfoCaster Network Manager is ready to manage multiple field devices. Use the Manager to remotely create and update the content, permissions and schedules of multiple InfoCaster displays over a LAN, FTP or TCP/IP network. InfoCaster Players run and update your displays. Content can be set to play identically on every system, or can be customized for individual Players, making it an effective tool for targeting localized audiences.

InfoCaster makes it possible to design your display your way. You can arrange multiple layers of graphics, text, video, rolls, crawl, 3D animations, clocks and logos in virtually limitless overlapping zones. You can set the depth of each layer and determine whether content is displayed in the foreground or background of a layer. There are many possibilities for this level of product already out there, and many more that I'm sure will soon be discovered. ■

Tor Rolf Johansen is an Emmy award-winning director and videographer who lives in Los Angeles. He may be contacted at tor@torphoto.com

COLOR CORRECTOR/PROCESSOR

Xintekvideo SDI-900MX Color Corrector

by Ken James

Xintekvideo, formally Intelvideo, has a product line that includes several low priced good quality conversion and processing devices. The 1 RU SDI-900MX color corrector/video processor is one of their most popular offerings. It did not take me long to understand why the device sells as well as it does. My demonstration unit came configured for both analog NTSC and 270 Mbps serial digital operation.

It doesn't take a lot of imagination to come up with a wide range of applications for this processor. These might include, but are certainly not limited to:

- Optimizing video for downstream compression
- Matching colors on non-standard display devices
- Analog to digital and digital to analog conversion, including analog decoding and encoding.

FEATURES

The SDI-900MX is loaded with front panel switches and controls. Located on the left, the power rocker switch, and easily visible LED "power on" indicator, activate the system. The unit that I received for this review included the capability to store and recall up to 400 panel adjustment configurations. Note that the 400 preset functionality is an option on the SDI-900; the basic configuration provides seven presets. Several switches and buttons are dedicated to this function. There is a source selection switch for delegating control between preset storing/recalling and the front panel controls. A "press-to-store" button activates the storage function and a thumbwheel switch assembly delegates the specific storage location.

A processor-enable switch selects between "bypass" and "enable" modes. In "bypass" mode, the active video portion is bypassed, while the blanking portion of the video is always processed.

Primary color correction is controlled via potentiometers with unity detents. The adjustments provide individual gain and pedestal and gain controls for the red, green and blue content of the processed signal.

The Xintekvideo SDI-900MX color corrector undergoing evaluation in the author's testing laboratory.

A noise reduction function is activated by a three-position toggle switch with off/auto/on positions. In the "on" position, two screwdriver adjustments are activated for setting the luminance and chrominance noise reduction levels.

Luminance processing adjustments control brightness, gamma curve selection and a high-frequency boost function.

Processor I/O connections are located on the rear of the frame. An easily accessed AC mains fuse is located next to the IEC power connection. I was a bit disappointed to find that there was no power cord retention capability associated with the connector. A looping SDI digital input and a terminating NTSC input comprise the system inputs. Analog NTSC/SDI digital input selection is accomplished with a rear-mounted toggle switch. Two processed SDI outputs and a simultaneous analog output round off the system outputs.

I like quiet and was glad to find that the frame has no cooling fans. The system boasts a power consumption of only about 10 VA and doesn't generate enough heat to require fans.

IN USE

Test equipment used in connection with the processor evaluation included the following:

- Tektronix 1750 waveform/vector monitor
- Sencore VG-91 video generator
- Sencore PR-570 variable voltage isolation transformer
- VHS tape machine
- DVD player
- Pioneer LD-S2 laser disk player
- B&W CCD camera
- Color CCD camera
- Satellite television demodulator

During input testing, I set the color corrector's RGB controls to their detent positions, set unity gain for gamma and turned off the HF boost and noise reduction.

The SDI-900 cleanly and easily processed the timebase-stable demodulated satellite TV video. I then tried the processor with NTSC video from my laser disk player. The laser disk time-base errors were greater than the satellite video, but still very small. Again, the system easily decoded and processed the video. I knew the laser disk itself contained a VIRS test alignment signal on line 17 and was surprised to see that the output of the processor did not contain this signal in either the bypass or enabled mode. After some additional checking, I determined the processor "enable" switch only enabled active video processing. A portion of the H and V blanking area was always processed.

FAST FACTS

Application
Professional video color correction

Key Features
Up to 400 preset memories, NTSC and SDI I/O and variable noise reduction

Price
$2,295 as configured

Contact
Xintekvideo Inc.
203-348-9229
www.xintekvideo.com

This processing added setup and removed video from lines 10 through 19. Lines 20 and 21 were always passed without processing, allowing closed captioning to get through the system. Next in line was the DVD player, which, as expected, worked fine in active video, and blanked lines 10 through 19. Non-timebase-corrected VHS video was the last source to be tested. I was curious to see how the color-under, non-SCH phased video would affect the processor. Head switching on my machine occurs about seven lines into active video and contains about four µsec of skew (about the width of a horizontal sync pulse). As might be expected, this was enough to confuse the sync separation circuits and caused excessive tearing of the video in both "bypass" and "enable" modes.

With no input, the processor produced a color black output. I fed it a black and white camera signal (with no color burst) and, as expected, the system inserted new blanking with burst.

Next, test signals from the video generator were used to determine the processor clipping levels. I used a super

black signal and quickly determined that anything below zero IRE blanking level was being clipped at blanking. Luminance levels up to 110 percent passed without any issues and the negative-going chrominance information from SMPTE bars passed perfectly.

For my last test of this nature, I tried switching back and forth between two stable, but asynchronous, signals. As expected, it took several frames to reacquire lock after the making the switch. With a clean upstream vertical interval switch, the system worked flawlessly.

When supplied with a stable SDI signal the system also worked flawlessly.

I used a multiburst signal to check luminance response. It was flat all the way to highest burst at 4.5 MHz. Modulated equal amplitude color bars were used to check the chrominance decoder frequency response. A small chroma vector amplitude change was noticed when switching between proc-on and bypass modes. The amplitude change occurred almost exactly 180 degrees from the burst vector and was unrelated to pedestal and gain settings.

I fed the unit SMPTE bars and observed the output on the Tektronix 1750 vector display. The pedestal and gain adjustments for red, green and blue worked exactly as expected.

My next bit of evaluation centered on the SDI-900's noise reduction capability.

Using a 2/3-inch single chip color camera in a low light condition, I was able to simulate grain noise. The luminance noise reduction circuit worked very well at reducing the graininess in the image to the extent that it was almost unnoticeable. However, the low light condition did not produce much chroma from the camera, thus it was difficult to test the chrominance noise reduction capabilities. The automatic setting functioned without introducing any noticeable smear, while greatly reducing the luminance noise.

I moved on to the high frequency boost adjustment. The boost curve started at a relatively low frequency and increased as the frequency increased. Be careful of excessive boost and lots of high frequency energy in the video signal or clipping can occur.

The unit has six selectable gamma curves. They easily compensated for different types of display devices.

The brightness adjustment was perfectly calibrated in the detent position, and as anticipated, moved the video signal on a DC pedestal.

I tried saving and recalling presets with the device and found that it was a simple and straightforward task.

As with most processing gear placed in the signal chain these days, electrical length is a concern. I'm pleased to report that the Xintekvideo has a very short electrical length—about 3 µsec—thus eliminating any possibility of audio lip-sync problems.

The SDI-900 generates so little heat that cooling fans aren't necessary. With 117 VAC applied, current consumption measured about 100 ma. This current draw remained fairly constant as I varied the line voltage from 80 to 140 V.

SUMMARY

Adding remote control capabilities would make the system more flexible. Deploy the unit in the equipment room, route inputs and outputs through the station router and you have an excellent and cost-effective processor for anything that has to pass through the system.

I was very pleased with the unit. The SDI-900 offers an excellent cost performance ratio. ■

Ken James is a video engineer with over 30 years experience. He spent most of his career in Grass Valley, Calif. before retiring to Montana. He remains active in video technology. He may be contacted at kenjames@blackfoot.net.

Adobe

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OpenEXR, 10-bit YUV, 32-bit TIFF, and, notably Flash Video, which can be encoded on export and includes alpha channel information.

After Effects 7.0 Pro sports is another huge capability expander with the addition of 32-bit high dynamic range color support. Processing done in this space with images of this bit depth yield much more natural and accurate lighting effects, blurs and color processes. OpenGL support (make sure to check Adobe's Web site for recommended cards for each platform) has also been beefed up this time around. Now, not only are previews greatly accelerated (both 2D and 3D are up to three times faster than they were in version 6.5), the transfer and blending modes, masks and anti-aliasing functionalities share this speed increase as well. The program now includes an option to use OpenGL for final output as well. With version 7.0, After Effects can also address more RAM than in previous versions, up to 3.5 GB under Mac OS X (version 10.4.3 minimum) and 3 GB under Windows XP or 4 GB under Windows XP 64-bit editions.

Several new effects are available within the After Effects 7.0 professional

The Adobe After Effects 7.0 user display

version. Timewarp is a retiming tool, with advanced control over interpolation, motion vectors, smoothing and the weighting of individual color channels. PixelMotion works in conjunction, behind the scenes, as an alternative to Frame Mix mode when Frame Blending is activated. The results are a quite dramatic improvement at the pixel level resulting in greater smoothness and less ghosting in interpolated frames. Lens Blur mimics the physical characteristics of a defocusing lens, such as maintaining the full brightness levels of a blooming highlight. Smart Blur works only on areas of the image where there is a very low level (user settable threshold) of detail and employs edge detection to protect high detail areas.

IN USE

Using After Effects 7.0 for several weeks on some small projects was quite an interesting experience in a number of ways. I gave myself a hard time over the redesigned interface and revised color scheme; much to my surprise. I hadn't realized how deeply my work habits in After Effects ran until I had to start looking in different places for my accustomed tools. My first response was to undock all the windows and try to recreate my habitual and familiar workspace. However, I soon realized the silliness of that approace and began to embrace the changes being offered. The newly introduced concept of side-by-side window views made it very easy to compare sets of footage. I found that the new color scheme was a little hard on the eyes, particularly in distinguishing among layers in the timeline. But overall, I was satisfied with the new ways in which I could control the workspace and easily change it for specific tasks associated with each project.

But it's really about the refinement of the tools. I was able to accelerate my workflow by using the improved OpenGL acceleraion. I found myself using the Bridge utility quite a bit, and discovered that the application also installs a number of templates and animation behaviors. These are quite handy and can be used as layout starting points for a variety of projects such as DVD menus, animated backgrounds and transitions.

I also very much appreciated the inclusion of Keylight (keying), ColorFinesse (advanced color correction), Cycore FX (huge range of effects) plug-ins, which represent not only major added value to the package, but a large portion of all the effects you'll ever need. Another bit of added value comes with the inclusion of two DVDs of Total Training introduction and instruction to the Adobe Production Suite package mentioned above. These disks contain enough material about After Effects 7.0 to prompt you to look at the more complete and specific materials by Total Training (*www.totaltraining.com*) for After Effects. These include "Professional Features," hosted by Steve Holmes and "Broadcast Design Secrets," hosted by Dean Velez, either of which will provide something new, informative and usable to all but the most battle-hardened motion graphics designers.

I hadn't realized how deeply my work habits in After Effects ran until I had to start looking in different places for my accustomed tools.

SUMMARY

For existing After Effects users, there are enough new features, refinements and great improvements in this version to more than justify the upgrade price. The interface changes might take a little getting used to, but in the long run, the time is well spent and you will be repaid with increased productivity. ■

Michael Hanish runs Free Lunch, a video/audio/multimedia production house near Guilford, Vt. He may be contacted at mhanish@sover.net.

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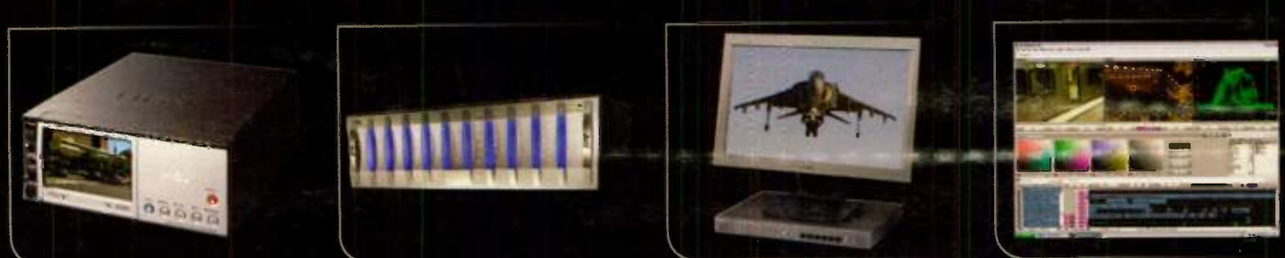

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EYE ON FURNITURE

Rack to the Basics

Every technical area starts with these basic building blocks

by James E. O'Neal

When a new control room, edit bay, or perhaps master control facility is being planned, many things must happen. First thoughts are given to defining the room's functions. The next item of business is selecting equipment to perform the required tasks. Somewhere on the long checklist is selecting furniture for the facility. And as most everyone reading this knows, furniture in a broadcast or teleproduction facility is a bit different than what you'd shop for in your local "Rooms-Are-Us" store.

Tables and file cabinets are important, but satisfactory items can be located at office supply companies.

It's the racks and console units that have to be "sent away for."

THE ORIGIN OF THE RACK

"Rack" is an interesting word. It can refer to meat, a place for putting things, or an ancient instrument of torture. It's a triangular device for grouping billiard balls, part of a gear assembly, or even a place to sleep. It refers to the set of antlers on a deer. Other examples come to mind, but it's probably safest to stop with the deer.

So how did the term get into broadcasting and become a fairly large budget consideration in most any sort of engineering project?

It appears that the phone company was the first large user of equipment racks—they were initially called relay racks, due to the widespread use of relays in early phone systems.

Racks have been part of electronic installations for the better part of a century and are available as off-the-shelf items from scores of suppliers.

The most common rack "size" or rail spacing is 19 inches. Another "standard" associated with equipment racks is the spacing of mounting holes (drilled holes for inserting clips to receive mounting screws, or tapped holes for directly accepting screws). These spacings reflect standardization in the height of equipment designed for rack mounting, as well as the position of mounting holes machined into panels. All rack-mount broadcast gear is vertically sized in multiples of 1.75 inches (approximately 44.5mm). The 1.75-inch height is termed a rack unit or "RU."

PLANNING IS IMPORTANT

Preparing rack layouts in new installations is one of the more important parts of the project. A great amount of study and consideration has to be given to "human factors," even if the facility being designed is not normally staffed. Some of this should be incredibly obvious—you do not want to encounter a patch panel mounted 10 inches above the floor—yet, mistakes in judgment do happen. Once everything is racked-up and wired, it's too late to bring the train back to the station. Even the wiring is started, installers are going to get upset over having to rearrange things. It's not fun moving an 80-pound piece of equipment up 14 inches just because you realized too late there was no room for the control panel that was supposed to go with another piece of gear. Proper planning is easier than having to explain to the big boss that you need 20 hours of overtime approved for rearranging racks.

A new workstation from Winsted specially designed to accommodate computer equipment

Fortunately, the computer has made rack layout much easier. Programs such as VidCAD and Winsted's WELS even allow you to create three-dimensional representations of equipment, racks and consoles. You are instantly alerted to the fact that the new router is going to hang out the back of the rack and not allow the door to close, or that the picture monitor going into that console at a nice viewing angle will crunch into the waveform monitor mounted below.

Even without the sophistication of 3D CAD, it's relatively easy to generate a 2D rack layout for your facility. Moving things around for best fit and ergonomics is a breeze compared with the good old days when everything was hand drawn. Part of facility planning involves a floor space drawing to ensure that everything is going to fit, that rack doors can be opened and that equipment on slides in facing racks can be installed and removed without problems.

Early computer programming instruction stressed building "no-op" steps into the program, as there might be changes later.

The same goes for rack layout too. Don't try to squeeze the maximum amount of gear into the rack for two reasons: First, you have absolutely nowhere to go if another piece of equipment has to be added later on. (And it always will!) Also, more than likely, some of the equipment will overheat from being in such close proximity to its similar heat-producing brethren. Moral: leave a lot of empty space and buy blank panels to cover it. Your equipment will run cooler and last longer and you'll be a hero later on when management wants one more "what's-it" installed as soon as it shows up on the loading dock.

Racks and consoles can be ordered with a number of accessories and options. At minimum you'll need power strips (two separately separate power sources and strips are recommended), lacing bars and grounding bus bars. If you have deep and/or heavy equipment, you'll need secondary rail sets.

Rack tops, doors, sides, accessory drawers, ventilating fans, writing surfaces, blank panels, along with console work surfaces should all be considered when the order is being prepared. Most companies can also provide caster sets if the rack, or group of racks needs to be somewhat mobile. (A word of caution: It is always possible to load a rack in such a way that it becomes top-heavy. A top-heavy rack is not something that should have wheels under it. Bolt it securely to the floor and rethink the mobility idea, or at least place the heavy stuff at the very bottom.)

When installing racks, the matter of floor loading should be more than a passing thought. While this should not really be a consideration in a new facility specially designed for broadcast installations, it could be a big issue in an older structure. If there's any doubt at all, bring in a qualified structural engineer and run some numbers to see if the floor will handle the load. This should never be left to guess work.

Also get shipping costs quoted up front for the racks and console units selected. Moving a lot of steel across country is not cheap and needs to be part of the project budget. Surprise big buck "collect" express charges are not going to put anyone on good terms with upper management.

CLIPS VS. TAPPED RAILS

As mentioned earlier, racks provide for mounting gear in two basic ways—clips that snap into pre-formed rail holes, and rails that have threaded holes to directly accept bolts. Both have advantages and disadvantages. Clips are handy, but require careful planning in order to line up with equipment mounting holes. (It's no fun hoisting that 65-pound chassis two-thirds of the way up the rack and finding out that two of the clips are in the wrong place.) It's no fun either to discover there aren't enough clips to mount everything—they're cheap, order more clips and matching screws than you think you'll need. Tapped holes have the advantage over clips in these situations, but can sometimes necessitate extra work. If the holes weren't cleanly tapped, or if they caught some of the rack's paint coat, you can only screw in a bolt with the greatest difficulty. Trying to drive bolts into partially occluded holes is not fun, and it's all too easy to strip both threads and bolt heads. The purchase of a couple of appropriately sized taps and tap wrenches is a very good idea with threaded rails.

Most manufacturers provide racks in a variety of styles, colors and equipment mounting space. Plan your purchases carefully. It's tempting to go with the tallest racks you can fit in. Leave some room for heat rise. Most of the heat generated by rack-mounted gear is going to go up in normal installations. Make sure that it has a way out.

RACK-MOUNT CHALLENGE

One of the real pains in projects nowadays is rack mounting computer gear. The situation here has improved over the last few years, but manufacturers need to get on board with the realization that most broadcast facilities are being built around computers and there should be a means for mounting them in racks and consoles without resorting to kludges and jury-rigging. Fortunately, some manufacturers do offer keyboards and trackballs specially designed for racking. Others provide LCD displays with standard 19-inch mounting. There are even a few companies that sell computers with rack ears and supports. Some rack furniture manufacturers have designed workstations to directly accommodate computer gear. (An example of a Winsted item for this purpose is seen in the accompanying photo.) However, it would make the broadcast engineer's life much easier if all computer vendors provided rack mounting hardware for computers and peripherals as either standard equipment or a readily available option.

That said, go ahead and get started on that next big project. I can almost smell those brand-new new freshly painted racks from here. ■

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Want to Sell

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Want to Sell

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TRANSMITTERS/ EXCITERS

Want to Sell

TRANSMITTERS - Used transmitters from Harris, Acrodyne, RCA, Emcee, TTC. Antennas, microwave, feedline, etc. See transmitterwarehouse.com or call 954-792-7207.

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VTRs/VCRs/ RECORDING MEDIA

Want to Sell

Sony UVW-1800 BetacamSP, $3995; Sony PVW-2800 BetacamSP, $4500; Sony PVW-2650 Betacam SP, $1990; Sony PVW-2600 Betacam SP, $1950; Sony BVW-70, $4750; Panasonic AJ-SD93 DVCPRO 50, lw hrs, $5495; Sony DSR-2000, $9500; Sony VO 9850 w/timecode, $1200; Sony VO 9800, $1000. 818-246-7100 or 212-564-9933 or www.tvprogear.com.

EMPLOYMENT

HELP WANTED

PURCHASING MANAGER:Location: Clearwater/St. Petersburg, FL. Rewarding position as Purchasing Manager for growing organization. Successful candidate is capable of managing the staff responsible for buying and planning purchased material. Lead the material cost reduction process through effective negotiations, purchasing volume leverage, and optimizing freight routings. Identify and resolve process and system roadblocks in conjunction with manufacturing engineering to improve productivity and throughput. Responsible for the accuracy and timeliness of all inventory data. Improve on-time delivery to customers and from vendors. Directly supervise purchasing staff. Qualifications: 5+ years experience in a Senior Purchasing/Materials position in a Manufacturing environment; Bachelors Degree, APICS certification and/or CPIM preferred; Experience with broadcast, RF or satellite communications gear is a plus; Exceptional negotiating skills with the ability to identify and solve potential issues quickly; Successfully manage people to achieve performance goals. Excellent people management skills including resolving conflict, coaching and developing others, promoting teamwork, and performance management; Strong organizational skills with the ability to multi-task; Excellent written and verbal communications skills; Good computer skills including Excel, Word, etc; Successful candidate must show previous experience in high volume production environment. Benefits: Our competitive salary and benefits package includes 401K, matching 401k, dental insurance, medical insurance, prescription drug coverage, short and long-term disability insurance, life insurance, a vision-care plan, paid time off. COMPANY CONFIDENTIAL. Email resume to: tlw2118@aol.com.

Maintenance Engineer: Company is seeking a hands-on individual to maintain and repair equipment found in a post production/duplication facility. Expertise in the repair and maintenance of broadcast video tape recorders from Digital Betacam, Betacam, and VHS. Minimum two years experience. Fax resume and salary requirements to: Lightning Media, 323-462-1842 or email: jobs@lightningmedia.com.

POSITIONS WANTED

Station manager wanted for Muskegon, MI TV station, salary negotiable. 231-733-4040.

ACTION-GRAM

Equipment Listings

TV Technology's Equipment Exchange provides a FREE listing service for TV stations and studios only.
All other end users will be charged. Simply send your listings to us and please indicate in which category you would like your listing to appear. Mail your listings to the address below. Thank you.

Please print and include all information:

Contact Name _____
Title _____
Company/Station _____
Address _____
City/State _____
Zip Code _____ – _____
Telephone _____

Brokers, dealers, manufacturers and other organizations who are not legitimate end users can participate in the Equipment Exchange on a **paid** basis. Line ad listings & display advertising are available on a per word or per inch basis.

Are you currently a subscriber to TV Technology?
❑Yes ❑No

Signature _____ Date _____

Please check only one entry for each category:

I. Type of Firm

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

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

II. Job Function

- ☐ A. Corporate mgt
- ☐ B. Engineering mgt
- ☐ C. Engineering staff
- ☐ D. Prod/oper mgt or staff
- ☐ E. News mgt or staff
- ☐ G. Traning
- ☐ F. Other (specify)

WTS ❑ WTB ❑ Category: _____
Make: _____ Model: _____
Brief Description: _____
Price: _____

WTS ❑ WTB ❑ Category: _____
Make: _____ Model: _____
Brief Description: _____
Price: _____

WTS ❑ WTB ❑ Category: _____
Make: _____ Model: _____
Brief Description: _____
Price: _____

*Listings close every other Friday for the following month's issue. All listings are run for one issue only.

Broadcast Equipment Exchange
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MARKETPLACE

Highlighting the latest products available to professionals in the video industry.

Transport Stream Analyzer

Stream-Sleuth from AutumnWave, LLC provides and easy and cost-effective way to analyze DTV data streams. The technology consists of an HD/SD television receiver bundled with a software package.

The equipment transforms a desk or laptop PC into a transport stream analyzer, providing users with decoded MPEG-2 tables, MPEG video images, PID information, closed captioning decoding, and more.

The Stream-Sleuth also allows users to record free-to-air SD and HD programs to the computer's hard drive. The device connects through the host's USB port and when used with a laptop, allows users to perform stream analysis anywhere a DTV signal is available.

For more information, contact AutumnWave LLC at 717-582-7134 or visit *www.autumnwave.com*.

LCD Prompter Monitor

The LCD-10P from Tekskil Industries Inc. is a new flat panel LCD prompter monitor designed for robotic head and field service. The LCD-10P incorporates several features not previously available in field prompter monitors, including an input management system providing conditioning for both composite and XGA signals, a signal and sync status indicator and DC power input polarity protection.

The unit also features a built-in tally circuit and an array of high-brightness LEDS which are visible to talent even in bright sunlight conditions.

The LCD-10P is very compact and light in weight, lending itself to use with smaller DV cameras and with jib and other applications.

The monitor has a 700:1 contrast ratio and provides more than 2,000 nits of light output.

For more information, contact Tekskil Industries Inc. at 770-518-07844 or visit *www.tekskil.com*.

Video Coaching Tool

The CSTV Edge from CSTV Networks Inc. is a hand-held video coaching tool, which can provide college football coaches and players immediate access to game footage.

The CSTV Edge combines hardware and proprietary software to create a system for viewing plays on Video iPods, with a searchable play-by-play interface. Live video of the game is obtained from a TV broadcast of the event, or from institution-generated coverage. Plays are categorized by offense, defense or special teams and then further broken down by quarter, down and distance, game situation and specific play.

Every play of the game is simultaneously downloaded into multiple Video iPods for team viewing and study.

Each player is able to leave the locker room with the completed game stored and cataloged on their personal Video iPod.

For more information, contact CTS Networks Inc. at 212-342-8700 or visit *www.cstv.com*.

ADVERTISERS INDEX

While every care is taken to ensure that these listings are accurate and complete TV Technology does not accept responsibility for omissions or errors.

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Univision Sold for $12.3B

LOS ANGELES

Univision, the largest Spanish-language broadcaster in the U.S., was sold to a group of investors last month for $12.3 billion. The buyers will also assume $1.4 billion in debt.

The group, which includes Madison Dearborn Partners, Providence Equity Partners, Texas Pacific Group, Thomas H. Lee Partners and Saban Capital Group, increased its offer from $35.50 per share to $36.25 per share in cash after Univision rejected the earlier offer as too low. An offer from Televisa of Mexico City, the world's largest Spanish-language broadcaster, exceeded the investor group's initial bid, but Televisa failed to put together a bid by the June 20 deadline.

The transaction involves the sale of two TV broadcast networks—Univision and TeleFutura, which combined, command an 80 percent share of the nation's Spanish-language TV market. Galavision, a Spanish-language cable network, 69 Spanish-language radio stations, the Univision Music Group, the nation's largest Latin music company, as well as Univision.com, the most popular Internet portal for the Hispanic community in the U.S., are also part of the transaction.

Univision "is an outstanding media brand with exceptional positions in the fastest-growing media markets in the country, world-class assets, strong management, popular programming and unmatched ratings," the investor group said in a statement.

The merger, expected to be complete by Spring 2007, is not contingent on financing.

FCC Okays Intelsat-PanAmSat Merger

PEMBROKE, BERMUDA

The FCC has approved the merger of Intelsat Ltd. and PanAmSat Holding Corp.

In a unanimous ruling in June, FCC commissioners found that the transaction would be in the public interest, and granted Intelsat's application for a transfer of control of PanAmSat's FCC licenses. The companies said no other regulatory approvals are required, prior to the closing of the transaction.

The companies expect to close the deal in July; however the closing is subject to the receipt of financing by Intelsat.

Intelsat and PanAmSat announced the merger agreement in August 2005. Under terms of the agreement, Intelsat will purchase PanAmSat for $25 per share in cash or about $3.2 billion. In addition, $3.2 billion in debt of PanAmSat and its subsidiaries will remain outstanding or be refinanced.

Intelsat Chief Executive Officer David McGlade said, "The closing of the merger will open a new chapter for our industry and our customers, who will benefit from expanded services and improved network flexibility and resilience as we bring together these two great companies."

PanAmSat launched a new bird last month to expand delivery of HD programming to North American customers. Galaxy 16, a Space Systems/Loral 1300 series satellite, includes 24 C-band and 24 Ku-band payloads, and will be used by ABC, Comcast, Fox Broadcasting, Warner Bros., Buena Vista and Televisa, National Public Radio (NPR) and Hughes Network Systems (HNS).

Tektronix Earnings Up in Q4

BEAVERTON, ORE.

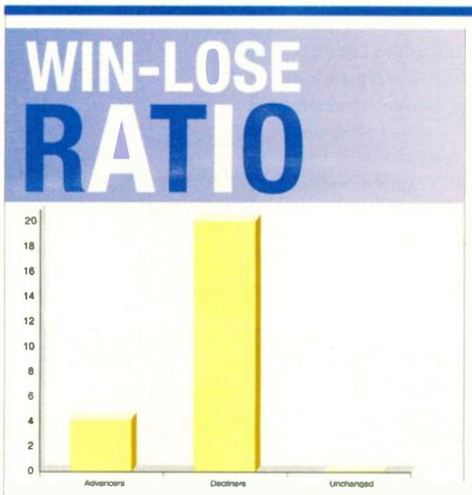
Tektronix said its fourth quarter net income rose about 50 percent from a year earlier, attributing the gain to new products and continued success in the telecommunications market.

The test, measurement and monitoring company reported Q4 sales that ended May 27, 2006 were $289.3 million and earnings were $31.9 million or $0.37 per share, compared with sales of $261.0 million, and earnings of $21.6 million or $0.25 per share for the same period last year. Excluding charges like acquisition-related costs and business realignment, earnings from continuing operations were $36.4 million, or $0.43 per share for Q4, compared with $27.4 million or $0.31 per share for the same period in 2005.

"Orders in the fourth quarter grew over 21 percent as compared to the same quarter last year, and all regions showed double-digit orders growth," said Rick Wills, Tektronix chairman and CEO.

For the full fiscal year that ended May 27, 2006, Tektronix reported sales of $1 billion and earnings of $90.9 million or $1.08 per share, compared with sales of $1 billion and earnings of $78.9 million or $0.89 per share for the prior fiscal year.

For the first quarter of fiscal 2007, the company expects revenue to be about $255 to $265 million. Earnings per share from continuing operations are expected to be between $0.31 and $0.34.



TOP ADVANCERS BROADCAST STOCKS
(June 9 - June 23)

Paxson	+1.11%
Sinclair	+0.24%

TOP DECLINERS BROADCAST STOCKS
(June 9 - June 23)

Young	-12.99%
Nexstar	-11.32%

TOP ADVANCERS TV TECH STOCKS
(June 9 - June 23)

SeaChange	+4.90%
Ciprico	+2.30%

TOP DECLINERS TV TECH STOCKS
(June 9 - June 23)

Tektronix	-10.32%
Avid	-9.48%

To have your company listed, contact Melissa Sullivan at msullivan@imaspub.com.

TV Tech STOCKS as of June 23

Company Name	52-Week Range	June 9	June 23	% Change
Avid	32.95 - 59.10	37.35	33.81	-9.48%
Belden	18.65 - 33.55	30.46	30.24	-0.72%
Ciprico	3.70 - 6.84	6.10	6.24	2.30%
Harmonic	3.79 - 6.95	4.22	4.17	-1.18%
Harris	30.56 - 49.78	39.74	38.72	-2.57%
LSI Logic	7.60 - 11.81	8.93	8.60	-3.70%
Scopus	4.80 - 8.35	5.65	5.25	-7.08%
SeaChange	5.07 - 9.89	6.53	6.85	4.90%
Tektronix	22.46 - 36.89	31.21	27.99	-10.32%

Broadcast STOCKS as of June 23

Company Name	52-Week Range	June 9	June 23	% Chang
Acme	3.50 - 5.74	5.25	5.01	-4.57%
Belo	16.13 - 24.68	16.99	16.33	-3.88%
Entravision	6.80 - 9.50	8.02	7.94	-1.00%
Fisher	41.43 - 49.89	42.65	41.81	-1.97%
Gray	5.52 - 13.59	6.24	5.61	-10.10%
Hearst Argyle	21.53 - 26.34	22.13	22.06	-0.32%
Nexstar	3.93 - 6.37	5.21	4.62	-11.32%
Lin TV	7.96 - 15.49	8.86	8.04	-9.26%
Paxson	0.37 - 1.15	0.90	0.91	1.11%
Sinclair	7.18 - 10.07	8.42	8.44	0.24%
Univision	23.52 - 36.67	35.03	32.95	-5.94%
Young	1.70 - 5.04	3.54	3.08	-12.99%
Tribune	27.09 - 39.56	31.96	31.34	-1.94%
Meredith	46.50 - 56.83	50.00	48.21	-3.58%
EW Scripps	43.21 - 51.19	46.81	44.59	-4.74%

QMC-2 Master Control by evertz

QMC-2

Intelligent Master Control

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