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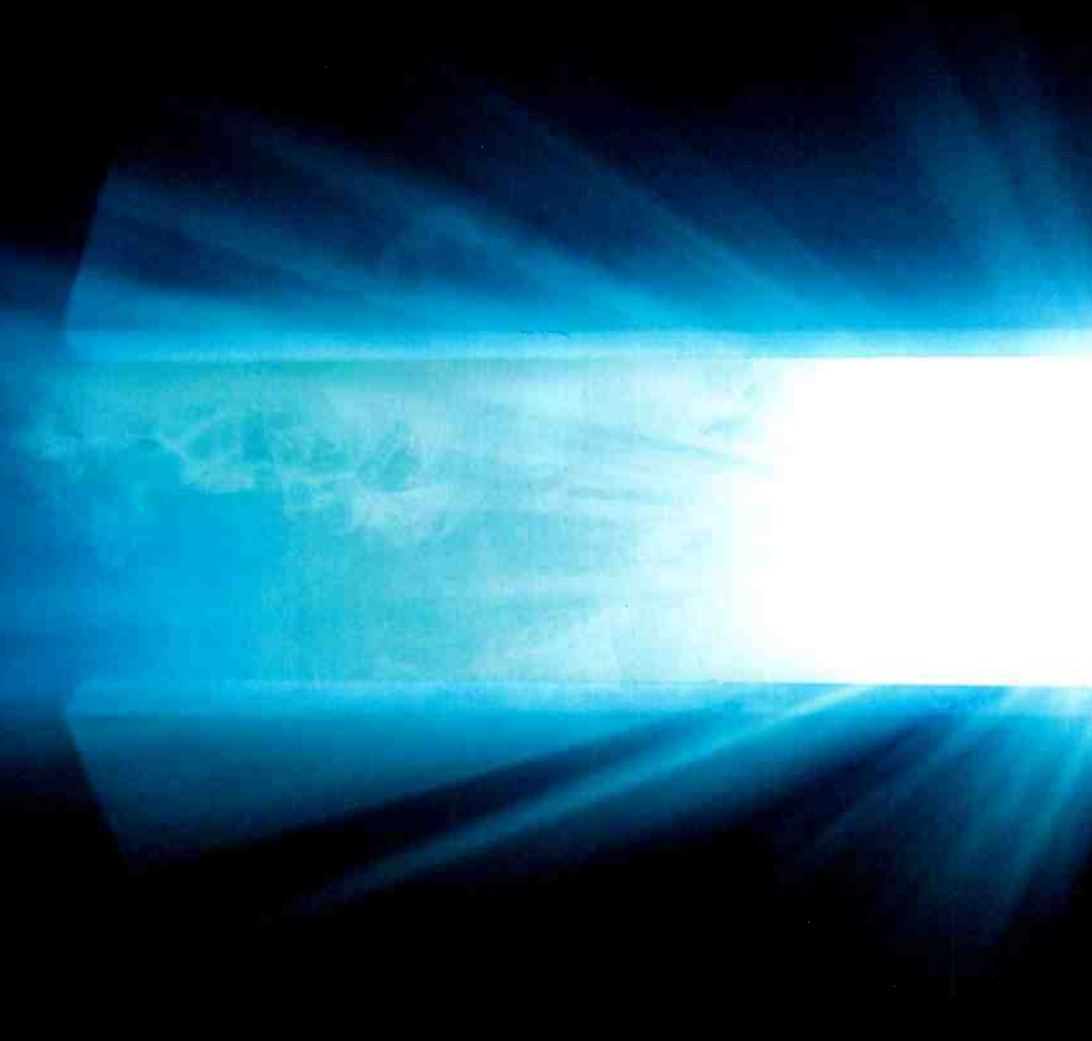


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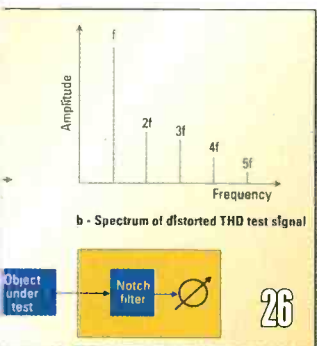
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ON THE COVER:

There were 105,046 registered attendees at NAB2006, which took place at the Las Vegas Convention Center. Photo by Douglas Schwartz.

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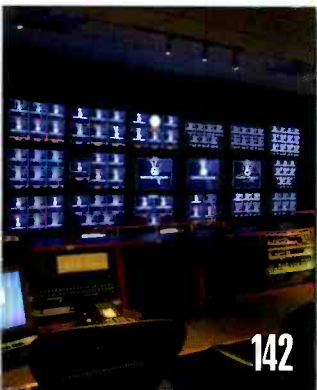
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Freezeframe

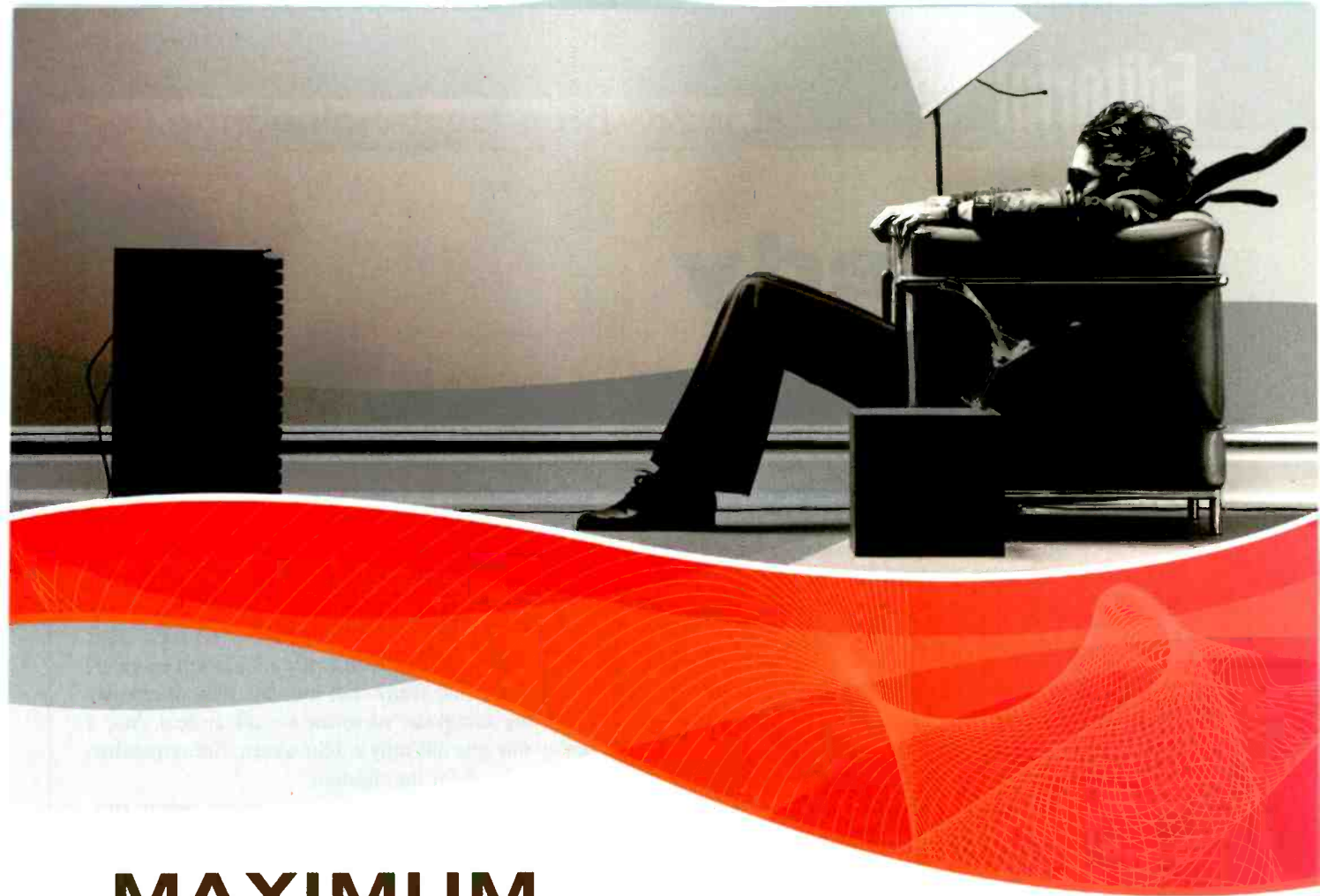
MPEG-4 compression is frequently described as an _____ compression method where an _____ is any part of a picture and can be assessed and processed independently. This question comes from Alexander Louis Todorovic's book *Television Technology demystified: A non-technical guide*. Readers submitting winning entries will be entered into a drawing for *Broadcast Engineering* T-shirts. Enter by e-mail. Title your entry "Freezeframe-June" in the subject field and send it to: editor@prismc2b.com. Correct answers received by August 1, 2006, are eligible to win.

February Freezeframe

- Q. The basic MPEG-2 standard defines ___ profiles and ___ levels. The information needed to decode a single picture is contained in the ___ layer.
- A. The basic MPEG-2 standard defines six profiles and four levels. The information needed to decode a single picture is contained in the picture layer.

Winners:

John Harris, Sharat Kumar, Larry Price



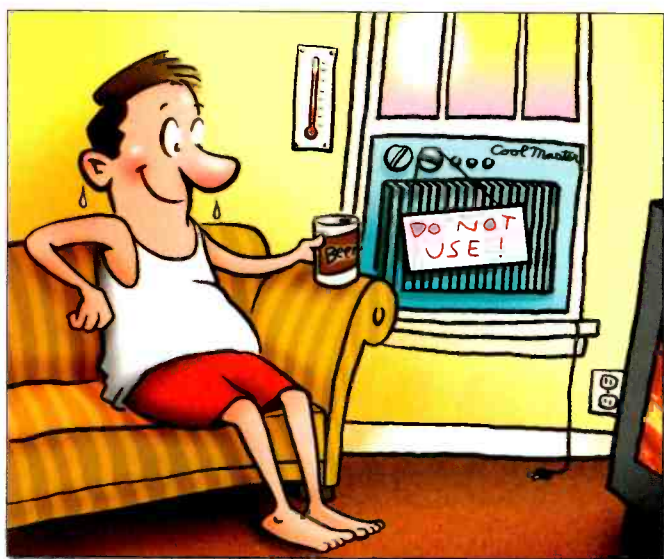
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Greedy HDTVs

You selfish, evil, big-screen-loving, plasma-pandering, LCD-demanding, DLT-touting, audio-blasting, kilowatt-consuming, power-wasting, TV-watching couch potatoes! Who the heck do you think you are, anyway? Don't you realize your TV habits are killing us? All that electronics is causing power companies to build even more pollution-puking power plants.



Thus goes the theme from the Al Gore crowd, the National Resources Defense Council and their fiends. Oh, sorry, I meant friends.

Yep. It seems the tree-hugging, Birkenstock-wearing, anti-wind-power, global-warming goofballs have decided to take on another cause: our increasing use of electricity for entertainment. Hence, they've just painted a big red target on just about everything in your home, especially your big-screen TV.

Many of us probably put these kinds of people in the kook folder. I don't give much credence to someone who screams the nation's power grid is failing because of our over consumption and in the next breath is protesting against the building of wind turbines off the coast of New Hampshire or Texas, claiming that they are ugly and pollute the visual environment. This is the same group that cries, "You broadcasters with your towers are killing hundreds of thousands

of teeny weeny, little defenseless birds ever year. Shame on you!"

The eco-czars' answer to ever larger TV sets is that they be made more efficient with such federally mandated "features" as sleep modes and require efficiency labels. The groups claim people shopping for new big-screen TV sets will pay attention to how much power the sets use when deciding what set to buy.

Can't you just see the average guy looking at a new HDTV set in Circuit City? He says to his wife, "Hey, hun, let's buy this little one. It's 2.5 percent more efficient than that really cool looking, 65in plasma set with the complete surround-sound system. Yes, I know this one has only a 32in screen. But remember, we're doing it for the children."

Viewers won't buy TV sets based on power consumption. That's like saying people buy cars based on how long they can go between oil changes.

According to Nstar, Massachusetts' largest investor-owned electric and gas utility, a standard 32in television uses about one-third as much power as a 42in plasma TV set. When you add the cost of an STB for the 32-inch, the total yearly cost to power both is \$121.20.

How much does a refrigerator cost to run? A standard fridge costs \$265 per year to operate. If you buy a new Energy Star model, that cost drops to the same as for a plasma TV set. A window air conditioner? \$345 a year.

Now, here's the dilemma: Do you choose to sit in an air-conditioned room, watching a great-looking TV set with a cold beer in hand, courtesy of your fridge, or do you choose to sweat it out without the air, a mini-TV and a warm beer. Hmm, let me see.

Okay, I've decided.

I can forgo the air conditioning, but not the rest. Besides, that air conditioner is the most expensive power consumer of the three, so I feel pretty ecologically responsible with this decision. That means it's shorts and T-shirts at my house. Bring on the beer, and what channel is the baseball game on?

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HDTV: MAKING IT HAPPEN



RAID

Brad Gilmer:

Most of the vendors in the video server arena require that we purchase pre-qualified drives from them. Of course, they charge a premium and in some cases an excessive price for a drive. This seems to fly in the face of the IT mantra of using off-the-shelf components and non-proprietary technologies. In your experience, is there a valid reason for manufacturers to do this, or is it a marketing ploy?

WILLIAM T. HAYES
DIRECTOR OF ENGINEERING
AND TECHNOLOGY
IOWA PUBLIC TELEVISION

Brad Gilmer responds:

There are some reasons for manufacturers to charge more than off-the-shelf pricing for their replacement drives. Here are a couple of examples:

- The methodology for calculating the price of replacement components such as drives is somewhat opaque. Such calculations may be based upon long-term purchase commitments. If the RAID array uses 40GB drives and the manufacturer has a policy of purchasing enough drives to keep parts

available for five years, then that manufacturer may be locked into pricing that seems ridiculous two years down the road. The manufacturer may also include other costs that pay for warehousing or customer support.

- Some manufacturers may perform 100-percent quality control on all drives that they put into their arrays. The manufacturers may pass on the cost of this additional quality check in the price of the replacement parts.

- The manufacturer may have to change suppliers at some point, requiring that all of the certification tests run on the original components be rerun on the new drives. Some engineering work may have to be done to make the new drives work in the old system.

- The manufacturer may make modifications to the off-the-shelf drives that involve cost and time.

- The manufacturer may purchase drives that are different from off-the-shelf drives. For example, the drives it purchases may have a longer mean time between failures or may be capable of status reporting, such as RPM or temperature, which the off-the-shelf drives cannot do.

- Manufacturers may also try to dissuade you from putting off-the-shelf drives into their products, even if you are able to find the exact replacement part on the open market. They do this for several reasons, but the biggest reason is that once you start to modify the product, the manufacturer has no idea what sort of system you have. If they just shipped the product and never heard from you again, then this might be fine with them.

However, as users, we expect and demand exceptional customer service for critical systems such as video servers. When users start substituting components and then call the manufacturer expecting support, the manufacturer may end up spending a

great deal of time to solve a problem caused by the substitution. This has a direct cost to the manufacturer. In a perfect world, no user would substitute a 40GB drive and expect it to work perfectly in a RAID array that uses 80GB drives, but it happens. It is not fair for the manufacturer to pay for two or three phone calls until the problem is solved.

- There are occasionally problems on the manufacturer side, too. Some manufacturers know that once you spend \$100,000 on a purpose-built piece of video equipment, you will be reluctant to put anything into the system other than approved parts. They take advantage of this by substantially marking up the off-the-shelf parts. In the long run, manufacturers that do this are shooting themselves in the foot. Users know how much disk drives cost. They can understand some markup to cover engineering, warehousing and testing costs, but there is a limit. Manufacturers who get greedy will be exposed as other manufacturers provide parts at a reasonable cost.

As the trend to use off-the-shelf components continues, prices for complete systems continue to fall. In the long run, the cost of replacement components will also fall.

Everything is a negotiation. If a drive price seems excessive, ask the manufacturer to negotiate a reduced price on spare parts. You might also try to negotiate a clause that lets you put in off-the-shelf drives. Ultimately, you may have to go to a manufacturer who has a pricing policy you can live with.

BE

Test Your Knowledge!

See the FreezeFrame question of the month on page 8 and enter to win a Broadcast Engineering T-shirt.

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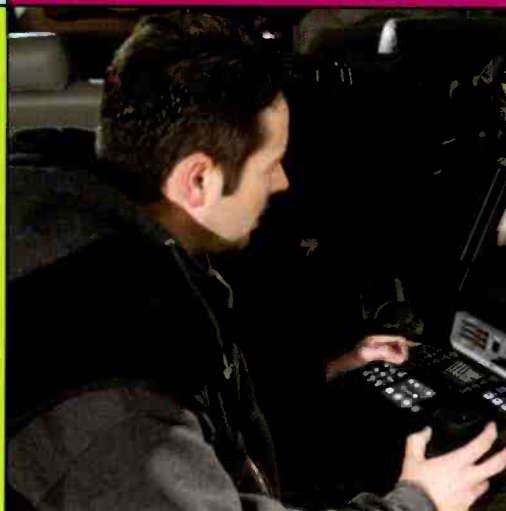
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A multiple choice media future

BY CRAIG BIRKMAIER

For decades, free-to-air broadcasting dominated the landscape of television. The NAB was considered to be the most powerful lobby in the nation's capitol. Today, the NAB's annual conference and exhibition continues to grow, even as the broadcasters it represents have fallen into a long, slow decline.

At NAB, broadcasting is now a side-show. It's the world's largest digital media marketplace that feeds the NAB's coffers in much the same way that TV broadcasters now look to millions of cable subscribers to pay a monthly subscription fee for free TV.

The TV world has exploded with multiple choices. For decades, this largely meant more program choices than the limited number of analog channels offered by TV broadcasters to deliver one program at a time.

Broadcasters who went to NAB2006 may have come home understanding a new meaning for multiple choice: Consumers want more choice, not

just in terms of content, but also in the venues for which digital media content can be optimized and delivered to them — anywhere, anytime on virtually any device.

Broadcasters are learning that they made a poor choice with respect to their standard for DTV broadcasting — that they are being left behind as the content conglomerates begin to exploit new channels of distribution in pursuit of new revenue streams. The short-lived era of free TV is over, at least here in the United States.

No respect

I still remember a conversation that took place in the early '90s with a close friend who has enjoyed a successful career as a broadcast engineer. At the time, I was participating in the Advisory Committee on Advanced Television Services (ACATS), which ultimately recommended to the FCC the adoption of the ATSC digital television standard. That standard was

being optimized for only one thing: the delivery of a single, high-definition television program via a 6MHz RF channel.

I was advocating a less rigid approach to DTV broadcasting, one that would allow the ability to broadcast all kinds of bits to all kinds of devices. This could include HDTV programs delivered alongside multiple channels of SDTV and new services capable of delivering TV and other forms of content to mobile and portable devices. My friend proceeded to lecture me about the basics of the broadcast TV business model.

"We are in the business of delivering the largest number of eyeballs possible at any moment in time to our advertisers," he said. And he was quite adamant that multicasting would further fragment the broadcast TV audience, while driving up programming and operating costs. It seems that most broadcasters still believe in the viability of this legacy business model; unless, of course, the FCC would grant them multicast must-carry/retransmission consent.

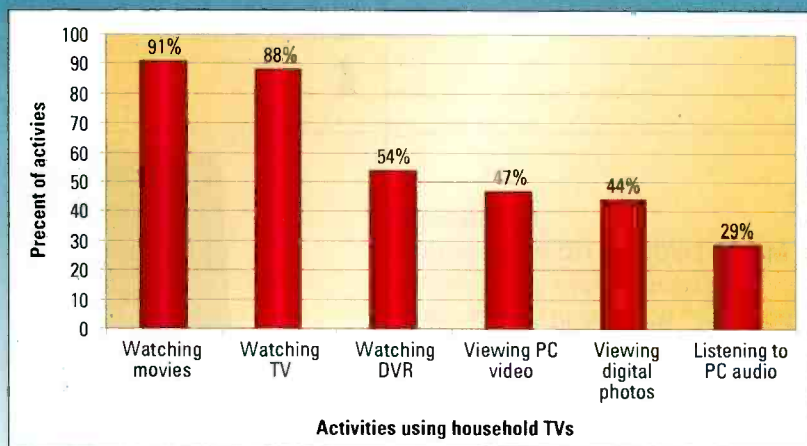
The topic of multicasting continues to rear its head from time to time. Somehow, it managed to slip in the backdoor of the ATSC standard at the last moment. Back in 1997, it nearly caused some heads to roll when ABC floated the idea that the network would fill the new DTV service with multicasts rather than a single HDTV program.

At the time, Sinclair Broadcasting president David Smith was a big fan of multicasting. In a 1997 interview, he talked about his controversial decision to reject HDTV and use his new digital channels for multicasting. Smith told *The Baltimore Sun* that the costs inherent in converting to HDTV

FRAME GRAB A look at the issues driving today's technology

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would have been staggering, and, besides, "I'm not going to get any more money from the car dealer on the corner because I have a prettier picture." (See "Web links" on page 20.)

By 2004, after the company tried unsuccessfully to get the FCC to allow alternatives to the ATSC standard, Sinclair was singing a different tune. When *USA Today* published a story in which it noted that 213 stations were delivering multicasts via their DTV signals, Sinclair's Smith was skeptical, "I'm not holding my breath that anyone's going to get rich putting weather up."

Recently, Sinclair announced two new multicast initiatives. WBFF-TV, the broadcaster's Baltimore Fox affiliate, has launched a multicast channel carrying syndicated and local programming. WBFF-DT-45.2 can be accessed over-the-air and on

the Comcast and Millennium digital cable systems (and on Verizon's FiOS-TV service when it's launched in Baltimore). The new digital channel broadcasts 24/7.

In March, The Tube Music Network announced a distribution agreement with Sinclair. Revealed just two weeks after a similar agreement with Tribune

can work is if cable systems are forced to carry these extra channels. This notwithstanding the fact that Sinclair and other broadcast groups have managed to gain carriage of both primary HD channels and additional multicast channels via voluntary negotiations.

The last time the subject of multicast must-carry came up at the FCC,

"I'm not going to get any more money from the car dealer on the corner because I have a prettier picture." — David Smith

Broadcasting was announced, The Tube Music Network is also available on 13 stations in Raycom Media markets.

Multicasting in the United States does not get much respect. Broadcasters firmly believe that the only way it

it was rejected, with a dissenting opinion from Commissioner Kevin Martin. At NAB2006, Martin, who is now FCC Chairman, suggested that this was "a missed opportunity for the commission." Martin noted that a wider choice of channels could



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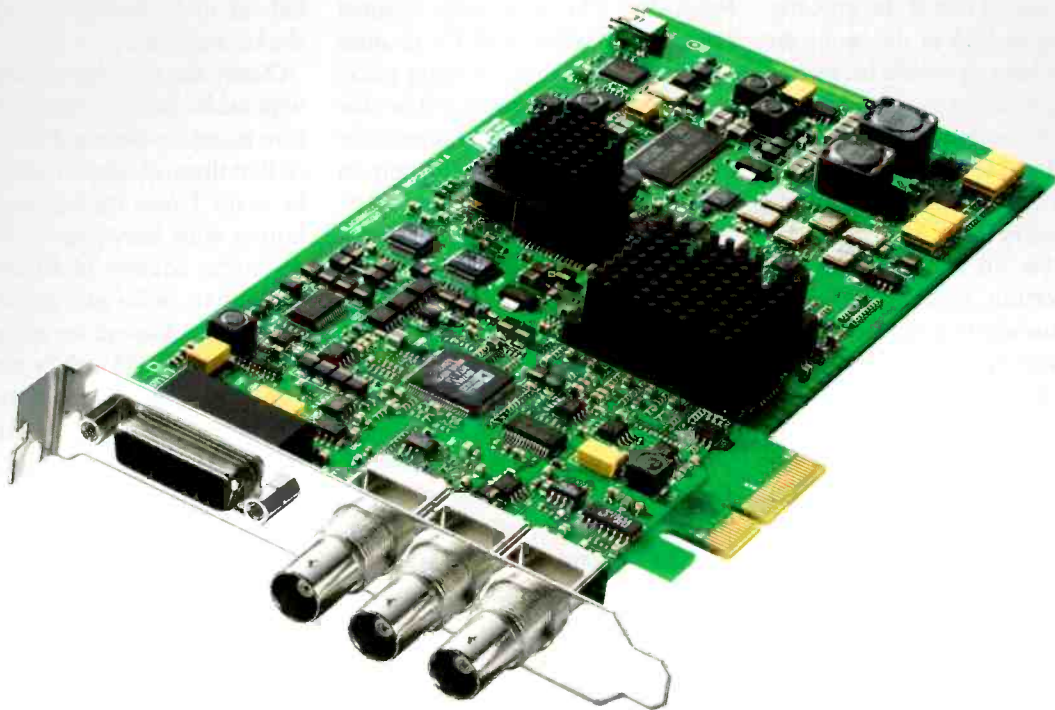
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provide the incentive for many of the homes that now depend exclusively on the NTSC service to buy DTV receivers. He stated that if the majority were willing to look at the multicast must-carry issue, it would be an important opportunity to address the issue before the return of analog channels, now slated for 2009.

Congress did not address the multicast must-carry issue when it set the new deadline for the return of the analog spectrum. And it is not likely that this issue will be addressed in any telecommunications legislation during this session of Congress.

The most visible attempt to use the DTV spectrum for multicast services is by USDTV, which now operates a multichannel subscription TV service in four U.S. markets: Albuquerque, NM; Dallas-Ft. Worth; Las Vegas; and Salt Lake City. In these markets, broadcasters share spectrum with USDTV, which delivers a package of 12 TV channels in addition to the primary program channels of all local DTV broadcasters.

At NAB, USDTV announced that it is migrating its portion of the ser-

vice to the more efficient H.264/AVC compression technology, which is also being used by DIRECTV and Dish Networks. The increased channel capacity will allow USDTV to offer additional paid programming packages. Existing subscribers will be able to get an AVC-to-MPEG-2 transcoder module that plugs into a USB port on current set-top boxes. The company also announced that a new AVC-enabled set-top box with a DVR would be available by the end of the year.

Over there!

U.S. broadcasters (and USDTV) are still struggling to find a viable business model for digital broadcasting. They need look no farther than the UK for a real world case study.

As was the case with most European countries, the UK rejected the notion of moving immediately to HDTV, choosing instead to offer a wider choice of SD multicast channels. The original business model included free-to-air equivalents of existing analog channels and a subscription service called On Digital. With the subscription service, a home could receive about 30 channels for a monthly fee below that of cable and DBS.

On Digital languished and ultimately failed due to financial problems related to bidding too much for exclusive television rights to a football (read: soccer) league. The system was reborn as Freeview, which offers about the same number of channels with no subscription fee. Viewers need only purchase a digital set-top box to receive the multicast package.

The response has been excellent, with more than 10 million receivers in 6.4 million homes. Freeview is expected to pass DBS service BSkyB in total subscribers this year. Even more important, UK broadcasters have recently bid millions of dollars to gain channel slots on the free service. (See "Web links.")

U.S. broadcasters may be wondering how this is possible. How can a company make money delivering advertiser-supported television content

without the help of the cable and DBS subscriber fees (which now account for nearly half of the typical monthly bill for multichannel TV services in the United States)?

Clearly, the only way to make money with multicasting in the United States is to mandate cable and DBS carriage so that these additional programs can be seen. There are just not enough homes with free-to-air DTV receivers in this country to attract enough eyeballs to make any money. It's as if U.S. broadcasters are saying, "Why worry about DTV when we can get the multichannel services to collect a fee from every viewer for using 'their' networks? Who cares about reaching TVs with antennas anyway?"

Anycasting

Apparently, there is a growing group that believes that we want to watch TV on cell phones, video iPods, BlackBerries, notebook computers and those screens that keep popping up in cars. You can count the NAB among those organizations that think TV broadcasters should be able to serve the growing market for mobile and portable video.

It is not surprising that the media conglomerates are less than keen on this idea. The content oligopoly is desperately trying to monetize the delivery of video through multiple distribution channels. The wireless phone companies and Qualcomm's (COFDM-based) MediaFlo network charge subscribers for the video content they deliver. And the media moguls are learning how to use the Internet to download content — for a fee.

For now, unfortunately, U.S. broadcasters are watching from the sidelines as a world of digital media, with new opportunities, takes form without them.

BE

Craig Birkmaier is a technology consultant at Pcube Labs, and he hosts and moderates the OpenDTV forum.

Web links

1997 Sinclair statement on multicasting

www.showbizdata.com/contacts/picknews.cfm/13413/SINCLAIR_CHIEF_CLEAR_WON'T_SELL

2004 USA Today story on multicasting

www.usatoday.com/money/media/2004-01-28-multicast_x.htm

The Tube Music Network

www.thetubetv.com

2006 FCC Chairman Martin's statement on revisiting must-carry ruling

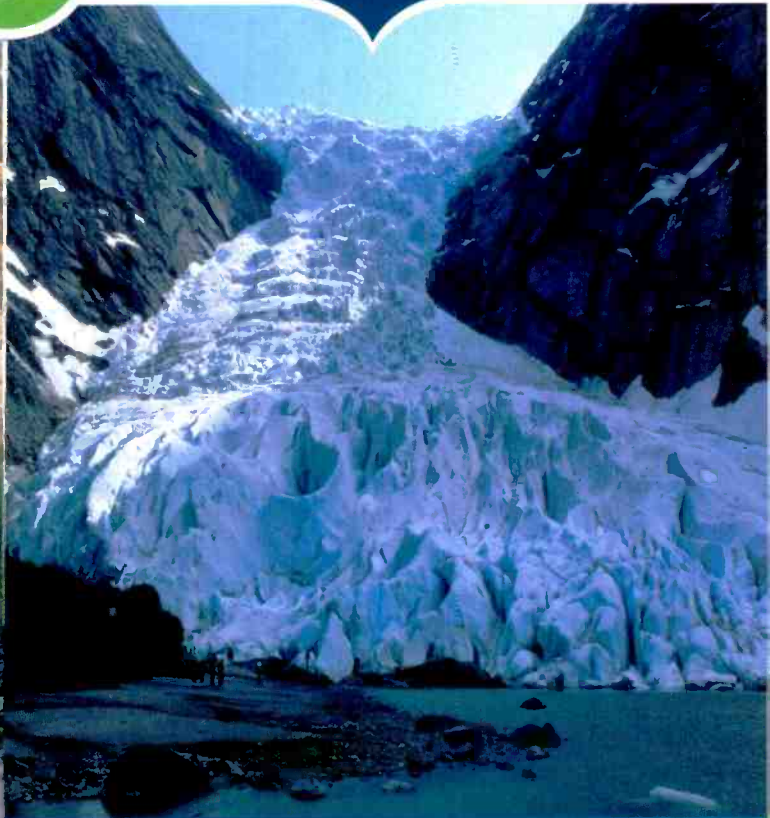
www.njtelecomupdate.com/lenya/telco/live/tb-WHAL1145995902432.html

ITV wins Freeview channel auction

http://news.bbc.co.uk/1/hi/entertainment/tv_and_radio/4402071.stm



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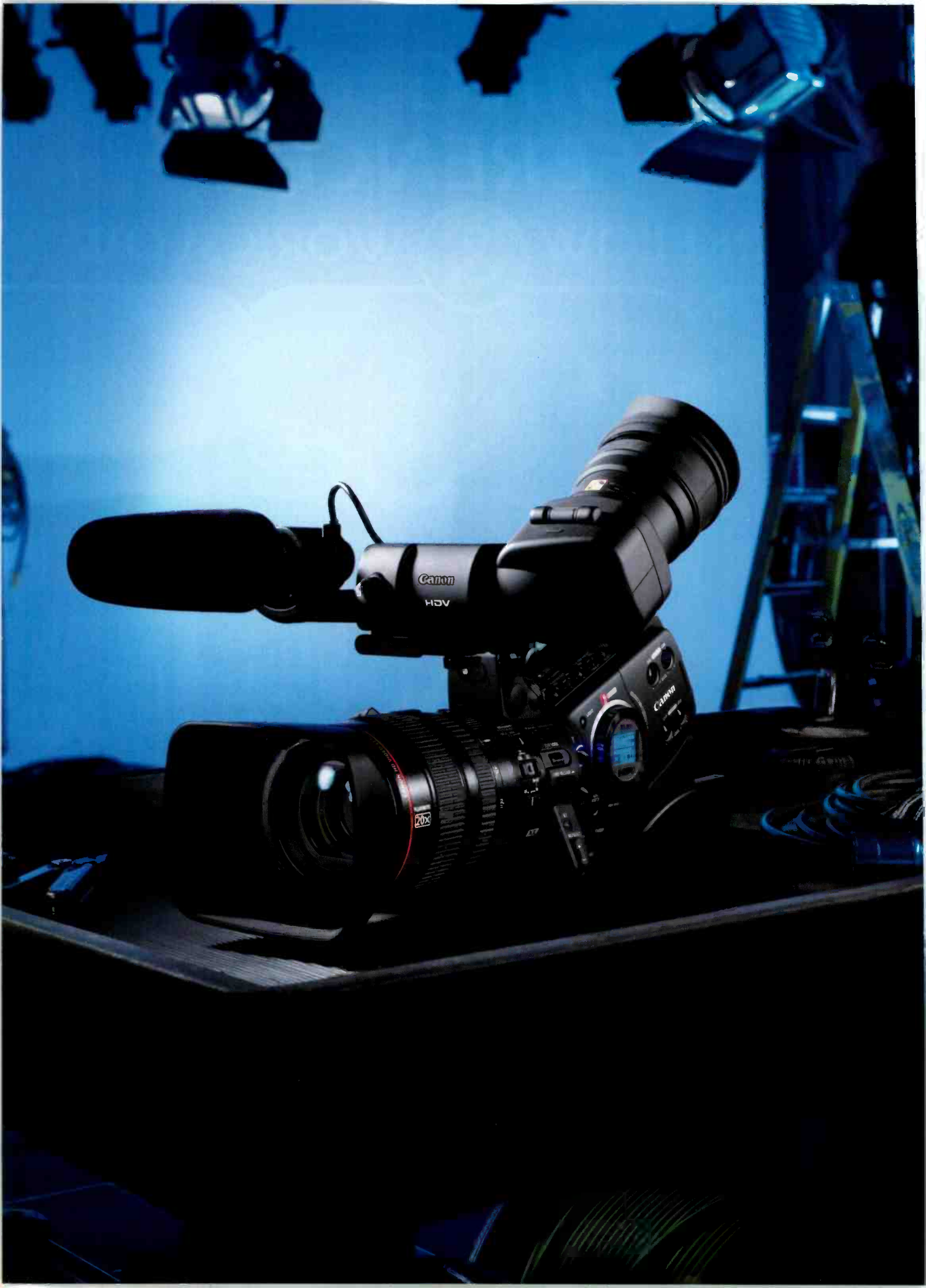


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VNRs, a continuing problem

BY HARRY C. MARTIN

Video news releases (VNRs), unsolicited taped publicity pieces, continue to create issues for TV stations that do not identify the sources when all or part of such pieces appear in their newscasts.

About a year ago, the FCC publicly warned licensees that they might have to disclose the origins of any tape used in a newscast if it was originally provided as part of a VNR. The warning arose after government-produced VNRs — including fully-produced packages that look like news stories — appeared on-air at some stations.

The commission also asked for public comment on VNR use, with the

Dateline

July 10 is the date that TV and Class A stations should place their quarterly issues and programs lists, and their quarterly children's programming reports (Form 398), in their public files. Form 398 also must be filed electronically with the FCC by July 10.

August 1 is the deadline for TV, LPTV, Class A TV and TV translator stations in California to file their 2006 renewal applications. TV and Class A stations must also file EEO program reports (Form 396) along with their renewals.

August 1 is the deadline for TV stations in California, North Carolina and South Carolina to file their biennial ownership reports.

August 1 is the date on which TV and Class A stations in the following states must place their annual EEO reports in their public files and, if they have one, post them on their Web sites: California, Illinois, North Carolina, South Carolina and Wisconsin. Stations with fewer than five full-time employees are exempt.

apparent intention of banning their use except where the sponsoring organization or government agency is properly identified.

According to a recently released study prepared by the Center for Media and Democracy and Free Press, as many as 77 TV stations used VNR-provided tape in the last year without disclosing its origins. The study was released with considerable fanfare, accompanied by a statement from Commissioner Jonathan Adelstein, a long-time critic of VNRs. Adelstein and his colleague, Michael Copps, have demanded that these stations apologize to their viewers.

Last spring, the FCC suggested that it could enforce good journalism practices through commission rules requiring disclosure of sponsorship and similar financial interests. The theory is that somebody somewhere presumably paid good money to have the VNR produced, with the goal being to persuade somebody of something through a broadcast of the piece. The sponsorship identification rules require that when a station receives consideration for the broadcast of any material, or when a station has actual knowledge that consideration was paid somewhere along the line, the station is obligated to disclose that information to its audience. Section 73.1212(a)(2) of the rules states that where a piece is provided free of charge, or at a nominal charge, no sponsorship ID is required.

Certainly, licensees have an interest in doing the right thing and disclosing to their audiences who is sponsoring various materials in their newscasts. But now, another more practical reason for policing compliance with the sponsorship ID rules is looming. The attorney general of New York,

Eliot Spitzer, has been on a crusade against payola practices on the part of major record companies and radio licensees. He has entered into multimillion-dollar settlements with at least two record giants and has filed a lawsuit against a major group radio station owner. All the while, Spitzer has complained that the FCC has not enforced the payola (i.e., sponsorship ID) rules.

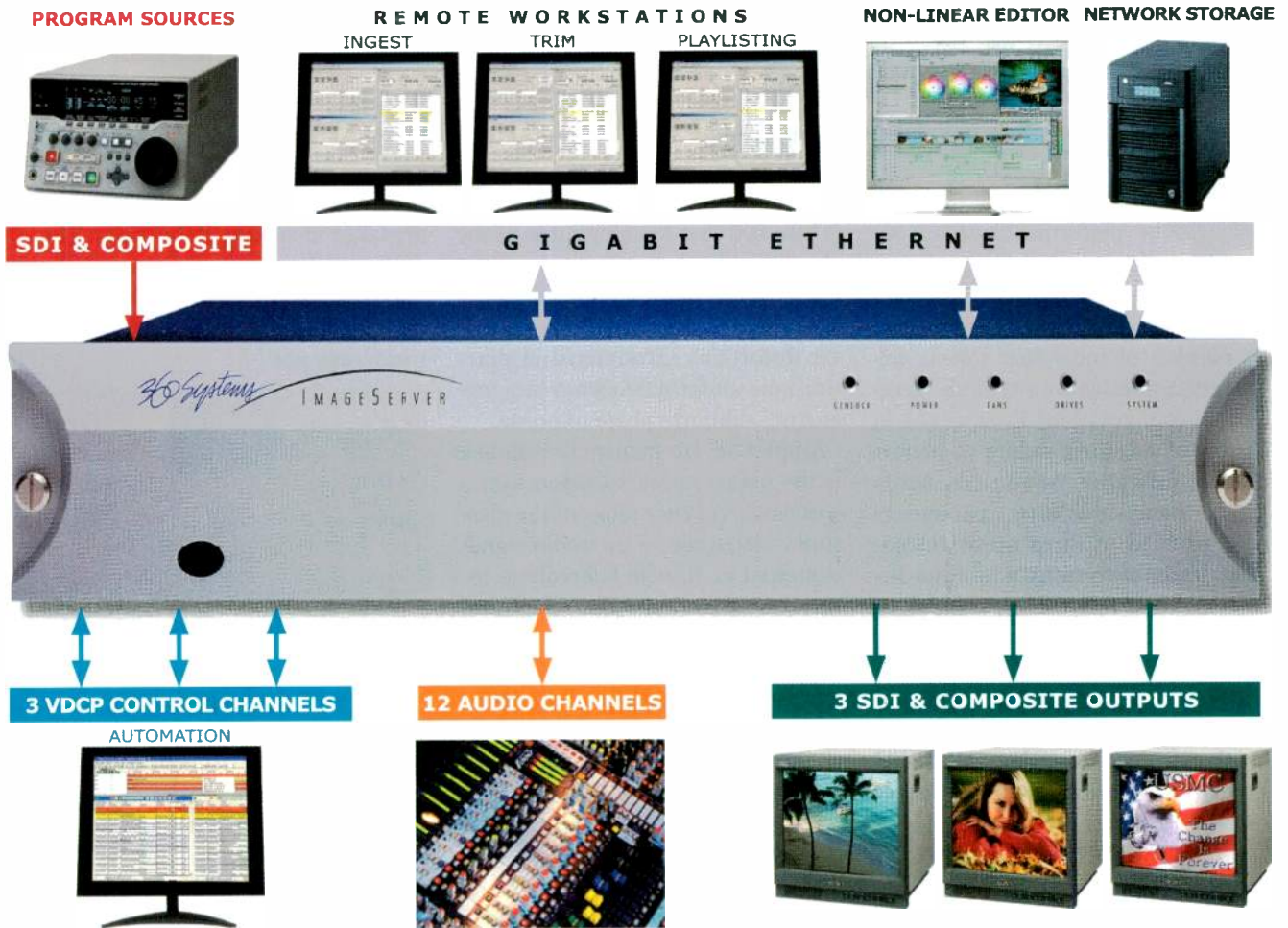
In April, the commission sent letters of inquiry to four broadcast groups seeking information concerning their relationships with record companies and record promoters. Published reports suggest that the four radio groups were negotiating with the FCC to try to reach a consent agreement under which they would make a "voluntary" contribution to the U.S. Treasury and possibly agree to adopt certain procedures and policies aimed at preventing sponsorship ID violations. But reports indicate that no agreement has been reached because the FCC is looking for a contribution of many millions of dollars, not the \$1 million the broadcasters offered.

With sponsorship ID investigations open on at least two fronts, the VNR issue is not going away. As a result, broadcasters would be well-advised to take a close look at their own internal policies relating to this issue. The sources of VNRs should, in all cases, be identified on the air. If the FCC decides to enforce this, fines could amount to tens of thousands of dollars or more due to the recent attention being given to sponsorship identification issues. **BE**

Harry C. Martin is the immediate-past president of the Federal Communications Bar Association and a member of Fletcher, Heald and Hildreth PLC.

SEND Send questions and comments to: harry_martin@prism2b.com

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Testing audio systems

BY MICHAEL ROBIN

The performance of an audio system element (e.g., an audio mixing console) or a complete system (consisting of a number of individual system elements connected in a typical operational configuration) is expressed in terms of measured values of performance-indicative parameters. Audio performance-indicative parameters are grouped in three major categories: linear distortions, nonlinear distortions and noise. This article deals with performance test concepts as developed by North American broadcasting organizations. A future article will discuss the dynamic range, with reference to analog and digital systems, as well as implications of various concepts of audio signal level monitoring (PPM and VU-meter).

Linear distortions

Electrical signal waveform modifications independent of the signal amplitudes are linear distortions. It

is assumed that the amplitude of the electrical signal does not exceed the clipping level of the equipment under test. There are two major types of linear distortions encountered in practice: non-uniform frequency response and non-uniform phase response.

Amplitude vs. frequency response is the peak-to-peak variation over a specified frequency range of the measured amplitude of an audio signal, expressed in dB with reference to the signal level at a specified frequency (usually 1kHz). The input port of the object under test is fed a 1kHz signal at the standard operating level (SOL) (i.e., +8dBu or +4dBu for high-level inputs and, typically, -60dBu or -70dBu for microphone inputs).

The gains are adjusted to obtain SOL (+8dBu or +4dBu) at the output. The audio analyzer is calibrated to read 0dB at the reference frequency. The input signal frequency is varied in discrete steps, or continuously, and readings in dB, with reference to 0dB,

are taken at specific frequencies. The measured frequency range is usually 20Hz to 20kHz. Figure 1 shows the typical setup for frequency response measurements.

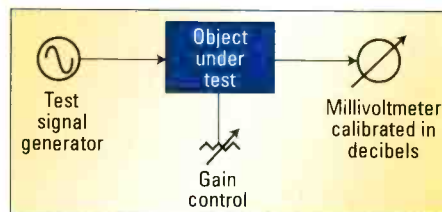


Figure 1. The measurement of frequency response

Phase vs. frequency response is the variable phase shift occurring in a system at several frequencies within a given band. The input of the object under test is fed a signal of variable frequency. A calibrated phase meter is connected at the output of the object under test. A plot of phase vs. frequency is carried out over the frequency band of interest.

Nonlinear distortions

Nonlinear distortions of an electrical signal are caused by deviations from a linear relationship between the input and the output of a given equipment or system. There are two types of nonlinear distortions encountered in practice: harmonic distortion and intermodulation distortion.

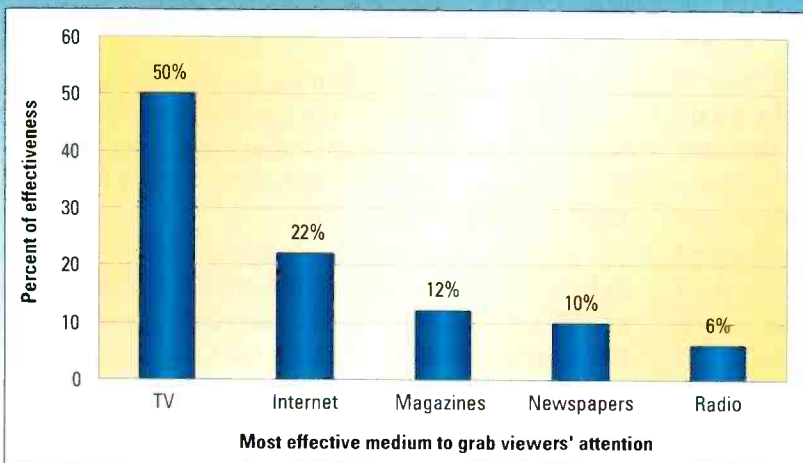
Harmonic distortion occurs when a system whose input is fed with a pure sine-wave signal of frequency f produces at its output a signal of frequency f and a set of signals with frequencies $(2f, 3f, \dots, nf)$ harmonically related to the input frequency. The distortion factor of a signal is the ratio of the total RMS voltage of all harmonics to the total RMS voltage. The performance of audio amplifying devices is expressed in terms of percentage of

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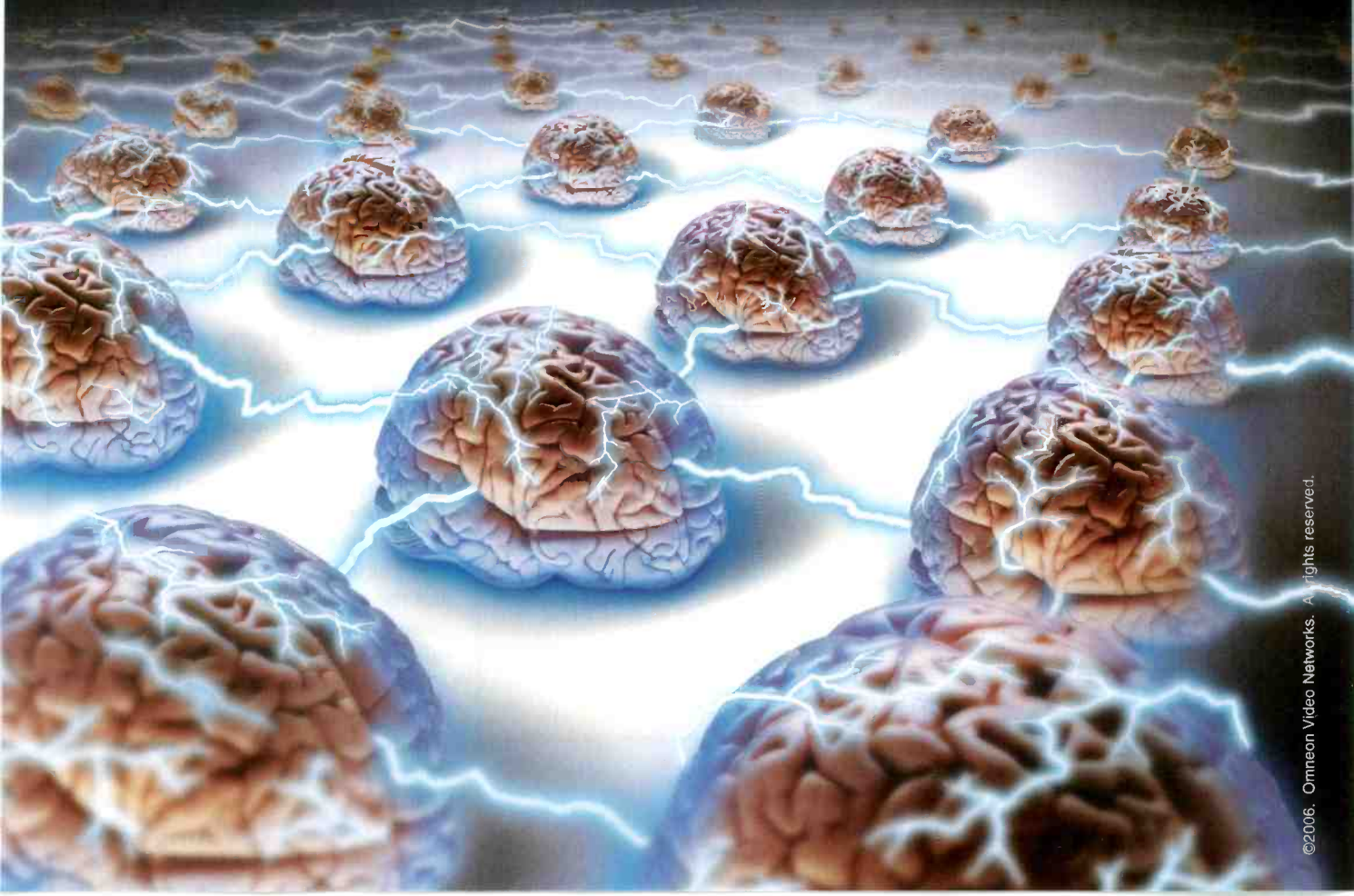
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total harmonic distortion (THD) at a specified output level. For professional studio-quality equipment, the output level THD is measured at 10dB above SOL (+18dBu or +14dBu). This level is called maximum operating level (MOL). The percentage of THD is the distortion factor multiplied by 100. The mathematical expression is:

$$THD = \frac{\sqrt{E_{2f}^2 + E_{3f}^2 + \dots + E_{nf}^2}}{\sqrt{E_f^2 + E_{2f}^2 + E_{3f}^2 \dots + E_{nf}^2}} \times 100$$

where:

- E_f = amplitude of fundamental voltage
- E_{2f} = amplitude of second harmonic
- E_{nf} = amplitude of n th harmonic voltage

To measure the THD, the audio analyzer removes the fundamental (first harmonic) component of the distorted signal present at the output of the object under test, and all the remaining energy, including noise and harmonics, is measured. The measurement bandwidth is usually limited to 20kHz. Because of the contribution of noise to the measured results, the method is better described as total harmonic distortion and noise (THD + N). The tests are carried out at several frequencies, such as 50Hz, 100Hz,

1kHz, 5kHz, 7.5kHz and 10kHz. THD measurements at frequencies above 10kHz are irrelevant because the harmonics generated by the object under test are above the audio bandwidth. Figure 2 shows the typical setup for THD measurements.

Intermodulation distortion (IMD) occurs when a system whose input is fed with two signals of frequencies f_1 and f_2 generates at its output, in addition to the signals at the input frequencies, signals having frequencies equal to sums and differences of integer multiples of the input frequencies. The SMPTE IMD test specifies the use of a test signal consisting of two separate frequencies ($f_1 = 60\text{Hz}$ and $f_2 = 7\text{kHz}$) with a respective amplitude ratio of 4:1. The IMD causes the 7kHz "carrier" to be modulated by the 60Hz signal. This results in the generation of sidebands above and below the 7kHz carrier with components at 60Hz and its harmonics. The IMD is computed as:

$$IMD = \frac{\text{Demodulated signal}}{E_{f_2}} \times 100$$

where: E_{f_2} = amplitude of the 7kHz component.

Figure 3 on page 30 shows the typical setup for IMD measurements.

Noise

Audio signals are affected by noise, which is best defined as an unwanted disturbance superimposed on a useful signal. The noise level is usually expressed in dB relative to a reference value and is commonly referred to as signal-to-noise-ratio (SNR). In professional studio equipment, the reference level for SNR measurements is the maximum operating level (MOL), which is typically the output level at which the THD is 1 percent. Usually, MOL is 10dB above the SOL.

The main source of random noise is the thermal agitation of electrons. Given R , the resistive component of an impedance Z , the mean square value of the thermal noise voltage is given by: $E_n^2 = 4kTBR$, where:

E_n = The noise voltage

k = Boltzmann's constant

(1.38×10^{-23} joules/Kelvin)

T = The absolute temperature in Kelvin

B = The bandwidth in hertz

T is usually assigned a value such that $1.38T = 400$, corresponding to about 17°C . The SNR at the output of a system depends on the noise generated by the resistive component of the signal source (e.g., the microphone) and the noise generated by the earliest amplifier stage in the chain. Assuming $B = 20\text{kHz}$ and a microphone with a resistive component $R = 150\Omega$, $E_n = 0.219\mu\text{V}$. This is the theoretical thermal noise of the microphone input circuit.

The microphone preamplifier contributes its own random noise, which considerably reduces the SNR of the system. The situation can be visualized as having an ideal noiseless amplifier whose input is fed by a noise generator. This fictitious noise is called the equivalent input noise (EIN) of the amplifier. The difference between the EIN and the calculated theoretical thermal noise level of the audio signal source is called the noise factor of the amplifier.

The measurement of SNR is a rather involved procedure, and the accuracy of the results depends on a strict adherence to a set of rules. The

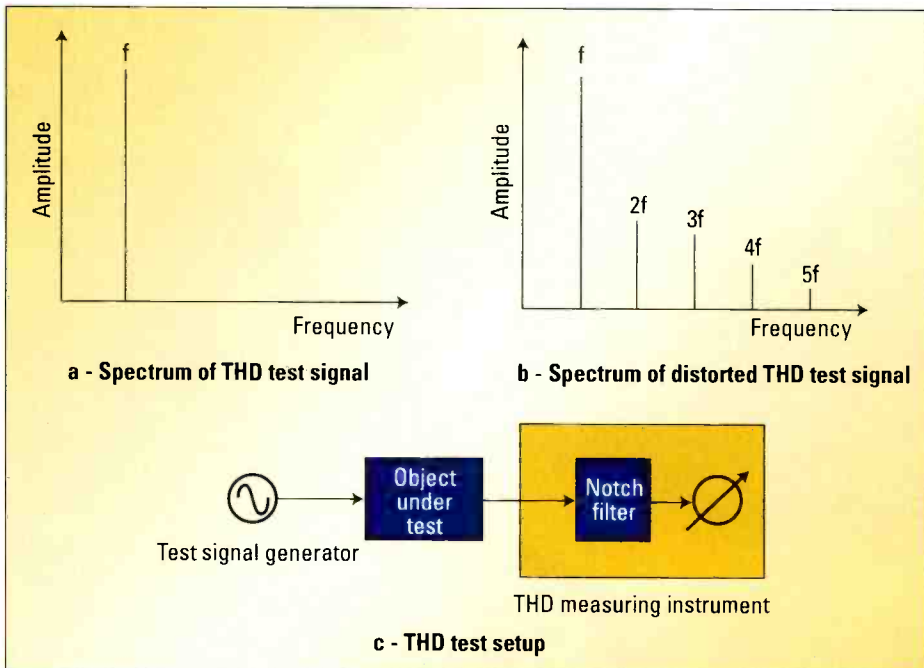


Figure 2. The measurement of total harmonic distortion

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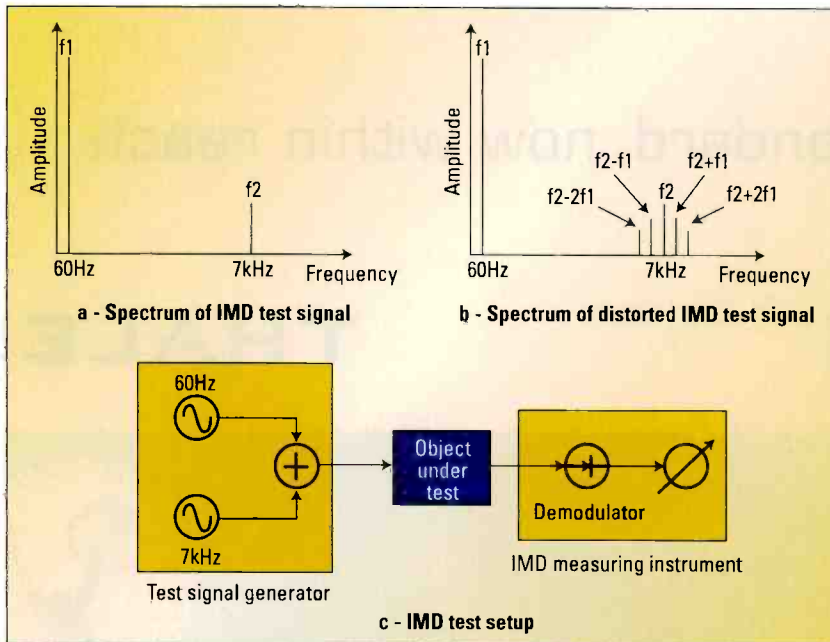


Figure 3. The measurement of intermodulation distortion

routine test procedure illustrated in Figure 4 and described below is suitable for the SNR measurements of an audio mixer:

- Step 1: Disable all inputs except the one in the measurement path. Disable all compressors and equalizers. Feed a 1kHz audio signal at the rated input level (e.g., -70dBu) at the microphone input and adjust input sensitivity, channel gain and master gain for SOL at the output (+8dBu or +4dBu).
- Step 2: Remove the input signal source

and substitute with a low-noise 150Ω resistor. Measure the noise at the output with the audio analyzer in dBu in a 20kHz bandwidth. An optional noise-weighting network may be used to simulate the ear frequency response.

The SNR is given by the difference, in dB, between MOL in dBu and the measured noise in dBu. The use of a weighting network will produce SNR values that may differ by 10dB or more from flat 20kHz bandwidth measurements.

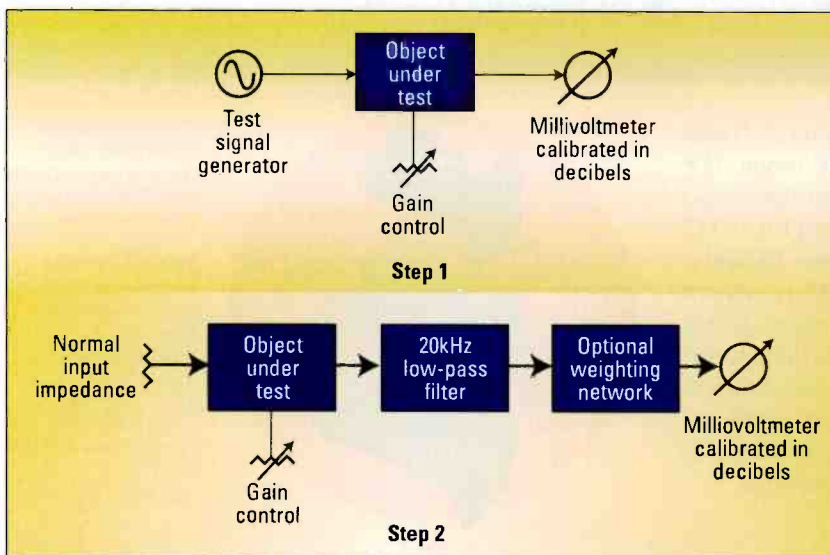


Figure 4. The measurement of signal-to-noise ratio

Periodic noise is generated outside the equipment and coupled in some manner into it. Unlike random noise, periodic noise can be eliminated by good engineering practice. The main type of periodic noise, commonly called hum, is 60Hz, and its harmonics. The measurement of signal-to-periodic-noise ratio is similar to the measurement of signal-to-random-noise ratio except that a 200Hz low-pass filter is used. A spectrum analyzer or oscilloscope may be added to help identify the frequency of the periodic noise.

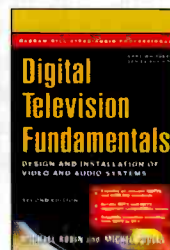
Crosstalk is defined as the injection of an unwanted signal from a neighboring circuit via a mutual impedance (e.g., between signal sources in an audio mixer). The measurement is quite involved. It includes feeding an MOL signal to the unwanted (crosstalking) input and measuring its effect at the wanted path, whose input is loaded with its characteristic source impedance. The two paths have to be adjusted for normal operating conditions. The audio analyzer is connected to the wanted path output, and the input of the crosstalking path is fed with a constant amplitude signal whose frequency is varied in discrete steps or continuously in the bandwidth of interest. The signal-to-crosstalk ratio is expressed in dB with reference to MOL.

BE

Michael Robin, a fellow of the SMPTE and former engineer with the Canadian Broadcasting's engineering headquarters, is an independent broadcast consultant located in Montreal. He is co-author of "Digital Television Fundamentals," published by McGraw-Hill and translated into Chinese and Japanese.



Send questions and comments to: michael_robin@prism2b.com



The second edition of Michael Robin's book may be ordered directly from the publisher by calling 800-262-4729. The book is available from several booksellers.

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digital emotion

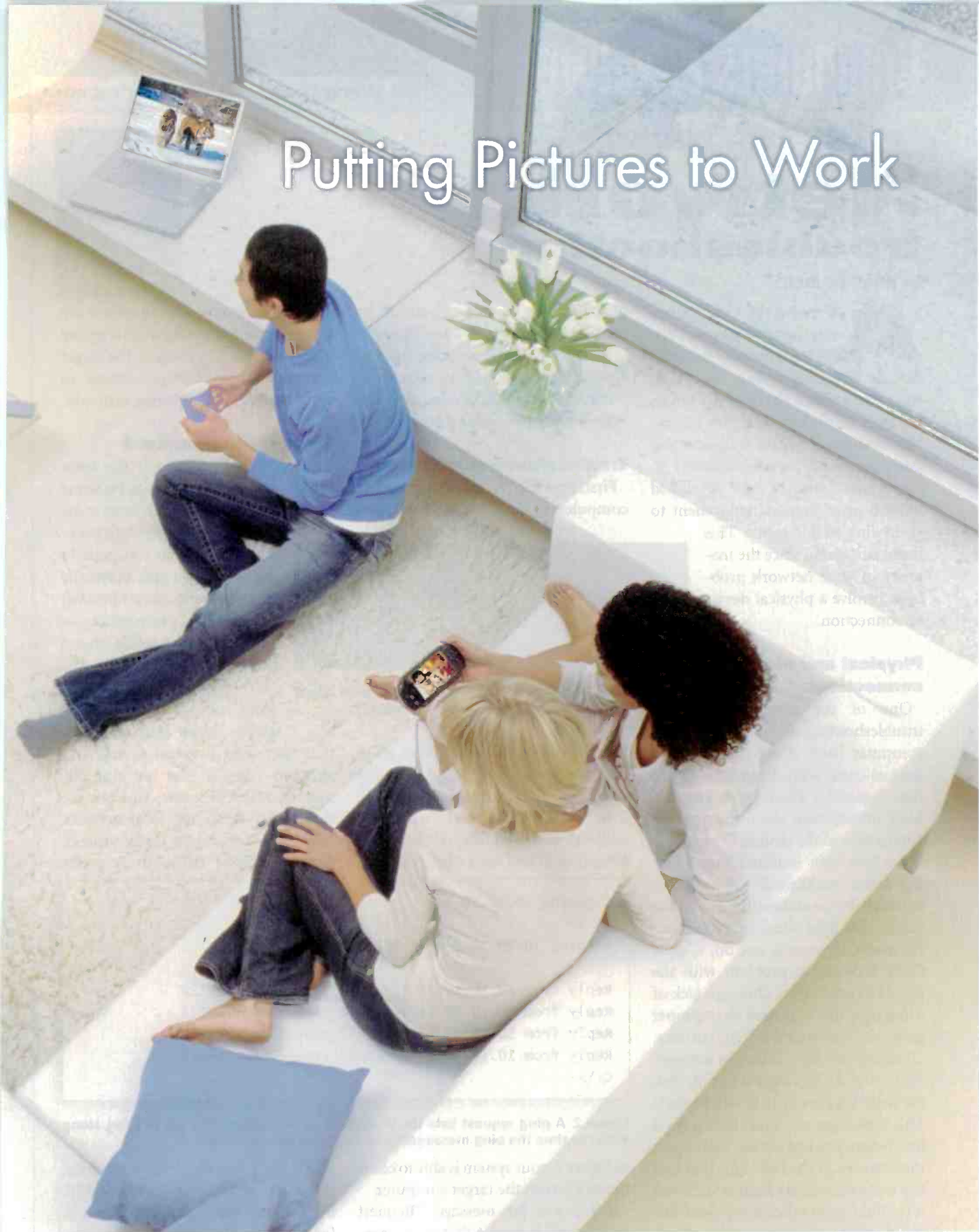
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Putting Pictures to Work

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Network troubleshooting

BY BRAD GILMER



All network architectures rely upon a physical (or RF) connection between devices. Troubleshooting almost always starts with a check of the physical layer of the network. Are the cables connected? Are the wall jacks and patch panels properly terminated?

A whole industry has developed around providing test equipment to verify link performance. This is not surprising since the majority of your network problems involve a physical device or connection.

Physical and electrical connections

One of the most useful troubleshooting tools is the computer itself. Almost all network devices come with diagnostics lights. (See Figure 1.) These lights give you basic information about the network connection to the device.

The link light indicates that a link has been established with another network device at the other end of the cable. This light should stay on continuously. If yours is not on, it most likely indicates a problem with the physical connection, although lack of a link may also be caused by improper network interface card (NIC) drivers.

The activity light indicates network activity. If the link light is not lit, then the network activity light will be dark. This is because you must have a good link before you can see any activity on the network. If the link light is lit and the network activity light is dark but it is blinking on other computers, this means that you have a valid physical and electrical connection, but for some reason, the NIC card in your computer is not seeing any network traffic. This could be because of a

port failure in the network switch, or it could be because of a wiring error. If the NIC lights are working, but you are still having problems, your computer has several programs that can help identify networking problems.

Troubleshooting with ping

First, find the IP address of another computer on the network (the target)



Figure 1. Link and activity lights can tell you a lot about the connection between two network devices.

that is working normally. Next, go to the computer that is having difficulty and open a command line window. Type “Ping [IP address],” where [IP address] is the address of the target computer. If you see a display similar

also mean that the computer you are trying to ping is configured to ignore ping requests. Try pinging the target computer from another system so that you know it is working properly.

Trace route command

Another useful utility is the trace route command (tracert on some systems, traceroute on others). Trace route not only shows the path packets take from one computer to another, but it also shows the time it takes packets to transit from one place to another.

Figure 3 on page 36 shows how trace route can be used to find areas of network congestion. In this example, I use trace route to find the route between myself and xyz.com (this is just an example, not the real XYZ.com). You can see that traffic leaves my local network and then travels on bellsouth.net. Transit time to bellsouth is pretty

```
C:\>Ping 10.10.10.2

Pinging 10.10.10.2 with 32 bytes of data:

Reply from 10.10.10.2: bytes=32 time<10ms TTL=128
Reply from 10.10.10.2: bytes=32 time<10ms TTL=128
Reply from 10.10.10.2: bytes=32 time<10ms TTL=128
Reply from 10.10.10.2: bytes=32 time<10ms TTL=128
C:\>
```

Figure 2. A ping request lists the IP address of the system you are pinging along with the time the ping messages took to transit the network.

to Figure 2, your system is able to communicate with the target computer.

If you see the message, “Request timed out,” it means that your computer cannot send and receive messages from the target computer. This could be caused by a problem in your computer or on the network. It could

good — generally less than 6ms. But then on hop 6 at 65.83.236.178, the response time jumps to 24ms. A few hops later, the carrier changes to broadwing.net. We can only assume that the jump in response times happens at a meeting point between bellsouth and broadwing. Next, on

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hop 11, the response time jumps to 63ms. From the URLs, it looks as if this jump occurs somewhere within the broadwing network.

In this example, we are observing congestion (or perhaps delays induced by distance) across the Internet. But trace route can be used equally as well to identify choke points on a local network.

Security

You might not think security belongs in an article on troubleshooting, but I can tell you from firsthand experience that many security issues manifest themselves initially as problems on the network. As the person in charge of maintaining your networks, it is important that you consider security when performance problems arise.

The effects of compromised security on a corporate network can be

may try to communicate with other computers in a distributed denial-of-service attack. This coordinated attack can slow network performance as a large number of computers all attempt to communicate with the same

able in the server, performance suffers dramatically.

As you might expect, streaming servers require a lot of bandwidth, both at the NIC card and on the bus. So, when users complain of slow net-

Many security issues manifest themselves initially as problems on the network.

host at the same time. Be aware that performance issues can point to a security breach in your organization.

Server troubleshooting

If most people on your network use a central server, the problem could actually be an overloaded server. Almost all servers typically have a number of diagnostic tools, which will let you know how heavily loaded they are.

The cause of server performance

work performance, be sure to consider whether the users all connect to a common server, and check the server to see if it is resource-starved.

There is one last place to look when you are troubleshooting network problems: log files. They are created by most modern operating systems and can be helpful. If you are a server administrator, you should look at log files every day. Not only can they help you identify network issues, but they can also provide early warning of security issues.

Summary

When you have problems with your network, you should start by checking the physical and electrical connections to the computer. You can then ping other computers to see if your computer is able to communicate across the network. If you experience performance problems on the network, you can use trace route to see where the problems come from. Remember, problems that appear to be network-related may actually be caused by a

```
C:\>tracert xyz.com
Tracing route to xyz.com [16.23.14.120]
over a maximum of 30 hops:
  1  <1ms  <1ms  <1ms  192.168.1.1
  2   4ms   4ms   4ms  ads1-33-166-1.asm.bellsouth.net [67.33.166.1]
  3   5ms   5ms   4ms  209.149.96.1
  4   7ms   4ms   4ms  205.152.99.161
  5   5ms   5ms   6ms  axr00asm-1-3-1.bellsouth.net [65.83.237.2]
  6  24ms  24ms  24ms  65.83.236.178
  7  30ms  28ms  25ms  65.83.237.210
  8  25ms  26ms  25ms  ge-2-1-0.a1.chcg.broadwing.net [216.140.15.17]
  9  34ms  30ms  29ms  p5-0.gnwd.broadwing.net [216.140.15.141]
 10  46ms  46ms  46ms  p4-0.c0.ftwo.broadwing.net [216.140.15.129]
 11  62ms  63ms  63ms  s7-3-0.c1.atln.broadwing.net [216.140.17.110]
 12  63ms  62ms  63ms  p3-0-0.a1.atln.broadwing.net [216.140.12.38]
 13  65ms  65ms  69ms  65.90.64.94
 14  65ms  65ms  64ms  www.xyz.com [16.23.14.120]
Trace complete.
C:\>
```

Figure 3. The trace route command can reveal the source of network bottlenecks.

substantial. An e-mail worm can slow performance as an infected computer sends out hundreds or thousands of e-mails in an attempt to infect other systems.

Viruses can turn computers into zombies — computers that can be remotely controlled by their attackers. At a prearranged time, the zombies

problems depends on how clients use the server. Database applications are computationally intensive. This can require large amounts of processor and memory resources. Certain operating systems — Windows Server 2003, for example — require large amounts of available memory. If there is not enough memory avail-

lack of available resources on a central server. Finally, if your network suddenly develops problems, remember that the problem may be caused by a security breach.

BE

Brad Gilmer is president of Gilmer & Associates, executive director of the AAF Association and executive director of the Video Services Forum.

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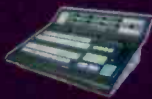
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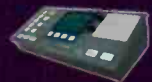
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Video server technology: Methods for reliable operations

BY AL KOVALICK

Providing a precise definition of a video server¹ is similar to the blind man describing an elephant; the description will depend on the vantage point of the observer. This is true because the video server comes in several different flavors, and this obscures its persona. In general, there are three classes of video server:

- the standalone AV server with internal storage and/or external storage;
- the clustered server with multiple AV input/output nodes, each connected to one or more storage arrays through a switching network; and
- the edge server with a few AV I/O ports, internal cache storage and file-based import/export using non-real-time (NRT) transfers.

Each of these server types also has control ports, monitoring/diagnostics ports and the usual timecode and video reference ports.

Figure 1 illustrates the first of three server types. The top section shows the generic video server with M input ports and N output ports. SDI video, composite, ASI, AES/EBU audio and video/IP are some input/output format types. Additionally, a LAN connection is customary for NRT and/or real-time (RT) file transfer. Optionally, there may be a connection (SCSI, Fibre Channel or Ethernet) for external storage access. In general, this architecture can represent the standalone server or the edge server

(as described earlier), depending on how the device is configured and used.

The standalone server model is the workhorse of our industry and is used in the capacity as VTR replacement, small clip server, play-to-air server for TV news operations and a host of other applications. The edge server model is typically loaded (or unloaded) with content via NRT file transfers from distant storage

Each I/O node has little or no internal storage and has the I/O richness of the standalone server. Importantly, an AV node is not a video server but rather a “media client.” However, the combination of a node plus storage offers all the functionality of a video server. The distinguishing features of the cluster are immense, including expandable external shared storage, a common file system that all nodes share and a switching network for

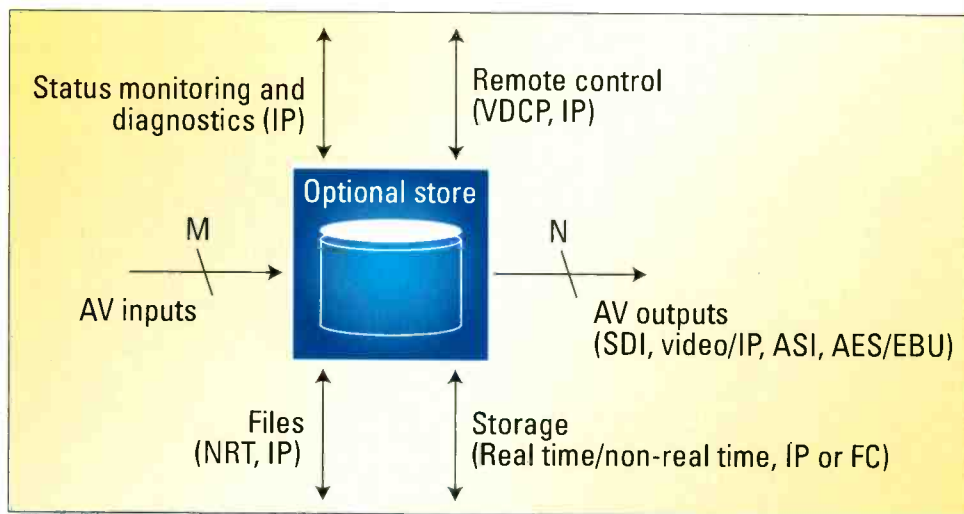


Figure 1. The standalone AV server has internal storage and/or external storage.

systems. Applications run the range from remote digital signage to low-cost AV ingest and playout nodes attached to inexpensive NRT storage systems.

The clustered server model is depicted in Figure 2. (See page 40.) Clusters are used in situations that require large I/O counts (100+) with support for 1000s of hours of shared AV storage. Nodes and storage are added as needed to meet usage demands.

nodes to access storage. This configuration requires a high level of reliability across the file system, switching and storage systems. Some switching systems use a hybrid combination of Ethernet, Fibre Channel or IEEE-1394 connectivity and may require non-trivial protocol translators inside the network.

Next, let's study a pool of techniques for creating high availability video servers.

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Built to last

First, let's look at some common reliability techniques that can be applied to all three classes of video server. In the big picture, reliability is linked to maintainability, including remote servicing and diagnostic ability. A feeble ongoing maintenance policy will result in overall poor reliability, regardless of how much attention is given to hardware/software reliability and stability. So, excellent maintenance practices are a prerequisite for high-availability operations. What else is needed?

Consider the generic standalone server and media client noted in Figures 1 and 2. To keep them running at peak performance, each needs swappable dual-power supplies with associated AC access to dual-power rails, dual (or more) fans, protected storage and spare I/O ports. All servers and media clients also have an internal controller with CPU, DRAM, glue logic and often hard disc storage.

not all of them. Element duplication results in improved unit reliability but does not provide truly fault-tolerant operation under all conditions. Such a unit may be described as having a single point of failure (SPOF) — the controller CPU, for example. It's less expensive to configure two mirrored

The amount of protection should be proportional to your business needs and budget.

Storage protection methods typically use RAID. RAID is a family of separate methods ranging from a 100-percent mirror of all stored data to using clever data parity tricks to

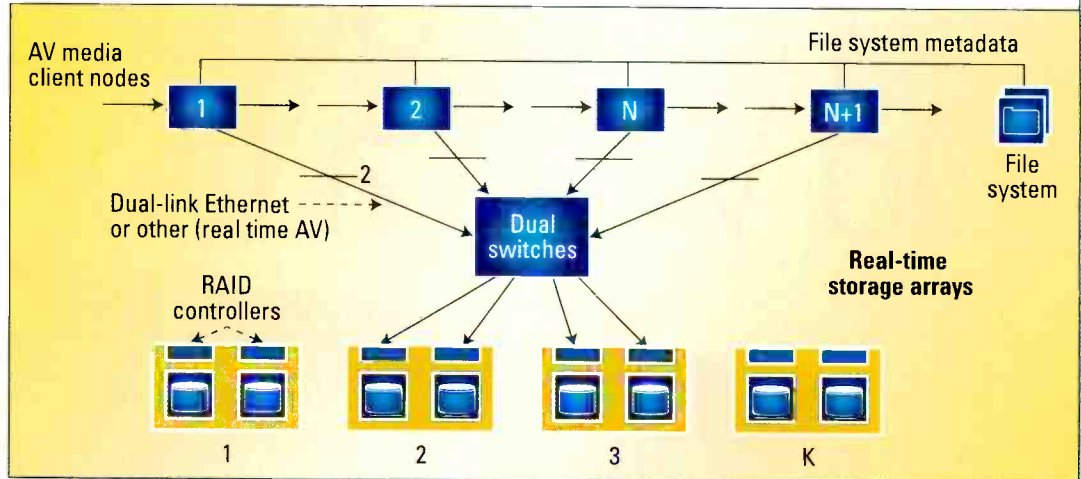


Figure 2. The clustered server has multiple AV input/output nodes, each connected to one or more storage arrays through a switching network.

In the end, it's not practical to build a single server or node that has duplicated every internal component.

It's not practical to duplicate the controller portion of the server or node because transferring from a failed to spare controller is extremely difficult and not feasible in practice. And who of us would not implicate software (executed on the internal controller) as a potential failure component?

In the end, it's not practical to build a single server or node that has duplicated every internal component. So, most servers in use today sensibly duplicate some internal components, but

SPOF servers running in parallel than to design a single unit that has no single point of failure (NSPOF) performance. However, two SPOF servers running in lock-step parallel do offer an NSPOF operational mode; if one server node fails, the other replaces it immediately or acceptably quick.

Everlasting storage

Storage is an essential part of most video servers. With hard discs clocking in at 500GB per unit in 2006, it is common practice to store 1000s of hours of RT online AV. As more AV content is stored, higher storage reliability is demanded. For the small edge server or single VTR replacement server, there may not be any storage protection. However, for most mid- to large-size server systems, storage protection strategies are used.

recreate missing or corrupt data, including losing an entire drive. RAID 3 and 5 use data parity and require less storage overhead compared with a pure data mirror (RAID 1). Real-time RAID performance requires careful array design and copious testing to guarantee that any R/W data anomaly is corrected. This is one area where manufacturer experience and field-proven products are a valuable metric when selecting a server vendor.

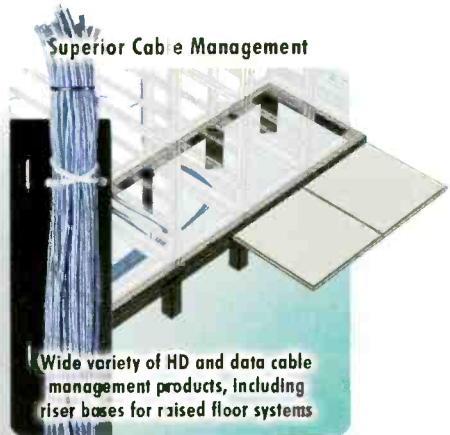
Let's see what might happen when a single hard disc fails completely, as in array number two (Figure 2) with eight drives using RAID 3. Reconstruction kicks in and, using stored parity information, the system begins recreating data from the missing drive. However, if the bad drive is not replaced quickly, the remaining seven drives of data are at risk if another drive fails.

Also, detecting and recreating the missing data in real time is both art and science. When the bad drive is replaced, RAID methods rebuild the data image using an automatic

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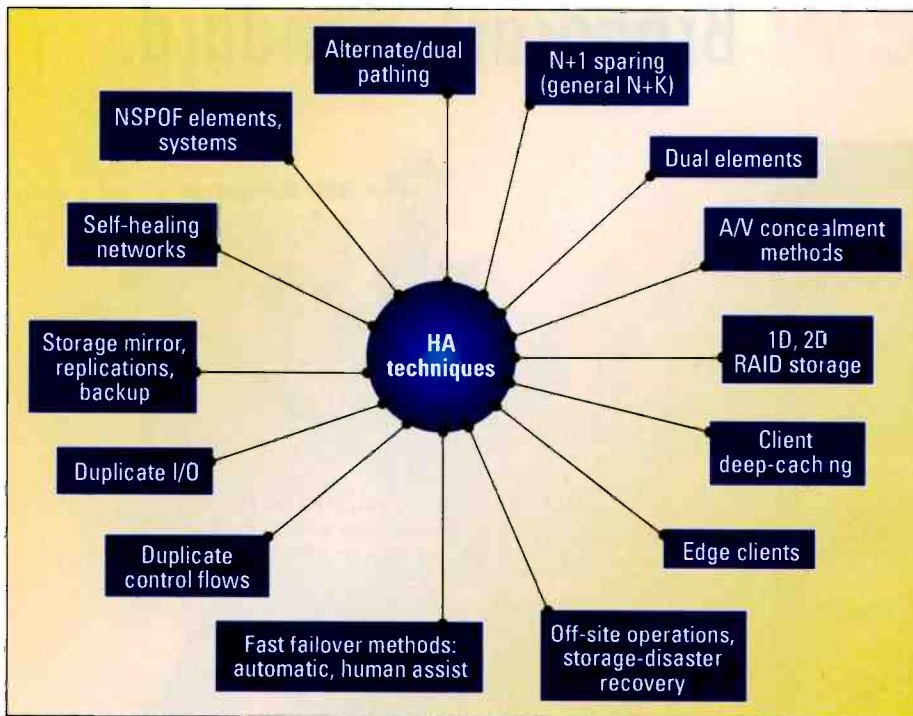


Figure 3. Many techniques are available to assure excellent uptime with NSPOF system-wide.

background process. It's important that the rebuilding procedure does not steal valuable "user" bandwidth with consequent loss of some AV I/O. It's always good to ask the providing vendor if server performance is sacrificed during a RAID rebuild.

Providing RAID storage is a necessary but not sufficient condition for bulletproof storage access. Also needed are dual RAID array controllers, a passive array backplane, and dual-power supplies and fans. Only then can an array be classed as NSPOF. Figure 2 on page 40 shows arrays each with dual controllers. The media clients must decide when to abandon an R/W transaction and switch to the alternate link but doing so without loss of data. As imagined, this requires excellent system engineering and testing.

RAID is not the only tactic for storage protection. A new method called Redundant Array of Independent Nodes (RAIN) was recently introduced by Avid in the Unity ISIS storage system. RAIN uses storage blades (nodes) in a novel configuration, providing 100-percent uptime with

NSPOF storage protection, and transparent background blade rebuilding.

Other techniques

The clustered server requires the most reliable hardware and software operation. Why? Because with more I/O and more storage at risk — com-

pared with the isolated standalone server — many different techniques are needed to assure excellent uptime with NSPOF system-wide. In addition to the methods previously discussed, the following methods are often applied. (See Figure 3.)

- *Dual links from a media client.* Using alternate links provides redundant paths to the storage via the switching network.
- *Redundant switching.* The Fibre Channel or IP switching network needs redundant switches for failover

as needed.

- *Redundant file system controllers.* In the event that all nodes share a common file system, the file metadata controllers must be duplicated.
- *N+1 sparing.* A spare node (number N+1) sits in standby mode until put into service. If node #2 fails, external control logic switches I/O from #2 to node N+1. The delay in switching nodes is a strong function of the speed at which a failure is detected. While it's true that the I/O nodes are SPOF designs, with proper failover, the entire system can be virtually NSPOF.
- *Automation redundancy.* In many cases, I/O nodes are under the control of external automation schedulers. Here it is wise to use dual controllers because if one system fails, the

alternate can take over.

- *Self healing.* This is design in automatic healing by using fast route-around techniques.

Conclusion

The methods mentioned in this paper describe high-availability video

No one method will guarantee NSPOF operations. However, all of these techniques mean that today's servers with outstanding availability are practical.

servers. No one method will guarantee NSPOF operations. However, all of these techniques mean that today's servers with outstanding availability are practical. **BE**

Al Kovalick is a strategist and fellow with Avid Technology and author of "Video Systems in an IT Environment: The Essentials of Professional Networked Media" (www.theAVITbook.com).

¹ RT is used to describe data movement in the "real time video" sense whereas NRT implies AV data transfer rates other than real time.

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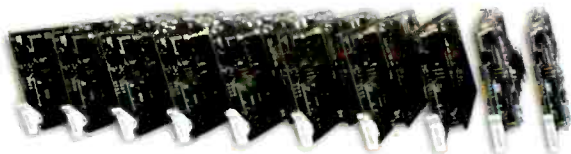
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Turning online services into revenue

BY BARB ROEDER

As with many new technologies, the novelty of streaming television content created the push for broadcasters to develop their online presence without much heed to their ROI. As the industry matures, there is growing evidence that streaming media can be a profitable arm of a broadcaster's business model. This is in part due to the audience's tolerance for advertising and pay-per-view services. It is also in part to the sophistication of ad insertion and tracking mechanisms that have developed over the past five years.

The effectiveness of online advertising

In today's market, streaming media capitalizes on the prevalence of broadband connections and the tech-savvy consumers who use them. CBS SportsLine reported record-breaking online coverage of March Madness, delivering more than 19 million video streams over the course of the playoffs. In addition, it reported an average viewing time of more than

two hours during its broadcast of the Masters golf tournament. (See "Web links" on page 51.) Large audiences glued to computer screens rather than television sets can certainly justify some investment in advertisers' dollars.

Businesses may also be more willing to pay for online advertising because their audiences have learned to respond more positively to these promotions. A recent study by the Online Publisher's Association shows that 31 percent of online viewers have

measurable and trackable, which can be an even greater advantage than over-the-air advertising. While these behaviors are relatively new, and the advertisers are understandably wary of the new technology, the trend may be that online advertising can exceed revenues from traditional channels in the future.

Types of online advertising

Online advertising, in the form of banner ads, pop-ups and sponsored

As the industry matures, there is growing evidence that streaming media can be a profitable arm of a broadcaster's business model.

clicked through to Web sites making online offers during a streaming media presentation, and 8 percent actually made purchases as a part of these actions. (See "Web links" on page 51.)

The advantage, of course, is that this direct impact on the business' ROI is

links, has a clear presence in the Web environment. Banners and links can use animated GIFs or Flash to catch viewers' attention and may be more effective than pop-ups because they are not subject to pop-up blockers that exist today.

New developments in Flash technology allow video to be incorporated into banners, as well as be integrated into a video stream using pre-roll, post-roll or interstitial ads within a program. While many content providers are still trying to fit into a broadcast model using 30-second or one-minute ads, this new technology lends itself to more flexible approaches that can capture a viewer's attention in much less time — even in odd increments.

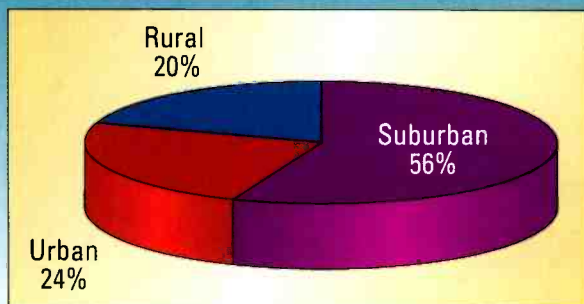
The online audience is no longer in a sit-back-and-be-entertained mode, so repurposing television ads may not be the most effective means for broadcasters to reach viewers and hold onto their advertising dollars.

FRAME GRAB

A look at the consumer side of DTV

DVR users by geographic location

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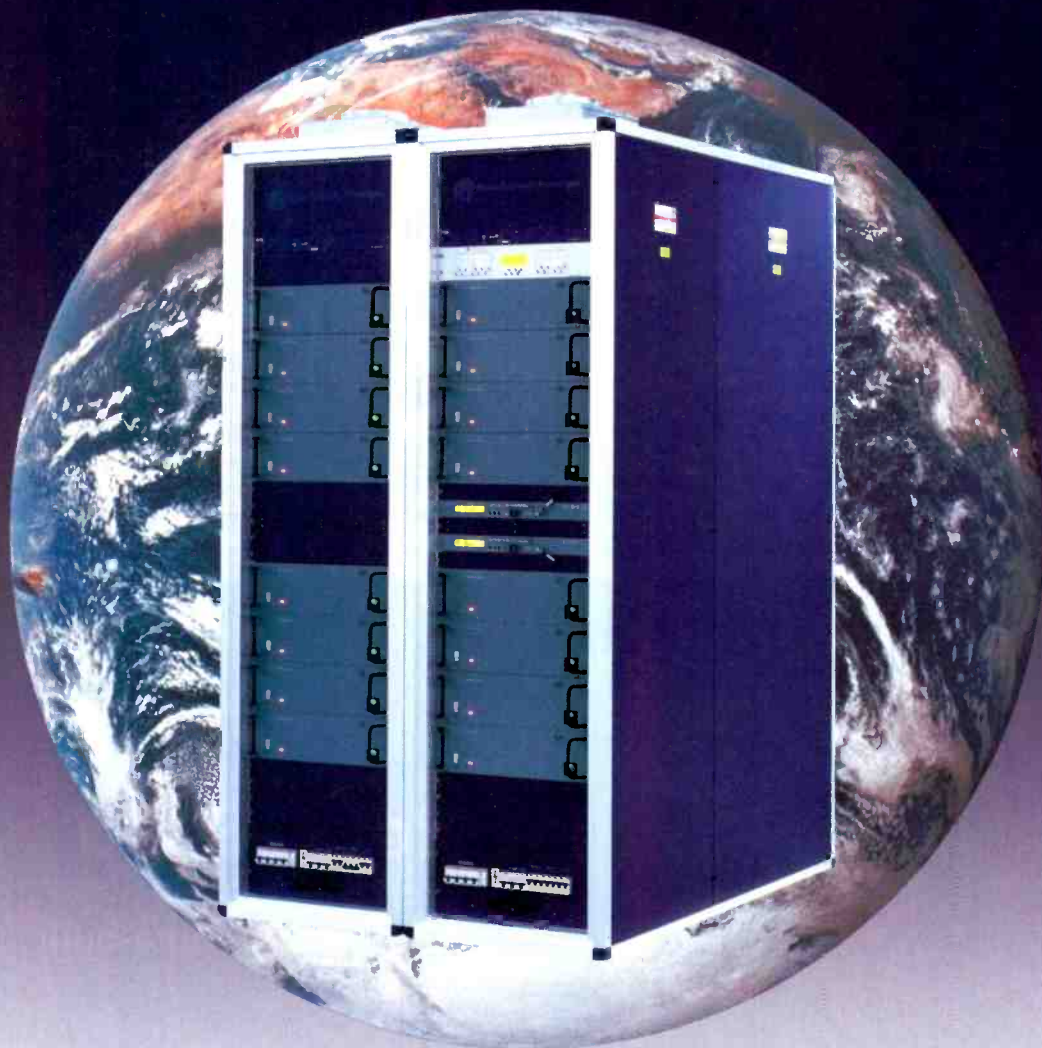


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Several companies offering ad insertion services use rollover interaction that will expand the video window and allow viewers to become more engaged in the advertisement without clicking through and leaving their original source.

Tracking online user behavior

Tracking online user behavior can be a major boon to the online advertising community. Web logs can determine how much of a stream is watched, or whether a banner ad or sponsored link initiated a click-through by the viewer, giving advertisers more assurance that their message is effective. Sites also offer sweepstakes to collect user demographics and data for mailing lists that can be an additional source of revenue.

Microtargeting, or tracking specific users' behavior and targeting ads

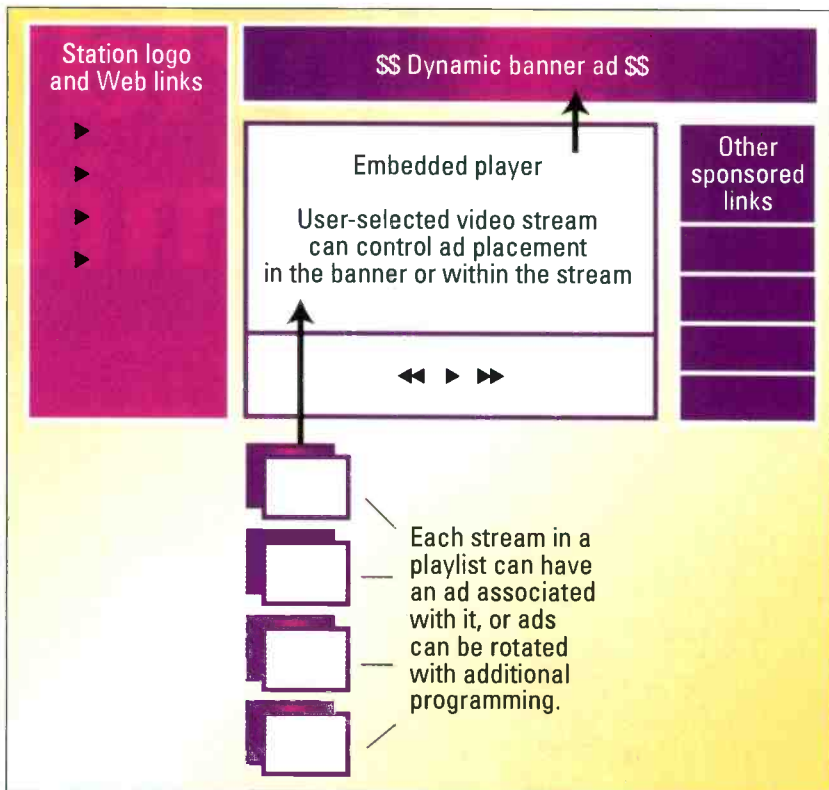


Figure 1. An example of a streaming content playlist

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DM240 XR DVB-S/S2 Modulator

- 30% Bandwidth Savings
- 1-250 Mb/s QPSK/8PSK/16QAM
- Gigabit IP/HSSI/ASI/G.703
- Upgrades to S2 and higher speeds



DD240 XR DVB-S/S2 Demodulator

- 30% Bandwidth Savings
- 1-250 Mb/s QPSK/8PSK/16QAM
- Gigabit IP/HSSI/ASI/G.703
- Upgrades to S2 and higher speeds

HE4000 HD and SD Encoder

- HD & SD Encoding Simultaneously
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- 1-160 Mb/s with built-in color Monitor



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- Selectable HD or SD 4:2:2 or 4:2:0
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UK: 44-1420-540233
Singapore: 65-6225-4016
Beijing: 86-10-65831975
Latin America: 561-487-7972

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catering to their particular interests, is used today for specific product showcases, such as Amazon.com, and usually gets end-user consent as members register to a site. While privacy concerns abound, individual tracking and demographic targeting for more effective advertising certainly lends itself to the personal nature of Internet delivery.

Development platforms

Flash has been the primary development platform for streaming advertisements, though much of the same functionality can be achieved in Microsoft's Windows Media or Real formats using SMIL or ASX. Originally from Macromedia, which was recently purchased by Adobe, Flash's success has been its ubiquitous nature in cross-platform delivery environments, claiming installation on

98 percent of all desktop computers. The most recent improvements to Flash video, including integration of On2's Truemotion VP6 codec, allow true ad insertion and full control over a browser page even as the video is playing. But this requires the use of Flash 8. Fortunately, automatic updates allow end users to easily install newer versions, making the experi-

For true integration with streaming content, playlists consisting of a series of program segments are created using XML and then delivered with the ads interspersed. Some programs may be more suited to the use of specific ads, or a more sophisticated approach can rotate ads as a user views multiple playlist items. (See Figure 1 on page 48.) Flash is ideal for this because it

Tracking specific users' behavior and targeting ads catering to their particular interests, is used today for specific product showcases.

ence more seamless than in the past.

Broadcasters can invest in Flash development resources or rely on several outside companies to create products and services for the interactive, flexible content required for ad insertion.

is an object-based programming environment, allowing authors to create reusable components for their Web site deliverables.

For streaming media delivery, Flash also has numerous tools for

FIRST in routing.

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Since 1989, the biggest names in TV broadcast, entertainment and post production have trusted NVISION award winning technology behind the scenes to keep them years ahead of the times.

THE FIRST synchronous AES router for audio, 1992

THE FIRST time code router with digital signal processing (US patent awarded), 1992

THE FIRST bidirectional machine control router with dynamic port management (US patent awarded), 1996

THE FIRST large-scale HD-SDI router (US patent awarded), 1998

THE FIRST integrated multichannel master control switcher and multiformat router, 2003

THE FIRST large scale digital video router small enough for mobile trucks, the award winning NV8288, 2006

If your business depends on managing large numbers of quality video and audio signals, turn to NVISION, the leaders in HD, SD and digital audio routing systems.

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controlling the entire Web site environment. Flash 8 introduces several new components for customizing skins, or player applications that embed the video directly in the Web site, keeping viewers focused on the entire message rather than being distracted with pop-up windows. Cues can be embedded into a Flash video stream to control the content appearing on the page as well. So, for instance, as a user selects a particular video to watch within a playlist, not only can a streaming ad be played, but a static banner can also be customized to his or her particular interests. Targeted ads such as these can draw a higher rate of return to the sponsor and therefore attract more advertising dollars to the broadcaster.

Prior to its latest incarnation, Flash video encoding relied on an older standard based on H.263. It had a reputation for lower quality and required higher bit rates to achieve the quality of other proprietary formats, such as Real and Windows Media.

Recently, On2's VP6 codec has proven to be a competitive technology for encoding various types of content in addition to including support for alpha channels useful for green screening. (See "Web links.") On2 offers the Flix video encoder tool to create Flash video from the original source, as well as a QuickTime exporter plug-in that can be purchased to run in any QuickTime video production tool, such as Apple's Final Cut Pro or Adobe Premiere.

In-house development of ad insertion technology requires a fairly substantial investment in Flash and Web development resources. Efficient delivery that takes advantage of these technologies also requires the Flash Communicator server for proper communications and streaming to the end user. Companies offering these specialized services can handle both creation and delivery.

As this industry grows, we will see more embedded advertisements, product placements and hot spots within the video stream itself. This will come as the technologies for content creation, including Flash and MPEG-4, mature. And they likely will be more common with video that is created exclusively for online audiences — unless we see a push for more interactive television in the future. **BE**

Barb Roeder is a consultant and president of BarbWired (www.barb-wired.net).

Web links

CBS SportsLine

<http://broadcastengineering.com/newsletters/sports/20060428/CBS-SportsLine-20060428/index.html>

Online Publisher's Association

www.online-publishers.org/?pg=press&dt=032906

"Proprietary codec 2006: Choosing and using the optimal video codec"

www.streamingmedia.com



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Pick Hits54

The top 40 new products from this year's show — selected by readers like you.

The 2006 Pick Hit judges:

Jim Boston, consultant
Mark Brown, SignaSys
Paul Byers, WQED Multimedia
Philip J. Cianci, consultant
David Danto, Lehman Brothers
Perry Drogo, TECADS
Sid Guel, consultant
Glenn Hall, Hewlett-Packard
Steve Hathaway, Agile Aura
George Maier, Orion Broadcast Solutions
Brian Murray, consultant
Lasse Nurmi, Morgankane
Jeremy Ruck, consultant
Dan Stark, consultant
Augusto Villaseñor, Globecomm Systems
Bob Wyatt, KSPS-TV

Product Jackpot58

Almost 200 hot new products from this year's NAB convention.

Want more? See the NAB Special Report packaged with this issue.

Technology Seminar ...58

Our writers and engineers provide insight into the convention's products and technology.

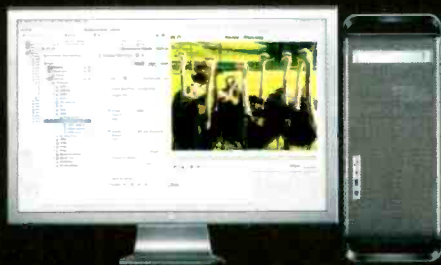
Editors	58
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<i>By Barry Braverman</i>	
Storage	69
<i>By Michael Grotticelli</i>	
TM&M	76
<i>By Philip J. Cianci</i>	
RF	84
<i>By Don Markley</i>	
Automation	90
<i>By Jim Boston</i>	
Audio	94
<i>By Tom Patrick McAuliffe</i>	
ENG	96
<i>By Phil Kurz</i>	
IPTV	110
<i>By Phil Kurz</i>	

Encoding Decoding Converting



Take your media encoding workflow to the next level with
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Increase performance, efficiency and quality without any sacrifices.

Compression Master



Compression Engine



Popwire delivers industrial-strength media coding solutions to the professional media industry.
Popwire's media coding suite simplifies the process of multiple format encoding and transcoding.

Our customers include broadcasters, traditional TV production companies and operators.

Popwire delivers state-of-the-art coding systems that increase the return of investment for digital media producers.

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Autoscript +Voice-Plus+

203-338-8356; www.autoscript.tv

An intelligent prompter module to WinPlus; eliminates the need for talent or operator to manually control the speed of text on a teleprompter; requires no training; the system simply follows the spoken word of the talent.



Autoscript GoPrompt15

203-338-8356
www.autoscript.tv

Compact prompting system; uses a 15in TFT display; is easy to set up and configure; im-

ports scripts from a USB, so no laptop or cables are required; wireless hand control is supplied as standard equipment.



Avid Media Composer

800-949-2843
www.avid.com

Professional film and video editing software for Mac and Windows; new features include motion tracking and stabilization, full-screen video output over DVI, and HD editing for Mac OS X Tiger systems; combines HD, SD, DV and film formats and resolutions without rendering.



Avid Mojo SDI

800-949-2843
www.avid.com

Media Composer NLE with Mojo SDI interface; handles DVCPRO HD and HDV, as well as uncompressed digital SDI I/O and IEEE 1394, component, composite and S-video signals; supports up to eight channels of embedded audio plus four channels of AES/EBU.



Axcera Axciter

800-215-2614
www.axcera.com

A completely reprogrammable digital TV exciter; is easily field upgradable with new software versions; system includes AXACT dynamic digital pre-correction and DTVision digital signal analysis; features a VGA front-panel display; supports slave-mode and SFN operation.



Axon Digital Design HSU20/21

+44 118 973 8920
www.axon.tv

High-end upconverter based on advanced Teranex algorithms; is compatible with ADD-ON Synapse systems; runs on two HQV Realta chips from Silicon Optix, providing 2 trillion ops; features two processed outputs, SD/HD-SDI input, 576i to 1080i/50 or 720p/50 conversion, and 480i to 1080i/59.94 or 720p.59.94 conversion.

Blackmagic Design On-Air

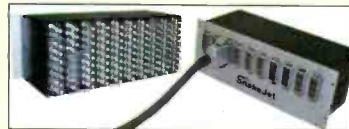
702-257-2371; www.blackmagic-design.com



Real-time HD mixing console with the power of Multibrige Extreme; provides a complete live TV production studio; supports two cameras; provides HD-SDI quality, direct recording to disk, graphics keying, genlock outputs and full camera monitoring; is a free software update for all Multibrige Extreme users.

BTX Technologies SnakeJet

800-666-0996; www.btx.com



An 18-channel, 75Ω coax video multi-connector; supports HD signals; consists of a breakout box on each end inter-linked with an 18-channel HD video coax snake; replaces 18 BNCs; available in 2-, 4- or 10-connector breakout versions.



Canon Console

800-321-4388; www.usa.canon.com

Software designed for either Canon XL H1 or XL2 cameras; allows professional control over multiple-camera record and play functions; provides menu-driven image control and storage interface for both record and play environments; includes built-in vectorscope and waveform monitoring.



Cinegy air

202-742-2736
www.cinegy.com

Completely software-based automation and playout server; relies on open IT architecture; supports all standard video files from DV to 1080i HD MPEG-2 long GOP 4:2:2; control via TCP/IP interconnect; scalable to hundreds of channels; supports closed caption and Dolby E pass-through.



Dielectric TFU-UT

207-655-4555; www.dielectric.com

Economical turnstile, low-power broadband UHF antenna; simple feed system; uses two batwings in a turnstile design, eliminating half of the needed feedlines; allows for dual inputs supporting single channel or for the simultaneous broadcast of two or more channels without combiner.

Evertz 7780TSM

905-335-3700; www.evertz.com

A complete embedded hardware-based solution for IPTV stream monitoring; when combined with a Vistalink Pro NMS, system provides tools to continuously and effectively monitor MPEG-2/H.264 signals in any IPTV network; provides auto-response scripting, multicast stream redirect and real-time monitoring; is SNMP-enabled.



FBBT Matador

+44 2890 317990

www.fbbt.co.uk

Business monitoring software; monitors, manages and helps control workflow by collecting, organizing, consolidating and leveraging network data from broadcast production, playout and transmission systems; can reduce salary and training costs of engineers and support staff by 25 percent; reduces disruptions and outages.

Floral Acuitas



352-372-8326

www.acuitastv.com

A file-based automation and asset management and playback software solution; based on non-proprietary computer

hardware; users can ingest, tag, play and archive digital content; supports single, multistation and multichannel environments; auto-reconcile traffic; drag-and-drop operation; is compatible with most legacy equipment.

Hamlet AR2-E8SHD

949-597-1053; www.hamlet.us.com



A rack-mounted 2RU professional audio monitor; decodes eight

channels of Dolby E and AC3 from HD-SDI, SD-SDI or AES signals; features LED displays for each HD-SDI or SD-SDI channel; auto sensing inputs, four AES or analog pairs inputs and HD/SD-SDI reclocked output.



Harris PTM-305

513-459-3400

www.broadcast.harris.com/videtok

Portable, PDA-sized battery-powered personal test and measurement instrument; supports multiple formats; includes two video signal generators, color and waveform monitor, vectorscope and audio analyzer/monitor; features an integrated 320 x 240 color LCD touch-screen display; runs on standard AA batteries for up to four hours.



Holophone H4 Super Mini

416-362-7790; www.holophone.com

A compact surround-sound microphone providing six channels of audio capture; is ideally suited for live-event TV broadcasts; features on-board multichannel pre amps and a virtual surround headphone monitor and encoder; generates matrix-encoded surround-sound output for stereo infrastructures; aux central channel mic XLR input.



Iconix HD-RH1

800-783-1080

www.iconixvideo.com

Miniature multiformat HD camera; supports all popular formats: SDI, DVI-D and analog outputs; offers electronic shutter and enhancement, fully programmable features and functions, 1/3in progressive square CCD capture, c-mount lens and 14-bit quantization; features five user-adjustable gamma settings and three user-programmable scene files.

Image Video IMD-1

416-750-8872; www.imagevideo.com



A compact video monitor display processor with auto detecting SDI or DVI outputs; supports 16:9 and 4:3 aspect ratios on both inputs and outputs; offers line-level audio output and four GPI inputs; monitors for frozen and loss of video detection; is compatible with Image Video's line of tally controllers.



Inlet Technologies Semaphore

919-856-1080

www.inlethd.com

Comprehensive video analysis software facilitating quality control for Windows Media and VC-1 content; identifies encoding flaws down to the frame level; features stackable graphs on displays, customizable automation and control, user-settable encoding thresholds, which allow immediate identification of errors, and exportable frame-level statistics.

PICK HITS

NAB2006

International Datacasting SFX2100

613-596-4120; www.intldata.ca



A satellite multimedia server appliance with internal hard drive and

multimedia content management and distribution software; features a standard 40GB drive that is upgradable to 120GB; offers easily customized configurations; supports sync, async and terminal interfaces; is part of the SFX2100 series of receivers.

LARCAN MXi Series



303-665-8000
www.larcan.com

Low-power UHF transmitter; supports analog, digital, DVB and DVB-H standards; outputs 10W

to 200W digital; touch-screen LCD display provides telemetry and control; is frequency agile; features a broadband design using LDMOS amplifiers and regulated power supplies; its compact housing with integrated cooling system supports operation under extreme conditions.

Microwave Radio MTX-4000

800-490-5700; www.mrcbroadcast.com

Companion ENG encoder/modulator for the CodeRunner 2; offers user-selectable COFDM and single-carrier QAM modulation; 50Mb/s in a 12MHz channel or 100Mb/s in a 25MHz channel; connectivity options — IEEE 1394, USB 2.0 and Ethernet; supports SDI, HD-SDI and ASI or analog NTSC/PAL video.

Middle Atlantic TEMP-DEC



800-266-7225
www.middleatlantic.com

A rack-mounted temperature display; monitors internal enclosure temperature and provides an LED readout; fits into any Decora-style opening; features adjustable over temperature setting and local and remote overtemp notification.

Miranda ASI-Bridge CAM



514-333-1772
www.miranda.com

A camera-mounted HDV-to-ASI converter; provides direct transmission of HDV footage

or HD recording to an MPEG-2 server; can be combined with the HD-Bridge DEC to create a long-range HDV newsgathering system; accepts HDV via IEEE 1394 connection; supports SD 525/625, HD at 720p and 1080i and ATSC.

Network Electronics SDI-IP-GTW

801-495-1635; www.network-electronics.com



An IPTV gateway solution for the transmission of uncompressed SDI over an IP network; no compression equipment needed; offers real-time, broadcast-quality contribution and distribution over WAN networks; provides user-selectable FEC modes for high QoS; is transparent to embedded AES audio or other VAC data.



Neutrik OpticalCon

732-901-9488
www.neutrikusa.com

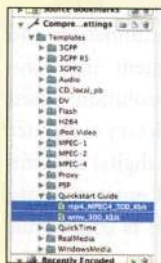
A fiber-optic connector based on standard LC-duplex design; provides safe and rugged connectivity; supports LC connectors or OpticalCon connectors; integrated gold-plated contacts allow the use of up to four copper wires for power or data; features a SMPTE-compatible wire arrangement and additional ground-shell contact.



Omneon MediaGrid

866-861-5690; www.omneon.com

Enterprise-level active storage for large digital media files; combines grid storage and grid computing through the use of multiple intelligent, interconnected and independent storage servers; composed of ContentDirectors and ContentServers; interconnection via redundant GigE; is highly scalable, reliable and manageable.



Popwire Compression Master 4.0

+46 8 726 75 00; www.popwire.com

Desktop video encoding platform; converts to and from all common formats, including MPEG-2, MPEG-4, QuickTime, DV, H.264, 3GPP, Flash and Windows Media; supports distribution to satellite, Web, broadcasting, DVD authoring, iPod and 3G mobile phones.



RK Enterprises MMRB-15

562-902-9200

Field confidence monitor for news and sports applications; offers a 15in LCD color screen with 1024 x 768 resolution; features a sturdy aluminum housing, RF input and optional 601 input; is standard C-mount camera battery-powered and tripod-mountable; provides 16:9, 4:3 or 16:9 stretch aspect ratio display.



Snell & Wilcox Helios

818-556-2616; www.snellwilcox.com

Software-based conversion platform; runs on open-standards IT hardware; provides Ph.C phase correlation motion estimation; can be used in both stream and file-based domains; capabilities include resizing, reformatting and reshaping of images for maximum viewer impact; supports MXF metadata.



Sony XDCAM HD

201-930-1000

www.sony.com.sg/pro/bp/

HD camera system offering flexible capture and recording functions, including user-selectable frame and data rates, interlace or progressive capture; up to two hours of storage on 23GB optical Sony Professional Disk media; supports MXF; uses 1/2in Power HAD CCD with 12-bit A/D signal processing.



TASCAM FW-1082

323-726-0303

www.tascam.com

Audio interface and control surface; supports FireWire and video editing software; includes four high-quality mic preamps with phantom power and compressors, line inputs and digital I/O, unique control surface acts as three surfaces in one — Mackie control protocol, editing surface for NLE applications and a MIDI control surface.



Tektronix Cerify

800-426-2200

www.tektronix.com

Automated system for checking/verifying file-based digital video content; automatically checks all aspects of video files, including encoding, standards compliance, resolutions, bit rates, and video and audio quality; supports all standards; logs errors, informs automation systems and transmits e-mails; Web-browser user interface.



Telecast Fiber Systems SCamp

508-754-4858

www.telecast-fiber.com

An inline repeater for 311M copper/fiber cable; receives and retransmits optical signals on each fiber at -7dBm; is powered by the camera's base station; features 15dB of new optical budget and integral optical power metering.



Thomson Grass Valley Infinity

800-547-8949;

www.grassvalley.com

A multiformat camera platform; supports 1080i50/60, 720p50/60, 525i/60 and 625i/50; records at DV25, JPEG2000 and MPEG-2 SD and HD; records/plays from integrated REV PRO drive and professional-grade CompactFlash media; supports HD-SDI, CVBS, TC and AES audio; IT-based interfaces include three USB, one FireWire, HDMI display and GigE.



Tiernan HE4000

602-437-9620

www.radyne.comstream.com

Dual program video encoder; can simultaneously encode one HD and one SD video stream, as well as up to four stereo audio pairs; supports 1Mb/s to 160Mb/s encoding on 4:2:0/4:2:2 signals; features a two-pass encoding process and built-in video upconverter and downconverters.



VAC VT-1

800-821-0426; www.vac-brick.com

Video tester measures gain and EQ levels anywhere in a composite video system; LED readouts make levels easy to read; has BNC connections; 12V AC power supply available.

Wohler Touch-it

510-870-0810; www.wohler.com



An audio and video monitor with router; 7in touch-screen LCD monitor allows users to

select from 12 displayed asynchronous composite video inputs and 12 stereo analog audio inputs (audio version only); selectable 4:3/16:9 aspect ratios and active video loop outputs.

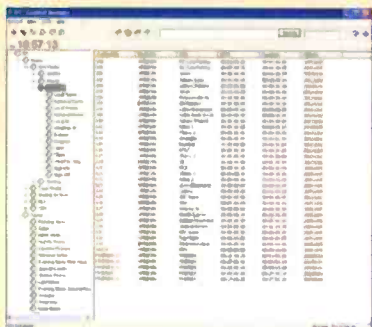


VertigoXmedia Xstation

514-397-0955

www.vertigoxmedia.com

Package to create, schedule and air complete DTV subchannels incorporating national, regional and local content; SD/HD video and graphics; includes hardware, software, data-parsers and asset management; RAID storage; compatible with Xmedia Suite.



AUTOMATION
Digital Transaction
Group (DTG) Xe

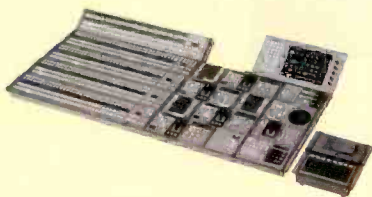
In combination with Microsoft SQL Server 2005, Xe enables customers to better manage and deliver content and provide a platform for open, interoperable data sharing and exchange for file-based workflows; SQL Server 2005 delivers increased scalability, availability and security to enterprise data and analytical applications, while making them easier to create, deploy and manage.

800-243-2001; www.dtgtv.com

PROGRAM OPTIMIZER
Dolby DP600

Supports file-based infrastructure and workflow; includes intelligent audio analysis and automated loudness normalization engine; offers Dolby E, Dolby Digital and Dolby Digital Plus encoding; automates quality control process in faster than real time; intelligently and automatically sets, validates and corrects audio metadata parameters without the need for decoding and re-encoding.

415-558-0200; www.dolby.com



VIDEO ROUTER
Sony IXS 6000 series

Hybrid routing switcher series supports SD and HD video, AES digital audio and RS-422 control signals all within the same mid-size matrix; sizes of 16 x 17 to 128 x 136; handles balanced digital audio matrices of 32 x 34 up to 256 x 272; supports Sony's S-Bus communications protocol for backward compatibility.

800-686-7669

www.sony.com/professional

TECHNOLOGY SEMINAR

Editors

BY L. T. MARTIN

Despite attendance topping 105,000, several of the biggest players in post production didn't have major editing announcements at NAB2006, which only left more time to examine the others who did.

What was worth seeing

Adobe unveiled the latest version of its Adobe Production Studio software last January, but it was still worth visiting the company's NAB booth to see how well Dynamic Link

MacBook Pro laptop system, which functions as fast as previous desktop towers.

However, some product partners are extending the reach of Apple's Final Cut Pro editing software into the realm of the digital intermediate (DI) with AJA Video's release of the new KONA 3 v2 card and Blackmagic Design's new Multibrige Extreme 5.5 board. Both leverage the new PCI Express architecture on the Power Mac G5 Quads to handle 2K



Interplay, an NLE collaboration system, was introduced at the Avid booth. The company also released software-only versions of Media Composer for PC and Macs. NAB2006 convention photos by Douglas Schwartz.

can interchange files between editing in Adobe Premiere Pro 2.0, massaging image content and parameters in Photoshop CS2, and creating effects in After Effects 7.0 Professional without any intermediate rendering.

Apple brought a universal version of its Final Cut Studio suite of post-production software to the show, but the company did not even bother hosting a press conference to unveil it. In fact, despite the admirable stability of Final Cut Pro 5.1 cutting 24p material on both the existing Power Mac and new Intel-based Mac platforms, one of Apple's most impressive introductions was the new 17in

resolutions. To reach those resolution heights in 10-bit RGB, Bluefish444 also announced it would be supporting Final Cut Studio across its entire product line, including a new 2K/HD driver for the SD|Greed video card, due out later this year.

Autodesk demonstrated that it has transferred all of its Media and Entertainment Division software products over to the Linux operating system. Although, the company will continue to support its legacy versions developed on the SGI OS. This has given Autodesk's Discreet line a significant speed boost with Discreet Inferno now providing five times the

performance on Linux that it offered on earlier SGI platforms like the Onyx 2.

The company also unveiled 10-bit RGB versions of its Discreet Smoke and Flint systems and brought out Autodesk Toxik 2007, a collaborative compositing software for feature film production. It now includes a paint system capable of working on high-resolution, high-dynamic range images.

The leader of the post-production parade, Avid, made a major announcement at NAB2006. The company introduced Interplay. This announcement almost overshadowed Avid's much anticipated release of software-only versions of the company's Media Composer systems for both PC and Mac.

Interplay is being touted as the world's first nonlinear workgroup collaboration system, giving everyone in the production chain integrated asset management, workflow automation and security control through a single system. The heart of Interplay is a client/server engine that works with any member of the Avid

for color correction. The new software provides support for Windows Media and includes EDIUS Speed Encoder for HDV, enabling fast HDV video output.

Canopus also presented EDIUS Broadcast, which incorporates all of the EDIUS Pro real-time editing capabilities in a streamlined interface. Designed to help post-production specialists get content to air quickly, it provides enhanced support for industry-standard formats, including Panasonic DVCPRO P2, DVCPRO 50, DVCPRO HD and VariCam; Sony's XDCAM; Windows Media; and, of course, Grass Valley's own Rev Pro storage from its IT-centric Infinity camcorders.

DVS introduced the latest version of CLIPSTER, a DI workstation that can handle up to 4K files on the set of a digital cinema shoot. CLIPSTER can now output in JPEG2000 for digital cinema applications and has a new content management system called Spycer, which can search through hundreds of terabytes of storage. Another DI system, the Nucoda Workstation from Digital Vi-

Showing the fruits of it Canopus acquisition, EDIUS Pro 4 NLE was launched at the Thomson Grass Valley booth.

Unity MediaNetwork shared storage systems to form the backbone of a completely interoperable media production environment. It offers a facility-wide workflow that tracks all Avid projects, as well as more than 100 media and non-media file types, including multi-resolution video, Microsoft Office documents, Adobe Photoshop and After Effects layered files, MPEGs, TIFs and spreadsheets.

Showing the fruits of its Canopus acquisition, EDIUS Pro 4 NLE was launched at the Thomson Grass Valley booth. Version 4 features include multicam support for up to eight cameras, nested sequence editing, improved trimming tools and new parameter-based keyframe support

tion, handled 4K files with the power of its 17 processors, which are based on AMD's latest AMD64 multi-core technology.

The Media 100 line of NLEs, seen under the umbrella of its new owner Boris FX, now includes the Media 100 HD suite. It adds integrated 3-D compositing, titling and effects along with its new version 11 software to bring uncompressed 10-bit HD editing to Mac OS X systems.

The new Media 100 HD, an entry-level HD option, can mix legacy Media 100 content with multiple QuickTime codecs and native DV material on the same timeline. If all you need is an SD editor, the company also now offers the Media 100 SDe, which



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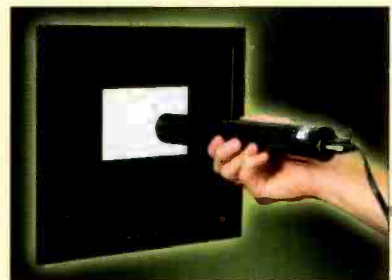
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TECHNOLOGY SEMINAR

features a modular design that allows users to add functions as their needs increase. Media 100 systems should be compatible with Intel-based Macs by this fall.

NewTek claimed to be the world's fastest video editor by running its new SpeedEDIT software on the APEXX 8 workstation from BOXX Technologies. The workstation is powered by 16 AMD Opteron processors. SpeedEDIT combines three-wheel color correction and four-band color selection and enables all editing functions to be performed directly within its unique timeline and storyboard interface.

Quantel has added the new eQ FX to its product line. eQ FX provides proprietary technologies, such as Quantel's TimeMagic acceleration hardware, 160 minutes of HD workspace, and the QColor in-context color-correction package of software and dedicated controls, including the latest Eiger 3.5 software. The company's latest real-time 4K color corrector, Pablo, performed real-time pan and scan by pulling a continuous 1.15GB of data from the disks.

Lightworks is stretching into mainstream broadcast post production with its new Alacrity MR system, which is designed for both multiformat HD and also multicam editing. Although it retains the familiar rotary "nudge" control that has made Lightworks systems the choice of many film editors accustomed to working on a flatbed edit table, the system adds sophisticated color correction and 3-D DVE effects capabilities to the swimming grounds of its familiar red shark icon.

At the Sony booth, attendees could see the XPRI NS family of NLEs based on the XPRI software platform. This new line includes a laptop field editor, a journalist's proxy editor and a full-resolution finishing system. XPRI NS is now an integral part of the SONAPS news production system. Sony also demonstrated its clever new Cinescore software that creates soundtracks based on

themes and variations rather than music loops. Cinescore is capable of generating an unlimited number of fully-orchestrated compositions as WAV files, which are customized to a video project's duration and can be imported into any NLE.

The old made new

Proving that everything old becomes new again, Editware brought a new linear edit system to NAB2006



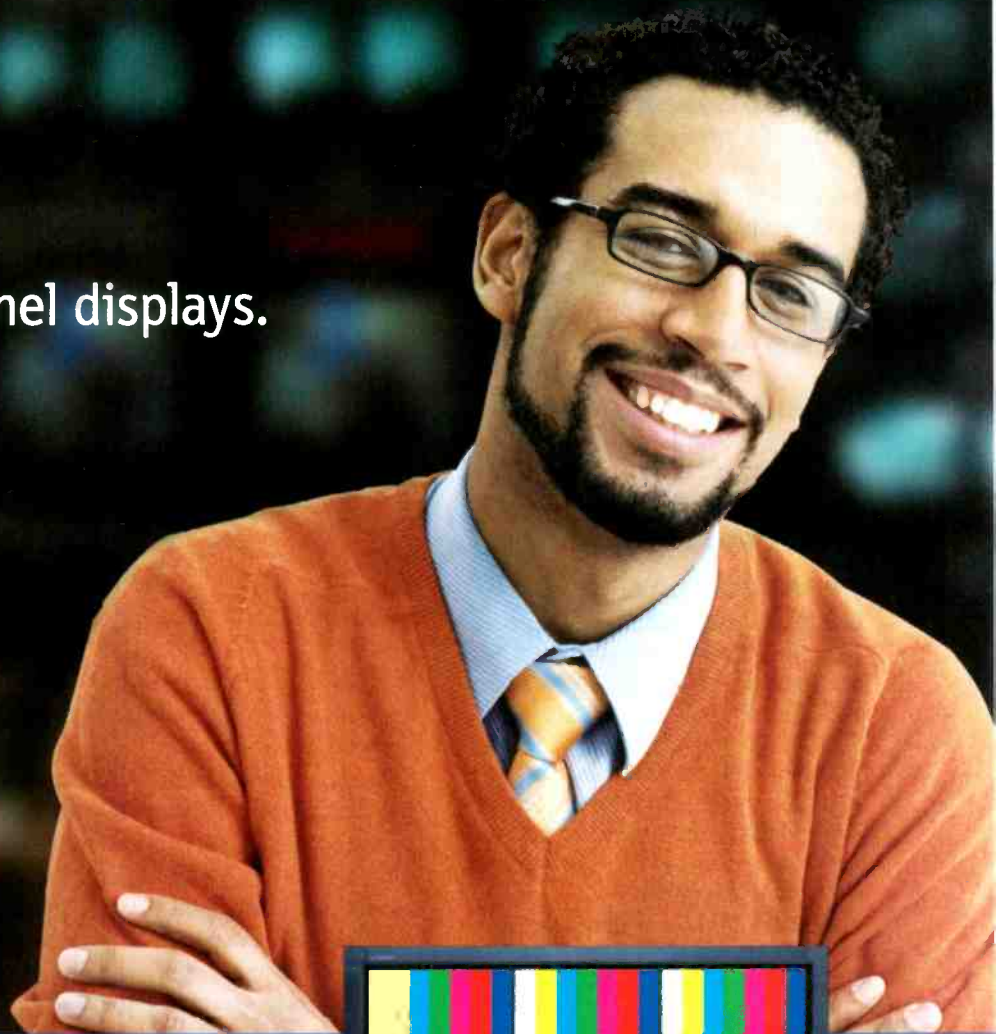
NAB2006 enjoyed increased traffic with more than 105,000 registered attendees and exhibitors.

— the LE-2000. It can be used to replace the Sony BVE-2000, which Sony discontinued last year. Editware's system has a unique dedicated control panel, including jog and shuttle control, and can be configured to control from four to 10 source devices.

Why introduce a linear editor today when disk-based post is dominant? Many facilities have audio mixers and video switchers with a lot of serviceable life left in them and need a linear system to direct them. If only a minor fix is required on a master tape about to be shipped, there is still a call for an alternative that does not require everything to be digitized before it can be worked on. In this day of chasing the latest digital fad, it is good to see one company is smart enough to think inside the box. **BE**

L.T. Martin is a freelance writer and post-production consultant.

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TECHNOLOGY SEMINAR

Cameras

BY BARRY BRAVERMAN

Let's think back in time, way back to the halcyon days of NAB2005. Affordable HD was all the rage and coming on strong, specifically HDV. This substantially compressed long-GOP DV variant was loudly touted to shooters as "high-definition image acquisition for the rest of us." At NAB2006, the HDV juggernaut continued to assert itself, of course, especially in the more capable models

At NAB2006, one thing was apparent: We broadcast shooters of the world are the mainstream now. On the other hand, maybe we always were.

Moving upmarket

Looking at HD from a prosumer perspective, JVC introduced the next iteration of its GY-HD100U. Moving clearly upmarket, the com-

At NAB2006, one thing was apparent: We broadcast shooters of the world are the mainstream now.

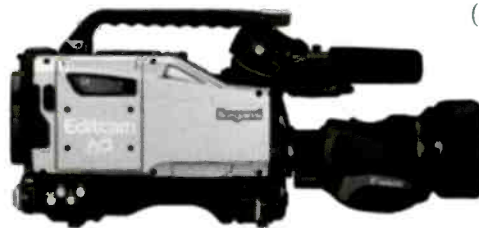
pany released the GY-HD200U and GY-HD250U models with 60p capability. The HD250U also sports broadcast features, such as HD-SDI with embedded audio, time-code synchronization and genlock.

from JVC. But in general, HD, from a broadcast shooter's perspective, reflected a new dynamic. The transformed HD landscape featured the former cinema-oriented wundergear of past years — the Thomson Grass Valley Vipers, Panasonic VariCams and Sony F900s — recast as new products with increased relevance and accessibility for broadcast shooters and profes-

Canon initiated the movement to HD-SDI in its XL H1 model introduced last November. This marked the first time that on-board uncompressed HD output was offered in a modestly priced, small-format HD (actually HDV) camcorder

— and the company continued to tout the camera's HD-SDI feature at this year's show. As many of us in the broadcast industry understand, HD-SDI opens up a plethora of switching and compositing options and signifies greater integration potential in low- to medium-sized studio facilities.

Speaking of facilities, HD integration into existing SD studio environments is facilitated in the JVC HD250U because the camera shares the same 26-pin connector used by the company's previous lineup of non-HD CCUs and related gear. This



Ikegami now offers the benefits of a 1000-line CMOS imager in its Editcam line.

signals. From the lower end of the spectrum, a comparable trend could be observed as last year's prosumer-targeted HDV gear acquired more professional capabilities, such as HD-SDI output and 60p image acquisition. Who could have envisioned that ENG shooters would warrant such consideration at this year's show?



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TECHNOLOGY SEMINAR

key compatibility obviates much of the hassle and expense one would normally associate with transitioning a facility into the HD realm.

The upmarket trend at JVC is reflected as well in the company's latest models featuring 60p image acquisition. The higher frame rate can often

broadcast markets. Sony, with respect to its ENG cameras, appears to be migrating to the smaller, more economical 1/2in camcorder models. This downsizing of the camera imager and higher compression of the MPEG-HD codec offers considerable price and weight advantages



At the Sony booth, *Broadcast Engineering* editorial director, Brad Dick (left), received a demonstration of the company's new HDV series of camcorders.

improve the look of an HD field recording as it provides much smoother motion for action news and sports events.

Filling the HD need

The mainstream HD movement at NAB2006 was also evident in Sony's new XDCAM HD models. Exhibiting many similarities to HDV, including a reduced 4:2:0 color space, the PDW-330 and PDW-350 models recognize the ENG and EFP shooters' need for a rugged image acquisition tool at a reasonable cost. For many, tapeless acquisition in HD will for many reasons swing towards Sony's blue-laser recorded disc. Therefore, the XDCAM models featured at this year's show could play a major role as the impetus for HD news and workflows takes hold.

Sony's XDCAM HD models illustrate that HD cameras are transitioning to the more mainstream

over the company's top-level HD-CAM gear, which has been a favorite of EFP and long-form independent producers for years.



One of several new lenses introduced at NAB2006 for the Sony XDCAM HD line, the Fujinon XS13X3.3RM offers a wide angle and a built-in extender.

The smaller imager in the XDCAM HD models may have a less-than-favorable effect on depth of field, however, so maintaining appropriate selective focus with respect to background sharpness



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TECHNOLOGY SEMINAR

could become more challenging for shooters. Nevertheless, I'm first to admit that many of my ENG brethren never give much thought to such cinematic notions as selective focus,

introduced. Both Fujinon and Canon announced new smaller-gauge objectives.

Fujinon showed a versatile 16X zoom equipped with a 4.6mm wide-



Panasonic highlighted several new cameras in their booth including the multi-format AJ-HDX900 HD camcorder. Recording at 100Mb/s, the HD images are captured in any of 11 video formats, covering both 60Hz and 50Hz platforms.

depth-of-field control and off-speed recording.

Speaking of which, the PDW-F350 allows off-speed recording from 4fps to 60fps, the effect of which can be played back in the camera's VF without the need for an external frame converter. Both new XDCAM HD models can record 1080i60, 1080i50, 1080p30, 1080p25 and 1080p24, so PAL standard-definition compatibility is assured. User

angle and built-in 2X extender. The company's 13X super-wide angle is designed specifically for the harried ENG shooter, who often shoots in cramped quarters like inside moving vehicles or ridiculously tight production trailers.

Joining the fray

Panasonic joined the rush to the HD mainstream with the introduction of the AJ-HDX900 camcorder,

Fujinon showed a versatile 16X zoom equipped with a 4.6mm wide-angle and built-in 2X extender.

selectable bit rates for HD recording range from 18Mb/s to 35Mb/s. At 18Mb/s, the camcorder can record more than two hours of HD (albeit with greater compression) on a single 23GB disc.

With the emergence of Sony's XDCAM HD models, a new lineup of 1/2in broadcast lenses was also

the heir apparent to the highly rented standard-definition SDX900 camera. The commercial-grade HDX900 camera is built like a tank, features the latest 2/3in imager, extreme low-light sensitivity and 24p recording.

This is a lot of camera at this price point, a clear effort by Panasonic to take control of the critical middle

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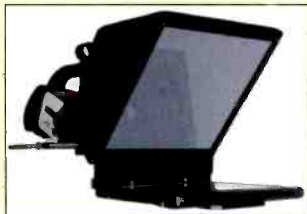
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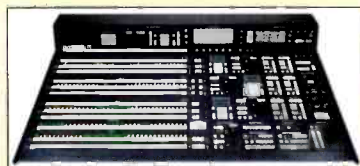
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TECHNOLOGY SEMINAR

ground by usurping many technological advances of its higher-level VariCam models. The HDX900 does not include the adjustable frame rate capabilities of the much pricier AJ-HDC27H, but the look of the new camera's pictures — if the company's current HDX400 is any indicator — will likely be groundbreaking.

Of course, the AG-HVX200 bandwagon just keeps on rolling with tens of thousands of units reportedly shipped and many more still on backorder. In the mainstream ENG space, the company introduced the AJ-HPC2000, its first P2-based HD camera with five P2 slots and FireWire/USB 2.0 outputs. The ruggedness of the recording system,

beginning of a long, creative, data management process. The Infinity looks to be the best indicator yet of the inexorable trend towards a more IT-based workflow. The camera is positioned in the thick of the competition price-wise. And its open design places it optimally for ENG, EFP or literally whatever creative space you aspire to work in.

Hail the mainstream HD shooter

Across the spectrum of camera manufacturers at this year's show, the concerted push into the broadcast HD mainstream was evident and will surely yield enormous dividends for shooters. For years, camera manufacturers seemed more

These developments in imager technology hold major promise for all of us who slave away daily in the industry trenches.

having no moving parts, makes P2 attractive for ENG and EFP shooters who are prone to operating in perilous or extreme atmospheric conditions.

Going mainstream

The push into the HD mainstream for broadcast shooters is perhaps best illustrated in the open-source Thomson Grass Valley Infinity camera. The absence of a proprietary image capture and recording media gives shooters enormous flexibility for optimal integration into any station or production facility's workflow.

The camera is built around Grass Valley's high-end Viper and advanced JPEG 2000 compression scheme (the same codec used in Digital Cinema). The Infinity embraces the industry's established I/O protocols, including Gigabit Ethernet, MXF, FireWire and recording to standard Flash memory or readily available Iomega drives.

As shooters in the burgeoning HD mainstream, we must remember our image acquisition tools are only the

concerned about appealing to the low-end prosumer, designing and building inexpensive gear that lacked robustness and brains. That changed at NAB2006, and we found such promising trends as Ikegami bringing the virtues of a 1000-line CMOS imager to its Editcam HD line.

These developments in imager technology hold major promise for all of us who slave away daily in the industry trenches. As more of us in the mainstream migrate to HD news and long-form programs, we can increasingly avail ourselves of the ever more capable and robust ENG and EFP cameras at reasonable price points.

We've got the tools now. We've got the power. Now let's go shoot HD! **BE**

Barry Braverman is a veteran cinematographer with more than 20 years experience in feature films, documentaries and music videos. He is currently serving as a digital media expert and consultant to major studios. His latest book, "Video Shooter," is available from CMP Books at www.cmpbooks.com.

Storage

BY MICHAEL GROTTICELLI

In the area of video storage, perhaps the most noteworthy development at this year's NAB convention was the fact that it marked the first show in 50 years that a new videotape format was not introduced. This paved the way for several new removable storage options that store video as data on hard drives, optical disk, or solid-state media and quickly load into a camera or an external player or recorder.

Next-generation, networked storage (either as NAS or SAN) was also prominent in the form of new enterprise-wide shared RAID storage systems and highly intelligent holographic storage.

Also noteworthy this year is that the major computer industry storage suppliers, such as HP, IBM, SGI and Sun Microsystems, are now working closely with broadcasters to build out their offline storage systems and get every-



Storage systems get smaller, faster and often, less expensive. Shown above is the Nexsan SATABeast storage array.

body at a station working on the same network. Some broadcasters seemed wary of them only five years ago.

Nearline storage systems — products that store content as it comes in to the facility and content that is prepared for distribution — are still the domain of such industry stalwarts as Avid (with its new ISIS family), Thomson Grass Valley (with its new K2 media server and client system), Harris (with its Leitch NEXIO server family) and Omneon (with the Spectrum media server and new MediaGrid system).

Broadcasters are recognizing the potential that file-based storage systems offer and are implementing them with increasing regularity. For

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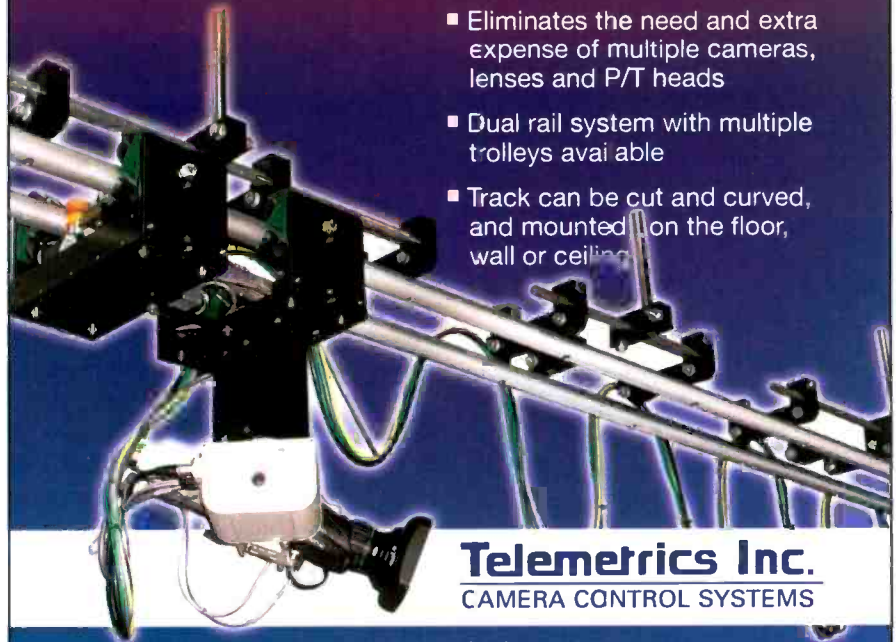
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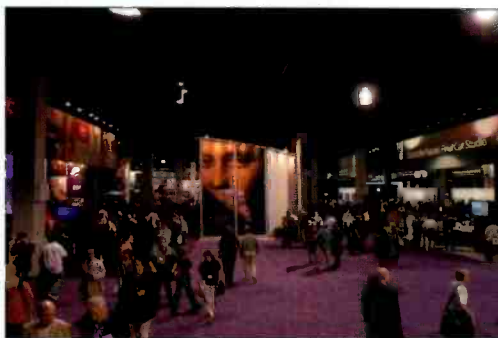
example, the CBS television network has contracted SAVVIS to deploy a digital media archiving and retrieval system supporting the entire network's content archives and its ap-

Line, which includes the SL500 and SL8500 tape systems, the 6920 mid-range disk system and NAS systems. Pappas Telecasting, a large, privately held, U.S. commercial television

Pappas Telecasting ... is installing a holographic storage system ... in its new automated master control facility in Reno, NV.

proximately 250,000 reels of content (and that number is expected to grow significantly over the next five years). The project includes implementing a digital archive, retrieval and distribution system for the CBS television entertainment library, which will allow the network to search, manage, store and repurpose assets.

broadcast group, is installing a holographic storage system from InPhase Technologies in its new automated master control facility for KAZR-TV and KREN-TV in Reno, NV. The InPhase Tapestry offers a 300GB write-once, read-many drive that enables broadcasters to record 35 hours of broadcast-quality video on a single disk with a transfer rate of 20MB/s in less than 4.5 hours. InPhase showed the system in the Maxell booth at NAB2006.



The right storage systems and network platforms for you are out there. NAB2006 offered attendees the chance to hunt down their ideal fit.

Other new options

SGI displayed its new shared-storage solutions, which allow customers to create content via a collaborative workflow. The SGI Altix 4700 server is a 64-bit Linux system with a blade

design that allows users to configure any combination of blades, including Intel Itanium 2 processors, co-processors, memory, storage, I/O and graphics. SGI's InfiniteStorage 6700, a 4Gb Fibre Channel storage system, provides 2.5GB/s throughput, while the SGI InfiniteStorage 10000 provides terabytes of storage arrays per square foot and fast retrieval of archived data at a price per terabyte that is comparable to a tape library, according to the company. Omneon launched its new Media-Grid active storage system at NAB, which is also designed for multiple employees to simultaneously work with large digital media files within

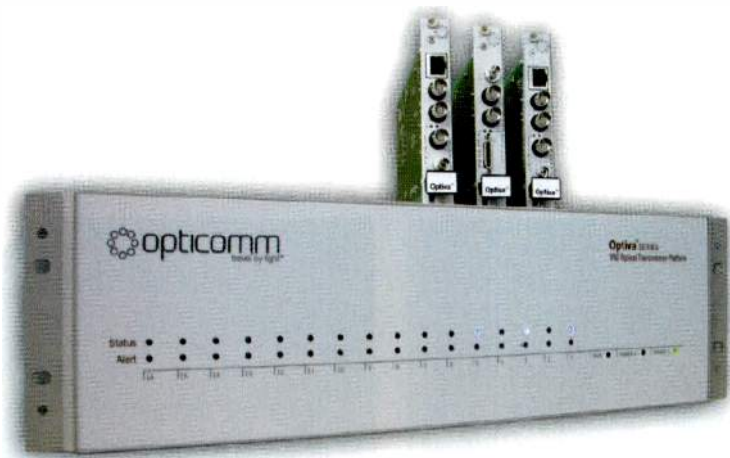
As another example typical of today's use of IT storage by broadcasters, FOX is using Sun Microsystems' Solaris 10 operating system for the network's new centralized sales, traffic and programming management system. With the Sun equipment — and Pilat Media's sales, traffic and program management software — FOX can monitor and manage the entire business process, from sales to billing, for all revenue streams. The IT server and storage project will be rolled out across all FOX television stations over the next three years.

Due to its acquisition of StorageTek, Sun showcased a hierarchical storage management solution based on the Sun StoreEdge and StorageTek Flex-

design that allows users to configure any combination of blades, including Intel Itanium 2 processors, co-processors, memory, storage, I/O and graphics. SGI's InfiniteStorage 6700, a 4Gb Fibre Channel storage system, provides 2.5GB/s throughput, while the SGI InfiniteStorage 10000 provides terabytes of storage arrays per square foot and fast retrieval of archived data at a price per terabyte that is comparable to a tape library, according to the company.

Omneon launched its new Media-Grid active storage system at NAB, which is also designed for multiple employees to simultaneously work with large digital media files within

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Panther Broadcast
Pixy Crane

Weighs a light 69lb even at longest configuration; has a maximum length of 36.5ft; the maximum payload is 55lb; with a remote head, it can be easily carried and operated by one person; in shorter configurations, it can be used as a jib arm; its well-engineered anchoring construction assures maximum stability.

+49 89 613 900 01; www.panther.tv



PEDESTAL
Shotoku TP-90

Compact three-stage, minimum-height pedestal has a column stroke reach of 37.2in and a payload of 132lb; is located under the carriage; cable guards can be height-adjusted by turning a knob located at the side of carriage; safety features include a new and improved column lock as well as a brake ring placed within reach of the cameraman.

866-746-8658; www.shotoku.tv

TECHNOLOGY SEMINAR

broadcast and production facilities. The system combines grid storage and grid computing through the use of multiple intelligent, interconnected-yet-independent storage servers.

The main components of the system are ContentDirectors and ContentServers. ContentDirectors act as the overall file system controllers, managing the distribution of data throughout the system and providing data maps for easy retrieval of media.

The MediaGrid architecture uses a

specifically enhanced for professional video and is "MXF-aware." This enables VTR-like access to clips by time code along with metadata.

Each 300GB-capacity tape cartridge is designed to hold more than six hours of HD content (recorded at 100Mb/s) and carries its own file system directory. Each tape cassette also allows direct drag-and-drop access by applications on a network without the need for other software. With built-in Gigabit Ethernet capability, the SDLT



IBM's Digital Media Center provides broadcasters with a pool of shared storage for broadcast production that is not dependent on any specific technology or vendor.

file segmentation scheme that employs file slices as the unit of storage, instead of the traditional blocks used by conventional data storage systems. Every file is divided into slices, which are stored in multiple locations across the ContentServers. Redundant ContentDirectors manage the distribution of slices and maintain the database of slice locations.

Quantum showed its new SDLT 600A professional video drive, a data tape drive and NAS system that's spe-

600A is also network-attached, permitting direct access by every workstation and server on the network.

IBM demonstrated its Digital Media Center storage solution at NAB, showing how stations can use it to reduce cost and improve operations. The system allows real-time access to incoming video and the seamless sharing of content among users. It also enables content to be accessed by multiple clients as soon as the first bytes of content are recorded on



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REMOTE LIVESHOT SYSTEM

Media 3 BureauCam

Remote system has an intuitive touch-screen interface, interactive help screens and user prompts; features robotic camera positioning and shot control system, and an integrated camera control unit.

212-983-5200; www.liveshots.com



CAMERA-BACK TRANSMITTER Nucomm CamPac 2

Transmitter has on-board triple-pass MPEG-2 encoding; can upgrade to MPEG-4/H.264; is available in the 1.99GHz to 2.7GHz and 6.4GHz to 7.1GHz bands; operates with DVB-T compliant modulation in 6MHz, 7MHz and 8MHz channels; supports COFDM operation in channel bandwidths from 4MHz to 24MHz; RF output power is programmable from 10mW to 200mW; accepts a variety of video formats.

908-852-3700; www.nucomm.com

TECHNOLOGY SEMINAR

the disk, as well as simultaneous real-time read and write of files.

Principal storage components of the Digital Media Center include the DS6000 and DS8000 storage systems. These redundant arrays work in tandem with the TotalStorage Enterprise Storage Server, pSeries servers, the xSeries servers, General Parallel File

worked platform to fit every need. The challenge is finding the "bandwidth" to research which one is right for you.

New removable media for acquisition

At NAB2006 the industry began to see the tapeless future in earnest. With all of these new recording formats —

Clearly, this year's NAB proved that there's a single storage system or networked platform to fit every need.

System; the IBM Tivoli Storage Manager (which helps protect data integrity); and the LTO Ultrium tape drive.

Along with its ISIS system, Avid showed its new VideoRAID product line, offering 5TB of storage with guaranteed real-time access for multistream SD and HD content. Both the VideoRAID RTR320 and RTR320X are designed for use with Avid's NLE systems and are the first in a series of low-cost parity RAID storage products that the company is introducing as a result of its acquisition of Medea last January.

Clearly, this year's NAB proved that there's a single storage system or net-

work unlike videotape — a variety of frame rates and compression schemes can be stored on the same media.

The price of solid-state storage has begun to come down, resulting in reduced prices for Panasonic DVCPRO P2 cards, which cost half of what they did last year. The secure digital memory cards provide approximately 35 minutes of DVCPRO 50 recording on a 4GB PCMCIA card, and a variety of frame rates can be stored on a single P2 card.

Professionals continue to embrace Sony's XDCAM optical discs. The same Professional Disc media used in the SD version of the XDCAM

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system is also compatible with the new HD version. Users can record up to two hours of HD content on a single 23.3GB optical disc, with a data transfer rate of 72Mb/s per optical head.

The Thomson Grass Valley REV PRO cartridge (manufactured by Iomega) was introduced to the United States this year. The new IT-immersed media is offered as part of the new Infinity series camcorder and digital media player. It combines the portability and cost-effectiveness of videotape with the speed, flexibility and ease of use of nonlinear, random access media. The product line also offers solid-state (SanDisk) and USB storage.

Along with its existing 80GB FieldPak2, Ikegami introduced a 120GB FieldPak (removable hard drive) for its HDN-X10 EditcamHD and standard definition DNS-33W Editcam3 camcorders. The 120GB FieldPak records 90 minutes of 145Mb/s HD video or nine hours of 25Mb/s SD video. The FieldPak weighs less than 9oz. The company also announced a 16GB RAMPak solid-state Flash memory that holds more than 70 minutes of DV25 video.

Finally, Hitachi introduced new solid-state Mediapac cartridges for its Z-DR1 dockable digital recorder in 8GB and 16GB versions and also showed a prototype 160GB hard disk storage drive. Hitachi's Z-DR1 recorder, introduced last year, was developed in partnership with nNovia and Audavi to provide an affordable field acquisition system. The Mediapacs are aluminum-encased Hitachi hard disks, ranging between 40GB and 120GB capacities, offering up to nine hours of recording time per disk. An optional accessory for Mediapacs incorporates hardware encryption for secure content transport from camera to the intended destination.

BE

Michael Grotticelli regularly reports on the professional video and broadcast technology industries.

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VIDEOCASSETTE

Maxell HDCAM

Videocassette uses binder systems to achieve durability and exceed the compulsory storage performance demands of long-term archiving; incorporates superfine ceramic armor metal particles (0.1 micron size) to surpass the low-noise requirements of HDCAM's 7-to-1 compression algorithm; lineup includes 6-, 12-, 22-, 32- and 40-minute cassettes; large cassette lineup includes tapes that run 34-, 64-, 94- and 124 minutes.

800-533-2836; www.maxell-usa.com



MULTI-IMAGE DISPLAY

Zandar Technologies FusionPro+

A signal monitoring system supporting all common formats, including composite video, SDI, HD-SDI, as well as RGBHV and DVI computer sources and audio; is highly modular with a range of plug-in interface cards enabling users to combine formats in one system; includes support for UMDs, tallies, clocks and time code; also includes video, audio and system fault detection, alarms and optional dual redundant power supplies.

321-939-0457; www.zandar.com

CONVERTER

Communications Specialties Scan Do HD

Converts DVI input at resolutions up to 1600 x 1200 to HD or SD-SDI output providing broadcast-quality video images; supports all SMPTE HD, NTSC and PAL output resolutions up to 1080i.

631-273-0404; www.commspecial.com

TECHNOLOGY SEMINAR

TM&M

BY PHILIP J. CIANCI

As I searched the NAB show room floor for the latest in test, measurement and monitoring (TM&M) equipment, I was especially interested in equipment that applied IT technologies in the broadcast environment. Unfortunately, I was disappointed in this respect. However, there were plenty of new TM&M products to excite any video engineer.

Subjective analysis

Pushing the evaluation envelope, Snell & Wilcox introduced Hyperion, a content monitoring system that uses intuitive algorithms to mimic human intelligence and therefore provide dedicated audio, video and metadata monitoring for television content as it passes through a facility. A broadcaster determines and sets what "normal" looks like for a given content type. If the content does not match up to the expected behavior, the system alerts the operator.

Content can be stamped with either SMPTE UMIDs or in-house IDs during ingest and linked to the facility's automation system. At transmission, these unique content identifiers in the playout schedule can be cross-checked with the IDs that have been stamped in the content, at both local and remote monitoring points.

Hyperion functionality is embedded in all new Snell & Wilcox infrastructure products. The system can be integrated with the RollCall, RollMap and RollSNMP broadcast control and monitoring systems, as well as third-party systems.

Video-quality measurement

A new generation of MPEG video analysis systems can verify the validity of compressed files on servers. Tektronix's Cerify performs compliance testing of file-based video and

audio against the encoding standards of all video from QCIF to SD, 720p and 1080i and for MPEG-2, MPEG-4, H.264, VC-1 and 3GPP for encoding errors. When a media file generates an alarm, Cerify reports the results and quarantines the



NAB2006 attendees showed an upbeat persona as they toured more than 1400 booths and exhibits. The good times are back.

file for further investigation. Video thumbnails allow the user to browse and drill down into content to determine the exact source of the errors.

It checks compliance and correctness to video and audio standards, video formats, resolutions, bit rates and video and audio quality. Users can prioritize the tests and base them on user-defined templates.

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This versatile new switcher can handle everything from editing and in-house studio applications to outside broadcasts and live productions. The main chassis and control panel have been combined into a compact self-contained unit, making it ideal for small trucks and fly packs. But, best of all, the surprising low cost of the HVS-500HS makes it an easy choice for multi-format productions.

- Functional in HD and SD format modes
- Analog and SDI input/output options can be selected
 - Analog component/RGBs (PC)/composite I/O board
 - HD/SD SDI I/O board
- Up to 8 HD/SD SDI inputs are possible; up to 12 total inputs possible
- PGM/PVW/AUX output available
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VIDEO TRANSPORT SYSTEM

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Transport system is built on Streambox's ACT-L3 codec; is integrated in one portable device; features a low-power requirement; matches MPEG-2 video quality at a 75 percent lower data rate; is up to 50 percent more efficient than MPEG-4.

206-956-0544; www.streambox.com

MULTI-IP

Crispin Multi-IP

Architecture allows facilities to float management of channels between various control rooms located anywhere on an IP network; each control room can be dynamically assigned channels on an as-needed basis depending on the event and number of regional feeds required; channel controls can be assigned to an off-site location.

919-845-7744; www.crispincorp.com



AUDIO WIRELESS TRANSMITTERS

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"Super Mini" transmitter delivers 107dB signal-to-noise ratio and flat frequency response to 20kHz; in native Digital Hybrid Wireless mode technology, both 24-bit digital audio and analog FM signal transmission methods can be used to encode a digital signal into an analog format for transmission over a UHF FM carrier; receiver captures the signal and DSP circuitry recreates the original digital audio.

505-892-4501; www.lectrosonics.com

VIDEO PRODUCTION SYSTEM

Solid State Logic MediaWAN

Provides a complete, scalable broadcast production system using proprietary software running on standard high-performance PCs and servers; software-encoders can import video from a variety of formats, including HD, while providing a preview and job allocation interface for production coordinators, editing software for journalists and management tools for news producers; an asset management database and user interface also provide for seamless information lifecycle management in the video domain.

212-315-1111; www.solidstatelogic.com

TECHNOLOGY SEMINAR

technologies in broadcast equipment, JDSU Acterna continues to develop broadcast applications for its network test and monitoring systems. In particular, the QT-1100 digital video service monitor analyzes MPEG transport streams carried over IP GigE networks, as well as traditional ASI, QPSK, QAM, 8-VSB and COFDM broadcast formats. Sta-

monitoring station products.

MaxView from ILC can either monitor and control individual resources or accept data from SNMP or other monitoring systems. This can cover an entire facility from ingest to playout, coordinating alarms with root cause analysis.

FBBT's Matador SNMP system offers the usual hierarchical system



The DVStation-IP from Pixelmetrix is a standalone MPEG-2 test and monitoring platform. All the broadcast services within a program transport stream IP connection are shown in a single, consolidated view.

tus is reported via SNMP aggregated information from all probes.

IPTV is a hot topic, and naturally many TM&M vendors are offering new IPTV features. Pixelmetrix has just launched the DVStor-IP, a hard-disk-based system that allows nonstop simultaneous recording of multiple channels of transmitted IP video. DVStation-IP is a standalone MPEG-2 test and monitoring platform that displays all of the broadcast services within a single program transport stream IP connection in a single consolidated view.

Sencore now offers a complete MPEG-over-IP stimulus and analysis solution. By combining the MIP 1664, an MPEG-over-IP generator, with the MIP1860, an MPEG-over-IP cross layer analyzer, broadcasters can fully test and evaluate IP-based infrastructures and equipment.

SNMP

With the continued integration of IT network capabilities in broadcast equipment, finding an SNMP system that can monitor both IT and traditional broadcast equipment has been elusive. Harris, Miranda and Evertz have each enhanced the functionality of their facility monitoring applications. And two new vendors in this arena, ILC and FBFT, provide manager-of-managers systems that integrate SNMP, GPI and other health signaling protocols into their central

topology view and a user-selectable "wiring" view that shows systems interconnects in a schematic fashion. Matador received a *Broadcast Engineering* Pick Hit Award this year.

Metadata analysis

As tape disappears, metadata is becoming the only way to manage content. Hence, the compliance of metadata with industry standards, such as AAF, MXF and V-ISAN, promotes interoperability between content management systems and helps ensure that you will find the content you need when you are looking for it.

Metaglugue has taken a step in this direction with its MXFixer software, a tool that extracts the essence and metadata from an MXF file, examines the metadata, checks it against known requirements and reports "OK," "Caution" or "Not passable." The full descriptive and structural metadata, media objects, metadata tree and KLV structure can be displayed. Tests can be programmed by the user to check MXF files for integrity against specific requirements.

AC-3 and Dolby-E metadata analysis has been added to Wohler's AMP2-E8 Dolby E decoder and monitor. Dialnorm, dynamic range and other metadata are monitored, and the decoder sends this information over a network connection to a PC application for analysis.

UTAH-400

It Just Keeps Getting Better...and Better

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+44 01422 842159; www.calrec.com

TECHNOLOGY SEMINAR

Lip-sync

In the digital facility, lip-sync has become such a significant concern that the ATSC has issued a guideline for synchronization of audio and video. Now, we have the first generation of lip-sync analyzers to help monitor the problem.

Pixel Instrument's LipTracker measures video errors by comparing selected sounds to mouth shapes. Analysis of these events produces a direct measurement of lip-sync errors. SMPTE 292/259 and SMPTE 276M audio inputs are supported.

DK-Technologies' solution is the PT8612 HD-SD test signal generator, a new option for the PT5300 HD-SD VariTime sync generator. It provides a test pattern to check lip-sync. The test pattern is based on the EBU Tech 3305 standard and extends to all common HD formats, including 1080 and 720 lines progressive,

Color legalization

Compositing graphics and conversion between HD and SD can sometimes create illegal colors that produce display and modulation problems. Using an automated correction system is a good way to prevent this from happening.

Harris introduced the DL-860 HD/SD serial digital legalizer. The DL-860 output format tracks the input format, and the signal can be legalized to HD, SD, RGB and/or encoded color space. CRC values are monitored and recalculated to ensure proper output values. The DL-860 has a selection to pass or blank all ancillary data without any alteration except CRC correction. All limits are variable, allowing for custom configurations to the HD clips, SD clips, encoded gamut and RGB gamut limits. All operational parameters are also supported via Ethernet using the



Tektronix demonstrated a wide range of TM&M solutions. Two new products include the WFM6100 and the WFM7100 series, providing all new troubleshooting and monitoring abilities for multiformat video.

frame rates of 24Hz, 25Hz, 29.97Hz, 30Hz, 50Hz, 59.94Hz and 60Hz.

Besides the lip-sync test pattern, which contains moving elements to detect frozen pictures, the generator also provides common test signals, such as color bars, monitor test signals, PLUGE and SDI check field. The test signals may be superimposed with text for identification and contain an embedded audio signal.

embedded Web server interface. The DL-860 also supports the Leitch CCS Navigator control and monitoring software and the NUCLEUS user-customizable control panel.

Traditional monitoring

In traditional lines of TM&M equipment, I found several interesting solutions. RF is here to stay, so we better pay attention to the signal that

It's What's Inside That Counts!



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MCL's outdoor HPAs, offered in C-, X-, Ku- and DBS-Band, are now available with Integrated MITEQ L-Band Input Block Upconverter Modules, with optional 10 MHz internal or external frequency reference.

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Consolidates all network management into one worldview; works in tandem with existing NMS deployments; allows for the direct assimilation of all network devices into the system; automatic topology discovery and display; root cause analysis based on user's scenarios; customizable user interface and advanced user management control.

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Covers 10Hz to 80kHz with dual-channel analog inputs and outputs; sampling rates from 32kHz to 192kHz; generates single- and dual-channel test signals, including sine wave, two-tone and noise waveforms; measurements include level, linear and nonlinear distortion and FFT.

410-910-7800

www.rohde-schwarz.com/usa

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TECHNOLOGY SEMINAR

goes out over the air. Burk Technology has enhanced its ARC transmitter remote control system with Lynx version 5.1 software and ARCPlus. Z Technology's DM1010 DTV measurement demodulator features a proprietary demodulator and measurement technology licensed by Tektronix.

Level Magic from Junger Audio implements an adaptive level control algorithm that can adjust multichannel surround-sound audio levels. The system helps maintain a consistent level for all format sources.

Triveni StreamScope introduced the MT-40 and RM-40 DTV real-time MPEG transport stream analyzers. The MT-40 is an end-to-end, MPEG-2/MPEG-4 transport stream monitoring and analysis system for DTV signals carried by broadcast, ca-

ory stick, so users can carry a complete monitoring suite in a pocket, giving any Windows computer with a suitable signal input port an automatic or objective monitoring device with waveform monitoring, vector scope and color gamut error logging and checking.

Versions are available for DV, HDV, SD and HD. The latter two are compatible with PC video capture cards. Because test results may be captured for later analysis, the VidScope-vx can be used to automatically process content, which arrives as a file over IP rather than as baseband video.

Camera calibration and alignment

In an effort to prevent garbage in and then garbage out, DSC Labs introduced two new camera alignment test

While IT vendors are increasing their presence at NAB, there is still a lack of genuine IT technology and system solutions at the show.

ble, satellite, IPTV or mobile networks. It supports QPSK, 64/256 QAM, ASI and GigE. It also handles video file inputs, has remote monitoring capabilities and analyzes IP routing. The RM-40 remotely monitors, measures, records and analyzes DTV streams to ensure their integrity, reliability and compliance with standards. Monitoring can be handled over SNMP.

The LV5800 multi-monitor platform from Leader auto detects and monitors HD and SD formats, including sampling and color formats. The system displays waveform, vector, five bar, picture and audio information. User settable error levels trigger alarms that make error log entries that are referenced to time code.

PC-based monitoring

NAB2006 saw the U.S. debut of the Hamlet HD and HDV VidScope-vx, test and measurement systems running entirely in software. They are supplied and run from a USB mem-

charts. The Billups VF/X is designed for special effects and features an 11-step grayscale and gradient. It also includes vector color chips with skin tones, resolution columns and saturated angled RGYB. The Cam Align FiddleHeads chart simplifies backfocus adjustment via a double spiral test pattern.

Next steps

While IT vendors are increasing their presence at NAB, there is still a lack of genuine IT technology and system solutions at the show. Maybe NAB could take a proactive position and promote increased IT vendor participation. There is a need to see the demonstration of integrated system solutions on the show floor as well as have a dedicated conference track discussing real-world IT issues for broadcasters.

BE

Philip J. Cianci has been in the TV business for 21 years and is currently writing a book about the transition to digital broadcasting.

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TECHNOLOGY SEMINAR

RF

BY DON MARKLEY

The emphasis was not on high power this year — at least not to the extent seen in the past. High power was still there with high-efficiency tube transmitters for both analog and digital systems. But the big interest seemed to be more in the low- and medium-power levels. In particular, several manufacturers were offering products for use in single-frequency networks.

Exciters

Axcera emphasized its new digital TV exciter, the Axciter. With its

Transmitters

Ai has been successful with its water-cooled tubes. Many of those units have been installed and are performing well, offering improved efficiency.

Larcam and Rohde & Schwarz both showed lower-power transmitters for either standalone DTV facilities or single-channel network use. The Larcam transmitters can be configured for either analog or digital use by the selection of the exciter. The units range from 10W to 200W.

Of course, the low power makes



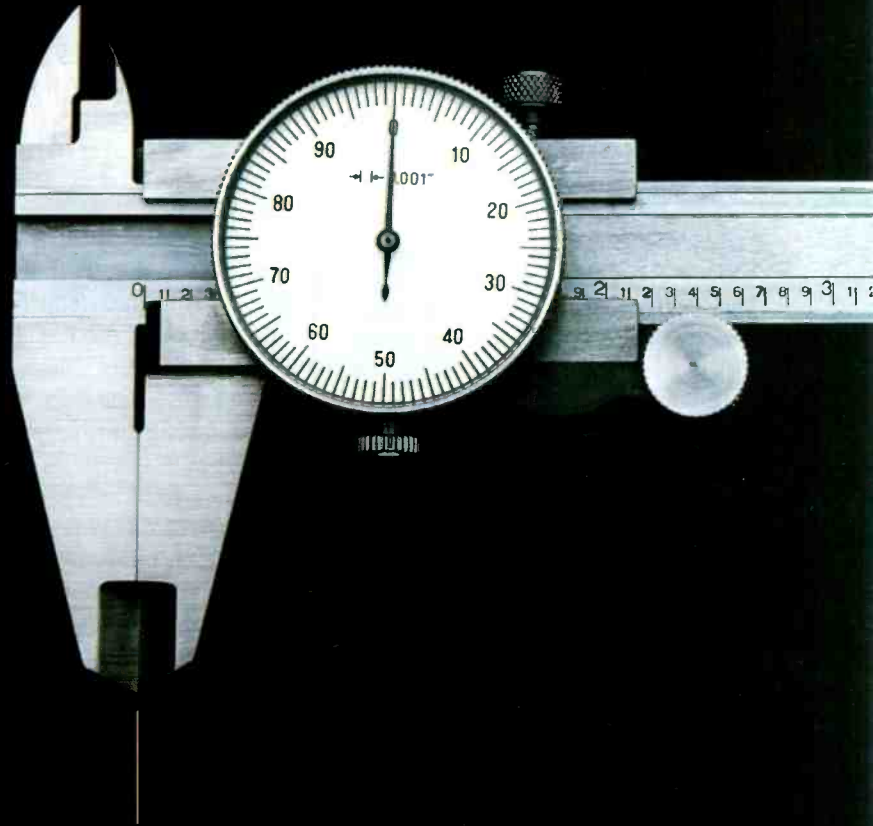
RF systems are still the broadcaster's last-mile solution. Shown above is the Japro booth.

companion upconverter unit, the Axciter provides an output signal on any television channel through selection on the front panel. The exciter is available with a complete digital signal analysis system.

The system software can be upgraded easily. The upgrade is simply loaded on a USB Flash drive, which is then plugged into one of the USB interfaces on the exciter. The new unit can also be used in the slave mode for single channel distributed transmission uses.

them good candidates for mobile video and for television translators. The construction of the company's FM translator is similar, with full frequency agility for both the receiver and transmitter.

The Rohde & Schwarz transmitters at low power also lend themselves to LPTV use or to the construction of single-channel networks. The company also showed its heavy involvement in the delivery of content to mobile users with the QUALCOMM technology. The company is also

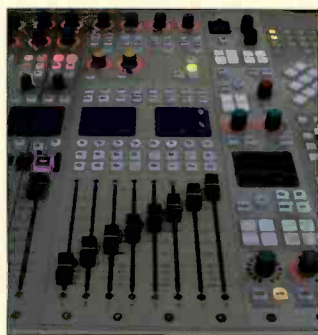


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TECHNOLOGY SEMINAR

working with Samsung and demonstrated A-VSB technology.

Harris has also been working extensively with QUALCOMM, using MediaFLO for the delivery of multimedia content to mobile handsets. Toward that end, Harris

cluding systems for the relocation problems in the 2GHz band.

Every now and then something from the radio world seems to find use in television. Broadcast Electronics created the Big Pipe STL for HD radio, but it also provides a cost-ef-

A big area this year was development of microwave systems for either STL or intercity use.

showed its Atlas and Ranger Mobile TV transmitters, which use the Apex television exciter. Harris and Rohde & Schwarz showed complete lines of solid-state DTV transmitters at various medium-power levels.

ENG

A big area this year was the development of microwave systems for either STL or intercity use. MRC displayed continued development of HD and SD systems using IP interface types. Those systems support

fective link for television. The system has more than enough bandwidth and can use all the popular formats. It operates in the 5.3GHz band without a license or in the 5.8GHz band for longer paths.

Antennas

Antennas were interesting this year. RFS' antennas are now manufactured in Australia, as are its filter products. At the show, the company emphasized its filters and manifold combiner systems.

Dielectric had several new antenna products to sell. Perhaps the most unique was a small broadband batwing for UHF frequencies. The unit is omnidirectional and is different because the batwing elements are cut out of a sheet of material. The entire unit is within a radome and can be mounted on a motorcycle or car as the radiator for an ENG system. The antenna also would serve well as a lower-power auxiliary, an LPTV antenna, in single-frequency networks or as a television translator.

Dielectric also displayed a UHF array with 30-channel bandwidth. The antenna is available in medium- or high-power versions. It is a slot-type antenna constructed on panels that can be removed for repairs if necessary. The slots are radome covered. The antenna is available in eight-through 30-bay configurations for gain and can be used for directional antenna purposes.

The previous Dielectric panel array has been modified by adding stainless



Local news is still the broadcaster's most potent tool in attracting audiences. Shown above is the news truck for KVOA-TV, Tucson, AZ.

real-time streaming or video-file transfer in non-real-time formats. The company showed new products for mobile systems. Nucomm also displayed new ENG technology, in-

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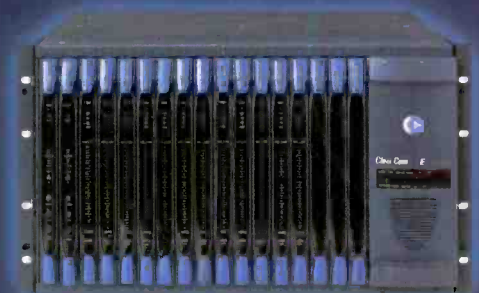
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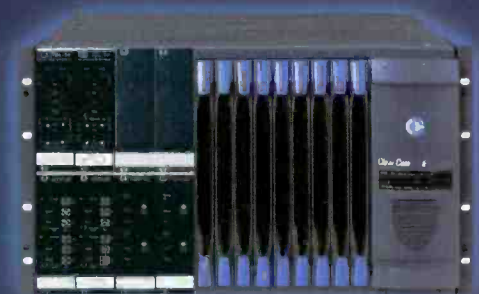
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TECHNOLOGY SEMINAR

steel backscreens and radiating elements. The TUA-M is a mid-power antenna primarily designed for multiplexed operation for digital and/or analog stations. The multiple panel approach allows for custom beam tilt and null fill applications. The individual panels are radome covered, or the entire antenna can be placed in a cylindrical radome for wind loading

New markets

A big issue in the RF arena this year was the obvious development of new markets for traditionally broadcast TV manufacturers. The transmitter companies were looking into lower-power operations for use in new technologies to provide data and video directly to handheld devices. Several were working with QUALCOMM in its new distribution system.

It is apparent that the big transmitter sales and antenna installation boom will soon take a major nose dive. Essentially, all TV stations will have installed new antennas and transmitter systems for digital television. With the exception of further maximization or new stations, the traditional TV market will be shrinking until the normal replacement cycle starts well on down the road.

On the other hand, the 700MHz areas and the 1.7GHz band are both buzzing with new applications and new services. The 700GHz areas are simply the high end of the old UHF broadcast band where a lot of experience exists in transmitters and antennas.

The new lower-power transmitters appeal directly to that market — as are many of the newer antenna systems. There is the growth of combiners to join several transmitters into a single antenna in either of those bands. The combiner companies see a large future demand for



Dielectric's mobile media antennas garnered attention from the QUALCOMM and DVB-H crowds.

purposes. In all, it is a nice modification of a proven existing product.

Electronics Research showed a new VHF batwing antenna. The antenna was different because it was not constructed on a pole. Instead, the antenna is supported by a square tower

A big issue in the RF arena this year was the obvious development of new markets for traditionally broadcast TV manufacturers.

section. All the necessary cables are run inside of the tower section instead of being fastened outside of a monopole. This provides better protection from ice, lightning and tower climbers. The routing of the lines inside the tower also allows better grounding with reduced damage from arcing.

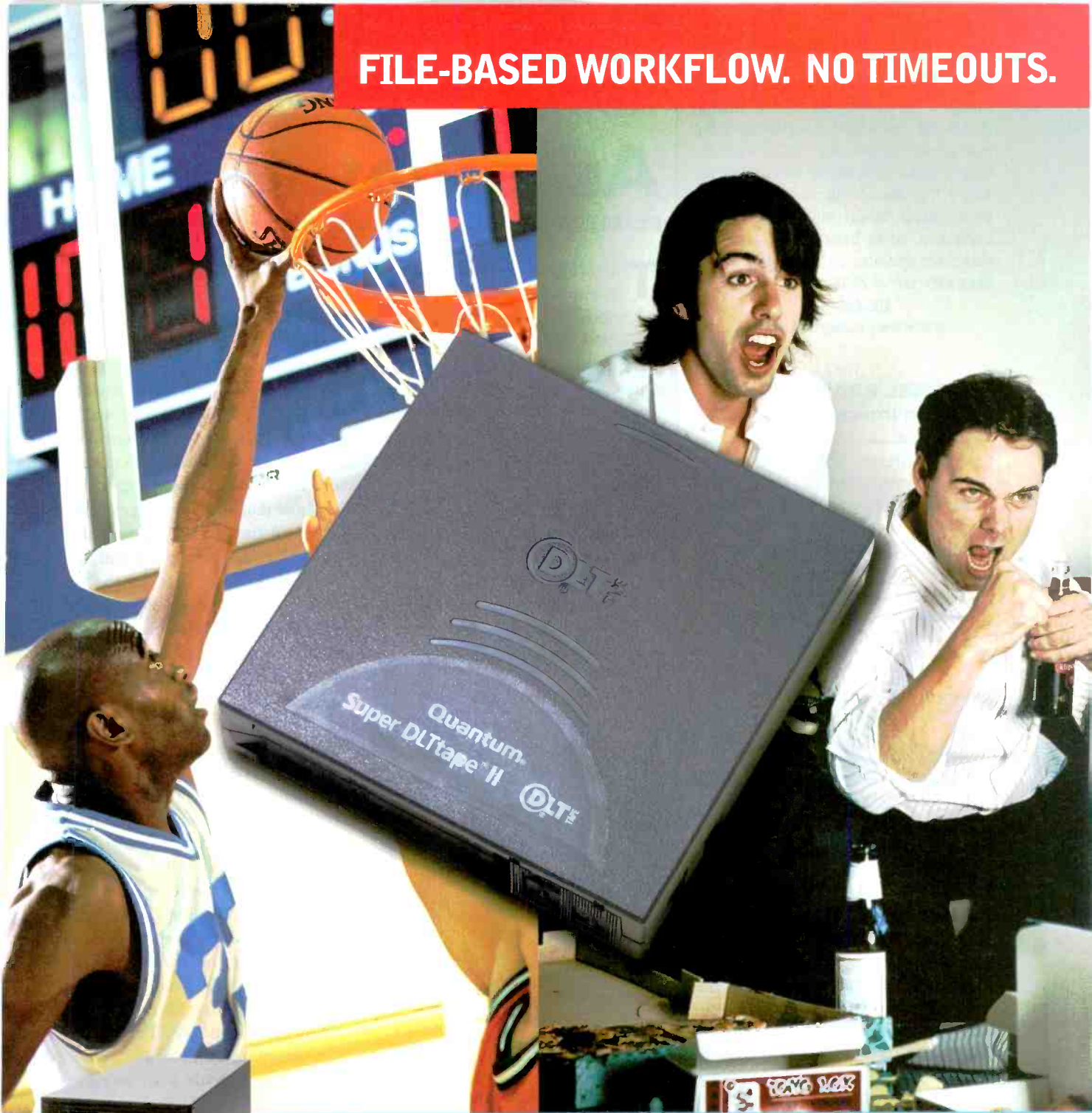
that product as do the antenna and transmitter manufacturers.

Just the tip of those developments was visible at this year's show, but it is certain that next year will reveal even more.

BE

Don Markley is president of D.L. Markley and Associates.

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TECHNOLOGY SEMINAR

Automation

BY JIM BOSTON

The accelerating pace of change in our industry was reflected in the television automation realm at NAB2006. The consensus regarding business at this year's show was that things have improved over the past few years, maybe not in the number of visitors, but in the perceived quality of interest in automation solutions.

The merging of servers and automation persists. And the march continues toward the goal of a station in a box, as the adoption of IT to implement solutions in all areas of television expands. Several ven-

Data Exchange Working Group's implementation of the ATSC Programming Metadata Communications Protocol (PMCP), specified in ATSC document A/76.

Broadcasters intent on surviving, and even thriving, are looking for new opportunities to distribute content. NAB president and CEO David Rehr told broadcasters in a speech at the show that every new device and gadget on the market is a potential vehicle through which content can be disseminated. That means, of course, more channels of programming with existing resources. Rehr predicted that issues with business models, copyright and technology will "get worked out."

What's newly shippable?

Sundance Digital replaced FastBreak with FastBreak NXT. It is geared for one and four channels of control and incorporates a number of features from the company's flagship Titan product line.

FastBreak XPress replaces FastBreak Spot as the slimmed down version of the NXT product. Geared for facilities looking for basic server and switcher control, XPress offers basic machine control and allows for an easy upgrade path to either FastBreak NXT or Titan. FlexEvents now includes expanded control of secondary events by allowing users to create mini timelines of secondary events and attach these either to the playlist or as an attribute of the element itself.

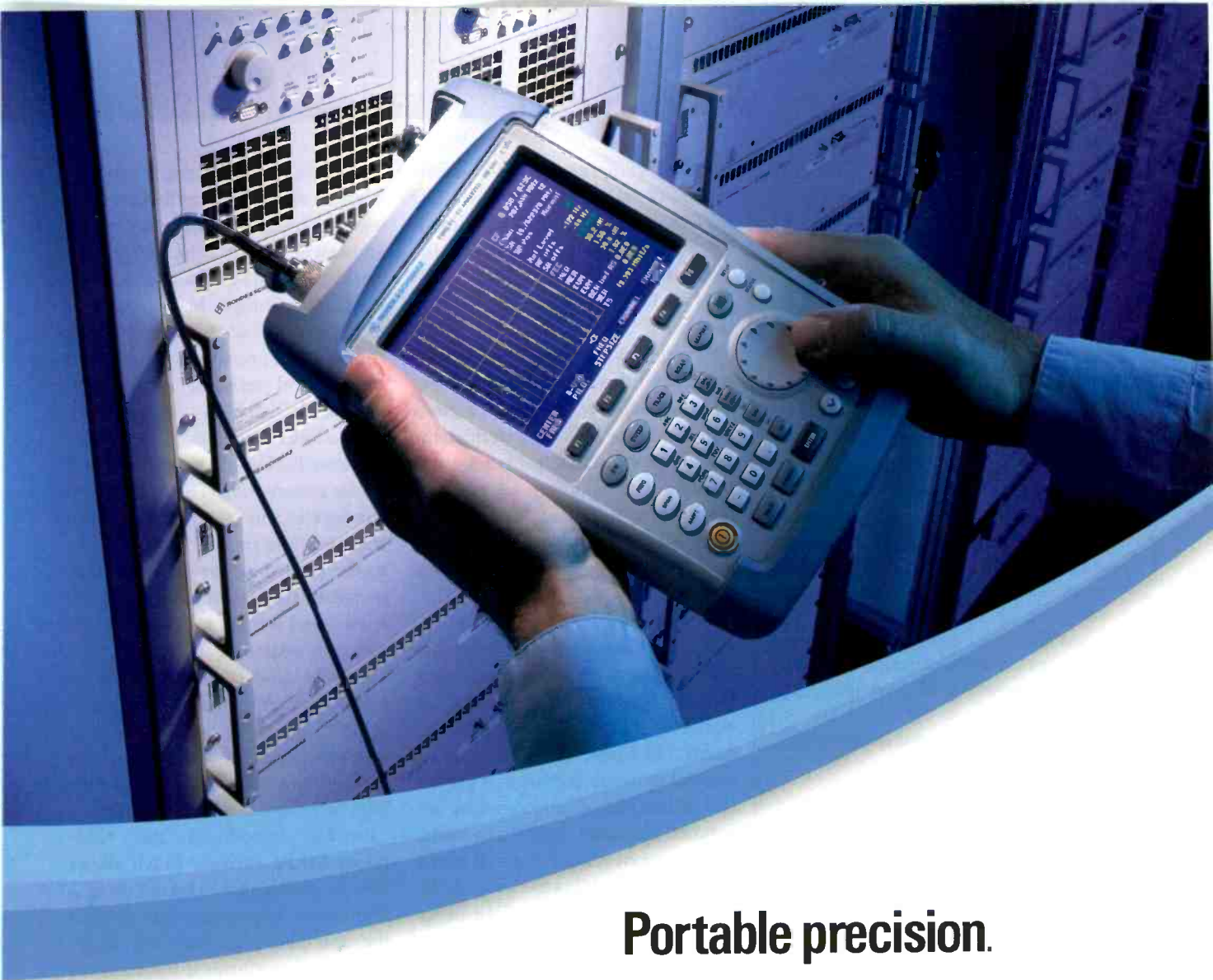
OmniBus showed iTX, which is based on the company's software and standard, off-the-shelf computer hardware for automation, server and master control. It runs using Microsoft Windows XP, 2003 Server, DirectShow and .NET; the AMD Opteron line of processors; and HP



Pro-Bel demonstrated the Morpheus automation system, which supports the payout of conventional content in addition to a wide range of multimedia and data-based material.

dors have incorporated automation into server hardware as part of their systems.

The systems have taken on such chores as transcoding between file formats, allowing for the seamless delivery of file-based content from end to end. This requires the management of a large amount of content and a wide range of formats. Tighter integration of graphics, automation and traffic systems is taking place with the completion of the SMPTE S22.10



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INTERCOM SYSTEM
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TECHNOLOGY SEMINAR

standard IT hardware. MCR effects capability via software includes 2-D DVE, CG and still-store functionality. When playlists are ingested, the associated media — be it MPEG, AVI WM or DV — is also ingested into the server.

NVerzion is offering NStat, which monitors Ethernet machine control and the company's NBase. NVerzion also introduced NLine, a multichannel application that provides users the ability to monitor all of their playlist schedules from one easy-to-read software interface. It also notifies the operator of any scheduling conflicts.

Harris released an enhanced D-Series playout automation solution that interfaces with its H-Class Content Delivery Platform for more efficient workflow in multichannel environments. The new H-Class Media Ingest features dynamic exchange of playlist and as-run data. It also provides automated file-based ingest from media delivery services with required transcoding and the ability to configure associated workflows, including proxy creation and audio normalization.

DTG's Xe automation system now includes transfer technology that automates and resolves Pathfire metadata. Xe's virtual metadata display technology provides information and alerts to browsers and to a Miranda Kaleido-K2 display showing the on-air event ID as well as warning messages. The system also has a DekoCast driver interface that allows an operator to specify a template file and insert text and information to automatically appear on-air.

Digital Broadcast MediaFire, a play-to-air server, now includes direct interfaces to such media delivery services as Pathfire, Fast Channel, DG Systems and Vyvx. Its MediaVault archiving system provides increased Blu-ray storage. The MediaBank Safety Net is a disaster recovery system that provides complete automated on-air functions off-site in the event the station is unable to maintain on-air operations.

Crispin's ArchiveManager provides nearline storage for media that is integrated into the automation system and can be used to help manage disk space on video servers. Crispin's Hierarchical Storage Management is incorporated into the system. This combination provides a policy-based storage and retrieval system. The company's Digital Transfer Agent provides a link between third-party content distribution and fully automated, on-air presentation. The transfer system locates and issues commands to transcode and transfer programming to the play-to-air server, along with metadata that is simultaneously retrieved and written to AssetBase, the company's database application.

AVECO showed ASTRA Lite, a simple 1RU PC server with one user station for ingest and playout of one on-air playlist and control of a 360 Systems server, a small router, logo inserter and a VTR for ingest.

Pro-Bel introduced the Morpheus Media Browse, which allows low-res copies to be created using a high-speed transcoder that streams the specified files from the material source, performs a transcode to Windows Media 9 format at twice real time and then stores it.

Pebble Beach System's Anemone is an entry-level automation system intended for small broadcast operations. It provides playout and ingest tools that can be used to run up to four channels.

Conclusion

Many segments of the industry are realigning their roles as to which systems are performing which roles in the television food chain. In a number of segments, the footprint of some gear has been reduced to the limits of required physical I/O for a box or system. So, if size can't be reduced, feature sets move and stretch across traditional boundaries, and vendors find that they have new competitors.



Jim Boston is a West Coast consultant.

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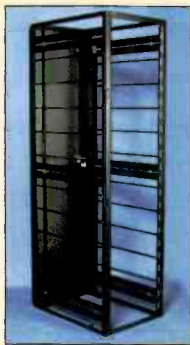
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TECHNOLOGY SEMINAR

Audio

BY TOM PATRICK MCAULIFFE

Be it general audio products, surround sound for video and television, or HD and digital audio post production, it was all on display at this year's NAB. New solutions — offering both higher quality at more effective price points and easier functionality — were in abundance. While exhibitors were enthusiastic, so were attendees looking for audio solutions, especially 5.1 surround-sound products. This being my fifth year covering the audio beat at NAB for *Broadcast Engineering*, I was anxious to see if any trends would emerge.

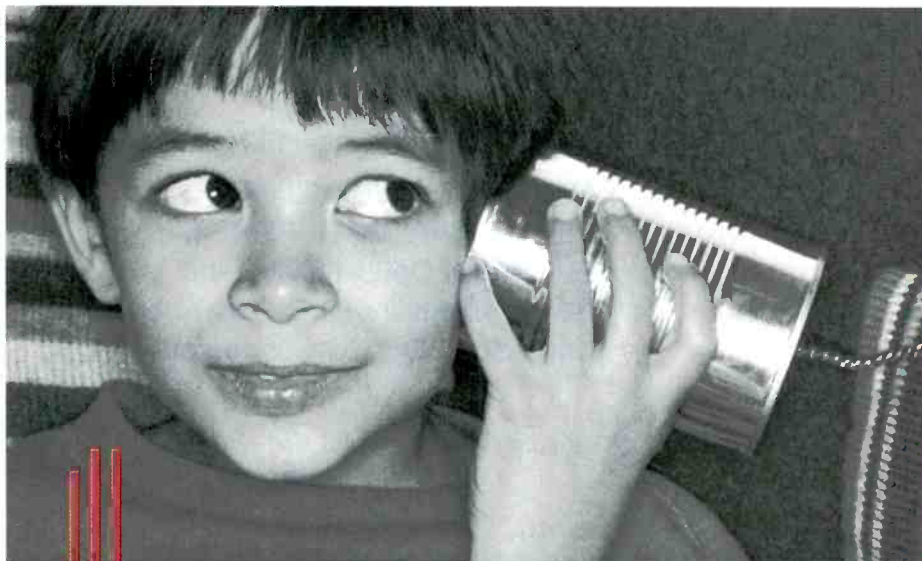
Viewers expect great audio to accompany their HDTV channels, and 5.1 audio will soon be a requirement for every digital broadcaster. Exhibitors said viewers are becoming less tolerant of excessive sound levels. Broadcasters are paying closer attention to perceived loudness and are asking for solutions to balance the divergent audio levels that often exist between drama and commercials. The last thing broadcasters want is for the viewer to find the difference in sound levels too great to tolerate

and then mute or change the channel. Fortunately, there were plenty of new audio solutions shown, with the trend being toward the smaller and less-expensive.

Microphones

The new H4 SuperMINI surround-sound mic from Holophone is a discrete 5.1-channel camera-mountable surround microphone that can encode surround audio directly to tape in real time. Sanken's COS-22 is a dual-capsule lavalier microphone. The ultra-miniature mic measures only 1.25in in length but has a full-frequency response of up to 20,000Hz. Neumann showed its new TLM 49 large diaphragm, cardioid, studio microphone. It features the K 47 capsule, which is used in the familiar M 49 and U 47 microphones.

This year's show also saw several other product trends, including increased automation and networking, as well as a better integration of software solutions. Surround mixers and software with built-in 5.1 support and higher 24-bit 196kHz resolution



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were also on display. For example, Euphonix showed its full line of broadcast and audio post consoles, including the new System 5-B and Max Air systems, which are specifically designed for on-air and live-to-tape applications. They include full integration with facility audio routers.

Euphonix digital audio mixing systems are now capable of fully integrating with most router control systems that use the ES-Switch protocol. Those vendors include NVISION, PESA, Pro-Bel, Sony, Thomson Grass Valley and Utah Scientific. The company's new System 5-P audio post system and the new System 5-MC integrated DAW audio mixing system offer networked control of other ap-



Microphones were a hot item as broadcasters looked for 5.1 broadcast and recording solutions.

plications, including Pro Tools, Logic Pro and Digital Performer via the HUI control protocol. Euphonix and Hitachi Data Systems also have teamed up to offer a new audio facility network server, which made its debut at NAB.

Recorders

Digital audio recorders of all shapes and sizes were available. The new Marantz Professional PMD560 is rack-mountable and records to Compact Flash or microdrives. It is capable of onboard editing, complete with instant audio access to the preset marked points. The unit provides more than 35 hours of recording time on a cost-effective 1GB Flash memory card.

Online

As more broadcasters move to repurpose content, many are interested in improving the online audio experience for viewers. An Orban and Coding Technologies partnership offered a free MPEG-4 aacPlus Audio (also known as HE-AAC) player for Windows Media users. Via a DirectShow Plug-in, the new audio software technology enables the more than 80 million users of Microsoft Windows Media to enjoy near-CD-quality audio at only 32Kb/s.

With the trend toward HD, the challenge for the broadcast and video industry with 5.1 continues to be providing more content that's compatible with the wide variety of consumer playback technologies.

BE

Tom Patrick McAuliffe is a journalist, video creator and former member of the U.S. Navy's Combat Camera Group.

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TECHNOLOGY SEMINAR

ENG

BY PHIL KURZ

In all things, change is inevitable, but the pace at which electronic newsgathering technology is evolving is unprecedented — and, to a degree, unpredictable — for this corner of live television. At NAB2006, at least three significant technology trends emerged that are reshaping how news will be gathered and transmitted to the local station. They include:

- the ongoing work by Sprint Nextel to relocate broadcasters to 12MHz digital channels in the 2GHz band,
- the development of wireless cam-

crowave as the preferred method of backhaul, it is becoming apparent that today, the technology offers a powerful means to supplement traditional ENG and in the future, may play an even greater role.

2GHz relocation

The FCC-mandated Sept. 7, 2007, deadline for the conversion of ENG operations from analog to digital and relocation to 12MHz-wide channels between 2025MHz and 2110MHz weighed heavily on the minds of



Frontline had ENG and remote trucks filled with new gear at the show. Everything the crew needs to originate a live shot or pre-produce a feed is within the operator's reach.

era transmitters capable of supporting high-definition news and, sports acquisition in the field, and

- the transmogrification of video from a signal to a digital file, allowing video to play in the IP space with all the advantages of the Internet.

It's become clear that this treatment of video as files, which can be sent via FTP across wireless Internet broadband service, adds a pinch of unpredictability to the ENG recipe. While few would argue that in the near term IP file transfer will replace traditional point-to-point mi-

many at NAB2006. It appears the FCC, Sprint and the industry could not foresee the obstacles currently impeding relocation progress. Many on the show floor questioned whether the 31.5 months allotted for the relocation would be sufficient. However, Sprint is sticking to its assessment that the job will be completed on time.

Failure to hit the deadline won't be the fault of microwave equipment vendors. At least two, including RF Central, showed photographs of shelves at their facilities chocked full



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TECHNOLOGY SEMINAR

of new, compliant microwave radios and associated equipment ready to be rolled out once exchange agreements are reached between Sprint and the stations, groups and networks. The consensus on the floor identified several factors, including unanticipated layers of group and network management, an initial lack of understanding about the complexity of the task, complicated tax implications and cautious

processes to avoid being the last on the relocation boat.

HD wireless cameras

Fresh off its use at the West Asian Games in Doha, Qatar; the Winter Olympics in Torino, Italy; and Super Bowl XL in Detroit, the Link Research LinkHD wireless camera system made its second NAB appearance this year. Exhibited in the Micro-



Shook Mobile Technology came to NAB2006 with a Hummer-based ENG vehicle destined for RCG. NAB2006 was also the last trade show for company founder Ed Shook, who retired in May.

corporate legal counsel, as reasons for the unexpected delays.

Perhaps a harbinger of better news was an announcement from the ABC Owned Television Stations Group and Sprint just prior to the opening of NAB2006. The two have agreed to a template Frequency Relocation Agreement for each ABC-owned station and a Group Reimbursement Agreement covering the network's station group relocation-related expenses in the 2GHz relocation project.

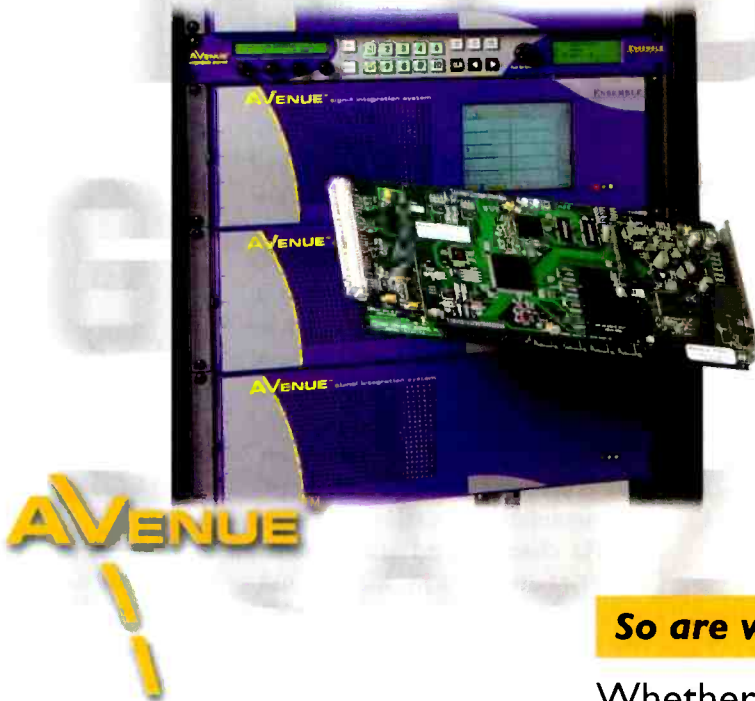
Under the terms of the agreement, Sprint will pay for ABC's relocation-related expenses, including the acquisition of comparable equipment to operate in its new frequencies. One Sprint source expressed the hope that now that a large network has committed to a relocation agreement, other networks and station groups will accelerate their approval

wave Radio Communications (MRC) booth (both companies are owned by Vislink Communications), LinkHD L1403 delivered HD shots with only a 50-millisecond delay. The system uses the company's MPEG-2 encoder and a diversity reception system for reliability and performance.

LinkHD offers 1.95GHz to 2.7GHz or 3.40GHz to 3.58GHz operation and supports LMS-T and DVB-T modulation schemes and a variety of camera control options. LMS-T is an expansion of the standard DVB-T pedestal. It couples all of the advantages of COFDM with a single carrier using a widened channel bandwidth of 8MHz to deliver greater throughput.

At the Nucomm booth, the latest version of the CamPac made its NAB debut. The CamPac 2 COFDM SD/HD camera-back transmitter offers

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TECHNOLOGY SEMINAR

user-selectable MPEG-2 encoding supporting a low latency mode down to two frames, as well as an IPB frame mode that delivers a 30 percent improvement in image quality. The "B" mode designates higher performance compression and typically is associated with rack-mounted encoders from companies, such as TANDBERG Television and Harmonic.

CamPac 2 delivered live HD shots at 34Mb/s from the back of the Las Vegas Convention Center Central Hall, where the NAB-HD studio was located all the way to Nucomm's booth in the front of the same hall. Nucomm's new Newscaster DR digital COFDM diversity SD/HD receiver was used to receive the live shots.

The Newscaster DR offers DVB-T compliance at 6MHz, 7MHz and 8MHz channels and provides variable IF bandwidth from 4MHz to 16MHz in the 1.99GHz to 2.7GHz bands and from 4MHz to 24MHz in the 6.4GHz to 7.1GHz bands. It's no coincidence the specs match those of the CamPac 2, which offers operation in the 1.99GHz to 2.7 GHz and 6.4GHz to 7.1GHz bands. The CamPac 2 operates with DVB-T-compliant modulation in 6MHz, 7MHz and 8MHz channels and also supports COFDM operation in channel bandwidths from 4MHz to 24MHz. While the CamPac 2 is due to ship in July, a prototype has been used for coverage of NBA basketball and the America's Cup race.

No stranger to high-profile HD coverage of sporting events, the RF Central RFX-HD-CMT camera-mounted system transmitted wireless high-definition video from around the Central Hall to a Global Microwave Systems Messenger Smart Receiver with a Sencore decoder in the company's booth. Used last season during the NFC playoff games, the RFX-HD-CMT supports MPEG-2 encoding and comes with dual COFDM carriers. Typically, RF Central would match the wireless camera transmitter with an RFX-RMR-X6, but for the sake of simplicity at the

show, the company used the GMS receiver.

The RFX-HD-CMT supports user-selectable 6MHz, 7MHz and 8MHz channels operating in 1GHz to 6Hz bands. Maximum RF output power is 200mW. The system can transmit a maximum range of between a quarter and half of a mile under typical operating conditions. However, in March, the company success-



In the outdoor ENG area, HandsFree Transporter's modified Segway turned quite a few heads as a camera-transport system for Steadi-Cam use.

fully linked a transmission from the RFX-HD-CMT through a helicopter a distance of 5mi.

Thomson Grass Valley also showed its new HD wireless camera system. The system is unique in that it uses JPEG2000 wavelet-based compression to deliver high compression efficiency and encoding latency in the one-frame range. The RF component of the new system uses a WiMax subset — 802.16 — to provide coverage of 3280ft with an optional roaming kit. Grass Valley's HD wireless camera system was designed to be used with the LDK 6000 series of high-definition cameras.

The fact that several vendors focused on HD wireless camera solutions at NAB2006 shouldn't be

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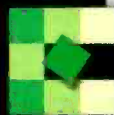
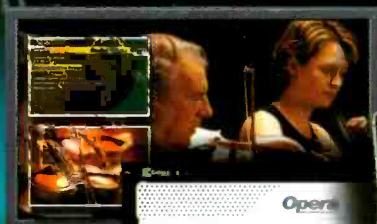
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TECHNOLOGY SEMINAR

too surprising given the explosion in high-definition production of major — and even less than major — sporting events and the ongoing building boom in HD teleproduction vehicles.



At NAB2006, RF Central showed photos (including the one above) of stocked shelves to demonstrate it's ready to replace analog radios as part of the 2GHz relocation.

Computers, data and file transfers

There has been digital video since the introduction of the D1 format two decades years ago, but only within the past few years have file-based systems, which leverage IT technology in a broadcast setting, brought the workflow efficiencies common in other industries to the domain of television.

For the past couple of NAB conventions, the concept of FTP file transfer via ENG transmission has been discussed and technology demonstrated. This year, at least two vendors — Microwave Radio Communications and Broadcast Microwave Systems (BMS) — brought deliverable systems to the floor.

The concept is simple: Encode IP traffic into the video data stream transmitted back to the station, giving journalists in the field the ability to FTP edited packages and B-roll. Couple this technology with a return link via microwave, a portion

of a multicast DTV channel, wireless broadband Internet provider or even an EVDO cell phone network, and suddenly the newsroom extends to the ENG truck. Reporters can now operate in the field as if they were behind their computers in the newsroom reading news wires, writing scripts, editing footage, producing voiceovers and filling in lower-third templates.

BMS showed the Truck-Coder II (TC-II) media router, an add-on to its TC-II COFDM digital microwave system. The media router system consists of two parts: the Mobile Media Router that resides in the ENG truck and the Fixed Media Router at the receive site.

The Mobile Media Router system scales the IP throughput to the amount of available bandwidth. That means during a live shot, an FTP transfer of offline material can be scaled back, and when the stand-up is complete, it can be ramped up to allot the entire channel to the FTP transfer. A variety of data return options can be used with the TC-II Media Router system. At NAB2006, BMS held out EVDO cell service as a likely, viable solution.

Leveraging the power of IP wasn't confined to the TC-II Media Router in the BMS booth. The company also showed a couple of important enhancements to the TC-II COFDM microwave system: a simplified set-up menu structure and IP addressability. These allow station engineers to load presets into the TC-II or to make tweaks to it using BMS software running on a PC connected to the unit via Ethernet. Additionally, this approach relieves engineers of the time-consuming task of setting up each TC-II at the station individually. Rather, once operating parameters are established and saved on a PC, they can be transferred to multiple TC-IIs quickly and efficiently.

MRC demonstrated its IP solution in its booth with a link from an ENG truck parked between the Central and South Halls of the Las

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Vegas Convention Center. Using the MTX4000 ENG encoder-modulator, a live HD feed from the truck was transmitted using COFDM at 20Mb/s along with FTP traffic to approximate how the system could be used in the field to simultaneously transmit live video and support offline file transfer. With the MTX4000, ENG crews can allocate bandwidth to FTP transfer based on existing needs — less during live shots, more at other times.

MRC identified a number of wireless links that could be used for a return channel with the MTX4000 system. However, from a practical point of view, unlicensed wireless 900MHz LAN extensions and EVDO cell phone service appear to be the most viable. While 900MHz systems offer good propagation, the band is pretty congested; therefore, EVDO may prove to be the preferred technology for a return link.

A viable return link is critical to the adoption of this file transfer from the field because it allows dropped data packets to be re-requested and delivered. Without it, broadcasters couldn't have confidence that files were delivered intact and ready for use, obviating the promised benefit to workflow.

Fade to black

Data transfer also introduced a degree of unpredictability into what the ultimate shape of ENG will become post 2GHz transition. While the industry is hard at work completing inventories of microwave equipment and negotiating with Sprint, a few have begun to push the envelope with file transfer.

KRON chief engineer Craig Porter and BitCentral CEO Fred Foucher presented a white paper at the conference on April 25 titled "Files to video journalists, a case study of organizational change At KRON 4 in San Francisco," which revealed the station currently is testing a Bay Area WiMax network for possible live contribution from its video journalists.

Running at 2.5Mb/s, the live shots will run over the WiMax connection from the carrier into the KRON building — staying in the WiMax network without being subjected to the public Internet — to protect contribution from latency. The WiMax service provider currently has 20 towers delivering coverage to the metro. Maximum distance from user to tower is 20mi, and the service provider sells full duplex data transmission from 1Mb/s to 7Mb/s and provides "a pilot carrier to establish a connection with the tower," the white paper said.

As envisioned, a KRON video journalist would set up a 12in-sq flat antenna on a tripod and point it at a local tower. The WiMax system would automatically assign a channel to the video journalist for file transfer. According to the paper, because the video journalists in the field and the station share the same network, "it is possible to use this type of connection to contribute live video."

Additionally, Inmarsat demonstrated its BGAN, a broadband global area network satellite system. It takes the concept of file transfer to its logical extension, offering broadcasters a way to contribute voice, video and data from 85 percent of the world's landmass over a broadband satellite network.

The KRON application and the promise of Inmarsat's BGAN satellite system demonstrate the growing importance of file transfer technology as forward-thinking broadcasters begin to experiment.

One day, this may transform the ENG landscape into something more akin to the World Wide Web than a dedicated point-to-point transmission system. When that will happen is anyone's guess. But one thing is certain: NAB2007 is likely to provide a clue.

BE

Phil Kurz authors several Broadcast Engineering e-newsletters, including "ENG Update," "HD Update," "IPTV Update," "News Technology Update" and "RF Update."

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TECHNOLOGY SEMINAR

IPTV

BY PHIL KURZ

It's amazing what can happen in one year's time. At NAB2005, Verizon Communications CEO and chairman Ivan Seidenberg recruited broadcasters to be a part of the company's FiOS IPTV plans. A year later, Verizon went to Las Vegas with FiOS service rolled out to a number of communities in New Jersey, New York, Texas and elsewhere, with more on the way.

NAB2006 also saw the optimistic assessment of Phil Corman, director of worldwide partner development for Microsoft's TV division. He said that 2006 is the year IPTV becomes a reality. With AT&T's impending deployment of its IPTV service, Project Lightspeed, and similar near-term rollouts of IPTV service planned from British Telecom and Deutsche Telekom — all deploying Microsoft TV IPTV Edition — it's little wonder why Corman sees a bright future for IPTV.

In fact, the NAB was so enthused about the prospects for high interest in IPTV at this year's convention that it dedicated an entire conference track to the subject. But before the exuberance over IPTV turns irrational, several issues must be addressed, and NAB2006 provided familiar and some not-so-familiar vendors with a good forum for their solutions.

The wide world of IPTV

Broadcasters know Tektronix for its video test and measurement expertise, but what they may not know is there's more to the company than the folks based in Beaverton, OR. Tektronix also has a team in Richardson, TX, which comes from a network and IP background. With a foot in both the video and the IP world, Tektronix believes it's well positioned to play in the emerging IPTV space.

Giving credence to the claim, the company highlighted its new

Spectra2|VQM monitor for diagnosis and analysis of streaming video transmitted via Internet Protocol and its new Cerify automated quality verification system for file-based audio and video. The Spectra2|VQM provides portable monitoring of QoS, as well as forward error correction analysis.

Part of the Tektronix Internet Protocol Diagnostics (IPD) product portfolio, it can measure multiple, concurrent SD and HD video streams transported over RTP and MPEG-2 transport stream protocols. With the



One question on broadcasters' minds was how to get 16:9 images shrunk to 1:1 for cell-phone displays so they can play a role in the next new channel.

Spectra2|VQM, IPTV operators can verify subscribers are receiving their requested service when they request it and at an acceptable quality.

Cerify reaches beyond just IPTV in its application, but for network operators, it can automatically test all aspects of stored compressed video and audio quality to assure it meets system specs, including desired format, resolution, bit rates, video and audio levels, and standards compliance. With Cerify, network operators can make sure video and audio

files are encoded properly when measured against a variety of industry standards, including MPEG-2, MPEG-4, H.264, VC-1 and 3GPP.

At Snell & Wilcox, conforming to multiple standards on multiple dis-



Viewing images on a Treo was easy ... as long as you were in the IPTV demonstration area. However, it's coming soon to a corner near you.

tribution devices, including IPTV networks, took center stage during NAB2006 with the introduction of Helios. Helios combines Ph.C motion estimation used in Snell & Wilcox's standards converters and FormatFusion technologies to build a system that allows content producers to master once and distribute anywhere, including IPTV, video on demand, mobile video and video iPods.

Helios allows content producers to automate the conversion process while still maintaining control over video, audio and metadata for the desired output format in a single pass. Helios dynamically scales the processing required for the conversion via an intelligent job manager that allocates CPU cycles to the conversion process at hand. A distribution module lets users repurpose content automatically to the correct distribution platform. And an interoperability module allows users to move files between IT hardware.

More IPTV

At Harris, the focus was on a comprehensive IPTV solution that covers business and operations, infrastructure, test and measurement, monitoring and network management.

By combining Harris' Leitch-brand video infrastructure products with content management software, the company is seeking to offer telcos a complete IPTV headend and media management solution as they roll out triple play services.

To make its IPTV offering, Harris is drawing on its workflow solutions

CAMERA RECEIVER beyerdynamic KE 800

Uses automatic channel targeting (ACT) function to search for an interference-free frequency; transmits via infrared to the matching handheld or pocket transmitter of the company's Opus 800 and Opus 500 Mk II wireless systems and locks in the frequency; comes equipped with an LC display that indicates the battery level of the transmitter, frequency and channel, squelch, AF and RF level.

631-293-3200

www.beyerdynamic-usa.com

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High Resolution Meets Easy Installation.

Introducing Brilliance® RGB Banana Peel® Hi-res Component Video Cables From Belden.

The unique patented design of Belden's hi-res RGB video cables eliminates the need for an overall jacket, simplifying installation and saving you time and money.

Belden Brilliance Mini Hi-res Component Video cables offer true 75 ohm high-frequency performance, making them ideal for demanding applications such as high resolution VGA on large screens, HDTV, Hi-res CAD, animation, editing and special effects. And now, to meet the needs of the installer, they are offered in Belden's unique Banana Peel composite configuration.

With no outer jacket, each individual cable is easy to identify — just peel them off the center spline and terminate! The elimination of the outer jacket also increases the cable's flexibility and allows the use of a smaller size conduit.

But don't trust us — see it for yourself. Get a FREE product sample and complete technical information today!

For more information, call:
Belden CDT Electronics Division
1-800-BELDEN-4.

Or, go to Belden's Web site at:
www.belden.com

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Belden CDT

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HD WEATHER GRAPHICS
Baron VIPIR HD

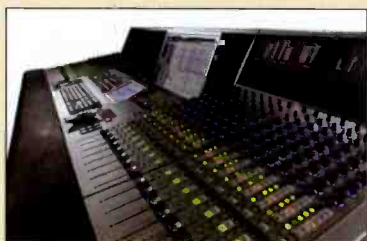
Provides crisp picture quality, graphics and content; FasTrac and StormWarn are also available in HD; chroma key and weather wall integration supports hand gestures; Voice Recognition allows meteorologists to direct video via their voice commands; MicroTrac follows the center line of a storm as it passes over schools, churches, houses and hospitals.

256-881-8811; www.baronservices.com

ENG TRANSMITTER
Microwave Radio
Corporation PTX-PRO

Full-integrated, self-contained, portable platform; supports integral MPEG-2 SD/HD encoding, plus analog or COFDM and high-speed single carrier digital modulation in bands between 1.9GHz and 2.6GHz; features user-friendly front panel controls, built-in AC/DC power supplies and nine programmable presets, which make set-up easy.

978-671-5700; www.mrcbroadcast.com



WAVEFORM MONITORS
Euphonix System 5 B

For the System 5-B digital audio mixing system; new modules are operationally compatible with previous versions of the System 5-B but have higher resolution displays at the top of each module; new touch-sensitive knobs include color-coded LED rings at the base for easy identification of the knobs' functions; new modules also include faster embedded microprocessors for quicker response and boot times.

650-855-0400; www.euphonix.com

TECHNOLOGY SEMINAR

for sales, traffic and scheduling, digital asset management and automated playout, as well as its Leitch line for signal processing, ad insertion, routing and switching. Add to the mix Videotek's line of test and measurement offerings, and the company has positioned itself to provide a complete IPTV solution.

At NAB2006, Harris announced that recently acquired Leitch has supplied systems to PCCW in Hong Kong for use in its IPTV video headend. Called "Now Broadband TV,"

chip's design and performance was nearly complete as of NAB2006. The first ViBE MPEG-4 encoders using the chip are expected at the beginning of next year. Thomson anticipates a range of applications for the processor, including its use in Grass Valley encoders, signal processing equipment and transcoders for delivery of SD and HD signals over IPTV networks.

TANDBERG Television launched a complete IP-based system intended for contribution and distribution IP video



Dale Mowry, VP and GM of the Harris Television Broadcast Systems business unit, demonstrates live video on a cell phone. The company supports both DVB-H with its Cool Play transmitter and QUALCOMM's MediaFLO system with the Atlas Mobile and Ranger Mobile series of transmitters.

PCCW's service is one of the largest IPTV deployments in the world, serving more than 550,000 subscribers with broadband television. The service offers 100 video channels and more than a dozen music channels.

New silicon and greater video compression efficiency highlighted Thomson Grass Valley's IPTV focus at the show. The company unveiled its Grass Valley Advanced Compression Processor and announced that its first application will be in its ViBE HD MPEG-4 encoder.

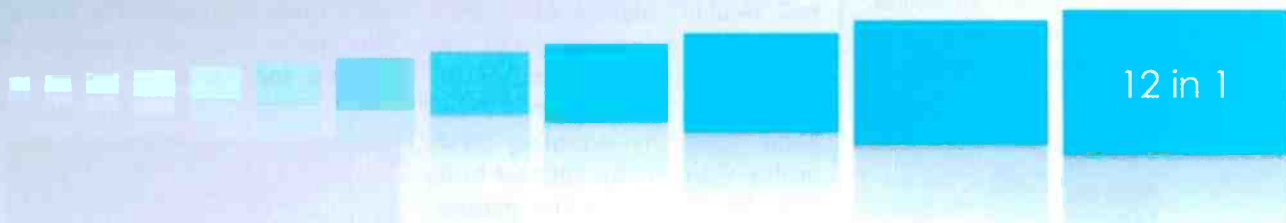
Developed over the past three years by a team of Grass Valley and Thomson engineers, the new chip has demonstrated the ability to encode high-definition MPEG-4 in bandwidth as low as 4Mb/s while maintaining high image quality. Verification of the

headends and for large and small direct-to-home cable, satellite, terrestrial and telco platforms. The iSIS 8000 IP system offers MPEG-2, MPEG-4 AVC and SMPTE VC-1 video encoding and transcoding, IP multiplexing and new receiver and decoders. It is controlled and managed by the company's nCompass application.

The company also unveiled the MX8400 IP multiplexer for use in central headend applications and integrated its SkyStream MediaPlex and iPlex digital video processing platforms into the iSIS 8000 system. The MediaPlex and iPlex can encode MPEG-2 and MPEG-4 AVC SD, transrate MPEG-2 SD, transcode MPEG-2 to MPEG-4 AVC, as well as provide multiplexing, demultiplexing, routing and streaming.

TOUCH IT...

From the company that invented in-rack audio & video monitoring



The New Touch It Touch Screen multi channel LCD Video System from Wohler



With a simple touch of the screen, the Touch It, dual 7" high resolution LCD screen monitors 12 asynchronous composite video inputs with mini router function and external multi-screen output capabilities. Touch it Plus offers 12 stereo analog inputs.

For more information on the Touch it, touch screen LCD Video Monitor and other new audio and video monitoring solutions, please visit our website www.wohler.com.

- 7" wide high resolution select matrix monitor
- 12 asynchronous composite video inputs
- External multi-screen output of selected video
- Adjustable tilt screen
- 4:3 / 16:9 aspect ratio
- Durable scratch resistant touch screen panels
- Excellent Touch screen life – 35 million + touches

Wohler Wins Again!



NAB 2006 Awards

VOICE-OVER-IP INTERCOM Clear-Com VOICE

PC Web client application; provides easy IP line and audio codec set-up along with diagnostics; can be monitored from a centralized remote location; codecs provide low latency audio digitization in user-selectable formats from 3.5KHz to 16KHz; provides broadcast compatible intercom and commentary over IP.

510-496-6600; www.clearcom.com



LIGHTED ETHERCON Neutrik Lighted EtherCon

Offers two light pipes for 3mm standard LEDs to indicate data transmission and status; the LEDs fit into an opening at the bottom of the light pipes, and the light pipes transmit the light to the front panel; provides all the components of Neutrik's Shielded EtherCon.

732-901-9488; www.neutrikusa.com

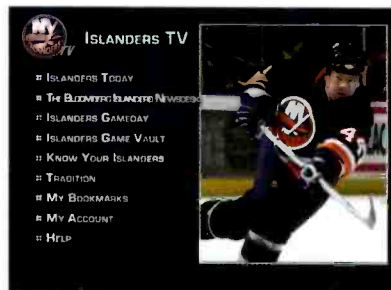
TECHNOLOGY SEMINAR

Around the floor

A variety of interesting IPTV developments from some lesser-known names turned up at NAB2006 as well. NeuLion highlighted its IPTV STB and service offering. The Plainview, NY, company bridges the gap between content provider and home viewer by streaming DVD-quality video via the Internet to its STB. NeuLion establishes partnerships with content providers like KyLinTV, a niche provider of Asian movies and TV shows to Asian audiences in North America, and brings its STB, network management, VOD and billing services to the table. At NAB2006, the company announced it's working with the New York Islanders and the Catholic Church to offer similar niche IPTV channels via the Internet.

Another newcomer to NAB2006 was WhiteBlox, which, as the name

implies, offers "unlabeled" blocks of tools to allow content providers to build their own private label broadband network, including interactivity and a video component. The WhiteBlox system is a mix of integrated software and hardware, as well as



NeuLion works with content providers, like KyLinTV (shown above), to establish their own niche IPTV distribution channel. NeuLion provides the technology and set-top box to support streaming DVD-quality video over the Internet, as well as the tools for video on demand, billing and record keeping.

Fair and Balanced Color



It's true. Kino Flo's telegenic ParaBeam 400 studio fixture delivers 3,000 Watts worth of tungsten soft light on 2 Amps—without the heat and without compromising your picture's color quality! The ParaBeam's cool brilliance owes to

a special parabolic reflector that practically turns light waves into projectiles.

As for image quality, the fixture uses Kino Flo designed True Match® lamps that display professional tungsten and daylight balanced illumination (CRI 95). A center mount lets you rotate between a horizontal and vertical beam. Slide in your choice of focusing louvers to spot the beam down to a 90°, 60° or 45° pool of light. DMX, analog and manual controls can dim the light to black. Like all Kino Flos, the ParaBeam is flicker free and dead quiet.

If you think the ParaBeam looks good on paper, wait 'til you see how it looks on video.

ParaBeam

2840 North Hollywood Way Burbank CA 91505 818 767 6528 voice 818 767 7517 fax



www.kinoflo.com

management tools and services. Major components include proprietary software tools to let users build their

tem. Under the agreement, Widevine will work with Siemens to provide a scalable and mature content protec-

A variety of interesting IPTV developments from lesser-known names turned up at NAB2006.

own network; packaged combinations of services specifically designed for five industry segments; custom-built enhancements for those with premium assets or special needs; and service elements to track, report, monitor and sell ads.

Finally, Widevine Technologies announced a global deal to with Siemens Communications to make Widevine a certified content protection vendor for broadband carriers delivering IPTV services to viewers via Siemens SURPASS Home Entertainment sys-

tem, which is necessary for operators to acquire premium broadcast and VOD content.

If NAB2005 served as a launching pad for the intertwining of telecommunications and television, NAB2006 demonstrated that both are throttling up and on their way to attaining a stable orbit in the IPTV space.

BE

Phil Kurz authors several Broadcast Engineering e-newsletters, including "ENG Update," "HD Update," "IPTV Update," "News Technology Update" and "RF Update."



HD AND SD SWITCHER FOR-A HVS-500HS

1 M/E switcher; the latest addition to the HANABI series; accepts HD, SD, HDV and DV formats; comes with 10-bit, 4:2:2 internal processing; connects to HDV cameras or PCs; is multiformat in HD for 1080/60i, 50i and 720/60p; is switchable from NTSC to PAL; standard switcher has four HD/SD SDI inputs, two PGM output and three AUX outputs.

212-861-2758; www.for-a.com

MEDIA SERVERS Videotechnics Apella

Support multiple formats from SD to HD; networked or standalone versions available; 3RU high; supports up to 4TB with RAID 1, 3, 5 and 6 options; IT-centric design; fully compatible with external NAS, SAN and DAS solutions.

404-327-8300; www.videotechnics.com

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with 1920 x 1080



Marshall

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Marshall's new 23-inch High Definition monitor let's you GO NATIVE with 1920 x 1080 digital and analog video. For under \$6K you get a loaded package with inputs for HDSDI/SDI, Analog Component YPrPb, S-Video, Composite, XGA from your computer and even DVI-I for HD video or computer generated images. All the features you need for HD production, like frame markers, safe area, adjustable color temperature and Pixel-to-Pixel native display for any video format are included and can be directly accessed without menus. All of this is in a durable all metal compact package with added scratch resistant polycarbonate screen protection that can be rack mounted or used on a desk top.

Marshall Electronics

Tel.: 800-800-6608
Fax: 310-333-0688

LCDracks.com

ARCHIVE SYSTEM

Crispin CAM-HSM

A policy-based storage and retrieval system; designed around a combination of high-density, reliable RAID units; near-term and long-term storage of media can exist in the same archive system, but are managed separately based upon need; all assets are searchable and viewable in a digital library that optionally includes low-resolution proxies of each clip.

919-845-7744; www.crispincorp.com

CONTENT SECURITY

Irdeto Plsys Control System

Provides and manages encryption keys to the scramblers, enabling the scrambling of content prior to its playout as a broadcast stream; generates unique encryption keys for each user's session; uses patented techniques for key generation to ensure maximum security and limited bandwidth usage.

425-497-2800; www.irdeto.com

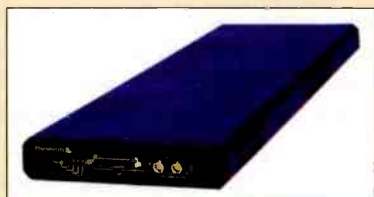
MULTIPLEXER/ DE-MULTIPLEXER

Network Electronics SDI-TD-MUX-4/DMUX-4

Time division multiplexes four SDI, DVB-ASI or SDTI signals into one HD signal; all signals are accepted synchronous or asynchronous and are automatically format-detected; a built-in routing switcher allows channel swapping on both mux and dmux devices.

800-420-5909

www.network-electronics.com

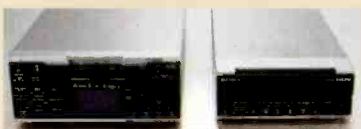


TEST AND MONITORING SYSTEM

Pixelmetrix DVStation Mini

A single-port version of the 21-module DVStation; available in two models: an ASI version for transport stream analysis and an 8VSB RF version for ATSC monitoring; allows remote control via LAN or the Internet; is controlled using a standard PC with Web browser or SNMP network management system; designed for single-source monitoring at multiple locations.

954-472-5445; www.pixelmetrix.com



HDV VCR

Sony HVR M25U and M15U

Records and plays HDV 1080i, DVCAM and DV SP; compatible with mini-size DV cassettes as well as standard-size cassettes; enables four hours of HDV recording with compatible tapes; supplies downconverted signals from HD to SD; is switchable between 60Hz and 50Hz (NTSC/PAL); supported connectivity options include i.LINK (IEEE-1394) digital interface, component output, S-Video I/O, composite I/O and analog audio I/O.

800-686-7669

www.sony.com/professional

IP-BASED VIDEO HEADEND

TANDBERG iSiS 8000

Complete IP-based system includes MPEG-2, MPEG-4 AVC and VC-1 video encoding, IP multiplexing and new receiver and decoders; uses SkyStream xPlex multiplexing; open standards-based; supports up to four independent multiplexed outputs from a single unit; Reflex statmux available.

678-812-6300; www.tandbergtv.com

AUDIO ROUTER

PESA Cheetah DRS

Base unit measures 64 x 64 in 1RU or 128 x 128 in 2U; is expandable to 2048 x 2048 in 36RU; offers a small form factor and distributed architecture that is fully compatible with Dolby E; supports both synchronous and asynchronous signals and sample rates up to 96kHz.

631-912-1301; www.pesa.com

TELESTRATOR SYSTEM

e-mediavision POINT-HD V2

New version of the broadcast telestrator and presentation system includes enhanced HD graphics engine for effects and tools; allows on-screen talent to draw and annotate over live video, using animated graphic tools to enhance the viewer experience; features a touch-sensitive control surface (LCD, plasma or point-holographic screen) with a simple graphical interface.

+44 208 755 2014

www.e-mediavision.com

TALLY SYSTEM

TSL TallyMan

Enhancements include ESP-1 and ESP-1R expanders, which allow the tally system to be extended, with increased capacity for serial and parallel relay connections; TM1 and TM2 system controllers run the program as an embedded Windows application, allowing real-time control of the system.

+44 1628 676 200; www.tsl.co.uk

SPORTS NEWS SYSTEM

IBIS Highlighter

A broadcast tool designed to enable fast turnaround and management of sports events, studio-based programming and outside broadcasts; does not rely on dedicated hardware and can be used within an existing video server network; captures all associated metadata from a sporting event, studio transmission or OB production, as well as highlights; retains that data for use by third-party systems.

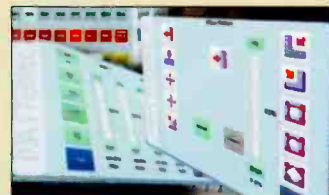
+44 1483 280 208; www.ibistv.com

MICROPHONE PREAMPLIFIER

Prism Sound MMA-4XR

Each of its four channels has controls for gain (60dB in 3dB steps), phase invert, cut (mute) and 48V phantom power; input and output headroom extend to +28dBu; frequency response extends to more than 200kHz; phantom power circuit provides a higher than usual level of current output.

+44 20 8481 1003; www.prismsound.com



MASTER CONTROL SWITCHER

Pro-Bel Masterpiece

Offers HD and SD switching, advanced audio processing and flexible keying and DVE options; upgrades include the addition of an HD DVE and the option to install Dolby E decoders and logo storage; now benefits from four keyers and has the ability to handle audio mixing.

925-735-9269; www.pro-bel.com



ENG TRIPOD Miller Sprinter II

Dual action, patented Sprinter II leg locks allow set-up in seconds; single stage and two-stage tripod combinations are available in ultra-light, high strength carbon fiber or alloy tubing; an inline carry handle allows safe and comfortable transport.

973-857-8300; www.miller.com.au



FIBER-OPTIC LINK Multidyne DTV-4000 series

A four-channel SDI serial digital video fiber-optic link with 16 audio channels or eight AES/SPDIF channels; fits 1RU with a modular tray that will house up to three DVM-4200, DVM-8200 or DIM-8200 cards; supports 24-bit stereo audio flat from 20Hz to 20kHz with SNR greater than 90dB and THD less than 0.5 percent; supports 110/220 VAC and, optionally, 48 VDC.

800-488-8378; www.multidyne.com



TV SIGNAL MONITORING AND VERIFICATION IdeasUnlimited ContentProbe

A software and hardware system for low-cost monitoring and verification of TV signals; Compliance module produces a browse stream of media, which is time code indexed and searchable; FaultTracker detects faults, including the presence of color bars, idents, black and audio silence; Verification compares TV signals in real time and checks content, aspect ratio, etc.; uses Media FingerPrint to generate a small, digital fingerprint of any video picture; the image fingerprint can then be used to monitor and compare other video sources with the source signal.

+44 870 162 7200; www.ideasunlimited.tv

PLAYOUT CONTROL Omneon ClipTool Pro

Enables users of the Omneon Spectrum media server to monitor and control playout and record functionality via an easy-to-use graphical user interface; copy-clip function creates sub-clips from manually-selected in and out points.

866-861-5690; www.omneon.com

CONFIGURATION TOOL Opticomm Optiva Configurator

Web-based configuration tool designed for the Optiva Series, a modular fiber-optic communication platform; allows users to create an Optiva system online with all inputs and outputs desired for their specific application.

858-450-0143; www.opticomm.com

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QTV Professional series

Line consists of four prompters: Professional series 8, which is suited for hand-held as well as SteadiCam use; Professional series 10, which is purpose-built for use on jib arms or small tripods where weight is limited but greater visibility and sight distance is required; Professional series 12, which is designed for studio production and field production applications; and Professional series 17, which features a unique combination of mounting, lightweight construction and a high-contrast display.

203-406-1400; www.qtv.com

STORAGE TECHNOLOGY

Thomson Grass Valley REV PRO

REV PRO drives will be delivered as a standard feature for customers of NewsEdit XT and Canopus EDIUS NLE systems; also available as a standalone option for existing PC-based desktop or laptop systems; fully compatible and integrated with current NewsEdit XT and EDIUS version 3.6.1; ideally suited for IT- and file-based acquisition and production.

800-547-8949; www.grassvalley.com



DIGITAL AUDIO MIXER Renegade Labs Blue328

Compact audio mixer allows editors to mix 16 channels at once via eight stereo faders; master fader gives instant adjustment to all eight program outputs; a built-in monitor matrix provides custom and preset monitor routing, allowing for any output channel to be routed to any or all monitor channels; features eight AES discrete inputs, eight AES discrete program outputs and eight analog monitor outputs.

530-273-7047; www.renegadelabs.com



FILE-SHARING SYSTEM

Small Tree

Communications BlazeFS

Designed for Macs; offers users the ability to store large data files, such as uncompressed HD video, on a file server rather than local to each client; allows clients to access these files at speeds similar to the local disk; can drive data to the maximum speed of a Gigabit Ethernet link; works in concert with Small Tree's 10Gb Ethernet and InfiniBand products.

866-782-4622; www.small-tree.com

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MEDIA FILE TRACKING **Studio Network** **Solutions Postmap**

Designed to easily find, manage and catalog files located on a SAN, file server and removable storage such as FireWire drives and DVDs; enables users to add custom metadata fields to project files, folders and media clips; workflow feature enables users to define and track the steps throughout their entire production process.

877-537-2094

www.studionetworksolutions.com



HDTV VIDEO AND **AUDIO MONITORING** **Zandar Technologies** **Predator HD8**

HDTV video and audio monitoring multiviewer system; features new Z-Configurator user software and ZdH Zandar dual head display facility; comes in a compact 1RU system; has eight auto-sensing inputs, allowing both HDTV 720p and 1080i formats and legacy SDI (270Mb/s) signals to be used together, bridging the migration to HDTV signal formats.

321-939-0457; www.zandar.com

CAMERA-MOUNTED **FIBER-OPTIC SYSTEM** **Telecast Fiber Systems** **CopperHead G2**

Provides full triax-like functionality for professional camcorders via a single, lightweight, tactical fiber-optic cable or via SMPTE hybrid cable for remote camera power; interface supports all signals between the camera and 1RU base station, including bidirectional analog composite or component video, digital SDI and HD-SDI video, and multiple audio.

508-754-4858; www.telecast-fiber.com

CONTENT SECURITY **Thomson NexGuard**

Comprehensive digital rights and content management package; protects, traces and monitors digital content in the professional media environment from production to post production through distribution; includes watermarking, encryption, controlled access and forensic data solutions to manage and secure the storage, transfer and viewing of content.

503-526-8150; www.thomson.net

VIDEOCASSETTE **Maxell D-5**

Format handles standard-, wide- and high-definition television configurations; uses 0.1 µm diameter ultra-fine Ceramic Armor Metal particles; has a thin, highly rigid PolyEthyleneNaphthalate base film material; uses technology that enables the tape to evenly clean the head surface without causing excessive wear, is available in 12-, 33-, 48- and 63-minute lengths, and 94- and 124-minute lengths.

800-533-2836; www.maxell-usa.com



DAM SOFTWARE **Focus Enhancements** **ProxSys version** **5.0 software**

A DAM server software update designed for medium- and large-scale deployments in video-driven applications where users need to organize rich multiformat media, including HD content; manages terabytes of low- and high-resolution video, audio, images, documents and data from a Web browser interface.

800-338-3348; www.focusinfo.com

VIDEO NETWORKING **Harris NetVX**

Multi-service video networking product; provides improved bandwidth efficiency for increased multichannel operations, enhanced HD services, disaster recovery, event support, remote newsgathering, and IP-based video transport; leverages packet switching, providing cost-effective, bidirectional transport over ATM, IP, DS-3, fiber (OC-3), satellite and microwave networks; supports triple-play services in one chassis.

513-459-3400; www.broadcast.harris.com

fischer broadcast connectors



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- Fits 3/8" and 1/2" cables
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- Waterproof rugged design
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Fischer Connectors, Inc.
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Alpharetta, GA 30004
Tel: 800.551.0121
Fax: 678.393.5401
mail@fischerconnectors.com
www.fischerconnectors.com



DIGITAL WAVEFORM MONITOR

Tektronix WFM7100

Supports SD/HD and composite video; options include support for monitoring digital audio (AES/EBU/analog and Dolby); SDI signal measurement and in-depth digital data analysis; integrated high-resolution XGA display; MyMenu feature allows users to place most frequently used functions in a single on-screen menu.

800-833-9200; www.tektronix.com

CG INPUT OPTION

VertigoXmedia VxASI

An option for the VertigoXG character generator; provides four DVB-ASI inputs with real-time demuxing and decoding of MPEG-2 video and audio streams; the decoded video and audio streams are sent to the VertigoXG rendering and compositing engines as standard SDI or HD-SDI video inputs and can be fully branded, DVE'd, mixed and output as either SDI or HD-SDI signals.

514-397-0955; www.vertigoxmedia.com

ZOOM LENSES

Thales Angenieux HD-e series

Cost-effective series consists of three lenses: the 19 x 7.3 AIF HD-e, with a zoom ratio of 19X and focal length ranging from 7.3mm to 139mm; the 10 x 5.3 AIF HD-e, with a zoom ratio of 10X and focal length ranging from 5.3mm to 53mm; and the 26 x 7.8 AIF HD-e, with a zoom ratio of 26X and focal length ranging from 7.8mm to 203mm.

973-812-3858; www.angenieux.com

HD QUAD SPLIT VIDEO PROCESSOR

Image Video VxV-4HD

Provides four auto-sensing SD-SDI and HD-SDI inputs; selectable 16:9 and 4:3 aspect ratios; DVI output UXGA 1600 x 1200, 1920 x 1080p; optional SD/HD SDI output; any input may be zoomed to full screen resolution; audio metering and monitoring for embedded SDI audio.

416-750-8872; www.imagevideo.com



OUTDOOR CAMERA HOUSING SYSTEM

Telemetrics LWP-HOU

Weatherproof system is available in various sizes; can accommodate various type and size camera configurations; provides complete camera setup and lens control functionality along with pan-and-tilt movement; options include encoded positional feedback for position tracking, as well as a heater, wiper and washer; a weatherproof local power supply enclosure is also available.

201-848-9818; www.telemetryinc.com

AUDIO METERS

Logitek Tru-VU

More than 50m configurations with analog, Bright-VU, Tru-VU, Super-VU and Ultra-VU series of meters; all use digital signal processing providing precision metering that conforms to international ballistics standards; availability of 96K sample rate to support all Super-VU and Ultra-VU, including those packaged for surround monitoring.

713-664-4479; www.logitekaudio.com

ENCODING PLATFORM

Inlet Technologies Fathom 2.5

Offers real-time HD and SD encoding; now includes MPEG-2 ingest, an SD-only option, interlaced encoding, watermarking and AVISynth support; features a user interface with dockable elements that can be viewed as a dashboard or arranged in a multiple-monitor configuration; available in six different configurations to meet post-production needs.

919-856-1080; www.inlethd.com

NEWSROOM EDITOR

JustEdit vsnscenes

The low-cost editor allows low-resolution proxy preview in variable speeds directly from the chosen format (XDCAM or P2) and selection of a list of clips or subs; automatically uploads high-resolution content to shared video servers; enables management of associated metadata, creating and importing EDLs and selection MXF for transcoding the selected high-res files.

+34 937 349 970; www.vsn-tv.com



HDV-TO-DVB-ASI CONVERTER

DVEO FireBridge

Converts HD 1394 video from HDV cameras to DVB-ASI for professional environments; converts the JVC GY-HD100U 1394 720/30p output to 720/60p; also converts 25Mb/s to 27Mb/s VBR output from Sony Z1U HDV camcorder to 27Mb/s CBR; works with Terayon Cherry Picker and HD satellite receivers from TANDBERG, Harris Leitch and Harmonic.

858-613-1818; www.dveo.com

AUTOMATION

Floral Automated Join In Process (JIP)

Featured in the AirBoss presentation controller; is fully automated to provide potentially unattended join in progress of local recorded programs based on a remote signal from the network.

352-372-8326; www.floral.com

HD P2 CAMERA

Panasonic AJ-HPC2000

A P2 HD camcorder; progressive HD 2/3in 3-CCD system and 14-bit A/D processing; captures in 720p, 1080i or 480i, offers exceptional dynamic range and low light recording; high sensitivity of F10 at 2000 lux; can capture images at a minimum illumination of 0.032 lux (at +62dB); features five hot-swappable P2 card slots, providing up to 40 minutes HD record time.

800-528-8601

www.panasonic.com/broadcast

ENCODING SYSTEMS

CONTROLLER

Digital Rapids

Broadcast Manager

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905-946-9666; www.digital-rapids.com



**3-D GRAPHICS
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A 3-D GPU with two dual-link DVI connectors, 256MB GDDR3 frame buffer memory and HD video output; offers 12-bit sub-pixel precision, full 128-bit color precision (32 bit per component) and 40Gb/ memory bandwidth.

818-486-2000; www.nvidia.com

VIDEO SERVER
**360 Systems Image
Server MAXX**

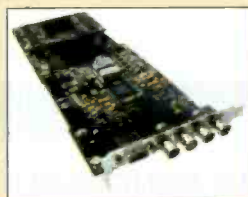
High-performance, three-channel broadcast server; with graphic store and key and fill; supports MPEG-2 video up to 50Mb; inputs MPEG-2 and DV over GigE from Apple FCP and Avid, as well as TARGA files from graphics programs; includes frame sync, SDI video ports, AES/EBU, digital, analog and embedded audio.

818-991-0360; www.360systems.com

DI PLATFORM
**Digital Vision 17 Processor
Nucoda Workstation**

A DI grading platform based on the AMD64 multi-core technology; includes a NVIDIA Quadro FX 5500 SDI graphics board; platform supports the full range of Nucoda data-centric software; allows post-production houses to deliver cleaner product to broadcasters.

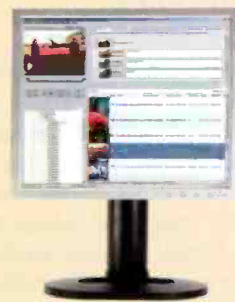
818-769-811; www.digitalvision.se



VIDEO CAPTURE CARD
Bluefish444 HDIFury

A 4:2:2 video capture card integrated with Aspex's Accelera HD MPEG-2 encoder card; offers high-quality, real-time HD MPEG-2 video compression for all HD formats up to 1080i 60; allows users to create cost-effective solutions for HD archival, live streaming, post production and IPTV applications.

+61 3 9682 9136; www.bluefish444.com



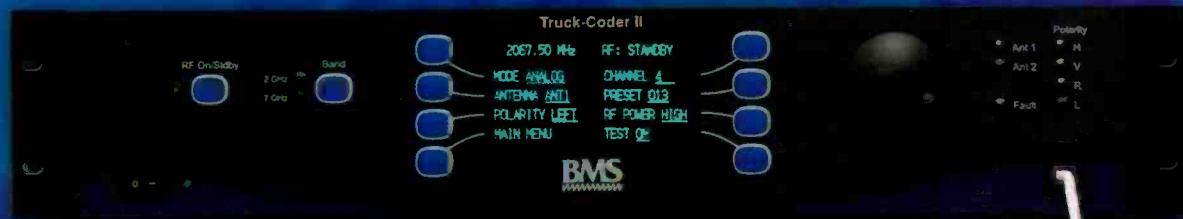
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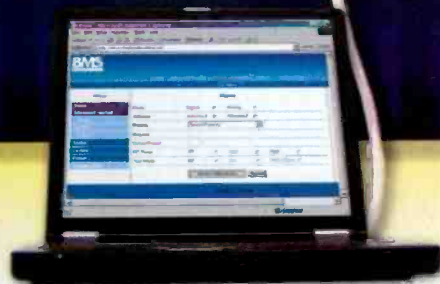
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+47 3352 1600; www.fjordmedia.com

HD STORAGE DEVICE Shining Technology CitiDISK HD

Palm-sized, high-capacity video storage device that provides direct HD recording and instant playback; supports Panasonic's DVCPRO HD format, including the AG-HVX200; provides 80GB, 100GB or 120GB of storage; weighs 10oz; allows users to record directly into most NLEs with instant playback.

714-761-9598; www.shining.com



VIDEO MONITORING SYSTEM JDSU NetComplete

A digital and IP video service monitoring application; provides continuous, simultaneous monitoring of more than 250 video streams, as well as test access coverage at QoS-relevant points in the network; addresses every deployment phase, including initial design, network element deployment.

408-546-5000; www.jdsu.com

HDTV ADVANCED COMPRESSION ENCODER Scientific-Atlanta PowerVu D9054

The MPEG-4 part 10/H.264 encoder supports multiple applications, including IPTV, satellite distribution, backhaul and contribution, DVB-T and xDSL; allows users to maintain high video quality, even at bandwidth-saving, low bit rates; delivers more channels over existing bandwidth, expanding the usefulness of current networks and providing opportunities to launch expanded HDTV programming and add new revenue generating services.

770-236-5000

www.scientificatlanta.com

ARCHIVE MANAGEMENT SGL FlashNet 6.0

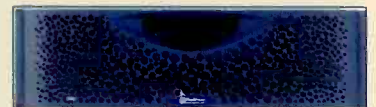
New version features a redesigned architecture that delivers increased scalability with unlimited storage capacity and full redundancy as standard; Storage Manager is an extension that allows the user to move, copy and delete data within the archive and to defragment the archive in order to free up media space that contains obsolete data.

+44 1635 44 991; www.sgluk.com

BATTERY CHARGER IDX System Technology LC-7P

A four-channel battery charger designed for Panasonic 7.2V batteries (models VW-VBD35 and VW-VBD55); charges VW-VBD35 batteries in two hours and VW-VBD55 in 3.5 hours; features LCD displays that show the batteries' charge levels.

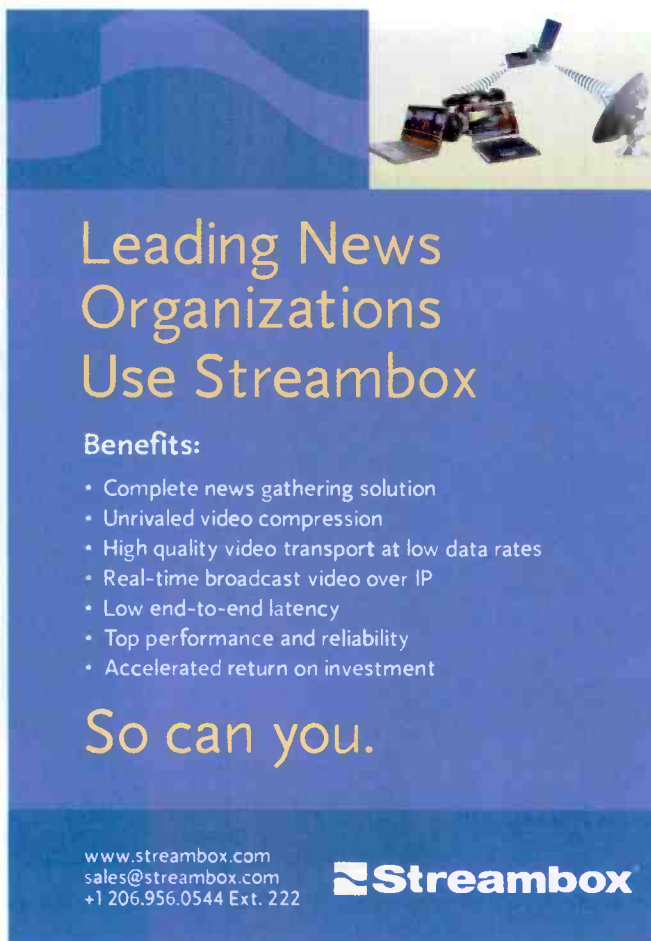
310-891-2800; www.idx.tv



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954-943-2026; www.pixelpower.com




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952-938-8080; www.adc.com

VISUAL EFFECTS SYSTEM **Discreet Flint 9.5**

System designed for broadcast and post-production operations requiring cost-effective motion graphics and interactive visual effects in HD and SD; allows users to build promos, station ID packages, commercials and brand graphics in an instant-feedback, real-time creative environment; uses powerful paint, fast versioning, template-based content creation, 3-D particles and text tools; offers new tools, including a layer-based paint module, Autodesk's Motion Estimation technology.

800-869-3505; www.autodesk.com/me

NLE SOFTWARE **Canopus EDIUS** **Pro version 4.0**

A real-time, multiformat video editing solution with new features, including multicam support, nested sequence editing, improved trimming tools and keyframe support for color correction; supports all video acquisition formats with real-time, multi-track, mixed-format HD/SD editing, compositing, chroma keying, titling and timeline output capabilities; provides editors with real-time, mixed-format HD/SD editing of HD, HDV, DV, MPEG-2, lossless and uncompressed SD video.

408-954-4500; www.canopus.com

HD TEST GENERATOR **Trilogy Mentor XL**

The sync and test generator offers full gunlock and master SPG with multiple timing planes; operates simultaneously in 525, 625 and HD modes; additional options for analog, AES and AES/SD embedded tones and silence are available from the same unit.

800-372-3198; www.trilogys.com

MAM SYSTEM **Konan Digital** **DigitalArc for News**

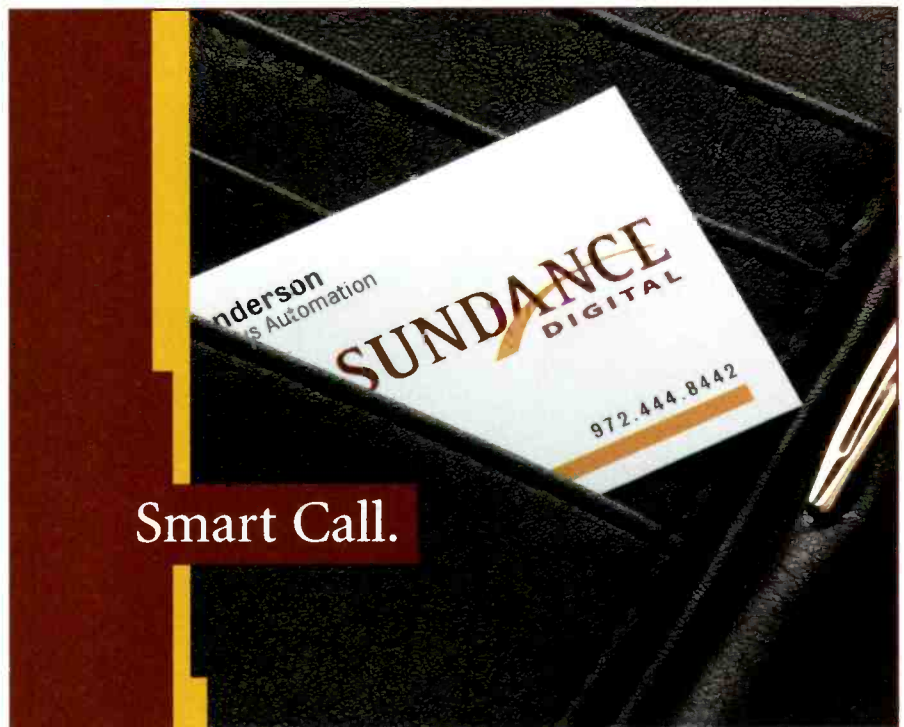
A streamlined, scalable and open-standards digital network environment for news production workflows; gives journalists and producers access to physical and digital media assets; features precision search and retrieval, multichannel cataloging and proxy editing.

818-649-8655; www.konandigital.com

UNCOMPRESSED **HD/SD CAPTURE CARD** **AJA KONA3 version 2**

For Power Mac G5 users, the new version supports 2K resolution video and hardware-based 1080-to-720 or 720-to-1080 crossconversion; directly and simultaneously creates 2K DPX files and 2K QuickTime reference movies; material can be played out at 2K via HSDL; additional features include 16-channel embedded audio and 96kHz AES audio.

800-251-4224; www.aja.com



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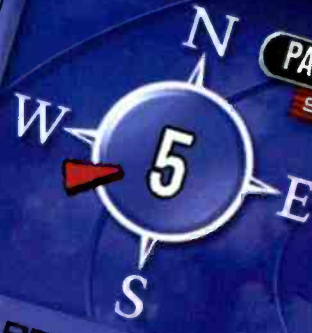
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JUNE 2006

Keeping your live Doppler radar in good operating condition will pay big dividends when storms arrive. Images courtesy Baron Services.

SPECIAL REPORT:

SEVERE

weather systems

BY DAVID STARNES

This is the time of year storm tracking systems become the cornerstone of your weather center. And now is the time to make sure your weather systems are locked and loaded for the stormy days ahead.

Arm yourself with knowledge

While daily weather is an essential element of a well-rounded weather presence, severe weather is when broadcasters' reputations are built and ruined. So stay on top of things. Know what kind of technology is out there.

When shopping, feel free to ask prospective vendors from where their weather data is obtained. Do they generate their own algorithms, or do they rely on slower, less specific technology? Proprietary algorithms can provide more accurate detection of the strongest areas of a storm, as well as a far greater timeliness.

The speed of the weather systems themselves is another crucial element. Select a storm tracker that also serves as a multi-purpose system that can be used for effective year-round weather coverage, not just during severe weather. Recent innovations have resulted in the advent of real-time displays that require no rendering, allowing your weather team to create weather shows quickly and get to air faster.

A renderless system eliminates the multi-box approach, running everything out of a single CPU. Having storm tracking and graphics display capability in one box not only streamlines the technology inside the weather center, but also provides an additional cost savings.

Work as a team

Oftentimes, engineers must work closely with the weather team. This happens often at small stations that are forced to spread resources across multiple departments. During the weeks ramping up to severe weather season, everyone involved should meet to determine the personnel who will be responsible for certain aspects of severe weather — weekend or late night coverage, for example. Knowing the duties beforehand will help prevent confusion once an actual outbreak does occur.

Make sure the weather team has access to the most appropriate NEXRAD sites. We recommend referencing at least four sites — one in the nearest major city, and three others in the nearest outlying areas. You can also ask if your vendor can provide the ability to display multiple live radar feeds in one unified display. Nationwide composites of radar data are also useful, and in the case of some vendors, they are more timely than conventional NEXRAD delivery.

From a community standpoint, have a plan of action. Some storm trackers feature the built-in ability to air digital images submitted by viewers. Work

with the weather team to create a process for requesting, receiving and displaying such viewer-oriented images.

Above all — practice, practice, practice. Work with your weather team to prepare drills.

And finally, formulate a backup plan in case one of your data sources goes down. Weather vendors have redundancy in places that should quickly restart the flow of data in the unlikely event a dropout does occur. Make sure your vendor has the capacity to get you back up quickly. Keep the vendor's customer service number handy, just in case.

Train yourself

We can't emphasize enough the importance of training seminars. Advise your weather staff to attend conferences on as many of your weather products as possible. If you've got some outstanding technical questions that can only be answered in-depth, you may want to consider attending yourself.

Be sure to look for seminars that cover the science behind meteorology and its practical day-to-day applications. After all, it's of little use to see an item of interest on the weather display and not understand its significance.

Tutorial DVDs serve as a supplement to seminars and traditional operations manuals. In many cases, they may prove more beneficial because they allow users to actually see the operations being performed, as well as provide the ability to instantly rewind or skip ahead to other sections.

Optimize the weather systems

Make sure the latest software updates have been made to all your weather systems before severe weather season begins. Reboot the computers and then verify their performance. If you live in a warm climate, you may not have used the instant alert crawl for some time. Run a test to make sure the crawl works properly and that it keys correctly in the display.



The year-round capabilities of Baron Services' VIPIR system make it equally adept at daily weather graphics, storm tracking and localized forecast modeling.

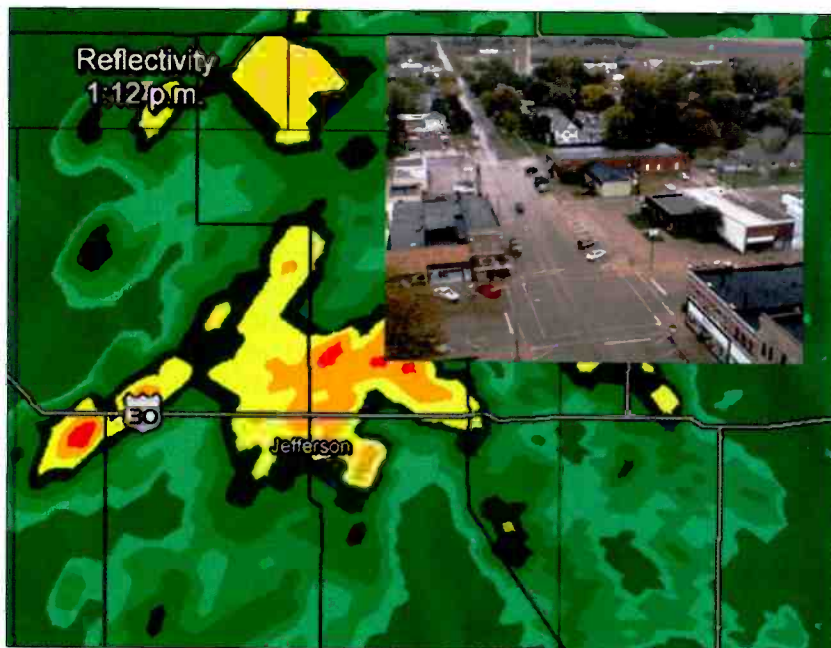
Encourage the weather team to go through highlighted city names in the storm tracker and configure their display range. This way, well-known areas will appear in the wider, zoomed-out views, with small communities becoming visible when the view range gets tighter. Your audience will be more easily able to get their bearings and see how the storm information relates to them.

The color-coded county maps in your alert crawl are especially effective because they deliver one-glance

warning information. Make sure the counties you want to highlight are configured to turn on once an alert comes in. Some storm trackers offer the ability to display county warnings in the mapping. If you have them, make sure these warnings are operational, too.

Reach into the community

Remote weather sensors are a popular way for stations to get their presence felt in the community. But after a long winter, and before the storms



Live camera integration allows Baron's FasTrac storm tracking system to spotlight areas of the community on-air.

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arrive, pay a visit to each of your sensors for a quick inspection.

Check all moving parts, and make sure the connections are dry. Now is a good time to perform any calibrations, as well. Make sure any remote weather cams are in good shape, too.

The value of sensors extends far beyond their visibility and a graphic, of course. Being able to integrate live readings into your weather display gives meteorologists a localized look at conditions during severe weather. Select products in which the readings are shown as an overlay on the mapping display.

Doppler radar is an excellent tool for determining where there may be a tornado. John McLaughlin, chief meteorologist at KCCI-TV in Des Moines, IA, said the addition of live pan/tilt/zoom webcams has allowed his station to actually see a tornado.

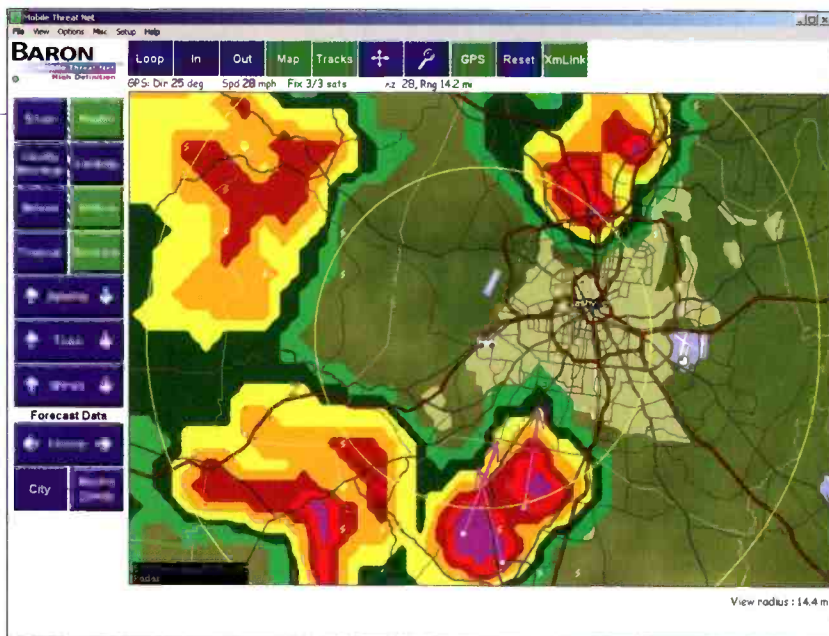
Last November, the station tracked a rare, late-fall tornado as it moved into the community of Woodward and destroyed several homes. Many residents sought shelter, not because they saw the radar image of a possible tornado, but because they could see the actual tornado live on television.

With nearly 70 sensors reporting data, there is just too much for a meteorologist to keep track of everything. Therefore, McLaughlin's team coupled its webcams with storm tracking data generated by their Baron FasTrac. When the wind exceeds 50mph or heavy rain begins, the weather stations automatically instant messages the office and say, "Hey, look at me! Something important is going on here!"

As an essential part of your community presence, your storm van also needs to be in good running condition, especially after a hard winter. Schedule any necessary maintenance, and be sure to calibrate any onboard weather sensors. Don't forget to update any onboard software, and verify that the new software version works correctly.

Maximize Doppler radar

Preventative maintenance is the key to making sure your live Dop-



With Baron's Mobile Threat Net mobile tracking system, you can share your radar information with EMAs or give your news vehicles on-board weather data.

pler radar will perform well through the turbulent weather months. Your radar vendor can perform inspections and maintenance, catching any calibration, sensitivity and waveguide issues, at a minimal cost.

Some stations elect to share their live radar feed with local emergency management agencies. Choose a product that provides EMA offices with a weather analysis system that lets them

effectively use the radar on-air, performing sector scans and the like with ease. If you don't have command and control, ask your vendor how to get it. Changing rotation speeds, range, modes and elevation angles becomes much easier and reduces your number of trips to the radar site.

Reap the benefits

Severe weather season presents nu-



Storm vans go a long way toward establishing your identity in the community, so make sure yours is in good running condition.

storm track and remotely communicate with their spotter networks. If your station has a FasTrac display, they can instantly share information with your weather team.

If you have radar command and control in your weather center, run that through a quick test to make sure the interface is working well. That capability will help meteorologists more

merous challenges to broadcasters, but viewers will note your success. Take the time now to make sure your capabilities are operational. It can alleviate some frustration later on, and when the rewards come in, you can sit back and enjoy a job well done. **BE**

David Starnes is director of sales for Baron Services.

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EGT delivers distributed digital conversion

BY CHRIS GORDON AND SANTHANA KRISHNAMACHARI

The primary goal of digital conversion is to improve the customer experience by increasing the quantity and quality of available programming. A secondary but important objective is to improve the flexibility and cost-effectiveness of the network.

Although a full digital conversion of the last mile is perhaps years away, the core networks connecting regional headends and hubs are transitioning to digital IP networks with centralized operation centers. In a centralized network, nearly all processing is performed centrally and distributed over IP networks with affordable edge decoding supporting the analog tier. Although this architecture has the advantage of centralizing control at a single location, there remains a requirement for distributed encoding and signal processing.

Distributed encoding

Not all content is available at centralized locations. Digital tier program line-ups are comprised of national, local broadcast and local public channels. While national channels are carried by all systems, local broadcast channels originate in different metropolitan areas. Local public channels

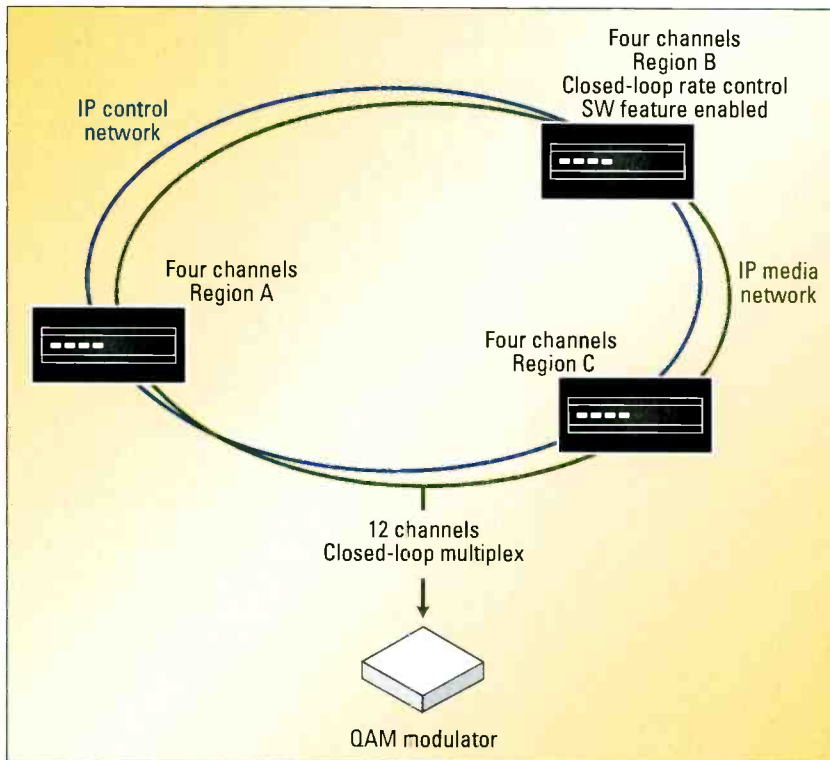


Figure 1. In EGT's distributed closed-loop architecture, the exchange of complexity/bit-rate messages and the output media traffic can be transported over a network.

Distributed encoding can be more bit-efficient. Encoding efficiency, characterized in terms of video quality, depends on many factors. Primary factors are the number of channels in the multiplex and the mix of

Digital ad insertion can also have an impact. Downstream or distributed ad insertion introduces an additional generation of re-encoding that can deteriorate video quality. By using local channels to reduce the number of ad-insertion channels per multiplex, distributed encoding offers additional flexibility for DPI load-balancing. However, the re-encoding issue still exists.

To fully optimize the network for distributed ad insertion, EGT has introduced DPI RateLock. DPI RateLock is a solution to the re-encoding problem that establishes a pre-defined bit rate for the advertising available and incorporates it into the encoding algorithm. Operators are then free to match the bit rate of the stored

Distributed encoding offers complete flexibility for mixing local channels with national channels with different priorities to achieve optimum quality.

have an even narrower viewing area and originate from multiple locations within a single system. This distributed nature of content availability requires that the encoding be distributed too.

channels chosen to form the multiplex. Distributed encoding offers complete flexibility for mixing local channels with national channels with different priorities to achieve optimum quality.

ad to the bit rate available, eliminating the re-encoding requirement and improving the quality and efficiency of the multiplex.

Open-loop vs. closed-loop architectures

There are two primary architectures for distributed encoding: open loop and closed loop. In distributed open-loop architectures, encoders are located in disparate locations and operate in an open-loop CBR or VBR mode. The outputs are transported to the aggregation location, and a statistically multiplexer via rate-shaping.

In open-loop architectures, there are at least two generations of MPEG re-encoding: the first one at the encoder and the second during the rate-shaping operation. This leads to a generational loss in video quality. In this architecture, it is necessary to ensure that the encoders and multiplexers are configured appropriately to minimize this loss.

Closed-loop architectures offer the most efficient compression performance and thus maximize the number of channels in a given bandwidth. In the past, closed-loop encoding has been synonymous with collocated encoding. However, EGT has deter-

mined that there is no underlying requirement that the encoders and the controller be collocated. The exchange of complexity/bit-rate messages and the output media traffic can be transported over a high-speed IP network, enabling distributed closed-loop architectures. (See Figure 1.)

EGT has integrated the closed-loop rate control function in the encoder, rather than in a separate piece of hardware. Apart from the obvious cost advantages, this architecture

sion project because of the basic geographic availability of sources, the need for multiplex efficiency and the desire to optimize multiplexes for ad insertion.

Embedded closed-loop control and DPI RateLock are important tools for improving the cost-effectiveness of the video network. However, as networks migrate toward IP distribution, careful consideration must also be paid to the delay, jitter and loss characteristics of the IP network.



This EGT encoder supports up to four channels of high-quality MPEG-2 encoding in 1RU and is configurable with either analog or digital interfaces.

provides flexibility. And the software closed-loop control feature enables simplified network designs, reduced sparing inventory and improved cost-effectiveness of the video network.

Conclusion

Declining costs and increasing capabilities provide new opportunities for centralization. However the need for distributed encoding remains as a prerequisite for any digital conver-

By combining intelligent system design with robust IP distribution infrastructures, operators will improve the efficiency and quality of their programming. They will also dramatically impact the operational efficiency and revenue potential of their systems. **BE**

Chris Gordon is director of product management and Santhana Krishnamachari is vice president of engineering for EGT.

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Volicon's monitoring and logging solution

BY JULIUS PERL

Video monitoring and logging is an essential function for all TV broadcasters and cable programmers. Most perform this task using traditional analog video recording systems in VHS format and archiving the tapes. Primarily, this is to comply with FCC regulations, to provide advertisers proof of airtime or to satisfy internal archiving needs. Although this system is relatively inexpensive, it takes time, lacks flexibility and is cumbersome.

Volicon has developed Observer, a digital broadcast monitoring system that enables broadcasters and cablecasters to view, monitor and share their own transmissions, as well as competitors' content, from any location using a PC and the Internet. Segments can be recorded and shared instantly via e-mail or URL.

Encoding

Efficient encoding is required to allow storage of captured audio and video for 90 days or more at an ac-

ceptable image quality while maintaining reasonable costs. The Windows Media Video 9 format, based on a modified MPEG-4 standard, was chosen because it offers superior image quality at all bit-rate levels, providing a high S/N ratio (in terms of PSNR, a reliable measure of image quality) compared with MPEG-2. This provides VHS quality at 256Kb/s to 512Kb/s, yielding 45 to 60 days of VHS-quality video storage per channel on a 250GB drive. This bit-rate range is suitable for video streaming over DSL and cable modem.

Storage

For storage, an SATA-based internal hard drive was selected over the SCSI standard (the traditional choice). SATA drives are well suited for storing compressed digital video with a price per megabyte at roughly one-third of that for SCSI.

Combined with the above-mentioned VCI encoding, the use of six 250GB internal drives provides up to 60 days of storage for a four-channel system, including RAID 5 and a hot spare drives. Ninety days is possible with eight 400GB drives.

Once the program is stored, there must be an easy and fast way to access the information. Instant retrieval is possible with a built-in search engine that searches closed-caption text.

Video can also be indexed and retrieved via the date and time of broadcast. Selected content can be "clipped" and sent to other users via the system's streaming server.

Streaming

Transmission control protocol assures firewall support and reliable delivery of the media stream by employing timeouts and retries. The unique use of a

server's storage caching and advanced buffering techniques permits a greater number of simultaneous client connections. The system can support an unlimited number of users, providing efficient transmission of real-time clips. Users can access the video from anywhere with access to the network.

User interface

The system's easy-to-navigate Web page with VCR-style controls enables the user to view single or multiple channels in real time or recorded segments. Users can toggle between windowed, split or full-screen display and move to an actual or relative timestamp based on the station's clock.

A menu bar offers various options, including Home, Clips, Programs, Preferences and Logout, where users navigate to customize which programs and channels to view and compare on the screen, create clips of segments for e-mailing or to save, and set recording times and time zones. The system's interface is based on the needs of all potential broadcast users, including creative staff, engineering, sales, traffic, engineering and corporate management.

Conclusion

Currently, the FCC has issued a Notice of Proposed Rule Making (FCC MB Docket No. 04-232) that may require the recording and storage of all broadcast programming for a period of 60 to 90 days "for enforcing restrictions on obscene, indecent and profane broadcast programming." Should this rule be adopted, stations and cable systems may be wise in complying with its requirements.

BE



The Discovery Channel uses a 32-channel system for monitoring and logging, with eight Observers (which are located at the bottom of the rack) and one WEB/SQL server (not shown). Photo courtesy of Discovery Channel.

Julius Perl is a founder and vice president of marketing at Volicon.



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Transporting SDI and HD-SDI with MRV Communications' SFP

BY SERGIU ROTENSTEIN

As high-definition television production increases, so does the demand for transporting SDI and HD-SDI signals across long distances. With transmission distances over coaxial cable limited to several hundred yards, fiber-optic transport seems the natural solution. However, the ability to use fiber-optic networks for SDI transmission is difficult and expensive due to the interface's data-scrambling algorithm.

A patent-pending small form-factor pluggable (SFP) solution from MRV Communications solves the problem. It enables the transport of SDI and HD-SDI signals using off-the-shelf optical transceivers — transforming any optical transport system into one fluent in SDI and HD-SDI.

The challenge of transmitting SDI over fiber

SDI employs a data-scrambling algorithm that may produce a pathological signal pattern — one that contains long strings (up to 20) of either zero or one bits — that is incompatible with the optical transceivers used in standard optical transport systems. The result? Broadcasting facilities have to build separate fiber-optic networks using equipment specifically designed for SDI.

The scrambling algorithm specified in the SMPTE 259M standard for transporting SDI signals over coaxial cable is meant to provide a balanced sequence of zeros and ones similar to telecom protocols. It is this balance of signal level transitions that allows a receiver to recover the clock and data. Once the receiver has captured the SDI signal, the decoder reverses the

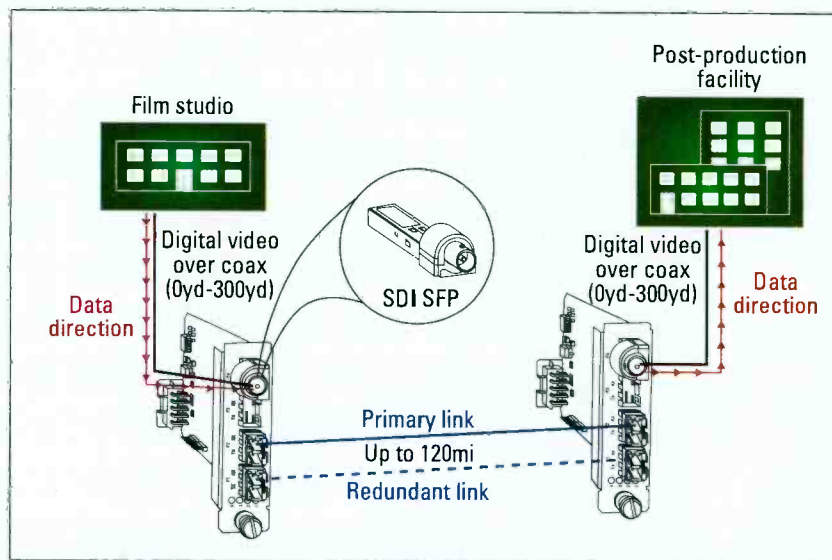


Figure 1. Shown here is a diagram of the MRV SFP workflow.

encoding process to recover the original video data.

This scrambling scheme is dependent on the level of correlation between successive bytes of information. There is no correlation between two successive data bytes in standard telecom protocols. However, SDI data has a high probability of a pattern being repeated again and again over an entire line-by-line picture frame scan. The SMPTE 259M scrambling algorithms do not compensate for such highly correlated data streams. The result is a signal pattern with long sequences of zero or one bits.

SDI and HD-SDI pathological patterns adversely affect two components of a standard optical transport system: the optical transceiver and the CDR of the transponder. A typical optical transceiver requires that the data signal transmitted to the laser diode be DC-balanced or that it has frequent transitions between

high (a digital "one") and low (zero) levels. As pathological waveforms are not DC-balanced, they negatively impact the signal-to-noise ratio and the transmission bit-error rate. Secondary effects include transmitter over-modulation, which causes intersymbol interference, and waveform distortion, which will prevent the receiver from locking onto the incoming signal.

Transponders employ rate-programmable CDR circuitry. Generally, used CDR components expect an DC-balanced signal with enough transitions to allow them to determine the clocking frequency of the incoming data signal. Pathological waveforms prevent the standard CDR from being able to perform this function. What is needed to bridge this technological gap is a solution that compensates for the pathological patterns of SDI while remaining compatible with a broad range of optical systems.

The flexible SDI SFP solution

A new solution from MRV uses the EG 34 recommendation (created by the SMPTE 259M standards body), which defines a method of selectively re-scrambling the SDI signal to create a fully DC-balanced sequence that has no pathological patterns. The process does not affect the quality of the SDI video signal as the receiver decodes and fully recovers the original information. MRV offers this capability in an SFP module. The SFP standard is an industry specification for pluggable, hot-swappable transceivers for data, voice, storage and video optical transport applications. It provides a common framework for systems manufacturers, system integrators and suppliers of SFPs.

The transceiver is comprised of a unidirectional encoding receiver and a decoding transmitter. (See Figure 1.) Plugged into an optical transport system, the encoding SFP accepts the digital video signal from the source device and rescrambles it. The now DC-balanced signal is passed off to the optical transport system, which transmits it out onto the fiber-optic network. At the other end, the process is reversed with the decoding SDI SFP transmitting an uncompromised SDI or HD-SDI signal.

The whole process remains transparent to the SDI devices, the optical transport systems and the user. An SFP-enabled optical transport system or device (transponder, converter, physical-layer switch, WDM, OADM,

sion multiplexing or optical add/drop multiplexing networks, or even across a free-space optics link.

The SFPs permit the digital video optical signal to be repeated, using available rate-specific or multi-rate

The SFP standard is an industry specification for pluggable, hot-swappable transceivers for data, voice, storage and video optical transport applications.

etc.) can seamlessly carry the digital video in a similar manner to a regular telecom protocol. And because the SFP is interchangeable, any upgrades to accommodate changes to the optical requirements of a particular SDI application can be accomplished without a swap out of the whole transponder or system. A simple swap of the optical SFP will do the job, saving both time and money.

The optical transport solution can also be used in a remarkably wide range of network applications. Once converted to a light pulse, the SDI or HD-SDI signal can be sent throughout a building or across the country via a dedicated or carrier-owned long-distance fiber-optic plant. It can also be used in existing wave divi-

peaters and transponders. They are also available in dual-speed SDI and HD-SDI coax that cover both common uncompressed digital video protocols in a single solution. With rate auto-sense and advanced performance monitoring (CRC and EDH error handling), the SFP opens the market of uncompressed digital video beyond a small, closed-vendor community.

This new solution allows the use of standard optical systems and components to transmit SDI and HD-SDI signals outside of the broadcast studio, lowering deployment costs and increasing deployment options. **BE**

Sergiu Rotenstein is vice president of MRV Communications.

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KWTV moves to digital archives with Telestream's MAPreview

BY RANDY CASSIMUS

Scrambling for tapes used to be common practice at Griffin Communications' KWTV, the CBS affiliate and only locally-owned station in the Oklahoma City market. The station recorded all programming onto VHS tapes, which involved multiple VHS tape machines going nonstop, 24 hours a day.

In addition, all newscasts were recorded onto Beta machines. This required a great deal of machine maintenance, tape handling and space to

hold the tapes. Ad-run verification alone was a time-consuming, labor-intensive effort that involved many people. When an account executive called, we had to scour our shelves to locate the appropriate air-check

tape, load and queue the eight-hour recording down to the commercial in question, view it, and dub a copy to send to the client.

This exercise cost us thousands of dollars in tape machines, mainte-

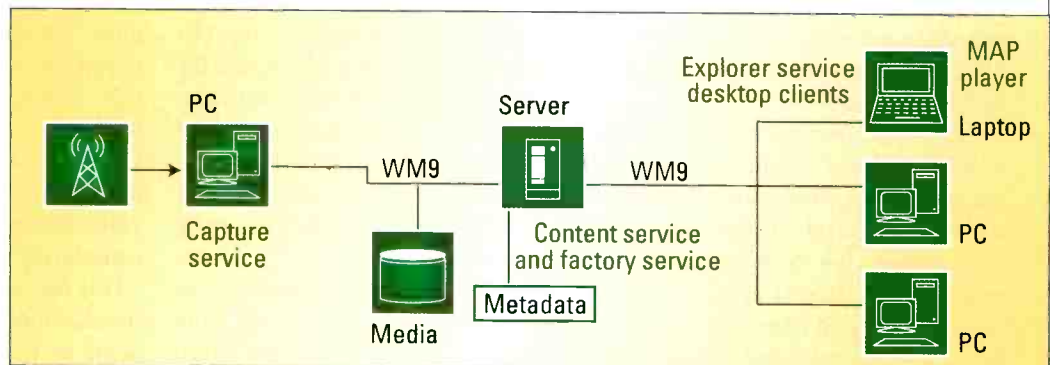
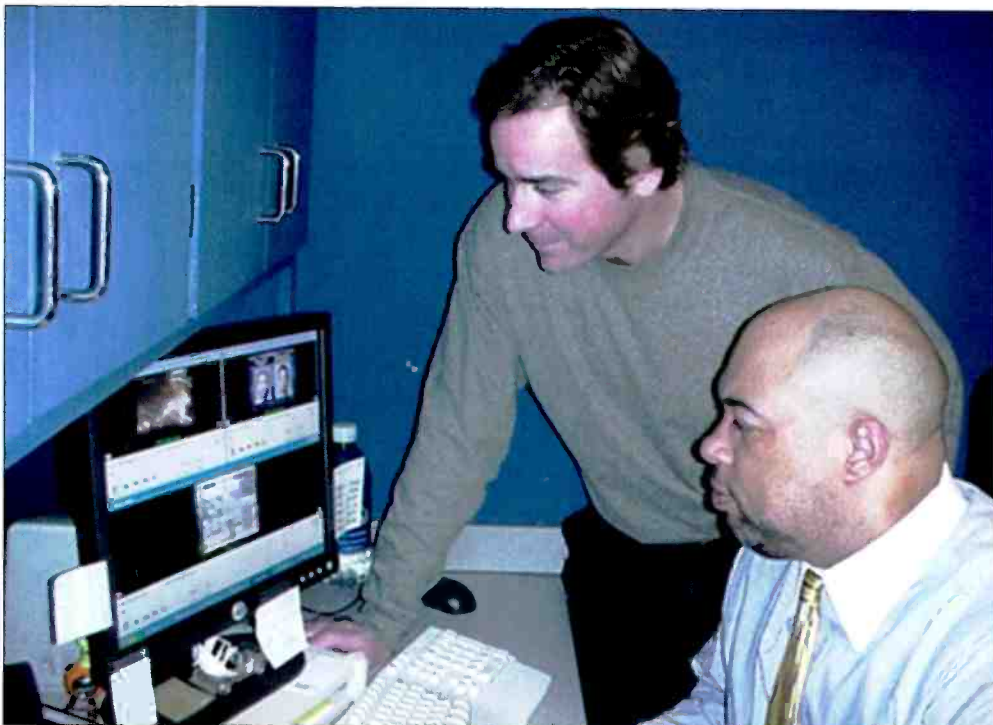


Figure 1. MAPreview automatically records multiple video feeds and captures metadata during ingest. Media are encoded and stored using the Windows Media 9 Series.



Randy Cassimus, KWTV director of production, and Blaise Labbe, news director, review three newscasts simultaneously using Telestream's MAPreview.

nance and tapes, as well as hundreds of square feet of shelf space. The station decided it was time to replace our massive tape-based archives and processes with a more efficient file-based digital archiving solution.

The solution

In April 2005, we purchased and installed the Telestream MAPreview digital video capture and logging system. The system offered just the solution we needed. Installation of the software and RAID drives and training led by

Telestream applications engineer David Piazzese took two days and went very smoothly.

The system is a server-based application that provides automatic multi-feed media recording, simple organization and easy-to-use desktop PC viewing. Metadata such as closed captioning, timecode, keyframes and as-run logs are captured during ingest, and custom metadata labels can be added. These important metadata enable efficient searching of media. We have even programmed our system to automatically display ratings data with the video every quarter-hour. MAPreview definitely makes our operation much more efficient, and it has been an important step in our migration to digital technology.

Using the new system, we now capture and archive all programming in a Windows Media 9 format onto MAP media capture servers. (See Figure 1.) The files are segmented hourly and are held for nine months for compliance with possible BMI and ASCAP audits, ad-run verification, program analysis and executive review.

We also use the system to capture and archive our competitors' programming 24 hours a day. Competitor files are held for one month and used by the marketing and news departments for strategic purposes. In addition, newscast blocks are archived in higher resolution formats for marketing use and

One of our favorite features is the ability to call up files, trim out clips from the recordings and e-mail them.

awards submission. All material is stored on RAID-arrayed LaCie drives, which total about 3.6TB of usable space.

With the new system, it's easy to organize media files and set up folders that execute intelligent tasks. Media files can be dragged, or saved from an editing application, to pre-configured folders, where tasks such as indexing, transcoding and delivery to other devices or network folders are automatically executed. The system features auto-archiving of media files onto DVD, CD or networked storage, while keeping metadata online for searching purposes.

The system also allows us to pull up our newscasts alongside our competitors' and watch all three shows simultaneously on our desktop PCs.

One of our favorite features is the ability to call up files, trim out clips from the recordings and e-mail them. For instance, remember the ad-verification scenario I mentioned earlier? Today, the account executive logs onto the system from her PC, calls up the timeframe, locates the spot, trims it out and e-mails it as a Windows Media file to the client. The production department phone never rings! **BE**

Randy Cassimus is director of production for KWTV, Oklahoma City, OK.



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Popwire's Compression Master 4.0 Mac OS X-based encoder

BY STEVE MULLEN

When I first encountered Popwire's Compression Master Mac OS X-based encoder, I assumed it was simply an alternative to Apple's Compressor that offered more advanced "expert" settings. Once I started working with the encoder, I realized that in addition to performing typical post-production compression tasks, the application has the functions nec-

essary to act as a universal standards converter. Popwire has packed the encoder with several features that support today's diverse media. These include:

- the generation of iPod A/V;
- multi-bit-rate (MBR) streaming (multiple encoder settings for bitrate and frame-rate that support — in a single encoded file — users with low-, medium- and high-bandwidth connections);
- hinted streaming; and
- metadata support.



Figure 1. 720p 8-bit uncompressed



Figure 2. MPEG-4 H.264 at 7Mb/s



Figure 3. 2-pass WM9 at 7Mb/s

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- the generation of iPod A/V;
- multi-bit-rate (MBR) streaming (multiple encoder settings for bitrate and frame-rate that support — in a single encoded file — users with low-, medium- and high-bandwidth connections);
- hinted streaming; and
- metadata support.

The encoder has a good selection of audio filters (balance, channels, fade, five-band equalizer, high pass/low pass, sample rate and volume filters). Floating-point math is used to avoid rounding errors. Video filters include: burn timecode, black and white restoration, contrast, fade, gamma, HSV levels, RGB filter, sharpen, smoothing, watermark,

Compression tasks

Compression Master is a standalone application and not a Final Cut Pro (FCP) plug-in. A plug-in provides both the simplicity of compression control from within an application

plus the advantage of not requiring the export of a movie. However, when you manually perform a QuickTime Movie export, you avoid the possibility of FCP using erroneous auto-settings.

When working with SD, you may export a DV/DVCPRO or a DVCPRO50

pressed input is not universally supported by the encoder, the optimal HD and SD solution is to export from FCP using Apple's 8-bit, 4:2:2 uncompressed codec. You do not need a RAID because you will not need to playback this movie.

When you use the encoding system as an alternative to Compressor, you begin by selecting your export movie. For my testing, this movie was an

8-bit, 1280 x 720, 29.97fps, 4:2:2 uncompressed file. (See Figure 1.)

Because Compression Master's Source Bookmarks folder is, by default, linked to the OS X Movies folder, if you export from FCP to the Movies folder, you can easily locate your file. Simply drag your movie

In addition to performing typical post-production tasks, the application has the functions necessary to act as a universal standards converter.

movie. (The latter is the optimum choice.) When working with HD, you should be able to work with QuickTime Reference movies. However, in my test of Reference movies, only the first frame of a Reference movie was compressed. Because 10-bit uncom-

pressed input is not universally supported by the encoder, the optimal HD and SD solution is to export from FCP using Apple's 8-bit, 4:2:2 uncompressed codec. You do not need a RAID because you will not need to playback this movie.

When you use the encoding system as an alternative to Compressor, you begin by selecting your export movie. For my testing, this movie was an 8-bit, 1280 x 720, 29.97fps, 4:2:2 uncompressed file. (See Figure 1.)

To use any of the dozens of presets, open the Compression Settings folder and choose the preset you need. Now drag a preset over an input file. Of course, the system allows you to drag multiple presets to an input file to create a multi-codec batch job.

For my first test, I dragged an MPEG-4, H.264 preset to my test movie. The encoder supports AVC Baseline, Mainline and High Profiles. The former two profiles support a 4:2:0 colorspace, whereas the latter profile also supports 4:2:2. Because Apple's QuickTime player does not support High Profile, I used the Mainline Profile at 7Mb/s.

Next, I clicked the Start Encoding button to begin the compression process. When compression is complete, you can play your movie, using the QuickTime Player, from within the encoder. (See Figure 2.)

Figure 3 is from a 7Mb/s, 720p HD, WM9 movie generated using a two-pass VBR peak constrained setting. Although the application has a preview function, it displays the source file or the result of applied video filters. Therefore, the lower quality of the WM9 movie was not apparent until after the encode. It would be useful if the encoder were to provide the ability to encode one GOP, or one second, of video to a RAM buffer for playback. Now one would be able to more accurately set encoding parameters.

Transcoding tasks

Video, especially HD video, is increasingly being shot at 24fps for a "film look" and/or for transfer to film. In doing so, you will likely encounter situations where 2:3:2:3 pulldown or 2:3:2:3 inverse pulldown must be applied. The encoder's frame-rate filter offers both "Telecine (23.98 => 29.97)" and "Inv. Telecine (29.97 => 23.98)" functions. Cadence detection is automatic, and cadence changes within a file are properly handled.

Although 2:3:2:3 pulldown is typically employed, 2:3:3:2 is also widely used. Unfortunately, you cannot cre-

ate a custom setting because there is no way to specify a different cadence. The filter's pulldown list needs a "Custom cadence ..." option or the option to use a 2:3:3:2 cadence.

The encoder also needs the ability to place Repeat flags within an MPEG-2 stream in order to effect

2:3:2:3 (24p carried by 60p) or 1:2 (30p carried by 60p) pulldown as well as inverse pulldown.

Because HD production is more common in the United States than in other parts of the world, Region 60 HD productions must often be converted to PAL. This task can also be



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done using the frame-rate filter. To test the conversion process, I chose the "NTSC => PAL (29.97 => 25)" option. (I would like to see the terms NTSC and PAL replaced, where ap-

fine the output image size as "PAL 720 x 576." The filter's "Maintain Aspect Ratio by" (better understood as "New Aspect Ratio by") dropdown determined how the image would be

When using the Resize filter, you have several options: Automatic, Bilinear, Bicubic, and Nearest Neighbor scaling. After processing, using the Bilinear option, I had three PAL movies.



Figure 4. Letterbox PAL DV



Figure 5. Center-cut PAL DV



Figure 6. Anamorphic PAL DV

propriate, by the more HD friendly terms — Region 60 and Region 50.) I added three Region 50 frame-rate presets to my uncompressed movie.

Now I used the resize filter to de-

resized in my test. The first movie received the "Letterbox — Pad" option; the second, the (Center) "Cut" option; and the third, the "None — Distort" option for anamorphic.

(See Figures 4, 5 and 6.)

A full set of ATSC SD sizes is not available on the Resize filter's pull-down list. You can, however, create a custom size if you need one.

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In an NTSC and PAL world, deinterlacing typically needs to be done only when transcoding video for computer use. However, powerful deinterlacing is required whenever NTSC, PAL or 1080i are used in a 720p, 1080p or

all the methods as well as specify how many times each method is executed.

Output options

Compression Master supports a wide range of formats and codecs for

minimal: G4 or better with 1GB RAM. The recommended hardware configuration is a dual 2GHz G5 PowerMac. You need to be running Mac OS X, version 10.4 or better, plus QuickTime version 7 or better. Version 4.0 is shipped as a Universal Application, so it can also be run on Intel-based Macs.

Other than the problem with QT Reference movies, V4.0 was rock-solid over many weeks of testing. Popwire's manual provides uneven coverage of the application. While the manual documents each function, it provides little in the way of guidance to the user. However, Popwire plans to add more information to the next version's manual.

BE

Steve Mullen is owner of Digital Video Consulting, which provides consulting and conducts seminars on digital video technology.

The encoder has a powerful deinterlace filter that provides a large selection of operating modes.

film production. The encoder has a powerful deinterlace filter that provides a large selection of operating modes.

When employing legacy video in HD productions, removing noise is a critical need. The encoder provides a noise reduction filter that supports three techniques: median, average and temporal. It enables you to combine

output. The QuickTime Preset provides the ability to select most, but not all, QuickTime codecs. For example, you cannot select Apple's native HDV codecs. Popwire may, however, enable HDV codecs in a release that should be available by the time you read this.

I found the encoder to be very fast on a dual G5 and quite fast on a G4 iBook. Its system requirements are

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Monitor walls

BY JOHN LUFF

Most of the technology we work with on a daily basis has changed in subtle ways over the last several decades. VTRs evolved from analog recording, to analog inputs on digital recorders, to digital inputs on digital recorders — but they still do the same job. Similarly, cameras still have lenses on the front and output analog and digital signals. However, our methods of monitoring have undergone fundamental change in the last five years. Monitoring has transformed from unitary monitors that were universally CRT-based to monitor processors outputting to inherently digital devices.

The first monitor processors appeared more than 10 years ago, not long after digital video effects became more affordable. As scaling hardware became more available and moved into consumer televisions, the professional side of the industry began looking for ways to use some of the same tools.

Today, the rich tool set available allows the design of monitoring environments, which are both flexible and can be made to adapt to changes in the signals they monitor. This has permitted several hardware manufacturers to develop new and exciting aspects to what was fundamentally a boring part of technology.

Display processor features

All multi-image display processors feature scaling engines, which adjust images in size and position, with few

boundaries. They scale the images to fit many output formats, commonly matching computer interfaces at the output today. This has been a major force in the switch from dedicated

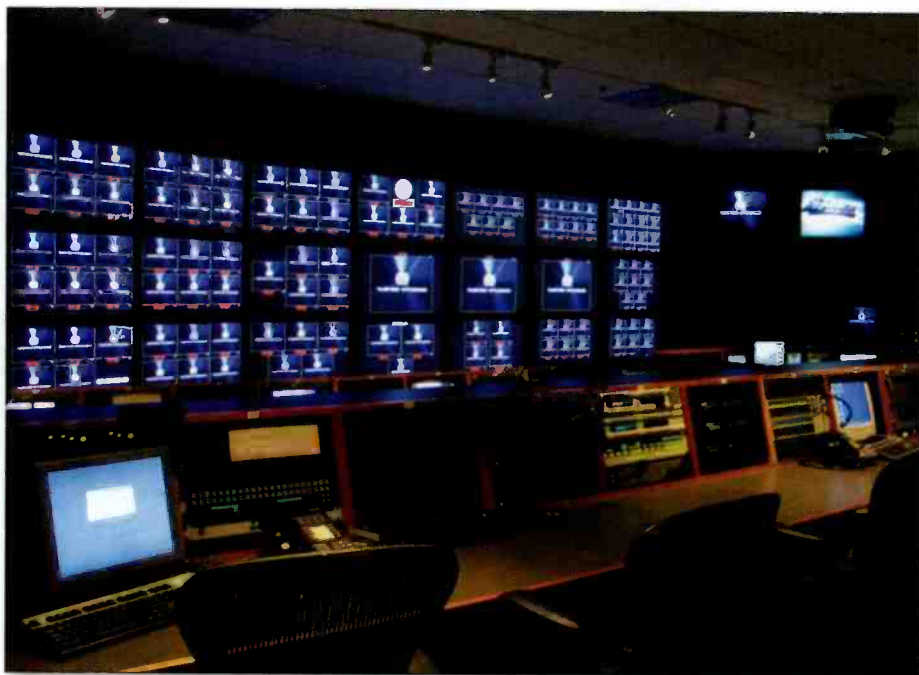
CRT displays to flat-panel LCD and plasma displays. Of course, there are limitations — primarily those related to quality issues. In the future, both displays and image processors must

Display processor functions

Today's best display processors perform a number of functions. First, they scale images to fit the output format and adjust size as appropriate and

Our methods of monitoring have undergone fundamental change in the last five years.

desired. They also allow many images to be combined into one output and insert borders and backgrounds to make the output pleasing and more relevant. In addition, they may offer



The monitor walls at Turner Studios' PCR-22 studio production control room feature Evertz MVP video processors that feed NEC color LCD displays. Photo courtesy AZCAR.

be able to replicate the resolution and colorimetry that a good CRT offers. Although at one time there was little focus on this important aspect, today many companies are developing products for such critical monitoring applications.

features that go way beyond display preparation.

One additional feature often incorporated is multiple level tally inputs. These may be triggered by simple GPI closures or may offer data connections to production switchers, routers and





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external tally processors. In many applications, this is a critical path capability. When a display monitors many sources in flexible ways, the tallies must by definition be done in the same manner before they are passed on to the display device. Although most CRT monitors did not have multiple level tally inputs, in today's production environment, it is almost a requirement that multiple levels be supported.

Signal-monitoring capabilities

With tallies, the processor often adds other ancillary data to the display of each input. This may include multiple-level audio metering, closed-caption and ratings displays. Some products, however, have added a critical signal-monitoring capability that no CRT ever offered. This can take the form of simple signal loss (audio or video), full monitoring of captioning and other inserted data, as well as levels and other more detailed parameters.

This information can be passed to the output in a number of ways. Alarms and signal monitoring can be added to the individual displays or passed to external computer monitoring to allow interaction with control systems, which need to be aware of signal status. This can lead to some interesting capabilities. For instance, Turner Entertainment uses this signal-monitoring capability as part of an automated program ingest system. When alarms are recorded for programs during unattended ingest, the data is written in a log by the automation system, which allows unattended ingest to proceed with operators checking only those sections with technical issues identified by the monitoring system. The savings in labor and efficiency are obvious.

Consider another perhaps more interesting application. By allowing the monitoring output to change when errors are found in a signal, one can give an operator more immediate access to the most critical information needed at any time. In master control, when a primary signal causes an alarm, the

system might bring the failed signal to full screen for the operator to decide if the failure is sensitive to air or not. When a station or network operations center is controlling many outputs, this allows the operator to concentrate on potential problems and spend less time scanning a wall of signals that are likely to be OK.

Large CRT monitor walls are often constructed with routing switchers or patching on the inputs of the monitors to allow display flexibility. Monitor processing engines (almost) universally allow that capability internally. They can often display 16 or more signals from a set of available inputs that is perhaps several times that many.

Large monitor wall processors allow further routing capability, with the ability to move complex outputs designed by the operator to other monitors. This also allows the duplication of a complex display in more than one place on a monitor wall for the convenience of other production personnel. In one IPTV facility, each operator can have access to each composite output. This allows supervisory positions to look over the shoulder of operators without having to get out of their chairs as often.

Conclusion

The future development of monitor processing systems could lead to many new applications. Although current designs do not allow transitions like DVE moves, if a future processor allowed that kind of capability, it would serve well for feeding some stadium spectator displays. Other public venues could benefit from the same capability. Automation of the placement and movement of individual displays, and even compositing of data and images, would create powerful new uses in broadcast and other applications. **BE**

John Luff is the senior vice president of business development for AZCAR.



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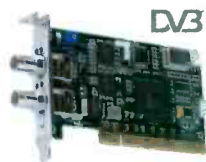
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The TTR BAYSAVER HD is a four input stand alone HD/SD routing matrix housed in a self contained small 180 x 190 x 40mm box. The standard unit comes with four Looping inputs, dual outputs and a local control panel. There is an optional RS232C control module available if required. The BAYSAVER HD has been designed to full SMPTE 292M, SMPTE 344M and SMPTE 259M specifications, and switches in the vertical interval but will switch immediately if no reference signal is present. This unit employs automatic sample rate detection on the input equalizers allowing a mixture of

HD / SD signals in the same unit. Front panel LED's indicate signal presence and control activity.

- Broadcast specification
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- Looping equalized inputs as standard
- Vertical interval switching
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- Re-clocked output

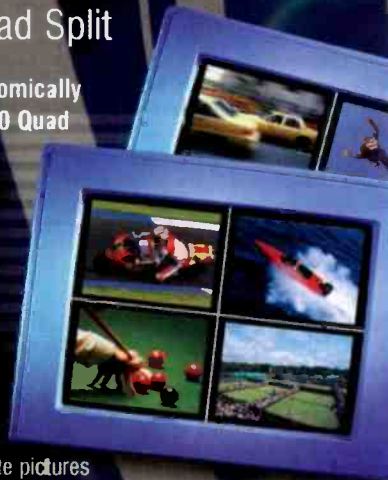
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Help Wanted

POSITIONS AVAILABLE

Front Porch Digital, the global leader in broadcast archive management, is seeking to fill several key positions to help the company meet the growing demand for its products and services.

Sales Engineering: The Company seeks to add two experienced sales engineers to its team headquartered in Boulder, Colorado. The ideal candidates will be able to demonstrate the following qualities:

- Four years experience in the design and sales of digital file based workflow solutions
- Experience with archive management, asset management / automation systems
- Overall system solution design skills based in broadcast storage infrastructures
- Strong written and verbal communications skills
- Positive references from previous customer engagements
- Though not a requirement, fluency in Spanish is desired

Systems Engineer: Front Porch Digital seeks to add an experienced System Engineer in our Mt. Laurel, NJ development facility. The successful candidate will be responsible for defining and executing system-engineering for all Company product lines. Experience within the digital broadcast environment is desired but not essential. The successful candidate must meet the following qualifications:

- Must have six years experience in system engineering responsibilities in a technical environment such as software, telecom, or product development.
- BS engineering, computer science, or equivalent
- System or project management in a technical environment
- Strong product documentation skills
- Good verbal / written communication skills
- Entrepreneurial attitude with an ability to multitask

As a rapidly growing company with worldwide operations, Front Porch Digital offers qualified candidates an exciting work environment with long-term career prospects. For consideration, please submit your resume, cover letter and salary requirements to: kkonecne@incentrasolutions.com

CHIEF ENGINEER

WAJI & WLDE have an immediate opening for a Chief Engineer. Ideal candidate would hold an electronic degree, have FCC license and SBE certification. Minimum two years supervisory broadcast position required. Knowledge of Audio Vault, Marketron and IT administration a plus. Send Resume to: C. Wendling, WAJI & WLDE, 347 W. Berry St., Suite 417 Fort Wayne, IN 46802 E.O.E. M/F

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Help Wanted

BROADCAST ENGINEER

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This position requires extensive experience with high and low power RF transmitters and related systems. Must have demonstrable skills to troubleshoot and make repairs both accurately and timely. Must be thoroughly familiar with relevant FCC regulations. Factory television transmitter training is highly desired. Minimum of an Associate Degree in Electronics Technology. Minimum 10 years of broadcast television experience. SBE certification a plus. Must be a team player and able to work under pressure.

Please send resume to David Siegler, Director of Operations and Engineering, WSOC-TV, 1901 N. Tryon St., Charlotte, NC 28206. No phone calls please. EOE M/F

Help Wanted

ASSISTANT CHIEF ENGINEER- PRODUCTION AND MAINTENANCE

Maryland Public Television is seeking an Assistant Chief Engineer to provide support in our Technology Department. The Assistant Chief Engineer will be responsible for maintaining both production and Master Control systems. Will write specifications and obtain price quotes for procurement of equipment and develop and oversee vendor relationships. Will develop a preventative maintenance schedule, organize and control inventory. Will develop and oversee staff schedules and train staff on operation and maintenance of new and existing technical equipment.

We require a minimum of 5 years of broadcast experience which must include maintenance, design and troubleshooting skills at system and component levels and at least 3 years of experience supervising maintenance personnel. Knowledge of computer/ software skills, PC maintenance, Windows based network systems, and Unix/Linux operating systems essential. A Bachelor's of Science in Electrical Engineering is preferred but equivalent experience and training in broadcast engineering may be substituted. Candidates must possess a valid driver's license, be willing to be on emergency call, and be available to work a variety of schedules that may include nights, weekends and holidays.

We offer a salary between \$51,900.00 to \$65,000.00 and an excellent Maryland state benefit package that includes Health, Dental and Prescription options and a generous Leave plan.

Email, mail or fax cover letter and resume with title ASSISTANT CHIEF ENGINEER clearly indicated to Maryland Public Television, Recruitment Coordinator, 11767 Owings Mills Blvd, Owings Mills, MD 21117 FAX: 410-581-4382 resumes@mpt.org EOE

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Are you the best broadcast engineer you know? Can you get things done on time, on budget, and with flair and creativity? Do you want to lead a terrific engineering team in building even better than the best broadcast production facilities?

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ESPN has the most technologically advanced broadcast facilities in the world. Our new all-HD Digital Center has set the standard for state-of-the-art ENG production technology. We've just broken ground in Los Angeles for our new West Coast Digital Broadcast Center and our growth continues to drive the need for more, better, and more interesting technical facilities.

What you will be doing: This executive role leads a staff of 3 Managers with approximately 20 engineers who are responsible for design and specification of 30+ meaningful projects per year and dozens of tech facilities and infrastructure improvements. You'll be asked to direct the planning, design, specification, and project scheduling for all of these projects. In other words, you'll be the principal architect for ESPN's broadcast facilities design.

What you need to have: A minimum of 10 years broadcast industry experience with broad-based technical knowledge and experience. You should have a track record of successful hands-on systems design and integration oversight, along with the demonstrated leadership skills and abilities to lead a management staff and their teams in large scale systems design projects.

You may currently be a Chief Engineer, or a Manager of Broadcast Engineering for a major market TV station...you may be a veteran of the broadcast technology industry, a senior level Customer Applications Manager for a major digital equipment manufacturer or broadcast systems integrator. Oh, and it won't hurt if you're nuts about sports, either. That's why we're here in the first place.

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VIDEO ENGINEER

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- Exp w/ troubleshooting electronic circuits down to the component level.
- Exp w/ computers including DOS, MS Windows 2K, XP, NT, Irix, Linux, and Mac OS.
- Extensive knowledge of IT Networking. A+, Network +, or MSCE a plus.
- Familiarity w/ automation, DDR's, Routers, various tape formats, test and measurement equipment.
- Minimum of an A.A.S. in Electronic or Electrical Engineering Technology or equivalent.
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Drivers for long-haul and local tractor/trailer transport from its base of operations in Chicago. Current CDL Class A license required with minimum of 3 years tractor/trailer experience.

Qualified candidates should send their resume to: Trio Video, 2132 West Hubbard, Chicago, IL 60612; resumes@triovideo.com; fax 312-421-0361.

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NAB times are a-changin'

BY PAUL MCGOLDRICK

NAB2006 is over. Most of us are back home nursing sore feet and trying to get back to a normal sleep pattern. The show was memorable for the reasonable temperatures and nice breeze in Las Vegas and for the least crowded show floors seen in a while. There were more than 105,000 official NAB badges issued, but that is not reality.

A change in the industry

The NAB show is different these days. The 1500-plus exhibitors were concentrated in the Upper and Lower South Halls, with the Central Hall looking spacious and only half of the North Hall in use; the days when it was difficult to find space in that focused audio and radio hall are over.

The industry has changed in a way that many of the larger box vendors do not understand and have not accepted. Solutions are moving from the dedicated, often elegant, black box to solutions focusing on what you can do with the software component. This is changing the kind of audience who attends the show. I would love to look at the breakdown of show visitors' occupations — something NAB is not going to let anyone outside the organization see. I would bet that more than 75 percent of the non-exhibitors are not directly connected to broadcasting.

A change in leadership

NAB itself has also changed. The reins were changed last December with the departure of Eddie Fritts. His replacement, David Rehr, is a long-time player within the Washington, D.C., Beltway, whose last gig was as CEO of the National Beer Wholesalers Association (NBWA).

I am the last person to suggest that

someone who promoted beer distribution is any less qualified to represent mom-and-pop radio and TV stations. A good CEO can probably drop into any industry slot and do well, unburdened with the past history of that business. I do wonder, however, why the NBWA Political Action Committee (PAC), which disbursed money

every election cycle (isn't "disbursed" a lovely version of "paid off with contributions?"), needed so many political favors. But Rehr's main qualification for the NAB position was that, with the NBWA PAC, he increased payouts from \$400,000 to nearly \$3 million every election.

The choice of a professional lobbyist for the NAB position is a clear indicator of where and how the organization believes it can achieve its members' targets.

What are those targets? The word broadcasting does not mean terrestrial transmission to NAB any more. NAB wants to:

- have the power to rein in satellite operators;
- make cable systems carry every kind of programming it wants to send them; and
- increase the number and type of distribution channels and platforms that can be used.

The organization also wants to send politicians the message of how important local content is — something that has already all but completely disappeared from radio and is declining rapidly in television.



I do agree, at least partially, with a comment that Rehr made in an interview: "The idea that you can walk into a Best Buy or Circuit City today and be sold a TV that will be obsolete in three years, without any warning to the consumer, is a travesty." Why limit it to Best Buy and Circuit City?

The new CEO also wants to ensure

Solutions are moving from the dedicated, often elegant, black box to solutions focusing on what you can do with the software component.

that the transition to digital broadcasting is smooth — meaning both digital TV and HD radio — and I'm sure he really understands all the issues associated with the latter. This ranks right up there with Intel High Definition Audio ...

Conclusion

NAB should seriously consider talking to its members about how much longer terrestrial broadcasting should continue in countries where the RF spectrum can be so much more efficiently used. I love RF, but how can we continue to justify the amounts of electrical power that are required, often 24/7, to deliver signals that are not being used by the majority of cable viewers?

BE

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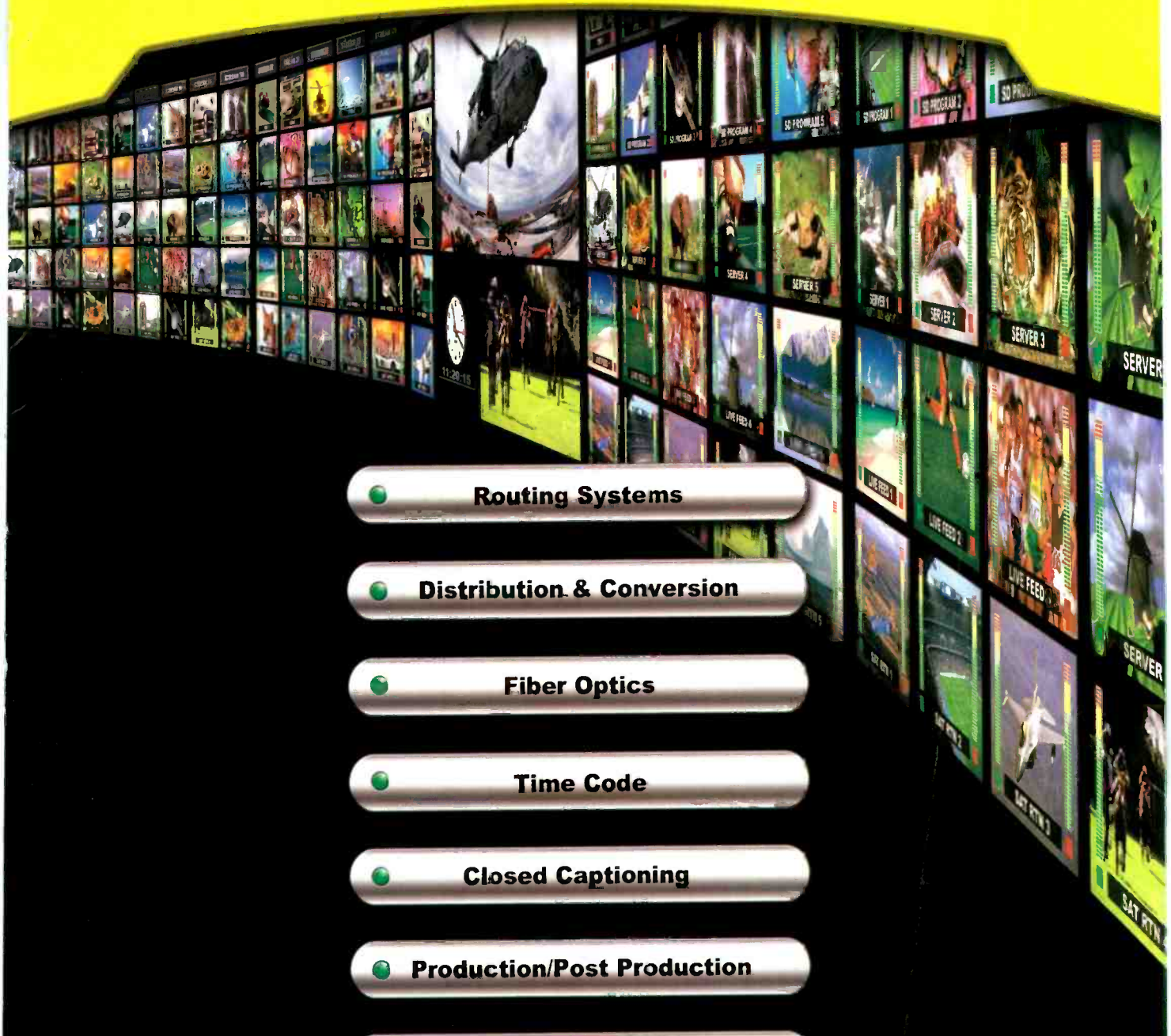
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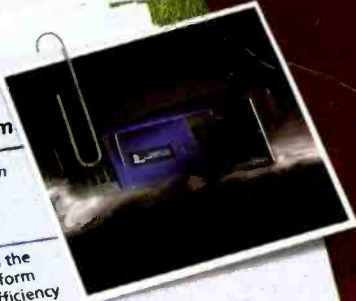
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