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APRIL 2001

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THE JOURNAL OF DIGITAL TELEVISION®

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— Craig Reeves, Audio Engineer

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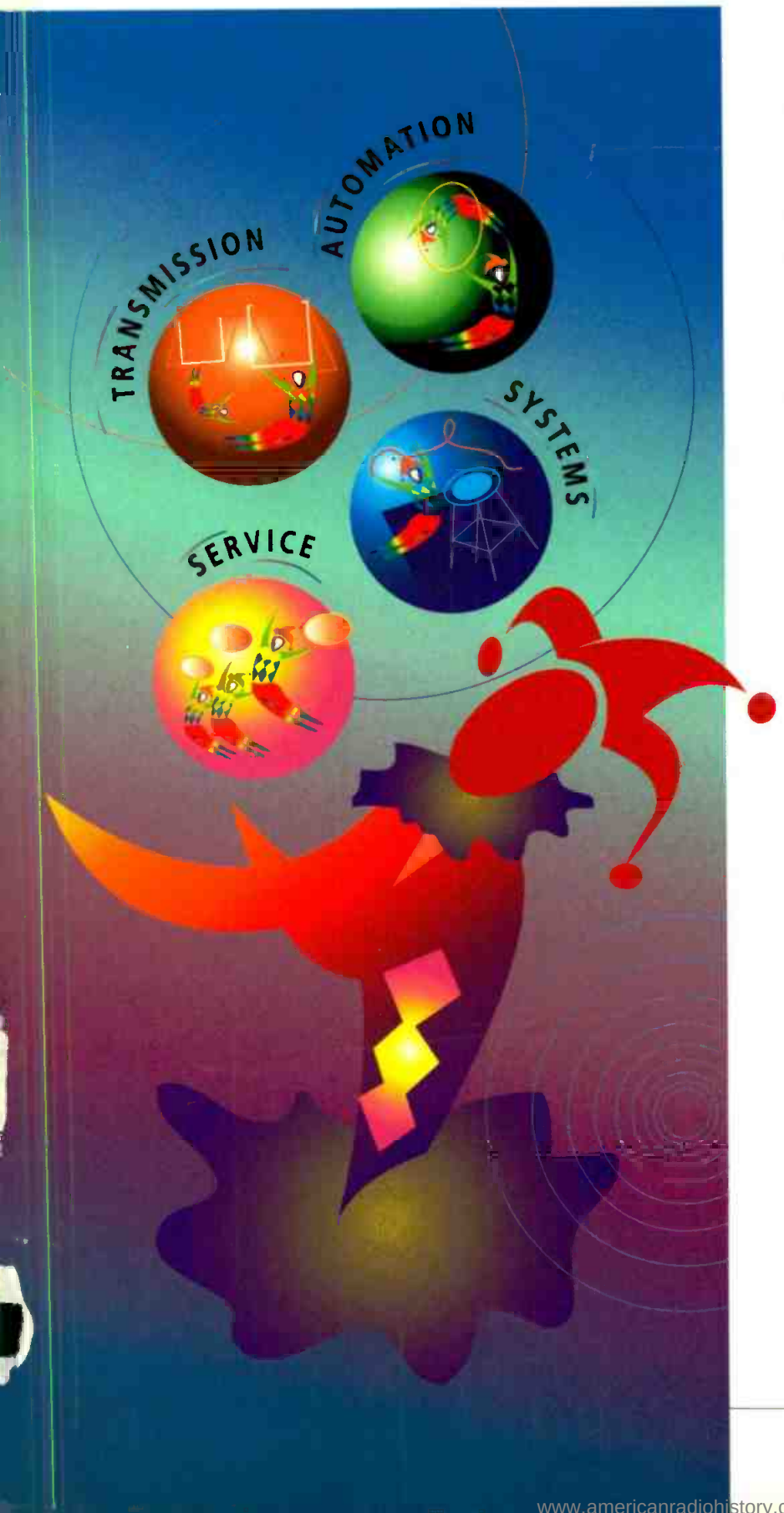

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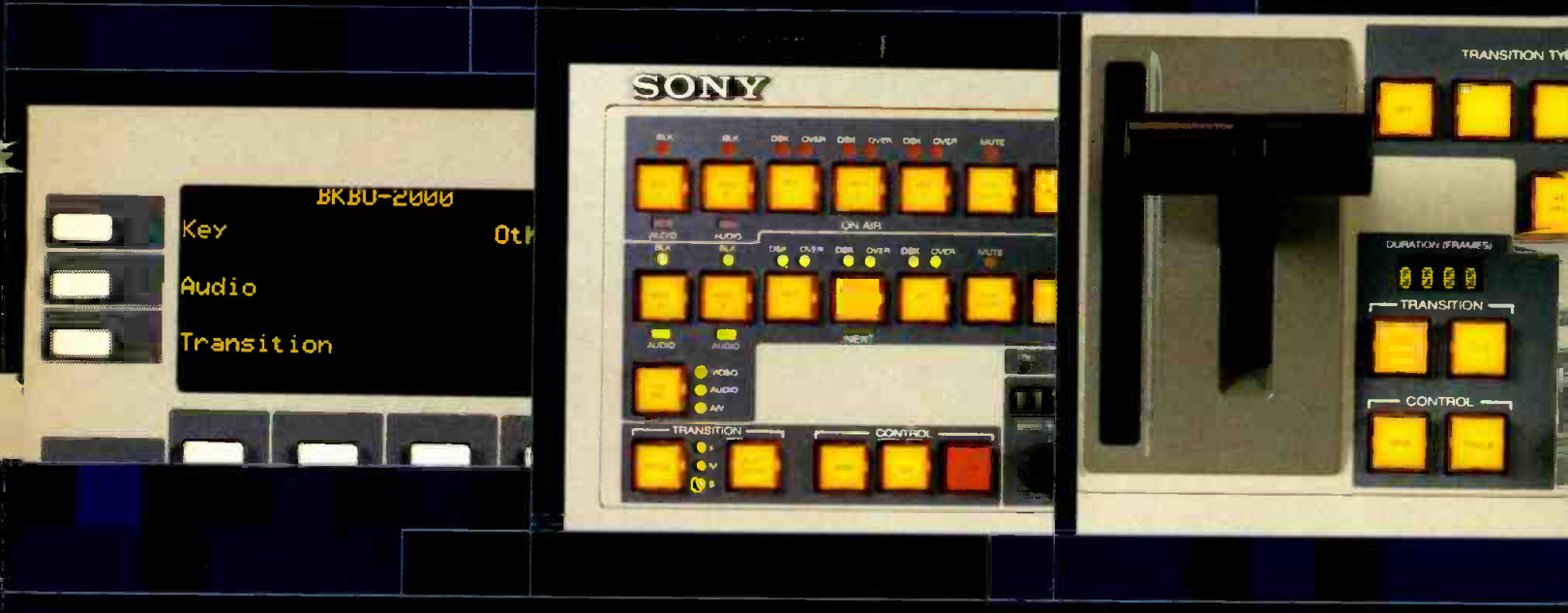

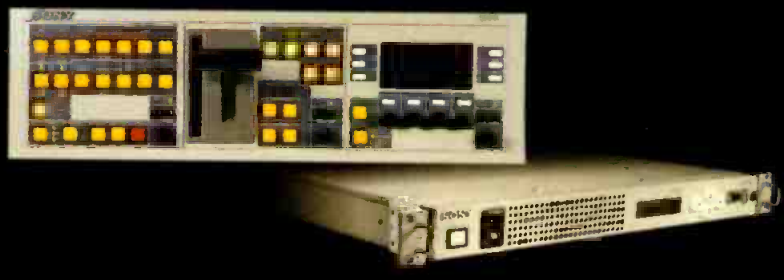

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ISARA

April 2001
Volume 43
Number 4

Broadcast ENGINEERING
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IN THIS ISSUE

ON THE COVER: The National Geographic Channel Base Camp Studio offers a street-level view of live television for passersby. The studio is visible from the street through large, partially color-corrected, double-pane picture windows. Photo by Anice Hoachlander.

Features

Beyond the Headlines

By the Numbers

Digital Handbook

(continued on page 8)

"There's nothing better..."

"DVCPRO50 clearly builds on DVCPRO25, which has been an excellent workhorse format for us. We knew how reliable DVCPRO50 would be. It's cost-effective and the quality is excellent– there's nothing better for our needs."

- Dale Kelly, senior vice president, Pappas Telecasting

When Pappas Telecasting, the nation's largest private station operator, wanted the best possible format for Azteca America, its new Spanish-language network, the choice was easy: DVCPRO50. Citing both backwards compatibility with 25Mbps DVCPRO and a clear migration path to HD, Pappas chose the award-winning format for acquisition through production. "Everything we're currently building is 4:2:2 601-based, so DVCPRO50 fits perfectly with our new network requirements," said Pappas Sr.V.P. Dale Kelly. DVCPRO50 is the world's first 4:3/16:9 production format to deliver a complete I-frame, 50Mbps, 4:2:2 studio quality production chain from field acquisition through editing to program transmission. Join forward-looking station groups like Pappas in selecting the interoperability and quality of DVCPRO50. To learn more, call **1-800-528-8601** or visit our web site at **www.panasonic.com/broadcast**.

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FREEZE FRAME

A look at the technology that shaped this industry.

Electronic cinema isn't new

The world of electronic cinema isn't as new as you might think. Name two of the first cameras shown at NAB '81 designed to emulate 35mm film-like operation. Hints: one of the manufacturers is still a key player today. One camera used t-stops instead of f-stops for exposure. Enter by e-mail. Title your entry "Freezeframe-April" in the subject field and send it to: editor@intertec.com. Correct answers received by June 1, 2001, will be eligible for a drawing of *Broadcast Engineering* T-shirts.

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For desktop video production, presentations or multimedia authoring, sounding good means using the best audio mixer you can plug into: The VLZ® PRO compact line from Mackie Designs.

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In addition to outstanding technology, Chyron's commitment to customer service is stronger than ever, including ongoing support for established products.

In the words of one customer, Chyron's Duet running Lyric Character Generator and the Aprisa Video Graphics Server "lets us push out twice as much volume - all at the high standards our viewers expect. It allows us to not only maintain quality, but also to increase it." Perhaps that's why when more and more broadcasters take a closer look at Chyron's powerful, integrated graphic solution, they like what they see.

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Editorial

Starting a new relationship

Have you ever second-guessed yourself about one of those "life decisions"? You'd done all your homework and worked things through carefully only to discover that you'd made a mistake. You find yourself unhappy, unfulfilled, alone, but there's nothing you can do. It hurts doesn't it?

You'd had some good times, sure, but you also found yourself occasionally wondering if you'd made the right choice. Could I have done better? Did I settle because it was time and it was easy to say yes? Would my life have been better if I'd chosen differently? Would I be happier if, only if?

For me that commitment was made several years ago. But, as time passed, the relationship began to sour. Things weren't bad, but they weren't good either. I began yearning for more excitement, variety ... well, you get the idea.

Soon I found myself cruising the local establishments. I told myself I wasn't really "looking," but I was. How can guys not look? You're out shopping, minding your own business, but then, across the showroom floor or on TV, that sexy model. I looked. I'll admit it. I've got eyes like every other red-blooded American guy. But I didn't act on the impulse — remember that commitment thing?

Making a significant life change isn't easy. It took me a long time to get the courage to do it. After all, decisions like these can be expensive. I spent almost a year just talking about what I was going to do. But I didn't do it. Friends even wagered that I wouldn't take the plunge. "Once bitten, twice shy," right? With one bad experience I wasn't looking to repeat that mistake.

By early fall I decided it was really time to break it off, and I did. So over the last six months I began venturing out more often, looking, but not really looking. It was the right time to make this change in my life. Even so, I was determined to not repeat the mistakes of the past. This time, before I made another commitment, I was convinced that the older-but-wiser approach would serve me well.

I played the field. In case you've been out of action for a while, let me tell you there is more variety out there than you ever thought. Times sure have changed, and anything goes today.

I even read books on this stuff. No quick decisions for me. Hours on the Internet, sometimes lurking in chat rooms hoping to learn from others' mistakes. Slow and easy, step by step.

Finally, after the holiday season, I found myself tiptoeing toward another commitment. It was frightening. Could I do this again? Would it work out or would I find myself back in that old rut — unhappy, but having made a decision and sticking with it? Would I be satisfied? Would the results be what I wanted, what I needed? Would I be happy?

I finally did get the courage to say yes. I'm convinced it was the right thing to do. I know you all wish me the best of luck. And I promise to keep you posted on how things go. The new HDTV set will be delivered next week. I can't wait. Anyone want my old set?

Brad Dick

Brad Dick, editor

Send comments to:
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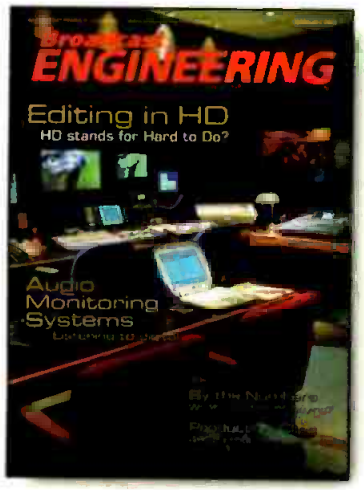
Reader Feedback



Mad about audio

I'm a student electronics engineer in Belgium. I have to make an essay about MADI. I can't find any information about it. Can you give me more information about what it is and how it works?

KIM VERBEKE
BELGIUM

From *Broadcast Engineering*'s sister publication, *BE Radio:*

MADI is an abbreviation for Multichannel Audio Digital Interface. It is a standard described by the Audio Engineering Society (AES) standards committee as AES-10 and AES-10id. With it, 56 channels of audio in the form of 28 AES-3 (AES/EBU) format signals can be sent across a single cable. (A single AES-3 channel has two channels by definition.) Its purpose is to provide a more simple means of distributing many channels of audio without the need of multiple cables or paths.

A MADI signal is transmitted via coaxial (AES-10) or fiber optic (AES-10id) cable. These signals are multiplexed — not compressed — so it is a lossless transport mechanism.

MADI is used within facilities to send many audio channels from one point to another. Many routing switcher manufacturers use MADI to connect multiple inputs and outputs to their distribution matrix. Large console manufactures also use MADI to simplify their input configurations. Some facilities use MADI simply as a point-to-point distribution method to reduce the cable requirements.

You can purchase a copy of the formal standard by contacting the company that publishes all the Audio Engineering Society standards, Global Engineering Documents, at 1-303-397-7956, 1-800-854-7179, or online at http://global.ihs.com.

CHRISS SCHERER
EDITOR, BE RADIO MAGAZINE

Need Townsend parts?

Recently a reader asked for help in locating parts for Townsend transmitters. Here's a source: Dave Compton 304-622-9622 or 304-622-9839.

Turn on the lights

I am trying to identify a light control unit associated with one of our towers. Attached is a picture of it. Do you recognize this lighting control? Can you help me locate someone who could supply parts?

JIM BARNES

The question was passed to our transmission guru, Don Markley. It took him about 20 minutes to locate the answer. The tower lighting unit is a ROHN FA2SS1, built around 1982. Parts are still available from:

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Recent Freezeframe winners

December: *"Identify the FCC chairman called both "visionary" and a "one-man wrecking crew."* The correct answer was Mark Folwer. Shame on those of you who have (or used to have) First Class licenses. Mr. Folwer was responsible in getting that license eliminated.

Correct answers supplied by:
Tom Anderson
KHQ-TV
Spokane, WA

and,

Mike Norton
Wisconsin Public Television

January: *"What (now renamed) company introduced a 7lb ENG camera at the 1976 NAB convention calling it the "Women's lib camera?"* The camera was introduced by Thomson-CSF Labs and officially called the Microcam. Fully loaded it weighed 12.5lbs. The whimsical name didn't stick for obvious reasons.

Correct answers supplied by:
Dave Kosh
Waterman Broadcasting

and,

Tom Anderson
KHQ-TV
Spokane, WA

Don't miss this month's Freezeframe question on page 8. Answering the question correctly will win you one of the newly designed *Broadcast Engineering* T-shirts and fame by being published in this magazine. ■

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News

Senate and House hold DTV hearings

BY LARRY BLOOMFIELD

A suggestion at recent Senate hearings that broadcasters need more time to transition to digital television was not well received by lawmakers. Even so, by the time the hearings concluded most agreed that a delay was inevitable. Following the hearing, Senator John McCain (R-AZ) said an extension was practically a done deal as "there's no chance in Gila Bend, Arizona" that broadcasters could make their deadlines. "You're looking at the power of the broadcasters," he told reporters. "I guarantee you there will be (an extension). I can assure you they have sufficient clout to extend these deadlines."

There was exasperation in McCain's voice over what he perceives as industry foot-dragging. The Senator's tenacity on this issue is somewhat more tempered recently and he has said on other occasions that extensions in the process would come as no surprise. Other senators who give the impression that they too are tiring of the digital TV novella have joined him.

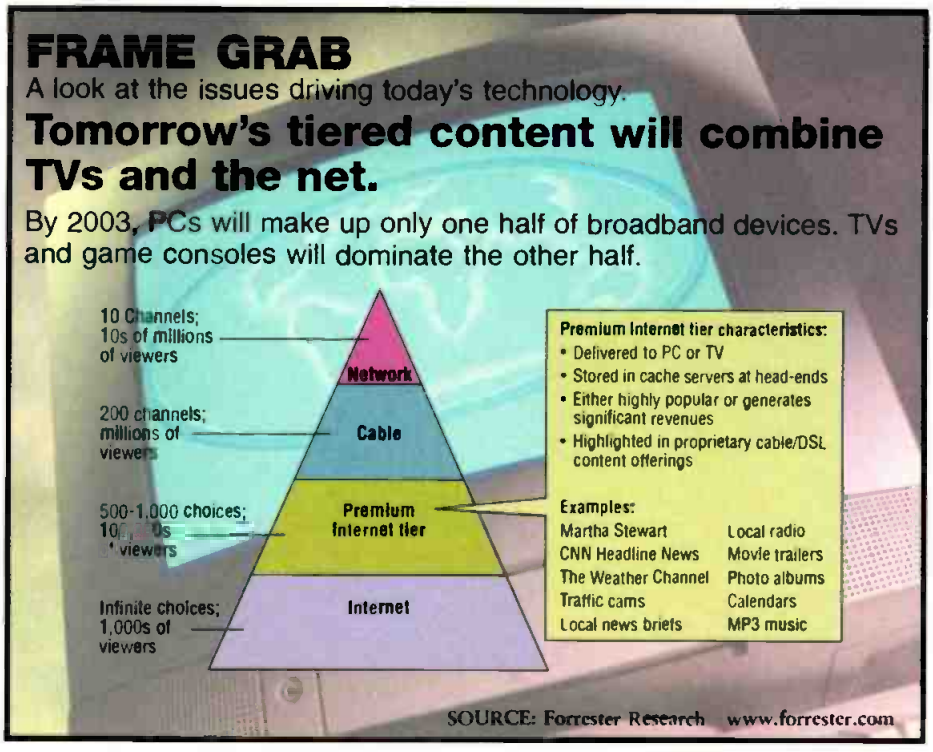
Remember, it was McCain who did not want to allow broadcasters to have the extra channels they need to facilitate the switch to digital TV, calling it a $70 billion giveaway, preferring instead to auction those frequencies to the highest bidder.

"You're looking at the power of the broadcasters. I guarantee you there will be (an extension)."

The Senate is not the only body that shows movement on the deadlines for auctioning the returning spectrum. The FCC has postponed the channels 60-69 auction and the Bush budget anticipates that an auction for channels 52-59 will also have to be rescheduled.

Not to be outdone, the House Telecommunications Subcommittee headed by Rep. Fred Upton (R-MI), held a similar hearing just two weeks later on the same subject with an emphasis on the views of private industry. The message to the House Subcommittee was a reprise of the earlier Senate hearings.

Neither of the lawmakers' hearings produced any suggestions or replacement time schedules for the DTV turnaround, but with an expected $7.5 billion in spectrum sales by 2011, they're not likely to let it slip too far. ■



Hollywood's HD sneak attack

Copyright, probably Hollywood's biggest fixation, hasn't as yet gotten the press in the digital era that other issues have received. It is a topic of gargantuan proportion at the studios and among producers, and it is slowly becoming an issue that will affect the entire television industry.

Hollywood has settled, for the time being, on HDTV as a distribution standard to theatres. There is no question that 35mm film is capable of better quality than what HDTV has to offer. However, the argument has been made from a financial standpoint that if in the estimation of consumers HD is of roughly the same quality as 35mm film and costs less, it is still a viable alternative.

This is an important topic to broadcasters, but for different reasons.

At first blush there doesn't seem to be a problem with carrying movies on cable or satellite. However, in negotiations over the past few months the studios have been pressuring the cable and satellite companies to decrease the resolution of high-definition digital video, lowering the quality of service (QoS) so there is less incentive for the consumer to copy it. Studios defend their actions in the name of "copyright protection."

Hollywood executives and producers see the exchange of music on the Internet as a pattern that relates to their industry as well. Most motion picture studios have strong ties with the music recording industry and their fears of digital-content swapping were not alleviated with Napster's agreement to start charging for music downloaded online. If anything, the horror of copyrighted music being spread freely around the world via the Internet has fueled fears among movie executives, who see digital video as next in line.

Hollywood is taking no chances. The Motion Picture Association of America (MPAA), which represents the Hollywood studios, is waging a quiet war in negotiations with distributors of its products to prevent the "Napsterization" of digital video and the perceived ruination of their multibillion-dollar industry.

It is important to think of the implications that this whole issue generates. People who pay from $3000 to $15,000 for a digital TV expect to see every pixel their set is capable of displaying and, should they choose, be able to delay watching the programs by recording them on their digital VCR.

The Supreme Court decided the personal use recording issue in 1984 when it ruled in favor of the consumer in Sony vs. Universal Studios. Now, the MPAA would have us all turn back the clock and revisit these issues. "There is no technology other than downres-ing [reducing resolution] to protect it from being copied and retransmitted on the Internet," says MPAA vice-president Fritz Attaway.

"There is no technology other than downres-ing to protect it from being copied and retransmitted on the Internet."

"Downresing" is nothing new. One Hollywood engineer recalls "At the O&O [network owned and operated station] where I worked back in the 1980s, just after installing our new second generation color cameras, we were told to cut back on the resolution because the new equipment showed up all the imperfections on the face of one of the high-priced news anchors when makeup wasn't able to easily cover them."

Michael Petricone, general counsel for the Consumer Electronics Association countered, "They aren't trying to preserve, but to cut back the rights consumers have had for 20 years to record video — so as to make even more money." Jim Burger, attorney with the Washington media law firm of Dow, Lohnes & Albertson, said, "The idea that improvements in technology have to stop so that Hollywood doesn't have to change its business model is crazy. Looking for perfect protection in the digital age will put you in a loony bin. What they should be looking for is a reasonable balance between making money and making life easier and better."

The MPAA dipped into its bag of statistics saying Hollywood loses $250 million annually in the U.S. due to video piracy and the figure is $2.5 billion a year, world wide. MPAA also claims digital technology will permit video pirates to make pristine copies even down several generations because picture quality doesn't degrade with each copy made as it does with traditional videocassettes.

Representative Rick Boucher (D-VA.), recently commented that "The public is going to be pretty incensed that the quality of programming they were promised isn't delivered."

Despite all this, Hollywood has gotten the ears of at least twelve Capitol Hill lawmakers who as recently as this March, sent a letter to FCC Chairman Michael Powell asking for his support on the digital TV copy issues that would restrict otherwise free over-the-air content.

The two-page document has some rather familiar signatures: Rep. W.J. "Billy" Tauzin (R-LA), chair of the powerful House Commerce Committee, and Rep. Fred Upton (R-MI), chair of the House Telecommunications Subcommittee, Rep. Edward Markey (D-MA), Rep. Cliff Stearns (R-FL), Sen. Barbara Boxer (D-CA), Sen. John Breaux (D-LA), Sen. Fritz Hollings (D-SC) and Sen. Ted Stevens (R-AK), and all members of the House or Senate Commerce Committees.

Lawmakers have said that without copy protection, the foundations of over-the-air broadcast would be threatened,

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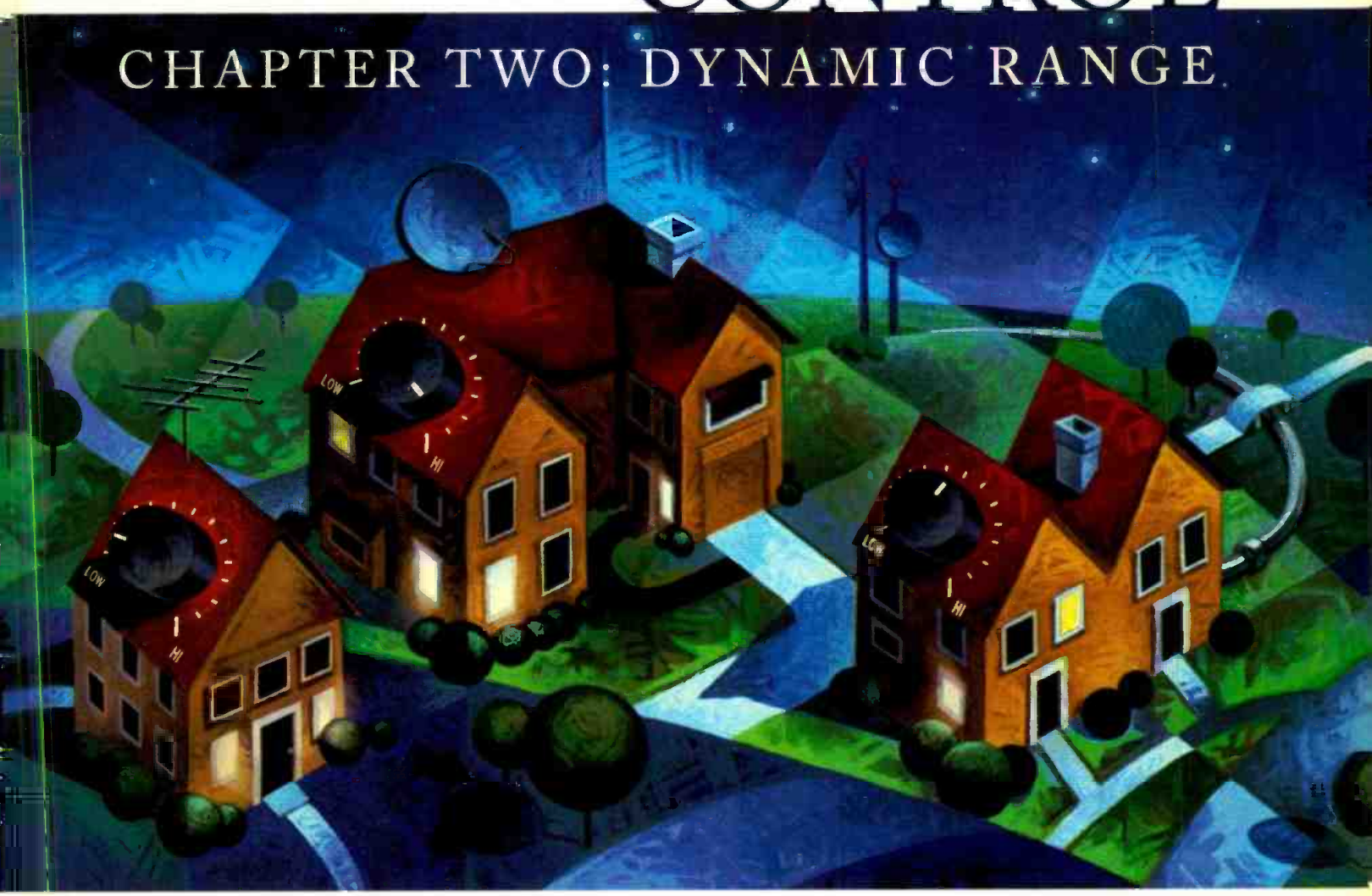
CHAPTER TWO: DYNAMIC RANGE



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since content providers would be reluctant to sell to broadcasters, turning to cable instead, which is based on paid subscription.

"Congress has a long-standing commitment to free, over-the-air television," the letter stated. "And for good reason: Millions of American households, particularly those that cannot afford subscription-based services like cable and satellite, continue to rely on free-over-the-air television for their entertainment and news information."

Despite this, Powell has strongly intimated that the issue of copy protection should be resolved on Capitol Hill and not by the FCC.

In what appears to be an important victory for the entertainment industry, both Disney and Fox have argued that it is not enough to only protect cable programming. The dichotomy is that most of the studios also have serious, deep-rooted interests in television, owning entire networks, not to mention a significant number of television stations. Not all Tinsel Town executives are singing the same song, however. Sony and Warner Bros. have indicated they would accept copy protection that covered cable programming and not broadcast.

Where does this leave us? Despite the millions of dollars each television station has or will have to invest in the digital television rollout, until these and other issues are resolved, TV set manufacturers will remain in limbo because there is no licensing agreement in place. ■

Superconductor breakthrough

As broadcast equipment becomes more sophisticated, especially in the digital domains, the speed at which information is transferred, processed, etc., through the equipment itself, becomes a very important factor. With computer processors that drive broadcast equipment today operating in the Gigahertz range, what good does it do if the remainder of the infrastructure works considerably slower?

Superconductors will go a long way in resolving this issue. Earlier this year, researchers led by Dr. Jun Akimitsu of Aoyama Gakuin University in Tokyo achieved a significant milestone when they announced that magnesium boride, a readily available metal compound known since the 1950s, has unexpectedly turned into the latest breakthrough in superconductors technology.

Magnesium boride is commonly used in some chemical reactions, but no one had ever tested its worth as a superconductor at low temperatures, where it demonstrates properties of moving electrons with virtually no resistance.

After hearing about Dr. Akimitsu's discovery and working with the substance, Dr. Paul C. Canfield, a professor of physics at Iowa State University and a researcher at Ames Laboratory said: "It's a fantastic discovery! We've been able to do a lot of neat stuff with it in the past month."

The material is very light and, from reports, is easier to work with as compared with the more complex superconducting materials such as the copper oxides, a so-called high-temperature superconductor. The more complex superconducting materials work at higher temperatures, but magnesium boride is comparatively inexpensive, selling for about $175 per 100-gram bottle.

Dr. Canfield said he and his colleagues at Iowa State and Ames Laboratory have worked extensively investigating magnesium boride and have already fashioned superconducting wires by exposing fibers of boron to magnesium vapors. At present, though, the wires are short; only couple of inches long, and brittle. Dr. Canfield said: "It's not something you can curl around your finger."

But then, who'd want to curl it around their finger? Magnesium boride, as a superconductor, is such only at temperatures up to minus 389 degrees, or about 29 degrees higher than any other simple metallic compound. Although not the solution, it is being hailed as a significant step in that direction, so stay tuned. ■

Send questions and comments to:
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FCC moves on cable caps

The U.S. Court of Appeals has thrown out Federal Communications Commission (FCC) restrictions on the number of subscribers cable operators can serve.

The ruling specifically addressed regulations that limited cable companies from serving more than 30 percent of all cable and satellite subscribers in the U.S. Additionally, the court threw out restrictions that prevent cable systems from carrying affiliated programming on more than 40 percent of their channels and sent the rules back to the FCC.

"The horizontal limit interferes with petitioners' speech rights by restricting the number of viewers to whom they can speak," Judge Stephen Williams wrote for the court. "The vertical limit restricts their ability to exercise their editorial control over a portion of the content they transmit."

The court's ruling is a plus for such cable companies as AT&T Broadband, the nation's largest. The panel also struck down an FCC rule that required that subscribers served by Time Warner Entertainment, or TWE, in which AT&T is a limited partner with AOL Time Warner Inc., be counted against AT&T's ownership limit. That rule pushed AT&T over the 30 percent limit when it merged with the MediaOne Group, forcing AT&T to divest either its stake in TWE or in the Liberty Media Group.

Where this is seen as good news for AT&T and other cable companies, consumer groups see the elimination of such limits as bad news. Many believe that the ruling provides greater incentive for cable companies to limit programming choices to their own programs instead of providing the wider array of programming consumers may want.

This U.S. Court of Appeals action may have far reaching effects, setting a precedent that could open the door for future revisions to the ownership "caps" on broadcast television stations, a heated issue in broadcast circles. ■

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FCC Update

Multiple ownership rules clarified

BY HARRY C. MARTIN

In January, the FCC released a decision addressing 14 petitions for reconsideration dealing with the new TV duopoly and cross-ownership rules.

The new TV duopoly rule, effective in November 1999, permits an entity to own two television stations licensed in the same DMA if: (1) the grade B contours of the stations do not overlap, or (2) one of the two stations is not ranked in the top four by Nielsen and at least eight independently owned TV stations (including NCE-TV stations) would remain post-merger.

The new radio-TV cross-ownership rule, adopted at the same time, permits an entity to own up to two television stations (if permitted under the TV duopoly rule) and any of the following radio station combinations in the same market:

(1) Up to six radio stations in any market where at least 20 independent "voices" would remain in the DMA post-merger ("voices" are radio or TV stations, daily newspapers, cable systems or radio stations with reportable Arbitron shares in the DMA).

(2) Up to four radio stations in any market where at least 10 independent voices would remain post-merger.

(3) One radio station (AM or FM) notwithstanding the number of independent voices in the market.

(4) In those markets where the rule will allow parties to own eight outlets in the form of two TV stations and six radio stations, a party can own, alternatively, one TV station and seven radio stations.

Dateline

Radio stations in the following locations must file their biennial ownership reports on or before June 1, 2001: Arizona, DC, Idaho, Maryland, Michigan, Nevada, New Mexico, Ohio, Utah, Virginia, West Virginia and Wyoming.

Duopoly rule

The revisions to the TV duopoly rule drew the most fire, with petitioners seeking reconsideration of the amended rule's requirements regarding (1) geographic scope, (2) the requirement that at least one of the stations being acquired not be among the four highest-ranked stations in the DMA, (3) the requirement that eight independently-owned stations remain in the DMA after a merger, and (4) the policy, also adopted in 1999, that waivers of the duopoly rule would be considered only in cases of failed, failing or unbuilt stations.

Petitioners argued that common owners would not run the same programming on multiple stations in the same market, and therefore would not hurt diversity. The Commission rejected that argument, but addressed the question of how to resolve a tie for market rank. In such cases, duopoly applicants will now have to submit detailed tie-breaker information on audience share.

The Commission also acknowledged that its decision to require eight broadcast TV stations remain in the market was an exercise in line-drawing. However, the Commission said that it was a justified approach because the line was drawn in a way that preserves a reasonable balance of efficiencies and robust diversity in a market.

However, the Commission relaxed its duopoly rule so that it only will count as among the eight market stations those stations whose Grade B signal contours overlap with the Grade B contours of at least one of the stations in the proposed combination. The intent of the modification is to prevent common ownership in geographically large DMAs where one party could own two overlapping stations even though most of the stations in the DMA do not serve the area served by those two. A similar rule will apply to media voices. The only television stations that will be counted toward the eight stations that need to remain in the market are those that are independently-owned and operating full-power stations within the DMA of the TV station's community of license which have Grade B signal contours that overlap with the Grade B signal contour of one of the TV stations involved in the merger.

The Commission reaffirmed its decision not to permit the transfer of a duopoly unless it adheres to rules or waiver standards in place at the time of the transfer, and continued to allow common ownership of two TV stations if they are licensed to communities in different DMAs, even if their Grade B contours overlap.

Cross-ownership rule

The recent order also reaffirmed the Commission's earlier decisions to (1) count noncommercial stations and daily newspapers as voices in a market, (2) to grandfather radio and TV combinations previously formed pursuant to a waiver, and (3) to prohibit the transfer of a radio/TV combination unless it meets a waiver standard.

LMA issues

The Commission also affirmed its earlier decision to grandfather television station LMAs entered into before Nov. 5, 1996, through the conclusion of the 2004 biennial review. It rejected the requests that it allow existing LMAs, especially grandfathered LMAs, to convert to duopolies. The option will not be extended to existing LMAs because, although the parties to existing LMAs may have had reasonable expectations of being able to maintain an LMA entered into before the Commission expressed an unequivocal LMA policy, those same parties have no such reasonable expectation of automatic conversion to duopolies. ■

Harry C. Martin is an attorney with Fletcher, Heald & Hildreth PLC, Arlington, VA.

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Powell's FCC: Let the private sector decide

BY MARK R. SMITH

With George W. Bush now at home (finally) and starting his wild ride from the White House, change is obviously in the air within the federal government, and it's not all about tax cuts and campaign finance reform.

One change that's already taken place is at the Federal Communications Commission (FCC), where fellow Republican Michael Powell, who had served as a Commissioner, succeeded Democrat William Kennard as chairman earlier this year.

Aside from finding a successor to soon-to-depart Commissioner Harold Furchtgoth-Roth as well as to Powell's old seat (both of which will be filled by Republicans), his FCC is in the midst of "internal reform efforts" slated to make the organization "more efficient, more decisive and more responsive," said a recent press release, to the whirlwind changes in the technology and telecommunications markets.

That's nothing too mind-boggling since people were expecting some political-speak right after a change in presidential administration. But they're also hoping something breaks concerning technical deadlocks that have plagued the broadcast industry. Externally, there are a number of issues on the table these days, notably concerning digital broadcast standards and cable must-carry.

New man in charge

One Washington industry source who requested anonymity remarked that there's no question Michael Powell has a different agenda than William Kennard.

"Powell will be more reactive than proactive in responding to issues," the source said. "Kennard clearly had a social engineering agenda in terms of trying to adopt government mandated free time for politicians and launching a ban on hard liquor advertising (which he eventually dropped). But I think Powell will be much more cognizant of political sensitivity, in terms of how Congress reacts to what he does. He'll keep them in the loop. One of Kennard's problems was not consulting with Congress before proposing some of his activist agenda."

Cable and commercial broadcasters are digging in for a long hard fight.

Powell is already cultivating support from key members of Congress who can provide him political cover, agreed Ken Johnson, spokesman for Congressman Billy Tauzin's office (R-LA) who is the head of House Energy & Commerce Committee.

Johnson said Powell would be "much less of an activist chairman. His core philosophy involves letting the markets work as freely as possible. I don't think you'll see him meddling in the private business of companies like his predecessors, Kennard and Reed Hundt. Powell recognizes that the FCC is answerable to Congress and not the White House."

DTV, or not DTV

The first source said Kennard did nothing to advance the DTV agenda and noted that Powell has already asked for Congressional direction on the issue. Today, the number of finished DTV installations stands at 185, including most big four (ABC, CBS, Fox and NBC) affiliates in the top 30 markets.

Powell offered what must have sounded like words of encouragement in a recent news conference, saying that the FCC will "do whatever it takes to clarify the legal and regulatory environment" so that concerned private sector businesses can "continue to make investments."

Michael Petricone, vice president of technology policy for the Consumer Electronics Association in Arlington, VA, said he thinks the FCC has been supportive of DTV. "The train certainly hasn't derailed from our perspective. DTV sets are selling at a clip that's in line with historical sales of other new consumer electronics products when they were introduced to the market." Those figures reveal that 625,000 digital sets worth $1.4 billion were sold in 2000, five times the amount from 1999.

The one thing that would be helpful, he said, is more content. "The vast majority being broadcast on digital stations is still upgraded analog, which is limited by the resolution of the source material. That's not a big consumer draw. Consumers want the best quality and, save CBS, it's slim pickins'."

With the May 2003 deadline for all stations, commercial and public, to go digital, the problem isn't that the industry hasn't been on the ball, Petricone said, but technical issues that have caused problems -- cable systems not carrying the digital signals being an example. Also, many DTV sets sold lack a DTV tuner.

Still, he sees a rosy horizon, noting a 40 percent price drop in the last year and a Zenith set on the market for less than $1000. "I suspect you'll see further reduction as the year goes forward, if history is any guide. And as price drops, functionality rises."

Cable must-carry

The FCC has tentatively concluded that cable operators are not required to

carry the digital signals of broadcasters. But that's still a top telecommunications issue Congress will be confronted with, with the cable and commercial broadcasters digging in for a long hard fight.

One observer said that he sees no problem with cable must-carry "since the cable industry is rolling out digital channel capacity on a rapid timetable. There's no evidence to suggest must-carry would be a problem. Cable operators would prefer carrying channels in which they own a financial stake, as opposed to local broadcast channels in which they don't."

But only a handful of cable systems are carrying the digital signals of local broadcasters at present, he said, adding that two-thirds of all viewing on a cable system consists of local broadcast channels.

It's key that cable companies cooperate, Petricone added, pointing out that 70 percent of viewers get their signal via cable.

But the folks at the National Cable Television Association in Washington don't see it quite that simply. "For broadcasters to presume entitlement to a privately built infrastructure is inappropriate, especially when they bring nothing new to the mix," stated Marc Osgoode Smith, senior communications director. "The physics don't lie. And if there's a legal mandate to carry programming that has yet to draw the attention of consumers, then certain networks and services like high-speed Internet, telephony and new digital video channels already on the market won't make it."

"If our customers want all of these signals, it would be competitive suicide not to carry them," he bluntly continued. "The government should not force an unknown business plan down the throats of consumers who are already enjoying the fruits of these new services."

Powell would be "much less of an activist chairman. His core philosophy involves letting the markets work as freely as possible."

Smith added that broadcast networks are the predominant owners of cable programming, citing the example of CBS' corporate ties to Viacom and its MTV Networks, and Disney's ownership of ABC and its cable properties like ESPN and the Disney Channel.

Where will it end

"Consumers are stuck in the middle of an ongoing fight between broadcasters, cable operators and manufacturers. They all have different agendas," observed Johnson. "But even consumers who aren't tech savvy understand that we're in a tech shakeout. No one wants to get stuck with a first-

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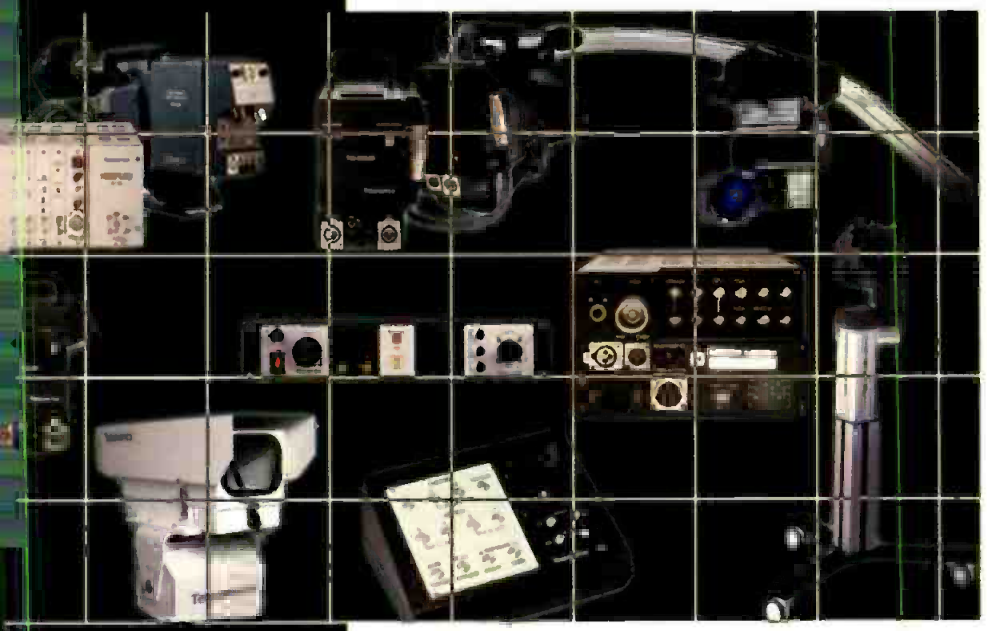

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generation digital set that's outdated in sixth months."

Programmers are reluctant to provide content, manufacturers build fewer sets and consumer scratch their heads. Where will it end?

No one knows, but Johnson still offered his long-term forecast. "This century, a TV should not be the centerpiece of our home entertainment center, but the centerpiece of our home information center.

"We're trying to get everyone moving in the same direction. Congress is making stations go digital, yet there's no business plan for them to make money. It's like Doublemint gum, but you don't double your pleasure, you double your expense. And now they don't know if they can get the digital signal on cable besides." ■

Mark R. Smith is a freelance writer and has covered broadcasting and post production for a decade. He resides in Odenton, MD, and can be reached at msmith1277@aol.com.

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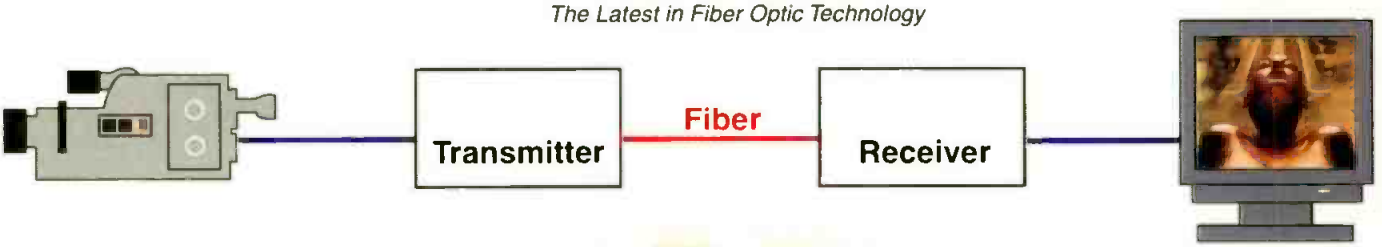

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By the Numbers

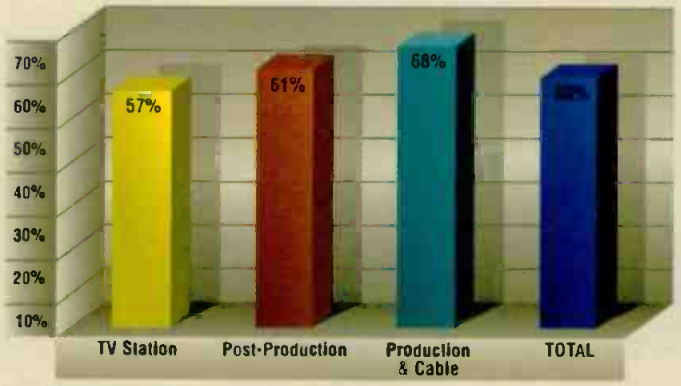
BY BRAD DICK, EDITOR

In Part 2 of our series looking at industry spending plans, we examine the state of editing technology. The data in this report was gathered from *Broadcast Engineering* readers in late winter.

The field of editing is one area in which old habits die hard. I was recently in one of the largest TV network newsrooms in Japan. In that one room, I counted more than 100 Sony decks assembling news clips by the old punch-and-crunch method. Why not use NLE? For their particular application, VTR editing is reliable, well understood and relatively inexpensive. Who can argue with that? So what are the NLE plans for our U.S. readers?

Who has NLE capability?

Production and cable facilities rank highest in terms of NLE usage. However, there's not a lot of difference based on the type of facility. Television stations rank lowest in terms of NLE capability, running at 57 percent, and post production houses barely higher at 61 percent. The production and cable locations show the highest current usage of NLE at 68 percent. Combined, 60 percent of all types of facilities report having NLE capability.

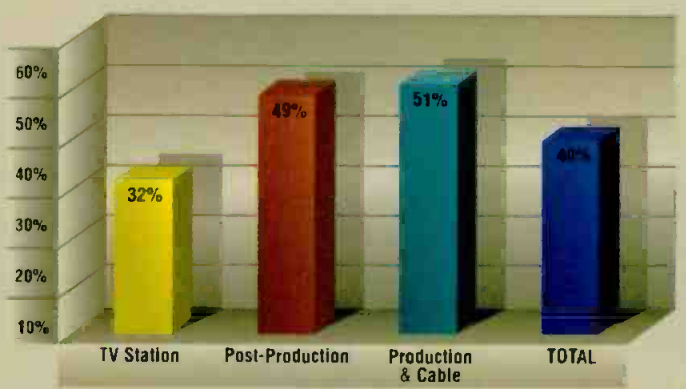


Adding new NLE this year?

Respondents were then asked about their plans to purchase NLE technology in 2001. A disappointing 32 percent of television stations report any plans to buy additional NLE capability this year. Looking at the other side of this equation, almost 52 percent of the TV stations said they would not be adding NLE technology this year. Sixteen percent did not answer the question.

The numbers are much better for production, cable and post facilities. About 51 percent of the production and cable facilities report that they will be buying new NLE hardware this year. About the same percentage of post houses, 49 percent, say they plan to add to their NLE equipment lineup in the next nine months.

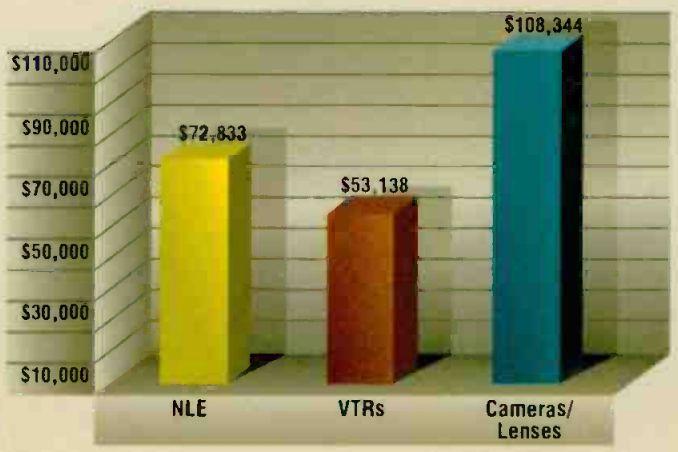
Looking at the overall response, almost 49 percent said they would not buy NLE equipment this year. Twelve percent of the respondents did not answer this question. So, is NLE hot? I think not.

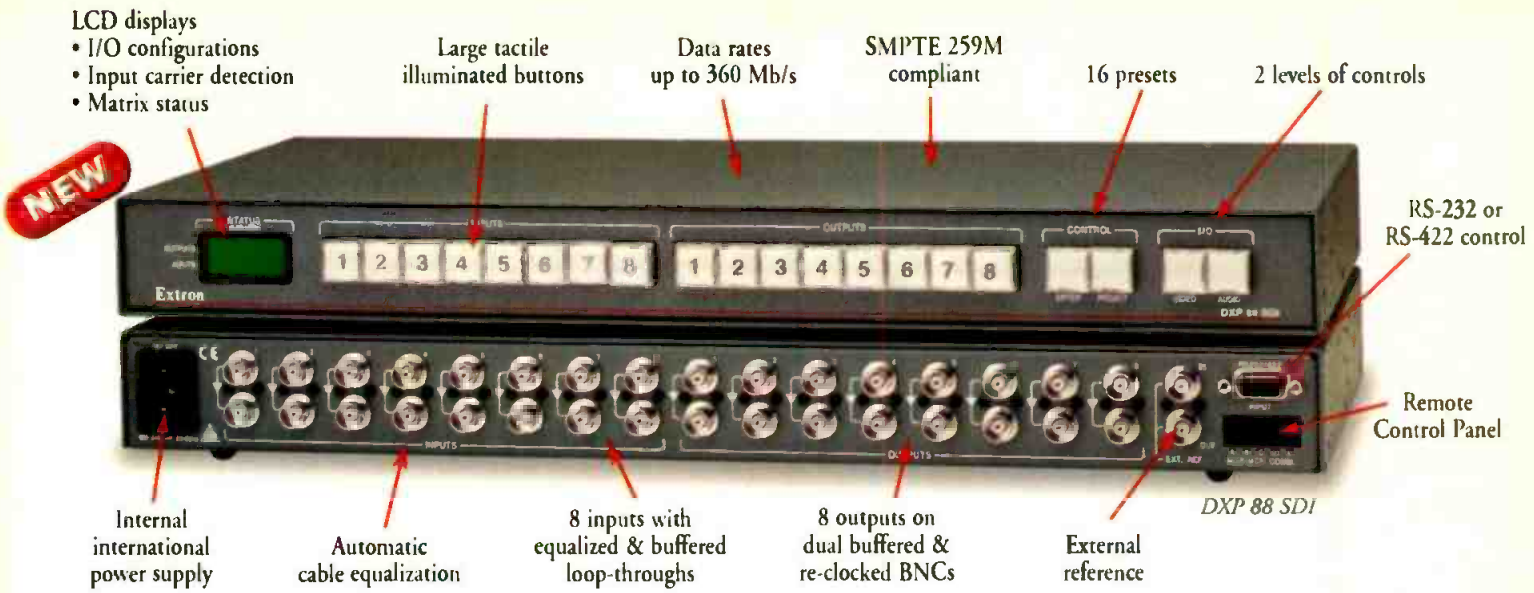


How much will you spend?

It's hard to know whether the answer to this question is good or bad news, at least as a measure of industry health. The survey asked for predicted equipment budgets for seven classes of equipment. It turned out that spending for NLE was the second highest, led only by planned spending on cameras and lenses.

Predicted spending for NLE equipment this year is $72,833. That will buy you a lot of software packages, or a small but full-featured newsroom or production system.





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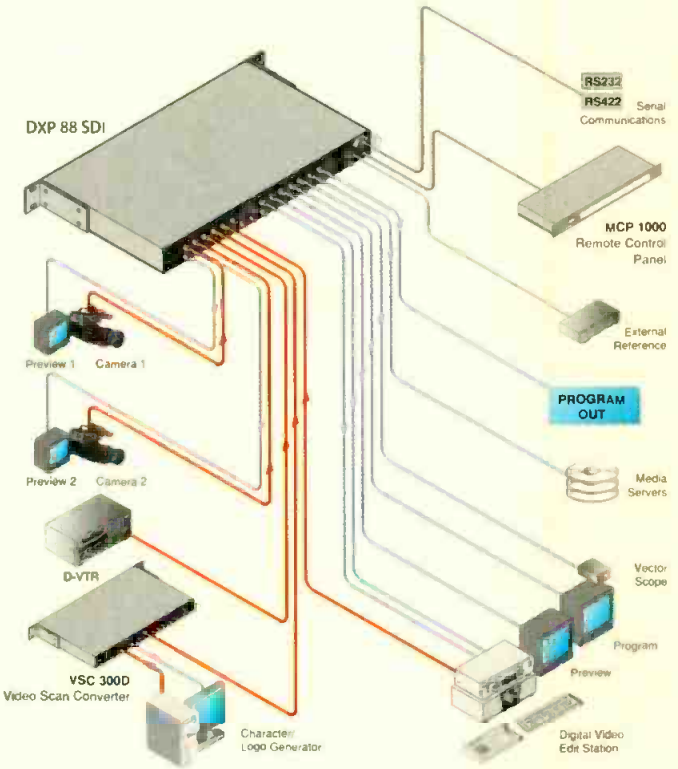

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Transition to Digital

HDTV data multiplexing, Part 2

BY MICHAEL ROBIN

This article is a continuation of our March HDTV data multiplexing article. It will deal with audio data multiplexing in the horizontal ancillary data space (HANC).

General considerations

The most important use of the HANC data space is for the insertion of audio signals. SMPTE Standard 299M, 24-Bit Digital Audio Format for HDTV Bit-Serial Interface defines the mapping of 24-bit AES digital audio data and associated control information into the ancillary data space of HDTV signals conforming to the SMPTE 292M standard.

For intrastudio applications the preferred implementation is an audio sampling rate of 48kHz synchronous to video. As an option the standard supports AES audio synchronously or asynchronously sampled at frequencies in the range of 32kHz to 48kHz. Audio is defined as being synchronous with the associated video if the sampling rate is such that the number of audio samples occurring within an integer number of video frames is itself a constant integer number.

The standard provides for the embedding of a minimum of two audio channels (one audio pair) to a maximum of sixteen audio channels (eight audio pairs). The audio channels are combined, where appropriate, into groups of four (two audio pairs). Each group is identified by an ancillary data ID.

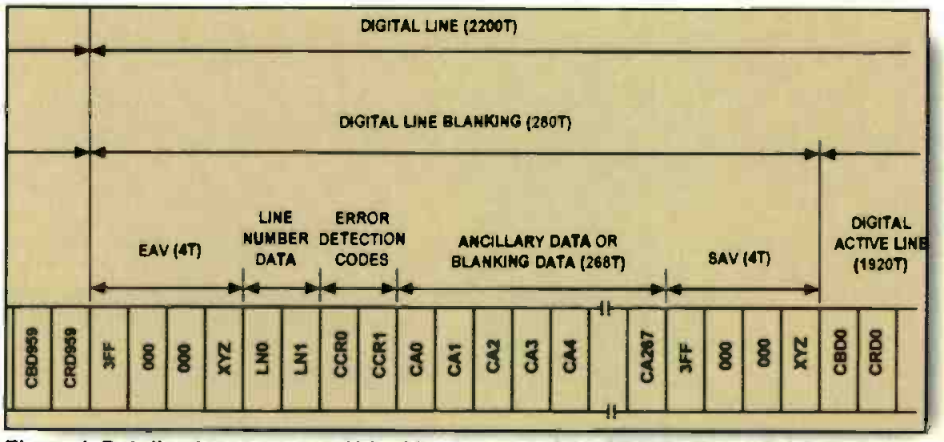

Figure 1. Details of the horizontal blanking interval of the CB/CR bit-parallel datastream.

The horizontal blanking interval

Figure 1 shows details of the horizontal blanking interval of the C_B/C_R bit-parallel datastream of a source format D (1920x1080i). In this format the total line duration is 2200 samples of which 1920 are active line samples. This leaves a total of 280 samples during the horizontal blanking interval. Excluding the TRS (EAV and SAV), line number and error detection leaves a total of 268 unused words to be used to transport ancillary data. The structure of the horizontal blanking interval is as follows:

- EAV: End of active video TRS consisting of four words: 3FF,000,000,XYZ;
- The line number data: Two words LN0 and LN1;
- The error detection codes: Two words CCR0 and CCR1;
- Ancillary data or blanking data: 268 words identified as CA0 to CA267;
- SAV: Start of active video TRS consisting of four words: 3FF,000,000,XYZ.

The audio data packet

Figure 2 shows the structure of an audio data packet. Audio data derived from two channel pairs (two AES data streams or four individual audio channels) are configured as an audio data packet consisting of:

- ADF: Ancillary data flag consisting

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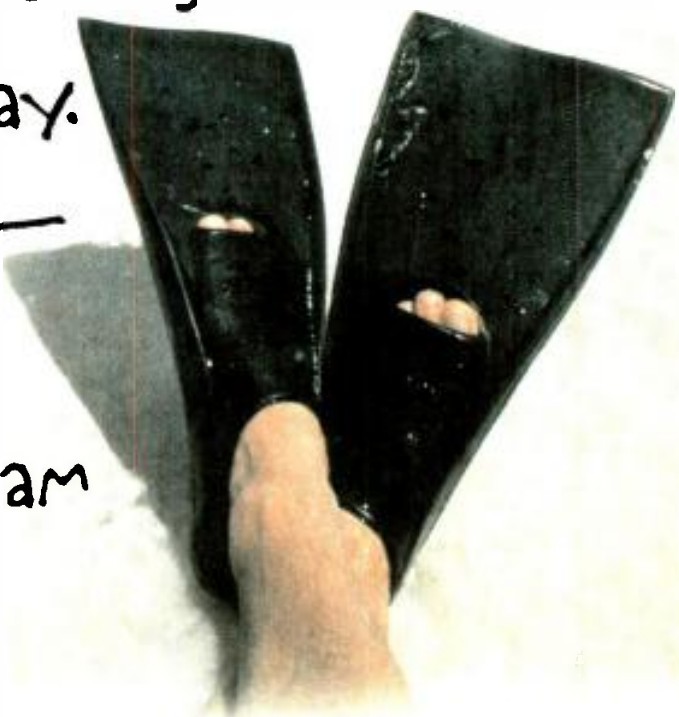

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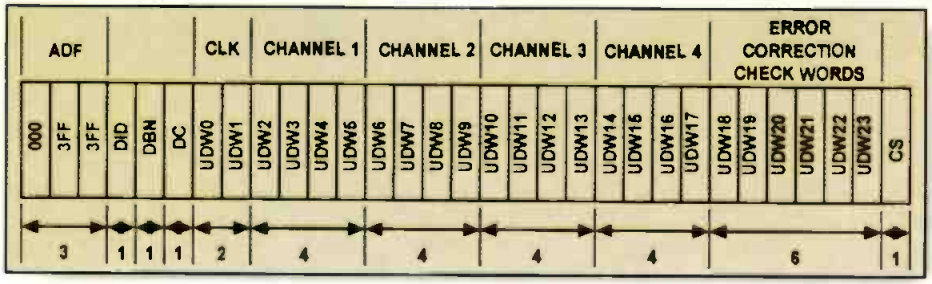

Figure 2. The structure of an audio data packet.

of three words 000,3FF,3FF;

•DID: One data identification word. Value depends on the respective audio group;

•DBN: One data block number word;

•DC: One data count word;

•UDW: 24 user data words UDW0 to UDW23;

•CS: One checksum word.

The UDW consists of three types of data:

•CLK: Two audio clock and phase data words UDW0 and UDW1;

•CHn: 16 words UDW2 to UDW17 identifying the four audio channels of a group;

•ECCs: Error correction codes consisting of six data words UDW18 to UDW23.

Embedding the audio packets

Audio data packets are multiplexed into the HANC data space of the C_B/C_R bit-parallel datastream with the exclusion of the line right after the switching line to avoid possible audio clicks. In the 1125/60 format the switching point exists in lines 7 and 569, hence the audio data packets are not permitted on lines 8 and 570. Figure 3 shows the manner in which an audio packet is formatted from two AES datastreams (e.g. 1 and 2). The audio of each channel consists of 29 bits as follows:

•AES audio: 24 bits;

•V: One validity bit;

•U: One user bit;

•C: One channel status bit;

•P: One parity bit;

•Z flag: One bit common to the two channels of the pair derived from the preamble of the AES datastream.

As shown, the 29 bits of each channel are embedded into four 10-bit words. Table 1 shows the typical manner in which the 29 channel bits are embedded in four 10-bit words, in this example UDW2, UDW3, UDW4 and UDW5. This representation is for one audio data packet carrying four audio channels from AES/EBU datastreams 1 and 2. Carrying 16 audio channels requires an additional three audio data packets containing, respectively, data from AES/EBU datastreams 3 and 4 (four channels), 5 and 6 (four channels) and 7 and 8 (four channels). Each group of four channels is identified by the DID word.

Table 1 Typical Bit-assignment of Audio data
(Reference Figure 2 and 3)

Bit Number	UDW2	UDW3	UDW4	UDW5
b9 (MSB)	not b8	not b8	not b8	not b8
b8	even parity (1)	even parity (1)	even parity (1)	even parity (1)
b7	aud 3	aud 11	aud 19	P
b6	aud 2	aud 10	aud 18	C
b5	aud 1	aud 9	aud 17	U
b4	aud 0 (LSB)	aud 8	aud 16	V
b3	Z	aud 7	aud 15	aud 23 (MSB)
b2	0	aud 6	aud 14	aud 22
b1	0	aud 5	aud 13	aud 21
b0 (LSB)	0	aud 4	aud 12	aud 20

NOTES
(1) Even parity for b0 through b7
(2) Z = AES block sync
(3) U = AES user bit of channel
(4) P = AES parity bit of channel
(5) aud(0-23) = 24-bit AES audio data of channel
(6) V = AES channel status bit
(7) The value of V, U, C and P is equal to that of the respective AES subframe

Table 1. Typical bit assignment of audio data. (Reference Figures 2 and 3.)

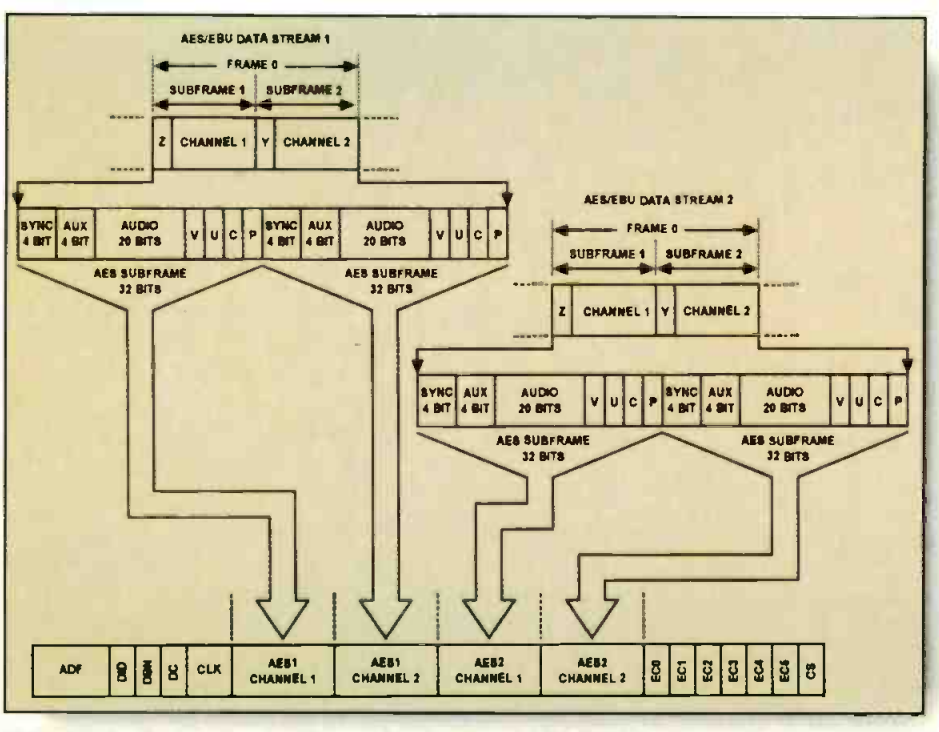

Figure 3. Audio data packet formatting from two AES/EBU datastreams.

Embedding of audio control packets

Audio control packets are multiplexed into the HANC data space of the Y bit-parallel datastream. They are transmitted once every field in the second line after the switching line, respectively on lines 9 and 571. The audio control packet contains data used in the process of decoding the audio datastream. Figure 4 shows the structure of the audio control packet.

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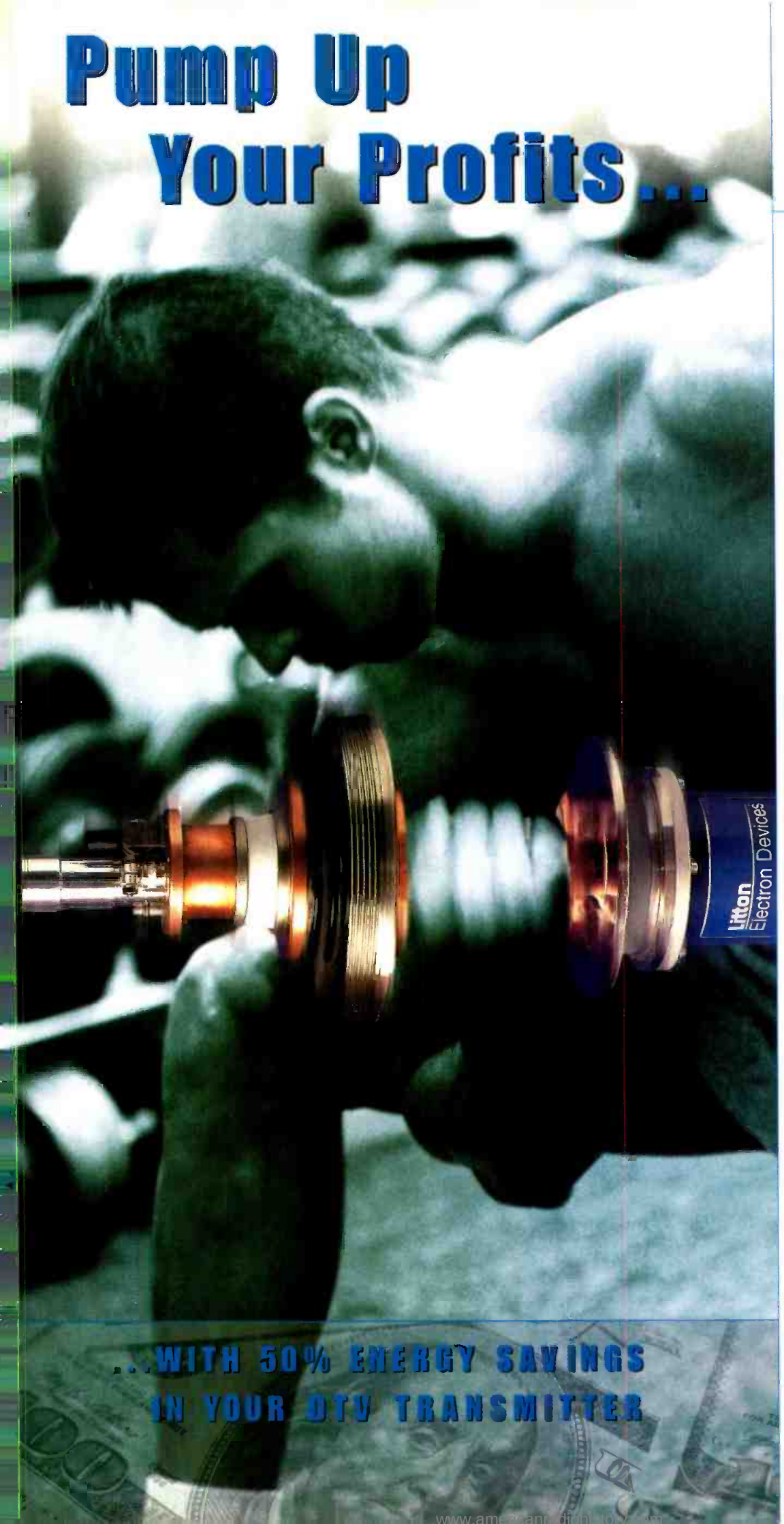

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It consists of:

•ADF: Ancillary data flag consisting of three words 000,3FF,3FF;

•DID: One data identification word. Value depends on the respective audio group;

•DBN: One data block number word;

•DC: One data count word;

•UDW: Eleven user data words UDW0 to UDW10;

•CS: One checksum word.

Conclusion

HDTV audio embedding as described in the SMPTE 299M sets the standard for future studio applications which require at least six audio channels (5.1). In this example we have described the manner in which audio is embedded in a 1920x1080i HDTV format. Other formats described in the SMPTE 292M Standard have different horizontal blanking structures and the audio embedding will differ somehow from the example discussed here. As in SDTV embedded audio applications there is always the possibility of getting audio clicks with live source switching, so an enlightened decision needs to be made whether to embed or not to embed. ■

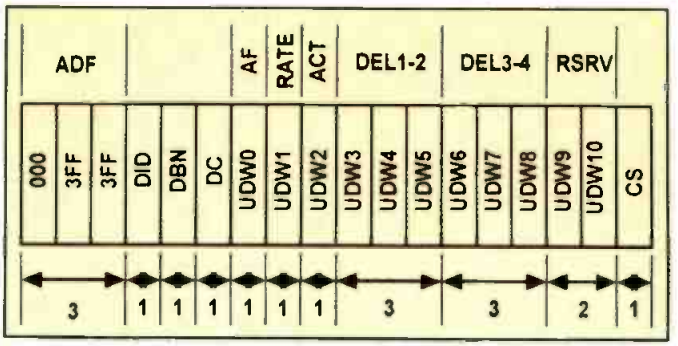

Figure 4. The structure of an audio control packet.

HDTV audio embedding as described in the SMPTE 299M sets the standard for future studio applications that require at least six audio channels.

The UDW consists of five types of data:

•AF: Audio frame number data;

•RATE: Sampling rate;

•ACT: Active channels;

•DEL *m-n*: Indication of the amount of accumulated audio vs. video delay;

•RSRV: Reserved for future use.

Michael Robin, former engineer with the Canadian Broadcasting Corporation's engineering headquarters, is an independent broadcasting consultant in Montreal, Canada. He is the co-author of Digital Television Fundamentals *published by McGraw-Hill.*

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Cable and wiring for LANs

BY BRAD GILMER

There has been a definite increase in the amount of networking technology installed in television facilities around the world. The reasons for this are clear. Over the last three years, network speeds have increased by a factor of ten. Technologies on the horizon promise another tenfold increase in 18 months or so. At the same time, consumer demand for these technologies has driven the prices down dramatically. 10Base-T hubs are now in the $20 range, 100Base-T hubs can be had for $125, and Gigabit Ethernet hubs are now available for around $1500. This low-cost, high-speed network technology has moved networking into the fast lane.

Basic topologies

Ethernet is by far the most common technology in use today. Fibre Channel and ATM are also finding their way into the television plant. While Ethernet and Fibre Channel are used widely within a facility, with a few exceptions, ATM is generally employed to connect one facility to another.

There are four basic topologies employed in computer networks today. These are point-to-point, star, Thinnet, and switched fabric.

Point-to-point

Figure 1 illustrates point-to-point topology where each node is directly connected to the next without any intervening hardware. The most common systems using this topology are fiber channel arbitrated loop (FC/AL) and token-ring.

Point-to-point topology is low-cost, but it has a big drawback. It is subject to many single points of failure. Since each computer is connected to the loop, a failure of any cable, any computer, or any network interface card can cause all computers to be unable to communicate. A common way to deal with this problem is to employ two loops. Another way that designers deal with this problem is to move to the star topology depicted below.

Star

Figure 2 illustrates star topology where each node is connected to a hub or concentrator. This is the basic building block of most Ethernet deployments. It is also used in Fibre Channel networks when designers want to protect the user from the problems described above.

A disadvantage of star topology is its somewhat higher cost. A big advantage of this topology is that all most all hubs can isolate a faulty node so that this connection does not affect other computers attached to the network.

Over the last three years, network speeds have increased by a factor of ten, with another tenfold increase in 18 months or so.

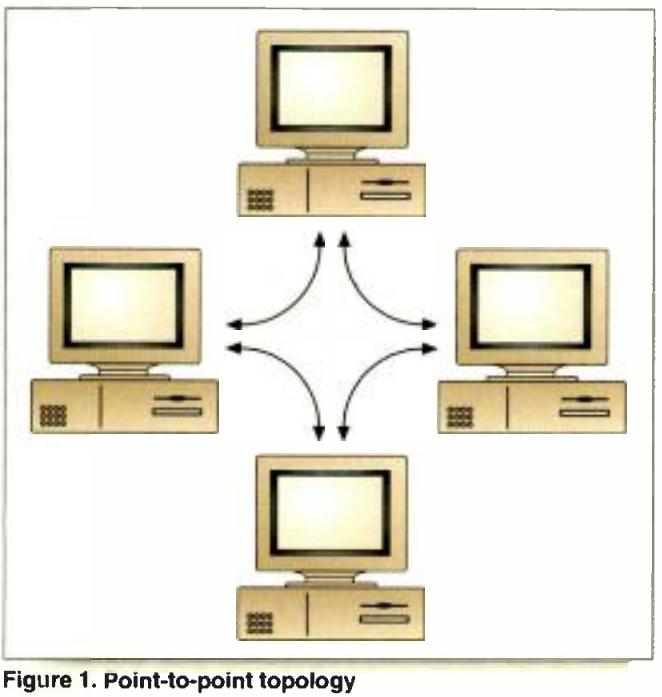


Figure 1. Point-to-point topology

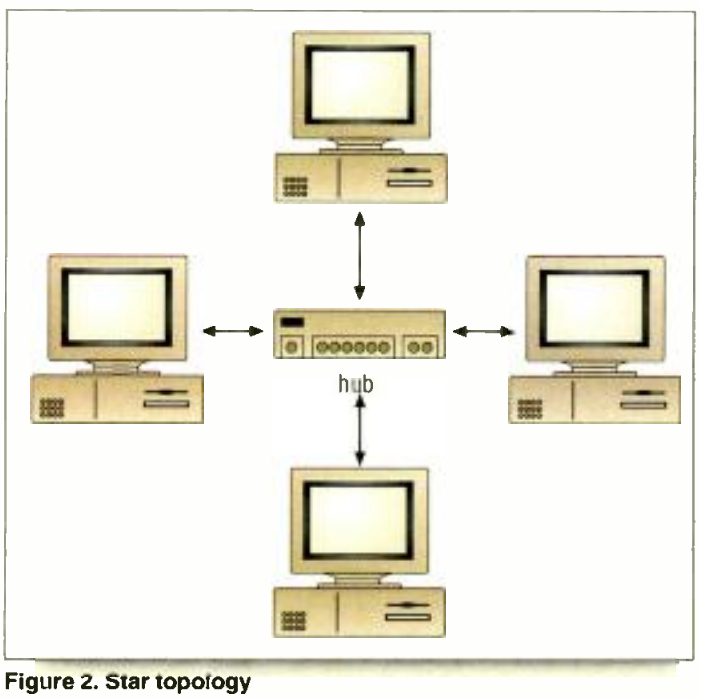
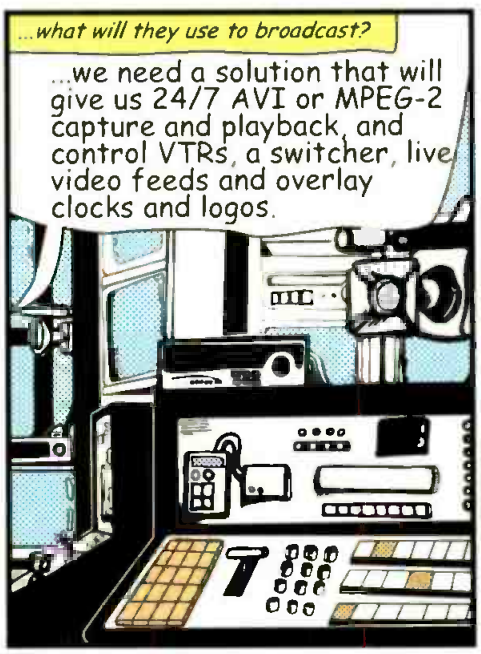


Figure 2. Star topology

Sometimes you can have it all.



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Of course, the hub is a single point of failure, and steps should be taken to minimize risk in this area.

Thinnet

Figure 3 illustrates Thinnet topology in which all computers connect to a common cable. Thinnet is based on RG-58 Coaxial cable, "T" connectors and 50-ohm terminators. This topology was very popular a number of years ago, but is now largely obsolete.

Thinnet is inexpensive, but if connection fails, it will affect all computers on the network. Also, termination of cables is time-consuming and prone to error. Furthermore, Thinnet typically costs more per connection than other technologies available.

Switched fabric

The fourth topology is switched fabric. (See Figure 4.) Switched fabric topologies are commonly used in switched networks such as Ethernet or Fibre Channel and ATM.

Switched networks can provide the highest aggregate bandwidth of any topology currently available short of dedicated point-to-point networks. Switched fabric networks will be the basis of most high-speed networks of the future.

The party line

With the exception of switched fabric topology, as the number of nodes on the network increases, performance decreases. This is because these networks connect everyone together on one big party line. As with an old-style telephone party line, if more than one person talks, it can be very confusing to determine what is being said.

In the past, network designers resolved this problem by keeping individual network segments small. They connected a number of segments together with bridges to build larger networks. (Bridges isolate the chatter on one network segment from another and only send messages across segments when required.) This solves the party line problem to some extent, but it does not fix it entirely. If you are unfortunate enough to share your segment with a fileserver, graphics workstation, or other high-bandwidth user, you will still notice a significant decrease in performance whenever these high-bandwidth devices are active.

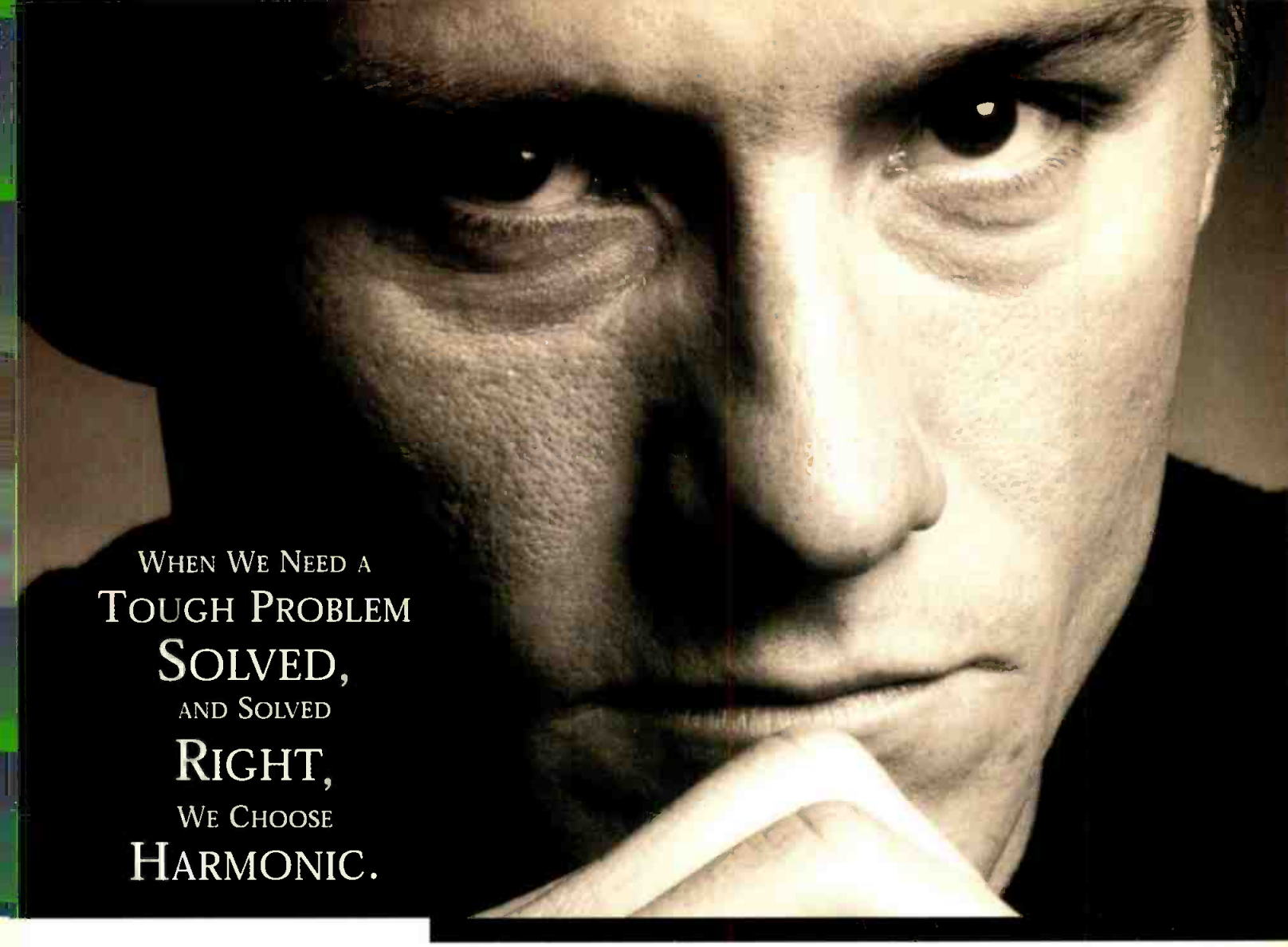
The advantage of switched fabric

So what is the difference between a switched fabric and other topologies?

The biggest difference is that a switch can give you a dedicated full-bandwidth segment all to yourself. This means that if you are running a 10-, 100-, or 1000MB network, you will have access to all that bandwidth (less overhead, of course).

Another big difference is that, once you go to a dedicated segment, you are able to use full duplex communications – that is, you can send and receive data at the same time. Remember that in other systems, one person talks while everyone else listens.

Furthermore, in particularly heavy usage situations, you can install more than one network connection to a device to provide simultaneous dedicated full bandwidth connections.



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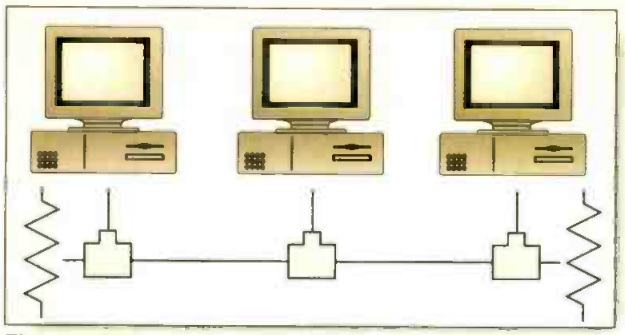

Figure 3. Thinnet topology

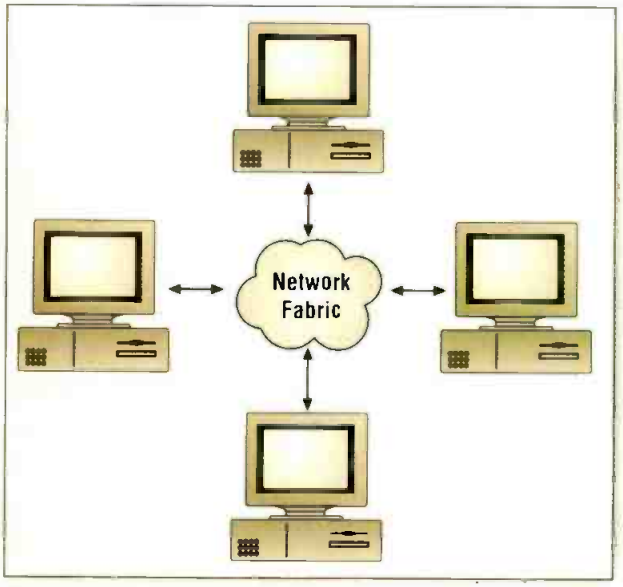

Figure 4. Switched fabric topology

Figure 5 illustrates how you might construct a switched network to provide very high bandwidth connectivity to a server and a graphics client while providing conventional connectivity to typical desktop users.

Note that the server is given two 100Mb full duplex connections to the switch. Because it is the only computer on these nodes, it has the full 100 megabits available on each link. It is possible to add more than two cards to a server, increasing the available network bandwidth even further. (There is no point in increasing the network bandwidth if the server has I/O or other limitations.)

Second, note that the graphics workstation has a dedicated 100Mb full duplex link to allow it to exchange very large files with the server.

Third, note that the Ethernet hub provides desktop clients access to the same high performance server, but over much slower 10Mb shared links.

Finally, note that the graphics workstation can consume all its available network bandwidth to the server without affecting any of the desktop connections.

Wiring

Most networks today are based upon unshielded twisted (UTP). Fiber is also gaining in popularity, but that is a subject for another article. UTP is popular because of its low cost and ease of installation. However, there are some things to be aware of. If you are planning a new network installation, be sure that you build it with CAT 5E components. (CAT 5 was the rating for network installations up to 100Mb/s. Cat 5 has been Extended for use up to 1000Mb/sec or one Gigabit. The "E" in CAT 5E stands for Extended.) CAT 5E assures that your wiring will be capable of supporting Gigabit+ Ethernet speeds. If you use CAT 3 or conventional telephone cable, you are asking for problems. I once had a network installation that was built with CAT 5 components, all except for a jumper panel that used some flat ribbon jumpers. The jumpers were not CAT 5 rated. As a result, the network was unpredictable, and in some cases, would not function at all. Replacing the non-rated jumpers with CAT 5 components fixed the problem. You might save some money by purchasing less expensive wire, terminating blocks or patch panels, but in doing this, you may be exposing yourself to problems down the road. When you look at the total cost of a network installation, wiring and components are frequently a small part of the total cost of the system.

As network speeds increase, new technologies building on this speed emerge. Storage Area Networking or SAN is one example. SAN is shared storage where the storage in a computer or server is physically separate from the computer itself. Multiple computers can connect to the same storage across a high-speed network. One can easily imagine a high-speed network with SAN to provide access to a pool of shared storage. Nonlinear editors, graphics workstations and other systems could share the storage. Such designs were not possible just a few years ago.

New networking equipment and techniques are being developed all the time. One thing is for sure – broadcasters will be at the forefront of this technology employing high speed networking in video applications. ■

Brad Gilmer is executive director of the AAF Association and president of Gilmer & Associates, a broadcast consulting firm.

Send questions and comments to:
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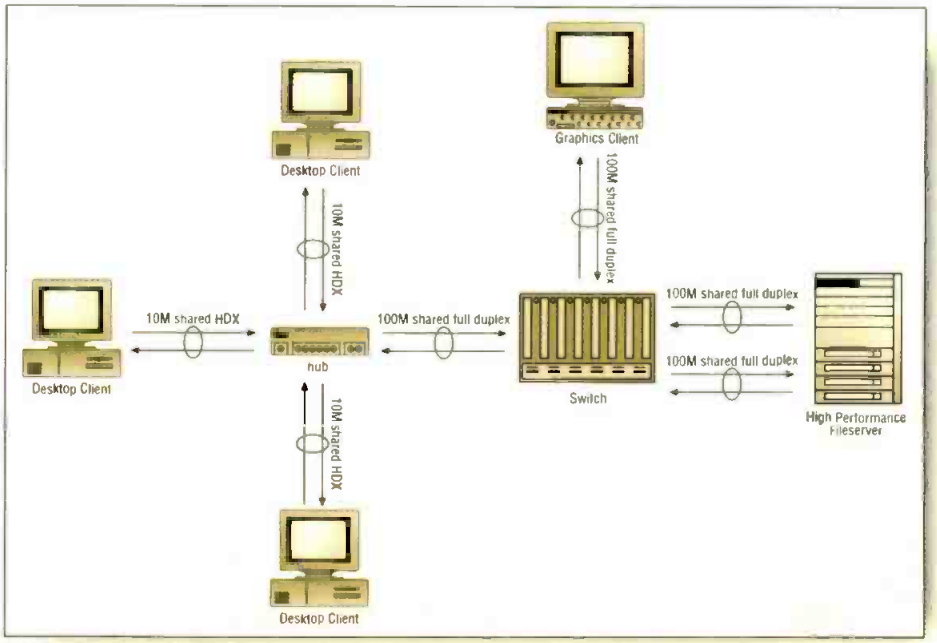

Figure 5. An example of a high-performance switched topology network.

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Audio and video compression

BY STEVEN M. BLUMENFELD

Those of you who have been reading my columns for a while know I have often pontificated on the wonders of audio/visual compression. Also you have read my views on content not really being useful unless it can be characterized and found. Over the years I have written about companies like Virage that have been working on systems to automate the classification and recognition of content.

I find myself smack dab in the middle of yet another hot area – speech and data recognition. So I look to my old friends on the MPEG committees once again for help with standardized data models that describe content.

Its current thrust is MPEG–7, the completion of which is scheduled for July 2001.

MPEG-7, formally named "Multimedia Content Description Interface," aims to create a standard for describing the multimedia content data that will support some degree of interpretation of the information's meaning and can be passed onto or accessed by a device or a computer code. According to the official MPEG website, MPEG-7 is not aimed at any one application. It will provide *standardized* support to a broad range of applications.

MPEG-7 tries to solve the problem of searching and managing huge amounts of digital data. The question of identifying and managing content is not just restricted to database retrieval applications such as digital libraries but extends to areas like broadcast channel selection, multimedia editing and multimedia directory services.

While audio and visual information used to be consumed directly by humans, increasingly audio/visual information is created, exchanged, retrieved and reused by computational systems. Image understanding (surveillance, intelligent vision, smart cameras, etc.), media conversion (speech to text, picture to speech, speech to picture, etc.), information retrieval (quickly and efficiently searching for various types of multimedia documents of interest to the user) and in-line filtering of content receiving multimedia data items which satisfy the user's preferences) represent specific computer uses of this information.

The goal of the MPEG-7 standard is to develop forms of information representation that go beyond the compression-based (such as MPEG-1 and MPEG-2) or even objects-based (such as MPEG-4) representations. Since the standard can be passed onto a device or a computer code, content encoded in the MPEG-7 standard could be referenced in many different ways. Possibly a verbal reference to a news item, such as "Florida elections," could bring up your latest newscast on the recount.

The MPEG-7 descriptions do not depend on coded representation of the material. The standard builds on MPEG-4, which provides the means to encode material as objects having certain relations in time (synchronization) and space (on the screen for video, or in the room for audio). If the material is encoded using MPEG-4, it will be possible to attach descriptions to elements (objects) *within* the scene, such as audio and visual objects.

The committee decided to base the textual representation of content descriptions on the Extensible Markup Language (XML) as the language of choice. The growing popularity of XML usage on websites to describe and collect data will facilitate interoperability in the future.

WhenMPEG-7 is fully implemented, it will make the Web as searchable for multimedia content as it is searchable for text today. This would apply especially to large content archives, enabling people to easily identify content. The information used for content retrieval can be used by computational agents for selection and filtering of personalized material.

On the consumer side new applications based on MPEG-7 descriptions will allow

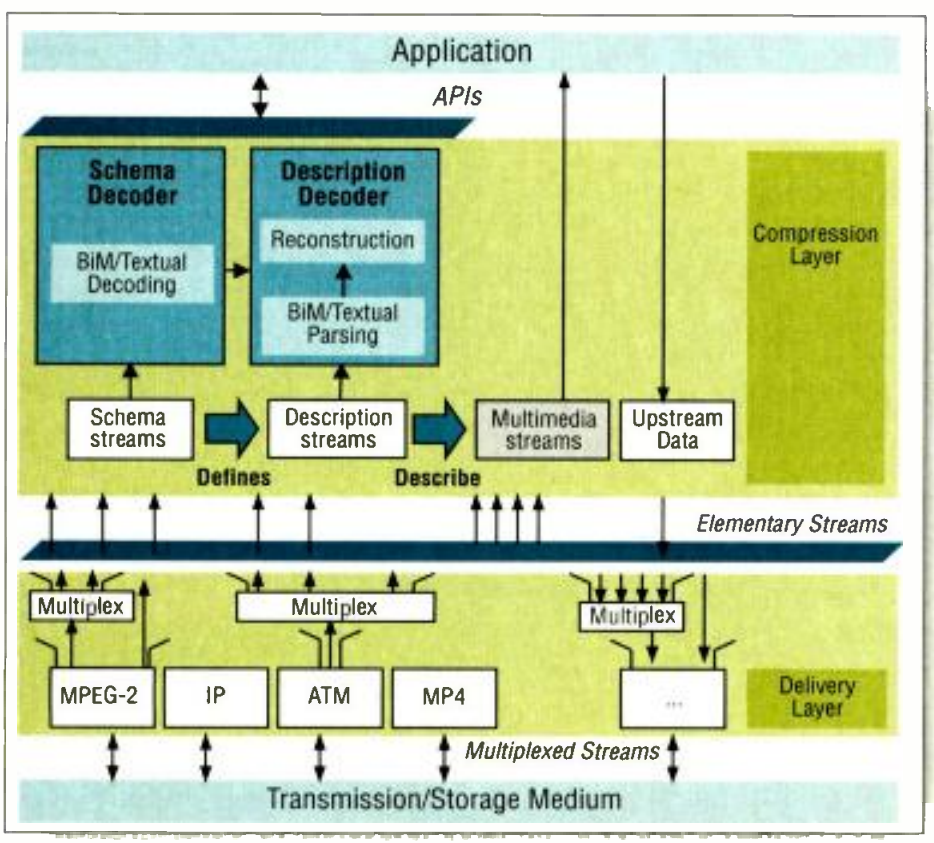

Figure 1. MPEG-7 aims to standardize the syntax of metadata across applications.

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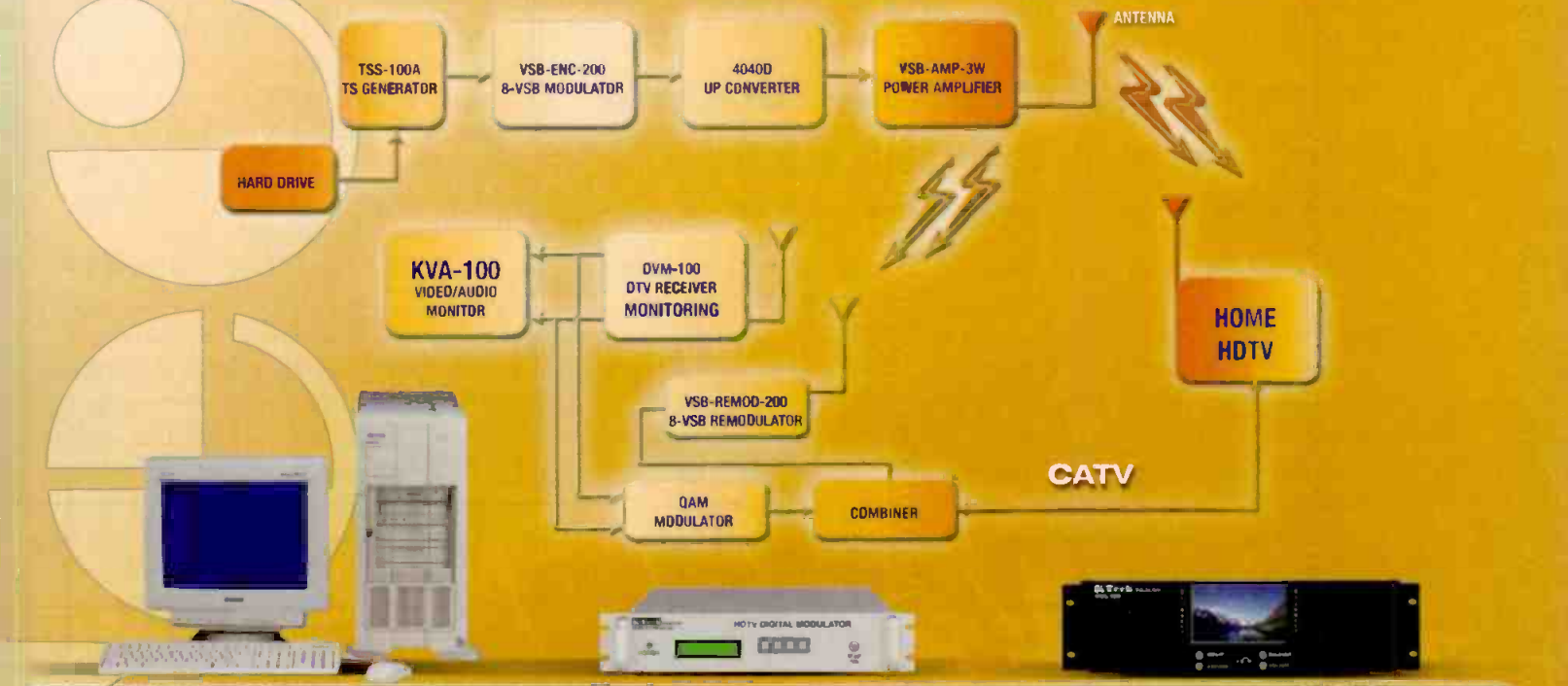


Video Server
MPEG2 Generator/Recorder

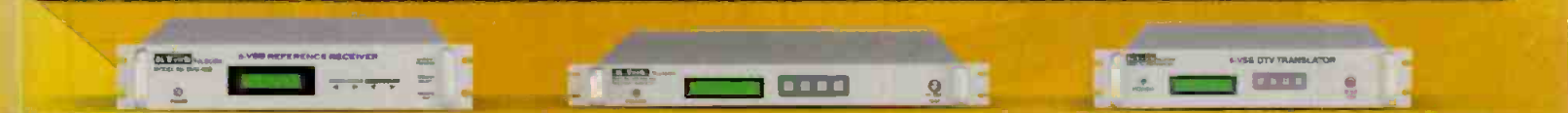
TSS-100A is a video server based on a scaleable power PC engineering workstation. Using high speed SCSI-II LVD hard-drives, its maximum capacity is limited to 100-Gbytes of Raid-0 storage capability. This unit is designed to transfer files by FTP, Internet, LAN, CD-ROM and SCSI. It generates MPEG2 files through DVB-ASI, SMPTE-310M and DVB-SPI outputs and records through DVB-ASI and SMPTE-310 inputs. Rack mounted and portable computer versions are also available.

8-VSB Modulator

VSB-ENC-200 is an 8-VSB modulator that conforms to the ATSC Terrestrial DTV Transmission Standard. Its input requires MPEG2 transport stream in SMPTE-310M, DVB-ASI or DVB-SPI format. The output is available on 44.0MHZ I.F. or a fixed channel RF. A variable frequency up-converter is also available as an option. External 10MHZ reference input or internal 10MHZ OCXO frequency source can be used to set the output frequency. Linear and non-linear precorrection is available as an option.

Video Audio Monitor

The KVA-100 is a rack mountable 6" diagonal unit LCD display, 16X9 aspect ratio, 640X350 resolution. L/R speakers. Volume meters, RGBHV input (BNC).



8-VSB Reference Receiver

DVM-100 is an 8-VSB Professional Receiver that accepts RF CH2-CH69 input, DVB-SPI input/output, DVB-ASI input/output, SMPTE-310M input/output and produces outputs in RGBHV video, VGA video, Y Pb Pr, Analog L & R audio, and Dolby Digital AC-3 audio. Video Modes: 1080i, 720p, 480p, 480i, NTSC Composite (BNC, SDI). PSIP Display, EPG. This product is useful in DTV monitoring and testing.

8-VSB Frequency Translator

The VSB-FREQ-100 is an 8-VSB channel converter, this unit performs tuning channels between VHF 2 - 13 and UHF 14 - 69 and produces an output frequency from 7 to 810 MHz. The LCD displays all input and output frequencies for an easy operation. This unit performs no demodulation.

8-VSB DTV Translator

VSB-REMOD-200 is an 8-VSB Translator that receives an 8-VSB signal via on-air or cable, demodulates to baseband data, corrects multipath errors by Forward Error Correction and Equalization techniques. Updates PSIP and re-modulates the baseband data into a new 8-VSB signal. A fresh copy of the original DTV signal is reproduced to extend your DTV coverage area.

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fast and cost-effective usage of the underlying data. My favorite would be an application that allowed semi-automatic multimedia presentation and editing.

The information representation specified in the MPEG-7 standard provides the means to represent coded multimedia content description information. The entity that makes use of such coded representation of the multimedia content is generically referred to as "terminal."

If there's not a way to describe, characterize and find content, does it really exist?

As Figure 1 shows, the delivery layer encompasses mechanisms allowing synchronization, framing and multiplexing of MPEG-7 content. The transport/storage of data can occur on a variety of delivery systems. The delivery layer demuxes data so it can provide the compression layer with elementary streams. Elementary streams consist of consecutive individually accessible portions of data called access units. An access unit is the smallest data entity to which timing information can be attributed.

At the compression layer, the flow of access units is parsed and the content description is reconstructed. Access units are structured as commands encapsulating the description information. Commands provide the dynamic aspects of the content. They allow a description to be delivered in a single chunk or to be fragmented in small pieces. They allow basic operations on the content such as updating a descriptor, deleting part of the description or adding new Description Definition Language (DDL) structure.

The main tools used to implement descriptions are Descriptors (Ds) and Description Schemes (DSs). Descriptors bind a feature to a set of values. Description schemes are models of the multimedia objects and of the universes that they represent, e.g. the data model of the description. They specify the types of the descriptors that can be used in a given description and the relationships between these descriptors or between other description schemes.

The DDL forms a core part of the MPEG-7 standard. It provides the solid descriptive foundation by which users can create their own description schemes and descriptors. The DDL defines the syntactic rules to express and combine description schemes and descriptors.

The DDL has to be able to express spatial, temporal, structural and conceptual relationships between the elements of a DS, and between DSs. It must provide a rich model for links and references between one or more descriptions and the data they describe. In addition, it must be platform and application independent and human- and machine-readable.

A DDL Parser capable of validating description schemes (content and structure) and descriptor data types, both primitive (integer, text, date, time) and composite (histograms, enumerated types), is also required.

The purpose of a schema is to define a class of XML documents by applying particular constructs to constrain their structure: elements and their content, attributes and their values, cardinalities and data types. Schemas can be seen as providing additional constraints to DTDs or a superset of the capabilities of DTDs.

XML is an excellent choice to adopt as the basis for the DDL because of its potential widespread adoption and the availability of tools and parsers. As XML was not designed specifically for audio/visual content, certain specific MPEG-7 extensions are required.

Descriptors

The MPEG-7 descriptors describe the following types of information: low-level features such as color, texture, motion, audio energy and so forth; high-level features of semantic objects, events and abstract concepts; content management processes; and information about the storage media.

It is expected that most descriptors corresponding to low-level features will be extracted automatically, whereas human intervention will be required for producing the high-level descriptors.

The DSs are categorized as pertaining specifically to the audio or visual domain, or pertaining generically to the description of multimedia. For example the generic DSs correspond to immutable metadata related to the creation, production, usage and management of multimedia, as well as to describing the content directly at a number of levels including signal structure, features, models and semantics. Typically, the multimedia DSs refer to all kinds of multimedia consisting of audio, visual and textual data, whereas the domain-specific descriptors, such as for color, texture, shape, melody and so forth, refer specifically to the audio or visual domain. As in the case of descriptors, the instantiation of the DSs can in some cases rely on automatic tools, but in many cases will require human involvement or authoring tools.

In this new paradigm we are given a glimpse of a world in which all data/content is accessible by various devices using real world descriptions/locators. With the constant influx of so much new content, if there's not a standardized way to describe, characterize and find it, does the content really exist at all? Does content exist, if there is not a system to find it?

The majority of this article was taken from N3752- Overview of the MPEG-7 Standard (version 4.0). For more on MPEG-7 go to www.cselt.it/mpeg/. ■

Steven M. Blumenfeld is currently the GM/CTO of AOL – Nullsoft, the creators of Winamp and SHOUTcast.

Encoding for broadband

By Laura Collins, Associate Editor

Zapex recently introduced the ZP-330 and 230 MPEG-2 video and audio encoders for digital compression. A new Program Stream feature allows for the encoders' use in broadband and streaming applications, while the Transport stream is used for broadcast and cable applications. The ZP-330 is able to encode video and Dolby digital audio simultaneously. On-board transport stream multiplexers enable users to feed output from the encoders into a DVB card.

Encoder chips improve image quality and reduce bit rates by using multiple algorithms to examine every macroblock. Automatic scene change detection enables the encoders to eliminate block artifacts by detecting subtle changes in the video. ■

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SYSTEMS DESIGN SHOWCASE

NATIONAL GEOGRAPHIC CHANNEL Base Camp Studio

By Paul Rogalinski and Adam Semcken

The production control room, shown above, serves as the central hub of the National Geographic base camp facility, with all support rooms (CER, Playback, Audio Control, Video Control) located immediately adjacent.
Photos by Anice Hoachlander.

Not all 24-hour cable channel start-ups launch with the luxury of a powerful brand name like The National Geographic Society. With over 100 years of successful magazine distribution, an internationally recognized logo and the successful show, *Explorer*, already in widespread distribution, The National Geographic Channel was poised to take the next logical step.

When setting out to conceive, design and build a 24-hour cable start-up production facility the most important steps occur at the beginning. Identifying top-level goals for the facility, selecting the project team and establishing an on-air deadline frames the structure for the undertaking.

Project planning

Partnering with FOX Broadcasting, the National Geographic Channel assembled a team of consultants, project managers, architects and designers to build their new "base camp" studio in Explorers Hall at NGC headquarters in Washington D.C. Andrew Wilk, executive vice president of Programming, Production and News, established the team and led the effort to bring a state-of-the-art image of The National Geographic Society to air. Janson Design Group Architects, Production Design Group and Lighting Design Group were brought aboard to design the structural, architectural, acoustic and signature on-air look of the glass-enclosed, street-level studio.

The National Geographic Channel identified several key technology requirements for their new facility. They wanted a flexible approach to systems design, a growth-oriented facility based on a digital platform and a backbone that could make the transition to high definition in the future. The Systems Group (TSG) was selected to join the team in early February and began the conceptual design effort to address these goals.

TSG helped to refine NGC's staffing model and budgetary operational costs, as well as investigating choices for playback format, edit platform and facility connectivity. Concurrently, TSG's engineering and planning departments began developing the top-level systems design, signal flow, project timeline and detailed equipment schedule that would be necessary to build the facility.

The effort associated with building a new facility, free of established paradigms and legacy commitments, presents different challenges than an entrenched

broadcaster or existing operation. As the National Geographic Channel facility began as a clean sheet of paper, the goal was to implement a design that utilized established technology while taking advantage of newer methods and systems where appropriate.

Several vendors, manufacturers and tape formats were considered during the conceptual design efforts. Price and performance factors, as well as service history and reliability, were integral to the selection process. The resulting equipment and technology complement was based on a proven SDTV core with infrastructure capable of supporting uncompressed HDTV, as well as alternate data-based transfer and interconnect methods.

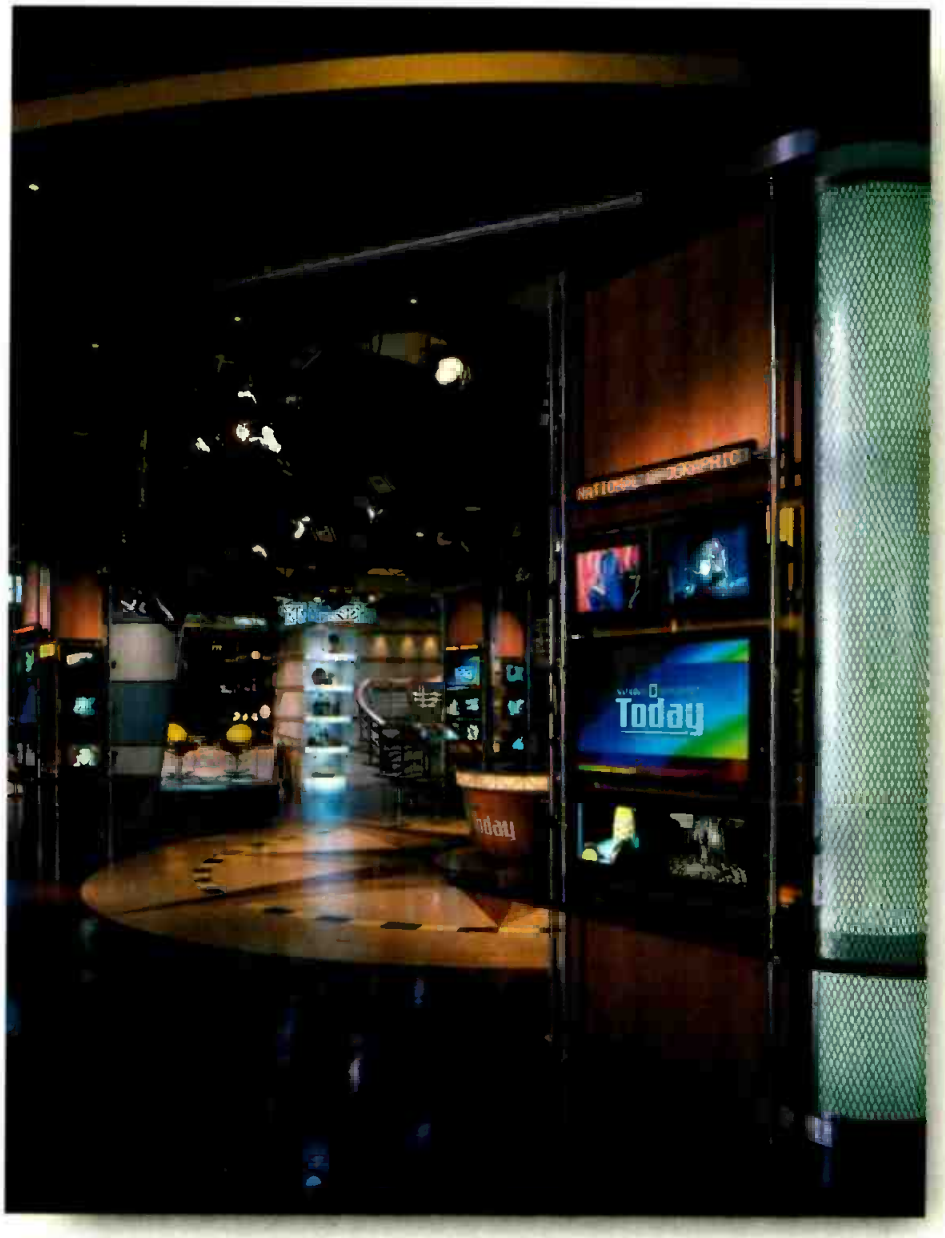
Technical facilities

The National Geographic Channel facility core operates within the CCIR-601 specification, allowing both SDI video and SDTI data transfers. The infrastructure is based upon Belden 1694A coax and ADC MVJT-series coaxial jackfields. This, in conjunction with stringent adherence to cable management standards providing a 4-inch minimum bend radius, will allow the facility to pass uncompressed SMPTE 292M throughout the core.

AES-3ID coaxial audio is the plant standard, allowing for future use of both Dolby E and AC-3 compression schemes. Digital audio parameters are standardized to 48kHz sampling, 24-bit, -20dBfs reference level.

The facility routing core is based on the Philips Venus 2001 architecture. The Venus 2001 serial video matrix is configured for wideband operation, allowing ASI, 270Mb/s and 1.485Gb/s operation.

As systems design efforts proceeded, The Systems Group worked closely with Janson Design Group to establish all aspects of the room requirements for the facility. Workflow, equipment and personnel heat loads, humidity levels, HVAC requirements, power needs and cable access were evaluated for each of the proposed technical spaces. Fit and finish details for the control room areas were developed to complement the studio look and address the ergonomic needs of the operators. Finally, an overall facility layout including detailed room descriptions was created based on the operations model established earlier.



The studio showcases the unique artifacts and extensive photographic archives of the National Geographic Society.

The team decided that the street-level facilities would include a studio, production control room (PCR), audio control room (ACR), video control room, tape playback room and central equipment room (CER). The 8000-square-foot studio would be separated from PCR by a wall of glass, so that on-camera views could include activities in the control room. The second floor of the new facility would include six nonlinear edit rooms, a media library (which would serve as a duplication and tape storage center, as well as a shared tape source for the edit rooms) and a graphics center (GFX). The graphics room would be located near the edit rooms for efficient operational workflow. Connectivity to support areas on the campus includes the main auditorium and an insert studio in the M Street building.

The project schedule specified construction completion to occur in phases so the integration team would get access to the 27-rack central equipment room and three of the six edit rooms in late August. This allowed TSG technicians to begin work on the core facility router, reference headend, intercom and transmission wiring while general construction continued on the rest of the facility.

The remaining rooms were turned over roughly every two weeks. Subsystems for each area were fabricated, tested and packed at TSG in Hoboken and then delivered to the site for installation. Due to the shared construction environment, a final walkthrough

operator is responsible for painting the set monitors. This is accomplished with Videotek SDC-101 color correctors and Vistek V1642 processing amplifiers. Facility triax patching is provided in VCR, using Trompeter JSI-24W triaxial jackfields.

Panasonic DVCPRO represented the best systemic implementation for the facility. Field tapes shot on DVCPRO camcorders are ingested directly into the NewsBYTE edit systems, without a resultant compression path. The finished NewsBYTE element can be transferred directly to a GVG PDR-404 DVCPRO Profile file server, again within the data realm, for playout.

Six identical Panasonic NewsBYTE NLE edit rooms are located on the second floor of the facility. The VTM-190 feeds into a 21-inch SVGA monitor, identical to the main bin monitor for the NewsBYTE, eliminating all color temperature and chromaticity inconsistencies. A Panasonic BTM-series broadcast monitor is included for NTSC confidence.

The Graphics Center is located adjacent to the NewsBYTE edit rooms and is outfitted with a Quantel Paintbox E.A.T., Chyron Maxine, Ross CDK-104 and three Apple PowerMac G4 CPUs with Digital Voodoo's D1 Desktop 64AV uncompressed capture board. The Ross CDK-104 keyer is used for video-based still image compositing.

A view into the video control room from production control. The VCR utilizes four Ikegami HL-45 camera systems, Videotek SDC-101 color correctors and Vistek V1642 processing amplifiers.

Project Team

National Geographic Channel
Andrew Wilk, Executive V. P., Programming, Production & News

Janson Design Group LLC
Dennis Janson, Architect
Joe Montalbano, Acoustic Designer
Production Design Group
James Fennhagen, Set Design
Lighting Design Group
Steve Brill, Lighting

Systems design and integration
The Systems Group
Paul Rogalinski, Project Manager
Adam Semcken, Project Engineer
Darwin Clermont, Integration Supervisor
Jim Tome, Jr. Project Engineer
Larry DeFazio, Lead Technician

Installation technicians
Alex Blanding
Tashon Boone
Skip Hughes
Will Jimenez
Steve Losquadro
Jose Morales
Bob Schanz
Joseph Kiernan

The National Geographic Channel launched Jan. 1, 2001, on DirecTV from their new Base Camp Studio. The set

> The graphics room would be located near the edit rooms for efficient operational workflow.

Also on the second floor, the Media Library serves as the VCR hub for all post-production requirements. A pool of seven source decks and four VHS target decks round out the system. All VCRs within the Media Library are interconnected to a Leitch X-Plus-series router through NTSC and stereo analog audio interfaces, while the digital machines are connected to the core routing system, simultaneously providing SDI and AES signal paths.

elements, core systems technology and facility workflow efficiencies can be seen on the daily NGC broadcasts, the results of a successful project team. ■

Paul Rogalinski is a project manager at The Systems Group. He was Project Manager for the National Geographic Channel Base Camp studio construction. Adam Semcken is a senior project engineer for The Systems Group and was the project engineer on the National Geographic Channel Base Camp studio construction.

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SYSTEMS DESIGN SHOWCASE

Real Broadcast Network's Internet Broadcast Operations Center

by Mark Siegel

Real Broadcast Network (RBN) is among the busiest broadcast networks in existence. While a traditional broadcast network today puts out between one to five signals, RBN pumps out 3000 programming signals of information 24 hours a day from its new all-digital Internet Broadcast Operations Center (BOC). In addition, RBN has the ability to pump out close to three times that amount due to the system's expandability.

Real Broadcast Network employees at the RBN Event Management System for proprietary traffic and billing. This is the main area of the IBOC control room.

With its integration experience and expertise in mind, Digital System Technology was brought in by RBN to help modernize its facilities. The network was operating with an antiquated analog system, and the goal was to upgrade its facilities into a forward-looking, fully digital streaming media center with a design created around the notion of the entire system being automation capable.

Utilizing a palletization technique to reduce on-site integration and installation time, a complete digital core was constructed and tested featuring all necessary processing equipment offsite before it was moved into the roughly 1800-square foot space created for the Internet BOC. Space directly adjacent to the analog studio was used for the new BOC.

Custom-designed Pinnacle StreamFactory encoders for audio and video developed specifically for RBN.

Though it was challenging to work with the limited space available for the new center, limited power proved to be a tougher obstacle. However, as the RBN building is an expansive 286,000 square feet, additional power from other sections of the building was tapped with the help and expertise of an electrical contractor. On top of this challenge, the system had to be brought up quickly — approximately 45 days from the execution of order to go online. The new system had to be put online while working around RBN's existing 24-hour broadcasting schedule, which entailed building consoles, setting up workstations, and tearing down existing equipment while people were working on the equipment being torn down. At completion of the new BOC, the majority of the analog equipment was gone.

RBN pumps out 3000 programming signals of information 24 hours a day from its new all-digital Internet Broadcast Operations Center (BOC).

With the new BOC, RBN is the first organization in the country to execute the full analog-to-digital conversion, including the digital processing and encoding of a digital signal directly to the Web. Another unique aspect of this system is that it marks the first time a streaming media company seriously considered and then implemented noise reduction within the streaming path. For this entire process, DST integrated Snell & Wilcox IQ Modular Series products with adaptive comb filters for decoding, frame synchronization and noise reduction purposes. Snell & Wilcox rack-mounted Kudos series converters were installed for the A/D conversion occurring directly from the satellite.

After conversion, the noise reduction process begins. By using noise reduction, the encoding process for RBN is much easier on storage and in streaming bits. Pinnacle Systems developed the system's encoders specifically for RBN, which funded the development of the product. (Though it consulted on the development of the encoder and integrated it into the system, the encoder selection was the only part of the system that did not come through DST.)

Racks of Symetrix 422 and 221 auto-levelers and other terminal equipment. The Symetrix units feature adjustable auto-leveling and automatic gain control.

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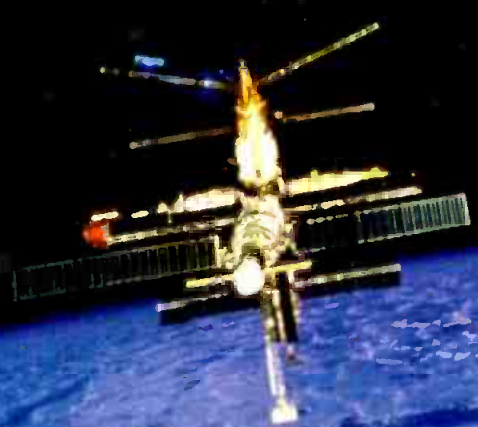

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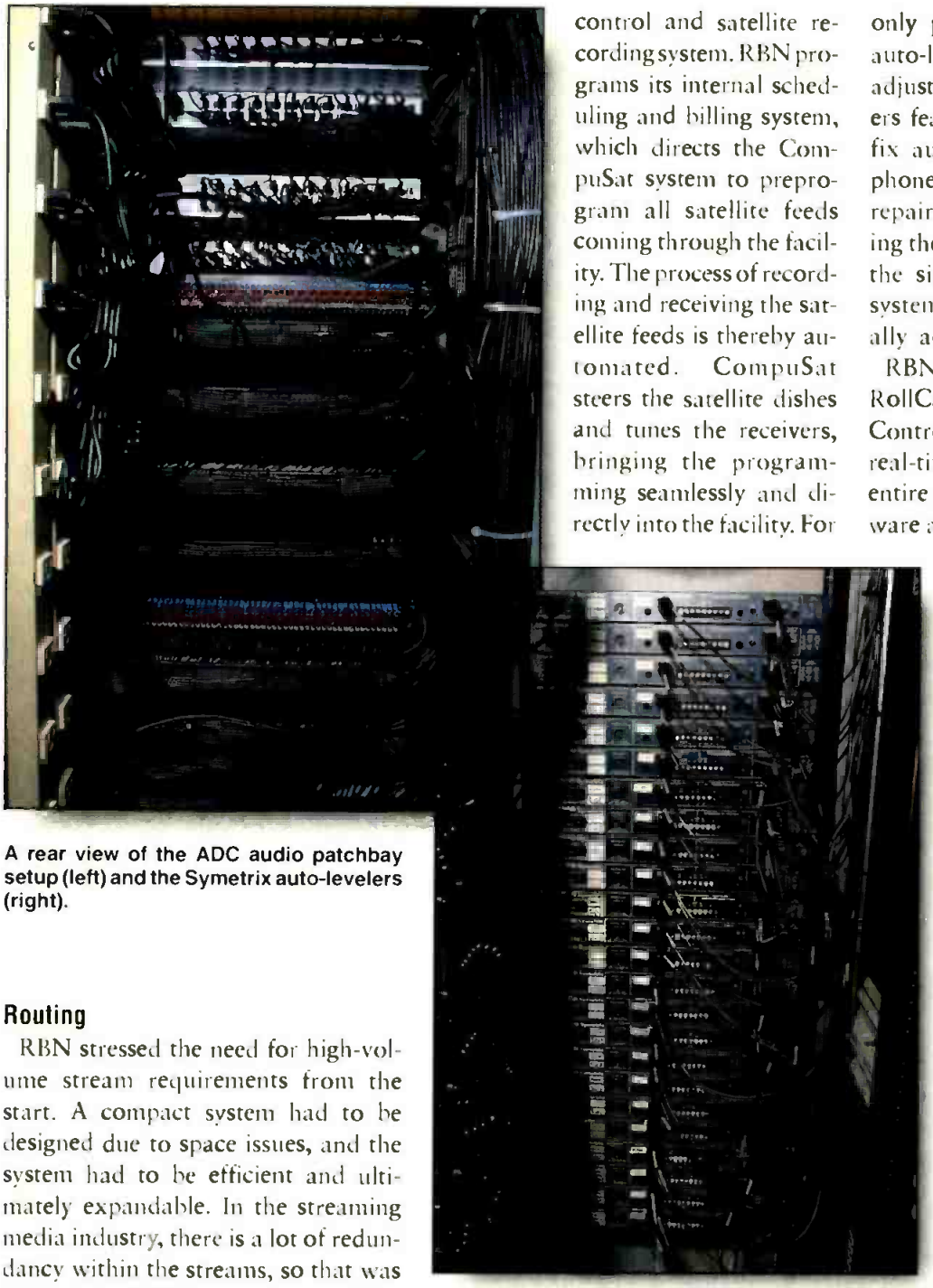

A rear view of the ADC audio patchbay setup (left) and the Symetrix auto-levelers (right).

Routing

RBN stressed the need for high-volume stream requirements from the start. A compact system had to be designed due to space issues, and the system had to be efficient and ultimately expandable. In the streaming media industry, there is a lot of redundancy within the streams, so that was addressed as well.

Considering all of these factors, DST decided to install a Philips 64x64 serial digital matrix routing and switching system. However, this has since been upgraded to a Philips 96x128, opening the doors for RBN to handle 128 discrete streams through its Internet BOC. The expandability does not stop there: The facility has the capability with its current design to upgrade to a 256x256 routing system. The flexibility of the Philips routing systems is essential to the growth of this facility.

Perhaps the most essential component DST implemented within the new BOC is CompuSat, an automated dish control and satellite recording system. RBN programs its internal scheduling and billing system, which directs the CompuSat system to preprogram all satellite feeds coming through the facility. The process of recording and receiving the satellite feeds is thereby automated. CompuSat steers the satellite dishes and tunes the receivers, bringing the programming seamlessly and directly into the facility. For RBN, this is important because they stream live events more so than any competitor. Most facilities streaming video for Internet broadcast record the event first and play it back later, which is exactly like a system recently integrated at Navisite.com. RBN instead receives a live satellite feed and sends it straight out over the Internet.

RBN accepted the recommendations for all other essential integrated products, including Symetrix 422 and 421 auto-levelers, Ikegami monitoring walls and Circuit-Werkes phone couplers. The Symetrix auto-levelers were vital for the facility and desirable above all competitive units as they were the only products capable of adjustable auto-leveling as opposed to strict, non-adjustable clamping. The auto-levelers feature automatic gain control to fix audio levels being fed from the phone couplers. The two-channel 422s repair the audio by raising or lowering the levels as needed before feeding the signals into the Philips routing system, and as mentioned, are manually adjustable.

RBN is also using the Snell & Wilcox RollCall Network Management and Control system to provide a continual real-time display of the status on the entire system's equipment. This software also allows many of the system's components to be fully flexible and controllable over a WAN. Essentially, if RBN were to open more facilities in the future, operators could control all aspects of the switching and routing and adjust the processing equipment from one central location through the existing network.

When it came time for launch in August 2000, there were the inevitable few hiccups. As the sparking of each new facility is unique, a few problems are normal. The main issue was crosstalk within the phone coupling setup. Signals were mixing across coupled phone lines, creating a challenge that would prove most difficult to address. DST developed an isolator that separated the signals and confined them to their own lines. Another problem that was minor in comparison was the need to switch the auto-leveler models initially provided by Symetrix to another model better suited for this facility.

An added bonus of this system is that it is moveable. Due to DST's palletization technique, the system can be broken down in two days, relocated and reinstalled in its current layout within seven days. Therefore, if RBN ever outgrows its current facility space and needs to move to a larger building, DST can smoothly relocate the facility. ■

Mark Siegel is vice president of DST, Washington.

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SYSTEMS DESIGN SHOWCASE

Fox Sports Net

by Steve Lewis

Unabashed enthusiasm for sports programming, with all its variety and action, has propelled the Fox Sports Network (FSN) to the attention of most sports TV viewers. FSN is distributed through a network of regional cable channels and is currently building on a base of 62 million homes in the U.S. and over 8 million homes in the Latin American market.

In response to the demands for additional programming and the desire for a digital redesign, the network has expanded its

The Los Angeles-based Network Operations Center (NOC) provides command and control over 21 national FSN news bureau locations.

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existing operations by implementing an innovative network communications scheme and incorporating new digital television interconnection solutions. Driven by the national production needs of The Regional Sports Report, FSN evaluated numerous technical strategies to create a new content distribution network. This broadcast project goes beyond the usual digital upgrade description because FSN decided to build its national network around ATM architecture. In fact, it is the first customer-controlled ATM/Switched Virtual Circuit (SVC)-based system in the U.S.

Using their groundbreaking networking capabilities, the network and its regional affiliates are now equipped to better leverage their collective regional and national sports programming to satisfy sports-hungry viewers everywhere.

Introduction to FSN

The Fox Sports Net main properties include national production and origination facilities located in Houston and Los Angeles. Paired with those facilities are 20 regional FSN affiliate sports bureaus. These include joint ownership arrangements with industry players such as NBC, Cablevision, and Comcast. A new program, *The Regional Sports Report*, is a twice-daily half hour show produced in nine regions and aired in all 22 regions that comprise FSN.

After Fox considered several approaches to create and support a collaborative, production process, a TCP/IP network emerged as a viable and cost-effective solution. FSN team decided on the new networking and communications architecture to share program information among the far-flung group partners and facilities including regional sports channels in New York, Washington, Chicago, Miami and San Francisco. The completed ATM network and operation enables, manages and transfers programming services among its distributed partners around the country.

The turnkey engineering design tasks included the development and delivery of new signal and control systems at each bureau location. The substantial origination operations at the main locations in Houston and Los Angeles were engineered to meet the 24/7 operational requirement incorporating fault tolerant considerations. The new network design is also equipped with effective signal management solutions to address its mission critical communications requirement. Redundant DS-3 and OC-3 circuits are utilized to keep potential telecommunications interruptions to an absolute minimum.

The new ATM network, the Fox Video Network (FVN), includes 20 regional locations connected with the main FSN facilities in Los Angeles and Houston.

FSN transitions to the Fox Video Network (FVN)

Driven by the fault tolerant nature of broadcast designs, an exhaustive analysis of telecommunication and broadcast alternatives was conducted to evaluate a prospective broadcast-ready and cost effective solution. The key cost component of the FSN digital upgrade, beyond investments in new digital broadcast systems, centered on the utilization of a 500Mb/s guaranteed bandwidth solution built around a national ATM network. Older cost structure models for telecommunications circuits were giving way to this new aggregate bandwidth and pricing model.

A national map is displayed of FSN's ATM SVC connections across the country.

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It was determined that using TCP/IP protocols would be adequate for delivering MPEG file transfers but FSN also needed to use the network for multiple live streams mixed with the other less time-dependent video traffic. An analysis showed that ATM's Quality of Service (QoS) offerings could support various kinds of simultaneous network traffic. ATM can prioritize signals such as high priority live video streams that use a CBR connection alongside simple MPEG-2 file transfers that use ABR (Available Bit Rate) connections. ATM's time-based guaranteed delivery capability along with its ability to integrate the local regions' OC-3 and DS-3 circuits provided FSN with an end to end networking solution that met all its communications needs.

The provisioning of a guaranteed bandwidth solution was pursued through national telecommunications vendors. FSN finally chose the ATM architectural component based upon the long-term trends and selected a cost-effective aggregate offering through Williams Communications. The new ATM network, the Fox Video Network (FVN), includes 20 regional locations connected with the main FSN facilities in Los Angeles and Houston. FSN's leading edge approach and its cost-effective underpinnings are bolstered every day by the phenomenal bandwidth expansion of the IP-based networking that continues unabated, everywhere.

The FSN plan to create a comprehensive design and to build new facilities at selective Fox locations proceeded. This project effort included a comprehensive solution to be integrated at each of the regional sports bureaus. FSN worked closely with a team of vendors to develop important design and technical functions and to solve critical management and control problems associated with the new digital operation.

The design process

Fox selected Communications Engineering, Inc., (CEI) to design, engineer and integrate the FSN facilities including the main Network Operations Center (NOC) in Los Angeles. Each of the 20 FSN regional affiliate locations also received an integrated ATM-based MPEG-2 system solution. FSN's new ATM-based network enables peer-to-peer connections between all locations in the country and supports simultaneous, bidirectional transfer of program content and control signals. The major technical and vendor solutions used in the FSN network are Tandberg's comprehensive MPEG compression/decompression systems and Marconi ATM and TCP/IP network switches.

FOX Sports Net approached Tandberg Television as a key component of the national video over ATM network due to Tandberg's turnkey solution for live streaming MPEG-2 video over ATM. Tandberg's comprehensive solution, which included sophisticated software management tools, was attractive since it enabled FSN to work with one vendor as opposed to several, therefore eliminating a number of potential incompatibility issues. The compression and decompression processing of program material is delivered through a series of encoders, decoders, and ATM network interface cards. Marconi (formerly Fore Systems) was chosen due to its carrier class ATM experience and extensive networking product line.

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FSN also desired to manage its own telecommunication network and Marconi's control software enables FSN to monitor and control its network of ATM switches located throughout the country. Communications Engineering Inc. (CEI), at its facility in Newington, Virginia, integrated the Tandberg and Marconi systems along with other broadcast technologies such as routing, monitoring, communications, and test & measurement solutions. A self-contained system was designed and built for each of the 20 FSN regional affiliate locations.

In the initial phase, FSN deployed 40 of Tandberg Television's E5610 encoders and 85 Alteia decoders. At each of the regional sites, original analog or digital program material is passed into an E5610 encoder, an MPEG-2 DVB compliant compression engine, which produces a DVB ASI transport stream. With a built-in ATM Network Interface Card, the E5610 encoder converts the DVB ASI transport stream to ATM packets through the encoder output, which feeds directly into the Marconi switches. The stream passes through a FVN connection link to another location's ATM Network Interface Card where it is converted from ATM packets back to a DVB ASI signal. The DVB ASI signal then becomes an input to the Alteia decoder, which outputs the original broadcast quality audio and video into a server or tape device. The FSN network is designed to pass professional contribution quality 4:2:2 audio and video at an average bitrate of approximately 20 Mb/sec. The high compression quality achieved with the E5610 encoder when paired with a 20 Mb/sec. transmission bitrate supports FOX Sports requirement to maintain exceptional video quality through multiple generations of encoded program material.

NOC

The FSN Network Operations Center could have been situated almost anywhere given the relatively small footprint of technology that actually manages and monitors the distributed technology components of FSN's peer-to-peer network. The NOC was built near other Fox broadcast operations in Los Angeles with the main components consisting of an equipment center and control room that houses the video/control display wall and operations consoles. A key consideration to the 24/7 operation is the FSN control and monitoring of all systems and locations comprising the FVN. The NOC uses a series of comprehensive software management tools designed into consoles in the main NOC room and displayed on a sophisticated monitor wall.

Master Control display

The custom monitor wall and operators consoles designed by CEI incorporate a combination of 9- and 14-inch broadcast monitors, flat panel computer displays, and eight 50-inch LCD Rear Projection Displays. The display systems are integrated with a multi image display system that allows the NOC operators to dynamically select a variety of video sources and control monitoring maps to be presented on the 50-inch LCD displays. Prearranged combinations of inputs can be alternatively displayed or blended on the LCD rear projection screens to support simultaneous viewing of picture quality, individual component health status, or ongoing communications connections and traffic. CEI worked with FSN operators to design flexibility into the control room's consoles, monitor wall and monitor bridge fixture, and developed control software to streamline operations. FSN operators are provided efficient access to the NOC's extensive technical systems, analysis tools, signals, and communications controls.

In order to keep track of the numerous program sources that appear on the presentation displays, a source identification system was incorporated into FSN's under monitor displays. Information to drive the source ID displays is derived from the routing and control switching systems. The NOC's control software polls the status of the various technology systems and presents color-coded alerts with specific FSN systems and locations identified. These alerts are superimposed on a national map thus aiding the FSN monitoring process. Color-coding (Green, Yellow or Red) as well as audible alarms immediately cue the operators to a telecommunications connection or equipment failure. The alarm and control management tools help the operators prioritize the multitude of activities being monitored across the widely dispersed but highly interdependent systems.

The center's displays and software management systems provide up-to-the-second feedback on FSN operations.

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The center was modelled to optimize operators' functions, which includes systems monitoring of remote news bureau locations.

Monitoring and software controls

The monitoring system for the TCP/IP network is built around the SNMP (Simple Network Management Protocol) and uses Hewlett Packard's Open View software system. FVN's in-band monitoring and control signals utilize the same ATM network connections and systems as the programming. The following software monitoring tools help FSN to identify nonperforming systems, efficiently address operations issues, and timely facilitate smooth network operations:

- As part of an end-to-end solution, FOX Sports Net utilizes Tandberg Television's new control software, Cortex, to support system control, monitoring, scheduling, resource and bandwidth allocation. With its client-server based architecture and comprehensive feature set, the Cortex software solution enables FOX Sports Net to implement the centralized monitoring and control procedures required for the extensive switched video network that comprises the Fox Video Network.
- The NOC also uses ForeView software from Marconi to manage the distributed ATM systems and network devices that link servers, workstations, and telecommunication circuits distributed throughout the country. The FSN operators are presented with location maps illustrating the operational status and health of the widely distributed ATM and TCP/IP network technology
- CEI designed and developed a Panja (AMX) -based control system that monitors the health and controls the operation of each regional site's rack of broadcast technology. Any interruption of signal flow will provide a visual alarm on the national map that is displayed within the Fox NOC.

While the NOC in Los Angeles monitors and maintains control over the performance of the national network, each regional sports bureau can and will create its own communications sessions with the other locations of the

Flexible peer-to-peer communications arrangement enables the FSN partners to share programming material without direct and constant intervention.

Equipment list

Bureau Locations

- APC Matrix UPS System
- EVERTZ small SDI Router
- MARCONI/FORE ATM Switch
- MARCONI/FORE Ethernet Switch
- IKEGAMI 9" Color Video Monitor
- IMAGE VIDEO Under Monitor Display
- LEITCH Xplus
- LEITCH Frame and Signal Processing Systems
- TANDBERG VAM ClipCourier
- TANDBERG MPEG encoders
- PANJA (AMX) Systems
- ROSS encoders
- TEKTRONIX Serial Digital Component Monitor
- WOHLER monitors
- RTS TW Communications System

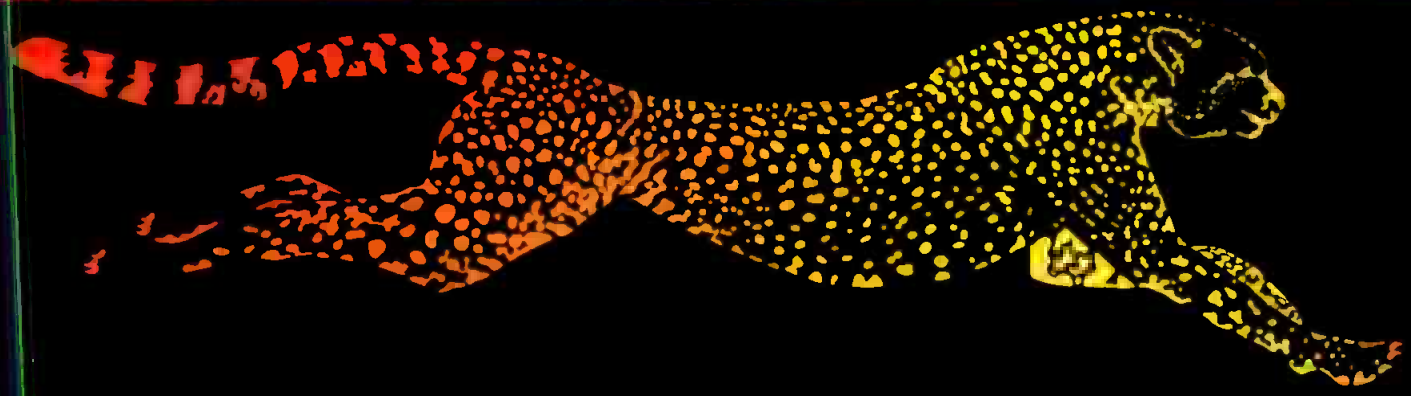
NOC

- BEST POWER Axxium UPS System
- CEI Monitoring & Control
- CEI Custom Display and Monitor Wall
- CEI Monitoring & Control Console
- EXTRON Computer Video Distribution System
- MARCONI/FORE ATM and Ethernet Switches
- HAFLER Power Amplifier
- IKEGAMI 9" & 14" Color Monitors
- IMAGE VIDEO Under Monitor Display
- LEITCH Xplus
- LEITCH Frames and Signal Processing Systems
- LINK Genflex D/A Sync Generators
- McCURDY Audio Metering
- MIRANDA Multi Image Display Systems
- TANDBERG MPEG Encoders
- PANJA (AMX) Systems
- ROSS encoders
- VIEWSONIC Flat-panel LCD displays

Cheetah

High-speed HD/SD routing switcher

64x64
128x128
256x256
512x512



The **Cheetah** provides a comprehensive solution to today's multi-format digital switching requirements. Engineered for HDTV operation, the **Cheetah** can also handle SDI signals in the same frame. Each block of 16 inputs or 16 outputs can be either copper or fiber. Monitor grade video DAC outputs are available as an option, an industry first! An ethernet control interface is also provided.

- Four standard frame sizes, from 64x64 to 512x512
- SDI or Multi-Rate (3Mb/s to 1.5 Gb/s) cards with reclocking
- Mix copper or fiber inputs and outputs in the frame
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Fox Sport Network. The flexible peer-to-peer communications arrangement enables the FSN partners to share programming material without direct and constant intervention of the LA NOC operations staff.

With the implementation of this ATM/SVC video network, the FSN controls its own feeds, manages its own resources and bandwidth allocation. An immediate advantage of this arrangement is that it eliminates delays associated with scheduling and booking feeds from a third party provider. Further, FSN has realized significant cost savings associated with the ATM network compared to the transmission costs of a traditional satellite or point-to-point fiber network. By having a combination of dedicated ATM/IP bandwidth capacity, encoders and decoders, and a network control system all operational 24/7 from the NOC in Los Angeles, FOX Sports Net has more flexibility, reliability and control while simultaneously lowering total operational costs.

The NOC oversees and monitors the operations health of the Fox Video Network.

Above all, FSN is pleased about its current cost advantages and the performance of its ATM-based Fox Video Network. As FSN's experience grows, it is anticipated that additional Fox signals and programming will migrate to the FVN such as event backhaul and other more critical content distribution tasks. FSN's future operational efficiency will also increase due to the expected availability of increasingly lower cost IP network bandwidth services in the market.

The reality of broadcast operations today is that you must do more and better with less, and that is a good description for FSN's upgraded facilities. ■

Steve Lewis is director of sales and marketing for Communications Engineering, Inc.

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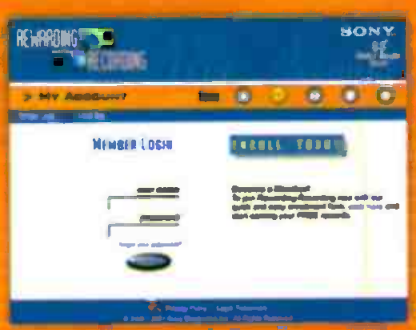

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Transmission & Distribution

When the thunder dies away

BY DON MARKLEY

The subject of lightning protection has been treated before in these pages (some would even say that it has been beaten to death). Therefore, let it be assumed that the tower has been appropriately equipped with funny looking, spiny things; the ground system is appropriately bonded and buried; and all possible precautions have been taken.

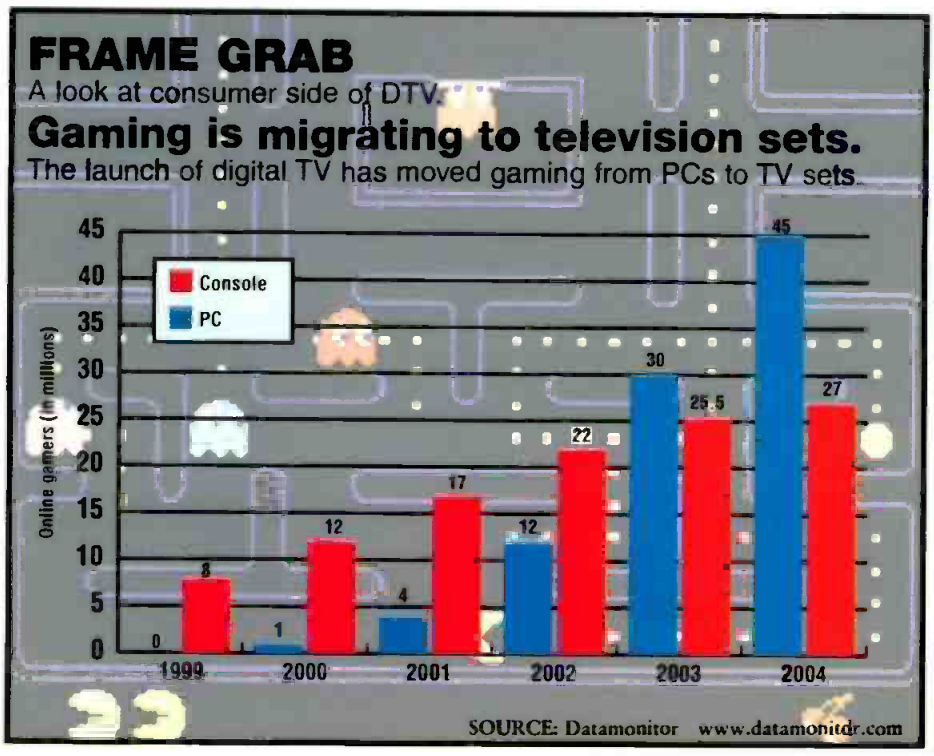
And then, there is a blinding flash of light and a very loud bang when lightning hits despite your precautions. For a while, one will usually sit quite still in an effort to perform a quick inventory of one's own vital functions. Once it is realized that no injury has occurred, other than a possible need to change clothes, a few things will start to become apparent. First, there is a funny smell in the air. Hopefully, it will only be ozone and not smoke. The next few realizations come quickly. It is dark, it is very quiet, nothing is running and the production people are asking what happened. They are usually a little slow in noticing things that are subtle, such as lightning. If the chief engineer's job has been done well and the management has permitted reasonable funding, the station will come back to life as the standby generator comes on line.

The standby power plant is expected to stay in its own little room, be ignored and still spring to life to save the day. Sounds like the chief engineer, doesn't it?

In fact, today's technology can even eliminate the gap when the station is down waiting for the standby generator. Uninterruptible power systems (UPS) are available to keep the whole plant running for a brief period, even including very large transmitters. UPS equipment doesn't have to keep the whole station running for an extended period. It is only necessary to keep the essential systems running until the standby generator has started and is on line. One or two minutes are more than satisfactory. By then, a modern standby plant is more than ready to accept the full station load until the primary power source is available. Then the UPS can again keep the necessary systems running while the switch is made back to the utility power system. In addition, a UPS will eliminate the glitches that often occur in the building power when switches are made.

Actually, the UPS system doesn't have to be sized to keep everything on line. For example, the building heating and air conditioning systems can wait for the standby plant to come on line. They should, if properly designed, cycle back on line without any difficulty. In a similar fashion, such short-term non-essentials as outside lighting, signs and even the tower lights can wait for the generator. However, as the UPS will probably be added to an existing plant, it may be less expensive to simply buy a larger unit than to rewire the distribution system to bypass smaller non-essential loads.

To be realistic, most stations won't opt for a UPS that is big enough to carry the whole load. Management will probably accept the momentary



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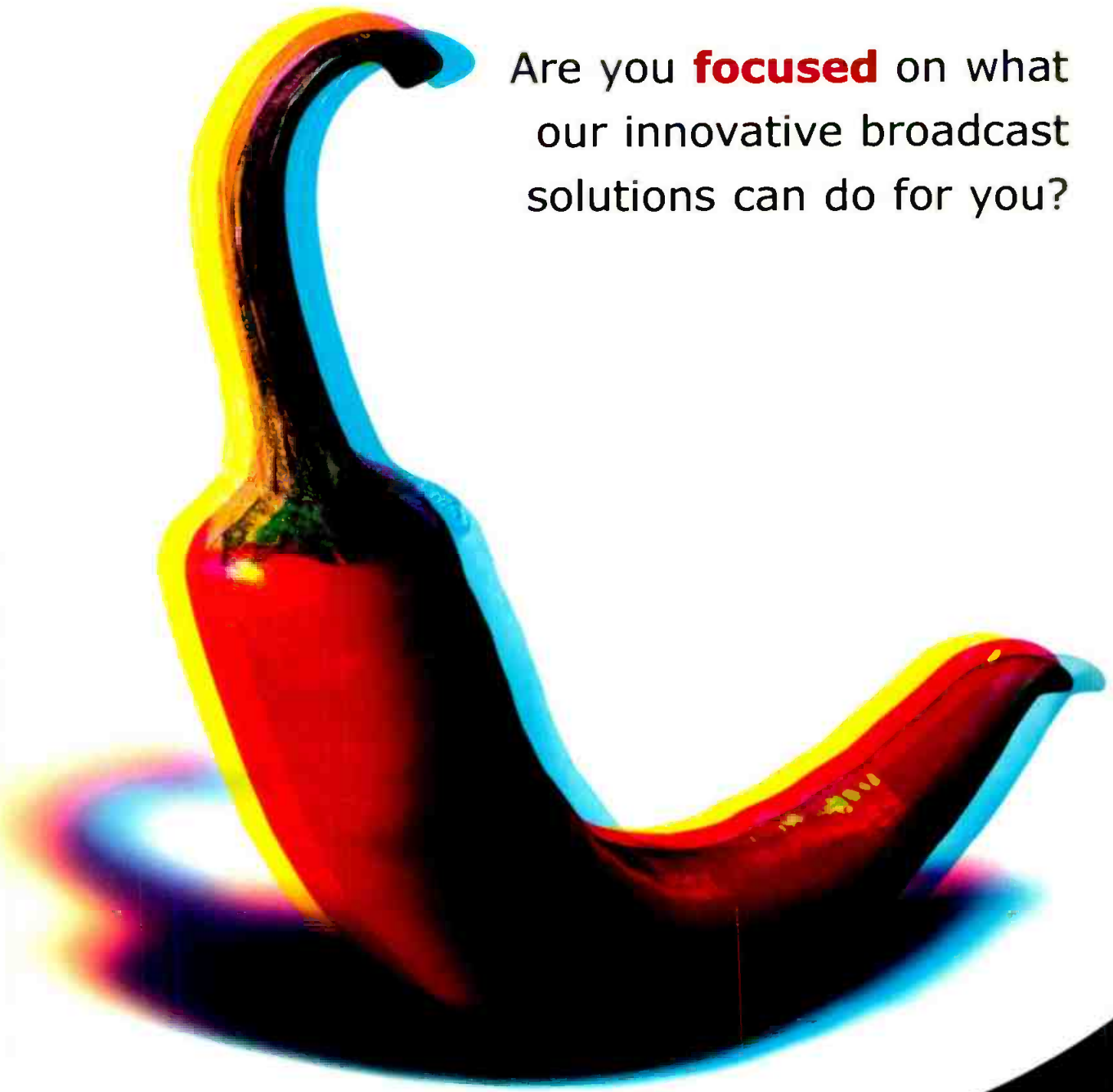
break in power while the generator comes on line. In that case, it makes a lot of sense to install several smaller UPS systems to keep some systems on line over the break. For example, a small UPS such as is available at any electronics supermarket will work to keep the control circuits and exciter in the transmitter up and running. In these days where the transmitters have multiple computer systems in operation, this can avoid glitches requiring rebooting from occurring. The transmitter will stay ready to come back on line with only the high power systems down. The UPS in the transmitter control and exciter circuits will keep those systems ready to resume operation, but some precautions need to be taken.

In some transmitters, maintaining the control systems with no power to the high voltage or high power circuits can result in a big bang when power returns. For example, step-start circuits may not realize that there has been a break in the power. As a result, high voltage can be applied instantly to amplifiers that have been without filament voltage, magnet currents, etc. That can result in the resumption of power being accompanied by loud and expensive noises and the recognizable odor of burnt carbon. Before a UPS is installed in the control circuits, check with the manufacturer of your transmitter to determine just what systems can be safely included in the standby feed.

In addition to the transmitter exciter and control systems, many of the studio systems can benefit from a UPS. This would include a number of pieces of equipment that are digital and controlled by computers. It isn't really the total loss of power that can cause this equipment to enter La La Land. Most systems will tolerate a clean break in power just as they handle being switched off. While they may require a little time to boot back up, most equipment will return to a reasonable state on the return of clean power. Some equipment will actually return to the exact mode in operation when power failed although many may require that you bring them back from some default mode. The problem is when the power fluctuates as the utility system attempts to recover from its own problems. Everyone has experienced this problem during storms. The electrical power may experience short-term transients as distribution circuit breakers reset after faults or as the power system eliminates feeds to downed power lines. The power may come and go two or three times or drop to a low level during such situations. This introduces some really ugly glitches into system power supplies that operate computer driven controllers. The computers see

In addition, run the plant often enough to use up the full tank of fuel annually.

Get the picture?



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incoming pulses, albeit from the wrong inputs, that look like more ones and zeros, and attempt to include them in their operation.

The UPS systems will eliminate most if not all of those glitches, even if the final result is that the systems will end up being without power. At least the break will be clean rather than erratic and noisy. Those same glitches can result from the switchover from main to auxiliary power. In this respect, the UPS is used not as much for the standby power aspect as for valuable power conditioning.

One more item in the whole chain should still be considered. The standby power plant is expected to stay in its own little room or enclosure, be ignored almost all of the time and still spring to life to save the day. Sounds like the chief engineer, doesn't it? It will fulfill that role only if it also receives a little tender loving care. Most large plants are diesel powered. Diesel fuel is susceptible to some really nasty critters that love to live in that atmosphere. These can build up to the point where they occupy most of the volume of the fuel tank and have to be physically removed. They can be avoided by adding appropriate fuel additives. These additives can be found at most truck stops. Even better, try visiting a marine supply store. Boaters tend to let their craft sit through the winter without operation. That allows the bacteria to build in the fuel tank and cause great difficulties in the spring. The additives need to be put into the fuel to prevent such growths. They will work after the fact by killing off the intruders, but the result will be continuing problems with fuel filters as dead bacteria plug them. The solution is to prevent the bacteria from forming in the first place. In addition, run the plant often enough to use up the full tank of fuel annually. That not only exercises the plant but keeps reasonably fresh fuel on hand.

The regular exercising of the standby plant serves a number of functions. First, it is good for the engine itself to be operated. Some manufacturers strongly advise that their engines be operated at least once a month and that the operation be long enough to bring all operating temperatures up to normal values. In addition, this will assure that the starting batteries are maintained at full charge. Engine block heaters must be checked to determine that they are operating normally. Nothing will make the chief engineer look more foolish than a trip to the auto supply store for batteries or a can of ether when the generator won't start when needed. The suits in the front office become unhappy when they have authorized big bucks for a standby plant and still find themselves in a dark, cold office with no hot coffee. ■

Don Markley is president of D.L.Markley and Associates, Peoria, IL.

Send questions and comments to:
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The real story about 16/9 and switchable cameras

BY CHRIS BEAUPARLANT

In today's video market, there seems to be a lot of confusion as to what is needed for lenses to work in accordance with switchable cameras. It is assumed in today's market that one needs a switchable lens to work with a switchable camera. This is not the case (although some would try to market it that way). This brief explanation should help in your understanding.

There are all sorts of cameras available today, each with their own unique features and benefits. However, when it comes to the switchable sensors, there are only two basic types. The following is a description of those two basic types from all of the camera manufacturers that give you the possibility to switch from 16/9 mode to 4/3 mode with the same sensor/CCD.

1. Cameras with a 4/3 sensor: These cameras can switch the picture height to make the 16/9 aspect ratio. These cameras only limit the vertical angle of view (cropping off the top and bottom to make the 16/9 ratio). This is not seen as a problem in the industry today.

2. Cameras with a 16/9 sensor. These cameras can switch the picture width to make the 4/3 aspect ratio. These cameras only limit the horizontal angle of view (cropping off the sides of the picture). This is not as big a problem as some camera and lens manufacturers are making it. Up to now all switchable cameras except Philips' have a 16/9 sensor.

Figure 1 demonstrates what happens to the field of view of your picture when you use a switchable camera with a 16/9 sensor.

In 2/3-inch format cameras the image diagonal (distance from one corner of the CCD to the other) of the sensor is 11mm. Each lens manufacturer makes the image circle in accordance with this 11mm sensor. Otherwise the lens is vignetting (not covering enough) or spilling light.

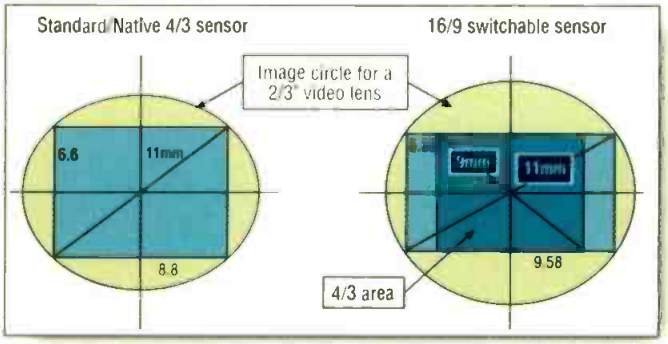

Figure 1. Field of view cropping inherent in switchable cameras with16/9 sensors.

Do some calculations for the widest focal length of the 12x5.3AIF.HR. F = 5.3

Given the diameter of 11mm, we can calculate the picture width x and the picture height y for the standard 4/3 and 16/9 ratio.

4/3 Standard/Native sensor

$x/y = 4/3 \qquad x^2 + y^2 = 11^2$

$y = \frac{3}{4} x$

$x = 8.8$

$y = 6.6$

$x^2 + 9/16\ x^2 = 11^2$

$25/16\ x^2 = 11^2$

$5/4\ x = 11$

16/9 sensor in 16/9 mode

$x/y = 16/9$

$y = 9/16\ x$

$x^2 + y^2 = 11^2$

$x^2 + 81/256\ x^2 = 11^2$

$337/256\ x^2 = 11^2$

$\sqrt{\ } 337/16\ x = 11$

$x = 9.58$

$y = 5.39$

The horizontal angle of view can be calculated from the following equations:

Where: α = 1/2 field angle; F = focal length; X = horizontal image size; Y = vertical image size

(4/3)

$tg\ \alpha = x / 2F = 8.8 / 2*5.3$

$2\ \alpha = 79.4°$

(16/9)

$Tg\ \alpha = x/2F = 9.58/2*5.3$

$2\ \alpha = 84.2°$

One conclusion that we can see already is that a 16/9 sensor has a wider field of view than a 4/3 sensor even though it is still 2/3-inch format or 11mm diagonal.

The same calculation for a 16/9 camera sensor operating in a 4/3 mode gives:

$x/y = 4/3$

$x = 7.19mm$

$y = 5.39$

$Tg\ \alpha = x/2F = 7.19/2*5.3$

$2\ \alpha = 68.3°$

Compared to the angle of view with a standard or native 4/3 sensor, the loss is only from 79.4° - 68.3°, approximately 11° (hardly noticeable even at a close distance).

Suppose this was a standard or native 4/3 sensor. Then the comparable focal length is:

$tg\ \alpha = x / 2F$

$tg\ 68.3°/2 = 9.58 / 2*F$

$0.68 = 4.4$

$F = 6.5\ mm.$

Focal length/ angle of view 4/3 sensors as in brochures	Angle of view for 16/9 sensor in 16/9 mode	Angle of view for 16/9 sensor in 4/3 mode	Comparable focal length 16/9 sensor in 4/3 mode
5.3 mm / 79.4	84.2	68.3	6.5 mm
5.2 mm / 80.4	85.3	69.3	6.4 mm
4.8 mm / 85	90.2	73.7	5.9 mm
8.3 mm / 56	60.0	46.8	10.2 mm
8.0 mm / 57.6	61.8	48.4	9.8 mm

Table 1. A comparison of different lenses with focal length and angle of view for different aspect ratios.

16 / 9 situation				4 / 3 situation			
f as in brochures	angle of view 2α	Tangent α	distance meters D	angle of view 2α	Tangent α	distance meters D	δ meters
5.3 mm	84.2°	0.90	1.10	68.3	0.68°	1.48	0.38
5.2 mm	85.2°	0.92	1.08	69.3	0.69°	1.44	0.36
4.8 mm	90.2°	1	1	73.7	0.75°	1.33	0.33
8.3 mm	60.0°	0.58	1.7	46.8	0.43°	2.3	0.6
8.0 mm	61.8°	0.6	1.8	48.8	0.45°	2.2	0.6

Table 2. Results of the differences inn distance 16/9 vs. 4/3.

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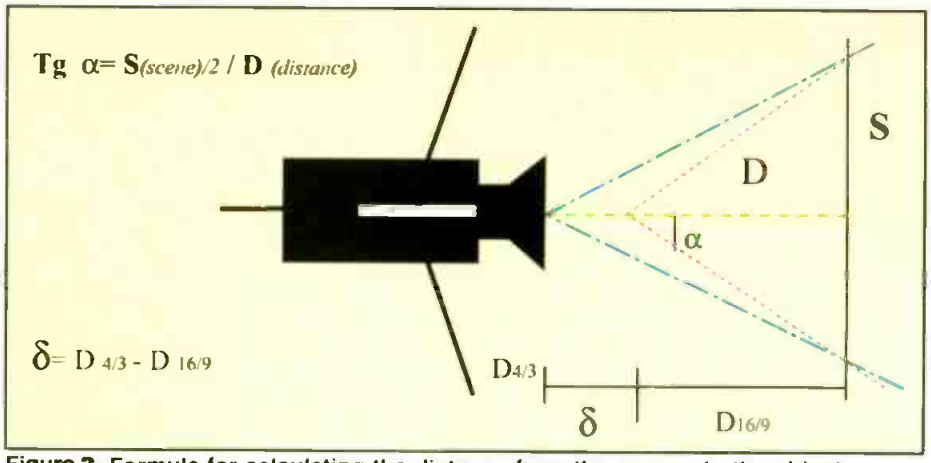

Figure 2. Formula for calculating the distance from the camera to the object.

Table 1 compares different lenses with Focal length and Angle of view for different aspect ratios.

Some practical calculations on distance camera to object.

Shooting in 16/9 with a given width of a scene we can calculate the distance from the camera to the object using the formula shown in Figure 2:

Suppose we have a 16/9 sensor in a switchable camera and a scene of 2M.

As seen in Table 2, if you switch from 16/9 to 4/3, the difference in angle of view forces a step or two backward with the camera (δ in the table) if you want to keep the same scene width/field of view. It is not worth the cost and weight difference for purchasing a switchable lens. Do not be fooled by the smoke and mirrors of some of the industry's marketing scams. You do not need a switchable lens for a switchable camera unless you are completely confined to a tight studio that does not allow any backward movement to make up for the loss of field of view when working in 4/3 mode on a 16/9 camera.

Conclusions

1. With a switchable camera with a 16/9-format sensor we loose angle of view only in the 4/3 mode. The use of a 0.8 range reducer in 4/3 mode can compensate the narrowest field of view if the minimal difference cannot be tolerated.

2. One step backwards has the same effect.

Options:

1. Purchase normal/standard/non-switchable lenses and get the most for your money

2. On all studio lenses an extra 0.8 Range reducer is available if there is no room to move back.

3. All ENG lenses can be delivered with a 0.8 Range reducer instead of the 2x Range extender. Any ENG lens that is modified can be transferred to original 2x RE on request up to eight years after delivery. ■

Chris Beauparlant is national sales manager for Angenieux.

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MPEG splicing in station operations

BY LAURA COLLINS, ASSOCIATE EDITOR

The general subject of MPEG splicing has been done to death over the last few years. However, this is a subject that won't go away soon. As standards evolve and more practical experience is gained working with MPEG transmission of HDTV and multicast programming, systems and facilities will continue to be faced with new challenges.

A case in point is determining what role MPEG splicing will play in minimizing and avoiding decompression-recompression cycles (and the resultant picture degradation) in the process of manipulating video at the station level. Of course the goal is to do all of our splicing, inserting and branding within the compressed domain. And of course, we can only do that at I frames because all other frames within the GOP are either predictive or bi-directionally interpolated information that reconstruct video frames later on at the decoder. So, what's a master control operator to do? We'll take a look at some present-day solutions and some future considerations.

Commercial broadcasters

Today, most commercial stations receive HDTV signals as MPEG-2 bitstreams at 45Mb/s. They download the signal and encode it to baseband HDTV and SDTV. The incoming 45Mb/s bitstream provides enough information for the station's decoder to produce a robust HDTV signal that stands up to the MPEG-to-baseband conversion. This signal is usually handed off to the local routing matrix for further manipulation and on-air control. The baseband video is used for operations that require manipulation on the pixel level, including logo insertion, ad insertion and any editing that takes place. The HDTV signal is then encoded to a 19.4Mb/s MPEG-2 bitstream for transmission.

Of course the goal is to do all of our splicing, inserting and branding within the compressed domain.

MPEG splicing helps stations maintain picture quality by avoiding decompression-recompression cycles in editing systems like the one at Texas Cable News (shown above). Photo courtesy Concept: Benson & Rice.

While the development of MPEG standards and tools for MPEG splicing is desirable, so far baseband conversion has been the standard practice in today's commercial environments because the results are within an acceptable range, at least for now. However, this is most likely a situation that will eventually demand improvement. I firmly believe HD viewers will be here soon, and advertisers will follow.

Think about the energy and talent that high end productions throw at compression and then consider the weakest link in the image path up to the transmitter. While the encoders that are available do a fairly good job, they have the burden of being a one-size-fits-all black box. There are real and perceived differences between the quality of compression that can be obtained by a trained compressionist eyeballing every scene in an expensive compression suite and an automated one-size-fits-all black box solution at the master control switcher. Ad agencies are likely to want to control the compression quality of their commercials by distributing 19.4Mb/s pre-compressed MPEG video to broadcasters. They might have the expectation or even the requirement to avoid degradation at the station level through the introduction of further decompression-recompression cycles.

One approach to this problem is to splice the pass-through MPEG-2 transport stream downstream from the master control switcher. In this configuration the output of the master control switcher is routed to an encoder. The resultant bitstream is then spliced

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into the pass-through program feed in a downstream splicer before routing to the transmitter. This approach maintains the integrity of the pass-through feed; however, it can only be achieved at I frames. The spot can be transferred to a local file server as a pre-encoded 19.4 MPEG-2 file. Downstream of your master control switcher the I frames are lined up at predetermined splice points and "spliced" into the on-air bitstream. Now, as an advertiser, I'm fairly confident that the quality is going to be consistent regardless of the transmit path.

PBS stations

The PBS stations are in a different situation, and one that creates a greater immediate challenge. PBS stations are receiving network feeds that are prepackaged at 19.4Mb/s. There are good reasons for this practice. The most pressing is that many PBS stations do not have the budgets to build an extensive internal DTV infrastructure. If they are fed MPEG streams that are already optimized for broadcast, all they need to do is pass the signal through to the transmitter, a much less costly approach.

However, there is still a need to manipulate the program for local branding and other functions. The problem is that the incoming 19.4Mb/s signal does not stand up to the process of decoding to baseband, processing and re-encoding to a new 19.4Mb/s MPEG bitstream anywhere near as well as the incoming 45Mb/s stream in the previous example.

Downstream splicing

Splicing downstream from the master control switcher is a solution to this problem. This effectively becomes a master encoding step that combines elements created at the station level and output by the master control switcher with elements being fed from other sources and passed through.

Ultimately, the desired requirements for the downstream splicer are that it be visually and syntactically seamless, maintaining the integrity of both the visual continuity and the structure of the bitstream.

There are several manufacturers of MPEG splicers, and products are available that allow you to splice into the transport stream in a number of different ways. Some methods involve the use of markers in metadata that indicate safe splice points in transport streams. One method is to drop to black for a few seconds or freeze a frame of video and then clear the memory buffer and start a new group of pictures with a new I frame. Another manufacturer uses proprietary algorithms to analyze bitstreams on the fly and determine safe splice points in real time. Another method drops to baseband, logs the incoming GOP/macroblock structure, performs operations in baseband, and reapplies the original GOP structure. There are a number of different ways to do it, each with its own pros and cons.

For now, making decisions with regard to MPEG splicing is a matter of careful consideration of both the available technologies and the specific requirements of a given application. With this in mind, it is reasonable to expect significant advances in the design and implementation of MPEG splicing technology as managing DTV signal paths becomes increasingly central to station operations. ■

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DTV update

NAB marks the start of the broadcast year. It all begins and ends in Las Vegas. Much like when the new models roll out in Detroit, each year the eager flock to the NAB show to see the newest fixes for their digital problems. To help you in your search, we continue our look at the products making their debut on this year's showroom floor.

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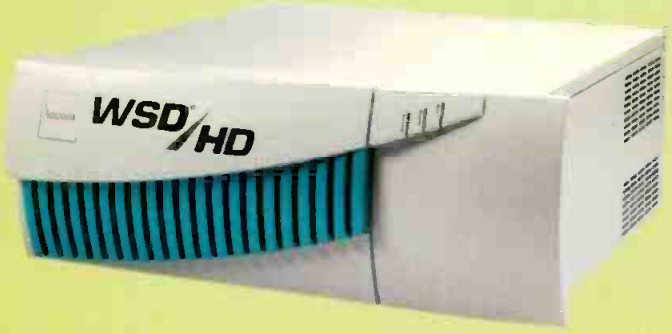

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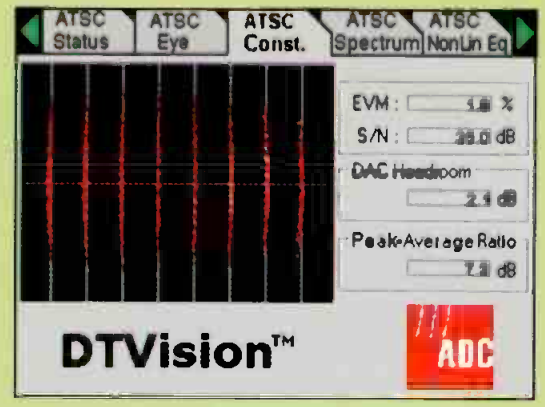

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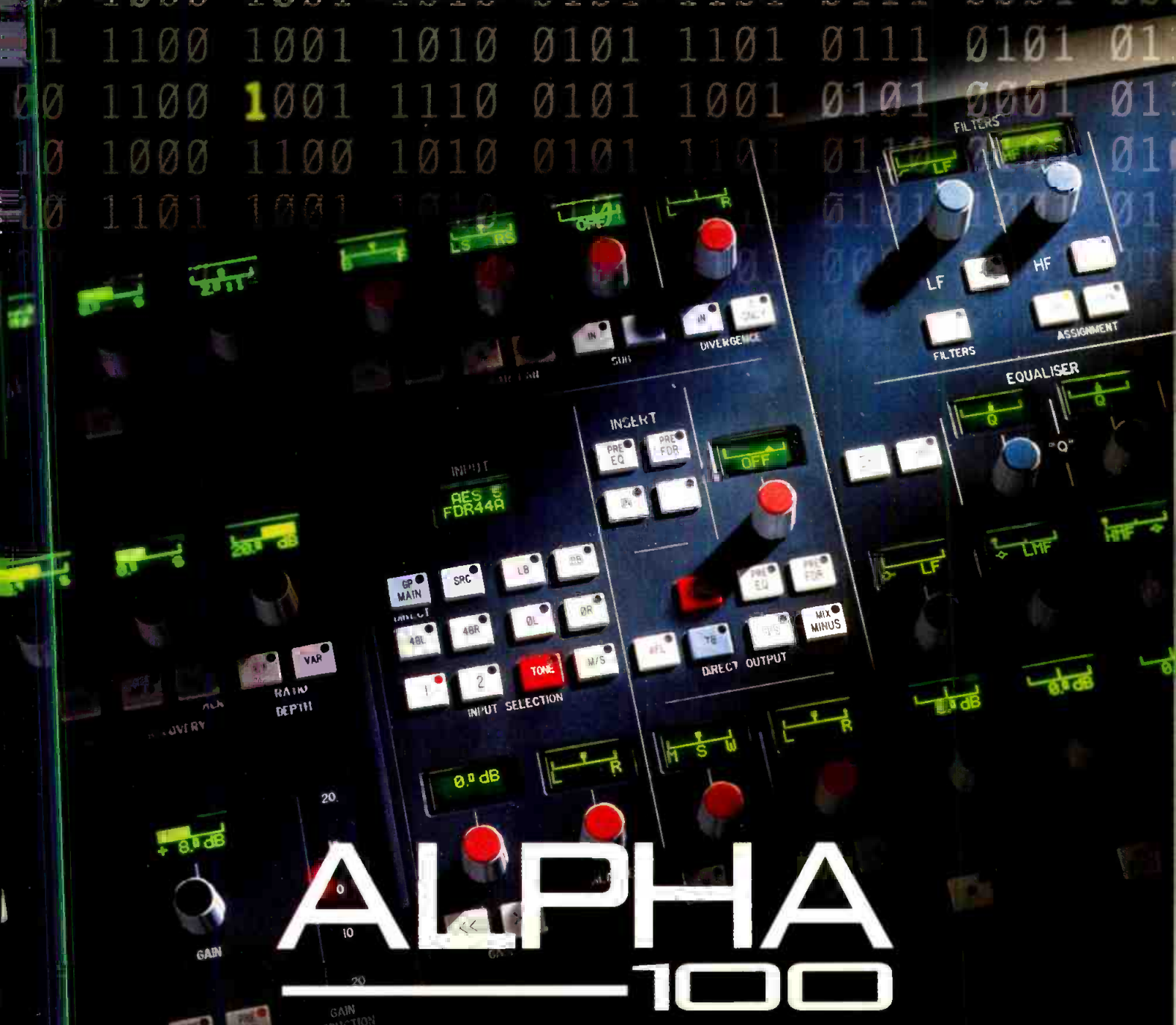

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www.evertz.com

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DIGITAL AUDIO CONSOLE

Calrec Audio Alpha 100

Fifth-generation Calrec desk features assignable digital control surface providing 48 multitrack/matrix outputs, 20 auxiliary buses, eight audio groups and four main outputs – each of which can function as mono, stereo or surround; all desk functions are saved to snapshots and full-system reset is achieved without audio interruption.

+44 1422 842 159; fax: +44 1422 845 244; www.calrec.com

Booth R2569 Circle (303) on Free Info Card

LIGHTWEIGHT EQUIPMENT CASES

Cases Plus TC2000 Series:

Designed with extra emphasis on strength, style and comfort; outer shell is high density thermofoamed polyethylene plastic giving it chemical resistance and high durability; a gasket in valance seal between the body and the top of the case closure seals out water, salt air and dust; equipped with wheels and telescoping handles.

800-9982-1880; www.casesplus.com

Booth E3914 Circle (305) on Free Info Card

WIRELESS TRANSMISSION SYSTEM

Canon DT-50/SDI:

Latest version of its Canobeam line allows full-bandwidth wireless transmission of a wide variety of digital video signals; system is ideal for transmitting sports events and news over 2km with a direct line of sight; sets up quickly and requires no license or frequency allocation.

800-321-4388; fax: 201-816-2909; www.canonbroadcast.com

Booth L10436 Circle (304) on Free Info Card

GRAPHIC PROCESSOR

Chyron Aprisa family:

Robust new 4RU hardware design includes redundant, hot swap power supplies and front loading, removable SCSI drives with RAID 0, 3, or 5 options; CG Playback Option plays back rolls, crawls, and flipbooks in an independent frame buffer that can be layered with key over the clip playback; Web Streaming Option streams out the entire DDR program buffer in Real G2 or ASF formats.

888 4 CHYRON; fax: 631-845-3867; www.chyron.com

Booths I6631, L12300 Circle (306) on Free Info Card

FIBRE CHANNEL STORAGE SOLUTION

Ciprico 2Gb JBDD

Expands real-time performance to 200MB/s per disk array; upgradable from 1Gb to 2Gb solution with a lower performance parity rate.

800-727-4669; fax: 763-551-4002; www.ciprico.com

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Circle (158) on Free Info Card

INTELLIGENT VIDEO SCALER

Communications Specialties Deuce MC:

Converts standard TV video to high-resolution, non-interlaced video with a user-selectable motion compensation feature that can be set based on the specific input source image; also features three scaled output resolutions, standard line doubling and quadrupling outputs, composite, S-Video and YcbCr component inputs and RGB or YcbCr component outputs plus an RS-232 remote.

631-273-0404; fax: 631-273-1638; www.commspecial.com

Booth M8767 Circle (308) on Free Info Card

CHARACTER GENERATORS

Compix Video CG:

Comes complete with a high-quality and high-capacity PC ; standalone turnkey systems are available with standard studio industrial strength rackmount cases; systems are compatible with composite video, S-Video or component video formats; all systems feature Alpha Key – 256 level linear key out.

310-320-8937; fax: 310-320-8938; www.compixmedia.com

Booth S2847 Circle (309) on Free Info Card

DATABASE INTERFACE SOFTWARE MODULE

Crispin WebAgent:

Interfaces with Crispin's database, AssetBase; checks video servers and other resources to make sure they're online and available; gathers information on the server, material ID, comment and duration from these devices if available; generates dublists for Crispin's Dubber 2000 module; takes translated traffic files from AssetBase to generate discrepancy reports and gathering typical traffic log information; can only be used in conjunction with AssetBase.

919-845-7744; fax: 919-845-7766; www.crispincorp.com

Booth: L12568 Circle (310) on Free Info Card

DIGITAL CHROMA KEYER

Crystal Vision Safire:

Allows users to make fine adjustments for optimized edges, shadow processing, internal and external masks, and linear key, mix and wipe modes; features a 266mm x 100mm board, which fits into Crystal Vision's standard interface frames, allowing six chroma keyers in 1U or 12 in 2U.

+44 1223 506 515; fax: +44 1223 506 514; www.crystalvis.com

Booth: L116 Circle (311) on Free Info Card

SAN SCALABILITY DIMENSION

DataDirect Networks Pay as you Grow:

New program launched across the company's SAN appliance family supplies users with higher levels of capacity in increments on an as-needed basis; the first level of the plan is the SAN directION SAN appliance, which provides for the requirements of small workgroups and clusters; users can move from this system to the larger SAN DataDirector SAN appliance configurations according to the amount of storage they need; SAN appliance hardware and software needed for future applications can be installed now, and the user can pay only for the part of the configuration actually in service.

800-322-4744; 818-700-7600; fax: 818-700-7601; www.datadirectnet.com

Booth: S5319 Circle (312) on Free Info Card

IMAGE SERVER

da Vinci Gallery:

Resolution-independent image server used in conjunction with 2K Color Enhancement System's internal frame store; allows colorist to compare, wipe and mix images in the frame store or live images with those in the Gallery; another feature is 10-bit log over HD I/O for data transport of RGB 16x9 images in real time.

919-845-7744; fax: 919-845-7766; www.crispincorp.com

Booth: L6406 Circle (313) on Free Info Card

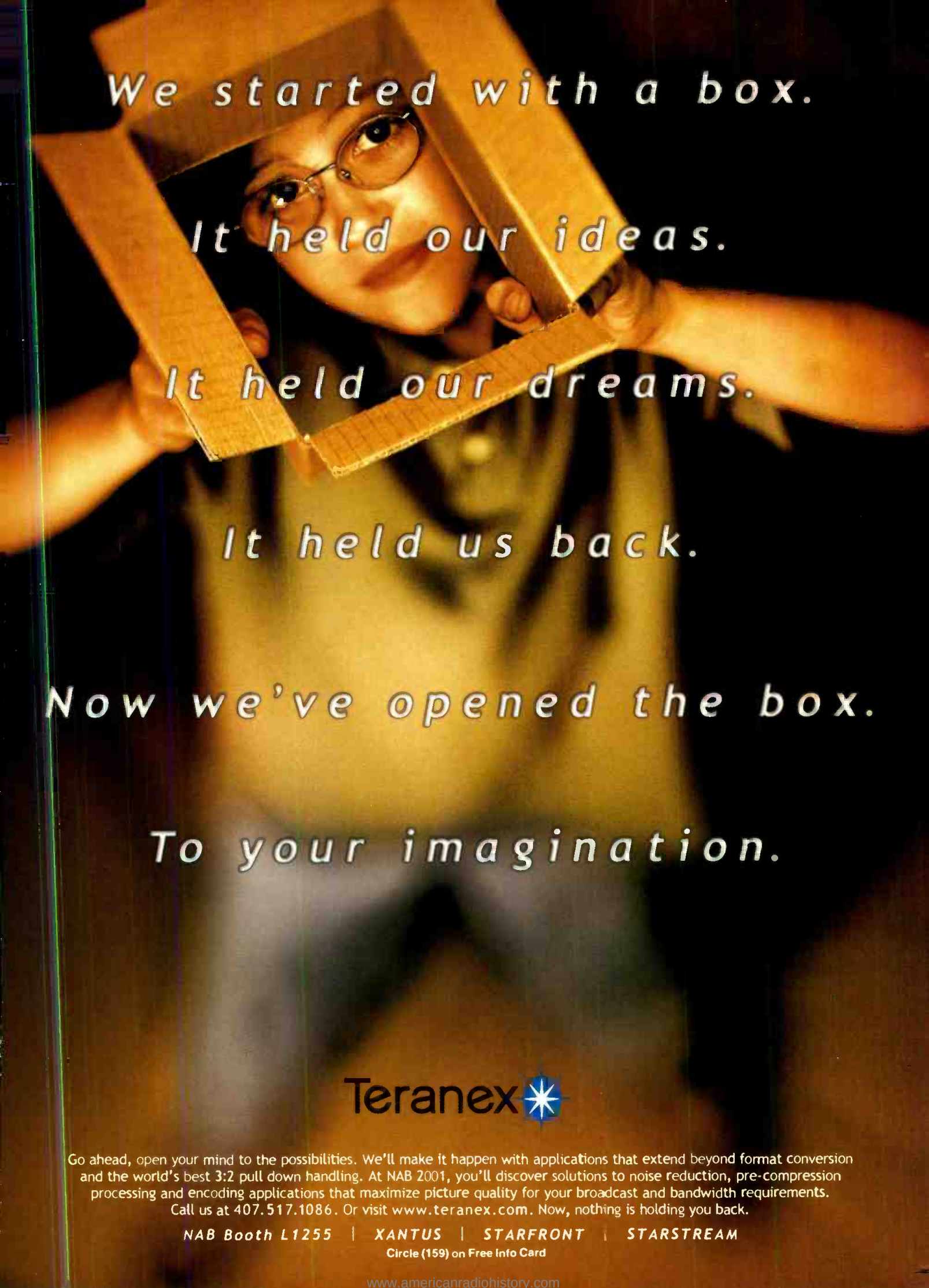
A/D CONVERSION MODULE

dB Technologies M*AD-824:

24-bit 96kHz module provides dB's dB*44-96 multichannel conversion system, which supports four slots for M*series modules; module is used with a M*Sync-1 clocking module, which provides internal and external word clock or AES sync capabilities for the M*AD-824; clocking module supports 44.1-, 48-, 88.2- or 96kHz, plus varispeed rates.

323-845-1155; fax: 323-845-1170; www.aidinc.com

Booth: R2855 Circle (314) on Free Info Card



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NEWSROOM AUTOMATION SYSTEM

DCM/Autocue WinCue family:

WinCueTx, WinCueNews; and WinCueNet form an integrated software family that provides flexible, innovative and seamless solutions for transmission facilities, production offices and newsrooms; new features include cuts-only video editing, desktop edit facilities, a variety of web interfaces, prompter integration, and extended automation event handling.

704-377-1496; fax 704-377-6336; www.dcm.net

Booth L12158 Circle (315) on Free Info Card

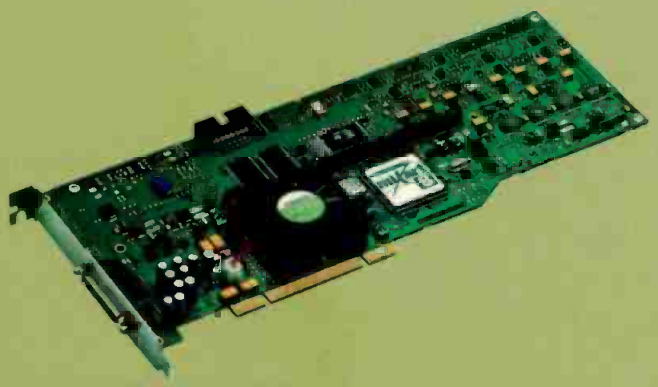
UHF PANEL ANTENNA

Dielectric Communications Deltalite:

Broadband, low-windload UHF panel antenna for the load conscious broadcaster; simple proven feed system design offers a high level of reliability.

866-DIELECTRIC; fax: 207-655-7120; www.dielectric.com

Booth L1429 Circle (316) on Free Info Card



AUDIO PROCESSOR

Digigram miXart:

Based on Motorola's PowerPC processor; includes scalable PCI cards with multiple analog and digital signal paths with on-board processing; other features include customizable editing and mixing software that can be integrated into the user's application, as well as an SDK for additional development; now available with eight analog input/output paths, four studio-quality microphone preamps and MIDI.

703-875-9100; fax: 703-875-9161; www.digigram.com

Booth: R2773 Circle (317) on Free Info Card

EDITING SOLUTION

Discreet Edit 6:

Advances support of jobnet, Discreet's NT based, real-time workgroup SAN solution to enable sharing of media assts; offers embedded content creation, encoding and web streaming capabilities with support for QuickTime, Windows Media Player and RealNetworks codecs.

800-869-3504; fax: 800-305-6442; www.discreet.com

Booth S4100 Circle (318) on Free Info Card

DIGITAL FRAME SYNCHRONIZER

Dolby Laboratories DP583:

Accepts all Dolby E and Dolby Digital frame and data rates, as well as PCM inputs and provides an output that has been reframed to match local plant reference; also allows post facilities to record Dolby E streams to non-video recorders, such as 20-bit DAT.

800-33-DOLBY; fax: 415-863-1373; www.dolby.com

Booth R2715 Circle (319) on Free Info Card

ANTENNA SERVICES

Doty Moore Antenna services:

New turnkey service for the procurement and installation of antenna systems; Doty Moore provides technical specifications, tower analysis tower modification, transmission line and antenna installation.

972-5560-9500; fax: 972-293-1255; www.spectrasite.com

Booth: L12611 Circle (320) on Free Info Card

VIDEO SERVER

Editing Technology Corp. ETC! FSC 1000:

New Windows version of the system; the server-based system can be used to replace videotape cart systems; new Windows interface offers familiar Windows features to facilitate user operation; users can sequence segments containing multiple elements, load them directly onto the server, name the clips or elements to be played and assign them a mode and length of play.

818-840-1101; fax: 818-556-3973; www.etcedit.com

Booth: L1269 Circle (321) on Free Info Card

PROGRAM CONTROL SYSTEM

Encoda Paradigm Program Control module:

Encoda is offering the control module for the first time in an application service provider (ASP) environment for broadcast station groups and multichannel cable networks; allows users to manage programming assets, staff, content, material and related expenses from a notebook computer.

303-237-4000; fax: 303-237-0085; www.encodasystems.com

Booth: L12220 Circle (322) on Free Info Card

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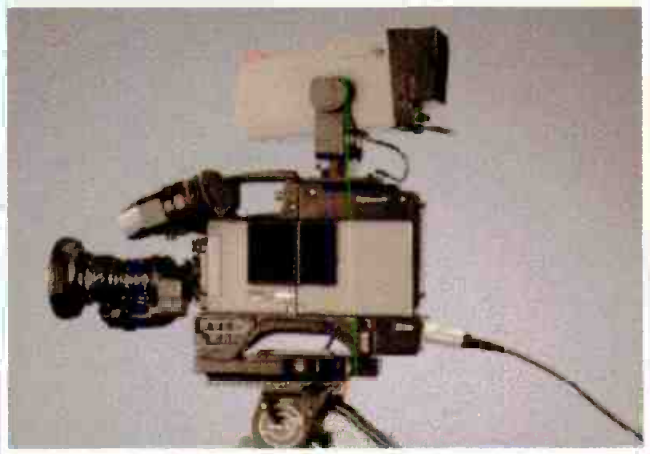

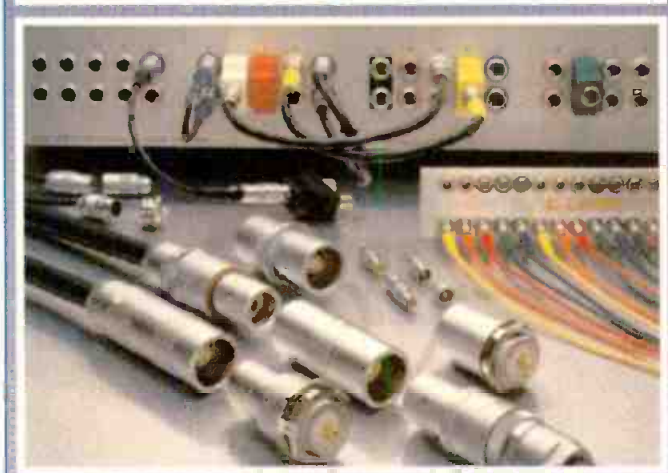

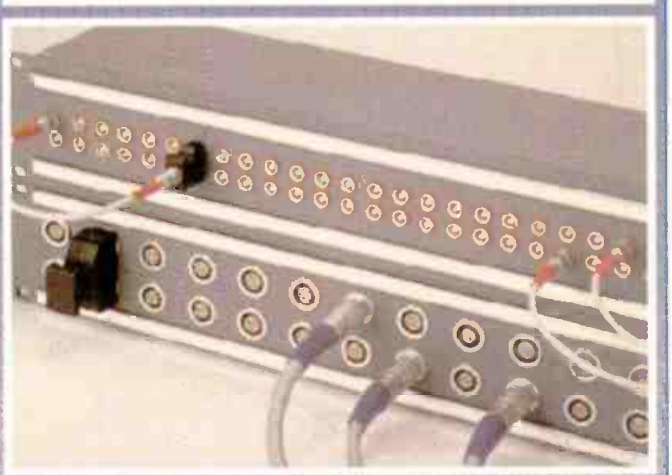

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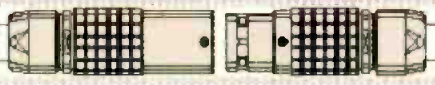

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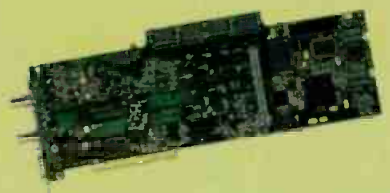


MULTIMEDIA INSERTION TECHNOLOGY

Enseo DVinci:

Provides video and graphics mixing capabilities, including transparent graphics and hardware-assisted rolls and crawls.

888-478-2687; 972-234-2513; fax: 972-680-7144; www.enseo.com

Booth: M7871 Circle (323) on Free Info Card

MONITOR STAND

Ergo 2000 CSD-15VA:

Fold-over design enables the unit to hold a 15-inch monitor, 101-key keyboard and a trackball in 3RU of vertical space and only 20 inches of depth; this configuration allows users to incorporate KVM switches, power conditioners and other accessories behind them; users can toggle between live video, computer signal and antenna feed.

800-635-9297; 714-992-0874; fax: 714-992-2131; www.ergoind.com

Booth: L414 Circle (324) on Free Info Card

AUDIO MONITORING SOFTWARE SYSTEM

Euphonix E-Deck:

E-deck allows users to access audio files of mixes from anywhere in the world via a secure server and personal computer; Listen-In feature enables real-time remote monitoring of live studio sessions through a PC; application is optimized for a range of connection speeds; playback is via PCM stereo at rates up to 24-bit/96kHz, with 24-bit/96kHz surround mixes available.

818-766-1666; fax: 818-766-3401; www.euphonix.com

Booth: R3005 Circle (325) on Free Info Card

PORTABLE FIBER OPTIC MODULES

Evertz 2405 series:

Wavelength conversion capability allows cost-effective wavelength conversion (eg 1313nm<>1550nm) to be accomplished in a single module, allowing compatibility between incoming/outgoing feeds and native system wavelengths.

905-335-3700; fax: 905-335-3573; www.evertz.com

Booth L12146 Circle (326) on Free Info Card

COMPUTER-TO-VIDEO SCAN CONVERTERS

Extron 300D:

Features user-selectable levels of horizontal and vertical filtering, high levels of color bit depth and autoscanning technology; capable of autoscanning images up to 1600x1280 resolution at 100kHz horizontal and 120Hz vertical frequency; RS-232 controllable with SIS and RGBS/HV as well as component, S-Video and composite video.

800-633-9876; fax: 714-491-1517; www.extron.com

Booth M7936 Circle (327) on Free Info Card

VIDEO SWITCHER

Extron SVS 100:

Four input, one output video switcher offers seamless switching, switching effects, picture controls, audio switching, user presets, vertical blanking and genlock capability; NTSC and PAL compatible, offers two composite and one S-Video outputs.

800-633-9876; fax: 714-491-1517; www.extron.com

Booth M7936 Circle (328) on Free Info Card

JIB

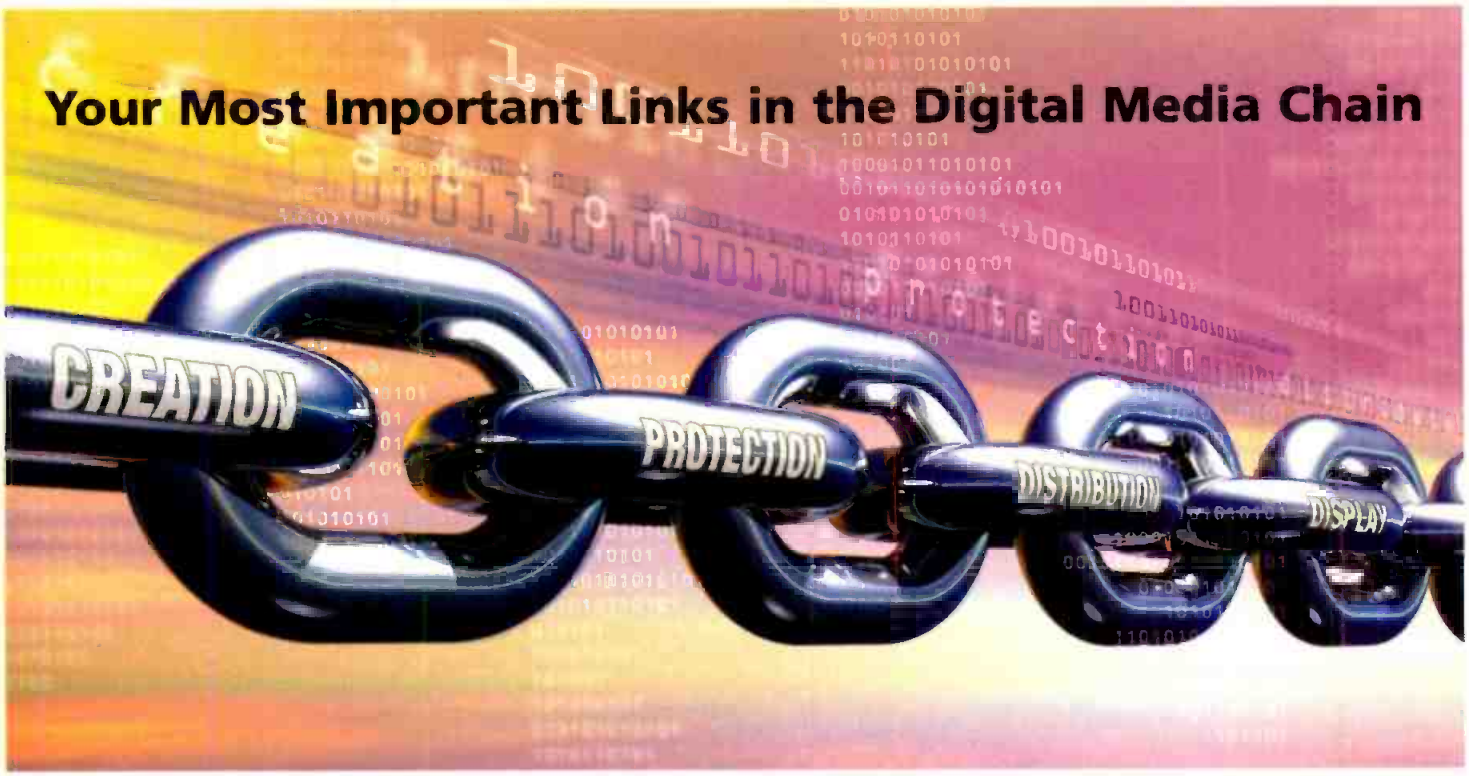
EZ FX Jib and Handle:

User-friendly jib arm is lightweight, portable and easy to set up; wide range of camera movement created by the jib produces smooth floating camera shots and simulated dolly moves.

407-877-2335; fax: 407-877-6603; www.ezfx.com

Booth S4205 Circle (329) on Free Info Card

Your Most Important Links in the Digital Media Chain



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www.thomson-multimedia.com

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BROADCAST & NETWORK SOLUTIONS

Circle (161) on Free Info Card

CABLE SIMULATOR

Faraday Technology Remote Cable Clone:
New version of Faraday's Cable Clone can be remotely controlled via an RS 232 interface; allows users to automatically switch between various lengths of simulated cable, rather than actually switching manually between different lengths of cable to test for the crash point of digital equipment; system allows for repeatability in the field.

+44 1782 661 501; fax: +44 1782 630 101; www.faradaytech.co.uk

Booth: L331 Circle (330) on Free Info Card

EDITING SYSTEM SPEED ENHANCEMENT

Fast Sales US InTime Option:
Rendering technology for accelerating even extremely complex compositing; six additional processors enhance the system to provide parallel processing power for either FAST's silver or purple NLE systems.

800-249-FAST; www.fastsalesus.com

Booth S4817 Circle (331) on Free Info Card

FIBER OPTIC DATA SYSTEM

Fiber Options RingMaster:
Self-healing, field selectable systems has floating master capability, in which one module must function as a master for control purposes so that if power fails, the system can continue to function; can be configured as point-to-point, drop-and-insert, or self-healing ring configuration; an 18dB optical budget for long-distance performance is standard.

800-342-3748; fax: 516-567-8322; www.fiberoptions.com

Booth S4166 Circle (332) on Free Info Card

DESKTOP EDITOR

Florical Systems NewsClipper:
Enables low-resolution desktop editing of raw news footage, saving time and expense; provides either cuts-only edited master high-resolution files or air or and EDL for use with any Avid, Sony or other editor using CMX EDLs.

352-372-8326; fax: 352-375-0859; www.florical.com

Booth L1317 Circle (333) on Free Info Card

FIREWIRE CABLE

FOCUS Enhancements (formerly Videonics) Distance DV:
Carries DV signals over distances of 10 to 50M; comprised of a single IEEE-1394-compatible cable with proprietary filter and equalizer that reduces noise and signal attenuation; cables available in 10, 20 and 50 meter lengths and each ships with locking four to six pin adapters.

800-338-3348; fax: 408-866-4859; www.videonics.com

Booth S5309 Circle (334) on Free Info Card

MULTISCREEN PRESENTATION SWITCHER

Folsom ScreenPro Plus:
Integrated package simplifies system interconnections, setup and control for presentations with up to three screens; features an intuitive user interface and a modular internal design; allows operators to select from up to sixteen universal inputs accepting composite video, s-video, component video, and computer video sources (640x480 VGA to 1600x1200 UXGA); system supports fourteen transition effects, including dissolves, wipes, cuts, and fade.

888-414-SCAN; 916-859-2500; fax: 916-859-2515; www.folsom.com

Booth: M9168 Circle (335) on Free Info Card

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VIRTUAL STUDIO SYSTEM

For-A digiWarp-EX:

Simple, cost-effective virtual studio system with 2048 x 2048 pixel, high-resolution background that allows no picture deterioration during zooms; easy system setup and breakdown for increased mobility when changing studio locations; auto defocus background in response to camera zoom.

212-861-2758; fax: 212-861-2793; www.for-a.com

Booth: L8612 Circle (336) on Free Info Card

AUDIO PROCESSOR AND DELAY

Fortel DTV DAS-441:

I/Os include two stereo pairs of balanced analog audio and two AES pairs of unbalanced digital audio; digital I/O uses 75-OHM BNC connectors for ease of installation; reference quality 24-bit A/D and D/A conversion at 96kHz for the analog I/Os ensures maximum transparency; maximum I/O levels are +28dBu.

800-530-5542; fax: 404-885-1501; www.forteldtv.com

Booth L1261 Circle (337) on Free Info Card

HDTV CINE-STYLE LENS SET

Fujinon XA87x lenses:

offer 87x magnification ideal for sports shooting and other applications where extreme close-ups and high-image quality are critical; lenses feature focal lengths up to 2300mm; XA87 series is available with an optional integrated image stabilizer.

800-553-6611; fax: 973-633-5216; www.fujinon.com

Booth L8739 Circle (338) on Free Info Card

STAND-ALONE IMAGE STABILIZER

Fujinon Image Stabilizer:

Compatible with most of Fujinon's existing field lenses.

800-553-6611; fax: 973-633-5216; www.fujinon.com

Booth L8739 Circle (339) on Free Info Card

MULTI-PAIR CABLES

Gepco 5596GFC Series:

Next-generation 110Ω AES/EBU digital audio multi-pair cable is designed for both superior electrical and mechanical performance; highly accurate for transmission of all formats of AES3 digital audio, including 24-bit, 96kHz; features an extended 12.3MHz bandwidth, ultra-low attenuation and jitter, mechanical stability and a 110W impedance.

800-966-0069; fax 847-795-8770; www.gepco.com

Booth: L5856 Circle (340) on Free Info Card

FACILITY CONTROL SOLUTION

Grass Valley Group Encore:

An open, scalable solution for facility control provides centralized and distributed router and machine control, remote monitoring and diagnostic capabilities and signal-integrity analysis to expand the capabilities of their LAN, Wan and video networks, thus maximizing signal management infrastructure investments; design will enable tighter integration with automation systems, third-party routers and other equipment, system promotes greater inter- and intra-facility integration.

800-824-5127; fax: 530-487-3755; www.grassvalleygroup.com

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smoke from Discreet gives you the tools to keep eyes riveted to the screen.

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Visit us at NAB Booth # S4100

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ROUTER SERIES

Grass Valley Group Concerto, Tempo and Bravo:
Each series offers a flexible, future proof design for a variety of applications – from multiscreen presentations to video and audio over broadband networks to traditional television-related uses; Concerto series features FlexFrame technology to enable format mixing within a single frame while supporting SD and HD video signals, AES/EBU digital audio; Tempo series offers FlexPoint technology that lets users configure 34 ports as I/Os; Bravo series provides entry-level series of fixed configuration utility routers.

800-824-5127; fax: 530-487-3755; www.grassvalleygroup.com

Booth L10409 Circle (342) on Free Info Card

NEWSROOM SYSTEM

Grass Valley Group Vibrint Digital News Production System:
PC-based software solution includes FeedClip, and interactive feed capture system, NewsEdit, a nonlinear editing system, and NewsQ, a low-cost playback application; provides native MPEG, DV and DVCPRO support and data throughput rates of up to 50Mb/s.

800-824-5127; fax: 530-487-3755; www.grassvalleygroup.com

Booth L10409 Circle (343) on Free Info Card

PRODUCTION SYSTEM

Grass Valley Group Vibrint/Profile platform:
new platform technology utilizing the Vibrint Digital News Production Workgroup system and a new version of the Profile XP Media Platform for production; together, the products provide flexible, end-to-end support of both DVCPRO- and MPEG-based news production environments; system incorporates the Grass Valley MAN real-time shared storage option for the Profile XP Media Platform and the Profile Network Archive partial file restore software; compliant with the Grass Valley Group's ContentShare software platform for media asset management to allow integration with third-party systems such as VNI News Tracker and Avid's iNews Media Browse.

800-824-5127; fax: 530-487-3755;
www.grassvalleygroup.com

Booth L10409 Circle (344) on Free Info Card

VIDEO MEASURING SET

Hamlet ADEPT:
DV-ready, entry-level, multiformat-capable, measuring set provides S-Video and composite and component 625/525 multistandard measurement and monitoring capability; SDI and Firewire are optional inputs; waveform and vectorscope displays of signals are depicted as familiar composite or component traces and output to any composite or S-Video monitor.

+44 0500 625 525; fax: +44 1494 791 283; www.hamlet.co.uk

Booth L6130 Circle (345) on Free Info Card

MPEG-2 ENCODER MANAGEMENT SYSTEM

Harris FlexiCoder:
Software application that replaces the GUI on the FlexiCoder chassis used for operation and control; enables broadcasters to remotely configure and control their Harris encoder as well as their ATSC satellite decoder (Harris NETplus) and ATM/IP communications link (Harris LINKplus); also enables the encoding system to be linked to the Harris Broadcast Manager.

800-622-0022; fax: 513-459-3890; www.harris.com

Booth L5023 Circle (346) on Free Info Card

DIGITAL AUDIO RECORDER

Henry Engineering DigiStor II:
Solid state digital audio recorder that can store up to 16 minutes of audio with a bandwidth of 7kHz; can record from a microphone or line level source; supports multiple play modes and features full remote control capability.

626355-3656; fax: 626-355-0077; www.henryeng.com

Booth R2132 Circle (347) on Free Info Card

STANDBY VIDEO SYSTEM

Horita SVS-50:
Self-contained video system that outputs standby full/SMPTE color bars with a source ID video overlay whenever a loss of normal video is detected; overlay can be up to nine lines or 20 characters each and can include a time and date display.

949-489-0240; fax: 949-489-0242; www.horita.com

Booth L9773 Circle (348) on Free Info Card

When Chicago's Tallest Building Needed 15 Channels* - They Came To the Leaders in Broadband Technology!

Chosen, by TrizecHahn Property Group, for over 30 years of global manufacturing experience, RFS is the leader in broadband technology.

Our broadband RF systems offer the most flexible and customized arrangements for the DTV Market and beyond.

RFS designs and manufactures broadband panel arrays, slot antennas, and combiners for adjacent and non adjacent channels designed to suit your needs. Complimented by a full range of rigid and flexible line along with complete accessories which have been reliably manufactured and supplied to the broadcast market for decades. RFS is your Total Systems Solution provider - come take a fresh look, we will deliver.

DTV Ready....

DTV Proven!

RADIO FREQUENCY SYSTEMS
RFS Broadcast
59 Dodge Avenue
North Haven, CT 06473
Tel: 203-239-3311 Fax: 203-239-9260
email: info@rfsbroadcast.com
web: www.rfsbroadcast.com

*Customer Requirements; 5 Channel, 7 Channel, and 3 Channel System

Circle (164) on Free Info Card

First Sears Building Broadband Panel Array Antenna

NEWS AND SPORTS AUTOMATION SYSTEM

IBIS SprinTx:

Integrates seamlessly with servers and newsroom computer systems from all major manufacturers and uses MOS protocols to ensure that the playout module can automatically be updated with any changes to the transmission schedules.

+44 1458 851150; fax: +44 1458 851170; www.ibistv.co.uk

Booth L11520 Circle (349) on Free Info Card

LOGGING SOFTWARE

Imagine Products MacTEP V7.0 and V8.0:

New versions feature compatibility with Apple's Final Cut Pro editor and OS 9.1 compliance; Final Cut Pro file export enables users to select and transfer logged shots for batch digitizing; HTML publishing feature allows for simple posting to the Web and offers the ability to save logs to searchable CDs; V8.0 adds Auto Capture Technology features allowing multifile searching of subdirectories or of the entire hard drive.

317-843-0706; fax: 317-843-0807; www.imagineproducts.com

Booth: i6755 Circle (350) on Free Info Card

GRAPHICS SOLUTION

Inscriber LIVE!RTX:

Includes development tools for the creation of custom information channels that combing streams of dynamic data with video; provides live titling solutions any application and features robust and flexible video clip playback, a simplified programming interface and sophisticated layering of active graphics, digital clips and background video.

800-363-3400; fax: 519-570-9140; www.inscriber.com

Booth S4832 Circle (351) on Free Info Card

DATACASTING CONTENT PROTECTION

Irdeto Access CypherCast:

IP/Internet digital conditional access solution allows the broadcast of up to 1000 individual multicast streams arrayed in up to 100 distinct program services for as many as 250,000 subscribers in a local viewing area; on the receive end, content can be accessed and decrypted through secure smartcard technology.

+31 23 556 2222; fax: +31 23 556 2240; www.irdetoaccess.com

Booth i6842 Circle (352) on Free Info Card

DTV TRANSMITTER

Itelco 50kW UHF:

Features an exclusive exciter system, a patented Switch Mode Beam Power Supply and the Itelco Supervisory System for remote monitoring and control; will accept IOT output devices from any major manufacturer; very small footprint.

303-464-8000; fax: 303-464-8770; www.itelco-usa.com

Booth L1417 Circle (353) on Free Info Card

TELECINE

Innovation TK Millennium Machine 70mm gate/4K high-speed data option:

New option for ITK's Millennium telecine enables 4K data transfers; users can now transfer both 65mm and 70mm film formats, including large formats like the 15-perf; same features are available when working with the 70mm format, including the same zooms, pans and rotates, as well as video processing with the same real-time aperture and primary and secondary color corrections.

+44-1992-553533; fax: +44-1992-558979; www.innovation-tk.com

Booth: L6356 Circle (354) on Free Info Card

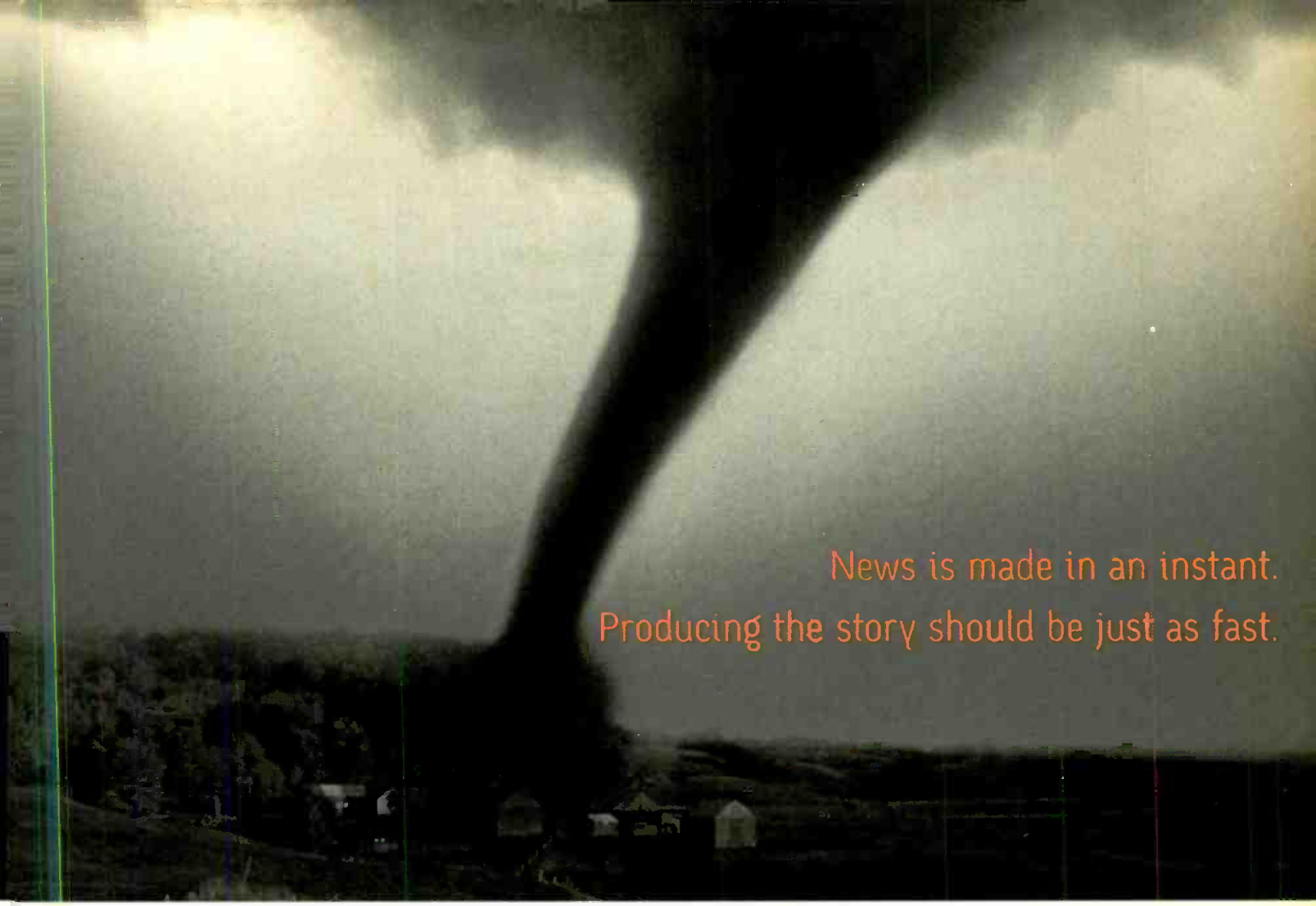
LIGHTING

K5600 Joker-Bug 800:

Comparable to a 3200/4000W quartz fixture but with a power draw of only about 12.5Amps; small quiet ballast can be easily hidden and greatly reduces the risk of overloading any circuit.

800-662-5756; fax: 818-762-6629; www.k5600.com

Booth L5356 Circle (355) on Free Info Card



Chances are, you've heard that digital technology can help produce news faster and easier. With an SGI Media Server,™ the evolution to digital can happen just as fast. The new SGI video server distributes media as data for browsing and sharing content over standard data networks, allowing you to leverage your existing infrastructure for repurposing content. Plus, our multi-format, resolution-independent solution delivers simultaneous input, serving, and play-out of video, eliminating the need for independent devices. These advantages – as well as 24x7 service and support – help make your transition to digital quick and easy. To learn more about SGI Media Commerce™ solutions, visit our Web site or call 1-800-800-7441.

www.sgi.com/go/broadband

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The new SGI Media Server • Up to 8 video channels • Video file transfers • Multi-format video I/O support

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BROADCAST, POST ASSET MANAGEMENT SYSTEM

Keyvia Key-MediaWorks Asset Management System 1.3: Complete environment for managing broadcast digital assets by combining asset management, recording automation, proxy browsing and marking into a scalable client/server architecture; LAN-based PC workstation are able to browse and mark digital assets under configuration using a frame-accurate, low-res proxy.

514-876-2855; fax: 514-876-3664; www.keyvia.com

Booth: M10226 Circle (356) on Free Info Card

CONNECTORS

Kings Electronics 7760 Series Fibre-Cam Tri-Loc: Hybrid fiber optic/electrical connector meets SMPTE 304M electrical and optical performance requirement; features field serviceable fiber optic terminations, polarized key mating and Kings Tri-Loc style connector body; design features direct crimp on outer cable braid, internal strength member, and power and audio contacts.

888-909-5551; 803-909-5000; fax: 803-909-5092; www.kingselectronics.com

Booth: L9039 Circle (357) on Free Info Card

ROUTING SWITCHER

Knox Video Chameleon 256: Matrix can be expanded in multiples of 32 from 32x32 to 256x256 by inserting audio or video cards into a 12U rackframe; audio and video frames are linked together via serial cable; audio-follows-video or audio can be routed separately; internal milspec power supply is 110V/230V auto-sensing; command options including SALVO, batch and strings are available via RS232 or the optional front panel controller; serial protocol is simple ASCII.

301-840-5805; fax: 301-840-2946; www.knoxvideo.com

Booth: L9054 Circle (358) on Free Info Card

8VSB MODULATOR

Ktech Telecommunications VSB-ENC-200: Modulates MPEG-2 transport stream into an 8VSB signal using linear and nonlinear pre-correction techniques; accepts SMPTE-310 or DVB-ASI @19.392Mb/s transport stream inputs and produces a 44MHz IF 8VB signal at output.

818-361-2248; fax: 818-270-2010; www.ktechtelecom.com

Booth L577 Circle (359) on Free Info Card

MULTIFORMAT DIGITAL VIDEO GENERATOR

Leader Instruments LT 442D: Provides two SDI outputs conforming to SMPTE 292M and eight channels of embedded AES/EBU digital audio in compliance with SMPTE 299M; six channels of AES/EBU digital audio are available in stereo pairs from three dedicated BNC connectors; generator genlocks to tri-level sync as well as NTSC or PAL black burst and offers advance/delay settings of up to ±100 lines and ±1100 pixels in one-pixel increments; analog outputs include tri-level sync, horizontal and vertical drive.

800-645-5104; 714-527-9300; fax: 714-527-7490; www.leaderusa.com

Booth: L8777 Circle (360) on Free Info Card

OSCILLOSCOPES

LeCroy Waverunner-2 series: Two- and four-channel digital oscilloscopes feature 350- to 500MHz bandwidth, a sampling rate of 1- to 4GS/s, memory up to 8Mpts, and WavePilot and QuickZoom for easy access to signal measurements; units also feature an Advanced Trigger Package offering runt and slew rate triggering.

800-553-2769; 914-425-2000; fax: 914-578-5985; www.lecroy.com

Booth: S3312 Circle (361) on Free Info Card

NEWSROOM SYSTEM

Leitch NewsFlash II Nonlinear editor is fully integrated with Leitch's VR Technology servers; suite includes BrowseCutter's journalist workstations and access to archival media using DVD archiving.

800-231-9673; fax: 757-548-4088; www.leitch.com

Booth L8620 Circle (362) on Free Info Card

The Avica Platform for Digital Media

Avica Technology introduces an advanced range of products, expressly designed for telecine suite mastering.

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April 23-26

www.avicatech.com

Circle (166) on Free Info Card

HIGH-POWER BROADCAST TUBE

Litton Electronic Devices L-4299 Constant Efficiency Amplifier:
Next-gen high-power tubes for UHF; operates a peak powers up to 120kW, offers high efficiency in comparison to standard IOT when operated in digital services.

800-861-1UHF; fax: 570-326-2903; www.littonedd.com

Booth: L6119 Circle (363) on Free Info Card

MPEG ENCODER

Logic Innovations IPE:
Supports SNMP, the IPE and Transport Stream Multiplexer, allowing data management and control from the broadcasters network management of choice; designed for encapsulation Internet data into an MPEG transport stream for broadcasting across satellite, cable and terrestrial networks.

888-34-LOGIC; fax: 619-455-7273; www.logici.com

Booth: E3217 Circle (364) on Free Info Card

ROUTER CONTROLLERS

Logitek Route3:
Rack-mounted controller for Logitek's Audio Engine offers full input selection control for three devices with a simple, easy-to-learn interface, same labels that display on any Logitek control surface are displayed in the units Route3 LCD window.

713-664-4470; fax: 713-664-4479; www.logitekaudio.com

Booth: R2147 Circle (365) on Free Info Card

MONITORING HARDWARE

Magni Systems SDM-560 Monitor:
Serial digital /composite video and audio monitor provides efficient monitoring of 601, composite video and audio; features routable displays, embedded audio decoding and metering, auto-measurement, alarming, reporting and complete remote control.

800-237-5964; fax: 503-615-1999; www.magnisystems.com

Booth L11373 Circle (366) on Free Info Card

IOT

Marconi Applied Technologies IOTD3100W:
Capable of 110kW peak digital or 55=5.5kW combined analog amplification, this plug-in IOT offers ease of installation and high-performance.

800-342-5338; fax: 914-592-5148; www.marconitech.com

Booth L12545 Circle (367) on Free Info Card

STREAMING MEDIA DESIGN SOFTWARE

Media 100 iFinish 4 PowerGrade series:
Allows web-designers to develop high-quality interactive digital media content for Windows 2000; enables the embedding of interactive instruction directly into streaming media programs to trigger visual, content rich capabilities, including Java, Flash and graphics.

800-773-1770 ; fax: 508-624-9384; www.media100.com

Booth: I6511 Circle (368) on Free Info Card

MPEG-2 ENCODER

MedioStream MediaPRO-XLT:
Interface to legacy systems with input of composite video, analog or AES/EBU audio, SDI or ASI; offers laptop docking module for input and output interfaces; output can be either MPEG-2 4:2:0 or 4:2:2 formats; real-time encoded events can also be transcoded into Windows Media, Real G2 and Quicktime formats.

408-452-5500; fax: 408-452-5522; www.mediostream.com

Booth: E5845 Circle (369) on Free Info Card

WIDEBAND CHANNEL COMBINER

Micro Communications Wideband Channel Combiner:
Provides high-power channel combining in multichannel sites where channels are spread across a wide frequency range; meets the requirements of installations running at high ERPs.

800-545-0608; 603-624-4351; fax: 603-624-4822; www.mcibroadcast.com

Booth: L8768 Circle (370) on Free Info Card

TRIPOD SYSTEM

Miller Camera Support HD 100 tripod:
Lightweight, two-stage carbon fibre system offers Quick-Lok vertical leg clamping, slip carry handle and variable mid-level spreader.

973-857-8300; fax: 973-857-8188; www.millertripods

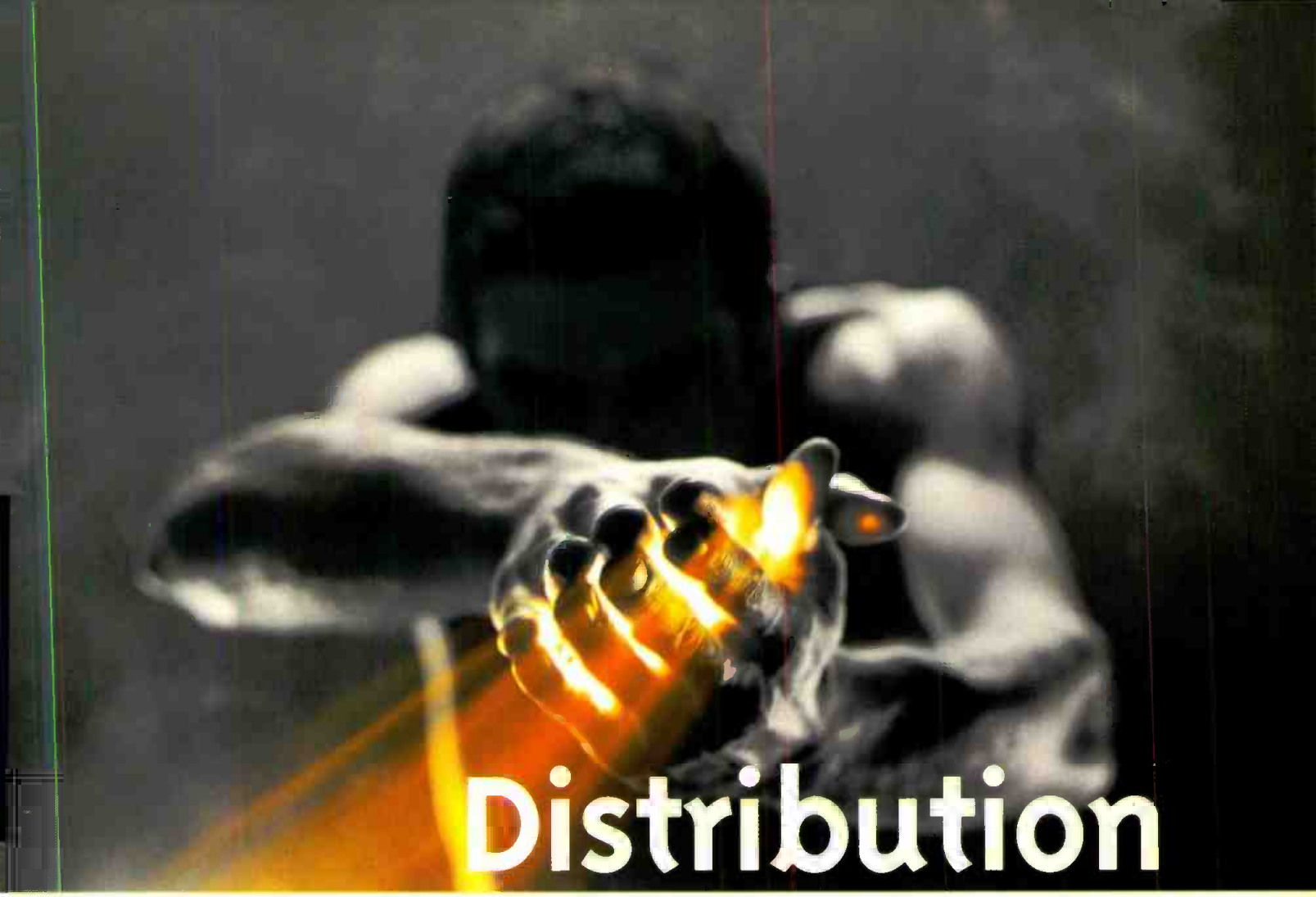
Booth: L10773 Circle (371) on Free Info Card

ROUTING SWITCHER SERIES

Miranda-Network:
Features a complete range of models for signal formats that include analog and digital video, analog and digital audio, HD SDI (SMPTE 292M), RS-422, and the popular datcom formats.

514-333-1772; fax: 514-333-9828; www.miranda.com

Booth: L8632 Circle (372) on Free Info Card



MONITORING

CONTRIBUTION

Open new perspectives in broadcast distribution.

Statewide digital networks, major broadcasters and post-production companies are using BarcoNet encoders and decoders for the quality and flexibility that result in cost-effective operation of your distribution network.

BarcoNet's encoders and decoders offer a great variety of versatile MPEG-2 encoding solutions featuring common ATM, satellite and cable interfaces for primary distribution, studio/transmitter links, and local encoding and decoding applications.

BarcoNet's capability for sharing High Definition and Standard Definition programming between multiple locations in one single network means you can build and rebuild your networks, while always getting the most out of your investment.

www.barconet.com

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See Us at NAB Booth #S5360

FREQUENCY MEASUREMENT SYSTEM

Modulation Sciences Precision Frequency Measurement Panel:

Provides NTSC and 8VSB frequency measurement for television carriers; measures local or off the air frequencies to an accuracy approaching one part in a billion.

800-826-2603; 732-302-3090; fax: 732-302-0206; www.modsci.com

Booth: L4416 Circle (373) on Free Info Card

CABLE CONNECTORS AND BULKHEADS

Neutrik BNC75:

Offers a push-pull version that makes assembly quick and simple and requires a standard center contact crimp die after cable preparation; includes screw lock cable retention with superior pull strength provided by the jacket.

732-901-9488; fax: 732-901-9608; www.neutrikusa.com

Booth 11636 Circle (374) on Free Info Card

SATELLITE INTERACTIVE TERMINAL OUTDOOR UNIT

Newtec America SIT ODU:

Features integrated 30GHz/12GHz or 30GHz/20GHz design compatible with DVB-RCS; available in 0.5, 1 or 2 watts; return channel is up to 2Mb/s with antenna sizes 60 to 90cm.

203-323-0042; fax: 203-323-8406; www.newtec.be

Booth: T550 Circle (375) on Free Info Card

SATELLITE-TRANSMITTER LINK

Nucomm Microwave V Stream:

STL featuring 8VSB modulation; offers digital signal monitoring with SMPTE 310 and ASI digital interfaces.

800-9-NUCOMM; 908-852-3700; fax: 908-813-0399; www.nucomm.com

Booth: L3854 Circle (376) on Free Info Card

MEDIA PRODUCTION TOOL

Omneon Video Network Networked Content Server System with FAST's purple:

Omneon and FAST Multimedia AG have integrated FAST's purple DV editing system to Omneon's platform; the platform's open, standards-based infrastructure serves multiple applications; the integrated system utilizes 1394 I/O with FAST's purple, the I/O serving as an edge device allowing direct transfers to a common file system.

408-585-5000; fax: 408-585-5090; www.omneon.com

Booth: L529 Circle (377) on Free Info Card

DIGITAL VIDEO SYSTEM

Opticomm DVX-5000 System

Universal multimedia digital transport system for distribution over wide area networks including PAL, NTSC and SECAM for multichannel QAM or VSB signals; offers transmission signals for the transport of digitized video, audio and control data signals over single-mode fiber; uncompressed 10-bit serial digital video system at 143, 177, 270, 360, 540 and 622Mb/s data route is free of adjustment over a wide dynamic range; digital signal offers receiver output stability not affected by the fiber, attenuation, aging, splicing or other factors;.

858-450-0143; fax: 858-450-0155; www.opticomm.com

Booth: S3047 Circle (378) on Free Info Card

VIDEOGRAPHICS WORKSTATION

Orad Hi-Tec Systems DVG-10:

PC-based system for virtual sets, on-air graphic and sports simulations; features high performance 3D graphics.

212-931-6723; fax: 212-931-6730; www.orad-ny.com

Booth: S5332 Circle (379) on Free Info Card

VIDEO SERVER

Orad Hi-Tec Systems Forum:

Records and plays on six channels concurrently; features slow motion, video effects, and editing and control using the Elefant remote control; offers provisions for networked operations for use in sports productions.

212-931-6723; fax: 212-931-6730; www.orad-ny.com

Booth: S5332 Circle (380) on Free Info Card

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Step up to Datatek

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The Datatek D-2800 Router

reflects the experience of Datatek's 30 years in the design and manufacture of broadcast-quality routing switchers.

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With a large number of systems in use worldwide, the D-2800 is available for:

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www.datateknj.com

See us at Booth L9949

Circle (168) on Free Info Card

DATATEK CORP

CHARACTER GENERATOR

Oxtel Easytext:

Integrated option to the Imagestore master control and channel branding system; can render static or scrolling characters over custom backgrounds; uses text fed directly via multisession automation; combination of Easytext with Imagestore allows a squeeze and reveal program schedule to be played out, combining a DVE transition with text insertion direct from a playlist.

+44 1491 820 000; fax: +44 1491 820 001; www.oxtel.com

Booth: L147 Circle (381) on Free Info Card

HIGH-DEFINITION CAMCORDER

Panasonic Broadcast AJ-HDC27A:

30frames/s to 60frames/s, dual-frame-rate, progressive-scan (720p) DVCPRO HD camcorder is based on a newly developed 1.1-million-pixel, 2/3-inch, three-CCD IT imaging system; offers a sensitivity of f/11 at 2000lux; provides 46 minutes of recording, two channels of 16-bit/48kHz digital audio, power consumption of 30W, and uses standard, 2/3-inch bayonet lenses; HD-DSI output enables full-color live and tape playback; 8MB multimedia card stores camera setups.

800-528-8601; 323-436-3500; fax: 323-436-3660; www.panasonic.com

Booth: L7020 Circle (382) on Free Info Card

AUDIO INPUT ADAPTER

Panasonic AJ-CA910:

Adapter increases audio channels of Panasonic's AJ-D910WA and AJ-D900WA 50Mb/s DVCPRO50 camcorders from two channels to four; features an LED audio level indication, audio level volume and phantom power supply (+48dB), as well as two inputs/outputs.

800-528-8601; 323-436-3500; fax: 323-436-3660; www.panasonic.com

Booth: L7020 Circle (383) on Free Info Card

VIDEO SWITCHER

Panasonic AW-SW300:

Live/non-live video switcher features four inputs, either composite or s-video; powered by AC or 12 volt DC; also features a built-in frame synchronizer, black-burst output and a variety of basic wipes; other features include a super impose key and intercom/tally capabilities.

800-528-8601; 323-436-3500; fax: 323-436-3660; www.panasonic.com

Booth: L7020 Circle (384) on Free Info Card

VIDEO PRODUCTION SYSTEM

ParkerVision PVTV Studio NEWS:

System features integrated video, audio, machine, camera and teleprompter functions; operators can control the system from a one- or two-operator station, available in Digital 16, Digital 24 and Digital 24 Plus! Systems; several package options available, several including ParkerVision's three-CCD robotic pan/tilt cameras and multicamera controllers.

800-532-8034; fax: 904-731-0958; www.pvtv.com

Booth L541 Circle (385) on Free Info Card

ROUTER

PESA Switching Systems Cougar HD/SD:

Supports either HDTV or SDI input and output cards; can be configured as 4x4 or expanded up to 32x32 capacity.

800-328-1008; 631-845-5020; fax: 631-845-5023; www.pesa.com

Booth: L8757 Circle (386) on Free Info Card

HD PRODUCTION SWITCHER FAMILY

Philips Broadcast Seraph:

Includes full range switchers from one mix effects band up to four; HD formats include 1080i, 720p, and 24p.

800-962-4287; fax: 818-729-7710; www.broadcast.philips.com

Booth 5010 Circle (387) on Free Info Card

PRODUCTION SWITCHER

Philips Broadcast DD35:

Now has HD/SD SimulCast networking production; simultaneous SD and HD production from a single switcher panel; up to eight M/Es with intelligent access; internal DVE and RAM storage capability including 2D DVE effects in 3D space as well as up to 32 seconds of video clip storage and/or still store applications.

800-962-4287; fax: 818-729-7710; www.broadcast.philips.com

Booth 5010 Circle (388) on Free Info Card

Everybody Wants More

Everybody is clamoring for more content, more choices and more bandwidth. When the pressure is on, programmers, broadcasters and service providers need the versatility delivered by PowerVu® digital content distribution systems.

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More Choices. Launch made-to-order interactive solutions with versatile encoders, receivers and multiplexers, plus our Explorer® digital set-tops.

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www.scientificatlanta.com

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Circle (169) on Free Info Card

DVE

Pinnacle Systems DVEXcel:

New frame-based DVE offers choice of one, two, three or four channels, each with video and key and three separate DVE engines; features include deep defocus and chroma keying and new effects.

650-526-1600; fax: 650-526-1601; www.pinnaclesys.com

Booth: L11327 Circle (389) on Free Info Card

UNIVERSAL 10-BIT SYNCHRONIZER

Pixel Instruments VS-5200:

Offers multiformat inputs and outputs and a built-in heterodyne TBC; provides selectable inputs in serial digital, composite analog, component analog and Y/C, as well as simultaneous outputs in the same formats; the system's DDO pulse output is used to control the audio delay of the AD-300 for automatic lip sync correction.

408-871-1975; fax: 408-871-1976; www.pixelinstruments.com

Booth: L430 Circle (390) on Free Info Card

ROBOTIC POSITIONING EQUIPMENT

Pro/Four Video Products 2000RP:

Remote positioning equipment features an onboard digital receiver, including control, power and video, and new "true balance" load balancing system; also features a new optical encoder closed-loop servo control design, which insures preset positioning accuracy as fine as one arc minute; unit is intended for use with cameras weighing up to 35 pounds.

813-447-6389; 800-457-8130; fax: 813-447-5166; www.pro-four.com

Booth: S4062 Circle (391) on Free Info Card

TELEPROMPTER SOFTWARE

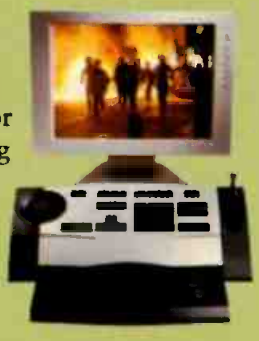
QTV WinCueLT:

Upgrade to QCPWIN prompter program; operates in a Windows95/98NT environment; features spell check, hard copy and support for thousands of scalable True Type fonts; system is multilingual; inserts error marks while scrolling; operates on a laptop or desktop; no preview screen is needed.

212-460-9050; fax: 212-328-1699; www.qtv.com

Booth: L12158 Circle (392) on Free Info Card

LIVE PRODUCTION SERVER



Quantel Clipbox Studio:

Offers access to video clips and stills for studio programming; provides resizing and re-aspecting capabilities for each output through internal 2D DVEs; this feature allows for windowed over-the-shoulder style presentation; internal mixers provide cross-fade capabilities between channels and on-board key combiners allow for live compositing of foreground over background.

203-656-3100; fax: 203-656-3459; www.quantel.com

Booth: L11520 Circle (393) on Free Info Card

HD VIRTUAL SET

Radamec HD Scenario:

Offers an upgrade path for Virtual Scenario users to move SD virtual studios to HD; utilizes high-definition inputs/outputs; processes real-time high definition or standard definition upconverted background video and key into its background and foreground; features an HD chromakeyer and HD still store; can be operated manually or robotically.

877-RADAMEC; 732-246-0906; fax: 732-448-1184; www.radamec.com

Booth: L1441 Circle (394) on Free Info Card

UNDER-MONITOR DISPLAY PANEL

RCI Custom Products Electro Luminescent series:

Lightweight electronic identifier for video monitors and flat panel displays; offers three standard lighting colors; features a wide range of options for font selection and text size; EL technology provides a long-life method of back lighting.

301-984-2202; fax: 301-984-9473; www.rcicustom.com

Booth: M9824, M9825 Circle (395) on Free Info Card

BROADBAND ANTENNA

RFS Broadcast RD Series:

Designed for the digital NTSC/DTV market; wideband (100MHz), low VSWR, low wind load; allows use of a single UHF TV antenna for multichannel NTSC/DTV applications; features include single or dual option, power rating up to 200kW NTSC and top-or-side-mount configuration.

203-239-3311; 203-239-9260;
www.rfsamericas.com

Booth: L9528 Circle (396) on Free Info Card

MICROWAVE LINK

RF Technology ACL-Series:

Link is analog, digital-ready or digital, available in a 2- to 16GHz frequency range; systems can be configured for QPSK, 16QAM or COFDM for transmission of ATSC/HDTV, DS3, E3, E2, E1 or T1; interfaces include G.703, SMPTE-310M and DVB-ASI; features protected/diversity terminals with errorless changeover, adaptive equalization and multiplex equipment; ACL also supports the transmission of analog video and up to six audio subcarriers.

800-762-4369; 203-866-4283; fax: 203-853-3513;
www.rftechnology.com

Booth: L12549 Circle (397) on Free Info Card

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NONLINEAR EDITING SYSTEM

Richardson Electronics Syntax Media Systems:
Multimedia nonlinear editing system is based on third-party editing software; system is tested and configured by Syntax Media Systems and assembled by Richardson Electronics to offer a step-by-step process to deliver video programs either to CD-ROM or the Internet.

800-348-5580; 630-208-2200; fax: 630-208-2550; www.rell.com

Booth: L6122, R2325 Circle (398) on Free Info Card

RECEIVERS/DEMODULATORS

Rohde & Schwarz EFA:
Enhancements to the EFA product family handle digital 8VSB and analog System "M" modulation, as well as US cable; systems demodulate digital formats to MPEG-2 transport at SMPTE 310 or ASI serial interfaces; System "M" is demodulated to baseband video/audio; demodulators utilize a measurement grade RF front end.

301-459-8800; fax: 301-459-2810; www.rohde-schwarz.com

Booth: L5750 Circle (399) on Free Info Card

MASTER CONTROL SWITCHER

Ross Video CDK 111:
Single DA-sized card provides video mixing, keyer with built-in animated logo storage and frame synchronizers for every input; other features include full preview, program bypass relay and automation port.

613-652-4886; fax: 613-652-4425; www.rossvideo.com

Booth: L11639

Circle (400) on Free Info Card

FILM CLEANING SYSTEM

Research Technology International EXCEL 2000:

Motion picture film cleaning system developed by Lipsner-Smith Company for applications where a solvent-based cleaning system is not required; removes dirt and contamination from film using four molded polymer rollers, before passing film through eight softnap rotary buffers with environmentally safe fluids.

800-323-7520; 847-677-3000; fax: 847-677-1311; www.rtico.com

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RANDOM ACCESS VIDEO RECORDER

SADiE Portia:
Eliminates the need for a VTR in track laying and dubbing in post production; system allows video to be recorded into a normal SADiE EDL and accessed with the audio; video appears as a dedicated stream in the EDL so video and audio can be scrubbed simultaneously.

615-327-1140; fax: 615-327-1699; www.sadie.com

Booth: E5935 Circle (403) on Free Info Card

CHARACTER GENERATORS

SAV Kronoss:
Offers real-time positioning, rotation and resizing; features simultaneous video and audio, AES/EBU digital and analog audio in/out with fade, and an additional built-in keyer for external sources.

33 1 53 38 22 00; fax: 33 1 42 40 47 80; www.sav-broadcast.com

Booth: L436 Circle (404) on Free Info Card

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Scientific-Atlanta PowerVu BitMizer:
Offers high-density grooming and MQAM modulator; provides end-to-end solution for cable headends.

770-903-5000; fax: 770-903-4617; www.sciatl.com

Booth: i7246 Circle (405) on Free Info Card

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Circle (171) on Free Info Card

DSNG ENCODER

Scopus (formerly Tadiran Scopus) CODICO E-1700:
Features built-in modulator to allow for encoding and modulation in one unit.

858-618-1600; fax: 858-618-1615; www.tadiranscopus.com

Booth: S5372 Circle (406) on Free Info Card

MPEG-2 VIDEO SERVER SYSTEM

SeaChange International Broadcast MediaCluster 1230/50:
Server system scales from a cluster of three computer servers to larger clusters with dozens of I/Os and terabytes of storage for use in mid-sized to large-scale broadcast operations; can store more than 4.2TB of video; supports up to 42 I/Os delivering 30Mb/s MPEG-2 4:2:2 long-GOP video, with two 24-bit uncompressed AES audio channels each.

978-897-0100; fax: 978-897-0132; www.schange.com

Booth: L917 Circle (407) on Free Info Card

DIGITAL CONSOLE

Sennheiser Electronics Sensory Compact:
Offers 32 mic/line inputs and eight line-only inputs feeding 32 patchable input channels; each channel includes a digitally controlled preamp, a low-cut filter and a gate/expander, as well as four bands of fully-parametric equalization and a four-digit label display; 12 busses mix down to three masters: L/R-mono, LCR or user-defined arrangements; the unit also has 16 matrix outputs with full digital processing.

860-434-9190; fax: 860-434-1759; www.sennheiserusa.com

Booth: R2253 Circle (408) on Free Info Card

PRODUCTION TRUCK

Shook Advantage Series A-16 EFP:
Custom 24-foot truck contains Ikegami HL-45WBT 16:9-4:3 cameras and monitors, as well as a Grass Valley Group 1200 SDI switcher and Sony DNW-500 Digital VCRs; also contains Leitch terminal hardware and router system; other equipment includes Soundcraft audio, STI IFB and Telex intercom.

888-651-5775; 210-651-5700; fax: 210-651-5220; shook-usa.com

Booth: OD306 Circle (409) on Free Info Card

AES SYNCHRONOUS DIGITAL AUDIO

Sierra Video Systems Yosemite:
Available in 3RU 64x64, 4RU 96x96 and 5RU 128x128 matrix sizes; module filters audio stream inputs at any rate through its internal sample rate converter and converts to the desired output sample rate; also features optional "bypass mode," which allows the input synchronizing circuit to be bypassed for non-AES/EBU signals.

530-478-1000; fax: 530-478-1105; www.sierravideo.com

Booth: L3750 Circle (410) on Free Info Card

DIGITAL AUDIO CONVERTERS

Sierra Video Systems DigiLinx:
Converters contain two identical stereo 24-bit A/D and D/A converters; analog end accepts full differential audio, while the digital end supports either AES or SPIF formats; analog-to-digital converter operates either locked to an external AES audio stream or free-running via a stable internal oscillator with selectable sample rates; AES-to-analog converter uses the same PLL technology to lock to the input digital audio stream.

530-478-1000; fax: 530-478-1105; www.sierravideo.com

Booth: L3750 Circle (411) on Free Info Card

SIGNAL LOSS DETECTION SYSTEM

Sigma Electronics SDX:
Detects the loss of a video source into Sigma's routing switchers and automatically switches to a preselected alternate source; panel is user programmable and occupies 2RU.

717-569-2681; fax: 717-569-4056; www.sigmaelectronics.com

Booth: L12639 Circle (412) on Free Info Card

VIDEO SOLUTION

Silicon Graphics Zx10 Visual Workstation:
Features two new video-enabled configurations; PCI video option supports uncompressed 10-bit YUV and 8-bit RGB (with alpha) SD video input/output; digital media solution offers SGI's exclusive Graphics to Video output with Wildcat 4210VIO graphics; options will be available as a bundled solution with two different configurations.

650-960-1980; 800-800-7441 fax: 650-933-0819;
www.sgi.com/go/broadband

Booth: S4132 Circle (413) on Free Info Card

ASSET MANAGEMENT SYSTEM

Silicon Graphics SGI StudioCentral Library 3.0:
Flexible, scalable system provides immediate access to storing, securing and managing digital assets including versioned/non-versioned text files and streaming media; can be used as a single workstation or multiple workgroups; provides StudioCentral server functionality from any platform.

650-960-1980; 800-800-7441 fax: 650-933-0819;
www.sgi.com/go/broadband

Booth: S4132 Circle (414) on Free Info Card

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DIGITAL MEDIA SOLUTION

Silicon Graphics SGI Onyx3000:

New HD/SD option supports HD uncompressed video in and out with real-time colorspace conversion; the system with the option supports HD 10-bit RGB or 10-bit YUV and SD 10-bit RGB or 10-bit YUV; also provides application support for 2k x 2k 24fps and is OpenML-compatible.

650-960-1980; 800-800-7441 fax: 650-933-0819;
www.sgi.com/go/broadband

Booth: S4132 Circle (415) on Free Info Card

UPCONVERTER

Snell & Wilcox Premier HD5500 PhC:

10-bit motion-compensated device upconverts 525/625 SD video signals to HDTV 1.48Gb/s output formats; utilizes Ph.C, proprietary motion compensation technology; supports field rate standards conversion as part of the upconversion process – for example, 525/60 to 1080i/50.

408-260-1000; fax: 408-260-2800; www.snellwilcox.com.

Booth: L10428 Circle (416) on Free Info Card

MIXING SOFTWARE

Solid State Logic Axiom-MT, V2.7:

New software for Axiom-MT features automatic mix latency management through the Mix Align feature; also offers choice of four EQ algorithms and ability to globally cycle through aux pages for quick interrogation of channel auxes.; displays all channel inserts on the central screen; system allows inserts, multitrack outputs, EQ and dynamics presets to be cleared or routed individually or in an incremental range.

212-315-1111; fax: 212-315-0251; www.solid-state-logic.com

Booth: R2515 Circle (417) on Free Info Card

DVD AUTHORING SOLUTION

Sonic Solutions DVD Fusion for Windows:

Integrated DVD production system features drag and drop authoring, integrated image compositing, and real-time video and audio encoding; also features direct-to-DVD writing, a text generator and a timeline-based user interface; the system supports eight audio streams and 32 subtitles; provides control of Sonic's studio-quality MPEG-2 real-time video encoder.

888-Sonic-4U; 415-893-8000; fax: 415-893-8008; www.sonic.com

Booth: S4826 Circle (418) on Free Info Card

DIGITAL MEDIA STORAGE

Sony MUS-2000:

The MUS-2000 is part of the MUP-2000 series content management networked system; provides multiaccess capability with high-speed file transfer rates and 288GB capacity; features RAID-5 HDD technology providing a self-diagnostics function and auto data recovery; other features include hot-swappable HDDs and backup power supply.

800-686-SONY; 201-930-1000; fax: 201-930-4752;
www.sony.com/professional

Booth: L11600 Circle (419) on Free Info Card

HSM AND DATA MOVER

Sony PetaServe/PetaBack V2.00:

Functions between data or video servers; optimized for Sony's PetaSite automated tape libraries and DTF computer tape drives; "middleware" manages disk and tape capacities, automates daily maintenance and volume management; system is SAN ready; Solaris 8 support allows the host installed by the UltraSPARC III processor to use the software.

800-686-SONY; 201-930-1000; fax: 201-930-4752;
www.sony.com/professional

Booth: L11600 Circle (420) on Free Info Card

DVD AUTHORING SYSTEM

Sony DVA-700BSC:

Offers an Instant Authoring function for entry-level users of DVD authoring; converts videotape to high picture quality DVD-Video; DVD-video produced by the system can be used as client copies, automatic repeating displays at stores or for video archives, etc.; system can also be used as a one-pass encoder for DVD authorware.

800-686-SONY; 201-930-1000; fax: 201-930-4752;
www.sony.com/professional

Booth: L11600 Circle (421) on Free Info Card

READER/WRITER WITH INTERFACE

Sony MLU-200/MLT-200:

Allows users to store and access production-related information using a non-contact read/write system during the shooting and pre-editing processes; users can check cassette information and cue data on a Tele-File memory label by bringing the reader/writer close to the label; Sony's MLT-200 serves as an interface between the MLU-200 and a PC, and can be used as a battery charger for the MLU-200.

800-686-SONY; 201-930-1000; fax: 201-930-4752;
www.sony.com/professional

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MONITOR

Sony BVM-F24U CineAlta monitor:

16:9 widescreen flat CRT monitor with a 24-inch viewable area; allows for critical evaluation of e-cinema content, including motion pictures produced in 1080/24p; multihigh scan monitor can display analog RGB and HD-SDI signals at horizontal frequencies of 54- to 90kHz and vertical frequencies of 48- to 75Hz; monitor accepts dual-link 4:4:4 mode HD-SDI signals.

800-686-SONY; 201-930-1000; fax: 201-930-4752;
www.sony.com/professional

Booth: L11600 Circle (423) on Free Info Card

DUAL-CHANNEL PRODUCTION SYSTEM

Spencer Technologies Newstore:

Provides storage for stills, clips, looping backgrounds and animations with linear keys; also stores custom video transitions and audio effects; each channel includes a DVE, linear keyer, and analog and digital input/output; system allows networked graphic files to be converted to video and linear key for key channel synchronization.

818-771-1850; fax: 818-771-1855; www.spencer-tech.com

Booth: L9057, L11639 Circle (424) on Free Info Card

STREAMING MEDIA TOOL

Splitstream XPRESS:

Uses cellular technology to transport high speed audio and video at 30fps; multiple cell channels on standard cellular networks are used to transmit video and audio, including wireless, cell phone, DSL, telephone and satellite; signals are compressed and transmitted and then reassembled at the receiving location into a single stream, with buffering, caching and error correction using the XPRESS' Divide/Tag technology.

310 277-3887; www.splitstream.tv

Booth: L6130 Circle (425) on Free Info Card

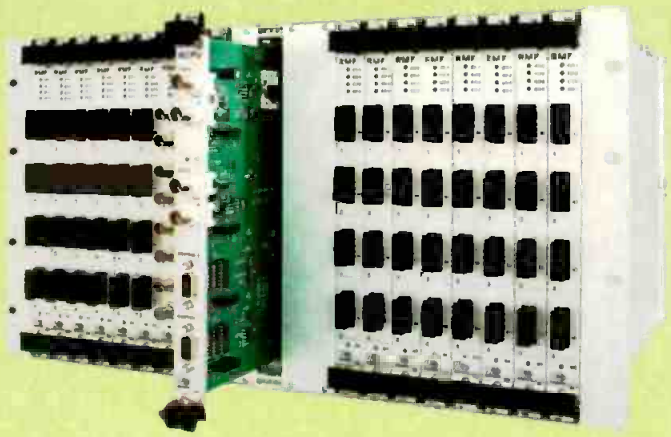
UNINTERRUPTIBLE POWER SUPPLY

Staco Energy Products Encore:

The system's power-conditioning feature protects against brownouts, surges, sags, spikes and other power anomalies; fully SNMP capable; includes power management software that provides for remote management of all aspects of power protection; system features external battery packs with independent charters for scalable unlimited runtime, front-access hot-swappable batteries, and voltage regulation incorporating double boost and double buck.

937-253-1191; fax: 937-253-1723; stacoenergy.com

Booth: L12252, L12253 Circle (426) on Free Info Card



DIGITAL ROUTER

Stagetec Nexus Star:

Features 100MHz twin-switch fabric design; can be configured for up to 4096 I/Os; uses 16 I/O cards, each handling 256 I/Os; in distributed system, additional base devices can be added and connected to the Nexus Star as needed; provides sample rate conversion over a range of 26K to 52K; fully synchronous system.

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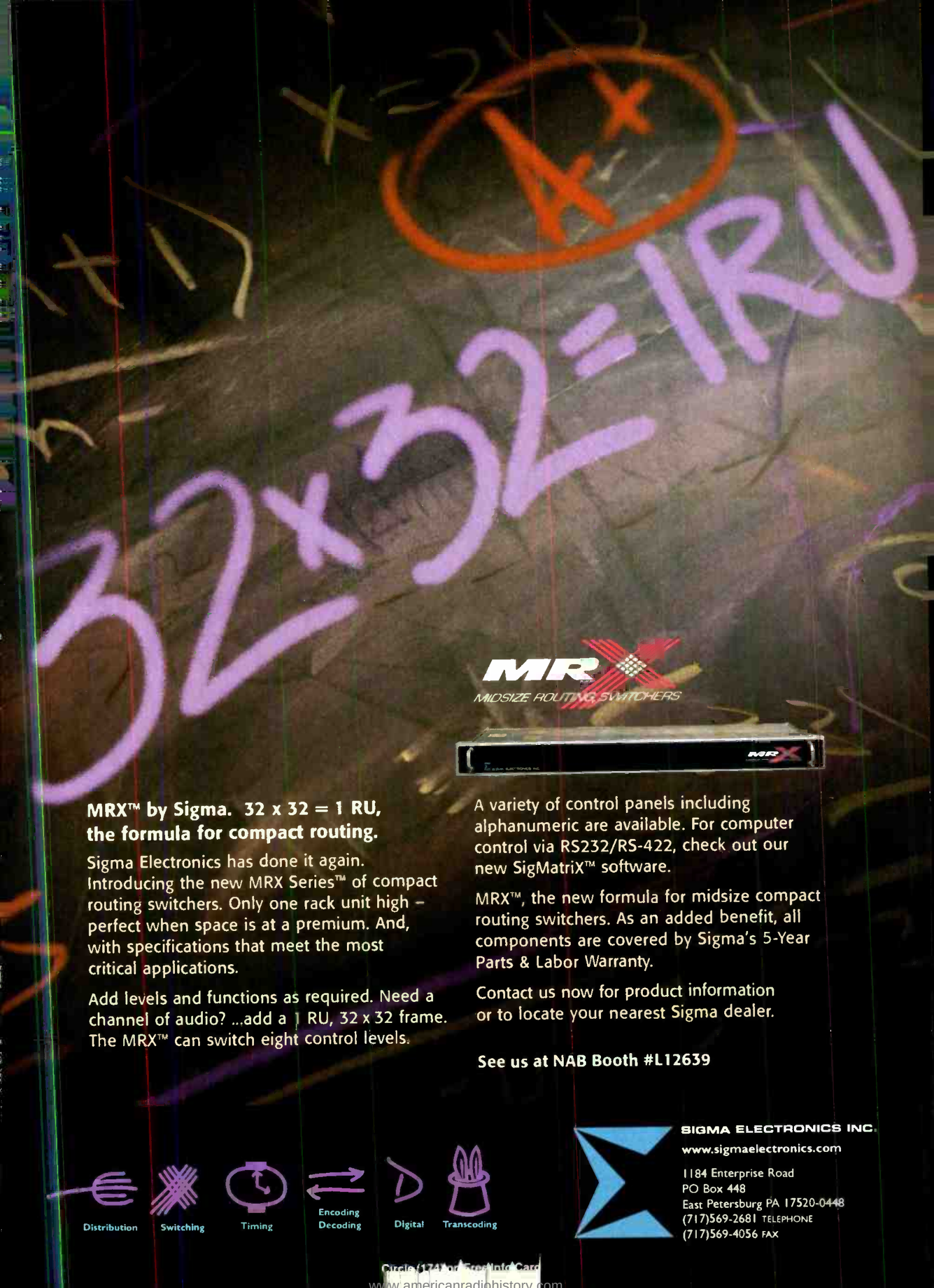
Booth: R2181 Circle (427) on Free Info Card



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972-550-9500; fax: 972-550-9595; www.spectrasite.com

Booth: L12611 Circle (428) on Free Info Card

VIDEO-ON-DEMAND SOLUTION

Streaming21 streaming solution:
System allows for the delivery of broadcast quality video and audio streams through global IP networks to interactive set-top boxes; this allows viewers to watch programming when they want rather than having to wait for a preprogrammed broadcast time to watch a limited number of movies; created in conjunction with Neon Technology and Sigma Designs; Streaming21 will contribute carrier-class delivery and a content distribution platform, to which Neon will add their SurfReady set-top box environment, using Sigma Design's decoder chips to allow for easy Internet access and high-quality video.

888-88STREAM; www.streaming21.com

Booth: E3239 Circle (429) on Free Info Card

DIGITAL MIXING CONSOLE

Studer On-Air 1000:
Available in versions for analog and digital environments; both versions feature 10-input faders, 20 inputs and two master faders, as well as the Touch'n'Action graphical user interface; settings can be personalized and stored for each operator.

+41 1 870 75 11; fax: +41 1 870 71 34; www.studer.ch

Booth: R2125 Circle (430) on Free Info Card

AUTOMATION SYSTEM

Sundance Digital FastBreak Automation Version 2.0:
Offers robust, scalable and frame-accurate control of video server and other station peripherals in either single or multichannel configurations; operates under Windows 2000; elements can be operator and time-of-day triggered; each may include an unlimited number of secondary events.

972-444-8442; fax: 972-444-8450; www.SundanceDigital.com

Booth: L1355 Circle (431) on Free Info Card

PORTABLE FLASH MEMORY RECORDERS

Superscope Technologies Inc/Marantz PMD690:
Records stereo and mono digital audio using the media of PC cards; also available as the PMD680 mono-only version with a telephone input/output; audio files can be transferred to a computer for editing, archiving or uploading to the Internet; also features multiple compression settings to extend recording times on smaller-capacity PC cards; can record in the MP2 format; also records uncompressed 16-bit PCM digital audio as a Wave or Broadcast Wave file; includes a built-in non-destructive EDL system to allow users to place reference marks and create custom playback sequences.

630-820-4800; fax: 630-820-8103; www.marantz.com/product/professional

Booth: R191, R1846, R2929 Circle (432) on Free Info Card

DIGITAL AUDIO DELAY UNIT

Symetrix 6100 Broadcast Audio Delay:
First in the AirTools family; 24-bit digital delay unit prevents unwanted profanity from reaching the airwaves; the unit delays the program until up to 20 seconds of 20kHz bandwidth stereo audio is stored in memory; if a person on a telephone line says something inappropriate, it can be dumped before it is aired; unit offers additional features, including an automation interface for network broadcasts.

425-787-3222; fax: 425-787-3211; www.symetrixaudio.com.

Booth: R2153 Circle (433) on Free Info Card

QPSK/8PSK/16QAM MODULATOR

Tandberg SM5600:

Offers optional Dynamic Pre-Correction system to protect against potential distortion; distortion is usually prevented by backing signals off from saturation; DPC technology corrects earth station uplink and satellite-based distortions while allowing the system to operate at saturation; the system allows smaller dish sizes and smaller earth station amplifiers to be used.

949-757-0488; fax: 949-757-0489; www.tandbergtv.com

Booth: S4859 Circle (434) on Free Info Card

DIGITAL BROADCAST MAXIMIZER

TC Electronics DBMAX V2.60:

New software release for the maximizer features new spectral stereo enhancer insert, an improved automatic gain controller with up to 9.9dB/sec; also features an additional Extra Soft Clipper in the Final Limiter; other features include distortion canceling and input channel swap function to allow right and left channels to be reversed; allows bypass of the input filters.

805-373-1828; fax: 805-379-2648; www.tcelectronic.com

Booth: M9639, R2101 Circle (435) on Free Info Card

AUDIO-TO-VIDEO DELAY CORRECTOR

Tektronix AVDC100:

Provides in-service monitoring and correction of A/V delay errors that occur during compression or other processing; allows user to reliably deliver video of definable quality; uses digital watermarking technology to embed audio time reference signals into video programming near the point of audio/video content creation, so lip-sync error can later be detected and corrected by analyzing the watermark and adjusting the audio delay.

800-835-9433; 503-627-7111; fax: 503-222-1542; www.tektronix.com

Booth: L9534 Circle (436) on Free Info Card

WAVEFORM MONITORS

Tektronix WFM601/WFM601/1700 series:
Waveform monitors measure and monitor baseband video signals.

800-835-9433; 503-627-7111; fax: 503-222-1542; www.tektronix.com

Booth: L9534 Circle (437) on Free Info Card

MULTICHANNEL CAMERA-MOUNTED MULTIPLEXER

Telecast Fiber Systems CopperHead:
Fiber optic multiplexer can be mounted on ENG and SNG cameras for remote television production; single optical fiber carries bi-directional signals to and from the camera, including program video and audio, return video and audio, intercom, black burst, tally and camera control data; lightweight tactical fiber increases camera-to-vehicle distance and eliminates grounding problems and signal interference.

508-754-4858; fax: 508-752-1520; www.telecast-fiber.com

Booth: L9568 Circle (438) on Free Info Card

MODULAR ROUTING SYSTEM

TeleCast Group/Sandar MF 1500:
2U routing, distribution and changeover system capable or handling SDI, ASI and G703 signals; enables a mix of a matrix, distribution, changeover or switch of signal modules and analog/digital routing; equipped with dual power, N+N redundancy and has RS-232 or RS-422 control.

+47 33 44 72 00; fax: +47 33 44 72 01; www.telecast.no

Booth R1663 Circle (439) on Free Info Card

ADAPTER

Telemetrics BOA:
Enables users to connect all the devices required for video production plus power to a control room through a single coax cable connection, rather than multiple cables, video equalizers and frame synchronizers; the BOA uses industry standard input connectors for a camera, monitor, teleprompter and microphone, as well as for a pan/tilt mechanism and a headset/intercom.

800-424-9626; 201-848-9818; fax: 201-848-9819;
www.telemetricsinc.com

Booth: L6054 Circle (440) on Free Info Card

PROMPTING SOFTWARE

Telescript PRO:
Windows NT/2000-based software works with off-the-shelf hardware to virtually eliminate compatibility problems; offers multiple monitor support to accommodate simultaneous prompting and control operations.

201-767-6733; fax: 201-784-0323; www.telescript.com

Booth L11073 Circle (441) on Free Info Card

INTERCOM

Telex BTR-800:
Two-channel, fully UHF intercom system; allows two distinct channels of intercom to be accessed by one or more wireless extensions to the intercom system; user synthesized to allow broadcasters to keep intercom systems clear of other wireless equipment; allows users to send a dry line level audio signal at +8dB to a given destination, allowing users to trigger a two-way radio and have audio be routed over it or any closure-activated device.

800-392-3497; 952-884-4051; fax: 952-884-0043; www.telex.com

Booth: L8763 Circle (442) on Free Info Card

NOISE REDUCTION SYSTEM

Teranex Starfront:
Features intelligent motion-based pixel-by-pixel filtering and automatic handling of the video-based content (30fps) and film-based content (24fps); other features include 3:2 pull-down handling and 32-point interpolation on down-sampling to CIF and QCIF image sizes.

407-517-1086; fax: 407-517-1101; www.teranex.com

Booth: E4211 Circle (443) on Free Info Card

MEDIA DELIVERY PLATFORM

Terayon CherryPicker 7000:
System also optimizes bandwidth; statistical re-multiplexing technology allows operators to unbundle and combine compressed streams from a variety of input sources in order to create an output multiplex to deliver customized programming; real-time switching and splicing take place completely in the compressed digital domain; system is capable of changing bit rates from input to output; remote and local video and audio, digital ad insertion, and other operator-provided content can be seamlessly integrated into the digital service.

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Thomcast Communications Ultimate 1kW Digital Transmitter:
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800-882-1824; 201-569-1650; fax: 201-569-1511; www.thomsonbroad.com

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Transoft Networks FibreNet 3:
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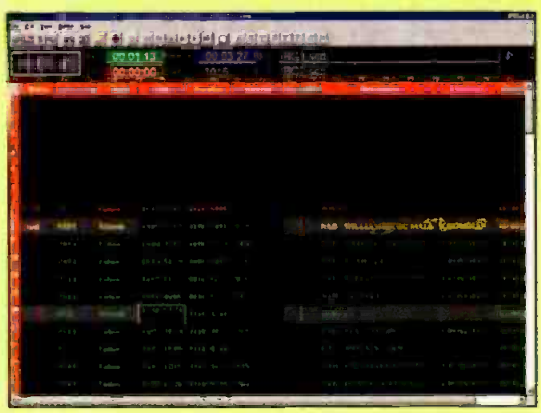

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Utah Scientific MAX series:
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801-524-9999; fax: 801-524-0555; www.utahscientific.com

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727-507-5300; fax: 727-507-5311; www.vela.com

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Vela DVD-based Archive system:
Automated system offers integrated HSM system; utilizes DVD-RAM to automatically store, manage and retrieve media files with the RapidAccess Video Server.

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Video Robotics RoboEFX:
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800-800-5719; 610-327-2292; fax: 610-327-9295; www.videotek.com

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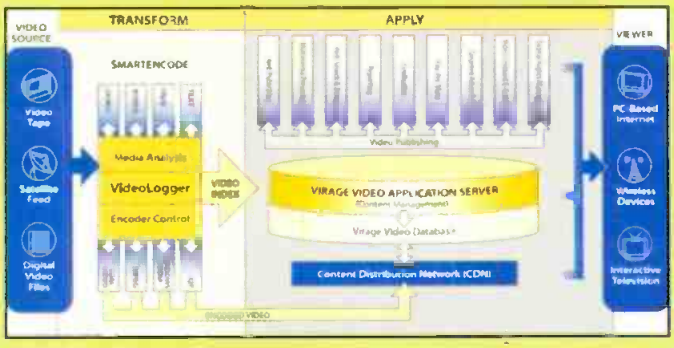

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Virage Video Application

Internet Video Application Platform allows video to be published, managed and distributed as easily as text; supports enterprise-scale deployments of video and provides the user with the necessary infrastructure for seamlessly integrating Internet-ready video into a web-site or corporate intranet.

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800-771-2556; 416-335-5999; fax: 416-335-5202;
www.ward-beck.com

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Ward-Beck Systems POD series:

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800-771-2556; 416-335-5999; fax: 416-335-5202;
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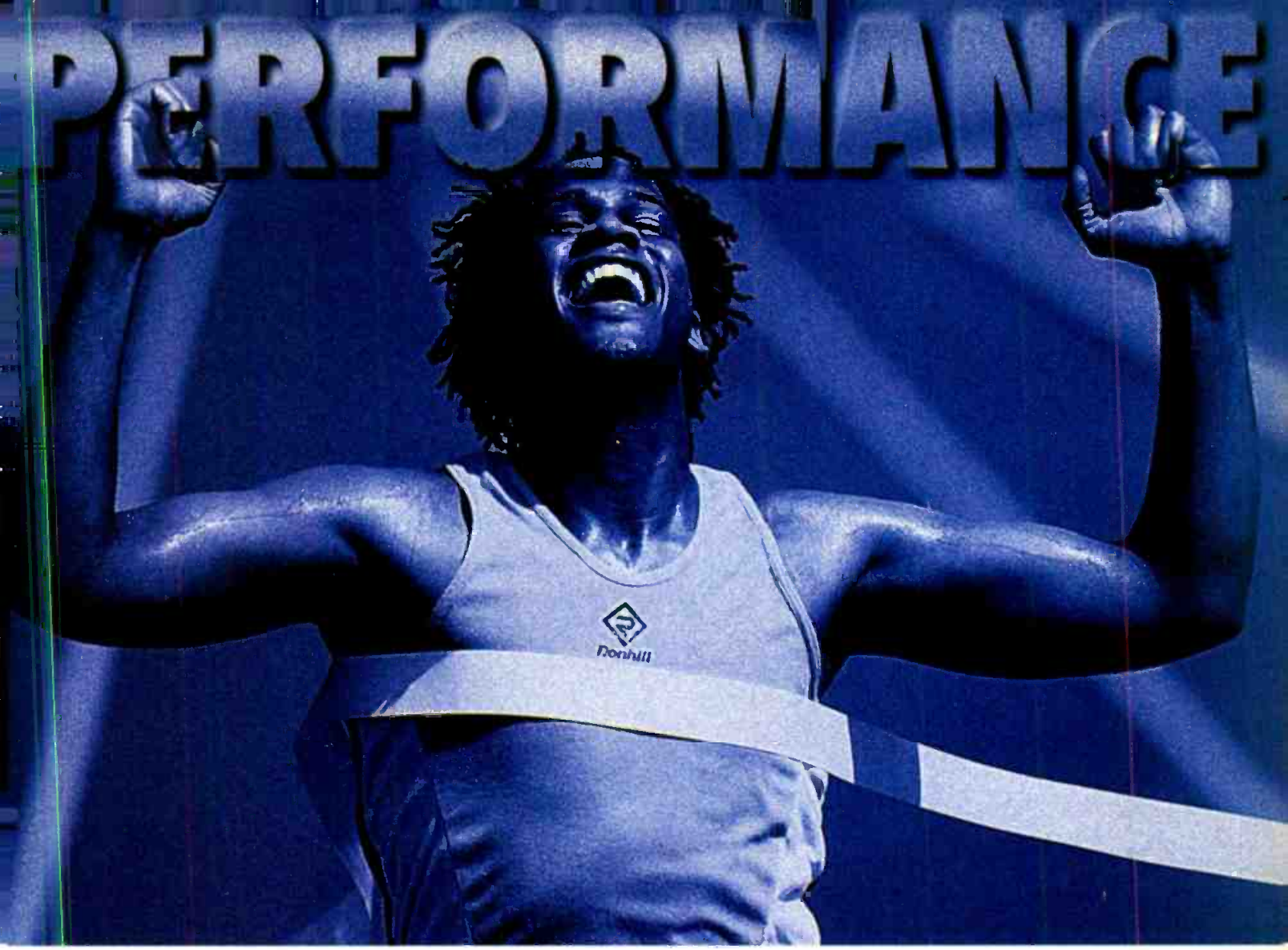

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Converts from HD analog signals YpbPr to SD-SDI 4:22 signals and SD analog composite signals; responds to four input signal formats: 1080/23.976P, 1080/29.97P, 1080/59.94i and 1080/25.; output signal is 1080/25 at 625/50i (PAL) and 525/59.94i (NTSC); offers 2:3 pulldown processing and three modes of aspect ration conversion: squeeze, letterbox and edge crop.

310-544-9343; fax: 310-544-9363; www.yem.com

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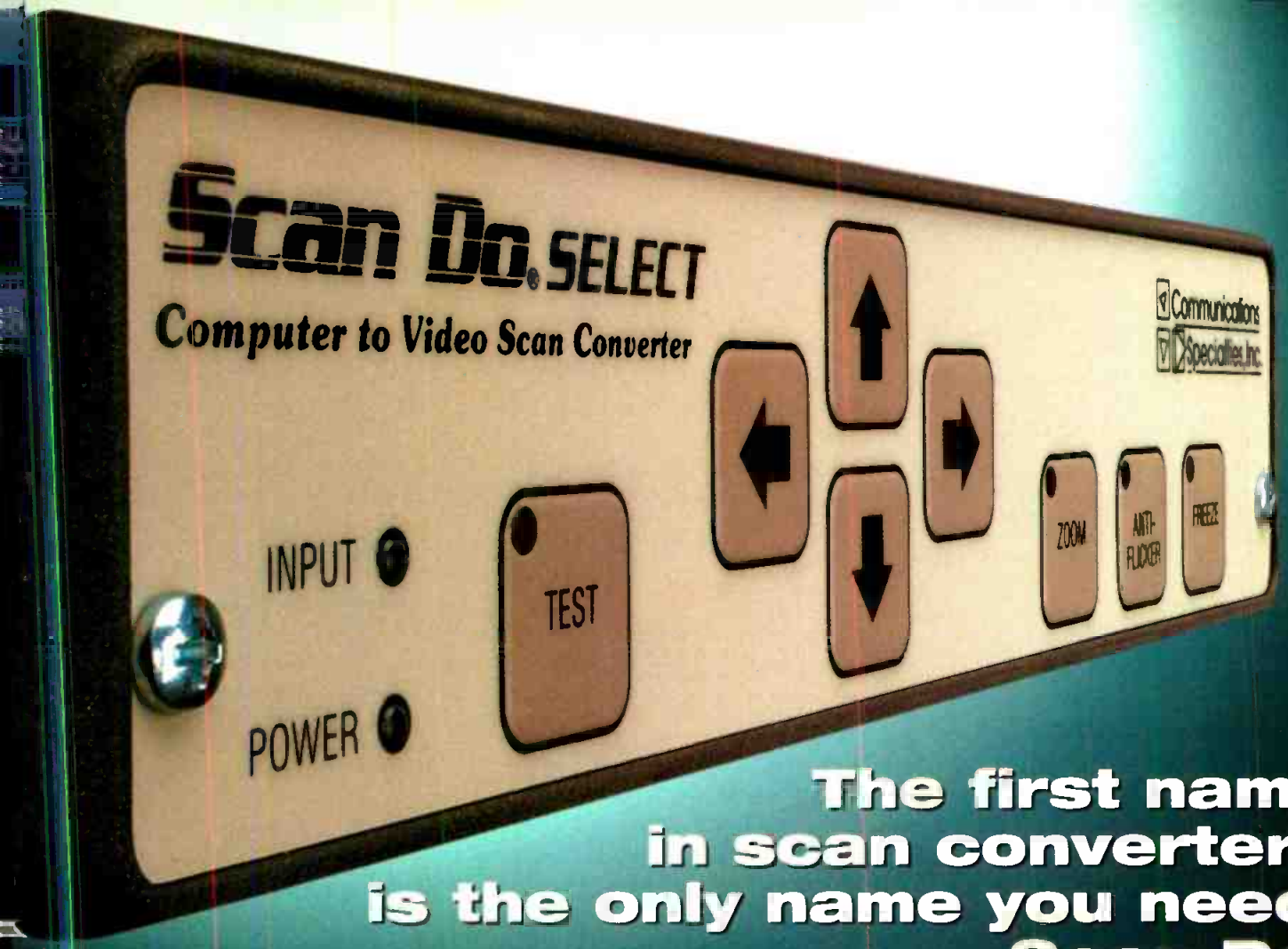

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data management in broadcast

By Carole Hogan

The case for digitization in broadcast is compelling. It is based on a variety of factors such as exponential leaps in the amount of content that must be processed and stored, superior quality of data content, speed of access to data content, speed of editing and other content preparation. Digitization also allows re-purposing of content to meet ever-increasing

viewer demand, and reduction of labor costs in individual facilities as steps in the workflow require less human involvement to accomplish.

With the digitization of broadcast facilities comes a requirement for a new and different type of material management paradigm. Computer-based systems and digital storage devices linked together by high-speed networks demand a different management model than the traditional approach of real-time device control. While it is always possible to throw hardware at any problem, it is efficient data content management products that can be expected to dominate this changing market. This article should serve as a technical primer for the broadcast IT professional facing the upcoming digital challenge.

With the advent of digitization, broadcast users are presented with "devices," i.e., computers, IP-based networks and data-based storage systems, that offer unlimited potential for solving workflow requirements. However, this potential is only realized with intelligent software management. Software that constrains video servers to the role of videotape recorders or data storage systems to analog archives denies users the benefits of digitization. Yet, it is precisely these benefits that users now need.

The intelligence that must exist in the management of "digital hardware," i.e., video servers, IP-based networks and data-based storage systems, falls into two categories:

1) Getting the data content where it needs to be when it needs to be there, with a minimum risk of failure and at a minimum cost; and,

2) Providing user access to the data, through interfaces such as GUIs, efficiently and at a minimum cost.

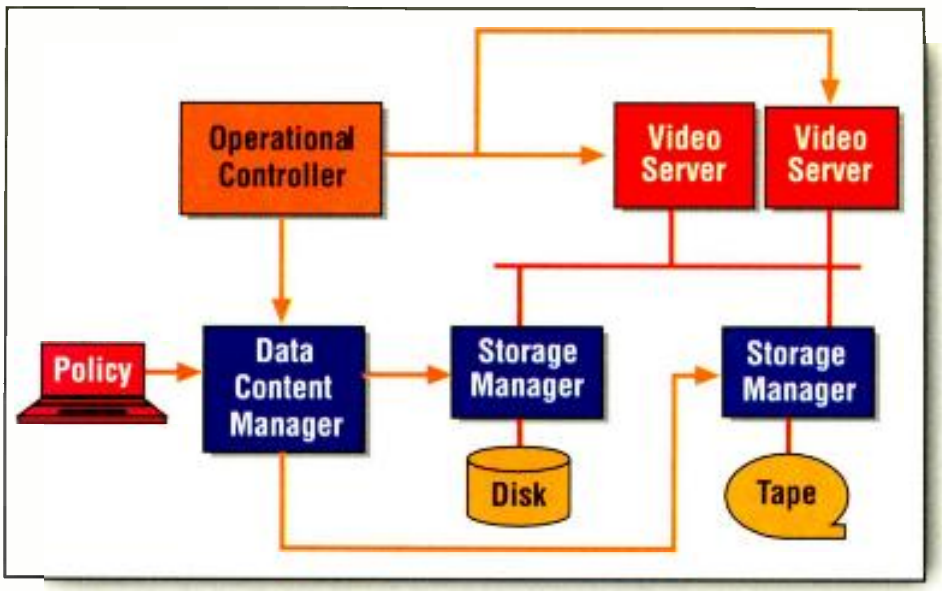


Figure 1. Relationship between the operational controller, the data content manager, the storage managers and the video servers.

As digitization blossoms in broadcast, users are defining increasingly sophisticated requirements for data content management. Because models vary, content management must be flexible enough to meet requirements for seamless management of data, both within single and connected facilities.

More specifically, material is acquired by or ingested into a facility in several ways — analog tape and satellite download being two prominent examples. The acquisition generally includes encoding the materials onto ingest video servers, a process that is managed by real-time operational controllers, and a QA review.

Once the material has been encoded and has passed QA, it becomes data content that must be dealt with. At some point, play-to-air video servers, again at the direction of real-time operational controllers, decode the content for broadcast. But, what happens to the content between ingest and play to air? Where does it go? How does it get there? How is it provided to the play-to-air servers in time for broadcast?

Users are defining increasingly sophisticated requirements for data content management.

The data content manager must get the data content where it needs to be when it needs to be there. To perform this data content distribution task intelligently, the manager accepts policy that takes into account several crucial factors including the facility's operation workflow, the quantity of data that is ingested, the throughput requirements that must be met as the data is moved between connected facilities, the redundancy requirements of the operation and budgetary constraints.

Data content management policies fall into the following categories:

1) Sophisticated data content management techniques using heterogeneous storage devices in complex, distributed environments.

2) Compensating for data content management shortcomings in other system components executing in multi-vendor environments.

3) Meeting operational redundancy requirements and, where necessary, implementing traditional disk storage space conservation.

Once these policies are defined, the data content manager should automatically put them into effect as the operational controllers issue commands to the data content manager. The manager should carry out these commands using the policies specified by the user's policy inputs.

The policies that intelligent data content management software must be

capable of implementing include the following courses of action.

Configurable data paths

Users today state data content management requirements that demand placement of data content on storage devices best suited to the content's characteristics. This means that each piece of content must be stored on the data storage device that is optimum for the user's environment, e.g., disk or data tape or disk and data tape simultaneously. This also means that, once stored on these devices, files must be transferred back to video servers directly from the storage device that is optimum for the user's environment, i.e., data tape, disk or data tape to disk and video server simultaneously. (See Figure 1.)

What happens to the content between ingest and play to air? Where does it go? How does it get there?

These requirements dictate the existence of policies that permit the users to define data migration (copy to storage) and caching (copy from storage) paths between disk storage, data tape storage and the video servers on a file-by-file basis. On the migration side, users must be able to dictate the "data path" of each file ingested into the data content management system, e.g., whether it will reside first on disk and then on data tape, or just on disk or just on tape. If files reside first on disk and then on tape, users must be able to specify when each file is copied to tape and when it is deleted from disk.

On the caching side, users, through policy inputs, must be able to define whether files on data tape are copied first to disk storage and then to the video servers or directly from tape to the video servers or to disk and the video servers simultaneously. These data path configuration policies allow disk storage and tape storage to exist in a peer relationship. No hierarchy of storage devices is assumed or required.

The peer-to-peer relationship between storage managers and the devices they manage permits users to receive optimized data content management for all files in the environment as well as the best use of their data storage devices. This flexibility allows data content to be managed according to workflow requirements, not according to the fixed dictates of inflexible software.

Automatic management of multiple target restore

Broadcast users often install their video servers in a primary-backup configuration. In this configuration, the primary servers ingest the material and deliver the material at the direction of the operational controllers. In the event that a primary server is not available, its companion backup server assumes the role of the primary.

Populating the backup servers with the same data content as the primary servers is referred to as *mirroring*. Users require that the mirroring occur simultaneously. They do not want a window of time when the content on the backup servers is less than what is on the primary servers. This creates the possibility of delivering "black air" if a backup server becomes the primary during this window of time. Data content manager policy inputs that specify automatic mirroring of the backup servers must be available.

The ability to automatically trigger simultaneous restores of files to a designated set of destinations satisfies these requirements. Referred to as multiple target restore, it is the ability to read a file once from its storage device and transfer it simultaneously to two or more destinations. The destination servers can be pairs of primary-backup servers or a set of video servers and disk storage in the data content management system.

High-performance disk storage management

Some broadcast user environments have special high-performance data transfer requirements. In these environments, data tape as a storage device is a necessity due to the large quantity of content that must be stored, but the speed of access from tape is not sufficient to meet throughput requirements.

Two such high-performance mechanisms are locality of reference and file leader caching. Locality of reference links specified files together as a collection of files for migration and caching purposes. File leader caching permits the first few data blocks of a file that resides on tape storage to remain on disk storage. The data content manager must accept policies that identify files for leader caching as well as the amount of file data to retain on disk storage. The manager must also manage the continuous stream of content to the video server.

Both the file leader caching feature and the locality of reference feature

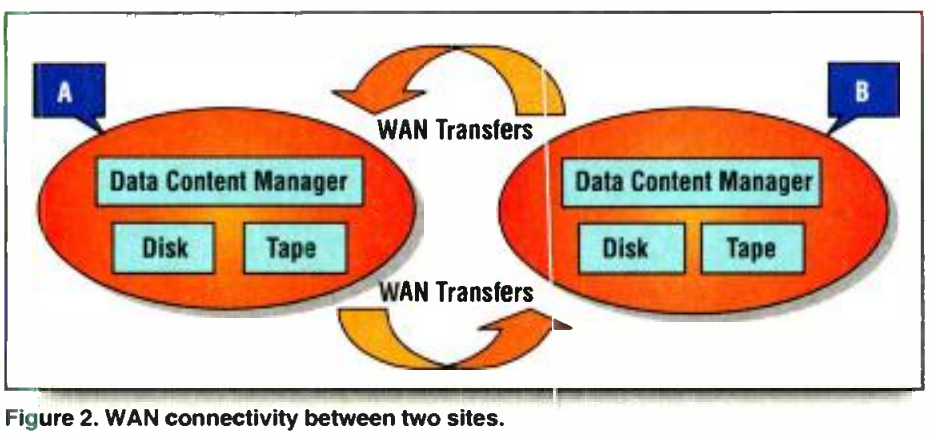


Figure 2. WAN connectivity between two sites.

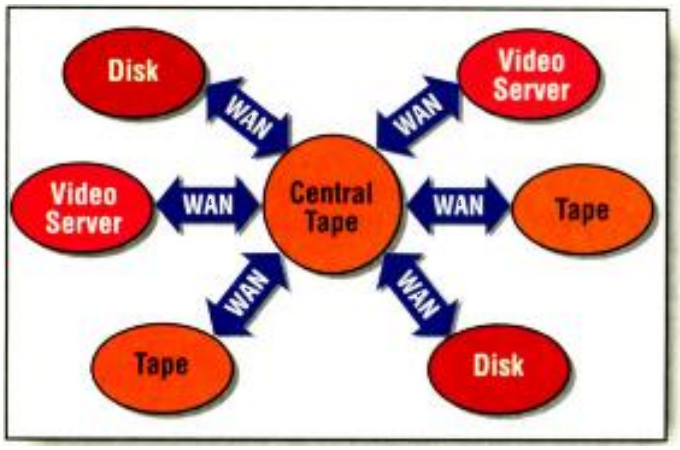


Figure 3. Remote sites are connected to a central system by an IP-based WAN topology.

significantly expedite access to data content stored on tape. Users who demand high-speed access to content stored in the data content management system but who also must store most of the content on tape require them.

Efficiently managing small amounts of disk storage

Not all users can afford the expense of large quantities of costly video server disk or even data content management disk storage. However, due to content access profiles and throughput requirements, a small amount of disk storage is often necessary for these users. The challenge in these environments is to manage relatively small quantities of disk storage efficiently.

Efficient management of small quantities of disk demands automated management algorithms that: begin migrating a file to tape before the entire file is on disk; delete a file from disk immediately after it has been copied to tape; begin restoring a file from disk to the video server before the file is completely on disk from tape; and delete a file from disk immediately after the file has been restored to the video server.

Managing WAN transfers

Users with environments that include several geographically distant sites often require transfers of data among these sites. Examples of such users include television networks, co-operating station groups or competing stations that share common facilities. In today's environment, geographically distant sites can be connected through IP-based wide area networks (WANs). (See Figure 2.)

The data content management requirements defined by these users are complex and include several degrees of the following capabilities: viewing and modifying metadata for files at remote sites; both pushing and pulling files to remote sites; and, persistence in overcoming transitory WAN failures. The file transfers must be capable of being initiated either by operator command or automatically according to site data content management policy. Because metadata viewing and modification are required and because time-critical file transfers are part of the daily operational mix, traditional store-and-forward management systems are insufficient.

As a further requirement, the automated WAN metadata and file transfers must be initiated independently of the operational controllers that may be installed at the sites. (See Figure 3.) This is because those controllers are generally not well suited for data content management in an environment where complex network transfer algorithms and persistence over transitory failures are required. Even so, the controllers at the destination sites must be informed of the transfers once they are complete so that the files may be included in the playlists.

Finally, the WAN transfers must be routable in several ways:

- Local data content management system to remote data content management system;
- Local data content management system to remote video server;
- Local video server to remote data content management system;
- Local video server to remote video server;
- Remote data content management system to local data content management system;
- Remote data content management system to local video server;
- Remote video server to local data content management system;
- Remote video server to local video server;
- Remote data content management system to remote data content management system;
- Remote data content management system to remote video server;
- Remote video server to remote data content management system; and,
- Remote video server to remote

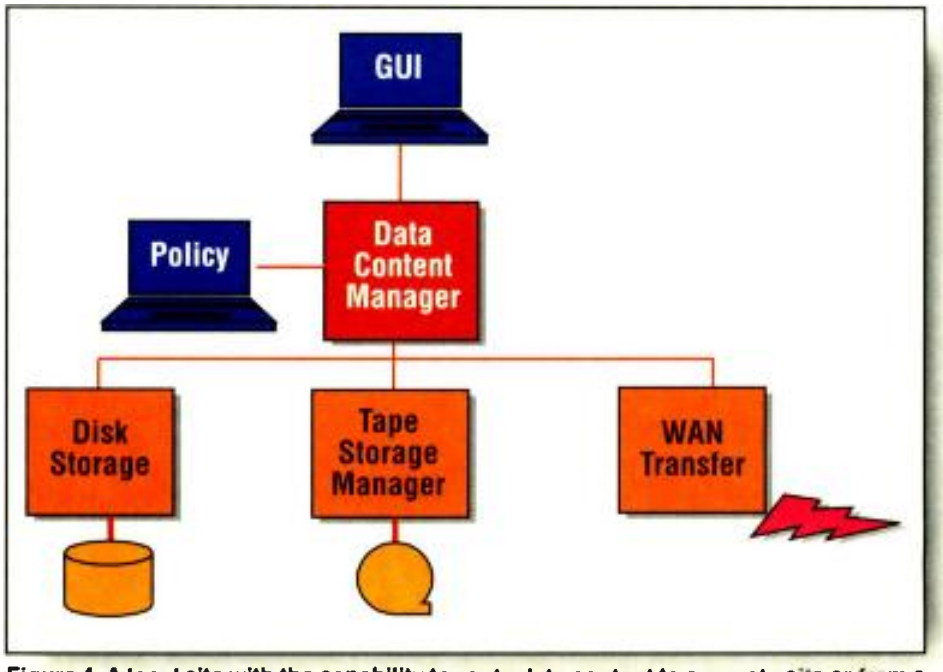


Figure 4. A local site with the capability to route data content to a remote site or from a remote site through the data content manager's use of its WAN transfer agent.

video server.

All use the same data content management software. The policy inputs accepted by the data content manager must accommodate each of these specifications, and the data content manager must distribute the metadata and the data content as specified, using software-based WAN transfer agents. The WAN transfer agents are connected to the other sites through an IP-based network that must be capable of supporting the throughput requirements of the user's workflow model. (See Figure 4.)

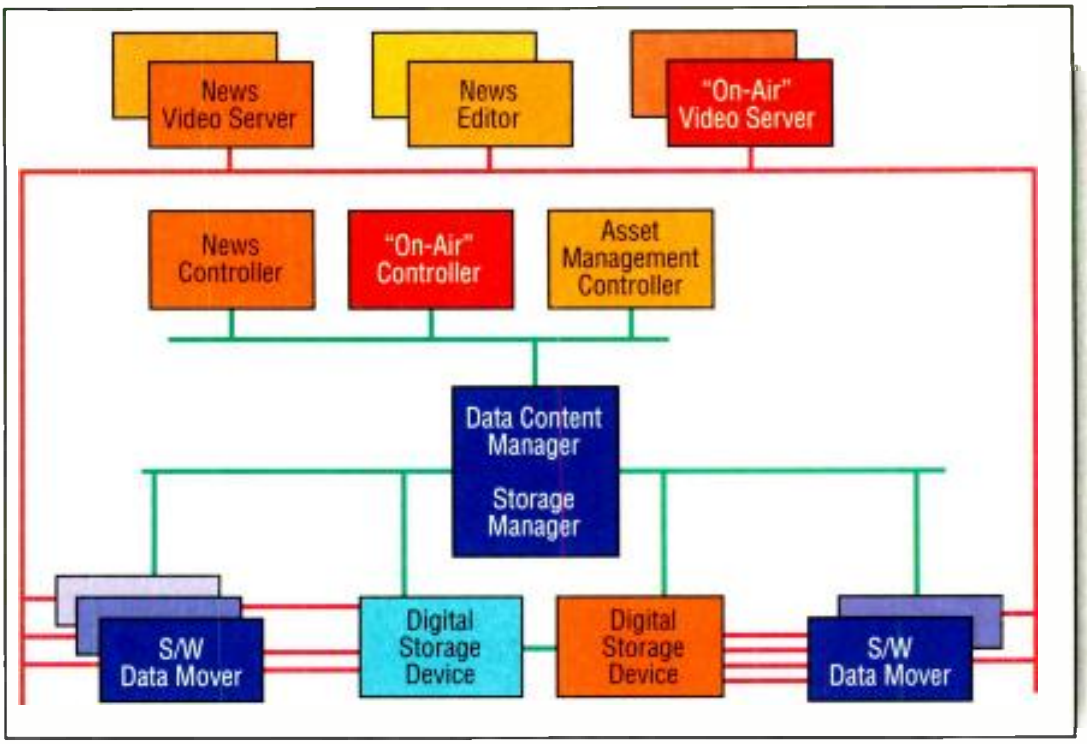


Figure 5. Distributed architecture of a storage manager that is storing and retrieving data content with three different departments under the direction of a data content manager

Auto backup and restore from secondary systems

Broadcast users with large budgets and strong aversions to single points of failure often install secondary storage systems to protect against the loss of the primary systems. To be useful, these secondary systems must be mirrored automatically and concurrently with the data content that is deposited into the primary systems. Also, if a primary system fails, the content must be automatically retrieved from the secondary system. Finally, the secondary system may be located at a site that is geographically remote from its primary counterpart or it may be located at the same site as the primary system.

Operational controllers generally lack the capability to manage secondary storage systems — either to populate them or to restore from them when primary storage systems become unavailable. The data content manager should accept policy inputs to fulfill this vital role because it is data content management in character and because it provides significant value add to the user environment. As part of the policy inputs, the data content manager must be provided with objective criteria to determine when the primary system has failed, e.g., through explicit notification of the failure, through a stated number of communication failures, etc.

The speed of access from tape is not sufficient to meet throughput requirements.

Expanding metadata

Operational controllers often have minimal capability to use the metadata features implemented in sophisticated storage management systems. On the other hand, a storage manager, as shown in Figure 5, offers the metadata features because users require those features. The challenge in these circumstances is to overcome the limitations of the operational controllers to exploit the power of the storage management system.

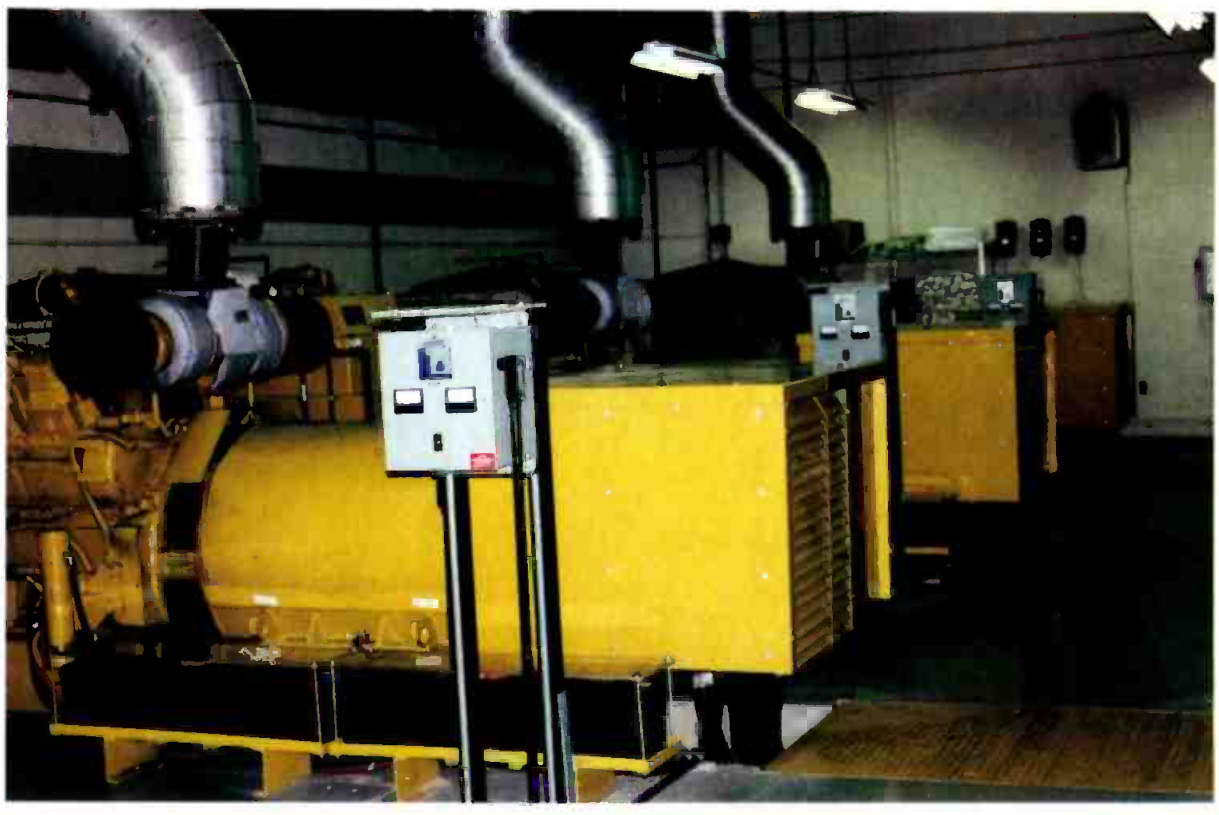
Overcoming operational shortcomings in the controllers is a task that falls to the data content manager. The manager must be able to expand upon the metadata that is specified by the controllers, in cases where the specified metadata is minimal, so that users can benefit from the metadata features of the storage management system. How that expansion is achieved depends on the nature of each piece of metadata. Sometimes the expansion can be based on other information received from the controllers. Sometimes the expansion is based on information specified independently by the users through policy inputs to the data content manager.

The technology described herein is currently implemented at WWOR in Secaucus, NJ, and at TVA in Montreal, Canada, which has allowed effective utilization of existing manpower to support operational consolidation of television broadcast stations. ■

Carole Hogan is director of archive solutions for EMC Media Solutions Group.

Power quality:

Ensuring equipment lives up to its promise



Today's broadcast systems, like the server farm shown left, are intolerant of voltage sags, blips and noise. The first step in ensuring clean power is to measure line noise and distortion.

UPS generator systems like the ones shown at far left are common at broadcast facilities. Unfortunately, they can also be generators of noise. Be sure backup power voltage is carefully filtered and regulated before it is connected into the station power grid.

By T K Wong

Three forces are driving the changeover to digital transmission in the entertainment industry today: the Federal Communication Commission's intention to mandate digital television broadcasting in the near future; advances in digital technology itself — including lighting

controls, cameras and post-production equipment; and the hype about the quality of HDTV. As a result, most existing analog facilities are either renovating existing space or moving to new facilities to accommodate the changeover. Yet there are many realistic questions and concerns about the impact of power quality on digital operations.

With advances in digital technology, broadcasting equipment is becoming more powerful, more efficient and more compact. With increasing use of this equipment, a greater burden than ever before is being placed on electrical infrastructure. Not only are these components sensitive to voltage, current and frequency variations in the power source, they are themselves a source of disturbances in power quality, including harmonic distortion.

Just as in any data processing equipment, digital broadcast equipment uses the binary logic system — a series of ones and zeroes — to encode, transmit and decode data. So it is not surprising that broadcast equipment is subject to the same forces that cause your PC to crash at the most inopportune moments.

Elements affecting power quality

A number of key elements affect power quality in broadcast facilities: grounding, harmonic distortion, voltage reference and AC magnetic interference. Analog and digital facilities vary somewhat in the degree to which these elements affect broadcast quality.

Grounding: Proper grounding design has always been an essential element in the analog world to mitigate common mode noise, or "hum," in the network. The dynamic components in most analog equipment are affected by frequency disturbances in the system. A clean ground will minimize those effects in analog as well digital facilities.

Harmonic distortion: Although grounding remains essential in digital systems, prevention of harmonic disturbance is even more crucial. Each piece of digital equipment contains a switch mode power supply that is both sensitive to, and a source of, harmonic disturbance in the power supply. The more the power supply is disturbed by the addition of digital electronic components, the greater the impact on transmission quality.

Clean voltage reference: For digital equipment that utilizes zero crossing of the reference voltage to maintain computation clock cycles, a clean voltage reference also is crucial. Even slight notches or variations at the voltage references will cause malfunctions.

Broadcast equipment is subject to the same forces that cause your PC to crash at the most inopportune moments.

AC magnetic interference: Advanced digital audio and video equipment is also sensitive to AC magnetic fields. An elevated low-frequency AC magnetic field is known to cause loss of data in high-speed transmission, as well as slow-downs in transmission speed due to increased error rates. All facilities contain some type of main electrical room, containing transformers, uninterrupted power systems and other high-current carrying equipment, which is a well-known source of magnetic fields. Yet in many broadcast facilities, critical equipment is located in a space nearby a main electrical room. This is especially true of older broadcast facilities without optimal conditions for effective space planning.

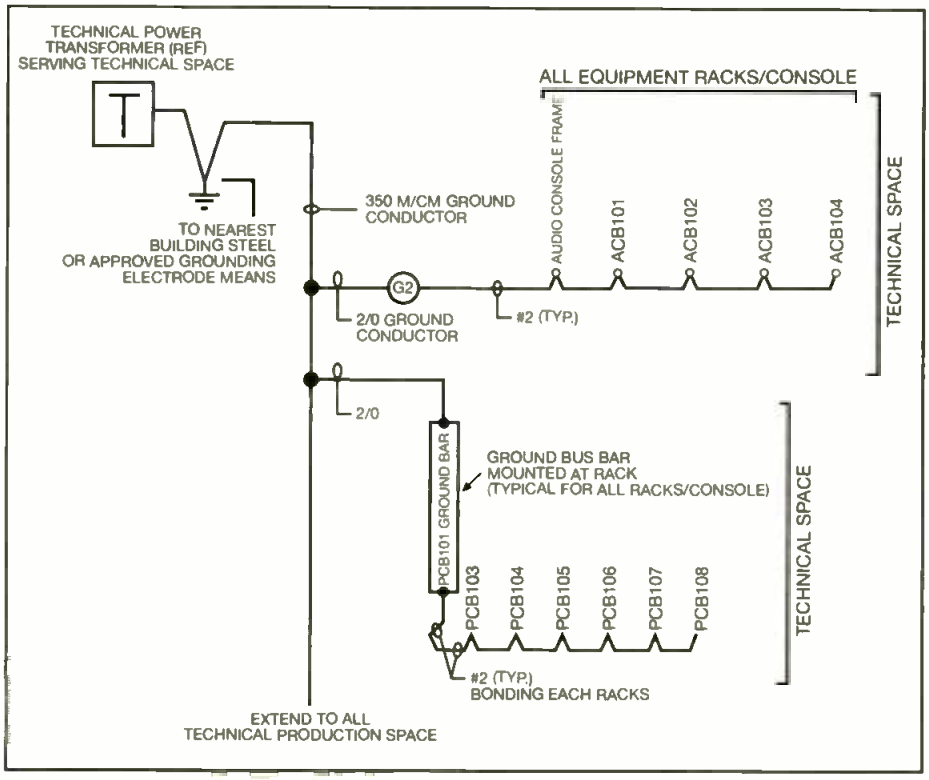
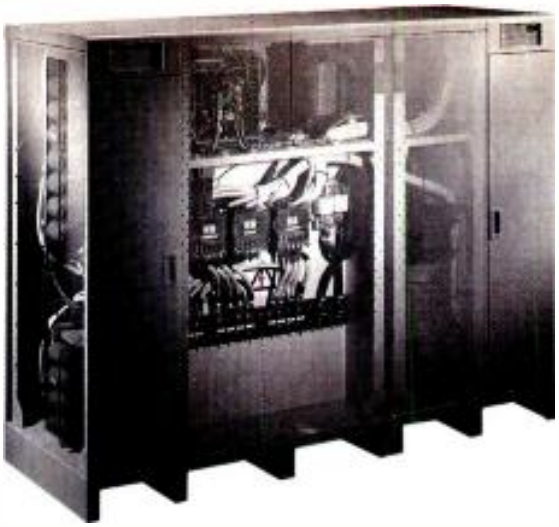


Figure 1. Most applications do not require sophisticated isolated ground power or other expensive grounding methods. A radial/star grounding scheme, shown here, is effective, economical and meets code requirements.

Power quality begins with basics

The fact is that when equipment problems occur at a digital broadcast facility, it often is difficult to identify the source of the problem. Steps taken at the outset of a renovation or fit out of a new facility to assure the highest quality power will reduce the likelihood of having to track down bugs in the power system.

For entertainment facilities housing studios, control rooms, AVID bays and related technical spaces with high concentrations of digital electronic



Some UPS systems provide an on-line, double conversion process where the load is fully isolated from primary line disturbances. Shown is a 150-300kVA, three-phase UPS system from Oneac.

equipment, a well-planned electrical infrastructure is crucial in ensuring power quality. It begins with the basics, something apparently as "simple" as the conventional techniques used in effective branch circuit design can ensure power quality. Yet the basics often are overlooked in designing an electrical infrastructure. Later, expensive solutions may have to be implemented.

For example, there are many cases in which poor power quality has been traced to an undersized neutral conductor. This is a common problem in older buildings. In the past, the National Electrical Code (NEC) allowed downsizing of the neutral conductor because it was considered a non-current carrying conductor in a three-phase shared neutral system. That is no longer the case. In fact, the triplen harmonics generated by today's electronic equipment has turned these formerly neutral conductors into current-carrying conductors. In many renovations, power quality can be improved simply by replacing the old wire with a properly sized neutral conductor.

As for technical grounding, simple radial/star grounding is not only compliant with NEC code and economical, but it also is effective in almost all digital broadcast applications.(See Figure 1.) Most applications simply do not require sophisticated isolated ground power or other expensive grounding methods. Instead, all equipment racks with associated ground bus bars can be bonded with ground conductors, and the main connection back to the ground source located at the rack nearest to the building's steel structure. This is a simple, economical and effective approach. Experience shows that problems with grounding often can be traced to subpar code compliance, not the grounding approach *per se*.

By definition, electrical noise is random voltage fluctuation with broadband spectrum content up to 200KHz. The induced electrical voltage in interconnecting system is variables of the inductance, the peak current noise or impulse and the rise time of the peak current. For example, conductor with 40nanoHenry/inch inductance, at high frequency of peak current noise of 5A with 1 nanoseconds, the induced potential voltage developed is (40*5)/1, which results in 200V peak per inch across the connection. This interference will distort most interconnect signal transmission.

It is essential to recognize the potential for harmonic distortion and take steps to minimize it.

A facility-wide UPS system needn't power everything. Focus first on critical on-air and playout systems that may fail with even a millisecond interruption in power.

One of the simple methods to determine grounding issues is to measure neutral-ground bond at panels that served the equipment and at load side. The neutral to ground voltage should be between 1V to 5V to maintain desired operation. Continuity test between equipment racks ground bonding is also recommended to ensure that all the network racks are at the same ground reference.

Minimizing harmonic distortion

In a fully digital facility, it is essential to recognize the potential for harmonic distortion and take steps to minimize it. An effective solution for low zero sequence harmonic distortion is installation of a low zero sequence impedance harmonic filter at each panel serving electronic equipment. (See Figure 2.) This type of filter also significantly reduces common system noise. Where a filter cannot be installed at the panel, it may be necessary to specify a rack-mounted filter on each rack. This is effective, yet more expensive.

Proper space planning — locating panels and electrical distribution equipment closer to the load — also reduces harmonic distortion caused by feeder impedance. Sometimes it is difficult to implement this type of solution due to the constraints imposed by an existing facility. Nontechnical people may question the aesthetics of this type of solution ("Why do we have this ugly wall panel here?"). An effective approach is to secure everyone's buy-in, including the architect, by explaining the benefits. Of course, compromise sometimes is necessary — there is always a cure, although it may be more expensive.

Power quality assessment is recommended for existing facilities that experiencing harmonic distortion. Power disturbance monitoring utilizing a state-of-the-

art spectrum analyzer provides detailed information about the power waveform. The information includes total harmonic distortion (THD) for voltage and current, breakdown of the harmonic components and its magnitude, frequency analysis, and other more useful information. The information will provide a trend of power system, which will help the designer to evaluate effective mitigation methods. Per IEEE 519 standard, the recommended THD for voltage is between 1.5 percent and 5 percent, depending on the magnitude of voltage distribution. As for current distortion, the recommended THD is between 5 and 20 percent depending on the ratio of the short circuit to the rated load current at the point of common coupling (PCC), which is the electrical service entrance. In broadcast facilities, the voltage distributions are typically 4160V, 480V/277V and 208/120V. Therefore, as a good rule of thumb, the voltage THD should be limited to 5 percent. As for current THD, because the recommended percentage is based on PCC it should not be applied at the load side. The harmonic current distortion generated by load should be compared to the actual distribution to evaluate if in fact the distortion is severe. For example, a 10A load generating a 50 percent current THD in a 225A distribution system is still acceptable because the actual contribution to the system is minimal.

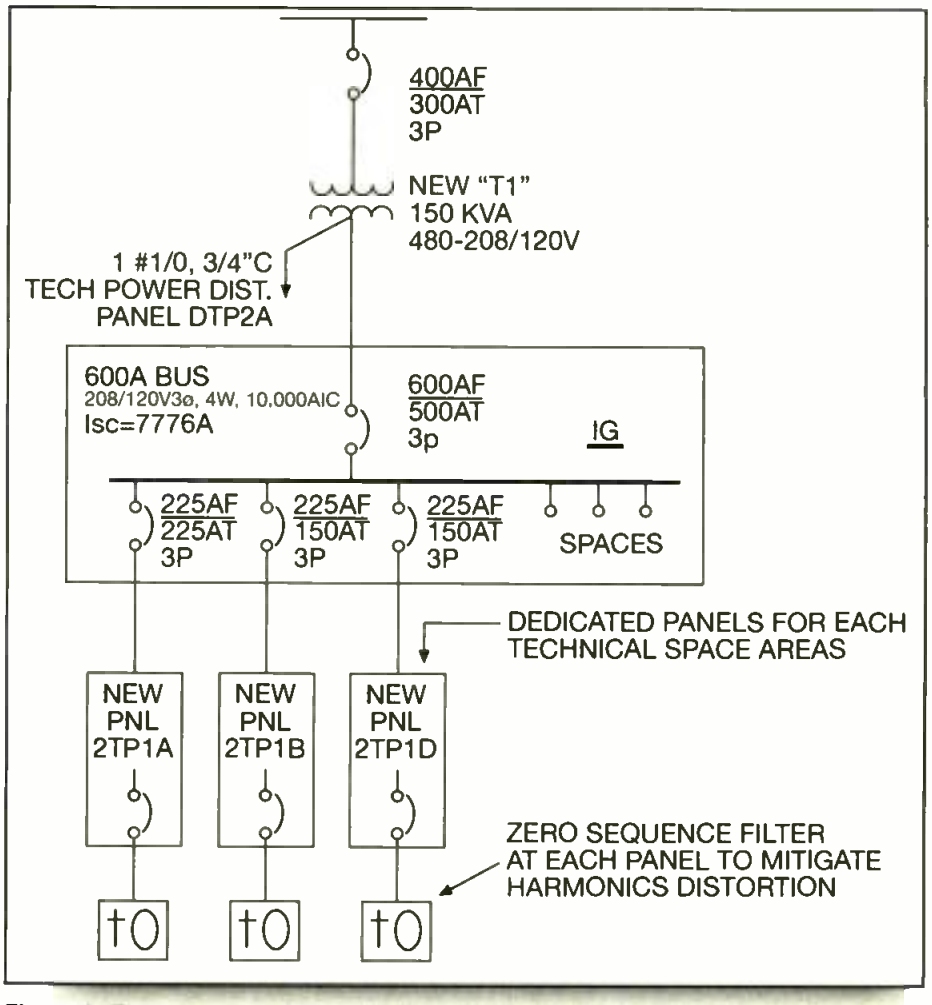


Figure 2. Zero sequence harmonic filter distribution. Implementation of a low zero sequence impedance harmonic filter is an effective solution for both harmonic disturbances and common system noise.

Although grounding remains essential in digital systems, prevention of harmonic disturbance is even more crucial.

Mitigating magnetic fields

Space planning also is crucial in reducing the risk of interference from elevated low-frequency magnetic fields. High-current carrying equipment, such as transformers and feeders, should be strategically located and routed whenever possible. In older facilities and new build-outs, routing and placement of any equipment carrying high current should be carefully coordinated to limit AC magnetic interference in sensitive areas. However, where the layout cannot be modified due to existing real estate constraints, interference can be mitigated by properly shielding the room, another effective but very expensive solution.

An AC magnetic source of 6mGs and greater is known to cause interference with computer video display monitors. AC magnetic source magnitude decreases inversely proportional to the cube of distance ($1/d^3$). Therefore placing sensitive equipment a few feet away from the source will decrease the impact dramatically. However it is all relative to the strengths of the magnetic field.

All of these examples illustrate an important, yet often under-appreciated principle of value engineering: first investigate the feasibility of the least-complex, least-expensive effective solution.

With each passing year, entertainment production equipment becomes more sophisticated, more powerful and more compact. The increasing use of digital equipment will require a parallel evolution in the design of electrical infrastructure to meet the need for superior power quality. It is the only way to ensure that digital broadcasting technology lives up to its promise. ■

T.K. Wong, P.E. is a senior associate with Entertainment Market Focus Group at Syska & Hennessy, a consulting engineering firm.

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Applied Technology

The Tektronix PQM300 QoS monitor

BY RAUL MARTINEZ

The advent of digital television and accompanying compression techniques require video program providers — whether they be TV broadcasters, cable or satellite providers, network operators or Internet service providers — to redefine how they evaluate program quality and provide quality of service (QoS) assurance to the viewer. MPEG video compression can result in picture degradation. Content providers must rely on sophisticated test and monitoring equipment to ensure the high level of picture quality that today's viewers expect.

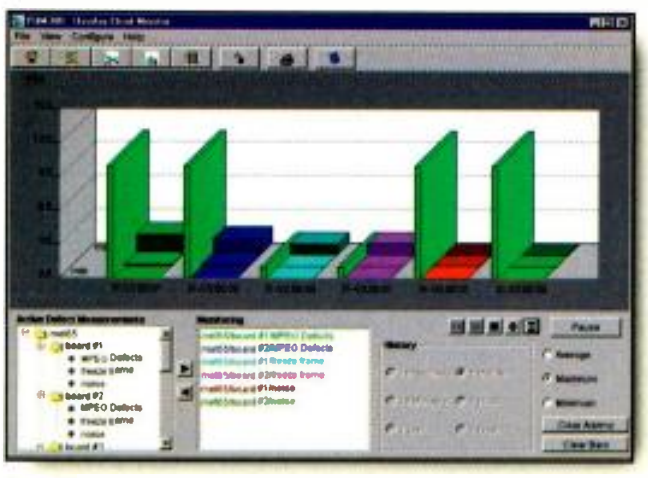
Tektronix is developing MPEG and picture quality monitoring solutions that help program providers reliably transmit video at a guaranteed level of quality to the viewer. The QoS systems also enable customers to optimize utilization of available bandwidth.

Bandwidth management is important for two reasons. First, picture defects can displace bits that would normally be allocated to video content. Second, the customer would ideally want to allocate bandwidth on a program-by-program basis, based on the program content. For example, a news program would ideally be allocated less bandwidth than a sporting event. The sporting event's content is dynamic, motion-filled, and requires more bits and therefore greater bandwidth. A news broadcast is comparatively static and requires fewer bits and less bandwidth.

For example, based on the content, a news program would ideally be allocated less bandwidth than a sporting event.

The bottom line is that bandwidth is money. The Tektronix PQM300 multichannel QoS monitor is a real-time, continuous solution for enhanced video quality monitoring that provides tools for bandwidth management. This enables users to ensure the quality of the video they provide their viewers, while protecting and generating more revenue for their services.

The system provides continuous signal monitoring to detect critical quality problems in the distribution of compressed digital video. It provides a tool for automated monitoring of ITU-R 601 serial digital video and composite analog video. It can quickly notify operators of problems with the video and help engineers diagnose and document picture quality problems within the video distribution network.



A screen shot of the PQM300's graphic user interface.

Network monitoring

The system's networking capabilities enable monitoring of up to eight channels, making it ideally suited for multichannel sites in a geographically dispersed network. The user can detect picture defects including MPEG blockiness, repeated frames and uncorrected noise using the Picture Defect Index (PDI) scale, which was derived from the industry-standard Picture Quality Rating (PQR) scale.

Tektronix established the PQR metric as a means of assessing picture quality by making full-reference measurements. The correlation between the PDI and PQR metrics allow users to make picture quality measurements for in-service monitoring situations where the reference video necessary for full-reference measurement is not needed.

The system provides a solution for in-depth quality monitoring of two or more channels of digital video information. It is effective for large, distributed networks requiring a flexible, extensible solution with simple alarm views and mechanisms that can be remotely monitored from network operation centers. Users can gain more robust access control and increased information through quality histories and defect logs for all of the simultaneously monitored programs.

The system's network capability enables users to construct an automated network monitoring system or incorporate picture quality monitoring into an existing system. The number of channels can be increased as monitoring needs change. For increased flexibility in larger facilities, multiple units may be networked to provide centralized monitoring.

The monitoring system supports SNMP network management protocol to enable

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Microwave Radio Communications (MRC) designs, manufactures and markets microwave radio systems and accessories for broadcasting, telecommunications and government applications. Founded as part of Microwave Associates in 1963, MRC has become the leading provider of analog and digital video microwave systems to television broadcasters in North America and a major provider worldwide.

As the world's broadcast organizations convert to digital technologies for contribution and distribution, MRC's innovative product lines are developing an increasing share of the market. The MRC TwinStream™ dual-carrier radio system brings together the leading analog and digital video microwave products. This allows broadcasters to transport new digital television services on the same RF channel as their existing analogue service. MRC TwinStream™ is the leading studio-to-transmitter link and multi-hop network system in the US and is building a worldwide reputation for quality.

The MRC CodeRunner™ has become the leading platform in North America for organizations seeking robust and bandwidth efficient digital ENG transmission. The use of new COFDM technology is ideal for television news, sports and special event coverage. New versions of the CodeRunner™ are gaining acceptance in defense, security and television broadcast organizations internationally.

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remote monitoring and prompt response. The SNMP protocol gives facilities the ability to display remote units as icons on a network monitoring workstation and monitor their status. It also supports leading Web browsers to enable remote operation of multiple units. These capabilities allow the system to provide monitoring capabilities for multiple channels in any number of locations.

Because picture quality is monitored at the video layer, even if the network receives all the bits, they may still face picture quality issues. If the video signal entering the network has noise, the signal may already be compromised and at risk of deteriorating further if it is compressed in any way. Noise and compression defects use bits that would normally be allocated to the video signal; thus the viewer is receiving an MPEG transport stream that is compromised.

The QoS monitoring system addresses DTV dynamics by allowing users to quickly identify the most common visual impairments, including blockiness, frozen and repeated frames, loss of service, and Gaussian noise, before they become viewer complaints. In-service, continuous monitoring of all frames assures that the most visually annoying picture defects are detected and logged for all monitored programs. Detection of an image defect or impairment signals an alarm, identifying the channel on which the problem exists.

The bottom line is that bandwidth is money.

System enhancements

A new graphical user interface enables users to identify, diagnose and correct program errors more accurately. Remote protocol monitoring has been added to send picture quality defect alarms to a central location. This also allows users to pinpoint the exact time and location of errors and then print program error logs.

The graphic user interface incorporates three new views for increased usability. A bar-chart display features a five-point scale for more objective analysis of picture quality during non-alarm-generating conditions. The confidence view offers a near real-time image of a monitored program as an alarm is triggered. Splash View allows numerous PQMs to be displayed in a near real-time thumbnail format, to allow for monitoring of non-alarm signal conditions across the entire network.

Relay outputs in the system provide customers with additional options for notifying operators of picture quality problems, while an integrated LCD display eliminates the need for a separate VGA monitor as a local display for the instrument.

The measurement capability of the PQM300, its current multichannel ability, and its networking and automation capability allow users to preserve their initial investment in picture quality monitoring by purchasing additional capability as their needs grow. ■

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Raul Martinez is a product marketing manager at Tektronix, Inc.

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hanced TV channel features three choices of video and associated text streams – for instance, "Latest headlines," "Sports results" and "Weather."

The equipment configuration behind this type of Enhanced TV channel is shown in Figure 2. The system comprises three Imagestore Interactive units operating in parallel, all set to give congruent DVE squeezes of the primary video input. A second program input to the units is used for mixing interstitial material. For clarity, four servers are shown, under automation control, to provide the video and audio for each channel although, in reality, these may be four outputs from a common server. Channel branding is common to the three channels and is accomplished in the graphics area using PC-based applications for image browsing, animation compilation and editing, text template creation, and media loading. Each channel's dynamic textual information is automated, using a simple program designed to send the relevant text and control messages to each Imagestore Interactive via Ethernet. This text automation is linked to the main station automation. The three video outputs are then fed to the MPEG multiplexer.

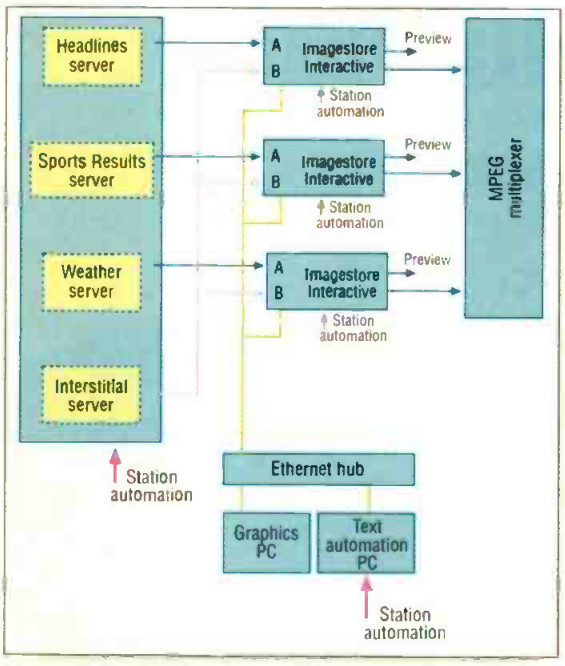

Figure 2. Imagestore Interactive system for creating Enhanced TV channel.

This modular approach has numerous advantages for the broadcaster. The system is based on components widely used in the broadcast industry and supported by the principal vendors of station automation.

The single automation interface for the system, which supports the mixing, branding and effects systems, simplifies and streamlines system automation. This high level of integration also reduces equipment costs and rack space requirements. The system offers integration with other established systems and applications for easy graphics creation.

To back up the automation, a range of remote panels are available, including a full master control surface that can control interactive channels, as well as multiple other SDI outputs equipped with Imagestore master control and channel branding systems. This enables the Imagestore to effectively integrate interactive television alongside other channels.

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Neil Sharpe is marketing manager at Oxtel.

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MedioStream software-based encoders

BY KEITH DUNFORD

MPEG video and audio compression was launched into the professional broadcast arena just over a decade ago. The early market leaders, Compression Labs (CLI) and General Instrument (GI), provided the industry with MPEG-1 encoders and decoders that could significantly reduce the cost of operating program contribution and distribution networks. These companies were soon joined by a number of U.S. and international competitors providing second generation, higher performance MPEG-2 products that were smaller, cheaper and easier to operate.

Application-specific encoders and decoders came along in the mid-1990s to address television networks' need to improve their capability and efficiency in news gathering and special event broadcasting. This was followed later in the decade by ATSC-compliant encoders utilizing advanced technology that enabled satellite networking of high definition television to become an economic reality.

Unlike the early MPEG-1 products, which largely used discrete circuit processing, the majority of MPEG-2 encoders have used RISC chip sets integrated with other circuit elements. This resulted in a lower cost but somewhat inflexible hardware architecture. Although the price of MPEG encoders has fallen over time, they remain an expensive item that has become a necessity in modern television operations.

The next generation of MPEG-2 encoders is about to arrive, promising to solve many of the issues related to flexibility and cost involved in encoding operations. This recent breakthrough has been achieved through advances in MPEG-2 real-time software encoding that can eliminate many of the restrictions associated with RISC processors.

A small number of companies are in the late stages of developing software-based encoding systems that allow real-time MPEG-2 and other compression formats to be processed using standard computer hardware. Software-based encoding systems provide a greater degree of encoder flexibility and improved performance when compared with RISC chip-based encoders.

The next generation of MPEG-2 encoders is about to arrive, promising to solve many of the issues related to flexibility and cost.

The software encoder price is also expected to be significantly less than current implementations. Additionally, software-based encoders can be expected to provide inexpensive and simple upgrades as the performance of standard computer hardware improves.

A software-based alternative to chip-set MPEG-2 encoders has been made possible largely through the significant progress made on commercial CPU architecture over the past several years, which has especially focused on improving multimedia processing capability. For example, new dedicated CPU instructions have been developed to help process Digital Cosine Transforms (DCTs) and other computational-intensive or repetitive processes involved in video encoding and decoding. These new instructions are called Single Instruction Multiple Data (SIMD) and can apply the same operation to multiple data segments at the same time, significantly increasing data processing efficiency.

Another critical improvement in PC performance has been the increased bandwidth to move around the huge amounts of data encountered in high-resolution video. For example, the bottleneck between the graphic card and the CPU has been eased thanks to the new AGP bus. The system bus bandwidth has been increased dramatically to facilitate large amounts of data processing, faster RAM has become available, and new instructions have been added to better manipulate complex data segments. Each of these improvements has contributed to bringing software-based MPEG-2 encoding and decoding to market as a low cost, flexible alternative to chip-set based dedicated hardware solutions.

MedioStream will demonstrate its real-time, broadcast performance MPEG-2 encoder at NAB 2001 to offer real-time software encoding solutions for the professional, industrial and consumer market sectors.

The CAMpeg RT real-time digital video-to-MPEG-2 transcoder encodes real-time digital video from a DV camcorder at full D1 (720x480) resolution and at 30fps (29.97fps) into MPEG-2 ML@MP format. The system provides near broadcast quality for personal video production at an affordable price.

Significant system requirements must be met in order to process real-time video. A computer with a Pentium III processor operating at 600MHz or higher or a 1GHz Pentium III processor is recommended to obtain best results with aggressive video and for simultaneous encode/decode operations. The system must also have 128MB of RAM, a 10GB hard drive and an AGP video graphics card with 8MB of RAM. It operates with Windows 98 SE (second

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edition), 2000 and 2000 Pro. Input from a DV camcorder to the computer is accomplished with an IEEE1394 (Firewire) adapter and cable or a PCMCIA card for laptop computers.

The company's second product targeted at the semi-professional and industrial market was beta tested during the first quarter of 2001, and is expected to be available by mid year. The product, named CAMpeg PRO, has an advanced user interface and processing features that provide improved performance and flexibility to the operator in the encoding process. The system processes real-time video at full D1 resolution in both NTSC and PAL standards. An upgrade to the system will allow the real-time transcoding of MPEG-2 encoded content to popular video streaming formats such as Windows Media, Real G2 and Quicktime. The product will also encode MPEG-1 for CDR authoring.

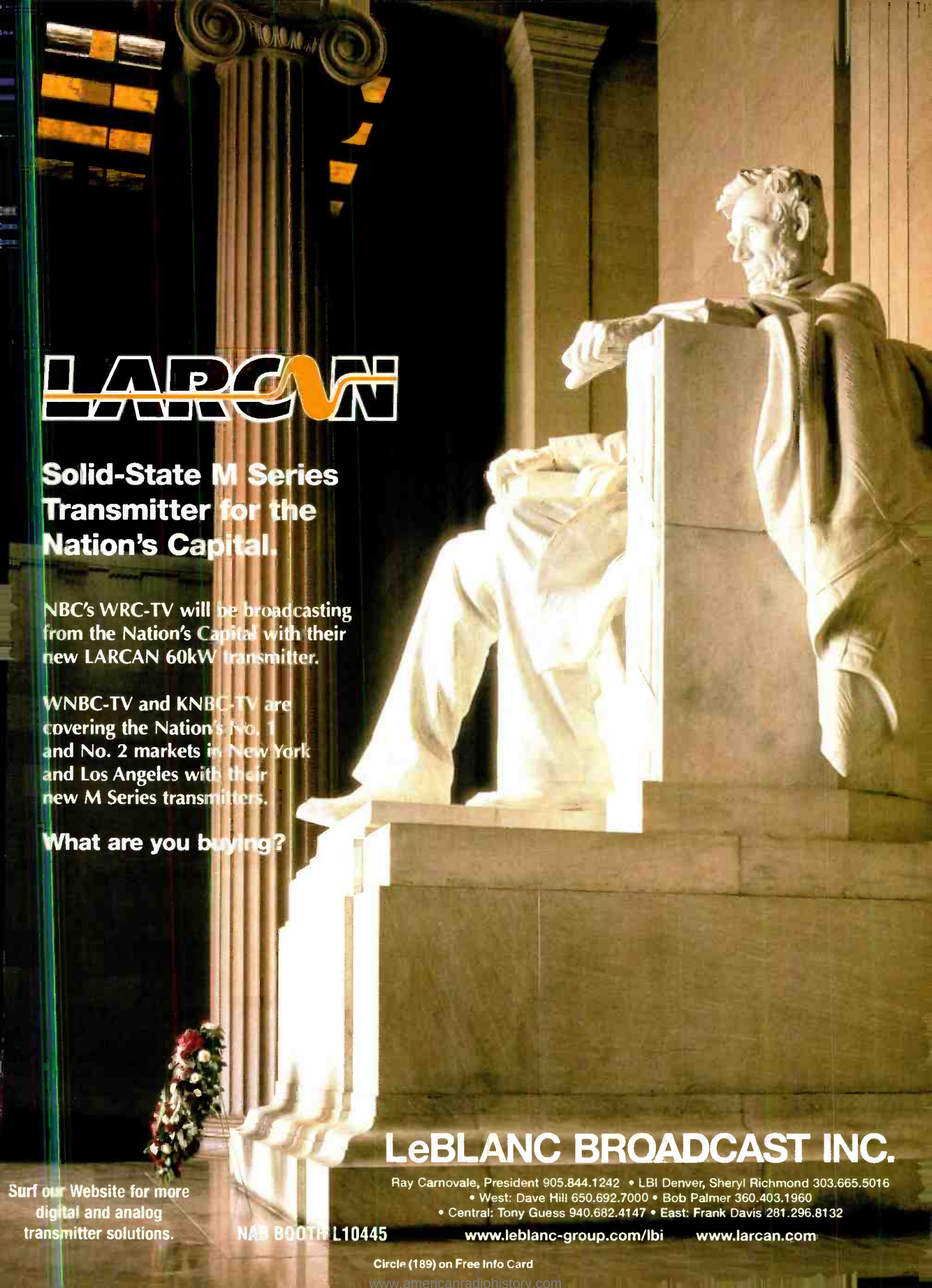
The third and most advanced product has been provisionally named MedioPRO and will be shown for the first time at NAB 2001. The company will offer two variants of the MPEG-2 software-based encoder system to meet the requirements of different operating environments. The basic product will provide digital-only input from either IEEE 1394 (Firewire) or 10/100baseT Ethernet. A higher priced variant will provide an interface to legacy systems where input might be composite video, analog or AES/EBU audio, SDI, or ASI. MedioPRO-XLT will be supplied with a laptop docking module providing the input and output interfaces in the mixed analog/digital system. The output can be either MPEG-2 ML@MP (4.2.0) or ML@SP (4.2.2) formats. MPEG-2 real-time encoded events can also be trans-coded into Windows Media, Real G2 and Quicktime formats for streaming.

CAMpeg PRO and system configuration

The system is a next generation Digital News Gathering (DNG) encoder, providing new technical and operational features. DSNG is recognized as one of the most significant advances in the news media industry. The transition of software encoding will significantly enhance the capability. Global news networks are constantly seeking new technologies that can provide a competitive advantage with lower operating cost. There is a significant opportunity for software-based encoders in transportable systems that require improved operating flexibility, high performance, lightweight and lower cost than the current generation of MPEG-2 encoders.

The system will be supplied as an integrated hardware and software system, featuring a Pentium III (1GHZ) tower or laptop computer, input/output interface module, cables, Windows OS, encoder /decoder software package and 24-hour customer support. A mobile news gathering solution can be easily integrated with a high-end notebook computer and professional DV camcorder. This, and the potential for improved operational and technical performance, promises to take MPEG-2 encoding to the next level. ■

Keith Dunford is a partner at Exam Associates, a consulting group specializing in digital media technology applications.



Bitcentral solutions for satellite broadcasting

BY KEN PIQUELLE

End-users, suppliers, service providers, integrators and enterprise businesses in the digital broadcasting and satellite communications industries operate in a highly fragmented market with nearly 1500 equipment manufacturers and distributors worldwide. Companies typically require multiple discrete components manufactured by different equipment suppliers, making it difficult — and expensive — for procurement departments to access information regarding product specifications, pricing and availability.

California-based broadband technology provider bitcentral sees an emerging opportunity to assist these companies by providing them with a single-site destination offering industry-specific information, news, employment opportunities and interactive discussion forums. This infrastructure serves as a resource facilitating business transactions between buyers and sellers of digital broadcasting and satellite communications equipment, wireless bandwidth and technical services. Bitcentral offers new and pre-owned equipment and a wide range of services including technical support, training, engineering, consulting and system configuration assistance.

These customized resources assisted Educational Service District 101 in updating its STEP•Star nationwide satellite program. ESD 101 is one of nine regional agencies in the State of Washington established by law to provide cooperative and informational services to local school districts and to assure equal opportunities for everyone.

In 1969 the Washington State Board of Education created a statewide system of intermediate school districts, or ISDs, to meet the needs of local school districts.

In 1972, the state board reviewed the needs of each geographic region and reduced the number of ISDs from 14 to 12. In 1975 the ISDs were renamed educational service districts, or ESDs.

ESD 101 launched its STEP.Star nationwide satellite program in 1986. Eventually the district was able to procure grants that allowed it to purchase its own equipment, hire its own talent, and produce programming in-house. In 1996 the district hired an engineer, John E. Savitz, to design, build and implement their studios, control rooms and satellite delivery system in an empty school building. Basing his designs on initial technical bid specifications and teachers requirements, Savitz literally built the entire system from the ground up.

The original STEP•Star system used DigiCipher compression technology, which limited the amount of programming ESD 101 could offer. John Savitz, engineer of technology and telecommunications for the district, persuaded ESD 101 to switch to the more versatile MPEG compression system using equipment and integration services from bitcentral.

The new compression system enabled ESD 101 to expand their programming.

According to Savitz, Bitcentral provided the agency with a complete turnkey solution demonstrating a thorough

ESD 101 utilized broadband services from bitcentral to migrate to MPEG compression equipment in its uplink room, shown above.

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understanding of the district's RFP. The company installed, configured and tested the network to ensure full operation and gave ESD 101 a one-year warranty on the entire system.

With DVB-compliant MPEG compression in place, ESD 101 was able to operate three channels on one-third of a transponder, compressing the signals into a smaller space. The new compression system enabled them to expand their programming to include the Corrections Learning Network for corrections officers and inmates.

The system also permitted ESD 101 to provide conditional access through encryption. The STEP•Star program includes receivers with smart cards in them. Each receiver is registered in the STEP•Star database. Whenever a receiver is turned on, it receives a signal from the database that either allows or disallows access. This served as a deterrent to signal piracy and allowed ESD 101 to control how many hours of programming a viewer received – from an hour of programming on a single channel to all programming on three channels. Equally important, encryption allowed ESD 101 to deny access to some programs, such as those directed to correctional officers that might be inappropriate for other viewers.

Equally important, encryption allowed ESD 101 to deny access to some programs.

Bitcentral also installed a Ku-band uplink for ESD 101. The district spent money on the front end so that subscribers could access educational programs inexpensively.

Working with PanAmSat, ESD 101's satellite provider, bitcentral installed, configured and tested a sophisticated uplink that allowed the district to operate three channels on the Galaxy 10R, Transponder 15 — the most powerful Ku band available — giving the district the capabilities they wanted. Bitcentral also worked with manufacturers to get ESD 101 an extra year of warranty.

Today, ESD 101's programming is broadcast to almost every area of the 50 states and beyond. Viewers watching the live, interactive broadcasts can telephone to ask questions on-air, which greatly enhances the learning process. All a subscriber needs to receive the Ku band signal is a 1.2-meter fixed dish, one of ESD 101's receivers and a coaxial cable. The district maintains its own 1.2-meter dish on site so they can constantly monitor their programming to ensure everything works.

At last count, ESD 101 had about 20,000 registered K-12 students at sites receiving direct classes on downlinks, 1 million homes receiving the K-12 programs on cable and over 6 million homes receiving the adult literacy programs on cable. The K-12, Adult Literacy and the Correctional Learning Network are growing rapidly. ■

Ken Piquelle is director of marketing for bitcentral.com.

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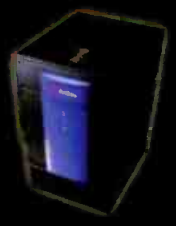

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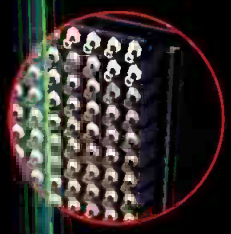

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Editing systems

BY JOHN LUFF

In the early years of television any editing was done strictly on film. Programs that needed the sophistication that editing allowed had to use both film production techniques and tools. In the balance, the ability to broadcast a program more than once was also protected, for at that time there was no effective means of recording a program without using film. The technique of recording after video production (live only) was called kinescope, a process in which a film camera was used to capture a program from a CRT in real time. Once the video was transferred to a non-electronic medium all manner of well-established film techniques could be used.

By the mid-1950s a number of research commercial departments in the U.S. and elsewhere had been working hard to find a commercially viable approach to recording the electronic images without chemical photography. Ampex, and later RCA, Sony, Panasonic, Bosch, Hitachi, NEC and others achieved considerable success in making increasingly more practical electronic copies of the live images. However, it was a number of years before practical electronic editing was perfected. For a decade editing was done by physically splicing videotape segments together in the same manner as film was physically spliced. Indeed editors used bins like film professionals to store clips (more accurately called waste baskets in the janitorial industry).

In the 1970s, "Rowan and Martin's Laugh In" took such efforts to new heights with literally hundreds of splices in some programs. While this was thoroughly enjoyable television, it was equally impractical for wide use in production. For instance, a split edit (one where video and audio cuts are not coincident) were impossible. The push to create usable electronic editing was spurred on by Hollywood's need to be able to produce electronically like they did with film, in the theory that video production would be as cheap or cheaper than film approaches.

However, unless you physically cut videotape (or use modern computer-based editing tools), video editing is relegated to a linear process in which scenes are transferred (dubbed) from original videotape to the master recording used for air. While beyond the scope of this article, it is important to realize the precision with which this had to be done. Scenes had to be written on the master tape in sequence, from the head of the program to the tail, and the tracks on the tape had to be precisely controlled to allow the playback of the edited signal by mechanical means with considerable hysteresis. To edit one had to begin erasing old video as the head passed the erase head, and a precise amount of time later begin recording the new material exactly where the erasure had started. Eventually, methods using tones on a cue track permitted "precisely" repeatable edits, though there were no methods to achieve time synchronization between VTRs unless the editor had extraordinary skill and the VTRs were carefully maintained.

In the early 1970s a timecode that could be recorded on tape and used to both synchronize transports and accurately control the timing of edits was developed by commercial companies and standardized by the SMPTE (SMPTE 12M is still titled "Time and Control Code"). Initially, implementations were still finicky and prone to less than perfectly repeatable results, due in part to the analog nature of the timecode. Over time, the systems utilizing this common "sync track" grew more capable. Companies including RCA and Ampex created systems that used special-purpose, hardware-programmed computers to control multiple VTRs and provided in some cases GPI control over production switchers and other devices to make integrated systems almost possible.

CMX however took a fresh look at the problem and created software to be run on a general-purpose computer that took control of VTRs, ATRs, production switchers and audio consoles in a more powerful environment. The CMX 300 and its successor products were the mainstay of the production industry for nearly 20 years. It certainly was true that no early computer editing system radically changed the topology of the editing landscape, as scenes were still laid down in strictly controlled places on the tape. However, it was now possible with adequate care to make a "tracking edit" in which a scene could be spliced to itself visually seamlessly and reliably. This was a breakthrough capability that today is still critically important to many production processes. An editor for film spent most of his or her time thinking about the flow of the content. A video editor typically was a technician who understood what made the complicated process tick and fixed the often-broken equipment.

With disk space as cheap as paperclips, load time is considerably less of an issue.

As the cost of the hardware and the sophistication increased, producers demanded less-expensive facilities to use to make first-cut decisions at lower cost. The software and other tools were created in less expensive incarnations using the then new U-matic 3/4-inch videotape format as a less-expensive medium less prone to technical complications

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and cheaper to run. In some environments the upward pressure began again, with offline editing booths acquiring editor-controlled audio consoles and larger production switchers. In some markets these tools were used as a final cut method.

However, the ability to replicate the film production process, which is essentially nonlinear in nature, had not yet been achieved. In a historical footnote, CMX produced the first nonlinear electronic editing system. The CMX 600 was intended strictly for offline purposes, as it was monochrome, and the quality of the preview image was never intended for any more than first cut purposes. One could however take the decision list that was output to punch tape on a CMX 600 and input it to a CMX online editing system to auto-conform an edit master from the source material. Only a few CMX 600s were made, with some notably used in Hollywood by CBS with some success. The system cost hundreds of thousands of dollars, which in the mid-1970s was serious cash. It would be more than a decade before nonlinear editing would come back as a commercial product.

It is clear that we have indeed come a long way from razor blades for editing television content.

Other media were used for other attempts at nonlinear editing. Lucas Films invested in the creation of a system called Edit Droid (and Sound Droid), using analog laser disks as the playback media. The theory was basically, provide enough copies of the media on enough machines, and random access editing would look like it was utilizing a single copy of the media in a nonlinear process. Too complicated and too expensive for general use, the Edit Droid and some similar competitors withered.

The idea behind the Droid and CMX 600 was critical to the future of editing. Playback in real time with immediate nonlinear access to any scene would make practical a new class of tools. It still would not quite emulate film, but if the software controlling the process was sophisticated enough, the editor might escape the technology and begin to go back to thinking only (actually *principally*) about content. To a large measure the cat was finally out of the bag, and the effect on the production process was profound.

When it became possible to compress video, put it on computer disks and play it back in a truly random access manner, the Holy Grail was within sight. Avid, and then an increasing number of competitors, achieved considerable commercial success as soon as the technology became practical. At first these rudimentary computer editing systems were still offline tools, but as the quality of compression and the speed of computers improved they moved closer and closer to the mainstream of electronic editing.

Today products we generally categorize as nonlinear editors supply fully acceptable quality for most editing

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needs, including uncompressed editing of both 525 video and HDTV. While this history lesson may be a long way to go to get to today, it is clear that we have indeed come a long way from razor blades for editing television content. Computer editing has now begun to move down to the home PC with IEEE 1394 interfaces to remarkable consumer cameras permitting convincing quality and considerable sophistication in editing products in wide distribution.

Now we have software that can provide many of the functions of a very expensive linear editing bay. But though we have indeed come a long way, we still do not have tools in software that can totally replace some linear editing functions, nor all of the capabilities of a fully configured linear editing bay. One of the limitations of nonlinear processes is the acquisition process itself.

In film the camera original is seldom edited directly. In early videotape editing with razor blades that was also true. The original is simply too valuable to risk losing it in the editing process. Film editing eventually conforms the camera original to the edited version, producing a clean copy only after the decisions are final.

Nonlinear editors do the same thing for different reasons. Fundamentally the camera original (videotape in almost all cases) is transferred, or dubbed, to the computer-accessible media because it has to be done for most systems to work. Thus the "load" time must be allocated before editing can begin. When nonlinear editors first became available, and disk space was quite limited, this was a severely limiting factor. A one-hour documentary with a 20:1 shooting ratio became an exercise in media management at least as complicated as linear editing. With disk space as cheap as paperclips, load time is considerably less of an issue. However the load time issue is not eliminated by the quantities of bits available.

Today's nonlinear editors, like the Sony XPRI shown above, provide new functionality in the editing process.

Imagine a single shot brought in to a session on tape. To use it one must ingest it (load) to the system, and then proceed with the edit. What if there are dozens of such shots, like there might be in the case of a news editing environment? It actually can be less efficient to edit nonlinearly in such circumstances. The ability to preview non-destructively, as well as to use features like fit to fill and other capabilities at will, makes nonlinear systems shine. But when a simple cuts-only program that is well understood and not subject to an interactive editing process, it may well be faster to lace up the tape, dump it to the master and move on.

Linear editing systems that grew out of the early CMX 300 linear editing systems can provide features that strictly nonlinear systems cannot. They can operate in a hybrid environment for instance — utilizing disk drives for random access features, but also accessing "linear tools" like VTRs and production switchers — to achieve the best of all worlds. Sony, Accom and others provide just such systems and offer the freedom to complete a project, or portions of one, in a linear fashion when appropriate, while accessing the essence of nonlinear techniques as well.

The future holds interesting possibilities as the power of general-purpose computers begins to achieve performance levels orders of magnitude higher than that used in the first nonlinear systems. One powerful concept that will certainly come to fruition is that of "proxy editing." Consider doing all your editing on inexpensive platforms using low bit rate proxies of the actual media with modest quality, but no reduction in production capability. Then the metadata representing all of your decisions is applied to the actual media stored elsewhere in the same compute environment, but executed on platforms with higher capability and sophisticated algorithms. By taking this approach, many people could be editing the material simultaneously and non-destructively. It would also allow an environment in which the expensive tools needed to do high-quality work need only be purchased once. The proxies for those tools could be much less expensive, turning back the clock to the early days when offline editing was done in less expensive editing bays with U-matic proxies of high-quality media. At the end of a session you might simply hit the print button and the final copy of the program would be assembled and delivered over the WAN to the distributor for release to air, while you retained the original media and the proxies in a secure environment controlled by the owner of the content. ■

John Luff is vice president of business development for AZCAR USA.

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Business highlights from broadcast and production

BY NANCY INWOOD, ASSISTANT EDITOR

While Sony will show plenty of new products at NAB2001, the focus is on the introduction of a wide range of integrated solutions and products for what it calls the new broadband era. The company's corporate theme at NAB, for this year's NAB is *An Anycast World*. Sony will demonstrate a range of technologies to help users "Produce once and distribute many". Based on the company's commitment to supporting broadband-based, networked products, the *Anycast* philosophy is clearly demonstrated in the Sony's NAB booth.

Crucial to the concept is a broadband interconnection, both for content producers and distributors. Sony is showing how content can be distributed through a variety of ways, OTA, satellite, cable, even wireless broadband. The value to the professional is being able to produce content once and still be able to distribute and display it on a variety of devices. A range of broadband content generation and distribution systems, from the XPRI digital content creation system to the networked, and Bulldog-driven, media asset management platform are available for demonstrations. The thread; "any content for any purpose, over any number of channels , on any viewing device, all networkable and IP ready is clearly visible and exhibited throughout the booth.

Also key is Sony's support to an "open systems" approach to equipment design. The company is showing technology partnerships and products from several partners including; Quantel, Leitch, FAST, Discreet, Panavision, Omnibus, Sierra, Evertz Microsystems, DaVinci and others.

ABC affiliate WISN-TV made a significant investment in Panasonic DVCPRO equipment to upgrade its news operations. The purchase was valued more than $1.1 million and included 88 pieces of DVCPRO gear, including AJ-LT85 laptop editing systems, AJ-D850 studio recorder/editors, AJ-D450 studio recorder/editors, AJ-D440 player/edit source decks, AJ-D250 desktop recorders and AJ-D230H desktop recorder/players, as well as AG-A850 edit controllers.

Televisa (Mexico City, Mexico), the largest Latin American television broadcaster, has made a multi-million dollar purchase of 50Mb/s DVCPRO50 and 25Mb/s DVCPRO camcorders and VTRs to cover parts of its operations. Televisa, the world's leading producer and broadcaster of Spanish-language television, has been using the Panasonic D-3 format since 1993.

Televisa's purchase consisted of the full line of DVCPRO50 VTRs, including the AJ-D960 studio editing VTRs, AJ-D950 studio VTRs, AJ-D910WA camcorders and AJ-LT95 laptop editors. The DVCPRO equipment bought included AJ-D610WA camcorders, AJ-D450 VTRs, and AJ-LT85 laptop editors.

Dreamtime Holdings has purchased Panasonic's AJ-HDC27A dual frame rate progressive scan DVCPRO HD camcorder and AJ-HD150 DVCPRO HD studio VTR to support this multi-faceted assignment. Dreamtime Holdings has an agreement to provide HD production services both at NASA's several ground centers and in orbit.

Westwind Media has installed two Snell & Wilcox HD1010 eight-input, high-definition television productions

Screen Shot

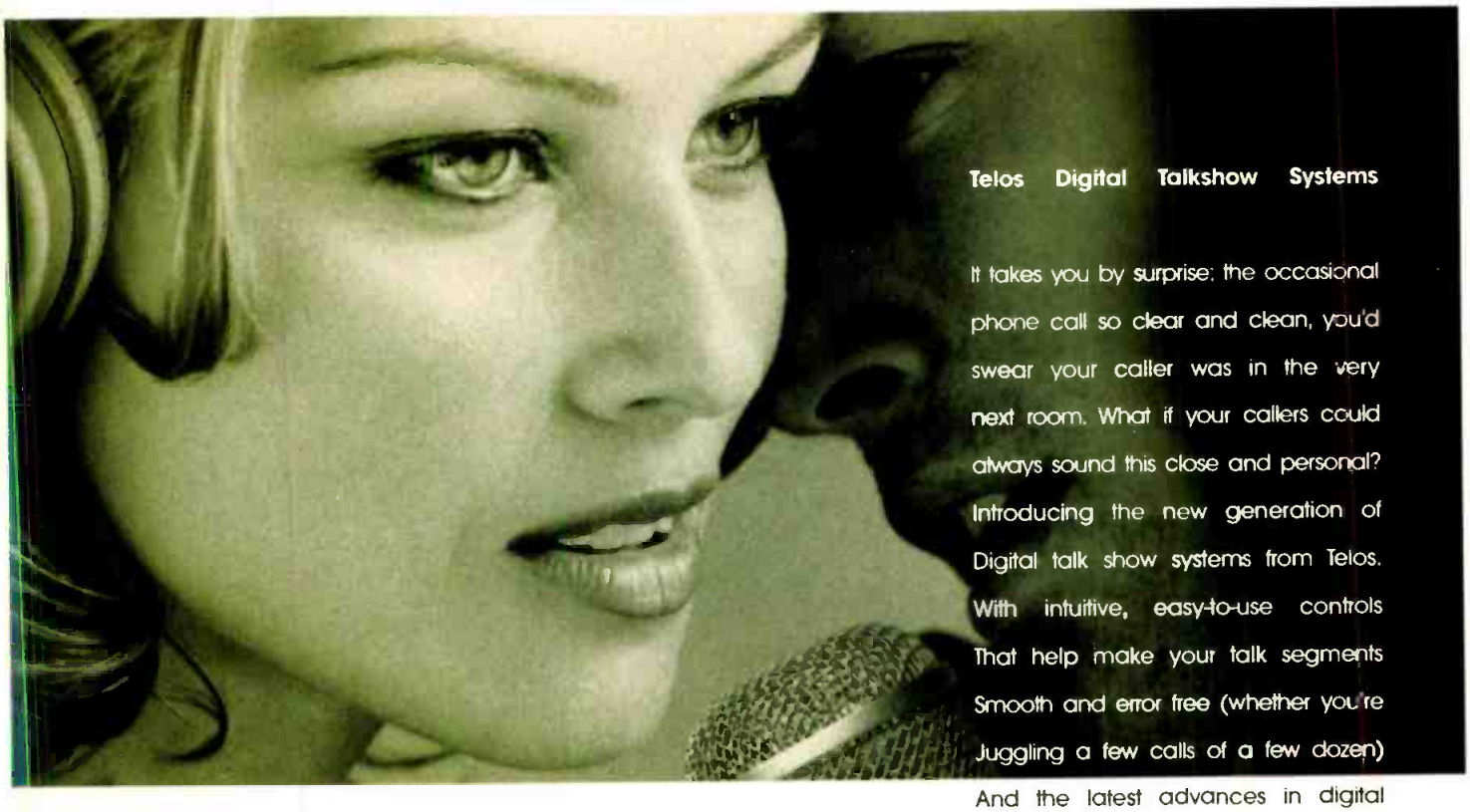
Panasonic 480p equipment used to shoot Caporale Studio's feature film

Caporale Studios purchased Panasonic Broadcast's AJ-PD900WA 2/3-inch DVCPRO50 Progressive camcorder both for theatrical feature production and general assign-ments, which range from national commercials to industrial video to video news releases.

Principal Michael Caporale, a veteran of both illustrative still photography and film production, recently served as director of photography on a 120-minute theatrical feature, "Ball of Wax," shot in its entirety with the AJ-PD900WA. Caporale also has used the DVCPRO progressive camcorder to service his existing accounts, for example, shooting a documentary for a local school for gifted children.

Solid State Logic console used to broadcast NBA All-Star game

Sundance, the newest addition to the five-truck hybrid digital fleet of live broadcast expandable production trucks owned by Core Digital Technologies-SWTV, used its new 96-channel Solid State Logic Aysis Air Mobile Digital broadcast console to broadcast the live Turner Network feed at this year's NBA All-Star game. The game was held at the MCI center in Washington, D.C. Freelance A1 operator, Jonathan Freed mixed the feed.



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switchers in two of the facility's telecine bays. The dual-format switchers, which feature both high-definition and standard-definition electronic frames, are being utilized in the postproduction of television programs such as "NYPD Blue" and "City of Angels."

The Bulldog Group and Sony Electronics recently announced that Sony had acquired a minority equity position in Bulldog and will serve as the exclusive distributor of Bulldog software in the U.S. The relationship will allow Sony's Systems Integration Center to distribute and resell Bulldog software to its customers in Japan as well as the US. Sony plans to develop add-on software modules to provide advanced capabilities for professional video applications, including frame accurate and low-res proxy editing.

WABC-TV in New York City recently selected eight Fujinon A17x17.8BERM lenses for field production on the station's local "Eyewitness News" program and one A10x4.8BERM for in-studio imaging on the nationally syndicated "Live with Regis and Kelly Show."

Fletcher Chicago purchased its first set of Fujinon HDTV Cine Style Prime lenses. Fletcher Chicago decided to purchase its first set of Fujinon HDTV Cine Style Prime lenses after witnessing them in action at a Sante Fe Workshop class, "High Definition Advanced Cinematography," in late October. All lenses in the Cine Style Prime series feature marking for zoom, focus, and iris-and cine-compatible gearing for interfacing with existing cine controls and matte boxes. The HA5B-10 features an angel of view of over 87 degrees, with focusing as close as 0.5 meters. At the other end of the line, the HA40B-10 features an angle of view of slightly over 13 degrees and a focusing range of 0.5 meters to infinity.

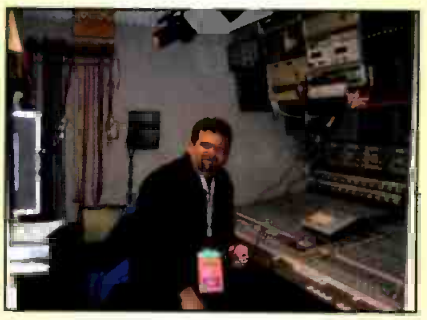
Soundtrack Boston, a seven-room full-service recording and post-production facility, recently installed a Sony DMX-R100 digital console in its newly refurbished Studio E. Soundtrack engineer Mike Sachs pilots the suite for a diverse clientele that encompasses commercial, corporate and film assignments.

Telestream has entered into an OEM agreement with WAM!NET a leading information technology services provider to bundle Telestream ClipMail Pro and ClipExpress store-and-forward

Sennheiser teams up with the XFL to produce more bashing and smashing

For all those who believe the bashing and smashing that is so much a part of football has gone unheard of for a long time will be glad to hear that the XFL, NBC Sports, Scharff Weisberg and Sennheiser have all teamed up to provide better sound quality at XFL games. The XFL has decided to hook up its players with more wireless microphones both on and off the field. The result is a "more real than real" experience.

The audio coordinator responsible for the endeavor is Jeff Cohen of JPC Systems. Cohen requested a list of Sennheiser wireless equipment to bring the XFL's vision to life. Scharff Wiesberg rents and maintains all the Sennheiser RF equipment for NBC Sports. The majority of the players are wired with Sennheiser wireless microphones, as are the coaches and referees, and there are parabolic dishes directed at the Neumann KM 183s to pick up sounds from the huddle. Sennheiser shotgun microphones capture the emotion in the locker room as well.



Abekas 6000

MultiFlex ■ DTV Server

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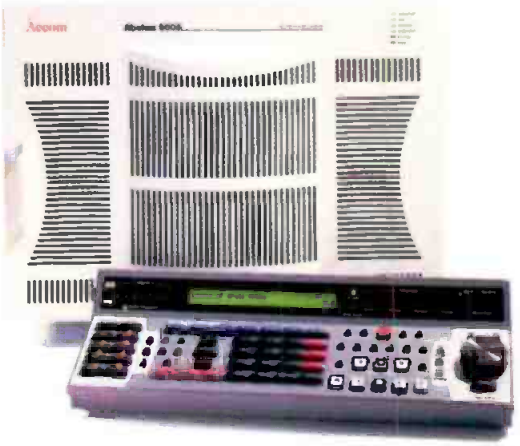

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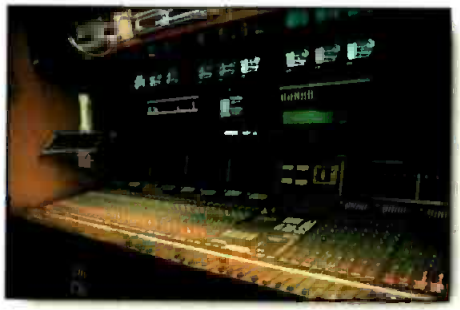
EMC² World Cup of Golf uses Live slow motion replay engines

The EMC² World Cup of Golf in Latin America consisted of four days of live broadcasting, retransmitted in more than 140 countries and reaching millions of viewers. More than 80 television production specialists were flown in for the event. The specialists brought with them their regular gear however, this broadcast system also incorporated 3x EVS LSM 6 channel Live slow motion replay engines. Each system permanently recorded signals from either two or four dedicated cameras, but routing allowed any other camera on the green to input to any LSM temporarily. That much slow motion replay facility a a golf contest may seem overdone. In this case, however, some other LSM features were used extensively. Golf lovers around the globe were able to follow the event through live quality broadcast.

media delivery appliances with WAM!NET Compressed Video Delivery Services.

Telestream's ClipMail Pro and ClipExpress are desktop MPEG appliances optimized for easy media encoding, decoding, network delivery and viewing. These store-and-forward media devices are an important component of WAM!NET's turnkey Compressed Video Delivery Service. Via this service, WAM!NET's customers are able to quickly and easily deliver video from any computer desktop or Telestream video appliance, streamlining the creative review, network clearance and content distribution processes.



SWTV (Southwest Television) installed Solid State Logic's Aysis Air Mobile Digital Broadcast Console, making the entire production chain digital. Servicing mostly live high-end sports and entertainment events, the reputation of the Aysis Air convinced SWTV to include the console in the advanced digital environment.

Oxtel has installed an Imagestore for KERA, the public broadcasting organization for North Texas. KERA purchased the master control and channel branding system to assist it's transition to a multichannel digital operation in addition to transmitting two analog program streams. KERA installed Imagestore in KERA's Master Control. An additional unit is scheduled to be installed in the coming months. Imagestore's keying layers will be used for inserting logos and captions.

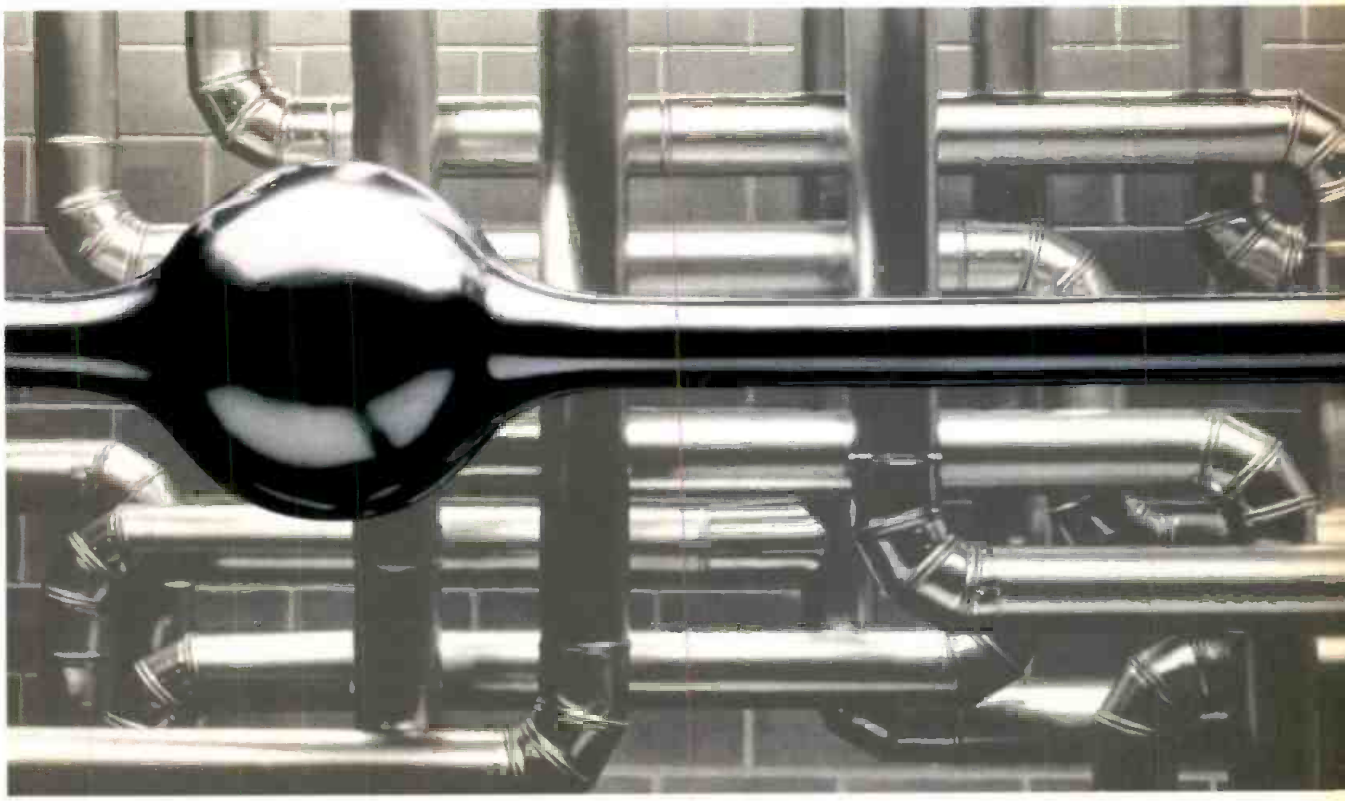
Keops Broadcast has announced that it has signed an agreement with SGI under which SGI will resell and integrate The Keops MediaWorks digital asset management system through its Professional Services group worldwide. Keops' MediaWorks integrated media environment combines asset management, recording automation, desktop video browsing, marking and broadcast playlist generation into a scalable client/server architecture.

Sony announced first results of development tools to allow content to be moved between SDTI-CP and the Material eXchange Format (MXF) format. MXF allows for easy exchange of material between file servers, tape streamers and digital archives.

The MXF project is a joint development between the Pro-MPEG forum and the AAF Association. The goal is to provide a seamless transfer between the real-time applications of video/audio content producers and networked systems. Sony's work will include full Metadata support based on XML data interfaces. Sony also announced that its products would fully support MXF. Technology demonstrations were available in the Pro-MPEG and Sony booths.

Steele VFX and Fence Post have recently installed Quantel's Henry Infinity to finish high-end commercials.

DTV Transmission
So Much Content–So Little Bandwidth



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MOTOROLA
Broadband Communications Sector

FloriCal System's AirBoss automated control system now supports Kaydara mediastore, a next-generation media server designed to provide broadcast facilities with fast access to stills, audio/video clips, animation and graphics. The combination of these technologies allows broadcast facilities to easily access and manipulate various types of media in demanding broadcast environments.

Dielectric Communications has signed a definitive agreement to purchase TCI International. The transaction is subject to approval by the shareholders of TCI. Dielectric's acquisition of TCI further broadens Dielectric's varied product offerings to U.S. broadcasters for TV and FM products and international broadcaster in the high- and medium-frequency spectrum.

Inscriber Technolgy has integrated Inscriber's text and graphics technology into Quantel's new platform, combining to form the new iQ system. Quantel iQ meets challenges by delivering a networked workflow solution with a powerful image processing engine at its heart that handles and combines all resolutions, from SD to HD and beyond. Quantel iQ is shipping with its own editing application, Qedit, and Inscriber's Qscribe, a customized module that directly utilizes Inscriber's text generation capabilities, combined with Inscriber's workflow design that is optimized for speed and flexibility.

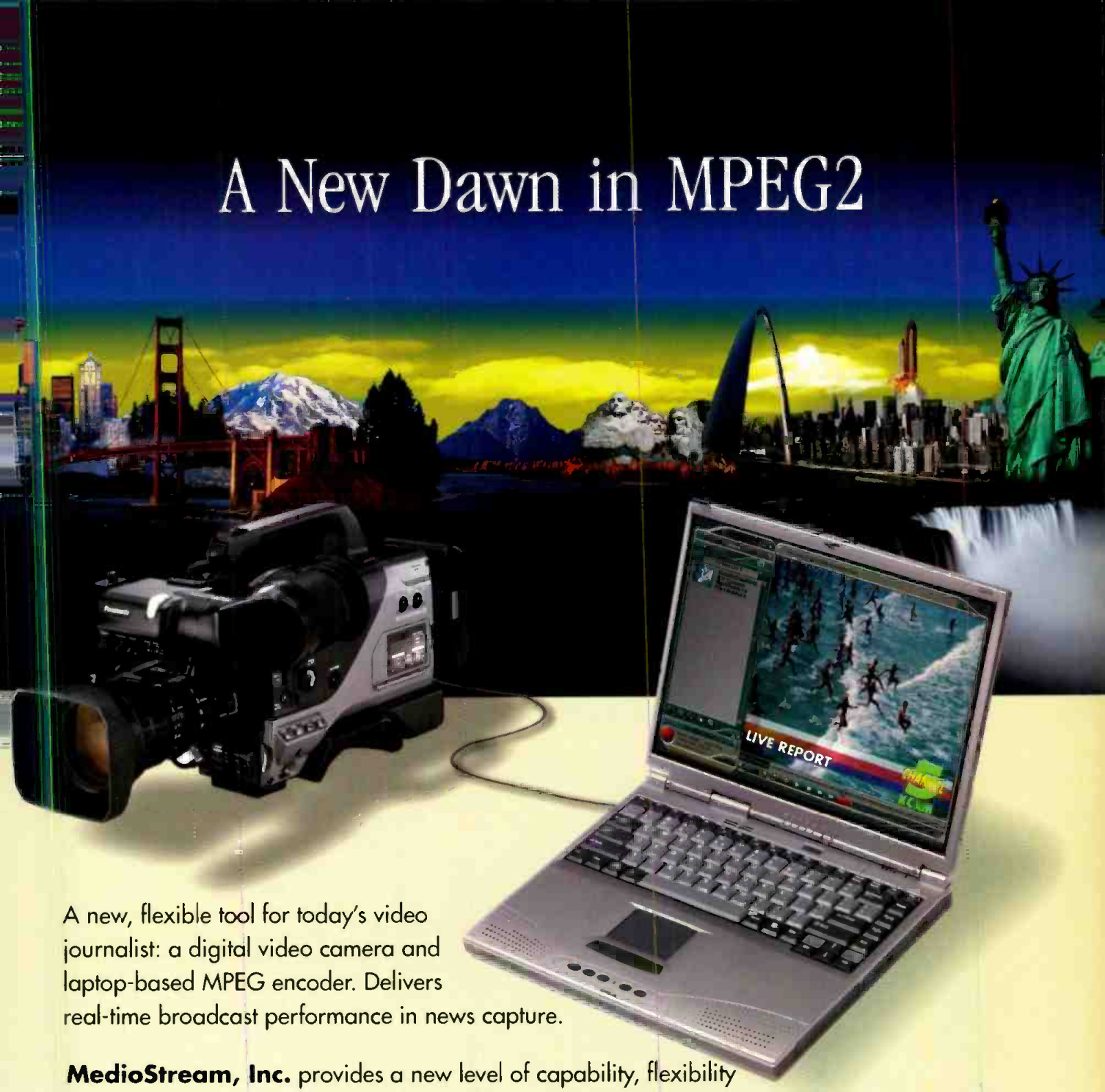
Keywest Technology has acquired Video Data Systems of Hauppauge, New York. The agreement gives the company exclusive rights to manufacture, sell and distribute all VDS products.

SeaChange International will provide video server systems for Azteca America Incorporated, a new national broadcast television network aimed at serving the U.S. Hispanic community. Azteca America is a joint venture between Pappas Telecasting and TV Azteca. Azteca America will rely on Broadcast MediaCluster to handle the large volume of video content that will be delivered daily to their affiliates.

USA Cable has selected A.F. Associates (AFA) to design and construct their new digital Network Operations Center (NOC) located in Jersey City, New Jersey. The existing origination facility is undergoing a complete transformation from a hybrid analog/digital infrastructure into a fully digital, multi-channel NOC, employing advanced archiving and digital asset management systems. AFA expects the new facility to be fully operational in the spring of 2001. USA Cable's new NOC will employ the latest automation and digital asset storage technologies, including the first ADIC AML/2 near-line archive system employed in the country.

The BBC is to set up a new limited liability company, BBC Technology Limited, following approval from the Secretary of State for Culture, Media and Sport, to create the new wholly owned subsidiary. BBC Technology

A New Dawn in MPEG2



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will offer access to engineering skills across a whole range of broadcast and Internet related technologies. Digital technology is opening up powerful and exciting new opportunities for companies to communicate with their customers and their staff.

NEP Super Shooters purchased a 60-channel Calrec S2 analog mixing console from Calrec Audio. The desk will go into NEP's new Super Shooter Seven truck to exclusively cover the Senior PGA Golf Tournament for 35 weeks of the year. NEP is an outside broadcast company with 31 vehicles on their roster, they now have three 60 channel S2 desks, two of which were converted from S series consoles purchased in 1995.

Minerva Networks announced a partnership with SGI aimed at developing a marketing complete solutions for the delivery of IP Television services over broadband networks. Minerva has integrated its IP Television service management software with Linux-based SGI 1200 and SGI 1450 servers. Minerva also announced it will support the SGI Origin family of streaming servers. The integrated server and management solution is combined with Minerva's carrier class streaming encoders, DVB-to-IP gateways, and media transcoders.

Equi=Tech has outfitted a plant in Sausalito, CA, with balanced power from Equi=Tech. Having added state-of-the-art 24-bit mastering services to its menu, balanced power had become more a matter of need than just one of preference. The upgraded Equi=Tech Model ET12.5W, was chosen for the plant's power upgrade.

NDS recently opened up an office in New York. NDS opened the NY office to focus on developing interactive TV systems and applications for the U.S. market. The new office is hoping to strengthen NDS's 24x7 customer support capabilities as well.

NDS also was chosen by iBlast to provide datacasting services for its highly anticipated national datacasting network in the U.S. NDS and iBlast are joining forces to deliver fast, broadband content to over 90 percent of U.S. households and offer broadcasters a new revenue stream. iBlast becomes the first major datacasting customer for NDS in the U.S.

BOXX Technology, provider of digital content creation systems for the entertainment and digital film industries, announced Rainbow Studios has installed 3DBOXX systems to enhance productivity and increase system performance in its digital production pipeline.

National Mobile Television, provider of mobile television production equipment, and Activate, a digital media infrastructure services company, announced a joint marketing agreement to provide customers with high-quality, on-location production services and end-to-end Webcasting solutions. This alliance integrates NMT's capabilities as a supplier of remote mobile television production trucks for broadcast, cable, the Internet and corporate television program production with Activate's range of digital media services, including production and distribution of online live and on-demand events in all major industry standard formats.

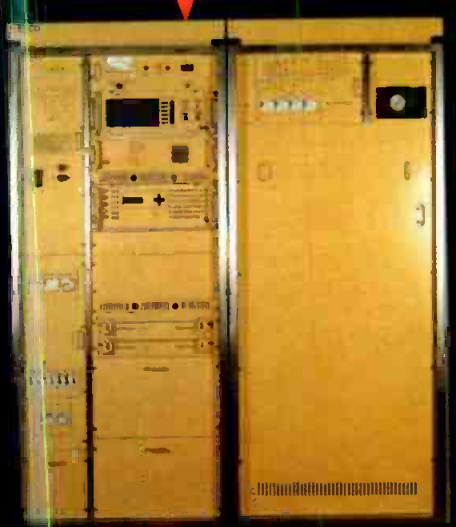
Bexel Corporation, a television production equipment rental company, has purchased Sony's HDW-F900 digital camcorders. The Bexel Corporation first ordered 10 of the cameras, has ordered five since the original order and plans to purchase another 15 within the year. In addition, Bexel plans to purchase about $1 million more in accessories to complement the cameras.

Radamec Broadcast Systems has opened a parts center in New York. Radamec's new parts center in New York is capable of supplying customers with critical replacement parts on the same day or overnight.

Accom announced that TechTV purchased seven AFFINITY nonlinear editing systems. TechTV produces shows that help viewers improve their computer knowledge and participate

The Most Demanding Markets

Demand Itelco



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more fully in the digital age. In all, seven existing edit suites are being upgraded to AFFINITY and with two suites already completed.

Sony Electronics has entered into an agreement with DNF Controls to offer complete server solutions for customers of Sony's MAV-555 multi access video disk recorder. The combined Sony MAV-555/DNF DMAT sports controller and MAV-555/DNF 2034CL Shot box recorder premiered at the 2000 summer games in Sydney, Australia. Now Sony is offering a third control option, DNF's production switcher interface.

Telemetric's camera robotics systems were installed throughout the Florida State Capital to provide comprehensive coverage of government sessions in the state senate, house and chamber. Florida Channel WFSU-TV, which is owned by Florida State University, provides the video feeds for airing on several different broadcast and cable channels to provide state-wide access to the programming. More than 50 of Telemetrics' PT-HP Camera Robotic Pan/Tilt Systems have been installed in the state capital building.

Philips and Dolby Laboratories have cooperated in a project to find a solution for handling Dolby E and metadata in a standard master control environment, which will provide broadcasters another tool to solve the challenges of handling multi-channel audio. The goal of the two companies is to aid broadcasters in delivering the high-quality audio increasingly demanded by viewers.

Sony Data System Division has added Harris Corporation to its growing list of Sony Data System Value added resellers. Harris Corporation provides

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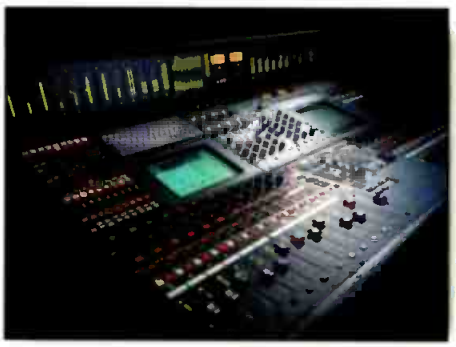
high-end broadcast and production systems to broadcasters in the U.S. and around the world. Harris Corporation has just completed its first purchase of a Sony DMSB150L Petasite with Sony DTF-2 drives which will be installed at Seattle's KCTS in an automated commercial insertion system with Avalon software and Grass Valley Group profiles.

Snell & Wilcox completed installation of its IQ Modular Series featuring Roll-Call Network Management System in the all-digital Internet broadcast operations center for **Real Broadcast Network** (RBN). The IQ Modular products are complete with rack-mounted A/D converters and adaptive comb filters for decoding, frame synchronization and noise reduction purposes.



The National Geographic channel, a new U.S. cable channel and a partnership between national Geographic Television and Fox Cable Networks Group, installed an **AMS Neve** Libra Live Series II digital broadcast console to use in its Washington D.C. studio. The console will be used initially for pre-production and live production of National Geographic Today, National Geographic Channel's on hour-long daily news program. The Libra Live Series II made its working debut on January 7.

Jarvis Studio recently purchased an **API** Legacy console. The console is the second largest API Legacy console in New York City. The console was so large it would not fit in the elevator to make it to its final destination on the sixth floor. In order to place the 64-channel Legacy with Flying Faders in Jarvis Studio's a crew was hired to "fly" the console in through the sixth floor window using a crane. In addition to its window-delivered Legacy, Jarvis houses an array of outboard equipment, speakers and microphones.

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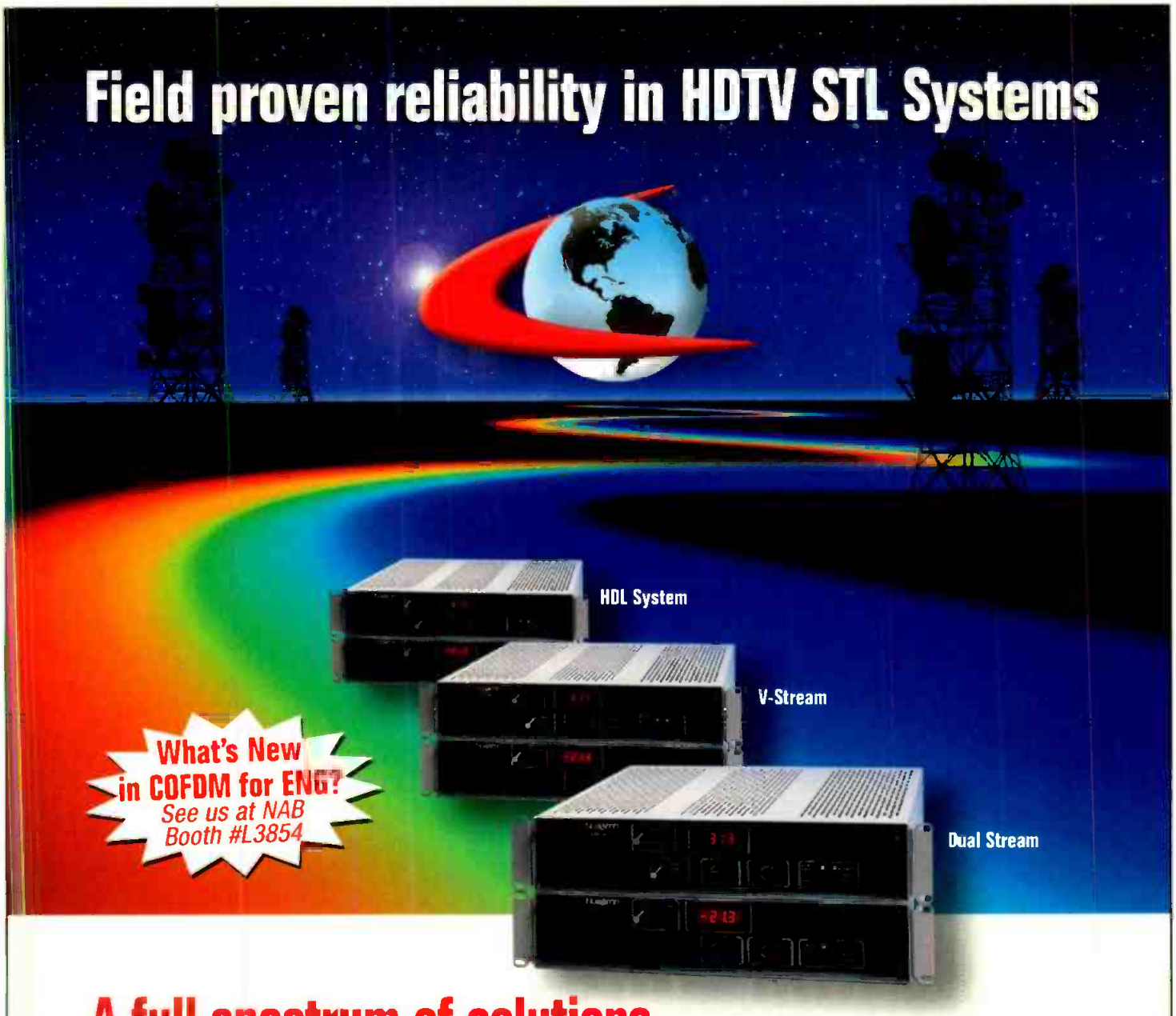

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- Digital signal monitoring capability
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- SMPTE 310M & ASI Interfaces Standard

V-STREAM
Uses Spectrally efficient 8VSB Technology
- Transports 19.39 signal, ASI SMPTE 310M Interface + T1
- Cost efficient solution

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Prime Image, manufacturer of digital video and audio processing equipment recently shipped unit number six thousand of the Model 5011 line of Time Base Corrector-Synchronizer-Freeze. The six-thousandth Model 5011 shipped to Warner Brothers. Other customers of Prime Image are the government of Israel, ESPN, Panasonic Systems Engineering and Norsat International.

The Nebraska Educational TV has added three **Angenieux** 60x9.5 HD OB lenses to its mobile production unit. The Angenieux lenses are being employed for a wide range of productions including sports, concerts and performing arts.

Crosscreek Television Productions has ordered a Grass Valley Kalypso Video Production Center from the **Grass Valley Group**. The order was Crosscreek's second in six months. The company will use the new system in its Voyager IV truck primarily for coverage of the National Hot Rod Association Winston Drag Races.

Toshiba has announced that it is employing **Vela**'s CineCast family of MPEG decoding products to enhance its distribution capabilities. The Vela products include the CineCast Quad, CineCast Quad Pro, and the new CineCast HD series of MPEG-2 decoders. Toshiba's use of the CineCast HD/2 marks the unit's worldwide debut and compliments the CineCast family with analog composite, component and HD-SDI video outputs. While both the CineCast Quad and Quad Pro offer four-channels of MPEG-2 decoding with individual genlock inputs, each channel of the CineCast Quad Pro also features serial digital video outputs, dual analog stereo audio, dual AES/EBU digital audio, and embedded SDI audio support.

The Public Broadcasting Service (PBS) and **Triveni Digital** announced a partnership for trials of PBS enhanced programming in four episodes of "Scientific American Frontiers" that has aired on four local PBS stations beginning March 27. The trials will be the first digital terrestrial (over-the-air) broadcast of interactive TV enhancements using the Advanced Television Enhancement Forum (ATVEF) Transport Type B specification. ATVEF Transport B allows the enhanced content to be broadcast with the program, rather than requiring a connection to the Internet, thereby speeding up the delivery of the enhancements to the viewer.

NEP Super Shooters have ordered three **Calrec Audio** C2 mixing consoles to provide supplemental applications to existing Q2 audio consoles. The C2s, one each of 60, 48 and 36 channels, are the first to ship to NEP, who already have seven Q2s, two S2s and two S Series desks. The 60-channel console is the largest C2 Calrec manufacture and is only the second to be made since its launch in 1998.

Telestream and **Vsoft** have announced a partnership involving integration of Telestream's MPEG media encoding/delivery appliance products and Vsoft's MPEG media management software tools. This product integration provides a seamless solution

Have you been given the Impossible Mission ?

Management wants powerful master control and channel branding to capture viewers' attention, with 'hooks' for interactive services. *Engineering* needs a system to simplify the station automation. And *Finance* wants all this at a manageable price! It may seem impossible ... if you don't know about Oxtel's Imagestore 2.

Yes Jim, Oxtel's *Imagestore* has set the standard around the world for highly automated but creative master control and channel branding. The system can bring your station output right up to date with dynamic DVE moves, voice-overs, and graphics which enhance programming, including Interactive television (iTV) branding: all in an easily automated 1RU box.

Imagestore's A/B video mixer can provide multi-group, audio mixing for multi-lingual and 5.1 broadcasting. Two keying layers can insert stills, animations, and clocks from internal storage. Up to 4,000 frames of video can be stored, along with up to 200 minutes of digital audio.

An integral DVE can perform 'squeeze and reveals', and a range of remote panels, including a full master control surface, can control up to 200 channels.

Imagestore is now also available with *Easytext* for real-time rendered character generation, using text fed via the automation or Ethernet interfaces.

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Imagestore 2 with A/B mix, two keying layers, DVE, audio mixing, and video/audio storage. Now available with *Easytext* CG.

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for the acquisition, delivery and management of high-quality digital media.

The partnership has enabled Vsoft and Telestream to develop file compatibility and metadata interchange to facilitate smooth and reliable operation between their products. Both companies share a common goal of replacing cumbersome handling of physical videotape with efficient digital media management and distribution solutions. The companies also share many of the same dealers, making one-stop shopping easy for their company.

In all five redundant multichannel systems will be installed at NBC's New York and Burbank facilities. The five systems will consist of **Tandberg** Television's E5611 encoders, evolution 5000 multiplexers, 8PSK-compliant modulators and a total of three Director network management and receiver control systems. In addition, 975 Alteia plus receivers will be supplied to affiliates across the country.

Norsk Lydskole, part of the Nordic Institute of Stage & Studio, has retrofitted its studio A to create a state-of-the-art digital studio. It has installed a **Soundtracs** DS-3 digital production console. The DS-3, 32-bit floating-point console digital console, replaced a Tascam M700 analog console.

Jonas Jensen Studios (Seattle, WA), a television and film studio facility recently invested in a complement of **Panasonic** DVCPRO50 equipment. Jonas Jensen's equipment roster includes the AJ-PD900WA 2/3" DVCPRO50 Progressive camcorder, the AJ-PD950A DVCPRO50 Progressive studio VTR, the AJ-D95 desktop DVCPRO50 AC/DC VRT and AJ-D90 dockable DVCPRO50. The facility also has access to a full range of Panasonic HDTV and DTV gear that equips a 58-foot HDTV mobile production truck that it operates and manages for The Ackerley Group.

People

Doug Butler

Doug Butler has been named director of engineering at A.F. Associates (AFA), a leading systems integrator servicing domestic and international clients. Butler will be responsible for the ongoing development and daily management of AFA's project engineering team. He will work closely with Jim McGrath, AFA's senior vice president of engineering and technology.

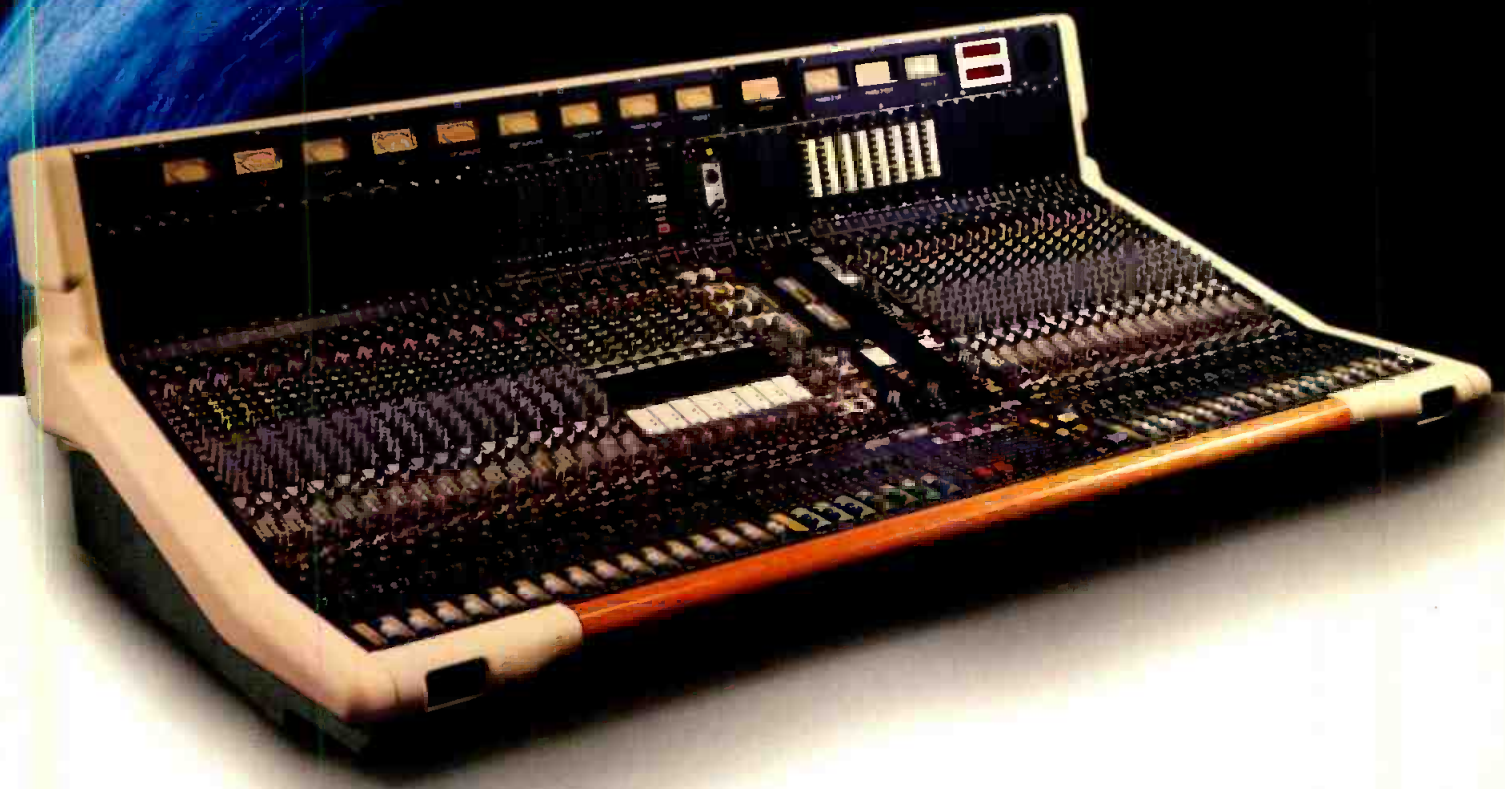
Staco Energy Products has announced **L. Mark Yaeger** as its new vice president of sales and marketing. Yaeger has had an extensive sales career in the electrical power and controls industries holding the positions of regional sales manager, national sales manager and director of sales.

Robin Shahid has been named assistant chief engineer at WLVI (WB56), Boston's WB affiliate and Tribune Broadcasting station. Shahid will be responsible for running day to day operations of WB56's engineering department. He will manage a staff of 34 technicians and engineers, as well as oversee all engineering and building operations.

GeoVideo Networks announced the appointment of **Phil Thompson** to the position of senior vice president of engineering. Thompson will lead GeoVideo's network data center strategy, which will initially focus on the

MIDAS B2000 BROADCAST

TELEVISION AUDIO PRODUCTION CONSOLE



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Circle (213) on Free Info Card

development of the industry's first controlled broadband video network. Thompson will oversee a product development center in Monmouth county, NJ, that will provide network interoperability testing, systems engineering, software development, hardware and software testing, and quality assurance for GeoVideo's fiber network.


Jim Hurwitz

Jim Hurwitz will be joining the staff of Telecast Fiber Systems as a U.S. sales manager for the Western region. Covering an area that reaches from the Pacific coast to the Mississippi, Hurwitz will oversee sales of the company's proprietary portable and fixed fiber optic systems optimized for the television broadcast industry.

Bernie Keach will head the sales territories as the new West coast regional sales manager for Sierra Video Also supporting Sierra Video Systems will be **Marty Morgan** who will be the new Central regional sales manager.


Jeff Riser

Carlson, a provider of consulting, design and implementation services for broadcasting, and mission-critical facilities has named **Jeff Riser** as the director of broadcasting and media.

John Russell was named chief engineer for Young Broadcasting's KCAL9-TV in Los Angeles. Russell left KLCS-TV as chief engineer to go to KCAL9, bringing over 20 years of engineering experience to Your Broadcasting's KCAL9. He will oversee all technical aspects of KCAL9's operations and reports directly to the general manager.

Snell & Wilcox named **Tom Lang** and Eloy Chairez vice president/general manager Eastern region and Western region, respectively. Lang had been general manager of the Eastern region prior to his promotion and Chairez was previously district manager for the Southern California region.

Avica Technology named **Don Bird** vice president of sales and marketing for both U.S. and international operations. Bird brings with him 12 years of experience after being at 360 Systems where he was vice president of corporate development. ■

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SONY

DSR-PD150

3-CCD Mini DVCAM Camcorder

High quality acquisition in the DVCAM component digital format, as well as in DV, allowing up to forty minutes recording on one tape Mini DVCAM tape or over a full hour in the DV mode. Suited for Event Videography and Video Journalist applications. This compact camcorder features three newly developed 1/3 inch 380K pixel CCDs with increased resolution and sensitivity at reduced noise and vertical smear.

- Allows two scanning modes: 480 progressive (for still) or interlaced (for video).
- Complete Professional Audio functions with two built-in XLR inputs.
- Built-in electronic zoom lens features AutoFocus and SuperSteadyShot with an MTF 12X high quality optical lens with manual Zoom, Focus and Iris control.
- Built-in slot for a flash memory card or Memory-Stick for still image storage. Up to 988 JPEG pictures can be stored in one 64 MB MemoryStick. The stored images can be mixed or keyed to the live image allowing logo insertion and/or mix effects.
- High resolution (500 lines) B&W viewfinder and a color swing out bright color LCD panel are included

Sony DSR-PD150 List Price $4,000
For B&H price ..... Call

DSR-250 3-CCD DV & DVCAM

Introducing everything you need in an event camera and more. The new completely digital DSR-250 from Sony is a high image quality reduced size camcorder which has been optimized for shooting events and parties. Every feature you could want is included in this revolutionary acquisition tool.

- **1/3 inch x three 380K pixel** (effective 340,000 pixels) **CCD's** that allow two scanning modes: 480 progressive (for still) or interlaced (for video). They also provide high quality acquisition with increased resolution and sensitivity at reduced noise and vertical smear. • One touch auto focusing in manual focus mode.
- **530 lines of horizontal resolution** allowing you to capture your subject with tremendous detail.
- **Switchable aspect ratio** 4:3 (TV mode) or 16:9 (Movie mode)
- **DXF-801 high resolution 1.5" black & white viewfinder** (same as on DSR500/1 & DXC-D35) enables easier focusing. Automatically switches from 4:3 aspect to 16:9.
- **Records in DVCAM or DV**, standard tapes or mini. Up to 270 minute recording in DV mode onto a 184 min. DVCAM tape.
- Manual or automatic functioning: Focus, Iris, Shutter-speed, Zoom, Gain (3 positions and memory).
- **Flip out 2.5" 200,000 dot LCD monitor**, finally available on a professional camera • Time date stamp • Soft Shoulder pad
- **58mm lens with 12x optical zoom.**
- **Advanced optical stabilization** allowing for a high quality digital zoom out to 24x, with a maximum digital zoom out to 48x
- **Assignable time code** (Rec Run, Free-run, User-bit)
- 16 bit 2 channel audio recording, or 12 bit 4 channel.
- **Digital in/out** (IEEE1394) and **analog in/out.**
- **Still image capture onto memory stick** • Upload graphics from memory stick or USB adapter, software included
- Phantom 48V power • Built in speaker • Directional microphone in pro mic holder. 2 XLR audio inputs • **Wireless remote**
- **Built in edit controller.** Equipped with an i.LINK interface, allowing camcorder to serve as edit player or recorder.
- External 12V supply/Connection for light. The DSR-250 is equipped with light output (DC 12 V, maximum 30 watts).

Sony DSR-250 List Price $5,900
For B&H price ..... Call

DSR-300A

3-CCD Digital (DVCAM) Camcorder

Inheriting many of the same features and functions as the DSR-130, the affordable DSR-300A actually extends operational convenience with a range of new features and peripheral products. Remarkably compact and lightweight, the improved DSR-300A provides high mobility without compromising picture quality and can be held comfortably on your shoulder through the longest shoots and gives videographers the ability to acquire their footage quickly and easily.

- The DSR-300A has three 1/2" IT Power HAD CCDs to deliver 800 lines of horizontal resolution, 62dB S/N ratio and high sensitivity of F/11 at 2000 lux.
- Power HAD CCDs also gives you a low smear level of -110 dB (DSR-130) allowing more freedom to shoot highlighted subjects
- With built-in 26-pin VCR interface, they can feed composite or S-Video output signals to an external recorder for parallel or back-up recordings. VCR recording modes including Parallel, Internal (only) and External (only) are selected via the trigger switch positioned on the operational panel
- With the DSR-300A, a picture previously recorded on tape can be superimposed on the viewfinder screen (Freeze Mix Function), allowing you to easily frame or reposition the subject just as in the previous shot. Combined with the SetupLog function, the retake shot becomes a breeze
- LSI Digital Signal Processor (the very same one used by the DXC-D30 cameras) for a high signal-to-noise ratio of 62 dB.
- Both mini cassettes (PDVM series) and standard cassettes (PDV series) can be used with the DSR-300A. With PDV-184ME (standard), a maximum recording time of 184 minutes can be achieved. They can also play back tapes recorded in the consumer DV format
- For operational convenience while shooting, the Time Code is superimposed on the viewfinder screen or MONITOR OUT screen, even during playback
- DXF-801 viewfinder featuring variable peaking, 3 level tally light and a white LED light with 2 levels of intensity to illuminate the lens setting • IEEE1394 i.Link (out only)

Sony DSR-300A List Price $9,900
For B&H price ..... Call

Panasonic

AG-DVC200

Full Size DV Camcorder

The Industry's first DV camcorder to utilize large DV cassettes

The AG-DVC200 1/2" 410,000-pixel IT 3-CCD DSP camcorder records for an astounding 4-1/2 hours (270 minutes) and offers an interchangeable bayonet mount lens that permits users to use their favorite 1/2" lens. With the incredible ability to shoot at F11 in lighting as low as 0.5 lux, the AG-DVC200 delivers an outstanding 800 lines of horizontal resolution, an IEEE 1394 interface, a signal-to-noise ratio of 62dB, and very low smear.

The 11-pound shoulder-style camcorder delivers many functions offered in Panasonic's most-popular DVCPROcamcorders, including a 4-position ND/CC filter, the ability to increase gain up to +36dB forshooting in dim light, User Scene Memory storage, and a 6-speed shutter with synchro scan for the flicker-free shooting of CRT displays.

JVC

GY-DV500U

1/2-inch 3-CCD Professional DV Camcorder

The GY-DV500 combines the convenience and cost-effectiveness of Mini DV with the performance and features you need. Incorporate three 1/2-inch 380,000 pixel IT CCDs for superior picture performance (equivalent to 750 lines of resolution) superb sensitivity of F11 at 2000 lux and minimum illumination of 0.75 lux (LoLux mode). Rugged construction with a rigid diecast magnesium housing. Extremely portable, compact and light weight (less than 11 lbs. fully loaded). Additional features like the menu dial and Super Scene Finder assure ease-of-use and shooting flexibility, while the IEEE1394 and RS-232 interface allow integration into various non-linear and post-production systems. A professional camcorder in every sense, the compact, lightweight GY-DV500 redefines acquisition for corporate, educational, cable and broadcast production, as well as wedding videography and multimedia applications.

Professional Performance

- 3 1/2" 380,000 pixel IT CCDs with 750 lines of resolution.
- F11 at 2000 lux. • Black Stretch/Black Compress function
- An advanced color matrix circuit ensures natural color.
- LoLux mode increases sensitivity with almost no increase in noise. • Multi-zone iris weighting system offers accurate auto exposure under any condition.
- Viewfinder status displays audio indicator, tape and battery remaining time, VCR operation and warning indicators. • Menu dial lets you quickly navigate through the viewfinder menu.

Professional Audio

- Two 16-bit 48-kHz channels or two 12-bit 32-kHz channels with a dynamic range of 85 dB
- Two XLR-balanced audio inputs with 48v phantom power and manual audio control.
- Side-mounted speaker for playback.

Automatic Functions

- Continuous Auto Black (CAB) circuit assures perfect Black Balance in a changing environment.
- Full Auto Shooting (FAS) mode for point-and-shoot ease of operation. Automatic video level control (ALC) is also activated, along with Extended Electronic Iris (EEI) and Full Auto White, which provide both variable gain and variable shutter.
- ALC (Automatic Level Control) with EEI for continuous shooting in all light levels

Special Purchase

BUY any JVC GY-DV500U Package:
GY-DV500U with Viewfinder and Lens Outfit
GY-DV500U with Bescor ST144 Kit
GY-DV500U with Viewfinder, Lens and AB1 Kit
GY-DV500U with Viewfinder, Lens and AB2 Kit
GY-DV500U with Viewfinder, Lens and IDX
GY-DV500U with Studio Kit
and RECEIVE FREE:
Anton Bauer Battery Kit ..... A Value of **999.95**
OR: IDX Battery Kit ..... A Value of **849.95**

GY-DV550U

1/2" 3-CCD DV Camcorder

Introducing the Versatile GY-DV550 from JVC. Designed by professionals, for professionals, the GY-DV550 is the world's first DV camcorder to offer studio camera capability. Thanks to the built-in 26-pin interface, you can connect the GY-DV550 to a CCU for remote-controlled studio operation or backup recorder in the field. But that's not all. It also comes with pool feed input/output, so you can transfer image data back and forth to another camera or cameras, making it ideal for special shooting situations such as press conferences, exclusive interviews, and sporting events. Record isolated camera views (ISO-Cam) during a live multi-camera shoot, making it ideal for parallel shooting at live concerts and other events. Naturally, we've made sure the GY-DV550 is equipped with all the other capabilities you need, including a standard 1/2-inch bayonet mount for use with a great diversity of professional lenses, bidirectional IEEE 1394 (NTSC) two 48 kHz 16-bit digital PCM audio channels, and a built-in SMPTE or EBU timecode reader/generator, as well as XLR microphone inputs, audio outputs, headphones output, and both composite and Y/C outputs. Maximum versatility, top-level performance, and superior cost-efficiency make the GY-DV550 the smart solution for producers who need a camcorder capable of doing double-duty in both the studio and the field.

Ready for EFP remote control (RM-LP57/LP55) The EFP remote connects directly to the GY-DV550 for precise control over the video parameters.
Return video output for Tele-Prompter Tele-Prompter capability assures full support for studio program production.
Genlocking function To meet the demand for systemization, the GY-DV550 is equipped with a genlocking function that includes SC lock to assure high-resolution pictures.
State-of-the-art 1/2" 3-CCD image pickup Incorporates three 1/2" 380,000 (NTSC)/440,000 (PAL) pixel interline-transfer CCD's. Each CCD is equipped with highly advanced circuitry that eliminates vertical smear when shooting bright lights in a dark room. Lag and image burn are also reduced to indiscernible levels, while high sensitivity of F11 at 2000 lux assures creative flexibility and simplifies lighting requirements.

SR-VS10U

MiniDV and S-VHS VCR Combo

The HR-DVS1U is a unique all-in-one video solution combining miniDV and Super Hi-Fi Stereo in one VCR. The MiniDV deck allows direct playback of cassettes you've recorded on a MiniDV camcorder without any cables to connect. One easy solution!

- Mini DV Format &High Resolution Super VHS and VHS
- DigiPure Technology w/ TBC and 4MB Frame Memory
- PCM Digital Audio (DV) andHi-Fi VHS Stereo with MTS Decoder • Jog/Shuttle on Remote
- VCR Plus+ with "Cable Eye" Cable Box Controller
- Insert Editing with Flying Erase Head • Plug & Play
- Audio Dubbing • Auto Index and Index Search
- DA4(Double Azimuth) Head Helical Scan System
- Digital AV Tracking • Express Programming • Auto SP-EP Timer Recording • Active Video Calibration • Multi-Brand TV/DBS Compatible Remote with Jog / Shuttle
- S-video Input on Front / Back Panel • Two S-Video Output on Back Panel • Rear AV INPUTs, Gold Plated Front Inputs
- DV Playback Component Video Output, Two A/V Outputs

Panasonic

AG-DVC10

Mini DV 3-CCD Camcorder

This lightweight unit uses the mini-DV format, large diameter lense, and a 3-CCD image sensor to deliver the high recording quality needed for professional use

High-Quality DV Recording
- Records on Mini DV cassettes in either SP (standard Play) or LP (Long Play) mode
- Records audio either as 16-bit 2 channel, or 12-bit 4-channel

Superior 3-CCD Picture Quality
- 1/4 inch, 270k-pixel IT 3CCD image sensor • 43 mm filter
- 12x Optical zoom
- Gain Up to + 12dB
- Neutral Density Filter
- Manual Focus, Manual Iris

New Shoulder-Type Design
- Excellent Shooting Stability
- Light weight weighing aprox. 6 lbs. • Extremely mobile

i-Link (DV IEEE1394) Terminal

antonbauer

HyTRON 50 Battery

Weighing a mere 31oz (880 grams) and packing 50 Watt-hours of energy - enough to operate a typical ENG camcorder for two hours, the HyTRON 50 is the most advanced lightweight battery in the industry.

- Made possible by recent advancements in a cell technology originally designed for the mobile computing industry, it incorporates nickel metal hydride cells that provide the highest energy density of any rechargeable cylindrical cell available. High performance is further assured through the integration of Anton/Bauer InterActive digital technology.
- Equipped with an on-board "fuel computer" which monitors energy input and output as well as critical operating characteristics and conditions. This data is communicated to the InterActive charger to ensure safety and optimize reliability.
- In addition, remaining battery capacity information is available by means of an LCD display on each battery and in the view-finder of the most popular broadcast & professional camcorders.
- Special low voltage limiter prevents potentially damaging overdischarge.

Specifications: 14.4 V, 50 WH (Watt Hours)
5-3/4" x 3-1/2" x 2-1/4", 1.9 lbs (88kg)
Typical runtime: 2 hours @ 25 Watts 3 hours @ 17 Watts

QUAD 2702/2401

Four-Position Power/Chargers

The lightest and slimmest full featured four position chargers ever, they can fast charge four Gold Mount batteries and can be expanded to charge up to eight. They also offer power from any AC main. In a package the size of a notebook computer and weighing a mere four lbs! The 40 watt 2401 can charge ProPacs in two hours and TrimPacs in one. Add the Diagnostic/ Discharge module and the QUAD 2401 becomes an all purpose power and test system. The 70 watt QUAD 2702 has the module and is the ultimate professional power system.

I·D·X

E-50

Endura V-Mount Battery Pack

E-50
Endura V-Mount Battery Pack

- The V-Mount or wedge-mount battery mounting connection is being found on more and more of today's camcorders. Due to this prevalent battery mounting system, IDX has developed the Endura Lithium Ion V-Mount battery system to work directly with these newer camcorders.
- The IDX Endura batteries incorporate Syncron technology, which automatically engages an on camera light whenever the record button on the camera is activated.
- The E-50 Lithium Ion Endura is a sleek and durable 50W, 14.4V battery.
- A PowerLink is included, as standard equipment with every Endura battery. This allows two batteries to be piggybacked together in order to double the power of this lightweight battery.

Special Purchase **$299.95**

SONY 800 SERIES

UHF WIRELESS MICROPHONE SYSTEMS

Consisting of 5 handheld and bodypack transmitters and 6 different receivers, Sony's UHF is recognized as the outstanding wireless mic system for professional applications. Operating in the 800 MHz band range, they are barely affected by external noise and interference. They incorporate a PLL (Phase Locked Loop) synthesized control system that makes it easy to choose from up to 282 operating frequencies, and with the use of Sony's pre-programmed channel plan, it is simple to choose the correct operating frequencies for simultaneous multi-channel operation. Additional features, like space diversity reception, LCD indicators, reliable and sophisticated circuit technology ensure low noise, wide dynamic range, and extremely stable signal transmission and reception. Ideal for broadcasting stations, film production facilities, and ENG work.

SONY

DSR-20/40 DVCAM Player/Recorders

The DSR-20 and DSR-40 are versatile DVCAM VCRs with compact chassis and a variety of convenient functions for recording, playback and simple editing. They feature Auto Repeat Playback, Power-On Recording/Playback, multiple machine control interfaces and i.LINK (IEEE1394) input and output. And, of course, they offer the stunning image and sound quality inherent to the DVCAM format.

- **i.LINK** They both offer i.LINK (IEEE1394) input/output. In addition, in the "Digital dubbing including TC Copy" mode, full information of video, audio and time code of the original tape can be copied to another tape. Especially useful when making working copies of the original.
- **Inputs and Outputs** They provide a full range of analog video inputs and outputs for integration into current analog-based systems. They both offer composite and S-Video input/output, while the DSR-40 (only) offers a component output as well. The DSR-20 is equipped with analog audio inputs and outputs (RCA), the DSR-40 with RCA inputs and XLR-balanced output. These connections in combination with their i.LINK interface allow a smooth transition to an all digital system in the future.
- **Record/Playback Functions** Automatic repeat function for repeated playback. After reaching the end of the tape, the DSR-20/40 automatically rewinds the tape, then starts playing back the segment again.
- They are capable of searching for Index Points, which are recorded on the tape as "in-point" marks every time a recording starts. They can also search for photo data recorded on a DVCAM cassette by the DSR-200A/300/PD-100, or where the recording date has been changed.
- **Reference Input** External sync input enables synchronized playback with other VCRs. Especially important in A/B Roll configurations. In addition, the DSR-40 only allows adjustment of H-sync and SC phase via the menu.
- **Control S Interface** The DSR-20/DSR-40 have a Control S input allowing control via the optional DSRM-20 Remote Control.

DSR-20.....List Price $3,950 ....For B&H price ...Call
DSR-40.....List Price $5,100 ....For B&H price....Call

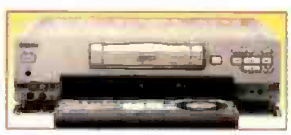
DSR-20 Only - The DSR-20 can be powered by AC or DC.

- Equipped with Control L interface, the DSR-20 can perform simple Time Code-based editing when connected to another DSR-20 or other similarly equipped VCRs/cameras.
- In addition to Control L, the DSR-20 also incorporates an RS-232 interface for remote control of basic VCR functions from a PC.
- Supplied with the RMT-DS20 Wireless Remote for control of basic VCR functions.

DSR-40 Only - Equipped with an RS-422A interface, it can perform as the editing player in A/B roll or cut editing system.

- The DSR-40 is not equipped with a synchronization capability, the editing accuracy is performed by pre-roll and play.

DSR-30 DVCAM Digital VCR



The DSR-30 is an industrial grade DVCAM VCR that can be used for recording, playback and editing. DV standard 4:1:1 sampling digital component recording with a 5:1 compression ratio provides spectacular picture quality and multi-generation performance. It has a Control L interface for editing with other Control L based recorders such as the DSR-200A DVCAM Camcorder or another DSR-30. It also has a continuous auto repeat playback function making it ideal for kiosks and other point of information displays.

- Records PCM digital audio at either 48kHz (16-bit 2 channel) or at 32kHz (12-bit 4 channel).
- Equipped with Control L, capable of SMPTE Time Code based accurate editing even without an edit controller. Built in editing functions include assemble and separate video and audio insert.
- By searching for either an Index point or Photo Data recorded by the DSR-200A camcorder, the DSR-30 drastically cuts the time usually required for editing. The DSR-30 can record up to 135 Index points on the Cassette Memory thanks to its 16K bits capability.
- Audio lock ensures audio is fully synchronized with the video for absolute precision when doing an insert edit.
- Built-in control tray has a jog/shuttle dial. VCR and edit function buttons. The jog/shuttle dial allows picture search at +1/5 to 15X normal speed and controls not only the DSR-30 but also a player hooked up through its LANC interface.
- DV In/Out (IEEE 1394) for digital dubbing of video, audio and data ID with no loss in quality.
- Analog audio and video input/outputs make it fully compatible with non-digital equipment.

Sony DSR-30 List Price $4,475
For B&H price ..... Call

UVW-1200/UVW-1400A

Betacam SP Player • Player/Recorder

The UVW-1200 and UVW-1400A are non-editing VCRs which deliver Betacam SP quality and offer features for a wide range of playback and recording applications. RGB and RS-232 interface make them especially ideal for large screen, high quality video presentation, scientific research and digital video environments.

- Ideally suited for work in computer environments, because RGB signals can be converted into component signals and vice versa with minimum picture degradation.
- 25-pin serial interface allows external computer control of all VCR functions based on time code information. Baud rate can be selected from between 1200 to 38,400 bps.
- Built-in Time Base Stabilizer (TBS) locks sync and subcarrier to an external reference signal as well as providing stable pictures. High quality digital dropout compensator further ensures consistent picture performance.
- Equipped with two longitudinal audio channels.
- Auto repeat of entire or a specific portion of the tape.
- Built-in character generator can display VTR status, time code, self-diagnostic messages, set-up menu, etc.
- Both read LTC Time Code) and UB (User Bits). The UVW-1400A also generates LTC and UB (Free-Run/Rec-Run).
- Control of jog, shuttle, playback, record, pause, FF and REW with the optional SVRM-100A Remote Control Unit.
- Composite and S-Video as well as component via BNCs which are switchable to RGB output. The UVW-1400A has two switchable sync connectors and a Sync on Green.
- Built-in diagnostic function and hour meter.

UVW-1200.....List Price 6,200 ...For B&H price...Call
UVW-1400A.....List Price 8,400 ...For B&H price...Call

UVW-1600/UVW-1800

Betacam SP Editing Player • Betacam SP Editing Recorder

The UVW-1600 and UVW-1800 are the other half of the UVW series. They offer the superiority of Betacam SP with sophisticated editing features. They feature an RS-422 9-pin interface, built-in TBC and Time Code operation. Inputs/outputs include component, composite and S-Video. **All the features of the UVW-1200/1400A *PLUS*—**

- Optional BVR-50 allows remote TBC adjustment.
- RS-422 interface for editing system expansion.
- Two types of component output via three BNC connectors or a Betacam 12-pin dub connector.
- Frame accurate editing is assured, thanks to sophisticated servo control and built-in time code operation.

UVW-1600.....List Price 9,600 ...For B&H price...Call
UVW-1800.....List Price 11,300 ...For B&H price...Call

PVM-14M2U/14M4U & 20M2U/20M4U

13-inch and 19-inch Production Monitors

Sony's best production monitors ever, the PVM-M Series provide stunning picture quality, ease of use and a range of optional functions. They are identical except that the "M4" models incorporate Sony's state-of-the-art **HR** Trinitron CRT display technology and have SMPTE C phosphours instead of P22.

- HR Trinitron CRT enables the PVM-14M4U and 20M4U to display an incredible 800 lines of horizontal resolution. The PVM-14M2U and 20M2U offer 600 lines of resolution. M4 models also use SMPTE C phosphours for the most critical evaluation of any color subject.
- Dark tint for a higher contrast ratio (black to white) and crisper, sharper looking edges.
- Each has two composite, S-Video and component input (R-Y/B-Y, analog RGB). For more accurate color reproduction, the component level can be adjusted according to the input system. Optional BKM-101C (video) and BKM-102 (audio) for SMPTE 259M serial digital input.
- Beam Current Feadback Circuit
- 4:3/16:9 switchable aspect ratio.
- True multi-system monitors they handle four color system signals: NTSC, NTSC 4.43, PAL & SECAM.
- External sync input and outputcan be set so that it will automatically switch according to the input selected.
- Switchable color temp: 6500K (broadcast), 9300K (pleasing picture), User preset (3200K to 10000K).
- Blue gun, underscan and H/V delay capability

PVM-14M2U.....List Price 1,265 ...For B&H price...Call
PVM-14M4U.....List Price 1,570 ...For B&H price...Call
PVM-20M2U.....List Price 2,525 ...For B&H price...Call
PVM-20M4U.....List Price 2,920 ...For B&H price...Call

PROFESSIONAL VIDEO TAPES

FUJI

Professional Grade VHS

PG-30	2.29	PG-60	2.39	PG-120	2.5

Broadcast Grade VHS Box

BGR-30	3.49	BGR-60	3.99	BGR-120	4.6

H471S S-VHS Double Coated

ST-30	6.99	ST-60	7.49	ST-120	7.99

M221 Hi 8 Double Coated

Metal Particles			Metal Evaporated		
P630HMP	4.49		E630HME		7.69
P660HMP	6.29		E660HME		10.49
P6120HMP	8.49		E6120HME		13.99

M321SP Metal Betacam (Box)

05S	10.99	10S	11.99	20S	12.99
30S	13.99	60L	20.99	90L	32.99

DP121 DVC PRO

12M (Med.)	7.49	23M	8.79	33M	10.99
63M	19.99	66L	22.50		
94L	30.99	126L	39.99		

maxell

Broadcast Quality Hi8 Metal Particle

P6-30 HM BQ	5.39	P6-60 HM BQ	6.09
P6-120 HM BQ			7.99

P/A PLUS VHS

T-30 Plus	1.69	T-60 Plus	1.99	T-90 Plus	2.09
T-120 Plus	2.19	T-160 Plus			2.69

HGX-PLUS VHS (Box)

HGXT-60 Plus	2.69	HGXT-120 Plus	2.99
HGXT-160 Plus			3.99

BQ Broadcast Quality VHS (Box)

T-30 BQ	3.89	T-60 BQ	3.99	T-120 BQ	5.99

BQ Professional S-VHS (In Box)

ST-31 BQ	6.79	ST-62 BQ	6.99
ST-126 BQ	7.45	ST-182 BQ	13.99

Betacam SP

B30MSP	13.49	B60MLSP	19.99	B90MLSP	27.95

Panasonic

Mini DV Tape

AY DVM-30	5.49	AY DVM-30 (10 Pack)	ea. 5.99
AY DVM-60	5.99	AY DVM-60 (10 Pack)	ea. 6.49
AY-DVM80	12.99	AY-DV123EB	20.95

DVCPRO

AJ-P12M (Medium)	7.99	AJ-P24M	9.99
AJ-P33M	11.49	AJ-P66M	19.49
AJ-P66L (Large)	20.99	AJ-P94L	29.99
AJ-P126L			38.95

SONY

HI-8 Professional Metal Video Cassettes

P6-30 HMPX	4.79	E6-30 HMEAD	6.99
P6-60 HMPX	5.79	E6-60 HMEAD	9.99
P6-120HMPX	8.99	E6-120HMEAD	13.99

PR Series Professional Grade VHS

T-30PR	2.39	T-60PR	2.59	T-120PR	2.79

BA Series Premier Hi-Grade Broadcast VHS (In Box)

T-30BA	3.69	T-60BA	4.19	T-120BA	4.99

MQ Master Quality S-VHS (In Box)

MQST-30	7.49	MQST-60	7.69	MQST-120	7.99

BRS 3/4" U-matic Broadcast Standard (In Box)

KCS-10 BRS (mini)	8.99	KCS-20 BRS (mini)	9.99
KCA-10 BRS	8.99	KCA-20 BRS	9.49
KCA-30 BRS	10.69	KCA-60 BRS	14.99

XBR 3/4" U-matic Broadcast Master (In Box)

KCS-10 XBR (mini)	9.79	KCS-20 XBR (mini)	11.29
KCA-10 XBR	10.29	KCA-20 XBR	11.79
KCA-30 XBR	13.29	KCA-60 XBR	17.39

BCT Metal Betacam SP Broadcast Master (In Box)

	Single	10 Pak/Ea.	50 Pak/Ea.
BCT-5M (small)	10.99	9.99	9.19
BCT-10M (small)	11.49	10.29	9.79
BCT-20M (small)	12.99	11.49	10.99
BCT-30M (small)	13.49	12.49	11.99
BCT-30ML	13.49	11.89	–
BCT-60ML	20.99	19.99	18.99
BCT-90ML	30.99	28.99	27.99

PDV Mini Series Professional DVCAM Tape (w/memory chip)

	(1)	(10) Ea		(1)	(10) Ea
PDVM-12ME	14.49	13.49	PDVM-22ME	15.19	14.49
PDVM-32ME	15.49	14.99	PDVM-40ME	15.99	16.49

PDV Series (Standard) Professional DVCAM Tape

PDV-34ME	24.99	23.99	PDV-34N	20.99	19.49
PDV-64ME	27.99	26.99	PDV-64N	24.99	26.99
PDV-94ME	32.99	31.49	PDV-94N	29.99	28.49
PDV-124ME	38.49	37.49	PDV-124N	32.99	31.99
PDV-184ME	46.49	44.49	PDV-184N	39.99	38.99

Mini DV Tape

DVM-30EXM w/Chip	12.79	DVM-60EXM w/Chip	16.99
DVM-30EX "No Chip"	11.99	DVM-60EX "No Chip"	12.99
DVM-30PR "No Chip"	7.99	DVM-60PR "No Chip"	9.75

Full Size DV Tape with Memory Chip

DV-120MEM	24.99	DV-180MEM	26.99

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DigiSuite LX offers all the great features of the best-selling Matrox DigiSuite platforms, plus DV, MPEG-2, and 1394 support. DigiSuite LX provides native DV and MPEG-2 editing under Windows 2000 • Award-winning realtime feature set • Native-DV and 50-Mbps MPEG-2 editing

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- Integrated web video creation tools
- Field-proven, reliable technology

SDI Option
- Provides serial digital (SDI) video and AES/EBU digital audio I/O

Adobe Turnkey System

- Pentium III 866 processor • 300 watt Full tower
- Asus CUSL2 motherboard • IBM 30GB System drive
- PNY 256MB SDRAM memory • Windows 2000
- 48X CD ROM Drive • Matrox G450 Dual Display Card
- Adaptec 29160 LVD-160 SCSI Card
- Seagate 73GB LVD-160 SCSI Drive • 3.5" floppy drive
- 102 Button Keyboard • Microsoft Trackball mouse
- DigiSuite LX • Adobe Premiere 6.0 Editing Software
- 19" Mitsubishi Diamond Plus Monitor
- 90 day Free Tech Support
- Fully assembled and tested

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Incite Turnkey System

- Pentium III 866 processor • 300 watt Full tower
- Asus CUSL2 motherboard • IBM 30GB System drive
- PNY 256MB SDRAM memory • Windows 2000
- 48X CD ROM Drive • Matrox G450 Dual Display Card
- Adaptec 29160 LVD-160 SCSI Card
- MEDEA 120GB Drive Array • 3.5" floppy drive
- 102 Button Keyboard • Microsoft Trackball mouse
- DigiSuite LX • Incite 800 Editing Software
- 22" Mitsubishi Diamond Plus Monitor
- Sony DRV-100 Internal DV Tape Drive
- 90 day Free Tech Support
- Fully assembled and tested

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Incite *Software for DigiSuite*

Incite is a non-linear editing software designed to run on Matrox DigiSuite hardware. Incite provides an easy to use editing interface, multiple editing modes, a powerful toolkit with extensive utilities, more than 15 simultaneous real-time effects with unlimited keyframing for up 2 layers of video + 1 layer of live input video + 1 graphic layer, tools for multilayer compiling and advanced compositing, real-time titling and graphics, as well as an extensive range of options that will quickly expand your editing software into a fully equipped editing suite.

For the local studio, the editing toolkit must be extensive. Incite provides features like media logging and batch capturing, 4 editing modes (TV, Film, Ripple and Get Trimmed), three point editing, quick transition creation, virtually unlimited real-time possibilities (including easy to build DVE, video key and motion effects), real-time animated titling & graphics features that will satisfy the most demanding client, templating and cut/copy/paste features for rapid application, filters and effects rendering for multilayer compositing, 3rd party FX integration, consolidate storyclips and batch re-digitizing ... just to cite a few key features.

For large post-production houses and broadcasters they key concepts are speed and integration. live input and hybrid editing features, VLAN control for up to 31 VTRs, integration of 3rd party effects hardware directly on the Incite timeline, and the ability to work with multiple formats (from Lossless MJPEG to DV and MPEG-2). As for speed, The number of real-time effects is unsurpassable while all effects that need to be rendered are rendered in the background.

on-line Express

Professional Editing for DigiSuite

Powerful, Intuitive and Freeform Editing

On-Line Express offers advanced editing tools and a freeform timeline which allows you to focus on your creativity and maximize your productivity. Edit multiple layers freely by moving single clips, blocks of clips or entire timelines without constraining modes.

Multi-Cam Editing - Whether or not you shot multi-camera, you will love the unique Multi-Cam feature. On-Line Express allows you to easily scrub and view 4 simultaneous camera angles for selecting desired cut points.

Powerful Media Management - On-Line Express provides the tools necessary to organize, sort and retrieve your digital content. With unlimited bins, projects and timelines you can easily open multiple timelines and bins and freely cut and paste between them.

Auto Storyboard - This unique feature allows you to instantly create programs with dissolves and audio crossfades without working on the timeline!

Supported Hardware - On-Line Express was designed specifically for the Matrox DigiSuite hardware. Support of Dual monitor display with the use of Matrox G400 or G450 VGA boards. Whether you are editing in MPEG-2 or streaming to the web, On-Line Express has a solution for you.

on-line Turnkey System

- Pentium III 866 processor • 300 watt Full tower
- Asus CUSL2 motherboard • IBM 30GB System drive
- PNY 512MB SDRAM memory • Windows 2000
- 48X CD ROM Drive • Matrox G450 Dual Display Card
- Adaptec 29160 LVD-160 SCSI Card
- JEMS 292GB LVD-160 (10K) SCSI Array • 3.5" floppy
- Sony DRV-100 Internal DV Tape Drive
- 102 Button Keyboard • Microsoft Trackball mouse
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Avid Xpress DV

Powerful Video Editing Tools

Avid Xpress DV software combines powerful video and audio editing tools, digital mastering, and extreme ease of use. Captures and edits DV video, adds effects, mixes audio, and outputs over IEEE1394 FireWire. Or transcodes the content to all major new media formats. MPEG-1 (for CD-R) MPEG-2 (for DVD-ROM) QuickTime or AVI for computer based presentations or for streaming on the web. As a member of the Avid Xpress Family, The Xpress DV offers the same Avid graphical user interface (GUI) used in the very high-end avid products, powerful audio and video tools.

DELL Precision 220

Workstation Bundle

- Pentium III 866 MHz / 1 GHz CPU
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- 20GB ATA100 IDE (7200 RPM) System Drive
- 40GB ATA100 IDE (7200 RPM) System Drive
- 48X IDE CD ROM Drive • 3.5" Floppy Drive • Windows NT

XPress DV software loaded and tested

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Express DV on Dell Precision 220 Workstation

866 MHz Processor, 128mb RDRam	*1 GHz Processor, 256mb RDRam*
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canopus DV-Rex M3

Mobile Real-Time DV Editing Workstation

Add portability to your video editing. This light weight unit sets up in minutes and comes with a flip down keyboard and a 15" high resolution LCD panel. Works with both analog and DV I/O allowing you to combine footage from analog and DV sources. Incorporates the latest computer components including dual Pentium III CPUs. 256MB RAM, Xplode effects acceleration and expandable storage options.

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Some real-time effects include, transitions, up to 10 tracks of titling, luma keying, color correction, slow-motion and picture-in-picture. Audio effects include echo, reverb, and parametric and graphic equalization.

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Non-Linear Editing Package

Revolutionary non-linear editing package that delivers the power of true uncompressed video with Apple's Final Cut Pro. Using Pinnacle's new HUB3 video processor, the CineWave combines infinite layering, incredible effects, advanced compositing tools and accurate motion tracking with all the major video formats in compressed or uncompressed video. Based on the new dual processor Apple G4's, CineWave delivers the worlds first scaleable desktop video system capable of outputting both Standard Definition and High Definition simultaneously.

Includes • Commotion Pro • Hollywood FX

Apple G4/Final Cut Pro Complete Video Editing Systems

Good System

Includes: • Apple G4/466 Computer
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- Total of 256MB of memory
- 45GB of ATA/100 storage
- CD-RW rewritable CD writer
- Final Cut Tutorial CD
- Mitsubishi Diamond Pro 2040 22" Monitor
- Apple Care-three year warranty
- Complete System integration and testing

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Great System

Includes: • Apple G4/533 Computer
- Final Cut Pro version 2.0 editing software
- 60GB of ATA/100 storage
- Total of 256MB of memory
- CD-RW rewritable CD writer
- Artel Boris Graffiti CG Program
- Final Cut Tutorial CD
- Mitsubishi Diamond Pro 2040 22" Monitor
- Apple Care-three year warranty
- Complete System integration and testing

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Best system

Includes: • G4/533 DUAL Processors
- 150GB (2x75) of ATA/100 storage
- VST Ultratrek IDE controller card
- ATI Rage Orion dual display card
- Total of 256MB of memory
- Artel Boris Graffiti CG Program
- Final Cut Tutorial CD
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- Apple Care-three year warranty
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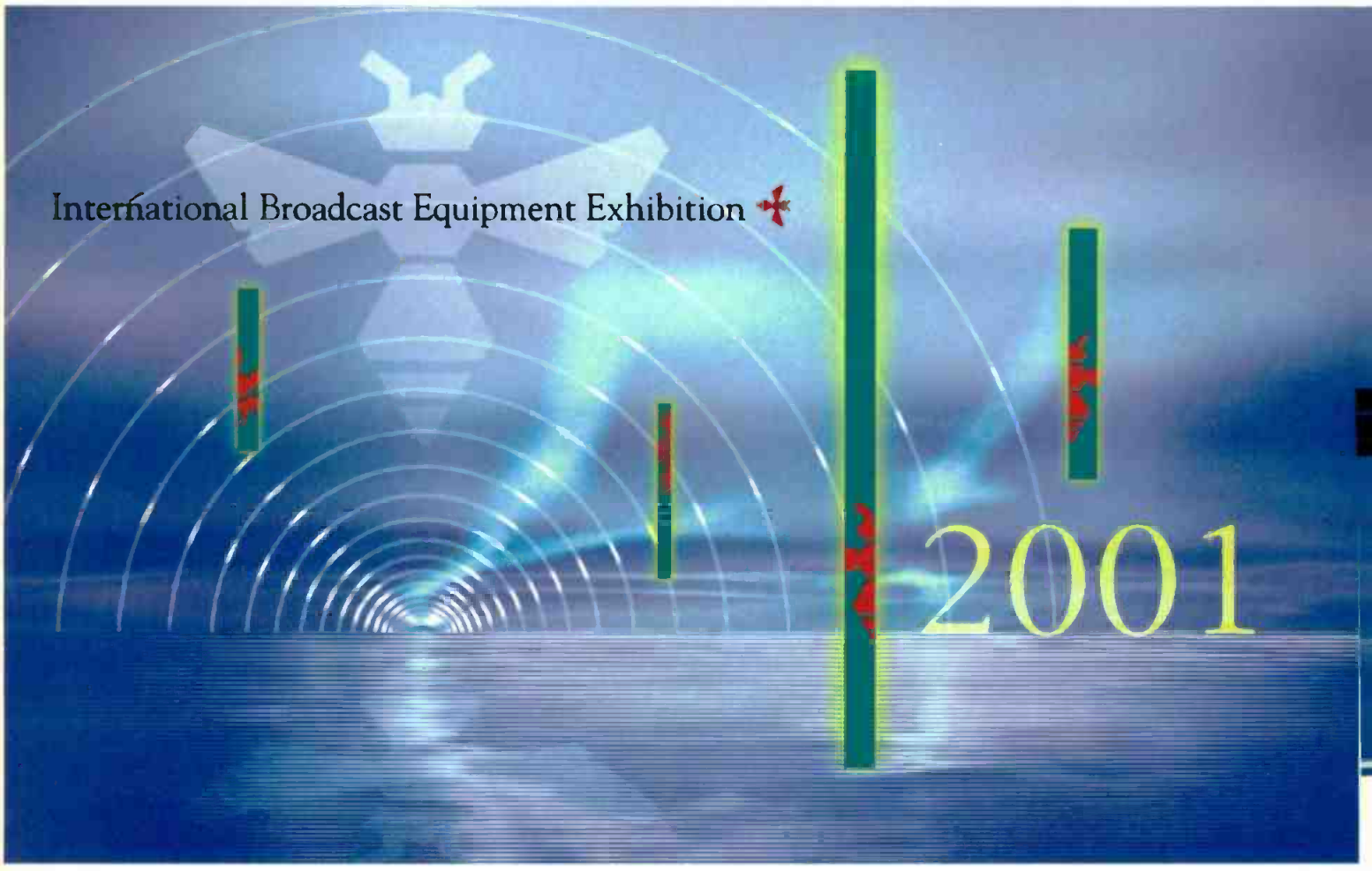
Inter BEE 2001

International Broadcast Equipment Exhibition 200

November 14-16, 2001 Nippon Convention Center(Makuhari Messe)



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Inter BEE 2001 will also host a range of symposiums, forums, and seminars led by prominent broadcasting, audio, and video software producers, as well as systems hardware developers. Insights will be gained into the future of broadcast, securing an edge for all who attend.

For more information on Inter BEE 2001, contact:

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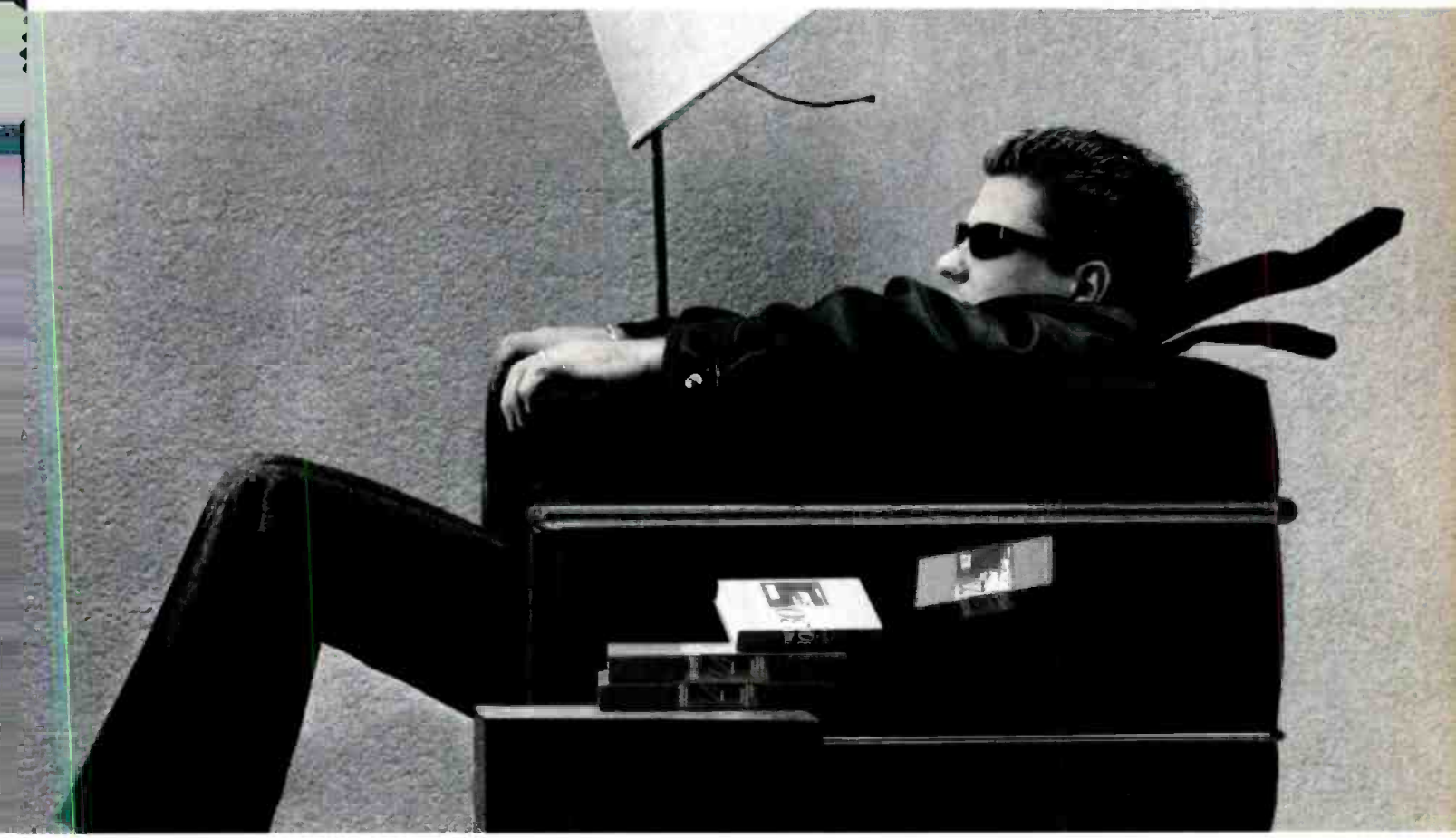
- Others



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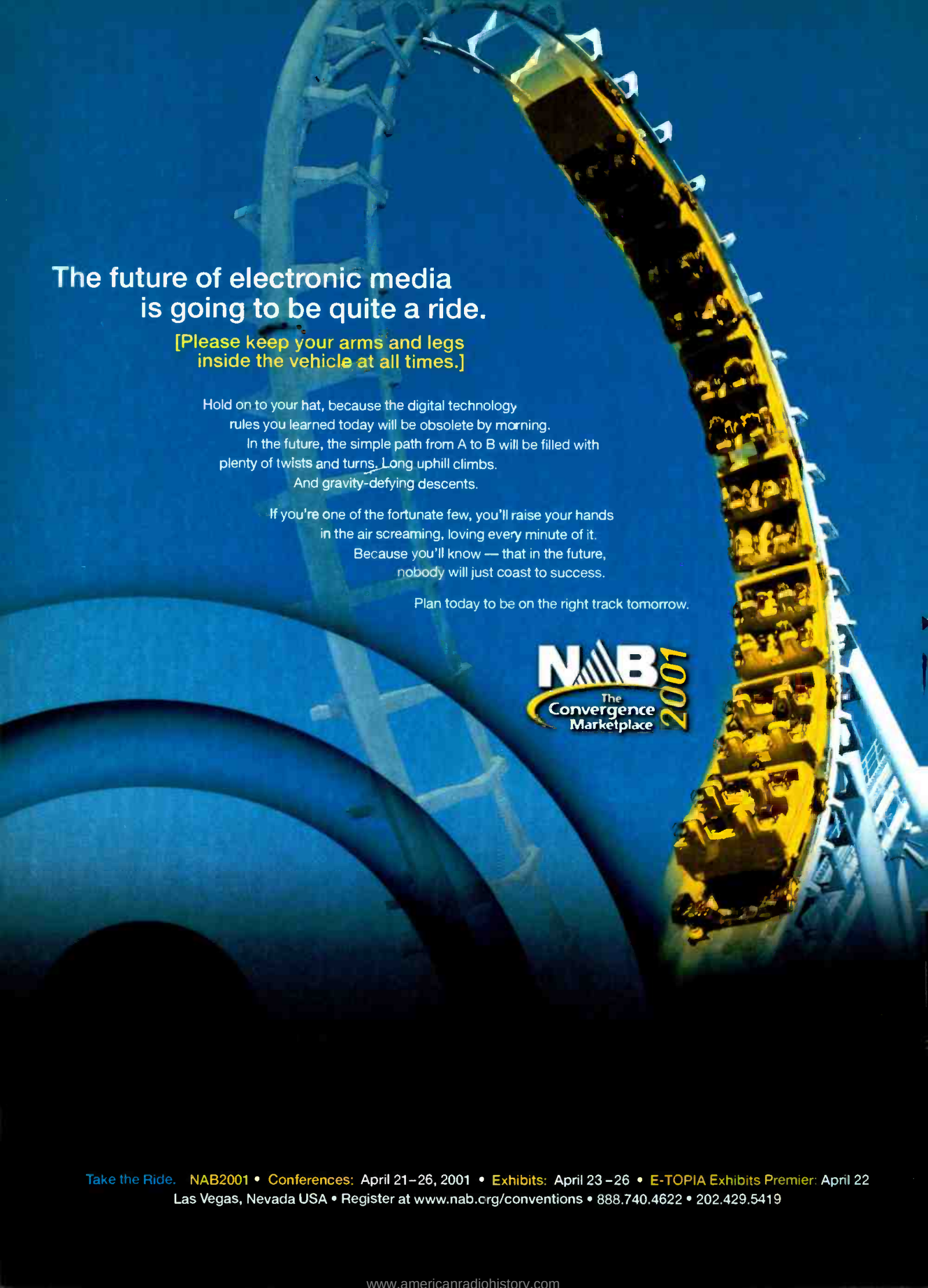

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streamed demonstration online. You can also view archived demos of previous Demo Room Stars from the Entertainment Technology online network.

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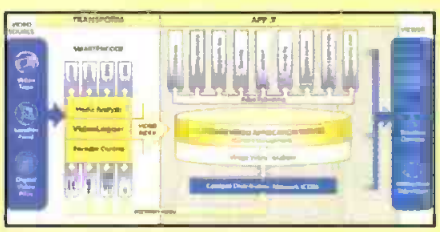
Tektronix AVDC100

Tektronix's AVDC100 audio-to-video delay corrector provides in-service monitoring and correction of A/V delay errors that occur during compression or other processing. The system uses digital watermarking technology to embed audio time reference signals into video programming. At any point downstream another AVDC100 can analyze the watermark and measure the lip-sync error. The system can then adjust the audio delay to ensure constant and proper alignment of the program audio and video signals. The AVDC100 corrects up to 30 fields or 1/2 second of variable lip-sync error when the video is delayed relative to the audio. After instalation, all processing is automatic with instrument status instantly available from the two-line LCD panel and front panel LEDs.

Grass Valley Group Vibrint/Profile platform technology

In Grass Valley Group's new platform technology, the Vibrint Digital News Production Workgroup system and a new version of the Profile XP Media Platform work together to provide end-to-end support of both DVCPRO- and MPEG-based news production; new platform technology also features the Grass Valley MAN real-time shared storage option for the Profile XP Media Platform and the Profile Network Archive partial file restore software; system is compliant with the Grass Valley Group's ContentShare software platform for media asset management, allowing for integration with third-party systems such as VNI News Tracker and Avid's iNews Media Browse.



Virage Video Application Server

Virage's Internet Video Application Platform allows video to be published, managed and distributed as easily as text. The platform supports enterprise-scale deployments of video and provides the user with the necessary infrastructure for seamlessly integrating Internet-ready video into a website or corporate intranet. The server enables users can create and maintain video-rich websites. Users can customize presentation of content to create new revenue streams and business applications. The system also allows searchable access to video collections. The video server integrates video with advertising, commerce, community, and other value-added applications.

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Help Wanted

FOX 28, WSJV South Bend, Indiana is seeking a hands-on Assistant Chief Engineer. Primary responsibility is overseeing UHF transmitter maintenance and operation. Other duties to include studio equipment installation and repairs and be familiar with Mac and PC operating systems. FCC license or SBE certification required. Send resume, references and salary requirements to Rick Owens, Chief Engineer, Fox 28, P.O. Box 28, South Bend, IN 46624. No phone calls. EOE

MAINTENANCE TECHNICIAN WPVI-TV has a full-time position for qualified broadcast maintenance technician. Minimum of 5 years experience in broadcast TV maintenance necessary. Requires thorough knowledge and skills to run application programs for maintaining and controlling station automation, production/master control/routing switchers, still stores, video servers, and DTV encoders. Should be knowledgeable in maintenance and repair of analog broadcast equipment, and state of the art digital equipment. Position requires varied shifts, including nights and/or weekends. Mail resume or fax 215-581-4515 (no calls) to James D. Gilbert, Director of Engineering, WPVI-TV, 4100 City Ave., Suite 800, Philadelphia, PA 19131 EOE

MAINTENANCE/SYSTEMS ENGINEER: Immediate Opening - Full-time Position Self-motivated engineer wanted for video post-production facility. Experience with digital and analog signal systems and/or network systems a plus. Salary commensurate with experience. Send inquiries to: Randy@ForestPost.com

VERMONT PUBLIC TELEVISION TRANSMITTER MAINTENANCE TECHNICIAN: Maintain, install, and align transmission and related equipment such as UHF transmitters, microwave equipment, and test equipment at mountain top location. Must have a thorough working knowledge of video, audio, and RF technologies. Minimum of two years in high powered transmitter maintenance and FCC General Radiotelephone license required. Trouble shooting skills will be required from component level to systems level using meters, scopes, and spectrum analyzers. Working knowledge of microprocessor based equipment is a must. Competitive salary and benefits. Send cover letter and resume to: Vermont Public Television, Attn: Employment Office, 88 Ethan Allen Avenue, Colchester, VT 05446. Equal Opportunity Employer.

WANTED: Maintenance, design & production engineers for busy production equipment company. Knowledge of all formats, analog & digital VTR's, cameras, terminal equipment. Resumes to sdwyer@wexlervideo.com

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Candidate should have an Associate degree (or equiv.) in electronics and 4 years minimum experience as a Maintenance Engineer working in television. Computer and Networking skills, and a strong knowledge of TV systems are highly desirable. Must be able to perform electronic repair and maintenance to the component level. SBE Certification a plus!

Send Resumes to: *David Costar, Technical Recruiter, cnn.engrjobs@turner.com; 250 Williams St., Ste.1250, Atlanta, GA 30303*
EMAIL PREFERRED, no phone calls please!

BROADCAST ENGINEER

DENVER, COLORADO

The position will be responsible for the day-to-day technical operation and maintenance of a new studio facility for nightly news production. Experience with a full range of production equipment is essential, including studio and ENG cameras, VTRs, audio consoles, linear and non-linear edit suites, and transmission equipment. Knowledge of Avid Newscutter and Phillips production switchers and routing systems a plus. Must be a self-starter and able to work a flexible shift. 3 years broadcast engineering experience and SBE certification preferred.

Qualified candidates apply on-line at http://fox.recruitingcenter.net/publicjobs, code #KC103861, or by mailing resume and cover letter to Fox Cable Networks, HR Dept. (#KC103861), 10000 Santa Monica Blvd., Los Angeles, CA 90067. EOE.

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BROADCAST SYSTEMS ENGINEER

Will maintain and repair analog, digital, video and audio systems; including routers, switchers, automation systems, VTR's, cameras, and related broadcast technology. Must have ability and desire to develop skills in UNIX, Windows NT, and networking systems. Required: 4 years experience as Broadcast Maintenance Engineer, with TV broadcast related systems and equipment.

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The Weather Channel, 300 Interstate North Parkway, Atlanta, GA 30339

CHIEF ENGINEER is needed in Hudson, Massachusetts for WHUB-TV/WHUB-DT. Qualifications: Minimum of 5 years experience as an Assistant Chief Engineer or a Chief Engineer. Experience in all areas of television system maintenance required including "hands on" maintenance and repair of analog and digital UHF television transmitters and associated processing equipment, satellite down link and fiber optic systems. Must be familiar with FCC rules and regulations and be capable of preparing and managing capital and operational budgets. Familiarity with operation and support of computer systems and computer networks also required. SBE/FCC certification a plus. Send or fax resume and cover letter to: WHUB-TV Gerard Gerrits Jr., 71 Parmenter Road, Hudson, MA 01749. Fax: 978-562-1166 Email: gerritsG@usabroadcasting.com

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BROADCAST ENGINEERING (ISSN 0007-1994) is published monthly (except semi-monthly in May and December) and mailed free to qualified persons by Intertec Publishing, 9800 Metcalf, Overland Park, KS 66212-2216. Periodicals with Ride-Along Enclosure postage paid at Shawnee Mission, KS, and additional mailing offices. Canada Post International Publications Mail (Canadian Distribution) Sales Agreement No. 0956295. POSTMASTER: Send address changes to *Broadcast Engineering*, P.O. Box 12902, Overland Park, KS 66282-2902. CORRESPONDENCE: Editorial and Advertising: 9800 Metcalf, Overland Park, KS 66212-2216 Phone: 913-341-1300; Edit. fax: 913-967-1905. Advert. fax: 913-967-1904.

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EOM

The government wants to help

BY PAUL MCGOLDRICK

Although news out of Los Alamos is usually rather muted, the Department of Energy's National Laboratory has been the subject of the news rather more often in the last year than wanted by the Department: From a suspected spy, with hard drives that should have been in the vault being found by the copier, to a devastating fire that was started by another Government department, the Lab has had its share of reporters' ink. Now a breakthrough in compression algorithms brings the Lab right into the broadcasting arena.

The Lab announced that an algorithm that was developed for image compression in underground nuclear testing is "capable of compressing a HDTV datastream to the point where the HDTV and analog signals can be broadcast over the same channel." The implications of this technology are quite staggering – and maybe even offer a lifeline for some small market stations.

Instead of simulcasting analog and DTV on different channels the Lab is saying that you can broadcast your analog signal and then superimpose your DTV data with that signal. The result is certainly analogous to the conversion days of monochrome to NTSC – and it also has some limitations with a not-completely-perfect compression/decompression. But it would mean that an older analog receiver could take the signal as transmitted and think it is an NTSC signal; the digital receiver, with a software loop, would identify the digital data in the channel and extract it for reception and decoding. The losses in the digital signal are stated by the Lab to be about 20 percent of what would have been transmitted for a full HDTV signal stream. One of the problems, apparently, is that sync signals have to be left untouched so there is "dead" processing time during those intervals when a digital receiver would still be working away.

The exact operation of the algorithm isn't being discussed by the Lab but, apparently, the vestigial sideband is being employed with some sort of quadrature modulation that the analog receiver does not understand, and some letter-boxing space is also used which the analog receiver will see as gray instead of black.

The implications of this technology are quite staggering – and maybe even offer a lifeline for some small market stations.

The phrasing by the Los Alamos statements, using the algorithm's developer (George Nickel) as the mouthpiece, tends to suggest that the Lab thinks there would be the chance for the existing analog channel to have the DTV signal added to it; but it is obviously too late to stop the roll out of the new channels allocated to broadcasters. In any case, the older channels have been virtually presold, with their auction values already included in the Government's budget numbers. But even the notion that a broadcaster could still broadcast an analog signal – but on the new channel – is rather exciting. Those with analog receivers could simply retune to the new channel and the original channel could be closed down. As the market gets more used to DTV the costs of making the conversion to a digital receiver will tumble and, eventually, the analog service could be curtailed.

If this technology is going to be used, things need to be addressed quite smartly – before there are enough HDTV receivers or tuners sold to make a modification like this practically impossible. There also needs to be testing done very quickly to see whether this new format of signal allows the present channel allocations to still work; certainly it is unlikely that the scientists at Los Alamos have considered such mundane needs.

This is something that needs to be brought to the attention of the FCC as swiftly as possible. Instead of being in a punishing role for what it perceives are delay tactics by broadcasters, here is a chance for the Commission and broadcasters to both get what they need at the same time. And it makes possible that the switchover date for the standards can really be met – which will please the fiscal hearts in Congress as well.

But there is a snag to all this. The Lab considers this compression algorithm to be a commercial thing – something to license. That is simply impossible if there is to be universal adoption of such a standard, and I have a really hard time understanding how taxpayers can cough up for research such as this and not be allowed to reap the rewards of it. This is not like a NASA project that turns into a commercial product to be manufactured and sold by a company who is at risk with its funds in doing so; this should be a public standard. Then we will be able to say, at least once, that the Government was here to help us. ■

Paul McGoldrick is an industry consultant based on the West Coast.

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